

Leoni Township Clean Water State Revolving Fund Project Plan

WASTEWATER TREATMENT PLANT

IMPROVEMENTS

DRAFT

PREPARED FOR:



JACKSON COUNTY, MICHIGAN



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EXECUTIVE SUMMARY

This Project Plan was completed to qualify for financing through the Clean Water State Revolving Fund (CWSRF) for improvements to the Leoni Township Wastewater Treatment Plant (WWTP). The Project includes upgrades to the biological treatment system, biosolids handling and septage receiving at the WWTP. The CWSRF program assists municipalities in financing certain utility improvements projects over a 20-year term at favorable interest rates typically between 2.0 – 2.5%. As such, projects reflect the long-term needs of the community.

The Leoni WWTP provides sewage disposal services to thirteen communities, which comprise the Leoni Regional Utility Authority (LRUA). Members of the LRUA are the Townships of Leoni, Napoleon, Columbia, Norvell, Hanover and Liberty, the Charter Townships of Blackman and Grass Lake and the Villages of Grass Lake and Brooklyn which are all located in Jackson County, as well as the Township of Cambridge, located in Lenawee County and the Townships of Sylvan and Lyndon, located in Washtenaw County.

This CWSRF Project Plan is the first step in an application for 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 are capable of meeting the long-term wastewater treatment needs of the Township. The viable alternatives are evaluated and compared as to their financial and technical feasibility with regard to implementation.

The three areas of improvements were broken down and evaluated in individual studies. The biological capacity study analyzed the biological capacity of the treatment facility and what would be needed to meet the projected future demand of the sewer district. The biosolids handling study analyzed biosolids dewatering and storage equipment and compared alternatives to replace the failing equipment. This equipment is aging and is necessary to continue to store biosolids on site and dispose of semi-annually. The septage receiving facility is beyond its useful life and needs to be replaced to continue to protect the downstream equipment. The Leoni WWTP accepts all septage within the Jackson area and this facility needs to perform adequately.

This Project will focus on the most critical needs with special focus on those items that affect treatment performance and reliability, as well as those that have the potential for increased efficiency, reduced energy usage, and overall cost benefits to the Township.

Several alternatives were developed for evaluation to address the project objectives. Of these, principal alternatives were identified for further consideration. The results of the analysis are shown in each study and discussed further below. The Recommended Alternative was selected because it has the lowest net present worth, provides increased treatment efficiency and reliability, allows for a potential reduction in energy usage, and is more favorable for future expansion considerations.

The average cost to users to finance the proposed project entirely through the CWSRF Program is estimated at \$4.75 to \$5.25 per month per Residential Equivalent Unit (REU). Actual monthly costs will vary depending on the final loan amount, if Green Project Reserve principal forgiveness funding is available, financing terms, and individual usage and community rate structure.

I. INTRODUCTION

Leoni Township is located in Jackson County due east of the City of Jackson. The Township, with a population of 13,847 people, owns and operates its sanitary sewer collection system, and wastewater treatment plant (WWTP), as well as the water supply, storage, and distribution system within the Township.

Most of the Township's sewer system was constructed in the 1970s. The sanitary sewer system currently serves the areas around Michigan City, Brills Lake and Gilletts Lake. The collection system includes approximately 40.5 miles of 8 to 36-inch concrete and plastic sanitary sewer that provide service to approximately 3,855 Resident Equivalent Units (REUs). There are 12 pump stations throughout the sanitary sewer system with the oldest pump stations constructed in 1971 and the newest pump station constructed in 2002. A map of the Leoni Township collection system is included as Figure A3, located in Appendix A.

The Leoni WWTP provides sewage disposal services to thirteen communities, which comprise the Leoni Regional Utility Authority (LRUA). Members of the LRUA are the Townships of Leoni, Napoleon, Columbia, Norvell, Hanover and Liberty, the Charter Townships of Blackman and Grass Lake and the Villages of Grass Lake and Brooklyn which are all located in Jackson County, as well as the Township of Cambridge, located in Lenawee County and the Townships of Sylvan and Lyndon, located in Washtenaw County.

Wastewater is collected throughout the service area and is pumped to the Leoni WWTP, which was originally constructed as a lagoon plant in 1971. In 2010, the plant underwent a major improvements project abandoning the lagoon plant and constructing the current MBR treatment system. The plant most recently underwent multiple improvements projects in 2021 and 2022 upgrading the headworks building and installing an odor control system and upgrading the MBR treatment system. WWTP processes include grit removal and screening, aeration basins, membrane bioreactors, and ultraviolet disinfection. Solids processes include sludge storage and sludge dewatering centrifuges, followed by land application or landfilling of the dewatered solids. Treated effluent is pumped from the WWTP and discharged to the Grand River in Michigan Center, MI. The effluent is discharged in accordance NPDES Permit No. MI0045942. A copy of this permit is included in Appendix B.

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 Clean Water State Revolving Fund (CWSRF) and the Strategic Water Quality Initiation Fund (SWQIF) programs (Michigan Administrative Code R323.952).

In addition, this Project Plan provides a basis for ranking the Township'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 Leoni WWTP, 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 availability of the Project Plan for public review has been advertised in the local newspaper (*The Salesman*) and the draft Project Plan will be placed on public display at the Leoni Township Hall and on the Township's website. A summary of public participation and public comments solicited by the Township regarding the Project Plan and Selected Alternative will be included in the Final Project Plan.

The format of this report follows the project planning guidelines for Clean Water Revolving Funds (CWSRF and SWQIF) prepared by the Michigan Department of Environmental, 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.

II. PROJECT BACKGROUND

The Leoni WWTP operates under the jurisdiction of the Michigan Department of Environment, Great Lakes & Energy (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 Township's wastewater system, including both the collection system and the WWTP, is in good to poor condition. Important improvements are needed in order to allow for continued reliable wastewater service. High influent flows during wet weather conditions have made permit compliance a difficult task, requiring an inordinate amount of extra time and effort from the WWTP operational staff. The last major improvements to the WWTP were conducted in 2021 and 2022 and they revitalized the key treatment equipment and improved hazardous locations. Even with these improvement projects, there are still areas of the facility that are in need of improvement and replacement. Despite the operation issues and the high flows, operations staff have generally been able to meet permit requirements.

A. Study Area Characteristics

1. Delineation of Study Area

The Study Area includes the Leoni Township Service Area. This Project Plan does not include study of the individual municipalities included within the LRUA. The Township sewer system is shown in Figure A3, in Appendix A. Figure A3 also identifies the location of the lift stations and the WWTP.

B. Environmental Setting

1. Cultural Resources

A search of the Michigan State Housing Development Authority Historic Sites Online website indicated no State or Federal listed historic sites in Leoni Township. There are three identified historic sites in the surrounding area.

- Horace & Mabel Hackett Foundation – Jackson, MI
- Ella Sharp Museum – Jackson, MI
- Grass Lake Depot and Whistle-stop – Grass Lake, MI

A letter requesting review with respect to impacts to known historical and archeological sites was previously sent to the State Historic Preservation Office (SHPO) as a part of the 2020 CWSRF 5733-01 Project Plan. It is assumed that this project is not an equivalency project, but a copy of the requested letter and Part 106 application of the previous project is included in Appendix C.

Letters requesting review with respect to impacts on tribally important cultural or religious sites was previously sent to each of the following Native American tribes associated with Jackson County; Hannahville Potawatomi Indian Community, Little River Band of Ottawa, Match-e-be-nash-shee-wish Gun Lake Band, Nottawaseppi Band of Huron Potawatomi and Pokagon Band of Potawatomi as a part of the 2020 CWSRF 5733-01 Project Plan. It is assumed that this project is not an equivalency project, but copies of the previous correspondence is included in Appendix C.

2. The Natural Environment

Climate

Climatological data for the area is based on information from the Michigan State University Climatology Program. The average January climatic conditions include average minimum temperatures of 16.6° F and average maximum temperatures of 30.7° F. The average July climatic conditions include average minimum temperatures of 60.3° F and average maximum temperatures of 82.0° F. The average rainfall is 31.43 inches per year and the average annual snowfall is 39.1 inches per year.

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 A7. Areas of freshwater emergent, freshwater pond and freshwater forested/shrub wetlands are adjacent to the Wastewater Treatment Plant.

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

A request for review of any potential impacts to land-water interfaces has previously been sent to EGLE. It is assumed that this project is not an equivalency project, but a copy of the previous request is included in Appendix C.

The proper permits will be acquired before construction commences.

Floodplains

The WWTP is not located in or near a floodplain. The online FEMA Floodplain Map Viewer was used and the floodplain map indicates that the area is of minimal flood hazard. The map is included in Figure A8 of Appendix A. Appropriate permits will be acquired before any construction commences.

A request for review of any potential impacts to floodplains was previously sent to EGLE. It is assumed that this project is not an equivalency project, but a copy of the previous request to EGLE is included in Appendix C.

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.

Rivers located within Leoni Township are not listed on the National Wild and Scenic Rivers System website, administered by the National Park System, or on the Michigan Natural Rivers System found on the Michigan Department of Natural Resources website.

Major Surface Waters

The most noticeable natural feature near the WWTP is Leoni Millpond. Leoni Millpond is a tributary of Center Lake which are the headwaters of the Grand River. The Grand River and surrounding lakes in/near Leoni Township provide recreational opportunities and aesthetic beauty to the area. Leoni Millpond discharges water to the southwest to Center Lake. The outlet of Center Lake is dammed in Michigan Center and the Grand River

is formed downstream of the dam. The Grand River continues to the west and flows through Jackson and continues north and to the west, emptying into Lake Michigan near Grand Haven.

Recreational Facilities

The Township owns and maintains five recreational facilities. At the location of the Township Hall there is a small park that is used for youth sporting events. The Leoni Community Park is located on Fifth Street and is a 12-acre park with a boat launch, walking trails, playground equipment, restrooms, and other amenities. Bender Park is located at the corner of Bender road and Gregory road. This park is seven acres and contains playground equipment, a pavilion, and paved walking path. Peter Alex Ball Park is located on Huggins Road and has a baseball field. Mill Pond Park is located on Michigan Avenue and is a wetlands area and wildlife sanctuary.

The State of Michigan owns and maintains four recreation facilities, two boat launches, bird sanctuary and Waterloo Recreation Area within the Township. The Waterloo Recreation Area is a 20,500-acre area located in the northeast area of the Township.

Jackson County owns and maintains a park in Leoni Township located at Gilletts Lake.

The Township is responsible for maintaining four cemeteries throughout the Township. There is also a branch of the Jackson County Library located within the Township.

No improvements proposed in this Plan are anticipated to impact any of these facilities.

The Leoni Township Master Plan adopted in 2012 was referenced to obtain the recreational facilities information.

Topography and Geology

Figure A9 shows the existing topography from the USGS quadrangle map. The elevations around the WWTP vary from 987 feet to 1,004 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 A10; and the Bedrock Geology of Michigan Map (MDNR Geological Survey Division, 1987), see Figure A11.

The general geology of Jackson County is characterized by glacial washout sand and gravel, and peat and much which overlie the Marshall Formation and the Grand River Formation.

Soils

Figure A12 is the USDA National Resources Conservation Service soil map for the Leoni Township WWTP. Soil located at the WWTP site are fine sandy loam which are well drained.

Agricultural Resources

Figure A13 shows the Farmland Classification soil types at the WWTP. Soils at the WWTP site are classified as prime farmland.

Because the improvements are limited to the existing WWTP and lift stations, the proposed project principal alternatives are not anticipated to have impacts on agricultural resources.

The biosolids (sludge) generated at the WWTP are dried and stored on site. In the spring and fall, the dried biosolids are hauled to agricultural fields to be land applied. This process will continue to benefit local farmers with the Recommended Alternative.

Flora and Fauna

A USFWS Section 7 review was previously completed as a part of the 2020 CWSRF 5733-01 Project Plan. According to the USFWS Official Species List, there are six federally listed endangered species, four threatened

species, and one experimental population species in the area. A response was previously received from the review request, and it stated that the endangered species in the area include the Indiana Bat, Mitchell's Satyr Butterfly and Poweshiek Skipperling. The threatened species in the area include the Northern Long-Eared Bat and Eastern Massasauga Rattlesnake. A copy of the list is included in Appendix C.

Because the proposed work is limited to the existing WWTP and lift stations, it was determined that no impacts to federally listed endangered or threatened species are anticipated.

A previous request to MNFI was sent to confirm that no State listed species would be impacted. A copy of the request and response is included in Appendix C.

Unique Natural Features

A previous request was sent to the MNFI for review considering potential impacts to rare species or unique natural features. The request and response are included in Appendix C.

National Natural Landmarks

The Black Spruce Bog Natural Area is located in Jackson County within the Waterloo State Recreation Area. This natural landmark will not be adversely affected throughout this project.

3. Land Use in the Study Area

A majority of the eastern and northern portions of Leoni Township is zoned for agricultural use. The southern and western areas of Leoni Township are zoned for residential, industrial, and commercial use. The current Zoning Map from the Master Plan is included as Figure A14 in Appendix A.

The Township Master Plan adopted in 2012 indicates future land use is similar to existing uses. A goal of the Master Plan is to minimize disruption of environmentally sensitive areas within the Township. The Future Land Use map from the Master Plan is included as Figure A15 for reference.

4. Surface and Ground Waters

In the southern portion of the Township are the headwaters of the Grand River. Wolf Lake flows into Center Lake which then begins the Grand River in Michigan Center. The Grand River then flows out of the Township and through the center of Jackson, MI. The Township's northern border is the Portage River which is a tributary to the Grand River. The Portage River flows into the Grand River west of the Township border and to the north of the City of Jackson. Treated and disinfected effluent from the WWTP is discharged to the Grand River in accordance with the facility's NPDES permit.

The Township owns and operates five municipal wells located in three different locations. The combined pumping capacity of the drinking water system is 3.0 million gallons per day. The water distribution system includes a storage tank located to the northeast of the intersection of Sutton Road and Michigan Avenue as well as 40 miles of water main.

C. Population Data

Leoni Township provides wastewater collection services for Leoni Township and wastewater treatment for the LRUA. The LRUA had a combined total of 12,336 Residential Equivalent Units (REUs) in 2019 that contribute wastewater to the WWTP.

The Region 2 Jackson County Road Commission population projection data was used to determine the 20-year population projections of the service area. The 2018 population estimate accounted for 27,272 people within the LRUA that contribute flow to the WWTP. The annual average population increase of 0.31% was used to scale the projected increase in population and REUs of the LRUA. The 2042 population estimate for the service area totals 29,405 people.

Table 1 shows the monthly average REUs for the different municipalities in the LRUA. These REUs were projected with a 0.31% growth rate to determine the 2042 REU projections.

Table 1. LRUA REU Projections		
	Average REU (2019)	Projected REU (2042)
Blackman Township	872	937
Brooklyn, Village of	860	924
Cambridge Township	25	27
Columbia Township	2,766	2,973
Grass Lake Township	809	869
Grass Lake, Village of	606	651
Hanover Township	412	443
Leoni Township	3,855	4,143
Liberty Township	182	196
Michigan International Speedway	151	162
Napoleon Township	546	587
Norvell Township	398	428
Sylvan Township	854	918
Total	12,336	13,258

D. Economic Characteristics

Table 2 summarizes the number of establishments for each economic sector within the Township in 2010, as published in the Township Maters Plan.

Table 2. Leoni Township Occupation		
	Leoni Township	% of Total
OCCUPATION		
Management, Professional and Related Services	1,311	21.6%
Sales and Office	1,018	16.8%
Natural Resources, Construction and Maintenance	1,832	30.2%
Production, Transportation and Material Moving	646	10.7%
Total	6,057	100%
INDUSTRY		
Agricultural, Forestry, Fishing and Hunting, and Mining	1,250	20.6%
Construction	31	0.5%
Manufacturing	465	7.7%
Wholesale Trade	1,180	19.5%
Retail Trade	240	4.0%
Transportation and Warehousing and Utilities	947	15.6%
Information	278	4.6%
Finance, Insurance, Real Estate and Rental and Leasing	159	2.6%
Professional, Scientific, Management, Administrative, and Waste Management Services	182	3.0%
Educational, Health and Social Services	377	6.2%
Arts, Entertainment, Recreation, Accommodation, and Food Services	1,138	18.8%
Other Services (Except Public Administration)	477	7.9%
Public Administration	315	13.1%
Total	6,057	100%

*data from 2012 Master Plan

Median income statistics from the 2019 U.S. Census estimates list the median household income for the Township at \$49,626 (2018 dollars). Table 3 shows the median household income for Leoni Township compared to the County and State.

Table 3. Median Household Income		
	Per Capita Income	Median Household Income
Leoni Township	\$30,282	\$49,626
Jackson County	\$26,942	\$51,431
State of Michigan	\$30,336	\$54,938

E. Existing Facilities

1. Collection System

Construction of the collection system first began in 1971, which included the large trunk sewers, a majority of the collectors, and the force main to the treatment plant. A few minor expansions were constructed in the 1980s, then regular expansions were constructed during the late 1990s through 2000s.

The collection system currently consists of approximately 40.5 miles of gravity sewers, which consist of PVC and reinforced concrete pipe (RCP). Pipes range in size from 8 to 36 inches in diameter. 12 lift stations operate throughout the Township and all wastewater is ultimately conveyed to the Main Lift Station southwest of the intersection of Page Avenue and 5th Street, where it is pumped to the Leoni Township wastewater treatment plant.

2. Lift Stations

The Township currently owns and maintains 12 lift stations. These lift stations range from 20 years in age, to over 45 years old. Table 4 presents details on each lift station. The Township maintains approximately 375 grinder pump stations.

Table 4. Lift Stations			
	Location	Year Built	Firm Capacity (gpm)*
#1 – Main Lift Station	116 5 th Street	1971	1,740
#2 – Lakeside Lift Station	570 S. Lakeside Drive	1971	250**
#3 – Donnelly Lift Station	4131 Donnelly Road	1971	740
#4 – Thrush Lift Station	4491 Donnelly Road	1971	990
#5 – Napoleon Lift Station	550 Napoleon Road	1971	400
#6 – Jane Lift Station	4242 Jane Drive	1971	275**
#7 – Washington Lift Station	316 Washington Avenue	1971	160
#8 – Young Lift Station	6290 Young Road	1971	320
#9 – Zigs Lift Station	6016 Ann Arbor Road	2002	450**
#10 – Munith Lift Station	626 Munith Road	2002	725**
#11 – Coronado Lift Station	37 Coronado Road	2000	400
#12 – Sanctuary Lift Station	7195 Sanctuary Drive	1997	400***

*firm capacity based on size of largest pump out of service

**firm capacity estimated based on drawdowns

***firm capacity estimated based on pump curve

3. Wastewater Treatment Plant

The Leoni Township Wastewater Treatment Plant is located at 8401 Page Avenue, Jackson, MI 49201. The existing WWTP is a membrane bioreactor plant designed to treat an average of 3.0 million gallons per day (MGD) of raw sewage. The original WWTP was a facultative lagoon facility in 1971 and subsequently upgraded to an aerated lagoon system. In 2010, major upgrades occurred to modernize the facility. Improvements included abandonment of the lagoon treatment system and the construction of a Headworks Building featuring grit removal and fine screening, three pre-anoxic tanks, three pre-aeration tanks, five MBR basins, two

ultraviolet disinfection light banks, cascade aeration steps, and an effluent pump station. In 2021 and 2022, the plant underwent major upgrades adding an odor control system to minimize the hazardous working conditions within the Headworks Building. This project included a bio-trickling filter, activated carbon polishing filter, makeup air unit, blower, nutrient feed skid and solid cover planking over the existing channels and tank openings. The 2022 project consisted of replacing the existing flat plate MBR treatment technology with hollow tube MBR technology and modifying the biological treatment process to improve treatment. One lagoon still serves as an Emergency Diversion Basin during high flow events. Solids processes include sludge storage and sludge dewatering centrifuges, followed by land application or landfilling of the dewatered solids. A treatment plant flow schematic is presented in Figure A4 of Appendix A and the existing hydraulic profile is presented in Figure A5.

Process Description

Influent wastewater is pumped to the WWTP through a 24-inch force main. The force main enters the headworks of the plant and flows through a vortex grit chamber followed by two rotary drum screens. The grit system consists of the vortex grit chamber, one air lift pump including a blower and an inclined grit screw classifier. The rotary drum screens contain two-millimeter perforated baskets that automatically remove the screenings from the wastewater prior to biological treatment. The grit classifier and automatic fine screens convey the inorganic material into dumpsters in the headworks building and plant operators remove the dumpsters from the building for disposal.

The WWTP has the ability to receive septage from local haulers. The septage is delivered to the septage receiving station and then is pumped into the influent force main upstream of the headworks building or to the sludge storage tanks.

Following primary treatment, influent flow is split and routed to the anoxic basins. The wastewater is mixed and combined with returned activated sludge (RAS) from the RAS flow splitter. The mixed liquor then flows through the bioreactor channel to aeration basins "A" where air is added to the mixed liquor to facilitate biological growth and treatment. Six submersible centrifugal feed forward pumps are utilized to pump the mixed liquor from aeration basins "A" to aeration basins "B". The feed forward pumps are each powered by a 23-HP motor and controlled by variable frequency drives (VFDs) that allow the pumps to match influent demand.

After being pumped to aeration basins "B", more air is added to the mixed liquor to continue to facilitate biological growth and treatment. Air is supplied to aeration basins "A" and "B" by three existing positive displacement blowers, each rated at 2,500 scfm and each powered by a 200-HP motor. Process Blower A is dedicated to aeration basins "A", Process Blower B is dedicated to aeration basins "B", and Process Blower C is a standby blower for both aeration basins "A" and "B." The internal recycle pumps can pump mixed liquor from aeration basins "B" into the anoxic basins to reduce odor.

The mixed liquor then flows into the MBR influent channel and into the MBR basins. Each MBR basin is equipped with a coarse bubble diffused aeration system, which is intended to introduce oxygen to the wastewater to enhance biological activity and to clean/scour the membranes to reduce fouling.

The purpose of the membrane is to separate biological solids from the mixed liquor, producing a high-quality effluent. In the existing membrane system, permeate from the waste stream is drawn through the hollow fiber membranes and collected in individual headers from each basin. These headers discharge to a common permeate header. Permeate flows through this header to the back pulse tank where some of the permeate is stored for future use to clean the membranes. The permeate that is not stored flows over a weir in the back pulse tank and flows by gravity to be disinfected. The solids that are retained within the MBR basins flow into the RAS weir box. The sludge flows by gravity back to the RAS splitter box located upstream of the anoxic basins. Waste activated sludge (WAS) pumps allow for the wasting of sludge from the RAS system to maintain a balance of biological solids in the treatment process.

Treated effluent flows from the back pulse tank to the UV disinfection chamber where it is exposed to UV light for disinfection prior to discharge. The system is equipped with two banks of UV lights to provide a fully redundant disinfection system.

The treated and disinfected effluent then flows through the cascade aeration structure to increase dissolved oxygen concentration prior to discharge. The effluent collects in the effluent pump station and is conveyed to the effluent outfall by three vertical turbine pumps. The effluent is discharged to Grand River in accordance with the facility's NPDES discharge permit.

Chemical Feed System

With current operations, chemical addition is necessary for proper plant operation. Ferric chloride is added at the headworks building downstream of the influent screens for phosphorus removal. The WWTP stores ferric chloride in a 6,000-gallon bulk storage tank where the chemical is pumped to the feed point. With the addition of ferric chloride, the WWTP is currently able to consistently meet its phosphorus limit of 0.33 mg/L.

A polymer feed system is utilized to enhance dewatering of the sludge. The polymer can be mixed with the WAS prior to discharge into the centrifuges or it can be added at the centrifuges. This enhances separation of the water from the sludge to increase the solids content in the sludge. There are two polymer blending systems that blend the polymer with final effluent water.

Solids Handling

To remove accumulated solids throughout the treatment process, WAS is pulled off the RAS piping and is pumped to the sludge storage tanks by the WAS pumps. The sludge storage tanks hold onto the sludge prior to pumping the waste sludge through the centrifuges.

The centrifuge pumps convey the sludge to the centrifuge for dewatering. Polymer is added upstream or at the centrifuge to enhance removal of water from the sludge. The dried sludge cake is conveyed to a dumper or dump truck that can haul the sludge off site for disposal or place the sludge into the sludge storage barn.

The centrate/drain pump station collects the centrate from the centrifuges along with the sludge storage overflow or drain line. This flow is pumped back to the head of the plant for further treatment.

A Residual Management Plan is in place to allow the Township to land-apply biosolids.

4. Condition Assessment

Headworks

The headworks system consists of grit removal and screening of the raw influent wastewater. An odor control system was constructed at the headworks building to capture and remove hydrogen sulfide gas released from the wastewater. Hydrogen sulfide gas is toxic and a safety hazard for operation personnel. Additionally, it creates a very corrosive atmosphere and has degraded all the equipment within the headworks building. The new odor control system is greatly reducing the quantity of hydrogen sulfide within the headworks building.

The vortex grit system is aging not functioning as intended. The existing system is not removing the anticipated quantity of grit and needs improvement. The grit classifier was recently replaced as a part of the 2022 project, but the remainder of the equipment needs to be addressed.

The influent screens are being upgraded from a three-millimeter basket to a two-millimeter basket that is responsible for screening the wastewater and utilizing an auger to convey the screenings from the influent channel to a dumpster.

Secondary Treatment Process

The secondary treatment process consists of the anoxic basins, aeration basins and MBR basins. Within the treatment basins, there are multiple submersible mixers and pumps. The mixers are intended to keep the solids from settling out of the mixed liquor and accumulating on the bottom of the basins. The pumps are responsible for pumping the mixed liquor up and into the second set of aeration basins. The other pumps recycle mixed liquor from the aeration basins to the anoxic basins. The mixers and pumps have been rebuilt or replaced as necessary. The replacement of this equipment at failure is necessary to continue to provide reliable treatment.

The aeration basins and MBR basins currently are equipped with an aeration system. There are a total of four membrane blowers and three process aeration blowers. These blowers provide air to the basins to facilitate biological growth and treatment. The fine bubble diffusers in the aeration basins and the coarse bubble diffusers in the MBR basins were recently replaced. The blowers were also replaced as a part of the previous SRF project.

Disinfection

The effluent is disinfected by two banks of UV lights. These lights kill the pathogens in the effluent prior to discharge. The UV system is currently functioning as intended but operators have noticed that the bulbs have become less efficient over time. Continued cleaning of the bulbs or potentially adding a self-cleaning mechanism to the UV system could be added in the future.

Effluent Pumping

The effluent pump station currently consists of three, 2,440 gpm vertical turbine pumps that pump the treated effluent approximately 4.5 miles to the Grand River for discharge. The pumps are currently in fair condition but will continue to require maintenance and potentially be rebuilt/replaced in the future.

Chemical Feed

The existing chemical feed system was not replaced in the 2010 project, 2021 project or 2022 project. Over the years the peristaltic metering pumps have been replaced as needed. The current bulk tank is located near the internet and communication equipment. Corrosion has occurred within the chemical storage area. The ferric feed system should be relocated in its own structure away from any electronics.

Solids Handling

The waste activated sludge pumps convey sludge from the WAS line into the sludge storage tanks. These pumps need to be replaced as needed to continue to remove accumulated biomass from the treatment process.

The sludge thickening process consists of centrifuge pumps, polymer feed system and two centrifuges. Sludge from the sludge storage tanks is pumped to the centrifuges through the centrifuge pumps. These pumps are progressive cavity pumps and are approaching their useful life. The centrifuges spin the sludge to dewater the sludge into a cake. The centrifuges recently underwent major maintenance and should continue to be maintained as necessary.

Polymer is added to the sludge to enhance dewatering. Polymer is mixed with final effluent water and injected into the sludge lines up stream of the centrifuges. This system is approaching its useful life and will need to be maintained or replaced to continue to perform.

WWTP Site

The WWTP facility contains an automatic gate with security access but does not contain a perimeter fence. A fence should be added to increase plant security. The asphalt and gravel drives are failing and should be replaced. The emergency diversion basin was not abandoned as depicted on the 2010 project drawings but has since been properly abandoned. The influent force main has had three breaks reported since 2009. A study was conducted and it was determined that the force main is in fair condition. The influent force main should be monitored and repaired or replaced when necessary.

Lift Stations

The Township currently maintains 12 lift stations that are in varying degree of condition. The Township recently received a Stormwater, Asset Management and Wastewater (SAW) grant that will assess the current condition of each lift station and provide a short-term and long-term capital improvements plan for each lift station and the collection system. This report is not yet finalized but it is anticipated that some of the improvements from the SAW Asset Management Plan may be incorporated into the CWSRF Project.

5. Current Wastewater Flows

Average Influent Flows

The average influent flow received at the WWTP from January 2017 through December 2021 was 2.06 MGD.

Wet Weather Flow – Infiltration and Inflow Evaluation

An infiltration and inflow (I/I) analysis was completed in accordance with the procedure established in MDEQ SRF Project Plan Preparation Guidance. The average influent flow for the high groundwater period March/April/May from 2017 through 2021 was 1.78 MGD, for non-precipitation days and for September/October/November from 2017 through 2021 was 1.37 MGD. As presented in Section C above, the estimated population equivalent for the Service Area is currently 27,272 persons. Dividing 1.78 MGD by 27,272 persons yields a per capita usage of 65 gallons per capita per day (gpcd). The MDEQ threshold value for excessive infiltration using this method is 120 gpcd. Infiltration is not considered to be excessive.

An analysis to determine if the treatment plant receives excessive inflow was also performed in accordance with MDEQ guidance. This method considers the flows received during the largest storms for the period April 1 through October 31. The influent is plotted versus the precipitation amount to generate a graph. The best-fit trendline and corresponding equation was determined and the estimated influent flow received for the 25-year, 24-hour design storm was extrapolated. A per capita flow rate is then determined from the extrapolated influent flow. Per capita values of greater than the threshold 275 gpcd are considered “excessive”.

The influent flows corresponding to days from April 1 through October 31 from 2017 through Fall 2021 where an inch or more of precipitation was observed were plotted for the initial inflow evaluation.

The graph of influent flow versus rainfall is shown in Figure 1 with the best fit trendline and corresponding equation.

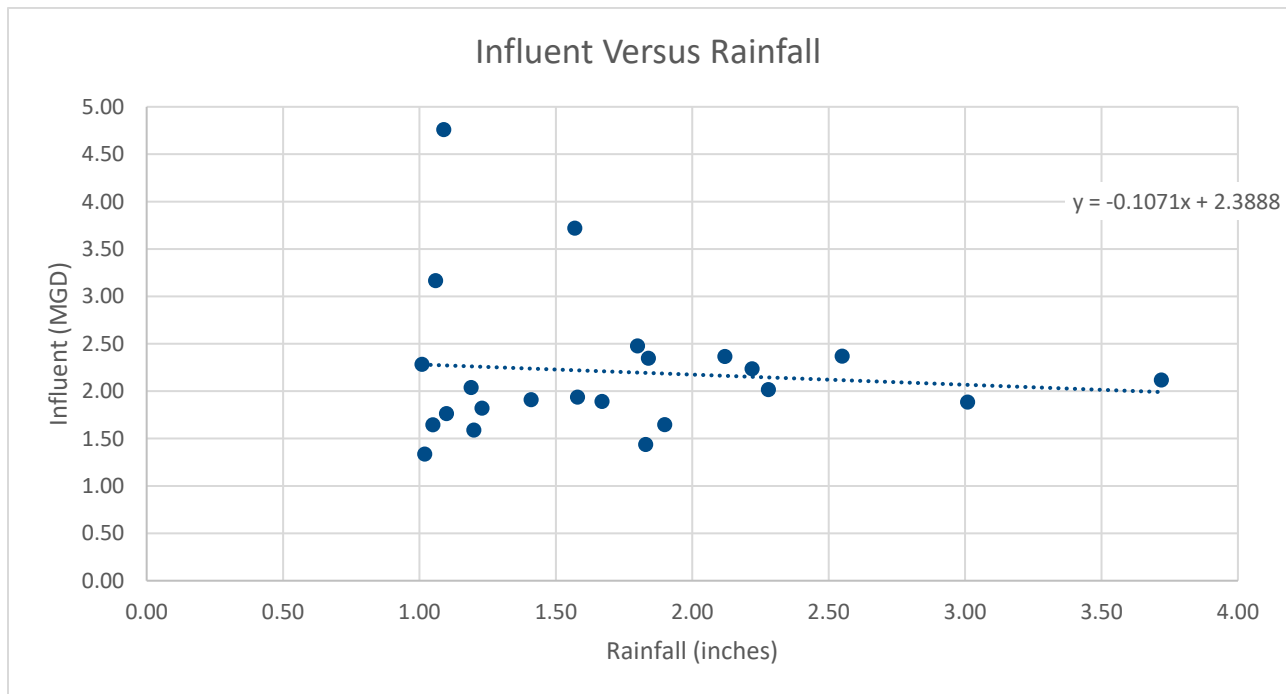


Figure 1. Influent Versus Rainfall

The 25-yr, 24-hr storm for Michigan is 3.9 inches of rain as standardized by EGLE. Substituting 3.9 inches of rain into the equation for “x” yields an estimated flow rate of 1.97 MGD. This corresponds to a per capita rate of 72 gpcd which is well below the EGLE threshold value of 275 gpcd for excessive inflow.

The Township is currently working along with customer communities on reducing any existing I/I. It is proposed to add a flow meter at each connection point or lift station for each municipality within the LRUA. The Township will start charging the municipalities based on flow, not total REUs. This will hold the individual municipalities accountable for any I/I they contribute to the Township’s WWTP.

In recent months, the WWTP experienced extreme inflow during rain and after events. Average daily flows increased to over 4.5 MGD. Although this flow is below the EGLE threshold value, recent extreme inflow events, coupled with limited capacity during the construction projects, have resulted in temporary bypasses of partially treated wastewater. The Township is currently performing additional I/I analysis in conjunction with its condition assessment of the collection system. It is assumed that some I/I is not observed in this evaluation because of the side of the service area. Increased influent may be observed a few days after a large rain event.

F. Need for the Project

Most of the existing process equipment that was not updated in the recent CWSRF project is beyond its useful life or causing operational problems and should be replaced to maintain reliable and effective wastewater treatment service.

1. Compliance Status

The Leoni WWTP operates under NPDES permit MI0045942. A copy of the current NPDES permit is included in Appendix B. The current permitted effluent limitations are summarized in Table 5.

Table 5. NPDES Permit Limitations

Parameter	Maximum Limits for Quality or Loading				Maximum Limits for Quality or Concentration				Frequency
	Monthly	7-Day	Daily	Units	Monthly	7-Day	Daily	Units	
Flow	(report)		(report)	MGD	---		---	---	Daily
CBOD5:									
May – Nov	100	250	(report)	lbs/day	4	---	10	mg/l	5x Weekly
Dec – Mar	580	850	(report)	lbs/day	23	---	34	mg/l	5x Weekly
Apr	600	900	(report)	lbs/day	24	---	36	mg/l	5x Weekly
TSS:									
May – Nov	500	750	(report)	lbs/day	20	30	(report)	mg/l	5x Weekly
Dec – Apr	750	1,100	(report)	lbs/day	30	45	(report)	mg/l	5x Weekly
Ammonia Nitrogen (as N)									
May – Nov	13	50	(report)	lbs/day	0.5	---	2	mg/l	5x Weekly
Dec – Mar	290	430	(report)	lbs/day	11.4	---	17	mg/l	5x Weekly
Apr	330	380	(report)	lbs/day	13.3	---	15	mg/l	5x Weekly
Total Phosphorus (as P)	8.3	---	(report)	lbs/day	0.33	---	(report)	mg/l	5x Weekly
Fecal Coliform Bacteria	---	---	---	---	200	400	(report)	cts/100 ml	5x Weekly
Available Cyanide	0.17	---	(report)	lbs/day	7	---	(report)	ug/l	Monthly
Total Selenium	0.16	---	(report)	lbs/day	6	---	(report)	ug/l	Monthly
Total Mercury:									
Corrected	(report)	---	(report)	lbs/day	(report)	---	(report)	ng/l	Quarterly
Uncorrected	---	---	---	---	---	---	(report)	ng/l	Quarterly
Field Duplicate	---	---	---	---	---	---	(report)	ng/l	Quarterly
Field Blank	---	---	---	---	---	---	(report)	ng/l	Quarterly
Lab Method Blank	---	---	---	---	---	---	(report)	ng/l	Quarterly
Parameter	Min % Monthly		Min % Daily	Units					
TSS Minimum % Removal:									
Dec – Apr		85	---	%					Monthly
Parameter	Min Daily		Max Daily	Units					
pH		6.5	10.0	S.U.					5x Weekly
Dissolved Oxygen:									
May – Nov		7.0		mg/L					5x Weekly
Dec – Apr		6.0		mg/L					5x Weekly

2. Noncompliance, Exceedance and Orders

The WWTP has recently received more flow than the plant can handle. At these times, WWTP operators divert a portion of the influent flow to the Emergency Diversion Basin. If the influent flows subside, the wastewater can be pumped back through the headworks for full treatment. If the high flows continue and the basin becomes full, a portion of the flow must bypass the biological treatment process and then combine with the treated effluent upstream of the UV disinfection process. This allows the combined flow to be disinfected prior to discharge.

Leoni Township is not currently under a consent order but there is a draft consent order. The most current document can be found in Appendix C.

3. Water Quality Problems

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

4. Projected Needs for the Next 20 Years

The projected 20-year wastewater flows were projected based on the Service Area REU projections presented in Section C above. These flow projections do not include additional lake communities that may be forced to connect to the treatment system. The projected wastewater flows for the design year 2042 are summarized in Table 6.

Table 6. Design Flow Projections	
	Flow (MGD)*
Average Daily Flow	2.1
Maximum Daily Flow	5.1
Maximum Monthly Flow	2.8

5. Project Objectives

The Township anticipates funding of all or part the Wastewater Treatment Plant Improvements project through the CWSRF program while using local funds and cash reserves for other immediate treatment plant needs. Immediate needed work includes:

- Improving operator safety.
- Upgrading electrical and control systems.
- Upgrading process equipment.

6. Future Environment Without the Proposed Project

If the project is not completed, the biosolids system and septage receiving system will continue to fail and will not be able to handle daily tasks. This will result in poor biosolids storage and management and unnecessary damage to process equipment.

III. ANALYSIS OF ALTERNATIVES

A. Identification and Evaluation of Potential Alternatives

Alternatives to accomplish needed improvements to the Township's 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:

- Ensure reliable wastewater collection and treatment service to the customers.
- Rehabilitate/repair high priority areas of existing wastewater infrastructure.
- Provide facilities capable of providing consistent compliance with regulatory and permit requirements.
- Minimize financial burden to the sewer system users.
- Minimize environmental impact during construction of the improvements project.

The Wastewater Treatment Plant Improvements Project was broken down into four different study areas:

1. Biological Capacity
2. Biosolids Handling
3. Septage Receiving
4. Lift Stations

Each one of these project areas were analyzed individually. Each report is included as an appendix to the Project Plan. A summary of each report is provided below.

1. Biological Capacity

The following alternatives were evaluated:

- Alternative 1 – No Action
- Alternative 2 – Regional Alternative: Pump to City of Jackson WWTP
- Alternative 3 – Optimize Existing Facilities Operation
- Alternative 4 – Upgrade Biological Capacity

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

Each alternative was evaluated using the proposed design criteria of the existing facility at a maximum monthly design flow of 5.0 MGD. Each alternative that continued the use of the existing WWTP included modifications and upgrades to the existing system. These process modifications are necessary to ensure reliable wastewater treatment and replace existing equipment that is failing and underperforming.

Alternatives 1, 2 and 3 were briefly analyzed, however, these alternatives were determined to be not feasible for the Township because they did not meet the project objectives. Alternative 4 was determined to be the principal alternative for detailed evaluation. Alternative 4 was broken down into two subsections: Alternative 4a – Upgrade Existing MBR Treatment System and Alternative 4b – Upgrade Process System.

Financial analysis of the principal alternatives followed a net 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 net present worth of the project.

Alternative 1 – No Action

Alternative 1 includes no improvements to the WWTP. The existing process train and MBR system would remain in service.

The existing MBRs are rated to treat the design average daily flow of 3.0 MGD with a peak hourly flow of 8.0 MGD with all three trains running. If the plant needs to take down an MBR train for maintenance they would not be able to treat the peak hourly flow, resulting in having to use the emergency overflow basin.

The biological capacity of the plant would continue to be 3.5 MGD. This would result in potential permit violations and inconsistent treatment if flows exceed 3.5 MGD.

The existing disinfection and chemical feed systems would be inadequate for the increased flows through the WWTP.

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

Alternative 2 – Regional Alternative: Pump to City of Jackson WWTP

Alternative 2 was developed to reroute the wastewater to the City of Jackson's WWTP. This is the closest treatment facility to the WWTP. With this alternative, the existing effluent force main would be extended from the discharge location to the Jackson WWTP. The influent force main would be rerouted from the headworks building to the effluent pump station which would be repurposed for the pump station to the Jackson WWTP. The WWTP would be decommissioned, and sections of the land could be sold or repurposed by the Township. The Township's collection system would still need to be maintained.

While this option would eliminate the need to improve and operate the existing facility, the costs associated with this alternative would not be fully known until agreements are reached with the City of Jackson. It is important to note that Alternative 2 assumes that Jackson would be willing to accept additional flow from the Township and the Authority.

The Jackson WWTP is approximately 10.8 miles from the Township's effluent pump station and 7.3 miles from the effluent outfall. The effluent force main would need to be continued to the Jackson WWTP. There would need to be a booster pump station installed along the force main route to convey the wastewater to the Jackson WWTP.

At the Leoni WWTP, the existing tanks onsite would be used as an equalization basin. This would allow the influent flow to be routed into the equalization basin if the pump station cannot keep up. Corrosion control measures would need to be installed at the pump station to reduce the corrosiveness of the wastewater prior to discharge to Jackson.

Considering the project cost and the current debt on the existing treatment facility has ruled Alternative 2 not feasible; therefore, no further analysis is presented on Alternative 2.

Alternative 3 – Optimize Existing Facilities Operation

The WWTP is in the process of major improvements that replace its failing membranes. Optimization of the process was included in the design of these improvements. The processes optimized with the improvements include grit removal and screening, biological treatment, RAS, MBR, and process aeration. Due to this, Alternative 3 was ruled out as a principal alternative and will not be evaluated further.

Alternative 4 – Upgrade Biological Capacity

Alternative 4 was developed to upgrade the biological capacity of the WWTP. Alternative 4 was broken down into two subsections: Alternative 4a – Upgrade Existing MBR Treatment System and Alternate 4b – Upgrade Process System. Alternative 4a and 4b were compared against each other based on net present worth and

operation, maintenance, and repair cost to determine which alternative provided the most feasible and cost-effective system.

Alternative 4a analyzes adding redundancy to the MBR treatment system to ensure adequate treatment by adding a 4th train to the process. Alternative 4b analyzes adding a fourth process train to the system to increase biological capacity.

Alternative 4a includes structural modifications to one of the existing basins, control system improvements, and installing new MBR supports, cassettes, valving and piping, solid cover planks, and a permeate pump.

Alternative 4b includes adding an anoxic basin, aeration basin “A,” aeration basin “B,” and a MBR train. The alternative also includes upgrades to the screening and grit removal process, upgrades to the process aeration system, permeate pump system, disinfection system, solids handling systems, and adding a flow equalization basin.

2. Biosolids Handling

The following alternatives were evaluated:

Alternative 1 – No Action

Alternative 2 – Regional Alternative: Pump to City of Jackson WWTP

Alternative 3 – Optimize Existing Facilities Operation

Alternative 4 – Upgrade Existing Biosolids Handling and Storage

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

Each alternative was evaluated using the proposed design criteria of the facility at a maximum monthly design flow of 5.0 MGD. Each alternative that continued the use of the existing WWTP included modifications and upgrades to the existing biosolids system. These process modifications are necessary to ensure reliable wastewater treatment and replace existing equipment that is failing and underperforming.

Alternatives 1, 2 and 3 were briefly analyzed, however, these alternatives were determined to be not feasible for the Township because they did not meet the project objectives. Alternative 4 was determined to be the principal alternative for detailed evaluation.

Financial analysis of the principal alternatives followed a net 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 net present worth of the project.

1. Alternative 1 – No Action

Alternative 1 includes no improvements to the WWTP. The existing biosolids system would remain in service.

There is a cost associated with Alternative 1 although it is difficult to quantify. The aging centrifuges will continue to require regular repairs to keep them functioning. Eventually they will fail beyond repair, resulting in the need for an expensive, emergency repair, with the potential for a biosolids back up situation, or similar challenging situation.

The biosolids storage would continue to be undersized for the current and future WWTP flows. This would result in continued limited storage space and the need to look elsewhere for land application or disposal.

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

Alternative 2 – Regional Alternative: Pump to City of Jackson WWTP

Alternative 2 was developed to reroute the wastewater to the City of Jackson's WWTP. This is the closest treatment facility to the WWTP. With this alternative, the existing effluent force main would be extended from the discharge location to the Jackson WWTP. The influent force main would be rerouted from the headworks building to the effluent pump station which would be repurposed for the pump station to the Jackson WWTP. The WWTP would be decommissioned, and sections of the land could be sold or repurposed by the Township. The Township's collection system would still need to be maintained.

While this option would eliminate the need to improve and operate the existing facility, the costs associated with this alternative would not be fully known until agreements are reached with the City of Jackson. It is important to note that Alternative 2 assumes that Jackson would be willing to accept additional flow from the Township and the Authority.

The Jackson WWTP is approximately 10.8 miles from the Township's effluent pump station and 7.3 miles from the effluent outfall. The effluent force main would need to be continued to the Jackson WWTP. There would need to be a booster pump station installed along the force main route to convey the wastewater to the Jackson WWTP.

At the Leoni WWTP, the existing tanks onsite would be used as an equalization basin. This would allow the influent flow to be routed into the equalization basin if the pump station cannot keep up. Corrosion control measures would need to be installed at the pump station to reduce the corrosiveness of the wastewater prior to discharge to Jackson.

Considering the project costs and the existing debt on the treatment facility has ruled Alternative 2 not feasible; therefore, no further analysis is presented on Alternative 2.

Alternative 3 – Optimize Existing Facilities Operation

Alternative 3 includes rehabilitating the existing biosolids system. This alternative also includes improvements to the solids handling process.

The existing aerobic basins are sufficient for the current WWTP flow rates. Continuing with only the existing aerobic basins though will not allow additional flow through the current system.

Eventually, the existing centrifuges will no longer be able to be repaired. The centrifuges can be refurbished but eventually they must be replaced to provide efficient and reliable sludge dewatering.

As flow continues to increase at the plant, the solids storage will become limited. It is proposed that the WWTP look into alternatives for offsite disposal. With increased solids production, the WWTP will be unable to store the solids within the existing tanks and solids storage building.

Alternative 3 does not meet the primary project objective and will not be evaluated further as a principal alternative.

Alternative 4 – Upgrade Existing Biosolids Handling and Storage

Alternative 4 was developed to improve sludge drying technologies, onsite plant handling of biosolids, and increased storage capacity. This alternative was evaluated based on net present worth and operation, maintenance, and repair costs to determine which dewatering technology provided the most feasible and cost-effective system.

An increase in the capacity of the centrifuges and the centrifuge pumps would be necessary once flows increase to reduce weekly run time. Rather than continued use of the aging centrifuges, they would be replaced with screws presses. Each with their own calibrated polymer feed systems to provide improved sludge dewatering.

To provide sufficient onsite storage of dewatered sludge, the sludge storage barn needs to be increased in size. Interior layout of the solids barn will be updated to accommodate for increased solids storage prior to land application.

3. Septage Receiving

The following alternatives were evaluated:

- Alternative 1 – No Action
- Alternative 2 – Regional Alternative: Send Septage Haulers to Another Facility
- Alternative 3 – Optimize Existing Facilities Operation
- Alternative 4 – Upgrade Existing Septage Receiving Facility

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

Alternatives 1, 2 and 3 were briefly analyzed, however, these alternatives were determined to be not feasible for the Township because they did not meet the project objectives. Alternative 4 was determined to be the principal alternative for detailed evaluation.

Financial analysis of the principal alternatives followed a net 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 net present worth of the project.

Alternative 1 – No Action

Alternative 1 includes no improvements to the Septage Receiving Facility. The existing system would remain in service.

There is a cost associated with Alternative 1 although it is difficult to quantify. The undersized rock trap will continue to allow heavy objects to reach the comminutor causing extra cleaning and repair of the comminutor. Eventually the comminutor will fail beyond repair, resulting in the need for an expensive emergency replacement, shut down of the station, or similar challenging situations.

The vector unloading station remains undersized and the potential of a sanitary sewer overflow persists.

There would continue to be only one pump in the wet well. The lack of a redundant pump would result in continued station shutdowns for pump maintenance and lost revenue.

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

Alternative 2 – Regional Alternative: Send Septage Haulers to Another Facility

Alternative 2 was developed to reroute the septic haulers to another Septage Receiving Facility. The Septage Receiving Station would be decommissioned, and the building could be used for additional storage for the WWTP.

While this option would eliminate the need to improve and operate the existing facility, regulations prevent this from happening. Jackson County Ordinance No. 10 – Septage Waste Disposal Ordinance states that any septage collected in Jackson County has to be disposed of at Leoni Township’s Septage Receiving Facility or other public septage waste disposal facility located in Jackson County. Currently, there are no other public septage waste disposal facilities in Jackson County. Due to this, no further analysis is presented on Alternative 2.

Alternative 3 – Optimize Existing Facilities Operation

Alternative 3 includes upsizing the rock trap and improving the controls of the station. This alternative also includes installing a tempered water supply for the haulers to use for cleanup.

Upsizing the rock trap would allow for a greater volume of heavy objects to be removed from the system before the trap has to be emptied, decreasing the frequency of emptying the trap and protecting the downstream equipment. However, upsizing the rock trap will increase difficulty of maintenance for the system. With more volume being emptied into the basket, it will be harder for operators to remove the basket and dispose of the debris, resulting in possible injury or damage to equipment.

Improving the controls of the station will add reliability to the station. Installing a level transducer to the wet well would allow for the system to run off the transducer and not rely only on the floats. In addition, all the controls of the septage receiving facility would be brought back to the plant SCADA, so the facility could be remotely monitored and the Township would not have to rely on the haulers to let them know of any mechanical issues or alarms.

The existing building and electrical for the station do not meet NEC code and presents a potential hazard to the WWTP. To remedy this issue, the station would have to be shut down for an extended period of time to upgrade the building and electrical to meet code. Due to this, Alternative 3 does not meet the primary project objective and will not be evaluated further as a principal alternative.

Alternative 4 – Upgrade Existing Septage Receiving Facility

Alternative 4 was developed to upgrade the existing septic receiving facility. This alternative includes constructing a new septic receiving station north of the main plant, a new pump station and a new drying bed to allow vactor trucks to unload at the WWTP.

The new septic receiving station consists of a new building designed to current design code and two covered drive through truck bays to allow multiple haulers to unload at the same time. The receiving room in the building will house two independent receiving process lines that will each have a rock trap, comminutor, flowmeter, automatic plug valve, pH and conductivity probe, and screen with an automated auger to convey the screenings to a dumpster. Card readers will be installed to active the process equipment and track flow for billing purposes. The truck bays will have heated floors to prevent ice from building up in the winter and a tempered water line for cleaning purposes. In addition, they will have large drains that flow to the pump station, so water does not build up in the truck bays.

A new duplex pump station will be installed to pump the septage into the WWTP. The station will be controlled by a level transducer and float control as backup. Two all-weather samplers will be installed at the pump station, one dedicated to each process line. The pump station would pump septage into the influent force main before the influent flow meter, allowing the septage to be properly metered.

All controls for the septic receiving station and the pump station will be tied into the plant SCADA system. This will allow the plant to monitor each process line, pump station, and alarms.

A new vactor dump pad will be constructed at the existing vactor truck unloading station. The existing pump station will be utilized to pump the wastewater collected by the underdrains upstream of influent flow meter.

4. Lift Stations

The following alternatives were evaluated:

- Alternative 1 – No Action
- Alternative 2 – Regional Alternative
- Alternative 3 – Optimize Existing Facilities Operation
- Alternative 4 – Pump Station Rehabilitation/Replacement

Alternative 1 – No Action

Alternative 1 includes no improvements to the existing lift station facilities. The existing system would remain in service.

The “no-action” alternative will merely delay the inevitable failure of the lift stations. This would lead to potential overflows, as the flows into the station are of a considerable volume and are constant. The Township wishes to avoid any major issues at this or any of its lift stations and consequently this alternative will not be considered as a principal alternative and will not be further discussed in this Project Plan.

Alternative 2 – Regional Alternative

Leoni Township wastewater system is already established as a regional facility that is currently serving the 13 communities. The Township WWTP is the regional alternative, therefore this cannot be considered as a principal alternative.

Alternative 3 – Optimize Existing Facilities Operation

Optimization of the existing facilities would include the replacement of the existing pumps currently in service at the pump station, as well as improvements to the outdated electrical/control components of the station. Optimization would not address the aging piping and valves at the stations. This alternative will not be considered as a principal alternative.

Alternative 4 – Lift Station Rehabilitation/Replacement

This alternative would include broader improvements to the lift stations. These improvements would include full lift station replacement, pump replacement, an alarm system that would be integrated into the Supervisory Control and Data Acquisition (SCADA) at the WWTP, complete piping and valve replacements within the station, and would include the replacement of the outdated electrical/control components of the stations. This alternative would also include installation of standby generators. This is the most comprehensive and thus the costliest of the alternatives being considered, but it could eliminate the potential for major issues related to the outdated piping and electrical/control system at the existing lift stations. This will be considered as a principal alternative.

Although there are immediate needs at the lift stations throughout the collection system, these needs will not be fully identified until the SAW Asset Management Plan is finalized. These needs may be incorporated into the CWSRF project at that time. All lift station needs would be identical for each WWTP Improvements study area so the inclusion of lift station improvements would not impact the net present worth analysis.

B. Analysis of Principal Alternatives

Multiple feasible principal alternatives were developed that meet the project objectives. These alternatives are analyzed further and are summarized in the following sections.

1. 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 the same funds required paying all present and future costs. The total present worth, used to compare the principal alternatives, 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 was established by EGLE at 0.5% for current SRF Projects.

The salvage value is calculated at the end of 20 years where portions of the project structures or equipment may have a salvage value, which is determined by using a straight-line depreciation. The present worth of the 20-year salvage value is then computed using the discount rate of 0.5%. The MDEQ guidance document establishes the estimated life for the project structures and equipment to assess salvage values at 20-year planning period. In general, concrete structures, earthwork basins, and piping have a useful life of 30-50 years and equipment has a useful life of 10-20 years.

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

To ensure uniformity of the cost comparisons, the following cost comparison details were specifically addressed and were applied in the present worth analysis as per the MDEQ 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 E for each principal alternative. Table 7 compares the costs for different principal Alternatives.

Table 7. Summary of Alternatives – Net Present Worth Analysis

	Biological Capacity		Biosolids Handling	Septage Receiving
	Alternative 4a	Alternative 4b	Alternative 4	Alternative 4
Project Cost	\$2,284,000	\$26,764,000	\$5,904,000	\$3,378,000
Annual OM&R Cost	\$38,000	\$458,000	\$107,400	\$127,000
Net Present Worth of OM&R Cost*	\$722,000	\$8,696,000	\$2,039,000	\$2,411,000
Total Present Worth	\$3,006,000	\$35,460,000	\$7,943,000	\$5,789,000
Salvage Value	\$191,000	\$2,194,000	\$610,000	\$490,000
Net Present Worth	\$2,815,000	\$33,266,000	\$7,333,000	\$5,299,000

*0.5% Discount Rate

2. Partitioning of the Project

There currently are no requirements to start on one section of the project prior to the whole improvements project.

3. Staging Construction

It is not anticipated that this project will need to be broken out into multiple stages/segments if the lift station portion of the project can be completed at the same time as the WWTP Improvements. If this is not feasible, the lift station section may be broken out as an additional segment.

4. The Environmental Evaluation

The major environmental impacts were compared for the principal alternatives. Objectives of the comparison are to highlight significantly differing environmental impacts.

Environmental impacts are similar for construction of all principal alternatives. All principal alternatives include construction at the existing WWTP site and lift stations. The optimization of existing facilities would have minimal impacts on the environment. Replacement/Rehabilitation would be confined to already developed areas.

Finished structures to be constructed for all of the alternatives would be located above the 100-year floodplain elevations where feasible.

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. These measures would be similar for all principal alternatives. Table 8 compares the impacts on various environmental features for the alternatives.

Table 8. Environmental Evaluation for Principal Alternative

Environmental Feature	Biological Capacity		Biosolids Handling	Septage Receiving
	Alternative 4a	Alternative 4b	Alternative 4	Alternative 4
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
Energy Resources	NSI	NSI	NSI	NSI
Fauna and Flora Communities/Habitat	NSI	NSI	NSI	NSI
Floodplains	NSI	NSI	NSI	NSI
Great Lakes Shoreline	NSI	NSI	NSI	NSI
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 differences in indirect, direct, and cumulative impacts were identified between alternatives.

5. Implementability and Public Participation

The Draft Project Plan was placed on display at the Leoni Township Hall and on the Township website on April 8, 2022; 32 days prior to the scheduled Public Hearing date.

A Public Hearing is scheduled for May 10, 2022, to discuss project alternatives in terms of effectiveness, implementability, project costs, anticipated user rates and environmental Impacts. A copy of the public notice and transcript of the Public Hearing will be attached in the final Project Plan.

6. Technical and Other Considerations

Inflow and Infiltration

The impact of the I/I on the total design flow is equal for each alternative. The treatment system and the effluent pump station must be designed to handle the projected flow.

Sludge and Residuals

Alternative 4 for the Biosolids Handling portion of the project would modify and improve the existing sludge management system. Biosolids would continue to be stored in the sludge storage tanks and dewatered prior to storage and land application.

Industrial Pretreatment

Leoni Township has no significant or categorical wastewater users and does not currently administer an Industrial Pretreatment Program.

Growth Capacity

All of the feasible alternatives were designed to meet the existing and project 20-year wastewater needs. The selected population growth rate of 0.31% annually was estimated using the best available information, including Census data, regional planning agency projections, and current sewer user billing records.

Reliability

The alternatives were evaluated with equal treatment reliability to consistently meet the permit limitations throughout the useful life of the project.

Alternative Sites and Routings

No new sewers, force mains or conveyance lines are proposed.

Contamination at the Project Site

An examination of the state's list of contaminated sites was previously performed. The WWTP site is not a known area of contamination.

IV. RECOMMENDED ALTERNATIVE

A. Description of the Recommended Alternative

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

- Ensure reliable wastewater collection and treatment to the customers.
- Rehabilitate/repair high priority areas of existing wastewater infrastructure.
- Provide facilities capable of providing consistent compliance with regulatory and permit requirements.
- Minimize financial burden to the sewer system users.
- Minimize environmental impact during construction of the improvements project.

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 4b for the Biological Capacity, Alternative 4 for the Biosolids Handling and Alternative 4 for the Septage Receiving has the lowest capital cost, lowest OM&R costs, and the lowest net present worth. A combination of the three study areas plus lift station improvements is the Recommended Alternative.

Additional discussion of Recommended Alternative presented below.

1. Relevant Design Parameters

A proposed layout of the combined alternative is presented in Figure A6. The existing MBR basins will house the new train of hollow fiber membranes. This will provide the WWTP with one redundant train.

The Biosolids Handling system will be upgraded to incorporate a difference sludge dewatering technology that is more efficient than the current system and should allow for less routine maintenance. The existing tankage onsite will be repurposed as sludge aeration prior to storage.

The Septage Receiving facility will be relocated to the north side of the property to provide adequate access and safety. The electrical and controls systems will be upgrade so they meet code and are rated for the classified space. This will improve traffic flow and efficiencies of the septage haulers.

The studies analyzed the capacity of the WWTP for a maximum monthly flow of 5.0 MGD. The design will allow for a modular expansion of the treatment systems if required.

2. Project Maps

The following maps and figures corresponding to the Recommended Alternative are included in Appendix A:

- Figure A3 – Leoni Township Sewer Map
- Figure A6 – Proposed Improvements Layout

3. Controlling Factors

Factors that control the design of the proposed project include:

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

4. 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). Proposed construction is limited to existing WWTP and lift stations. All work will be performed in accordance with necessary permit requirements. Figure A7 shows locations of wetlands. Figure A8 illustrate the flood zones developed by FEMA.

5. Project Delivery Method

The Township has reviewed various methods for delivering the construction of their project. EGLE has published the State Revolving Fund and Drinking Water Revolving Fund Project Delivery Methods Guidance Document in March 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 Township has reviewed all four methods and summarized comparisons 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 Township 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 Township before or early on in the design process. An engineer works closely with the Township 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 Township 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 Township has one single firm responsible for the design, schedule, construction, and warrantee of the project. If there are issues that arise during construction or after construction, the Township 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 Township 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 warrantee 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 Township may contract with a third party to act as the Owner's Advisor.

The Township, WWTP operators and the engineering firm that developed the Project Plan had discussions regarding the available project delivery methods and advantages and disadvantages offered by each method to develop the preferred method for presentation at the Public Hearing.

For the current Membrane System Improvements, the Township selected to go with a Design-Build project delivery. It was discussed with the Township and it is anticipated that the Township will proceed with Progressive Design-Build project delivery method for the WWTP Project.

6. Schedule of Design and Construction

Table 9 presents the proposed project schedule, which follows the CWSRF FY2023 Q4 milestone schedule, assuming that funds will be available in FY2023. Dates are subject to change pending the final CWSRF milestone schedule.

Table 9. Proposed Schedule for Design and Construction	
Anticipated Date	Activity
June 2022	Submit Final SRF Project Plan to EGLE
February 2023	Submit Preliminary Plans & Specifications
April 2023	Submit Final Plans & Specifications
May/June 2023	Bidding
August 2023	MFA Closing
September 2023	Begin Construction
December 2024	Complete Construction
February 2025	O&M Manual, Startup Assistance, and Record Drawings

7. Cost Summary

Table 10 summarizes the estimated costs for the Recommended Alternative which includes the alternatives from each project area. Appendix E shows the breakdown of the project costs.

Table 10. Recommended Alternative Cost Summary	
Project Cost	\$11,566,000
Annual OM&R Cost	\$272,400
Net Present Worth of OM&R Cost*	\$5,172,000
Total Present Worth	\$16,738,000
Salvage Value	\$1,291,000
Net Present Worth	\$15,447,000

*0.5% Discount Rate

B. Authority to Implement the Recommended Alternative

Implementation of a selected alternative is the responsibility of Leoni Township.

The Township Board will select an alternative at the May 10, 2022 Public Hearing. A copy of the resolution will be included in the Final Project Plan.

C. User Costs

The Township funds wastewater treatment operations through user fees billed to the customer communities based on the total REUs for each community. The customer communities then distribute these charges to individual sewer users.

Using an interest rate of 2.0% – 2.5% annually over 20 years, the estimated annual debt service for Recommended Alternative is \$741,900 without considering any Green Project Reserve principal forgiveness or Township funding. The estimated increase in sewer service fees per REU is approximately \$4.75 to \$5.25 per month. The Green Project Reserve Cost Summary has not yet been completed because it is anticipated that there will be no principal forgiveness for this funding cycle. If funds become available for Green Project Reserve, a business case will be pulled together at that time.

The exact increase in a customer's sewer bill will depend on REU variability and the customer community's existing rate structure. A Municipal Financial Advisor should be consulted to confirm and refine these rates.

D. Disadvantaged Community Status

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. The Disadvantaged Community Status Determination Worksheet from SRF Project No. 5733-01 is included in Appendix E. EGLE has determined that the previous project does not qualify for Disadvantaged Community Status so it is assumed that this project will not qualify.

E. Useful Life

The Township intends to secure a 20-year SRF loan for the construction of the Recommended Alternative. Equipment that has a useful life of less than 20-years was included in the replacement costs as a part of the net present worth analysis. The Township must budget for these replacements within the 20-year project planning period. This is included in the overall OM&R costs.

V. ENVIRONMENTAL IMPACTS

A. Description of the Impacts

The potential environmental impacts of the Recommended 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 that increase in magnitude over time, or result from individually minor, but collectively significant actions.

1. Beneficial and 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 impacts resulting from the Recommended Alternative with special emphasis on cultural or environmentally sensitive resources.

2. 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.

3. 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. Description of the Impacts

1. Direct Impacts

Direct impacts are the environmental impacts directly attributable to the construction and operation of the project. The effects of the proposed project are considered for each of the following environmental factors:

Historic, Archaeological, Geological, Cultural or Recreational

An application for a Section 106 Review of the previous project was made to the Environmental Review Coordinator at the State Historic Preservation Office.

Typically, on a project not affecting historically significant structures themselves, the SHPO focuses on disturbance to the surrounding landscape. Removal of mature trees and significant alterations of the existing landscape may affect a property's overall aesthetic value and therefore its ability to be listed on the federal register.

The proposed project construction is limited to the existing wastewater treatment plant property and lift stations, therefore minimal disturbances to the surrounding landscape is anticipated.

Natural Setting and Sensitive Ecosystems

The Recommended Alternative is not anticipated to impact any sensitive ecosystems.

Existing and Future Quality of Surface Water and Groundwater

A primary goal of the project is to maintain reliable wastewater service and compliance with the facility's NPDES discharge permit. The proposed project is not anticipated to cause changes to the quality of nearby surface or groundwater.

Consumption of Materials, Land, Energy, Construction and Operation

Construction materials, public funds, energy and manpower will be consumed to construct and operate the proposed improvements. No known shortage of these items exists, 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.

Human, Social and Economic Impacts

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

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

Construction and Operational Impacts

A minor impact on local traffic may occur during the construction of the proposed project. 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 minimal excavation operations.

2. 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 wastewater 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 Leoni Township, including residential, commercial and industrial areas.

Transportation and infrastructure is already in place within the service area, and the proposed project will only serve to enhance the existing 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 individual communities' existing zoning requirements.

3. 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 membrane system improvements.

VI. MITIGATION

A. General

Structural and non-structural measures, that 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 County, City, and Townships. 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

Because construction work will be limited to the WWTP site and lift stations, it is not anticipated that traffic control measures will be required. However, in the event that traffic control is necessary, the contractor will maintain access to homes and businesses.

Construction site safety is the responsibility of the contractor. The contractor will be required to have only trained persons performing all phases of the work. The contractor will also be required to comply with the Occupational Safety & Health Act (OSHA), including using back up alarms on all equipment, having employees trained in hazard control, and maintaining materials safety data sheets (MSDS) 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 Township 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/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

Construction will generally be confined to the existing WWTP site and lift stations. Disturbed areas will be restored in a timely fashion and in accordance with the project specifications.

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 system improvements.

The construction work at the WWTP site and lift stations will incorporate “best management practice” methods for installing pipelines or disturbing the earth. Wetland, floodplain, and inland stream mitigation would be handled through the permit process. If impacts cannot be avoided, wetland mitigation measures will be used, although this is not anticipated as part of this Project. 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.

Site and Routing Decisions

All construction activities proposed by this project are located within the existing WWTP site and lift stations. It is not anticipated that detours or road closures will be necessary.

Operational Impacts

There are no anticipated changes in operational impacts to the environment.

The potential impact of effluent discharge has been investigated, and 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. Unrestricted growth in these areas is not anticipated with or without the proposed project.

VII. PUBLIC PARTICIPATION

A. Public Meetings on Project Alternatives

A Public Hearing for the CWSRF Project Plan will be held May 10, 2022 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 I in the Final Project Plan.

B. Formal Public Hearing

A formal public hearing on project alternatives and user costs will be held on May 10, 2022 at 6:00 pm at the Leoni Township Hall.

1. Public Hearing Advertisement

The public hearing was advertised in a local newspaper (*The Salesman*) for the Jackson Country area. A copy of the public hearing notice is included in Appendix I.

A copy of the Draft Project Plan was made available to the public for a 30-day period at the Leoni Township Hall and on the Township's website as stated in the public hearing notice.

2. Public Hearing Transcript

A verbatim transcript of the public hearing, recorded by a certified court reporter, will be included in Appendix I of the Final Project Plan.

3. Public Hearing Contents

The following items will be discussed at the public hearing:

- Project background.
- A description of the wastewater treatment 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.

4. Comments Received and Answered

The comments received at the Public Hearing will be added in this section for the Final Project Plan.

5. Adoption of the Project Plan

The official period for receiving comments will be ended at the close of the formal public hearing. After the close of the public comment period, the Recommended Alternative will be selected for implementation by the Leoni Township Board. A copy of the Township's resolution to adopt the Project Plan and to implement the selected alternative will be included in Appendix I.

APPENDIX A MAPS AND FIGURES

PREPARED FOR:





FIGURE A1. JACKSON COUNTY MAP

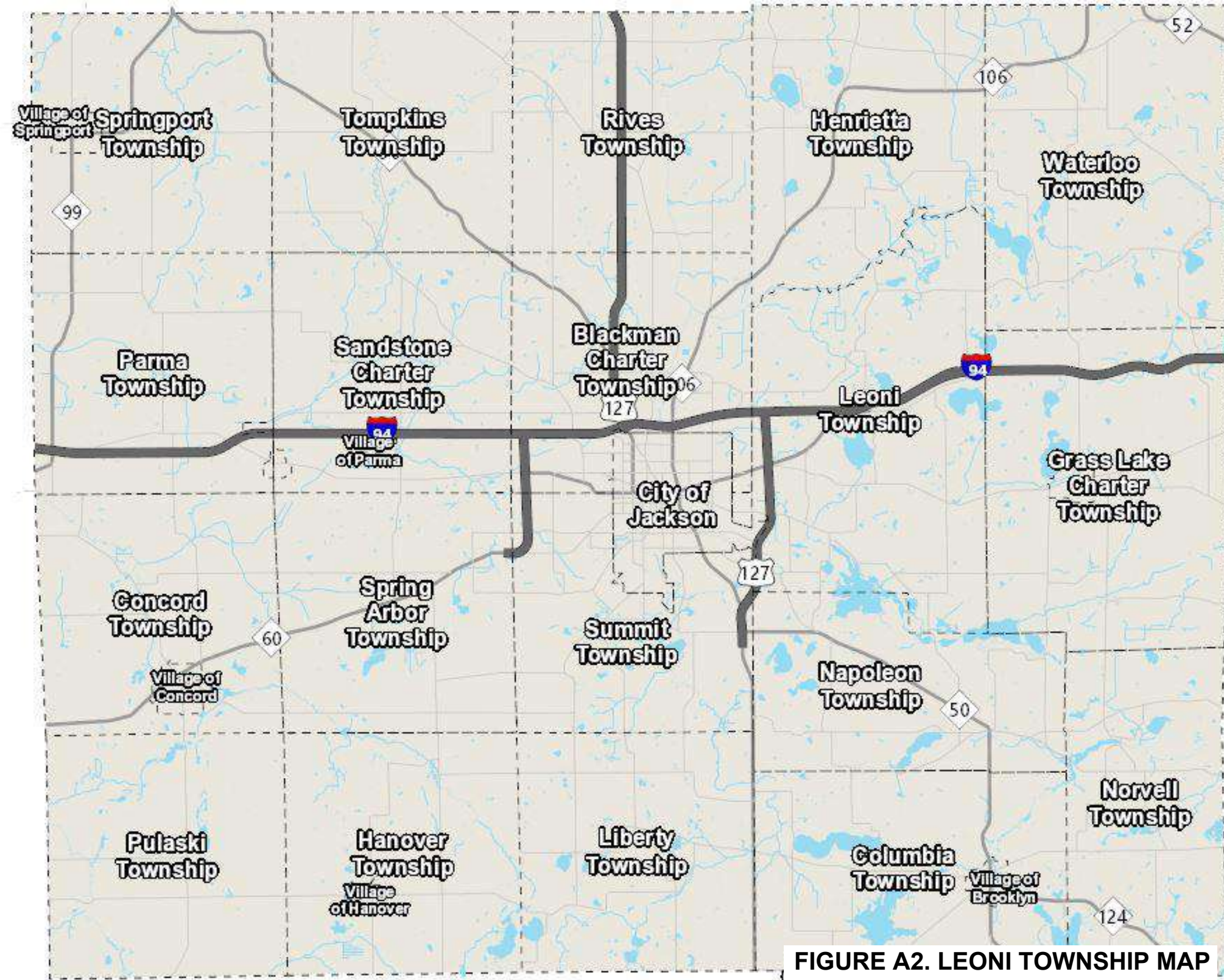
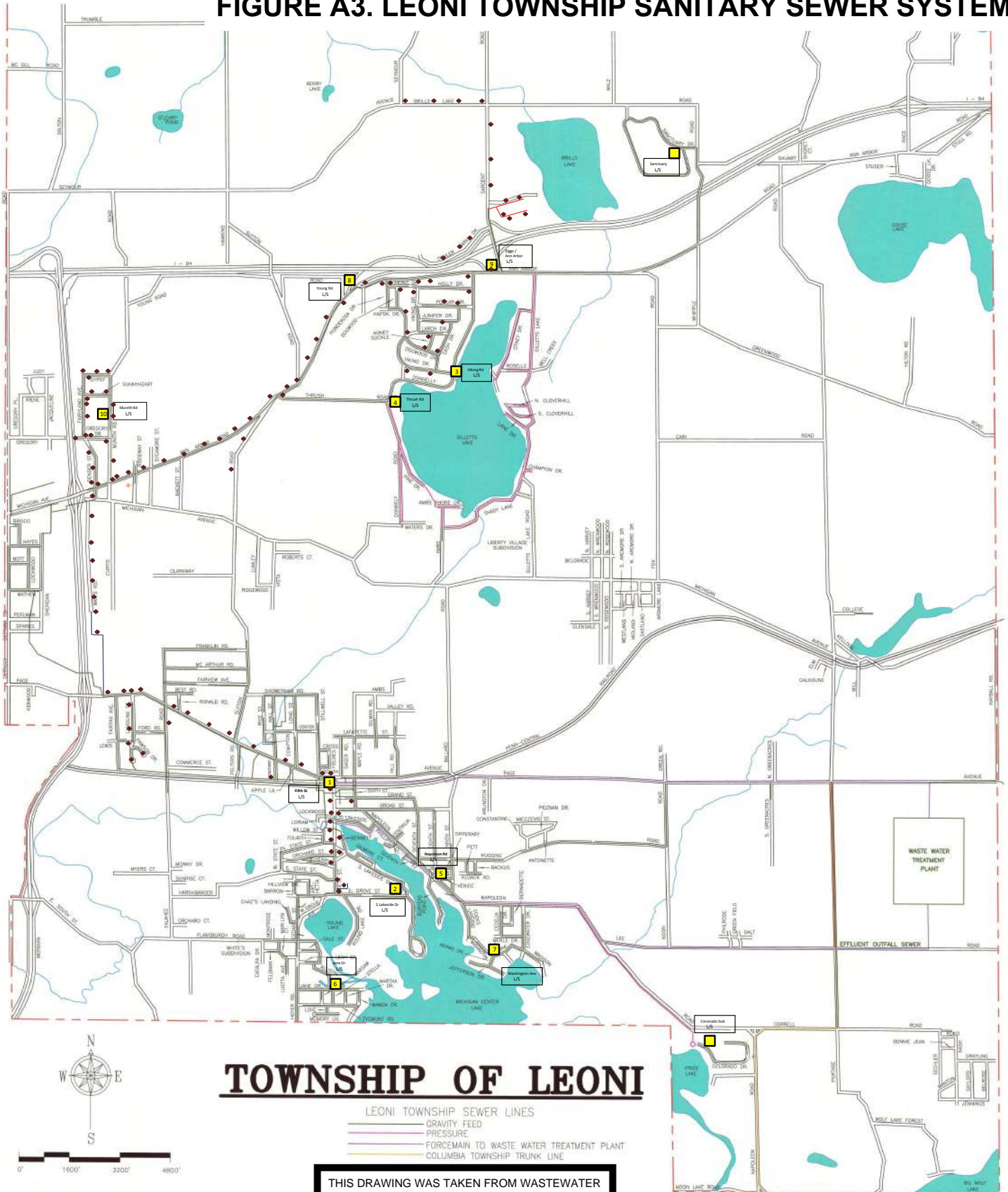
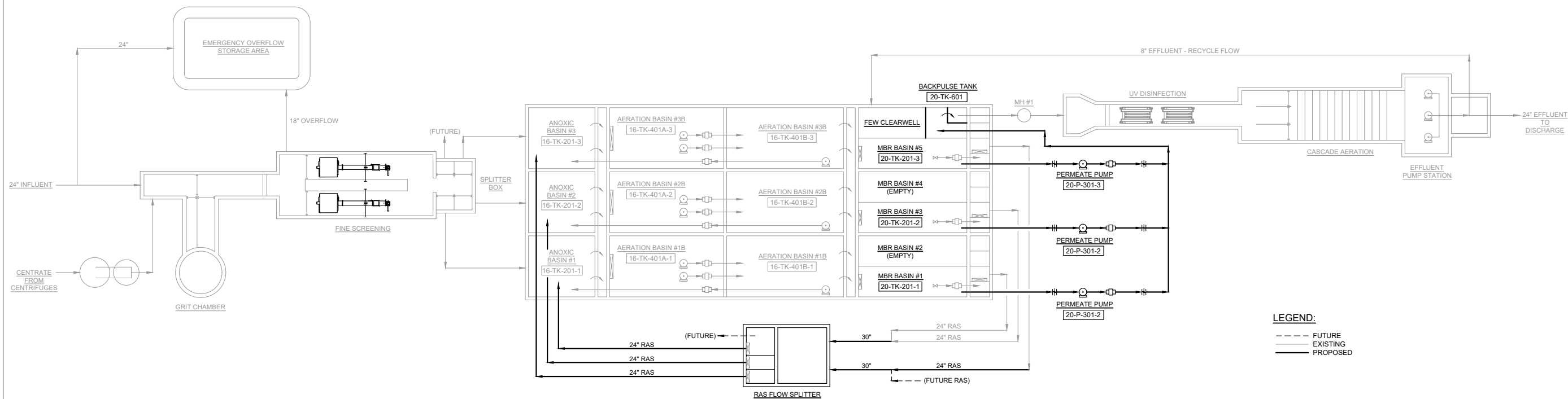


FIGURE A2. LEONI TOWNSHIP MAP

FIGURE A3. LEONI TOWNSHIP SANITARY SEWER SYSTEM



M:\Proj\839001-84000\840610 Leon1 - WWTP Membrane Replace Eas\Cad\Plan\840610_D002.dwg - plotted on 4/7/2021 1:17 PM



PROCESS FLOW SCHEMATIC

Conform to Contract	04/2021	DCH	2
Issued for Bid	02/2021	DCH	1

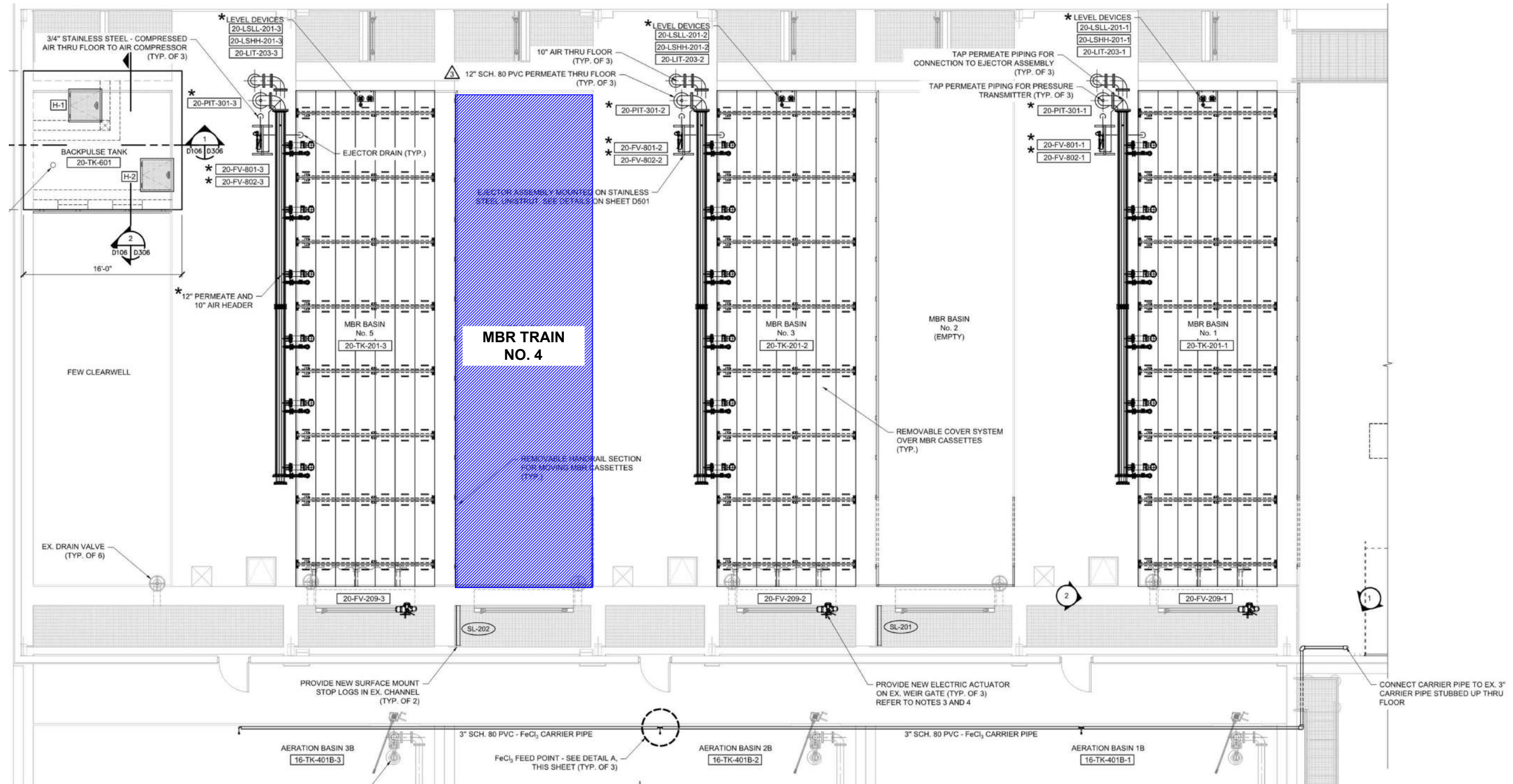
REVISION:

LEONI TOWNSHIP
JACKSON COUNTY, MICHIGAN
WWTP MEMBRANE SYSTEM IMPROVEMENTS
PROCESS FLOW SCHEMATIC



DESIGN TEAM:	PROJ MGR: DCH DESIGNED BY: JHB DRAWN BY: DCT
CHECK BY:	DCH
DRAWING INFORMATION:	FEB. 2021
	840610_D002
	030121 davet

FSV PROJECT NO:
840610

FIGURE A4. EXSITING PROCESS FLOW SCHEMATIC



LEGEND:

-  PIPING
-  PROPOSED STRUCTURES

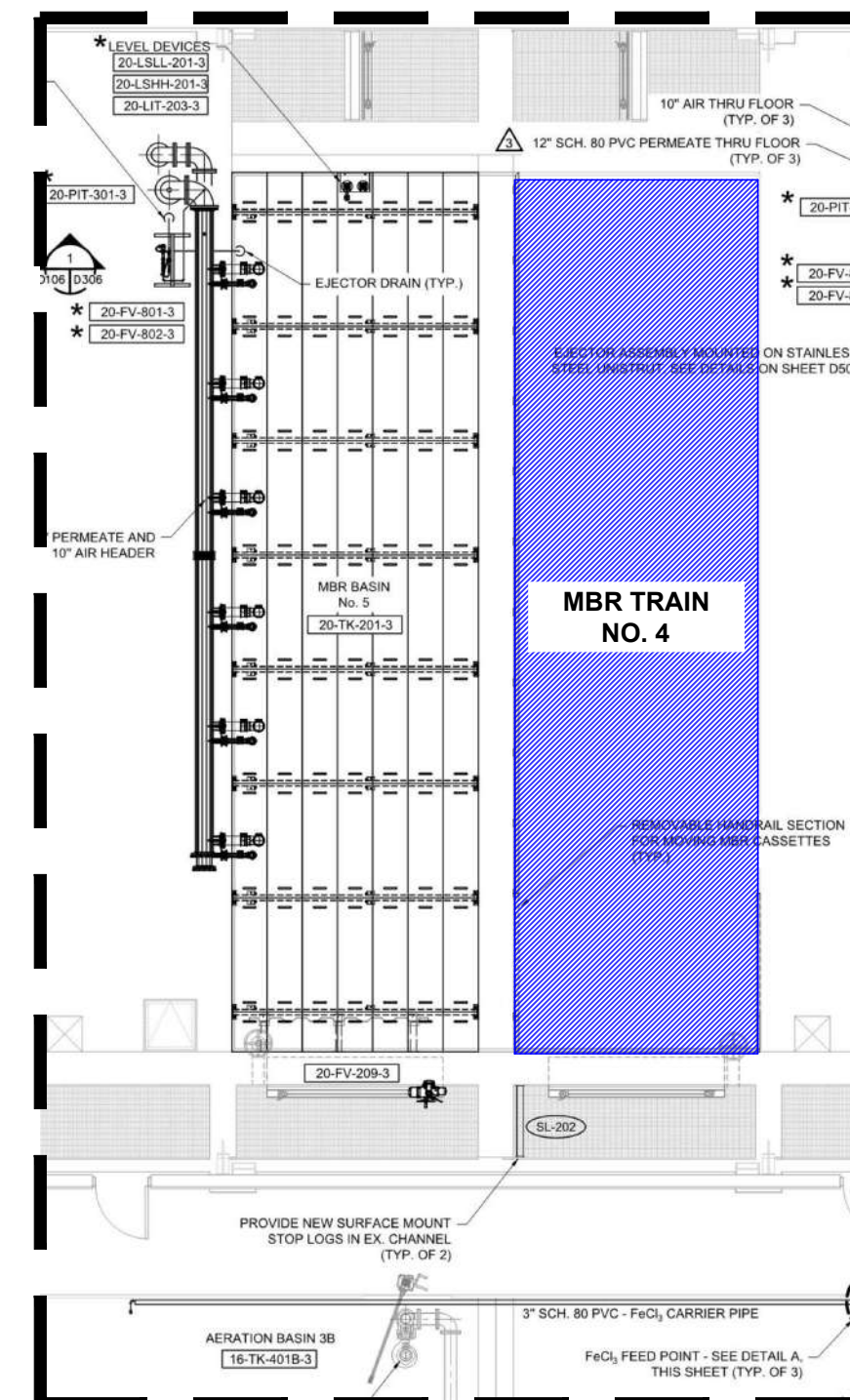
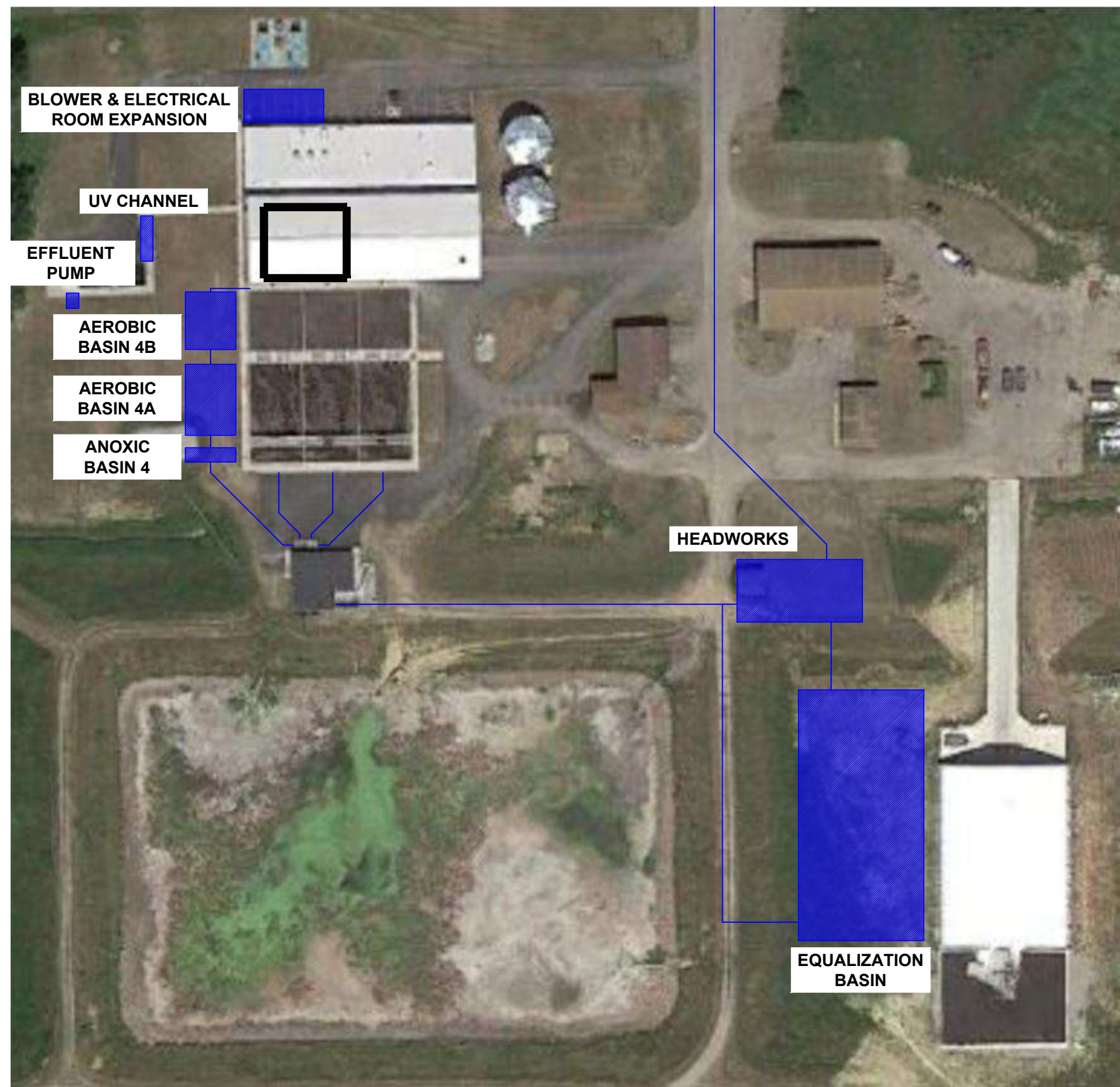
LEONI TOWNSHIP
JACKSON COUNTY, MI
WWTP BIOLOGICAL CAPACITY STUDY

ALTERNATIVE 4a LAYOUT

FIGURE A6. PROPOSED IMPROVEMENTS LAYOUT



F&V PROJECT NO. 853390

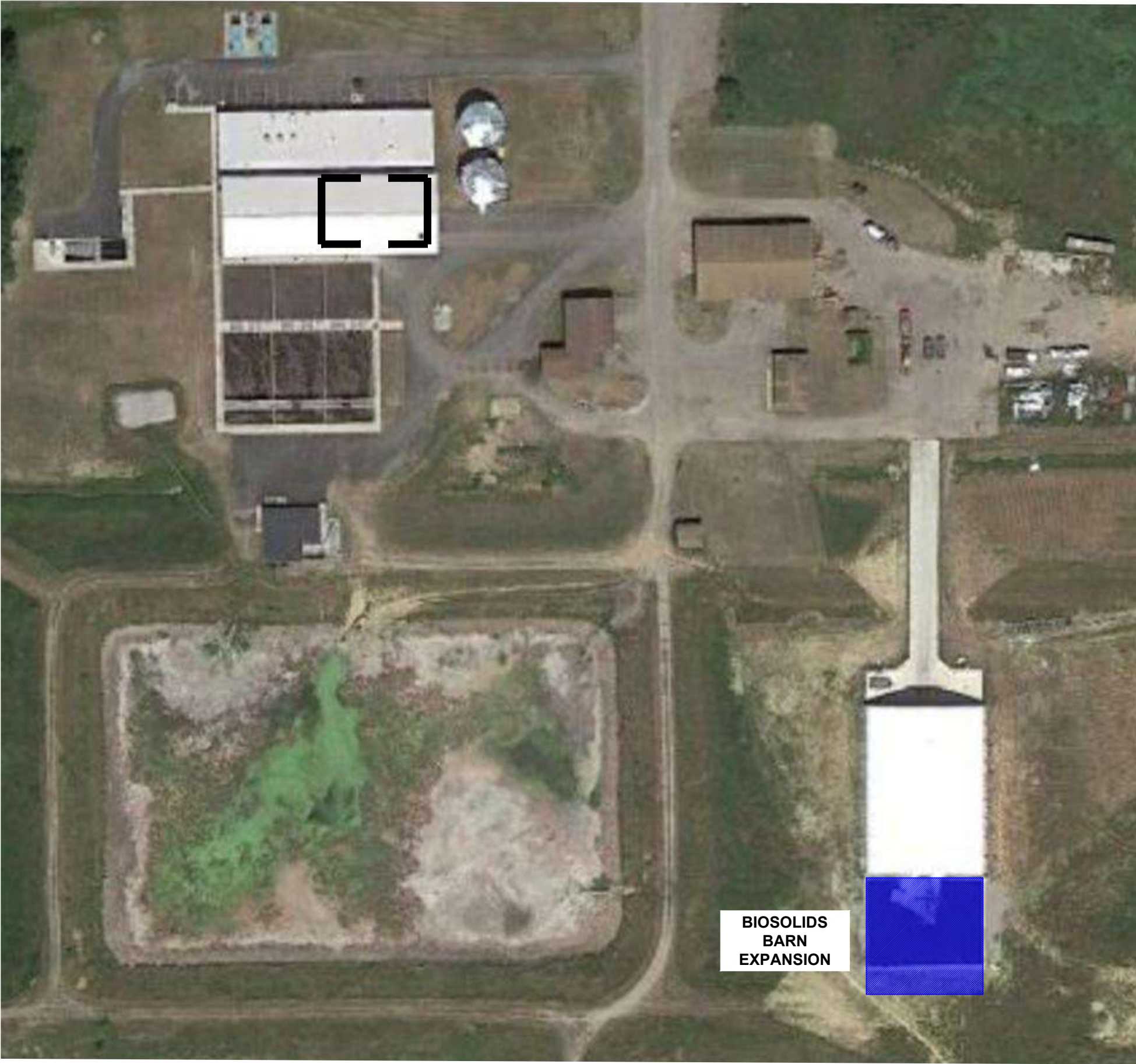


LEGEND:

- PIPING
- PROPOSED STRUCTURES

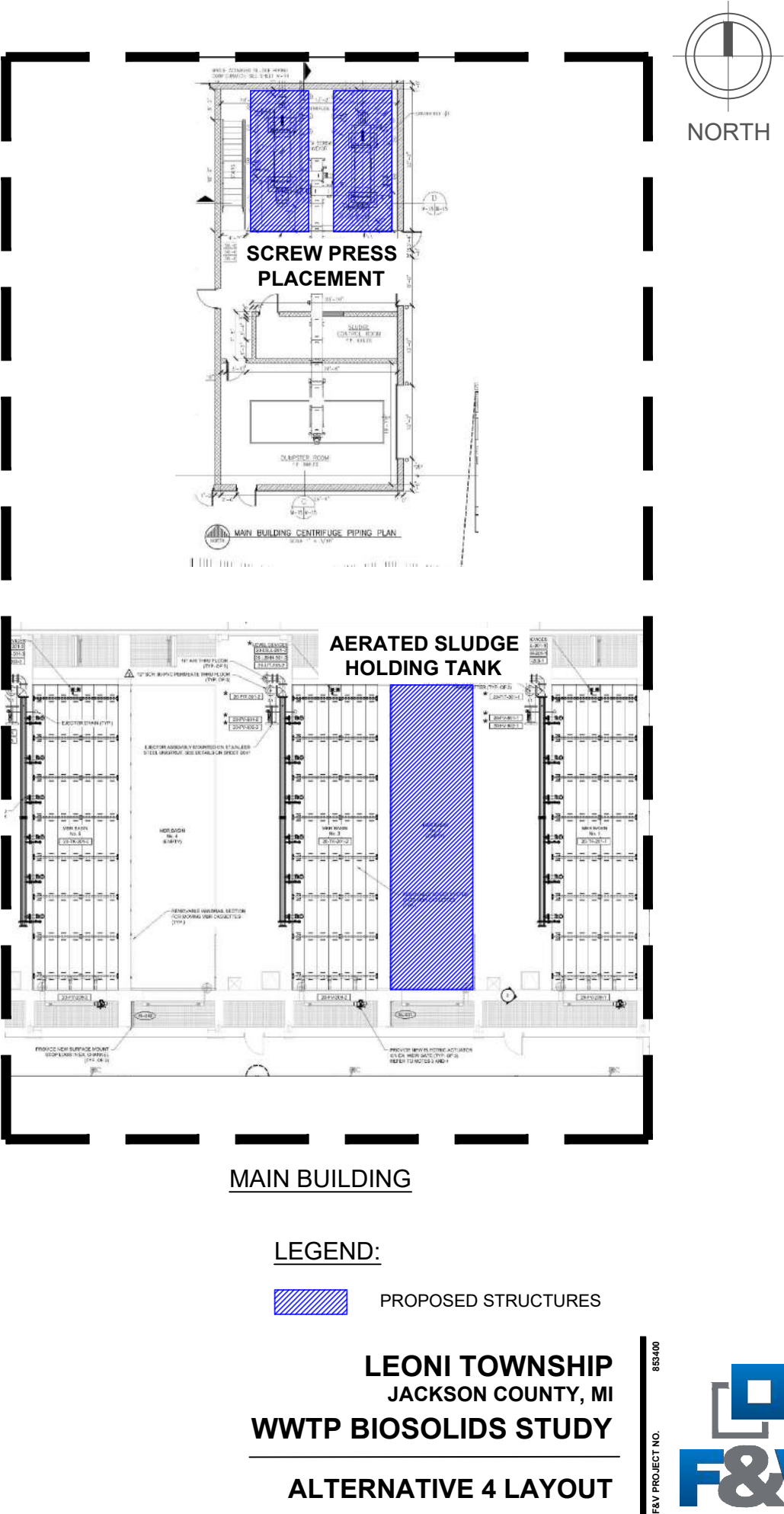


FIGURE A6. PROPOSED IMPROVEMENTS LAYOUT



WWTP SITE PLAN

FIGURE A6. PROPOSED IMPROVEMENTS LAYOUT



SCREW PRESS
PLACEMENT

AERATED SLUDGE
HOLDING TANK

MAIN BUILDING

LEGEND:

 PROPOSED STRUCTURES

LEONI TOWNSHIP
JACKSON COUNTY, MI
WWTP BIOSOLIDS STUDY

ALTERNATIVE 4 LAYOUT

855400
F&V PROJECT NO.





LEGEND:

- PIPING
- PROPOSED STRUCTURES
- PROPOSED PAVEMENT

LEONI TOWNSHIP
JACKSON COUNTY, MI
WWTP SEPTAGE RECEIVING STUDY
ALTERNATIVE 4 LAYOUT

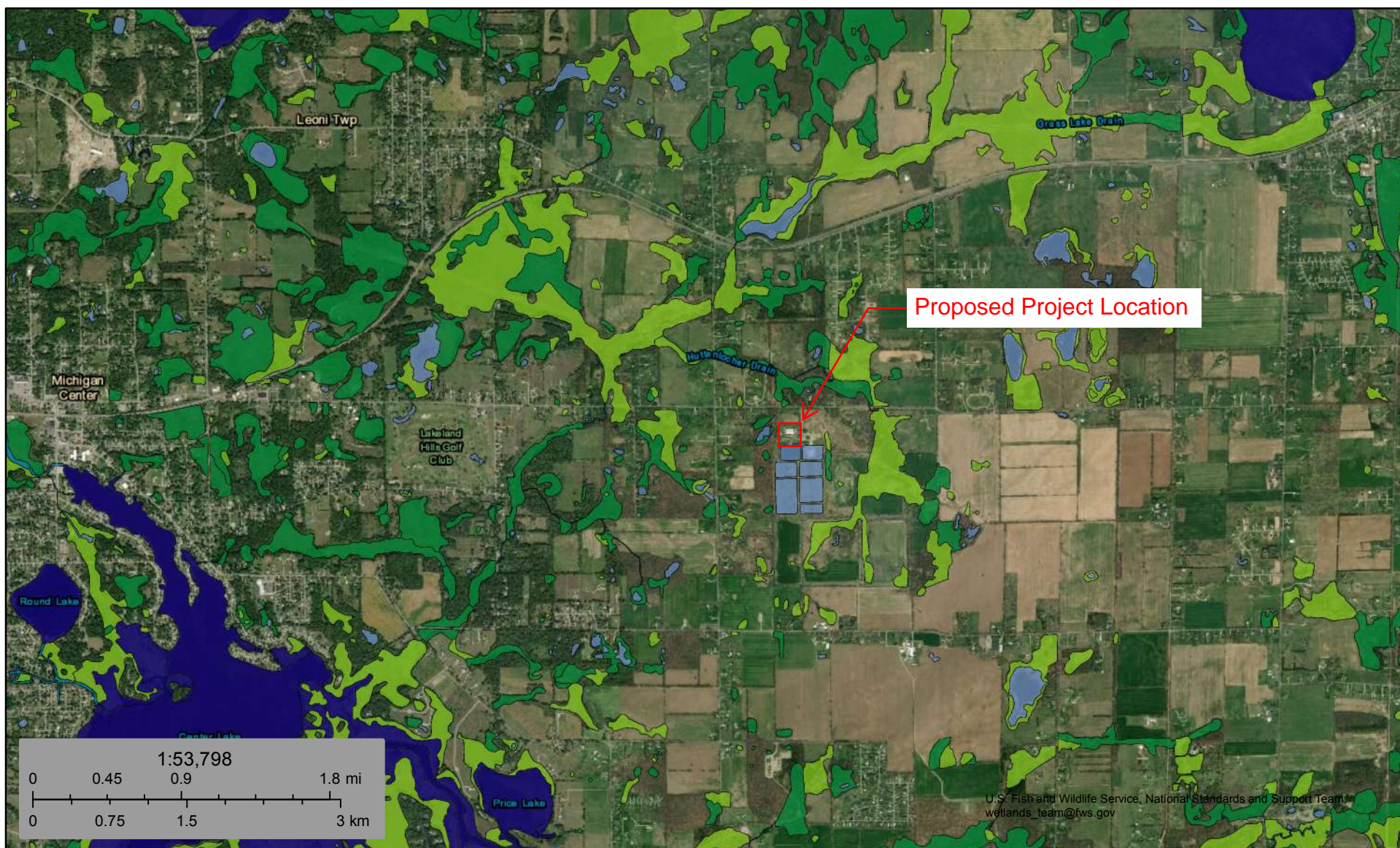
F&V PROJECT NO. 853410



FIGURE A6. PROPOSED IMPROVEMENTS LAYOUT



Leoni Township Wetlands



May 18, 2020

Wetlands

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

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

FIGURE A7. USFWS WETLANDS MAP



FIGURE A8. FEMA FLOODPLAIN MAP

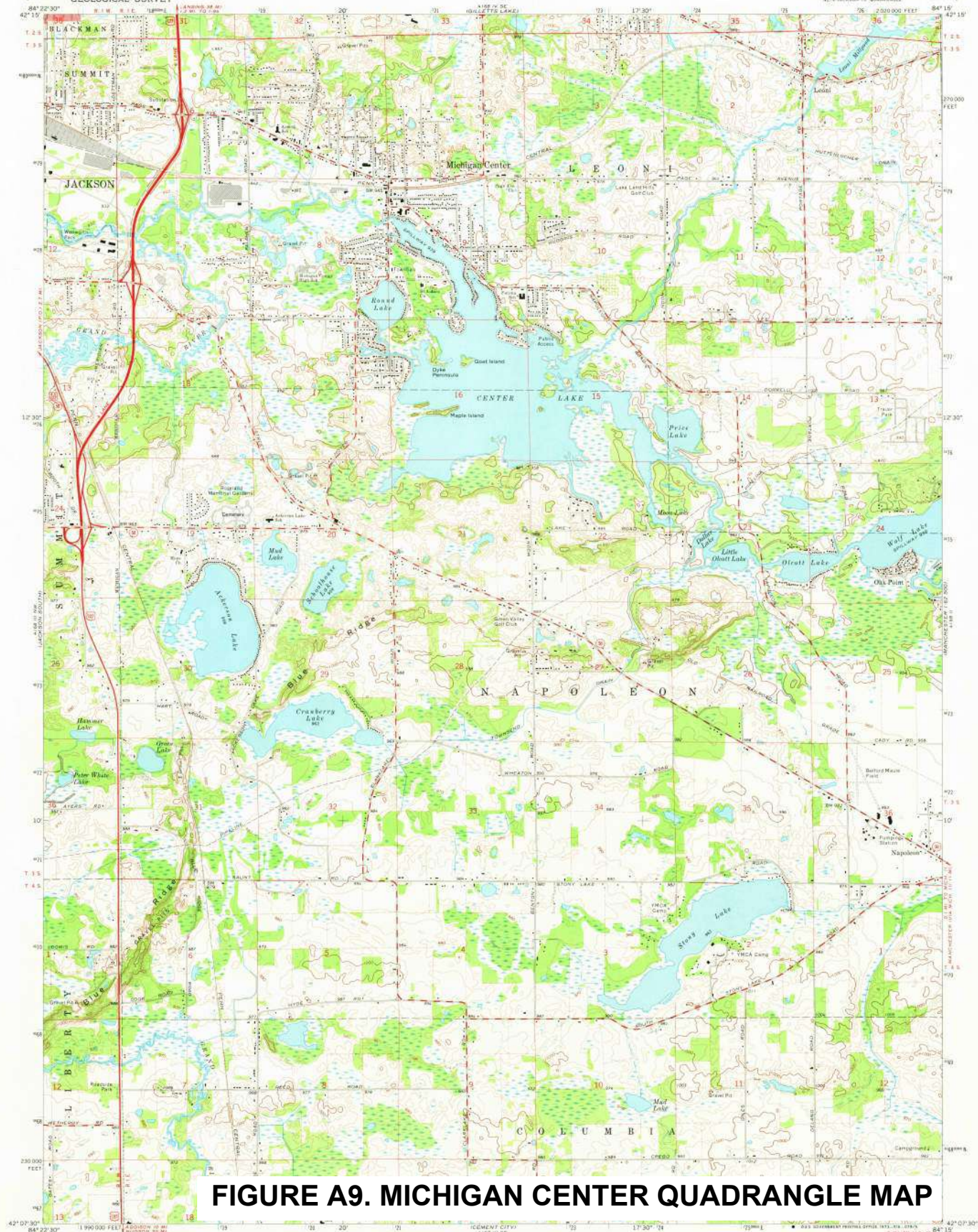


FIGURE A9. MICHIGAN CENTER QUADRANGLE MAP

Maped, edited, and published by the Geological Survey

Control by USGS and USCAOS

Topography by photogrammetric methods from aerial

photographs taken 1970. Field checked 1973

Projection: 1927 North American datum

10,000-foot grid based on Michigan coordinate system, south zone

1,000-meter Universal Transverse Mercator grid lines,

zone 16, shown in blue

Red tint indicates area in which only landmark buildings are shown

Field checked lines indicate selected fence and field lines where

generally visible on aerial photographs. This information is uncorrected

USE GRID AND ONLY MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

CONTOUR INTERVAL 10 FEET
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

Primary highway, hard surface	Light duty road, hard or improved surface
Secondary highway, hard surface	Unimproved road
Interstate Route	U.S. Route
	State Route

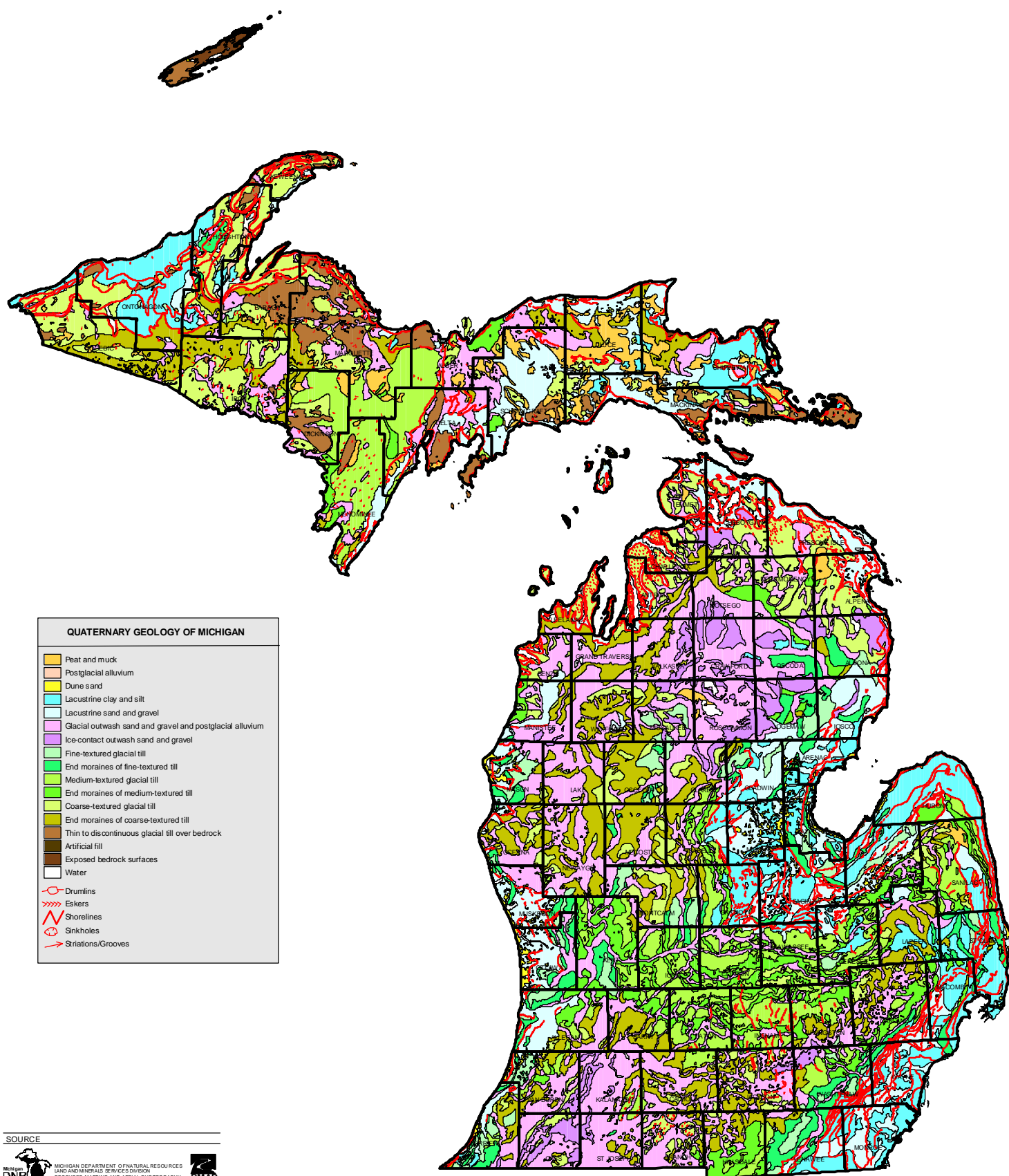
MICHIGAN CENTER, MICH.
NE 1/4 SECTION 16 QUADRANGLE
NA207 S—WS415/7.5

1973

AND 2108 01 NE—SERIES 1602

MAY 1 1973

1982 QUATERNARY GEOLOGY OF MICHIGAN



QUATERNARY GEOLOGY OF MICHIGAN

- Peat and muck
- Postglacial alluvium
- Dune sand
- Lacustrine clay and silt
- Lacustrine sand and gravel
- Glacial outwash sand and gravel and postglacial alluvium
- Ice-contact outwash sand and gravel
- Fine-textured glacial till
- End moraines of fine-textured till
- Medium-textured glacial till
- End moraines of medium-textured till
- Coarse-textured glacial till
- End moraines of coarse-textured till
- Thin to discontinuous glacial till over bedrock
- Artificial fill
- Exposed bedrock surfaces
- Water
- Drumlins
- Eskers
- Shorelines
- Sinkholes
- Striations/Grooves

SOURCE

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

Michigan Resource Information System
Part 1505, Resource Inventory of the Natural Resources and
Environmental Protection Act, 1994 PA 451, as amended.

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

Date: 11/12/99



0 20 40 Miles

FIGURE A10. QUATERNARY GEOLOGY OF MICHIGAN MAP

1987 BEDROCK GEOLOGY OF MICHIGAN

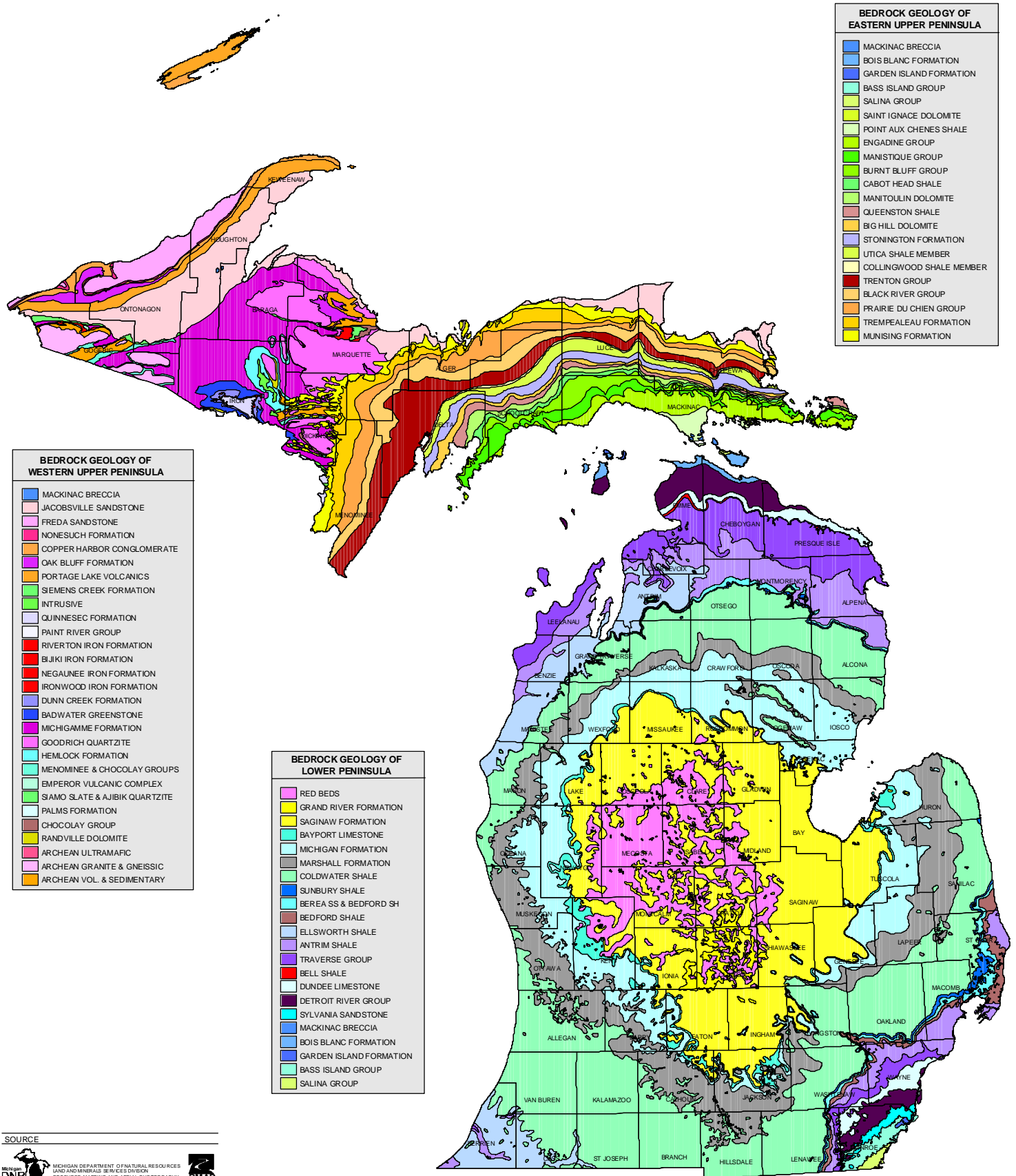


FIGURE A11. BEDROCK GEOLOGY OF MICHIGAN MAP

Soil Taxonomy Classification—Jackson County, Michigan




Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

FIGURE A12. USDA SOILS MAP









MAP LEGEND




Area of Interest (AOI)

 Area of Interest (AOI)








Soils





Soil Rating Polygons

-  Coarse-loamy, mixed, active, mesic Typic Hapludalfs
-  Coarse-loamy, mixed, semiactive, mesic Typic Hapludalfs
-  Coarse-loamy, mixed, superactive, mesic Typic Endoaquolls
-  Coarse-loamy, siliceous, semiactive, mesic Aquic Glossudalfs
-  Euic, mesic Typic Haplosaprists
-  Fine-loamy, mixed, active, mesic Typic Hapludalfs
-  Fine-loamy, mixed, superactive, mesic Typic Argiaquolls
-  Loamy, mixed, active, mesic Arenic Hapludalfs







-  Loamy, mixed, euic, mesic Terric Haplosaprists
-  Sandy, mixed, mesic Lamellic Hapludalfs
-  Not rated or not available





Soil Rating Lines

-  Coarse-loamy, mixed, active, mesic Typic Hapludalfs
-  Coarse-loamy, mixed, semiactive, mesic Typic Hapludalfs
-  Coarse-loamy, mixed, superactive, mesic Typic Endoaquolls
-  Coarse-loamy, siliceous, semiactive, mesic Aquic Glossudalfs
-  Euic, mesic Typic Haplosaprists
-  Fine-loamy, mixed, active, mesic Typic Hapludalfs
-  Fine-loamy, mixed, superactive, mesic Typic Argiaquolls


-  Loamy, mixed, active, mesic Arenic Hapludalfs
-  Loamy, mixed, euic, mesic Terric Haplosaprists
-  Sandy, mixed, mesic Lamellic Hapludalfs
-  Not rated or not available

Soil Rating Points






-  Coarse-loamy, mixed, active, mesic Typic Hapludalfs
-  Coarse-loamy, mixed, semiactive, mesic Typic Hapludalfs
-  Coarse-loamy, mixed, superactive, mesic Typic Endoaquolls
-  Coarse-loamy, siliceous, semiactive, mesic Aquic Glossudalfs
-  Euic, mesic Typic Haplosaprists
-  Fine-loamy, mixed, active, mesic Typic Hapludalfs

-  Fine-loamy, mixed, superactive, mesic Typic Argiaquolls
-  Loamy, mixed, active, mesic Arenic Hapludalfs
-  Loamy, mixed, euic, mesic Terric Haplosaprists
-  Sandy, mixed, mesic Lamellic Hapludalfs
-  Not rated or not available


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 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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: Jackson County, Michigan

Survey Area Data: Version 16, Sep 16, 2019

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

Date(s) aerial images were photographed: Data not available.

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.

Soil Taxonomy Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
11B	Boyer-Oshtemo sandy loams, 1 to 6 percent slopes	Coarse-loamy, mixed, semiactive, mesic Typic Hapludalfs	2.6	1.3%
13B	Ormas-Spinks complex, 0 to 6 percent slopes	Loamy, mixed, active, mesic Arenic Hapludalfs	18.6	9.6%
14B	Spinks sand, 0 to 6 percent slopes	Sandy, mixed, mesic Lamellic Hapludalfs	22.0	11.3%
15A	Teasdale fine sandy loam, 0 to 3 percent slopes	Coarse-loamy, siliceous, semiactive, mesic Aquic Glossudalfs	39.9	20.5%
17	Barry loam, 0 to 2 percent slopes	Fine-loamy, mixed, superactive, mesic Typic Argiaquolls	0.3	0.2%
18	Gilford-Colwood complex	Coarse-loamy, mixed, superactive, mesic Typic Endoaquolls	32.1	16.5%
20	Houghton muck, 0 to 1 percent slopes	Euic, mesic Typic Haplosaprists	1.4	0.7%
37	Palms muck, 0 to 1 percent slopes	Loamy, mixed, euic, mesic Terric Haplosaprists	4.0	2.0%
42B	Riddles sandy loam, 1 to 6 percent slopes	Fine-loamy, mixed, active, mesic Typic Hapludalfs	24.8	12.7%
42C	Riddles sandy loam, 6 to 12 percent slopes	Fine-loamy, mixed, active, mesic Typic Hapludalfs	7.8	4.0%
49B	Hillsdale-Riddles sandy loams, 1 to 6 percent slopes	Coarse-loamy, mixed, active, mesic Typic Hapludalfs	16.4	8.4%
W	Water		25.0	12.8%
Totals for Area of Interest			194.9	100.0%

Description

This rating presents the taxonomic classification based on Soil Taxonomy.

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999 and 2003). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. This table shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in sol. An example is Alfisols.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalfs (Ud, meaning humid, plus alfs, from Alfisols).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (Hapl, meaning minimal horizonation, plus udalfs, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective Typic identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, active, mesic Typic Hapludalfs.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

References:

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. (The soils in a given survey area may have been classified according to earlier editions of this publication.)

Rating Options

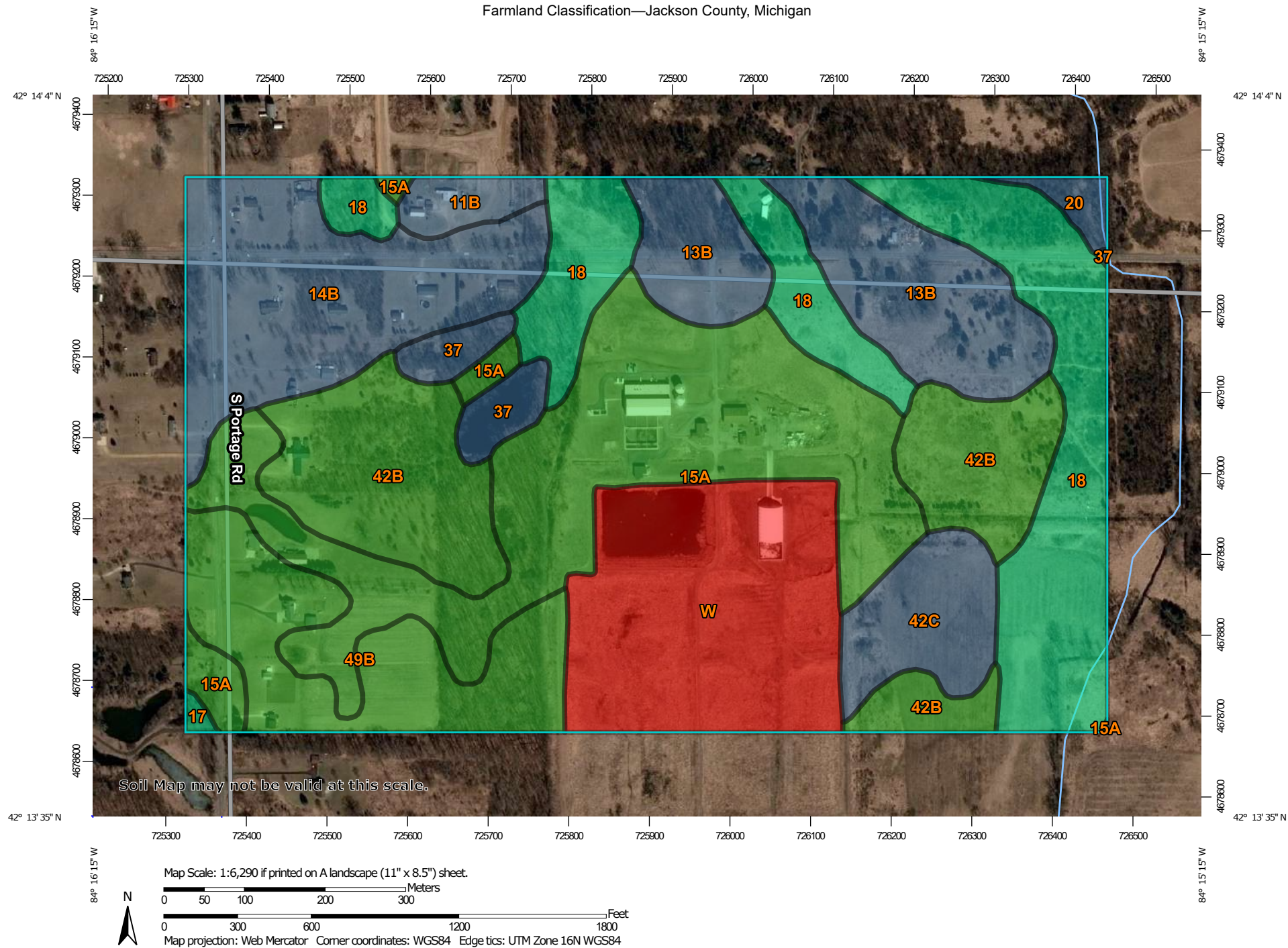
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

FIGURE A13. USDA FARMLAND CLASSIFICATION MAP

Farmland Classification—Jackson County, Michigan




**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

6/1/2020
Page 1 of 5









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

Farmland Classification—Jackson County, Michigan

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

Farmland Classification—Jackson County, Michigan



Farmland Classification

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
11B	Boyer-Oshtemo sandy loams, 1 to 6 percent slopes	Farmland of local importance	2.6	1.3%
13B	Ormas-Spinks complex, 0 to 6 percent slopes	Farmland of local importance	18.6	9.6%
14B	Spinks sand, 0 to 6 percent slopes	Farmland of local importance	22.0	11.3%
15A	Teasdale fine sandy loam, 0 to 3 percent slopes	All areas are prime farmland	39.9	20.5%
17	Barry loam, 0 to 2 percent slopes	Prime farmland if drained	0.3	0.2%
18	Gilford-Colwood complex	Prime farmland if drained	32.1	16.5%
20	Houghton muck, 0 to 1 percent slopes	Farmland of local importance	1.4	0.7%
37	Palms muck, 0 to 1 percent slopes	Farmland of local importance	4.0	2.0%
42B	Riddles sandy loam, 1 to 6 percent slopes	All areas are prime farmland	24.8	12.7%
42C	Riddles sandy loam, 6 to 12 percent slopes	Farmland of local importance	7.8	4.0%
49B	Hillsdale-Riddles sandy loams, 1 to 6 percent slopes	All areas are prime farmland	16.4	8.4%
W	Water	Not prime farmland	25.0	12.8%
Totals for Area of Interest			194.9	100.0%

Description

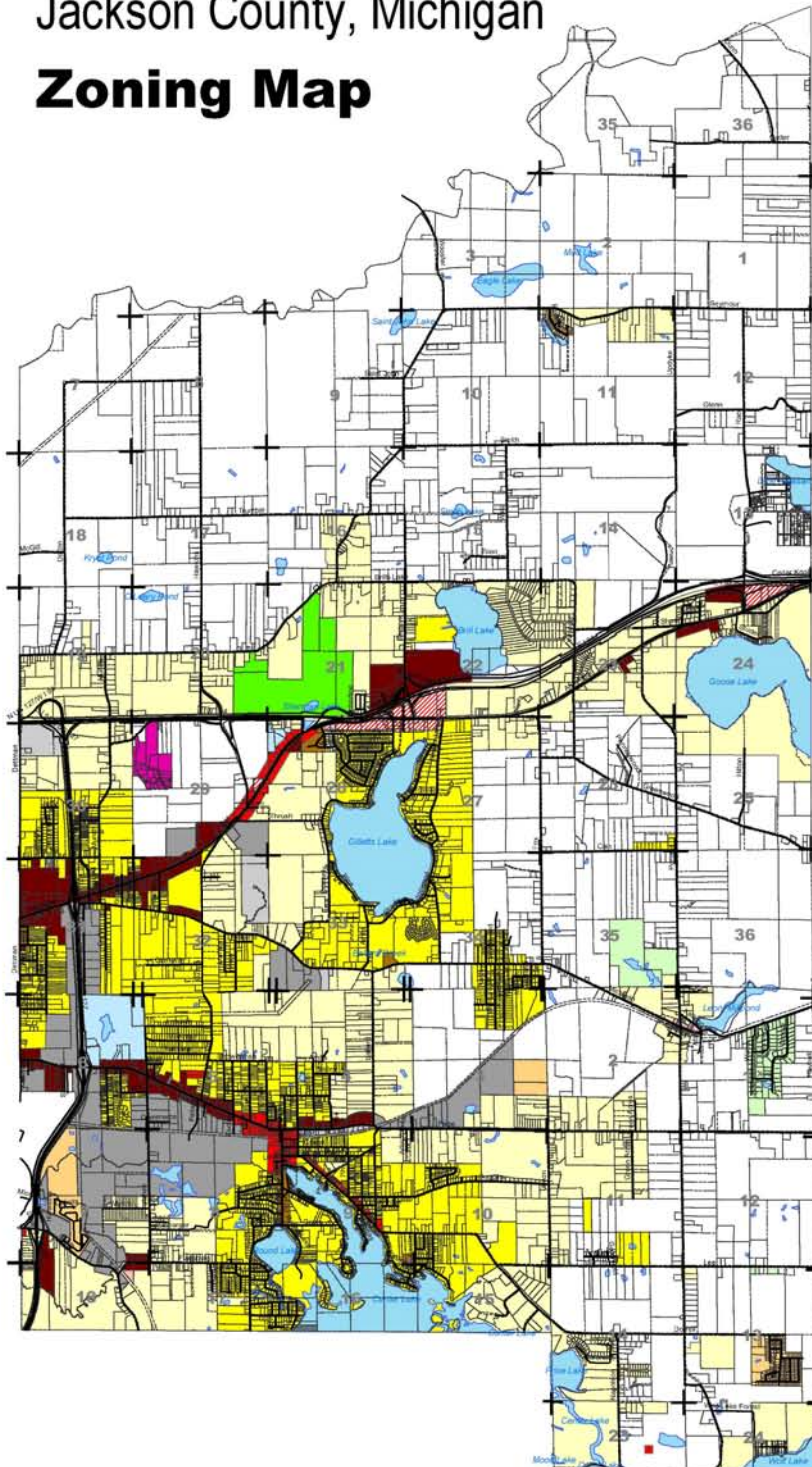
Farmland classification identifies map units as prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland. It identifies the location and extent of the soils that are best suited to food, feed, fiber, forage, and oilseed crops. NRCS policy and procedures on prime 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

Leoni Township Jackson County, Michigan Zoning Map



ZONING DISTRICTS

- AG** Agricultural District
- RNF** Rural Non-Farm Residential District
- RS** Suburban Residential District
- R-1** One Family Residential District
- PR-1** Planned Residential District
- R-4** High Density Residence & Office District
- RM** Mobile Home Residential District
- B-1** Neighborhood Business District
- B-2** Community Business District
- B-4** General Business District
- B-5** Highway Business District
- ML** Light Industrial District
- M** Heavy Industrial District
- PUD** Planned Unit Development District
- OS** Open Space District

Date of Last Zoning Revision:
August 9, 2010

This is to certify that this is the Official Zoning Map referred to in the
Zoning Ordinance of _____
adopted on _____

signature _____ Supervisor date ____/____/____
signature _____ Clerk date ____/____/____



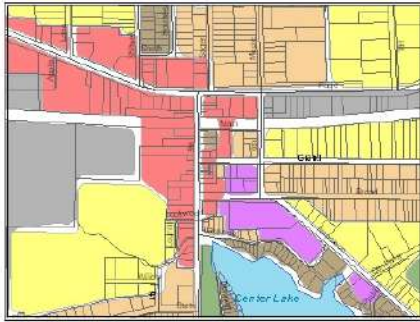
0 625 1250 2500 3750 5000 Feet



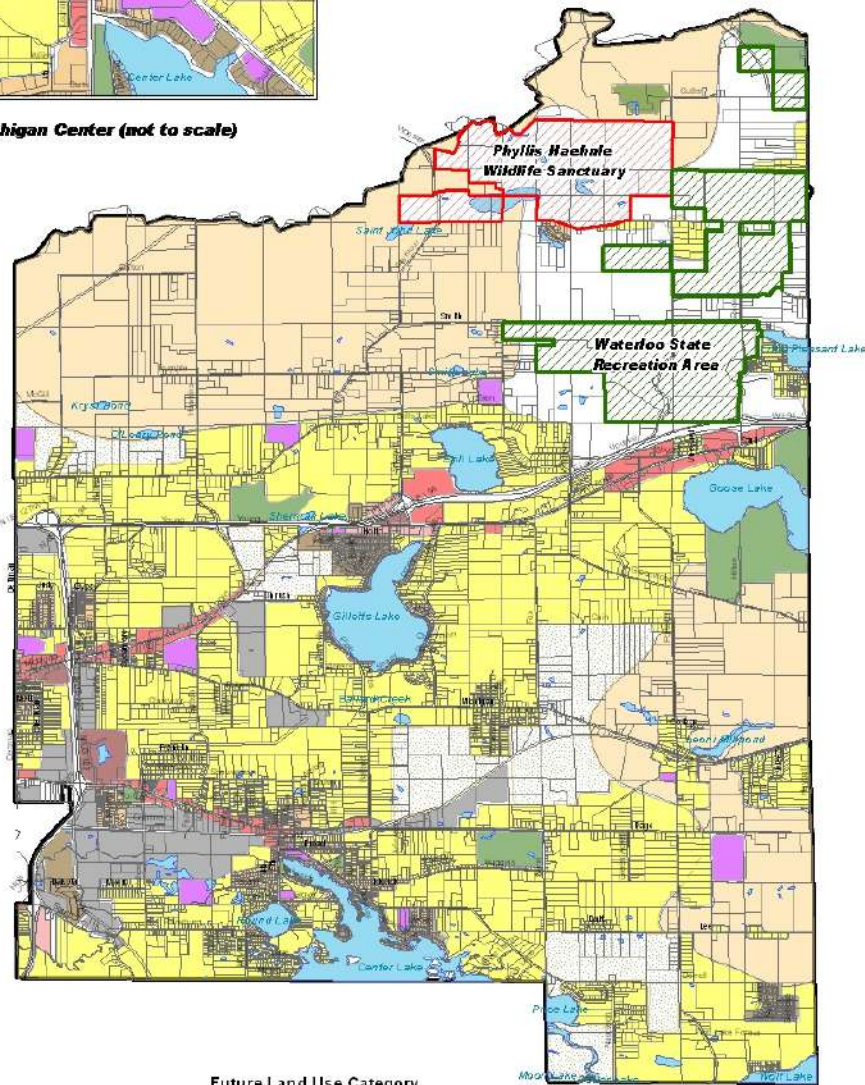
FIGURE A14. LEONI TOWNSHIP ZONING MAP

Map 1

Leoni Township Future Land Use Plan



Michigan Center (not to scale)



Future Land Use Category

Low-Density Residential	Commercial	Agricultural Preservation Areas
Moderate-Density Residential	General Commercial	Parks and Recreation
High-Density Residential	Regional Commercial	Public/Quasi-Public
Agriculture	Industrial	Open Space

0 1 2 Miles



Map Created: December 7, 2011
Revised: January 18, 2012

FIGURE A15. LEONI TOWNSHIP FUTURE LAND USE MAP

APPENDIX B NPDES PERMIT

PREPARED FOR:



Project No.: 854460

PERMIT NO. MI0045942

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,

Leoni Township
913 Fifth Street
Michigan Center, MI 49254

is authorized to discharge from the **Leoni Township Wastewater Treatment Plant** located at

8401 Page Avenue
Jackson, MI 49201

designated as **Leoni Twp WWTP**

to the receiving water, an unnamed tributary to the Grand River 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 April 4, 2017, as amended through July 13, 2017.

This permit takes effect on November 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. MI0045942 (expiring October 1, 2017).

This permit and the authorization to discharge shall expire at midnight on **October 1, 2022**. 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, 2022**.

Issued DRAFT

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 Major, less than 10 MGD (Individual Permit)

In accordance with Section 324.3118 of the NREPA, the permittee shall make payment of an annual storm water fee to the Department for each January 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 March 15 for notices mailed by February 1. The fee is due no later than 45 days after receiving the notice for notices mailed after February 1.

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 Jackson District Office of the Water Resources Division. The Jackson District Office is located at 301 East Louis Glick Highway, Jackson, MI 49201-1535, Telephone: 517-780-7690, Fax: 517-780-7855.

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 an unnamed tributary to the Grand River at Latitude 42.22890, Longitude -84.32720. 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					
Parameter	Monthly	7-Day	Daily	Units	Monthly	7-Day	Daily	Units	Monitoring Frequency	Sample Type
Flow	(report)		(report)	MGD	---		---	---	Daily	Report Total Daily Flow
Carbonaceous Biochemical Oxygen Demand (CBOD ₅)										
May – November	100	250	(report)	lbs/day	4	---	10	mg/l	5x Weekly	24-Hr Composite
December – March	580	850	(report)	lbs/day	23	---	34	mg/l	5x Weekly	24-Hr Composite
April	600	900	(report)	lbs/day	24	---	36	mg/l	5x Weekly	24-Hr Composite
Total Suspended Solids (TSS)										
May – November	500	750	(report)	lbs/day	20	30	(report)	mg/l	5x Weekly	24-Hr Composite
December - April	750	1100	(report)	lbs/day	30	45	(report)	mg/l	5x Weekly	24-Hr Composite
Ammonia Nitrogen (as N)										
May – November	13	50	(report)	lbs/day	0.5	---	2	mg/l	5x Weekly	24-Hr Composite
December – March	290	430	(report)	lbs/day	11.4	---	17	mg/l	5x Weekly	24-Hr Composite
April	330	380	(report)	lbs/day	13.3	---	15	mg/l	5x Weekly	24-Hr Composite
Total Phosphorus (as P)	8.3	---	(report)	lbs/day	0.33	---	(report)	mg/l	5x Weekly	24-Hr Composite
Fecal Coliform Bacteria	---	---	---	---	200	400	(report)	cts/100 ml	5x Weekly	Grab
Available Cyanide	0.17	---	(report)	lbs/day	7	---	(report)	ug/l	Monthly	Grab
Total Selenium	0.16	---	(report)	lbs/day	6.0	---	(report)	ug/l	Monthly	24-Hr Composite
Total Mercury										
Corrected	(report)	---	(report)	lbs/day	(report)	---	(report)	ng/l	Quarterly	Calculation
Uncorrected	---	---	---	---	---	---	(report)	ng/l	Quarterly	Grab
Field Duplicate	---	---	---	---	---	---	(report)	ng/l	Quarterly	Grab
Field Blank	---	---	---	---	---	---	(report)	ng/l	Quarterly	Calculation
Laboratory Method Blank	---	---	---	---	---	---	(report)	ng/l	Quarterly	Calculation
					Minimum % Monthly		Minimum % Daily			
Total Suspended Solids Minimum % Removal										
December - April	---	---	---	---	85	---	(report)	%	Monthly	Calculation
					Minimum Daily		Maximum Daily			
pH	---	---	---	---	6.5	---	9.0	S.U.	5x Weekly	Grab

PART I**Section A. Limitations and Monitoring Requirements**

<u>Parameter</u>					<u>Minimum Daily</u>			<u>Units</u>	<u>Monitoring Frequency</u>	<u>Sample Type</u>
Dissolved Oxygen										
May – November	---	---	---	---	7.0	---	---	mg/l	5x Weekly	Grab
December - April	---	---	---	---	6.0	---	---	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: 3.0 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 Carbonaceous Biochemical Oxygen Demand (CBOD₅), Total Suspended Solids (TSS), Ammonia Nitrogen (as N), Total Phosphorus (as P), and Total Selenium shall be taken prior to disinfection. Samples for Fecal Coliform Bacteria, Available Cyanide, 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. **Quarterly Monitoring**
Quarterly samples shall be taken during the months of January, April, July, and October. If the facility does not discharge during these months, the permittee shall sample the next discharge occurring during the period in question. If the facility does not discharge during the period in question, a sample is not required for that period. For any month in which a sample is not taken, the permittee shall enter "*"G" on the Discharge Monitoring Report (DMR). (For purposes of reporting on the Daily tab of the DMR, the permittee shall enter "*"G" on the first day of the month only).
- d. **Ultraviolet Disinfection**
It is understood that ultraviolet light will be used to achieve compliance with the fecal coliform limitations. If disinfection other than ultraviolet light will be used, the permittee shall notify the Department in accordance with Part II.C.12. of this permit.
- e. **Percent Removal Requirements**
These requirements shall be calculated based on the monthly (30-day) effluent TSS concentrations and the monthly influent concentrations for approximately the same period.
- f. **Monitoring Frequency Reduction for Available Cyanide and Total Selenium**
After the submittal of 24 months of data, the permittee may request, in writing, Department approval for a reduction in monitoring frequency for available cyanide and/or total selenium. This request shall contain an explanation as to why the reduced monitoring is appropriate. Upon receipt of written approval and consistent with such approval, the permittee may reduce the monitoring frequency indicated in Part I.A.1. of this permit. The monitoring frequency for available cyanide and total selenium shall not be reduced to less than annually. The Department may revoke the approval for reduced monitoring at any time upon notification to the permittee.

PART I**Section A. Limitations and Monitoring Requirements****g. 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.

The Department will review the mercury monitoring data using the reasonable potential process described in R 323.1211 of the Michigan Administrative Code to determine if there is a reasonable potential for the Water Quality Standard of 1.3 ng/l of total mercury to be exceeded in the effluent. If it is determined that the effluent has a reasonable potential to exceed 1.3 ng/l of total mercury, upon written notification by the Department, the permittee shall resume the Pollutant Minimization Program for Total Mercury in accordance with the provisions of Part I.A.4. of this permit. If, at any time during the life of the permit, the final effluent concentration exceeds 5 ng/l, the permittee shall notify the Department at the time of its next regular monthly monitoring report and shall resume the Pollutant Minimization Program for Total Mercury contained in Part I.A.4. of this permit.

PART I**Section A. Limitations and Monitoring Requirements****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	
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

PART I**Section A. Limitations and Monitoring Requirements**

Parameter	QL	Units	Analytical Method
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. Additional Monitoring Requirements

As a condition of this permit, the permittee shall monitor the discharge from monitoring point INSERTBOX for the constituents listed below. This monitoring is an application requirement of 40 CFR 122.21(j), effective December 2, 1999. Testing shall be conducted in August 2019, May 2020, March 2021, and October 2021. Grab samples shall be collected for total mercury, available cyanide, total phenols, and the Volatile Organic Compounds identified below. For all other parameters, 24-hour composite samples shall be collected.

Test species for whole effluent toxicity monitoring shall include fathead minnow **and** *Ceriodaphnia dubia*, for a total of four (4) tests on each species. Testing and reporting procedures shall follow procedures contained in EPA-821-R-02-013, "Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" (Fourth Edition). When the effluent ammonia nitrogen (as N) concentration is greater than 3 mg/l, the pH of the toxicity test shall be maintained at a pH of 8 Standard Units. Acute and chronic toxicity data shall be included in the reporting for the toxicity test results. Toxicity test data acceptability is contingent upon the validation of the test method by the testing laboratory. Such validation shall be submitted to the Department upon request.

PART I**Section A. Limitations and Monitoring Requirements**

The results of such additional monitoring shall be submitted with the application for reissuance (see the cover page of this permit for the application due date). The permittee shall notify the Department within 14 days of completing the monitoring for each month specified above in accordance with Part II.C.5. Additional reporting requirements are specified in Part II.C.11. The permittee shall report to the Department any whole effluent toxicity test results greater than 1.0 TU_A or 1.0 TU_C within five (5) days of becoming aware of the result. If, upon review of the analysis, it is determined that additional requirements are needed 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.

Whole Effluent Toxicity

acute toxicity chronic toxicity

Hardness

calcium carbonate

Metals (Total Recoverable), Cyanide and Total Phenols

antimony	arsenic	barium	beryllium
boron	cadmium	chromium	copper
lead	nickel	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

4-chloro-3-methylphenol	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-trichlorophenol	

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		

PART I**Section A. Limitations and Monitoring Requirements****4. Pollutant Minimization Program for Total Mercury**

This condition is required, upon written notification by the Department or if the permittee notifies the Department that the final effluent concentration of total mercury has exceeded 5 ng/l, as specified in Part I.A.1. 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 upon notification shall resume implementation of the Pollutant Minimization Program approved on July 13, 2009, and modifications thereto, to proceed towards 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.

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.

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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.

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Section A. Limitations and Monitoring Requirements

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.

8. Asset Management

The permittee shall at all times properly operate and maintain all facilities (i.e., the sewer system and treatment works as defined in Part 41 of the NREPA), and control systems installed or used by the permittee to operate the sewer system and treatment works and achieve and maintain compliance with the conditions of this permit (also see Part II.D.3 of this permit). The requirements of an Asset Management Program function to achieve the goals of effective performance, adequate funding, and adequate operator staffing and training. Asset management is a planning process for ensuring that optimum value is gained for each asset and that financial resources are available to rehabilitate and replace those assets when necessary. Asset management is centered on a framework of five (5) core elements: the current state of the assets; the required sustainable level of service; the assets critical to sustained performance; the minimum life-cycle costs; and the best long-term funding strategy.

a. Asset Management Program Requirements

The permittee shall continue to implement the Asset Management Plan approved on September 16, 2015, and approved modifications thereto. The Asset Management Plan contains a schedule for the development and implementation of an Asset Management Program that meets the requirements outlined below in 1) – 4):

1) *Maintenance Staff.* The permittee shall provide an adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit. The level of staffing needed shall be determined by taking into account the work involved in operating the sewer system and treatment works, planning for and conducting maintenance, and complying with this permit.

2) *Collection System Map.* The permittee shall complete a map of the sewer collection system it owns and operates. The map shall be of sufficient detail and at a scale to allow easy interpretation. The collection system information shown on the map shall be based on current conditions and shall be kept up-to-date and available for review by the Department. **Note: Items below referencing combined sewer systems are not applicable to separate sewer systems.** Such map(s) shall include but not be limited to the following:

- a) all sanitary sewer lines and related manholes;
- b) all combined sewer lines, related manholes, catch basins and CSO regulators;
- c) all known or suspected connections between the sanitary sewer or combined sewer and storm drain systems;

PART I**Section A. Limitations and Monitoring Requirements**

- d) all outfalls, including the treatment plant outfall(s), combined sewer treatment facility outfalls, untreated CSOs, and any known SSOs;
 - e) all pump stations and force mains;
 - f) the wastewater treatment facility(ies), including all treatment processes;
 - g) all surface waters (labeled);
 - h) other major appurtenances such as inverted siphons and air release valves;
 - i) a numbering system which uniquely identifies manholes, catch basins, overflow points, regulators and outfalls;
 - j) the scale and a north arrow;
 - k) the pipe diameter, date of installation, type of material, distance between manholes, and the direction of flow; and
 - l) the manhole interior material, rim elevation (optional), and invert elevations.
- 3) *Inventory and assessment of fixed assets.* The permittee shall complete an inventory and assessment of operations-related fixed assets. Fixed assets are assets that are normally stationary (e.g., pumps, blowers, and buildings). The inventory and assessment shall be based on current conditions and shall be kept up-to-date and available for review by the Department.
- a) The fixed asset inventory shall include the following:
 - (1) a brief description of the fixed asset, its design capacity (e.g., pump: 120 gallons per minute), its level of redundancy, and its tag number if applicable;
 - (2) the location of the fixed asset;
 - (3) the year the fixed asset was installed;
 - (4) the present condition of the fixed asset (e.g., excellent, good, fair, poor); and
 - (5) the current fixed asset (replacement) cost in dollars for year specified in accordance with approved schedules;
 - b) The fixed asset assessment shall include a "Business Risk Evaluation" that combines the probability of failure of the fixed asset and the criticality of the fixed asset, as follows:
 - (1) Rate the probability of failure of the fixed asset on a scale of 1-5 (low to high) using criteria such as maintenance history, failure history, and remaining percentage of useful life (or years remaining);
 - (2) Rate the criticality of the fixed asset on a scale of 1-5 (low to high) based on the consequence of failure versus the desired level of service for the facility; and
 - (3) Compute the Business Risk Factor of the fixed asset by multiplying the failure rating from (1) by the criticality rating from (2).

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4) *Operation, Maintenance & Replacement (OM&R) Budget and Rate Sufficiency for the Sewer System and Treatment Works.* The permittee shall complete an assessment of its user rates and replacement fund, including the following:

- a) beginning and end dates of fiscal year;
- b) name of the department, committee, board, or other organization that sets rates for the operation of the sewer system and treatment works;
- c) amount in the permittee's replacement fund in dollars for year specified in accordance with approved schedules;
- d) replacement fund strategy of all assets with a useful life of 20 years or less;
- e) expenditures for maintenance, corrective action and capital improvement taken during the fiscal year;
- f) OM&R budget for the fiscal year; and
- g) rate calculation demonstrating sufficient revenues to cover OM&R expenses. If the rate calculation shows there are insufficient revenues to cover OM&R expenses, the permittee shall document, within three (3) fiscal years after submittal of the Asset Management Plan, that there is at least one rate adjustment that reduces the revenue gap by at least 10 percent. The permittee may prepare and submit an alternate plan, subject to Department approval, for addressing the revenue gap. The ultimate goal of the Asset Management Program is to ensure sufficient revenues to cover OM&R expenses.

b. Reporting

The permittee shall develop a written report that summarizes asset management activities completed during the previous year and planned for the upcoming year. The written report shall be submitted to the Department on or before July 31 of each year. The written report shall include:

- 1) a description of the staffing levels maintained during the year;
- 2) a description of inspections and maintenance activities conducted and corrective actions taken during the previous year;
- 3) expenditures for collection system maintenance activities, treatment works maintenance activities, corrective actions, and capital improvement during the previous year;
- 4) a summary of assets/areas identified for inspection/action (including capital improvement) in the upcoming year based on the five (5) core elements and the Business Risk Factors;
- 5) a maintenance budget and capital improvement budget for the upcoming year that take into account implementation of an effective Asset Management Program that meets the five (5) core elements;
- 6) an updated asset inventory based on the original submission; and
- 7) an updated OM&R budget with an updated rate schedule that includes the amount of insufficient revenues, if any.

PART I**Section A. Limitations and Monitoring Requirements****9. Discharge Monitoring Report – Quality Assurance Study Program**

The permittee shall participate in the Discharge Monitoring Report – Quality Assurance (DMR-QA) Study Program. The purpose of the DMR-QA Study Program is to annually evaluate the proficiency of all in-house and/or contract laboratory(ies) that perform, on behalf of the facility authorized to discharge under this permit, the analytical testing required under this permit. In accordance with Section 308 of the Clean Water Act (33 U.S.C. § 1318); and R 323.2138 and R 323.2154 of Part 21, Wastewater Discharge Permits, promulgated under Part 31 of the NREPA, participation in the DMR-QA Study Program is required for all major facilities, and for minor facilities selected for participation by the Department.

Annually and in accordance with DMR-QA Study Program requirements and submittal due dates, the permittee shall submit to the Michigan DMR-QA Study Program state coordinator all documentation required by the DMR-QA Study. DMR-QA Study Program participation is required only for the analytes required under this permit and only when those analytes are also identified in the DMR-QA Study.

If the permitted facility's status as a major facility should change, participation in the DMR-QA Study Program may be reevaluated. Questions concerning participation in the DMR-QA Study Program should be directed to the Michigan DMR-QA Study Program state coordinator.

All forms and instructions required for participation in the DMR-QA Study Program, including submittal due dates and state coordinator contact information, can be found at <http://www.epa.gov/compliance/discharge-monitoring-report-quality-assurance-study-program>.

PART I**Section B. Storm Water Pollution Prevention****1. Final Effluent Limitations and Monitoring Requirements**

The permittee is authorized to discharge storm water associated with industrial activity, as defined under 40 CFR 122.26(b)(14)(i-ix), to the surface waters of the state. Such discharge shall be limited and monitored by the permittee as specified below.

- a. **Narrative Standard**
The receiving water shall contain no turbidity, color, oil films, floating solids, foams, settleable solids, suspended solids, or deposits as a result of this discharge in unnatural quantities which are or may become injurious to any designated use.
- b. **Visual Assessment of Storm Water Discharges**
To ensure that storm water discharges from the facility do not violate the narrative standard in the receiving waters, storm water discharges shall be visually assessed in accordance with this permit.
- c. **Implementation of Storm Water Pollution Prevention Plan**
The permittee shall implement an acceptable Storm Water Pollution Prevention Plan (SWPPP) as required by this permit.
- d. **Certified Operator**
The permittee shall have an Industrial Storm Water Certified Operator who has supervision over the facility's storm water treatment and control measures included in the SWPPP.

PART I**Section B. Storm Water Pollution Prevention**

The Storm Water Pollution Prevention Plan (SWPPP) is a written procedure to reduce the exposure of storm water to significant materials and to reduce the amount of significant materials in the storm water discharge. An acceptable SWPPP shall identify potential sources of contamination and describe the controls necessary to reduce their impacts in accordance with Part I.B.2. through Part I.B.8. of this permit.

2. Source Identification

To identify potential sources of significant materials that can pollute storm water and subsequently be discharged from the facility, the SWPPP shall, at a minimum, include the following:

- a. A site map identifying:
 - 1) buildings and other permanent structures;
 - 2) storage or disposal areas for significant materials;
 - 3) secondary containment structures and descriptions of the significant materials contained within the primary containment structures;
 - 4) storm water discharge points (which include outfalls and points of discharge), numbered or otherwise labeled for reference;
 - 5) location of storm water and non-storm water inlets (numbered or otherwise labeled for reference) contributing to each discharge point;
 - 6) location of NPDES-permitted discharges other than storm water;
 - 7) outlines of the drainage areas contributing to each discharge point;
 - 8) structural controls or storm water treatment facilities;
 - 9) areas of vegetation (with brief descriptions such as lawn, old field, marsh, wooded, etc.);
 - 10) areas of exposed and/or erodible soils and gravel lots;
 - 11) impervious surfaces (e.g., roofs, asphalt, concrete, etc.);
 - 12) name and location of receiving water(s); and
 - 13) areas of known or suspected impacts on surface waters as designated under Part 201 (Environmental Response) of the NREPA.
- b. A list of all significant materials that could pollute storm water. For each material listed, the SWPPP shall include each of the following descriptions:
 - 1) the ways in which each type of significant material has been, or has reasonable potential to become, exposed to storm water (e.g., spillage during handling; leaks from pipes, pumps, and vessels; contact with storage piles, contaminated materials, or soils; waste handling and disposal; deposits from dust or overspray; etc.);

PART I**Section B. Storm Water Pollution Prevention**

- 2) identification of the discharge point(s) and the inlet(s) contributing the significant material to each discharge point through which the significant material may be discharged if released; and
- 3) an evaluation of the reasonable potential for contribution of significant materials to storm water from at least the following areas or activities:
 - a) loading, unloading, and other significant material-handling operations;
 - b) outdoor storage, including secondary containment structures;
 - c) outdoor manufacturing or processing activities;
 - d) significant dust- or particulate-generating processes;
 - e) discharge from vents, stacks, and air emission controls;
 - f) on-site waste disposal practices;
 - g) maintenance and cleaning of vehicles, machines, and equipment;
 - h) areas of exposed and/or erodible soils;
 - i) Sites of Environmental Contamination listed under Part 201 (Environmental Response) of the NREPA;
 - j) areas of significant material residues;
 - k) areas where animals (wild or domestic) congregate and deposit wastes; and
 - l) other areas where storm water may come into contact with significant materials.
- c. A listing of significant spills and significant leaks of polluting materials that occurred in areas that are exposed to precipitation or that discharge to a point source at the facility. The listing shall include spills that occurred over the three (3) years prior to the effective date of a permit authorizing discharge. The listing shall include the date, volume, and exact location of the release, and the action taken to clean up the material and/or prevent exposure to storm water or contamination of surface waters of the state. Any release that occurs after the SWPPP has been developed shall be controlled in accordance with the SWPPP and is cause for the SWPPP to be updated as appropriate within 14 calendar days of obtaining knowledge of the spill or loss.
- d. A determination as to whether its facility discharges storm water to a water body for which an EPA-approved Total Maximum Daily Load (TMDL) has been established. If so, the permittee shall assess whether the TMDL requirements for the facility's discharge are being met through the existing SWPPP controls or whether additional control measures are necessary. The permittee's assessment of whether the TMDL requirements are being met shall focus on the effectiveness, adequacy, and implementation of the permittee's SWPPP controls.
- e. A summary of existing storm water discharge sampling data (if available), describing pollutants in storm water discharges at the facility. This summary shall be accompanied by a description of the suspected source(s) of the pollutants detected.

PART I**Section B. Storm Water Pollution Prevention****3. Nonstructural Controls**

To prevent significant materials from contacting storm water at the source, the SWPPP shall, at a minimum, include each of the following nonstructural controls:

- a. Written procedures and a schedule for routine preventive maintenance. Preventive maintenance procedures shall describe routine inspections and maintenance of storm water management and control devices (e.g., cleaning of oil/water separators and catch basins, routine housekeeping activities, etc.), as well as inspecting and testing plant equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to the storm sewer system or the surface waters of the state. The routine inspection shall include areas of the facility in which significant materials have the reasonable potential to contaminate storm water. A written report of the inspection and corrective actions shall be retained in accordance with Record Keeping, below.
- b. Written procedures and a schedule for good housekeeping to maintain a clean, orderly facility. Good housekeeping procedures shall include routine inspections that focus on the areas of the facility that have a reasonable potential to contaminate storm water entering the property. The routine housekeeping inspections may be combined with the routine inspections for the preventive maintenance program. A written report of the inspection and corrective actions shall be retained in accordance with Record Keeping, below.
- c. Written procedures and a schedule for **quarterly** comprehensive site inspections, to be conducted by the Industrial Storm Water Certified Operator. At a minimum, one inspection shall be performed within each of the following quarters: January-March, April-June, July-September, and October-December. The comprehensive site inspections shall include, but not be limited to, inspection of structural controls in use at the facility, and the areas and equipment identified in the routine preventive maintenance and good housekeeping procedures. These inspections shall also include a review of the routine preventive maintenance reports, good housekeeping inspection reports, and any other paperwork associated with the SWPPP. The permittee may request Department approval of an alternate schedule for comprehensive site inspections. A written report of the inspection and corrective actions shall be retained in accordance with Record Keeping, below, and the following shall be included on the comprehensive inspection form/report:
 - 1) Date of the inspection.
 - 2) Name(s), title(s), and certification number(s) of the personnel conducting the inspection.
 - 3) Precipitation information (i.e., a description of recent rainfall/snowmelt events).
 - 4) All observations relating to the implementation of control measures. Items to include if applicable:
 - a) updates on corrective actions implemented due to previously identified pollutant and/or discharge issues;
 - b) any evidence of, or the potential for, pollutants to discharge to the drainage system or receiving waters and the condition of and around the discharge point including flow dissipation measures needing maintenance or repairs;
 - c) any control measures needing maintenance or repairs; and
 - d) any additional control measures needed to comply with permit requirements.

PART I**Section B. Storm Water Pollution Prevention**

- 5) Any required revisions to the SWPPP resulting from the inspection.
- 6) A written certification stating the facility is in compliance with this permit and the SWPPP, or, if there are instances of noncompliance, they are identified.
- 7) Written procedures and a schedule for **quarterly** visual assessments of storm water discharges. At a minimum, one visual assessment shall be conducted within each of the following quarters: January-March, April-June, July-September, and October-December. These assessments shall be conducted as part of the comprehensive site inspection within one month of control measure observations made in accordance with 4), above. If the Department has approved an alternate schedule for the comprehensive site inspection, the visual assessment may likewise be conducted in accordance with the same approved alternate schedule.

The following are the requirements of the visual assessment. The permittee shall develop and clearly document, in writing, procedures for meeting these requirements:

- a) Within six (6) months of the effective date of this permit, the permittee shall develop written procedures for conducting the visual assessment and incorporate these procedures into the SWPPP. If Qualified Personnel rather than an Industrial Storm Water Certified Operator will collect storm water samples, these procedures shall include a written description of the training given to these personnel to qualify them to collect the samples, as well as documentation verifying that these personnel have received this training. The first visual assessment shall be conducted in conjunction with the next occurring comprehensive inspection. If changes resulting in altered drainage patterns occur at the facility, the permittee shall modify the procedures for conducting the visual assessment in accordance with the requirements of Keeping SWPPPs Current, below, and these modifications shall be incorporated into the SWPPP prior to conducting the next visual assessment.
- b) A visual assessment shall be conducted of a representative storm water **sample** collected **from each storm water discharge point**. Storm water samples shall be visually assessed for conditions that could cause a violation of water quality standards as defined in Water Quality Standards, below. The visual assessment shall be made of the storm water sample in a clean, clear glass or plastic container. Only an Industrial Storm Water Certified Operator shall conduct this visual assessment. Visual assessment of the storm water sample shall be conducted within 48 hours of sample collection.

Representative storm water samples shall be collected:

- (1) from each storm water discharge point identified as set forth under Source Identification, above. These samples may be collected by one or more of the following: an Industrial Storm Water Certified Operator; and/or an individual who meets qualifications acceptable to the Department and who is authorized by an Industrial Storm Water Certified Operator to collect the sample ("Qualified Personnel"); and/or an automated sampling device; and
- (2) within the first 30 minutes of the start of a discharge from a storm event and on discharges that occur at least 72 hours (3 days) from the previous discharge. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample shall be collected as soon thereafter as practicable, but not exceeding 60 minutes. In the case of snowmelt, samples shall be collected during a period with measurable discharge from the site.

PART I**Section B. Storm Water Pollution Prevention**

- c) A visual assessment shall be conducted of the storm water **discharge at each storm water discharge point**. (If an automated sampling device is used to collect the storm water sample, this requirement is waived). Either an Industrial Storm Water Certified Operator and/or Qualified Personnel may conduct this visual assessment. This visual assessment may be conducted directly – by someone physically present at the storm water discharge at each storm water discharge point; or it may be conducted indirectly – through the use of a visual recording taken of the storm water discharge at each storm water discharge point. Direct visual assessment shall be conducted at the same time that the storm water sample is collected. Indirect visual assessment shall be conducted using a visual recording taken of the storm water discharge at the same time that the storm water sample was collected.
- d) Visual assessments shall be documented. This documentation shall be retained in accordance with Record Keeping, below, and shall include the following:
 - (1) sampling location(s) at the storm water discharge point(s) identified on the site map (see Source Identification, above);
 - (2) storm event information (i.e., length of event expressed in hours, approximate size of event expressed in inches of precipitation, duration of time since previous event that caused a discharge, and date and time the discharge began);
 - (3) date and time of the visual assessment of each storm water **discharge** at each storm water discharge point;
 - (4) name(s) and title(s) of the Industrial Storm Water Certified Operator or Qualified Personnel who conducted the visual assessment of the storm water **discharge** at each storm water discharge point. If an automated sampling device was used to collect the storm water sample associated with this discharge point, this documentation requirement is waived;
 - (5) observations made during visual assessment of the storm water **discharge** at each storm water discharge point. If an automated sampling device was used to collect the storm water sample associated with this discharge point, this documentation requirement is waived;
 - (6) if applicable, any visual recordings used to conduct the visual assessment of the storm water **discharge** at each storm water discharge point;
 - (7) date and time of sample collection for each storm water **sample**;
 - (8) name(s) and title(s) of the Industrial Storm Water Certified Operator or Qualified Personnel who collected the storm water **sample**. If an automated sampling device was used to collect the storm water sample, the permittee shall document that, instead;
 - (9) date and time of the visual assessment of each storm water **sample**;
 - (10) name(s), title(s), and operator number(s) of the Industrial Storm Water Certified Operator(s) who conducted the visual assessment of each storm water **sample**;
 - (11) observations made during visual assessment of each storm water **sample**;
 - (12) full-color photographic evidence of the storm water **sample** against a white background;
 - (13) nature of the discharge (i.e., rainfall or snowmelt);

PART I**Section B. Storm Water Pollution Prevention**

- (14) probable sources of any observed storm water contamination; and
 - (15) if applicable, an explanation for why it was not possible to collect samples within the first 30 minutes of discharge.
- e) When adverse weather conditions prevent a visual assessment during the quarter, a substitute visual assessment shall be conducted during the next qualifying storm event. Documentation of the rationale for no visual assessment during a quarter shall be included with the SWPPP records as described in Record Keeping, below. Adverse conditions are those that are dangerous or create inaccessibility for personnel, such as local flooding, high winds, electrical storms, or situations that otherwise make sampling impractical such as drought or extended frozen conditions.
 - f) If the facility has two (2) or more discharge points that are believed to discharge substantially identical storm water effluents, the facility may conduct visual assessments of the discharge at just one (1) of the discharge points and report that the results also apply to the other substantially identical discharge point(s). The determination of substantially identical discharge points is to be based on the significant material evaluation conducted as set forth under Source Identification, above, and shall be clearly documented in the SWPPP. Visual assessments shall be conducted on a rotating basis of each substantially identical discharge point throughout the period of coverage under this permit.
- d. A description of material handling procedures and storage requirements for significant materials. Equipment and procedures for cleaning up spills shall be identified in the SWPPP and made available to the appropriate personnel. The procedures shall identify measures to prevent spilled materials or material residues from contaminating storm water entering the property. The SWPPP shall include language describing what a reportable spill or release is and the appropriate reporting requirements in accordance with Part II.C.6. and Part II.C.7. The SWPPP may include, by reference, requirements of either a Pollution Incident Prevention Plan (PIPP) prepared in accordance with the Part 5 Rules (R 324.2001 through R 324.2009 of the Michigan Administrative Code); a Hazardous Waste Contingency Plan prepared in accordance with 40 CFR 264 and 265 Subpart D, as required by Part 111 of the NREPA; or a Spill Prevention Control and Countermeasure (SPCC) plan prepared in accordance with 40 CFR 112.
 - e. Identification of areas which, due to topography, activities, or other factors, have a high potential for significant soil erosion. Gravel lots shall be included. The SWPPP shall also identify measures used to control soil erosion and sedimentation.
 - f. A description of the employee training program that will be implemented on an annual basis to inform appropriate personnel at all levels of their responsibility as it relates to the components and goals of the SWPPP. The SWPPP shall identify periodic dates for the employee training program. Records of the employee training program shall be retained in accordance with Record Keeping, below.
 - g. Identification of actions to limit the discharge of significant materials in order to comply with TMDL requirements, if applicable.
 - h. Identification of significant materials expected to be present in storm water discharges following implementation of nonstructural preventive measures and source controls.

PART I**Section B. Storm Water Pollution Prevention****4. Structural Controls**

Where implementation of the measures required by Nonstructural Controls, above, does not control storm water discharges in accordance with Water Quality Standards, below, the SWPPP shall provide a description of the location, function, design criteria, and installation/construction schedule of structural controls for prevention and treatment. Structural controls may be necessary:

- a. to prevent uncontaminated storm water from contacting, or being contacted by, significant materials; or
- b. if preventive measures are not feasible or are inadequate to keep significant materials at the site from contaminating storm water. Structural controls shall be used to treat, divert, isolate, recycle, reuse, or otherwise manage storm water in a manner that reduces the level of significant materials in the storm water and provides compliance with water quality standards as identified in Water Quality Standards, below.

5. Keeping SWPPPs Current

- a. The permittee and/or the Industrial Storm Water Certified Operator shall review the SWPPP annually after it is developed and maintain a written report of the review in accordance with Record Keeping, below. Based on the review, the permittee or the Industrial Storm Water Certified Operator shall amend the SWPPP as needed to ensure continued compliance with the terms and conditions of this permit. The written report shall be submitted to the Department on or before January 10th of each year.
- b. The SWPPP developed under the conditions of a previous permit shall be amended as necessary to ensure compliance with this permit.
- c. The SWPPP shall be updated or amended whenever changes at the facility have the potential to increase the exposure of significant materials to storm water, significant spills occur at the facility, or when the SWPPP is determined by the permittee or the Department to be ineffective in achieving the general objectives of controlling pollutants in storm water discharges associated with industrial activity. Updates based on increased activity or spills at the facility shall include a description of how the permittee intends to control any new sources of significant materials, or respond to and prevent spills in accordance with the requirements of this permit (see Source Identification; Nonstructural Controls; and Structural Controls, above).
- d. The Department may notify the permittee at any time that the SWPPP does not meet minimum requirements of this permit. Such notification shall identify why the SWPPP does not meet minimum requirements of this permit. The permittee shall make the required changes to the SWPPP within 30 days after such notification from the Department or authorized representative and shall submit to the Department a written certification that the requested changes have been made.
- e. Amendments to the SWPPP shall be signed and retained on-site with the SWPPP pursuant to Signature and SWPPP Review, below.

6. Industrial Storm Water Certified Operator Update

If the Industrial Storm Water Certified Operator is changed or an Industrial Storm Water Certified Operator is added, the permittee shall provide the name and certification number of the new Industrial Storm Water Certified Operator to the Department. If a facility has multiple Industrial Storm Water Certified Operators, the names and certification numbers of all shall be included in the SWPPP.

PART I**Section B. Storm Water Pollution Prevention****7. Signature and SWPPP Review**

- a. The SWPPP shall be reviewed and signed by the Industrial Storm Water Certified Operator(s) and by either the permittee or an authorized representative in accordance with 40 CFR 122.22. The SWPPP and associated records shall be retained on-site at the facility that generates the storm water discharge.
- b. The permittee shall make the SWPPP, reports, log books, storm water discharge sampling data (if collected), and items required by Record Keeping, below, available upon request to the Department. The Department makes the non-confidential business portions of the SWPPP available to the public.

8. Record Keeping

The permittee shall maintain records of all SWPPP-related inspection and maintenance activities. Records shall also be kept describing incidents such as spills or other discharges that can affect the quality of storm water. All such records shall be retained for three (3) years. The following records are required by this permit (see Nonstructural Controls; and Keeping SWPPPs Current, above):

- a. routine preventive maintenance inspection reports;
- b. routine good housekeeping inspection reports;
- c. comprehensive site inspection reports;
- d. documentation of visual assessments;
- e. employee training records; and
- f. written summaries of the annual SWPPP review.

9. Water Quality Standards

At the time of discharge, there shall be no violation of water quality standards in the receiving waters as a result of the storm water discharge. This requirement includes, but is not limited to, the following conditions:

- a. In accordance with R 323.1050 of the Part 4 Rules promulgated pursuant to Part 31 of the NREPA, the receiving waters shall not have any of the following unnatural physical properties as a result of this discharge in quantities which are, or may become, injurious to any designated use: turbidity, color, oil films, floating solids, foams, settleable solids, suspended solids, or deposits.
- b. Any unusual characteristics of the discharge (i.e., unnatural turbidity, color, oil film, floating solids, foams, settleable solids, suspended solids, or deposits) shall be reported within 24 hours to the Department, followed by a written report within five (5) days detailing the findings of the investigation and the steps taken to correct the condition.
- c. Any pollutant for which a level of control is specified to meet a TMDL established by the Department shall be controlled at the facility so that its discharge is reduced by/to the amount specified in the TMDL.

PART I**Section B. Storm Water Pollution Prevention****10. Prohibition of Non-Storm Water Discharges**

Discharges of material other than storm water shall be in compliance with an NPDES permit issued for the discharge. Storm water shall be defined to include all of the following non-storm water discharges, provided pollution prevention controls for the non-storm water component are identified in the SWPPP:

- a. discharges from fire hydrant flushing;
- b. potable water sources, including water line flushing;
- c. water from fire system testing and fire-fighting training without burned materials or chemical fire suppressants;
- d. irrigation drainage;
- e. lawn watering;
- f. routine building wash-down that does not use detergents or other compounds;
- g. pavement wash waters where contamination by toxic or hazardous materials has not occurred (unless all contamination by toxic or hazardous materials has been removed) and where detergents are not used;
- h. uncontaminated condensate from air conditioners, coolers, and other compressors and from the outside storage of refrigerated gases or liquids;
- i. springs;
- j. uncontaminated groundwater;
- k. foundation or footing drains where flows are not contaminated with process materials such as solvents; and
- l. discharges from fire-fighting activities. Discharges from fire-fighting activities are exempted from the requirement to be identified in the SWPPP.

11. Tracer Dye Discharges

This permit does not authorize the discharge of tracer dyes without approval from the Department. Requests to discharge tracer dyes shall be submitted to the Department in accordance with Rule 1097 (R 323.1097 of the Michigan Administrative Code).

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**

The permittee is authorized to land-apply bulk biosolids or prepare bulk biosolids for land application in accordance with the permittee's approved Residuals Management Program (RMP) approved on May 10, 2017, and approved modifications thereto, in accordance with the requirements established in R 323.2401 through R 323.2418 of the Michigan Administrative Code (Part 24 Rules). The 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. The Part 24 Rules 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).

a. 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>.

b. Modifications to the Approved RMP

Prior to implementation of modifications to the RMP, the permittee shall submit proposed modifications to the Department 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.

c. 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.

d. 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.

PART II**Section A. Definitions**

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.

EC₅₀ 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.

PART II**Section A. Definitions****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.

IC₂₅ 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.

PART II

Section A. Definitions

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.

LC₅₀ 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.

PART II

Section A. Definitions

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.

PART II

Section A. Definitions

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)).

PART II

Section A. Definitions

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.

PART II

Section A. Definitions

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.

PART II**Section C. Reporting Requirements****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.

PART II**Section C. Reporting Requirements****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.

PART II**Section C. Reporting Requirements****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.

PART II**Section C. Reporting Requirements****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.

PART II**Section C. Reporting Requirements****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.

PART II**Section D. Management Responsibilities****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 AGENCY/ENVIRONMENTAL REVIEW CORRESPONDENCE

PREPARED FOR:





May 21, 2020

Environmental Review Coordinator
State Historic Preservation Office
Michigan Historical Center
702 W. Kalamazoo Street
P.O. Box 30740
Lansing, MI 48909

RE: Leoni Township Wastewater Treatment Plant Membrane System Improvements

Dear Sir or Madam:

Leoni Township is currently preparing a Project Plan to apply for funding from the Clean Water State Revolving Fund program for the referenced project. One of the requirements of the application is the evaluation of specific cultural and environmental issues by the appropriate agencies.

Because the project is required to comply with both the Archeological and Historical Preservation Act of 1974 (16 U.S.C. §469 through §469c-1) and the National Historic Preservation Act (16 U.S.C. §470, et. seq.), we request that your office review the reference project to identify if the project might cause irreparable loss or destruction of significant scientific, prehistorical, historical or archeological data. An application for Section 106 Review is attached for the project.

If you have any questions, please feel free to contact me at (616) 977-1000.

Thank you in advance for your cooperation. We would like to have your response before June 4, 2020, if possible, to incorporate into the Project Plan.

Sincerely,

FLEIS & VANDENBRINK

A handwritten signature in blue ink that reads "Corey Turner".

Corey Turner
Project Engineer

Enclosures

STATE HISTORIC PRESERVATION OFFICE Application for Section 106 Review

SHPO Use Only			
<input type="checkbox"/> IN	Received Date	____ / ____ / ____	Log In Date
<input type="checkbox"/> OUT	Response Date	____ / ____ / ____	Log Out Date
	Sent Date	____ / ____ / ____	

Submit one copy for each project for which review is requested. This application is required. Please type. Applications must be complete for review to begin. Incomplete applications will be sent back to the applicant without comment. Send only the information and attachments requested on this application. Materials submitted for review cannot be returned. Due to limited resources we are unable to accept this application electronically.

I. GENERAL INFORMATION

☒ THIS IS A NEW SUBMITTAL ☐ THIS IS MORE INFORMATION RELATING TO ER#

- a. Project Name: Wastewater Treatment Plant Membrane System Improvements
- b. Project Address (if available): 8401 Page Ave, Jackson, MI 49201
- c. Municipal Unit: Leoni Township County: Jackson
- d. Federal Agency, Contact Name and Mailing Address (If you do not know the federal agency involved in your project please contact the party requiring you to apply for Section 106 review, not the SHPO, for this information.): U.S. EPA Region 5, 77 W. Jackson Blvd., Mail Code WS-15J, Chicago, IL, 60604
- e. State Agency (if applicable), Contact Name and Mailing Address: EGLE, David Worthington, 525 West Allegan St., P.O. Box 30473, Lansing, MI 48909
- f. Consultant or Applicant Contact Information (if applicable) including mailing address: Fleis & VandenBrink Engineering, 2960 Lucerne Dr. SE, Grand Rapids, MI 49546

II. GROUND DISTURBING ACTIVITY (INCLUDING EXCAVATION, GRADING, TREE REMOVALS, UTILITY INSTALLATION, ETC.)

DOES THIS PROJECT INVOLVE GROUND-DISTURBING ACTIVITY? ☒ YES ☐ NO (If no, proceed to section III.)

Precise project location map (preferably USGS 7.5 min Quad with quad name, date, and location) with previously recorded archaeological sites visible (this site information is available to qualified archaeologists at the SHPO Office) Portions, photocopies of portions, and electronic USGS maps are acceptable as long as the location is clearly marked.

- a. USGS Quad Map Name: Jackson County
- b. Township: 03S Range: 01E Section: 12
- c. Site plan showing limits of proposed excavation. Description of width, length and depth of proposed ground disturbing activity: Most of the proposed work is limited to within the existing building and tanks. Anticipated ground disturbing activity will include relocating the return activated sludge piping.
- d. Previous land use and disturbances: The site has been a wastewater treatment plant since 1971 when the original wastewater plant was constructed. The wastewater plant was improved and upgraded in 2008.
- e. Current land use and conditions: Wastewater Treatment Plant
- f. Did you check the State Archaeological Site Files located at the SHPO? ☐ YES ☒ NO

III. PROJECT WORK DESCRIPTION AND AREA OF POTENTIAL EFFECTS (APE)

Note: Every project has an APE.

- a. Provide a detailed written description of the project (plans, specifications, Environmental Impact Statements (EIS), Environmental Assessments (EA), etc. cannot be substituted for the written description): See attached project description for details.
- b. Provide a localized map indicating the location of the project; road names must be included and legible.
- c. On the above-mentioned map, identify the APE.

- d. Provide a written description of the APE (physical, visual, auditory, and sociocultural), the steps taken to identify the APE, and the justification for the boundaries chosen. The APE is limited to the existing wastewater treatment plant site which does not include any historically significant building or structures. The boundaries chosen are the existing wastewater treatment plant site boundaries.

IV. IDENTIFICATION OF HISTORIC PROPERTIES

- a. List and date all properties 50 years of age or older located in the APE. **The Section 106 Above-Ground Resources inventory form is the preferred format for providing this information and a completed form should be included as an attachment to this application.** If the property is located within a National Register eligible, listed or local district it is only necessary to identify the district: Although there are registered historic properties and sites located near the wastewater treatment plant, the APE is limited to the existing wastewater treatment plant which does not include any historically significant buildings or structures.
 - b. Describe the steps taken to identify whether or not any **historic** properties exist in the APE and include the level of effort made to carry out such steps: A search of the MSHDA historic sites online webpage was performed and local maps were consulted to determine where these sites were located in relation to the proposed work area.
 - c. Based on the information contained in "b", please choose one:
☐ Historic Properties Present in the APE
☒ No Historic Properties Present in the APE
 - d. Describe the condition, previous disturbance to, and history of any historic properties located in the APE: NA
-

V. PHOTOGRAPHS

Note: All photographs must be keyed to a localized map.

- a. Provide photographs of the site itself.
 - b. Provide photographs of all properties 50 years of age or older located in the APE (faxed or photocopied photographs are not acceptable).
-

VI. DETERMINATION OF EFFECT

**Note: you must provide a statement explaining/justifying your determination.
Include statement as an attachment if necessary.**

- ☒ No historic properties affected based on [36 CFR § 800.4(d)(1)], **please provide the basis for this determination.**
- ☐ No Adverse Effect [36 CFR § 800.5(b)] on historic properties, **explain why the criteria of adverse effect, 36 CFR Part 800.5(a)(1), were found not applicable.**
- ☐ Adverse Effect [36 CFR § 800.5(d)(2)] on historic properties, **explain why the criteria of adverse effect, [36 CFR Part 800.5(a)(1)], were found applicable.**

***Please print and mail completed form and required information to:
State Historic Preservation Office, Cultural Resources Management Section
Michigan Economic Development Corporation
300 North Washington Square, Lansing, MI 48913***

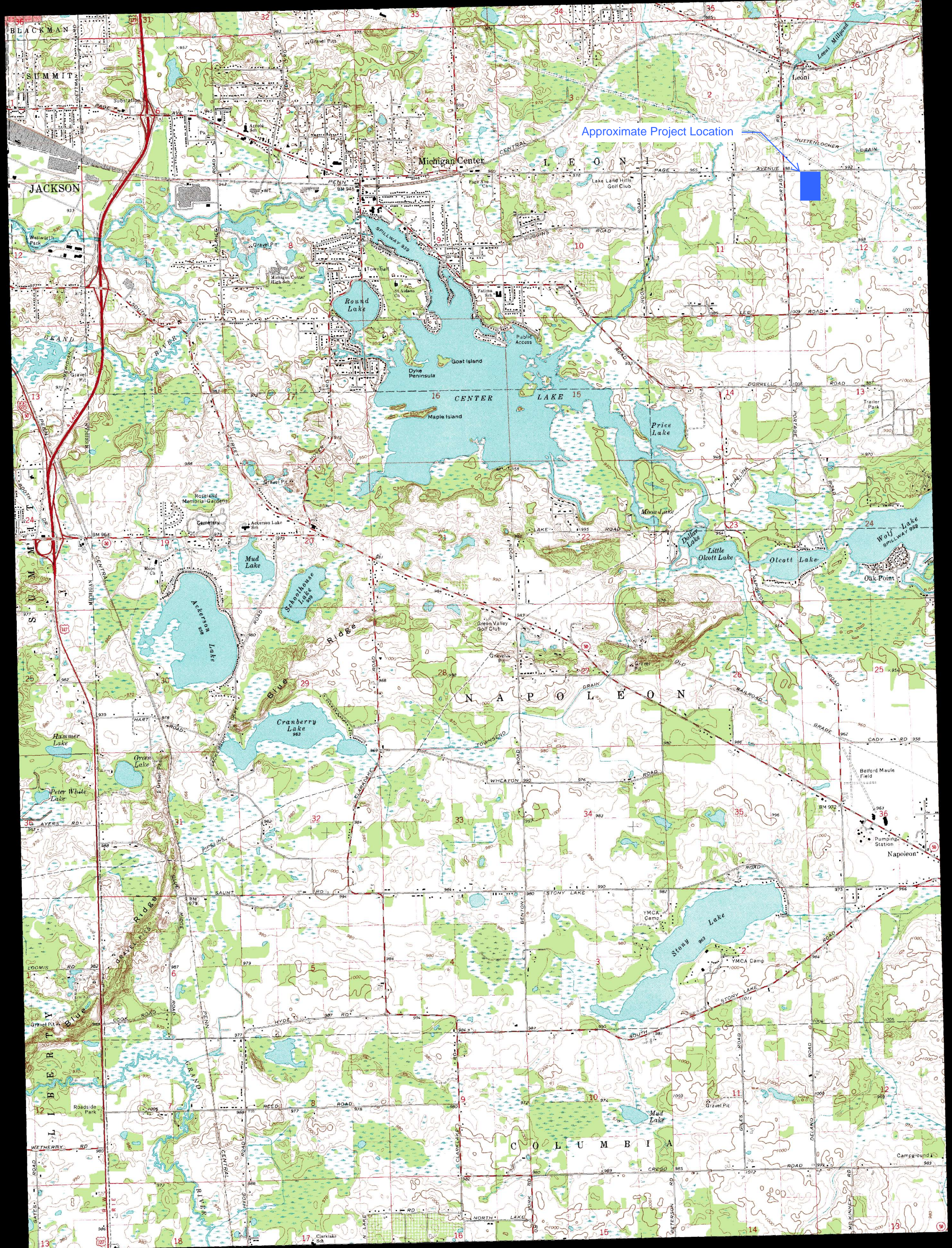


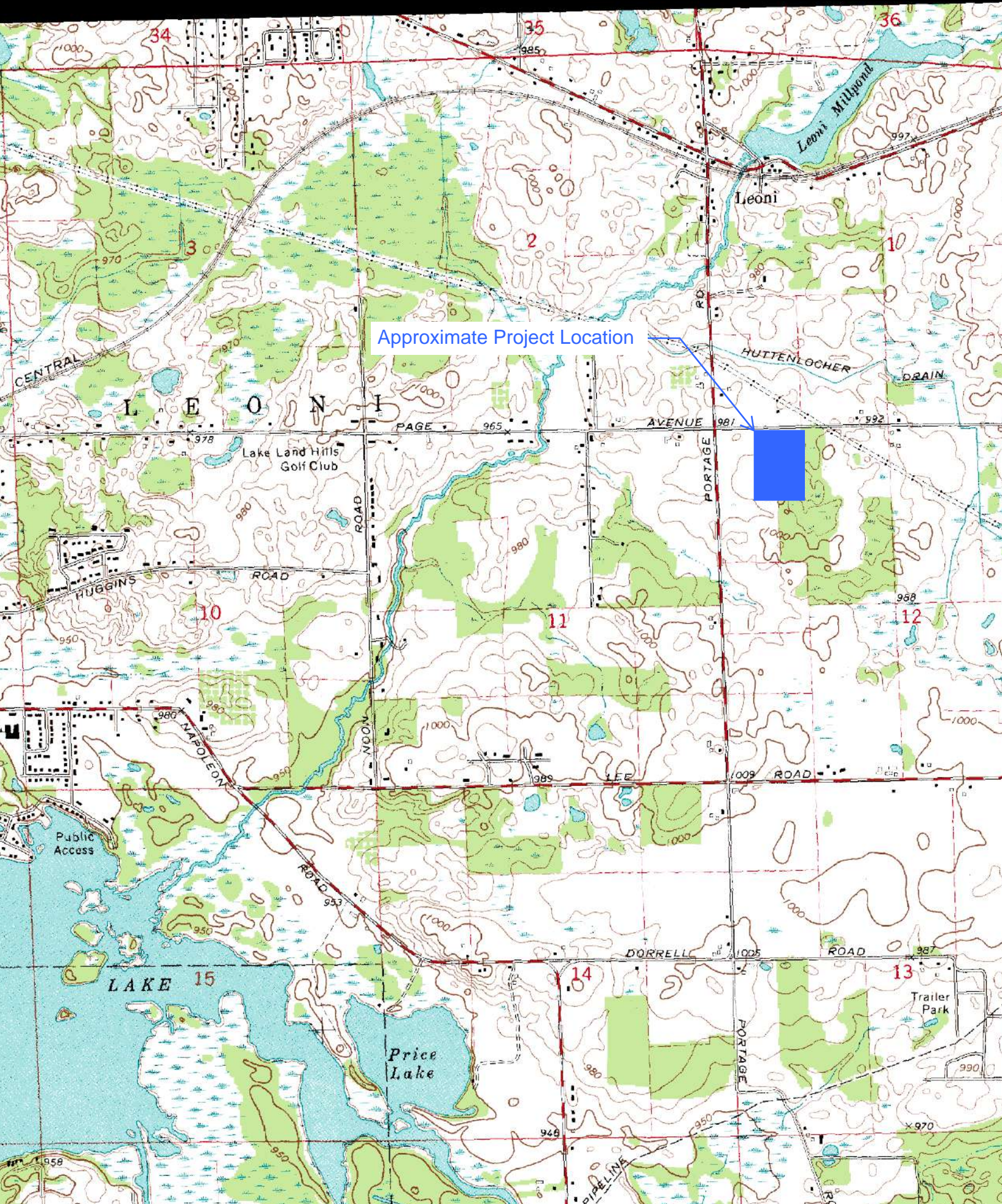
Project Description
State Historic Preservation Office
Application for Section 106 Review

III. Project Work Description and Area of Potential Effects (APE)

- a. Provide a detailed written description of the project (plans, specifications, Environmental Impact Statement (EIS), Environmental Assessments (EA), etc. cannot be substituted for the written description):

Wastewater Treatment Plant Membrane System Improvements (all occurring at the existing wastewater treatment plant) project includes upgrades to the existing WWTP Membrane Treatment System, including removal and replacement of process piping and equipment, modifications to existing treatment basins, upgrades to electrical and control systems, and all related work.





Approximate Project Location

SHPO Application – Leoni Township – Wastewater Treatment Plant Membrane System Improvements
Photographs of APE



Photo 1 – Wastewater Treatment Plant Aerial



Photo 2 – Membrane Treatment Building (South View)



Photo 3 – Membrane Treatment Building (West View)



GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
MICHIGAN STRATEGIC FUND
STATE HISTORIC PRESERVATION OFFICE

MARK A. BURTON
PRESIDENT

June 24, 2020

DAVID WORTHINGTON
MICHIGAN DEPARTMENT OF ENVIRONMENT GREAT LAKES AND ENERGY
525 WEST ALLEGAN STREET
LANSING MI 48933

RE: ER20-789 Leoni Township Wastewater Treatment Plant Membrane System Improvements,
8401 Page Avenue, Sec. 12, T3S, R1E, Leoni Township, Jackson County (EPA)

Dear Mr. Worthington:

Under the authority of Section 106 of the National Historic Preservation Act of 1966, as amended, we have reviewed the above-cited undertaking at the location noted above. Based on the information provided for our review, it is the opinion of the State Historic Preservation Officer (SHPO) that **no historic properties are affected** within the area of potential effects of this undertaking.

This letter evidences the EPA's compliance with 36 CFR § 800.4 "Identification of historic properties," and the fulfillment of the EPA's responsibility to notify the SHPO, as a consulting party in the Section 106 process, under 36 CFR § 800.4(d)(1) "No historic properties affected." **If the scope of work changes in any way, or if artifacts or bones are discovered, please notify this office immediately.**

We remind you that federal agency officials or their delegated authorities are required to involve the public in a manner that reflects the nature and complexity of the undertaking and its effects on historic properties per 36 CFR § 800.2(d). The National Historic Preservation Act also requires that federal agencies consult with any Indian tribe and/or Tribal Historic Preservation Officer (THPO) that attach religious and cultural significance to historic properties that may be affected by the agency's undertakings per 36 CFR § 800.2(c)(2)(ii).

The State Historic Preservation Office is not the office of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking.

If you have any questions, please contact Brian Grennell, Cultural Resource Management Coordinator, at 517-335-2721 or by email at GrennellB@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for this opportunity to review and comment, and for your cooperation.

Sincerely,

Brian G. Grennell
Cultural Resource Management Coordinator

for Brian D. Conway
State Historic Preservation Officer

SAT:BGG

Copy: Corey Turner, Fleis & VandenBrink Engineering





May 21, 2020

Heather Bush
Match-e-be-nash-shee-wish Gun Lake Band of Potawatomi Indians
2872 Mission Drive
Shelbyville, MI 49344

RE: Leoni Township Wastewater Treatment Plant Membrane System Improvements

Dear Ms. Bush:

Leoni Township is located on the east side of Michigan's Jackson County. Fleis & VandenBrink Engineering, working on behalf of Leoni Township, is currently preparing a Project Plan to apply for funding from the Clean Water State Revolving Fund (SRF) to subsidize necessary improvements to its Wastewater Treatment Plant (WWTP), starting in fiscal year 2021.

The proposed project is located within Leoni Township and is focused on the WWTP at 8401 Page Avenue, Jackson, MI 49201. The WWTP is located in Town 03S, Range 01E, Section 12 of Jackson County. Please refer to the attached map for the project location and specific work areas.

The Wastewater Treatment Plant Membrane System Improvements project includes upgrades to the existing WWTP Membrane Treatment System, including removal and replacement of process piping and equipment, modifications to existing treatment basins, upgrades to electrical and control systems, and all related work.

This notice and opportunity to comment is being sent to you to fulfill Section 106 of the National Historic Preservation Act review process, which requires a federal agency or applicant to consult with THPOs and federally recognized Indian Tribes. The purpose of this notice is to give you an opportunity to have your interests and concerns considered. Should you have any comments on potential impacts to known religious and/or culturally significant properties in the area of the proposed project, please provide them to us within 30 days of this notice.

If you have any questions, please feel free to call me at (616) 977-1000.

Sincerely,

FLEIS & VANDENBRINK

A handwritten signature in blue ink that reads "Corey Turner".

Corey Turner
Project Engineer

2960 Lucerne Drive SE
Grand Rapids, MI 49546
P: 616.977.1000
F: 616.977.1005
www.fveng.com



May 21, 2020

Earl Meshigaud
Hannahville Potawatomi Indian Community
N-14911 Hannahville B-1 Road
Wilson, MI 49896

RE: Leoni Township Wastewater Treatment Plant Membrane System Improvements

Dear Mr. Meshigaud:

Leoni Township is located on the east side of Michigan's Jackson County. Fleis & VandenBrink Engineering, working on behalf of Leoni Township, is currently preparing a Project Plan to apply for funding from the Clean Water State Revolving Fund (SRF) to subsidize necessary improvements to its Wastewater Treatment Plant (WWTP), starting in fiscal year 2021.

The proposed project is located within Leoni Township and is focused on the WWTP at 8401 Page Avenue, Jackson, MI 49201. The WWTP is located in Town 03S, Range 01E, Section 12 of Jackson County. Please refer to the attached map for the project location and specific work areas.

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If you have any questions, please feel free to call me at (616) 977-1000.

Sincerely,

FLEIS & VANDENBRINK

A handwritten signature in blue ink that reads "Corey Turner".

Corey Turner
Project Engineer

2960 Lucerne Drive SE
Grand Rapids, MI 49546
P: 616.977.1000
F: 616.977.1005
www.fveng.com



May 21, 2020

Jay Sam, Director
Little River Band of Ottawa Indians
2608 Governmental Center Drive
Manistee, MI 49660

RE: Leoni Township Wastewater Treatment Plant Membrane System Improvements

Dear Mr. Sam:

Leoni Township is located on the east side of Michigan's Jackson County. Fleis & VandenBrink Engineering, working on behalf of Leoni Township, is currently preparing a Project Plan to apply for funding from the Clean Water State Revolving Fund (SRF) to subsidize necessary improvements to its Wastewater Treatment Plant (WWTP), starting in fiscal year 2021.

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If you have any questions, please feel free to call me at (616) 977-1000.

Sincerely,

FLEIS & VANDENBRINK

Corey Turner
Project Engineer

2960 Lucerne Drive SE
Grand Rapids, MI 49546
P: 616.977.1000
F: 616.977.1005
www.fveng.com



May 21, 2020

Mon-ee Zapata, Cultural Specialist
Nottawaseppi Band of Huron Potawatomi
1485 Mno-Bmadzewen Way
Fulton, MI 49052

RE: Leoni Township Wastewater Treatment Plant Membrane System Improvements

Dear Mon-ee Zapata:

Leoni Township is located on the east side of Michigan's Jackson County. Fleis & VandenBrink Engineering, working on behalf of Leoni Township, is currently preparing a Project Plan to apply for funding from the Clean Water State Revolving Fund (SRF) to subsidize necessary improvements to its Wastewater Treatment Plant (WWTP), starting in fiscal year 2021.

The proposed project is located within Leoni Township and is focused on the WWTP at 8401 Page Avenue, Jackson, MI 49201. The WWTP is located in Town 03S, Range 01E, Section 12 of Jackson County. Please refer to the attached map for the project location and specific work areas.

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If you have any questions, please feel free to call me at (616) 977-1000.

Sincerely,

FLEIS & VANDENBRINK

Corey Turner
Project Engineer

2960 Lucerne Drive SE
Grand Rapids, MI 49546
P: 616.977.1000
F: 616.977.1005
www.fveng.com



May 21, 2020

Marcus Winchester, THPO
Pokagon Band of Potawatomi
58620 Sink Road
Dowagiac, MI 49047

RE: Leoni Township Wastewater Treatment Plant Membrane System Improvements

Dear Mr. Winchester:

Leoni Township is located on the east side of Michigan's Jackson County. Fleis & VandenBrink Engineering, working on behalf of Leoni Township, is currently preparing a Project Plan to apply for funding from the Clean Water State Revolving Fund (SRF) to subsidize necessary improvements to its Wastewater Treatment Plant (WWTP), starting in fiscal year 2021.

The proposed project is located within Leoni Township and is focused on the WWTP at 8401 Page Avenue, Jackson, MI 49201. The WWTP is located in Town 03S, Range 01E, Section 12 of Jackson County. Please refer to the attached map for the project location and specific work areas.

The Wastewater Treatment Plant Membrane System Improvements project includes upgrades to the existing WWTP Membrane Treatment System, including removal and replacement of process piping and equipment, modifications to existing treatment basins, upgrades to electrical and control systems, and all related work.

This notice and opportunity to comment is being sent to you to fulfill Section 106 of the National Historic Preservation Act review process, which requires a federal agency or applicant to consult with THPOs and federally recognized Indian Tribes. The purpose of this notice is to give you an opportunity to have your interests and concerns considered. Should you have any comments on potential impacts to known religious and/or culturally significant properties in the area of the proposed project, please provide them to us within 30 days of this notice.

If you have any questions, please feel free to call me at (616) 977-1000.

Sincerely,

FLEIS & VANDENBRINK

A handwritten signature in blue ink that reads "Corey Turner".

Corey Turner
Project Engineer

2960 Lucerne Drive SE
Grand Rapids, MI 49546
P: 616.977.1000
F: 616.977.1005
www.fveng.com

Approximate Project Location





May 21, 2020

Donna Cervelli
EGLE – Water Resources Division
301 E Louis Glick Highway
Jackson, MI 49201

RE: Leoni Township Wastewater Treatment Plant Membrane System Improvements

Dear Ms. Cervelli:

Leoni Township is located on the east side of Michigan's Jackson County. Fleis & VandenBrink Engineering, working on behalf of Leoni Township, is currently preparing a Project Plan to apply for funding from the Clean Water State Revolving Fund (SRF) to subsidize necessary improvements to its Wastewater Treatment Plant (WWTP), starting in fiscal year 2021.

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The Wastewater Treatment Plant Membrane System Improvements project includes upgrades to the existing WWTP Membrane Treatment System, including removal and replacement of process piping and equipment, modifications to existing treatment basins, upgrades to electrical and control systems, and all related work.

A requirement of the application is the evaluation of specific cultural and environmental issues by the appropriate agencies. Because the project is required to comply with Federal Executive Order 11988, we request that your office review the proposed project with respect to floodplains, noting if any are present, their location, and whether the proposed project presents the possibility of any impact to them. Please provide comments to us within 30 days of this notice. If you have any questions, please feel free to call me at (616) 977-1000.

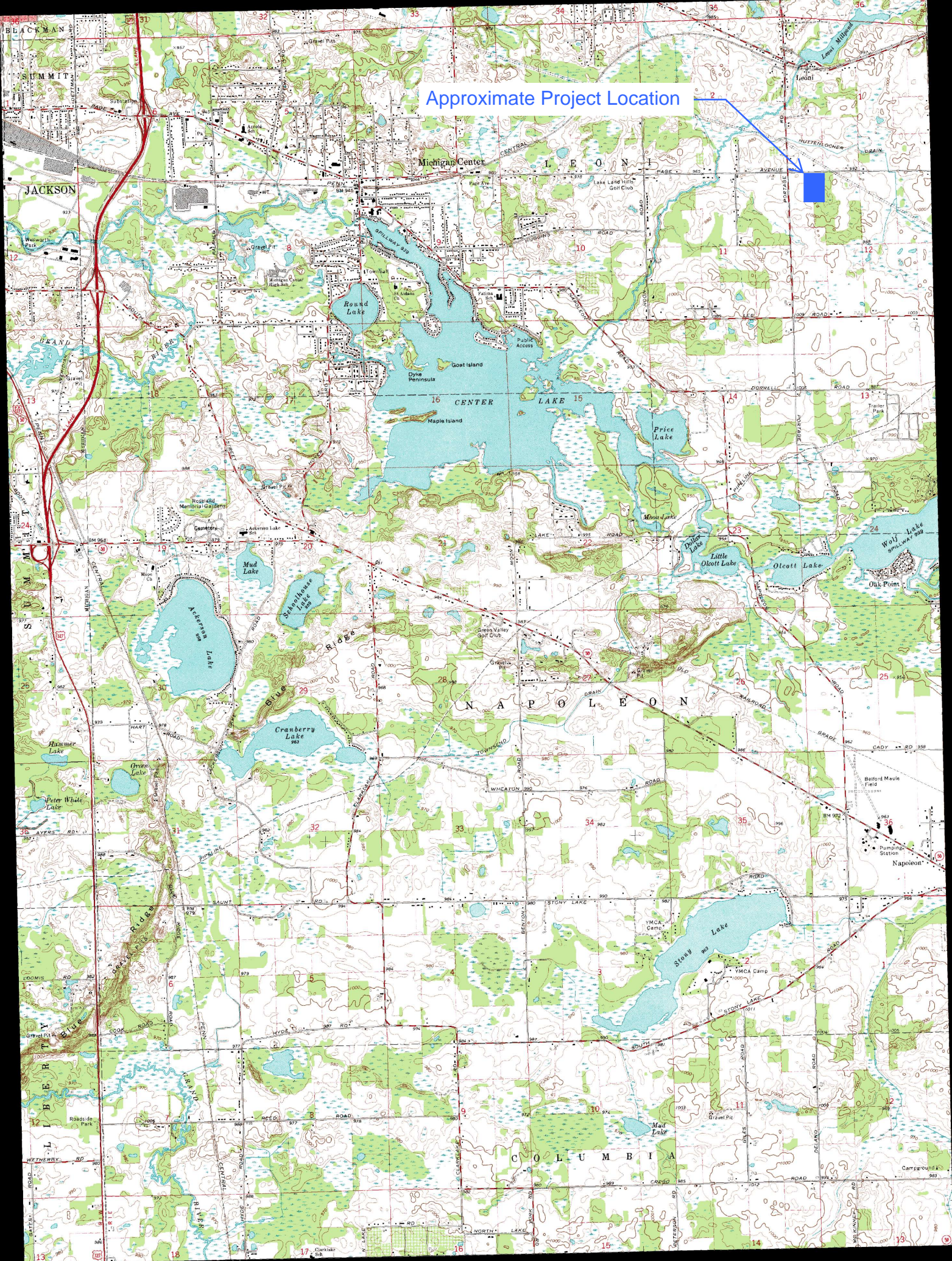
Sincerely,

FLEIS & VANDENBRINK

Corey Turner
Project Engineer

2960 Lucerne Drive SE
Grand Rapids, MI 49546
P: 616.977.1000
F: 616.977.1005
www.fveng.com

Approximate Project Location





3

T2S R1E S34

T2S R1E S36

AREA OF MINIMAL FLOOD HAZARD
Zone X

26075C0350D
eff. 5/3/2010

S4

T3S R1E S3

T3S R1E S2



Proposed Project Location



May 21, 2020

Kate Kirkpatrick
EGLE – Water Resources Division
301 E Louis Glick Highway
Jackson, MI 49201

RE: Leoni Township Wastewater Treatment Plant Membrane System Improvements

Dear Ms. Kirkpatrick:

Leoni Township is located on the east side of Michigan's Jackson County. Fleis & VandenBrink Engineering, working on behalf of Leoni Township, is currently preparing a Project Plan to apply for funding from the Clean Water State Revolving Fund (SRF) to subsidize necessary improvements to its Wastewater Treatment Plant (WWTP), starting in fiscal year 2021.

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The Wastewater Treatment Plant Membrane System Improvements project includes upgrades to the existing WWTP Membrane Treatment System, including removal and replacement of process piping and equipment, modifications to existing treatment basins, upgrades to electrical and control systems, and all related work.

A requirement of the application is the evaluation of specific cultural and environmental issues by the appropriate agencies. Because the project is required to comply with the Fish and Wildlife Coordination Act, Federal Executive Order 11990, the Coastal Barrier Resources Act, as amended, the Rivers and Harbors Act of 1899, and the Clean Water Act of 1977, we request that your office review the proposed project with respect to any land-water interfaces, including inland lakes and streams, wetlands, and Great Lakes Shorelands, noting if any are present, their location, and whether the proposed project presents the possibility of any impact to them. Please provide comments to us within 30 days of this notice. If you have any questions, please feel free to call me at (616) 977-1000.

Sincerely,

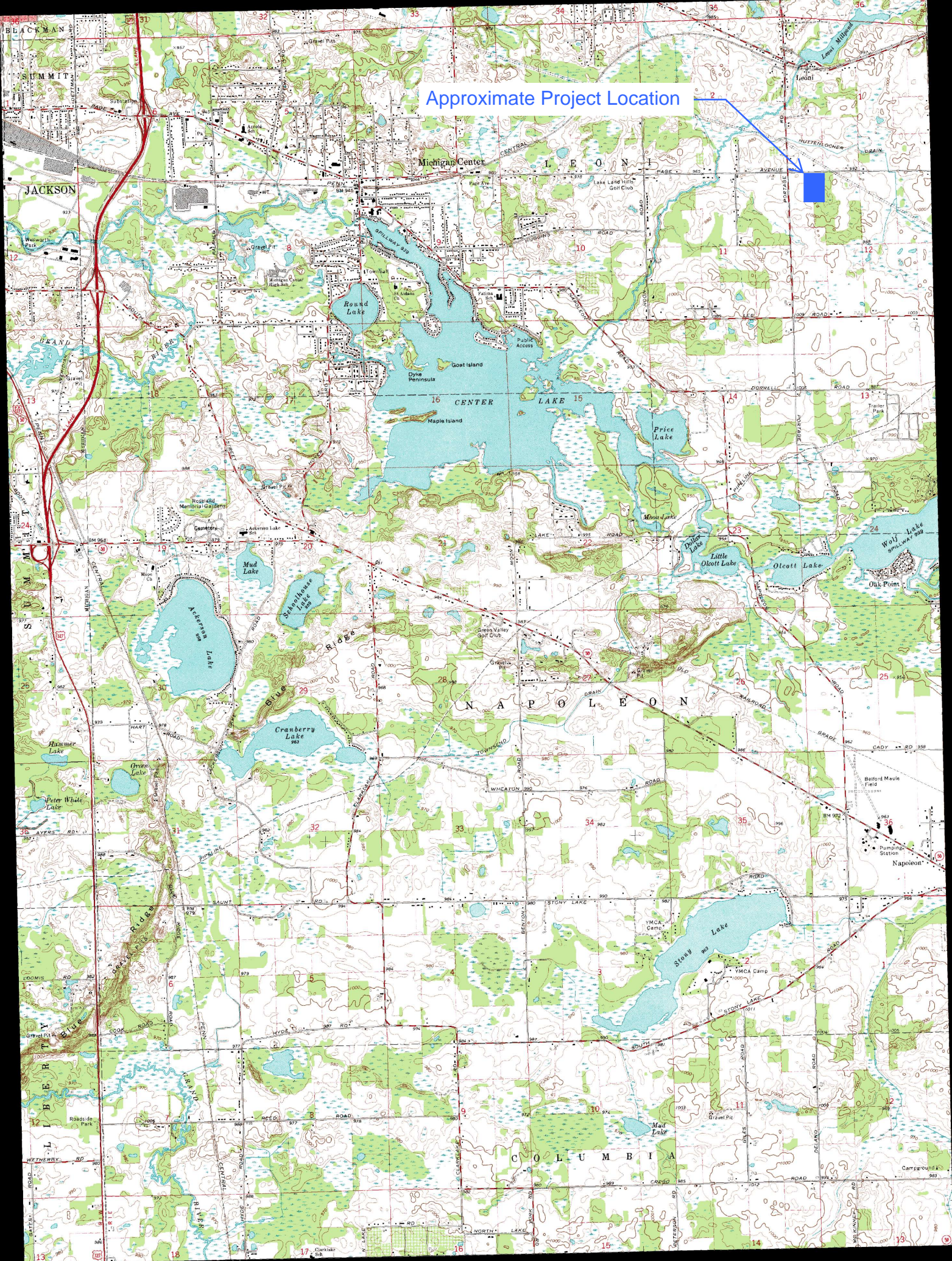
FLEIS & VANDENBRINK

A handwritten signature in blue ink that reads "Corey Turner".

Corey Turner
Project Engineer

2960 Lucerne Drive SE
Grand Rapids, MI 49546
P: 616.977.1000
F: 616.977.1005
www.fveng.com

Approximate Project Location



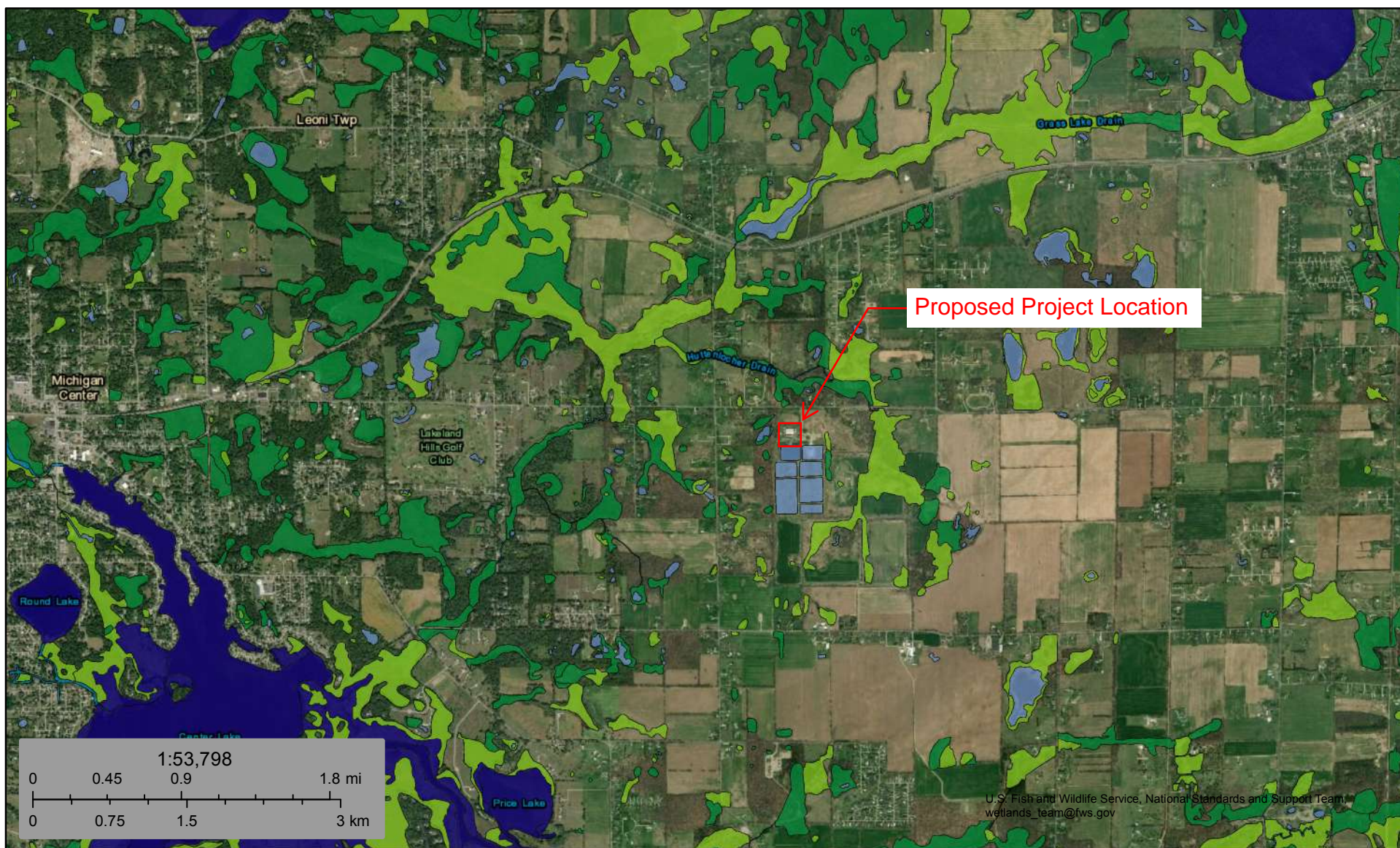




U.S. Fish and Wildlife Service

National Wetlands Inventory

Leoni Township Wetlands



May 18, 2020

Wetlands

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

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

Corey Turner

From: Kirkpatrick, Kathryn (EGLE) <KirkpatrickK3@michigan.gov>
Sent: Wednesday, June 10, 2020 2:21 PM
To: Corey Turner
Subject: RE: Leoni Township Opportunity to Comment

Hi Corey,

Thanks for the additional information. Based on this latest attachment, I have no concerns about the project. If the scope or area of work changes, let me know.

-Kate

Kathryn Kirkpatrick

Environmental Quality Analyst

Water Resources Division | Jackson District Office

Michigan Department of Environment, Great Lakes, and Energy

(517) 435 - 9014 | KirkpatrickK3@Michigan.gov

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Please Note: Due to temporary layoffs, I am not available to respond to emails or phone calls on Mondays starting the week of May 18, 2020 through July 24, 2020. Thank you.

From: Corey Turner <cturner@fveng.com>
Sent: Friday, June 5, 2020 1:08 PM
To: Kirkpatrick, Kathryn (EGLE) <KirkpatrickK3@michigan.gov>
Subject: RE: Leoni Township Opportunity to Comment

CAUTION: This is an External email. Please send suspicious emails to abuse@michigan.gov

Hi Kate,

The current scope of the project is to replace existing equipment within the main building and tanks on the site. The area of work is depicted in the attachment outlined in red. The only excavation work on site that might occur is outlined with a blue box. This will be determined in detailed design.

It is not currently proposed to expand any building or tankage footprint.

Please let me know if you need additional information on the equipment replacement within the existing structures.

Thank you,

Corey Turner

Process EIT

FLEIS & VANDENBRINK

2960 Lucerne Drive SE, Suite 100 | Grand Rapids | MI | 49546

O: 616.977.1000 | D: 616.965.8765 | C: 616.821.0777 | F: 616.977.1005

From: Kirkpatrick, Kathryn (EGLE) <KirkpatrickK3@michigan.gov>
Sent: Friday, June 5, 2020 8:29 AM
To: Corey Turner <cturner@fveng.com>
Subject: RE: Leoni Township Opportunity to Comment

Hi Corey,

Thanks for sending this. Could you please provide more detail on what the project is proposing? From the plans and information provided, it's too vague for me to determine if there are any potential resource impacts.

Thank you,

Kate

Kathryn Kirkpatrick
Environmental Quality Analyst
Water Resources Division | Jackson District Office
Michigan Department of Environment, Great Lakes, and Energy
(517) 435 - 9014 | KirkpatrickK3@Michigan.gov
[Follow Us](#) | Michigan.gov/EGLE

Please Note: Due to temporary layoffs, I am not available to respond to emails or phone calls on Mondays starting the week of May 18, 2020 through July 24, 2020. Thank you.

From: Corey Turner <cturner@fveng.com>
Sent: Friday, May 22, 2020 10:32 AM
To: Kirkpatrick, Kathryn (EGLE) <KirkpatrickK3@michigan.gov>
Subject: Leoni Township Opportunity to Comment

CAUTION: This is an External email. Please send suspicious emails to abuse@michigan.gov

Kate,

I am sending this opportunity to comment on the proposed project at the Leoni Township Wastewater Treatment Plant. A summary of the work is included in the attachment. If you have any questions or concerns, please contact me.

Thank you,

Corey Turner
Process EIT

FLEIS & VANDENBRINK
2960 Lucerne Drive SE, Suite 100 | Grand Rapids | MI | 49546
O: 616.977.1000 | D: 616.965.8765 | C: 616.821.0777 | F: 616.977.1005
www.fveng.com

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Corey Turner

From: Sanders, Mike (DNR-Contractor) <SandersM1@michigan.gov>
Sent: Thursday, June 4, 2020 12:26 PM
To: Corey Turner
Subject: RE: Rare Species Review Request - Leoni Township Wastewater Treatment Plant
Attachments: RSR #2638 - Response Letter.pdf; RSR #2638_Section 7 Comments_Jackson County.pdf

Hi Corey,

Please find our response letter for Rare Species Review #2638 in Jackson County, Michigan. Also included are comments for projects involving federal funding or a federal agency authorization.

Please let me know if you have questions or comments.

Thank you,

Mike Sanders

Michael A. Sanders
Rare Species Review Specialist/Zoologist
Michigan Natural Features Inventory
Michigan State University Extension
PO Box 13036
Lansing, MI 48901
Office: 517-284-6215

From: Corey Turner <cturner@fveng.com>
Sent: Thursday, May 21, 2020 5:10 PM
To: mnfi@msu.edu
Subject: Rare Species Review Request - Leoni Township Wastewater Treatment Plant

CAUTION: This is an External email. Please send suspicious emails to abuse@michigan.gov

To whom it may concern:

Leoni Township is located on the east side of Michigan's Jackson County. Fleis & VandenBrink Engineering, working on behalf of Leoni Township, is currently preparing a Project Plan to apply for funding from the Clean Water State Revolving Fund (SRF) to subsidize necessary improvements to its Wastewater Treatment Plant (WWTP), starting in fiscal year 2021.

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This notice and opportunity to comment is being sent to you because the project is required to comply with the Fish and Wildlife Coordination Act. We request that your office review the proposed project with respect to any State or Federally listed endangered or threatened species, notion if any are present, their location and whether the project presents the possibility of any impact to them. Should you have any comments on potential impacts to known endangered or threatened species in the area, please provide them to us within 30 days of this notice.

Please send any associated invoices to my attention.

Feel free to contact me with any questions.

Thank you,

Corey Turner

Process EIT

FLEIS & VANDENBRINK

2960 Lucerne Drive SE, Suite 100 | Grand Rapids | MI | 49546

O: 616.977.1000 | D: 616.965.8765 | C: 616.821.0777 | F: 616.977.1005

www.fveng.com

 Please consider the environment before printing this email.

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Corey Turner
Process EIT
Fleis & Vandenbrink Engineering, Inc.
2960 Lucerne Drive SE, Suite 100
Grand Rapids, MI 49546
616-977-1000

June 4, 2020

**Re: Rare Species Review #2638 – Leoni Township Wastewater Treatment Plant Project,
Jackson County, MI (T03S R01E Section 12).**

Mr. Turner:

The location for the proposed project was checked against known localities for rare species and unique natural features, which are recorded in the Michigan Natural Features Inventory (MNFI) natural heritage database. This continuously updated database is a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features. Records in the database indicate that a qualified observer has documented the presence of special natural features. The absence of records in the database for a particular site may mean that the site has not been surveyed. The only way to obtain a definitive statement on the status of natural features is to have a competent biologist perform a complete field survey.

Under Act 451 of 1994, the Natural Resources and Environmental Protection Act, Part 365, Endangered Species Protection, "a person shall not take, possess, transport, ...fish, plants, and wildlife indigenous to the state and determined to be endangered or threatened," unless first receiving an Endangered Species Permit from the Michigan Department of Natural Resources (MDNR), Wildlife Division. Responsibility to protect endangered and threatened species is not limited to the lists below. Other species may be present that have not been recorded in the database.



MSU EXTENSION

**Michigan Natural
Features Inventory**

PO Box 13036
Lansing MI 48901

(517) 284-6200
Fax (517) 373-9566

mnfi.anr.msu.edu

MSU is an affirmative-
action, equal-opportunity
employer.

At-risk species have been documented within 1.5 miles of the project site. However, the occurrences are far removed from the proposed activity so **it is not likely** that negative impacts will occur. Keep in mind that MNFI cannot fully evaluate this project without visiting the project site. MNFI offers several levels of [Rare Species Reviews](#), including field surveys which I would be happy to discuss with you.

Sincerely,

Michael A. Sanders

Michael A. Sanders
Environmental Review Specialist/Zoologist
Michigan Natural Features Inventory

Comments for Rare Species Review #2638: It is important to note that it is the applicant's responsibility to comply with both state and federal threatened and endangered species legislation. Therefore, if a state listed species occurs at a project site, and you think you need an endangered species permit please contact: Casey Reitz, Wildlife Division, Michigan Department of Natural Resources, 517-284-6210 or ReitzC@michigan.gov. If a federally listed species is involved and, you think a permit is needed, please contact Carrie Tansy, Endangered Species Program, U.S. Fish and Wildlife Service, East Lansing office, 517-351-8375, or Carrie_Tansy@fws.gov.

Special concern species and natural communities are not protected under endangered species legislation, but efforts should be taken to minimize any or all impacts. Species classified as special concern are species whose numbers are getting smaller in the state. If these species continue to decline they would be recommended for reclassification to threatened or endangered status.

Please see Michigan's Rare Plant and Animal Lists for additional information regarding the listed species: <https://mnfi.anr.msu.edu/species>

Table 1: Occurrences of threatened & endangered species within 1.5 miles of RSR #2638

ELCAT	SNAME	SCOMNAME	USESA	SPROT	G_RANK	S_RANK	FIRSTOBS	LASTOBS
Animal	<i>Ammodramus henslowii</i>	Henslow's sparrow		E	G4	S3	2005	2006-05-16

Comments for Table 1:

No concerns. Occurrence is far removed from the proposed activity.

Table 2: Occurrences of special concern species & other natural features within 1.5 miles of RSR #2638

ELCAT	SNAME	SCOMNAME	USESA	SPROT	G_RANK	S_RANK	FIRSTOBS	LASTOBS
Animal	<i>Spiza americana</i>	Dickcissel		SC	G5	S3	2005-06-17	2005-06-22
Animal	<i>Lithobates palustris</i>	Pickerel frog		SC	G5	S3S4	1997-05-21	1997-05-21

Comments for Table 2:

No concerns. Occurrences are far removed from the proposed activity.

Codes to accompany tables:

State Protection Status Code Definitions (SPROT)

E: Endangered
T: Threatened
SC: Special concern

Federal Protection Status Code Definitions (USESA)

LE = listed endangered
LT = listed threatened
LELT = partly listed endangered and partly listed threatened
PDL = proposed delist
E(S/A) = endangered based on similarities/appearance
PS = partial status (federally listed in only part of its range)
C = species being considered for federal status

Global Heritage Status Rank Definitions (GRANK)

The priority assigned by [NatureServe](#)'s national office for data collection and protection based upon the element's status throughout its entire world-wide range. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

G1 = critically imperiled globally because of extreme rarity (5 or fewer occurrences range-wide or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 = imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3: Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g. a single western state, a physiographic region in the East) or because of other factor(s) making it vulnerable to extinction throughout its range; in terms of occurrences, in the range of 21 to 100.

G4: Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.

G5: Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

Q: Taxonomy uncertain

State Heritage Status Rank Definitions (SRANK)

The priority assigned by the Michigan Natural Features Inventory for data collection and protection based upon the element's status within the state. Criteria not based only on number of occurrences; other critical factors also apply. Note that ranks are frequently combined.

S1: Critically imperiled in the state because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation in the state.

S2: Imperiled in state because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extirpation from the state.

S3: Rare or uncommon in state (on the order of 21 to 100 occurrences).

S4 = apparently secure in state, with many occurrences.

S5 = demonstrably secure in state and essentially ineradicable under present conditions.

SX = apparently extirpated from state.

Section 7 Comments for Rare Species Review #2638

Fleis & Vandenbrink

Leoni Township WWTP Project

Jackson County, MI

June 4, 2020

For projects involving Federal funding or a Federal agency authorization

The following information is provided to assist you with Section 7 compliance of the Federal Endangered Species Act (ESA). The ESA directs all Federal agencies "to work to conserve endangered and threatened species. Section 7 of the ESA, called "Interagency Cooperation, is the means by which Federal agencies ensure their actions, including those they authorize or fund, do not jeopardize the existence of any listed species." Listed species and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS).

The project falls within the range of following federally listed species which have been identified by USFWS to potentially occur in Jackson County, MI:

Federally Endangered

Indiana bat - there appears to be suitable habitat within 1.5 miles of the project site. Indiana bats (*Myotis sodalis*) are found only in the eastern United States and are typically confined to the southern three tiers of counties in Michigan. Indiana bats that summer in Michigan winter in caves in Indiana and Kentucky. This species forms colonies and forages in riparian and mature floodplain habitats. Nursery roost sites are usually located under loose bark or in hollows of trees near riparian habitat. Indiana bats typically avoid houses or other artificial structures and typically roost underneath loose bark of dead elm, maple and ash trees. Other dead trees used include oak, hickory and cottonwood. Foraging typically occurs over slow-moving, wooded streams and rivers as well as in the canopy of mature trees. Movements may also extend into the outer edge of the floodplain and to nearby solitary trees. A summer colony's foraging area usually encompasses a stretch of stream over a half-mile in length. Upland areas isolated from floodplains and non-wooded streams are generally avoided.

Management and Conservation: the suggested seasonal tree cutting range for Indiana bat is between October 1 and March 31 (i.e., no cutting April 1-September 30). This applies throughout the Indiana bat range in Michigan.

Mitchell's satyr butterfly - there does not appear to be suitable habitat within 1.5 miles of the project site. The federally endangered and state endangered Mitchell's satyr butterfly (*Neonympha mitchellii mitchellii*) is restricted to calcareous wetlands known as prairie fens. In Michigan, this habitat is characterized by scattered tamaracks, poison sumac, and dogwood with a ground cover of sedges, shrubby cinquefoil, and a variety of herbaceous species with prairie affinities. Adult Mitchell's satyr butterflies are active two to three weeks each summer, with males emerging before females. Adult flight dates are from mid-June to mid-July. Larvae hibernate near the bottom of a sedge. The larval food plant is thought to be several species of sedge. The caterpillar is green with white stripes.

Management and Conservation: the primary threat to the continued survival of this species is habitat loss and modification. Many of the wetland complexes occupied currently have been altered or drained for agriculture or development. Wetland alteration is responsible for extirpating the single known satyr population in Ohio. Wetland alteration also can lead to invasion by exotic plant species such as glossy buckthorn (*Rhamnus*

frangula), purple loosestrife (*Lythrum salicaria*), common buckthorn (*Rhamnus cathartica*), and the common reed (*Phragmites australis*). In addition, landscape-scale processes that may be important for maintaining suitable satyr habitat and/or creating new habitat, such as wildfires, fluctuations in hydrologic regimes, and flooding from beaver (*Castor canadensis*) activity, have been virtually eliminated or altered throughout the species' range.

Poweshiek skipperling - there does not appear to be suitable habitat within the 1.5-mile search buffer. In Michigan, the poweshiek skipperling (*Oarisma poweshiek*) inhabits alkaline wetlands known as fens. This habitat is characterized by scattered tamaracks, poison sumac, and dogwood clones with a ground cover of sedges and other herbaceous species. This rare insect has a single generation each year. Egg laying is believed to occur on sedges and rushes sometime around early July. Poweshiek larvae (caterpillar stage) hibernate through the winter on the food source on which they have been feeding on. In early April, they become active and continue developing until they pupate and emerge as adult butterflies. Adults have a lifespan of only 1-2 weeks and can be seen in late June through the first three weeks of July. Nectar plants include black-eyed susan (*Rudbeckia hirta*) and palespike lobelia (*Lobelia spicata*).

Management and Conservation: The primary threat to the continued survival of this species is habitat loss and modification. Many of the wetland complexes occupied currently have been altered or drained for agriculture or development. Wetland alteration also can lead to invasion by exotic plant species such as glossy buckthorn (*Rhamnus frangula*) and purple loosestrife (*Lythrum salicaria*).

Federally Threatened

Northern long-eared bat - Northern long-eared bat (*M. septentrionalis*) numbers in the northeast US have declined up to 99 percent. Loss or degradation of summer habitat, wind turbines, disturbance to hibernacula, predation, and pesticides have contributed to declines in Northern long-eared bat populations. However, no other threat has been as severe to the decline as White-nose Syndrome (WNS). WNS is a fungus that thrives in the cold, damp conditions in caves and mines where bats hibernate. The disease is believed to disrupt the hibernation cycle by causing bats to repeatedly awake thereby depleting vital energy reserves. This species was federally listed in May 2015 primarily due to the threat from WNS.

Although no known hibernacula or roost trees have been documented within 1.5 miles of the project site, this activity occurs within the designated [WNS zone](#) (i.e., within 150 miles of positive counties/districts impacted by WNS). In addition, there appears to be suitable habitat within the 1.5 mile buffer. The USFWS has prepared a [dichotomous key](#) to help determine if this action may cause prohibited take of this bat. Please consult the USFWS [Endangered Species Page](#) for more information.

Also called northern bat or northern myotis, this bat is distinguished from other *Myotis* species by its long ears. In Michigan, northern long-eared bats hibernate in abandoned mines and caves in the Upper Peninsula; they also commonly hibernate in the Tippy Dam spillway in Manistee County. This species is a regional migrant with migratory distance largely determined by locations of suitable hibernacula sites.

Northern long-eared bats typically roost and forage in forested areas. During the summer, these bats roost singly or in colonies underneath bark, in cavities or in crevices of both living and dead trees. Roost trees are selected based on the suitability to retain bark or provide cavities or crevices. Common roost trees in southern Lower Michigan include species of ash, elm and maple. Foraging occurs primarily in areas along woodland edges, woodland clearings and over small woodland ponds. Moths, beetles and small flies are common food items. Like all temperate bats this species typically produces only 1-2 young per year.

Management and Conservation: when there are no known roost trees or hibernacula in the project area, we encourage you to conduct tree-cutting activities and prescribed burns in forested areas during October 1 through March 31 when possible, but you are not required by the ESA to do so. When that is not possible, we encourage you to remove trees prior to June 1 or after July 31, as that will help to protect young bats that may be in forested areas but are not yet able to fly.

Eastern massasauga rattlesnake – this project falls outside of Tier 1 or Tier 2 EMR Habitat as designated by the USFWS. In addition, there are known occurrences within the search area. The federally threatened and state special concern eastern massasauga rattlesnake (*Sistrurus catenatus*) is Michigan's only venomous snake and is found in a variety of wetland habitats including bogs, fens, shrub swamps, wet meadows, marshes, moist grasslands, wet prairies, and floodplain forests. Eastern massasaugas occur throughout the Lower Peninsula but are not found in the Upper Peninsula. Populations in southern Michigan are typically associated with open wetlands, particularly prairie fens, while those in northern Michigan are better known from lowland coniferous forests, such as cedar swamps. These snakes normally overwinter in crayfish or small mammal burrows often close to the groundwater level and emerge in spring as water levels rise. During late spring, these snakes move into adjacent uplands they spend the warmer months foraging in shrubby fields and grasslands in search of mice and voles, their favorite food.

Often described as "shy and sluggish", these snakes avoid human confrontation and are not prone to strike, preferring to leave the area when they are threatened. However, like any wild animal, they will protect themselves from anything they see as a potential predator. Their short fangs can easily puncture skin and they do possess potent venom. Like many snakes, the first human reaction may be to kill the snake, but it is important to remember that all snakes play vital roles in the ecosystem. Some may eat harmful insects. Others like the massasauga consider rodents a delicacy and help control their population. Snakes are also a part of a larger food web and can provide food to eagles, herons, and several mammals.

Management and Conservation: any sightings of these snakes should be reported to the Michigan Department of Natural Resources, Wildlife Division. If possible, a photo of the live snake is also recommended.

USFWS Section 7 Consultation Technical Assistance can be found at:

<https://www.fws.gov/midwest/endangered/section7/index.html>

The website offers step-by-step instructions to guide you through the Section 7 consultation process with prepared templates for documenting "no effect." as well as requesting concurrence on "may affect, but not likely to adversely affect" determinations.

Please let us know if you have questions.

Michael Sanders
Environmental Review Specialist/Zoologist
Sander75@msu.edu
517-284-6215



United States Department of the Interior



FISH AND WILDLIFE SERVICE

Michigan Ecological Services Field Office

2651 Coolidge Road Suite 101

East Lansing, MI 48823-6360

Phone: (517) 351-2555 Fax: (517) 351-1443

<http://www.fws.gov/midwest/endangered/section7/s7process/step1.html>

In Reply Refer To:

May 20, 2020

Consultation Code: 03E16000-2020-SLI-1109

Event Code: 03E16000-2020-E-03454

Project Name: Leoni Township Wastewater Treatment Plant Membrane System Improvements

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The attached species list identifies any federally threatened, endangered, proposed and candidate species that may occur within the boundary of your proposed project or may be affected by your proposed project. The list also includes designated critical habitat if present within your proposed project area or affected by your project. This list is provided to you as the initial step of the consultation process required under section 7(c) of the Endangered Species Act, also referred to as Section 7 Consultation.

Section 7 of the Endangered Species Act of 1973 requires that actions authorized, funded, or carried out by Federal agencies not jeopardize federally threatened or endangered species or adversely modify designated critical habitat. To fulfill this mandate, Federal agencies (or their designated non-federal representative) must consult with the Fish and Wildlife Service if they determine their project may affect listed species or critical habitat.

There are several important steps in evaluating the effects of a project on listed species. Please use the species list provided and visit the U.S. Fish and Wildlife Service's Region 3 Section 7 Technical Assistance website at <http://www.fws.gov/midwest/endangered/section7/s7process/index.html>. This website contains step-by-step instructions to help you determine if your project may affect listed species and lead you through the section 7 consultation process.

Under 50 CFR 402.12(e) (the regulations that implement section 7 of the Endangered Species Act), the accuracy of this species list should be verified after 90 days. You may verify the list by visiting the ECOS-IPaC website (<http://ecos.fws.gov/ipac/>) at regular intervals during project planning and implementation and completing the same process you used to receive the attached list.

For all **wind energy projects** and **projects that include installing towers that use guy wires or are over 200 feet in height**, please contact this field office directly for assistance, even if no federally listed plants, animals or critical habitat are present within your proposed project area or may be affected by your proposed project.

Please see the “Migratory Birds” section below for important information regarding incorporating migratory birds into your project planning. Our Migratory Bird Program has developed recommendations, best practices, and other tools to help project proponents voluntarily reduce impacts to birds and their habitats. The Bald and Golden Eagle Protection Act prohibitions include the take and disturbance of eagles. If your project is near an eagle nest or winter roost area, see our Eagle Permits website at <https://www.fws.gov/midwest/eagle/permits/index.html> to help you avoid impacting eagles or determine if a permit may be necessary.

Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit <https://www.fws.gov/birds/policies-and-regulations/administrative-orders/executive-orders.php>.

We appreciate your concern for threatened and endangered species. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
 - Wetlands
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Michigan Ecological Services Field Office

2651 Coolidge Road Suite 101

East Lansing, MI 48823-6360

(517) 351-2555

Project Summary

Consultation Code: 03E16000-2020-SLI-1109

Event Code: 03E16000-2020-E-03454

Project Name: Leoni Township Wastewater Treatment Plant Membrane System Improvements

Project Type: WASTEWATER FACILITY

Project Description: Following is a summary of the major components of the proposed project at the WWTP site:

1. Removal of the existing MBR treatment system and plumbing.
2. Replacement of the membranes, permeate piping and air piping.
3. Replacement of the existing permeate pumping system.
4. Replacement of the process aeration blowers and the membrane air scour blowers.
5. Replacement of the existing chemical feed system with skid mounted chemical feed systems.
6. Relocation of the existing return activated sludge piping from the anoxic basins to the anaerobic basins.
7. Electrical and control system upgrades.

The project is anticipated to start in the Spring of 2021 and be finished in 2022.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/42.24606085439267N84.42168774865706W>



Counties: Calhoun, MI | Eaton, MI | Hillsdale, MI | Ingham, MI | Jackson, MI | Lenawee, MI |
Washtenaw, MI

Endangered Species Act Species

There is a total of 11 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 1 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Indiana Bat <i>Myotis sodalis</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/1/office/31410.pdf	Endangered
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045 General project design guidelines: https://ecos.fws.gov/ipac/guideline/design/population/10043/office/31410.pdf	Threatened

Birds

NAME	STATUS
Whooping Crane <i>Grus americana</i> Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non-Essential

Reptiles

NAME	STATUS
<p>Copperbelly Water Snake <i>Nerodia erythrogaster neglecta</i></p> <p>Population: Indiana north of 40 degrees north latitude, Michigan, Ohio</p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/7253</p>	Threatened
<p>Eastern Massasauga (=rattlesnake) <i>Sistrurus catenatus</i></p> <p>No critical habitat has been designated for this species.</p> <p>This species only needs to be considered under the following conditions:</p> <ul style="list-style-type: none"> ▪ All Projects: Tier 1 EMR Habitat Present ▪ All Projects: Project is Within EMR Range ▪ All Projects: Tier 2 EMR Habitat Present <p>Species profile: https://ecos.fws.gov/ecp/species/2202</p> <p>General project design guidelines:</p> <p>https://ecos.fws.gov/ipac/guideline/design/population/7800/office/31410.pdf</p>	Threatened

Clams

NAME	STATUS
<p>Clubshell <i>Pleurobema clava</i></p> <p>Population: Wherever found; Except where listed as Experimental Populations</p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/3789</p> <p>Species survey guidelines:</p> <p>https://ecos.fws.gov/ipac/guideline/survey/population/352/office/31410.pdf</p>	Endangered
<p>Rayed Bean <i>Villosa fabalis</i></p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/5862</p> <p>Species survey guidelines:</p> <p>https://ecos.fws.gov/ipac/guideline/survey/population/6062/office/31410.pdf</p>	Endangered
<p>Snuffbox Mussel <i>Epioblasma triquetra</i></p> <p>No critical habitat has been designated for this species.</p> <p>Species profile: https://ecos.fws.gov/ecp/species/4135</p> <p>Species survey guidelines:</p> <p>https://ecos.fws.gov/ipac/guideline/survey/population/5281/office/31410.pdf</p>	Endangered

Insects

NAME	STATUS
Mitchell's Satyr Butterfly <i>Neonympha mitchellii mitchellii</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8062	Endangered
Poweshiek Skipperling <i>Oarisma poweshiek</i> There is final critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9161	Endangered

Flowering Plants

NAME	STATUS
Eastern Prairie Fringed Orchid <i>Platanthera leucophaea</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/601	Threatened

Critical habitats

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Poweshiek Skipperling <i>Oarisma poweshiek</i> https://ecos.fws.gov/ecp/species/9161#crithab	Final

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

The following FWS National Wildlife Refuge Lands and Fish Hatcheries lie fully or partially within your project area:

FACILITY NAME	ACRES
Shiawassee National Wildlife Refuge Shiawassee National Wildlife Refuge 6975 Mower Road Saginaw, MI 48601-9783 (989) 777-5930 https://www.fws.gov/refuges/profiles/index.cfm?id=31520	872
Michigan Wetland Management District Michigan Wetland Management District 6975 Mower Road Saginaw, MI 48601-9783 (989) 777-5930 https://www.fws.gov/refuges/profiles/index.cfm?id=31731	298

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Bittern <i>Botaurus lentiginosus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/6582	Breeds Apr 1 to Aug 31
American Golden-plover <i>Pluvialis dominica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black Tern <i>Chlidonias niger</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Buff-breasted Sandpiper <i>Calidris subruficollis</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9488	Breeds elsewhere
Cerulean Warbler <i>Dendroica cerulea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 22 to Jul 20
Dunlin <i>Calidris alpina arctica</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Eastern Whip-poor-will <i>Antrostomus vociferus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Golden Eagle <i>Aquila chrysaetos</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds elsewhere
Golden-winged Warbler <i>Vermivora chrysoptera</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20

NAME	BREEDING SEASON
Henslow's Sparrow <i>Ammodramus henslowii</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3941	Breeds May 1 to Aug 31
Least Bittern <i>Ixobrychus exilis</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/6175	Breeds Aug 16 to Oct 31
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Semipalmated Sandpiper <i>Calidris pusilla</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Short-billed Dowitcher <i>Limnodromus griseus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Willow Flycatcher <i>Empidonax traillii</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/3482	Breeds May 20 to Aug 31
Wood Thrush <i>Hylocichla mustelina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the

FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

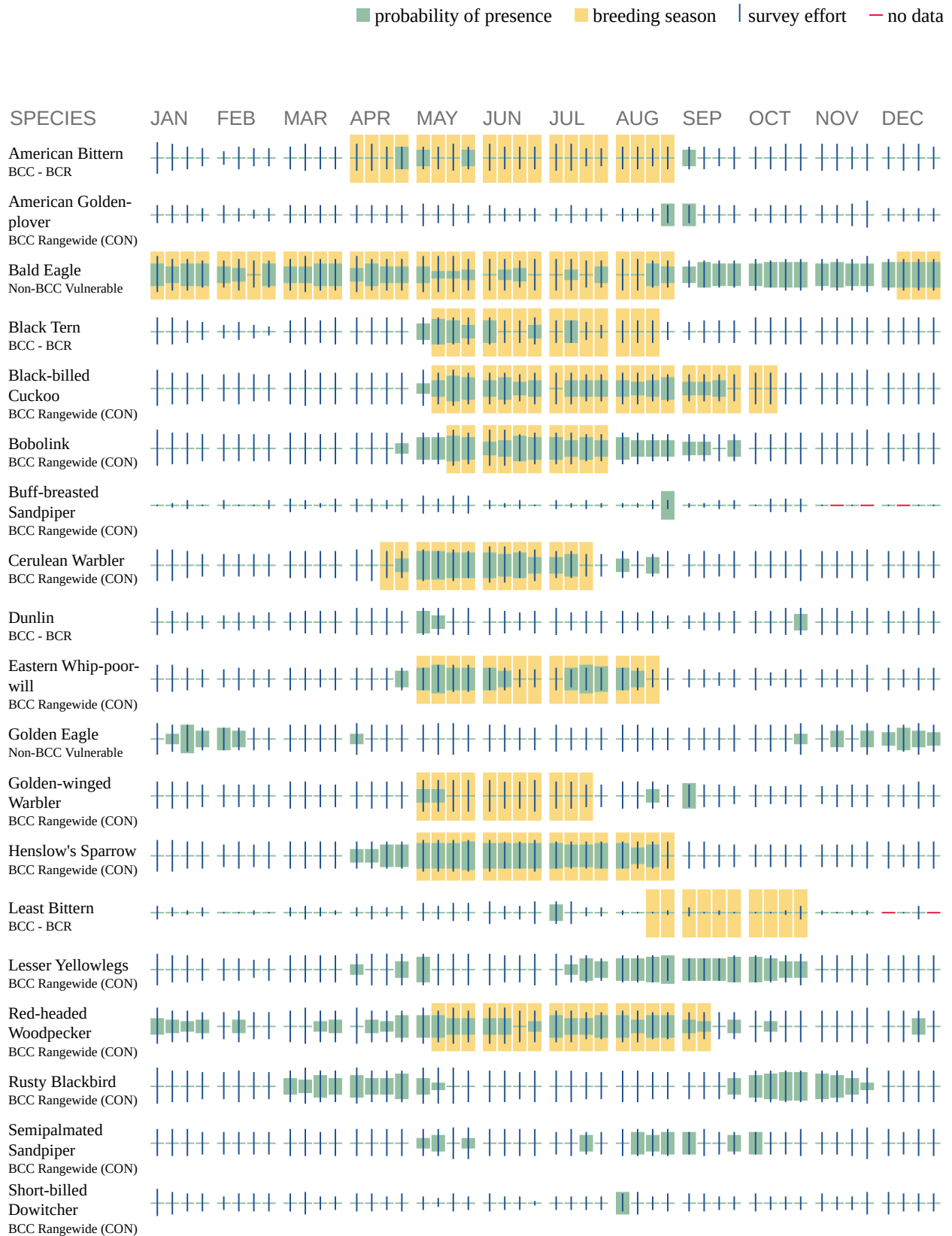
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

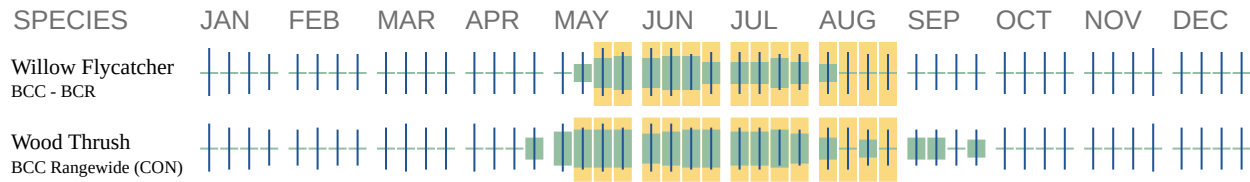
No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the “no data” indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ “Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds” at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

Due to your project's size, the list below may be incomplete, or the acreages reported may be inaccurate. For a full list, please contact the local U.S. Fish and Wildlife office or visit <https://www.fws.gov/wetlands/data/mapper.HTML>

FRESHWATER EMERGENT WETLAND

- [PEM1/AB3F](#)
- [PEM1/AB4F](#)
- [PEM1A](#)
- [PEM1Ad](#)
- [PEM1Af](#)
- [PEM1B](#)
- [PEM1Bd](#)
- [PEM1C](#)

FRESHWATER POND

- [PAB/UBF](#)
 - [PAB/UBG](#)
 - [PAB/UBGh](#)
 - [PAB3/UBF](#)
 - [PAB3/UBG](#)
 - [PAB3F](#)
 - [PAB3G](#)
 - [PAB4/UBF](#)
 - [PAB4/UBG](#)
 - [PAB4F](#)
 - [PAB4G](#)
 - [PABF](#)
 - [PABG](#)
-

- [PABGx](#)

LAKE

- [L1UBH](#)
 - [L1UBHh](#)
 - [L1UBHx](#)
 - [L2ABHh](#)
 - [L2EM2G](#)
-

Corey Turner

From: Dijak, Claire (EGLE) <DijakC@michigan.gov>
Sent: Tuesday, June 2, 2020 3:46 PM
To: Corey Turner
Subject: RE: Leoni Township - Membrane System Improvements NPDES Permit Review

Hi Corey,

Since the plant design capacity will not be changing, you do not need to request a modification of the NPDES Permit.

Thank you,

Claire Dijak

Environmental Quality Analyst
Water Resources Division/Jackson District Office
Michigan Department of Environment, Great Lakes, and Energy
517-281-8355 | DijakC@Michigan.gov
Follow Us | [//Michigan.gov/EGLE](https://Michigan.gov/EGLE)

Please Note: Due to temporary layoffs, I am not available to respond to emails or phone calls on Mondays starting the week of May 18, 2020 through July 24, 2020. Thank you.

From: Corey Turner <cturner@fveng.com>
Sent: Tuesday, June 2, 2020 12:27 PM
To: Dijak, Claire (EGLE) <DijakC@michigan.gov>
Subject: Leoni Township - Membrane System Improvements NPDES Permit Review

CAUTION: This is an External email. Please send suspicious emails to abuse@michigan.gov

Good Afternoon Claire,

Leoni Township has proposed a Membrane System Improvements project to be funded by the State Revolving Program. The Wastewater Treatment Plant Membrane System Improvements project includes upgrades to the existing WWTP Membrane Treatment System, including removal and replacement of process piping and equipment, modifications to existing treatment basins, upgrades to electrical and control systems, and all related work.

The proposed project will not change or modify the existing wet treatment process or increase the design capacity of the existing treatment facility. We do not anticipate any modifications or changes to the existing NPDES discharge permit due to the Project. Please provide your review comments.

If you need additional information or would like to discuss the project in more detail, please call me at 616.821.0777.

Thank you,

Corey Turner

Process EIT

FLEIS & VANDENBRINK

2960 Lucerne Drive SE, Suite 100 | Grand Rapids | MI | 49546
O: 616.977.1000 | D: 616.965.8765 | C: 616.821.0777 | F: 616.977.1005
www.fveng.com

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GRETCHEN WHITMER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING



LIESL EICHLER CLARK
DIRECTOR

November 16, 2021

CERTIFIED MAIL 7021 0350 0000 6194 5658

Mr. Howard Linnabary, Township Supervisor
Leoni Township
913 Fifth Street
Michigan Center, Michigan 49254

Dear Mr. Linnabary:

SUBJECT: Leoni Township, Draft Administrative Consent Order

Enclosed with this letter, please find a draft copy of the proposed Administrative Consent Order (ACO) prepared by the Department of Environment, Great Lakes, and Energy (EGLE), Water Resources Division (WRD), to formally resolve the violations of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.3101 *et seq.*, and the associated administrative rules; Part 41, Sewerage Systems, of the NREPA, MCL 324.4101 *et seq.*; the Part 22, Groundwater Quality, administrative rules promulgated pursuant to Part 31, Mich Admin Code, R 323.2201 *et seq.*; and National Pollutant Discharge Elimination System Permit No. MI0045942, by Leoni Township.

The WRD is requesting that Leoni Township review the draft ACO and respond with any comments no later than **December 20, 2021**. If Leoni Township wishes to meet with WRD staff in advance of this date, please contact me at 517-230-1430 or DotyS2@Michigan.gov; no later than **November 30, 2021**, to make arrangements.

Sincerely,

Susan Doty, Environmental Quality Specialist
Enforcement Unit
Water Resources Division

Enclosure

cc: Mr. Jon Russell, EGLE
Ms. Tiffany Myers, EGLE
Mr. David Pingel, EGLE
Mr. Dan Beauchamp, EGLE
Mr. Charles Hill, EGLE
Ms. Bridgett Carver, EGLE
Ms. Miekyn Cotton, EGLE

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**STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
WATER RESOURCES DIVISION**

In the matter of:

ACO-05553

Date Entered: _____

Leoni Township
913 Fifth Street
Michigan Center, Michigan 49254

ADMINISTRATIVE CONSENT ORDER

This document results from allegations by the Department of Environment, Great Lakes, and Energy (EGLE), Water Resources Division (WRD). EGLE alleges Leoni Township, which is in Jackson County, Michigan, owns and operates a Wastewater Treatment Plant (WWTP) located at 8401 Page Avenue, Jackson, Jackson County, Michigan (Facility), and is in violation of Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act (NREPA), MCL 324.3101 *et seq.* (Part 31); Part 41, Sewerage Systems, of the NREPA, MCL 324.4101 *et seq.* (Part 41); the Part 21, Wastewater Discharge Permits, administrative rules promulgated pursuant to Part 31, Mich Admin Code, R 323.2101 *et seq.* (Part 21 Rules); and National Pollutant Discharge Elimination System Permit No. MI0045942 (NPDES Permit). Leoni Township is a municipality, as defined by Section 301 of the NREPA, MCL 324.301. Leoni Township and EGLE agree to resolve the violations set forth herein through entry of this Administrative Consent Order (Consent Order).

I. STIPULATIONS

Leoni Township and EGLE stipulate as follows:

- 1.1 Executive Order 2019-06, signed by Governor Gretchen Whitmer on February 20, 2019, renamed the Department of Environmental Quality (DEQ) as EGLE, effective April 22, 2019. This Consent Order uses EGLE to refer to the DEQ prior to April 22, 2019.
- 1.2 The NREPA, MCL 324.101 *et seq.*, is an act that controls pollution to protect the environment and natural resources in the state.

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- 1.3 Part 31 and the rules promulgated pursuant thereto provide for the protection, conservation, and the control of pollution of the water resources of the state.
- 1.4 Part 41 and the rules promulgated pursuant thereto provide for the proper planning, construction and operation of sewerage facilities to prevent unlawful pollution of the water resources of the state.
- 1.5 EGLE is authorized by Sections 3106 and 3112(4) of Part 31 and Section 4111 of Part 41, MCL 324.3106 and MCL 324.3112(4) and MCL 324.4111 respectively, to enter orders requiring persons to abate pollution or otherwise cease or correct activities in violation of a specific part. The director of EGLE may delegate this authority to a designee under Section 301(b) of the NREPA, MCL 324.301(b).
- 1.6 Leoni Township consents to the issuance and entry of this Consent Order and stipulates that the entry of this Consent Order constitutes a final order of EGLE and is enforceable as such under Section 3112(4) of Part 31 and Section 4110 of Part 41. Leoni Township agrees not to contest the issuance of this Consent Order and that the resolution of this matter by the entry of this Consent Order is appropriate and acceptable. It is also agreed that this Consent Order shall become effective on the date it is signed by the director of the WRD, delegate of the director of EGLE, pursuant to Section 301(b) of the NREPA.
- 1.7 Leoni Township and EGLE agree that the signing of this Consent Order is for settlement purposes only and does not constitute an admission by Leoni Township that the law has been violated.
- 1.8 The signatory to this Consent Order certifies that he/she is fully authorized by Leoni Township to enter into the terms and conditions of this Consent Order and to execute and legally bind Leoni Township to this document. Leoni Township hereby agrees to comply with the requirements of this Consent Order to resolve the violations stated in Section II of this Consent Order and agrees to achieve compliance with Part 31, Part 41, the Part 21 Rules, and the Permit by fulfilling the terms of Section III of this Consent Order.

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II. FINDINGS

- 2.1 On November 2, 2018, Leoni Township was issued the NPDES Permit that authorized the discharge of treated wastewater from the WWTP to an unnamed tributary to the Grand River.
- 2.2 From January 11, 2020, through January 14, 2020, Leoni Township discharged raw sewage to the ground.
- 2.3 From January 13, 2020, through January 21, 2020, Leoni Township discharged approximately five million gallons of partially treated sewage to the Grand River, a surface water of the state. In addition, Leoni Township failed to test the Grand River for *E. coli* to assess the risk to public health as a result from the illegal discharge.
- 2.4 In March 2020, Leoni Township discharged effluent that contained available cyanide in violation of the NPDES Permit limit for cyanide.
- 2.5 On March 28, 2020, Leoni Township discharged approximately 750 gallons of partially treated wastewater to land and the Grand River due to a failure of the WWTP alarm system and overflow of the secondary tank.
- 2.6 From May 25, 2020, through June 27, 2020, Leoni Township illegally discharged to the Grand River from Outfall 001 approximately twelve million gallons of partially treated wastewater that was pumped directly from the Emergency Use Lagoon to upstream of the Ultraviolet Disinfection process in the WWTP, thereby bypassing the majority of the treatment in the WWTP.
- 2.7 During and after the illegal discharges in May and June 2020, Leoni Township reported, on twenty-three days, the final effluent it discharged to the Grand River exceeded the NPDES Permit limit for fecal coliform. In addition, Leoni Township reported exceedances the NPDES Permit limits for carbonaceous biochemical oxygen demand and ammonia nitrogen prior to disinfection.

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- 2.8 Leoni Township failed to test the Grand River for *E. coli* to assess the risk to public health as a result the illegal discharges in May and June 2020, in violation of Section 3112a(3) of Part 31, MCL 324.3112a(3).
- 2.9 Leoni Township reported exceedances of NPDES Permit limit for total phosphorus in July, August, and September 2020, prior to disinfection.
- 2.10 Since at least January 2020, Leoni Township failed to ensure adequate and timely replacement of membranes in the WWTP in a manner that shall minimize upsets and discharges of excessive pollutants to the waters of the state, in violation of Rule 55 of the Part 4, Operation and Maintenance of Sewerage Systems, administrative rules promulgated pursuant to Part 41, Mich Admin Code, R 299.2955.
- 2.11 On March 9, 2021, the WRD issued an Enforcement Notice to Leoni Township detailing the violations identified in Paragraphs 2.2 through 2.10 of this Consent Order and that the WRD intended to resolve the violations through an escalated enforcement action.
- 2.12 On April 6, 2020, EGLE issued Part 41 Permit No. P41002560v1.0 to Leoni Township for the construction of headworks odor control improvements.
- 2.13 On February 1, 2021, EGLE issued Part 41 Permit No. P41002998v1.0 to Leoni Township for the construction of membrane replacement in Train Four of the WWTP.
- 2.14 On March 10, 2021, EGLE issued Part 41 Permit No. P41003050v1.0 to Leoni Township for the construction of Membrane System improvements (Membrane System Improvements Project).

III. COMPLIANCE PROGRAM

IT IS THEREFORE AGREED AND ORDERED THAT Leoni Township shall take the following actions to comply with and prevent further violations of Part 31, Part 41, the Part 21 Rules, and the NPDES Permit:

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- 3.1 Within sixty (60) days after the effective date of this Consent Order, Leoni Township shall submit to the WRD for review and approval, through its MiWaters account, a contingency plan in case of WWTP failure during the Membrane System Improvements Project. If additional information or any corrections are requested by the WRD, Leoni Township shall provide that information within 30 days of the request. Upon WRD approval, Leoni Township shall implement the contingency plan. The WRD-approved contingency plan shall be incorporated into this Consent Order by reference and is enforceable hereunder.
- 3.2 Within sixty (60) days after the effective date of this consent order, Leoni Township shall submit to the WRD for review and approval, through its MiWaters account, a plan and schedule for updating all contracts with its contributing municipalities (CM). At a minimum the plan shall include the following: the steps Leoni Township intends to take to update all contracts by including with contract capacities that each CM may contribute to the WWTP (including peak flow and average daily flow capacities as appropriate), and the steps Leoni Township will take to monitor and enforce those contract capacities (including the steps identified in Paragraph 3.3 of this Consent Order). Leoni Township shall give particular consideration to WWTP capacity when establishing CM contract capacities. If additional information or any corrections are requested by the WRD, Leoni Township shall provide that information within 30 days after the request. Upon WRD approval, Leoni Township shall implement the plan. The WRD-approved plan shall be incorporated into this Consent Order by reference and is enforceable hereunder.
- 3.3 Within sixty (60) days after the effective date of this Consent Order, Leoni Township shall submit to the WRD for review and approval, through its MiWaters account, a plan and schedule to install permanent flow meters to measure the flow from each CM to the WWTP. At a minimum the plan shall include the following: location of flow meters, which CM it monitors, a maintenance and calibration plan, and a plan for data collection. If additional information or any corrections are requested by the WRD, Leoni Township shall provide that information within 30 days after the request. Upon WRD approval, Leoni Township shall implement the plan. The WRD-approved plan shall be incorporated into this Consent Order by reference and is enforceable hereunder.

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- 3.4 As per Part 2, Section C.6. of the NPDES Permit, Leoni Township shall report all violations that may endanger health or the environment to EGLE within 24 hours after becoming aware of the noncompliance. A written submission is also required within five days after Leoni Township becoming aware of the noncompliance.
- 3.5 Leoni Township shall comply with its current and any subsequent NPDES Permit.
- 3.6 Not later than February 1, 2022, Leoni Township shall submit to the WRD for review and approval, through its MiWaters account, an approvable workplan to conduct an Infiltration/Inflow (I/I) study of Leoni Township's collection system. The I/I study workplan shall include a description and a schedule for conducting representative flow monitoring (considering factors such as drought and monitoring during the entire growth season) and analyzing the flow data of the sanitary sewer system. The I/I study workplan may require additional flow meters than the permanent flow meters specified in item 3.3 above. The I/I study workplan shall include a schedule with dates for the start and end of flow monitoring. If additional information or any corrections are requested by the WRD, Leoni Township shall provide that information within 30 days after the request. Upon WRD approval, Leoni Township shall implement the I/I study workplan. The WRD-approved I/I study workplan shall be incorporated into this Consent Order by reference and is enforceable hereunder.
- 3.7 Not later than January 1, 2023, Leoni Township shall submit to the WRD for review and approval, through its MiWaters account, an approvable I/I study report, that identifies the areas of the sanitary sewer system that are experiencing excessive I/I. Excessive I/I is defined in 40 CFR 35.2005(16). If additional information or any corrections are requested by the WRD, Leoni Township shall provide that information within 30 days after the request.

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- 3.8 Not later than March 1, 2023, Leoni Township shall submit to the WRD for review and approval, through its MiWaters account, an approvable workplan for conducting a Sewer System Evaluation Study (SSES), that addresses, at a minimum, areas with excessive I/I, as identified in the I/I Study Report. The SSES workplan shall include but not be limited to description of activities and a schedule for conducting a SSES study to identify and quantify sources of I/I and a description for performing a cost-effectiveness analysis to determine which I/I sources are cost effective to remove. If additional information or any corrections are requested by the WRD, Leoni Township shall provide that information within 30 days after the request. Upon WRD approval, Leoni Township shall implement the SESS workplan. The WRD-approved SESS workplan shall be incorporated into this Consent Order by reference and is enforceable hereunder.
- 3.9 Not later than March 1, 2024, Leoni Township shall submit to the WRD for review and approval, through its MiWaters account, an approvable SSES Report that summarizing the findings of the SSES. The report shall identify and quantify the I/I sources discovered and include the results of the cost-effectiveness analysis for elimination of I/I sources. Additionally, the SSES Report shall include the proposed sanitary sewer system improvements needed to eliminate system overflows and WWTP bypasses resulting from wet-weather events up to the Remedial Design Standard (RDS). The Program shall meet the following RDS: discharges shall be eliminated to the 25-year, 24-hour event, in the growth season (April through October), using normal soil moisture, a rainfall hyetograph based on Natural Resources Conservation Service (NRCS) Type II, Bratter-Sherrill, or equivalent for total amount and peak hour amount, and /or may result in a discharge no more often than once per 10-year period on average (April through October). If additional information or any corrections are requested by the WRD, Leoni Township shall provide that information within 30 days after the request. Upon WRD approval, Leoni Township shall implement the SESS Report workplan. The WRD-approved SESS Report workplan shall be incorporated into this Consent Order by reference and is enforceable hereunder.

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- 3.10 Not later than November 1st of each year, Leoni Township shall submit to the WRD for review and approval, through its MiWaters account, approvable annual I/I status reports. Each status report shall include at a minimum:
- a. A description of I/I reduction activities and investigations conducted in the prior year.
 - b. Results of the prior years' activities in reducing I/I to the collection system.
 - c. I/I reduction activities planned for the current year.
- 3.11 Not later than January 1, 2028, Leoni Township shall complete all sanitary sewer improvements projects identified in the approved SSES Report. Also, on or before this date, all SSOs within the collection system, WWTP, and secondary treatment bypasses from the facility shall be eliminated in accordance with the RDS.
- 3.12 Leoni Township shall comply with Part 41 Permit No. P41002560v1.0 for headworks odor control improvements. In addition, Leoni Township shall complete all construction upgrades and repairs authorized by that permit by no later than April 7, 2022.
- 3.13 Leoni Township shall comply with Part 41 Permit No. P41002998v1.0 for construction of membrane replacement in Train Four of the WWTP. In addition, Leoni Township shall complete all construction upgrades and repairs authorized by that permit no later than February 1, 2023.
- 3.14 Leoni Township shall comply with Part 41 Permit No. P41003050v1.0 for construction of the Membrane System Improvements Project. In addition, Leoni Township shall complete all construction upgrades and repairs authorized by the Permit no later than April 30, 2023.
- 3.15 Not later than September 1, 2027, Leoni Township shall submit to the WRD for review and approval, through its MiWaters account, an approvable workplan for conducting a Project Performance Certification (PPC) to certify that the collection system can adequately transport, and the WWTP can adequately treat, sanitary wastewater flows, in accordance

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with the NPDES Permit, Parts 31 and 41, and EGLE's SSO Policy and Clarification Statement. The PPC workplan shall include but not be limited to:

- a. A description and a schedule for conducting PPC flow monitoring or alternate means of providing supporting flow data. Flow data shall be collected for a minimum of one consecutive calendar year and shall be used to demonstrate that the collection system can adequately transport flows up to and including those generated by the CMs.
 - b. A description and schedule for data collection to demonstrate that the upgraded WWTP is capable of consistently meeting its effluent limitations in accordance with the Permit, at all flows up to and including those generated by the CMs.
 - c. A schedule for submittal of a PPC report.
- 3.16 Upon WRD approval, Leoni Township shall implement the PPC workplan. The EGLE--approved PPC workplan shall be incorporated into this Consent Order by reference and is enforceable hereunder. Not later than April 1, 2029, Leoni Township shall submit to EGLE an approvable a PPC report that determines if the PPC has been successfully certified. If Leoni Township is unable to certify that the project meets the performance requirements as identified in Paragraph 3.15 of this Consent Order, then Leoni Township shall submit a Corrective Action Plan (CAP) workplan with implementation schedule for WRD review and approval. Upon WRD approval, Leoni Township shall implement the CAP workplan. The WRD-approved CAP workplan shall be incorporated into this Consent Order by reference and is enforceable hereunder.
- 3.17 Within thirty (30) days after the effective date of this consent order, Leoni Township shall submit to the WRD for review and approval, through its MiWaters account, a procedure for notification of appropriate parties and monitoring required after any illegal discharge of untreated or partially treated sewage. If additional information or any corrections are requested by the WRD, Leoni Township shall provide that information within 30 days of the request.

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- 3.18 Not later than April 1, 2022, Leoni Township shall submit to the WRD for review and approval, through its MiWaters account, a tracking system (Tracking System) for the sewerage system it constructed under Part 41. The Tracking System shall include, but not be limited to, an analysis of all existing and any permitted flows that are currently, or plan to be, connected to Leoni Township's collection system. These flows shall be compared to the capacity of key downstream facilities, including interceptor sewers, any pumping stations, and the treatment plant. The Tracking System shall be updated and provided to EGLE with each Part 41 application submitted to EGLE, to ensure that there is adequate downstream capacity for all proposed additional flows. The Tracking System shall also include a schedule for periodic calibration of flow rates at the key downstream facilities to track previously permitted flows after they are connected. If additional information or any corrections are requested by the WRD, Leoni Township shall provide that information within 30 days after the request. Leoni Township shall implement the Tracking System approved by EGLE. The WRD-approved Tracking System shall be incorporated into this Consent Order by reference and is enforceable hereunder.
- 3.19 Within one hundred and twenty (120) days after the effective date of this Consent Order, Leoni Township shall submit to the WRD, through its MiWaters account, a revised wet weather operational plan (WWOP), for review and approval. At minimum, the plan shall contain the criteria for the use of the Emergency Use Lagoon during wet weather events, a plan for both filling and dewatering, and written notification to EGLE within 24 hours, as required by Paragraph 3.20 of this Consent Order. If additional information or any corrections are requested by the WRD, Leoni Township shall provide that information within 30 days after the request. Upon EGLE approval, Leoni Township shall implement the WWOP. The EGLE-approved WWOP shall be incorporated into this Consent Order by reference and is enforceable hereunder.
- 3.20 After construction, as required in Paragraphs 3.12, 3.13, and 3.14 of this Consent Order, is complete, Leoni Township shall notify the WRD, Jackson District Office supervisor, in writing, within 24 hours after any interim use of the Emergency Use Lagoon to hold overflow sewage. The notification shall include the approximate volume of sewage that

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was diverted to the Emergency Use Lagoon, the reason sewage had to be diverted, the length of time Leoni Township used or plans to use the Emergency Use Lagoon, and a plan to resolve any issues that caused the diversion, if needed. If Leoni Township plans any continuous use of the Emergency Use lagoons for one month or longer, it shall evaluate the existing lagoon construction, including whether the liner meets current requirements. That evaluation shall be included as part of any corrective action plan that is required based on the results of the PPC required by Paragraph 3.16 of this Consent Order.

- 3.21 Leoni Township shall submit all reports, work plans, specifications, schedules, or any other writing required by this section to their MiWaters account and, if required, to the WRD, Jackson District Office supervisor, at EGLE, 301 East Louis Glick Highway, Jackson, Michigan 49201-1556. The cover letter with each submittal shall identify the specific paragraph and requirement of this Consent Order that the submittal is intended to satisfy.

IV. EGLE APPROVAL OF SUBMITTALS

- 4.1 For any work plan, proposal, or other document, excluding applications for permits or licenses, that are required by this Consent Order to be submitted to EGLE by Leoni Township, the following process and terms of approval shall apply.
- 4.2 All work plans, proposals, and other documents required to be submitted by this Consent Order shall include all of the information required by the applicable statute and/or rule, and all of the information required by the applicable paragraph(s) of this Consent Order.
- 4.3 In the event EGLE disapproves a work plan, proposal, or other document, it will notify Leoni Township, in writing, specifying the reasons for such disapproval. Leoni Township shall submit, within 30 days of receipt of such disapproval, a revised work plan, proposal, or other document which adequately addresses the reasons for EGLE's disapproval. If the revised work plan, proposal, or other document is still not acceptable to EGLE, EGLE will notify Leoni Township of this disapproval.

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- 4.4 In the event EGLE approves with specific modifications a work plan, proposal, or other document, it will notify Leoni Township, in writing, specifying the modifications required to be made to such work plan, proposal, or other document prior to its implementation and the specific reasons for such modifications. EGLE may require Leoni Township to submit, prior to implementation and within 30 days of receipt of such approval with specific modifications, a revised work plan, proposal, or other document which adequately addresses such modifications. If the revised work plan, proposal, or other document is still not acceptable to EGLE, EGLE will notify Leoni Township of this disapproval.
- 4.5 Upon EGLE approval, or approval with modifications, of a work plan, proposal, or other document, such work plan, proposal, or other document shall be incorporated by reference into this Consent Order and shall be enforceable in accordance with the provisions of this Consent Order.
- 4.6 Failure by Leoni Township to submit an approvable work plan, proposal, or other document, within the applicable time periods specified above, constitutes a violation of this Consent Order and shall subject Leoni Township to the enforcement provisions of this Consent Order, including the stipulated penalty provisions specified in Paragraph 9.3 of this Consent Order.
- 4.7 Any delays caused by Leoni Township's failure to submit an approvable work plan, proposal, or other document when due shall in no way affect or alter Leoni Township's responsibility to comply with any other deadline(s) specified in this Consent Order.
- 4.8 No informal advice, guidance, suggestions, or comments by EGLE regarding reports, work plans, plans, specifications, schedules or any other writing submitted by Leoni Township will be construed as relieving Leoni Township of its obligation to obtain written approval, if and when required by this Consent Order.

V. EXTENSIONS

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5.1 Leoni Township and EGLE agree that EGLE may grant Leoni Township a reasonable extension of the specified deadlines set forth in this Consent Order. Any extension shall be preceded by a written request in duplicate to the WRD, Enforcement Unit supervisor, at EGLE, P.O. Box 30458, Lansing, Michigan 48909-7958, and the WRD, Jackson District Office supervisor at the address provided in Paragraph 3.21 of this Consent Order, no later than ten business days prior to the pertinent deadline, and shall include:

- a. Identification of the specific deadline(s) of this Consent Order that will not be met.
- b. A detailed description of the circumstances that will prevent Leoni Township from meeting the deadline(s).
- c. A description of the measures Leoni Township has taken and/or intends to take to meet the required deadline.
- d. The length of the extension requested and the specific date on which the obligation will be met.

The WRD, Jackson District Office supervisor or a designee, in consultation with the WRD, Enforcement Unit supervisor, shall respond in writing to such requests. No change or modification to this Consent Order shall be valid unless in writing from EGLE, and if applicable, signed by both parties.

VI. REPORTING

6.1 Leoni Township shall verbally report any violation(s) of the terms and conditions of this Consent Order to the WRD, Jackson District Office supervisor by no later than the close of the next business day following detection of such violation(s) and shall follow such notification with a written report within five business days following detection of such violation(s). The written report shall include a detailed description of the violation(s), as well as a description of any actions proposed or taken to correct the violation(s). Leoni Township shall report any anticipated violation(s) of this Consent Order to the above-referenced individual in advance of the relevant deadlines whenever possible.

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VII. RETENTION OF RECORDS

- 7.1 Upon request by an authorized representative of EGLE, Leoni Township shall make available to EGLE all records, plans, logs, and other documents required to be maintained under this Consent Order or pursuant to the NREPA or its rules. All such documents shall be retained by Leoni Township for at least a period of five years from the date of generation of the record unless a longer period of record retention is required by the NREPA or its rules.

VIII. RIGHT OF ENTRY

- 8.1 Leoni Township shall allow any authorized representative or contractor of EGLE, upon presentation of proper credentials, to enter upon the premises of the Facility at all reasonable times for the purpose of monitoring compliance with the provisions of this Consent Order. This paragraph in no way limits the authority of EGLE to conduct tests and inspections pursuant to the NREPA and the rules promulgated thereunder, or any other applicable statutory provision.

IX. PENALTIES

- 9.1 Within 30 days after the effective date of this Consent Order, Leoni Township shall pay to the State of Michigan TBD DOLLARS as partial compensation for the cost of investigations and enforcement activities arising from the violations specified in Section II of this Consent Order. Payment shall be made in accordance with Paragraph 9.5 of this Consent Order.
- 9.2 Within 30 days after the effective date of this Consent Order, Leoni Township shall pay to the State of Michigan a civil fine of TBD DOLLARS for the violations specified in Section II of this Consent Order. Payment shall be made in accordance with Paragraph 9.5 of this Consent Order.
- 9.3 For each failure to comply with a provision contained in Section III of this Consent Order, Leoni Township shall pay a stipulated penalty of \$5,000. If, after 30 days from the original deadline, Leoni Township has not fully corrected the violation, Leoni Township shall pay

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stipulated penalties of \$200 per violation per day for one to seven days of violation, \$300 per violation per day for eight to 14 days of violation, and \$500 per violation per day for each day of violation thereafter. Payments shall be made in accordance with Paragraph 9.5 of this Consent Order.

- 9.4 For each failure to comply with any provision of this Consent Order other than the provisions contained in Section III of this Consent Order, Leoni Township shall pay stipulated penalties of \$200 per violation per day for one to seven days of violation, \$300 per violation per day for eight to 14 days of violation, and \$500 per violation per day for each day of violation thereafter. Payments shall be made in accordance with Paragraph 9.5 of this Consent Order.
- 9.5 Leoni Township shall pay all stipulated penalties within 30 days after receipt of the demand for payment of stipulated penalties from EGLE. Leoni Township agrees to pay all funds due pursuant to this Consent Order by check made payable to the State of Michigan and delivered to the Accounting Services Center, Cashier's Office for EGLE, P.O. Box 30657, Lansing, Michigan 48909 8157, or hand delivered to the Accounting Services Center, Cashier's Office for EGLE, 425 West Ottawa Street, Lansing, Michigan 48933. To ensure proper credit, all payments made pursuant to this Consent Order must include the Payment Identification No. WRD60121.
- 9.6 Leoni Township agrees not to contest the legality of the civil fine or costs paid pursuant to Paragraphs 9.1, and 9.2, above. Leoni Township further agrees not to contest the legality of any stipulated penalties assessed pursuant to Paragraphs 9.3 or 9.4, above, but reserves the right to dispute the factual basis upon which a demand by EGLE for stipulated penalties is made.
- 9.7 EGLE reserves its rights to seek interest on any unpaid sums due pursuant to the terms of the Consent Order. Subject to the other provisions of this Section IX, EGLE may waive, in its unreviewable discretion, any portion of stipulated penalties and interest that has accrued pursuant to this Consent Order. This interest penalty shall be based on the rate

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set forth at MCL 600.6013(8), using the full increment of amount due as principal, and calculated from the due date for the payment until the delinquent payment is finally made in full.

X. FORCE MAJEURE

- 10.1 Leoni Township shall perform the requirements of this Consent Order within the time limits established herein, unless performance is prevented or delayed by events that constitute a "Force Majeure." Any delay in the performance attributable to a "Force Majeure" shall not be deemed a violation of Leoni Township's obligations under this Consent Order in accordance with this section.
- 10.2 For the purpose of this Consent Order, "Force Majeure" means an occurrence or nonoccurrence arising from causes not foreseeable, beyond the control of, and without the fault of Leoni Township, such as: an Act of God, untimely review of permit applications or submissions by EGLE or other applicable authority, and acts or omissions of third parties that could not have been avoided or overcome by Leoni Township's diligence and that delay the performance of an obligation under this Consent Order. "Force Majeure" does not include, among other things, unanticipated or increased costs, changed financial circumstances, or failure to obtain a permit or license as a result of Leoni Township's actions or omissions.
- 10.3 Leoni Township shall notify EGLE, by telephone, within 48 hours of discovering any event that may cause a delay in its compliance with any provision of this Consent Order. Verbal notice shall be followed by written notice within ten calendar days and shall describe, in detail, the anticipated length of delay, the precise cause or causes of delay, the measures taken by Leoni Township to prevent or minimize the delay, and the timetable by which those measures shall be implemented. Leoni Township shall adopt all reasonable measures to avoid or minimize any such delay. Nothing in this paragraph obviates the need to report violations as required by Paragraph 6.1 of this Consent Order.

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- 10.4 Failure of Leoni Township to comply with the notice requirements and time provisions under Paragraph 10.3 shall render this Section X void and of no force and effect as to the particular incident involved. EGLE may, at its sole discretion and in appropriate circumstances, waive in writing the notice requirements of Paragraph 10.3, above.
- 10.5 If the parties agree that the delay or anticipated delay was beyond the control of Leoni Township, this may be so stipulated, and the parties to this Consent Order may agree upon an appropriate modification of this Consent Order. However, EGLE is the final decision-maker on whether or not the matter at issue constitutes a force majeure. The burden of proving that any delay was beyond the reasonable control of Leoni Township, and that all the requirements of this Section X have been met by Leoni Township, rests with Leoni Township.
- 10.6 An extension of one compliance date based upon a particular incident does not necessarily mean that Leoni Township qualifies for an extension of a subsequent compliance date without providing proof regarding each incremental step or other requirement for which an extension is sought.

XI. GENERAL PROVISIONS

- 11.1 With respect to any violations not specifically addressed and resolved by this Consent Order, EGLE reserves the right to pursue any remedies to which it is entitled for any failure on the part of Leoni Township to comply with the requirements of the NREPA and its rules.
- 11.2 EGLE and Leoni Township consent to enforcement of this Consent Order in the same manner and by the same procedures for all final orders entered pursuant to Parts 31 and 41.
- 11.3 This Consent Order in no way affects Leoni Township's responsibility to comply with any other applicable state, federal, or local laws or regulations.
- 11.4 The WRD reserves its right to pursue appropriate action, including injunctive relief to enforce the provisions of this Consent Order, and at its discretion, may also seek stipulated

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finer or statutory fines for any violation of this Consent Order. However, the WRD is precluded from seeking both a stipulated fine under this Consent Order and a statutory fine for the same violation.

- 11.5 The parties agree to diligently and in good faith pursue informal negotiations to resolve any disputes arising out of this Consent Order prior to resorting to judicial enforcement. Such negotiations shall proceed in a timely manner.
- 11.6 Nothing in this Consent Order is or shall be considered to affect any liability Leoni Township may have for natural resource damages caused by Leoni Township's ownership and/or operation of the Facility. The State of Michigan does not waive any rights to bring an appropriate action to recover such damages to the natural resources.
- 11.7 In the event Leoni Township sells or transfers the Facility, it shall advise any purchaser or transferee of the existence of this Consent Order in connection with such sale or transfer. Within 30 calendar days, Leoni Township shall also notify the WRD, Jackson District Office supervisor, in writing, of such sale or transfer, the identity and address of any purchaser or transferee, and confirm the fact that notice of this Consent Order has been given to the purchaser and/or transferee. The purchaser and/or transferee of this Consent Order must agree, in writing, to assume all of the obligations of this Consent Order. A copy of that agreement shall be forwarded to the WRD, Jackson District Office supervisor within 30 days of assuming the obligations of this Consent Order.
- 11.8 The provisions of this Consent Order shall apply to and be binding upon the parties to this action, and their successors and assigns.
- 11.9 This Consent Order constitutes a civil settlement and satisfaction as to the resolution of the violations specifically addressed herein; however, it does not resolve any criminal action that may result from these same violations.
- 11.10 The effective date of this Consent Order is the date it is signed by the director of the WRD.

XII. TERMINATION

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12.1 This Consent Order shall remain in full force and effect until terminated by a written Termination Notice (TN) issued by EGLE. Prior to issuance of a written TN, Leoni Township shall submit a request consisting of a written certification that Leoni Township has fully complied with the requirements of this Consent Order and has made payment of any fines, including stipulated penalties, required in this Consent Order. A suggested form for providing the required written certification is appended as Exhibit A of this Consent Order. Specifically, an acceptable certification shall include:

- a. The date of compliance with each provision of the compliance program in Section III of this Consent Order, and the date any fines or penalties were paid.
- b. A statement that all required information has been reported to the WRD, Jackson District Office supervisor.
- c. Confirmation that all records required to be maintained pursuant to this Consent Order are being maintained at the Facility.

EGLE may also request additional relevant information. EGLE shall not unreasonably withhold issuance of a TN.

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Signatories

The undersigned CERTIFY they are fully authorized by the party they represent to enter into this Consent Order to comply by consent and to EXECUTE and LEGALLY BIND that party to it.

DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Teresa Seidel, Director
Water Resources Division

Date

LEONI TOWNSHIP

By: Howard Linnabary
Title: Township Supervisor

Date

APPROVED AS TO FORM:

By: Neil D. Gordon, Assistant Attorney General
For: Robert P. Reichel, Division Chief
Environment, Natural Resources, and Agriculture Division
Michigan Department of Attorney General

Date



ADMINISTRATIVE CONSENT ORDER TERMINATION REQUEST

The completion of this form is voluntary and is intended to be used as guidance for persons that are eligible to request EGLE to issue a Termination Notice of their Administrative Consent Order (ACO). However, it may not be relied upon as being legally sufficient to cover all potential issues related to the specific requirements of the ACO. EGLE does not assume any liability for the use of this document and encourages the user to seek independent legal advice before using this form to draft its certification and request for Termination of its ACO.

PLEASE TYPE OR PRINT

1.ACO	ADMINISTRATIVE CONSENT ORDER NUMBER:		
2. Facility Owner or Legally Authorized Representative	Facility Owner/Legally Authorized Representative Who Signed the ACO:		
	Address:		Address 2 or P.O. Box:
	City:	State:	Zip Code:
	Telephone:	Fax:	E-mail address:
3. Compliance Section	<i>Summarize each completed requirement in the Compliance Section of the ACO give the completion date. Please use additional sheets if necessary:</i>		

**ADMINISTRATIVE CONSENT ORDER TERMINATION REQUEST**

3. Certification	<p>I, _____, hereby certify that each requirement of the ACO that was entered into with the Department of Environment, Great Lakes, and Energy (EGLE) on enter the date has been complied with and completed including paying all money required by the ACO including but not limited to costs, civil fines, stipulated fines and fees. I also certify that all information that I am required to report to EGLE, Jackson District Office Supervisor has been reported and that all records I am required to maintain pursuant to the ACO are being maintained at the facility (or other location as specified in Section 12 of the ACO). I hereby request that EGLE issue a Termination Notice, formally terminating the ACO in recognition of the resolution of the matters therein. I certify under penalty of law that this certification is true, accurate and complete. I am aware there are significant penalties for submitting false information, including the possibility of a fine for having knowledge of violations and certifying that there are none.</p> <p>Print Name _____ Title _____</p> <p>Signature _____ Date _____</p>
------------------	--

Please mail this completed form to EGLE, Water Resources Division, District Office that is listed in Section III of the ACO the Owner/Legally Responsible Representative entered into with EGLE. Addresses for the district offices are listed below.

Bay City District Office
401 Ketchum Street, Suite B
Bay City, Michigan 48708

Jackson District Office
301 E. Louis Glick Highway
Jackson, Michigan 49201-1556

Cadillac District Office
120 West Chapin Street
Cadillac, Michigan 49601-2158

Kalamazoo District Office
7953 Adobe Road
Kalamazoo, Michigan 49009-5026

Gaylord District Office
2100 West M-32
Gaylord, Michigan 49735-9282

Lansing District Office
525 West Allegan Street (Constitution Hall, 1S)
P.O. Box 30242
Lansing, Michigan 48909-7742

Grand Rapids District Office
State Office Building, 5th Floor
350 Ottawa Avenue NW, Unit 10
Grand Rapids, Michigan 49503-2341

Marquette District Office
1504 West Washington Street
Marquette, Michigan 49855

Warren District Office
27700 Donald Court
Warren, Michigan 48092-2793

Corey Turner

From: Grant Bauman <GBauman@mijackson.org>
Sent: Thursday, May 21, 2020 8:40 AM
To: Corey Turner
Subject: Population Projection Request

Corey,

You recently submitted a population projection request for Leoni Township and Jackson County through 2040. The R2PC utilizes the projections created by the Michigan Department of Transportation for the travel demand model it maintains on behalf of Jackson County. That data makes the following projections:

	Leoni Twp.	Jackson County
2025	13,981	162,214
2035	14,269	164,796
2045	14,225	163,650

I hope the data meets your needs.

Regards,
Grant

Grant E. Bauman | Principal Planner

Region 2 Planning Commission

Serving Hillsdale, Jackson and Lenawee Counties

www.region2planning.com | gbauman@mijackson.org

p. +1-517-768-6711 | c. +1-517-416-1372 | f. +1-517-788-4635

120 W. Michigan Ave., 9th Floor, Jackson, MI 49201

APPENDIX D

PRELIMINARY BASIS OF DESIGN

PREPARED FOR:





Leoni Township WWTP MBR Basis of Design Summary

Date: Updated April 2022
Type of Treatment: Membrane Bioreactor

Existing MBR Basis of Design	
Maximum Monthly Flow:	3.0 mgd
Peak Daily Flow:	4.8 mgd
Frequency of Peak Daily Flow Events:	10 per year
Peak Instantaneous Flow:	8.0 mgd
<u>Average Influent Wastewater Characteristics:</u>	
BOD:	8,081 lb/d
TSS:	9,207 lb/d
Ammonia:	1,051 lb/d
TKN:	1,476 lb/d
Phosphorous (Total P)	7,506 lb/d
FOG:	<35 mg/L
pH:	6-8 SU
Average influent water temperature:	10-20 °C
Ambient air temperature:	5-60 °C
MLSS at design loading conditions:	8,000 mg/L
<u>Average Effluent Quality (monthly average of at least four 24-hr composite samples):</u>	
BOD:	<4 mg/L
Ammonia:	<0.5 mg/L
TSS:	<20 mg/L

Current Influent Flows and Loadings (2017-2021):

2019 Population Served:	27,272
Average Daily Influent Flow (ADF):	1.83 MGD
Maximum Daily Flow:	5.11 MGD
Maximum Monthly Flow:	2.38 MGD
Peak Hourly Flow:	6.20 MGD

Current Influent Sewage Characteristics (2017-2021):

	<u>Average</u>		<u>Max Month</u>	<u>Max Day</u>
	mg/L	lbs/day	lbs/day	lbs/day
BOD:	242	3624	4,735	12,475
TSS:	412	6171	8,043	44,002
Phosphorus:	7.9	118.6	164	527
Ammonia:	31.6	472.9	688	1,492

Projected Influent Flows (2042):

Projected REUs:	13,258
Projected Average Daily Influent Flow (ADF):	2.1 MGD
Projected Maximum Daily Flow:	5.1 MGD
Projected Maximum Monthly Flow:	2.8 MGD

NPDES Effluent Limitations

Effluent Parameter	Maximum Loading (lb/d)			Maximum Concentration (mg/L)		
	Monthly	7-Day	Daily	Monthly	7-Day	Daily
<u>CBOD₅</u>						
May-November	100	250	(report)	4	---	10
December-March	580	850	(report)	23	---	34
April	600	900	(report)	24	---	36
<u>Total Suspended Solids</u>						
May-November	500	750	(report)	20	30	(report)
December-April	750	1100	(report)	30	45	(report)
<u>Ammonia Nitrogen</u>						
May-November	13	50	(report)	0.5	---	2
December-March	290	430	(report)	11.4	---	17
April	330	380	(report)	13.3	---	15
<u>Total Phosphorus</u>	8.3	---	(report)	0.33	---	(report)

APPENDIX E

OPINION OF PROBABLE COSTS

PREPARED FOR:



**Summary Table: Engineer's Opinion of Probable Project Costs
WWTP Improvements Selected Alternatives Analysis**

Summary of Selected Alternatives - Net Present Worth Analysis						
Alternative	Project Cost	Annual OM&R Cost	Net Present Worth of OM&R Cost (1)	Total Present Worth	Salvage Value	Net Present Worth
WWTP Membrane System Improvements						
Alternative 4a – Upgrade Existing MBR Treatment System	\$ 2,284,000	\$ 38,000	\$ 722,000	\$ 3,006,000	\$ 191,000	\$ 2,815,000
Alternative 4 – Upgrade Existing Biosolids Handling and Storage	\$ 5,904,000	\$ 107,400	\$ 2,039,000	\$ 7,943,000	\$ 610,000	\$ 7,333,000
Alternative 4 – Upgrade Existing Septage Receiving Facility	\$ 3,378,000	\$ 127,000	\$ 2,411,000	\$ 5,789,000	\$ 490,000	\$ 5,299,000
Overall Project Total	\$ 11,566,000	\$ 272,400	\$ 5,172,000	\$ 16,738,000	\$ 1,291,000	\$ 15,447,000

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

(1) Discount Rate

0.5%



Engineer's Opinion of Probable Project Cost ⁽¹⁾

<i>Project:</i>	Leoni Township Biological Capacity Study	<i>Project No.</i>	853390
<i>Basis for Estimate:</i>	<input checked="" type="checkbox"/> Conceptual <input type="checkbox"/> Basis of Design <input type="checkbox"/> Final	<i>Estimator:</i>	SMW/ARH
<i>Work:</i>	Alternative 4a – Upgrade Existing MBR Treatment System	<i>Date:</i>	Apr-2022
		<i>Current ENR-CCI:</i>	12791

Item	Description	Unit	Qty.	Unit Price	Amount
1	MBR Equipment	LS	1	\$1,250,000	\$1,250,000
2	Flowable Fill	CY	177	\$150	\$27,000
3	Concrete	CY	15.5	\$1,200	\$19,000
4	Thermal Mass Flow Meter	EA	1	\$6,000	\$6,000
5	Process Piping and Valves	LS	1	\$75,000	\$75,000
6	Blower Equipment Pad	CY	2	\$500	\$1,000
7	FRP Tank Covers	LS	1	\$81,000	\$81,000
8	Chemical Cleaning Piping	LS	1	\$4,000	\$4,000
9	Electrical/Controls	LS	1	\$30,000	\$30,000
10	General Conditions and OH&P				\$224,000
				Construction Cost:	\$1,717,000
11	Construction Contingency				\$172,000
12	Design Engineering				\$137,000
13	Construction Engineering				\$172,000
14	Planning, Legal, Bonding & Administration				\$86,000
				Total Project Cost:	\$2,284,000

Notes:

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



Engineer's Opinion of Probable Project Cost ⁽¹⁾

<i>Project:</i>	Leoni Township Biological Capacity Study	<i>Project No.</i>	853390
<i>Basis for Estimate:</i>	<input checked="" type="checkbox"/> Conceptual <input type="checkbox"/> Basis of Design <input type="checkbox"/> Final	<i>Estimator:</i>	SMW/ARH
<i>Work:</i>	Alternative 4b – Upgrade Process System	<i>Date:</i>	Apr-22
		<i>Current ENR-CCI:</i>	12791

Item	Description	Unit	Qty.	Unit Price	Amount
1	Equalization Basin	LS	1	\$5,745,000	\$5,745,000
2	Preliminary Treatment	LS	1	\$6,879,000	\$6,879,000
3	Biological Treatment	LS	1	\$2,355,000	\$2,355,000
4	MBR	LS	1	\$1,717,000	\$1,717,000
5	Disinfection	LS	1	\$504,000	\$504,000
6	Effluent PS Upgrades	LS	1	\$299,000	\$299,000
7	General Conditions and OH&P				\$2,625,000
				Construction Total:	\$20,124,000
8	Construction Contingency				\$2,012,000
9	Design Engineering				\$1,610,000
10	Construction Engineering				\$2,012,000
11	Planning, Legal, Bonding & Administration				\$1,006,000
				Total Project Cost:	\$26,764,000

Notes:

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



Engineer's Opinion of Probable Project Cost ⁽¹⁾

<i>Project:</i>	Leoni Township Biosolids Handling Evaluation	<i>Project No.</i>	853400
<i>Basis for Estimate:</i>	<input checked="" type="checkbox"/> Conceptual <input type="checkbox"/> Basis of Design <input type="checkbox"/> Final	<i>Estimator:</i>	SMW/ARH
<i>Work:</i>	Alternative 4 – Upgrade Existing Biosolids Handling and Storage	<i>Date:</i>	Apr-22
		<i>Current ENR-CCI:</i>	12791

Item	Description	Unit	Qty.	Unit Price	Amount
1	Aerobic Holding Tank	LS	1	\$595,000	\$595,000
2	Sludge Screw Press	LS	1	\$1,648,000	\$1,648,000
3	Biosolids Storage Building Addition	LS	1	\$1,617,000	\$1,617,000
4	General Conditions and OH&P				\$579,000
Construction Total:					\$4,439,000
5	Construction Contingency				\$444,000
6	Design Engineering				\$355,000
7	Construction Engineering				\$444,000
8	Planning, Legal, Bonding & Administration				\$222,000
Total Project Cost:					\$5,904,000

Notes:

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



Engineer's Opinion of Probable Project Cost ⁽¹⁾

<i>Project:</i>	Leoni Township - WWTP Septage Receiving Study	<i>Project No.</i>	853410
<i>Basis for Estimate:</i>	<input checked="" type="checkbox"/> Conceptual <input type="checkbox"/> Basis of Design <input type="checkbox"/> Final	<i>Estimator:</i>	SMW
<i>Work:</i>	Alternative 4 – Upgrade Existing Septage Receiving Facility	<i>Date:</i>	Apr-2022
		<i>Current ENR-CCI:</i>	12791

Item	Description	Unit	Qty.	Unit Price	Amount
1	Lift Station	LS	1	\$361,000	\$361,000
2	Septage Receiving Building	LS	1	\$1,778,000	\$1,778,000
3	Drying Bed	LS	1	\$70,000	\$70,000
4	General Conditions and OH&P				\$331,000
				Construction Total:	\$2,540,000
5	Construction Contingency				\$254,000
6	Design Engineering				\$203,000
7	Construction Engineering				\$254,000
8	Planning, Legal, Bonding & Administration				\$127,000
				Total Project Cost:	\$3,378,000

Notes:

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

Bond Schedule**Date:****April-22**

Borrower Name: Leoni Township
Interest Rate: 2.000%
Yrs Deferred Principle 0
Principal: \$11,566,000
Ammort. Factor 0.0612
Amortized Payment: \$707,300

Type of Bond: Revenue

Year	Interest Paid	Principal Paid	Total Year Payment	Loan Balance
				11,566,000
1	231,320	476,000	707,320	11,090,000
2	221,800	486,000	707,800	10,604,000
3	212,080	495,000	707,080	10,109,000
4	202,180	505,000	707,180	9,604,000
5	192,080	515,000	707,080	9,089,000
6	181,780	526,000	707,780	8,563,000
7	171,260	536,000	707,260	8,027,000
8	160,540	547,000	707,540	7,480,000
9	149,600	558,000	707,600	6,922,000
10	138,440	569,000	707,440	6,353,000
11	127,060	580,000	707,060	5,773,000
12	115,460	592,000	707,460	5,181,000
13	103,620	604,000	707,620	4,577,000
14	91,540	616,000	707,540	3,961,000
15	79,220	628,000	707,220	3,333,000
16	66,660	641,000	707,660	2,692,000
17	53,840	653,000	706,840	2,039,000
18	40,780	667,000	707,780	1,372,000
19	27,440	680,000	707,440	692,000
20	14,840	692,000	706,840	0

Bond Schedule**Date:****April-22**

Borrower Name: Leoni Township
Interest Rate: 2.500%
Yrs Deferred Principle 0
Principal: \$11,566,000
Ammort. Factor 0.0641
Amortized Payment: \$741,900

Type of Bond: Revenue

Year	Interest Paid	Principal Paid	Total Year Payment	Loan Balance
				11,566,000
1	289,150	453,000	742,150	11,113,000
2	277,825	464,000	741,825	10,649,000
3	266,225	476,000	742,225	10,173,000
4	254,325	488,000	742,325	9,685,000
5	242,125	500,000	742,125	9,185,000
6	229,625	512,000	741,625	8,673,000
7	216,825	525,000	741,825	8,148,000
8	203,700	538,000	741,700	7,610,000
9	190,250	552,000	742,250	7,058,000
10	176,450	565,000	741,450	6,493,000
11	162,325	580,000	742,325	5,913,000
12	147,825	594,000	741,825	5,319,000
13	132,975	609,000	741,975	4,710,000
14	117,750	624,000	741,750	4,086,000
15	102,150	640,000	742,150	3,446,000
16	86,150	656,000	742,150	2,790,000
17	69,750	672,000	741,750	2,118,000
18	52,950	689,000	741,950	1,429,000
19	35,725	706,000	741,725	723,000
20	19,075	723,000	742,075	0

Disadvantaged Community Status Determination Worksheet

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

Robert Schneider
Revolving Loan Section
Drinking Water and Municipal Assistance Division
P.O. Box 30817
Lansing, MI 48909-8311
Schneiderr@michigan.gov

If you have any questions please contact Robert Schneider at 517-388-6466

Please check the box this determination is for:

☐ DWRF ☒ SRF

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

\$9,700,000

2. Annual payments on the existing debt for the system.

\$3,618,500

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

\$4,530,400

4. Number of "residential equivalent users" in the system.

12,336

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

Leoni WWTP Customer Sewer Expenses

Municipality	Treatment Debt and OM&R	Collection System OM&R	Average Monthly REUs July 2018 - July 2019	Annual Collection System Debt	Notes
Blackman Twp	\$ 276,249	\$ 184,478	872	\$ -	Collection OM&R scaled based on REUs
Brooklyn, Village of	\$ 272,543	\$ 193,114	860	\$ -	
Cambridge Twp	\$ 7,920	\$ 28,700	25	\$ -	
Columbia Twp	\$ 785,192	\$ 934,767	2,766	\$ 757,226	Includes Vineyard Lake and Clark Lake interceptor.
Grass Lake Twp	\$ 261,803	\$ -	809	\$ 32,546	
Grass Lake, Village of	\$ 192,212	\$ 144,588	605	\$ -	
Hanover Twp	\$ 130,205	\$ -	412	\$ 174,712	
Leoni Twp	\$ 1,221,270	\$ 538,515	3,855	\$ 422,325	
Liberty Twp	\$ 57,657	\$ 31,746	182	\$ -	Includes Liberty SW Line
MIS	\$ 36,460		150		MIS Collection System OM&R not included.
Napoleon Twp	\$ 155,549	\$ 371,310	546	\$ 246,662	Includes YMCA
Norvell Twp	\$ 126,087	\$ 76,119	398	\$ -	
Sylvan Twp	\$ 271,497	\$ 217,454	854	\$ -	No debt related to Washtenaw County Advance included.
Totals	\$ 3,794,600	\$ 2,720,800	12,336	\$ 1,633,500	

Summary for Disadvantaged Community Status Determination Worksheet				Totals	
Debt	\$ 1,985,000			\$ 1,633,500	\$ 3,618,500
OM&R	\$ 1,809,600	\$ 2,720,800			\$ 4,530,400

Step 1: Enter amount of total debt for project	Amount of Debt	\$9,700,000
Step 2: Enter term up to 20 years	Terms	20
Step 3: Enter present target rate of interest (call DEQ)	Rate	2.00%
Step 4: Enter projected annual OM & R after completion	OM & R	\$4,530,400
Step 5: Annual debt payment is computed	New annual debt	\$593,220
Step 6: Total annual cost of system is computed	existing debt	\$3,618,500
Step 7: Enter total number of system users in service area	Total Annual Cost	\$8,742,120
Step 8: Annual user cost is computed		
Step 9: Updated State Wide MAHI is:	# of Users	12336
Step 9: Enter 1990 census median annual household income	Annual User Cost	\$709
Step 10: Updated MAHI is calculated on Detroit CPI-U to 1997		
Step 11: The percentage of MAHI is computed		
Step 12: If the annual user cost exceeds the percentage of MAHI, the community may qualify as a disadvantaged community	Updated MI MAHI	\$51,597
	MAHI - 2010 census	\$52,737
	Updated MAHI:	\$58,801
	MAHI Threshold \$	\$1,764
	Disadvantaged??	NO

Leoni Twp
CWSRF

	reus	%	mahi	blend
Blackman Twp	872	0.070687	38571	2726
Brooklyn, Village of	860	0.069715	32946	2297
Cambridge Twp	25	0.002027	55746	113
Columbia Twp	2766	0.224222	57145	12813
Grass Lake Twp	809	0.06558	70000	4591
Grass Lake, Village of	605	0.049043	46929	2302
Hanover Twp	412	0.033398	58567	1956
Leoni Twp	3855	0.3125	48088	15028
Liberty Twp	182	0.014754	67396	994
MIS	150	0.01216		0
Napoleon Twp	546	0.044261	50788	2248
Norvell Twp	398	0.032263	51914	1675
Sylvan Twp	854	0.069228	86607	5996
	12336			52738

APPENDIX F BIOLOGICAL CAPACITY STUDY

PREPARED FOR:



Leoni Township Wastewater Treatment Plant Biological Capacity Study

PREPARED FOR:



JACKSON COUNTY, MICHIGAN

DATE: APRIL 2022
PROJECT No.: 853390


FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

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APPENDICES

Appendix A – Proposed Layout

Appendix B – Opinion of Probable Cost

I. BACKGROUND AND PURPOSE OF STUDY

A. Background

The existing wastewater treatment plant (WWTP) is an activated sludge plant designed to treat an average of 3.0 million gallons per day of raw sewage. The original WWTP was a facultative lagoon facility constructed 1971. The plant underwent a major improvements project in 2010 abandoning the lagoon plant and constructing the current membrane bioreactor (MBR) treatment system. WWTP processes include grit removal and screening, anoxic and aerobic basins, membrane bioreactors, and ultraviolet disinfection. Solids processes include sludge storage and sludge dewatering centrifuges, followed by land application or landfilling of the dewatered solids. Treated effluent is pumped from the WWTP and discharged to the Grand River in Michigan Center, MI. The effluent is discharged in accordance NPDES Permit No. MI0045942.

The headworks building at the plant underwent an upgrade in 2021 to add an odor control system that consists of a bio-trickling filter, activated carbon polishing filter, makeup air unit, blower, nutrient feed skid and solid cover planking over the existing channels and tank openings. The plant is currently undergoing a membrane improvement project to address process inefficiencies and to replace the failing MBRs.

In the early 2000s, the plant built a septage receiving facility. The facility consists of an actuated plug valve, a magnetic flow meter, and a mechanical screen. In 2012, the WWTP replaced the old equipment with a new septage receiving station and kept the mechanical screen as a backup. The septage receiving system includes a rock trap, comminutor, existing actuated plug valve, magnetic flow meter, and an electronic billing system. In 2021, the plant staff replaced the comminutor to improve reliability of the system.

B. Purpose of Study

The Leoni WWTP serves thirteen communities and there are several development projects within the service area that are on hold until the capacity restrictions at the WWTP or the excess Inflow/Infiltration (I/I) challenges are addressed within the sanitary collection system.

In December 2021, Fleis and VandenBrink (F&V) was authorized to evaluate updating the WWTP processes to increase overall plant capacity and provide conceptual costs for adding a fourth MBR as a redundant system. As part of this evaluation, F&V reviewed record drawings of the WWTP, flow data, interviewed plant staff, and evaluated potential new technologies. This study is intended to present a summary of the existing conditions, the findings, and recommendations for improvements.

II. EVALUATION OF EXISTING CONDITIONS

A. Existing Facilities

The Leoni Township Wastewater Treatment Plant is located at 8401 Page Avenue, Jackson, MI 49201. The existing WWTP is a MBR plant that is designed to treat an average of 3.0 MGD of raw sewage. The original WWTP was constructed as a facultative lagoon facility in 1971 and subsequently upgraded to an aerated lagoon system. In 2010, major upgrades occurred to modernize the facility. Improvements included abandonment of the lagoon treatment system and the construction of a headworks building featuring grit removal and fine screening, three pre-anoxic tanks, three pre-aeration tanks, five MBR basins, two ultraviolet disinfection light banks, cascade step aeration, and an effluent pump station. One lagoon still serves as an Emergency Diversion Basin during high flow events. Solids processes include sludge storage and sludge dewatering centrifuges, followed by land application or landfilling of the dewatered solids.

All influent flow to the WWTP is conveyed via pump stations and a main forcemain. Due to the long detention times throughout the collection system, hydrogen sulfide gas is produced and released upon discharge at the headworks. The headworks building at the WWTP was upgraded in 2021 to address these high levels of odorous and corrosive gases. This project included adding a bio-trickling filter, activated carbon polishing filter, makeup air unit, blower, nutrient feed skid and solid cover planking over the existing channels and tank openings.

The membrane systems improvements project is currently being constructed to replace the failing MBRs and address process inefficiencies. The fine screens and grit system are being upgraded to accommodate for the new MBR system.

Process Description

Influent wastewater is pumped to the WWTP through a 24-inch force main. The force main enters the headworks of the plant and flows through a vortex grit chamber followed by two rotary drum screens. The grit system consists of the vortex grit chamber, one air lift pump including a blower and an inclined grit screw classifier. The rotary drum screens contain two-millimeter perforated baskets that automatically remove the screenings from the wastewater prior to biological treatment. The grit classifier and automatic fine screens convey the inorganic material into dumpsters in the headworks building and plant operators remove the dumpsters from the building for disposal.

The WWTP has the ability to receive septage from local haulers. The septage is delivered to the septage receiving station and then is pumped into the influent force main upstream of the headworks building or to the sludge storage tanks.

Following primary treatment, influent flow is split and routed to the anoxic basins. The wastewater is mixed and combined with returned activated sludge (RAS) from the RAS flow splitter. The mixed liquor then flows through the bioreactor channel to aeration basins "A" where air is added to the mixed liquor to facilitate biological growth and treatment. Six submersible centrifugal feed forward pumps are utilized to pump the mixed liquor from aeration basins "A" to aeration basins "B". The feed forward pumps are each powered by a 23-HP motor and controlled by variable frequency drives (VFDs) that allow the pumps to match influent demand.

After being pumped to aeration basins "B", more air is added to the mixed liquor to continue to facilitate biological growth and treatment. Air is supplied to aeration basins "A" and "B" by three existing positive displacement blowers, each rated at 2,500 scfm and each powered by a 200-HP motor. Process Blower A is dedicated to aeration basins "A", Process Blower B is dedicated to aeration basins "B", and Process Blower C is a standby

blower for both aeration basins “A” and “B.” The internal recycle pumps can pump mixed liquor from aeration basins “B” into the anoxic basins to reduce odor.

The mixed liquor then flows into the MBR influent channel and into the MBR basins. Each MBR basin is equipped with a coarse bubble diffused aeration system, which is intended to introduce oxygen to the wastewater to enhance biological activity and to clean/scour the membranes to reduce fouling.

The purpose of the membrane is to separate biological solids from the mixed liquor, producing a high-quality effluent. In the existing membrane system, permeate from the waste stream is drawn through the hollow fiber membranes and collected in individual headers from each basin. These headers discharged to a common permeate header. Permeate flows through this header to the back pulse tank where some of the permeate is stored for future use to clean the membranes. The permeate that is not stored flows over a weir in the back pulse tank and flows by gravity to be disinfected. The solids that are retained within the MBR basins flow into the RAS weir box. The sludge flows by gravity back to the RAS splitter box located upstream of the anoxic basins. waste activated sludge (WAS) pumps allow for the wasting of sludge from the RAS system to maintain a balance of biological solids in the treatment process.

Treated effluent flows from the back pulse tank to the UV disinfection chamber where it is exposed to UV light for disinfection prior to discharge. The system is equipped with two banks of UV lights to provide a fully redundant disinfection system.

The treated and disinfected effluent then flows through the cascade aeration structure to increase dissolved oxygen concentration prior to discharge. The effluent collects in the effluent pump station and is conveyed to the effluent outfall by three vertical turbine pumps. The effluent is discharged to Grand River in accordance with the facility’s NPDES discharge permit.

B. Existing Flows and Loads

Existing Basis of Design

The WWTP is designed to treat a maximum monthly flow of 3.0 million gallons per day (MGD), a peak daily flow of 4.8 MGD and a peak instantaneous flow of 8.0 MGD.

The existing design criteria is displayed in Table 1.

Table 1. Existing WWTP Design Criteria		
		Unit
Maximum Monthly Flow	3.0	MGD
Peak Daily Flow	4.8	MGD
Peak Instantaneous Flow	8.0	MGD
BOD	8,090	lbs/day
TSS	9,210	lbs/day
Ammonia	1,060	lbs/day
TKN	1,480	lbs/day
Alkalinity	7,510	lbs/day
pH	6-8	S.U.

Average Influent Flows

The average influent flow received at the WWTP from January 2017 through December 2021 was 2.06 MGD.

Peaking Factor

Peak hourly flows were analyzed to determine the peaking factor of the influent flow. The maximum peak hour flow through December 2021 was 3.28 MGD with the average daily influent flow of 2.06 MGD.

A peaking factor of 2.5 was used to estimate projected future peak hour flows with the expansion. The Township is currently in the process of addressing I/I issues throughout the Leoni Regional Utility Authority. It is anticipated that the peaking factor will remain consistent or be reduced with the I/I improvements that will be made.

Influent Concentration and Loading

The current influent concentration and loading are displayed in Table 2.

Table 2. Current Influent Concentration and Loading*				
	Average Concentration (mg/l)	Average Loading (lbs/day)	Max Month Loading (lbs/day)	Max Day Loading (lbs/day)
BOD	242	3,624	4,735	12,475
TSS	412	6,171	8,043	44,002
Phosphorus	7.9	118.6	164	527
Ammonia	31.6	472.9	688	1,492

*January 2017 through December 2021

C. Existing Discharge Permit

The existing NPDES Permit is summarized in Table 3.

Table 3. NPDES Permit Limitations									
Parameter	Maximum Limits for Quality or Loading				Maximum Limits for Quality or Concentration				Frequency
	Monthly	7-Day	Daily	Units	Monthly	7-Day	Daily	Units	
Flow	(report)		(report)	MGD	---		---	---	Daily
CBOD5:									
May – Nov	100	250	(report)	lbs/day	4	---	10	mg/l	5x Weekly
Dec – Mar	580	850	(report)	lbs/day	23	---	34	mg/l	5x Weekly
Apr	600	900	(report)	lbs/day	24	---	36	mg/l	5x Weekly
TSS:									
May – Nov	500	750	(report)	lbs/day	20	30	(report)	mg/l	5x Weekly
Dec – Apr	750	1,100	(report)	lbs/day	30	45	(report)	mg/l	5x Weekly
Ammonia Nitrogen (as N)									
May – Nov	13	50	(report)	lbs/day	0.5	---	2	mg/l	5x Weekly
Dec – Mar	290	430	(report)	lbs/day	11.4	---	17	mg/l	5x Weekly
Apr	330	380	(report)	lbs/day	13.3	---	15	mg/l	5x Weekly
Total Phosphorus (as P)	8.3	---	(report)	lbs/day	0.33	---	(report)	mg/l	5x Weekly
Fecal Coliform Bacteria	---	---	---	---	200	400	(report)	cts/100 ml	5x Weekly
Available Cyanide	0.17	---	(report)	lbs/day	7	---	(report)	ug/l	Monthly
Total Selenium	0.16	---	(report)	lbs/day	6	---	(report)	ug/l	Monthly
Total Mercury:									
Corrected	(report)	---	(report)	lbs/day	(report)	---	(report)	ng/l	Quarterly
Uncorrected	---	---	---	---	---	---	(report)	ng/l	Quarterly
Field Duplicate	---	---	---	---	---	---	(report)	ng/l	Quarterly
Field Blank	---	---	---	---	---	---	(report)	ng/l	Quarterly
Lab Method Blank	---	---	---	---	---	---	(report)	ng/l	Quarterly
Parameter	Min % Monthly		Min % Daily	Units					
TSS Min. % Removal:									
Dec – Apr		85	---	%					Monthly
Parameter	Min Daily		Max Daily	Units					
pH		6.5	10.0	S.U.					5x Weekly
Dissolved Oxygen:									
May – Nov		7.0		mg/L					5x Weekly
Dec – Apr		6.0		mg/L					5x Weekly

D. Future Flows and WWTP Capacity

1. Projected 20 Year Flows

The projected 20-year wastewater flows were projected based on the Service Area Residential Equivalent Unit (REU) projections. An annual increase of 0.31% was used to project the future design flows. The projected wastewater flows for the design year 2042 are summarized in Table 4. The projected flows account for the addition of neighboring communities including the lake communities of Lake LeAnn, Lake Somerset and Mirror Lake to the system. A peaking factor of 2.5 was used to project the peak hour flow.

Table 4. Design Flow Projections	
	Flow (MGD)
Average Daily Flow	2.8
Maximum Daily Flow	6.8
Maximum Monthly Flow	3.8
Peak Hour Flow	7.0

2. Proposed Design Values

Table 5 displays the design values that were used in the expansion evaluation to compare the existing equipment and process design to the projected future flow with expansion.

Table 5. Proposed Design Values	
	Flow (MGD)
Average Daily Flow	4.0
Maximum Daily Flow	8.0
Maximum Monthly Flow	5.0
Peak Hour Flow	10.0

E. Evaluation

1. Influent Pump Station

The influent pump station is located at 116 5th Street, Michigan Center, MI. It consists of a wet well/dry well configuration with three pumps located in a can structure underground. Each pump is rated for 1,740 gpm and is equipped with a 56-HP motor. All three pumps are on VFDs and control the liquid level within the wet well.

The wet well is constructed of concrete and has an in-channel comminutor installed to breakup large debris.

Maximum pumping capacity with all three pumps in service is approximately 3,750 gpm (5.4 MGD).

A pump station and collection system evaluation should be completed prior to installing any future connections. This evaluation would determine which pump stations need to increase capacity and what areas of the collection system need to be addressed to accept the increased flow.

2. Headworks

The headworks system is responsible for removing inorganic material from the wastewater prior to biological treatment. Heavy material such as rocks and sand are removed in the grit system and other inorganic material such as rags, hair and sticks are removed in the screening process.

Since the influent wastewater is pumped directly to the headworks processes without any upstream flow equalization, the grit system and screening system need to be designed for the peak hour influent flow rate. For the expansion evaluation, the proposed peak hour flow rate is approximately 10.0 MGD.

The vortex grit chamber is 11.5 feet in diameter and 19 feet deep. The total volume of the chamber is approximately 4,800 gallons. Per the OMM Operation and Maintenance Manual dated May 2011, the existing grit system is rated for 10.7 MGD.

At the proposed design flows, the grit vortex system does not need to be expanded.

The grit removal system was improved during the membrane improvement project, but the system was not expanded. Additional improvements could be made to the grit collection and removal system to increase performance.

The screening system is comprised of two in channel, 2 mm rotary drum screens. The screening units were replaced during the membrane improvement project. In addition, the opening size of the screens was changed from 3 mm to 2 mm to improve debris capture rate.

Per the Saveco shop drawings dated August 2021, the existing screening system is designed for a peak capacity of 8.0 MGD.

Future expansion flows will be considered when designing the proposed screening system.

3. Biological Treatment

The biological treatment system is responsible for promoting biological growth and reducing the organic nutrients within the wastewater. The biological treatment system consists of a series of tanks that promote biological activity, and the membrane system that filters the permeate from the biological mater.

The biological treatment system needs to be designed for the maximum monthly influent flow rate. For the biological capacity evaluation, the proposed maximum monthly flow rate is 5.0 MGD.

The biological treatment system consists of the anoxic basins, aeration basins "A," and aeration basins "B." There are three trains of biological treatment that have a total working volume of 1,700,000 gallons. The WWTP will become biologically overloaded once influent flows surpass 3.5 MGD.

In the 2008 WWTP Record Drawings by OMM, there was a conceptual plan to add a fourth biological train to the existing system. This additional treatment train would need to be constructed to achieve the design capacity for the monthly maximum flow of 5.0 MGD

The MBR treatment system currently utilizes three tanks that contain 18 MBR cassette modules. The system is designed with a hydraulic capacity of greater than 5.0 MGD.

To provide sufficient biological treatment, a fourth train of anoxic and aeration basins would need to be added to the WWTP process once flows surpass 3.5 MGD. This would consist of constructing new concrete tanks, and the addition of an aeration system with diffusers, a blower, submersible mixers and feed forward pumps. The estimated cost to implement this additional treatment system is analyzed later in the report.

In order to install a redundant fourth MBR train, a currently unused MBR tank would have to be modified to accommodate the new MBR system. Modifications include new air and permeate piping, new permeate pump,

installing an actuator to the influent weir gate, and installing a new MBR tank cover system. The estimated cost to install a redundant fourth MBR train is analyzed later in the report.

4. Ultraviolet Disinfection

Ultraviolet (UV) light is utilized to disinfect the effluent prior to discharge to the Grand River. The existing system contains two banks of lights with a total of 64 lamps providing a fully redundant system. The current system is design for an average daily flow of 4.0 MGD and a peak hour flow of 10.0 MGD.

Since the UV disinfection system does not meet the maximum monthly design flow, it is anticipated that the UV disinfection system will need to increase in capacity.

The UV system can be retrofitted by removing the reduction baffle and adding an additional two modules per each bank of lights. This would increase the average daily capacity of the UV system to 4.5 MGD and peak hour flow to 12 MGD. The cost for the expansion of the existing system is analyzed later in the report.

5. Effluent Pump Station

The effluent pump station consists of three vertical turbine pumps that are each rated for 2,440 gpm and equipped with a 60-HP motor. The maximum daily pumping capacity of the effluent pump station with one pump out of service is approximately 7.0 MGD. The pump station capacity should be increased to be designed for the peak hour influent flow.

The wet well and valve vault was constructed with a 10-inch pipe stubbed through the wall so an additional pump could be added in the future.

Adding an additional pump to the effluent pump station would increase the capacity to be greater than the proposed peak hour influent flow. This could be achieved by using the existing 10-inch pipe, installing a new vertical turbine pump, valves and relocating the final effluent water (FEW) feed line. Once the fourth pump is installed, the pump stations capacity would be increased to approximately 10 MGD. The cost for the expansion of the effluent pump station is analyzed later in the report.

6. Solids Handling

The RAS system draws off the bottom of the MBR basins and overflows a weir that controls the MBR basin liquid level. The RAS then flows by gravity to the RAS splitter box upstream of the anoxic basins.

The existing RAS system is capable of providing return rates for the proposed increase in capacity. Future projected flows will be considered when designing the proposed modifications to the RAS system.

The existing WAS system draws off the RAS piping. The WAS pumps are not located in a preferred location. The existing WAS system is currently being modified to promote better control of the wasted sludge. Future projected flows will be considered when designing the proposed modifications to the WAS system.

The septage receiving system will not change as part of the biological modifications. The volume of septage will stay the same when the septage receiving rehabilitation occurs. Increased domestic wastewater flows will not affect the septage receiving system. The total volume of accepted septage should be monitored to accommodate for current sludge storage volumes and WWTP loading. The solids handling cost will be analyzed later in the report.

7. Chemical Feed System

The membranes use sodium hypochlorite and citric acid to clean the membranes. These chemical feed systems will be capable of meeting the future flow rates.

The ferric feed system has adequate chemical storage to accommodate for the future flows.

III. ANALYSIS OF ALTERNATIVES

A. Identification and Evaluation of Potential Alternatives

Alternatives to accomplish needed improvements to the Township's 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:

- Ensure reliable wastewater collection and treatment service to the customers.
- Rehabilitate/repair high priority areas of existing wastewater infrastructure.
- Provide facilities capable of providing consistent compliance with regulatory and permit requirements.
- Minimize financial burden to the sewer system users.
- Minimize environmental impact during construction of the improvements project.

The following alternatives were evaluated:

- a. Alternative 1 – No Action
- b. Alternative 2 – Regional Alternative: Pump to City of Jackson WWTP
- c. Alternative 3 – Optimize Existing Facilities Operation
- d. Alternative 4 – Upgrade Biological Capacity

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

Each alternative was evaluated using the proposed design criteria of the existing facility at a maximum monthly design flow of 5.0 MGD. Each alternative that continued the use of the existing WWTP included modifications and upgrades to the existing system. These process modifications are necessary to ensure reliable wastewater treatment and replace existing equipment that is failing and underperforming.

Alternatives 1, 2 and 3 were briefly analyzed, however, these alternatives were determined to be not feasible for the Township because they did not meet the project objectives. Alternative 4 was determined to be the principal alternative for detailed evaluation. Alternative 4 was broken down into two subsections: Alternative 4a – Upgrade Existing MBR Treatment System and Alternative 4b – Upgrade Process System.

Financial analysis of the principal alternatives followed a net 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 net present worth of the project.

1. Alternative 1 – No Action

Alternative 1 includes no improvements to the WWTP. The existing process train and MBR system would remain in service.

The existing MBRs are rated to treat the design average daily flow of 3.0 MGD with a peak hourly flow of 8.0 MGD with all three trains running. If the plant needs to take down an MBR train for maintenance they would not be able to treat the peak hourly flow, resulting in having to use the emergency overflow basin.

The biological capacity of the plant would continue to be 3.5 MGD. This would result in potential permit violations and inconsistent treatment if flows exceed 3.5 MGD.

The existing disinfection and chemical feed systems would be inadequate for the increased flows through the WWTP.

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

2. Alternative 2 – Regional Alternative: Pump to City of Jackson WWTP

Alternative 2 was developed to reroute the wastewater to the City of Jackson's WWTP. This is the closest treatment facility to the WWTP. With this alternative, the existing effluent force main would be extended from the discharge location to the Jackson WWTP. The influent force main would be rerouted from the headworks building to the effluent pump station which would be repurposed for the pump station to the Jackson WWTP. The WWTP would be decommissioned, and sections of the land could be sold or repurposed by the Township. The Township's collection system would still need to be maintained.

While this option would eliminate the need to improve and operate the existing facility, the costs associated with this alternative would not be fully known until agreements are reached with the City of Jackson. It is important to note that Alternative 2 assumes that Jackson would be willing to accept additional flow from the Township and the Authority.

The Jackson WWTP is approximately 10.8 miles from the Township's effluent pump station and 7.3 miles from the effluent outfall. The effluent force main would need to be continued to the Jackson WWTP. There would need to be a booster pump station installed along the force main route to convey the wastewater to the Jackson WWTP.

At the Leoni WWTP, the existing tanks onsite would be used as an equalization basin. This would allow the influent flow to be routed into the equalization basin if the pump station cannot keep up. Corrosion control measures would need to be installed at the pump station to reduce the corrosiveness of the wastewater prior to discharge to Jackson.

Considering the project cost and the current debt on the existing treatment facility has ruled Alternative 2 not feasible; therefore, no further analysis is presented on Alternative 2.

3. Alternative 3 – Optimize Existing Facilities Operation

The WWTP is in the process of major improvements that replace its failing membranes. Optimization of the process was included in the design of these improvements. The processes optimized with the improvements include grit removal and screening, biological treatment, RAS, MBR, and process aeration. Due to this, Alternative 3 was ruled out as a principal alternative and will not be evaluated further.

4. Alternative 4 – Upgrade Biological Capacity

Alternative 4 was developed to upgrade the biological capacity of the WWTP. Alternative 4 was broken down into two subsections: Alternative 4a – Upgrade Existing MBR Treatment System and Alternate 4b – Upgrade Process System. Alternative 4a and 4b were compared against each other based on net present worth and operation, maintenance, and repair cost to determine which alternative provided the most feasible and cost-effective system.

Alternative 4a analyzes adding redundancy to the MBR treatment system to ensure adequate treatment by adding a 4th train to the process. Alternative 4b analyzes adding a fourth process train to the system to increase biological capacity.

Alternative 4a includes structural modifications to one of the existing basins, control system improvements, and installing new MBR supports, cassettes, valving and piping, solid cover planks, and a permeate pump.

Alternative 4b includes adding an anoxic basin, aeration basin “A,” aeration basin “B,” and a MBR train. The alternative also includes upgrades to the screening and grit removal process, upgrades to the process aeration system, permeate pump system, disinfection system, solids handling systems, and adding a flow equalization basin.

B. Analysis of Principal Alternatives

Two feasible principal alternatives were developed that meet the project objectives, identified as Alternatives 4a and 4b. These alternatives are analyzed further and are summarized in the following sections.

1. 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 the same funds required paying all present and future costs. The total present worth, used to compare the principal alternatives, 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 was established by EGLE at 0.5% for current SRF Projects.

The salvage value is calculated at the end of 20 years where portions of the project structures or equipment may have a salvage value, which is determined by using a straight-line depreciation. The present worth of the 20-year salvage value is then computed using the discount rate of 0.5%. The MDEQ guidance document establishes the estimated life for the project structures and equipment to assess salvage values at 20-year planning period. In general, concrete structures, earthwork basins, and piping have a useful life of 30-50 years and equipment has a useful life of 10-20 years.

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

To ensure uniformity of the cost comparisons, the following cost comparison details were specifically addressed and were applied in the present worth analysis as per the MDEQ 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 B for each principal alternative. Table 6 compares the costs for different principal alternatives.

Table 6. Summary of Alternatives – Net Present Worth Analysis		
	Alternative 4a	Alternative 4b
Project Cost	\$2,284,000	\$26,764,000
Annual OM&R Cost	\$38,000	\$458,000
Net Present Worth of OM&R Cost*	\$722,000	\$8,696,000
Total Present Worth	\$3,006,000	\$35,460,000
Salvage Value	\$191,000	\$2,194,000
Net Present Worth	\$2,815,000	\$33,266,000

*0.5% Discount Rate

IV. RECOMMENDED ALTERNATIVE

A. Description of the Recommended Alternative

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

- Ensure reliable wastewater collection and treatment to the customers.
- Rehabilitate/repair high priority areas of existing wastewater infrastructure.
- Provide facilities capable of providing consistent compliance with regulatory and permit requirements.
- Minimize financial burden to the sewer system users.
- Minimize environmental impact during construction of the improvements project.

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

The present worth analysis determined that Alternative 4a has the lowest capital cost, lowest OM&R costs, and the lowest net present worth. Alternative 4a – Upgrade Existing MBR Treatment System is the Recommended Alternative.

Additional discussion of Recommended Alternative 4a is presented below. It should be noted that Alternative 4b can be used as a future planning tool for the township when evaluating treatment expansion.

1. Relevant Design Parameters

A proposed layout of this alternative is presented in Appendix A. The existing MBR basins will house the new hollow fiber membranes.

The existing process aeration and membrane air scour blowers will be removed and replaced in the current project. The permeate pumps are currently being removed and replaced with positive displacement pumps that are on VFDs in the ongoing project. This will allow for the pumps to run forward and backward. When the pumps run backwards, they “back pulse” the membranes and push effluent back through the membranes assisting with membrane cleaning and solids removal.

The bottom of the MBR basin will be sloped with concrete to facilitate removal of accumulated solids. This can be achieved with the recommended alternative because the membrane modules are secured within the basins by brackets that are mounted to the top of the basin walls. There are no requirements to have the membrane modules supported from the floor.

The capacity of the WWTP will continue to be rated for a maximum monthly flow of 5.0 MGD. The design will allow for a modular expansion of the MBR system if required.

2. Project Maps

The proposed layout for alternatives 4a and 4b are included in Appendix A.

3. Controlling Factors

Factors that control the design of the proposed project include:

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

4. 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). Proposed construction is limited to existing WWTP. All work will be performed in accordance with necessary permit requirements.

B. Useful Life

The Township intends to secure a 20-year SRF loan for the construction of the recommended alternative. The estimate life of the membranes is anticipated to be great than 10-years. The manufacturer is confident that the membranes will last longer than 10-years, but it is assumed that some membranes will need to be replaced within the planning period. The Township must budget for one membrane replacement within the 20-year project planning period. This is included in the OM&R costs.

V. RECOMMENDED NEXT STEPS

The results of the alternative analysis identify Alternative 4a as the only viable alternative as it meets the project objectives:

- Ensure reliable wastewater collection and treatment to the customers.
- Rehabilitate/repair high priority areas of existing wastewater infrastructure.
- Provide facilities capable of providing consistent compliance with regulatory and permit requirements.
- Minimize financial burden to the sewer system users.
- Minimize environmental impact during construction of the improvements project.

The following next steps are recommended to help make an informed decision on the final selected alternative.

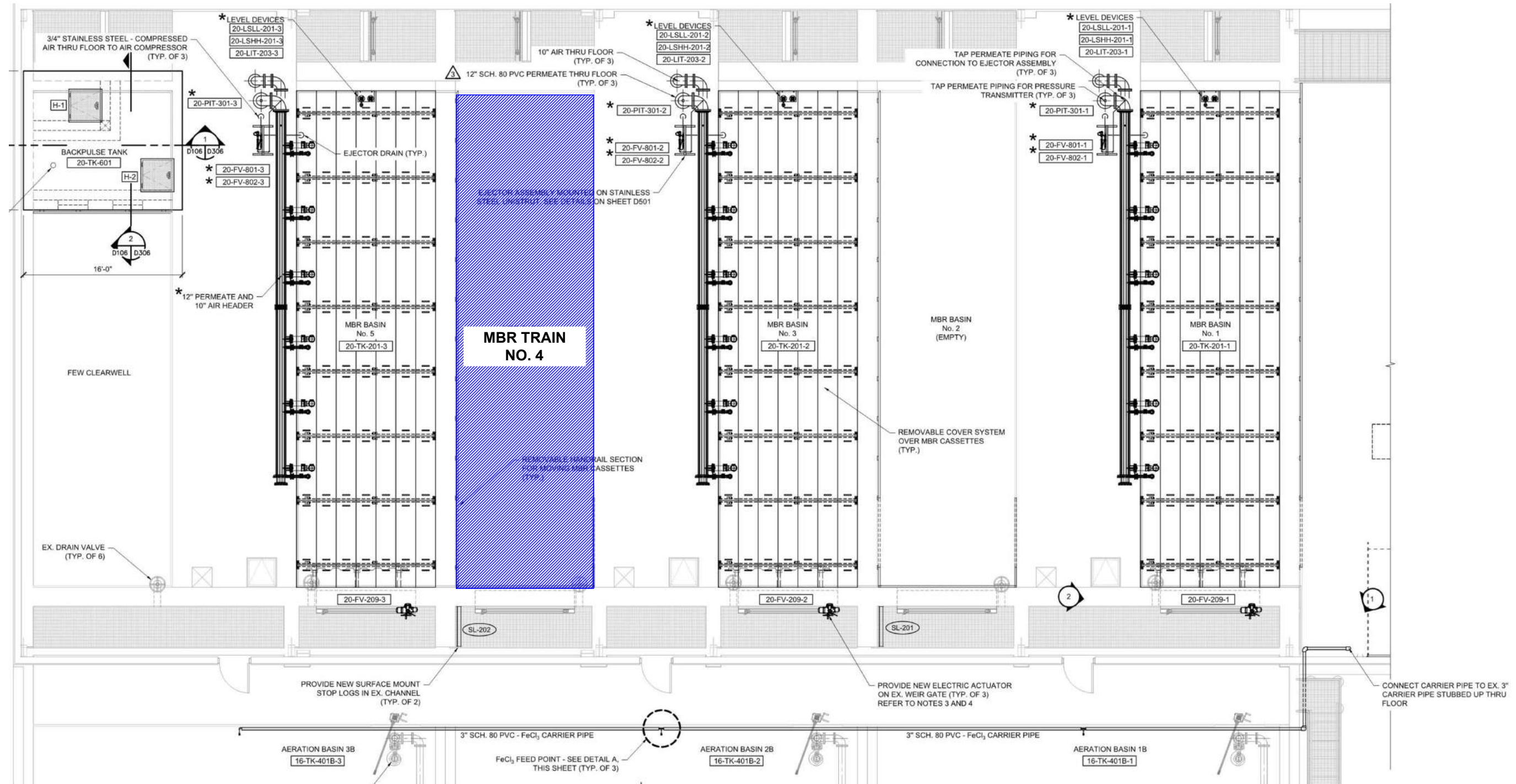
1. Consult with a Municipal Financial Advisor to conduct a rate study considering the Alternative and funding options.
2. Evaluate rate impacts, funding options, and project phasing.
3. Complete EGLE SRF Project Plan.
4. Begin design of the improvements.

This study has been completed in order to evaluate alternative improvement options to meet the long-term biological treatment needs of the WWTP. A comprehensive analysis of the principal alternatives showed Alternative 4a was the recommended alternative. The results of the financial analysis can be used to help select the desired course of action for proposed improvements. The township can utilize Alternative 4b as a future planning tool for treatment facility growth.

APPENDIX A MAPS AND FIGURES

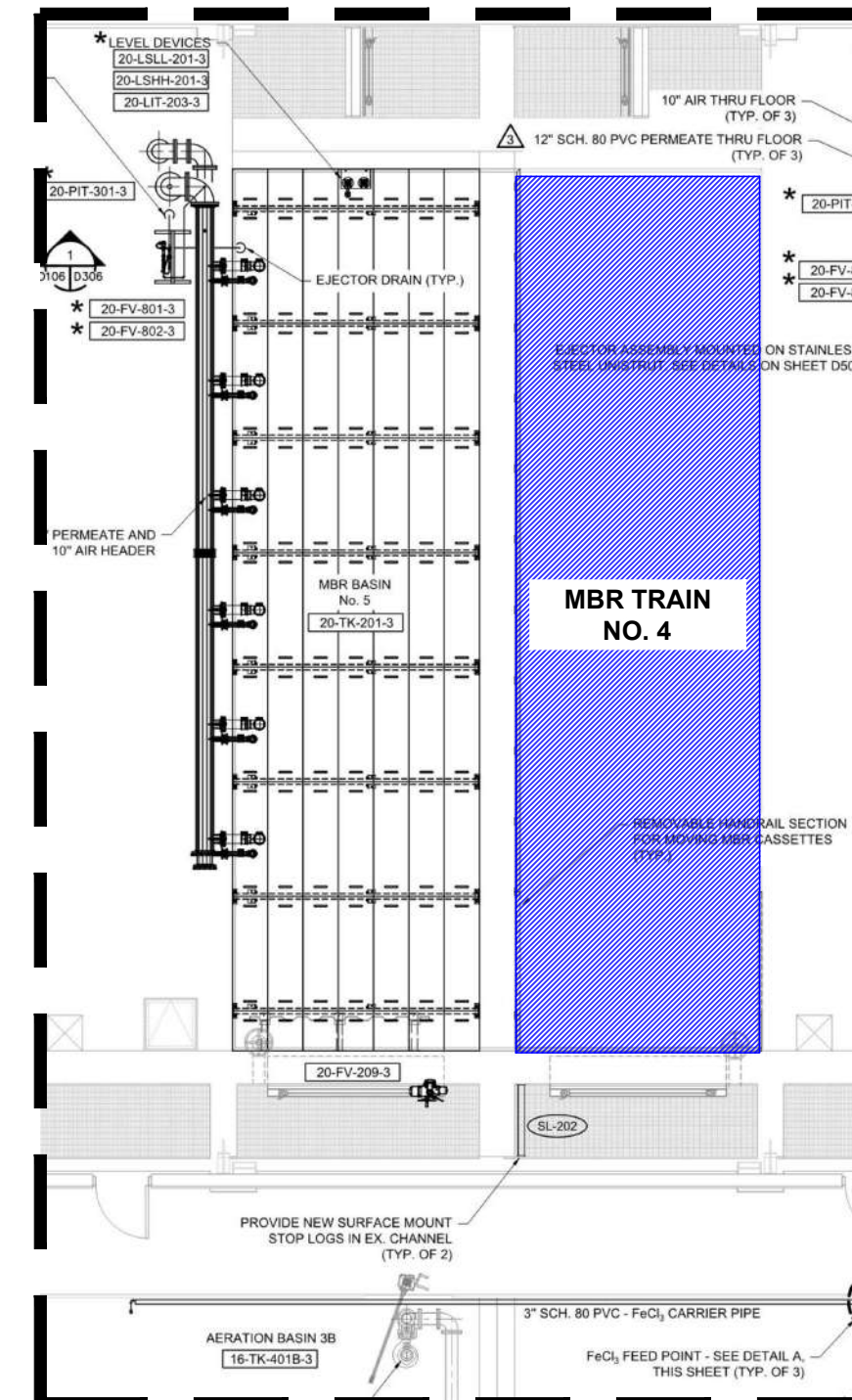
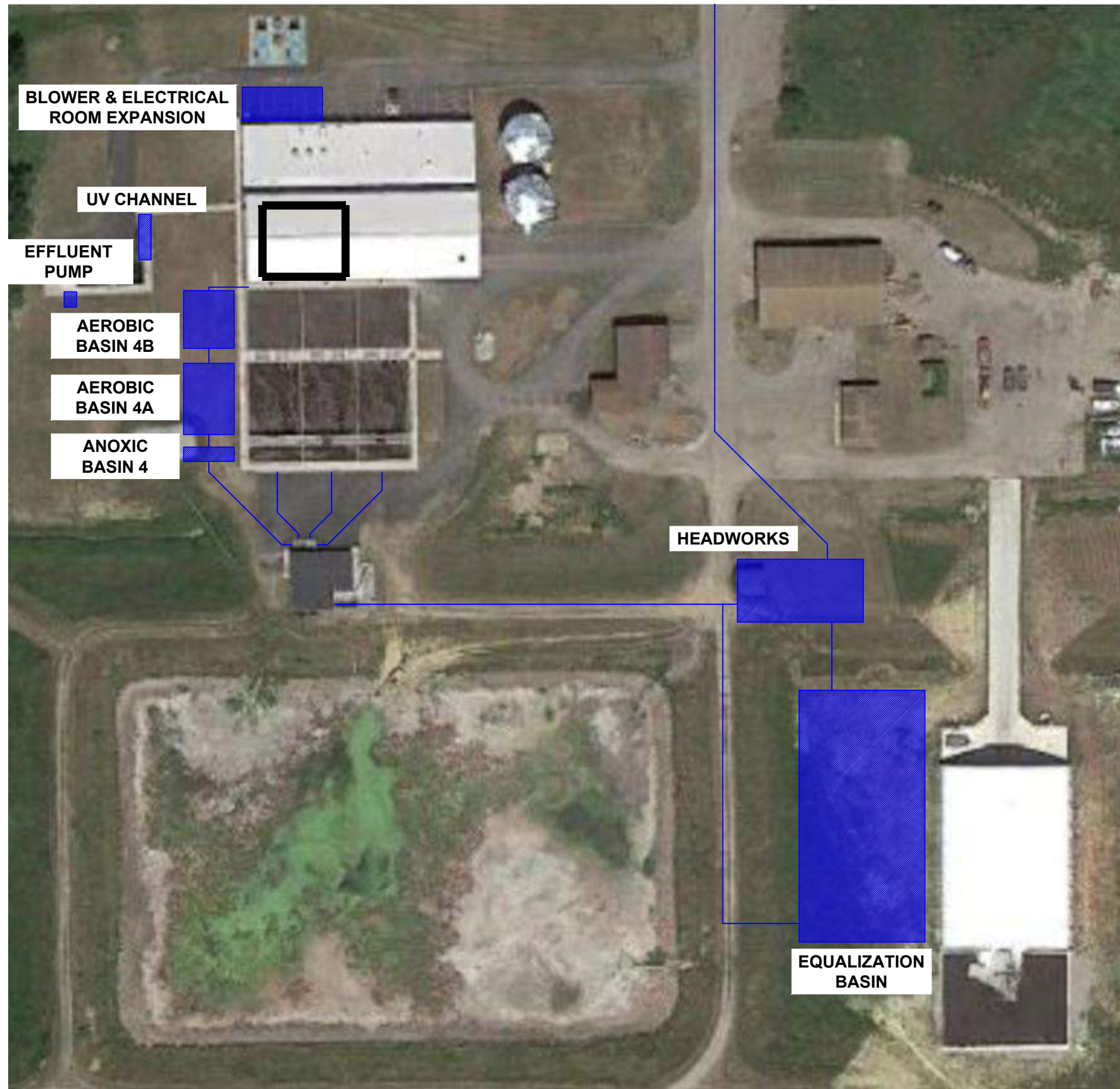
PREPARED FOR:





LEGEND:

- PIPING
- PROPOSED STRUCTURES



LEGEND:

- PIPING
- PROPOSED STRUCTURES



APPENDIX B

OPINION OF PROBABLE COSTS

PREPARED FOR:





Summary Table: Engineer's Opinion of Probable Project Costs
WWTP Alternatives Analysis

Summary of Alternatives - Net Present Worth Analysis						
Alternative	Project Cost	Annual OM&R Cost	Net Present Worth of OM&R Cost (1)	Total Present Worth	Salvage Value	Net Present Worth
WWTP Biological System Improvements						
Alternative 4a - Upgrade Existing MBR Treatment System	\$ 2,284,000	\$ 38,000	\$ 722,000	\$ 3,006,000	\$ 191,000	\$ 2,815,000
Alternative 4b - Upgrade Process System	\$ 26,764,000	\$ 458,000	\$ 8,696,000	\$ 35,460,000	\$ 2,194,000	\$ 33,266,000

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

(1) Discount Rate

0.5%



Engineer's Opinion of Probable Project Cost ⁽¹⁾

<i>Project:</i>	Leoni Township Biological Capacity Study	<i>Project No.</i>	853390
<i>Basis for Estimate:</i>	[X] Conceptual [] Basis of Design [] Final	<i>Estimator:</i>	SMW/ARH
<i>Work:</i>	Alternative 4a - Upgrade Existing MBR Treatment System	<i>Date:</i>	Apr-2022
		<i>Current ENR-CCI:</i>	12791

Item	Description	Unit	Qty.	Unit Price	Amount
MBR Train 4					
1	MBR Equipment from SUEZ	LS	1	\$1,250,000	\$1,250,000
2	Flowable Fill	CY	177	\$150	\$27,000
3	Concrete	CY	15.5	\$1,200	\$19,000
4	Thermal Mass Flow Meter	EA	1	\$6,000	\$6,000
5	Process Piping and Valves	LS	1	\$75,000	\$75,000
6	Blower Equipment Pad	CY	2	\$500	\$1,000
7	FRP Tank Covers	LS	1	\$81,000	\$81,000
8	Chemical Cleaning Piping	LS	1	\$4,000	\$4,000
9	Electrical/Controls	LS	1	\$30,000	\$30,000
10	General Conditions and OH&P				\$224,000
Construction Cost:					\$1,717,000
11	Construction Contingency				\$172,000
12	Design Engineering				\$137,000
13	Construction Engineering				\$172,000
14	Planning, Legal, Bonding & Administration				\$86,000
Total Project Cost:					\$2,284,000



Engineer's Opinion of Probable Project Cost ⁽¹⁾

<i>Project:</i>	Leoni Township Biological Capacity Study	<i>Project No.</i>	853390
<i>Basis for Estimate:</i>	[X] Conceptual [] Basis of Design [] Final	<i>Estimator:</i>	SMW/ARH
<i>Work:</i>	Alternative 4b - Upgrade Process System	<i>Date:</i>	Apr-22
		<i>Current ENR-CCI:</i>	12791

Item	Description	Unit	Qty.	Unit Price	Amount
1	Equalization Basin	LS	1	\$5,745,000	\$5,745,000
2	Preliminary Treatment	LS	1	\$6,879,000	\$6,879,000
3	Biological Treatment	LS	1	\$2,355,000	\$2,355,000
4	MBR	LS	1	\$1,717,000	\$1,717,000
5	Disinfection	LS	1	\$504,000	\$504,000
6	Effluent PS Upgrades	LS	1	\$299,000	\$299,000
7	General Conditions and OH&P				\$2,625,000
Construction Total:					\$20,124,000
8	Construction Contingency				\$2,012,000
9	Design Engineering				\$1,610,000
10	Construction Engineering				\$2,012,000
11	Planning, Legal, Bonding & Administration				\$1,006,000
Total Project Cost:					\$26,764,000

Notes:

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

APPENDIX G BIOSOLIDS HANDLING STUDY

PREPARED FOR:



Leoni Township Wastewater Treatment Plant Biosolids Study

PREPARED FOR:



JACKSON COUNTY, MICHIGAN

DATE: APRIL 2022
PROJECT No.: 853400


FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.



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APPENDICES

- Appendix A – Proposed Layout
- Appendix B – Opinion of Probable Cost



I. BACKGROUND AND PURPOSE OF STUDY

A. Background

The existing wastewater treatment plant (WWTP) is an activated sludge plant designed to treat an average of 3.0 million gallons per day of raw sewage. The original WWTP was a facultative lagoon facility constructed 1971. The plant underwent a major improvements project in 2010 abandoning the lagoon plant and constructing the current membrane bioreactor (MBR) treatment system. WWTP processes include grit removal and screening, membrane bioreactors, and ultraviolet disinfection. Solids processes include sludge storage and sludge dewatering centrifuges, followed by land application or landfilling of the dewatered solids. Treated effluent is pumped from the WWTP and discharged to the Grand River in Michigan Center, MI. The effluent is discharged in accordance NPDES Permit No. MI0045942.

The headworks building at the plant underwent an upgrade in 2021 to add an odor control system that consists of a bio-trickling filter, activated carbon polishing filter, makeup air unit, blower, nutrient feed skid and solid cover planking over the existing channels and tank openings. The plant is currently undergoing a membrane improvement project to address process inefficiencies and to replace the failing MBRs.

In the early 2000s, the plant built a septage receiving facility. The facility consists of an actuated plug valve, a magnetic flow meter, and a mechanical screen. In 2012, the WWTP replaced the old equipment with a new septage receiving station and kept the existing mechanical screen as a backup. The septage receiving system includes a rock trap, comminutor, actuated plug valve, magnetic flow meter, and an electronic billing system. In 2021, the plant staff replaced the comminutor to improve reliability of the system.

B. Purpose of Study

Biosolids are produced as a byproduct of the wastewater treatment process. Currently, waste sludge is pumped from the MBR tanks into two sludge holding tanks, then pumped through one of two centrifuges for dewatering, thereby creating a relatively dry cake. The biosolids cake is then transported by truck to the onsite holding structure. The biosolids are either used for land application to agricultural fields or transported to a licensed sanitary landfill for disposal.

In December 2021, Fleis and VandenBrink (F&V) was authorized to evaluate the existing biological treatment system and solids handling. This study evaluates the existing biosolids handling process and provides recommendations for process improvements, equipment replacement options and evaluation of storage options. As part of this evaluation, F&V reviewed record drawings of the WWTP, flow data, interviewed staff, and evaluated potential new technologies. This study is intended to present a summary of the existing conditions, the findings, and recommendations for improvements.

II. EVALUATION OF EXISTING CONDITIONS

A. Existing Facilities

Biological Treatment System

Following primary treatment, influent flow is split and routed to the anoxic basins. The wastewater is mixed and combined with returned activated sludge (RAS) from the RAS flow splitter. The mixed liquor then flows through the bioreactor channel to aeration basins “A” where air is added to the mixed liquor to facilitate biological growth and treatment. Six submersible centrifugal feed forward pumps are utilized to pump the mixed liquor from aeration basins “A” to aeration basins “B”. The feed forward pumps are each powered by a 23-HP motor and controlled by variable frequency drives (VFDs) that allow the pumps to match influent demand.

After being pumped to aeration basins “B”, more air is added to the mixed liquor to continue to facilitate biological growth and treatment. Air is supplied to aeration basins “A” and “B” by three existing positive displacement blowers, each rated at 2,500 scfm and each powered by a 200-HP motor. Process Blower A is dedicated to aeration basins “A”, Process Blower B is dedicated to aeration basins “B”, and Process Blower C is a standby blower for both aeration basins “A” and “B.” The internal recycle pumps can pump mixed liquor from the aeration basins “B” into the anoxic basins to reduce odor.

The mixed liquor then flows into the MBR influent channel and into the MBR basins. Each MBR basin is equipped with a coarse bubble diffused aeration system, which is intended to introduce oxygen to the wastewater to enhance biological activity and to clean/scour the membranes to reduce fouling.

The purpose of the membrane is to separate biological solids from the mixed liquor, producing a high-quality effluent. In the existing membrane system, permeate from the waste stream is drawn through the hollow fiber membranes and collected in individual headers from each basin. These headers discharged to a common permeate header. Permeate flows through this header to the back pulse tank where some of the permeate is stored for future use to clean the membranes. The permeate that is not stored flows over a weir in the back pulse tank and flows by gravity to the UV disinfection system. The solids that are retained within the MBR basins flow into the RAS weir box. The sludge flows by gravity back to the RAS splitter box located upstream of the anoxic basins. Waste activated sludge (WAS) pumps allow for the wasting of sludge from the RAS system to maintain a balance of biological solids in the treatment process.

Chemical Feed System

With current operations, chemical addition is necessary for proper plant operation. Ferric chloride is added at the headworks building downstream of the influent screens and in the aeration basins for phosphorus removal. The WWTP stores ferric chloride in a 6,000-gallon bulk storage tank where the chemical is pumped to the feed points.

A polymer feed system is utilized to enhance dewatering of the sludge. The polymer can be mixed with the waste activated sludge prior to discharge into the centrifuges or the polymer can be added at the centrifuges. This enhances separation of the water from the sludge to increase the solids content of the sludge. There are two polymer blending systems that mix powdered polymer with final effluent water.

Solids Handling

To remove accumulated solids throughout the treatment process, WAS is pulled off the RAS piping and is pumped to the sludge storage tanks by the WAS pumps. The sludge storage tanks hold onto the sludge prior to pumping the waste sludge through the centrifuges.

The centrifuge pumps convey the sludge to the centrifuges for dewatering. Polymer is added upstream or at the centrifuges to enhance removal of water from the sludge. The dried sludge cake is conveyed to a dumper or dump truck. From there, the sludge can either be hauled off site for disposal or relocated into the sludge storage barn for temporary storage.

The centrate/drain pump station collects the centrate from the centrifuges along with the sludge storage overflow and drain line. This flow is pumped back to the head of the plant for further treatment.

A Residual Management Plan is in place to allow the Township to land-apply biosolids.

B. Existing Flows and Loads

Existing Basis of Design

The WWTP is designed to treat a maximum monthly flow of 3.0 million gallons per day (MGD), a peak daily flow of 4.8 MGD and a peak instantaneous flow of 8.0 MGD.

The existing biosolids production design is displayed in Table 1.

Table 1. Existing WWTP Biosolids Design Criteria		
		Unit
Design Influent Flow	3.0	MGD
BOD	323	mg/l
Yield Coefficient	0.75	
Sludge Production	6,000	lbs/day
Volume Sludge Production*	51,300	gpd
Avg Septage Flow	14,000	gpd
Total Design Biosolids Flow	66,300	gpd
Total Required Short-Term Sludge Holding	265,100	gallons
Total Volume of Sludge**	464,000	gallons
Weekly Dewatering	1,950	minutes
Design Flow to Centrifuge	238	gpm

*assuming WAS sludge to be 1.4% solids

**generated in one week including septage

Average Influent Flows

The average influent flow received at the WWTP from January 2017 through December 2021 was 2.06 MGD.

Peaking Factor

Peak hourly flows were analyzed to determine the peaking factor of the influent flow. The maximum peak hour flow through December 2021 was 3.28 MGD with the average daily influent flow of 2.06 MGD.

A peaking factor of 2.5 was used to estimate projected future peak hour flows with the expansion. The Township is currently in the process of addressing Inflow and Infiltration (I/I) issues throughout the Leoni Regional Utility Authority. It is anticipated that the peaking factor will remain consistent or be reduced with the I/I improvements that will be made.

C. Future Flows and WWTP Capacity

1. Projected 20 Year Flows

The projected 20-year wastewater flows were projected based on the Service Area Residential Equivalent Unit (REU) projections. An annual increase of 0.31% was used to project the future design flows. The projected wastewater flows for the design year 2042 are summarized in Table 2. The projected flows account for the addition of neighboring communities including the lake communities of Lake LeAnn, Lake Somerset and Mirror Lake to the system. A peaking factor of 2.5 was used to project the peak hour flow.

Table 2. Design Flow Projections	
	Flow (MGD)
Average Daily Flow	2.8
Maximum Daily Flow	6.8
Maximum Monthly Flow	3.8
Peak Hour Flow	7.0

2. Proposed Design Values

Table 3 displays the design values that were used in the biosolids evaluation to compare the existing equipment and process design to the projected future flow.

Table 3. Proposed Design Values	
	Flow (MGD)
Average Daily Flow	4.0
Maximum Daily Flow	8.0
Maximum Monthly Flow	5.0
Peak Hour Flow	10.0

D. Evaluation

1. Biological Treatment

The biological treatment system is responsible for promoting biological growth and reducing the organic nutrients within the wastewater. The biological treatment system consists of a series of tanks that promote biological activity, and the membrane system that filters the permeate from the biological mater.

The biological treatment system consists of anoxic basins and aerobic basins. There are three trains of biological treatment that have a total working volume of 1,700,000 gallons. With the recent basin modifications, the WWTP will become biologically overloaded once influent flows surpass 3.5 MGD.

In the 2008 WWTP Record Drawings by OMM, there was a conceptual plan to add a fourth biological train to the existing system. This additional treatment train would need to be constructed to achieve the design capacity for the monthly maximum flow of 5.0 MGD.

2. Return Activated Sludge

The RAS system draws off the bottom of the MBR basins and overflows a weir that controls the MBR basin liquid level. The RAS then flows by gravity to the RAS splitter box upstream of the anoxic basins.

The existing RAS system is capable of providing return rates for the proposed increase in capacity. Future projected flows will be considered when designing the proposed modifications to the RAS system.

The existing WAS system draws off the RAS piping. The WAS pumps are not located in a preferred location. The existing WAS system is currently being modified to promote better control of the wasted sludge. Future projected flows will be considered when designing the proposed modifications to the WAS system.

The septage receiving system will not change as part of the biological modifications. The volume of septage will stay the same when the septage receiving rehabilitation occurs. Increased domestic wastewater flows will not affect the septage receiving system. The total volume of accepted septage should be monitored to accommodate for current sludge storage volumes and WWTP loading. The solids handling cost will be analyzed later in the report.

3. Sludge Storage

Two storage tanks are utilized to store liquid sludge and a sludge storage barn is used to store dried sludge cake. Sludge is pumped by the WAS pumps into the sludge storage tanks where it is thickened and then pumped through the centrifuges. The dried sludge cake is hauled to the sludge storage barn for storage prior to disposal.

The two sludge storage tanks hold approximately 414,000 gallons total of sludge. With the increased flows, approximately 62,000 gallons of sludge would be wasted daily. The septage receiving system can add an additional 15,000 gpd to the sludge storage tanks. The approximate holding time of the sludge storage tanks is 5.4 days. Additional sludge storage capacity is necessary along with proper operation and maintenance of the dewatering equipment which is essential to maintaining adequate sludge storage.

The sludge storage barn was constructed in 2016 to store the dried sludge cake prior to land application. Currently, the dried sludge storage volume is limited, and the sludge storage barn needs to be expanded, or an alternate means of sludge disposal should be explored. The original design intent was for the dried sludge to be landfilled but if adequate storage is available, land application is preferred.

4. Sludge Thickening

Thickened sludge is pump from the sludge storage tanks to the centrifuges by the centrifuge pumps. A polymer feed system is utilized to add polymer downstream of the pumps prior to dewatering in the centrifuges. These centrifuges remove water from the liquid sludge and reduce the sludge to a dried cake.

The system is designed for one centrifuge to run for approximately 33 hours per week at maximum monthly design flows. With increased flow and biosolids production from the proposed design criteria, the centrifuge system would need to run for approximately 37 hours per week to accommodate the increased biosolids. Once the WWTP surpasses an average daily flow rate of 3.5 MGD, the centrifuges and centrifuge pumps will have to be upgraded and increase capacity to reduce weekly runtime.

III. ANALYSIS OF ALTERNATIVES

A. Identification and Evaluation of Potential Alternatives

Alternatives to accomplish needed improvements to the Township's 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:

- Ensure reliable wastewater treatment and storage.
- Rehabilitate/repair high priority areas of existing biosolids handling infrastructure.
- Provide facilities capable of providing consistent compliance with regulatory and permit requirements.
- Minimize environmental impact during construction of the improvements project.

The following alternatives were evaluated:

- a. Alternative 1 – No Action
- b. Alternative 2 – Regional Alternative: Pump to City of Jackson WWTP
- c. Alternative 3 – Optimize Existing Facilities Operation
- d. Alternative 4 – Upgrade Existing Biosolids Handling and Storage

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

Each alternative was evaluated using the proposed design criteria of the facility at a maximum monthly design flow of 5.0 MGD. Each alternative that continued the use of the existing WWTP included modifications and upgrades to the existing biosolids system. These process modifications are necessary to ensure reliable wastewater treatment and replace existing equipment that is failing and underperforming.

Alternatives 1, 2 and 3 were briefly analyzed, however, these alternatives were determined to be not feasible for the Township because they did not meet the project objectives. Alternative 4 was determined to be the principal alternative for detailed evaluation.

Financial analysis of the principal alternatives followed a net 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 net present worth of the project.

1. Alternative 1 – No Action

Alternative 1 includes no improvements to the WWTP. The existing biosolids system would remain in service.

There is a cost associated with Alternative 1 although it is difficult to quantify. The aging centrifuges will continue to require regular repairs to keep them functioning. Eventually they will fail beyond repair, resulting in the need for an expensive, emergency repair, with the potential for a biosolids back up situation, or similar challenging situation.

The biosolids storage would continue to be undersized for the current and future WWTP flows. This would result in continued limited storage space and the need to look elsewhere for land application or disposal.

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

2. Alternative 2 – Regional Alternative: Pump to City of Jackson WWTP

Alternative 2 was developed to reroute the wastewater to the City of Jackson's WWTP. This is the closest treatment facility to the WWTP. With this alternative, the existing effluent force main would be extended from the discharge location to the Jackson WWTP. The influent force main would be rerouted from the headworks building to the effluent pump station which would be repurposed for the pump station to the Jackson WWTP. The WWTP would be decommissioned, and sections of the land could be sold or repurposed by the Township. The Township's collection system would still need to be maintained.

While this option would eliminate the need to improve and operate the existing facility, the costs associated with this alternative would not be fully known until agreements are reached with the City of Jackson. It is important to note that Alternative 2 assumes that Jackson would be willing to accept additional flow from the Township and the Authority.

The Jackson WWTP is approximately 10.8 miles from the Township's effluent pump station and 7.3 miles from the effluent outfall. The effluent force main would need to be continued to the Jackson WWTP. There would need to be a booster pump station installed along the force main route to convey the wastewater to the Jackson WWTP.

At the Leoni WWTP, the existing tanks onsite would be used as an equalization basin. This would allow the influent flow to be routed into the equalization basin if the pump station cannot keep up. Corrosion control measures would need to be installed at the pump station to reduce the corrosiveness of the wastewater prior to discharge to Jackson.

Considering the project costs and the existing debt on the treatment facility has ruled Alternative 2 not feasible; therefore, no further analysis is presented on Alternative 2.

3. Alternative 3 – Optimize Existing Facilities Operation

Alternative 3 includes rehabilitating the existing biosolids system. This alternative also includes improvements to the solids handling process.

The existing aerobic basins are sufficient for the current WWTP flow rates. Continuing with only the existing aerobic basins though will not allow additional flow through the current system.

Eventually, the existing centrifuges will no longer be able to be repaired. The centrifuges can be refurbished but eventually they must be replaced to provide efficient and reliable sludge dewatering.

As flow continues to increase at the plant, the solids storage will become limited. It is proposed that the WWTP look into alternatives for offsite disposal. With increased solids production, the WWTP will be unable to store the solids within the existing tanks and solids storage building.

Alternative 3 does not meet the primary project objective and will not be evaluated further as a principal alternative.

4. Alternative 4 – Upgrade Existing Biosolids Handling and Storage

Alternative 4 was developed to improve sludge drying technologies, onsite plant handling of biosolids, and increased storage capacity. This alternative was evaluated based on net present worth and operation, maintenance, and repair costs to determine which dewatering technology provided the most feasible and cost-effective system.

An increase in the capacity of the centrifuges and the centrifuge pumps would be necessary once flows increase to reduce weekly run time. Rather than continued use of the aging centrifuges, they would be replaced with screws presses. Each with their own calibrated polymer feed systems to provide improved sludge dewatering.

To provide sufficient onsite storage of dewatered sludge, the sludge storage barn needs to be increased in size. Interior layout of the solids barn will be updated to accommodate for increased solids storage prior to land application.

B. Analysis of Principal Alternative

One feasible principal alternative was developed that meet the project objectives, identified as Alternative 4. This alternative is analyzed further and is summarized in the following sections.

1. 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 the same funds required paying all present and future costs. The total present worth, used to compare the principal alternatives, 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 was established by EGLE at 0.5% for current SRF Projects.

The salvage value is calculated at the end of 20 years where portions of the project structures or equipment may have a salvage value, which is determined by using a straight-line depreciation. The present worth of the 20-year salvage value is then computed using the discount rate of 0.5%. The MDEQ guidance document establishes the estimated life for the project structures and equipment to assess salvage values at 20-year planning period. In general, concrete structures, earthwork basins, and piping have a useful life of 30-50 years and equipment has a useful life of 10-20 years.

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

To ensure uniformity of the cost comparisons, the following cost comparison details were specifically addressed and were applied in the present worth analysis as per the MDEQ 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 A for the principal alternative. Table 4 outlines the costs for the principal Alternative.

Table 4. Net Present Worth Analysis – Alternative No. 4	
	Alternative 4
Project Cost	\$5,904,000
Annual OM&R Cost	\$107,400
Net Present Worth of OM&R Cost*	\$2,039,000
Total Present Worth	\$7,943,000
Salvage Value	\$610,000
Net Present Worth	\$7,333,000

*0.5% Discount Rate

IV. RECOMMENDED ALTERNATIVE

A. Description of the Recommended Alternative

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

- Ensure reliable wastewater treatment and storage.
- Rehabilitate/repair high priority areas of existing biosolids handling infrastructure.
- Provide facilities capable of providing consistent compliance with regulatory and permit requirements.
- Minimize environmental impact during construction of the improvements project.

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

The present worth analysis determined that Alternative 4 has the lowest capital cost, lowest OM&R costs, and the lowest net present worth. Alternative 4 – Upgrade Existing Biosolids Handling and Storage is the Recommended Alternative.

Additional discussion of Recommended Alternative 4 is presented below.

1. Relevant Design Parameters

A proposed layout of this alternative is presented in Appendix A.

The existing centrifuges will be removed and will be replaced with screw presses. This will allow for more efficient sludge dewatering and reduced future maintenance.

The biosolids storage building will be upgraded to accommodate for increased onsite plant handling of biosolids. This will allow for the ability to store dewatered solids onsite and have sufficient storage to land apply solids semi-annually.

The capacity of the WWTP will continue to be rated for a maximum monthly flow of 5.0 MGD.

2. Project Maps

The proposed layout of the recommended alternative is included in Appendix A.

3. Controlling Factors

Factors that control the design of the proposed project include:

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

4. 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). Proposed construction is limited to existing WWTP. All work will be performed in accordance with necessary permit requirements.

B. Useful Life

The Township intends to secure a 20-year SRF loan for the construction of the Recommended Alternative. The estimate useful life of the screw press is anticipated to be great than 10-years. The manufacturer is confident that the screw press will last longer than 10-years, but it is assumed that least one of the screw presses will need to be replaced within the planning period. The Township must budget for one screw press replacement within the 20-year project planning period. This is included in the OM&R costs.

V. RECOMMENDED NEXT STEPS

The results of the alternative analysis identify Alternative 4 as the only viable alternative, as it meets the project objectives:

- Ensure reliable wastewater treatment and storage.
- Rehabilitate/repair high priority areas of existing biosolids handling infrastructure.
- Provide facilities capable of providing consistent compliance with regulatory and permit requirements.
- Minimize environmental impact during construction of the improvements project.

The following next steps are recommended to help make an informed decision on the final selected alternative.

1. Consult with a Municipal Financial Advisor to conduct a rate study considering the Alternative and funding options.
2. Evaluate rate impacts, funding options, and project phasing.
3. Complete EGLE SRF Project Plan.
4. Begin design of the improvements.

This study has been completed in order to evaluate alternative improvement options to meet the long-term biosolids handling needs of the WWTP. A comprehensive analysis of the principal alternatives showed Alternative 4 was the only viable solution. The results of the financial analysis can be used to help select the desired course of action for proposed improvements.



APPENDIX A MAPS AND FIGURES

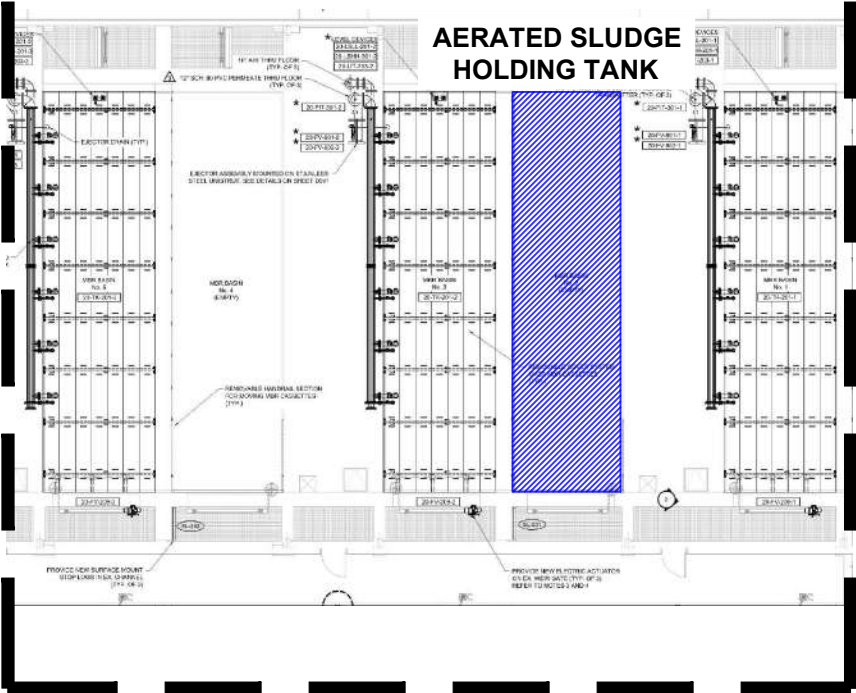
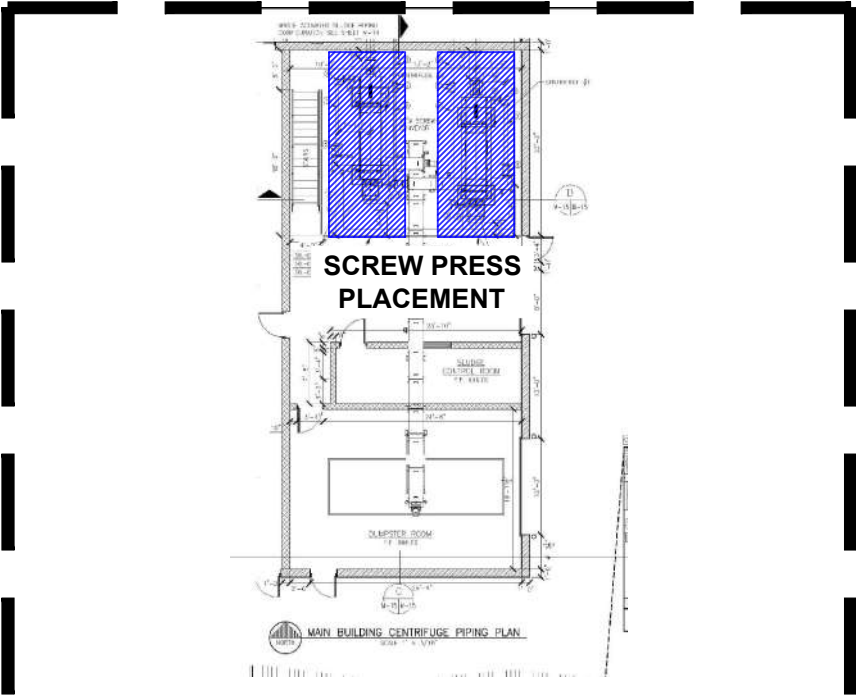
PREPARED FOR:





**BIOSOLIDS
BARN
EXPANSION**

WWTP SITE PLAN



MAIN BUILDING

LEGEND:
 PROPOSED STRUCTURES

**LEONI TOWNSHIP
JACKSON COUNTY, MI
WWTP BIOSOLIDS STUDY**

ALTERNATIVE 4 LAYOUT



F&V PROJECT NO. 853400



APPENDIX B

OPINION OF PROBABLE COSTS

PREPARED FOR:





**Summary Table: Engineer's Opinion of Probable Project Costs
WWTP Alternatives Analysis**

Summary of Alternatives - Net Present Worth Analysis						
Alternative	Project Cost	Annual OM&R Cost	Net Present Worth of OM&R Cost (1)	Total Present Worth	Salvage Value	Net Present Worth
WWTP Biosolids System Improvements						
Alternative 4 – Upgrade Existing Biosolids Handling and Storage	\$ 5,904,000	\$ 107,400	\$ 2,039,000	\$ 7,943,000	\$ 610,000	\$ 7,333,000

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

(1) Discount Rate

0.5%

Engineer's Opinion of Probable Project Cost ⁽¹⁾

<i>Project:</i>	Leoni Township Biosolids Handling Evaluation	<i>Project No.</i>	853400
<i>Basis for Estimate:</i>	<input checked="" type="checkbox"/> Conceptual <input type="checkbox"/> Basis of Design <input type="checkbox"/> Final	<i>Estimator:</i>	SMW/ARH
<i>Work:</i>	Alternative 4 – Upgrade Existing Biosolids Handling and Storage	<i>Date:</i>	Apr-22
		<i>Current ENR-CCI:</i>	12791

Item	Description	Unit	Qty.	Unit Price	Amount
1	Aerobic Holding Tank	LS	1	\$595,000	\$595,000
2	Sludge Screw Press	LS	1	\$1,648,000	\$1,648,000
3	Biosolids Storage Building Addition	LS	1	\$1,617,000	\$1,617,000
4	General Conditions and OH&P				\$579,000
Construction Total:					\$4,439,000
5	Construction Contingency				\$444,000
6	Engineering, Legal, Financial & Administration				\$355,000
7	Construction Engineering				\$444,000
8	Planning, Legal, Bonding & Administration				\$222,000
Total Project Cost:					\$5,904,000

Notes:

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

APPENDIX H SEPTAGE RECEIVING STUDY

PREPARED FOR:



Leoni Township Wastewater Treatment Plant Septage Receiving Study

PREPARED FOR:



JACKSON COUNTY, MICHIGAN

DATE: APRIL 2022
PROJECT No.: 853410


FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

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APPENDICES

Appendix A – Maps and Figures

Appendix B – Opinion of Probable Costs

I. BACKGROUND AND PURPOSE OF STUDY

A. Background

The existing wastewater treatment plant (WWTP) is an activated sludge plant designed to treat an average of 3.0 million gallons per day of raw sewage. The original WWTP was a facultative lagoon facility constructed 1971. The plant underwent a major improvements project in 2010 abandoning the lagoon plant and constructing the membrane bioreactor (MBR) treatment system. In 2021, the plant upgraded its membrane bioreactor system to a hollow fiber membrane system. The WWTP processes included grit removal and screening, anoxic basins, aeration basins “A”, aeration basins “B”, membrane bioreactors, and ultraviolet disinfection. Solids processes include sludge storage and sludge dewatering centrifuges, followed by land application or landfilling of the dewatered solids. Treated effluent is pumped from the WWTP and discharged to the Grand River in Michigan Center, MI. The effluent is discharged in accordance NPDES Permit No. MI0045942.

The headworks building at the plant underwent an upgrade in 2021 to add an odor control system that consists of a bio-trickling filter, activated carbon polishing filter, makeup air unit, blower, nutrient feed skid and solid cover planking over the existing channels and tank openings. The plant is currently undergoing a membrane improvement project to address process inefficiencies and to replace the failing MBRs.

In the early 2000s, the plant built a septage receiving facility. The facility consists of a station for septage haulers to unload, a station for vector trucks to unload, and a pump station. The original septage hauler station consisted of an actuated plug valve, magnetic flow meter, and mechanical screening. The vector truck unloading station consists of a splash pad and an underground containment tank. In 2012, the WWTP replaced the old septage unloading station with a new septage receiving station and kept the existing mechanical screen as a backup. The septage receiving system includes a rock trap, comminutor, actuated plug valve, magnetic flow meter, and an electronic billing system. In 2021 the plant staff replaced the comminutor to improve reliability of the system.

B. Purpose of Study

The Leoni WWTP receives septage from haulers within the Jackson County area. The facility does not meet current design code and is in need of upgrades.

In December 2021, Fleis and VandenBrink (F&V) was authorized to evaluate the existing septage receiving facility and develop alternatives and conceptual costs forecasts for handling the septage. Developing a preliminary layout and capital costs for a new septage receiving facility was also included. As part of this evaluation, F&V reviewed record drawings of the septage receiving facility, flow data, interviewed plant staff and septic haulers, and evaluated potential septage handling technologies. This study is intended to present a summary of the existing conditions, the findings, and recommendations for improvements.

II. EVALUATION OF EXISTING CONDITIONS

A. Existing Facility

The septage receiving facility is located in the middle of the WWTP site. The septage hauler unloading station is housed in a metal pole barn structure with a covered truck bay. The station consists of a rock trap, comminutor, actuated plug valve, magnetic flow meter, and pump station. Septic haulers connect to the station via a four-inch flexible connection. The station is activated by the haulers at the card reader, which tracks the gallons pumped into the system and is used for billing. Once active, the septage is pumped by the hauler into the system where the septage flows through the rock trap, comminutor, plug valve, magnetic flow meter, and finally to the pump station. From the pump station, the septage is pumped into the influent force main upstream of the headworks building to be treated by the WWTP.

The rock trap is designed to remove heavy objects out of the septage stream to protect the comminutor, the pump station, and the overall plant equipment. The comminutor consist of cutters that are designed to grind up larger debris, such as flushable wipes or food wrappers, to help prevent clogging of the pump in the pump station. The pump station consists of a wet well, a 20 hp submersible pump, and controls.

The facility also includes a vactor truck unloading station. The unloading station consists of a splash pad and an underground holding tank. The holding tank is piped to the wet well of the pump station with a valve in between to control the flow from the holding tank to the wet well. The tank also has an overflow pipe that is connected to the wet well. Vactor trucks will unload at the splash pad, where the water drains into the holding tank and the solid debris is contained in the splash pad to dry. Once the solids are dried, operation staff dispose of the debris in dumpsters to be hauled away to the landfill.

B. Evaluation

Several deficiencies have been identified while evaluating the septage receiving facility and interviewing operation staff and septic haulers.

1. Building

The septage receiving station is classified as a Class 1, Division 1, Class D hazardous space under the National Electrical Code (NEC). The current electrical and equipment in the space does not meet the standards required for a Class 1, Division 1 space. In addition, the walls are lined with particle board inside the pole barn structure. Under this classification, materials of construction of the space cannot be flammable.

The existing piping in the building appears to have been installed with miscellaneous pipes and fittings that were on site. This could cause operational issues in the future. Finally, there is not an active ventilation system in the building and ventilation occurs only when the garage door is open. This could cause hazardous gasses to build up creating a hazardous environment and degradation of the equipment.

2. Rock Trap

Interviews with operation staff revealed that they have to empty the rock trap at a minimum of once per day. Often times the trap has to be cleaned twice a day. When the rock trap gets full, it allows for bigger debris to pass through and get caught in the comminutor. To empty the trap, the operators have to pull a knife gate valve to allow the rocks to fall into a perforated screening basket. The perforated screen allows for water that is caught in the trap to drain out into a sump located in the building. Smaller debris can get through the screen causing the drain line to clog. In addition, when closing the knife gate, small debris can get clogged in the seating ring

preventing the valve from closing properly. When this happens, the operators have to remove the valve from the system to clean out the seating ring. This causes delays for septic haulers, as the station has to be shutdown during the cleaning process.

3. Comminutor

Interviews with operation staff and septic haulers revealed the comminutor has reliability issues and often trips out when first starting up. There is no alarm linked to the plant to alert staff that the comminutor is not working. The Township relies on the septic haulers to alert them when the comminutor is in fault. Most of the time, the fault can be cleared by resetting the comminutor at its control panel, but often it takes two or three resets to get the system to operate properly. After a few times resetting the comminutor, staff have to shut down the station and clean out the comminutor of large debris or rags. This causes delays for the septic haulers as they have to find an operation staff member to clear the alarm and wait for them to clean the comminutor if needed. In the summer of 2021, operation staff replaced the comminutor, however the issues continued. Currently, plant staff clean the comminutor at least once a week to remove large debris.

4. Vector Truck Unloading Station

Issues have also been identified with the vector truck unloading station. The splash pad is undersized and often the wastewater overflows into a secondary containment area on top of the concrete holding tank. The splash pad is difficult to clean and fills with solids after a single vector unloads. It is unknown if the valve between the holding tank and the wet well is operational nor the position of the valve. Finally, the condition of the holding tank is unknown.

5. Pump Station

The pump station contains one pump that is controlled by floats when the system is in automatic mode. Interviews with operation staff revealed that the floats get covered with debris, which prevents them from functioning properly. The pump station is not tied to the plant SCADA, but does have an alarm strobe and horn that notifies operators when issues occur. Due to this, operators have to rely on septic haulers to let them know if an alarm is active at the station. To prevent pump clogging and debris build up on the floats, the station gets cleaned by-monthly. Cleaning of the station is done by contracting a vector truck company to suck out and spay down the wet well. Operation staff remove and clean the floats while the vector truck operators are cleaning the wet well.

6. Sampling

The current facility does not have a way to sample the septage stream that the haulers are unloading. Sampling is necessary to ensure that the haulers are not bring in industrial waste to the plant and to protect the plant from excess loadings or toxic shock.

7. Septic Hauler Issues

Interviews with the septic haulers revealed that they have issue offloading septage in the winter months. The local control/billing station the haulers use to operate the system is not in a heated room, which can affect the receipts from printing properly. The floor of the truck bay frequently gets covered in a thick sheet of ice and presents a slip hazard for the haulers. The truck bay does have a drain to remove excess water, but that does not fully prevent the bay from freezing. The hose that hauler use to clean the bay when they are finished unloading often freezes in the winter. The plant has installed a self-winding garden hose reel to keep the hose inside the building as much as possible to prevent the freezing, but freezing still occurs.

In addition to the problems in the winter, interviews with septic haulers revealed that they often have to wait in line to unload their truck, they have issues with their swipe card not working on the local control/billing station,

and they would like the unloading times to be faster. The septic receiving station also does not have a bathroom nearby for the haulers to use.

III. ANALYSIS OF ALTERNATIVES

A. Identification and Evaluation of Potential Alternatives

Alternatives to accomplish needed improvements to the Township's Septage Receiving Facility 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:

- Ensure reliable septage receiving service to the customers.
- Rehabilitate/repair high priority areas of existing septage receiving infrastructure.
- Provide facilities capable of providing consistent compliance with regulatory and permit requirements.
- Improve traffic flow through the plant.
- Minimize financial burden to the customers.
- Minimize environmental impact during construction of the improvements project.

The following alternatives were evaluated:

- a. Alternative 1 – No Action
- b. Alternative 2 – Regional Alternative: Send Septage Haulers to Another Facility
- c. Alternative 3 – Optimize Existing Facilities Operation
- d. Alternative 4 – Upgrade Existing Septage Receiving Facility

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

Alternatives 1, 2 and 3 were briefly analyzed, however, these alternatives were determined to be not feasible for the Township because they did not meet the project objectives. Alternative 4 was determined to be the principal alternative for detailed evaluation.

Financial analysis of the principal alternatives followed a net 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 net present worth of the project.

1. Alternative 1 – No Action

Alternative 1 includes no improvements to the Septage Receiving Facility. The existing system would remain in service.

There is a cost associated with Alternative 1 although it is difficult to quantify. The undersized rock trap will continue to allow heavy objects to reach the comminutor causing extra cleaning and repair of the comminutor. Eventually the comminutor will fail beyond repair, resulting in the need for an expensive emergency replacement, shut down of the station, or similar challenging situations.

The vacor unloading station remains undersized and the potential of a sanitary sewer overflow persists.

There would continue to be only one pump in the wet well. The lack of a redundant pump would result in continued station shutdowns for pump maintenance and lost revenue.

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

2. Alternative 2 – Regional Alternative: Send Septage Haulers to Another Facility

Alternative 2 was developed to reroute the septic haulers to another Septage Receiving Facility. The Septage Receiving Station would be decommissioned, and the building could be used for additional storage for the WWTP.

While this option would eliminate the need to improve and operate the existing facility, regulations prevent this from happening. Jackson County Ordinance No. 10 – Septage Waste Disposal Ordinance states that any septage collected in Jackson County has to be disposed of at Leoni Township's Septage Receiving Facility or other public septage waste disposal facility located in Jackson County. Currently, there are no other public septage waste disposal facilities in Jackson County. Due to this, no further analysis is presented on Alternative 2.

3. Alternative 3 – Optimize Existing Facilities Operation

Alternative 3 includes upsizing the rock trap and improving the controls of the station. This alternative also includes installing a tempered water supply for the haulers to use for cleanup.

Upsizing the rock trap would allow for a greater volume of heavy objects to be removed from the system before the trap has to be emptied, decreasing the frequency of emptying the trap and protecting the downstream equipment. However, upsizing the rock trap will increase difficulty of maintenance for the system. With more volume being emptied into the basket, it will be harder for operators to remove the basket and dispose of the debris, resulting in possible injury or damage to equipment.

Improving the controls of the station will add reliability to the station. Installing a level transducer to the wet well would allow for the system to run off the transducer and not rely only on the floats. In addition, all the controls of the septage receiving facility would be brought back to the plant SCADA, so the facility could be remotely monitored and the Township would not have to rely on the haulers to let them know of any mechanical issues or alarms.

The existing building and electrical for the station do not meet NEC code and presents a potential hazard to the WWTP. To remedy this issue, the station would have to be shut down for an extended period of time to upgrade the building and electrical to meet code. Due to this, Alternative 3 does not meet the primary project objective and will not be evaluated further as a principal alternative.

4. Alternative 4 – Upgrade Existing Septage Receiving Facility

Alternative 4 was developed to upgrade the existing septic receiving facility. This alternative includes constructing a new septic receiving station north of the main plant, a new pump station and a new drying bed to allow vector trucks to unload at the WWTP.

The new septic receiving station consists of a new building designed to current design code and two covered drive through truck bays to allow multiple haulers to unload at the same time. The receiving room in the building will house two independent receiving process lines that will each have a rock trap, comminutor, flowmeter, automatic plug valve, pH and conductivity probe, and screen with an automated auger to convey the screenings to a dumpster. Card readers will be installed to active the process equipment and track flow for billing purposes. The truck bays will have heated floors to prevent ice from building up in the winter and a tempered water line for cleaning purposes. In addition, they will have large drains that flow to the pump station, so water does not build up in the truck bays.

A new duplex pump station will be installed to pump the septage into the WWTP. The station will be controlled by a level transducer and float control as backup. Two all-weather samplers will be installed at the pump station, one dedicated to each process line. The pump station would pump septage into the influent force main before the influent flow meter, allowing the septage to be properly metered.

All controls for the septic receiving station and the pump station will be tied into the plant SCADA system. This will allow the plant to monitor each process line, pump station, and alarms.

A new vector dump pad will be constructed at the existing vector truck unloading station. The existing pump station will be utilized to pump the wastewater collected by the underdrains upstream of influent flow meter.

B. Analysis of Principal Alternatives

Only one feasible principal alternative was developed that met the project objectives, identified as Alternative 4. This alternative is analyzed further and is summarized in the following sections.

1. 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 principle 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, used to compare the principal alternative, 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 was established by EGLE at 0.5% for current SRF Projects.

The salvage value is calculated at the end of 20 years where portions of the project structures or equipment may have a salvage value, which is determined by using a straight-line depreciation. The present worth of the 20-year salvage value is then computed using the discount rate of 0.5%. The MDEQ guidance document establishes the estimated life for the project structures and equipment to assess salvage values at 20-year planning period. In general, concrete structures, earthwork basins, and piping have a useful life of 30-50 years and equipment has a useful life of 10-20 years.

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

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

Table 1 shows the costs of principal Alternative 4.

Table 1. Alternative 4 – Net Present Worth Analysis	
	Alternative 4
Project Cost	\$3,378,000
Annual OM&R Cost	\$127,000
Net Present Worth of OM&R Cost*	\$2,411,000
Total Present Worth	\$5,789,000
Salvage Value	\$490,000
Net Present Worth	\$5,299,000

*0.5% Discount Rate

IV. RECOMMENDED ALTERNATIVE

A. Description of the Recommended Alternative

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

- Ensure reliable septage receiving service to the customers.
- Rehabilitate/repair high priority areas of existing septage receiving infrastructure.
- Provide facilities capable of providing consistent compliance with regulatory and permit requirements.
- Improve traffic flow through the plant.
- Minimize financial burden to the customers.
- Minimize environmental impact during construction of the improvements project.

Alternative 4 was reviewed for effectiveness, reliability, implementability, environmental impacts, and cost effectiveness.

Additional discussion of Recommended Alternative 4 is presented below.

1. Relevant Design Parameters

The existing septage receiving station will be abandoned. This includes the existing rock trap, comminutor, plug valve, flow meter, piping leading to the existing pump station, and all related appurtenances. The existing vector truck splash pad will be demolished and the drain line into the existing holding tank will be abandoned.

A new septic receiving building and pump station will be constructed north of the main plant. The building will house the process equipment, contain two truck bays, and two card readers. The pump station will be a duplex station to improve reliability of the system and will house the all-weather samplers.

A new vector dump pad will be constructed in place of the old vector splash pad. The underdrain system will be tied into the existing pump station, so a new station would not need to be built.

2. Project Map

The proposed layout of the recommended alternative is included in Appendix A.

3. Controlling Factors

Factors that control the design of the proposed project include:

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

4. 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). Proposed construction is limited to existing WWTP. All work will be performed in accordance with necessary permit requirements.

B. Useful Life

The Township intends to secure a 20-year SRF loan for the construction of the Recommended Alternative. The estimate life of the septic receiving equipment in the building is anticipated to be 20 years except for comminutor teeth, which have a useful life of 10 years. The estimated life of the pump station is estimated to be 10 years based on the useful life of the pumps. The drying bed is estimated to have a life of over 50 years, with the pump station having a useful life of 10 years.

The Township must budget for three pump replacements and one teeth replacement for the comminutor within the 20-year project planning period. This is included in the OM&R costs.

V. RECOMMEND NEXT STEPS

The results of the alternative analysis identify Alternative 4 as the only viable alternative, as it meets the project objectives:

- Ensure reliable septage receiving service to the customers.
- Rehabilitate/repair high priority areas of existing septage receiving infrastructure.
- Provide facilities capable of providing consistent compliance with regulatory and permit requirements.
- Improve traffic flow through the plant.
- Minimize financial burden to the customers.
- Minimize environmental impact during construction of the improvements project.

The following next steps are recommended to help make an informed decision on the final selected alternative.

1. Consult with a Municipal Financial Advisor to conduct a rate study considering the Alternative and funding options.
2. Evaluate rate impacts, funding options, and project phasing.
3. Complete EGLE SRF Project Plan.
4. Begin design of the improvements.

This study has been completed in order to evaluate alternative improvement options to meet the long-term septage receiving need of the community. A comprehensive analysis of the principal alternatives showed Alternative 4 was the only viable solution. The results of the financial analysis can be used to help select the desired course of action for proposed improvements.

APPENDIX A MAPS AND FIGURES

PREPARED FOR:





- LEGEND:**
- PIPING
 - PROPOSED STRUCTURES
 - PROPOSED PAVEMENT

LEONI TOWNSHIP
JACKSON COUNTY, MI
WWTP SEPTAGE RECEIVING STUDY
ALTERNATIVE 4 LAYOUT



F&V PROJECT NO. 853410

APPENDIX B

OPINION OF PROBABLE COSTS

PREPARED FOR:



Summary Table: Engineer's Opinion of Probable Project Costs
WWTP Alternatives Analysis

Summary of Alternatives - Net Present Worth Analysis						
Alternative	Project Cost	Annual OM&R Cost	Net Present Worth of OM&R Cost (1)	Total Present Worth	Salvage Value	Net Present Worth
WWTP Septage System Improvements						
Alternative 4 - Upgrade Existing Septage Receiving Facility	\$ 3,378,000	\$ 127,000	\$ 2,411,000	\$ 5,789,000	\$ 490,000	\$ 5,299,000

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

(1) Discount Rate

0.5%



Engineer's Opinion of Probable Project Cost ⁽¹⁾

<i>Project:</i>	Leoni Township - WWTP Septage Receiving Study	<i>Project No.:</i>	853410
<i>Basis for Estimate:</i>	[X] Conceptual [] Basis of Design [] Final	<i>Estimator:</i>	SMW
<i>Work:</i>	Alternative 4 - Upgrade Existing Septage Receiving Facility	<i>Date:</i>	Apr-2022
		<i>Current ENR-CCI:</i>	12791

Item	Description	Unit	Qty.	Unit Price	Amount
1	Lift Station	LS	1	\$361,000	\$361,000
2	Septage Receiving Building	LS	1	\$1,778,000	\$1,778,000
3	Vactor Dump Pad	LS	1	\$70,000	\$70,000
4	General Conditions and OH&P				\$331,000
				Construction Total:	\$2,540,000
5	Construction Contingency				\$254,000
6	Design Engineering				\$203,000
7	Construction Engineering				\$254,000
8	Planning, Legal, Bonding & Administration				\$127,000
				Total Project Cost:	\$3,378,000

Notes:

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

APPENDIX I

PUBLIC PARTICIPATION

PREPARED FOR:



NOTICE OF PUBLIC HEARING

Leoni Township will hold a public hearing on a proposed improvements project at the Leoni Township Wastewater Treatment Plant (WWTP). The purpose of the Public Hearing is to receive comments from interested persons.

Leoni Township is pursuing subsidized financing through the Clean Water State Revolving Fund (CWSRF) in order to make necessary improvements to the Leoni WWTP to address identified deficiencies and help ensure the continued reliability of the WWTP. The Leoni WWTP provides sewage disposal services to thirteen communities, which comprise the Leoni Regional Utility Authority (LRUA). Members of the LRUA are the Townships of Leoni, Napoleon, Columbia, Norvell, Hanover and Liberty, the Charter Townships of Blackman and Grass Lake and the Villages of Grass Lake and Brooklyn which are all located in Jackson County, as well as the Township of Cambridge, located in Lenawee County and the Townships of Sylvan and Lyndon, located in Washtenaw County. The Township is developing a Project Plan that provides a 20-year design basis for needed wastewater system improvements. The Township is pursuing low-interest financing through the CWSRF program over a 20-year period.

**The hearing will be held at 6:00 p.m. on May 10, 2022, at the following location:
Leoni Township Hall, 913 Fifth Street, Michigan Center, Michigan 49254**

Please visit the Leoni Township website at <http://www.leonitownship.com> prior to the meeting for meeting details.

Recommended improvements include the following:

- Upgrades to the Biological Treatment System
- Upgrades to the Biosolids Handling System
- Upgrades to the Septage Receiving System
- Upgrades to the Collection System
- Upgrades to electrical and control systems

Expected impacts of the proposed project include improved treatment efficiency and increased reliability of the wastewater treatment plant. Short-term construction related impacts include noise and dust during construction.

The average cost to users to finance the proposed project entirely through the CWSRF Program is estimated at \$4.75 to \$5.25 per month per Residential Equivalent Unit (REU). Actual monthly costs will vary depending on financing terms as well as individual usage and community rate structure.

The SRF Project Plan will be available for public review on April 8, 2022, at the following locations:

- Leoni Township Hall, 913 Fifth St., Michigan Center, Michigan 49254
- Online at the Leoni Township Website at <http://www.leonitownship.com>

Written comments received before the public hearing record is closed on May 10, 2022, will receive responses in the Final Project Plan. Written comments should be sent to:

Leoni Township
Attn: Cindy Norris, Township Clerk
915 Fifth Street
Michigan Center, Michigan 49254



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