VILLAGE OF THREE OAKS, MICHIGAN

WASTEWATER SYSTEM IMPROVEMENTS PROJECT

PROJECT PLAN

TO BE FUNDED BY THE CLEAN WATER STATE REVOLVING FUND

April 2023

WIGHTMAN

VILLAGE OF THREE OAKS CWSRF PROJECT PLAN

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I) INTRODUCTION

The Village of Three Oaks (Village) operates a wastewater collection and treatment system consisting of nearly 11.2 miles of gravity sewer pipe, over 220 manholes, and nearly 0.55 miles of pressurized forcemains which convey wastewater from Village customers to the Three Oaks wastewater stabilization lagoons (WWSL) for treatment. The Village wastewater system consists primarily of gravity flow pipes and manholes leading to a series of three wastewater stabilization lagoons. In addition to the pipes and manholes in the collection system, the Village relies on a series of sewage lift stations to convey the wastewater through the system. Two lift stations and associated pressurized force main pipes are located at the edges of the gravity collection system and a third lift station is located at the lagoon site.

After a series of violation notices spanning eight years, the State of Michigan Department of Environment, Great Lakes, and Energy (EGLE) issued an Administrative Consent Order (ACO) to the Village. This ACO includes a variety of requirements, a portion of which will be addressed through the implementation of the proposed Wastewater System Improvements Project.

The purpose of this study is to analyze the various alternatives available to restore the integrity of the Village wastewater system and increase system efficiency. The selected alternative will address EGLE's concerns related to the Village WWSLs and collection system, as stated in the ACO. These improvements will reduce the likelihood of infrastructure failure and damage to the environment which might occur as a result. The study includes an environmental and economic analysis to determine the most cost-effective method to restore the integrity and efficiency of the wastewater system.

II) BACKGROUND

A) STUDY AND SERVICE AREAS

The study area for this project encompasses the existing Village wastewater service area. The proposed service areas will be the same as the current service areas, as there are no proposed system expansions. A map showing the proposed study area is provided in Appendix A.

The Village wastewater system serves the businesses and residents within the Village, located in southwest Michigan in the southcentral portion of Berrien County. The Village is served by both US-12 and an Amtrak railroad which run from east to west.

The Village owns and operates a wastewater collection and treatment system which serves the entire area within the Village limits. This system collects sanitary sewage from residents and businesses and carries this waste to the Village's WWSLs located to the west of the Village in Three Oaks Township along and east of Schwark Road. After wastewater is stabilized it is discharged from the WWSLs as treated effluent. This discharge is permitted under the National Pollutant Discharge Elimination System (NPDES) General Permit for facultative lagoons as well as an individual Certificate of Coverage (MIG580294). This state permit allows the Village to discharge to Deer Creek during two periods annually in the spring and fall. It also imposes effluent limits on the Village's total discharge volume and discharge characteristics.

B) POPULATION DATA

Table I lists the population growth experienced in the Village since 1990 according to U.S. Census data, along with projected growth to the year 2042. In 2020, Three Oaks, MI had a population of 1,410 people. Village population is assumed to remain steady over the 20-year study period of this project. This estimate of 0% growth over the 20-year planning period provides a conservative extrapolation of the historical population trend. This factor will be utilized in 20-year system demand projections.

	Village of Three Oaks	
	Population	**Percent Period Change**
1990	1,811	-
2000	1,828	0.1%
2010	1,622	-1.2%
2020	1,410	-1.4%
2021	1,397	-0.9%
2028*	1,309	0%
2042*	1,146	0%

C) EXISTING ENVIRONMENTAL EVALUATION

(a) Cultural and Historic Resources

According to the National Register of Historic Places Database, there are no historic sites listed within the Village or surrounding areas served by the sanitary sewer system.

(b) Air Quality

There are no known existing air quality issues within the study area. The air quality of the project area will be temporarily impacted during construction due to the exhaust of the heavy machinery and dust from construction activities. These temporary impacts to the air quality of the project area will not persist post-construction.

(c) Wetlands

Wetlands within the study area are primarily located along Deer Creek and along drainage channels. There are also sporadic wetlands located southwest and southeast of the Village.

(d) Great Lakes Shorelands, Coastal Zones, and Coastal Management Areas

There are no great lakes shorelands, coastal zones, and coastal management areas located within the project area.

(e) Floodplains

According to the Federal Emergency Management Agency (FEMA) National Floodplain Hazard Maps, no portion of the Village collection system or lagoons are within the 100-year flood hazard area. The FEMA Flood Hazard Map is provided in Appendix B.

(f) Natural or Wild and Scenic Rivers

There are no federally designated Wild and Scenic Rivers or state designated Natural Rivers that would be affected by this project.

(g) Major Surface Waters

The only surface water included in the project area is Deer Creek. Precautions will be taken for projects located within 500 feet of Deer Creek including soil erosion and sedimentation control (SESC) best practices and permitting. The selected alternative will have no adverse effects on Deer Creek.

(h) Topography

The majority of the runoff in the study area flows to Deer Creek. All elevations throughout the project area are between 660 and 680 feet above sea level.

(i) Geology

The geology in the area is comprised of basal clayey-silt till deposits of the lower lake border morainic system. This geology does not affect the project alternatives.

(j) Soil Types

Soil information pertaining to soil classifications and locations within the project area as well as a soil map is provided in Appendix C.

(k) Agricultural Resources

There are no prime or unique farmlands located within the project area.

(l) Fauna And Flora

As required under the Endangered Species Act, Section 7 Consultation, the threatened and endangered species list for the Village was reviewed. Species listed as endangered included the Indiana Bat, Piping Plover, and Mitchell's Star Butterfly. On the list of threatened species are the Northern Long-Eared Bat, Tricolored Bat, Red Knot Calidris, Eastern Massasauga Rattlesnake, and the Pitcher's Thistle. No critical habitats are known within the project area. The threatened and endangered species list is provided in Appendix J.

Upon review of the habitats for each of these species, the determinations for these listed species include only "may affect" for the Indiana bat. However, if tree clearing is necessary to complete the project, it will be required to be completed between October 1 through March 31.

D) EXISTING SYSTEM

1) General

The Village owns and operates a wastewater collection and treatment system which serves the entire area within the Village limits. This system collects sanitary sewage from Village residents and businesses and carries this waste to the Village's WWSLs located to the west of the Village in Three Oaks Township along and east of Schwark Road.

This system consists primarily of gravity flow pipes and manholes leading to a series of three lagoon ponds (cells). Two pumping stations (lift stations) and pressurized forcemain pipes are located at the edges of the gravity collection system and a third lift station is located at the WWSLs site.

2) Wastewater Collection System

The Village operates a wastewater collection system consisting of approximately 61,000 feet of 8-inch to 15-inch gravity sewer, 221 manholes, 2 lift stations ranging from 20 to 180 gallons per minute (GPM), and 2,900 feet of pressurized force main. The collection system is split into two distinct sewer districts, separated by the Amtrak railroad which runs east-west through the center of the Village. The north trunkline sewer conveys wastewater west from Chicago Street to the Village's WWSLs within an easement traversing a farm field. The south trunkline sewer conveys wastewater west along US-12 to just past the Village limits, then north to the WWSLs. In addition to the pipes in the collection system, the Village relies on two sewage lift (pump) stations to convey the wastewater from sub-sewersheds within the system.

The Village wastewater collection system consist of the following assets:

Wastewater Collection System Assets		
Item	**Quantity**	**Units**
15-inch Gravity Sanitary Sewer	3,270	LF
12-inch Gravity Sanitary Sewer	4,743	LF
10-inch Gravity Sanitary Sewer	9,854	LF
8-inch Gravity Sanitary Sewer	41,895	LF
6-inch Force Main	2,322	LF
4-inch Force Main	578	LF
Sanitary Manholes	221	EA
Collection System Lift Stations	2	EA

The first sewers in the Village were constructed around 1932 using vitrified clay pipe with oakum mortar joints. They were originally intended to be used as storm sewers, however, due to the type of soil and high groundwater table, most of the individual septic tank systems were eventually connected to the storm system. The storm system discharged directly to surface water courses without treatment of any kind. The joints used on the original system had a tendency to shrink, allowing groundwater to enter the sewer. The vitrified clay pipe used for these sewers was susceptible to cracking if not bedded or backfilled properly. This was a historic source of infiltration for the collection system.

In 1970, a major renovation of the system was completed. An attempt was made to separate the sanitary and storm sewer systems through the construction of several new storm and sanitary sewers. A lagoon system was also constructed for wastewater treatment. In an attempt to save money, as much of the existing system as possible was utilized for sanitary sewers. Approximately 18,000 linear feet of gravity sewer and a pump station on US-12 were constructed to improve the collection system in 1970. These sewers were constructed of vitrified clay pipe with premium joints. In 1978, a collection system improvements project was undertaken with the goal of removing significant amounts of inflow and infiltration (I/I) from the system. Sections of the original 1932 sewers were replaced or repaired with chemical grout and manholes were replaced or repaired with hydraulic grout as part of the 1978 project.

In 2001, an extensive sanitary collection system improvements project was completed. The separation of the sanitary and storm sewer systems was accomplished with the construction of

nearly 40,000 feet of PVC gravity sewer, replacing the remaining portions of the original 1932 clay sewers as well as deteriorated sections constructed in 1970. A sewer extension was completed in 2004 to serve a manufacturing facility located north of the Village in Three Oaks Township, and gravity sewer and a small grinder station were constructed in 2005 to serve a housing development constructed in the southeast corner of the Village.

The Village utilizes three wastewater lift stations. A summary of these stations is below.

Lift Station No. 1 (Lagoon Station):

This station is a "can" type station which houses wastewater in a wet well and pumps in a separate underground steel structure. The station was originally designed with comminutor and bar screen bypass installed within the wet well. At some point this original equipment failed and the bar screen was replaced with a new comminutor. As recorded drawings for this station are not available. A 1979 operation and maintenance manual shows this station as an existing asset suggesting a minimum age of 44 years. intermittent replacements and upgrades have taken place during this period in order to maintain a pumping capacity of approximately 800 gpm.

Generally, Lift Station No. 1 is in poor condition. The steel structure exhibits corrosion and represents a confined space when pumps require maintenance.

Lift Station No. 2 (Highway Station):

This station is a can type station similar to Lift Station No. 1 in layout and age. Testing results show a pumping capacity of 150 gpm for pump 1 and 169 gpm for pump 2. In order to maintain a cleansing velocity in the downstream forcemain, a pumping capacity of at least 180 gpm is required.

This station is in fair condition and requires rehabilitation of its pumping and control systems.

Lift Station No. 3 (Swan Song Station):

This station was constructed in 2005 and is a more modern submersible pump lift station. Testing showed a pumping capacity of 19 gpm for pump 1 and 15 gpm for pump 2. This capacity is reasonable for the station's service area.

This station is in good condition and only requires minor upgrades to its monitoring system.

3) Wastewater Stabilization

The Village WWSLs consists of three lagoons and a series of level control structures, discharge structures, and pumping components. A listing of these assets is provided in the below table.

Wastewater Stabilization Lagoon Assets		
Item	**Quantity**	**Units**
Lagoon Cells	3	EA
Emergency Pump Building	1	EA
Lagoon Lift Station No. 1	1	EA
Comminutor	1	EA
8-inch Force Main	500	FT
8-inch Valves	3	EA
Distribution Chambers	3	EA
10” Gravity Sewer	900	FT
Wastewater Treatment System	1	EA
Water Level Control Chambers	2	EA
12” Gravity Sewer	400	FT
Effluent Structure	3	EA
Weir Manhole	3	EA
15” Gravity Sewer	700	FT
Effluent Discharge Headwall	1	EA
Storm Water Discharge Headwall	2	EA

The total available lagoon volume and surface area is 70,807,515 gallons and 35.3 acres. The Village receives an average daily wastewater flow of approximately 133,804 gpd. This provides for a retention time of 529 days. This is significantly above the 180 day minimum requirement.

Based on sampling results, Village wastewater influent concentration for BOD_5 is 403.3 mg/l on average. Given the available acreage and an average flow of 133,804 gpd, the daily loading is 450.1 lbs/day or 12.8 lb/acre/day for all three lagoons. This loading to less than the required minimum of 20 lb/acre/day.

Details regarding Lagoon sizing and capacity are provided in Appendix K.

Dry weather flows were analyzed for periods from March to May and from September to November for the years 2020, 2021, and 2022. The average gallons per capita per day (GPCD) for these periods was calculated to be 82 GPCD. This flow fails to meet EGLE's threshold of 120 GPCD for infiltration.

		Metered Wastewater Flow (MGD)	Population	GPCD
2020	**March - May**	5.431	1410	104
2021	**March - May**	8.434	1410	82
2022	**March - May**	6.054	1410	98
2020	**Sept - Nov**	6.364	1410	69
2021	**Sept - Nov**	7.347	1410	73
2022	**Sept - Nov**	6.002	1410	64
Average Dry Weather Flow:		0.115	1410	82

Wet weather flows were identified by reviewing the largest flows metered at the Village lagoons during rain events which occurred between April 1 to October 31 during the years 2020, 2021, 2023. It was found the average flow for these days is 220 GPCD. This falls below EGLE's threshold of 275 GPCD for Inflow.

		Metered Wastewater Flow (MGD)	Population	GPCD
2020	**14-May**	0.642	1410	455
2020	**3-Aug**	0.158	1410	112
2021	**25-Aug**	0.188	1410	133
2021	**25-Oct**	0.296	1410	210
2022	**3-May**	0.380	1410	270
2022	**6-May**	0.201	1410	142
Average Wet Weather Flow:				220

Finally, as shown in the previously referenced report on lagoon sizing and capacity, the Village lagoons are not hydraulicly overloaded.

E) NEED FOR PROJECT

1) Wastewater Collection System Needs

(a) Compliance and Administrative Consent Order

On March 10th, 2023, the Village entered into an Administrative Consent Order (ACO) with the State of Michigan. Regarding the Village collection system this ACO required the Village to complete an inspection and assessment report. The report documents the age, conditions, and required repair work necessary. This report is provided in Appendix L and the Village ACO is provided in Appendix E.

(b) Water Quality Problems

The Village's collection system is in fair to good condition. Much of the system was replaced in 2001 with a few sections of the original system constructed in the the 1970s. The required repair work identified during the Village's inspections are as follows:

- Lift Station No. 1 (Highway Station): This station was found to be in good condition with regards to structural components such as the wet well. However, pumps, electrical, and controls were found to be in fair or poor condition and need replacement. Draw down testing showed a pumping rate of 150 gpm for pump 1 and 169 gpm for pump 2. The design capacity for this station is 180 gpm in order to maintain cleansing velocity in the downstream 6 inch forcemain.

- Lift Station No. 2 (Swan Song Station): The swan song station is in good condition but lacks a robust monitoring system for both flow and alarms. The addition of a monitoring system is required at this location.

- Featherbone Avenue Spot Repair: A short section of PVC sanitary sewer along Featherbone Avenue, south of West Beech Street, has been partially collapsed. This section of sewer was constructed in 2001 and is in good condition except for an approximately 5 foot long section of pipe which has partially collapsed and requires repair.

2) Wastewater Stabilization Lagoon Needs

(a) Compliance and Administrative Consent Order

The ACO addresses the Village lagoons and requires several items including lagoon sludge removal, lagoon bank erosion repairs, lagoon inspections and assessment report, and completion of any required improvements.

(b) Water Quality Problems

The wastewater treatment lagoons are in fair condition overall but require several improvements in order to restore asset conditions and improve reliability and efficiency. These improvements are as follows:

- Lagoon Lift Station Replacement: The lagoon lift station requires replacement in order to restore its condition, mitigate confined space concerns, and allow for a more accessible layout of the station components. Currently the comminutor which is housed in the wet well is not readily accessible. Pumps, valves and metering equipment is located within an underground structure.

- Lagoon Bank Restoration: The south and west banks of each lagoon have eroded and require repair. Rip rap armoring is also required in order to prevent future erosion from reoccurring.

- Sludge Removal from Cell No. 1: Sludge judging was completed on cell no. 1 of the lagoons and a significant buildup of biosolids was found in the southeast corner of the pond. This sludge must be removed, and full capacity of the lagoons restored.

- Miscellaneous Structure Rehabilitation: The following structures were found to be in poor condition and require rehabilitation: Metering equipment, cell no. 3 discharge structure, cell no. 3 10" valves, cell no. 3 outfall improvements, cell no. 1 distribution chamber, restoration of the existing gravel drives along cells no. 1 and no. 2, and sewer overflow pipe removal.

- Deer Creek Discharge Pipes: The lagoons discharge to Deer Creek which flows between cells no. 1 and no. 2. Several storm sewer pipes discharge to this creek as well. These discharge points show severe erosion and require full replacement of headwalls. In addition, the banks of Deer Creek are exhibiting erosion at other locations which should be stabilized.

- Emergency Pump Building Repairs: The existing building which houses the emergency backup pump is in need of repairs to its roof as well as its entry door. The existing roof, soffit and paint are showing signs of failure. If not restored, the structure will likely leak water onto the emergency backup pump as well as the controls for the lagoon lift station.

F) PROJECTED FUTURE NEEDS

Based on the population projections listed in II.B, the existing wastewater collection system is not expected to require expansion within a planning period of 20 years. Future needs will be limited to maintaining the existing system assets. As sanitary assets continues to age, additional rehabilitation and replacement will likely be required on those items not being replaced as part of work proposed in this project plan.

III) ANALYSIS OF ALTERNATIVES

A) IDENTIFICATION OF POTENTIAL ALTERNATIVES

1) No Action

The No Action alternative would mean none of the proposed wastewater system improvements would be constructed. Assets in the collection system and at the WWSL will continue to age and ultimately fail, resulting in costly emergency repairs and likely SSOs. The current ACO requirements would also not be met.

2) Optimum Performance of Existing Facilities

Optimum performance of the existing facilities would mean all of the project needs identified in Section II.G would be addressed. The assets located at the lagoons would be rehabilitated or replaced and collection system improvements would take place. The system's optimum performance can be met by implementing the following improvements:

Lift Station No. 1 (Highway Station): This lift station would have pumps and controls replaced in order to increase pumping capacity and reliability. A monitoring system like those manufactured by Mission Communications would also be installed.

Lift Station No. 2 (Swan Song Station): This lift station would be retrofitted with a monitoring system like those manufactured by Mission Communications.

Featherbone Avenue Spot Repair: A 5 foot section of existing sewer along Featherbone Avenue would be excavated and repaired in order to correct the partially collapsed pipe at this location.

Lagoon Lift Station Replacement: The lagoon lift station would be replaced and converted into a modern submersible pump lift station. The existing lagoon wet well would be modified and reused to house the proposed pumps. The existing comminutor would be replaced with an inline unit housed within a new structure.

Lagoon Bank Restoration: The south and west banks of each lagoon will be restored with 2 feet of compacted clay. Rip rap armoring will be installed on the restored banks to prevent future erosion.

Sludge Removal from Cell No. 1: Sludge would be removed from the southeast corner of cell no. 1 of the lagoons.

Miscellaneous Structure Rehabilitation: Metering equipment would be replaced. Cell no. 3 discharge structure and cell no. 1 distribution chamber would receive concrete repairs and grouting of joints. An emergency sewer overflow pipe will be completely removed, Three (3) 10 inch valves on the discharge pipes from cell no. 3 would be replaced. the outfall location for cell no. 3 will be improved to provide safe access for the collection of samples.

Deer Creek Discharge Pipes: Two storm sewer discharge pipes and associated headwalls will be replaced. The banks of Deer Creek will receive some removal of excessive vegetation at the storm sewer discharge locations and restoration at those locations as well several other eroded areas would be completed.

Emergency Pump Building Repairs: This item would replace the roof on the existing emergency pump building, repair rot in the soffit, replaced the existing entry door, and apply paint to the building exterior.

By making the above improvements the Village would restore the existing lagoon system to proper working order. Below is a summary of the costs required to implement this alternative. Detailed costs can be found in Appendix F.

Alternative 2 - Optimum Performance of Existing Facilities

Description	**Amount**
Collection System Improvements:	*$ 100,000*
Lagoon Lift Station Replacement:	*$ 485,600*
Lagoon Bank Restoration:	*$ 728,000*
Sludge Removal from Cell No. 1:	*$ 95,000*
Miscellaneous Structure Rehabilitation:	*$ 109,000*
Deer Creek Discharge Pipes:	*$ 75,000*
Emergency Pump and Storage Building:	*$ 31,500*
SUBTOTAL ESTIMATED CONSTRUCTION COST	***$ 1,624,100***
Construction Contingencies (10%)	$ 163,141
Assistance with ACO Requirements	$ 196,759
CWSRF Funding Application	$ 40,000
Design Engineering (8%)	$ 130,000
Construction Engineering (9%)	$ 147,000
Bond Counsel, Local Counsel, Rate Consultant (3%)	$ 49,000
Administrative Costs (0.5%)	$ 9,000
TOTAL ESTIMATED PROJECT COST	***$ 2,359,000***

3) Regionalization

The regional alternative considered for the Village is to transport wastewater from the lagoon site and discharge it to the Galine River Sanitary Sewer Authority (GRSD) collection and treatment system. This distance is approximately 4-miles and would require an increase in pumping pressure at the lagoon lift station. Collection system improvements would still be required for this alternative. GRSD was contacted and wastewater treatment rates as well as GRSD WWTP improvement requirements were provided.

Below is a summary of the costs required to implement this alternative. Detailed costs can be found in Appendix F.

Alternative 3 - Regionalization

Description		Amount
Lagoon Decommissioning	*$*	*1,775,500*
Equalization Tank	*$*	*315,000*
Lift Station Upgrades	*$*	*130,000*
Transmission Forcemain	*$*	*1,729,024*
GRSD Improvements	*$*	*5,360,000*
SUBTOTAL ESTIMATED CONSTRUCTION COST	***$***	***9,309,524***
Construction Contingencies (10%)	$	931,317
Assistance with ACO Requirements	$	196,759
CWSRF Funding Application	$	40,000
Design Engineering (8%)	$	745,000
Construction Engineering (9%)	$	838,000
Bond Counsel, Local Counsel, Rate Consultant (3%)	$	280,000
Administrative Costs (0.5%)	$	47,000
TOTAL ESTIMATED PROJECT COST		***$ 12,387,600***

B) ANALYSIS OF PRINCIPAL ALTERNATIVES

The “No Action” alternative does not meet the project needs, including compliance with the Village’s ACO. This alternative will not be addressed further in this project plan.

The Village’s system is not part of an existing regional utility. The “regional alternative” would address the project needs and will be considered in the following sections.

1) Monetary Evaluation

The complete monetary evaluation of the principal alternatives is included in Appendix G. The evaluation includes estimated project costs; Operation, Maintenance and Replacement (O, M, & R) cost estimates; an estimate of the salvage value; a present worth analysis; and a user cost analysis.

The assumptions used to calculate the salvage value are shown in Appendix G and are in accordance with SRF requirements for project plan preparation.

The total present worth is the sum of the total estimated project cost, and the present worth value of the O, M, & R costs, less the present worth of the salvage value. The below table provides a summary of the present worth analysis of the Optimum Performance of Existing Facilities alternative and the Regionalization alternative.

Present Worth Analysis

Alternative:	Optimum Performance of Existing Facilities	Regionalization
Capital Costs	$1,624,100	$9,309,524
Plus Present Worth of O&M	$2,108,921	$2,108,921
Plus Present Worth of Cap. Rep.	$747,560	$1,082,054
Less Present Worth of Salvage Value	$1,191,007	$6,826,984
Total Present Worth Value	**$3,289,574**	**$5,673,514**

The monetary evaluation in Appendix G also includes an analysis of utility rates which will be used to repay the loan for the improvements included in the principal alternatives. A summary of the required cost increases is shown in the below table.

Summary of Customer Rates

		Optimum Performance of Existing Facilities		***Regionalization***	
100% Loan 20-year term at I = 1.875%	Existing Rate	Proposed Rate	Rate Increase	Proposed Rate	Rate Increase
Ready to Serve Charge:					
5/8" to 1"	$ 37.00	$ 37.00	0%	$ 62.90	70%
1" to 2"	$ 37.00	$ 37.00	0%	$ 62.90	70%
2"	$ 42.50	$ 42.50	0%	$ 72.25	70%
3"	$ 45.00	$ 45.00	0%	$ 76.50	70%
Sewer Usage Rate (per 1,000 gal.):					
First 1,000 gal.	$ -	$ -	0%	$ -	0%
1,001 - 3,000 gal.	$ 6.00	$ 6.00	0%	$ 10.20	70%
3,001 - 6,000 gal.	$ 7.50	$ 7.50	0%	$ 12.75	70%
6,001 gal. +	$ 8.50	$ 8.50	0%	$ 14.45	70%

2) Environmental Evaluation

The following is an evaluation of the effects each alternative will have on the specific environmental issue.

(a) Cultural and Historic Resources

According to the National Register of Historic Places Database, there are no historic sites listed within the project influence areas for either of the principal alternatives.

(b) Air Quality

The principal alternatives being considered will temporarily adversely impact air quality in the project area during construction due to the exhaust of the heavy machinery. These impacts to the air quality of the project area will not persist post-construction.

The regionalization alternative will likely have a greater impact due to the extended length of the project area.

(c) Wetlands

The Optimum Performance of Existing Facilities alternative will not impact wetlands. The only portion of this project located within wetland areas would be the regionalization alternative which requires crossing the south branch of the Galien River. The crossing would be completed via directional drilling.

(d) Floodplains

Only the Regionalization alternative is within the 100 year flood plain according to FEMA National Floodplain Hazard Maps. Regardless, this alternative would not include filling of land and would therefore not have an impact of floodplains. All appropriate permitting would be obtained for the selected alternative.

(e) Major Surface Waters

The Optimum Performance of Existing Facilities alternative would involve improvements adjacent to Deer Creek. The Regionalization alternative will be both adjacent to Deer Creek and below the Galien River. Best management practices will be utilized to prevent any impacts to surface waters due to runoff.

(f) Topography

Neither alternative will have an impact on the existing site topography.

(g) Geology

Neither alternative will have an impact on the existing site Geology.

(h) Soil Types

Neither alternative will have an impact on the existing site soil types.

(i) Fauna And Flora

Both alternatives would include tree removals. The Regionalization alternative would involve significantly more tree removals in order to install a new transmission forcemain. All tree removals, for either alternative, will be required to be completed between October 1 through March 31.

(j) Effects On Groundwater

Both alternatives will have a negligible impact on the groundwater. Installation of new transmission forcemain by open cut, as part of the Regionalization alternative, would have the largest adverse impact on the groundwater due to required dewatering during construction. Dewatering will be temporary and appropriately permitted.

The Regionalization alternative would require significantly more dewatering due to the length of a new forcemain.

(k) Noise Level

The principal alternatives being considered would produce a low level of noise pollution in the project areas during construction from the use of heavy machinery. When the improvements are complete, noise in the project area will return to current levels.

The regionalization alternative would have a greater impact due to the extended work area while the Optimum Performance of Existing Facilities alternative work would be located primarily at the existing WWSLs.

(l) Noticeability

During construction, the public will notice temporary obstructions due to traffic control, storage of materials prior to installation, and construction equipment. However, following completion of the proposed improvements, the majority of the work will be shielded from the public's view as it is underground. There will be no major noticeable changes within the service area.

(m) Construction Effects

The principal alternatives would have temporary adverse impacts on the environment during construction through loss of vegetation, storm water runoff, erosion, noise, and air pollution. Improvements constructed via the open-cut method will have the largest impact due to the impact of an open utility trench. All improvements proposed for construction within wetland areas or across rivers will be installed via horizontal directional drilling or other such methods which significantly reduce the impact to the environment. Additionally, SESC best practices must be implemented to prevent erosion and protect the water of the state from construction sediment. Proper disposal of old equipment and any other site material to be removed will be required. The regionalization alternative would have a more significant impact due to the length of the project area.

IV) SELECTED ALTERNATIVE

A) DESCRIPTION OF SELECTED ALTERNATIVE

The selected alternative for this project is the Optimum Performance of Existing Facilities. The proposed improvements include wastewater collection system improvements and WWSL improvements. Implementation of the improvements from each of these parts would address all of the project needs identified previously in this project plan. Improvement locations are shown in the project location map in Appendix A.

1) Wastewater Collection System Improvements

Improvements to the Village collection system will restore aging assets which have reached the end of their useful life as well as correct a localized pipe defect. Making these improvements will extend the useful life of the existing Highway Lift Station and increase the reliability of the Swan Song Lift Station.

2) Wastewater Stabilization Lagoon Improvements

WWSL improvements will all occur at the WWSL lagoon site. Improvements include replacement of the lagoon lift station, restoration of the south and west banks of all three lagoon cells, removal of sludge from the south east corner of cell 1, rehabilitation of several lagoon structures, restoration of gravel access roads along cells 1 and 2, replacement of storm water discharge pipes along Deer Creek, and replacement of the emergency pump building roof. The proposed improvements will increase treatment reliability and efficiency. Reduced energy use for treatment will result from new pumping and electrical equipment. Any adverse impacts these improvements will introduce will be temporary including noise and exhaust fumes from construction vehicles. Completion of these improvements will ensure wastewater is adequately treated before discharge into the Deer Creek.

B) DESIGN PARAMETERS

1) Wastewater Collection System Improvements

Highway Lift Station Rehabilitation:

This work will include replacement of the existing lift station pumps and controls. Pumps will be sized in order to restore a cleansing velocity in the downstream 6 inch forcemain. Controls will include a monitoring system common to all three of the Village owned lift stations.

Swan Song Lift Station Improvements:

This lift station will be retrofitted with a monitoring system common to all three of the Village owned lift stations.

Featherbone Avenue Spot Repair:

This work will replace a 5 foot section of PVC pipe which has partially collapsed.

2) Wastewater Stabilization Lagoon Improvements

Lagoon improvements will address the items identified during a 2023 facility assessment. These improvements include the following:

Lagoon Lift Station Replacement: The lagoon lift station will be replaced and converted into a modern submersible pump lift station. The existing lagoon wet well will be modified and reused to house the proposed pumps. The existing comminutor will be replaced with an inline unit housed within a new structure. Miscellaneous piping and valve replacements will take place in order to connect to the existing forcemain.

Lagoon Bank Restoration: The south and west banks of each lagoon will be restored with 2 feet of compacted clay. Rip rap armoring will be installed, along with the appropriate geotextiles, on the restored banks to prevent future erosion.

Sludge Removal from Cell No. 1: Sludge would be removed from the southeast corner of cell no. 1 of the lagoons. A triangular area approximately 5,000 SFT in size shows sludge buildup.

Miscellaneous Structure Rehabilitation: Metering equipment will be replaced. Cell no. 3 discharge structure and cell no. 1 distribution chamber will receive concrete repairs and grouting of joints. An emergency sewer overflow pipe will be completely removed, Three (3) 10 inch valves on the discharge pipes from cell no. 3 will be replaced. the outfall location for cell no. 3 will be improved to provide safe access for the collection of samples.

Deer Creek Discharge Pipes: Two storm sewer discharge pipes and associated headwalls will be replaced. The banks of Deer Creek will receive some removal of excessive vegetation at the storm sewer discharge locations and restoration at those locations as well several other eroded areas would be completed.

Emergency Pump Building Repairs: Replacement of the roof on the existing emergency pump building, repair of rot in soffit, replacement of the existing entry door, and the painting of the building exterior.

C) USEFUL LIFE

This project includes a variety of components of varying useful life estimates. A weighted average useful life calculation was completed and is provided in Appendix G. This weighted average is 40.4 years.

D) PROJECT MAPS

The routing of the existing sanitary sewer system, including pipe sizes, lift station and WWTP locations, and manholes, is included in Appendix A.

E) WATER AND ENERGY EFFICIENCY

The proposed project will replace a variety of aging and inefficient electrical and pumping equipment. New equipment will consume less power and will be more efficient. The proposed project will maximize, to the extent possible, the efficiency of water and power use.

F) SCHEDULE FOR DESIGN AND CONSTRUCTION

The schedule for this project plan through the end of construction is as follows:

Public Hearing	04/27/2023
Plan Adoption	04/27/2023
Submittal of Final Project Plan	05/01/2023
Begin Design	11/15/2023
Submittal of Final Plans & Specifications	05/27/2024
EGLE Approval of Plans & Specifications	07/06/2024
Obtain all Construction Permits	07/01/2024
Advertise for Bids	07/06/2024
Open Bids	08/08/2024
Tentative Contract Award	08/17/2024
Close SRF Loan	08/29/2024
Begin Construction	10/28/2024
End Construction	11/10/2025

G) COST SUMMARY

A detailed cost estimate for the selected alternative is included in Appendix F. A summary of this cost estimate is provided below.

Summary of Project Costs

Construction Costs:		
Total Estimated Construction Cost =	***$***	***1,624,100***
Project Costs:		
Construction Contingency (10% +/-)	$	163,141
Assistance with ACO Requirements	$	196,759
CWSRF Funding Application	$	40,000
Design Engineering (8%)	$	130,000
Construction Engineering (9%)	$	147,000
Bond Counsel, Local Counsel, Rate Consultant (3%)	$	49,000
Administrative Costs (0.5%)	$	9,000
Total Estimated Project Cost =	***$***	***2,359,000***

1) USER COSTS

An analysis of the user rates required for the Optimum Performance of Existing Facilities alternative without loan forgiveness is shown at the end of Appendix G.

For the selected alternative, there is no expected change in operation, maintenance, and replacement costs over the current operating budget. However, the Village has not had a certified operator on staff for several years. This cost is accounted for by adding an additional $65,000 to the three year annual average O&M costs.

An increase in rates will not be required because the Village recently, FY2022, retired a similarly sized CWSRF debt. There will be no other costs to the customers as everyone is already connected. The rate estimate has been calculated based upon CWSRF funding at 1.875% for 20 years without loan forgiveness (grant). The below table lists the existing rate for each customer category.

Existing Rate Structure

100% Loan, 20-year term at I = 1.875%	Existing Rate	
Ready to Serve Charge:		
5/8" to 1"	$	37.00
1" to 2"	$	37.00
2"	$	42.50
3"	$	45.00
Sewer Usage Rate (per 1,000 gal.):		
First 1,000 gal.	$	-
1,001 - 3,000 gal.	$	6.00
3,001 - 6,000 gal.	$	7.50
6,001 gal. +	$	8.50

Based on the rates in the previous table and an average monthly usage of 5,000 gallons per month, the average residential customer will see a monthly sewer bill of $56.50.

2) IMPLEMENTABILITY

The Village of Thee Oaks will own, operate, and finance the proposed wastewater system improvements. The existing ordinances provide the necessary authority to implement the selected alternative and make changes to the rate structure, if required, to repay financing associated with the proposed improvements.

V) ENVIRONMENTAL AND PUBLIC HEALTH IMPACTS

A) DIRECT IMPACTS

1) Construction Impacts

The areas which will be impacted by the construction of the selected alternative will include existing lift station sites, one sanitary sewer pipe located within the existing right-of-way of Featherbone Avenue, and the WWSL site located on Village owned land. These areas have been previously disturbed through the construction of the existing assets to be replaced/rehabilitated.

Adverse environmental impacts are limited to short term construction impacts such as temporary noise, dust, and traffic disruption. Sediment loss to the Deer Creek during construction will be limited by implementing standard best management practices for the various construction activities involved in the project. All necessary construction permits will be obtained and all rules and regulations pertaining to these construction activities will be followed.

For open cut improvements the trench width will be approximately 10 feet wide and will be limited to the greatest extent possible. Localized dewatering will likely be required in some locations. Dewatering depths will be limited to the depth required for installation of proposed sewer pipe repair.

The principle beneficial effects of the project on the environment include reducing the possibility of catastrophic infrastructure failures and utilization of new, more efficient, pumps.

2) Operational Impacts

The existing WWSLs will remain in operation during the construction of the proposed project. Facility discharges will remain within the current effluent limitations.

3) Social Impacts

The primary social impact of the proposed improvements will be debt service costs. EGLE grants (principal forgiveness) would be the primary method of reducing user costs. No significant or long-term disturbances to traffic are anticipated.

B) INDIRECT IMPACTS

The short-term impacts of this project are all related to construction activities and include tracking of mud and dust on public streets, potential soil erosion into Deer Creek, and noise and exhaust produced by construction equipment.

No interceptors or capacity expansions are planned as part of this project; therefore, no new residential or commercial development is anticipated due to this project. Changes in development, land use, air quality, water quality, secondary growth are not anticipated. No Indirect Impacts are anticipated.

Because proposed improvements are similar in nature, capacity, and location to the existing facility, there are no long-term adverse impacts associated with this alternative. The proposed improvements will be in-place replacements or immediately adjacent to existing infrastructure, requiring no additional land commitment. All long-term impacts are positive.

This project does not involve the irreversible commitment of any natural resource, nor will any irretrievable resources be used as a part of the project. The project will not negatively impact the future use of the land and water resources in the project area.

C) CUMULATIVE IMPACTS

No other construction projects are anticipated to be constructed concurrently with this project. Cumulative impacts are not anticipated as part of this project.

VI) MITIGATION

A) MITIGATION OF SHORT-TERM IMPACTS

Short term mitigation of construction-related impacts includes following best management practices for dewatering, sedimentation and erosion control, traffic, noise, and dust control. These practices include but are not limited to discharging dewatering water overland or to the storm sewer, using silt fence when disturbing ground within 500 feet of waters of the state, implementing adequate signage for detour routes, operating construction vehicles within approved working times such at 7:30 am to 5:30 pm when working within the Village limits, and wetting disturbed ground to keep dust to a minimum.

Operation of heavy equipment and the disposal of soils in wetlands or floodplains will be prohibited. Tree removals will be completed only during the appropriate time of year.

B) MITIGATION OF LONG-TERM IMPACTS

There will be no long-term impacts to the project area, and therefore no long-term mitigation will be required.

C) MITIGATION OF INDIRECT IMPACTS

There will be no indirect impact to the project area due to the proposed improvements, and therefore no mitigation will be required.

VII) PUBLIC PARTICIPATION

A) PUBLIC MEETING

Advertisement of the formal public meeting was published in the Village of Three Oaks website, social media outlets, and announced during a public council meeting on April 12, 2023. This advertisement also notified residents that a copy of the draft project plan was available at Village Hall.

A formal public meeting was held April 27, 2023, at Village Hall. There were no questions or comments submitted prior to the public hearing. A summary of the meeting is provided in Appendix H.

B) ADOPTION OF THE PROJECT PLANNING DOCUMENT

The Village held a special meeting on April 27, 2023, (immediately after the public meeting) to formally adopt the project plan and approve the recommended alternative. The formal resolution is provided in Appendix I.

APPENDIX A
PROJECT STUDY AREA AND IMPROVEMENT LOCATIONS MAP

WIGHTMAN
it's all about people

210330

VILLAGE OF THREE OAKS

SANITARY SEWER ASSET MANAGEMENT PLAN

SEWER SYSTEM MAP BY DIAMETER

4/12/2023

APPENDIX B
NATIONAL FLOODPLAIN HAZARD MAPS

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' National Geodetic Vertical Datum of 1929 (NGVD29). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Michigan State Plane South zone 6401 (FIPSZONE 2113). The **horizontal datum** was NAD83. Differences in datum, spheroid, projection or state plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the National Geodetic Vertical Datum of 1929. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was provided in digital format by Berrien County Planning and GIS Mapping. This information was photogrammetrically compiled at a scale of 1:24000 feet from aerial photography dated Spring 1996.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on this map.

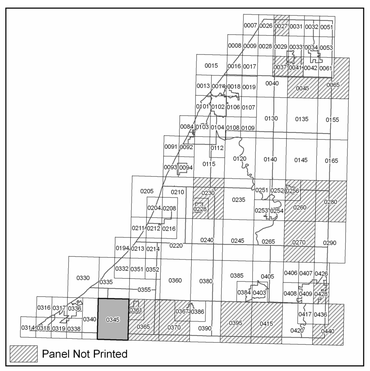
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

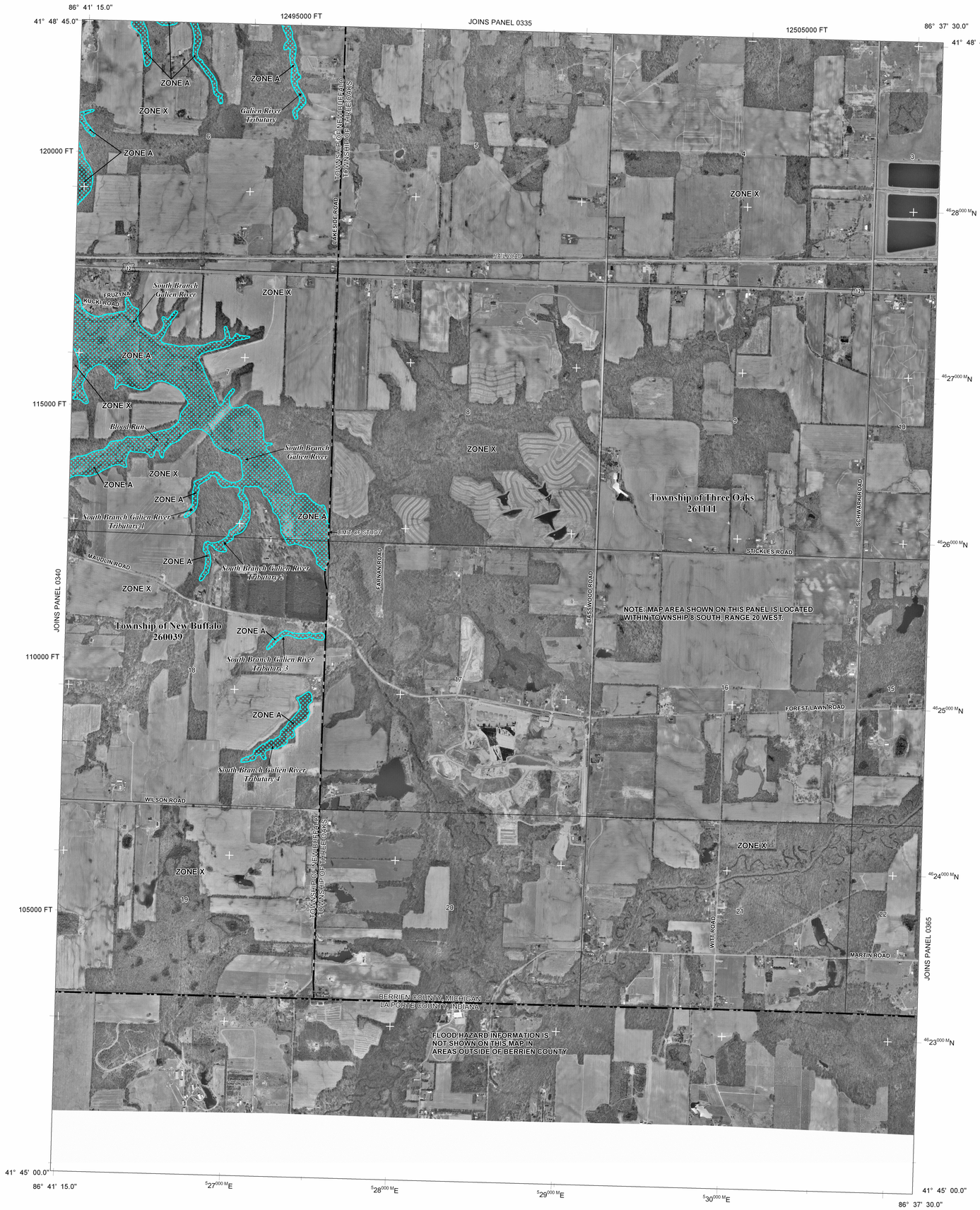
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.

PANEL INDEX





LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100 year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard may include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside of the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COSTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway Boundary
- Zone D Boundary
- CBRS and OPA boundary
- Boundary Dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 10) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the National Geodetic Vertical Datum of 1929

- A — A — Cross section line
- 23 — 23 — Transect line
- -85° 03' 45.0" , 41° 24' 22.5" — Geographic coordinates referenced to the North American Datum of 1983 (NAD83)
- 4587000 M — 1000-meter Universal Transverse Mercator grid values, zone 16
- 2250000 FT — 5000-foot grid ticks: Michigan State Plane South Coordinate System, 6401 zone (FIPSZONE 2113) Lambert Conformal Conic
- KA0015 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
APRIL 17, 2006

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800- 638-6620.

MAP SCALE 1 " = 1000 '

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0345C

FIRM
FLOOD INSURANCE RATE MAP

BERRIEN COUNTY, MICHIGAN
(ALL JURISDICTIONS)

PANEL 345 OF 440
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

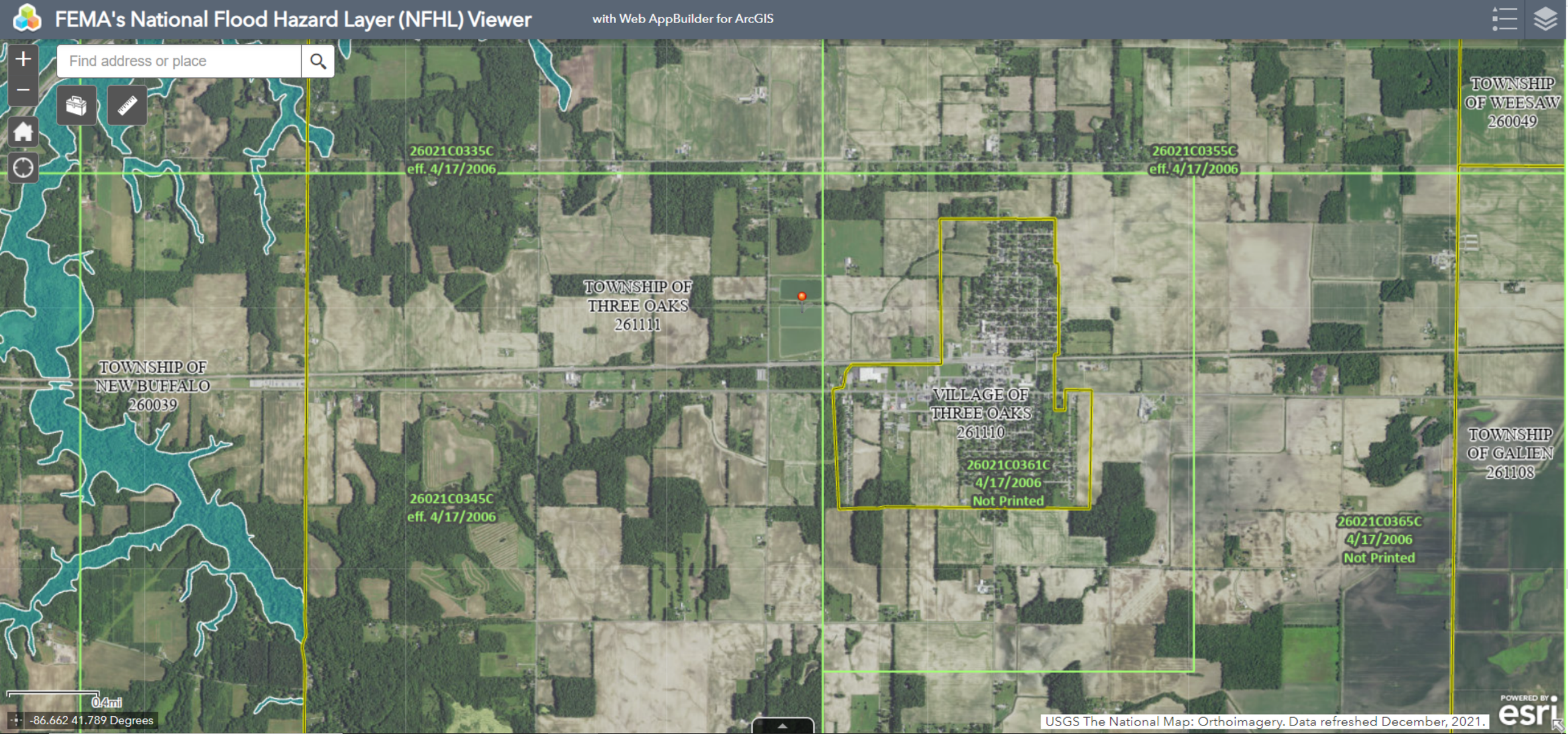
COMMUNITY	NUMBER	PANEL	SUFFIX
NEW BUFFALO, TOWNSHIP OF	260039	0345	C
THREE OAKS, TOWNSHIP OF	261111	0345	C

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
26021C0345C

EFFECTIVE DATE
APRIL 17, 2006

Federal Emergency Management Agency


FEMA's National Flood Hazard Layer (NFHL) Viewer
with Web AppBuilder for ArcGIS
Find address or place
26021C0335C
eff. 4/17/2006
26021C0355C
eff. 4/17/2006
TOWNSHIP OF WEESAW
260049
TOWNSHIP OF THREE OAKS
261111
TOWNSHIP OF NEW BUFFALO
260039
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26021C0365C
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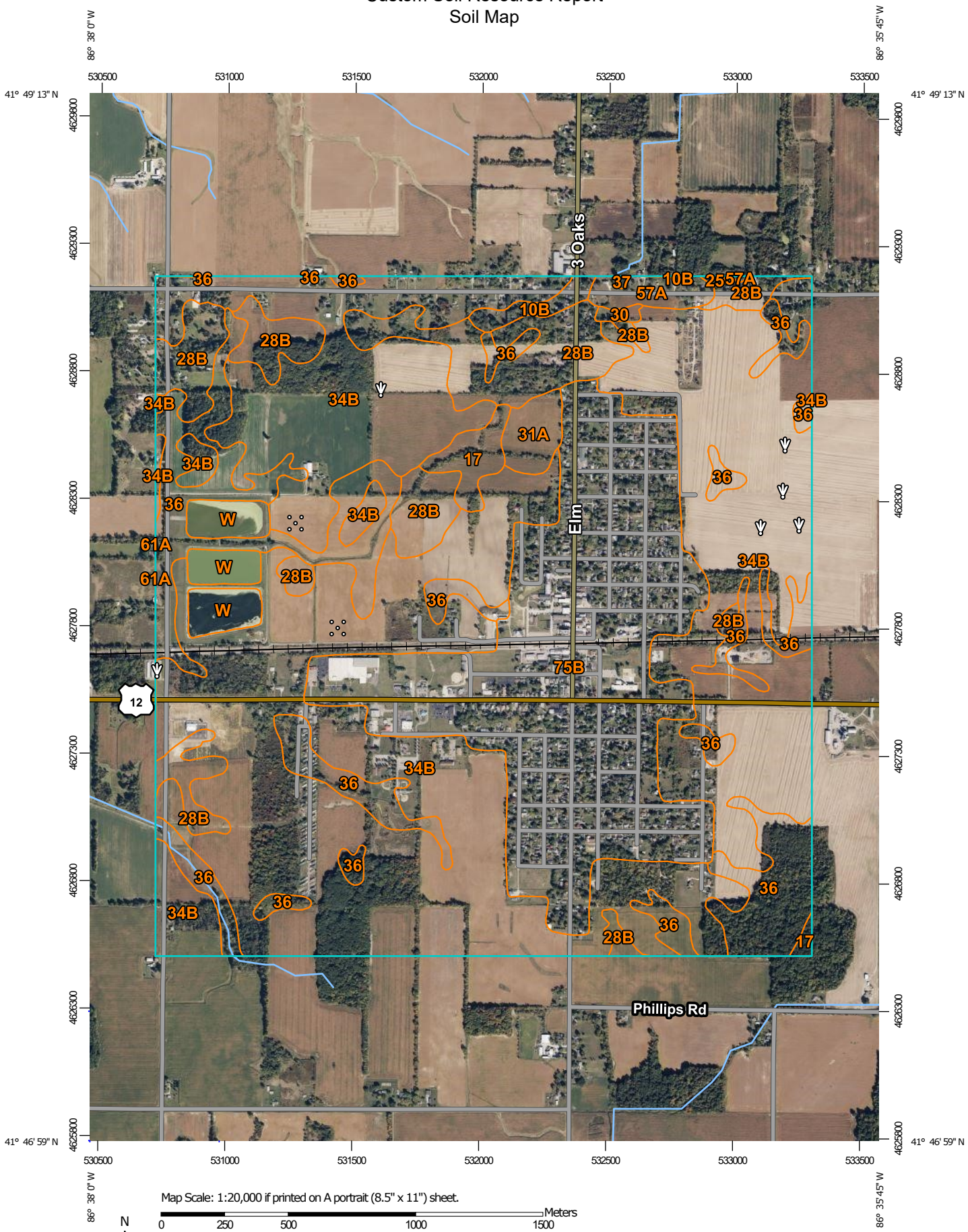
USGS The National Map: Orthoimagery. Data refreshed December, 2021.
POWERED BY esri

APPENDIX C
SOIL RESOURCE REPORT AND MAP

Custom Soil Resource Report
Soil Map



Map Scale: 1:20,000 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 250 500 1000 1500

Feet: 0 500 1000 2000 3000

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

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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: Berrien County, Michigan
Survey Area Data: Version 17, Aug 25, 2022

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

Date(s) aerial images were photographed: Oct 4, 2022—Oct 28, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10B	Oakville fine sand, 0 to 6 percent slopes	9.1	0.5%
17	Rensselaer silt loam	17.3	1.0%
25	Lenawee silty clay loam	0.7	0.0%
28B	Rimer loamy fine sand, 0 to 4 percent slopes	140.0	8.2%
30	Belleville loamy fine sand	2.4	0.1%
31A	Kibbie loam, 0 to 3 percent slopes	14.9	0.9%
34B	Blount loam, 0 to 4 percent slopes	915.3	53.5%
36	Pewamo silt loam	203.2	11.9%
37	Granby loamy fine sand, lake plain, 0 to 2 percent slopes	0.5	0.0%
57A	Thetford loamy sand, 0 to 2 percent slopes	13.7	0.8%
61A	Whitaker loam, 0 to 2 percent slopes	0.0	0.0%
75B	Rimer-Urban land complex, 0 to 4 percent slopes	360.1	21.1%
W	Water	33.1	1.9%
Totals for Area of Interest		**1,710.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called

noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can

be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Berrien County, Michigan

10B—Oakville fine sand, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 67pd
Elevation: 600 to 1,200 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Oakville and similar soils: 79 percent
Minor components: 21 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oakville

Setting

Landform: Outwash plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy outwash

Typical profile

H1 - 0 to 3 inches: fine sand
H2 - 3 to 27 inches: fine sand
H3 - 27 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: A
Ecological site: F097XB033IN - Chicago Dry Sandy Lake Plain
Hydric soil rating: No

Minor Components

Morocco

Percent of map unit: 7 percent
Ecological site: F097XA006MI - Moist Acidic Sandy Flatwoods
Hydric soil rating: No

Pipestone

Percent of map unit: 7 percent
Ecological site: F097XA006MI - Moist Acidic Sandy Flatwoods
Hydric soil rating: No

Thetford

Percent of map unit: 7 percent
Ecological site: F097XB035IN - Chicago Moist Sandy Swale
Hydric soil rating: No

17—Rensselaer silt loam

Map Unit Setting

National map unit symbol: 67q1
Elevation: 360 to 1,200 feet
Mean annual precipitation: 32 to 36 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Rensselaer and similar soils: 88 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rensselaer

Setting

Landform: Till plains, depressions
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

H1 - 0 to 10 inches: silt loam
H2 - 10 to 35 inches: silt loam
H3 - 35 to 47 inches: loam
H4 - 47 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent

Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F097XA023MI - Wet Loamy Depression
Hydric soil rating: Yes

Minor Components

Crosier

Percent of map unit: 6 percent
Ecological site: F097XA022MI - Moist Loamy Drift Plains
Hydric soil rating: No

Selfridge

Percent of map unit: 6 percent
Ecological site: F097XA012MI - Moist Sandy Depression
Hydric soil rating: No

25—Lenawee silty clay loam

Map Unit Setting

National map unit symbol: 67q7
Elevation: 580 to 1,530 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Lenawee and similar soils: 84 percent
Minor components: 16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lenawee

Setting

Landform: Lake plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty and clayey lacustrine deposits

Typical profile

H1 - 0 to 8 inches: silty clay loam
H2 - 8 to 26 inches: silty clay
H3 - 26 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 25 percent
Available water supply, 0 to 60 inches: High (about 11.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F097XA023MI - Wet Loamy Depression
Hydric soil rating: Yes

Minor Components

Kibbie

Percent of map unit: 6 percent
Ecological site: F097XA022MI - Moist Loamy Drift Plains
Hydric soil rating: No

Blount

Percent of map unit: 6 percent
Ecological site: F097XA022MI - Moist Loamy Drift Plains
Hydric soil rating: No

Belleville

Percent of map unit: 4 percent
Landform: Depressions
Ecological site: F097XA008MI - Wet Sandy Flatwoods
Hydric soil rating: Yes

28B—Rimer loamy fine sand, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 67qc
Elevation: 590 to 800 feet
Mean annual precipitation: 32 to 36 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Rimer and similar soils: 72 percent

Minor components: 28 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rimer

Setting

Landform: Till plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glaciolacustrine deposits over loamy till

Typical profile

H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 32 inches: loamy fine sand
H3 - 32 to 60 inches: clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F097XA012MI - Moist Sandy Depression
Hydric soil rating: No

Minor Components

Belleville

Percent of map unit: 7 percent
Landform: Depressions
Ecological site: F097XA008MI - Wet Sandy Flatwoods
Hydric soil rating: Yes

Tustin

Percent of map unit: 7 percent
Ecological site: F097XA004MI - Dry Sandy Lake Plain
Hydric soil rating: No

Morocco

Percent of map unit: 7 percent
Ecological site: F097XA006MI - Moist Acidic Sandy Flatwoods
Hydric soil rating: No

Blount

Percent of map unit: 7 percent
Ecological site: F097XA022MI - Moist Loamy Drift Plains
Hydric soil rating: No

30—Belleville loamy fine sand

Map Unit Setting

National map unit symbol: 67qg
Elevation: 600 to 1,200 feet
Mean annual precipitation: 32 to 36 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Belleville and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Belleville

Setting

Landform: Depressions, lake plains
Landform position (three-dimensional): Rise, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits over loamy till

Typical profile

H1 - 0 to 10 inches: loamy fine sand
H2 - 10 to 30 inches: sand
H3 - 30 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F097XA008MI - Wet Sandy Flatwoods
Hydric soil rating: Yes

Minor Components

Rimer

Percent of map unit: 10 percent
Ecological site: F097XA012MI - Moist Sandy Depression
Hydric soil rating: No

Selfridge

Percent of map unit: 10 percent
Ecological site: F097XA012MI - Moist Sandy Depression
Hydric soil rating: No

31A—Kibbie loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 67qh
Elevation: 360 to 1,200 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Kibbie and similar soils: 79 percent
Minor components: 21 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kibbie

Setting

Landform: Lake plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy glaciofluvial deposits and/or silty glaciolacustrine deposits

Typical profile

H1 - 0 to 9 inches: loam
H2 - 9 to 32 inches: silty clay loam
H3 - 32 to 60 inches: stratified fine sand to silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F097XA022MI - Moist Loamy Drift Plains
Hydric soil rating: No

Minor Components

Pella

Percent of map unit: 7 percent
Landform: Depressions
Ecological site: F097XA023MI - Wet Loamy Depression
Hydric soil rating: Yes

Rensselaer

Percent of map unit: 7 percent
Landform: Depressions
Ecological site: F097XA023MI - Wet Loamy Depression
Hydric soil rating: Yes

Thetford

Percent of map unit: 7 percent
Ecological site: F097XA012MI - Moist Sandy Depression
Hydric soil rating: No

34B—Blount loam, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 67qm
Elevation: 580 to 1,530 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Blount and similar soils: 78 percent
Minor components: 22 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blount

Setting

Landform: Till plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Loamy till

Typical profile

H1 - 0 to 9 inches: loam
H2 - 9 to 18 inches: silty clay loam
H3 - 18 to 34 inches: clay
H4 - 34 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 4 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.57 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F097XA022MI - Moist Loamy Drift Plains
Hydric soil rating: No

Minor Components

Pewamo

Percent of map unit: 8 percent
Landform: Depressions
Ecological site: F097XA023MI - Wet Loamy Depression
Hydric soil rating: Yes

Lenawee

Percent of map unit: 8 percent
Landform: Depressions
Ecological site: F097XA023MI - Wet Loamy Depression
Hydric soil rating: Yes

Rimer

Percent of map unit: 6 percent
Ecological site: F097XA012MI - Moist Sandy Depression
Hydric soil rating: No

36—Pewamo silt loam

Map Unit Setting

National map unit symbol: 67qp

Elevation: 580 to 1,530 feet
Mean annual precipitation: 32 to 36 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Pewamo and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pewamo

Setting

Landform: Depressions, lake plains
Landform position (three-dimensional): Talf, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy lacustrine deposits

Typical profile

H1 - 0 to 15 inches: silt loam
H2 - 15 to 42 inches: silty clay loam
H3 - 42 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Ecological site: F097XA023MI - Wet Loamy Depression
Hydric soil rating: Yes

Minor Components

Kibbie

Percent of map unit: 7 percent
Ecological site: F097XA022MI - Moist Loamy Drift Plains
Hydric soil rating: No

Blount

Percent of map unit: 7 percent
Ecological site: F097XA022MI - Moist Loamy Drift Plains
Hydric soil rating: No

Belleville

Percent of map unit: 4 percent
Landform: Depressions
Ecological site: F097XA008MI - Wet Sandy Flatwoods
Hydric soil rating: Yes

37—Granby loamy fine sand, lake plain, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2w5my
Elevation: 580 to 720 feet
Mean annual precipitation: 34 to 41 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 170 to 230 days
Farmland classification: Not prime farmland

Map Unit Composition

Granby, lake plain, and similar soils: 94 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Granby, Lake Plain

Setting

Landform: Depressions on nearshore zones (relict), depressions on outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, talf
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Sandy glaciolacustrine deposits

Typical profile

Ap - 0 to 11 inches: loamy fine sand
Bg - 11 to 34 inches: fine sand
Cg - 34 to 80 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (1.42 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 1.0

Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D
Ecological site: F097XA008MI - Wet Sandy Flatwoods
Hydric soil rating: Yes

Minor Components

Thetford

Percent of map unit: 3 percent
Landform: Outwash plains, nearshore zones (relict)
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, rise
Down-slope shape: Concave, linear
Across-slope shape: Linear
Ecological site: F097XA012MI - Moist Sandy Depression
Hydric soil rating: No

Morocco

Percent of map unit: 3 percent
Landform: Nearshore zones (relict), outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F097XA006MI - Moist Acidic Sandy Flatwoods
Other vegetative classification: Trees/Timber (Woody Vegetation)
Hydric soil rating: No

57A—Thetford loamy sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 67r2
Elevation: 600 to 1,200 feet
Mean annual precipitation: 30 to 36 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 140 to 150 days
Farmland classification: Farmland of local importance

Map Unit Composition

Thetford and similar soils: 73 percent
Minor components: 27 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Thetford

Setting

Landform: Outwash plains

Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy outwash

Typical profile

H1 - 0 to 10 inches: loamy sand
H2 - 10 to 31 inches: fine sand
H3 - 31 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: F097XA012MI - Moist Sandy Depression
Hydric soil rating: No

Minor Components

Oakville

Percent of map unit: 7 percent
Ecological site: F097XA004MI - Dry Sandy Lake Plain
Hydric soil rating: No

Plainfield

Percent of map unit: 7 percent
Ecological site: F097XA004MI - Dry Sandy Lake Plain
Hydric soil rating: No

Spinks

Percent of map unit: 7 percent
Ecological site: F097XA004MI - Dry Sandy Lake Plain
Hydric soil rating: No

Granby

Percent of map unit: 6 percent
Landform: Depressions
Ecological site: F097XA008MI - Wet Sandy Flatwoods
Hydric soil rating: Yes

61A—Whitaker loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 67r5
Elevation: 360 to 1,300 feet
Mean annual precipitation: 32 to 36 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Whitaker and similar soils: 79 percent
Minor components: 21 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Whitaker

Setting

Landform: Lake plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Stratified silty and/or loamy lacustrine deposits

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 38 inches: silty clay loam
H3 - 38 to 60 inches: stratified sand to silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Ecological site: F097XA022MI - Moist Loamy Drift Plains
Hydric soil rating: No

Minor Components

Pella

Percent of map unit: 8 percent
Landform: Depressions
Ecological site: F097XA023MI - Wet Loamy Depression
Hydric soil rating: Yes

Poy

Percent of map unit: 8 percent
Landform: Depressions
Ecological site: F097XA027MI - Wet Floodplain
Hydric soil rating: Yes

Martinsville

Percent of map unit: 5 percent
Ecological site: F097XA018MI - Dry Loamy Drift Plains
Hydric soil rating: No

75B—Rimer-Urban land complex, 0 to 4 percent slopes

Map Unit Setting

National map unit symbol: 67rm
Elevation: 590 to 710 feet
Mean annual precipitation: 32 to 36 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Rimer and similar soils: 65 percent
Urban land: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rimer

Setting

Landform: Till plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy glaciolacustrine deposits over loamy till

Typical profile

H1 - 0 to 9 inches: loamy fine sand
H2 - 9 to 32 inches: loamy fine sand
H3 - 32 to 60 inches: clay

Properties and qualities

Slope: 0 to 4 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: F097XA012MI - Moist Sandy Depression
Hydric soil rating: No

Minor Components

Tustin

Percent of map unit: 3 percent
Ecological site: F097XA004MI - Dry Sandy Lake Plain
Hydric soil rating: No

Glynwood

Percent of map unit: 3 percent
Ecological site: F097XA022MI - Moist Loamy Drift Plains
Hydric soil rating: No

Pewamo

Percent of map unit: 2 percent
Landform: Depressions
Ecological site: F097XA023MI - Wet Loamy Depression
Hydric soil rating: Yes

Belleville

Percent of map unit: 2 percent
Landform: Depressions
Ecological site: F097XA008MI - Wet Sandy Flatwoods
Hydric soil rating: Yes

W—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

APPENDIX D
CERTIFICATE OF COVERAGE

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
WATER RESOURCES DIVISION
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
Authorized by Michigan Act 451, Public Acts of 1994, as amended, Part 31

CERTIFICATE OF COVERAGE (COC)

Under General Permit No. MIG580000
Wastewater Stabilization Lagoon General Permit

COC NO.:	MIG580294
DESIGNATED NAME:	Three Oaks WWSL
PERMITTEE:	Village of Three Oaks
MAILING ADDRESS:	14 East Maple PO Box 335 Three Oaks, Michigan 49128

This COC authorizes the permittee to discharge treated sanitary wastewater from the Village of Three Oaks Wastewater Stabilization Lagoon facility located on Schwark Road, Three Oaks, Michigan 49128. Consistent with the criteria and requirements established in General Permit No. MIG580000, the permittee is authorized to discharge 115.9 MGY of treated sanitary wastewater from Monitoring Point 001A through Outfall 001. Outfall 001 discharges to Deer Creek, in the NW1/4, SW1/4, Section 3, Town 8 S, Range 20 W, Berrien County.

All sections of the General Permit are applicable to this facility **except** the following: Part I.A.3. – Groundwater Monitoring for Lagoon Exfiltration/Leakage; Part I.A.4. – Additional Final Effluent Limitation for Total Phosphorus; Part I.A.14. – Industrial Waste (for non POTWs such as mobile home parks, campgrounds, nursing homes and marinas); and Part I.A.10 – Residuals Management Program for Land Application of Biosolids: APPROVED RMPs.

Prior to any land application of bulk biosolids, the permittee shall have a Residuals Management Program (RMP) approved by the Department in accordance with Part I.A.9. of the General Permit. RMP-related submittals other than annual reports shall be sent to the Kalamazoo District Supervisor of the Water Resources Division. The Kalamazoo District Office is located at 7953 Adobe Road, Kalamazoo, Michigan 49009-5025 Telephone: 269-567-3500, Fax: 269-567-9440.

RMP annual reports shall be sent to the Biosolids Program, Water Resources Division, Department of Environmental Quality, P.O. Box 30458, Lansing, MI 48909-7958.

References in the general permit to the Department shall be defined as the Kalamazoo District Supervisor of the Water Resources Division. The Kalamazoo District Office is located at 7953 Adobe Road, Kalamazoo, Michigan 49009-5026, telephone: 269-567-3500, fax: 269-567-9440.

Any person who is aggrieved by this COC 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.

The issuance of this COC does not 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 (Department) permits, or approvals from other units of government as may be required by law.

This COC is based on a complete application received by the Department on July 14, 2014. The permittee is subject to all conditions specified in General Permit No. MIG580000 issued January 29, 2014, and **modified (minor)** on October 2, 2014, expiring April 1, 2019. This COC may be modified, terminated, reissued, or revoked as allowed for in General Permit No. MIG580000. On its effective date, this COC shall supersede COC No. MIG580294, issued November 13, 2008, which is hereby revoked.

This COC takes effect on the date of issuance.

November 7, 2014
Date Issued

Original Permit Signed by Tiffany Myers
Tiffany J. Myers, Chief
Lakes Michigan and Superior Permits Unit
Permits Section
Water Resources Division

EQP 4677 (10/97)

APPENDIX E
ADMINISTRATIVE CONSENT ORDER

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

In the matter of:

ACO-05238
Date Entered: 2023-03-10 16:12:47 UTC

Village of Three Oaks
21 North Elm Street
Three Oaks, Michigan 49128
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ADMINISTRATIVE CONSENT ORDER

This document results from allegations by the Department of Environment, Great Lakes, and Energy (EGLE), Water Resources Division (WRD). EGLE alleges the Village of Three Oaks (Village), with Wastewater Stabilization Lagoons (WWSLs) located on Schwark Road in Three Oaks, Berrien County, Michigan 49128, is in violation of Part 31, Water Resources Protection, and Part 41, Sewerage Systems, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCLs 324.3101 and 324.4101 *et seq.*, and their associated administrative rules. In addition, EGLE alleges the Village has violated National Pollution Discharge Elimination System (NPDES) Certificate of Coverage (COC), No. MIG580294 (Permit), issued to the Village by EGLE with an effective date of November 7, 2014. The Village is a person, as defined by Section 301 of the NREPA, MCL 324.301. The Village and EGLE agree to resolve the violations set forth herein through entry of this Administrative Consent Order (Consent Order).

I. STIPULATIONS

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.

The Village and EGLE stipulate as follows:

1.1 The NREPA, MCL 324.101 *et seq.*, is an act that controls pollution to protect the environment and natural resources in the state.

1.2 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.

1.3 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.

1.4 EGLE is authorized by Sections 3106 and 3112(4) of Part 31, MCLs 324.3106 and 324.3112(4), and Section 4111 of Part 41, MCL 324.4111, 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).

1.5 The Village 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 4111 of Part 41. The Village 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.

1.6 The Village and EGLE agree that the signing of this Consent Order is for settlement purposes only and does not constitute an admission by the Village that the law has been violated.

1.7 The signatory to this Consent Order certifies that they are fully authorized by the Village to enter into the terms and conditions of this Consent Order and to execute and legally bind the Village to this document. The Village 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 Parts 31 and 41 by fulfilling the terms of Section III of this Consent Order.

1.8 As used in this Consent Order, the terms "days," "months," and "years" mean "calendar days," "calendar months," and "calendar years," respectively, unless expressly provided otherwise herein.

II. FINDINGS

2.1 The Village is authorized through COC No. MIG580294 under the WWSL Effluent General Permit No. MIG5800000 (collectively, the NPDES Permit), to discharge treated sanitary wastewater from the WWSLs to Deer Creek, in accordance with the terms and conditions of the NPDES Permit. The COC was issued and took effect November 7, 2014, and is currently extended past its original expiration date of April 1, 2019.

2.2 The Village's WWSLs receive domestic and nondomestic wastewater from users in the Village. In 2015, the Village started accepting nondomestic wastewater from an identifiable Significant Industrial User (SIU).

2.3 On May 28, 2015, the WRD issued the Village Violation Notice (VN), No. VN-006057, citing violations found during an inspection on May 13, 2015. The inspection was a response to odor complaints. During the inspection, the WRD requested, and the Village provided, composite samples to determine the cause of the odors. The results of the composite samples indicated the WWSLs were receiving approximately five (5) times the amount of Biochemical Oxygen Demand (BOD) loading they were designed to treat. In the VN, EGLE cited the following violations identified during the inspection:

a. Part I.A.3.b.5. of the NPDES Permit, that requires the occurrence of offensive odors to be minimized.

b. Rule 55 of the Sewerage Systems rules promulgated pursuant to Part 41, Mich. Admin. Code, R 299.2955 (Rule 55), requires that sewerage systems be operated and maintained at all times as efficiently as possible and in a manner that will minimize upsets and discharges of excessive pollutants.

c. Part I.A.13. of the NPDES Permit, that states that the permittee does not receive the discharge of any type or quantity of substance that may cause interference with the operation of the treatment works; therefore, the permittee is not required to develop an Industrial Pretreatment Program in accordance with Section 307 of the Clean Water Act, 33 USC 1317 (Section 307). The NPDES Permit requires the permittee to comply with Section 307 upon accepting any such discharge for

treatment. The permittee is also required to notify the WRD within 30 days if any user discharges or proposes to discharge such wastes to the permittee for treatment.

EGLE requested the Village provide both a short-term and long-term solution to the violations cited in the VN, including a schedule to return to compliance with Parts 31 and 41, and the NPDES Permit by June 26, 2015.

2.4 In a letter submitted to the WRD, dated June 26, 2015, the Village provided a response to the VN stating its understanding that the SIU would cease discharging to the Village's wastewater collection system. The schedule provided in the response letter did not meet the due dates requested in the VN.

2.5 On August 17, 2015, the Village submitted to the WRD a long-term plan for wastewater treatment as requested in the VN. The Village also confirmed they would no longer accept wastewater from the SIU once the SIU completed a planned expansion.

2.6 In a January 8, 2016, electronic correspondence from the Village to the WRD, the Village confirmed that wastewater from the SIU was no longer being accepted at the Village's WWSLs as of November 18, 2015.

2.7 The WRD received a Pollution Emergency Alerting System call reporting a release from the SIU on October 13, 2016. WRD staff inspected the site of the complaint on October 16, 2016, and identified an unauthorized discharge of wastewater to the ground from a pipe that stretched from the SIU's facility to a Village sanitary manhole that was propped open.

2.8 On November 7, 2016, the WRD issued the Village Second Violation Notice (SVN), No. SVN-000586, citing continuing violations of Parts 31 and 41, and the NPDES Permit. New violations were also identified that included:

a. Monthly effluent limitation exceedance for Total Suspended Solids (TSS) during December 2015.

b. Monthly effluent limitation exceedance for BOD during May 2016, in violation of the NPDES Permit.

2.9 On March 5, 2018, the WRD issued the Village SVN-00724 citing continuing violations of Parts 31 and 41, and the NPDES Permit. SVN-00724 stated that the submittal of the Village's plan to address nondomestic wastewater at the WWSLs, requested in SVN-000586, was not received by the WRD. New violations of Part 41 and/or the NPDES Permit were also identified that included:

a. Sample results since SVN-000586 was issued indicate that the organic loading to the WWSL exceeds the design capacity of the system, and the WRD requested the removal of sludge from the WWSLs.

b. The discharge monitoring reports submitted by the Village have missing data and/or are reporting incorrect seven-day (7-day) and monthly averages and geometric means.

c. Daily maximum and monthly average effluent limitation exceedances for TSS during November 2017.

2.10 On July 24, 2018, the WRD issued the Village an Enforcement Notice identifying that EGLE intended to resolve the Village's violations through an escalated enforcement action.

2.11 On February 12, 2020, the WRD issued the Village VN-010308 citing continuing violations of Parts 31 and 41, and the NPDES Permit. There were new violations also identified that included:

a. Failure to maintain lagoons and monitoring equipment.

b. Failure to conduct effective inspections.

c. Illegal discharge of wastewater to the ground.

d. Exceedances of effluent limits in daily monitoring reports.

2.12 On April 10, 2020, the WRD issued the Village VN-010455 identifying that a failure to conduct adequate sampling as required by its approved Residuals Management Program for a Class B biosolids facility utilizing lagoon stabilization *(an Alternative 1 process)* for pathogen reduction.

III. COMPLIANCE PROGRAM

IT IS THEREFORE AGREED AND ORDERED THAT the Village shall take the following actions to comply with and prevent further violations of Parts 31 and 41, and the NPDES Permit:

NPDES PERMIT REQUIREMENTS AND OPERATIONAL MONITORING

3.1 The Village shall comply with its NPDES Permit and any subsequently issued permits.

3.2 The Village shall have the waste treatment facilities under direct supervision of an operator certified at the appropriate level for the facility by EGLE as required by Section 3110 of Part 31 and Section 4104 of Part 41.

3.3 Starting June 30 2023, and quarterly thereafter, the Village shall submit to EGLE via its MiEnviro Portal account, for review and approval, all inspections logs from the previous quarter. The logs shall include any corrective actions taken to address any identified concerns.

3.4 The Village shall ensure that the facility contact is accurate, and the Village shall notify EGLE in writing within ten (10) days after any replacement of the facility contact (including the name, address, and telephone number of the new facility contact).

3.5 The Village shall submit accurate and timely discharge monitoring reports in accordance with the NPDES Permit.

3.6 Not later than 30 (thirty) days after the effective date of this Consent Order, the Village shall submit to EGLE via its MiEnviro Portal account, for review and approval, a report listing the actions taken thus far, to revise and amend the current Sewer Use Ordinance (Three Oaks, Michigan, Code of Ordinance, Title V: Public Works, Chapter 51: Sewers, Ordinance 75, adopted November 14, 1979) to maximize the Village's authority to protect

the Village's sewers and WWSLs, ensure compliance with the Village's NPDES permit, issue and require compliance with SIU discharge permits, require SIUs to pretreat discharges to meet applicable discharge limits, expand the Village's enforcement authority, require SIUs to install dedicated sampling and control manholes on their premises, and to otherwise respond to any problems that might arise with respect to SIU discharges to the sewer system, consistent with all applicable local, state, and federal laws and regulations.

3.7 Not later than 30 (thirty) days after the effective date of this Consent Order, the Village shall submit to EGLE via its MiEnviro Portal account, for review and approval, a sampling plan that includes sampling dates to conduct sampling in July or August 2022, to determine loadings and sources within the Village's WWSLs service area. Upon approval of the sampling plan the Village shall implement the sampling plan.

3.8 Not later than 60 (sixty) days after completing the sampling described in Paragraph 3.7 of this Consent Order, the Village shall submit to EGLE via its MiEnviro Portal account, for review and approval, a report that shall include: the sampling results, a determination of required wastewater treatment capacity, availability, and future plans; a list of all users that were evaluated to determine if the user is a significant industrial use; and the method used to determine if a user was a significant industrial user.

3.9 Not later than 45 (forty-five) days after the effective date of this Consent Order, the Village shall complete a thorough inspection of all structural items in its WWSLs to include but not limited to such as weirs, monitoring equipment, inlet piping, outlet piping, and transfer piping.

3.10 Not later than 45 (forty-five) days after the completion of the inspection described in Paragraph 3.9 of this Consent Order, the Village shall submit to EGLE via its MiEnviro Portal account, for review and approval, a report of the findings. At a minimum, this report shall include:

a. Identification of all structural items and their location.

b. Method used to evaluate integrity and functionality of structural items.

c. Current status of each structural item (e.g., operational, in need of repair, non-operational, missing) including any identified deficiencies.

After evaluation of the report, if EGLE determines there are any deficiencies within the report, then EGLE shall notify the Village in writing. The Village shall correct all report deficiencies within 30 (thirty) days after the written notification from EGLE.

3.11 Not later than 45 (forty-five) days after the approval of the report described in Paragraph 3.10 of this Consent Order, the Village shall submit to EGLE via its MiEnviro Portal account, for review and approval, a work plan identifying the timeline for the repair or replacement of all structural items identified in Paragraph 3.10 of this Consent Order that are missing, deficient, or in need of repair. After evaluation of the plan, if EGLE determines deficiencies within the plan, EGLE shall inform the Village in writing. The Village shall correct all plan deficiencies within 30 (thirty) days after the written notification from EGLE. Upon approval by EGLE, the Village shall implement the plan.

3.12 Not later than 30 (thirty) days after the effective date of this Consent Order, the Village shall submit to EGLE via its MiEnviro Portal account, for review and approval, a proposed procedure for long term sampling, monitoring, and enforcement of its Sewer Use Ordinance. Upon approval by EGLE, the Village shall implement the procedure.

3.13 By January 31st of each year, for a period of five (5) full years after the effective dates of this Consent Order, the Village shall submit to EGLE via its MiEnviro Portal account, for review and approval, an annual report of all new connections, name, business type, and connection date, within the last year with expected daily hydraulic and organic loadings.

3.14 Not later than four (4) months after the effective date of this Consent Order, the Village shall adopt its new revised Sewer Use Ordinance, amended as provided by Paragraph 3.6 of this Consent Order.

3.15 Not later than four (4) months after the effective date of this Consent Order, no nondomestic users that are SIUs (or that otherwise have the reasonable potential to cause interference with the operation of the Village's WWSLs or to violate any pretreatment standard or requirement) shall discharge to the Village's WWSLs except as authorized by

a user discharge permit issued by the Village requiring the user to pretreat its discharge to meet all applicable pretreatment standards and requirements; and the Village shall take such other actions as needed to prevent interference with the operation of the Village's WWSLs and otherwise ensure compliance by users with applicable discharge limits and its Sewer Use Ordinance.

WWSL IMPROVEMENTS

3.16 Not later than 60 (sixty) days after the effective date of this Consent Order, the Village shall submit to EGLE via its MiEnviro Portal account, for review and approval, a work plan for the removal of biosolids from cell 1 of the WWSLs. Not later than 12 (twelve) months after the effective date of this Consent Order, the Village shall begin the removal of biosolids from the cell 1 of the WWSLs, in accordance with the work plan approved by EGLE. If the Village cannot land apply the biosolids, the Village shall find an alternate, legal, method of disposal.

3.17 Not later than 30 (thirty) days after the effective date if this Consent Order, the Village shall submit to EGLE via its MiEnviro Portal account, for review and approval, a work plan to determine the composition and adequacy of the natural soils and/or the soils in the lagoon liners. If the lagoon liners are determined to not meet the minimum requirements of the Part 22, Groundwater Quality, administrative rules promulgated pursuant to Part 31, Mich Admin Code, R 323.2201 *et seq.*, the liners shall be restored. Upon approval by EGLE the Village shall implement the work plan.

3.18 Not later than 60 (sixty) days after the implementation of the work plan identified in Paragraph 3.17 of this Consent Order, the Village shall submit to EGLE via its MiEnviro Portal account, for review and approval, a report and work plan identifying the current status of the lagoon liners and the timeline and method for the repair and/or replacement of lagoons. After evaluation of the report and work plan, if EGLE determines deficiencies within the plan, EGLE shall inform the Village in writing. The Village shall correct all plan deficiencies within 30 (thirty) days after the written notification from EGLE. Upon approval by EGLE, the Village shall implement the work plan.

3.19 Not later than 17 (seventeen) months from the approval of the work plans and reports identified in Paragraphs 3.11, 3.17, and 3.18 of this Consent Order, the Village shall submit an administratively complete Part 41 permit application, if required, to repair all structural deficiencies and/or upgrade the capacity of the Village's WWSLs.

3.20 Not later than 13 (thirteen) months after the issuance of a Part 41 permit, the Village shall commence construction of the structural repairs and/or system upgrade, in accordance with the Part 41 permit issued by EGLE. Not later than one year from the commencement of construction of the WWSLs repair and/or upgrade, the Village shall complete construction of the WWSLs repair and/or upgrade and be fully operational such that the Village is in full compliance with Parts 31 and 41, and the NPDES Permit.

3.21 Within 30 (thirty) days after construction completion, the Village shall submit to EGLE an updated Operation and Maintenance Manual and a revised treatment facility monitoring program that includes new or modified treatment processes at the WWSLs. The revised treatment facility monitoring program shall include, at a minimum, the monitoring specified in Paragraph 3.12 of this Consent Order

3.22 Upon approval of the Operation and Maintenance Manual described in Paragraph 3.21 of this Consent Order, the Village shall immediately implement it.

WASTEWATER COLLECTION SYSTEM IMPROVEMENTS

3.23 The Village shall conduct a detailed inspection of the entire wastewater collection system to document and repair structural integrity defects within the wastewater collection system in accordance with the following schedule:

a. On or before March 15, 2023, the Village shall complete a detailed inspection of the entire wastewater collection system.

b. On or before April 14, 2023, the Village shall submit to EGLE, for review and approval, a report that documents the detailed inspection of the entire wastewater collection system referenced in Paragraph 3.17(a) of this Consent Order. The report shall also document any repair work, with schedule, that is necessary as a result of the inspections. The Village is advised that implementation of repairs to

the wastewater collection system may require Part 41 wastewater construction permits or may require other EGLE approvals.

c. Not later than 28 (twenty-eight) months after the effective date of this Consent Order, the Village shall complete all repair work identified in the report referenced in Paragraph 3.29(b) of this Consent Order.

3.24 The Village shall comply with all future and current permits under Part 31 and/or Part 41.

3.25 The Village shall at all times properly operate and maintain all facilities and control systems installed or used by the Village to operate the wastewater collection system and WWSLs and ensure compliance with Part 41 and/or any future NPDES wastewater collection system permit.

ASSET MANAGEMENT PLANNING

3.26 The requirements of an Asset Management Program function to achieve the goals of effective performance, adequate funding, and adequate operator staffing and training to ensure proper operation and maintenance of the wastewater collection system and WWSLs. 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 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. On or before June 1, 2023, the Village shall submit to EGLE, for review and approval, an Asset Management Plan. An approvable Asset Management Plan shall contain a schedule for the development and implementation of an Asset Management Program that meets the requirements outlined below. Upon EGLE approval, the Asset Management Plan shall be incorporated by reference into this Consent Order.

i. *Maintenance Staff.* The Village shall employ adequate staff to carry out the operation, maintenance, repair, and testing functions required to

ensure compliance with Part 41. The level of staffing needed shall be determined by considering the work involved in operating the sewer system and planning for and conducting maintenance.

ii. *Wastewater Collection System Map.* The Village shall complete a map of its wastewater collection system. The map shall be of sufficient detail and at a scale to allow easy interpretation. The wastewater 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 EGLE. Such map(s) shall include but not be limited to the following:

(1) All sanitary sewer lines/interceptors and related manholes.

(2) All known or suspected connections between the sanitary sewer and storm drain systems.

(3) All pump stations and force mains.

(4) All surface waters (labeled).

(5) Other major appurtenances such as inverted siphons and air release valves.

(6) A numbering system that uniquely identifies manholes.

(7) The scale and a north arrow.

(8) The pipe diameter, date of installation, type of material, distance between manholes, and the direction of flow.

(9) The manhole interior material, rim elevation (optional), and invert elevations.

iii. *Inventory and Assessment of Fixed Assets.* The Village shall complete an inventory and assessment of operations-related fixed assets. Fixed

assets are assets that are normally stationary, such as the WWSLs and wastewater collection system infrastructure. The inventory and assessment shall be based on current conditions and shall be kept up-to-date and available for review by EGLE.

(1) The fixed asset inventory shall include the following:

(a) 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.

(b) The location of the fixed asset.

(c) The year the fixed asset was installed.

(d) The present condition of the fixed asset (e.g., excellent, good, fair, or poor).

(e) The current fixed asset (replacement) cost in dollars for the year specified in accordance with approved schedules.

(2) 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:

(a) Rate the probability of failure of the fixed asset on a scale of 1-10 (low to high) using criteria such as maintenance history, failure history, and remaining percentage of useful life (or years remaining).

(b) Rate the criticality of the fixed asset on a scale of 1-10 (low to high) based on the consequence of failure versus the desired level of service for the wastewater collection system.

(c) Compute the Business Risk Factor of the fixed asset by multiplying the failure rating from (1) by the criticality rating from (2).

iv. *Operation, Maintenance & Replacement (OM&R) Budget and Rate Sufficiency for wastewater collection system and WWSLs.* The Village shall complete an assessment of its user rates and replacement fund, including the following:

(1) Beginning and end dates of the fiscal year.

(2) Name of the department, committee, board, or other organization that sets rates for the operation of the sewer system.

(3) Amount in the Village's replacement fund in dollars for the year specified in accordance with approved schedules.

(4) Replacement fund strategy of all assets with a useful life of 20 years or less.

(5) Expenditures for maintenance, corrective action, and capital improvement taken during the fiscal year.

(6) OM&R budget for the fiscal year.

(7) 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 Village shall document that there will be sufficient funds no later than January 1, 2025. The ultimate goal of the Asset Management Program is to ensure sufficient revenues to cover OM&R expenses.

b. Following EGLE's approval of the Village's Asset Management Plan, the Village shall implement it.

c. The Village shall develop a written report that summarizes the asset management activities completed during the previous fiscal year and planned for the upcoming year. The written report shall be submitted to EGLE on or before July 1st of each year. The written report shall include:

i. A description of the staffing levels maintained during the year.

ii. A description of inspections and maintenance activities conducted, and corrective actions taken during the previous year.

iii. Expenditures for the wastewater collection system and WWSLs maintenance activities, corrective actions, and capital improvement during the previous year.

iv. A summary of assets/areas identified for inspection/action (including capital improvement) in the upcoming year based on the five 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) and the Business Risk Factors.

v. 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 core elements.

vi. An updated asset inventory based on the original submission.

vii. An updated OM&R budget with an updated rate schedule that includes the amount of insufficient revenues, if any.

GENERAL REQUIREMENTS

3.27 The Village shall submit all reports, work plans, specifications, schedules, or any other writing required by this section to its MiEnviro Portal account and, if required, to the WRD, Kalamazoo District Office-Water Quality Unit supervisor at EGLE, 7953 Adobe Road, Kalamazoo, Michigan 49009-5025. The cover letter with each submittal shall identify the specific paragraph and requirement of this Consent Order that the submittal is intended to satisfy.

3.28 Not later than 10 (ten) days from the effective date of this Consent Order, the Village shall mail a completed W-9 form (included as Exhibit A of this Consent Order) to the Michigan Department of Transportation, Accounting Services Division, EGLE General Ledger Manager, 425 West Ottawa Street, B175, Lansing, Michigan 48933.

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 the Village, 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 the Village, in writing, specifying the reasons for such disapproval. The Village shall submit, within 30 (thirty) 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 the Village of this disapproval.

4.4 In the event EGLE approves with specific modifications a work plan, proposal, or other document, it will notify the Village, 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 the Village to submit, prior to

implementation and within 30 (thirty) 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 the Village 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 the Village 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 the Village to the enforcement provisions of this Consent Order, including the stipulated penalty provisions specified in Paragraphs 9.3 and 9.4 of this Consent Order.

4.7 Any delays caused by the Village's failure to submit an approvable work plan, proposal, or other document when due shall in no way affect or alter the Village'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 the Village will be construed as relieving the Village of its obligation to obtain written approval, if and when required by this Consent Order.

V. EXTENSIONS

5.1 The Village and EGLE agree that EGLE may grant the Village 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, Water Quality Enforcement Unit supervisor at EGLE, P.O. Box 30458, Lansing, Michigan 48909-7958, and the WRD, Kalamazoo District Office-Water Quality Unit supervisor at the address provided in Paragraph 3.27 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 the Village from meeting the deadline(s).

c. A description of the measures the Village 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, Kalamazoo District Office-Water Quality Unit supervisor or a designee, in consultation with the WRD, Water Quality 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 The Village shall verbally report any violation(s) of the terms and conditions of this Consent Order to the WRD, Kalamazoo District Office-Water Quality Unit 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 5 (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). The Village shall report any anticipated violation(s) of this Consent Order to the above-referenced individual in advance of the relevant deadlines whenever possible.

VII. RETENTION OF RECORDS

7.1 Upon request by an authorized representative of EGLE, the Village 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 the Village for at least a period of 5 (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 The Village 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 (thirty) days after the effective date of this Consent Order, the Village shall pay to the State of Michigan $12,048 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 9.6 of this Consent Order.

9.2 Within 30 (thirty) days after the effective date of this Consent Order, the Village shall pay to the State of Michigan a civil fine of $57,600 for the violations specified in Section II of this Consent Order. Payment shall be made in accordance with Paragraph 9.6 of this Consent Order.

9.3 For each failure to comply with a provision contained in Section III of this Consent Order, except Paragraph 3.15, the Village shall pay a stipulated penalty of $5,000. If, after 30 (thirty) days from the original deadline, the Village has not fully corrected the violation, the Village shall pay stipulated penalties of $200 per violation per day for 1 (one) to 7 (seven) days of violation, $300 per violation per day for 8 (eight) to 14 (fourteen) days of violation, and $500 per violation per day for each day of violation thereafter. Payments shall be made in accordance with Paragraph 9.6 of this Consent Order.

9.4 For each known failure to comply with Paragraph 3.15 this Consent Order, the Village shall pay a stipulated penalty of $10,000. If, after 30 thirty days from the original deadline contained in Paragraph 3.15 of this Consent Order, the Village has not disconnected a user or issued the user a discharge permit as required by Paragraph 3.15, the Village shall pay stipulated penalties of $200 per violation per day for 1 (one) to 7 (seven) days of

violation, $300 per violation per day for 8 (eight) to 14 (fourteen) days of violation, and $500 per violation per day for each day of violation thereafter. Payments shall be made in accordance with Paragraph 9.6 of this Consent Order.

9.5 For each failure to comply with any provision of this Consent Order other than the provisions contained in Section III of this Consent Order, the Village shall pay stipulated penalties of $200 per violation per day for 1 (one) to 7 (seven) days of violation, $300 per violation per day for 8 (eight) to 14 (fourteen) days of violation, and $500 per violation per day for each day of violation thereafter. Payments shall be made in accordance with Paragraph 9.6 of this Consent Order.

9.6 The Village shall pay all stipulated penalties within 30 (thirty) days after receipt of the demand for payment of stipulated penalties from EGLE. The Village agrees to pay all funds due pursuant to this Consent Order by check made payable to the State of Michigan and delivered to the Michigan Department of Transportation, Accounting Services Division, Cashier's Office for EGLE, P.O. Box 30657, Lansing, Michigan 48909-8157, or hand delivered to the Michigan Department of Transportation, Accounting Services Division, 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. WRD60097**.

9.7 The Village agrees not to contest the legality of the civil fine or costs paid pursuant to Paragraphs 9.1, and 9.2, above. The Village further agrees not to contest the legality of any stipulated penalties assessed pursuant to Paragraphs 9.3, 9.4, or 9.5 above, but reserves the right to dispute the factual basis upon which a demand by EGLE for stipulated penalties is made.

9.8 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 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 The Village 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 the Village'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 the Village 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 the Village'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 the Village's actions or omissions.

10.3 The Village 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 days and shall describe, in detail, the anticipated length of delay, the precise cause or causes of delay, the measures taken by the Village to prevent or minimize the delay, and the timetable by which those measures shall be implemented. The Village 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.

10.4 Failure of the Village 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 the Village, 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 the Village, and that all the requirements of this Section X have been met by the Village, rests with the Village.

10.6 An extension of one compliance date based upon a particular incident does not necessarily mean that the Village 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 the Village to comply with the requirements of the NREPA and its rules.

11.2 EGLE and the Village 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 the Village'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 fines 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 the Village may have for natural resource damages caused by the Village'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 the Village 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 (thirty) days, the Village shall also notify the WRD, Kalamazoo District Office-Water Quality Unit 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, Kalamazoo District Office-Water Quality Unit supervisor within 30 (thirty) 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

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, the Village shall submit a request consisting of a written certification that the Village 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 B 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, Kalamazoo District Office-Water Quality Unit 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.

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

E-SIGNED by Teresa Seidel
on 2023-03-10 16:12:47 EST

Teresa Seidel, Director
Water Resources Division

2023-03-10 16:12:47 UTC

Date

VILLAGE OF THREE OAKS

E-SIGNED by Richard Smith
on 2023-03-10 15:21:41 EST

By: Richard Smith
Title: Village President

2023-03-10 15:21:41 UTC

Date

APPROVED AS TO FORM:

E-SIGNED by Margaret A. Bettenhausen
on 2023-03-10 15:40:20 EST

By: Margaret A. Bettenhausen, Assistant Attorney General
For: Robert P. Reichel, Division Chief
Environment, Natural Resources, and Agriculture Division
Michigan Department of Attorney General

2023-03-10 15:40:20 UTC

Date

APPENDIX F
DETAILED COST ESTIMATES

Project **Wastewater System Improvements Project - Alternative 2**
Date **April, 2023**

Collection System Improvements

1	L.S.	Highway Lift Station Rehabilitation	@	$	75,000	$	75,000
1	L.S.	Swan Song Lift Station Monitoring System	@	$	10,000	$	10,000
1	L.S.	Featherbone Avenue Spot Repair	@	$	15,000	$	15,000
					Subtotal:	$	*100,000*

Lagoon Lift Station Replacement

1	L.S.	Site Piping and Structures	@	$	150,000	$	150,000
1	L.S.	Pump and Control Equipment	@	$	200,000	$	200,000
1	L.S.	Site Work and Excavation	@	$	50,000	$	50,000
1	L.S.	Electrical Feed to Site	@	$	65,600	$	65,600
1	L.S.	Power Panel & Breakers	@	$	15,000	$	15,000
1	L.S.	Erosion Control	@	$	5,000	$	5,000
					Subtotal:	$	*485,600*

Lagoon Bank Restoration

1,700	CYD	Lagoon Bank Erosion Repair	@	$	50	$	85,000
2,500	SYD	Lagoon Bank Restoration	@	$	5	$	12,500
9,700	SYD	Lagoon Bank Rip Rap	@	$	65	$	630,500
					Subtotal:	$	*728,000*

Sludge Removal from Cell No. 1

190,000	GAL	Minor Sludge Removal From Cell 1	@	$	0.5	$	95,000
					Subtotal:	$	*95,000*

Miscellaneous Structure Rehabilitation

1	L.S.	Metering Equipment Replacements	@	$	10,000	$	10,000
1	EA	Cell 3 Discharge Structure Improvements	@	$	10,000	$	10,000
3	EA	Cell 3 Discharge 10" Valve Replacement	@	$	5,000	$	15,000
1	EA	Cell 1 Distribution Chamber (DC-1) Rehabilitation	@	$	7,500	$	7,500
1	L.S.	Remove Emergency Sanitary Sewer Overflow	@	$	5,000	$	5,000
1	L.S.	Lagoon 3 Outfall Improvements	@	$	15,000	$	15,000
3,100	SYD	Aggregate Driveway Restoration	@	$	15	$	46,500
					Subtotal:	$	*109,000*

Deer Creek Discharge Pipes

1	L.S.	Replace East Stormwater Pipe Outlet and Headwall	@	$	7,500	$	7,500
1	L.S.	Replace West Stormwater Pipe Outlet and Headwall	@	$	7,500	$	7,500
3,000	SYD	Deer Creek Bank Restoration	@	$	20	$	60,000
					Subtotal:	$	*75,000*

Emergency Pump and Storage Building

1	L.S.	Replace Roof, Soffit, and Paint Siding	@	$	30,000	$	30,000
1	L.S.	Replace Door	@	$	1,500	$	1,500
					Subtotal:	$	*31,500*

SUBTOTAL ESTIMATED CONSTRUCTION COST	***$***	***1,624,100***
Construction Contingencies (10%)	$	163,141
Assistance with ACO Requirements	$	196,759
CWSRF Funding Application	$	40,000
Design Engineering (8%)	$	130,000
Construction Engineering (9%)	$	147,000
Bond Counsel, Local Counsel, Rate Consultant (3%)	$	49,000
Administrative Costs (0.5%)	$	9,000
TOTAL ESTIMATED PROJECT COST	***$***	***2,359,000***

PROJECT: **Wastewater Treatment Feasibility Study - Alternative 3**
DATE: **April, 2023**

Lagoon Decommissioning							
6,138,000	GAL	Sludge Removal	@	$	0.20	$	1,227,600
2,500	LFT	Regrading Banks	@		10		25,000
169,400	SYD	Slope Restoration, Type A	@		3		508,200
6,600	LFT	Fence Removal	@		2		13,200
300	LFT	Pipe Abandonment	@		5		1,500
					Subtotal:	*$*	*1,775,500*
Equalization Tank							
1	L.S.	Holding Tank	@	$	300,000	$	300,000
1	L.S.	Piping Modifications	@		15,000		15,000
					Subtotal:	*$*	*315,000*
Lift Station Upgrades							
2	EA	New Pumps	@	$	35,000	$	70,000
1	L.S.	Control Panel	@		20,000		20,000
1	L.S.	Tcomm. & Electrical	@		20,000		20,000
1	L.S.	Valve Replacement/ Piping Modifications	@		20,000		20,000
					Subtotal:	*$*	*130,000*
Transmission Forcemain							
1	L.S.	Traffic Control	@	$	50,360	$	50,360
21,290	LFT	Forcemain, PVC, 10-inch	@		65		1,383,850
250	LFT	Bore and Jack, Steel Casing, 18-inch	@		250		62,500
460	LFT	Directional Drilling, 10-inch	@		200		92,000
4	EA	Air Release Valve	@		2,500		11,000
1	L.S.	Connection to Existing Station	@		5,000		5,000
137	TON	HMA Approach	@		110		15,040
1	L.S.	Lift Station No. 61 Improvements	@		20,000		20,000
1	L.S.	Lift Station No. 50 Improvements	@		20,000		20,000
23,091	SYD	Slope Restoration, Type A	@		3		69,273
					Subtotal:	*$*	*1,729,024*
		SUBTOTAL ESTIMATED CONSTRUCTION COST				*$*	*3,949,524*
		Contingency			25%		988,000
		Design & Construction Engineering			20%		790,000
		SUBTOTAL ESTIMATED TRANSMISSION LINE COST				*$*	*5,728,000*
GRSD Improvements							
1	L.S.	Primary Clarifier Addition	@	$	1,700,000	$	1,700,000
1	L.S.	Aeration Tank Addition	@		1,800,000		1,800,000
1	L.S.	Secondary Clarifier Addition	@		1,500,000		1,500,000
1	L.S.	Tertiary Filters	@		300,000		300,000
1	L.S.	Disinfection	@		60,000		60,000
					Subtotal:	*$*	*5,360,000*
		TOTAL ESTIMATED PROJECT COST				**$**	**11,088,000**

APPENDIX G
MONETARY EVALUATION

PROJECT: Wastewater System Improvements Project

DATE: April, 2023

Alternative 2 - Rehabilitate Existing Facilities

Asset		Estimated Replacement Cost	Estimated Useful Life
Highway Lift Station Rehabilitation	$	75,000	25
Swan Song Lift Station Monitoring System	$	10,000	25
Featherbone Avenue Spot Repair	$	15,000	75
Lagoon Lift Station Replacement	$	485,600	35
Lagoon Bank Restoration	$	728,000	50
Sludge Removal from Cell No. 1	$	95,000	30
Miscellaneous Structure Rehabilitation	$	109,000	30
Deer Creek Discharge Pipes	$	75,000	30
Emergency Pump and Storage Building	$	31,500	20
TOTAL ESTIMATED REPLACEMENT RESERVE:	$	1,624,100	
Weighted Useful Life:		40.42 Years	

PROJECT: Wastewater System Improvements Project
DATE: April, 2023

Alternative 1 - No Action

Asset	Estimated Replacement Cost	Estimated Replacement Year	Annualized Replacement Cost
Lagoon Lift Station - Rehabilitation	$ 100,000	2025	$ 33,333
Lagoon Lift Station - Replacement	$ 500,000	2060	$ 13,158
Emergency Bypass Pump	$ 75,000	2035	$ 5,769
Lagoon Repairs Due to Erosion	$ 728,000	2025	$ 242,667
Sludge Removal from Cell 1	$ 1,629,144	2075	$ 30,739
Misc. Lagoon Equipment	$ 264,000	2025	$ 88,000
		TOTAL ESTIMATED ANNUAL REPLACEMENT RESERVE:	***$ 413,666***

Alternative 2 - 2)Optimum Performance of Existing Facilities

Asset	Estimated Replacement Cost	Estimated Replacement Year	Annualized Replacement Cost
Lagoon Lift Station - Replacement	$ 350,000	2060	$ 9,211
Emergency Bypass Pump	$ 75,000	2035	$ 5,769
Sludge Removal from Cell 1	$ 1,629,144	2075	$ 30,739
		TOTAL ESTIMATED ANNUAL REPLACEMENT RESERVE:	***$ 45,718***

Alternative 3 - Regionalization

Asset	Estimated Replacement Cost	Estimated Replacement Year	Annualized Replacement Cost
Lagoon Lift Station	$ 750,000	2060	$ 19,737
Equalization Tank	$ 500,000	2070	$ 10,417
Transmission Forcemain	$ 1,729,024	2070	$ 36,021
		TOTAL ESTIMATED ANNUAL REPLACEMENT RESERVE:	***$ 66,175***

Federal Discount Rate for Water Resources Planning (Interest Rate) i = 2.00%

Number of Years, n = 20 years

Alternative 1 - No Action	
Initial Capital Costs =	$0
Annual Operations & Maintenance Costs =	$128,975
Annual Capital Replacement Costs =	$413,666
Present Worth of 20 years of O & M Costs=	$2,108,921
Present Worth of 20 years of Capital Replacement Costs =	$6,764,027
Less Present Worth of Salvage Value =	$0
Alternative B Total Present Worth =	**$8,872,948**

Alternative 2 - Optimum Performance of Existing Facilities	
Initial Capital Costs =	$1,624,100
Annual Operations & Maintenance Costs =	$128,975
Annual Capital Replacement Costs =	$45,718
Present Worth of 20 years of O & M Costs=	$2,108,921
Present Worth of 20 years of Capital Replacement Costs =	$747,560
Less Present Worth of Salvage Value =	$1,191,007
Alternative B Total Present Worth =	**$3,289,574**

Alternative 3 - Regionalization	
Initial Capital Costs =	$11,088,000
Annual Operations & Maintenance Costs =	$128,975
Annual Capital Replacement Costs =	$66,175
Present Worth of 20 years of O & M Costs=	$2,108,921
Present Worth of 20 years of Capital Replacement Costs =	$1,082,054
Less Present Worth of Salvage Value =	$8,131,200
Alternative B Total Present Worth =	**$6,147,774**

Village of Three Oaks
Wastewater System Improvements Project
ESTIMATED PRELIMINARY RATE ASSESMENT
4/17/2023

ASSUMPTIONS

Initial Rate Increase			0.0%
Start Date of Initial Rate Increase			2025
Duration of Initial Rate Increase (Years)			1
Annual COLA Rate Increase			0.00%
Start Date of Annual COLA Increase			2026
Inflation			2.00%
Ready to Serve Charge:			
	5/8" to 1"	$	37.00
	1" to 2"	$	37.00
	2"	$	42.50
	3"	$	45.00
Sewer Usage Rate (per 1,000 gal.):			
	First 1,000 gal.	$	-
	1,001 - 3,000 gal.	$	6.00
	3,001 - 6,000 gal.	$	7.50
	6,001 gal. +	$	8.50

Meter Inventory:

Size:	Number in System:
5/8" to 1"	520
1" to 2"	4
2"	1
3"	3
Total:	528

REVENUES		**2020**	**2021**	**2022**	**2023**
Rate Increase		0.00%	0.00%	0.00%	0.00%
Ready to Serve Charge:					
	5/8" to 1"	$ 37.00	$ 37.00	$ 37.00	$ 37.00
	1" to 2"	$ 37.00	$ 37.00	$ 37.00	$ 37.00
	2"	$ 42.50	$ 42.50	$ 42.50	$ 42.50
	3"	$ 45.00	$ 45.00	$ 45.00	$ 45.00
Sewer Usage Rate (per 1,000 gal.):					
	First 1,000 gal.	$ -	$ -	$ -	$ -
	1,001 - 3,000 gal.	$ 6.00	$ 6.00	$ 6.00	$ 6.00
	3,001 - 6,000 gal.	$ 7.50	$ 7.50	$ 7.50	$ 7.50
	6,001 gal. +	$ 8.50	$ 8.50	$ 8.50	$ 8.50
Other Revenue		7,561	2,531	3,331	
	Ready to Serve Charge:	$ 234,786	$ 234,786	$ 234,786	$ 234,786
	Sewer Usage Rate (per 1,000 gal.):	$ 368,674	$ 368,674	$ 379,960	$ 372,436
	Average Units Billed Per Year:	$ 50,274	$ 50,274	$ 51,813	$ 50,787
Total Revenue - Annual		**$ 611,021**	**$ 605,991**	**$ 618,077**	**$ 607,222**
Typical Homeowner's Bill (Assuming 5,000 Gallons per month)		$ 56.50	$ 56.50	$ 56.50	$ 56.50
OPERATING EXPENDITURES					
O&M		$ 179,807	$ 207,117	$ 239,830	$ 273,918
Net Operating Revenue		$ 431,214	$ 398,874	$ 378,247	$ 333,304
NON-OPERATING EXPENDITURES					
Debt Service: 2001 CWSRF Bond					
	Principle	$ 130,000	$ 130,000	$ 135,000	$ -
	Intrest	$ 8,125	$ 4,875	$ 1,625	$ -
Debt Service: 2001 USDA Bond					
	Balance	$ 866,000	$ 842,000	$ 817,000	$ 791,000
	Principle	$ 24,000	$ 25,000	$ 26,000	$ 27,000
	Intrest	$ 38,970	$ 37,890	$ 36,765	$ 35,595
Net Operating and Non-Operating Revenue		$ 230,119	$ 201,109	$ 178,857	$ 270,709

Bonds	Project Cost	Grant %	Bond Amount	Term	Rate	Start	End	Debt Service		
									Balance:	$ -
CWSRF	$2,359,000	0%	$2,359,000	20	1.875%	2025	2044	$ 142,534	*Principal:*	$ -
									Interest:	$ -
									Total:	$ -

Net Cash Flow	$ 230,119	$ 201,109	$ 178,857	$ 270,709
Cash Fund Balance	**$ 891,247**	**$ 1,092,356**	**$ 1,271,213**	**$ 1,541,922**

2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00
$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00
$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50
$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00
$ -	$ -	$ 1.00	$ 2.00	$ 3.00	$ 4.00	$ 5.00	$ 6.00	$ 7.00	$ 8.00	$ 9.00
$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00
$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50
$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50
$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786
$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436
$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787
$ 607,222	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**
$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50
$ 279,396	$ 284,984	$ 290,684	$ 296,498	$ 302,428	$ 308,476	$ 314,646	$ 320,939	$ 327,357	$ 333,905	$ 340,583
$ 327,826	$ 322,238	$ 316,538	$ 310,724	$ 304,794	$ 298,746	$ 292,576	$ 286,283	$ 279,865	$ 273,317	$ 266,639
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 764,000	$ 736,000	$ 706,000	$ 672,200	$ 638,400	$ 604,600	$ 570,800	$ 537,000	$ 494,800	$ 452,600	$ 410,400
$ 28,000	$ 30,000	$ 33,800	$ 33,800	$ 33,800	$ 33,800	$ 33,800	$ 42,200	$ 42,200	$ 42,200	$ 42,200
$ 34,380	$ 33,120	$ 31,770	$ 30,249	$ 28,728	$ 27,207	$ 25,686	$ 24,165	$ 22,266	$ 20,367	$ 18,468
$ 265,446	$ 259,118	$ 250,968	$ 246,675	$ 242,266	$ 237,739	$ 233,090	$ 219,918	$ 215,399	$ 210,750	$ 205,971
$ -	$ 2,359,000	$ 2,260,697	$ 2,160,551	$ 2,058,527	$ 1,954,590	$ 1,848,704	$ 1,740,833	$ 1,630,940	$ 1,518,985	$ 1,404,932
$ -	$ 98,303	$ 100,146	$ 102,024	$ 103,937	$ 105,886	$ 107,871	$ 109,894	$ 111,954	$ 114,053	$ 116,192
$ -	$ 44,231	$ 42,388	$ 40,510	$ 38,597	$ 36,649	$ 34,663	$ 32,641	$ 30,580	$ 28,481	$ 26,342
$ -	$ 142,534	$ 142,534	$ 142,534	$ 142,534	$ 142,534	$ 142,534	$ 142,534	$ 142,534	$ 142,534	$ 142,534
$ 265,446	$ 116,583	$ 108,434	$ 104,141	$ 99,732	$ 95,205	$ 90,556	$ 77,384	$ 72,864	$ 68,216	$ 63,437
$ 1,807,368	**$ 1,923,951**	**$ 2,032,385**	**$ 2,136,526**	**$ 2,236,258**	**$ 2,331,463**	**$ 2,422,019**	**$ 2,499,403**	**$ 2,572,267**	**$ 2,640,483**	**$ 2,703,921**

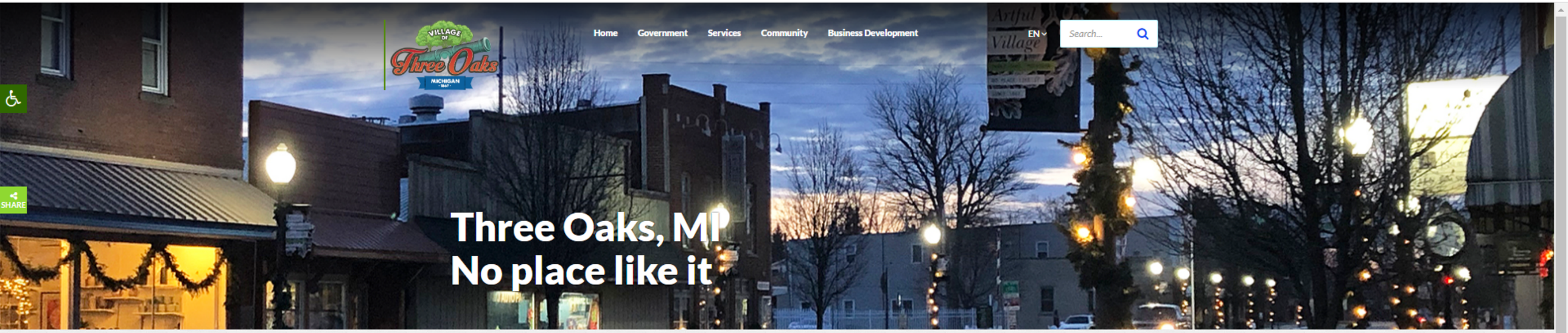
2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00
$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00	$ 37.00
$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50	$ 42.50
$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00
$ 10.00	$ 11.00	$ 12.00	$ 13.00	$ 14.00	$ 15.00	$ 16.00	$ 17.00	$ 18.00	$ 19.00
$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00
$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50	$ 7.50
$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.50
$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786	$ 234,786
$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436	$ 372,436
$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787	$ 50,787
$ 607,222	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**	**$ 607,222**
$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50	$ 56.50
$ 347,394	$ 354,342	$ 361,429	$ 368,658	$ 376,031	$ 383,551	$ 391,222	$ 399,047	$ 407,028	$ 415,168
$ 259,828	$ 252,880	$ 245,793	$ 238,564	$ 231,191	$ 223,671	$ 216,000	$ 208,175	$ 200,194	$ 192,054
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
$ 368,200	$ 326,000	$ 273,400	$ 220,800	$ 168,200	$ 115,600	$ 63,000	$ -	$ -	$ -
$ 42,200	$ 52,600	$ 52,600	$ 52,600	$ 52,600	$ 52,600	$ 63,000	$ -	$ -	$ -
$ 16,569	$ 14,670	$ 12,303	$ 9,936	$ 7,569	$ 5,202	$ 2,835	$ -	$ -	$ -
$ 201,059	$ 185,610	$ 180,890	$ 176,028	$ 171,022	$ 165,869	$ 150,165	$ 208,175	$ 200,194	$ 192,054
$ 1,288,740	$ 1,170,370	$ 1,049,780	$ 926,929	$ 801,775	$ 674,274	$ 544,382	$ 412,055	$ 277,247	$ 139,911
$ 118,370	$ 120,590	$ 122,851	$ 125,154	$ 127,501	$ 129,892	$ 132,327	$ 134,808	$ 137,336	$ 139,911
$ 24,164	$ 21,944	$ 19,683	$ 17,380	$ 15,033	$ 12,643	$ 10,207	$ 7,726	$ 5,198	$ 2,623
$ 142,534	$ 142,534	$ 142,534	$ 142,534	$ 142,534	$ 142,534	$ 142,534	$ 142,534	$ 142,534	$ 142,534
$ 58,524	$ 43,076	$ 38,356	$ 33,494	$ 28,488	$ 23,334	$ 7,630	$ 65,641	$ 57,660	$ 49,519
$ 2,762,445	**$ 2,805,521**	**$ 2,843,876**	**$ 2,877,370**	**$ 2,905,858**	**$ 2,929,193**	**$ 2,936,823**	**$ 3,002,464**	**$ 3,060,124**	**$ 3,109,644**

APPENDIX H
PUBLIC PARTICIPATION

My Website

threeoaksvillage.org

Ajera | Rural Utilities Loan I... | https://data.census.... | EGLE - Forms and G... | Michigan Audits | System for Award... | Sector Workload Sp... | Watervliet | Decatur | Three Oaks | Hartford | Community Water... | MiWaters - Login | eAuthentication | Mortgage Center |...



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Current Village Projects

Agendas & Minutes

Village Facebook Page

Alerts

Employment

Upcoming Events

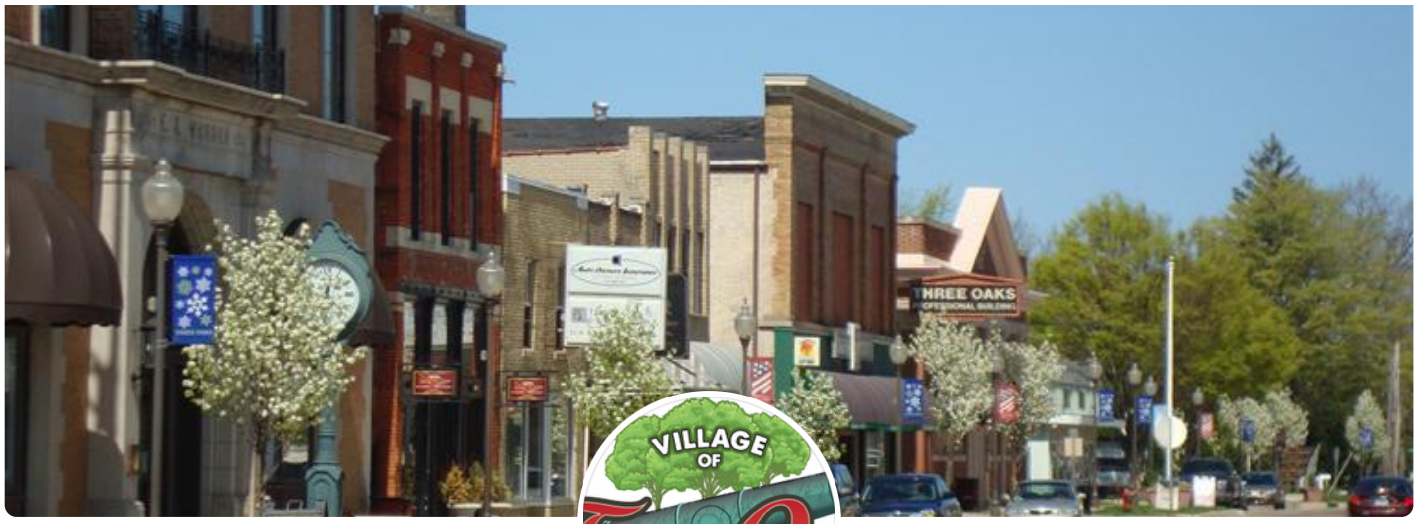
See All Events →

APR 18	Trash & Recycling
APR 19	Brush Pickup

Latest News

See All News →

APR 12	Notice of Project Plan Public Meeting for Wastewater System Improvement
APR 05	Planning Commission Special Meeting



Village of Three Oaks

3.6K followers • 32 following

Posts About Photos Videos ...

Intro

The village of Three Oaks is located in the southwest corner of Michigan, just 5 miles from the shor

Page · Government organization

21 North Elm St, Three Oaks, MI, United States, Michigan

(269) 756-9221

villagemgr@threeoaksvillage.org

threeoaksvillage.org

Open now

Rating · 4.1 (51 Reviews)

Village of Three Oaks
9h ·

NOTICE OF PROJECT PLAN PUBLIC MEETING

The Village of Three Oaks will hold a public meeting on the proposed Wastewater System Improvements Project for the purpose of receiving comments from interested persons.

The hearing will be held at 6:00 p.m. on April 27th, 2023 at the following location: Three Oaks Village Hall, 21 North Elm Street, Three Oaks, MI 49128.

The purpose of the proposed project is to improve the Village wastewater system such that it meets state regulations and provides appropriate treatment capacity to meet Village needs.

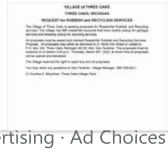
Project construction will involve reinvestment in the wastewater collection system, sanitary pump stations, and wastewater treatment system to restore full treatment capacity and extend service life for the next 20+ years.

Impacts of the proposed project include reducing the possibility of infrastructure failures, lowering operational costs at the treatment lagoons, and functional repairs to the treatment system. Temporary impacts to traffic and localized service disruptions are anticipated as part of construction activities.

The estimated cost to users for the proposed project will be $2,500,000.

Copies of the plan detailing the proposed project are available for inspection at the following location: 21 North Elm Street, Three Oaks, MI 49128

Written comments received before the hearing record is closed on April 27th, 2023 will receive



Like Comment

Village of Three Oaks
1d ·

Phone: (269) 756-9221 Fax: (269) 756-3031

Village of Three Oaks
April 13, 2023 - 7:00 PM
Regular Council Meeting "In-Person"
21 North Elm Street (Village Hall Conference Room)
AGENDA

1. CALL TO ORDER
   Pledge of Allegiance
   Roll Call
   Additions/Deletions to the Agenda/ Approval of the Agenda
2. PUBLIC COMMENT
3. CORRESPONDENCE - Short Term Rental
4. Consent Agenda. Any item on the consent agenda may be removed upon Council discussion/approval:
   a) Approval of the March 15, 2023 Regular Council Meeting Minutes
   b) Acceptance of Invoices Payable for April 2023 and Disbursements & Acceptance of Prepays and Payroll for March 2023
   c) Police Report – Chief Krause
   d) Building Inspector and Zoning Administrator Report – Ed Carpenter

Old Business

5. 21 North Elm Street Acquisition - Update
6. DDA - Social District - Update
7. Revision of Purchasing Policy
8. Wightman ACO - Update – Andrew Rudd

New Business

9. Wightman Proposal - Hickory Creek Bridge Grant - Suzanna Deneau
10. Parks and Recreation – Lot Purchase
11. Building and Grounds – Police Department Furnance
12. Farnan Farm Sanitary Sewer Agreement
13. Rubbish and Recycling RFP Results
14. Parks and Recreation – Comemoritive Plaque with Post
15. Manager's Contract
16. DDA – Appointments Carolyn Dries/Julie Shaffer, Suzanna Bierwirth and Ron Zarantenello
17. Clerk/Treasuer – Job Descriptions
18. Planning Commission Annual Report
19. Board/Committee Reports
    a) Planning Commission
    b) Parks & Recreation
    c) DDA
    d) Public Service Committee
    e) Zoning Board of Appeals
20. Managers' Report
21. President Remarks
22. Council Remarks
23. Public Comment
24. Adjourn

1

Like Comment

Village of Three Oaks
2d ·

Spring has arrived! It's that time of year again where the Village Street Department has begun to pick up yard waste. As a reminder, the Village of Three Oaks does have an ordinance regarding the definition of yard waste:

ACCEPTABLE YARD WASTE. Grass clippings and garden weeds, leaves, and trimmings.

APPROVED YARD WASTE CONTAINERS. Include paper yard waste bags, 32-gallon cans clearly marked "yard waste," or biodegradable

APPENDIX I
VILLAGE RESOLUTION AND SUBMITTAL FORM

A RESOLUTION ADOPTING A FINAL PROJECT PLAN
FOR WASTEWATER SYSTEM IMPROVEMENTS or
NPS POLLUTION CONTROL/STORMWATER IMPROVEMENTS AND
DESIGNATING AN AUTHORIZED PROJECT REPRESENTATIVE

WHEREAS, the Village of Three Oaks *(legal name of applicant)* recognizes the need to make improvements to its existing wastewater treatment and collection system or its existing NPS pollution control/stormwater treatment system; and

WHEREAS, the Village of Three Oaks *(legal name of applicant)* authorized Wightman & Associates Inc. *(name of consulting engineering firm)* to prepare a Project Plan, which recommends the construction of Lift station, collection system, and wastewater treatment lagoon improvements; and

WHEREAS, said Project Plan was presented at a Public Hearing held on April 27th, 2023 and all public comments have been considered and addressed;

NOW THEREFORE BE IT RESOLVED, that the Village of Three Oaks *(legal name of applicant)* formally adopts said Project Plan and agrees to implement the selected alternative (Alternative No. 2).

BE IT FURTHER RESOLVED, that the Village Manager *(title of the designee's position)*, a position currently held by Dan Faulkner *(name of the designee)*, is designated as the authorized representative for all activities associated with the project referenced above, including the submittal of said Project Plan as the first step in applying to the State of Michigan for a revolving fund loan to assist in the implementation of the selected alternative.

Yeas:

Nays:

Abstain:

Absent:

I certify that the above Resolution was adopted by The Village Council *(the governing body of the applicant)* on April 27th, 2023.

BY: Dan Faulkner - Village Manager
Name and Title *(please print or type)*

Signature Date

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Finance Division

CLEAN WATER STATE REVOLVING FUNDS (CWSRF/SWQIF)
PROJECT PLANNING DOCUMENT SUBMITTAL FORM

Part 53, Clean Water Assistance, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

Project Name: Wastewater System Improvements Project

Project Description: Lift station rehabilitation, pipe replacement, and lagoon improvements.

Legal Name of Applicant: Village of Three Oaks
(Name of the applicant municipality bonding for the project. Ex. A county bonding on behalf of a village or township)

Applicant Address: 21 North Elm Street

City: Three Oaks Zip Code: 49128 County: Berrien

Applicant's Federal Employer Identification Number (EIN):

Congressional District: 5 State Senate District: 17 State House District: 37

NPDES Permit Number: MIG580294 Associated SAW Grant Number: NA

Estimated Total Project Cost: $2,359,000 Target Construction Start Date: 10/28/2024

Applicant Authorized Representative Name: Dan Faulkner

Title: Village Manager Phone: 269-756-9221 Email: manager@threeoaksvillage.org

Authorized Representative Address. If same as applicant address above, check here ☒

Address: City: Zip Code:

Signature of Authorized Representative Date

Completed Project Useful Life and Cost Analysis Certification Form. Blank copy included for use.
☒ Attached

Completed PPL Scoring Data Form. Blank copy included for use.
☒ Attached

Joint Resolution of Project Planning Document Adoption/Authorized Representative Designation.
☒ Attached

Did you follow the Qualifications Based Selection (QBS) process for obtaining planning services?
☐ Yes ☒ No

A final project planning document, prepared and adopted in accordance with EGLE's CWSRF Project Planning Document Preparation Guidance, must be submitted by the annual deadline as indicated on EGLE's CWSRF website for a proposed project to be considered for placement on Michigan's Project Priority List for the upcoming fiscal year.

Please email your final project planning document and attachments with this form to your EGLE Water Infrastructure Funding and Financing Section Project Manager.

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

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

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

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Finance Division

PROJECT USEFUL LIFE AND COST ANALYSIS CERTIFICATION FORM

Per Section 602(b)(13) of the Federal Water Pollution Control Act (FWPCA), all Clean Water State Revolving Fund (CWSRF) assistance recipients must certify that they have conducted the studies and evaluations described in 602(b)(13)(A) and (B), collectively known as a cost and effectiveness analysis.

Applicant Name: Village of Three Oaks CWSRF Project Number: TBD

Project Description: Lift station rehabilitation, pipe replacement, and lagoon improvements.

1) The applicant has studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is sought under the CWSRF; and

2) The applicant has selected, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account the cost of:

- constructing the project or activity;
- operating and maintaining the project or activity over the life of the project; and
- replacing the project or activity.

3) The applicant has completed a Project Useful Life analysis for the project or activity and is included in the Project Planning Document or appropriate documentation is attached to this certification.

☒ I certify that requirements (1), (2), and (3) above have been met.

Andrew Rudd, P.E.

Name of Professional Engineer (Please Print or Type)

Signature of Professional Engineer Date

Dan Faulkner - Village Manager

Name and Title of Authorized Representative (Please Print or Type)

Signature of Authorized Representative Date

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Finance Division

PROJECT PRIORITY LIST SCORING DATA FORM

Part 53, Clean Water Assistance, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

Instructions

The following information must be completed and submitted alongside a Project Planning Document for the Clean Water State Revolving Fund (CWSRF) or Strategic Water Quality Initiatives Fund (SWQIF). This form should only be completed for items to be included in the upcoming fiscal year project. Include page numbers and appendices of where supporting documentation can be found in the planning document. For traditional wastewater projects, including combined sewer separation, please complete sections 1-4. For projects with only storm water work please complete sections 5-8.

For questions related to wastewater scoring, please contact Charlie Hill at 906-236-3916 or HillC@Michigan.gov. For questions related to storm water scoring, please contact Christe Alwin at 517-420-1501 or AlwinC@Michigan.gov.

Project Information

Applicant: Village of Three Oaks

Project Location: Village of Three Oaks

CWSRF/SWQIF Project Number: TBD

Applicant Population: 1,410 Population Served by the Project: 1,410

Project Type: ☒ Wastewater (including emerging contaminant projects) ☐ Storm Water

1. Compliance – Wastewater Projects

Does the project have an enforceable construction schedule established by an order, permit, enforcement action, or other document issued by EGLE?

☒ Yes ☐ No

If yes, copy of enforcement action, order, permit, notice, or another document. Pages: Appendix E

2. Public Health – Wastewater Projects

Sanitary Sewer Overflow (SSO)/Bypass. Pages: x

☐ Wet weather related SSOs demonstrated not meeting SSO policy.

☒ Operational-related SSOs demonstrated dry weather SSOs due to structural concerns (incorrect pumps, difficult to maintain siphons, etc.).

Combined Sewer Overflow (CSO). Pages:

Based on maximum annual volume reported in the last five years, does the project involve the reduction of annual CSO volumes? Check which volume reduction applies.

☐ Greater than 10MG ☐ 5-10MG ☐ Less than 5MG ☐ N/A

Biosolids scoring for PFOS. Pages:

☐ Meets 20 ppb PFOS as expressed in interim biosolids strategy. Must meet EPA public risk level if issued before 3 years. Must meet interim biosolids strategy if revised in next 3 years.

3. Water Quality – Wastewater Projects

Pre-project conditions, including wastewater collection/treatment deficiencies and water quality problems occurring. Pages: 7-9

☐ Project includes centralized treatment to address failing septic systems in unsewered areas.

Pages:

If you selected this option, please identify the following documentation included below.

☐ Documentation of fecal coliform in surface water resulting from failing septic tanks.

☐ Documented illicit discharges of sanitary sewage to surface water resulting from failing septic tanks.

☐ Documentation of impact to surface water resulting from failing septic tanks (visual indicators or other metrics).

☐ No documentation of impacts to surface water is included.

Post-project conditions, including proposed facilities and water quality improvements.

Pages: 16-17

A. Information on Existing Discharge Pages: 6-7

i. Discharge Method:
☒Surface Water ☐Groundwater ☐No existing discharge

ii. Discharge Type:
☐Continuous ☒Seasonal ☐Intermittent ☐ No existing discharge

iii. Flow (identify MGD or MGY): Average Influent to Lagoons: 0.134 MGD
For facilities that discharge to regional treatment plants and do not file surface water discharge monitoring reports, provide the average daily metered flow.

iv. Receiving Water and Type: Deer Creek

v. Location (township, range, and section): 8S, 20W, 03

vi. Existing Treatment:
☐Untreated ☐Secondary ☐Tertiary ☐Combined Sewer Overflow
☒Primary (includes septic systems with tile fields or direct surface water discharge)

vii. Existing Disinfection Process:
☒None ☐Chlorination ☐Alternative, other: _____

viii. Nitrate contamination of public or private wells caused by the discharge of effluent/waste from the treatment system or systems. Pages: _____

☐ Public well(s) in vicinity contains nitrates > 10 mg/L
☐ Private well(s) in vicinity contains nitrates > 10 mg/L
☐ Monitoring well(s) in vicinity contains nitrates > 10 mg/L
☐ No evidence of nitrate contamination in local wells

Note: If only the total inorganic nitrogen ("TIN" ammonia + nitrite + nitrate) concentration is available, a separate sampling and nitrate analysis should be performed to document the nitrate concentration.

B. Information on Proposed Discharge Pages: 6

i. Discharge Type:
☐Continuous ☒Seasonal ☐Intermittent

ii. Discharge Points and Receiving Waters:

The existing and proposed discharge point is on the west edge of the existing lagoon site into Deer Creek.

iii. Average Design Flow (identify MGD or MGY): 0.134 MGD

iv. Identify Receiving Water: Deer Creek

v. Location (township, range, and section): 8S, 20W, 03

vi. Effluent Limits:

Minimum Dissolved Oxygen: 5 mg/l CBOD$_5$: NA

Ammonia: Report only Phosphorus: Report only

Total Inorganic Nitrogen (TIN) from groundwater permit: NA

vii. Will the proposed facility address documented total residual chlorine (TRC) violations?
☐Yes, proceed to question viii. ☒No

viii. Will the proposed improvements involve either dechlorination or an alternative disinfection technology (e.g., ultraviolet disinfection, ozonation) that eliminates the use of chlorine? ☐Yes ☒No

C. Existing Pre-Project CSO and SSO Discharges

Information must be provided for each outfall directly associated with the proposed project. Note that both tables must be completed for each discharge.

Outfall Number	Receiving Stream	Location (township, range, section)	Estimated Overflow Volume (MG) for 1-year, 1-hour storm event
001			
002			
003			
004			
005			

Outfall Number	Estimated Overflow Duration, in hours	Estimated Annual Overflow Volume (MG)	Tributary Residential Population
001			
002			
003			
004			
005			

D. Future Post-Project CSO and SSO Discharges

List each outfall from Section C. For outfalls which will cease to function as combined sewer outfalls upon the completion of this project, simply enter “Eliminated” under Receiving Stream. List any new outfalls (e.g., for a retention/treatment basin) created by this project and include its associated discharge data. Note that both tables must be completed for each discharge.

Outfall Number	Receiving Stream	Location (township, range, section)	Estimated Overflow Volume (MG) for 1-year, 1-hour storm event
001			
002			
003			
004			
005			

Outfall Number	Estimated Overflow Duration, in hours	Estimated Annual Overflow Volume (MG)	Detention Time Before Discharge for 1-year, 1-hour storm event
001			
002			
003			
004			
005			

4. Improving Infrastructure – Wastewater Projects

Check the following which apply to the proposed project. Pages: 16-17

☐ Proposed project is part of an approved Asset Management Program.

☐ The purpose of the proposed project is for regionalization of systems.

☒ The proposed project involves resiliency components (e.g., pumping or type of pumps, electrical systems, basement backup protection, etc.)

The following items only apply to storm water projects.

5. Compliance – Storm Water Projects

Is the applicant a Municipal Separate Storm Sewer System (MS4) permittee?

☐ Yes, permit number:_____ ☐ No

Has the applicant received a violation notice identifying violations related to at least one of the following MS4 permit requirements? ☐ Yes, select all that apply below ☐ No

☐ Illicit Discharge Elimination Program

☐ Post-Construction Stormwater Runoff Program

☐ Pollution Prevention and Good Housekeeping Program

☐ Total Maximum Daily Load (TMDL) Implementation Plan

Copy of violation notice. Page:_____

6. Public Health – Storm Water Projects

Does the project result in **all** the following? Pages:_____

☐ Reduced storm water runoff volume for small and large events.

☐ Treatment of the water quality volume.

☐ At least one of the following

- Addresses known flooding issue causing water quality problems or basement backups.
- The design considers projected precipitation for the service life of the project or an increase in precipitation above the current National Oceanic Atmospheric Administration (NOAA) Atlas 14 estimates.

7. Water Quality – Storm Water Projects

Is the project located in an applicable TMDL watershed (i.e., E. coli, biota/sediment, phosphorus, dissolved oxygen, or chloride)?

☐ Yes, TMDL(s) title:_____ ☐ No

Does the project result in a direct reduction of the pollutant(s) causing the TMDL impairment?

☐ Yes ☐ No Pages:_____

Does the project result in reduced storm water runoff volume as a primary focus of the project?

☐ Yes ☐ No Pages:_____

Identify all best management practices (BMPs) and estimate size/quantity of each in the project. Definitions of the BMPs below are included at the end of this document.

Bioretention Basins Pages:_____

Enter the quantity for each size bioretention basin included in the project.

Less than 0.5 acre:_____ 0.5-1.5 acres:_____ Greater than 1.5 acres:_____

Rain Gardens Pages:_____

Enter the quantity for each size rain garden included in the project.

Less than 300ft^2:_____ 300-1000ft^2:_____ Greater than 1000ft^2:_____

Bioswales Pages:_____

Enter the quantity for each size bioswale included in the project.

Less than 1 acre:_____ 1 – 3 acres:_____ Greater than 3 acres:_____

Infiltration Trenches Pages:_____

Enter the quantity for each size infiltration trench included in the project.

Less than 1 acre:_____ 1 – 5 acres:_____ Greater than 5 acres:_____

Pervious Pavement Pages:_____

Select the size of pervious pavement included in the project.

☐ Less than 1 acre ☐ 1 – 5 acres ☐ Greater than 5 acres

Green Roofs Pages:_____

Enter the quantity of green roofs included in the project:_____

Native Revegetation Pages:_____

Select the size area of native revegetation included in the project.

☐ Less than 1 acre ☐ 1 – 5 acres ☐ Greater than 5 acres

Water Storage and Reuse Pages:_____

Select the quantity of water storage and reuse included in the project.

☐ Less than 1,000 gallons ☐ 1,000 – 5,000 gallons ☐ Greater than 5,000 gallons

Tree Cover Pages:_____

Enter the quantity of trees planted as part of the project:_____

Does the project result in increased water quality treatment from an existing discharge?

☐ Yes ☐ No Pages:_____

Does the project result in disconnection of existing impervious surfaces with a quantifiable runoff volume reduction or water quality benefit?

☐ Yes, disconnection area:_____ ☐ No Pages:_____

Does the project result in a new or retrofitted regional BMP(s) to address known local site issues preventing full implementation of the NPDES MS4 post-construction requirements?

☐ Yes ☐ No Pages:_____

Does the regional BMP(s) serve more than one site/parcel?

☐ Yes, number of sites/parcels:_____ ☐ No

8. Improving Infrastructure – Storm Water Projects

Does the project result in implementation of a Stormwater Asset Management Program.

☐ Yes ☐ No Pages:_____

Does the project result in a water quality benefit from the coordination between two or more municipal agencies on stormwater management?

☐ Yes, list municipal entities benefiting from the project ☐ No Pages:_____

_____

_____

_____

BMP Definitions:

Bioretention Basins: Shallow, vegetated basins designed to infiltrate, treat, and temporarily store stormwater. Bioretention basins should be pretreated to optimize water quality performance.

Rain Gardens: Shallow surface depressions planted with native vegetation to capture and treat stormwater runoff. Rain gardens should be pretreated to optimize water quality performance.

Bioswales: Shallow, vegetated stormwater channels designed to slow down runoff and provide infiltration. Check dams may be included to improve performance and maximize infiltration.

Infiltration Trenches: Linear subsurface infiltration structures, typically composed of stone trenches wrapped with geotextile fabric, designed to provide infiltration and conveyance of stormwater.

Green Roof: Rooftops or constructed surfaces that include a thin covering of vegetation or growth media that enables infiltration and evapotranspiration of stormwater.

Native Revegetation: transitioning impervious or previously non-native turfgrass spaces to native plants. Native revegetated spaces may include forest, prairie, meadow, or constructed wetland.

Water Storage and Reuse: structures designed to intercept and store runoff from rooftops and other impervious spaces and allow for its reuse.

Tree Cover: Trees planted specifically for stormwater benefit purposes including stormwater uptake, storage, and evapotranspiration.

APPENDIX J
THREATENED AND ENDANGERED SPECIES LIST

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

In Reply Refer To: March 30, 2023
Project Code: 2023-0062568
Project Name: Village of Three Oaks Wastewater System Improvements Project

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

To Whom It May Concern:

Official Species List
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.

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 IPaC website (https://ipac.ecosphere.fws.gov/) at regular intervals during project planning and implementation. To update an Official Species List in IPaC: from the My Projects page, find the project, expand the row, and click Project Home. In the What's Next box on the Project Home page, there is a Request Updated List button to update your species list. Be sure to select an "official" species list for all projects.

Consultation requirements and next steps
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 two approaches to evaluating the effects of a project on listed species.

Approach 1. Use the All-species Michigan determination key in IPaC. This tool can assist you in making determinations for listed species for some projects. In many cases, the determination key

will provide an automated concurrence that completes all or significant parts of the consultation process. Therefore, we strongly recommend screening your project with the **All-Species Michigan Determination Key (Dkey)**. For additional information on using IPaC and available Determination Keys, visit https://www.fws.gov/media/mifo-ipac-instructions (and click on the attachment). Please carefully review your Dkey output letter to determine whether additional steps are needed to complete the consultation process.

Approach 2. Evaluate the effects to listed species on your own without utilizing a determination key. Once you obtain your official species list, you are not required to continue in IPaC, although in most cases using a determination key should expedite your review. If the project is a Federal action, you should review our section 7 step-by-step instructions before making your determinations: https://www.fws.gov/office/midwest-region-headquarters/midwest-section-7-technical-assistance. If you evaluate the details of your project and conclude "no effect," document your findings, and your listed species review is complete; you do not need our concurrence on "no effect" determinations. If you cannot conclude "no effect," you should coordinate/consult with the Michigan Ecological Services Field Office. The preferred method for submitting your project description and effects determination (if concurrence is needed) is electronically to EastLansing@fws.gov. Please include a copy of this official species list with your request.

For all **wind energy projects** and **projects that include installing communications towers that use guy wires**, 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.

Migratory Birds
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 prohibits the take and disturbance of eagles without a permit. If your project is near an eagle nest or winter roost area, see our Eagle Permits website at https://www.fws.gov/program/eagle-management/eagle-permits 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/partner/council-conservation-migratory-birds.

We appreciate your consideration of threatened and endangered species during your project

planning. Please include a copy 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".

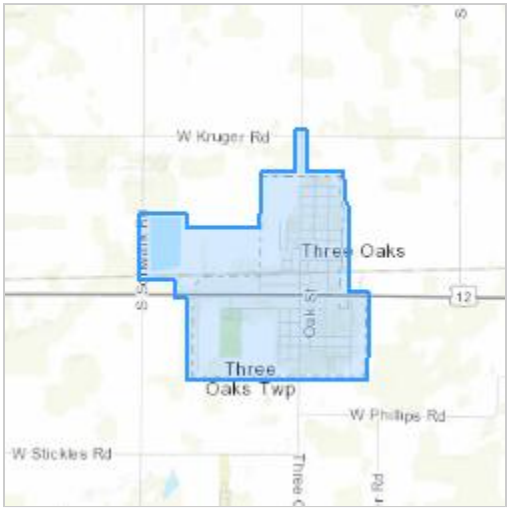
This species list is provided by:

Michigan Ecological Services Field Office
2651 Coolidge Road Suite 101
East Lansing, MI 48823-6360
(517) 351-2555

PROJECT SUMMARY

Project Code: 2023-0062568
Project Name: Village of Three Oaks Wastewater System Improvements Project
Project Type: Wastewater Facility - Maintenance / Modification
Project Description: Improvements to existing wastewater lagoons, pipe lining, and manhole lining.
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.802622549999995,-86.6172042231716,14z



Counties: Berrien County, Michigan

ENDANGERED SPECIES ACT SPECIES

There is a total of 9 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 2 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 Fisheries[1], 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.

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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 *Myotis sodalis* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5949 General project design guidelines: https://ipac.ecosphere.fws.gov/project/ZPQ45EDF3FCWJCITO7CY7324YI/documents/generated/6982.pdf	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045 General project design guidelines: https://ipac.ecosphere.fws.gov/project/ZPQ45EDF3FCWJCITO7CY7324YI/documents/generated/6983.pdf	Threatened
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME | STATUS

Piping Plover *Charadrius melodus* — Endangered

Population: [Great Lakes watershed DPS] - Great Lakes, watershed in States of IL, IN, MI, MN, NY, OH, PA, and WI and Canada (Ont.)

There is **final** critical habitat for this species. Your location does not overlap the critical habitat.

Species profile: https://ecos.fws.gov/ecp/species/6039

Red Knot *Calidris canutus rufa* — Threatened

There is **proposed** critical habitat for this species.

This species only needs to be considered under the following conditions:

- Only actions that occur along coastal areas during the Red Knot migratory window of MAY 1 - SEPTEMBER 30.

Species profile: https://ecos.fws.gov/ecp/species/1864

REPTILES

NAME | STATUS

Eastern Massasauga (=rattlesnake) *Sistrurus catenatus* — Threatened

No critical habitat has been designated for this species.

This species only needs to be considered under the following conditions:

- For all Projects: Project is within EMR Range

Species profile: https://ecos.fws.gov/ecp/species/2202

General project design guidelines:
https://ipac.ecosphere.fws.gov/project/ZPQ45EDF3FCWJCITO7CY7324YI/documents/generated/5280.pdf

INSECTS

NAME | STATUS

Mitchell's Satyr Butterfly *Neonympha mitchellii mitchellii* — Endangered

No critical habitat has been designated for this species.

Species profile: https://ecos.fws.gov/ecp/species/8062

Monarch Butterfly *Danaus plexippus* — Candidate

No critical habitat has been designated for this species.

Species profile: https://ecos.fws.gov/ecp/species/9743

FLOWERING PLANTS

NAME | STATUS

Pitcher's Thistle *Cirsium pitcheri* — Threatened

No critical habitat has been designated for this species.

Species profile: https://ecos.fws.gov/ecp/species/8153

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

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.

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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 Golden-plover *Pluvialis dominica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Bald Eagle *Haliaeetus leucocephalus* 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.	Breeds Dec 1 to Aug 31

NAME	BREEDING SEASON
Black Tern *Chlidonias niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Black-billed Cuckoo *Coccyzus erythropthalmus* 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 *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Cerulean Warbler *Dendroica cerulea* 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
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Golden Eagle *Aquila chrysaetos* 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
Henslow's Sparrow *Ammodramus henslowii* 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
Lesser Yellowlegs *Tringa flavipes* 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 *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Ruddy Turnstone *Arenaria interpres morinella* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere

NAME	BREEDING SEASON
Short-billed Dowitcher *Limnodromus griseus* 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
Upland Sandpiper *Bartramia longicauda* 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/9294	Breeds May 1 to Aug 31
Wood Thrush *Hylocichla mustelina* 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:

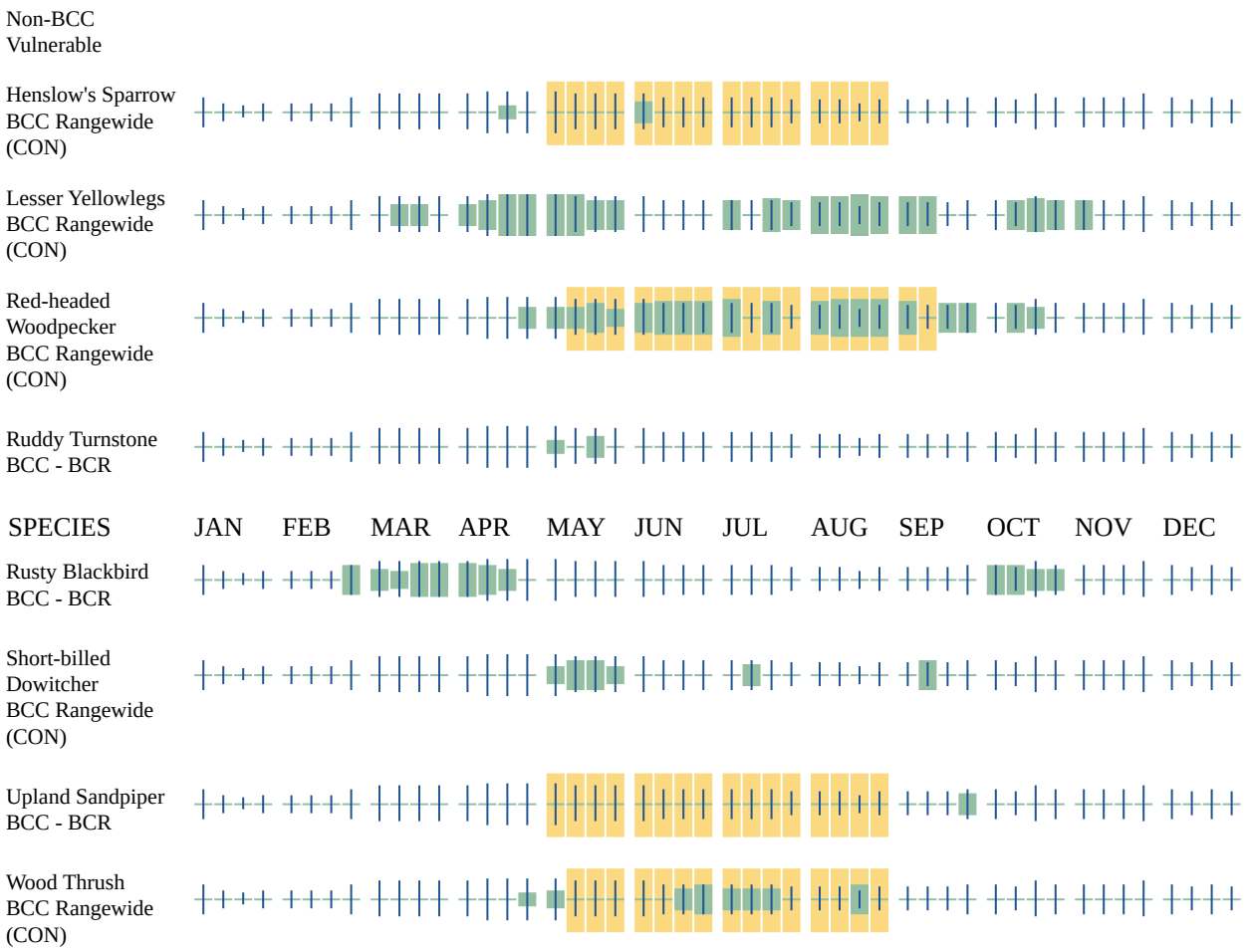
1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability 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 https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.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 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 list of migratory birds that potentially occur 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 Rapid Avian Information Locator (RAIL) 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 or migrating in my 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 query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. 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.

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1C
- PFO1A

FRESHWATER EMERGENT WETLAND

- PEM1A
- PEM1C

FRESHWATER POND

- PUBK
- PUBGx

RIVERINE

- R4SBC

IPAC USER CONTACT INFORMATION

Agency: Three Oaks village
Name: Andrew Rudd
Address: 433 E Ransom Street
City: Kalamazoo
State: MI
Zip: 49007
Email arudd@gowightman.com
Phone: 2693641664

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Michigan Department of Environment, Great Lakes, and Energy

APPENDIX K

LAGOON SIZING AND CAPACITY REPORT

PROJECT: **Wastewater Lagoon Capacity Analysis**

CLIENT: **Village of Three Oaks, Berrien County, Michigan**

DATE: October 12, 2022

Sampling Locations and Water Usage - Round 3 Sampling

From Water Usage Spreadsheet (provided by Village):

For analysis purposes, water use in the Village was divided into five (5) locations corresponding to the 5 sampling points as shown on the enclosed Sanitary Sewer System Map. Location 1 is at the Lagoon Lift Station, which conveys 100% of the Village wastewater flows to the treatment lagoons. Location 3 includes contributing flows from Location 4. Location 9 includes contributing flows from Location 8. A flow diagram has been attached to illustrate this flow schematic.

	Location 1	Location 3	Location 4	Location 8	Location 9
Water Usage (gal/yr)	10,270,900	4,358,000	1,829,100	1,366,000	15,494,000
Total Water Usage (gal/yr)	33,318,000	6,187,100	1,829,100	1,366,000	16,860,000
Percentage of water usage flow	30.8%	13.1%	5.5%	4.1%	46.5%
Percent of total water usage	100.0%	18.6%	5.5%	4.1%	50.6%
Wastewater Usage (gal/yr)	15,055,365	6,388,075	2,681,145	2,002,320	22,711,527
Wastewater Usage (gal/day)	41,248	17,502	7,346	5,486	62,223
Total Wastewater Usage (gal/yr)	48,838,431	9,069,220	2,681,145	2,002,320	24,713,847
Total Wastewater Usage (gal/day)	133,804	24,847	7,346	5,486	67,709

Total Water Usage Flow (gal/yr):	33,318,000
Total Estimated Wastewater Flow (gal/yr):	48,838,431
Average Wastewater Flow (gpd):	133,804

Excluding Journeyman Distillery, nearly all of the water use in the Village is domestic or small business; as such, it is assumed that water use can reasonably approximate sewer discharge volumes. The percentage of flow calculated from water usage data was then applied to total estimated wastewater lagoon flow to incorporate I/I volumes in the system. I/I was applied equally to all locations.

Concentrations Data: *From Three Oaks Wastewater Test Results (measured by Trace Analytical Laboratories, Inc.):*

Sampling was conducted at five (5) locations in August 2022 as previously discussed and as illustrated on the attached Sanitary Sewer System Map. BOD5, Ammonia, and Ethanol were tested from 8/15/22 to 8/21/22. Sampling at Location 1 was completed for a portion of the days due to a misunderstanding with the Laboratory. The following are the testing results, which are illustrated on the attached charts, including the averages:

Location 1

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
BOD_5 (mg/L)	-	-	590	300	320	-	-
Ammonia	-	-	37	37	40	-	-
Ethanol	-	280	0	6.4	2.9	-	-

Location 3

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
BOD_5 (mg/L)	330	330	290	220	360	540	430
Ammonia	3.3	34	36	33	39	49	46
Ethanol	2.7	0	14	1.5	17	0	50

Location 4

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
BOD_5 (mg/L)	420	600	270	120	440	650	860
Ammonia	33	28	26	16	24	34	22
Ethanol	3.7	0	8.4	0	32	34	14

Location 8

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
BOD_5 (mg/L)	270	350	370	250	400	490	360
Ammonia	47	38	27	42	40	46	49
Ethanol	3.7	0	47	0	27	12	14

PROJECT: **Wastewater Lagoon Capacity Analysis**

CLIENT: **Village of Three Oaks, Berrien County, Michigan**

DATE: October 12, 2022

Location 9

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
BOD_5 (mg/L)	210	320	350	300	340	440	450
Ammonia	44	38	37	45	47	42	46
Ethanol	2.4	0	1.2	0	13	2.1	4.7

Sampling Results: Round 3 Average Concentrations

	BOD_5 (mg/L)	Ammonia (mg/L)	Ethanol (mg/L)
Location 1	403	38.0	72.3
Location 3	357	34.3	12.2
Location 4	480	26.1	13.2
Location 8	356	41.3	14.8
Location 9	344	42.7	3.3

Mass Balance: Calculated Contributing Area Average Concentrations

	BOD_5 (mg/L)	Ammonia (mg/L)	Ethanol (mg/L)	Wastewater (gallons/Year)
Area 1	528	32.5	221.8	15,055,365
Area 3	305	37.7	11.8	6,388,075
Area 4	480	26.1	13.2	2,681,145
Area 8	356	41.3	14.8	2,002,320
Area 9	343	42.8	2.3	22,711,527
Ordinance Limit	300	No limit	Flammable, not allowed	

Average Loading Calculations: Based on Mass Balance Concentrations

	BOD_5 (lb/day)	BOD_5 %	Ammonia (lb/day)	Ammonia %	Ethanol (lb/day)	Ethanol %	Wastewater (gpd)	Flow %
Area 1	181.7	40.4%	11.2	26.4%	76.3	73.6%	41,248	30.8%
Area 3	44.5	9.9%	5.5	13.0%	1.7	1.7%	17,502	13.1%
Area 4	29.4	6.5%	1.6	3.8%	1.6	1.5%	7,346	5.5%
Area 8	16.3	3.6%	1.9	4.5%	1.9	1.8%	5,486	4.1%
Area 9	178.1	39.6%	22.2	52.4%	22.2	21.4%	62,223	46.5%
Summation Total	**450.0**		**42.4**		**103.8**		**133,804**	

Treatment Lagoons

Per 10 States Standards for Wastewater:

1) Treatment lagoons should be sized to provide a minimum of 180 days of detention time between the 2 foot level and the maximum operating depth of the entire lagoon system.

Treatment lagoons should be sized for either:

2.a) 15 to 35 pounds of BOD_5 per acre per day at the average operating depth in the primary cell(s) at the design average BOD_5 loading.
or

2.b) Less than 20 pounds of BOD_5 per acre per day at the average operating depth of all cell(s) at the design average BOD_5 loading.

PROJECT: **Wastewater Lagoon Capacity Analysis**

CLIENT: **Village of Three Oaks, Berrien County, Michigan**

DATE: October 12, 2022

From lagoon plan (Wightman drawing: X-613, dated July 1977):

Lagoon 1:

High water elevation (2-foot freeboard)	653	feet
Low water elevation (2-foot depth) =	648	feet
Median elevation (avg. operating depth	650	feet
Surface area at avg. operating depth =	10.9	acres (per X613)
Operating volume =	2,374,020	cubic feet (area at avg. depth * working depth)
	17,758,903	gallons

Lagoon 2:

High water elevation (2-foot freeboard)	653	feet
Low water elevation (2-foot depth) =	648	feet
Median elevation (avg. operating depth	650	feet
Surface area at avg. operating depth =	10.8	acres (per X613)
Operating volume =	2,352,240	cubic feet (area at avg. depth * working depth)
	17,595,977	gallons

Lagoon 3:

High water elevation (2-foot freeboard)	653	feet
Low water elevation (2-foot depth) =	645	feet
Median elevation (avg. operating depth	649	feet
Surface area at avg. operating depth =	13.6	acres (per X613)
Operating volume =	4,739,328	cubic feet (area at avg. depth * working depth)
	35,452,635	gallons

1) Total Lagoon Volume/Detention Time Analysis:

Total lagoon volume =	70,807,515	gallons
Detention time at present avg. day flow =	529	days

Treatment lagoon volume is sufficient to meet present conditions for hydraulic loading.

2.a) Primary Cell (Lagoon 1) BOD_5 Loading Analysis:

Calculated based on discharge and sampling data collected in the summer of 2022:

Average daily BOD_5 influent concentration =	403.3	mg/L	
Average daily influent flow rate =	133,804	gallons/day	
Daily BOD_5 loading at present avg. day =	450.1	lbs/day	
Primary lagoon BOD_5 loading (present) =	41.3	lb/acre/day	[Between 15 - 35 lb/acre/day]

2.b) Lagoon System BOD_5 Loading Analysis:

Daily BOD5 loading at present avg. day =	450.1	lbs/day	
Lagoon System BOD_5 loading (present) =	12.8	lb/acre/day	[Below 20 lb/acre/day]

The surface area of the total lagoon system is sufficient to meet present condition for BOD_5 removal requirements per the State of Michigan. The measured average BOD_5 loading rate of 12.8 lb/acre/day is below the upper limit of 20 lb/acre/day.

APPENDIX L

WASTEWATER COLLECTION SYSTEM REPORT

WIGHTMAN
it's all about people

April 14, 2023

Village of Three Oaks
P.O. Box 335
Three Oaks, MI 49128

Attention: ***Mr. Dan Faulkner, Village Manager***

RE: ***WASTEWATER COLLECTION SYSTEM ASSESSMENT REPORT***

Dear Mr. Faulkner:

The following are the results of the Wastewater Collection System Assessment, which included field inspections of the two (2) sanitary lift stations located in the collection system and a conditional assessment of all known collection system assets.

1.0 Background Information

The Village of Three Oaks, Michigan is located in the south-central portion of Berrien County in southwestern Michigan, approximately three miles from the Michigan and Indiana state line. Per the 2020 US Census, 1,370 people live in the Village. Three Oaks is served by US-12, Three Oaks Road, and the Amtrak Railroad. Interstate Highway 94 bypasses the Village approximately six (6) miles to the west.

The Village of Three Oaks treats sanitary waste discharged from the Village with a series of three (3) lagoons that are located on the east side of Schwark Road north of US-12 in Three Oaks Township and one (1) mile east of the Village. This system is operated under a Surface Water Discharge Permit Certificate of Coverage (COC) No. MIG580294 that authorizes the discharge under General Permit Number MIG580000.

In accordance with the Village's Administrative Consent Order (ACO) dated March 10th, 2023, an assessment of the wastewater collection system is required. The following sections of the ACO describe the requirements:

3.23 The Village shall conduct a detailed inspection of the entire wastewater collection system to document and repair structural integrity defects within the wastewater collection system in accordance with the following schedule:

a. On or before March 15, 2023, the Village shall complete a detailed inspection of the entire wastewater collection system.

b. On or before April 14, 2023, the Village shall submit to EGLE, for review and approval, a report that documents the detailed inspection of the entire wastewater collection system referenced in Paragraph 3.23(a) of this Consent Order. The report shall also document any repair work, with schedule, that is necessary as a result of the inspections. The Village is advised that implementation of repairs to the wastewater collection system may require Part 41 wastewater construction permits or may require other EGLE approvals.

Repair work identified in this report must be completed within twenty-eight (28) months after the effective date of the Consent Order.

2.0 History of Existing Wastewater Collection System

The first sewers in the Village of Three Oaks were constructed around 1932 using vitrified clay pipe with oakum mortar joints. They were originally intended to be used as storm sewers, however, due to the type of soil and high groundwater table, most of the individual septic tank systems were eventually connected to the storm system. The storm system discharged directly to surface water courses without treatment of any kind. The joints used on the original system had a tendency to shrink, allowing groundwater to enter the sewer. The vitrified clay pipe used for these sewers was susceptible to cracking if not bedded or backfilled properly. This was a historic source of infiltration for the collection system.

In 1970, a major renovation of the system was completed. An attempt was made to separate the sanitary and storm sewer systems through the construction of several new storm and sanitary sewers. A lagoon system was also constructed for wastewater treatment. In an attempt to save money, as much of the existing system as possible was utilized for sanitary sewers. Approximately 18,000 linear feet of gravity sewer and a pump station on US-12 were constructed to improve the collection system in 1970. These sewers were constructed of vitrified clay pipe with premium joints. In 1978, a collection system improvements project was undertaken with the goal of removing significant amounts of inflow and infiltration (I/I) from the system. Sections of the original 1932 sewers were replaced or repaired with chemical grout and manholes were replaced or repaired with hydraulic grout as part of the 1978 project.

In 2001, an extensive sanitary collection system improvements project was completed. The separation of the sanitary and storm sewer systems was accomplished with the construction of nearly 40,000 feet of PVC gravity sewer, replacing the remaining portions of the original 1932 clay sewers as well as deteriorated sections constructed in 1970. A sewer extension was completed in 2004 to serve a manufacturing facility located north of the Village in Three Oaks Township, and gravity sewer and a small grinder station were constructed in 2005 to serve a housing development constructed in the southeast corner of the Village.

3.0 Wastewater Asset Inventory

The Village of Three Oaks operates a wastewater collection system consisting of approximately 61,000 feet of 8-inch to 15-inch gravity sewer, 221 manholes, 2 lift stations ranging from 20 to 180 gallons per minute (GPM), and 2,900 feet of pressurized force main. The collection system is split into two distinct sewer districts, separated by the Amtrak railroad which runs east-west through the center of the Village. The north trunkline sewer conveys wastewater west from Chicago Street to the Village's treatment lagoons within an easement traversing a farm field. The south trunkline sewer conveys wastewater west along US-12 to just past the Village limits, then north to the treatment lagoons. In addition to the pipes in the collection system, the Village relies on two sewage lift (pump) stations to convey the wastewater from sub-sewersheds within the system.

With a thorough knowledge of the basic layout of the collection system, a comprehensive inventory of all wastewater system assets was performed using as-built utility drawings and previously obtained on-site Global Positioning System (GPS) field locations. Using the data collected, detailed maps of the wastewater collection system were prepared using Geographical Information System (GIS) software. Table 1 contains a summary of the wastewater system assets identified.

Item	Quantity	Units
15-inch Sanitary Sewer	3,270	LF
12-inch Sanitary Sewer	4,743	LF
10-inch Sanitary Sewer	9,854	LF
8-inch Sanitary Sewer	41,895	LF
Sanitary Manholes	221	EA
Lift Station	2	EA
Backup Generator	1	EA
6-inch Force Main	2,322	LF
4-inch Force Main	578	LF

Table 1 - Wastewater system assets

4.0 System Maps

Maps of the wastewater system identifying the collection system assets by diameter, by material, and by age are included in Appendix A. These maps were developed from an existing GIS map prepared for the Village and revised with record drawing information to improve accuracy.

5.0 Asset Conditions

After completing the inventory of the utility system assets, condition assessments of all asset components were performed. The condition assessment provides the critical information needed to assess the physical condition and functionality of the assets in the collection system and estimate their remaining service life. Within the sanitary collection system, pipe condition was primarily rated based upon the age and material of the pipe. This information was gathered through as-built records which provided information for a majority of the system. Targeted sections of gravity sewer were inspected using closed-circuit televising (CCTV) equipment designed for use in sewer pipes.

Both collection system lift stations owned and maintained by the Village were inspected in detail and the equipment was assessed by Wightman employees, including drawdown testing to determine the condition of the pumping equipment and photographing the various assets comprising the lift station. Examples of some of these pictures are shown in Figures 1 through 6.

Figure 1 - Highway Lift Station

Figure 2 – Highway Lift Station Wet Well

Figure 3 - Highway Lift Station Generator

Figure 4 – Highway Lift Station Control Panel

Figure 5 – Swan Song Grinder Station

Figure 6 – Swan Song Grinder Station Wet Well

During the field inspections discussed above, any notable equipment defects were documented. This information was used to make decisions about necessary station improvements.

Overall collection system asset conditions were assessed using a systematic method to produce consistent, useful information. This information was used to make estimates of each asset's remaining useful life and its long-term performance. The age and materials for the collection system were determined based upon the most recent as-built drawings.

The conditional assessment for the collection system assets that were not physically or visually inspected were based on a numerical grading system, which defines the condition as determined by the age and material of the asset. The numerical system uses numbers ranging from 1 to 5 as shown in Table 2 below.

Pipe Condition Rating	Condition Description	Age Range
1	Very Good	0 to 24 years old
2	Good	25 to 44 years old
3	Fair	45 to 59 years old
4	Poor	60 to 74 years old
5	Very Poor	75 years or older

Table 2 - Conditional assessment system

Inspections at the lift stations included physical and visual inspections of all the major components along with drawdown tests to determine the performance of the pumping equipment, as previously discussed. Table 3 shows the design capacity, current pump rates, and the condition of the individual components of the lift stations.

Station	Pump Design Capacity (gpm)	Pump 1 Test Rate (gpm)	Pump 2 Test Rate (gpm)	Wet Well Condition	Pump Condition	Electrical & Controls Condition	Generator Condition
Highway	180	150.3	169.1	Good	Fair	Fair	Good
Swan Song	20	18.8	15.0	Good	Good	Good	N/A

Table 3 - Wastewater system lift station condition ratings

6.0 Remaining Useful Life

Remaining useful life estimation is another method commonly used to characterize the condition of assets – especially those assets that were not physically or visually assessed. Remaining useful life is defined as an estimate of the duration of time remaining until an unacceptable condition exists or an asset no longer meets its primary function. It does not mean that the asset will fail at that point in time, but rather that replacement of the asset should be budgeted for due to rising maintenance costs, inability to find replacement parts, increased unreliability, and/or the potential for failure.

Remaining useful life for sanitary sewers is dependent on the materials used in construction. Sanitary sewer pipe materials have evolved over the years. Early piping was generally constructed of hollowed-out logs, brick, or stone and transitioned over the years to vitrified clay, cast iron, and concrete. Sewers constructed today are typically constructed from concrete, ductile iron, plastic (truss pipe), high-density polyethylene (HDPE), and polyvinyl chloride (PVC) piping. Early manholes were generally constructed of bricks, cast-in-place concrete, or segmented block and transitioned over the years to precast reinforced concrete.

Figure 7 shows the percentages of the various pipe materials that are present in the gravity sewers throughout the wastewater collection system. The pipe materials of construction are included as an attribute in each asset's entry in the electronic GIS mapping database.

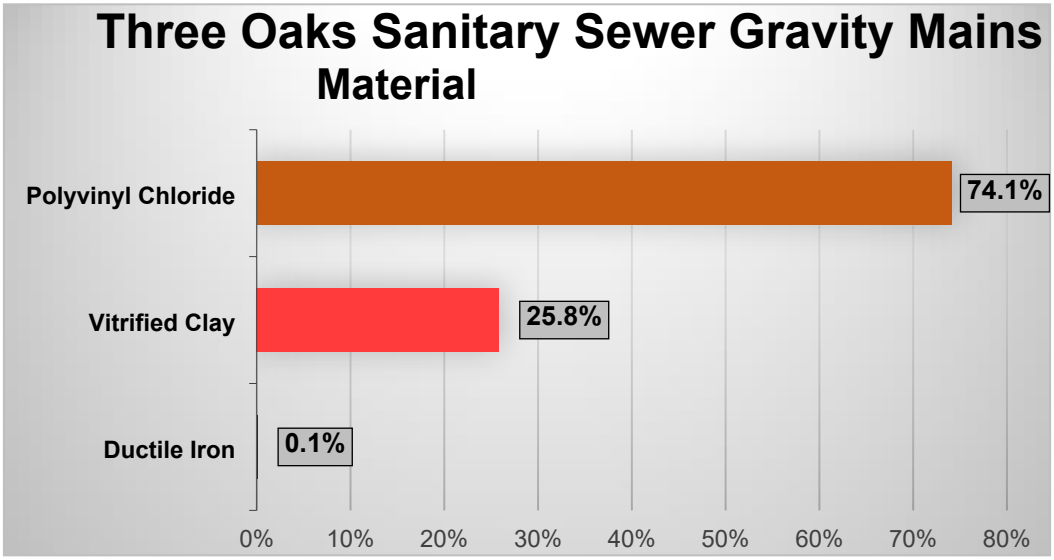


Figure 7 - Sanitary sewer gravity main pipe materials

There are several methods utilized to estimate the remaining useful life of an asset:

- The simplest method uses a typical useful life table, which lists the estimated total life of an asset type from its first day of use to when it is estimated to fail to function. Based upon the actual age of the asset, the remaining useful life is calculated. This method does not consider the current condition of the asset or any other factors.
- A second method utilizes a typical useful life table as well but applies a factor to the calculation based upon the current condition of the asset.
- A third method utilizes actual decay curves based upon the maintenance and failure experience of a specific asset or asset class for the utility in question. This is the most accurate method. However, most utilities do not have the historical data necessary to develop the decay curves.

Determining the useful life of an asset is as much art as it is science. For this report, the remaining useful life has been calculated using the second method discussed above – a typical useful life table modified by current condition factors. Table 4 presents the typical useful lives for the asset types included in the wastewater system.

Asset Type	Typical Useful Life (years)
Gravity Sewer Pipe (HDPE, PVC, Truss Pipe, Vitrified Clay)	100
Gravity Sewer Pipe (Brick, Cast Iron, Ductile Iron, ABS Plastic, Concrete)	75
Force Main Pipe (HDPE, PVC)	75
Force Main Pipe (Cast Iron, Ductile Iron)	50
Manholes/Concrete Structures	80
Pumps	20
Electrical and Controls	20
Mechanical (Equipment, Valves, etc.)	30
Structural Components	50
Land	Unlimited

Table 4 - Typical useful lives for wastewater assets

These typical useful life values have been increased or decreased for each specific asset based upon industry-standard specifications for materials and components. The estimated remaining life of each asset in the wastewater system is included as an attribute for that asset in the GIS mapping database. The estimated remaining life of the sanitary sewer gravity mains, force mains, and manholes, in ten-year increments, is shown in Figures 8 through 10.

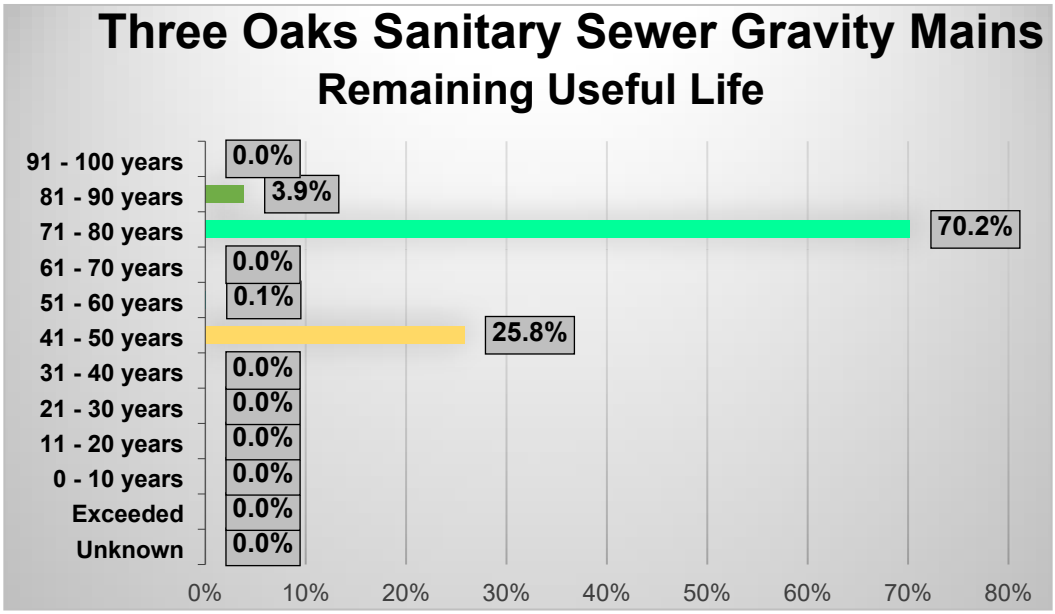


Figure 8 - Sanitary sewer gravity main remaining useful life

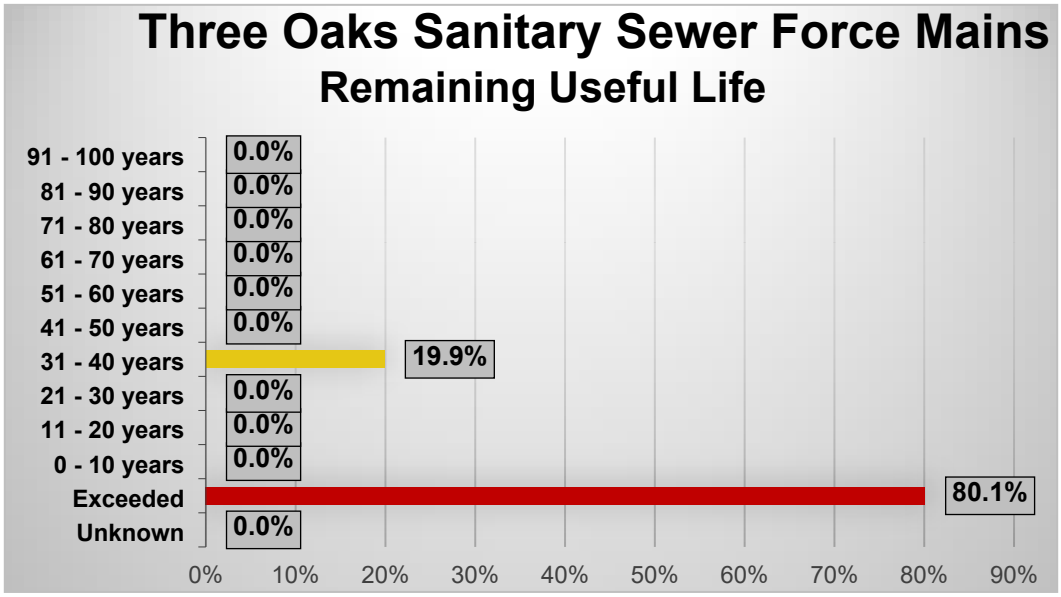


Figure 9 - Sanitary sewer force main remaining useful life

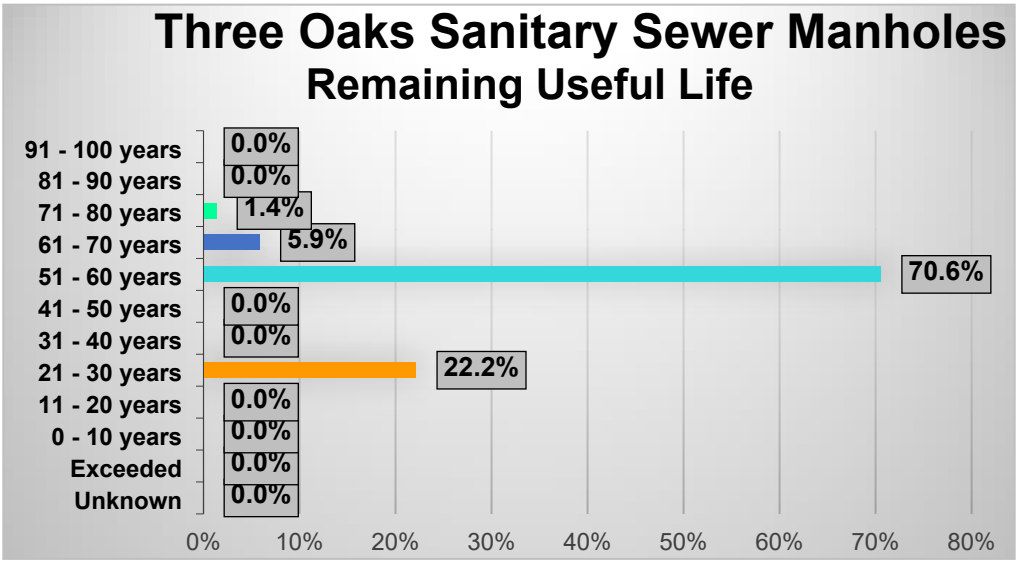


Figure 10 - Sanitary sewer manhole remaining useful life

7.0 Criticality, Likelihood of Failure, and Consequence of Failure

Not all assets are equally important to a utility's operation. While some assets may have a high likelihood of failure, their failure may cause little to no disruption in the ability of the utility to meet their level of service. Correspondingly, some assets may be unlikely to fail but their failure may cause a catastrophic disruption to the utility's ability to meet their desired level of service. Criticality is a rating that is applied to the assets that considers both the likelihood and the consequences of an asset failing.

Criticality is determined by multiplying the likelihood of failure by the consequence of failure and is a significant factor in prioritizing capital improvements. In general, the higher the criticality of an asset, the more resources that should be allocated to maintain the asset, or the higher the priority that repairs to that asset should take. However, criticality is only one tool that can be utilized to analyze and prioritize capital improvements and its use is subject to careful evaluation of the asset(s) in question and sound engineering judgement.

For gravity sanitary sewers, sanitary manholes, and lift station components, the likelihood of failure was determined by the conditional rating of the asset with consideration given to the remaining asset life as shown below in Table 5. The methodology of examining the asset conditions and assigning conditional ratings to noted defects was discussed previously. The likelihood of failure for all assets assessed based only on the remaining asset life was determined in accordance with Table 5.

Likelihood of Failure Rating	Asset Condition/ Description	Remaining Useful Life
1	Very Good	More than 90%
2	Good	60 to 89.9%
3	Fair	30 to 59.9%
4	Poor	10 to 29.9%
5	Very Poor	Less than 10%

Table 5 – Likelihood of failure assessment methodology

It should be noted, however, that the condition descriptions are carried over in the GIS model as the likelihood of failure. In other words, if an asset's condition is rated as a "4" (Poor) or "5" (Very Poor), that same description carries over as the

likelihood of failure indicating that the asset is in “Poor” or “Very Poor” condition rather than that the likelihood of failure is “Poor” or “Very Poor”. The opposite applies as well, with assets whose condition is rated as a “1” (Very Good) or “2” (Good) showing a likelihood of failure of “Very Good” or “Good”, again describing the condition of the asset rather than the likelihood that it will fail.

To determine the consequence of failure, it is important to consider the significant costs of failure. These costs include not only the monetary cost of the repair, but could also include:

- Social costs associated with the failure of the asset.
- Repair/replacement costs related to collateral damage caused by the failure.
- Legal costs related to damage caused by the failure.
- Regulatory fines resulting from a Sanitary Sewage Overflow (SSO) related to the failure.
- Environmental costs (and possible environmental cleanup costs) created by the failure.
- Loss of business revenue to the community caused by the failure.
- Other miscellaneous costs associated with the asset failure.

The consequence of failure can be high if any one of these costs is significant or if the accumulation of several costs occurs due to a failure. In the case of the failure of a wastewater asset, the environmental, social, and legal costs can outweigh the costs of collateral damage and even the cost of repairing the failure itself. The consequence of failure was assessed using the criteria presented in Table 6.

Consequence of Failure Rating	Social, Human, and Environmental Effects	Collateral Damage Effects
1 (Insignificant)	< 10% loss of service, limited potential for human contact with sewage, minimal property damage	Structure/pipe outside of road right-of-way (ROW), no impact to traffic or other structures
2 (Minor)	10% to 24% loss of service, potential for human contact with sewage, minimal property damage	Structure/pipe located under the pavement or curb of a residential or minor local road
3 (Moderate)	25% to 49% loss of service, potential for human contact with sewage, limited property damage, disruption to essential services/major industry	Structure/pipe located under the pavement or curb of a major collector roadway
4 (Major)	50% to 89% loss of service, likely human contact with sewage, moderate property damage, disruption to multiple industries/essential services	Structure/pipe located along state roadways, interstate highways, railroad ROW, or close enough to a building to cause collateral damage
5 (Catastrophic)	90+% loss of service, high potential of human contact with sewage, extensive property damage	Structure/pipe located under the pavement or curb of state roadways or interstate highways, under railroad tracks, or underneath a building

Table 6 - Consequence of failure rating scheme for wastewater assets

Utilizing the above ranking system, a thorough knowledge of the service area, and sound engineering judgement, a consequence of failure was assigned to each asset in the wastewater system. These consequence of failure values for each asset are included as an attribute for that asset in the GIS mapping database. The consequence of failure for the various asset classes in the wastewater collection system is shown in Figures 11 through 13 below.

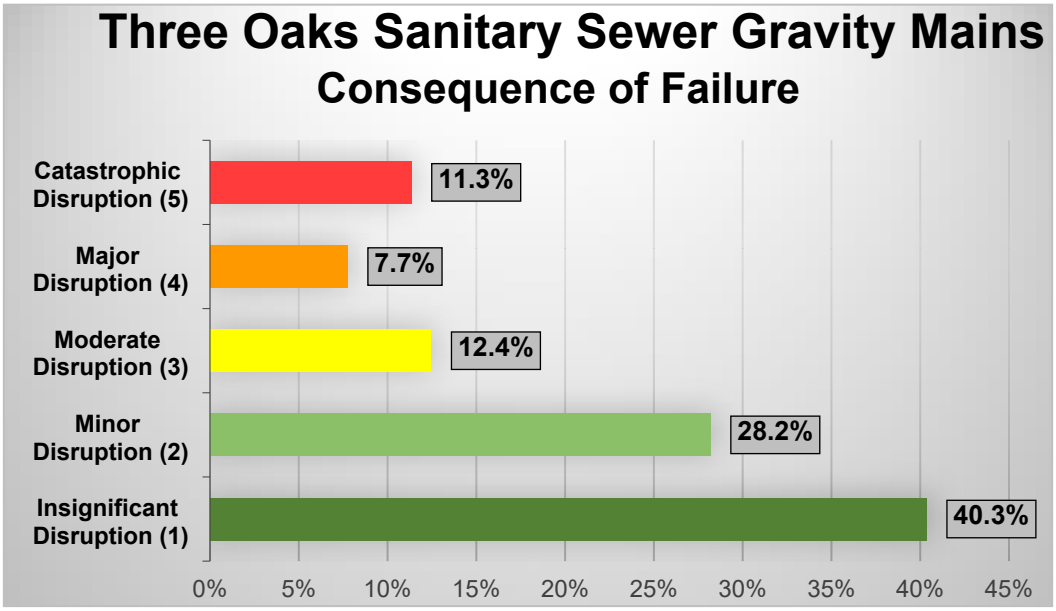


Figure 11 - Sanitary sewer gravity main consequence of failure rating

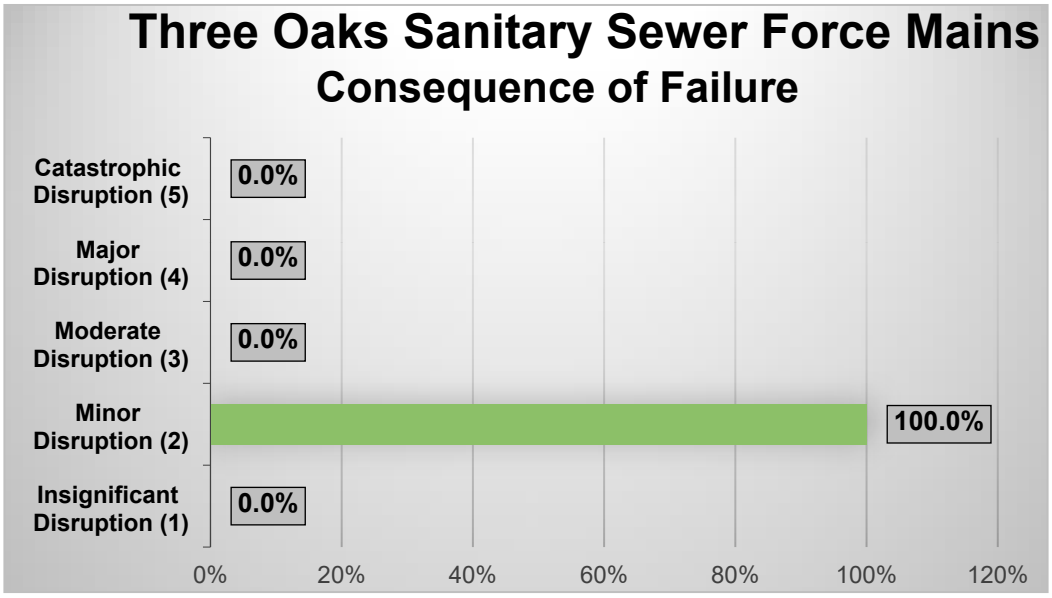


Figure 12 - Sanitary sewer force main consequence of failure rating

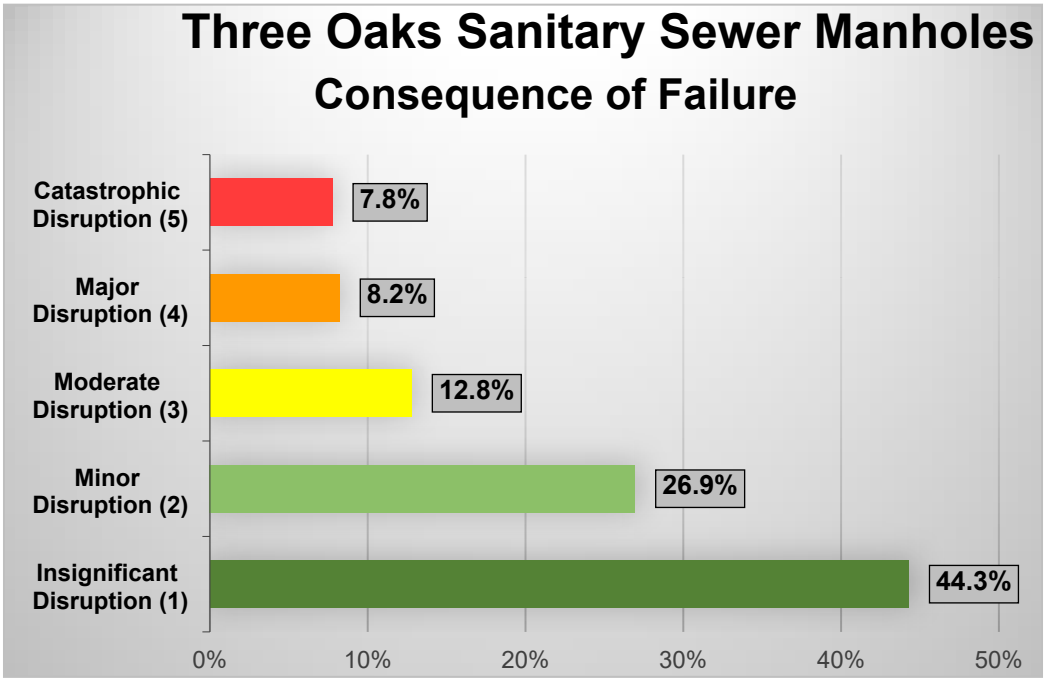


Figure 13 - Sanitary sewer manhole consequence of failure rating

8.0 Criticality Map

As previously discussed, the criticality of each asset was calculated by multiplying the condition rating corresponding to the likelihood of failure of the asset by the consequence of failure rating of the asset. As such, the range of criticality numbers that can be assigned to an asset is 1 to 25 with the criticality of the asset increasing the higher the number assigned to it, as shown in Table 7. The resulting criticality of each asset is included as an attribute for that asset in the GIS mapping database. A map of the wastewater collection system showing asset criticality is included in Appendix B.

Criticality Rating	Criticality Description
1 to 5	Very Low
6 to 10	Low
11 to 15	Moderate
16 to 20	High
21 to 25	Very High

Table 7 - Criticality rating descriptions

While the criticality ratings provide a point of reference to help in determining issues that may need to be addressed, it is only a tool. Sound engineering judgement still needs to be applied to determine if there is an issue with an asset that needs to be addressed by a capital improvement project.

9.0 Recommended Improvements

Based on the information gathered, the Village of Three Oaks sanitary collection system is generally in very good condition. CCTV inspections identified one (1) section of PVC gravity sewer approximately five (5) feet long on Featherbone Avenue that appears to have been crushed, likely during installation. We recommend the location be excavated and a spot repair be completed to replace the section of crushed pipe.

The Highway Lift Station located on US-12 conveys wastewater flows from the residential areas in the southeast section of the Village. Minor improvements have been completed at the station since it was constructed in 1970, and cyclical pump replacements and replacement of the control panel are needed at this time. Additionally, we recommend telemetry improvements be completed at both the Highway Lift Station and Swan Song Lift Station, such as the addition of Mission Control panels, to improve station monitoring and increase system reliability.

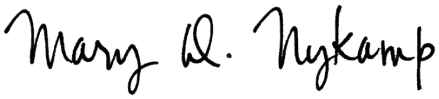
10.0 Schedule for Completion of Improvements

The Village of Three Oaks is in the process of applying to the Michigan Department of Environment, Great Lakes, and Energy's (EGLE) Clean Water State Revolving Fund (CWSRF) loan program for the above-mentioned collection system improvements, as well as for improvements identified at the wastewater treatment lagoons. The final Project Plan will be submitted to EGLE by the May 1, 2023 deadline for consideration of 2024 funding.

Plans, specifications, and permit applications will be completed by early 2024, with an anticipated project bid issuance occurring in April of 2024. If material and equipment procurement timelines continue to be prolonged, as has been the case since the COVID-19 pandemic disrupted supply-chains and manufacturing, construction of the improvements is likely to begin in early 2025. If material and equipment procurement timelines revert to pre-COVID-19 conditions, construction could start by late summer or early fall of 2024.

Sincerely,

WIGHTMAN & ASSOCIATES, INC.



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mnykamp@gowightman.com