VILLAGE OF EPHRAIM

FOUNDED 1853

Wastewater Committee Agenda
Monday, October 7th, 2024 - 9:00 AM
Village Hall 9996 Water Street

NOTE: This Meeting of the Village Wastewater Committee will also be held via teleconferencing. It will be available to the public to attend in person or by computer, phone, tablet, or dial in. Connection information is included below in this notice.

1. Call to order.
2. Changes in Agenda.
3. Previous minutes – 8/26/2024.
4. Visitors' comments.
5. Discussion and recommendation for the ITA/PERF submittal for possible projects in 2026.
6. Plant managers report.
7. Discussion and recommendation of the 2025 rates and charges.
8. Visitors' comments.
9. New business for next meeting.
10. Adjournment.

WW Meeting
Oct 7, 2024, 9:00 – 11:00 AM (America/Chicago)

Please join my meeting from your computer, tablet or smartphone.
https://meet.goto.com/885090437

You can also dial in using your phone.
Access Code: 885-090-437
United States: +1 (224) 501-3412

**It is possible that a quorum of the Village Board or other Village Committees may be present at the meeting. However, no action will be taken by any other Board or Committee unless specifically noticed.*

Andrea Collak, Clerk

Kim Roberts, Deputy Clerk

Date 10/3/2024
X Village Administrative Office
X Visitors' Center
X Post Office
X Website www.ephraim-wisconsin.com
X Emailed to WDOR/Peninsula Pulse

VILLAGE OF EPHRAIM

FOUNDED 1853

Wastewater Committee Minutes
Monday, August 26, 2024, 9:00 AM

Present: Karen McMurtry- Chair, Michael McCutcheon, Dennis Jewell, Bruce Nelson
Absent: Jim Peterman
Staff: Brad Rasmusson – Wastewater Manager/Operator in Charge, Dan Oakley – Operator, Andrea Collak – Clerk/Treasurer

1. **Call to order:** The meeting was called to order by Chair - McMurtry and a quorum was present for this meeting.
2. **Changes in Agenda:** None
3. **Previous minutes – Minutes from June 3, 2024**

   Nelson moved, McMurtry seconded to approve June 3, 2024, meeting minutes as presented, all ayes, and the motion carried.

4. **Visitors' comments:** None
5. **Ephraim Wastewater Operator in Charge Report**: Rasmusson reviewed the WW, WWT, and SS OIC reports as included in the agenda packet. Wastewater duties were completed according to schedule.

   On June 11th, a load of Aluminum Sulfate "Alum" was delivered.

   Cummins was on-site making repairs to the plant generator, luckily during the process the tech found that the water pump was broken and extremely worn out, on the edge of failure. The new pump was delivered from Green Bay and installed the same day.

   June 14 & 15th, helping with the building of the main Fyr-Bal fire and setting up, taking shifts during the Fyr-Bal event.

   June 21st, EDMR, long and short, was submitted.

   On July 4th, Rasmusson worked the holiday, garbage, flower watering, and bathroom cleaning.

   On July 10th, a confined space entry into the W. Basin was made to replace broken diffusers with the assistance of Dan and the maintenance department.

   On July 11th, a water lab audit with the Wisconsin of Agriculture, Trade and Customer Protection (DATCP). It was passed with flying colors. Dan deserves a lot of credit for the quality and condition of our lab.

   On July 12th, opened the W. Basin for wasting.

   On July 17th, submitted EDMR.

   July 29th, the water sample bottle vessel check.

   August 13th, cleaned Eff sampler and tubing

   WW met with the salesman from Advanced Microbial Solutions (AMS). They have had a lot

of success with removing organic sludge from lagoon systems but have yet to try their product in an extended air system such as ours. After several discussions, we decided to conduct an experiment at our facility. We purchased one tote of their sludge-removing bacteria, and they gave us a second tote to try it. There will be several before and after tests conducted including sludge characteristics tests on both sides. This product should either remove or reduce the amount of sludge. It could possibly change the future for a lot of plants. It is a good opportunity to try it with the uncertain future for biosolids. There will be plenty more information to follow.

The months of June and July 2024:
There were 481 in-house bacteria tests completed (913 for the year so far), 509 water tests (946 for the year so far), and 28 clean water tests (33 for the year so far). 29 holding tank pump-outs and 1 septic pump-outs. There were no emergency call-ins.

6. Discussion and recommendation regarding the 2025 Budget:
Rasmusson reported that he ***increased*** the budget in a few of the accounts.
Property Insurance 610-30-57401-211 – Raised to $7,500 because it cost $7,334.00 in 2024.
Phone 610-30-57401-306 -raised $400 because of slight overages in the last few years. This also includes the internet, and we might look at other options in the future.
Auditing Expense 610-30-57401-377 – raised $1,500 due to $1,400 over in 2023 and $1400 over to date in 2024.
Electricity/Generator Fuel 610-30-57402-303 - raised $3,000 due to a trend of going up roughly $3,000 per year for the last several years.
Chemicals Plant 610-30-57402-380 - raised $500 because of increasing costs and transportation in the last few years.
LP Gas Lift 1 Generator 610-30-57403-304 - raised $1,000 because of overages in 2023 and 2024.

Rasmusson noted that he ***decreased*** the budget in one account.
Training/Conferences 610-30-57401-320 - lowered $4,000. This was raised last year to get Dan's CDL which we will be working on this fall.

The budget stayed the same.
Vehicle Fuel 610-30-57401-310 – left at $2,500 because the overages over the past couple of years were due to the maintenance department using the WW F-350 for daily garbage collection and flower watering in the summer.
Sludge Expense 610-30-57402-383 – left at $20,000 because of the uncertain future, Sturgeon Bay is not accepting sludge in the summer of 2025. There is always an option to take the sludge to Green Bay.

The numbers for state income and insurance are just starting to come in so the decision will have to be fluid. Wages and health insurance will also have to be considered by the Village Board.

Rasmusson noted that the committees should also consider raising rates across the board except for the well water test by another 5% - 10% so that we can meet inflation and still

contribute to the replacement fund. Last year we went up 7%. The committee will discuss and consider rates at the next meeting.

McMurtry moved, McCutcheon seconded to approve 2025 Wastewater and Well Water Budgets as submitted, and pass it onto the Village Board, all ayes, and the motion carried.

8. **Visitors' comments:** None

9. **New business for the next meeting:** Rates. The next meeting to be determined.

10. **Adjournment**

McMurtry moved, Jewell seconded to adjourn the meeting, all ayes, and the motion carried.

Recorded by,
Andrea Collak- Clerk/Treasurer

Facility Plan Amendment

Wastewater Collection & Treatment System

Prepared for

VILLAGE OF EPHRAIM

DOOR COUNTY, WISCONSIN

McMAHON ENGINEERS ARCHITECTS

SEPTEMBER 13, 2024

McMAHON ASSOCIATES, INC.
1445 McMAHON DRIVE NEENAH, WI 54956 Mailing: PO BOX 1025 NEENAH, WI 54957-1025 PH 920.751.4200 MCMGRP.COM
McM. No. E0035-09-22-00363.04 / ESL:jlh

Facility Plan Amendment

Wastewater Collection & Treatment System

Prepared for

VILLAGE OF EPHRAIM
DOOR COUNTY, WISCONSIN

SEPTEMBER 13, 2024
McM. No. E0035-09-22-00363.04

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

APPENDICES

Chapter I
Introduction

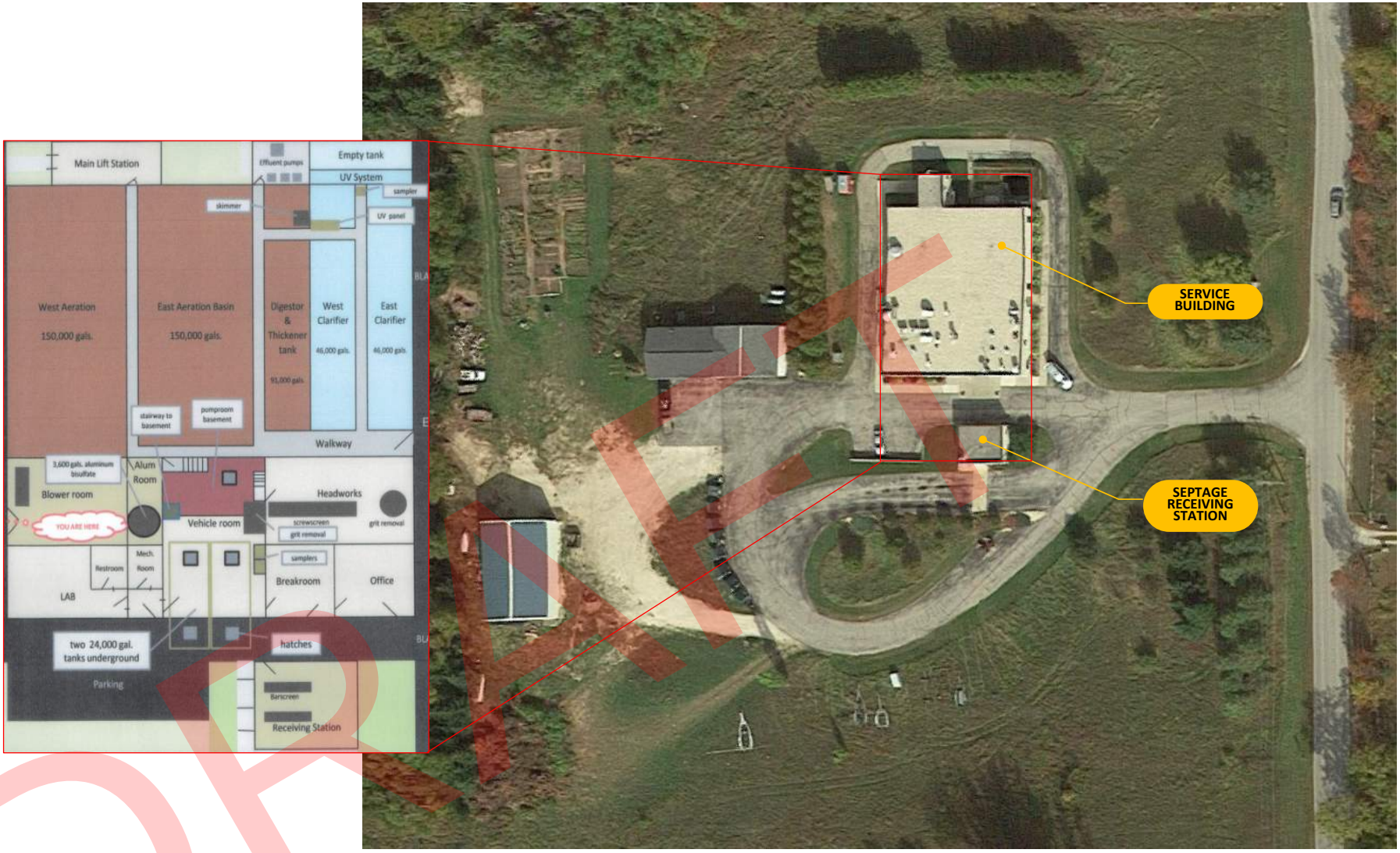
The Village of Ephraim, Door County, Wisconsin, owns and operates a wastewater collection system and Wastewater Treatment Facility (WWTF), located at 10285 Town Line Drive, Ephraim, Wisconsin, which currently serve a residential population of approximately 350 and a seasonal tourist population. The WWTF also accepts approximately 1.0 million gallons (MG) of septage and holding tank waste from surrounding areas each year. There are no industrial wastewater contributors to the system.

Most of the Village is served by a gravity sanitary sewer collection system, originally constructed in 1986, and two (2) sewage lift stations, one (1) at the public beach (Lift Station #1) and the other at the intersection of Spruce Street and Water Street (Lift Station #2), which pumps most of the Village's wastewater through an 8-inch force main to a newer section of gravity sewer on STH 42 flowing directly to the WWTF. Additional sanitary sewers and a WWTF on-site influent lift station were constructed in 2005 to serve the areas along STH 42 and Town Line Road near the WWTF. Properties along the bluff on the north (North Shore Road) and south (Crystal Springs Road) ends of the collection system are served by individual grinder pump stations and common low pressure sewer systems, which connect to the main collection system.

The WWTF, which was originally constructed in 1986, generally consists of the following major unit processes:

- Hauled-In Waste Receiving, Holding Tanks, and Pumping
- Raw Wastewater Pumping
- Fine Screening
- Vortex Grit Removal
- Conventional Activated Sludge Secondary Treatment
  - Two (2) Aeration Basins With Fine Bubble Diffusers
  - Two (2) Rectangular Shaped Final Clarifiers
  - Chemical Addition For Phosphorus Removal
- Ultraviolet Disinfection
- Effluent Pumping
- Aerated Sludge Holding Tanks and Loadout

An overall WWTF Site Layout is depicted in Figure I-1. A WWTF Process Flow Schematic is provided in Figure I-2.



McMAHON ENGINEERS ARCHITECTS

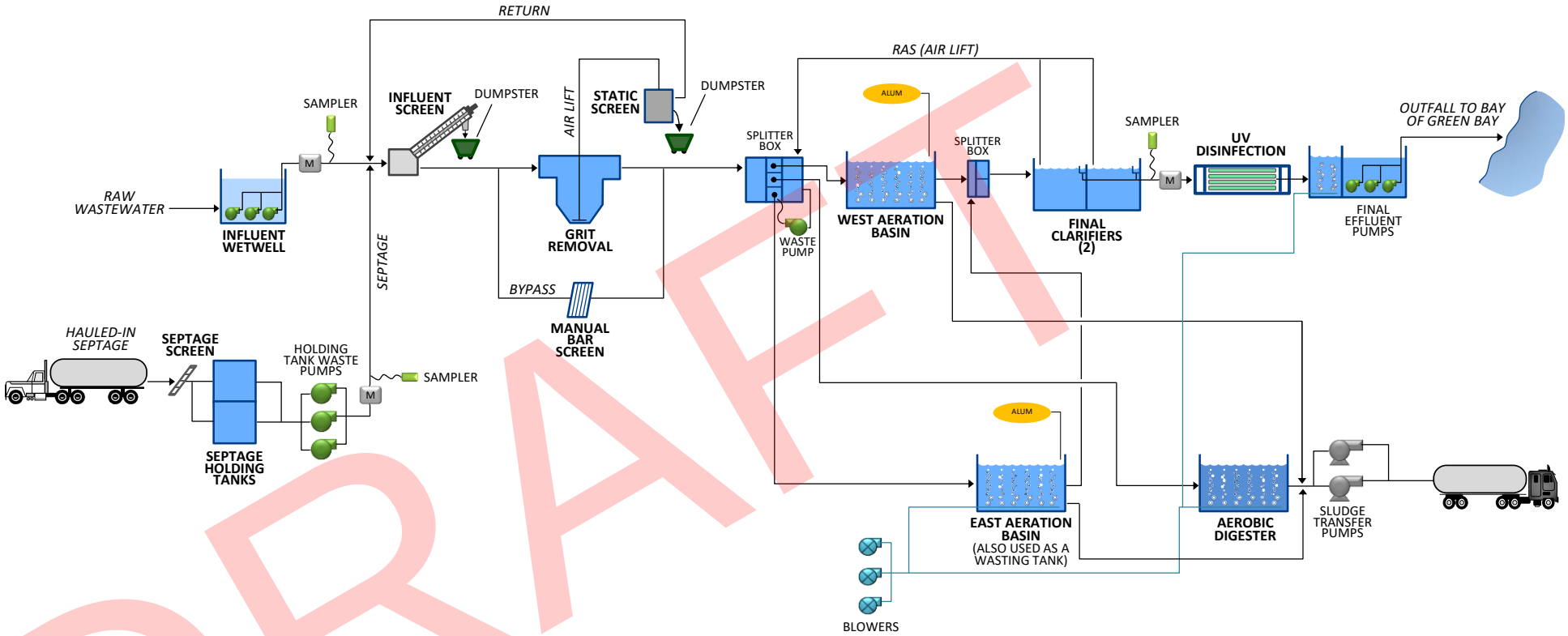
FIGURE I-1

WWTF SITE PLAN

WASTEWATER TREATMENT FACILITIES PLAN AMENDMENT
VILLAGE OF EPHRAIM, WI

McM #E0035-9-22-00363.04 1/31/2024

ID: \2023\MCM WIS\EPHRAIM, VILL OF-WWTF PROCESS FLOW SCHEMATIC.PPTX ESL



McMAHON ENGINEERS ARCHITECTS

FIGURE I-2

WWTF FLOW SCHEMATIC

WASTEWATER TREATMENT FACILITIES PLAN AMENDMENT
VILLAGE OF EPHRAIM, WI

McM #E0035-9-22-00363.04 1/31/2024

ID: \2023\MCM WIS\EPHRAIM, VILL OF-WWTF PROCESS FLOW SCHEMATIC.PPTX ESL

The original WWTF influent design criteria are summarized below.

Design Flows & Loadings	Peak Season	Off-Season
Flow, gpd		
Average	0.31	0.0827
Maximum Day	0.62	0.1654
BOD_5, lbs./day		
Average	1,400	300
Maximum Day	2,100	600
TSS, lbs./day		
Average	1,200	250
Maximum Day	1,800	500
Total P, lbs./day		
Average	48	10
Maximum Day	72	20

Peak season is assumed to be the period from May through October, while the off-season is assumed to be November through April.

Raw wastewater received at the WWTF is pumped from the influent lift station to the Headworks of the WWTF using three (3) submersible pumps. The raw wastewater is metered and sampled prior to being discharged in the Headworks. Hauled-in septage and holding tank waste is screened prior to being discharged into two (2) below grade concrete holding tanks. Three (3) positive displacement pumps transfer the hauled-in waste to the screening and grit removal process in the Headworks Room.

After screening and grit removal, the raw wastewater flows by gravity through a splitter box to the activated sludge secondary treatment system, which consists primarily of two (2) rectangular aeration basins and two (2) rectangular final clarifiers. Alum is added to the Mixed Liquor Suspended Solids (MLSS) between the aeration basins and final clarifiers for chemical Phosphorus (P) reduction. Return Activated Sludge (RAS) is recycled back to the aeration basin splitter box via air lift pumps.

During disinfection season (May through September) effluent from the final clarifiers is treated via UV disinfection prior to discharge. Following disinfection, effluent flows through a reaeration channel to the effluent wet well. Three (3) submersible pumps transfer treated final effluent to the outfall in Lake Michigan's Green Bay.

A portion of the RAS flow is pumped as Waste Activated Sludge (WAS) with a submersible pump to whichever aeration basin is not being used for treatment. The WAS is aerated and eventually transferred to the adjacent aerobic digester tank. The WAS is occasionally thickened in the aerated sludge holding tank and eventually hauled to the Sturgeon Bay Utilities WWTF for further treatment and disposal.

Chapter II
Water Quality Objectives

A. FEDERAL BACKGROUND

Major Federal legislation has previously been enacted in an effort to alleviate the pollution of the Nation's waters. The basic Federal Water Pollution Control Legislation is Public Law (PL 84-660), approved July 9, 1956, which has been amended by: 1) The Federal Water Pollution Control Act Amendment Of 1961 (PL 87-88); 2) The Water Quality Act Of 1965 (PL 89-234); 3) The Federal Water Pollution Control Act Amendment Of 1972 (PL 92-500); 4) The Clean Water Act Of 1977 (PL 95-217), with amendments in 1981; and 5) The Water Quality Act Of 1987.

The Water Quality Act of 1965 required each State adopt water quality criteria applicable to inter-state waters or portions thereof within the State, and adopt a plan for implementing and enforcing those criteria. It was soon found that the water quality standards were difficult, if not impossible, to enforce from an administrative viewpoint. The 1972 Federal Amendments sought to correct this situation by establishing restrictions for municipalities, based upon the concentration of certain pollutants in their wastewater. If these guidelines were found to be insufficient to ensure water quality criteria adopted under the 1965 Amendments, further treatment of wastes would be required to achieve the applicable standards.

The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500) replaced the previous language of Act (PL 84-660) and its amendments entirely. The 1977 Amendments to the Clean Water Act (PL 95-217) includes, in part, as its declared goals:

1. To restore and maintain the chemical, physical and biological integrity of the Nation's waters by:
    a. Eliminating the discharge of pollutants into navigable waters by 1985.
    b. Attaining, where possible, an interim goal of water quality, which provides for the protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and on the water, be achieved by July 1, 1983.
    c. Prohibiting the discharge of toxic pollutants in toxic amounts.
2. To recognize, preserve and protect the primary responsibilities and rights of States to reduce and eliminate pollution, to plan and use (including restoration, preservation, and enhancement) land and water resources. [1]

Although substantial progress has been made since passage of PL 92-500 and the 1987 Amend-ments, nevertheless, many waterways (notably marine estuaries, lakes, and rivers in heavily populated areas) still suffer from degradation. In amending the Clean Water Act of 1987, the basic issue lawmakers had to confront was that, after most technology standards called for in the 1970's

[1] Clean Water Act, as amended.

had been issued and the final push to get cities to provide a minimum of secondary treatment for sewage was at hand, some stubborn water pollution problems still remained. The most serious of these remaining problems are excessive levels of toxic pollutants in some waters (even where discharges have installed required pollution control technologies) and contained in runoff from 'non-point' sources, such as farmland and city streets.

The Water Quality Act of 1987 sought to correct these problems. The Amendments direct the Environmental Protection Agency (EPA) and State officials to supplement existing, nationwide technology-based standards with a water-quality-based approach to control persistent pollution problems. Essentially, Congress said regulators should identify waterways that are still polluted and do what is needed to restore them.

In other key changes, the Amendments:

1. Require permits for all discharges of stormwater from industrial facilities, and set deadlines for cities to obtain permits for stormwater discharges.
2. Limit the ability of industrial facilities to get exemptions or 'variances' from Federal pollution control regulations.
3. Prohibit, except in certain, narrowly-defined circumstances, 'backsliding' on permits or the weakening of treatment requirements when industrial and municipal discharge permits are renewed or reissued.
4. Extend deadlines for industries to comply with national pollution control standards to account for the fact that the EPA has not finished issuing some of these regulations.
5. Specify deadlines for the EPA to issue remaining, needed industrial effluent limitations.
6. Require the EPA to promulgate regulations to control toxic pollutants in sewage sludge.
7. Limit availability of modifications of Federal treatment standards for non-conventional pollutants for five well understood substances.

Recent Federal regulations have dealt with sludge management and toxins affecting the Great Lakes.

40 CFR, Part 503, sets standards for the use or disposal of sewage sludge. These regulations set metals limits, establish pathogen reduction standards, and establish vector attraction reduction standards for sludge being land applied. The Wisconsin Department of Natural Resources (DNR) administers these regulations through the Wisconsin Administrative Code, NR 204.

40 CFR, Part 132, establishes water quality guidance for the Great Lakes system. This regulation sets limits on bio-accumulating compounds. The Wisconsin DNR administers these regulations through NR 105 and 106, and via the Sturgeon Bay Utilities' Wisconsin Pollutant Discharge Elimination System (WPDES) permit.

Pretreatment regulations are also established by the Federal government for specific categories of industrial dischargers.

B. SANITARY SEWER SYSTEM OVERFLOWS

The EPA proposed revisions to National Pollutant Discharge Elimination System (NPDES) permit regulations to improve the operation of municipal sanitary sewer collection systems, reduce the frequency and occurrence of sewer overflows, and provide more effective public notification when overflows do occur. The goal of the proposal was to provide communities with a framework for reducing health and environmental risks associated with overflowing sewers. The anticipated result was to be fewer overflows, better information for local communities, and extended lifetime for the Nation's infrastructure. This Rule primarily addresses sanitary sewer overflows, not combined sewer overflows.

Sewer system overflows are covered by the Wisconsin DNR in Administrative Code NR 210 – Sewage Treatment Works. NR 210 requires the following:

- **Capacity Assurance, Management, Operation & Maintenance Programs**

  All permittees are required to implement a CMOM program. The goal of the program is to ensure collection systems have adequate wastewater collection and treatment capacity, and incorporate many standard operation and maintenance activities for good system performance. When implemented, these programs should provide for efficient operation of sanitary sewer collection system.

- **Notifying The Public & Health Authorities**

  Permittees must notify the public of any sanitary sewer and sewage treatment facility overflows consistent with its emergency response plan. Such public notification shall occur promptly following any overflow event using the most effective and efficient communications available in the community. At minimum, a daily newspaper of general circulation in the county(s) and municipality whose waters may be affected by the overflow shall be notified by written or electronic communication.

- **Prohibition Of Overflows**

  The existing Clean Water Act prohibition of sanitary sewer overflows that discharge to surface waters is clarified to provide communities with limited protection from enforcement in cases where overflows are caused by factors beyond their reasonable control or severe natural conditions, provided there are no feasible alternatives.

- **Expanding Permit Coverage To Satellite Systems**

  Satellite municipal collection systems are those collection systems where the Owner or Operator is different from the Owner or Operator of the Treatment Facility. Satellite collection systems are required to obtain WPDES permit coverage.

C. WISCONSIN ADMINISTRATIVE CODE REVISIONS

1. WISCONSIN DNR AMMONIA POLICY

The DNR Natural Resources Board approved the proposed ammonia regulations on October 22, 2003. A summary of the Rule changes related to Ammonia Water Quality Criteria are:

a. NR 104 - Uses & Designated Standards

The Ammonia Water Quality Criteria and effluent limitations of 3 and 6 mg/L that applied in summer and winter, respectively, for discharges to limited forage fish streams were deleted. Criteria for limited forage fish streams are included in NR 105 and effluent limitations are to be calculated similar to other aquatic life waters, as described in NR 106.

b. NR 105 - Surface Water Quality Criteria & Secondary Values For Toxic Substances

Acute and Chronic Ammonia Criteria are included in NR 105. The acute criteria relate to the pH of the effluent; the chronic criteria relate to both the pH and temperature of the receiving water body. These criteria were developed consistent with the EPA 1999 criteria update, and reflect the fish species present in Wisconsin. Criteria were developed for cold water fish, warm water sport fish, limited forage fish, and limited aquatic life classifications. These criteria are also protective for wildlife and human health uses. This approach establishes criteria that are necessary to assure attainment of the designated use for the water body receiving the discharge.

c. NR 106 - Procedures For Calculating Water Quality Based Effluent Limitations For Toxic & Organoleptic Substances Discharged For Surface Waters

A new subchapter, entitled '*Effluent Limitations For Ammonia Discharges*' was included. Although conceptually the same, the specific calculation procedures for determining an ammonia effluent limitation differs significantly from those used for other toxicants. Temperature, pH, and the percent of stream flow used, and the presence of early life stages of fish are all considered in determining the limits. It was, therefore, appropriate to establish a separate subchapter for ammonia. Additionally, the subchapter contains implementation procedures for lagoon and pond systems treating primarily domestic wastewater that is unique to ammonia. A one-time categorical variance procedure with an approximate 5-year term was developed for these systems.

d. NR 210 - Sewage Treatment Works

As in NR 104, the limits of 3 and 6 mg/L in the summer and winter, respectively, for discharges to intermediate (limited forage fish) streams were deleted. This was replaced with criteria in NR 105 and the effluent limitation calculation procedures in NR 106.

2. NR 217 PHOSPHORUS REGULATIONS

NR 217 was adopted in 1992, and established a technology based effluent Phosphorus limit of 1.0 mg/L for Wastewater Treatment Facilities. A limit of up to 2.0 mg/L was applicable for Facilities that employed biological Phosphorus removal systems. Municipalities discharging less than 150 lbs./month and industries discharging less than 60 lbs./month were exempt from the 1.0 mg/L limit. Revisions to the NR Codes were adopted on December 1, 2010. A summary of the Rule changes related to Phosphorus Water Quality Criteria are as follows:

a. NR 102 - Water Quality Standards For Wisconsin Surface Waters

New numeric water quality criteria for Phosphorus were established as follows for Wisconsin surface waters:

1) Large Streams.....0.1 mg/L
2) Small Streams.....0.075 mg/L
3) Non-Stratified Lakes & Impoundments.....0.040 mg/L
4) Stratified Lakes & Impoundments.....0.015 - 0.030 mg/L
5) Great Lakes.....0.005 - 0.007 mg/L

The new water quality criteria generally do not apply to the following water classifications:

1) Ephemeral streams.
2) Lakes and reservoirs of less than 5-acres.
3) Wetlands.
4) Waters identified as limited aquatic life water under NR 104.

However, discharges to the above water classes could be subject to Phosphorus Water Quality Based Effluent Limits (WQBEL's) to ensure that the applicable water quality criteria for downstream water classes are being achieved.

b. NR 217 - Effluent Standards & Limitations

New Subchapter III repealed and replaced NR 102.06, and includes detailed procedures for establishing WQBEL's for Phosphorus discharges. NR 217 also provided provisions for different types of Phosphorus limits, including:

1) WQBEL's

Takes stream flow and background Phosphorus concentration into account, where the limit is established at a concentration where resulting Phosphorus concentration downstream of the discharge is equal to the water quality criterion at the combined base stream and discharge flow.

2) Total Maximum Daily Load (TMDL)-Based Limits In Addition To Or In Lieu Of The WQBEL's

Considers contributions and potential reductions from non-point source discharges in determining discharge limits for point sources. A mass based limit is included, in addition to or in lieu of the WQBEL. Up to two (2) permit terms or 'specified implementation period' are provided for compliance with the TMDL, where the WQBEL may be applied if no progress is observed in the receiving water body.

3) Technology-Based Limits If More Stringent Than The WQBEL

The technology based limits of 1.0 mg/L and 2.0 mg/L (Biological P removal) will be in effect if they are more restrictive than WQBEL's.

In addition, the regulations are no longer wastewater specific, applying to other point source dischargers of Phosphorus, including non-contact cooling water discharges, Concentrated Animal Feeding Operations (CAFO's), and other sites where NR 151 and NR 216 regulations are not sufficient to meet the Water Quality Criteria established in NR 102. The WPDES permit limits will be expressed as a concentration (30-day rolling average) and a mass limit if the discharge is to a lake or reservoir, outstanding or exceptional resource water, impaired water, or surface water with approved TMDL for Phosphorus.

NR 217 also allows for an allowable load to be divided amongst multiple dischargers, establishes that the effluent limit cannot be more restrictive than NR 102 criteria, and new sources cannot discharge to an impaired water unless a TMDL has established reserve capacity, the discharger improves the water quality or a pollutant trade occurs. NR 217 provides some flexibility for compliance with WPDES permit effluent Phosphorus limits, including approved TMDL's, extended compliance schedules, and

variances for municipal stabilization ponds and storage lagoons, as well as Adaptive Management plans and pollutant trading options.

c. NR 151 - Runoff Management

New provisions were established to control runoff from farmland, including new agricultural performance standards, which place a numerical limit on the amount of Phosphorus that can be applied to agricultural fields. There are three (3) major changes to the previous NR 151 rules.

1) NR 151.03 prohibits crop producer from conducting a tillage operation that negatively impacts stream bank integrity or deposits soil directly in surface waters, and establishes tillage setbacks of greater than 5-feet but no more than 20-feet.
2) NR 151.04 establishes an average Phosphorus index of 6 or less over the accounting period, and no greater than 12 in any individual year during the period for croplands, pastures and winter grazing areas.
3) NR 151.055 restricts significant discharge of process wastewater to waters of the State.

   Permitted Non-Point Sources (CAFO's) are subject to these rules under their WPDES permits; however, unpermitted non-point sources are subject to these rules to the extent of cost-share or funding dollars offered to the non-point source for implementation of Best Management Practices (BMP's).

The changes to NR 151 affect wastewater treatment facilities two-fold:

1) It may be increasingly difficult to obtain suitable land for application of biosolids generated at wastewater treatment facilities.
2) Providing cost-share dollars for implementation of agricultural performance standards may provide a means of meeting NR 217 regulations through available Adaptive Management and Watershed-Based Effluent Trading.

NR 217 also allows for an 'Adaptive Management' approach, where up to three permit terms would be available for achieving compliance with Water Quality Standards. In order to be eligible for the Adaptive Management option:

1) The exceedance of Phosphorus Water Quality Criterion must be attributed to both point (wastewater treatment facilities) and non-point (agricultural) sources.
2) The sum of the non-point source plus permitted municipal separate storm sewer systems must be at least 50% or Water Quality Criteria cannot be met without non-point source control.

3) The permittee will be required to implement advance filtration or an equivalent technology to achieve compliance.

4) The Adaptive Management plan identifies specified actions that will achieve compliance with the water quality criterion.

Several reduction strategies are available under the Adaptive Management option including:

1) Providing financial support to non-point sources to implement BMP's, such as Nutrient Management Plans.

2) Working with other point sources to reduce Phosphorus loading.

3) Using Water Quality Trading to either meet the effluent limit or to meet an Adaptive Management tool.

4) Completing wetlands restoration within the watershed.

5) Creation of a bubble limit or watershed permit, which integrates the aggregate Phosphorus load on the watershed under a group or under a single permit.

6) Creation of a third party TMDL.

Watershed Trading is an option that can be used in conjunction with other compliance options, where another source reduces Phosphorus to satisfy the difference between the permittee's discharge and the WPDES permit limit. The DNR and EPA impose a number of conditions on acceptable Trades, unless the Trading is used to meet an Adaptive Management goal; in which case, the conditions are much more flexible because the Trades are being used to meet a management goal, and not a specific effluent limit. Generally, Trades will only be allowed with sources that contribute to the same stream segment, unless the Trade is within the context of a TMDL, which would allow for a broader reach. A Trade ratio would be included to address the uncertainty in non-point source reduction practices.

d. <u>Temperature Regulations</u>

Water Quality Standards for temperature have been established in NR 102 to protect fish and other aquatic life from lethal and sub-lethal effects. The rules primarily affect power plants and other industrial dischargers that add heat to process wastewater and non-contact cooling water; however, the rules also apply to municipal wastewater treatment facilities. The 'thermal limits' are based on both acute and chronic or sub-lethal impacts on aquatic life.

- Acute limits are established if the effluent discharge exceeds default values assigned to a particular classification of water body on a monthly basis or exceeds site specific stream temperatures based on wastewater treatment

facility data. For 'effluent dominated' streams, the temperature at the outfall can be used as the ambient temperature.

- Chronic limits are established if the effluent discharge exceeds default values or measured values, and the DNR determines, by examining several site specific factors, that the effluent has a reasonable potential to cause or contribute to the inability of the water body to support aquatic life.

Specific procedures for calculating WQBEL for temperature are specified in NR 106. These Rule changes became effective on October 1, 2010. Temperature sampling requirements and a Compliance Schedule to meet temperature limits would be set in the WPDES permit. The limitations and Compliance Schedule may be invalidated, if testing indicates that the temperature limit is not necessary.

D. SLUDGE REGULATIONS

1. 503 REGULATIONS

Land application of sewage sludge is regulated under CFR 40, Part 503, '*Standards For The Use Or Disposal Of Sewage Sludge*'. This regulation establishes two (2) levels of sewage sludge quality, with respect to heavy metal concentrations [ceiling concentrations and exceptional quality (see below)], two (2) levels of quality, with respect to pathogen densities (Class A or Class B), and two (2) types of approaches for meeting vector attraction reduction. In order for the sludge to qualify for land application, metals must be below ceiling limits, and the sludge must meet Class B requirements for pathogens and vector attraction reduction requirements.

a. Metals

Metals limits for land application of sewage sludge are summarized below:

LAND APPLICATION POLLUTANT LIMITS
(All Weights Are On Dry Weight Basis)

Table In 503 Rule	Table #1	Table #2	Table #3	Table #4
Pollutant	Ceiling Concentration Limits* (mg/kg)	Cumulative Pollutant Loading Rates (kg/ha)	"High Quality" Pollutant Concentration Limits * (mg/kg)	Annual Pollutant Loading Rates (lbs./acre/yr.)
Arsenic	75	41	41	1.78
Cadmium	85	39	39	1.69
Copper	4,300	1,500	1,500	66.9
Lead	840	300	300	13.4
Mercury	57	17	17	0.76
Molybdenum	75	N/A	N/A	N/A
Nickel	420	420	420	18.7
Selenium	100	100	100	4.4
Zinc	7,500	2,800	2,800	125

* Absolute Values
** Monthly Averages

To be land applied, bulk sewage sludge must meet the pollutant Ceiling Concentrations and Cumulative Pollutant Loading or Pollutant Concentrations limits.

b. Pathogen Reduction

Sewage sludge that is land applied must meet Class A or B pathogen requirements.

Class A sludge must meet one of the following criteria:

- Fecal coliform density less than 1,000 Most Probable Number (MPN) per gram of total dry solids; or
- Salmonella density less than 3 MPN/4 grams of total dry solids.

Class B sewage sludge must meet one of the following pathogen requirements:

- The sewage sludge must be treated by a Process To Significantly Reduce Pathogens (PSRP) process; or
- At the time of disposal, the geometric mean of sewage sludge samples must be less than 2,000,000 MPN/gram total solids (dry weight).

c. Vector Attraction

Vector attraction reduction reduces the potential for spreading of infectious disease agents by vectors (flies, rodents and birds). At a minimum, one of the following must be met prior to land application of the sludge for anaerobic processes:

- Minimum volatile solids reduction of 38% of raw sludge, compared to stabilized sludge.
- Injection - Liquid sludge should be injected beneath the soil surface, with no significant amount of sewage sludge present after 1-hour of injection (Class B) or 8-hours for Class A.
- Incorporation - Sewage sludge that is land applied on a surface disposal site shall be incorporated into the soil within 6-hours of application (Class B) or 8-hours for Class A. This applies to dewatered sludge.

2. NR 204 REGULATIONS

The DNR regulates sludge disposal through Chapter NR 204 of the Wisconsin Administrative Code. The 1996 Revisions to NR 204, for the most part, mirror the 503 Regulations. The major revisions to NR 204 are summarized as follows:

- Additional testing requirements are required of the sludge, depending upon its end use and facility size. These will be specified in the WPDES permit. Additional tests could include SOUR, salmonella, viruses, viable helminth ova and a priority of pollutant scan.
- The DNR defines an 'Exceptional Quality Sludge' as one that meets Class A pathogen requirements, high quality pollutant concentrations and vector reduction requirements of the 503 Regulations. Sludge certified as 'Exceptional Quality' is exempt from the minimum separation distances to residences, businesses, recreational areas, or property lines, if land applied. A permit is not required to land apply the sludge and site life is unlimited. Sludge may be commercially distributed in bulk, only if it is certified as exceptional quality.
- Application of sludge on frozen or snow covered ground is prohibited, unless a permittee can demonstrate that there are no other reasonable disposal methods available and there is absolutely no likelihood that the sludge will enter the waters of the State. Application may be approved on a case by case basis until storage is available.
- Sludge quality standards, with respect to vector attraction reduction, pathogen reduction and metals from the 503 Regulations are incorporated into these regulations, including site restrictions.
- All municipal mechanical treatment plants that land apply sludge shall have the ability to store sludge for 180-days.

E. WISCONSIN WATER QUALITY OBJECTIVES

The State of Wisconsin enforces the requirements of the Federal Water Pollution Control Act through the WPDES. This system is a permitting process, which permits point discharges of treated effluent to receiving waters. Effluent requirements are established by the DNR, based upon water quality limitations associated with the receiving waters; and are established for the protection of public health and welfare for the propagation of fish and wildlife, and for domestic, recreational, agricultural, commercial, industrial, and other legitimate uses.

F. CURRENT EFFLUENT REQUIREMENTS

The existing WWTF discharges to Lake Michigan's Green Bay. The discharge is permitted under WPDES Permit No. WI-0061271-07-1 (Appendix A), effective January 1, 2022, modified May 1, 2022. The effluent limits are based upon an annual average discharge flow of 0.31 mgd.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Sample Frequency	Sample Type
BOD_5			45 mg/L	30 mg/L	2/Week	F.P.
TSS			45 mg/L	30 mg/L	2/Week	F.P.
pH	9.0 s.u.	6.0 s.u.			5/Week	Grab
E. Coli				126#/100 mL	Weekly	Grab
Total Phosphorus				0.6 mg/L	2/Week	F.P.
NH_3-N	18 mg/L		18 mg/L	18 mg/L	Monthly	F.P.

F.P. = 24-hour flow proportional composite.

E. Coli limit of 126#/100 mL calculated using the geometric monthly mean. Also, no more than 10% of E. Coli samples in a month may exceed 410#/100mL. E. Coli limits apply May through September.

A. CURRENT INFLUENT FLOWS & LOADINGS

Influent flows and loadings to the WWTF, including both wastewater from the collection system and hauled-in waste, from 2019 through 2023 are summarized below in Table III-1. Additional tables showing monthly influent flows and loadings to the WWTF from 2019 through 2023 are provided in Appendix B.

TABLE III-1
SUMMARY OF INFLUENT FLOWS & LOADINGS - 2019 THROUGH 2023

Parameter	2019	2020	2021	2022	2023	Average	Max
Flow, mgd							
Average Day	0.090	0.083	0.075	0.081	0.075	0.081	-
Max Month	0.141	0.146	0.142	0.145	0.136	-	0.146
Max Day	0.270	0.209	0.182	0.185	0.197	-	0.270
BOD_5, mg/L							
Average Day	116	111	155	116	132	126	-
Max Month	207	189	231	158	180	-	231
Max Day	288	288	411	258	518	-	518
BOD_5, lbs./day							
Average Day	95	83	105	73	78	87	-
Max Month	253	221	268	176	197	-	268
Max Day	466	250	296	257	233	-	466
TSS, mg/L							
Average Day	125	135	176	134	153	144	-
Max Month	237	238	252	251	254	-	252
Max Day	550	718	775	468	1,060	-	1,060
TSS, lbs./day							
Average Day	102	98	114	77	86	96	-
Max Month	287	238	275	164	202	-	287
Max Day	582	474	304	223	248	-	582

Current seasonal flows and loadings to the WWTF compared to the plant's original design criteria are summarized in Table III-2.

TABLE III-2
CURRENT INFLUENT FLOWS & LOADINGS VS. DESIGN CRITERIA

	PEAK SEASON			OFF-SEASON		
Parameter	**[1] Current**	**Design**	**% of Design**	**[1] Current**	**Design**	**% of Design**
Flow, mgd						
Average Day	0.113	0.310	36%	0.048	0.083	58%
Max Day	0.270	0.620	44%	0.197	0.165	119%
BOD_5, lbs./day						
Average	140	1,400	10%	34	300	11%
Max Day	466	2,100	22%	136	600	23%
TSS, lbs./day						
Average	150	1,200	13%	41	250	16%
Max Day	582	1,800	32%	298	500	60%
[2] Total P, lbs./day						
Average	-	48	-	-	10	-
Max Day	-	72	-	-	20	-

1 2019 through 2023 Average and Max Day values.
2 Influent Total P is not monitored.

Peak season is assumed to be the period from May through October, while the off-season is assumed to be November through April.

Current flows to the WWTF during peak season are typically around 36% of the WWTF's rated peak season design capacity, while Biological Oxygen Demand (BOD) and Total Suspended Solids (TSS) loadings are typically in the 10 to 13% range of the rated peak season capacity. During the off-season, influent flows are roughly half of those observed during the peak season and are typically around 58% of the rated off-season capacity. Off-season peak flows often exceed the off-season capacity of the plant during late March or April, which is likely associated with snowmelt and spring rainfall. Off-season BOD and TSS loadings are roughly 25% of those observed during the peak season and are typically around 11 to 16% of the rated off-season capacity.

B. WWTF PERFORMANCE

WWTF effluent discharges from 2019 through 2023 are summarized in Table III-3. Additional tables showing monthly WWTF effluent discharges from 2019 through 2023 are provided in Appendix B.

TABLE III-3
SUMMARY OF EFFLUENT FLOWS & LOADINGS - 2019 THROUGH 2023

Parameter	2019	2020	2021	2022	2023	Average	Max
Flow, mgd							
Average Day	0.087	0.080	0.072	0.078	0.071	0.078	-
Max Month	0.135	0.141	0.136	0.137	0.129	-	0.141
Max Day	0.265	0.204	0.176	0.183	0.197	-	0.265
BOD_5, mg/L							
Average Day	4.3	3.4	3.4	3.5	3.9	3.7	-
Max Month	5.0	4.0	4.6	4.8	5.4	-	5.4
Max Day	9.4	6.0	6.1	7.4	11.1	-	11.1

TABLE III-3
SUMMARY OF EFFLUENT FLOWS & LOADINGS - 2019 THROUGH 2023

Parameter	2019	2020	2021	2022	2023	Average	Max
TSS, mg/L							
Average Day	11.6	7.7	8.3	11.1	10.8	9.9	-
Max Month	16.4	12.7	10.9	15.1	14.6	-	16.4
Max Day	21.2	18.6	16.8	22.0	21.9	-	22.0
Total P, mg/L							
Average Day	0.33	0.30	0.28	0.29	0.30	0.30	-
Max Month	0.54	0.56	0.45	0.45	0.38	-	0.56
Max Day	0.88	0.80	0.53	0.63	0.43	-	0.88
NH3-N, mg/L							
Average Day	0.11	0.06	0.13	0.10	0.14	0.11	-
Max Month	0.61	0.29	0.82	0.23	0.14	-	0.82
Max Day	0.61	0.29	0.82	0.23	0.14	-	0.82
E. coli, #/100mL							
Average Day	1.6	2.1	1.1	1.1	1.1	1.4	-
Max Month	3.3	3.9	1.4	1.5	1.3	-	3.9
Max Day	9.5	7.5	3.2	2.0	2.0	-	9.5
pH, s.u.							
Min Day	6.9	6.6	6.9	6.9	6.8	6.6 (Min)	-
Average Day	7.2	7.1	7.3	7.2	7.3	7.2	-
Max Day	7.9	7.7	7.6	7.5	7.8	-	7.9

The WWTF has performed quite well over the last 5-years. Current effluent permit limits are provided below.

- BOD_5
  - 45 mg/L (Weekly Avg)
  - 30 mg/L (Monthly Avg)
- TSS
  - 45 mg/L (Weekly Avg)
  - 30 mg/L (Monthly Avg)
- pH
  - 6.0 to 9.0 s.u. (Daily Min and Max)
- E. coli
  - 126#/100 mL (Geometric Monthly Mean)
  - 10% Exceedance (Monthly, % of samples >410#/100 mL)
- NH3-N
  - 18 mg/L (Daily Max, Monthly Avg, and Weekly Avg)
- Total P
  - 0.6 mg/L (Monthly Avg)

Effluent results have been well below permit limits, resulting in no effluent limit exceedances over the last 5-years.

C. BIOSOLIDS QUANTITIES

The volume of biosolids hauled from the Village of Ephraim WWTF, annually, from 2018 through 2023, is summarized in Table III-4.

TABLE III-4
BIOSOLIDS QUANTITIES HAULED

Year	Gallons/Year	Destination
2018	150,000	Sturgeon Bay Utilities WWTF
2019	159,000	Sturgeon Bay Utilities WWTF
2020	151,500	Sturgeon Bay Utilities WWTF
2021	156,600	Sturgeon Bay Utilities WWTF
2022	182,000	Sturgeon Bay Utilities WWTF
2023	154,000	Sturgeon Bay Utilities WWTF

Year 2022 saw the highest volume of biosolids hauled from the Village's WWTF, with a total of 182,000 gallons. Typically, the average annual volume of biosolids hauled out is between 150,000 and 160,000 gallons. Most loads are 7,000 gallons. Therefore, approximately 21 to 23 loads of biosolids hauled off-site annually, while in 2022 approximately 26 loads were hauled.

D. NEEDS ASSESSMENT

The existing WWTF was assessed with respect to age, condition, capacity, performance, and code compliance. The purpose of the Needs Assessment is to establish a basis for the need for improvements to the WWTF to comply with permit requirements, current codes, and future flows and loadings. Each unit process is evaluated individually. Code compliance is based upon Chapter NR 110 of the Wisconsin Administrative Code and the National Electric Code (NEC).

1. SANITARY SEWER COLLECTION SYSTEM

The Village's collection system consists primarily of gravity sewer with two (2) sewage lift stations, one located at the public beach within the bathhouse (Lift Station #1) and the other at the intersection of Spruce Street and Water Street (Lift Station #2). Lift Station #1 transfers wastewater north along Highway 42 to the gravity sewer flowing toward Lift Station #2. Lift Station #2 handles all the original collection system, pumping wastewater up to the WWTF site. Sections low pressure sewer main serve properties along the bluff off North Shore Road in the north end of the Village and along Crystal Springs Drive on the south end of the Village.

a. Low Pressure Sewer System

The low-pressure force main, which serves properties with privately owned individual grinder pump stations, transfers residents' wastewater from North Shore Road to the gravity sewer main at North Water Street. The force main has experienced freezing during winter months when some properties in the area are unoccupied, resulting in stagnant flow conditions in the main and exposure to

frozen soil, both from frost penetrating below the paved road above and exposure from the adjacent bluff. The Village has mitigated pipe freezing by periodically unloading water at a private grinder pump station near the end of the south leg.

A "Freeze Mitigation Study" of the North Shore low pressure force main was conducted in 2016 to identify feasible alternatives for eliminating the freezing issues. Several alternatives were evaluated including (1) continuing the current practice of hauling water to the grinder pump station near the head of the force main, (2) construction of a well to supply water to a pump station and, in turn, the low pressure force main, (3) heat tracing the section of force main affected by freezing, and (4) insulating the section of force main affected by freezing. The study recommended continuing the practice of hauling water to the private grinder pump station. However, this practice relies on cooperation from the property owner. The most feasible long-term remedy is likely insulation of the section of impacted force main. However, the force main is below a private road, and work would need to be coordinated with the property owners.

b. Gravity Sewer

The Village's sanitary sewer collection system is generally believed to be in good condition. However, there are several unused lateral stubs at vacant lots along Larson Lane, Hidden Springs Road, and Brookside Lane that are believed to be leaking and a source of clear water (infiltration) to the collection system and WWTF. A corrective measure to eliminate this source of infiltration would involve lining the sections of sewer main at each lateral location. The lining could then be cut out at the lateral connection to the sewer main when a customer connects to the lateral stub in the future.

c. Lift Station #1 (Public Beach)

Lift Station #1 consists of two (2) 3 HP Ebara submersible pumps and ductile iron discharge piping in a precast concrete manhole located inside the bathhouse building and a separate precast concrete below grade valve vault with rubber "duckbill type" check valves and plug valves outside the building. A spare pump is normally kept on-site. A monorail beam and electric hoist were provided for removing the pumps from the wet well for service. The pumps are operated from the control panel using a level sensor with float backup system. The pump station is remotely monitored using both landline alarm communication and Mission Communication managed SCADA. A propane fueled generator installed outside the building in a weather enclosure provides backup power for the lift station.

The main issues identified with Lift Station #1 primarily include pump ragging issues and extended run times during rain events. In addition, there is metal corrosion evident in the lift station wet well and valve vault; however, the precast

structures appear to be in good condition. The lift station control panel is showing its age and some of the electrical components associated with the lift station may not be suitable for the environment.

Suggested improvements to Lift Station #1 include the following:

- Replacement of submersible pumps and slide rail systems with new pumps with higher capacity and ability to handle rags without clogging.
- Replacement of piping in both the wet well and valve vault with stainless steel piping.
- Replace check valves and plug valves in the valve vault.
- Replace wet well hatch with a tighter sealing hatch including safety grating for fall protection.
- Upgrade lift station electrical, controls, and telemetry with modern technology and components suitable for the environment in which they are installed.
- Replace the generator if necessary to operate new pumps.
- Inspection and televising of the collection system serviced by the lift station to identify sources of infiltration.

d. **Lift Station #2 (Spruce Street & Water Street)**

Lift Station #2 is a Usemco wet well/dry well "can style" pump station originally installed in 1989. The wet well is a combination of precast concrete base and an upper fiberglass barrel section. The can style dry well contains two (2) centrifugal pumps and associated ductile iron piping and valves. The pump volutes were recently replaced in 2021 following failure and flooding of the dry well. The below grade dry well is also provided with a local control and power distribution panel, sump pump, and heating and ventilation systems. The lift station's main control panel and emergency backup diesel generator with automatic transfer switch are installed in the nearby Smith Building.

While the lift station dry well and wet well structures and internal components generally appear to be in good condition, the main issues identified at Lift Station #1 primarily involve Operator safety. Accessing the dry well presents safety hazards for operating staff. A 25-foot ladder is provided for access to the dry well, which is considered a "confined space." In addition, the pumps often need to be re-primed by operating staff. The lift station controls and backup generator are also showing age and may need replacement in the near future.

Suggested improvements to Lift Station #2 include the following:

- Replacement of existing lift station with a new submersible type pump station including precast concrete wet well and valve vault structures and modern control panel. The existing wet well would be converted to a flow through manhole, discharging to the new lift station wet well.
- Replacement of the backup generator.
- Integration of fire and intrusion monitoring of the Smith Building.

2. WASTEWATER TREATMENT FACILITY

a. Site & Structures

The existing WWTF site primarily includes a masonry block hauled-in waste receiving station and a masonry block main treatment building which utilizes cast-in-place concrete common wall construction and houses all of the main unit processes in the treatment train as well as a laboratory area with office space. Both buildings have precast roof panels covered with tapered insulation, single ply membrane roofing, and gravel ballast. The site is accessed off of Townline Road by an asphalt drive which loops around both the main treatment building and the hauled waste receiving station.

The on-site structures were originally constructed in 1986, while a public works garage was later constructed west of the main treatment building. An influent lift station addition to the main treatment building was constructed in 2005. The main WWTF building roofing was replaced around the same time.

While the facilities and grounds have generally been well maintained, the main treatment and hauled-in waste receiving buildings are approaching 40-years old and are in need of some general improvements to extend their service life.

Suggested improvements to the WWTF site and structures include the following:

- Mill and overlay existing asphalt paving.
- Inspect membrane roofing system and replace if necessary.
- Address cracks in exterior masonry walls.
- Paint exposed metal surfaces and replace entry and overhead doors with extensive corrosion.
- Inspect all exposed piping and paint or replace as needed.
- Replace building lighting with modern, energy efficient fixtures.
- Improve HVAC systems in corrosive areas.

b. Hauled-In Waste Receiving Station, Holding Tanks & Transfer Pumps

The WWTF currently accepts hauled-in waste from surrounding unsewered areas. Hauled-in waste facilities primarily include a receiving station with mechanical and manual screening as well as two (2) below grade cast-in-place concrete holding tanks and three (3) positive displacement transfer pumps, which discharge the holding tank waste to the main treatment facilities at a controlled rate. The Village also owns and operates a tanker truck for collecting and hauling septage and holding tank waste to the WWTF.

The existing mechanical screening unit has failed and is no longer in operation. Metal channel mounted bar screens, which require frequent manual cleaning, are currently used to remove foreign objects from the hauled-in waste stream. The holding tank access hatches, both inside and outside of the main treatment building, are corroded and in need of replacement. The cast-in-place concrete tank cover outside the building is also showing wear and is in need of repairs. The three (3) Penn Valley double diaphragm style transfer pumps have been rebuilt and are in good working condition; however, associated piping and valves are showing age and are in need of rehabilitation or replacement. The Village's tanker truck dates back to the 1990's, has surpassed its service life, and is in need of replacement.

Should the Village intent to continue hauling and accepting septage and holding tank waste at the WWTF, suggested improvements to the hauled-in waste facilities include the following:

- Replacement of the existing mechanical screening equipment.
- Replacement of the interior and exterior holding tank hatches with tight sealing gasketed traffic rated hatches.
- Repairs to the outdoor portion of concrete holding tank cover
- Inspection and repairs to holding tank interior concrete as necessary.
- Replacement of transfer pump valves and painting or replacement of transfer pump piping.
- Installation of a direct connection for unloading hauled-in waste including piping, a hose, and 6-inch camlock fitting to mitigate spills.
- Replacement of the hauled waste tanker truck with modern equipment that may also be used for sewer cleaning.

c. Influent Lift Station

The influent lift station building addition to the main treatment building was constructed in 2005 in conjunction with sanitary sewer construction to serve the area immediately surrounding the WWTF on Highway 42 and Town Line Drive.

The influent lift station primarily includes three (3) 5 HP Ebara submersibles in a precast concrete wet well with ductile iron discharge piping and an above grade ductile iron discharge piping and valve nest. A spare pump is kept on-site. A monorail beam and chain hoist are provided for servicing the pumps. A Motor Control Center (MCC) with Variable Frequency Drives (VFDs) for pump operation was installed inside the influent lift station building.

While the influent lift station facilities generally appear to be in good condition, the influent lift station has been problematic since construction. The submersible pumps initially needed to be modified with new volutes and impellers to provide sufficient capacity, and the VFDs meant to flow pace the pumps have never been used. The very large common access hatch above the pumps with no fall protection presents a safety issue for operating staff. While some of the influent lift station building's electrical components appear suitable for a hazardous classified area, the MCC and associated VFDs, panels, and lighting do not appear to be suitable for the area, which is also considered very corrosive. Area classification requirements are likely met through continuous ventilation of the space.

Suggested improvements to the influent lift station include the following:

- Replacement of submersible pumps as they reach their service life.
- Modification or replacement of the wet well access hatch to a vapor tight seal when closed and fall protection grating when open.
- Relocation/replacement of the MCC and other electrical components outside of the corrosive and hazardous classified area.
- Modification of controls to allow for variable speed pumping.
- Modifications to HVAC equipment to improve efficiency.
- Removal of items currently stored in the influent lift station building.

d. Headworks Facilities (Influent Fine Screening & Grit Removal)

Preliminary treatment, consisting of fine screening of foreign objects and grit removal from the influent raw wastewater, is currently provided within a designated area (Headworks) of the main treatment building. A channel mounted cylindrical fine screen, consisting of a perforated basket strainer and spiral conveyance screw, was installed approximately 13-years ago, replacing the original mechanical bar screen. Following screening, the raw wastewater flows by gravity through a vortex type grit removal chamber and on to the flow splitting box upstream of the secondary treatment system. The existing Smith and Loveless Pista Grit system with air lift type transfer system and slope screen type grit separator are original to the treatment facility. The grit removal unit has been rebuilt since installation.

The fine screen, which was built by Lee's Contracting/Fabrication, Inc. and installed 13-years ago, appears to be in good working order. However, foreign objects can be found in the sludge and treated effluent, which brings into question the efficiency and capacity of the fine screen unit. The grit removal equipment has reached its service life and is due for replacement with modern, more efficient equipment. The "Headworks" area of the plant is often the most odorous and corrosive area of the treatment facility. Therefore, improvements to this area of the treatment facility should be aimed at mitigating odors and corrosive gases and replacement of corroded mechanical and electrical components.

Suggested improvements to the existing Headworks include the following:

- Replacement of the fine screen equipment.
- Replacement of the mechanical components of the vortex grit removal unit.
- Installation of a grit pump replacing the air lift type grit transfer system.
- Replacement of the grit separation system with a modern grit washer and relocation of the unit to contain odors and corrosive gases.
- Improvements to the HVAC system to contain odors and remove corrosive gases from the area.
- Relocation of the grit dumpster outside of the vehicle room.

e. <u>Aeration Basins & Blowers</u>

Activated sludge type biological secondary treatment is provided in two (2) 24-feet wide by 60-feet long by 14-feet side water depth concrete aeration basins. Aeration and mixing in the basins are provided via fine bubble tube type diffusers, which replaced the original coarse bubble diffusers in 2012. Currently, only one (1) aeration basin is used for treatment as flows and loadings to the facility do not warrant having both basins in service. Therefore, the second aeration basin is currently used for sludge holding. The facility has enough spare fine bubble tube diffuser elements for one (1) aeration tank.

Air is supplied to the aeration basins using two (2) 30 HP lobe style blowers installed in 2005. The blowers are operated on VFD's and can be controlled based on the Dissolved Oxygen (DO) concentration being monitored in the aeration basins. There is also a single 75 HP lobe style blower available as a backup that was original to the WWTF construction. The blowers also supply air to the aerobic digester, hauled-in waste holding tanks, and air lift type grit and RAS pumps in a common header pipe.

While the aeration basins and diffuser grids appear to be in good working order, deficiencies in the air supply system often result in aeration basin operation at

excessive DO concentrations and operational difficulties associated with controlling air supply to multiple processes, each operating at different pressures, off a common supply header. In addition, the blower muffler housing located on the roof of the treatment building is in need of replacement.

Suggested improvements to the existing aeration basins and blowers include the following:

- Adding submersible mixers to the aeration basins to provide mixing independent of blower operation.
- Replacement of all aeration blowers and roof silencer housing.
- Reconfiguration of the air supply piping.

f. Alum Storage & Feed System

The WWTF has a permit effluent Total Phosphorus discharge limit of 0.6 mg/L. Alum is currently dosed to the MLSS upstream of the secondary clarifiers for phosphorus removal. Alum is stored in a 6,000-gallon FRP bulk storage tank that is original to the WWTF. The bulk storage tank was installed in a below grade concrete containment area. Alum is transferred up from the containment pit to a 100-gallon "day tank" using an end suction centrifugal pump installed on the floor of the containment pit. Two (2) chemical feed pumps draw from the day tank and discharge to the secondary clarifier splitter box. Both chemical feed pumps are relatively new. One (1) pump was brought on-line in June of 2024 and is flow-paced, while the second replacement pump is operated during peak season at a constant rate, as the flow pacing never worked with the replacement pump. A spare chemical feed pump is kept on-site.

Suggested improvements to the existing alum storage and feed system include the following:

- Inspection and refurbishment of the FRP alum storage tank and containment area.
- Installation of an orthophosphate analyzer for chemical feed control.

g. Secondary Clarifiers

Two (2) 8-feet wide by 60-feet long by 13-feet side water depth rectangular final clarifiers with mechanical sludge collectors are used for settling MLSS from the aeration basins. Clarified effluent overflows fiberglass finger weirs at the end of the clarifier tanks. Scum removal is manual using a rotating skimmer. The scum discharges to a hopper and is air lifted to the aerated sludge holding tank. RAS is air lifted from the hopper on the south end of each clarifier into a channel which flows to the aeration basin splitter box. RAS flow is monitored using a Parshall Flume. The chain and scraper style sludge collectors are original to the WWTF;

however, the rails have been previously rebuilt. Additionally, the scrapers and flights for the west clarifier were recently replaced. The sprockets, shafts, slide rails, and slide rail holders for both clarifiers are in need of replacement.

Suggested improvements to the existing final clarifiers include the following:

- Replace the chain and rake sludge collector components, including replacement of the sprockets, shafts, slide rails, and slide rail holders.
- Replace common clarifier drive assembly with separate drives.
- Optimization/Automation of the sludge return and wasting processes.

h. UV Disinfection & Effluent Pumping

Clarified effluent is disinfected using UV disinfection. The original chlorine contact tank was modified for installation of the UV disinfection system about 25-years ago. Effluent flow is metered using a 45 degree V-notch weir and discharges to the final effluent pump station which contains three (3) submersible effluent pumps. Plant effluent is pumped via an 8-inch force main to the outfall in Lake Michigan. One (1) of the effluent pumps as well as the slide rails and connectors for all three (3) pumps were replaced in the mid-2000's. The other two (2) effluent pumps are original to the 1986 WWTF construction.

The existing Fischer Porter UV disinfection system equipment is approximately 25-years old. It was inspected 3-years ago, and boards in the control panel were replaced at that time. The system is currently in good working order, and the facility is meeting E. coli discharge limits.

Suggested improvements to the existing UV disinfection system and effluent pump station include the following:

- Replacement of effluent pumps.
- Covering the UV system to mitigate freezing and control pests from entering the building.
- Relocation of the UV control panel out of the secondary treatment room.
- Replacement of the UV system wiring and conduit.

i. Aerated Sludge Holding

Aerobic digestion and sludge holding is provided in a single 14.5-feet wide by 60-feet long by 14-feet side water depth concrete basin. Aeration and mixing in the basin are provided via the original stainless steel coarse bubble diffusers. The aerated sludge holding tank is provided with a decant air lift pump for sludge thickening.

The original design intent for this basin was to provide aerobic digestion during peak season and act as the main aeration basin during the off-season. However, the WWTF is currently operated with one (1) aeration basin in service year round, one (1) aeration basin used for aerated sludge holding, and the aerated sludge holding tank used for sludge thickening prior to hauling the liquid sludge to the WWTF in Sturgeon Bay for disposal.

Suggested improvements to the aerated sludge holding tank include the following:

- Improving aeration control through piping and valve modifications.
- Improving sludge thickening in the basin or adding mechanical thickening of WAS.

j. Sludge Transfer Pumps

Two (2) 3 HP EMU centrifugal pumps are used to transfer sludge from any of the three (3) aeration basins to the loadout station. The pumps have been rebuilt over their service life and are currently in good working order.

Suggested improvements to the existing sludge transfer pumps include the following:

- Replacement of pumps and associated valves and piping.
- Reconfigure discharge piping to allow for transfer from one basin to another.

k. Biosolids Handling & Disposal

Digested sludge is pumped to the loadout station and hauled to the Sturgeon Bay Utilities (SBU) WWTF by a contract hauler for further processing. This process is O&M intensive and presents the risk of a spill. SBU often restricts periods in which they will receive biosolids from outside sources. Typically, these restrictions are only in place during the winter months, from December through February.

It should be noted that SBU has a significant digester improvements project planned, which is anticipated to take place in the next few years. This project will likely result in the inability of SBU to receive sludge from outside sources for an extended period of time. Additionally, there is no guarantee that SBU will continue to accept biosolids from outside sources over the next 20-years.

Therefore, the following sludge disposal alternatives will be evaluated.

- Alternative #1 – Continue to Haul to SBU WWTF
- Alternative #2 – Construct Reed Bed Biosolids Dewatering and Storage System

These alternatives will be discussed in further detail later in this Facilities Plan Amendment.

I. Electrical Systems, Controls, & SCADA

The WWTF's main MCC is in the Service Building Blower Room along with the 250-kW diesel generator. A 1,000-gallon diesel fuel storage tank for the generator is located just outside the Blower Room. Both the MCC and generator are original to the WWTF. Danfoss VFD's were added to the MCC in 2005 for operation of the 30 HP aeration blowers. A small MCC with VFD's in the influent pump station building addition was added in 2005 and powered out of the main MCC in the Blower Room.

It should be noted that the existing 250 kW generator is oversized for the WWTF. Previous electrical wasting tests indicated that the maximum power consumption of the WWTF is approximately 147 kW. Therefore, the new generator could likely be downsized.

Most of the treatment facility is either controlled directly out of the main MCC and via a series of remotely mounted control panels, which are either original to the treatment facility or supplied with equipment later retrofitted into the WWTF. In the late 1990's, the control systems were integrated into a Supervisory Control and Data Acquisition (SCADA) system utilizing Wonderware software, which is currently maintained by PJ Kortens. The SCADA computer, which is located at a desk in the Service Building Laboratory, is running the Windows 7 Professional operating system.

The electrical and controls systems, as well as the WWTF SCADA system, are reaching or have surpassed their service life and are due to replacement.

Suggested improvements to the existing electrical systems, controls, and SCADA are as follows:

- Replacement of the main MCC.
- Replacement of the plant controls and SCADA system including integration of the two (2) lift stations.
- Replacement of the diesel generator considering outdoor installation.

m. Laboratory

The Village operates a certified laboratory out of the WWTF Service Building. Operating staff also perform water testing in addition to the regulatory testing necessary for demonstrating compliance with the WWTF WPDES effluent discharge permit. The laboratory, while original to the WWTF, contains new lab equipment. Existing cabinetry and counter tops are showing some age but are in relatively good condition. Some remodeling of the space, including painting the cabinetry, providing new flooring, and replacement of lab equipment should be considered if the Village intends to continue operating with the certified laboratory.

3. PRIORITIZATION OF NEEDS

The existing sanitary sewage collection system, lift stations, and WWTF were originally constructed around 1986, and while some improvements have been made at the WWTF since startup, much of the infrastructure is approaching 40-years old. The buildings and tankage appear to be in very good condition with only minor improvements needed to extend their service life. However, much of the wastewater process, mechanical and electrical equipment is reaching, or has already surpassed, its intended service life and is due for replacement.

Given the age of the WWTF, it is important to identify what infrastructure improvements are needed to (1) maintain compliance with WPDES effluent discharge permit limits; (2) maintain reserve capacity for growth in the sewer service area; (3) extend the service life of the treatment facility and; (4) improve operability and maintainability, with the goal of avoiding major capital improvements costs over the 20-years following a significant WWTF upgrade.

The existing treatment facility has an abundance of reserve capacity. Current wastewater flows to the WWTF during summer/peak season months (approximately 120,000 to 160,000 gpd) are less than half of the facility's rated average design flow capacity (310,000 gpd), and loadings to the facility are less than a quarter of the rated design capacity. Therefore, improvements aimed at increasing the facility's treatment capacity would not be considered a high priority.

Given the current infrastructure in place and the associated reserve capacity, the existing WWTF should be well suited for maintaining compliance with WPDES permit limits with only minor improvements. Current effluent BOD, TSS, ammonia, and Total Phosphorus limitations should be readily achievable with the existing activated sludge biological secondary treatment system and associated chemical addition and should not require additional advanced treatment to meet these limits. It is expected that current effluent limits will remain unchanged in future WPDES permit reissuances. However, it should be noted that one of operating staff's biggest concerns is maintaining compliance with effluent phosphorus limits (0.6 mg/L), especially during peak season with periods of

higher flows and loadings to the WWTF. Concerns are primarily associated with the impacts of alum addition on the effluent pH, rising chemical costs, and sludge hauling costs, where chemical phosphorus removal results in a significant amount of chemical sludge production.

Prioritization of needs and associated improvements can be somewhat subjective. However, an emphasis should always be placed on improving Operator safety whenever possible. High priority should also be given to improving the operability and maintainability of the facilities. After prioritizing needs associated with Operator safety and improving Operation and Maintenance, consideration can be given to refurbishment or replacement of general items that have surpassed their service life, where failure can be expected within a 5- to 10-year period, replacement parts may be no longer available, or modern more efficient technology is available.

Proposed improvements identified in the previous section have been ranked based on perceived priority.

a. <u>High Priority Improvements</u>

- Complete improvements to Lift Station #1 including replacement of submersible pumps, slide rail systems and wet well access hatch to improve Operator safety and maintainability and increase the capacity of the lift station.
- Replace Lift Station #2 with a submersible type lift station to improve Operator safety and maintainability of the station.
- Should the Village choose to continue to accept hauled-in waste, complete improvements to the hauled-In waste receiving facilities including replacement of the existing mechanical screening equipment, and holding tank access hatches, and complete repairs to the concrete tank cover to improve operability and maintainability of the system. Replacement of the hauled waste tanker truck may also be warranted should the Village decide to continue to haul septage and holding tank wastewater.
- Complete modifications or replacement of influent pump station wet well access hatch to improve Operator safety.
- Complete improvements to secondary treatment system including installation of submersible mixers to the aeration basins, replacement of aeration blower(s), and reconfiguration of air supply piping to improve efficiency, operability, and maintainability of the system.
- Replace the alum feed pumps and associated piping and accessories and install an orthophosphate analyzer for chemical feed control to improve efficiency and operability of the system and maintain permit compliance.

- Complete piping and valve modifications associated with the aerated sludge holding tank and improve sludge thickening to improve efficiency and operability of the process.

b. Medium Priority Improvements

- Replace the discharge piping and valves and upgrade the electrical system, controls, and telemetry to improve operability and maintainability as well as extend the service lift of Lift Station #1.
- Replace the backup generator at Lift Station #2 and integrate fire and intrusion monitoring of the Smith Building, which currently houses the lift station controls and generator, to extend the service life of the lift station and improve security.
- Relocate the influent pump station MCC and controls out of the corrosive and potentially hazardous area.
- Complete improvements to the Headworks area HVAC systems to contain odors and removal corrosive and hazardous gases from the area, improving operability and maintainability while extending the service life of the building and equipment installed in the Headworks.
- Replace the final clarifier chain and scraper sludge collector equipment to extend the service lift of the system and optimize/automate of the sludge return and wasting processes to improve efficiency and operability.
- Replace the main MCC and plant controls and SCADA system to improve operability and extend the service life of the facility.
- Replace the emergency backup diesel generator to extend the service lift of the facility. Consideration should be given to installing a new generator outdoors in a weather and sound attenuating enclosure to eliminate noise during operation and free up space in the Blower Room.

c. Low Priority Improvements

- Insulate (and heat trace) the section(s) of low-pressure force main impacted by freezing.
- Line sections of sewer with leaking lateral stubs to reduce infiltration to the collection system.
- Replace the generator at Lift Station #1 if necessary to operate new larger pumps.
- Inspection and televising of the collection system serviced by Lift Station #1 to identify sources of infiltration and complete repairs as necessary.
- Mill and overlay the existing asphalt paving at the WWTF.

- Inspect the membrane roofing systems on existing WWTF buildings and replace if necessary.
- Paint exposed metal surfaces and replaced entry and overhead doors with extensive corrosion.
- Inspect the hauled-in waste receiving tank interior and complete repairs as necessary.
- Replace the valves and re-paint or replace the hauled-in waste transfer pump piping.
- Replace the submersible influent pumps as they reach their service life and complete necessary modifications to allow for variable speed control of the pumps.
- Replace the fine screen and grit removal equipment and install a self-priming grit pump to replace the air lift type grit transfer system to improve operability, maintainability, and improve efficiency.
- Inspect and repair the FRP alum storage tank and containment area.
- Replace the UV disinfection system and relocate the control panel outside of the secondary treatment area.
- Replace the effluent pumps and associated discharge piping and valves.
- Cover the UV system and chlorine contact tank to mitigate freezing and algae growth.
- Replace the sludge transfer pumps and associated valves and piping and reconfigure the discharge piping to allow for transfer from one basin to another.
- Replace the building lighting with modern energy efficient fixtures.
- Complete laboratory renovations.

Chapter IV
Future Conditions

A. BACKGROUND

To evaluate and size facilities for a wastewater management system, future populations, and wastewater flows and pollutant loadings must be estimated for the planning area. Wastewater flows and loadings are a function of sewered population, per capita water use, commercial and industrial discharges, public authority flows, Infiltration/Inflow (I/I), and hauled-in wastes.

This Section defines the planning period, estimates future populations, projects future flows and loadings, and establishes future effluent limitations.

B. PLANNING PERIOD

The planning period is the time period over which a wastewater management system is evaluated for cost effectiveness. The planning period begins with the system's initial year of operation. According to United States Environmental Protection Agency (EPA) and Wisconsin DNR regulations, the planning period for a Facilities Plan shall be 20-years [NR 110.09(1)]. For purposes of this Facilities Plan Amendment, the planning period will be to the year 2045.

C. DESIGN PERIOD

The design period is the time period during which a wastewater management system is expected to reach design capacity. For wastewater treatment facilities, three (3) alternative staging periods of 10-, 15- and 20-years should be analyzed for cost effectiveness, and the least costly period selected [NR 110.09(1)]. A second method of determining the staging period is based upon the following table, contained in NR 110.

Flow Growth	Minimum Initial Staging Period
Design Flow Less Than 1.3 Times Initial Flow	20-Years
Design Flow 1.3 To 1.8 Times Initial Flow	15-Years
Design Flow Greater Than 1.8 Times Initial Flow	10-Years

The estimates of flows and loadings developed in this Section will be used to determine the staging period for the Village of Ephraim's Wastewater Treatment Facility.

D. POPULATION PROJECTIONS

Historical populations and trends for the Village of Ephraim are shown below:

Year	Population	Percent Change
1960	221	--
1970	236	6.8%
1980	319	35.2%
1990	261	-18.2%
2000	353	35.2%
2010	288	-18.4%
2020	345	19.8%

The Wisconsin Department of Administration (DOA) provided the following population projections in 2013 for the Village of Ephraim.

Year	DOA Projected Population	Actual Population
2020	280	345
2025	275	--
2030	265	--
2035	255	--
2040	235	--

Note: The Wisconsin DOA estimated a population of 280 for 2020, while the actual population observed from the 2020 Decennial Census for the Village of Ephraim was 345 (a difference of 65 residents). Based on the Wisconsin DOA's population projections, the Village of Ephraim's population is projected to decrease over the planning period.

The Bay-Lake Regional Planning Commission (BLRPC) was also contacted regarding population projections for the Village of Ephraim. BLRPC indicated they also use the Wisconsin DOA's population projections. Additionally, BLRPC stated that new population projections from the Wisconsin DOA are expected to be released in 2024. These updated population projections have not yet been released.

The 2013 Wisconsin DOA population projections for all of Door County are included below. These projections can be used to estimate future hauled in waste flows and loadings.

Year	DOA Projected Population	Percent Change (%)	Actual Population
2020	27,518	--	30,066
2025	27,896	+1.4	--
2030	27,889	-0.0	--
2035	27,207	-2.4	--
2040	26,029	-4.3	--

Based on the adjusted Wisconsin DOA's population projections, the population of Door County is expected to peak in 2025 before declining over the next 15-years.

E. CURRENT WWTF FLOWS & LOADINGS

Influent raw wastewater from the Village's collection system is metered and sampled prior to discharging to the Headworks. The hauled-in waste is metered and sampled separate from the raw wastewater from the collection system.

Influent flows and loadings from the Village's collection system for 2019 through 2023 are summarized below in Table IV-1.

TABLE IV-1
SUMMARY OF INFLUENT FLOWS & LOADINGS - COLLECTION SYSTEM
2019 THROUGH 2023

Parameter	2019	2020	2021	2022	2023	Average	Max
Flow, mgd							
Average Day	0.088	0.082	0.074	0.080	0.074	0.080	-
Max Month	0.137	0.144	0.140	0.143	0.135	-	0.144
Max Day	0.264	0.203	0.182	0.184	0.197	-	0.264
BOD_5, lbs./day							
Average Day	89	75	101	68	70	81	-
Max Month	233	213	261	171	184	-	261
Max Day	458	237	290	257	225	-	458
TSS, lbs./day							
Average Day	93	85	110	69	74	87	-
Max Month	238	227	270	159	187	-	270
Max Day	472	334	301	219	229	-	472

Influent flows and loadings from the Village's collection system have remained relatively consistent over the last 5-years. Loadings have decreased slightly over the last 2-years compared to the previous 3-years. Additional tables showing monthly influent flows and loadings from the collection system between 2019 and 2023 are provided in Appendix B.

Influent flows and loadings from the Village's collection system have remained relatively consistent for both the off-seasons and peak seasons over the last 5-years. During the off-seasons of 2019 through 2023, influent flows from the collection system averaged 0.048 mgd and influent loadings for BOD and TSS averaged 29 lbs./day and 34 lbs./day, respectively. Influent flows from the collection system typically double during the peak seasons, while influent loadings from the collection system typically quadruple during the peak seasons. During the peak seasons of 2019 through 2023, influent flows from the collection system averaged 0.112 mgd and influent loadings for BOD and TSS averaged 132 lbs./day and 139 lbs./day, respectively.

Hauled-in waste flows and loadings to the WWTF from 2019 through 2023 are summarized in Table IV-2.

TABLE IV-2
SUMMARY OF HAULED-IN WASTE FLOWS & LOADINGS
2019 THROUGH 2023

Parameter	2019	2020	2021	2022	2023	Average	Max
Flow, gpd							
Average Day	1,559	1,493	1,255	1,281	1,188	1,356	-
Max Month	3,790	3,194	2,287	3,338	2,071	-	3,790
Max Day	20,000	12,700	9,400	13,100	11,500	-	20,000
BOD_5, lbs./day							
Average Day	11.3	7.9	4.8	5.5	10.6	7.7	-
Max Month	32.0	27.6	9.1	16.3	21.0	-	32.0
Max Day	131	137	37	46	7.5	-	137
TSS, lbs./day							
Average Day	19	13	4.7	7.9	15.4	11.6	-
Max Month	78	62	13	29	35.9	-	78
Max Day	345	321	65	101	181	-	345

Hauled-in waste flows and loadings have remained relatively consistent over the last 5-years. Additional tables showing monthly hauled-in waste flows and loadings to the WWTF from 2019 through 2023 are provided in Appendix B.

Hauled-in waste flows and loadings remain relatively consistent over the off-seasons. During the off-seasons of 2019 through 2023, hauled-in waste flows averaged 765 gpd and hauled-in waste loadings for BOD and TSS averaged 5.7 lbs./day and 9.5 lbs./day, respectively. Hauled-in waste flows and loadings typically double during the peak seasons. During the peak seasons of 2019 through 2023, hauled-in waste flows averaged 1,946 gpd and hauled-in waste loadings for BOD and TSS averaged 10.1 lbs./day and 14.4 lbs./day, respectively.

F. WWTF DESIGN FLOWS & LOADINGS

As previously discussed, the Village of Ephraim's population is not anticipated to increase over the 20-year planning period. Therefore, it is assumed that influent flows and loadings from the collection system will not increase over the 20-year planning period. Additionally, it is assumed that tourism during the summer months and the resulting increase in peak seasons flows and loadings are not expected to significantly increase over the 20-year planning period.

The population of Door County as a whole is anticipated to peak in 2025 before decreasing over the next 15-years. For the purposes of estimating future hauled-in waste flows and loadings, a 5% increase will be used.

Projected future "combined" influent flows and loadings to the WWTF (collection system and hauled-in wastes) compared to current flows and loadings and the original WWTF design criteria are summarized in Table IV-3.

TABLE IV-3
PROJECTED FUTURE FLOWS & LOADINGS VS. DESIGN CRITERIA

	[1]PEAK SEASON				OFF-SEASON			
	[2]Current	[3]Projected Future	Rated Capacity	[4]of Capacity	[2]Current	[3]Projected Future	Rated Capacity	[4]of Capacity
Flow, mgd								
Average Day	0.113	0.114	0.310	37%	0.048	0.049	0.083	59%
Max Day	0.270	0.270	0.620	44%	0.197	0.198	0.165	120%
BOD_5, lbs./day								
Average Day	140	143	1,400	10%	34	35	300	12%
Max Day	466	469	2,100	22%	136	142	600	24%
TSS, lbs./day								
Average Day	150	154	1,200	13%	41	44	250	18%
Max Day	582	582	1,800	32%	298	298	500	60%
[5]Total P, lbs./day								
Average Day	-	-	48	-	-	-	10	-
Max Day	-	-	72	-	-	-	20	-

[1]Peak season is assumed to be May through October, while the off-season is assumed to be November through April.
[2]2019 through 2023 Average and Max Day values.
[3]Projected future flows and loadings assume a 5% increase in hauled-in wastes.
[4]% of Capacity based on projected future flows and loadings.
[5]Influent Total P is not monitored.

Future flows and loadings are not expected to significantly increase over the planning period. Furthermore, the existing WWTF has an abundance of reserve capacity to handle the projected future flows and loadings. Therefore, this Facilities Plan Amendment does not aim to change the capacity of the WWTF.

G. STAGING ANALYSIS

The average peak season flow to the WWTF over the last 5-years was 0.113 mgd, while the average off-season flow to the WWTF over the same time period was 0.048 mgd. The projected peak and off-season future flows to the facility are 0.114 mgd and 0.049 mgd, respectively, providing ratios of 1.0. Per NR 110, if the ratio is less than 1.3, a 20-year staging period can be used. Therefore, a 20-year staging period will be used.

H. FUTURE EFFLUENT LIMITATIONS

The Facilities Plan Amendment does not aim to change the capacity of the WWTF as the existing WWTF has an abundance of reserve capacity to handle the projected future flows and loadings, nor does it aim to significantly change any of the original unit process design criteria (e.g., no new treatment processes are proposed). Therefore, it is assumed that future effluent limitations will remain unchanged. A summary of the current effluent limitations follows.

CURRENT MONITORING REQUIREMENTS AND EFFLUENT LIMITATIONS

Parameter	Limit Type	Limit & Units	Sample Frequency	Notes
BOD_5	Weekly Avg	45 mg/L	2/Week	
	Monthly Avg	30 mg/L	2/Week	
TSS	Weekly Avg	45 mg/L	2/Week	
	Monthly Avg	30 mg/L	2/Week	
NH_3-N	Daily Max	18 mg/L	Monthly	
	Weekly Avg	18 mg/L	Monthly	
	Monthly Avg	18 mg/L	Monthly	
pH Field	Daily Min	6.0 s.u.	5/Week	
	Daily Max	9.0 s.u.	5/Week	
E. coli	Geometric Mean -Monthly	126 #/100mL	Weekly	Limit effective April through October
	% Exceedance >410 #/100mL	10% per Month	Monthly	
Phosphorus, Total	Monthly Avg	0.6 mg/L	2/Week	

Chapter V
Infiltration & Inflow (I/I) Analysis

A. BACKGROUND

An Infiltration/Inflow (I/I) Analysis is an integral part of Facility Planning and is required per Wisconsin Administrative Code NR 110. The I/I Analysis shall demonstrate whether or not excess I/I exists in the sewer system and shall identify the presence, flow rate, and type of I/I conditions that exist in the sewer system.

Per NR 110, the definition of infiltration and inflow are:

- *" 'Infiltration' means water other than wastewater that enters a sewerage system (including sewer service connections) from the ground through such sources as defective pipes, pipe joints, connections or manholes. Infiltration does not include, and is distinguished from, inflow."*
- *" 'Inflow' means water other than wastewater that enters a sewerage system (including sewer service connections) from sources such as roof leaders, cellar drains, yard drains, area drains, foundation drains, drains from springs and swampy areas, manhole covers, cross-connections between storm sewers and sanitary sewers, catch basins, cooling towers, storm waters, surface runoff, street wash water, or drainage. Inflow does not include, and is distinguished from, infiltration."*

Per NR 110, the following information is required in an I/I Analysis:

"(a) The infiltration/inflow analysis shall demonstrate whether or not excess infiltration/inflow exists in the sewer system. The analysis shall identify the presence, flow rate and type of infiltration/inflow conditions, which exist in the sewer system.

"(b) For determination of the possible existence of excessive infiltration/inflow, the analysis shall include an estimate of the cost of eliminating the infiltration/inflow conditions. These costs shall be compared with estimated total costs for transportation and treatment of the infiltration/flow. This determination shall be made at several levels of infiltration/inflow removal.

"(c) If the infiltration/inflow analysis demonstrates the existence or possible existence of excessive infiltration/inflow and the specific sources of excessive infiltration/inflow have not been adequately identified, a sewer system evaluation survey shall be conducted. A detailed plan for the sewer system evaluation survey shall be included in the infiltration/inflow analysis. The plan shall outline the tasks to be performed in the survey and their estimated costs.

"(d) The department (DNR) may waive the requirements of pars. (a) through (c) if the owner can demonstrate to the department's satisfaction the obvious existence or nonexistence of excessive infiltration or inflow, or both. The information necessary for this

demonstration may include infiltration and inflow estimates, per capita design flows, ratio of total flow to dry weather flow, cubic meters of infiltration per centimeter diameter per kilometer of pipe per day (gallons of infiltration per inch diameter per mile per day), bypassing, and other hydrological and geological factors. The department may require the information be expanded to meet the requirements of pars. (a) through (c) if this demonstration is inconclusive."

By memorandum from the Wisconsin DNR, dated December 5, 1991, a simplistic I/I analysis can be used to determine whether or not excessive I/I exists in a sewer system. Two (2) methods are suggested:

The first method is from *Facilities Planning*; 1981, EPA 430/9-81-002. The criteria for judging when infiltration is non-excessive is listed below.

Length Of Sewer Pipe	Non-Excessive Infiltration Rate
>100,000 feet	2,000 to 3,000 gpd/in-mi
10,000 to 100,000 feet	3,000 to 6,000 gpd/in-mi
< 10,000 feet	6,000 to 10,000 gpd/in-mi

The infiltration is based upon the highest 7-day to 14-day average infiltration within a 12-month period. The infiltration allowance determined above applies to both I/I Analysis and Sewer System Evaluation Survey (SSES).

A second method is provided in *I/I Analysis & Project Certification*; May, 1995, EPA:

Infiltration is non-excessive if Dry Weather Flows (DWF) $\leq$ 120 gpcd

Inflow is non-excessive if Wet Weather Flows (WWF) $\leq$ 275 gpcd and the treatment plant does not experience hydraulic overloads during storm events.

Inflow is excessive if WWF $\geq$ 275 gpcd or the treatment plant experiences hydraulic overloads during storm events.

DWF = Highest average daily flow recorded over a 7- to 14-day period without precipitation during a period of seasonal high groundwater (typically March through July).

WWF = Highest daily flow recorded during a storm event.

B. INFILTRATION/INFLOW ANALYSIS

An I/I analysis was conducted using wastewater treatment influent flow data and precipitation records (Appendix C). Base flows were estimated as the minimum week flows for each year. Precipitation data from 2019 through 2023 was retrieved from the National Centers for Environmental Information's (NCEI) database. The nearest weather station with the required data is located at the Ephraim WWTF. This information was accessed through the Midwest Regional Climate Center cli-MATE online application.

The Village of Ephraim has approximately 36,447 linear feet, or 6.9 miles of gravity flow sanitary sewer in its collection system.

SEWER LENGTHS FOR THE VILLAGE OF EPHRAIM

Diameter (in)	Length (ft)	In-Mile
8	31,311	47.4
10	5,136	9.7
Total	36,447	57.1

For communities with 10,000 to 100,000 linear feet of sewer, infiltration is non-excessive if the infiltration rate is between 3,000 to 6,000 gpd/in-mile. Infiltration is computed during a high groundwater period using 7- to 14-days consecutive flow data after rain, but not during rain events.

Infiltration rates ranged from 1,837 to 2,152 gpd/in-mile from 2019 through 2023. Therefore, infiltration is not considered excessive.

A second method for determining whether infiltration is excessive is based on population. Infiltration is non-excessive if Dry Weather Flows (DWF) are less than 120 gpcd. It is important to consider the effect of tourism for this method, as the Village of Ephraim sees significant increases in tourism during the summer months. As outlined in an Executive Summary published by Destination Door County (DCC) in September 2022, which is included in Appendix D, the visitor to resident ratio for the Village of Ephraim can increase up to 4.0 (September 2022) during the summer months. Typically, this ratio averages approximately 2.9 during the summer months. For the purposes of estimating infiltration and inflow rates, a population of 345 will be used for off-season months and a total population of 1,345 will be used for the peak season months. This is shown in Appendix C.

Infiltration rates ranged from 78 to 91 gpcd from 2019 through 2023. Therefore, infiltration would not be considered excessive using the population based method. However, this method may not be a very accurate estimate, as tourist populations can vary significantly throughout the year.

Inflow is considered excessive if the amount of wet weather flow to the WWTF exceeds 275 gpcd. WWTF influent flows were graphed together with precipitation data from 2019 through 2023 to identify maximum day flows resulting from rainfall events. Graphs are included in Appendix C. Inflows ranged from 108 to 197 gpcd from 2018 through 2023. Therefore, inflow would not be considered excessive based on EPA criteria. Once again, this method may not be a very accurate estimate, as tourist populations can vary significantly throughout the year.

Peak inflow is estimated by taking the peak flow to the WWTF and subtracting the base flow. Peak inflow is intended to represent the maximum increase in influent flow to the WWTF that could be experienced. Base flow is estimated to be 0.0246 mgd (the average of the minimum week flows from 2019 through 2023). According to the Ten States Standards, for a population of approximately 345, the peaking factor is 4.0. Similarly, for a population of approximately 1,345, the peaking factor is closer to 3.7.

Peak inflow to the WWTF occurred on August 12, 2019 (peak season), with an influent flow of 0.2643 mgd (183.5 gpm). Therefore, the peak hourly inflow to the WWTF would be approximately 0.0910 mgd (63.2 gpm, 3.7 x 0.0246 mgd). The estimated peak inflow is:

- Peak Flow .....183.5 gpm
- Estimated Peak Base Flow.....63.2 gpm
- Estimated Peak Inflow.....120.3 gpm

Again, this calculation may not be an appropriate estimate, as the tourist population varies significantly throughout the year.

C. ADDRESSING INFILTRATION/INFLOW

The sanitary collection system contains approximately 160 manholes, 36,447-feet of gravity sewer mains, and 23,115-feet of force mains. The Village is aware of the presence of inflow and infiltration in their system and has undertaken efforts to address the issue.

Most of the Village is served by a gravity sewer collection system, originally constructed in 1986, and two (2) sewerage lift stations, one at the public beach (Lift Station #1) and the other at the intersection of Spruce Street and Water Street (Lift Station #2). Lift Station #2 accepts and pumps most of the Village's wastewater in an 8-inch force main to a newer section of gravity sewer on STH 42 flowing directly to the WWTF. Additional sanitary sewers and a WWTF on-site lift station were constructed in 2005 to serve the areas along STH 42 and Town Line Road near the WWTF. Properties along the bluff on the north (North Shore Road) and south (Crystal Springs Road) ends of the collection systems are served by individual grinder pump stations and common low pressure sewer systems, which connect to the main collection system.

The Village's sanitary sewer collection system is generally believed to be in good condition. However, there are several unused lateral stubs at vacant lots along Larson Lane, Hidden Springs Road, and Brookside Lane that are believed to be leaking and a potential source of clear water (infiltration) to the collection system and WWTF.

A formal SSES is not recommended for the Village of Ephraim's collection system at this time. As discussed in NR 110.09(5)(c), an SSES shall be conducted when the specific sources of excessive inflow and infiltration have not been adequately identified. The Village of Ephraim is actively identifying and addressing inflow and infiltration problem areas.

Chapter VI
Alternatives Evaluation & Preliminary Screening

A. INTRODUCTION

Prior to evaluating specific wastewater treatment alternatives, wastewater management options require evaluation on the planning level. These options include the 'No Action' Alternative and regional treatment with a neighboring WWTF.

This Chapter summarizes and evaluates planning level alternatives. A preliminary screening was completed to identify those alternatives that are applicable to the Village. Those alternatives surviving the preliminary screening process are evaluated for cost effectiveness in Chapter VIII.

B. 'NO ACTION' ALTERNATIVE

The 'No Action' alternative consists of maintaining status quo conditions with the WWTF. In this alternative, no WWTF improvements or modifications would be implemented.

The Village of Ephraim's WWTF can consistently meet their current effluent permit limits. However, much of the existing infrastructure is original to the 1986 construction and has surpassed its design service life, or is nearing its service life, as it approaches 40-years in service. Additionally, improvements to many of the unit treatment processes are necessary to improve efficiency, operability, maintainability, and safety. Therefore, the 'No Action' alternative is not a feasible long-term solution.

C. REGIONAL TREATMENT ALTERNATIVE

The regional treatment alternative considers joint treatment with another community. Neighboring municipal WWTF's to the Village of Ephraim include the Village of Sister Bay, which is approximately 3-miles northeast from Ephraim's WWTF, the Fish Creek Sanitary District #1, which is approximately 6-miles southwest from Ephraim's WWTF, and the Town of Baileys Harbor, which is approximately 10-miles south from Ephraim's WWTF.

Neither the Fish Creek Sanitary District #1's nor the Town of Baileys Harbor's WWTF's have sufficient reserve treatment capacity to accept wastewater from the Village of Ephraim. The cost to improve their treatment facilities coupled with the cost to convey the wastewater to either municipality would far exceed the cost to upgrade the Village of Ephraim's WWTF.

The Village of Sister Bay has expressed interest in regionalizing with the Village of Ephraim. Sister Bay's WWTF was designed for a maximum month flow of 0.70 mgd and an average design BOD load of 1,780 lbs./day.

The average monthly flow to Sister Bay's WWTF in 2022 was 0.2036 mgd and the maximum month flow of 0.3196 mgd occurred in July 2022. The average monthly BOD load to Sister Bay's WWTF in 2022 was 694 lbs./day and the maximum month BOD load of 1,403 lbs./day occurred in July 2022.

The projected future maximum day flow for the Village of Ephraim is 0.270 mgd and the projected maximum day load is 466 lbs./day. This would suggest that the Sister Bay WWTF has sufficient reserve capacity to handle the Village of Ephraim's wastewater flows and loadings.

Although the Village of Sister's Bay collection system and WWTF appear to have adequate reserve capacity to handle the wastewater flows and loadings from the Village of Ephraim, the Village of Ephraim is not interested in regionalization, as they already have a functional WWTF that is still in good condition. Additionally, the Village of Ephraim would need to construct approximately 1.5 miles of new sanitary sewer and purchase a portion of the capacity of Sister Bay's WWTF and collection system, which would result in the loss of control over sewer rates. Therefore, regionalization with the Village of Sister Bay will not be considered as part of this Facilities Plan Amendment.

D. WASTEWATER COLLECTION & TREATMENT FACILITIES IMPROVEMENTS

The main objective of this Facility Plan Amendment is to determine the most cost-effective means of addressing the aging infrastructure and impending needs at the WWTF. Applicable wastewater treatment alternatives should: (1) extend the service life of the existing facilities, (2) improve Operator safety, (3) improve operability and maintainability, (4) maintain reserve treatment capacity for future growth, and (5) achieve compliance with permit effluent limits.

1. COLLECTION SYSTEM

Based on an assessment of the existing collection system facilities, improvements are needed at both lift stations, and the sections of sewer with leaking lateral stubs.

a. Lift Station #1 Improvements

- Replacement of the submersible pumps, slide rail systems, and wet well access hatch, to improve Operator safety and increase capacity.
  - Lift Station #1 has had issues with ragging and experiences extended pump run times during periods of wet weather. Therefore, the new pumps should have improved capacity and solids handling.
- Replacement of the discharge piping and valves, electrical systems, controls, and telemetry to extend service life and improve operability and maintainability.
- Replacement of the backup generator, if necessary, to operate the larger pumps.

b. Lift Station #2 Improvements

- Complete replacement of the lift station with a submersible type lift station to improve Operator safety, operability, and maintainability.
  - The existing wet well would be converted to a flow through manhole discharging to the new lift station wet well.
- Replacement of the backup generator and integration of fire and intrusion monitoring in the Smith Building to extend service life and improve security.

c. Sewer Lining

- Televising and lining the sections of sewer with leaking lateral stubs to reduce infiltration.

An Opinion of Probable Construction Cost (OPCC) will be completed for these proposed Collection System improvements.

2. PRELIMINARY TREATMENT

Based on an assessment of the existing preliminary treatment facilities, improvements are needed at the Influent Pump Station, Headworks, and Hauled-In Waste Receiving.

a. Influent Pump Station Improvements

- Modification or replacement of the wet well access hatch and addition of safety grating to improve Operator safety.
- Replacement of the submersible pumps and provide variable speed control for the new pumps to improve operability and efficiency.
- Relocating the MCC and controls out of the potentially hazardous and corrosive area to extend service life and improve Operator safety.

b. Headworks Improvements

- Replacement of the fine screen equipment to improve Operator safety, efficiency, operability, and maintainability.
- Replacement of the grit removal equipment, air lift type grit transfer system and grit dewatering unit, and relocation of the grit classifier/dewatering unit to contain odors and corrosive gases.
- Complete HVAC system replacement to contain odors and remove corrosive and hazardous gases from the area to extend equipment service life and improve Operator safety.

c. Hauled-In Waste Receiving Improvements

- Replacement of the screening equipment and holding tank access hatches to improve operability and maintainability.
- Concrete repairs to the holding tank cover and repairs to the interior of the tanks to extend service life.
- Replacement of the transfer piping valves and replacement or re-painting of the transfer piping to extend service life and improve operability.
- Installation of a direct connection for unloading hauled-in waste including piping, a hose, and 6-inch camlock fitting to mitigate spills.
- Providing a new tanker truck.

An OPCC will be completed for these proposed Preliminary Treatment improvements.

3. SECONDARY TREATMENT

Based on an assessment of the existing secondary treatment facilities, improvements are needed to the blowers, aeration piping and mixing, secondary clarifiers, and chemical feed systems.

a. Blowers, Aeration, & Mixing Improvements

- Replacement of the existing blowers and roof silencer housing, providing new aeration basin mixers, and reconfiguration of the air supply piping to improve operability, maintainability, and efficiency.

b. Secondary Clarifier Improvements

- Replacement of the final clarifier chain and rake sludge collector components, including replacement of the sprockets, shaft, slide rails, and slide rail holders to extend service life and improve operability, maintainability, and efficiency.
- Replacement of the common clarifier drive assembly with separate drives to extend service life and improve operability.

c. Chemical Feed Improvements

- Inspection and refurbishment of the FRP alum storage tank and containment area, as necessary, to extend service life.
- Installation of an effluent orthophosphate analyzer to maintain permit compliance.

An OPCC will be completed for these proposed Secondary Treatment improvements.

4. TERTIARY TREATMENT & EFFLUENT DISCHARGE

Based on an assessment of the existing tertiary treatment and effluent discharge systems, improvements are needed to the effluent discharge pumps.

- Replacement of the effluent pumps to extend service life and improve operability and maintainability.
- Installation of a cover over the UV system to improve operability and maintainability and to extend service life.
- Relocation of the UV disinfection system controls out of the secondary treatment room to extend service life.
- Replacement of the UV system wiring and conduit.

An OPCC will be completed for these proposed Effluent Discharge improvements.

5. SOLIDS HANDLING

Based on an assessment of the existing solids handling facilities, the proposed improvements to the solids handling facilities include:

- Replacement of the sludge transfer pumps and associated discharge piping and valves to allow for transfer from one basin to another, to extend service life and improve operability and maintainability.
- Installation of permanent decanting pumps and transfer piping to improve sludge thickening.

An OPCC will be completed for these proposed Solids Handling improvements.

6. BIOSOLIDS HANDLING & DISPOSAL

The following sludge disposal alternatives will be evaluated. A Present Worth Analysis of these alternatives is provided in Chapter VII.

- Alternative #1 – Continue to Haul to Sturgeon Bay Utilities (SBU) WWTF
- Alternative #2 – Construct Reed Bed Biosolids Dewatering and Storage System

a. Alternative #1 – Haul to Sturgeon Bay Utilities (SBU) WWTF

Under this alternative, the Village of Ephraim will continue their current operation of hiring a contracted hauler to haul the digested sludge from the Ephraim WWTF to the SBU WWTF for further processing. Currently, costs for hauling the digested sludge to SBU are approximately $0.04 per gallon. For planning purposes, it is assumed that future hauling costs will increase by an additional $0.02 per gallon for a total of $0.06 per gallon.

Currently, treatment costs for liquid sludge received at SBU are $0.09 per gallon. According to the SBU staff, this rate is expected to increase to $0.12 per gallon in 2025 due to planned improvement projects at the SBU WWTF. Therefore, total future costs are estimated at $0.18 per gallon after the digested sludge leaves the Ephraim WWTF.

The SBU WWTF often restricts periods in which they will receive biosolids from outside sources, such as Ephraim. Typically, these restrictions are only in place during the winter months, from December through February.

It should be noted that SBU has a significant digester improvements project planned, which is anticipated to take place in the next few years. This project will likely result in the inability of SBU to receive sludge from outside sources for an extended period of time.

Additionally, there is no guarantee that SBU will continue to accept biosolids from outside sources over the next 20-years. This process is also O&M intensive and presents the risk of a spill.

b. <u>Alternative #2 – Construct Biosolids Storage & Dewatering Reed Beds</u>

Under this alternative, aerobically digested sludge would be applied to drying beds that have been planted with reeds (*phragmites*). A schematic of this alternative is provided in Figure VI-1.

The reed beds consist of a sand drying bed with reeds planted at approximately 18-inches on center. The system combines the action of conventional drying beds with the effects of aquatic plants on water-bearing substrates. These plants have a high water demand which causes their root systems to extend into the biosolids deposits. The extended root system not only draws water from the biosolids, but also causes the establishment of rich microflora, which feed on the organic content of the biosolids. As a result, some sludge solids are eventually converted to carbon dioxide and water, with a corresponding volume reduction.

The final product in the reed beds resembles topsoil. The reeds should be harvested annually in the late fall or early winter, after the plants have gone dormant but prior to them shedding their leaves. This is necessary to avoid clumps of dead vegetation, which would interfere with biosolids distribution on the bed. The reeds should be harvested to a stubble of approximately 10-inches, promoting lateral growth of the rhizomes (a horizontal creeping stem). Even though the reeds are harvested, biosolids may still be applied year-round.

Stabilized biosolids are typically applied to a maximum standing liquid depth of 4-inches in the reed beds. This is calculated depth, not a visual observation to be made in the field. Therefore, a 3,750 square foot reed bed can accept 1,250 cubic

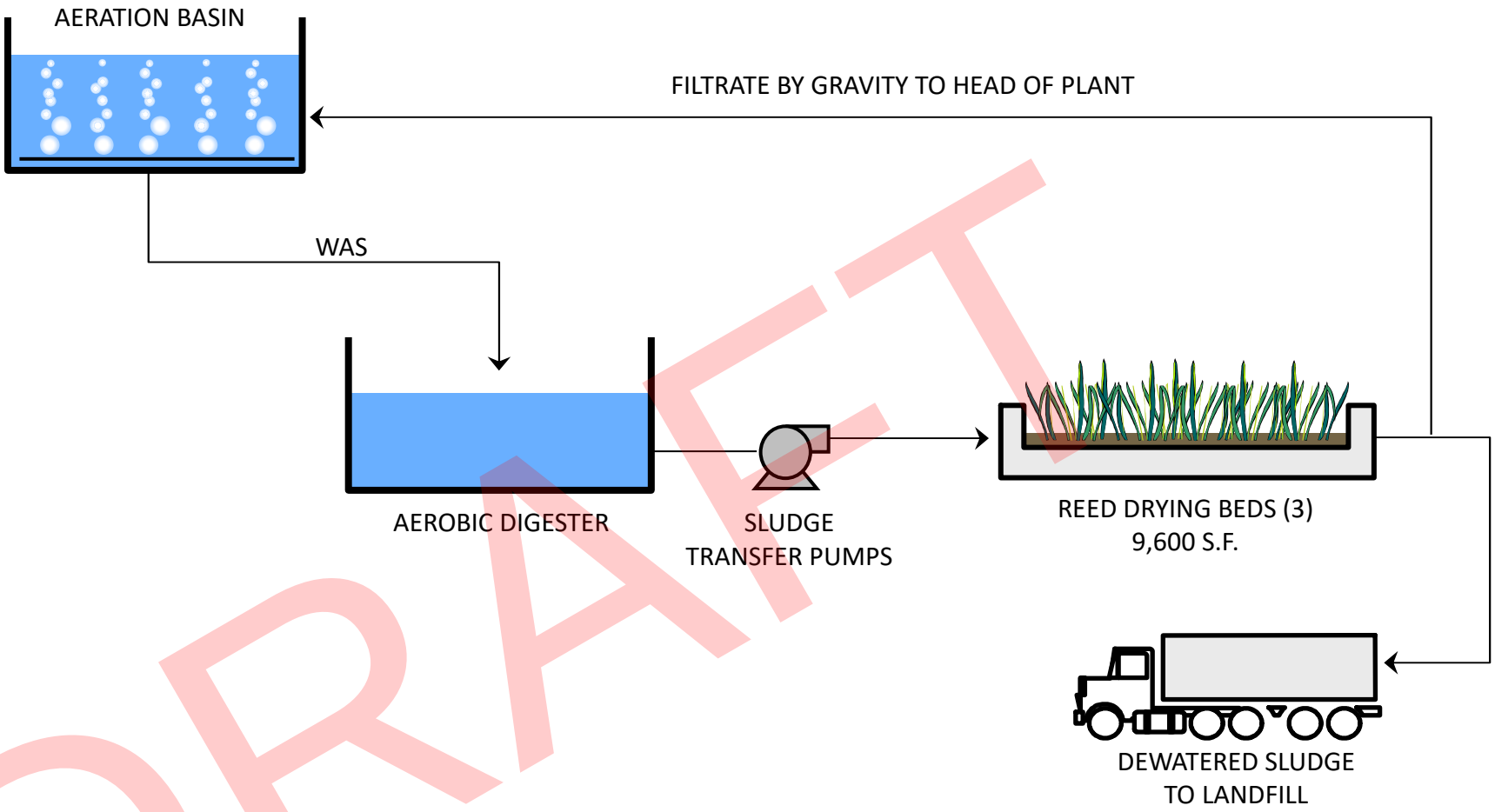


FIGURE VI-1

REED BED SYSTEM FLOW SCHEMATIC

WASTEWATER TREATMENT FACILITIES PLAN AMENDMENT

VILLAGE OF EPHRAIM, WI

McM #E0035-09-22-00363.04 9/5/2024

ID: \2023\MCM WIS\EPHRAIM, VILL OF-WWTF PROCESS FLOW SCHEMATIC.PPTX ESL

McMAHON ENGINEERS ARCHITECTS

feet, or 9,340 gallons in a single loading. Reed beds can typically accept one (1) application of stabilized biosolids every 10 to 20-days.

The life of each bed is typically around 10 years, at which time the biosolids must be removed and disposed of by landfilling. Sufficient root structure should remain intact after emptying the beds to ensure the reeds re-grow. The loading rates of the beds must be carefully planned, especially around the ninth or tenth year, so the biosolids in a bed can sit dormant for up to a year before disposal. During this period, biosolids can no longer be applied to that bed. After the biosolids have been removed from a bed, another bed should be ready to remain dormant for 6-months to 1-year. A bed is ready to lay dormant once it has accumulated approximately 39 to 42-inches of dried biosolids.

2022 saw the highest volume of biosolids produced, with an annual total of 182,000 gallons. For the purposes of comparing the alternatives listed above, the 2022 annual biosolids production volume of 182,000 gallons will be used as the basis for future annual biosolids production volumes.

The reed beds are sized on the basis of 30 gallons of biosolids/square foot/year loading. At the assumed future biosolids loading rate of 182,000 gallons/year, 6,100 square feet of reed beds would be needed. A three-bed system (each bed being 40-feet wide by 80-feet long) would adequately treat the design biosolids loadings. A three-bed system also provides redundancy so that one bed can be taken out of service for biosolids removal without compromising the ability of the other beds to dewater the biosolids.

Each bed is provided with a synthetic liner and a layer of stone, pea gravel and sand in which the reeds are planted. Concrete walls provide the bed structure. Under drains collect water that separates from the biosolids during dewatering and any rainwater not taken up by the reeds. It may be possible to drain this by gravity to the head of the plant for treatment. New sludge transfer pumps are needed to pump the digested sludge from the aerobic digesters to the reed beds.

7. ELECTRICAL, CONTROLS, & SCADA

Based on an assessment of the existing electrical and controls systems, the following improvements are recommended.

- Replacement of the main MCC, plant controls, and SCADA system, including integration of the two lift stations, to extend service life and improve operability and maintainability.
- Replacement of the emergency backup generator with a new outdoor generator to extend service life.

An OPCC will be completed for these proposed electrical, controls and SCADA systems improvements.

8. MAIN TREATMENT BUILDING & SITE IMPROVEMENTS

Proposed improvements to the main treatment building and treatment site include:

- Replacement of the membrane roofing systems on existing buildings, if necessary.
- Painting of exposed metal surfaces.
- Inspecting all exposed piping and painting or replacing as needed.
- Replacement of entry and overhead doors that show signs of extensive corrosion.
- Completion of laboratory renovations.
- Replacement of building lighting with modern energy efficient fixtures and LED lighting.
- Milling and overlay of the existing asphalt pavement.
- Addressing cracks in the exterior masonry walls.

An OPCC will be completed for these proposed Plant Controls and General Site Work improvements.

Chapter VII
Cost Effective Analysis

A. INTRODUCTION

Typically, cost effective analyses are used as a means to compare various treatment alternatives. This Facilities Plan Amendment proposes miscellaneous improvements to the Village's wastewater collection and treatment systems. A complete cost effective analysis is not provided in this Facilities Plan Amendment, as no new wastewater treatment processes or technologies are being proposed.

The proposed improvements generally consist of the in-kind replacement of existing treatment processes that are nearing the end of their useful service life, or improvements to increase efficiency, operability, maintainability, and operator safety. Therefore, Opinions of Probable Capital Costs (OPPCs) will be provided instead of cost effective analyses.

B. COST ESTIMATING PROCEDURES

Capital construction cost items used in this analysis include the following:

- Equipment costs.
- Construction and Installation Costs, including contractor's overhead and profit.
- Cost of engineering, design, field exploration, construction management, on-site field observation, and startup services.
- Cost of administration and legal services, including costs of bond sales.
- Interest during construction.

Prices of equipment, components, and installation are estimated on the basis of current market prices, equipment vendor quotations, and pricing from recent projects. Additional project costs (engineering, contingencies, legal, fiscal, and administrative) are estimated at 40% of capital costs, which includes 25% contingencies and 15% for engineering, legal, fiscal, administrative and interest costs. Contractor general conditions are estimated at 10% of the construction capital cost.

The design period over which the analysis occurs is 20-years. Future replacement costs for equipment with a life expectancy of less than 20-years are also included in the analysis. The useful life of the various structures and equipment are estimated as follows:

ITEM	USEFUL LIFE
Land	Permanent
Wastewater Conveyance Structures (i.e., pipes, interceptors)	40-years
Structures, Tankage, Basins	40-years
Process Equipment	20-years
Auxiliary Equipment	1 to 15-years

OPPCs were developed for each of the proposed improvement projects. The OPCCs include equipment costs and construction/installation costs.

Capital costs for mechanical piping and valves are estimated at 25% to 40% of the total equipment capital cost. Mechanical, piping, and valve installation are estimated at 15% to 20% of the total equipment capital cost. Electrical, controls, and instrumentation installation are estimated at 10% to 20% of the subtotal capital cost.

Construction costs include the following assumed costs.

- Concrete Costs
  - Footing Costs ..... $600 per cu. yd.
  - Slabs On Grade ..... $700 per cu. yd.
  - Walls ..... $1,000 per cu. yd.
  - Elevated Slab ..... $1,800 per cu. yd.
- Excavation & Backfill ..... $25 per cu. yd.
- Rock Blasting & Backfill ..... $75 per cu. Yd.
- Building Costs (without foundation) ..... $500 per sq. ft.

Annual Operation and Maintenance (O&M) costs were not evaluated, as the proposed improvements generally consist of the in-kind replacement of existing treatment processes. Therefore, annual O&M costs are not expected to change significantly.

O&M costs include all annual costs, which include O&M labor, equipment parts, repairs and supply, chemicals, power, and fuel costs necessary to operate and maintain the system. O&M costs are only addressed for the sludge disposal alternatives to compare the cost effectiveness of the two (2) alternatives. All other proposed collection system and WWTF improvements generally consist of the in-kind replacement of existing treatment processes. Therefore, annual O&M costs are not expected to change significantly.

The O&M costs utilized are provided in Table VII-1.

TABLE VII-1
O&M COST ASSUMPTIONS

Item	Cost
Labor	$50/hour
Liquid Haul to SBU	$0.06/gallon
Treatment at SBU	$0.12/gallon
Biosolids Removal & Haul to Landfill	$150/cubic yard
Biosolids Disposal at Landfill	$35/cubic yard

All O&M costs are based upon the design criteria for each operation analyzed and the personnel required to operate and maintain the equipment for each alternative. Labor and personnel requirements are based upon with, and operation of systems of this size. Disposal and treatment costs were obtained directly from SBU and nearby county landfills. Biosolids removal costs were obtained from previous reed bed cleanout projects.

Alternatives are evaluated based on a simplified 20-year Present Worth Analysis. Annual O&M costs, future costs, and salvage values are calculated to present worth values using a discount rate of 2.625%. This discount rate is established by the Wisconsin DNR for facilities planning purposes and is adjusted periodically by the DNR based upon the economy.

For the purposes of the Present Worth Analysis, the following assumptions were made:

- Average annual sludge production volume .....182,000 gallons (2022 volume)
- Reed bed life after removal .....10 years
- Reed bed cleanout volume, annual equivalent .....119 cubic yards (calculation below)

$$119\ yd^3 = (40\ ft)(80\ ft)(40\ inches)(\frac{1\ ft}{12\ inches})(3\ beds)(\frac{1\ yd^3}{27\ ft^3})(\frac{1}{10\ years})$$

C. OPINIONS OF PROBABLE CAPITAL COSTS

A summary of the OPCCs associated with each of the proposed collection system and WWTF improvement projects is provided in Table VII-2.

TABLE VII-2
SUMMARY OF OPINIONS OF PROBABLE CAPITAL COSTS (OPCCs)

Improvement Project	Opinion of Capital Cost
Collection System	$3,446,500
Preliminary Treatment	$3,028,000
Secondary Treatment	$1,436,500
Effluent Discharge	$517,000
Solids Handling	$294,000
Electrical & Controls	$1,539,500
General	$645,500
Total	**$10,907,000**

The individual OPCCs for each of the individual improvement projects are provided in Tables VII-3 through VII-9. The OPCCs include equipment costs and construction/installation costs.

D. SLUDGE DISPOSAL ALTERNATIVES PRESENT WORTH ANALYSIS

A summary of the Present Worth Analysis for the sludge disposal alternatives is provided in Table VII-10.

TABLE VII-10
SLUDGE DISPOSAL ALTERNATIVES PRESENT WORTH ANALYSIS

	Option #1 Haul to Sturgeon Bay	Option #2 Reed Beds
Present Worth – Capital Cost	$0	$578,400
Present Worth – Annual O&M	$535,500	$360,700
Total Present Worth	**$535,500**	**$939,100**

The individual Present Worth Analysis for each of the sludge disposal alternatives are provided in Tables VII-11 and VII-12.

The most cost-effective option appears to be to continue hauling digested sludge to the SBU WWTF. Therefore, it is recommended that the Village continue their current operation of hauling digested sludge to SBU.

However, it should still be noted that the construction of a new reed bed biosolids dewatering and storage system has several advantages:

1) There is no guarantee that SBU will continue to accept sludge from outside communities over the next 20-years. The reed bed system is a perpetual solution for the life of the Wastewater Treatment Facilities.
2) This would eliminate roughly 22 to 26 loads/year of biosolids being hauled annually to the SBU WWTF. This completely eliminates the hazard of a spill.
3) The hauling option has no new capital costs, and the present worth cost is principally associated with the cost of hauling and treatment. Neither of these costs are fixed or determined by the Village of Ephraim. As regulations tighten on treatment facilities and energy costs rise, the future costs to haul and treat could exceed the values utilized in this exercise.
4) The reed bed option is resistant to inflation as it has very minimal O&M, as compared to the hauling option, which is O&M intensive.

(1) The Opinion Of Probable Cost was prepared for use by the Owner in planning for future costs of the project. In providing Opinions Of Probable Cost, the Owner understands that the Design Professional has no control over costs or the price of labor, equipment, or materials, or over Construction Professionals' method of pricing, and that the Opinions Of Probable Costs provided herewith are made on the basis of the Design Professional's qualifications and experience. It is not intended to reflect actual costs and is subject to change with the normal rise and fall of the local area's economy. This Opinion must be revised after every change made to the project or after every 30-day lapse in time from the original submittal by the Design Professional.

Table VII-3

Collection System
Opinion of Probable Capital Costs

Wastewater Treatment Facilities Plan Amendment
Village of Ephraim, WI

Description	Opinion of Capital Cost
Lift Station #1 Improvements	
General	
Site Work	$10,000
Demolition - Pumps, Piping, Valves, Access Hatch, Controls, and Generator	$21,500
Structures	
Access Hatch & Safety Grating	$16,000
Equipment	
Furnish Equipment	
Submersible Pump & Slide Rail System - Qty. 2	$70,000
Discharge Piping and Valves	$14,000
Electrical, Control Panel, & Telemetry	$50,000
Backup Generator	$65,000
Equipment Installation	
Mechanical Installation	$61,500
Electrical & Controls Installation	$49,500
Subtotal	$357,500
Lift Station #2 Improvements	
General	
Site Work (Traffic Control & Fencing)	$30,000
Public Utility Relocation & Coordination	$5,000
Existing Station Demolition	$25,000
Clearing & Grubbing	$5,000
Excavation & Backfill	$171,000
Rock Blasting & Excavation	$165,000
Soil Stabilization	$100,000
Trench Dewatering	$20,000
Ashpalt Reconstruction (12" CABC, fine grade agg base, 3.5" ashpalt)	$30,000
Furnish & Install Lawn Restoration, Complete	$2,500
Structures	
200 ft of 10" SDR35 PVC Gravity Sanitary Sewer	$22,000
220 ft of 8" Force Main	$27,500
Convert Existing Wet Well to Flow Through Manhole	$20,000
Triplex Submersible Lift Station	$450,000
Equipment	
Furnish Equipment	
Submersible Pump & Slide Rail System - Qty. 3	$105,000
Discharge Piping and Valves	$21,000
Electrical, Control Panel, & Telemetry	$55,000
Backup Generator	$65,000
Smith Building Fire & Intrusion Monitoring	$5,000
Equipment Installation	
Mechanical Installation	$331,000
Electrical & Controls Installation	$265,000
Subtotal	$1,920,000
Sewer Lining	
General	
Site Work	-
Demolition	-
Structures	-
Equipment	
Furnish Equipment	-
Televise Sewer to Locate Leaking Lateral Stubs	$6,000
Equipment Installation	
Grout/Cap Leaking Lateral Stubs	$14,000
Subtotal	$20,000
Subtotal	$2,297,500
Contractor General Conditions (10%)	$230,000
Engineering & Contingencies (40%)	$919,000
Total Capital Cost	**$3,446,500**

Table VII-4

Preliminary Treatment
Opinion of Probable Capital Costs

Wastewater Treatment Facilities Plan Amendment
Village of Ephraim, WI

Description	Opinion of Capital Cost
Influent Pump Station	
General	
Site Work - New MCC & Controls Building	$10,000
Demolition - Submersible Pumps - Qty. 3	$10,000
Structures	
Access Hatch & Safety Grating Retrofit	$30,000
New MCC & Controls Building (20'x12')	$144,000
Equipment	
Furnish Equipment	
Submersible Pump & Slide Rail System - Qty. 3	$100,000
Electrical & Control Panel	$60,000
Equipment Installation	
Mechanical Installation	$88,500
Electrical & Controls Installation	$69,000
Subtotal	$511,500
Headworks	
General	
Site Work	-
Demolition - Bar Screen, Grit Removal Equipment, and Grit Transfer Air Lift	$38,000
Demolition - Headworks HVAC	$10,500
Structures	
Screening Channel Modifications	$27,000
Equipment	
Furnish Equipment	
Fine Screen	$180,000
Vortex Grit Removal System and Grit Washer/Classifier	$250,000
Grit Pump	$35,000
Grit System Piping	$14,500
HVAC System	$80,000
Equipment Installation	
Mechanical Installation	$159,000
Electrical & Controls Installation	$127,000
Subtotal	$921,000
Hauled-In Waste Receiving	
General	
Site Work	$5,000
Demolition - Screening Equipment and Access Hatches	$17,000
Structures	
Screening Channel Modifications	$16,000
Concrete Holding Tank Repairs	$10,000
Equipment	
Furnish Equipment	
Screening Equipment	$160,000
Access Hatch and Safety Grating - Qty. 2	$32,000
Tanker Truck	$220,000
Direct Connection (Core Hole, Piping, Hose, and 6-inch Camlock Fitting)	$5,000
Transfer Piping Valves	$5,000
Equipment Installation	
Repaint Transfer Piping	$2,500
Mechanical Installation	$63,000
Electrical & Controls Installation	$50,500
Subtotal	$586,000
Subtotal	$2,018,500
Contractor General Conditions (10%)	$202,000
Engineering & Contingencies (40%)	$807,500
Total Capital Cost	**$3,028,000**

Table VII-5

Secondary Treatment
Opinion of Probable Capital Costs

Wastewater Treatment Facilities Plan Amendment
Village of Ephraim, WI

Description	Opinion of Capital Cost
Blowers, Aeration & Mixing	
General	
Site Work	$5,000
Demolition - Blowers, Bases, Air Supply Piping, and Mufflers	$34,000
Structures	
Blower Base - Qty. 3	$9,000
Equipment	
Furnish Equipment	
P.D. Blower- Qty. 3	$180,000
Submersible Mixers	$65,000
Air Suppling Piping, Valves, and Insulation	$36,000
Equipment Installation	
Painting	$5,000
Mechanical Installation	$83,500
Electrical & Controls Installation	$67,000
Subtotal	$484,500
Secondary Clarifiers	
General	
Site Work	-
Demolition - Common Drive and Clarifier Chain & Sludge Scraper -Qty. 2	$46,500
Structures	-
Equipment	
Furnish Equipment	
Clarifier Chain & Sludge Scraper - Qty. 2	$232,000
Clarifier Drives - Qty. 2	$30,000
Equipment Installation	
Mechanical Installation	$77,000
Electrical & Controls Installation	$11,500
Subtotal	$397,000
Chemical Feed	
General	
Site Work	-
Structures	
Inspect & Repair Alum Storage Tank & Containment Area	$7,500
Equipment	
Furnish Equipment	
Effluent Orthophosphate Analyzer	$45,000
Equipment Installation	
Mechanical Installation	$13,000
Electrical & Controls Installation	$10,500
Subtotal	$76,000
Subtotal	$957,500
Contractor General Conditions (10%)	$96,000
Engineering & Contingencies (40%)	$383,000
Total Capital Cost	**$1,436,500**

Table VII-6

Effluent Discharge
Opinion of Probable Capital Costs

Wastewater Treatment Facilities Plan Amendment
Village of Ephraim, WI

Description	Opinion of Capital Cost
General	
Site Work	-
Demolition - Submersible Pumps - Qty. 3	$10,000
Relocate UV System Control Panel	$7,500
Structures	-
Equipment	
Furnish Equipment	
Submersible Effluent Discharge Pump & Slide Rail System - Qty. 3	$100,000
Electrical & Control Panel	$70,000
UV System Cover	$30,000
UV System Wiring and Conduit	$20,000
Equipment Installation	
Mechanical Installation	$59,500
Electrical & Controls Installation	$47,500
Subtotal	$344,500
Contractor General Conditions (10%)	$34,500
Engineering & Contingencies (40%)	$138,000
Total Capital Cost	**$517,000**

Table VII-7

Solids Handling
Opinion of Probable Capital Costs

Wastewater Treatment Facilities Plan Amendment
Village of Ephraim, WI

Description	Opinion of Capital Cost
General	
Site Work	-
Demolition - Sludge Transfer Pumps & Discharge Piping & Valves	$12,000
Structures	-
Equipment	
Furnish Equipment	
Sludge Transfer Pump - Qty. 2	$70,000
Sludge Transfer Piping and Valves	$7,000
Digester Decant Submersible Pumps - Qty. 2	$40,000
Digester Decant Piping and Valves	$6,000
Equipment Installation	
Mechanical Installation	$34,000
Electrical & Controls Installation	$27,000
Subtotal	$196,000
Contractor General Conditions (10%)	$19,500
Engineering & Contingencies (40%)	$78,500
Total Capital Cost	**$294,000**

Table VII-8

Electrical, Controls, & SCADA
Opinion of Probable Capital Costs

Wastewater Treatment Facilities Plan Amendment
Village of Ephraim, WI

Description	Opinion of Capital Cost
General	
Site Work	$5,000
Demolition - Main MCC, Plant Controls, and SCADA System	$48,500
Demolition - Backup Generator	$11,500
Structures	
Generator Pad	$6,000
Equipment	
Furnish Equipment	
Main MCC	$212,000
Plant Controls	$200,000
SCADA System	$75,000
200 kW Backup Generator	$150,000
Equipment Installation	
Mechanical Installation	$141,500
Electrical & Controls Installation	$177,000
Subtotal	$1,026,500
Contractor General Conditions (10%)	$102,500
Engineering & Contingencies (40%)	$410,500
Total Capital Cost	**$1,539,500**

Table VII-9

Main Treatment Building & Site Improvements
Opinion of Probable Capital Costs

Wastewater Treatment Facilities Plan Amendment
Village of Ephraim, WI

Description	Opinion of Capital Cost
General	
Site Work - Mill & Overlay Existing Asphalt Pavement	$45,000
Demolition - Membrane Roofing Systems	$11,500
Demolition - Entry & Overhead Doors w/ Extensive Corrosion	$5,000
Demolition - Laboratory Room Equipment & Cabinets	$11,500
Structures	
Roofing	$75,000
Entry Doors - Qty. 4	$8,000
Overhead Door - Qty. 2	$12,000
Structural Improvements to Cracking Exterior Wall(s)	$50,000
Equipment	
Furnish Equipment	
Laboratory Room Renovations (New Cabinets, Shelving, Flooring, Dishwasher)	$75,000
Replace any non-LED lights	$13,000
Equipment Installation	
Paint Exposed Metal Surfaces and Exposed Piping	$25,000
Mechanical Installation	$99,500
Subtotal	$430,500
Contractor General Conditions (10%)	$43,000
Engineering & Contingencies (40%)	$172,000
Total Capital Cost	**$645,500**

Table VII-11

Present Worth Analysis
Option #1 - Maintain Status Quo - Haul to Sturgeon Bay Utilities (SBU)

Wastewater Treatment Facilities Plan Amendment
Village of Ephraim, WI

Item	Unit Price	Quantity (per Year)	Capital Cost	Salvage Value
Total Capital Cost	-	-	**$0**	**$0**
Annual Operation and Maintenance (O&M)				
Hauling	$0.06/gal	182,000 gal	$10,920	-
Treatment	$0.12/gal	182,000 gal	$21,840	-
Labor	$50/hr	40 hr	$2,000	-
Total Annual O&M Cost			**$34,760**	
Present Worth				
Present Worth - Capital Cost			$0	
Present Worth - Annual O&M Cost			$535,500	
Total Present Worth			**$535,500**	

Table VII-12

Present Worth Analysis
Option #2 - Construct Reed Sludge Drying Beds

Wastewater Treatment Facilities Plan Amendment
Village of Ephraim, WI

Item	Unit Price	Quantity (per Year)	Capital Cost	Salvage Value
Capital Cost				
Site Work (Excavation & Backfill)	$25/CY	2,000 CY	$50,000	-
Concrete Walls (CY)	$1,000/CY	84 CY	$84,000	$42,000
Concrete Footing (CY)	$600/CY	27 CY	$16,200	$8,100
Reed Bed Clean Sand	$31/CY	360 CY	$11,200	$5,600
Reed Bed Pea Gravel	$40/CY	120 CY	$4,800	$2,400
Reed Bed Clean Rock/Stone	$43/CY	360 CY	$15,500	$7,750
Reed Bed Liner (Includes Installation)	$10/SF	13,000 SF	$130,000	$26,000
Site Piping & Valves (4-inch D.I.)	$100/ft	500 ft	$50,000	$25,000
Purchase & Plant Native Reeds			$20,000	-
Mechanical Installation			$50,300	-
Subtotal			$432,000	$116,850
Contractor General Conditions (10%)			$43,200	
Engineering & Contingencies (40%)			$172,800	
Total Capital Cost			**$648,000**	**$116,850**
Annual Operation and Maintenance (O&M)				
Biosolids Removal & Haul to Landfill	$150/CY	119 CY	$17,850	
Biosolids Disposal at Landfill	$35/CY	119 CY	$4,165	
Harvest Reeds	$50/hr	16 hr	$800	
Labor	$50/hr	12 hr	$600	
Total Annual O&M Cost			**$23,415**	
Present Worth				
Present Worth - Capital Cost			$578,400	$69,600
Present Worth - Annual O&M Cost			$360,700	
Total Present Worth			**$939,100**	

Chapter VIII
Environmental Assessment

A. INTRODUCTION

The potential impacts associated with the construction of the proposed collection system and WWTF improvements are discussed in this Chapter.

Environmental impacts are put into categories of primary and secondary impacts. Primary impacts result directly from construction activities and facility operations. Secondary impacts are indirect and occur because the project causes changes that induce actions that would not have occurred without the project. A third category is that of unavoidable, adverse impacts.

The proposed construction project(s) will be confined to the existing lift stations and WWTF site.

1. NOISE, ODOR & AESTHETICS

Construction of improvements at the Village of Ephraim's WWTF site and Lift Stations #1 and #2 will generate some noise and may generate some dust. These will be short-term impacts from truck travel and other associated construction activities. These short-term impacts will be a nuisance to residents living near the activities and along truck routes. Mitigation of these impacts will be discussed in the 'Mitigation of Impacts' section of this Chapter. A short-term aesthetic impact will be the construction of the new facilities.

2. EROSION & SEDIMENTATION

Soils exposed during construction will be subject to accelerated erosion until the surface is re-vegetated. Erosion will be mitigated by construction methods.

3. SURFACE WATER

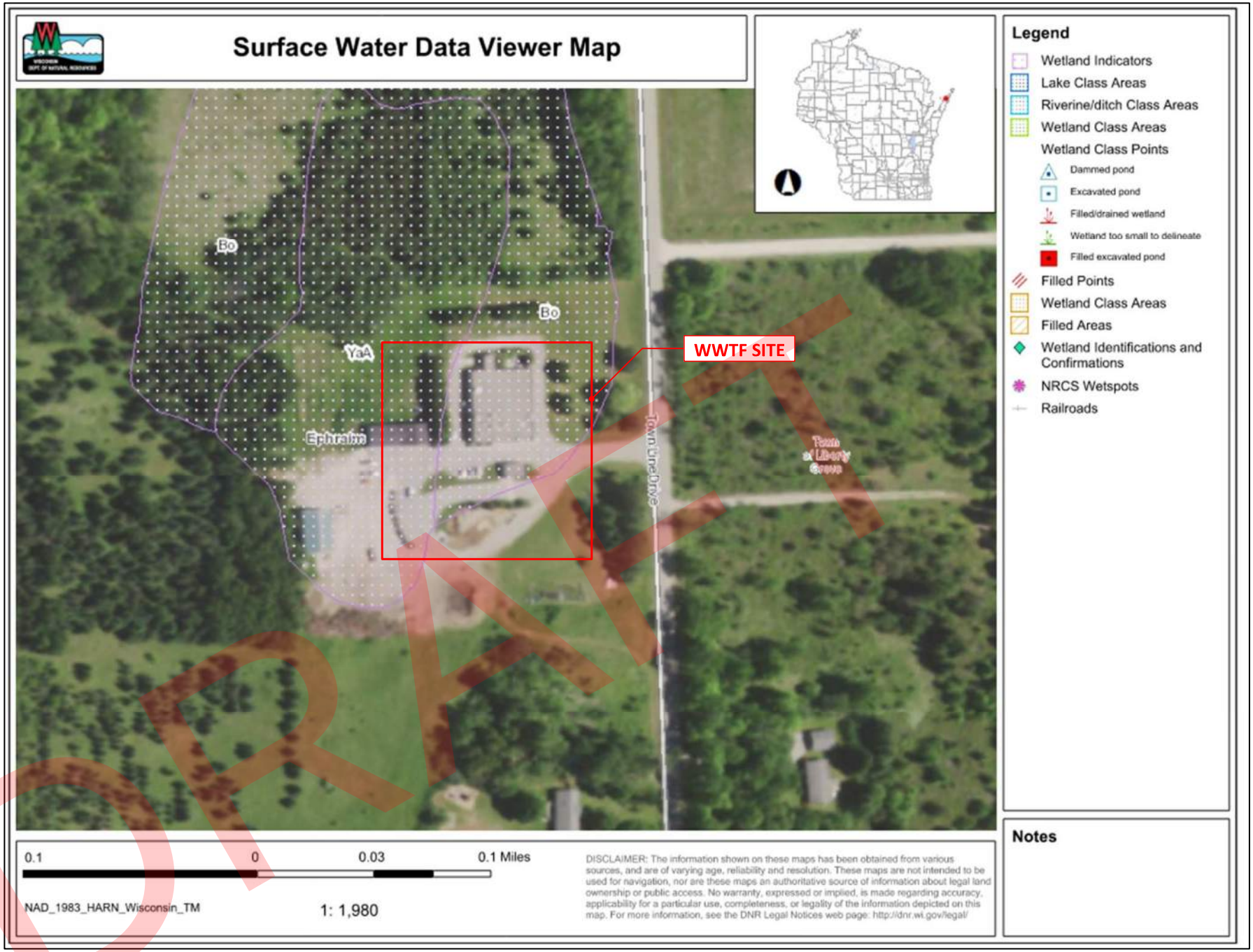
Erosion control will be provided, as necessary, to protect nearby surface water from sedimentation due to runoff during construction.

4. GROUNDWATER

Groundwater impacts are not expected to occur as a result of this project.

5. WETLANDS & FLOODPLAINS

Impacts to wetland areas and floodplains are not expected as a result of the proposed improvements. Figure VIII-1 shows the Wisconsin Department of Natural Resources (DNR)-mapped wetlands in relation to the WWTF site. Figures VIII-2 and VIII-3 show DNR



McMAHON ENGINEERS ARCHITECTS

FIGURE VIII-1

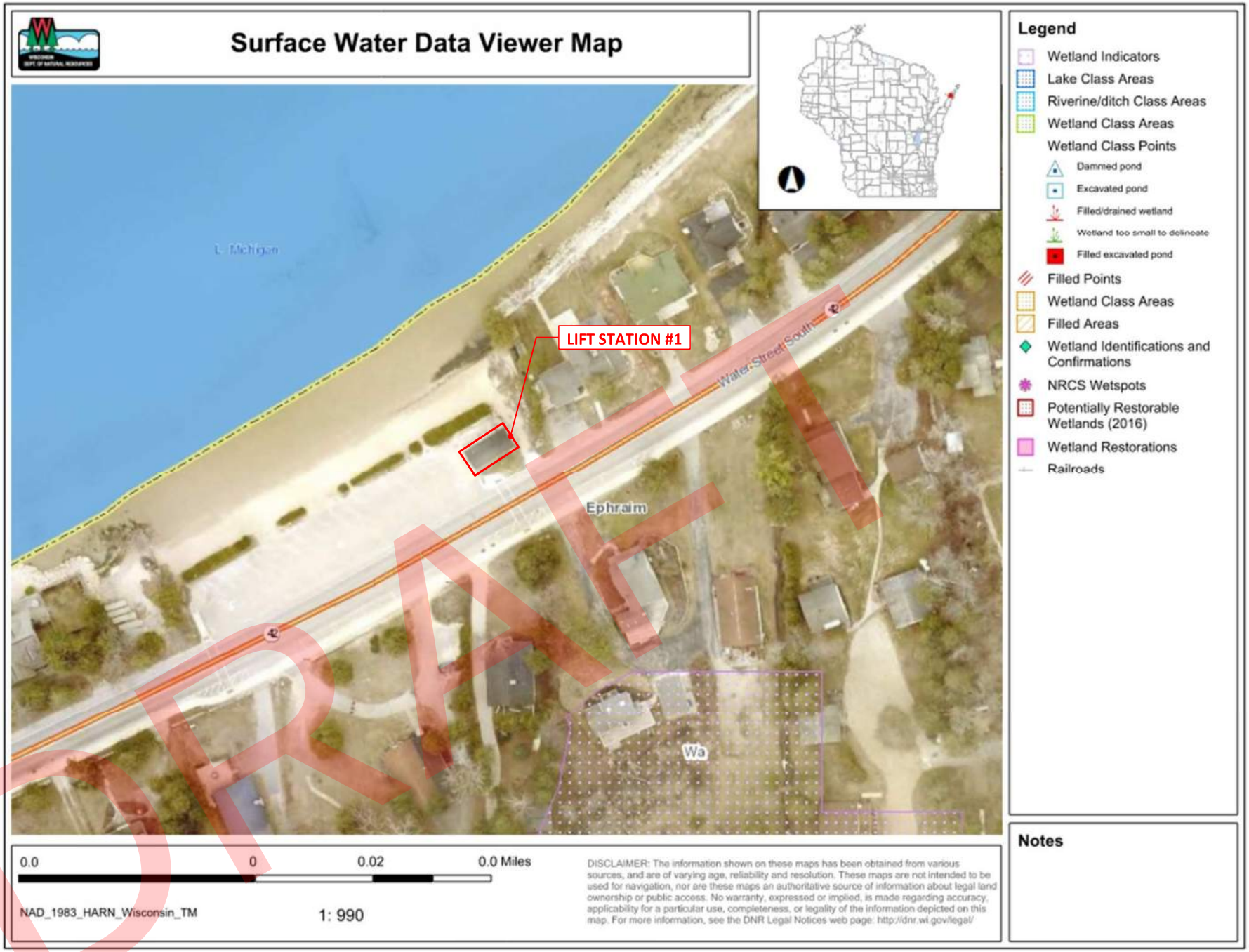
WWTF SITE WETLANDS MAP

WASTEWATER TREATMENT FACILITIES PLAN AMENDMENT

VILLAGE OF EPHRAIM, WI

McM #E0035-9-22-00363.04 1/31/2024

ID: W:\PROJECTS\E0035\092200363\Dept\Water-WW\Environmental Assessment



McMAHON ENGINEERS ARCHITECTS

FIGURE VIII-2

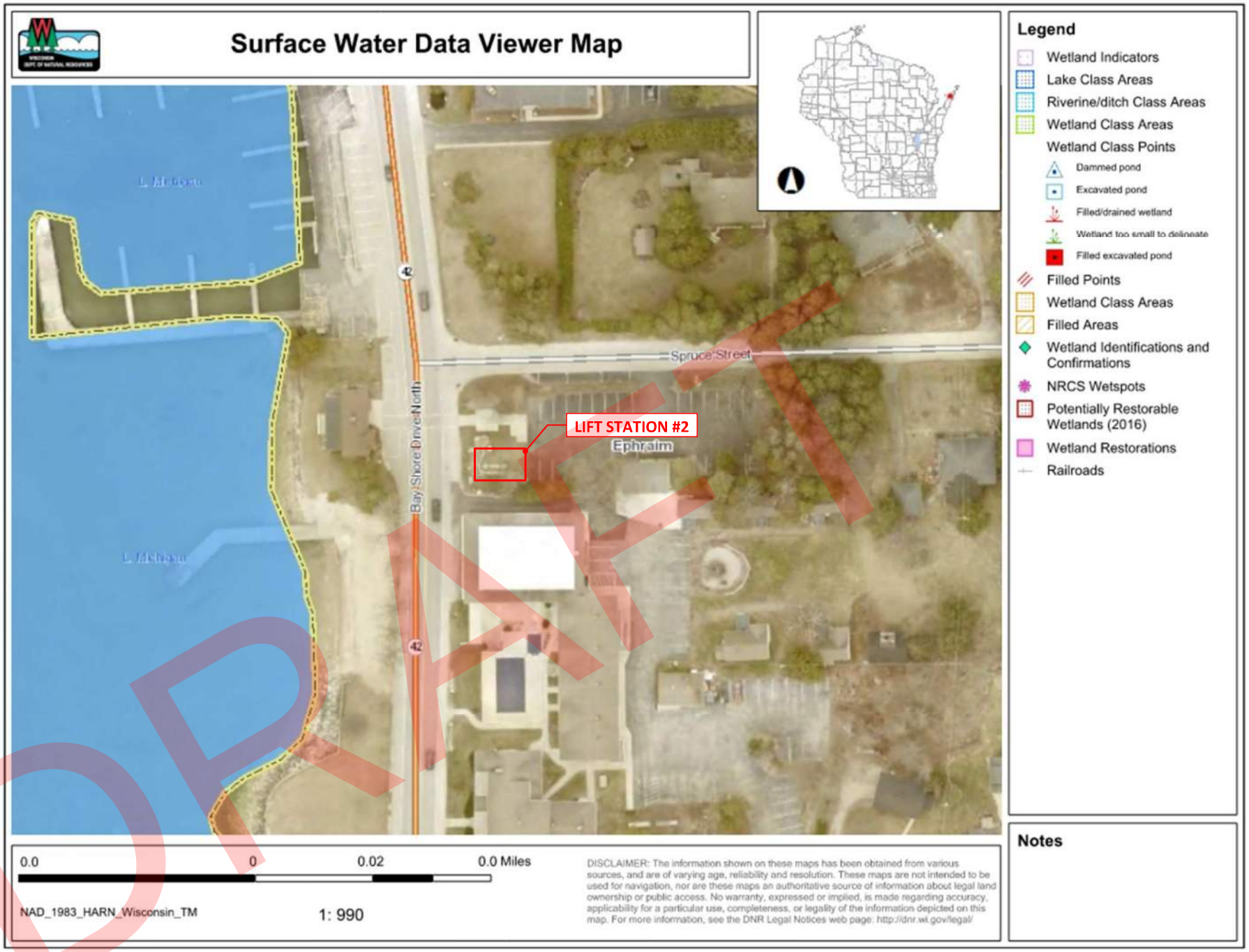
LIFT STATION #1 WETLANDS MAP

WASTEWATER TREATMENT FACILITIES PLAN AMENDMENT

VILLAGE OF EPHRAIM, WI

McM #E0035-9-22-00363.04 1/31/2024

ID: W:\PROJECTS\E0035\092200363\Dept\Water-WW\Environmental Assessment



McMAHON ENGINEERS ARCHITECTS

FIGURE VIII-3

LIFT STATION #2 WETLANDS MAP

WASTEWATER TREATMENT FACILITIES PLAN AMENDMENT

VILLAGE OF EPHRAIM, WI

McM #E0035-9-22-00363.04 1/31/2024

ID: W:\PROJECTS\E0035\092200363\Dept\Water-WW\Environmental Assessment

mapped wetlands in relation to Lift Stations #1 and #2. The WWTF site is located on wetland indicator soil types, however, a mapped wetland is not present. The presence of wetland indicating soil types does not constitute any further review or permitting requirements from the DNR. Therefore, the proposed WWTF site improvements are not expected to impact any wetland areas.

Figures VIII-4 through VIII-6 show FEMA mapped floodplains in relation to the WWTF site and Lift Stations #1 and #2. Although a portion of Lift Station #1 may be located within a 100-year floodplain, impacts to the floodplain are not expected, as the proposed improvements to Lift Station #1 primarily include the replacement of existing equipment within the existing Public Beach Building.

6. ENDANGERED RESOURCES

An Endangered Resources Preliminary Assessment was completed on Wisconsin DNR's Natural Heritage Inventory Public Portal for the WWTF site, the Lift Station #1 site, and the Lift Station #2 site. Since all three (3) project areas occur entirely within urban/residential, manicured lawn, and artificial/paved surfaces, these projects are covered by the Broad Incidental Take Permit/Authorization for No/Low Impact Activities (No/Low BITP/A).

A bald eagle nest was recorded within 1-mile of Lift Station #1 (Public Beach); however, this project is not expected to impact any eagles' nests. Therefore, the proposed improvements are not expected to impact any endangered resources and no further action is necessary. The results of this assessment are provided in Appendix E.

7. AGRICULTURAL LANDS

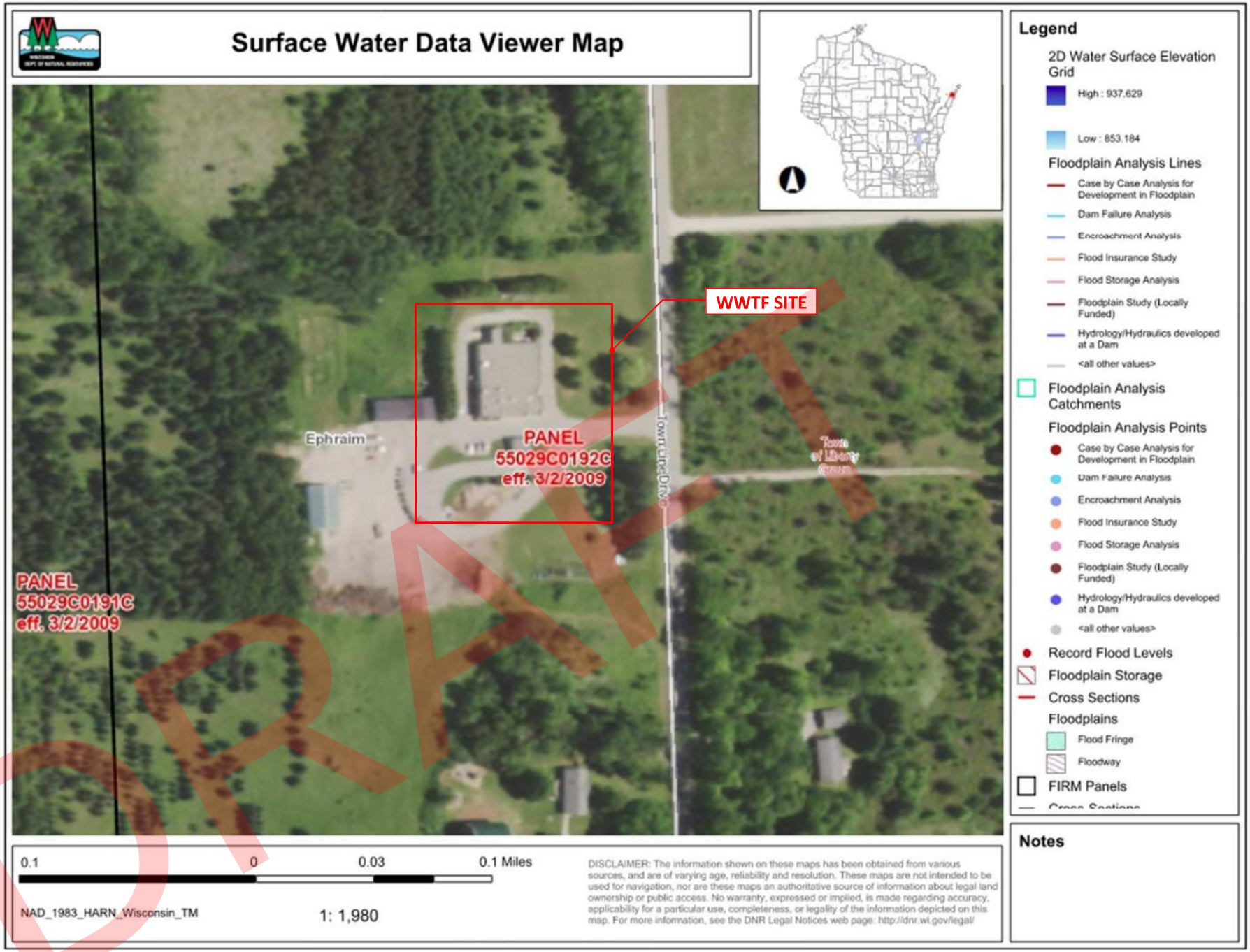
The project and its implementation are to be located at Village-owned property, including the site of the existing Ephraim WWTF. As a result, there will be no immediate impact on agricultural lands.

8. LAND USE

This project is not expected to induce changes in previously identified land use. Development will continue to occur in the Village of Ephraim. Mitigation of growth-related impacts will be discussed in the 'Mitigation of Impacts' section of this Chapter.

9. TRANSPORTATION

Short-term impacts will include increased truck traffic from construction activities. These activities are not expected to disrupt traffic flow or the use of short-term detours. Long-term transportation impacts are not expected.



McMAHON ENGINEERS ARCHITECTS

FIGURE VIII-4

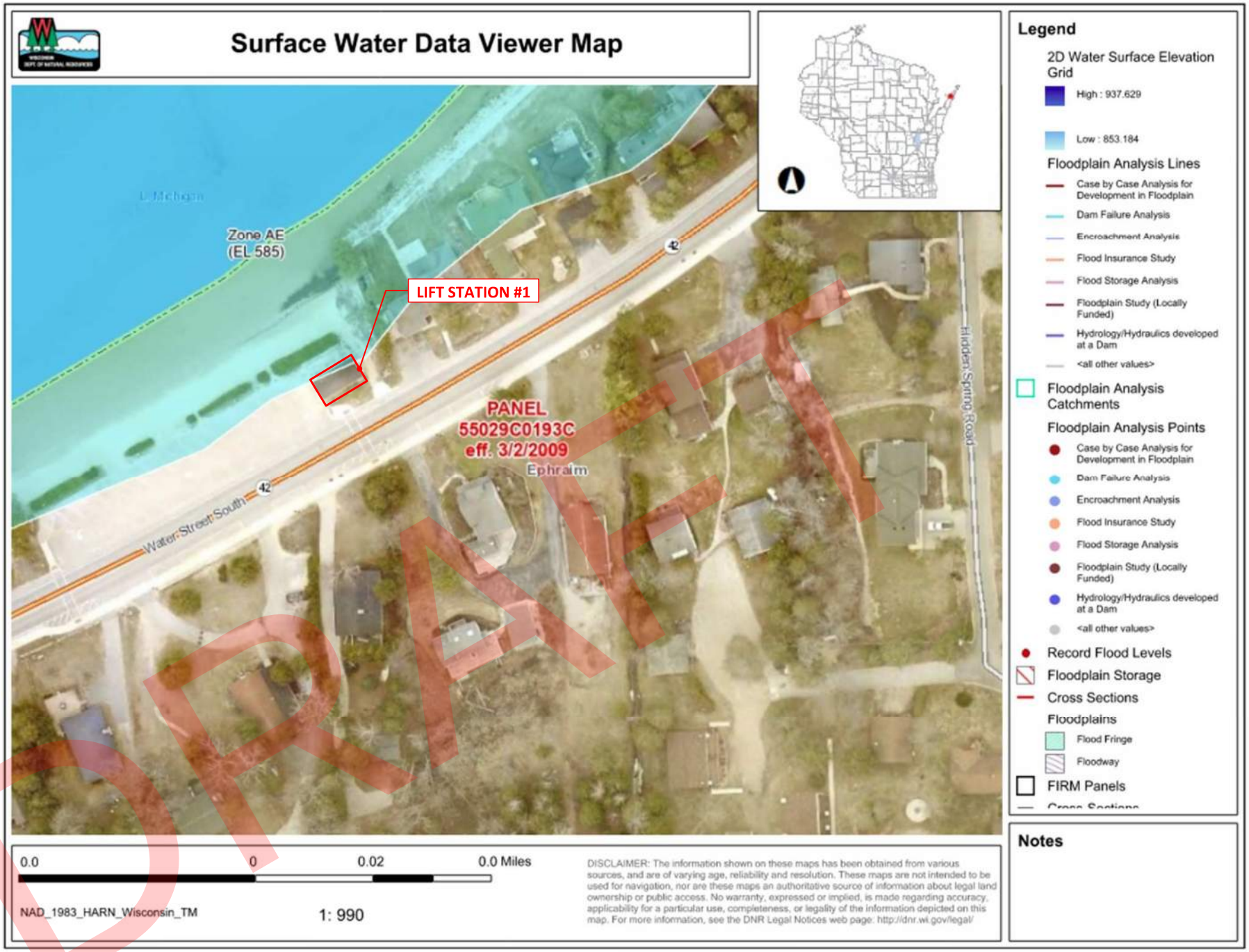
WWTF SITE FLOODPLAIN MAP

WASTEWATER TREATMENT FACILITIES PLAN AMENDMENT

VILLAGE OF EPHRAIM, WI

McM #E0035-9-22-00363.04 1/31/2024

ID: W:\PROJECTS\E0035\092200363\Dept\Water-WW\Environmental Assessment



McMAHON ENGINEERS ARCHITECTS

FIGURE VIII-5

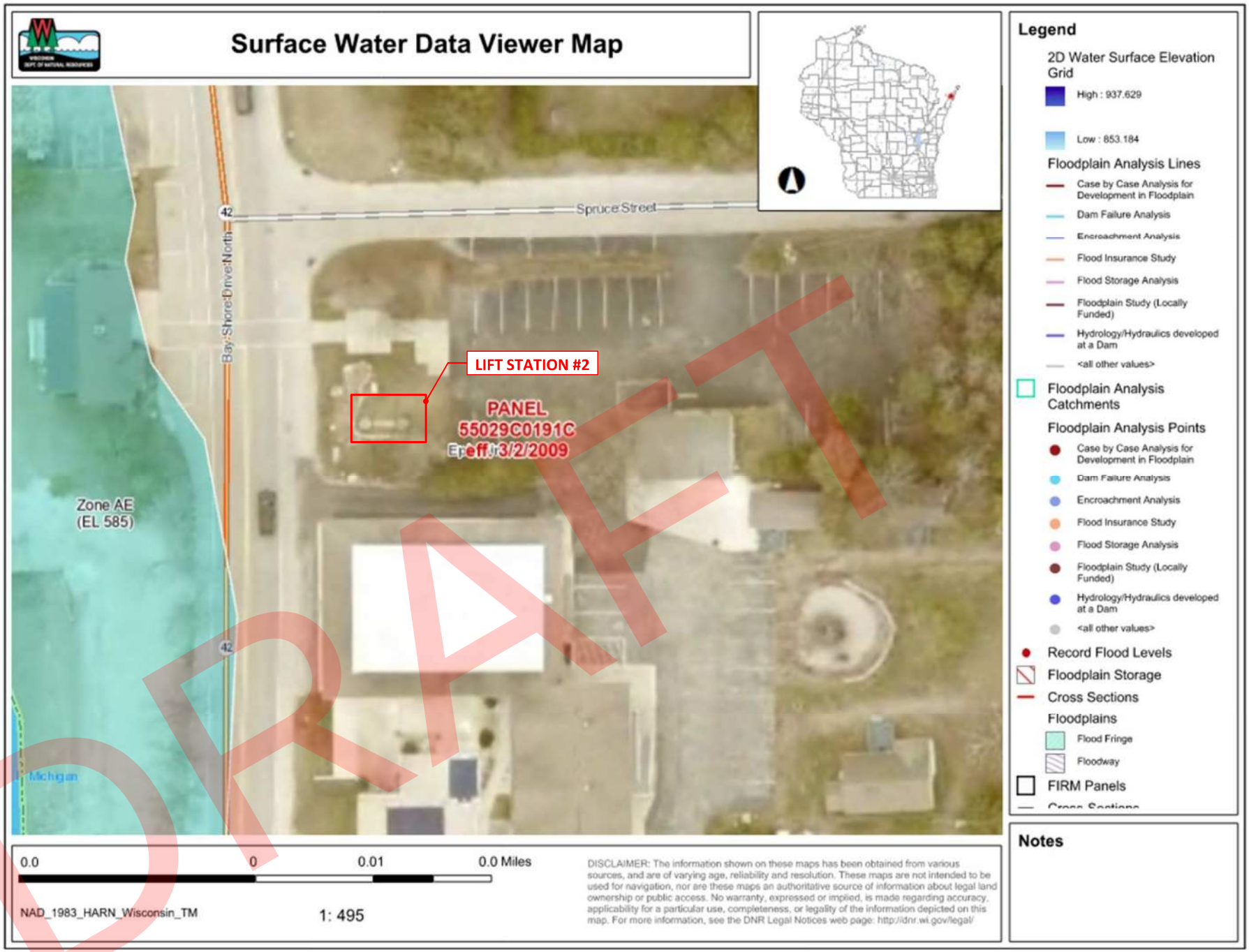
LIFT STATION #1 FLOODPLAIN MAP

WASTEWATER TREATMENT FACILITIES PLAN AMENDMENT

VILLAGE OF EPHRAIM, WI

McM #E0035-9-22-00363.04 1/31/2024

ID: W:\PROJECTS\E0035\092200363\Dept\Water-WW\Environmental Assessment



McMAHON ENGINEERS ARCHITECTS

FIGURE VIII-6

LIFT STATION #2 FLOODPLAIN MAP

WASTEWATER TREATMENT FACILITIES PLAN AMENDMENT

VILLAGE OF EPHRAIM, WI

McM #E0035-9-22-00363.04 1/31/2024

ID: W:\PROJECTS\E0035\092200363\Dept\Water-WW\Environmental Assessment

10. ECONOMICS

Construction of the proposed improvements will lead to short-term increases in employment and purchases of goods and services in the service area.

11. CULTURAL RESOURCES

A request was made of the DNR archaeologist to determine if any archaeological sites or historic structures/sites are present in the vicinity of Lift Stations #1 and #2 and the WWTF site. The DNR archaeologist state there are no known archaeological sites or historical structures within the vicinity of these areas. This correspondence is provided in Appendix F.

12. UNAVOIDABLE ADVERSE IMPACTS

Some impacts associated with implementation of the proposed improvements cannot be avoided. The proposed improvements would have the following adverse impacts:

- Short-term construction dust, noise, and traffic.
- Minor erosion during construction.

13. IRRETRIEVABLE & IRREVERSIBLE RESOURCE COMMITMENTS

The proposed improvements would include the commitment of the following resources:

- Fossil fuel, electrical energy, and human labor for facilities construction and operation.
- User fees and/or tax dollars for construction and operation.
- Some unsalvageable construction materials.

B. MITIGATION OF IMPACTS

As previously discussed, various adverse impacts would be associated with the proposed improvements. Many of these adverse impacts could be reduced significantly by the application of mitigative measures. These mitigative measures consist of a variety of legal requirements, planning measures and design practices. The extent to which these measures are applied will determine the ultimate impact of the particular actions. Potential measures for alleviating construction, operation, and secondary effects are discussed in the following section.

1. MITIGATION OF CONSTRUCTION IMPACTS

Construction related impacts are primarily short-term effects resulting from construction activities. Mitigation measures for these impacts are the responsibility of the contractor and would be governed by requirements in the project plans and specifications and appropriate regulations.

Erosion and sediment control measures would be required by the project specifications. The specifications would require the contractor provide an erosion and sediment control program consisting of a schedule for land clearing and grading for each structure and trench excavation, along with a description of measures to be used during construction for erosion and sediment control. Adherence to the required plan will minimize adverse impacts from erosion and sedimentation.

The specifications would also require the contractor to provide dust control measures. These measures generally consist of periodic watering of the construction area.

Traffic control during construction activities will adhere to appropriate requirements.

2. MITIGATION OF OPERATION IMPACTS

Proper operation and maintenance of the collection system and WWTF will improve the reliability of the system, leading to the discharge of high-quality effluent. The new facilities will be constructed without disrupting existing treatment.

3. MITIGATION OF SECONDARY IMPACTS

Secondary impacts are principally associated with induced development associated with the improvements to the wastewater treatment system. Induced growth can be controlled with proper planning and zoning controls.

C. RESOURCES IMPACT SUMMARY

Appendix G contains the 'Resources Impact Summary' for the Village of Ephraim's proposed improvements. This document will be made available for public review and comment.

Chapter IX
Recommended Plan

A. INTRODUCTION

The main objective of this Facility Plan Amendment is to determine the most cost-effective means of addressing the aging infrastructure and impending needs at the WWTF. Applicable wastewater alternatives should: (1) extend the service life of the existing facilities, (2) improve operator safety, (3) improve operability and maintainability, (4) maintain reserve treatment capacity for future growth, and (5) achieve compliance with permit effluent limits.

This Facilities Plan Amendment does not aim to change the capacity of the WWTF, as the existing WWTF has an abundance of reserve capacity to handle the projected future flows and loadings, nor does it aim to significantly change any of the original unit process design criteria (e.g., no new treatment processes are proposed).

B. PROPOSED IMPROVEMENTS

Based on an assessment of the existing collection system and WWTF, miscellaneous improvements are needed throughout the system. The proposed improvements are as follows:

1. COLLECTION SYSTEM

a. Lift Station #1

- Replace the submersible pumps, slide rail systems, wet well access hatch, discharge piping and valves, and electrical systems, controls, and telemetry.
- Replace the backup generator, if necessary, to operate the larger pumps.

b. Lift Station #2

- Complete lift station replacement with a submersible type lift station.
- Convert existing wet well to a flow through manhole.
- Replace the backup generator.
- Integrate fire and intrusion monitoring in the Smith Building.

c. Sewer Lining

- Televise and line the sections of sewer with leaking lateral stubs.

2. PRELIMINARY TREATMENT

a. Influent Pump Station

- Modify or replace the existing wet well access hatch and add safety grating.
- Replace the submersible pumps.
- Relocate the MCC and controls out of the Lift Station Building Addition.

b. Headworks

- Replace the fine screen, grit removal equipment, and air lift-type grit transfer system.
- Replace the HVAC system.

c. Hauled-In Waste Receiving

- Replace the screening equipment, holding tank access hatches, transfer piping and valves.
- Repair the concrete holding tank as necessary.
- Provide a new tanker truck.
- Install a direction connection for haulers.

3. SECONDARY TREATMENT

a. Aeration Basins

- Replace the aeration blowers and roof silencer housings.
- Modify aeration piping.
- Provide aeration basin mixers.

b. Secondary Clarifiers

- Replace the final clarifier mechanisms.
- Replace the common clarifier drive assembly.

c. Chemical Feed Systems

- Repair the alum storage tank and containment area as necessary.
- Integrate an effluent orthophosphate analyzer.

4. EFFLUENT DISCHARGE

- Replace the effluent pumps.
- Relocate the UV disinfection system controls.
- Replace the UV system wiring and conduit.
- Install a cover over the UV system.

5. SOLIDS HANDLING

- Replace the sludge transfer pumps and associated discharge piping and valves.
- Install permanent decanting pumps and transfer piping.

6. ELECTRICAL, CONTROLS, & SCADA

- Complete replacement of the main MCC, plant controls, and SCADA system.
- Replace the emergency backup generator.

7. MAIN TREATMENT BUILDING & SITE IMPROVEMENTS

- Replace the membrane roofing systems, entry and overhead doors, and building lighting.
- Paint exposed metal surfaces.
- Inspect exposed piping and paint or replace as needed.
- Complete laboratory renovations.
- Mill and overlay the existing asphalt pavement.
- Address cracks in the exterior masonry walls.

A summary of the Opinions of Probable Capital Costs associated with each of the proposed improvements follows:

Improvement Project	Opinion Of Probable Capital Cost
Collection System	$3,446,500
Preliminary Treatment	$3,028,000
Secondary Treatment	$1,436,500
Effluent Discharge	$517,000
Solids Handling	$294,000
Electrical & Controls	$1,539,500
General	$645,500
Total	**$10,907,000**

C. USER IMPACT ANALYSIS

The Village currently serves 414 residential and commercial sewer users. These 414 customers are charged on a Residential Equivalent Unit (REU) basis, whereas 1 REU represents the equivalent of a single-family residence, and larger commercial customers may be assigned multiple REUs. The total number of REUs for the 414 sewer users is 758.18 REUs. The Village's current sewer user rate is $124/REU/quarter. The Village's sewer utility generates additional revenue from holding and septic tank pumping and treatment charges, late fees, income taxes, and interest on investments.

In 2023, the Village's sewer utility generated a total revenue of $528,124, of which, sewer user charges generated $351,796, holding tank and septic charges generated $20,014, and other sources (income taxes, interest, late fees) generated $156,314. The sewer utility's total expenses were $504,598. The Village currently has annual debt service on two loans totaling $104,459. The existing debt service is set to be retired in 2025.

The Opinion of Probable Capital Cost for the proposed wastewater collection, conveyance, and treatment facilities improvements is $10,907,000. If the improvements were financed at an unsubsidized market interest rate of 4.30% (Wisconsin DNR, effective July 1, 2024), over a 20-year period, the resulting new annual debt service would be $824,020.

Assuming the proposed wastewater system improvements are completed after the current debt service is retired, the projected impact on sewer rates resulting from the proposed improvements is as follows:

- Current Revenue $528,124
- Current Expenses .....($400,139)
- Estimated New Debt Service.....($824,020)
- Estimated Revenue Shortfall.....($696,035)

The current user charge for 'typical' residential sewer customer (1 REU) is $496/year. If the projected revenue shortfall of $696,035 is completely recovered through an increase in user charges, the charge per quarter would need to increase by $230/REU/quarter. Therefore, a residential sewer customer would see an annual increase in their user charge from $496/year to $1,416/year; an increase of 185%.

Potential project financing alternatives and associated subsidies are discussed in the following section.

D. FINANCING OPTIONS

There are several programs or tools available to municipalities to fund WWTF projects. The two most common financing programs are described below.

1. CLEAN WATER FUND PROGRAM (CWFP)

The Clean Water Fund Program (CWFP) is administered by the State of Wisconsin Department of Natural Resources (DNR). Under this program, the Village may be eligible for a 'low interest loan' (subsidized) for the construction of proposed treatment facility improvements. Eligible costs are financed at 55% of the State's market interest rate, while ineligible costs are financed at the market rate, which is currently 4.3% (effective July 1, 2024). Therefore, eligible wastewater project costs are currently being funded at approximately 2.365% on a 20-year amortization schedule.

The DNR can also provide 'hardship' funding to communities that meet certain criteria. For eligible projects of disadvantaged municipalities with population less than 10,000 and a Median Household Income (MHI) of less than or equal to 80% of the State average, costs are financed at 33% of the State's market interest rate or 1.419% on a 20-year amortization schedule.

Principal Forgiveness (PF) is an additional federal subsidy to assist municipalities that would experience significant hardship raising the revenue necessary to finance needed infrastructure projects. PF is used to reduce the size of a CWFP loan, thus reducing annual principal and interest payments. The CWFP loan is written for the full amount of funds being provided for a project, but the PF portion is forgiven at the time of disbursement. The municipal bond pledged as security for the loan only needs to cover the amount of principal that will actually be repaid.

The PF allocation methodology is structured to allocate PF funds to the highest-priority CWFP projects, which is primarily determined by population and MHI, with additional points awarded based on population trends, family poverty level, county unemployment rate, and lowest quintile household income upper limit. An additional 10% PF is awarded to communities that are a part of the Green Tier Legacy Communities Program.

Based on an assessment of the PF allocation categories as current scoring matrices, the Village may be eligible for 45% PF. Therefore, a 45% reduction in the CWFP loan required for the collection system and WWTF improvements may be realized. PF is generally capped at 70% of the project cost. CWFP General PF is also capped at $2,100,000 for State Fiscal Year (SFY) 2024 projects.

1. Parallel Cost Percentage

The 'Parallel Cost Percentage' is a calculation used to show the proportion of project costs eligible for below-market-rate financing, relative to the total project cost, through the CWFP.

The parallel cost percentage is calculated as follows:

- Determine the total design capacity based on total flows and loadings, including hauled-in septage, estimated for the project design year condition.
- Calculate a reduced capacity condition by subtracting from the total design capacity the flows and loadings associated with each of the following as applicable:
  - The reserve capacity associated with a sewage collection system, individual system, or interceptor project in an unsewered municipality that is provided to serve projected flows beyond the initial flow expected at the project completion date.
  - The reserve capacity that is provided in the wastewater project to treat projected flows (including septage treatment capacity) beyond 10-years from the project completion date.
  - The capacity for both present and future flows and loadings from industrial wastewater users or from industrial areas regulated under Ch. NR 216, Wis. Adm. Code.
  - The capacity for flow from State and Federal facilities if the flow from these facilities exceeds 5% of the total flow to the treatment works or best management practices.

The Parallel Cost Percentage is then determined as follows:

PC = RC/DC

Where:

PC = the parallel cost percentage expressed as a decimal.

RC = construction costs associated with the reduced capacity condition.

DC = construction costs associated with the total design capacity.

2. Parallel Cost Percentage Calculation

The parallel cost percentage for this project is 1.0 based on the following:

- There are no existing categorical industrial dischargers in the Village, nor does the Village anticipate receiving any industrial loads in the future.
- Minimal growth is expected in the Village over the next 20-years. The size and cost of the project would not change from a 10-year to a 20-year design.

- The Village of Ephraim's WWTF does not receive flow from any State or Federal facilities.

The parallel cost percentage calculation is as follows:

RC = DC = $10,907,000 (see Cost Effective Analysis Chapter)

PC = RC/DC = $10,907,000 /$10,907,000 = 1

3. Septage Percentage Calculation

If the project includes costs for septage receiving facilities and/or septage treatment capacity, those costs may be eligible for a 0% loan rate. The estimate costs eligible for the 0% rate can be calculated as follows:

SP = (RC-RC2)/DC

Where:

SP = septage percentage (percentage of project costs eligible for a 0% rate).

RC = construction costs associated with the reduced capacity condition.

RC2 = construction costs associated with a capacity condition without market rate items and without septage receiving facilities or septage capacity.

DC = construction costs associated with the total design capacity.

The septage percentage calculation is as follows:

RC = DC = $10,907,000 (see Cost Effective Analysis Chapter)

RC2 = $10,907,000 - $549,000 = $10,358,000

SP = (RC/RC2)/DC - ($10,907,000 - $10,358,000)/$10,907,000 = 0.0503

Where:

Septage receiving costs are estimated at $549,000.

2. UNITED STATES DEPARTMENT OF AGRICULTURE – RURAL DEVELOPMENT (USDA-RD)

The United States Department of Agriculture (USDA) administers both a grant and loan program, which provides Federal funds for essential community facilities such as wastewater treatment facilities. Communities with no more than 20,000 residents are eligible for the program. A priority point system based on population and MHI is used to establish funding priority, where communities with population less than 5,500 and low-income communities having a MHI below 80% of the state MHI. Grant eligibility is based on a graduated scale with smaller communities with lowest MHI eligible for a higher proportion of grant funds where:

- Maximum of 75% when population is less than 5,000 and MHI is at or below 60% of the state MHI.
- Maximum of 55% when population is less than 12,000 and MHI is at or below 70% of the state MHI.

- Maximum of 35% when population is less than 20,000 and MHI is at or below 80% of the state MHI.
- Maximum of 15% when population is less than 20,000 and MHI is at or below 90% of the state MHI.

The Village of Ephraim has a SFY 2025 MHI of $72,292 and a population of less than 5,000. The State's SFY 2025 MHI is $72,458. Ephraim's MHI as a percentage of the State's MHI falls at 99%.

Loan repayment terms may not be longer than the useful life of the facility, state statutes, the applicant's authority, or a maximum of 40-years, whichever is less. Interest rates are set by USDA-RD based on the MHI of the service area and population of the community, and once the loan is approved, the interest rate is fixed for the entire term of the loan. There are no pre-payment penalties.

USDA-RD also has a loan and grant program specifically for funding water and wastewater projects in eligible rural areas with population of 10,000 or less. The program primarily provides long-term low-interest loans but may be combined with a grant to keep user costs reasonable. Like the 'Community Facilities' program, up to a 40-year payback period is available based on the useful life of the facilities financed, and fixed interest rates are based on the need of the project and the MHI of the area to be served.

E. RECOMMENDATIONS

Based upon the analyses completed in this Facility Plan, it is recommended that the Village of Ephraim take the following actions:

1) Submit the Wastewater Collection & Treatment System Facility Plan Amendment to the Wisconsin DNR in the third quarter of 2024.
2) Initiate design of the recommended improvements project in the fourth quarter of 2024 or 2025.
3) Request the Village or its financial consultant review the projected capital costs and begin to develop a conceptual plan to finance the proposed improvements project and to generate revenue to provide bond coverage.

F. IMPLEMENTATION

The proposed implementation schedule is shown below:

- Public Hearing.....September 2024
- Submit Facility Plan Amendment to DNR .....September 2024
- Submit ITA/PERF for CWF Project Funding .....October 2024
- DNR Approval of Facility Plan Amendment.....January 2025
- Submit Final Plans & Specifications to DNR .....June 2025
- DNR Approval of Plans & Specifications .....September 2025
- Submit Application for CWFP SFY 2026 Funding .....September 2025
- Open Bids for Construction .....December 2025
- Loan Closing .....March 2026
- Start Construction .....March 2026
- Complete Construction .....November 2027

APPENDIX A

WPDES Permit

WISCONSIN
DEPT. OF NATURAL RESOURCES

WPDES PERMIT

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

PERMIT TO DISCHARGE UNDER THE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM

Village of Ephraim

is permitted, under the authority of Chapter 283, Wisconsin Statutes, to discharge from a facility located at
10285 Townline Road, Ephraim, Wisconsin
to
Green Bay (Water Body Identification Code number 70) of Lake Michigan

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in this permit.

The permittee shall not discharge after the date of expiration. If the permittee wishes to continue to discharge after this expiration date an application shall be filed for reissuance of this permit, according to Chapter NR 200, Wis. Adm. Code, at least 180 days prior to the expiration date given below.

State of Wisconsin Department of Natural Resources
For the Secretary

By Heidi Schmitt Marquez
Wastewater Field Supervisor

April 28, 2022
Date Permit Signed/Issued for Modification

PERMIT TERM: EFFECTIVE DATE - January 01, 2022 **EXPIRATION DATE - December 31, 2026**
EFFECTIVE DATE OF MODIFICATION: May 01, 2022

TABLE OF CONTENTS

1 Influent Requirements

1.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
701	Influent - Collection System: Influent from the sanitary sewage collection system. Representative samples shall be collected from the automatic sampling device drawing samples from the influent pipe prior to the wetwell.
702	Influent - Septage: Influent from the septage receiving stations east and west holding tanks. Representative samples shall be collected from the automatic sampling device drawing samples from the discharge pipe from the holding tanks prior to the wetwell.
703	Influent - Calculated: Calculated total combined influent loading from sample points 701 and 702.

1.2 Monitoring Requirements

The permittee shall comply with the following monitoring requirements.

1.2.1 Sampling Point 701 - Influent - Collection System; 702- Influent - Septage

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	See Section 1.2.1.1
BOD_5, Total		mg/L	2/Week	24-Hr Flow Prop Comp	See Section 1.2.1.2
Suspended Solids, Total		mg/L	2/Week	24-Hr Flow Prop Comp	See Section 1.2.1.2

1.2.1.1 Reporting of Flow Rate at 702

If no septage is pumped into the treatment system on any given day, a value of zero (0) shall be reported for that day on the Discharge Monitoring Report (DMR) form.

1.2.1.2 Sampling Events at 701 & 702

Influent samples at sample points 701& 702 shall be collected during the same 24-hour period.

1.2.2 Sampling Point 703 - Influent - Calculated

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Calculated	See Section 1.2.2.1
BOD_5, Total		mg/L	2/Week	Calculated	See Section 1.2.2.2
Suspended Solids, Total		mg/L	2/Week	Calculated	See Section 1.2.2.2

1.2.2.1 Calculation of Combined Daily Flow

The permittee shall use the following formula to calculate and report Total Combined Daily Flow:

Total Daily Flow 703 (MGD) = Daily Flow at 701 (MGD) + Daily Flow at 702 (MGD)

1.2.2.2 Calculation of Combined Concentration

The permittee shall use the following formula to calculate and report the combined concentrations for BOD5 and Sus pended Solids at sample point 703.

$$\text{Concentraton at 703 (mg/L)} = \frac{[\text{Flow at 701 (MGD)} \times \text{Concentraton at 701 (mg/L)}] + [\text{Flow at 702 (MGD)} \times \text{Concentraton at 702 (mg/L)}]}{\text{Flow at 701 (MGD)} + \text{Flow at 702 (MGD)}}$$

1.2.2.3 Combined Collection System Influent and Septage Sampling

In lieu of calculating the flow and pollutant concentrations at sample point 703, the permittee may make the necessary facility modifications to collect actual samples of the combined influent. Plans and specifications of the proposed modifications must be submitted to the Department for approval prior to making those modifications. The permittee must provide written notification to the Department 30 days prior to beginning collection of actual combined influent samples at sample point 703. The Department will then change the "Sample Type" description of sample point 703 from "Calculated" to "24-Hr flow proportional composite". Upon beginning collection of actual combined influent samples at sample point 703, the requirement to monitor sample point 701 will be discontinued, and likewise the requirement to monitor sample point 702 for BOD5 and Total Suspended Solids will be discontinued, however the requirement for flow monitoring at sample point 702 will remain. These modifications to the influent sample points and the associated modifications to the permit will be made without public notice.

2 Surface Water Requirements

2.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
001	Effluent: Representative composite samples shall be collected from the automatic sampling device drawing samples after the final clarifier and prior to the UV disinfection unit. Representative grab type samples for pH and *E. coli* shall be collected after the UV disinfection unit.

2.2 Monitoring Requirements and Effluent Limitations

The permittee shall comply with the following monitoring requirements and limitations.

2.2.1 Sampling Point (Outfall) 001 - Effluent

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD_5, Total	Weekly Avg	45 mg/L	2/Week	24-Hr Flow Prop Comp	
BOD_5, Total	Monthly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	
pH Field	Daily Min	6.0 su	5/Week	Grab	
pH Field	Daily Max	9.0 su	5/Week	Grab	
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Limit applies May through September annually.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit applies May through September annually. See section 2.2.1.2 for details on the *E. coli* percent limit. Enter the result in the DMR on the last day of the month.
Nitrogen, Ammonia (NH_3-N) Total	Daily Max	18 mg/L	Monthly	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	18 mg/L	Monthly	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	18 mg/L	Monthly	24-Hr Flow Prop Comp	

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Phosphorus, Total	Monthly Avg	0.6 mg/L	2/Week	24-Hr Flow Prop Comp	
Arsenic, Total Recoverable		µg/L	Monthly	24-Hr Flow Prop Comp	Monitoring only in calendar year 2023. See section 2.2.1.3 for analytical requirements.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See section 2.2.1.4 for Nitrogen Series Monitoring requirements and test schedule.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See section 2.2.1.4 for Nitrogen Series Monitoring requirements and test schedule.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Annual in rotating quarters. See section 2.2.1.4 for Nitrogen Series Monitoring requirements and test schedule. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.

2.2.1.1 Annual Average Design Flow

The annual average design flow of the permittee's wastewater treatment facility is 0.31 MGD.

2.2.1.2 *E. coli* Percent Limit

No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 #/100 ml. Bacteria samples may be collected more frequently than required. All samples shall be reported on the monthly discharge monitoring reports (DMRs). The following calculation should be used to calculate percent exceedances.

$$\frac{\#\ of\ Samples\ greater\ than\ 410\ \#/100}{Total\ \#\ of\ samples} \times 100 = \%\ Exceedance$$

2.2.1.3 Arsenic Monitoring – Analytical Requirements

Samples shall be analyzed using an approved analytical method from chapter NR 219, Wis. Adm. Code, with a limit of detection (LOD) below the regulatory limit of 0.2 ug/L. If the required level of detection cannot be met by any of the methods available in ch. NR 219, Wis. Adm. Code, then the method with the lowest limit of detection shall be used.

2.2.1.4 Nitrogen Series Monitoring

Monitoring for Total Kjeldahl Nitrogen (TKN), Nitrite + Nitrate Nitrogen, and Total Nitrogen shall be conducted once each year in rotating quarters in order to collect seasonal information about the discharge. Tests are required during the following quarters:

- 3rd Quarter (July 1 to September 30) 2022
- 4th Quarter (October 1 to December 31) 2023
- 1st Quarter (January 1 to March 31) 2024
- 2nd Quarter (April 1 to June 30) 2025
- 3rd Quarter (July 1 to September 30) 2026

Nitrogen Series monitoring shall continue after the permit expiration date (until the permit is reissued) in accordance with the monitoring requirements specified in the last full calendar year of this permit. For example, the next test would be required in 3rd Quarter (July 1 to September 30) 2027.
Testing: Monitoring shall be performed during normal operating conditions. Permittees are not allowed to turn off or otherwise modify treatment systems, production processes, or change other operating or treatment conditions during testing.

3 Land Application Requirements

3.1 Sampling Point(s)

The discharge(s) shall be limited to land application of the waste type(s) designated for the listed sampling point(s) on Department approved land spreading sites or by hauling to another facility.

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
002	Class B, Liquid, Aerobically digested biosolids. Representative samples of the aerobically digested liquid sludge shall be collected from the digester. Results of all sludge analyses shall be reported on form 3400-49 "Waste Characteristics Report". Requirements for land application of sludge shall be assured and form 3400-55 "Land Application Report" shall be submitted if sludge is disposed of by land application. If sludge is disposed of by hauling to another facility the permittee shall analyze for List 1 parameters one time annually and shall also submit Form 3400-52 "Other Methods of Disposal or Distribution". All reports required by this section shall be submitted by January 31 following each year that sludge disposal occurs.

3.2 Monitoring Requirements and Limitations

The permittee shall comply with the following monitoring requirements and limitations.

3.2.1 Sampling Point (Outfall) 002 - Liquid Sludge

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Annual	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	Limits apply only when sludge is land applied.
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	Monitoring required only when sludge is land applied.
Nitrogen, Ammonium (NH_4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Monitoring required in 2023; see Sections 3.2.1.4 and 4.5.6 for monitoring requirements. Limits apply only when sludge is land applied.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	

Other Sludge Requirements	
Sludge Requirements	**Sample Frequency**
List 3 Requirements – Pathogen Control: The requirements in List 3 shall be met prior to land application of sludge.	**Required only when sludge is land applied**
List 4 Requirements – Vector Attraction Reduction: The vector attraction reduction shall be satisfied prior to, or at the time of land application as specified in List 4.	**Required only when sludge is land applied**

3.2.1.1 List 2 Analysis

Monitoring for List 2 parameters is required prior to land application of sludge.

3.2.1.2 Changes in Feed Sludge Characteristics

If a change in feed sludge characteristics, treatment process, or operational procedures occurs which may result in a significant shift in sludge characteristics, the permittee shall reanalyze the sludge for List 1, 2, 3 and 4 parameters each time such change occurs.

3.2.1.3 Sludge Which Exceeds the High Quality Limit

Cumulative pollutant loading records shall be kept for all bulk land application of sludge which does not meet the high quality limit for any parameter. This requirement applies for the entire calendar year in which any exceedance of Table 3 of s. NR 204.07(5)(c), is experienced. Such loading records shall be kept for all List 1 parameters for each site land applied in that calendar year. The formula to be used for calculating cumulative loading is as follows:

[(Pollutant concentration (mg/kg) x dry tons applied/ac) ÷ 500] + previous loading (lbs/acre) = cumulative lbs pollutant per acre

When a site reaches 90% of the allowable cumulative loading for any metal established in Table 2 of s. NR 204.07(5)(b), the Department shall be so notified through letter or in the comment section of the annual land application report (3400-55).

3.2.1.4 Sludge Analysis for PCBs

The permittee shall analyze the sludge for Total PCBs one time during **2023**. The results shall be reported as "PCB Total Dry Wt". Either congener-specific analysis or Aroclor analysis shall be used to determine the PCB concentration. The permittee may determine whether Aroclor or congener specific analysis is performed. Analyses shall be performed in accordance with Table EM in s. NR 219.04, Wis. Adm. Code and the conditions specified in Standard Requirements of this permit. PCB results shall be submitted by January 31, following the specified year of analysis.

3.2.1.5 Lists 1, 2, 3, and 4

List 1 **TOTAL SOLIDS AND METALS** See the Monitoring Requirements and Limitations table above for monitoring frequency and limitations for the List 1 parameters
Solids, Total (percent)
Arsenic, mg/kg (dry weight)
Cadmium, mg/kg (dry weight)
Copper, mg/kg (dry weight)
Lead, mg/kg (dry weight)
Mercury, mg/kg (dry weight)
Molybdenum, mg/kg (dry weight)
Nickel, mg/kg (dry weight)
Selenium, mg/kg (dry weight)
Zinc, mg/kg (dry weight)

List 2 **NUTRIENTS** See the Monitoring Requirements and Limitations table above for monitoring frequency for the List 2 parameters
Solids, Total (percent)
Nitrogen Total Kjeldahl (percent)
Nitrogen Ammonium (NH4-N) Total (percent)
Phosphorus Total as P (percent)
Phosphorus, Water Extractable (as percent of Total P)
Potassium Total Recoverable (percent)

List 3
PATHOGEN CONTROL FOR CLASS B SLUDGE

The permittee shall implement pathogen control as listed in List 3. The Department shall be notified of the pathogen control utilized and shall be notified when the permittee decides to utilize alternative pathogen control.

The following requirements shall be met prior to land application of sludge.

Parameter	Unit	Limit
Fecal Coliform*	MPN/gTS or CFU/gTS	2,000,000
OR, ONE OF THE FOLLOWING PROCESS OPTIONS		
Aerobic Digestion	Air Drying	
Anaerobic Digestion	Composting	
Alkaline Stabilization	PSRP Equivalent Process	

* The Fecal Coliform limit shall be reported as the geometric mean of 7 discrete samples on a dry weight basis.

List 4
VECTOR ATTRACTION REDUCTION

The permittee shall implement any one of the vector attraction reduction options specified in List 4. The Department shall be notified of the option utilized and shall be notified when the permittee decides to utilize an alternative option.

One of the following shall be satisfied prior to, or at the time of land application as specified in List 4.

Option	Limit	Where/When it Shall be Met
Volatile Solids Reduction	≥38%	Across the process
Specific Oxygen Uptake Rate	≤1.5 mg O_2/hr/g TS	On aerobic stabilized sludge
Anaerobic bench-scale test	<17 % VS reduction	On anaerobic digested sludge
Aerobic bench-scale test	<15 % VS reduction	On aerobic digested sludge
Aerobic Process	>14 days, Temp >40°C and Avg. Temp > 45°C	On composted sludge
pH adjustment	>12 S.U. (for 2 hours) and >11.5 (for an additional 22 hours)	During the process
Drying without primary solids	>75 % TS	When applied or bagged
Drying with primary solids	>90 % TS	When applied or bagged
Equivalent Process	Approved by the Department	Varies with process
Injection	-	When applied
Incorporation	-	Within 6 hours of application

3.2.1.6 Daily Land Application Log

Daily Land Application Log		
Discharge Monitoring Requirements and Limitations The permittee shall maintain a daily land application log for biosolids land applied each day when land application occurs. The following minimum records must be kept, in addition to all analytical results for the biosolids land applied. The log book records shall form the basis for the annual land application report requirements.		
Parameters	**Units**	**Sample Frequency**
DNR Site Number(s)	Number	Daily as used
Outfall number applied	Number	Daily as used
Acres applied	Acres	Daily as used
Amount applied	As appropriate * /day	Daily as used
Application rate per acre	unit */acre	Daily as used
Nitrogen applied per acre	lb/acre	Daily as used
Method of Application	Injection, Incorporation, or surface applied	Daily as used

*gallons, cubic yards, dry US Tons or dry Metric Tons

4 Standard Requirements

NR 205, Wisconsin Administrative Code: The conditions in ss. NR 205.07(1) and NR 205.07(2), Wis. Adm. Code, are included by reference in this permit. The permittee shall comply with all of these requirements. Some of these requirements are outlined in the Standard Requirements section of this permit. Requirements not specifically outlined in the Standard Requirement section of this permit can be found in ss. NR 205.07(1) and NR 205.07(2).

4.1 Reporting and Monitoring Requirements

4.1.1 Monitoring Results

Monitoring results obtained during the previous month shall be summarized and reported on a Department Wastewater Discharge Monitoring Report. The report may require reporting of any or all of the information specified below under 'Recording of Results'. This report is to be returned to the Department no later than the date indicated on the form. A copy of the Wastewater Discharge Monitoring Report Form or an electronic file of the report shall be retained by the permittee.

Monitoring results shall be reported on an electronic discharge monitoring report (eDMR). The eDMR shall be certified electronically by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

If the permittee monitors any pollutant more frequently than required by this permit, the results of such monitoring shall be included on the Wastewater Discharge Monitoring Report.

The permittee shall comply with all limits for each parameter regardless of monitoring frequency. For example, monthly, weekly, and/or daily limits shall be met even with monthly monitoring. The permittee may monitor more frequently than required for any parameter.

4.1.2 Sampling and Testing Procedures

Sampling and laboratory testing procedures shall be performed in accordance with Chapters NR 218 and NR 219, Wis. Adm. Code and shall be performed by a laboratory certified or registered in accordance with the requirements of ch. NR 149, Wis. Adm. Code. Groundwater sample collection and analysis shall be performed in accordance with ch. NR 140, Wis. Adm. Code. The analytical methodologies used shall enable the laboratory to quantitate all substances for which monitoring is required at levels below the effluent limitation. If the required level cannot be met by any of the methods available in NR 219, Wis. Adm. Code, then the method with the lowest limit of detection shall be selected. Additional test procedures may be specified in this permit.

4.1.3 Recording of Results

The permittee shall maintain records which provide the following information for each effluent measurement or sample taken:

- the date, exact place, method and time of sampling or measurements;
- the individual who performed the sampling or measurements;
- the date the analysis was performed;
- the individual who performed the analysis;
- the analytical techniques or methods used; and
- the results of the analysis.

4.1.4 Reporting of Monitoring Results

The permittee shall use the following conventions when reporting effluent monitoring results:

- Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 0.1 mg/L, report the pollutant concentration as < 0.1 mg/L.

- Pollutant concentrations equal to or greater than the limit of detection, but less than the limit of quantitation, shall be reported and the limit of quantitation shall be specified.

- For purposes of calculating NR 101 fees, the 2 mg/l lower reporting limits for BOD_5 and Total Suspended Solids shall be considered to be limits of quantitation

- For the purposes of reporting a calculated result, average or a mass discharge value, the permittee may substitute a "0" (zero) for any pollutant concentration that is less than the limit of detection. However, if the effluent limitation is less than the limit of detection, the department may substitute a value other than zero for results less than the limit of detection, after considering the number of monitoring results that are greater than the limit of detection and if warranted when applying appropriate statistical techniques.

- If no discharge occurs through an outfall, flow related parameters (e.g. flow rate, hydraulic application rate, volume, etc.) should be reported as "0" (zero) at the required sample frequency specified for the outfall. For example: if the sample frequency is daily, "0" would be reported for any day during the month that no discharge occurred.

4.1.5 Compliance Maintenance Annual Reports

Compliance Maintenance Annual Reports (CMAR) shall be completed using information obtained over each calendar year regarding the wastewater conveyance and treatment system. The CMAR shall be submitted and certified by the permittee in accordance with ch. NR 208, Wis. Adm. Code, by June 30, each year on an electronic report form provided by the Department.

In the case of a publicly owned treatment works, a resolution shall be passed by the governing body and submitted as part of the CMAR, verifying its review of the report and providing responses as required. Private owners of wastewater treatment works are not required to pass a resolution; but they must provide an Owner Statement and responses as required, as part of the CMAR submittal.

The CMAR shall be certified electronically by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The certification verifies that the electronic report is true, accurate and complete.

4.1.6 Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings or electronic data records for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit for a period of at least 3 years from the date of the sample, measurement, report or application. All pertinent sludge information, including permit application information and other documents specified in this permit or s. NR 204.06(9), Wis. Adm. Code shall be retained for a minimum of 5 years.

4.1.7 Other Information

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

4.1.8 Reporting Requirements – Alterations or Additions

The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is only required when:

- The alteration or addition to the permitted facility may meet one of the criteria for determining whether a facility is a new source.
- The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification requirement applies to pollutants which are not subject to effluent limitations in the existing permit.
- The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use of disposal sites not reported during the permit application process nor reported pursuant to an approved land application plan. Additional sites may not be used for the land application of sludge until department approval is received.

4.2 System Operating Requirements

4.2.1 Noncompliance Reporting

Sanitary sewer overflows and sewage treatment facility overflows shall be reported according to the 'Sanitary Sewer Overflows and Sewage Treatment Facility Overflows' section of this permit.

The permittee shall report the following types of noncompliance by a telephone call to the Department's regional office within 24 hours after becoming aware of the noncompliance:

- any noncompliance which may endanger health or the environment;
- any violation of an effluent limitation resulting from a bypass;
- any violation of an effluent limitation resulting from an upset; and
- any violation of a maximum discharge limitation for any of the pollutants listed by the Department in the permit, either for effluent or sludge.

A written report describing the noncompliance shall also be submitted to the Department's regional office within 5 days after the permittee becomes aware of the noncompliance. On a case-by-case basis, the Department may waive the requirement for submittal of a written report within 5 days and instruct the permittee to submit the written report with the next regularly scheduled monitoring report. In either case, the written report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; the steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and if the noncompliance has not been corrected, the length of time it is expected to continue.

A scheduled bypass approved by the Department under the 'Scheduled Bypass' section of this permit shall not be subject to the reporting required under this section.

NOTE: Section 292.11(2)(a), Wisconsin Statutes, requires any person who possesses or controls a hazardous substance or who causes the discharge of a hazardous substance to notify the Department of Natural Resources **immediately** of any discharge not authorized by the permit. **The discharge of a hazardous substance that is not authorized by this permit or that violates this permit may be a hazardous substance spill. To report a hazardous substance spill, call DNR's 24-hour HOTLINE at 1-800-943-0003.**

4.2.2 Flow Meters

Flow meters shall be calibrated annually, as per s. NR 218.06, Wis. Adm. Code.

4.2.3 Raw Grit and Screenings

All raw grit and screenings shall be disposed of at a properly licensed solid waste facility or picked up by a licensed waste hauler. If the facility or hauler are located in Wisconsin, then they shall be licensed under chs. NR 500-555, Wis. Adm. Code.

4.2.4 Sludge Management

All sludge management activities shall be conducted in compliance with ch. NR 204 "Domestic Sewage Sludge Management", Wis. Adm. Code.

4.2.5 Prohibited Wastes

Under no circumstances may the introduction of wastes prohibited by s. NR 211.10, Wis. Adm. Code, be allowed into the waste treatment system. Prohibited wastes include those:

- which create a fire or explosion hazard in the treatment work;
- which will cause corrosive structural damage to the treatment work;
- solid or viscous substances in amounts which cause obstructions to the flow in sewers or interference with the proper operation of the treatment work;
- wastewaters at a flow rate or pollutant loading which are excessive over relatively short time periods so as to cause a loss of treatment efficiency; and
- changes in discharge volume or composition from contributing industries which overload the treatment works or cause a loss of treatment efficiency.

4.2.6 Bypass

This condition applies only to bypassing at a sewage treatment facility that is not a scheduled bypass, approved blending as a specific condition of this permit, a sewage treatment facility overflow or a controlled diversion as provided in the sections titled 'Scheduled Bypass', 'Blending' (if approved), 'SSO's and Sewage Treatment Facility Overflows' and 'Controlled Diversions' of this permit. Any other bypass at the sewage treatment facility is prohibited and the Department may take enforcement action against a permittee for such occurrences under s. 283.89, Wis. Stats. The Department may approve a bypass if the permittee demonstrates all the following conditions apply:

- The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
- There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities or adequate back-up equipment, retention of untreated wastes, reduction of inflow and infiltration, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance. When evaluating feasibility of alternatives, the department may consider factors such as technical achievability, costs and affordability of implementation and risks to public health, the environment and, where the permittee is a municipality, the welfare of the community served; and
- The bypass was reported in accordance with the Noncompliance Reporting section of this permit.

4.2.7 Scheduled Bypass

Whenever the permittee anticipates the need to bypass for purposes of efficient operations and maintenance and the permittee may not meet the conditions for controlled diversions in the 'Controlled Diversions' section of this permit, the permittee shall obtain prior written approval from the Department for the scheduled bypass. A permittee's written

request for Department approval of a scheduled bypass shall demonstrate that the conditions for bypassing specified in the above section titled 'Bypass' are met and include the proposed date and reason for the bypass, estimated volume and duration of the bypass, alternatives to bypassing and measures to mitigate environmental harm caused by the bypass. The department may require the permittee to provide public notification for a scheduled bypass if it is determined there is significant public interest in the proposed action and may recommend mitigation measures to minimize the impact of such bypass.

4.2.8 Controlled Diversions

Controlled diversions are allowed only when necessary for essential maintenance to assure efficient operation. Sewage treatment facilities that have multiple treatment units to treat variable or seasonal loading conditions may shut down redundant treatment units when necessary for efficient operation. The following requirements shall be met during controlled diversions:

- Effluent from the sewage treatment facility shall meet the effluent limitations established in the permit. Wastewater that is diverted around a treatment unit or treatment process during a controlled diversion shall be recombined with wastewater that is not diverted prior to the effluent sampling location and prior to effluent discharge;
- A controlled diversion does not include blending as defined in s. NR 210.03(2e), Wis. Adm. Code, and as may only be approved under s. NR 210.12. A controlled diversion may not occur during periods of excessive flow or other abnormal wastewater characteristics;
- A controlled diversion may not result in a wastewater treatment facility overflow; and
- All instances of controlled diversions shall be documented in sewage treatment facility records and such records shall be available to the department on request.

4.2.9 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training as required in ch. NR 114, Wis. Adm. Code, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

4.2.10 Operator Certification

The wastewater treatment facility shall be under the direct supervision of a state certified operator. In accordance with s. NR 114.53, Wis. Adm. Code, every WPDES permitted treatment plant shall have a designated operator-in-charge holding a current and valid certificate. The designated operator-in-charge shall be certified at the level and in all subclasses of the treatment plant, except laboratory. Treatment plant owners shall notify the department of any changes in the operator-in-charge within 30 days. Note that s. NR 114.52(22), Wis. Adm. Code, lists types of facilities that are excluded from operator certification requirements (i.e. private sewage systems, pretreatment facilities discharging to public sewers, industrial wastewater treatment that consists solely of land disposal, agricultural digesters and concentrated aquatic production facilities with no biological treatment).

4.3 Sewage Collection Systems

4.3.1 Sanitary Sewage Overflows and Sewage Treatment Facility Overflows

4.3.1.1 Overflows Prohibited

Any overflow or discharge of wastewater from the sewage collection system or at the sewage treatment facility, other than from permitted outfalls, is prohibited. The permittee shall provide information on whether any of the following conditions existed when an overflow occurred:

- The sanitary sewer overflow or sewage treatment facility overflow was unavoidable to prevent loss of life, personal injury or severe property damage;
- There were no feasible alternatives to the sanitary sewer overflow or sewage treatment facility overflow such as the use of auxiliary treatment facilities or adequate back-up equipment, retention of untreated wastes, reduction of inflow and infiltration, or preventative maintenance activities;
- The sanitary sewer overflow or the sewage treatment facility overflow was caused by unusual or severe weather related conditions such as large or successive precipitation events, snowmelt, saturated soil conditions, or severe weather occurring in the area served by the sewage collection system or sewage treatment facility; and
- The sanitary sewer overflow or the sewage treatment facility overflow was unintentional, temporary, and caused by an accident or other factors beyond the reasonable control of the permittee.

4.3.1.2 Permittee Response to Overflows

Whenever a sanitary sewer overflow or sewage treatment facility overflow occurs, the permittee shall take all feasible steps to control or limit the volume of untreated or partially treated wastewater discharged, and terminate the discharge as soon as practicable. Remedial actions, including those in NR 210.21 (3), Wis. Adm. Code, shall be implemented consistent with an emergency response plan developed under the CMOM program.

4.3.1.3 Permittee Reporting

Permittees shall report all sanitary sewer overflows and sewage treatment overflows as follows:

- The permittee shall notify the department by telephone, fax or email as soon as practicable, but no later than 24 hours from the time the permittee becomes aware of the overflow;
- The permittee shall, no later than five days from the time the permittee becomes aware of the overflow, provide to the department the information identified in this paragraph using department form number 3400-184. If an overflow lasts for more than five days, an initial report shall be submitted within 5 days as required in this paragraph and an updated report submitted following cessation of the overflow. At a minimum, the following information shall be included in the report:

  ◦The date and location of the overflow;
  ◦The surface water to which the discharge occurred, if any;
  ◦The duration of the overflow and an estimate of the volume of the overflow;
  ◦A description of the sewer system or treatment facility component from which the discharge occurred such as manhole, lift station, constructed overflow pipe, or crack or other opening in a pipe;
  ◦The estimated date and time when the overflow began and stopped or will be stopped;
  ◦The cause or suspected cause of the overflow including, if appropriate, precipitation, runoff conditions, areas of flooding, soil moisture and other relevant information;
  ◦Steps taken or planned to reduce, eliminate and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
  ◦A description of the actual or potential for human exposure and contact with the wastewater from the overflow;

◦Steps taken or planned to mitigate the impacts of the overflow and a schedule of major milestones for those steps;
◦To the extent known at the time of reporting, the number and location of building backups caused by excessive flow or other hydraulic constraints in the sewage collection system that occurred concurrently with the sanitary sewer overflow and that were within the same area of the sewage collection system as the sanitary sewer overflow; and
◦The reason the overflow occurred or explanation of other contributing circumstances that resulted in the overflow event. This includes any information available including whether the overflow was unavoidable to prevent loss of life, personal injury, or severe property damage and whether there were feasible alternatives to the overflow.

NOTE: A copy of form 3400-184 for reporting sanitary sewer overflows and sewage treatment facility overflows may be obtained from the department or accessed on the department's web site at http://dnr.wi.gov/topic/wastewater/SSOreport.html. As indicated on the form, additional information may be submitted to supplement the information required by the form.

- The permittee shall identify each specific location and each day on which a sanitary sewer overflow or sewage treatment facility overflow occurs as a discrete sanitary sewer overflow or sewage treatment facility overflow occurrence. An occurrence may be more than one day if the circumstances causing the sanitary sewer overflow or sewage treatment facility overflow results in a discharge duration of greater than 24 hours. If there is a stop and restart of the overflow at the same location within 24 hours and the overflow is caused by the same circumstance, it may be reported as one occurrence. Sanitary sewer overflow occurrences at a specific location that are separated by more than 24 hours shall be reported as separate occurrences; and
- A permittee that is required to submit wastewater discharge monitoring reports under NR 205.07 (1) (r) shall also report all sanitary sewer overflows and sewage treatment facility overflows on that report.

4.3.1.4 Public Notification

The permittee shall notify the public of any sanitary sewer and sewage treatment facility overflows consistent with its emergency response plan required under the CMOM (Capacity, Management, Operation and Maintenance) section of this permit and s. NR 210.23 (4) (f), Wis. Adm. Code. Such public notification shall occur promptly following any overflow event using the most effective and efficient communications available in the community. At minimum, a daily newspaper of general circulation in the county(s) and municipality whose waters may be affected by the overflow shall be notified by written or electronic communication.

4.3.2 Capacity, Management, Operation and Maintenance (CMOM) Program

- The permittee shall have written documentation of the Capacity, Management, Operation and Maintenance (CMOM) program components in accordance with s. NR 210.23(4), Wis. Adm. Code. Such documentation shall be available for Department review upon request. The Department may request that the permittee provide this documentation or prepare a summary of the permittee's CMOM program at the time of application for reissuance of the WPDES permit.
- The permittee shall implement a CMOM program in accordance with s. NR 210.23, Wis. Adm. Code.
- The permittee shall at least annually conduct a self-audit of activities conducted under the permittee's CMOM program to ensure CMOM components are being implemented as necessary to meet the general standards of s. NR 210.23(3), Wis. Adm. Code.

4.3.3 Sewer Cleaning Debris and Materials

All debris and material removed from cleaning sanitary sewers shall be managed to prevent nuisances, run-off, ground infiltration or prohibited discharges.

- Debris and solid waste shall be dewatered, dried and then disposed of at a licensed solid waste facility.
- Liquid waste from the cleaning and dewatering operations shall be collected and disposed of at a permitted wastewater treatment facility.
- Combination waste including liquid waste along with debris and solid waste may be disposed of at a licensed solid waste facility or wastewater treatment facility willing to accept the waste.

4.4 Surface Water Requirements

4.4.1 Permittee-Determined Limit of Quantitation Incorporated into this Permit

For pollutants with water quality-based effluent limits below the Limit of Quantitation (LOQ) in this permit, the LOQ calculated by the permittee and reported on the Discharge Monitoring Reports (DMRs) is incorporated by reference into this permit. The LOQ shall be reported on the DMRs, shall be the lowest quantifiable level practicable, and shall be no greater than the minimum level (ML) specified in or approved under 40 CFR Part 136 for the pollutant at the time this permit was issued, unless this permit specifies a higher LOQ.

4.4.2 Appropriate Formulas for Effluent Calculations

The permittee shall use the following formulas for calculating effluent results to determine compliance with average concentration limits and mass limits and total load limits:

Weekly/Monthly/Six-Month/Annual Average Concentration = the sum of all daily results for that week/month/six-month/year, divided by the number of results during that time period. [Note: When a six-month average effluent limit is specified for Total Phosphorus the applicable periods are May through October and November through April.]

Weekly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the week.

Monthly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the month.

Six-Month Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the six-month period. [Note: When a six-month average effluent limit is specified for Total Phosphorus the applicable periods are May through October and November through April.]

Annual Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the entire year.

Total Monthly Discharge: = monthly average concentration (mg/L) x total flow for the month (MG/month) x 8.34.

Total Annual Discharge: = sum of total monthly discharges for the calendar year.

12-Month Rolling Sum of Total Monthly Discharge: = the sum of the most recent 12 consecutive months of Total Monthly Discharges.

4.4.3 Effluent Temperature Requirements

Weekly Average Temperature – The permittee shall use the following formula for calculating effluent results to determine compliance with the weekly average temperature limit (as applicable): Weekly Average Temperature = the sum of all daily maximum results for that week divided by the number of daily maximum results during that time period.

Cold Shock Standard – Water temperatures of the discharge shall be controlled in a manner as to protect fish and aquatic life uses from the deleterious effects of cold shock. 'Cold Shock' means exposure of aquatic organisms to a rapid decrease in temperature and a sustained exposure to low temperature that induces abnormal behavior or physiological performance and may lead to death.

Rate of Temperature Change Standard – Temperature of a water of the state or discharge to a water of the state may not be artificially raised or lowered at such a rate that it causes detrimental health or reproductive effects to fish or aquatic life of the water of the state.

4.4.4 Visible Foam or Floating Solids

There shall be no discharge of floating solids or visible foam in other than trace amounts.

4.4.5 Surface Water Uses and Criteria

In accordance with NR 102.04, Wis. Adm. Code, surface water uses and criteria are established to govern water management decisions. Practices attributable to municipal, industrial, commercial, domestic, agricultural, land development or other activities shall be controlled so that all surface waters including the mixing zone meet the following conditions at all times and under all flow and water level conditions:

a) Substances that will cause objectionable deposits on the shore or in the bed of a body of water, shall not be present in such amounts as to interfere with public rights in waters of the state.

b) Floating or submerged debris, oil, scum or other material shall not be present in such amounts as to interfere with public rights in waters of the state.

c) Materials producing color, odor, taste or unsightliness shall not be present in such amounts as to interfere with public rights in waters of the state.

d) Substances in concentrations or in combinations which are toxic or harmful to humans shall not be present in amounts found to be of public health significance, nor shall substances be present in amounts which are acutely harmful to animal, plant or aquatic life.

4.4.6 Percent Removal

During any 30 consecutive days, the average effluent concentrations of BOD_5 and of total suspended solids shall not exceed 15% of the average influent concentrations, respectively. This requirement does not apply to removal of total suspended solids if the permittee operates a lagoon system and has received a variance for suspended solids granted under NR 210.07(2), Wis. Adm. Code.

4.4.7 *E. coli*

The monthly limit for *E. coli* shall be expressed as a geometric mean. In calculating the geometric mean, a value of 1 is used for any result of 0.

4.4.8 Seasonal Disinfection

Disinfection shall be provided from May 1 through September 30 of each year. Monitoring requirements and the limitations *E. coli* apply only during the period in which disinfection is required. Whenever chlorine is used for disinfection or other uses, the limitations and monitoring requirements for residual chlorine shall apply. A dechlorination process shall be in operation whenever chlorine is used.

4.5 Land Application Requirements

4.5.1 Sludge Management Program Standards And Requirements Based Upon Federally Promulgated Regulations

In the event that new federal sludge standards or regulations are promulgated, the permittee shall comply with the new sludge requirements by the dates established in the regulations, if required by federal law, even if the permit has not yet been modified to incorporate the new federal regulations.

4.5.2 General Sludge Management Information

The General Sludge Management Form 3400-48 shall be completed and submitted prior to any significant sludge management changes.

4.5.3 Sludge Samples

All sludge samples shall be collected at a point and in a manner which will yield sample results which are representative of the sludge being tested, and collected at the time which is appropriate for the specific test.

4.5.4 Land Application Characteristic Report

Each report shall consist of a Characteristic Form 3400-49 and Lab Report. The Characteristic Report Form 3400-49 shall be submitted electronically by January 31 following each year of analysis.

Following submittal of the electronic Characteristic Report Form 3400-49, this form shall be certified electronically via the 'eReport Certify' page by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report is true, accurate and complete. The Lab Report must be sent directly to the facility's DNR sludge representative or basin engineer unless approval for not submitting the lab reports has been given.

The permittee shall use the following convention when reporting sludge monitoring results: Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 1.0 mg/kg, report the pollutant concentration as < 1.0 mg/kg .

All results shall be reported on a dry weight basis.

4.5.5 Calculation of Water Extractable Phosphorus

When sludge analysis for Water Extractable Phosphorus is required by this permit, the permittee shall use the following formula to calculate and report Water Extractable Phosphorus:
Water Extractable Phosphorus (% of Total P) =
[Water Extractable Phosphorus (mg/kg, dry wt) ÷ Total Phosphorus (mg/kg, dry wt)] x 100

4.5.6 Monitoring and Calculating PCB Concentrations in Sludge

When sludge analysis for "PCB, Total Dry Wt" is required by this permit, the PCB concentration in the sludge shall be determined using either congener-specific analysis or Aroclor analysis. The permittee may decide which of these analyses is performed. Analyses shall be performed in accordance with the following provisions and Table EM in s. NR 219.04, Wis. Adm. Code:

- If congener-specific analysis is employed: All PCB congeners shall be delineated. Non-detects shall be treated as zero. The values that are between the limit of detection (LOD) and the limit of quantitation

shall be used when calculating the total value of all congeners. All results shall be added together and the total PCB concentration by dry weight reported.

- If Aroclor analysis is employed, reporting protocols, consistent with s. NR 106.07(6)(e), should be as follows: If all Aroclors are less than the LOD, then the Total PCB Dry Wt result should be reported as less than the highest LOD. If a single Aroclor is detected, then that is what should be reported for the Total PCB result. If multiple Aroclors are detected, they should be summed and reported as Total PCBs. If the LOD cannot be achieved after using the appropriate clean up techniques, a reporting limit that is achievable for the Aroclors or each congener for the sample shall be determined. This reporting limit shall be reported and qualified indicating the presence of an interference.

4.5.7 Annual Land Application Report

Land Application Report Form 3400-55 shall be submitted electronically by January 31, each year whether or not non-exceptional quality sludge is land applied. Non-exceptional quality sludge is defined in s. NR 204.07(4), Wis. Adm. Code. Following submittal of the electronic Annual Land Application Report Form 3400-55, this form shall be certified electronically via the 'eReport Certify' page by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

4.5.8 Other Methods of Disposal or Distribution Report

The permittee shall submit electronically the Other Methods of Disposal or Distribution Report Form 3400-52 by January 31, each year whether or not sludge is hauled, landfilled, incinerated, or exceptional quality sludge is distributed or land applied. Following submittal of the electronic Report Form 3400-52, this form shall be certified electronically via the 'eReport Certify' page by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

4.5.9 Approval to Land Apply

Bulk non-exceptional quality sludge as defined in s. NR 204.07(4), Wis. Adm. Code, may not be applied to land without a written approval letter or Form 3400-122 from the Department unless the Permittee has obtained permission from the Department to self approve sites in accordance with s. NR 204.06 (6), Wis. Adm. Code. Analysis of sludge characteristics is required prior to land application. Application on frozen or snow covered ground is restricted to the extent specified in s. NR 204.07(3) (l), Wis. Adm. Code.

4.5.10 Soil Analysis Requirements

Each site requested for approval for land application must have the soil tested prior to use. Each approved site used for land application must subsequently be soil tested such that there is at least one valid soil test in the four years prior to land application. All soil sampling and submittal of information to the testing laboratory shall be done in accordance with UW Extension Bulletin A-2100. The testing shall be done by the UW Soils Lab in Madison or Marshfield, WI or at a lab approved by UW. The test results including the crop recommendations shall be submitted to the DNR contact listed for this permit, as they are available. Application rates shall be determined based on the crop nitrogen recommendations and with consideration for other sources of nitrogen applied to the site.

4.5.11 Land Application Site Evaluation

For non-exceptional quality sludge, as defined in s. NR 204.07(4), Wis. Adm. Code, a Land Application Site Request Form 3400-053 shall be submitted to the Department for the proposed land application site. The Department will

evaluate the proposed site for acceptability and will either approve or deny use of the proposed site. The permittee may obtain permission to approve their own sites in accordance with s. NR 204.06(6), Wis. Adm. Code.

4.5.12 Sludge Hauling

The permittee is required to submit Form 3400-52 to the Department. If sludge is hauled to another facility, information shall include the quantity of sludge hauled, the name, address, phone number, contact person, and permit number of the receiving facility. Form 3400-52 shall be submitted annually by January 31 each year whether or not sludge is hauled.

5 Summary of Reports Due

FOR INFORMATIONAL PURPOSES ONLY

Description	Date	Page
Compliance Maintenance Annual Reports (CMAR)	by June 30, each year	12
General Sludge Management Form 3400-48	prior to any significant sludge management changes	20
Characteristic Form 3400-49 and Lab Report	by January 31 following each year of analysis	20
Land Application Report Form 3400-55	by January 31, each year whether or not non-exceptional quality sludge is land applied	21
Other Methods of Disposal or Distribution Report Form 3400-52	by January 31, each year whether or not sludge is hauled, landfilled, incinerated, or exceptional quality sludge is distributed or land applied	21
Wastewater Discharge Monitoring Report	no later than the date indicated on the form	11

Report forms shall be submitted electronically in accordance with the reporting requirements herein. Any facility plans or plans and specifications for municipal, industrial, industrial pretreatment and non industrial wastewater systems shall be submitted to the Bureau of Water Quality, P.O. Box 7921, Madison, WI 53707-7921. All other submittals required by this permit shall be submitted to:

Northeast Region, 2984 Shawano Avenue, Green Bay, WI 54313-6727

APPENDIX B

WWTF Influent Flows & Loadings and Plant Performance Data Tables

Table #1
Village of Ephraim WWTF
2019 Influent Flows & Loadings

Month	Influent (Collection Sytem)										Influent (Hauled-In Wastes)										Total Combined Influent									
	Flow		BOD				TSS				Flow		BOD				TSS				Flow		BOD				TSS			
	MGD		mg/L		lbs./day		mg/L		lbs./day		gpd		mg/L		lbs./day		mg/L		lbs./day		MGD		mg/L		lbs./day		mg/L		lbs./day	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Jan-19	0.039	0.066	104	249	38	136	103	214	38	117	732	7,100	617	3,033	19.8	71	1,731	9,733	50	227	0.040	0.067	125	249	48	136	159	550	63	247
Feb-19	0.036	0.056	84	180	25	54	79	120	24	36	1,193	7,800	144	236	5.0	6.5	102	297	2.3	2.8	0.037	0.056	88	180	28	54	79	120	25	36
Mar-19	0.065	0.112	58	146	23	43	56	116	21	32	1,319	8,300	175	230	8.8	10	105	210	5.3	8.9	0.066	0.112	67	146	27	51	60	119	24	37
Apr-19	0.106	0.157	57	121	48	93	57	104	49	80	737	8,600	606	1,456	14.7	27	1,686	4,000	29	54	0.107	0.157	62	152	53	119	68	171	59	134
May-19	0.103	0.152	82	110	68	132	90	126	75	151	1,139	8,500	146	252	2.6	5.1	145	223	3.5	10	0.104	0.152	83	115	69	125	90	129	75	141
Jun-19	0.122	0.162	155	228	154	253	184	262	180	264	1,110	7,100	212	421	10.6	14	187	570	8.2	12	0.123	0.162	157	228	157	253	162	255	160	264
Jul-19	0.137	0.166	199	285	220	306	199	226	220	248	3,790	16,600	168	217	14.0	20	113	160	9.3	16	0.141	0.169	198	285	228	306	195	219	225	248
Aug-19	0.128	0.264	194	278	233	458	200	228	238	472	2,945	20,000	819	2,206	32.0	131	2,353	7,320	78	345	0.131	0.270	207	288	253	466	237	493	287	582
Sep-19	0.105	0.153	146	163	114	126	154	186	121	144	2,007	14,700	192	274	13.1	21	256	450	18	35	0.107	0.153	148	173	125	147	161	210	137	179
Oct-19	0.098	0.132	107	156	84	128	118	184	92	151	2,255	11,800	349	733	10.6	26	805	2,267	21	65	0.100	0.132	112	159	90	128	130	217	105	152
Nov-19	0.053	0.121	69	79	25	32	74	84	26	34	753	4,100	287	1,043	3.9	6.3	655	2,960	7.4	13	0.054	0.121	74	80	28	33	85	103	32	39
Dec-19	0.062	0.148	65	91	34	77	65	86	35	92	642	5,500	133	247	2.4	6.6	131	253	2.1	6.6	0.063	0.149	67	100	36	77	67	86	37	92
Avg	0.088		110		89		115		93		1,559		321		11.3		690		19		0.090		116		95		125		102	
Off-Season Avg (Nov-Apr)	0.060		73		32		72		32		896		327		9.1		735		16		0.061		80		37		86		40	
Peak Avg (May-Oct)	0.115		146		143		156		152		2,215		308		14.3		621		24		0.118		149		151		161		162	
Max	0.137	0.264	199	285	233	458	200	262	238	472	3,790	20,000	819	3,033	32.0	131	2,353	9,733	78	345	0.141	0.270	207	288	253	466	237	550	287	582

Table #2
Village of Ephraim WWTF
2020 Influent Flows & Loadings

Month	Influent (Collection Sytem)										Influent (Hauled-In Wastes)										Total Combined Influent									
	Flow		BOD				TSS				Flow		BOD				TSS				Flow		BOD				TSS			
	MGD		mg/L		lbs./day		mg/L		lbs./day		gpd		mg/L		lbs./day		mg/L		lbs./day		MGD		mg/L		lbs./day		mg/L		lbs./day	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Jan-20	0.059	0.101	48	75	23	63	53	88	26	74	287	3,100	118	194	1.1	3.5	141	283	1.1	4.7	0.059	0.101	49	75	24	63	54	88	27	74
Feb-20	0.041	0.061	62	78	19	24	80	104	24	31	662	4,200	108	137	2.2	3.9	88	117	1.8	3.0	0.042	0.061	65	81	21	27	80	102	26	34
Mar-20	0.064	0.113	49	68	24	54	54	80	25	44	810	5,300	130	167	2.8	6.5	138	270	2.8	11	0.065	0.113	53	80	27	54	58	103	28	47
Apr-20	0.071	0.109	49	77	29	44	46	74	27	47	590	3,400	182	262	3.0	6.1	110	280	1.8	4.9	0.072	0.109	52	80	31	50	48	75	29	49
May-20	0.085	0.175	72	101	47	73	72	112	48	81	1,494	8,300	214	255	6.1	16	136	187	3.7	9.7	0.086	0.175	78	106	53	80	74	113	52	85
Jun-20	0.109	0.144	131	188	121	199	146	204	134	216	2,040	6,800	190	307	6.2	17	172	384	5.5	19	0.111	0.147	134	189	127	203	147	206	140	221
Jul-20	0.144	0.173	189	222	213	237	196	238	222	276	2,816	10,100	190	217	7.9	16	140	188	5.9	12	0.146	0.173	189	220	221	243	194	232	228	288
Aug-20	0.134	0.203	178	213	190	228	211	240	227	334	3,194	8,400	238	373	9.6	22	277	610	12	36	0.138	0.209	180	221	200	250	214	252	238	348
Sep-20	0.099	0.132	142	179	105	122	173	212	130	173	1,897	8,200	859	2,791	27.6	137	2,142	6,520	62	321	0.101	0.132	168	255	133	248	238	487	192	474
Oct-20	0.088	0.131	132	156	76	102	161	226	94	139	2,219	7,100	467	1,659	10.5	19	926	4,520	18	53	0.090	0.131	144	190	86	106	186	281	112	160
Nov-20	0.049	0.084	80	118	31	55	103	164	40	69	940	12,700	477	1,272	12.5	89	1,669	5,700	37	261	0.050	0.084	106	288	44	119	186	718	77	298
Dec-20	0.033	0.044	117	190	32	63	141	220	38	72	900	5,000	102	131	2.1	3.7	97	180	2.0	3.9	0.034	0.044	116	183	34	65	138	209	40	74
Avg	0.082		104		75		120		85		1,493		276		7.9		509		13		0.083		111		83		135		98	
Off-Season Avg (Nov-Apr)	0.053		68		26		79		30		698		186		4.0		374		7.7		0.054		73		30		94		38	
Peak Avg (May-Oct)	0.110		140		125		160		142		2,280		372		11.7		673		19		0.112		149		136		177		161	
Max	0.144	0.203	189	222	213	237	211	240	227	334	3,194	12,700	859	2,791	27.6	137	2,142	6,520	62	321	0.146	0.209	189	288	221	250	238	718	238	474

Table #3
Village of Ephraim WWTF
2021 Influent Flows & Loadings

Month	Influent (Collection Sytem)										Influent (Hauled-In Wastes)										Total Combined Influent									
	Flow		BOD				TSS				Flow		BOD				TSS				Flow		BOD				TSS			
	MGD		mg/L		lbs./day		mg/L		lbs./day		gpd		mg/L		lbs./day		mg/L		lbs./day		MGD		mg/L		lbs./day		mg/L		lbs./day	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Jan-21	0.031	0.052	171	447	35	92	269	852	55	176	661	6,400	124	231	2.3	7.7	125	270	1.7	4.9	0.032	0.052	167	411	38	95	252	775	57	179
Feb-21	0.033	0.047	107	142	26	47	125	192	30	63	903	9,100	109	145	2.9	11	83	140	1.5	5.0	0.034	0.047	108	139	28	52	121	186	31	66
Mar-21	0.046	0.065	102	146	40	51	118	152	47	66	1,058	6,000	339	917	7.6	13	440	1,330	5.1	9.8	0.047	0.070	108	157	45	63	120	152	51	73
Apr-21	0.059	0.095	86	117	42	63	94	134	45	81	887	4,300	694	2,364	9.1	37	1,496	6,600	13	65	0.060	0.097	100	205	49	75	117	295	55	107
May-21	0.082	0.120	129	217	79	135	128	208	78	132	945	7,500	240	422	6.0	14	203	520	3.5	6.8	0.083	0.120	130	214	83	145	126	206	81	138
Jun-21	0.113	0.145	214	292	191	246	206	262	187	243	2,287	9,400	177	261	5.9	12	158	373	4.7	9.8	0.115	0.145	213	291	197	250	204	264	191	253
Jul-21	0.140	0.182	233	253	261	280	241	268	270	292	1,490	6,500	150	182	6.2	7.7	132	247	5.4	11	0.142	0.182	231	249	268	287	237	263	275	297
Aug-21	0.129	0.146	211	253	220	290	233	268	241	301	1,958	8,700	147	189	6.6	11	126	172	5.4	7.7	0.131	0.151	209	247	227	296	229	263	247	304
Sep-21	0.102	0.132	179	242	147	232	191	234	156	224	1,650	9,100	179	309	4.5	7.7	278	600	6.3	17	0.103	0.132	178	242	152	232	192	238	163	224
Oct-21	0.089	0.117	148	176	100	124	183	240	123	172	1,219	7,900	143	226	5.0	7.4	232	470	8.0	15	0.090	0.117	148	173	105	130	185	246	131	185
Nov-21	0.032	0.060	142	199	31	47	180	228	40	61	890	5,600	94	149	1.7	3.8	128	249	1.9	4.2	0.033	0.060	139	192	33	49	174	207	41	65
Dec-21	0.030	0.049	128	167	33	57	164	220	43	75	1,110	6,000	92	131	2.4	6.6	84	122	2.0	5.3	0.031	0.052	125	167	36	57	157	220	45	75
Avg	0.074		154		101		178		110		1,255		204		4.8		281		4.7		0.075		155		105		176		114	
Off-Season Avg (Nov-Apr)	0.039		123		35		158		43		918		242		4.3		393		4.3		0.040		124		38		157		47	
Peak Avg (May-Oct)	0.109		186		167		197		177		1,588		173		5.7		185		5.6		0.111		185		173		196		182	
Max	0.140	0.182	233	447	261	290	269	852	270	301	2,287	9,400	694	2,364	9.1	37	1,496	6,600	13.4	65	0.142	0.182	231	411	268	296	252	775	275	304

Table #4
Village of Ephraim WWTF
2022 Influent Flows & Loadings

Month	Influent (Collection Sytem)										Influent (Hauled-In Wastes)										Total Combined Influent									
	[1] Flow		BOD				TSS				[1] Flow		BOD				TSS				[1] Flow		BOD				TSS			
	MGD		mg/L		lbs./day		mg/L		lbs./day		gpd		mg/L		lbs./day		mg/L		lbs./day		MGD		mg/L		lbs./day		mg/L		lbs./day	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Jan-22	0.027	0.045	136	178	28	39	160	200	32	44	413	4,300	119	181	1.3	4.2	167	428	1.2	3.7	0.027	0.045	134	175	29	41	156	200	34	45
Feb-22	0.026	0.036	117	132	21	23	143	176	25	32	500	4,300	128	228	1.7	2.9	159	355	1.2	2.1	0.026	0.036	115	132	22	25	137	165	26	33
Mar-22	0.053	0.184	79	124	26	74	91	154	33	117	723	11,600	235	434	4.5	21	233	620	2.0	7.9	0.054	0.185	83	138	31	74	88	131	36	118
Apr-22	0.093	0.183	36	75	25	34	42	114	28	45	880	7,100	118	203	2.5	6.5	96	232	2.3	8.9	0.094	0.183	38	80	27	36	43	120	30	54
May-22	0.115	0.172	65	107	58	109	72	110	63	113	1,923	9,700	141	226	5.5	10.4	149	280	5.6	12	0.117	0.176	68	109	63	116	75	117	69	125
Jun-22	0.123	0.139	113	142	112	144	105	148	104	143	1,617	6,700	309	689	5.7	16	457	1,540	7.1	22	0.124	0.139	116	150	118	153	109	157	111	160
Jul-22	0.143	0.157	146	197	171	257	136	202	159	219	1,642	13,100	336	817	6.6	13	563	1,800	6.9	13	0.145	0.157	147	197	176	257	138	197	164	223
Aug-22	0.128	0.150	137	182	141	196	138	224	141	194	1,861	7,800	171	251	6.4	14	209	530	7.9	23	0.130	0.150	138	180	147	200	140	222	148	200
Sep-22	0.098	0.131	109	158	85	130	101	176	79	145	2,147	7,800	297	704	16.3	46	448	1,560	29	101	0.100	0.131	120	164	97	143	123	229	100	200
Oct-22	0.090	0.109	127	155	95	104	111	138	78	82	3,338	12,600	486	2,130	11.3	17	2,310	14,400	18	33	0.093	0.109	139	150	103	114	123	134	91	105
Nov-22	0.029	0.039	133	256	31	52	180	340	42	69	791	4,300	424	1,149	4.2	17	1,456	5,000	15	74	0.030	0.039	158	258	35	53	251	468	57	125
Dec-22	0.026	0.053	146	200	28	45	213	312	41	76	555	2,700	285	572	5.1	11	488	1,170	8.5	22	0.027	0.053	158	207	33	51	238	319	50	86
Avg	0.080		112		68		124		69		1,281		255		5.5		560		7.9		0.081		116		73		134		77	
Off-Season Avg (Nov-Apr)	0.042		108		26		138		33		644		218		3.2		433		5.1		0.043		114		29		152		39	
Peak Avg (May-Oct)	0.119		116		112		111		107		1,955		283		7.8		656		10.7		0.121		119		119		117		116	
Max	0.143	0.184	146	256	171	257	213	340	159	219	3,338	13,100	486	2,130	16.3	46	2,310	14,400	29	101	0.145	0.185	158	258	176	257	251	468	164	223

[1] No flow data provided from 10/14/2022 through 11/7/2022.

Table #5
Village of Ephraim WWTF
2023 Influent Flows & Loadings

Month	Influent (Collection Sytem)										Influent (Hauled-In Wastes)										Total Combined Influent									
	[1] Flow		BOD				TSS				[1] Flow		BOD				TSS				[1] Flow		BOD				TSS			
	MGD		mg/L		lbs./day		mg/L		lbs./day		gpd		mg/L		lbs./day		mg/L		lbs./day		MGD		mg/L		lbs./day		mg/L		lbs./day	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Jan-23	0.028	0.042	142	253	31	60	178	536	39	127	642	3,400	334	1,232	6.0	25	571	2,640	10.2	53	0.029	0.042	156	329	37	85	206	700	49	180
Feb-23	0.027	0.038	116	144	22	26	162	248	33	58	343	3,000	366	634	3.6	8.3	401	700	3.8	11	0.027	0.038	126	170	26	34	170	249	36	58
Mar-23	0.052	0.170	68	107	26	38	81	130	30	48	319	4,000	715	1,803	4.1	14	2,058	4,900	10.3	38	0.052	0.170	71	109	28	53	90	124	36	80
Apr-23	0.095	0.197	36	66	27	67	31	56	25	80	570	5,200	441	1,018	3.2	5.9	1,356	4,370	9.7	26	0.095	0.197	38	66	29	71	36	61	30	89
May-23	0.076	0.122	81	113	50	84	92	154	57	100	1,352	3,800	413	1,417	4.7	7.9	544	2,167	3.7	5.6	0.078	0.122	85	117	54	91	94	158	60	103
Jun-23	0.111	0.149	142	171	125	154	153	174	134	161	1,673	8,400	282	382	7.7	18	343	1,033	6.4	13	0.111	0.149	142	171	125	154	153	174	134	161
Jul-23	0.135	0.158	169	209	184	225	172	212	187	229	1,900	11,500	377	597	14	30	451	1,100	17	39	0.136	0.158	175	209	197	233	180	215	202	248
Aug-23	0.124	0.139	147	193	151	217	151	174	154	188	2,071	7,700	422	784	18	44	584	1,433	25	92	0.121	0.143	177	330	154	232	179	250	164	232
Sep-23	0.096	0.141	135	158	96	112	141	156	100	120	1,420	5,000	433	1,346	12	38	709	3,660	20	104	0.097	0.141	145	171	107	131	162	257	120	197
Oct-23	0.089	0.134	113	147	82	115	116	170	85	131	1,739	7,800	484	1,105	13	31	593	2,133	16	60	0.091	0.134	127	158	95	123	135	190	101	152
Nov-23	0.034	0.060	110	170	26	47	115	216	26	47	1,267	8,200	993	4,733	21	75	1,943	11,400	36	181	0.035	0.060	180	518	45	99	254	1,060	58	202
Dec-23	0.026	0.045	136	181	28	50	137	208	28	51	887	4,300	337	561	10	17	502	1,140	15	36	0.027	0.045	156	208	35	58	177	252	39	61
Avg	0.074		116		70		127		74		1,188		469		10.6		825		15.4		0.075		132		78		153		86	
Off-Season Avg (Nov-Apr)	0.044		101		27		117		30		671		531		8.0		1,138		14.2		0.044		121		33		155		41	
Peak Avg (May-Jun)	0.105		130		112		136		117		1,694		405		12.1		540		15.6		0.105		141		120		149		128	
Max	0.135	0.197	169	253	184	225	178	536	187	229	2,071	11,500	993	4,733	21.0	75	2,058	11,400	35.9	181	0.136	0.197	180	518	197	233	254	1,060	202	248

[1] No flow data provided from 8/23/2023 through 8/28/2023.

2019 through 2023

Avg	0.080		119		81		133		87		1,356		303		7.7		570		11.6		0.081		126		87		144		96	
Off-Season Avg (Nov-Apr)	0.048		94		29		113		34		765		301		5.7		615		9.5		0.048		103		34		129		41	
Peak Avg (May-Oct)	0.112		143		132		152		139		1,946		309		10.1		535		14.4		0.113		149		140		160		150	
Max	0.144	0.264	233	447	261	458	269	852	270	472	3,790	20,000	993	4,733	32.0	137	2,353	14,400	78	345	0.146	0.270	231	518	268	466	254	1,060	287	582

Table #6
Village of Ephraim WWTF
2019 Plant Performance

Month	Effluent																			
	Flow		BOD				TSS				Total P				[1] NH3-N		pH		Fecal Coliform		E. coli	
	MGD		mg/L		lbs./day		mg/L		lbs./day		mg/L		lbs./day		mg/L		s.u.		#/100 mL		#/100 mL	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Jan-19	0.038	0.066	4.9	9.4	1.8	5.0	9.6	15.6	3.5	7.6	0.17	0.23	0.06	0.11	0.05	0.05	7.1	7.4	-	-	-	-
Feb-19	0.036	0.054	3.7	5.8	1.2	1.9	8.9	13.6	2.9	6.1	0.18	0.29	0.06	0.13	0.03	0.03	7.2	7.5	-	-	-	-
Mar-19	0.065	0.110	4.1	6.0	1.9	3.8	12.1	16.6	6.1	12.7	0.25	0.36	0.13	0.27	0.04	0.04	7.4	7.6	-	-	-	-
Apr-19	0.105	0.156	4.5	6.1	4.0	5.8	16.4	21.2	14.6	20.1	0.31	0.36	0.28	0.36	0.61	0.61	7.3	7.4	-	-	-	-
May-19	0.103	0.152	5.0	6.5	4.0	5.9	13.2	16.0	10.8	17.6	0.26	0.34	0.22	0.39	0.05	0.05	7.3	7.4	1.0	1.0	1.0	1.0
Jun-19	0.118	0.157	4.4	6.3	4.4	7.2	11.5	15.6	11.3	17.8	0.39	0.51	0.36	0.58	0.03	0.03	7.2	7.4	1.3	2.0	1.3	2.0
Jul-19	0.135	0.164	4.7	6.4	5.2	7.1	12.1	19.6	13.3	20.9	0.54	0.69	0.60	0.86	0.06	0.06	7.0	7.1	2.7	6.3	3.3	9.5
Aug-19	0.126	0.265	4.4	5.6	5.1	10.0	10.8	16.4	12.6	24.3	0.49	0.88	0.55	0.92	0.06	0.06	7.0	7.2	1.5	3.1	1.4	3.1
Sep-19	0.103	0.150	3.6	5.0	2.9	3.5	9.7	13.4	7.8	9.2	0.25	0.39	0.21	0.34	0.04	0.04	7.3	7.6	1.0	1.0	1.0	1.0
Oct-19	0.097	0.130	4.1	4.7	3.2	3.9	11.2	13.2	8.5	11.3	0.36	0.49	0.27	0.40	0.03	0.03	7.2	7.5	-	-	-	-
Nov-19	0.053	0.121	3.7	5.6	1.3	2.1	10.3	13.6	3.8	4.9	0.33	0.42	0.12	0.16	0.05	0.05	7.3	7.5	-	-	-	-
Dec-19	0.063	0.149	4.4	6.5	2.4	5.0	13.5	21.0	7.1	14.9	0.44	0.83	0.21	0.37	0.29	0.29	7.5	7.9	-	-	-	-
Avg	0.087		4.3		3.1		11.6		8.6		0.33		0.26		0.11		7.2		1.5		1.6	
Off-Season Avg (Nov-Apr)	0.060		4.2		2.1		11.8		6.3		0.28		0.14		0.18		7.3		-		-	
Peak Avg (May-Oct)	0.114		4.4		4.1		11.4		10.7		0.38		0.37		0.04		7.1		1.5		1.6	
Max	0.135	0.265	5.0	9.4	5.2	10.0	16.4	21.2	14.6	24.3	0.54	0.88	0.60	0.92	0.61	0.61	7.5	7.9	2.7	6.3	3.3	9.5

[1] One (1) sample per month.

Table #7
Village of Ephraim WWTF
2020 Plant Performance

Month	Effluent																					
	Flow		BOD				TSS				Total P				[1] NH3-N		pH		Fecal Coliform		E. coli	
	MGD		mg/L		lbs./day		mg/L		lbs./day		mg/L		lbs./day		mg/L		s.u.		#/100 mL		#/100 mL	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Jan-20	0.057	0.099	3.7	4.8	1.7	2.9	12.7	16.8	5.9	10.2	0.32	0.62	0.14	0.25	0.29	0.29	7.4	7.7	-	-	-	-
Feb-20	0.040	0.059	2.9	3.7	0.9	1.2	8.5	12.4	2.7	4.4	0.21	0.34	0.07	0.12	0.03	0.03	7.2	7.3	-	-	-	-
Mar-20	0.064	0.113	3.3	4.5	1.8	3.6	7.0	10.8	3.4	5.4	0.21	0.36	0.10	0.13	0.04	0.04	7.2	7.3	-	-	-	-
Apr-20	0.071	0.109	2.6	3.1	1.6	2.3	5.7	7.6	3.5	4.8	0.15	0.19	0.09	0.12	0.01	0.01	7.2	7.4	-	-	-	-
May-20	0.085	0.173	3.5	5.3	2.5	3.6	9.2	12.4	6.7	14.2	0.24	0.33	0.18	0.38	0.05	0.05	7.0	7.2	1.0	1.0	1.0	1.0
Jun-20	0.107	0.141	3.4	4.0	3.1	4.7	10.3	18.6	9.1	17.0	0.32	0.55	0.29	0.51	0.00	0.00	6.9	7.0	1.0	1.0	1.5	2.0
Jul-20	0.141	0.168	4.0	5.5	4.5	6.2	5.9	7.4	6.7	8.9	0.56	0.68	0.64	0.81	0.03	0.03	6.9	7.1	1.0	1.0	2.0	5.0
Aug-20	0.131	0.204	3.6	5.2	3.7	5.7	6.5	9.8	6.8	10.6	0.56	0.80	0.61	0.92	0.04	0.04	7.0	7.2	1.0	1.0	2.6	5.2
Sep-20	0.097	0.127	4.0	6.0	2.9	4.1	5.2	8.0	3.8	5.7	0.29	0.48	0.22	0.36	0.09	0.09	6.9	7.1	3.1	5.2	3.9	7.5
Oct-20	0.086	0.128	3.6	4.3	2.0	2.5	5.2	6.2	3.0	3.9	0.19	0.32	0.11	0.17	0.05	0.05	7.1	7.3	-	-	-	-
Nov-20	0.047	0.080	3.1	4.0	1.2	1.5	6.7	8.2	2.5	3.1	0.24	0.40	0.09	0.15	0.04	0.04	7.4	7.5	-	-	-	-
Dec-20	0.032	0.042	3.3	4.4	0.9	1.3	8.8	11.4	2.4	3.2	0.27	0.36	0.07	0.10	0.04	0.04	7.5	7.6	-	-	-	-
Avg	0.080		3.4		2.2		7.7		4.7		0.30		0.22		0.06		7.1		1.4		2.1	
Off-Season Avg (Nov-Apr)	0.052		3.1		1.3		8.2		3.4		0.23		0.09		0.08		7.3		-		-	
Peak Avg (May-Oct)	0.108		3.7		3.1		7.1		6.1		0.36		0.34		0.04		7.0		1.4		2.1	
Max	0.141	0.204	4.0	6.0	4.5	6.2	12.7	18.6	9.1	17.0	0.56	0.80	0.64	0.92	0.29	0.29	7.5	7.7	3.1	5.2	3.9	7.5

[1] One (1) sample per month.

Table #8
Village of Ephraim WWTF
2021 Plant Performance

Month	Effluent																			
	Flow		BOD				TSS				Total P				[1] NH3-N		pH		Fecal Coliform		E. coli	
	MGD		mg/L		lbs./day		mg/L		lbs./day		mg/L		lbs./day		mg/L		s.u.		#/100 mL		#/100 mL	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Jan-21	0.030	0.050	3.3	5.1	0.7	1.2	8.8	11.2	1.9	2.5	0.26	0.34	0.06	0.07	0.82	0.82	7.3	7.5	-	-	-	-
Feb-21	0.033	0.046	3.3	4.9	0.9	1.7	7.1	10.8	1.8	3.9	0.16	0.28	0.04	0.10	0.04	0.04	7.3	7.4	-	-	-	-
Mar-21	0.046	0.069	3.8	5.1	1.6	2.5	8.1	12.8	3.4	7.3	0.22	0.34	0.09	0.19	0.04	0.04	7.3	7.4	-	-	-	-
Apr-21	0.058	0.096	4.2	6.1	2.1	3.6	10.9	12.8	5.4	8.3	0.27	0.31	0.13	0.21	0.05	0.05	7.4	7.6	-	-	-	-
May-21	0.079	0.114	3.6	5.0	2.1	3.1	10.4	16.8	6.1	9.1	0.23	0.31	0.14	0.20	0.11	0.11	7.3	7.6	1.0	1.0	1.0	1.0
Jun-21	0.109	0.139	4.0	5.9	3.5	5.0	8.7	12.2	7.5	10.2	0.33	0.48	0.29	0.40	0.06	0.06	7.2	7.3	1.0	1.0	1.0	1.0
Jul-21	0.136	0.176	4.6	5.8	5.1	6.9	8.7	11.8	9.6	14.0	0.43	0.50	0.47	0.59	0.05	0.05	7.2	7.4	1.0	1.0	1.4	3.2
Aug-21	0.124	0.144	3.8	4.9	3.9	5.5	8.7	11.4	8.8	10.8	0.45	0.53	0.46	0.53	0.07	0.07	7.2	7.3	1.0	1.0	1.0	1.0
Sep-21	0.099	0.128	3.1	3.5	2.5	3.4	6.6	8.4	5.4	7.4	0.33	0.40	0.27	0.37	0.10	0.10	7.3	7.4	1.0	1.0	1.0	1.0
Oct-21	0.087	0.112	2.7	3.4	1.8	2.6	6.1	7.2	4.1	4.9	0.25	0.28	0.17	0.22	0.07	0.07	7.2	7.3	-	-	-	-
Nov-21	0.032	0.060	2.3	2.9	0.5	1.0	6.2	9.8	1.4	2.5	0.18	0.24	0.04	0.08	0.07	0.07	7.1	7.2	-	-	-	-
Dec-21	0.030	0.052	2.7	3.0	0.8	1.3	9.4	12.0	2.6	3.9	0.25	0.33	0.07	0.10	0.05	0.05	7.1	7.2	-	-	-	-
Avg	0.072		3.4		2.1		8.3		4.8		0.28		0.19		0.13		7.3		1.0		1.1	
Off-Season Avg (Nov-Apr)	0.038		3.3		1.1		8.4		2.7		0.22		0.07		0.18		7.3		-		-	
Peak Avg (May-Oct)	0.106		3.6		3.2		8.3		7.0		0.34		0.30		0.08		7.2		1.0		1.1	
Max	0.136	0.176	4.6	6.1	5.1	6.9	10.9	16.8	9.6	14.0	0.45	0.53	0.47	0.59	0.82	0.82	7.4	7.6	1.0	1.0	1.4	3.2

[1] One (1) sample per month.

Table #9
Village of Ephraim WWTF
2022 Plant Performance

Month	Effluent																			
	[1] Flow		BOD				TSS				Total P				[2] NH3-N		pH		Fecal Coliform		E. coli	
	MGD		mg/L		lbs./day		mg/L		lbs./day		mg/L		lbs./day		mg/L		s.u.		#/100 mL		#/100 mL	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Jan-22	0.026	0.045	2.7	3.3	0.5	0.7	10.1	13.8	2.1	3.1	0.24	0.32	0.05	0.07	0.12	0.12	7.2	7.3	-	-	-	-
Feb-22	0.025	0.034	2.7	3.0	0.5	0.6	9.1	10.8	1.7	2.1	0.20	0.23	0.04	0.04	0.04	0.04	7.1	7.3	-	-	-	-
Mar-22	0.054	0.183	3.1	4.4	1.8	6.7	10.8	18.6	6.6	28.3	0.23	0.40	0.14	0.61	0.20	0.20	7.2	7.4	-	-	-	-
Apr-22	0.094	0.181	3.4	5.2	2.7	3.8	15.1	22.0	11.6	15.7	0.26	0.38	0.21	0.32	0.04	0.04	7.4	7.4	-	-	-	-
May-22	0.116	0.174	4.2	5.8	3.7	4.8	14.4	19.0	12.6	20.7	0.28	0.32	0.25	0.35	0.23	0.23	7.3	7.4	-	-	1.0	1.0
Jun-22	0.118	0.133	3.4	4.1	3.3	4.4	9.8	20.0	9.5	21.2	0.38	0.49	0.36	0.47	0.08	0.08	7.3	7.4	-	-	1.5	2.0
Jul-22	0.137	0.150	4.8	7.4	5.4	9.2	10.4	13.0	11.7	16.0	0.45	0.58	0.51	0.67	0.08	0.08	7.2	7.3	-	-	1.2	2.0
Aug-22	0.121	0.141	3.9	6.5	3.9	7.4	9.6	17.6	9.8	20.0	0.36	0.63	0.37	0.71	0.13	0.13	7.1	7.2	-	-	1.0	1.0
Sep-22	0.095	0.123	4.3	4.8	3.3	4.4	11.9	15.8	9.0	13.8	0.34	0.45	0.26	0.39	0.09	0.09	7.2	7.4	-	-	1.0	1.0
Oct-22	0.088	0.105	3.7	4.5	2.5	2.8	11.0	13.8	7.1	7.8	0.29	0.42	0.16	0.21	0.06	0.06	7.1	7.2	-	-	-	-
Nov-22	0.027	0.038	3.0	3.7	0.6	0.9	9.1	11.2	1.8	2.7	0.21	0.26	0.04	0.06	0.10	0.10	7.1	7.3	-	-	-	-
Dec-22	0.026	0.051	3.2	4.1	0.7	1.1	12.3	15.6	2.5	4.0	0.25	0.36	0.05	0.09	0.05	0.05	7.2	7.5	-	-	-	-
Avg	0.078		3.5		2.4		11.1		7.3		0.29		0.21		0.10		7.2		-		1.1	
Off-Season Avg (Nov-Apr)	0.042		3.0		1.1		11.1		4.4		0.23		0.09		0.09		7.2		-		-	
Peak Avg (May-Oct)	0.115		4.0		3.8		11.2		10.2		0.35		0.33		0.11		7.2		-		1.1	
Max	0.137	0.183	4.8	7.4	5.4	9.2	15.1	22.0	12.6	28.3	0.45	0.63	0.51	0.71	0.23	0.23	7.4	7.5	-	-	1.5	2.0

[1] No flow data provided from 10/14/2022 through 11/7/2022.
[2] One (1) sample per month.

Table #10
Village of Ephraim WWTF
2023 Plant Performance

Month	Effluent																							
	[1] Flow		BOD				TSS				Total P				[2] NH3-N		pH		Fecal Coliform		E. coli		[2] Total Recoverable Arsenic	
	MGD		mg/L		lbs./day		mg/L		lbs./day		mg/L		lbs./day		mg/L		s.u.		#/100 mL		#/100 mL		ug/L	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Jan-23	0.027	0.040	3.8	4.4	0.8	1.1	14.6	17.2	3.1	5.1	0.31	0.39	0.07	0.11	0.14	0.14	7.2	7.3	-	-	-	-	8.30	8.30
Feb-23	0.026	0.036	3.6	4.9	0.7	1.1	11.8	14.8	2.3	3.7	0.21	0.26	0.04	0.07	0.14	0.14	7.3	7.3	-	-	-	-	0.28	0.28
Mar-23	0.051	0.169	3.2	4.4	1.2	2.1	11.2	14.2	4.4	7.7	0.21	0.29	0.08	0.13	0.14	0.14	7.3	7.4	-	-	-	-	0.28	0.28
Apr-23	0.094	0.197	4.7	10.2	4.7	16.7	13.4	21.9	12.3	35.9	0.23	0.34	0.21	0.56	0.14	0.14	7.6	7.8	-	-	-	-	0.28	0.28
May-23	0.074	0.118	4.0	7.8	2.4	5.8	11.5	16.8	6.6	10.1	0.22	0.29	0.13	0.18	0.14	0.14	7.3	7.5	-	-	1.0	1.0	0.28	0.28
Jun-23	0.104	0.140	5.4	11.1	4.4	8.6	10.5	17.6	8.4	13.6	0.31	0.43	0.25	0.34	0.14	0.14	7.2	7.3	-	-	1.0	1.0	0.28	0.28
Jul-23	0.129	0.150	4.8	6.2	5.1	6.6	9.6	12.4	10.3	13.2	0.38	0.48	0.40	0.51	0.14	0.14	7.3	7.5	-	-	1.3	2.0	-	-
Aug-23	0.119	0.136	3.6	4.6	3.6	5.2	8.0	9.4	8.0	9.7	0.38	0.41	0.38	0.46	0.14	0.14	7.3	7.4	-	-	1.2	2.0	-	-
Sep-23	0.091	0.133	3.3	4.4	2.3	3.2	7.9	9.2	5.4	6.0	0.33	0.36	0.23	0.25	0.14	0.14	7.3	7.5	-	-	1.0	1.0	-	-
Oct-23	0.086	0.127	3.8	5.9	2.7	3.9	9.2	13.6	6.4	9.0	0.36	0.44	0.25	0.32	0.14	0.14	7.3	7.5	-	-	-	-	-	-
Nov-23	0.032	0.057	3.2	4.1	0.8	1.4	11.1	13.7	2.7	4.6	0.30	0.35	0.07	0.13	0.14	0.14	7.4	7.6	-	-	-	-	-	-
Dec-23	0.024	0.045	3.2	4.7	0.6	0.8	11.2	14.6	2.1	2.5	0.29	0.37	0.06	0.08	0.14	0.14	7.2	7.8	-	-	-	-	0.28	0.28
Avg	0.071		3.9		2.4		10.8		6.0		0.30		0.18		0.14		7.3		-		1.1		1.43	
Off-Season Avg (Nov-Apr)	0.042		3.6		1.5		12.2		4.5		0.26		0.09		0.14		7.3		-		-		1.88	
Peak Avg (May-Jun)	0.100		4.1		3.4		9.5		7.5		0.33		0.27		0.14		7.3		-		1.1		0.28	
Max	0.129	0.197	5.4	11.1	5.1	16.7	14.6	21.9	12.3	35.9	0.38	0.48	0.40	0.56	0.14	0.14	7.6	7.8	-	-	1.3	2.0	8.30	8.30

[1] No flow data provided from 8/23/2023 through 8/28/2023.

[2] One (1) sample per month.

2019 through 2023

Avg	0.078		3.7		2.5		9.9		6.3		0.30		0.21		0.11		7.2		1.3		1.4		1.43	
Off-Season Avg (Nov-Apr)	0.047		3.4		1.4		10.3		4.3		0.25		0.10		0.13		7.3		-		-		1.88	
Peak Avg (May-Oct)	0.108		4.0		3.5		9.5		8.3		0.35		0.32		0.08		7.2		1.3		1.4		0.28	
Max	0.141	0.265	5.4	11.1	5.4	16.7	16.4	22.0	14.6	35.9	0.56	0.88	0.64	0.92	0.82	0.82	7.6	7.9	3.1	6.3	3.9	9.5	8.30	8.30

APPENDIX C

Infiltration / Inflow (I/I) Analysis

Village of Ephraim WWTF
I/I Analysis

Gravity Sewer

Diameter (in.)	Length (ft)	(in-mi)
8	31,311	47.4
10	5,136	9.7
Total	36,447	57.2

Off-Season Population	345	(November through April)
Peak Season Population	1,345	(May through October)

2019

Base Flow

Min. Avg. Week Flow (MGD)	0.030	Corresponds to week of 2/7/2019 through 2/13/2019.

Infiltration

Max Flow Week w/o Precip. (MGD)	0.149	Corresponds to week of 8/9/2019 through 8/15/2019.	
Infiltration (MGD)	0.119		
Based on in./mi (gpd/in-mi)	2,082	Non excessive	*Excessive if >3,000 to 6,000 gpd/in-mi for sewers between 10,000 to 100,000 ft.
Based on Population of 1,345 (gpcd)	88	Non excessive	*Excessive if DWF >120 gpcd.

Inflow

Influent Flow (MGD)	Date	[1] Inflow (gpcd)	Excessive / Non Excessive	
0.2643	8/12/2019	197	Non excessive	*Excessive if WWF > 275 gpcd.
0.1661	7/6/2019	123	Non excessive	*Excessive if WWF > 275 gpcd.
0.1623	6/16/2019	121	Non excessive	*Excessive if WWF > 275 gpcd.

[1] Based on a population of 1,345.

2020

Base Flow

Min. Avg. Week Flow (MGD)	0.030	Corresponds to week of 12/14/2020 through 12/20/2020.

Infiltration

Max Flow Week w/o Precip. (MGD)	0.142	Corresponds to week of 7/1/2020 through 7/6/2020.	
Infiltration (MGD)	0.112		
Based on in./mi (gpd/in-mi)	1,959	Non excessive	*Excessive if >3,000 to 6,000 gpd/in-mi for sewers between 10,000 to 100,000 ft.
Based on Population of 1,345 (gpcd)	83	Non excessive	*Excessive if DWF >120 gpcd.

Inflow

Influent Flow (MGD)	Date	[1] Inflow (gpcd)	Excessive / Non Excessive	
0.2031	8/10/2020	151	Non excessive	*Excessive if WWF > 275 gpcd.
0.1749	5/18/2020	130	Non excessive	*Excessive if WWF > 275 gpcd.
0.1684	7/19/2020	125	Non excessive	*Excessive if WWF > 275 gpcd.

[1] Based on a population of 1,345.

2021

Base Flow

Min. Avg. Week Flow (MGD)	0.024	Corresponds to week of 11/28/2021 through 12/4/2021.

Infiltration

Max Flow Week w/o Precip. (MGD)	0.140	Corresponds to week of 8/1/2021 through 8/7/2021.	
Infiltration (MGD)	0.116		
Based on in./mi (gpd/in-mi)	2,029	Non excessive	*Excessive if >3,000 to 6,000 gpd/in-mi for sewers between 10,000 to 100,000 ft.
Based on Population of 1,345 (gpcd)	86	Non excessive	*Excessive if DWF >120 gpcd.

Inflow

Influent Flow (MGD)	Date	[1] Inflow (gpcd)	Excessive / Non Excessive	
0.1818	7/24/2021	135	Non excessive	*Excessive if WWF > 275 gpcd.
0.1517	7/5/2021	113	Non excessive	*Excessive if WWF > 275 gpcd.
0.1448	6/27/2021	108	Non excessive	*Excessive if WWF > 275 gpcd.

[1] Based on a population of 1,345.

2022

Base Flow

Min. Avg. Week Flow (MGD)	0.021	Corresponds to week of 12/18/2022 through 12/24/2022.

Infiltration

Max Flow Week w/o Precip. (MGD)	0.144	Corresponds to week of 7/14/2022 through 7/20/2022.	
Infiltration (MGD)	0.123		
Based on in./mi (gpd/in-mi)	2,152	Non excessive	*Excessive if >3,000 to 6,000 gpd/in-mi for sewers between 10,000 to 100,000 ft.
Based on Population of 1,345 (gpcd)	91	Non excessive	*Excessive if DWF >120 gpcd.

Inflow

Influent Flow (MGD)	Date	[1] Inflow (gpcd)	Excessive / Non Excessive	
0.1843	3/23/2022	137	Non excessive	*Excessive if WWF > 275 gpcd.
0.1830	4/6/2022	136	Non excessive	*Excessive if WWF > 275 gpcd.
0.1720	5/12/2022	128	Non excessive	*Excessive if WWF > 275 gpcd.

[1] Based on population of 1,345.

2023

Base Flow

Min. Avg. Week Flow (MGD)	0.018	Corresponds to week of 12/19/2023 through 12/25/2023.

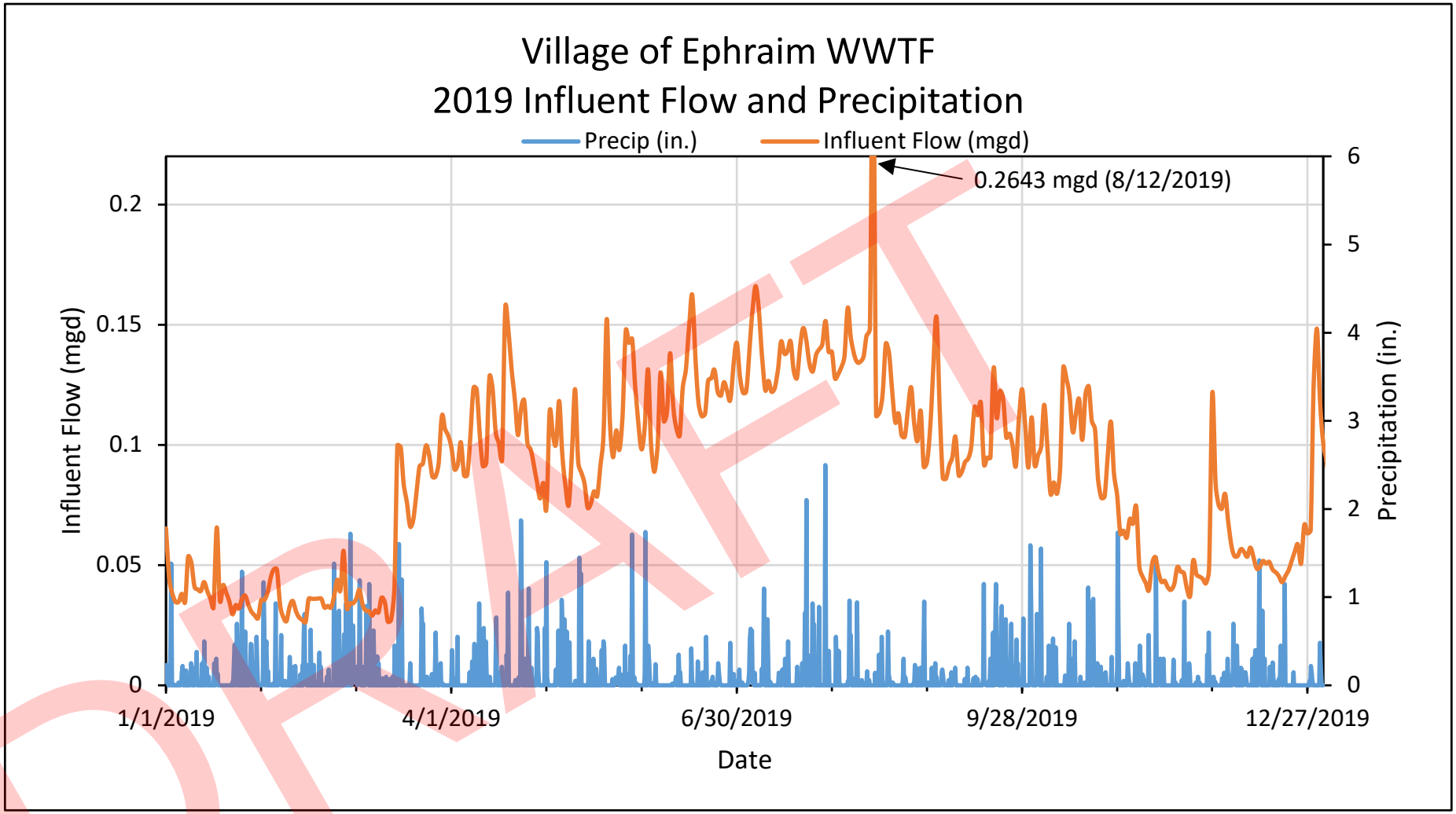
Infiltration

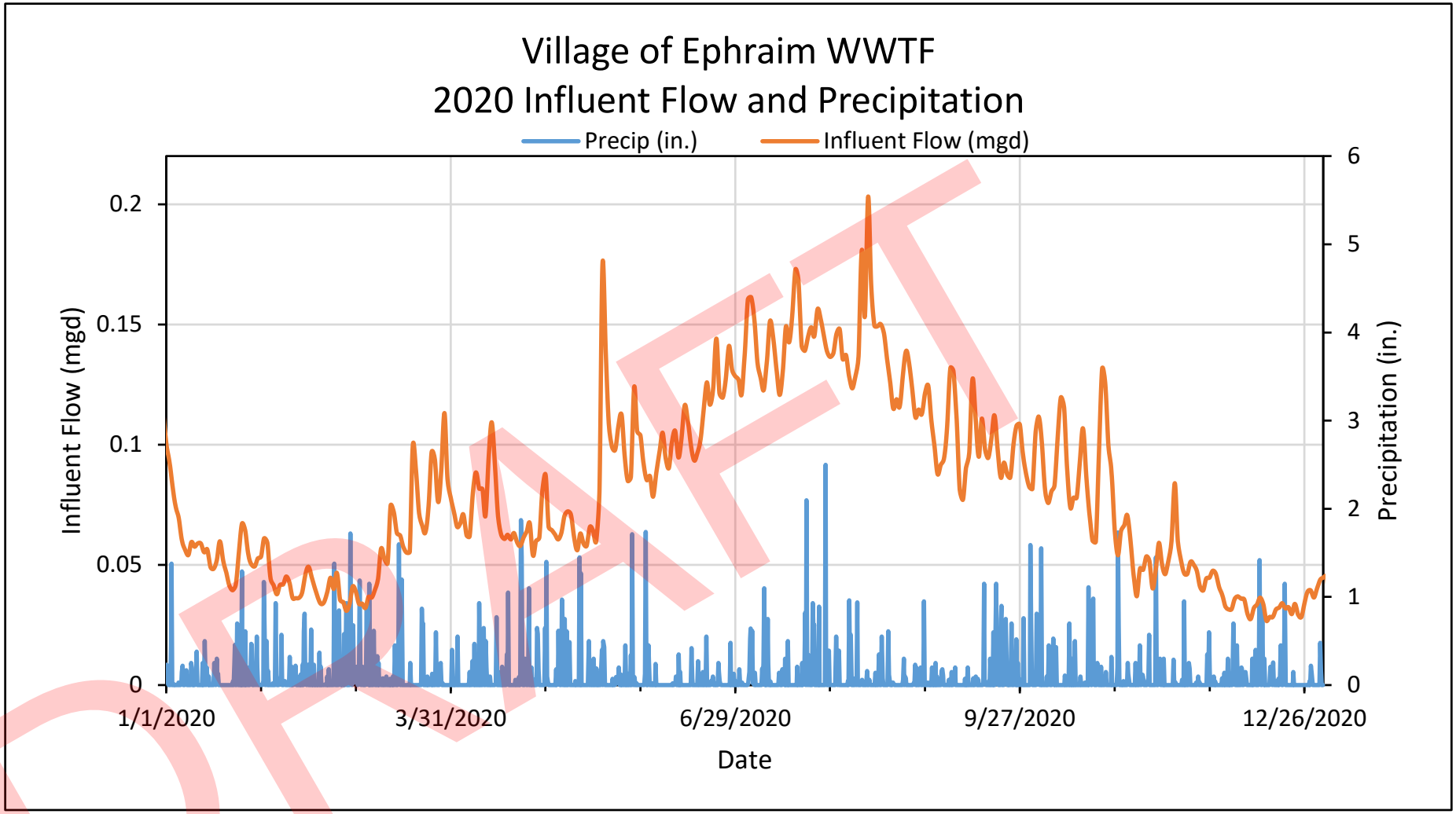
Max Flow Week w/o Precip. (MGD)	0.127	Corresponds to week of 6/16/2023 through 6/22/2023.	
Infiltration (MGD)	0.109		
Based on in./mi (gpd/in-mi)	1,907	Non excessive	*Excessive if >3,000 to 6,000 gpd/in-mi for sewers between 10,000 to 100,000 ft.
Based on Population (gpcd)	81	Non excessive	*Excessive if DWF >120 gpcd.

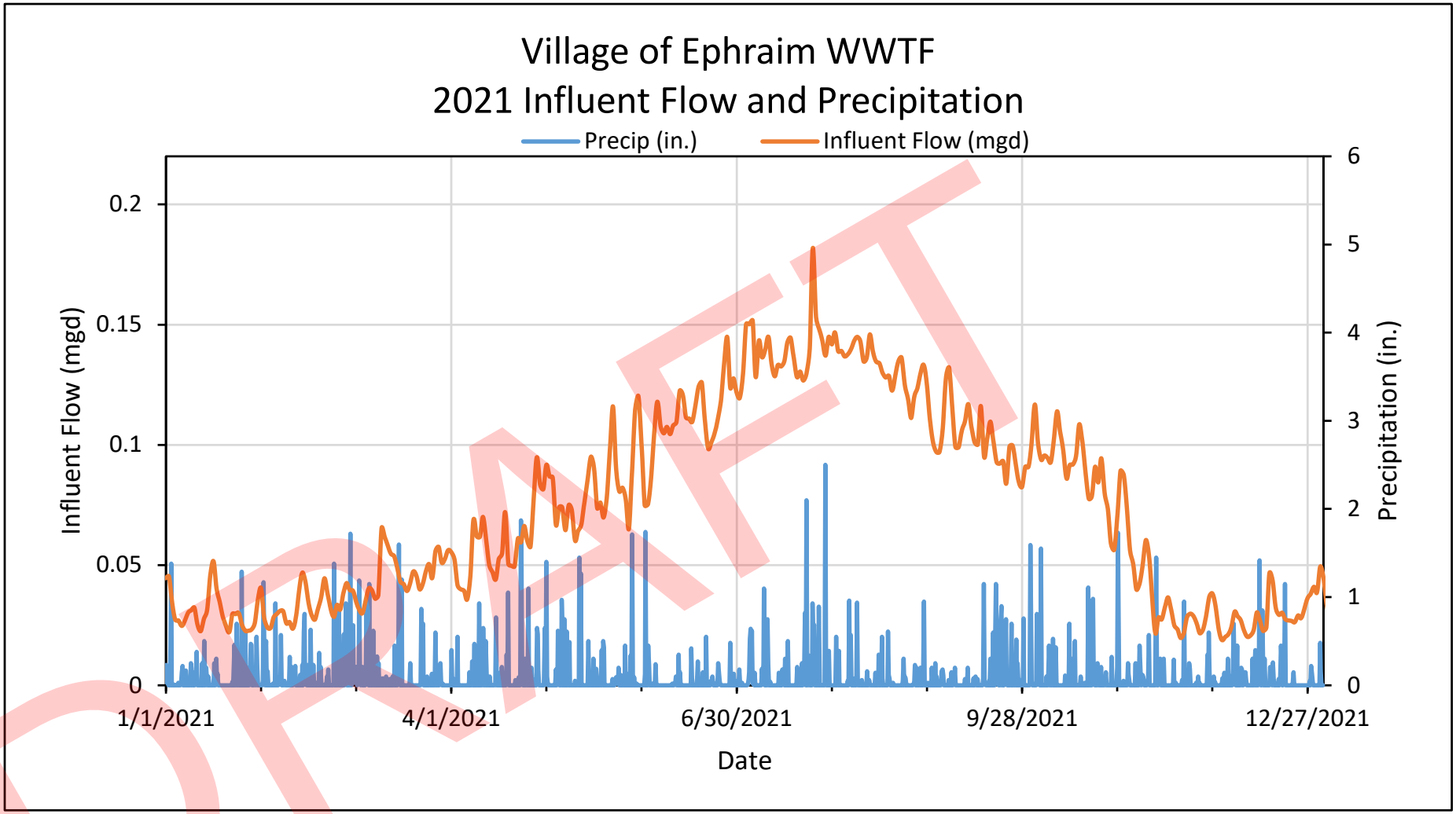
Inflow

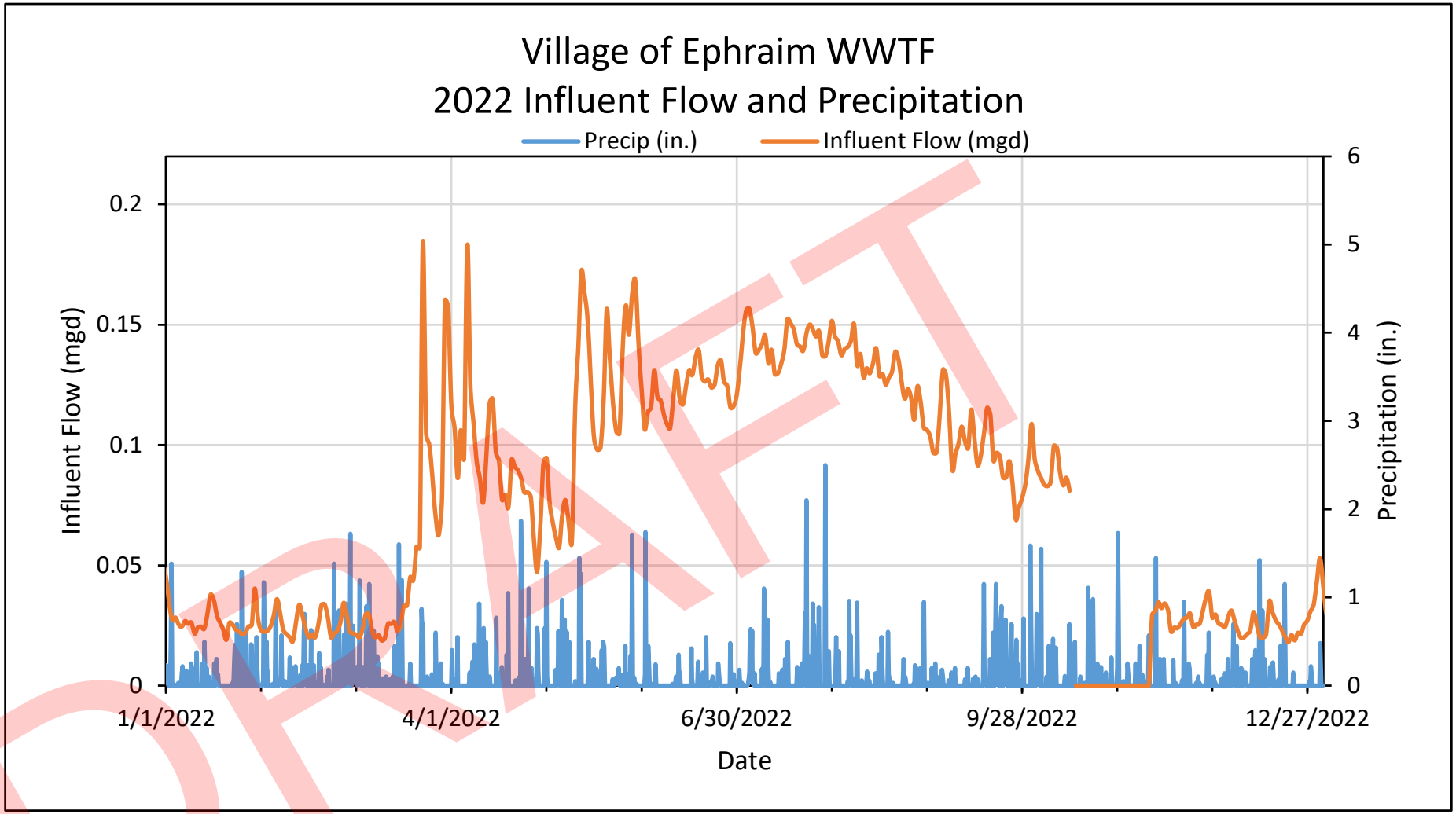
Influent Flow (MGD)	Date	[1] Inflow (gpcd)	Excessive / Non Excessive	
0.1968	4/4/2023	146	Non excessive	*Excessive if WWF > 275 gpcd.
0.1702	3/31/2023	127	Non excessive	*Excessive if WWF > 275 gpcd.
0.1583	7/2/2023	118	Non excessive	*Excessive if WWF > 275 gpcd.

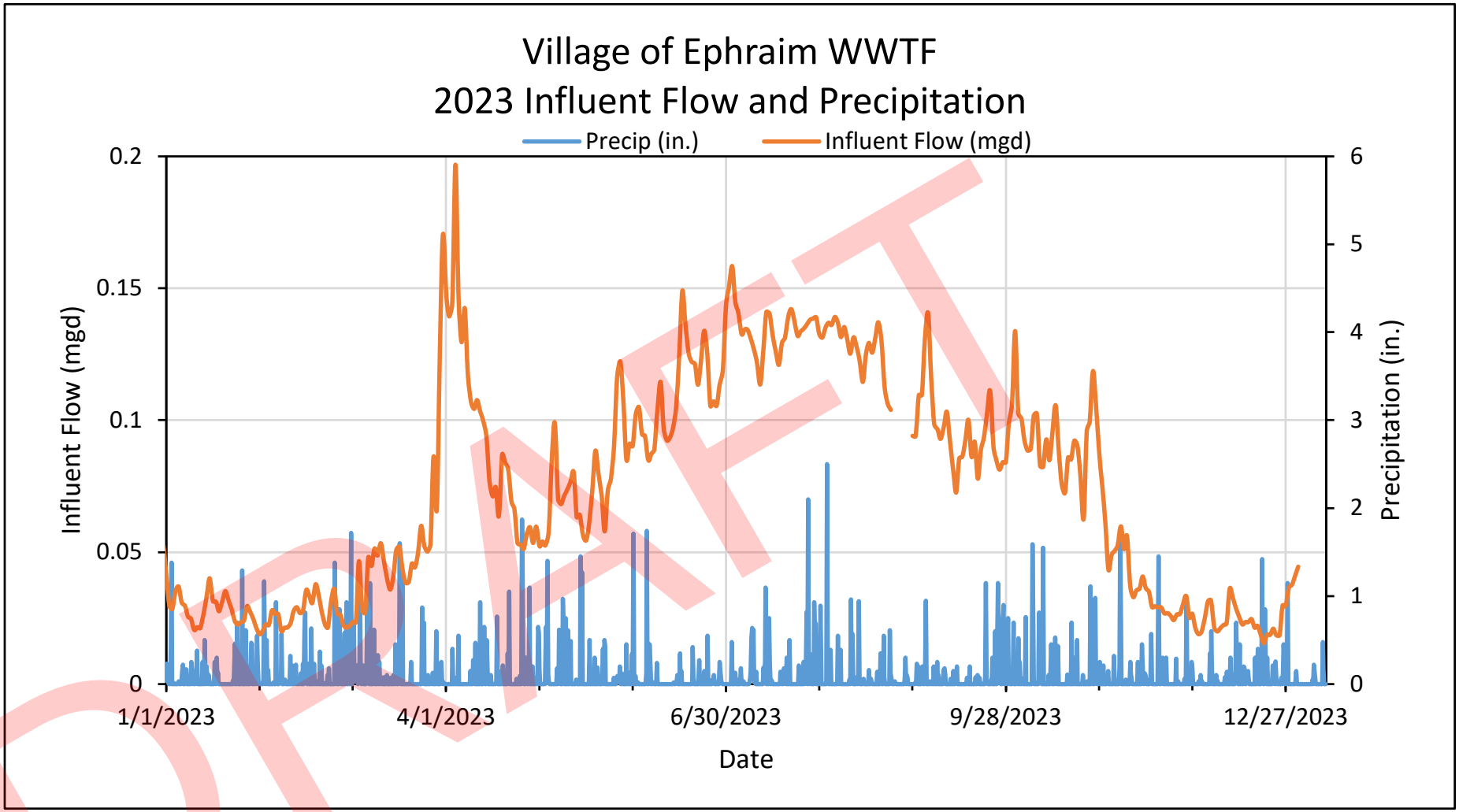
[1] Based on population of 1,345.


Village of Ephraim WWTF
2019 Influent Flow and Precipitation
Precip (in.)
Influent Flow (mgd)
0.2643 mgd (8/12/2019)
Influent Flow (mgd)
Precipitation (in.)
0
0.05
0.1
0.15
0.2
0
1
2
3
4
5
6
1/1/2019
4/1/2019
6/30/2019
9/28/2019
12/27/2019
Date


Village of Ephraim WWTF
2020 Influent Flow and Precipitation
Precip (in.)
Influent Flow (mgd)
Influent Flow (mgd)
0.2
0.15
0.1
0.05
0
Precipitation (in.)
6
5
4
3
2
1
0
1/1/2020
3/31/2020
6/29/2020
9/27/2020
12/26/2020
Date


Village of Ephraim WWTF
2021 Influent Flow and Precipitation
Precip (in.)
Influent Flow (mgd)
Influent Flow (mgd)
Precipitation (in.)
0.2
0.15
0.1
0.05
0
6
5
4
3
2
1
0
1/1/2021
4/1/2021
6/30/2021
9/28/2021
12/27/2021
Date


Village of Ephraim WWTF
2022 Influent Flow and Precipitation
Precip (in.)
Influent Flow (mgd)
Influent Flow (mgd)
Precipitation (in.)
0.2
0.15
0.1
0.05
0
6
5
4
3
2
1
0
1/1/2022
4/1/2022
6/30/2022
9/28/2022
12/27/2022
Date



1/30/2024 2:12 PM W:\PROJECTS\E0035\092200363\Dept\Water-WW\WWTF Data\2019-2023 Combined Data.xlsx

APPENDIX D

Destination Door County Executive Summary, September 2022

DESTINATION DOOR COUNTY

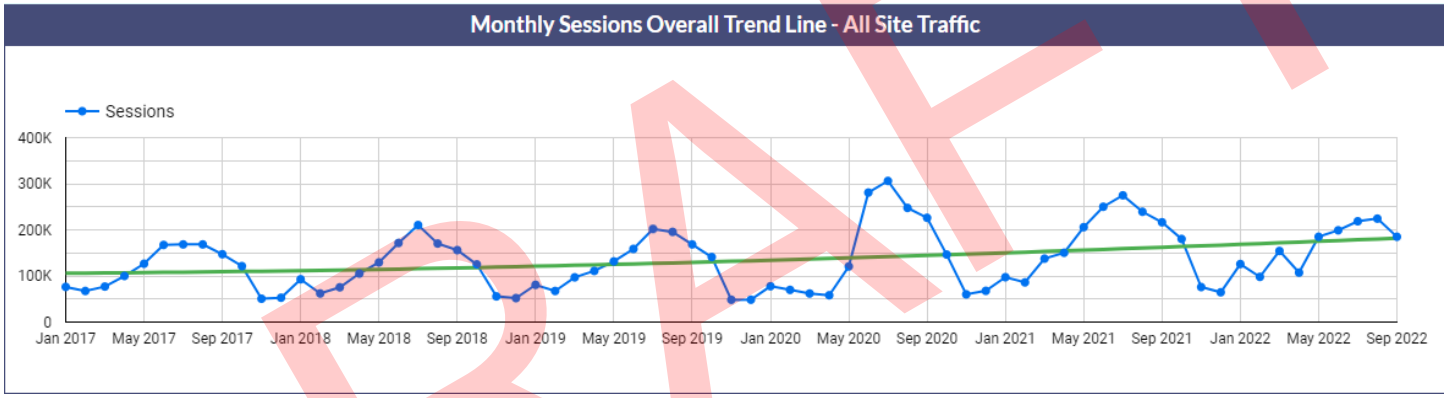
EXECUTIVE SUMMARY

SEPTEMBER 2022

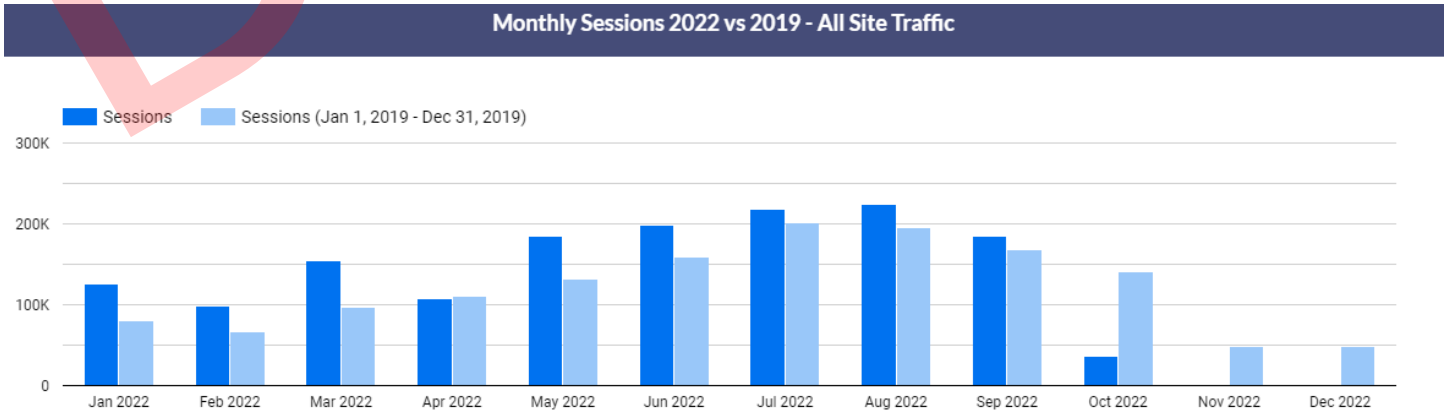
MARKETING & BRAND STRATEGY

DOORCOUNTY.COM

Overall traffic was down compared to 2021 for the month of September following the same trend we have noted through prior months. Traffic on site from all sources combined is still lower than what we saw in 2021 and 2020 due to record interest and traffic during the COVID19 pandemic. Organic traffic accounted for the most sessions on site seeing over 91,000 sessions last month. Paid search traffic was the next most popular channel with 33,000 sessions followed by direct traffic and (other) traffic accounting for around 20,000 sessions each.



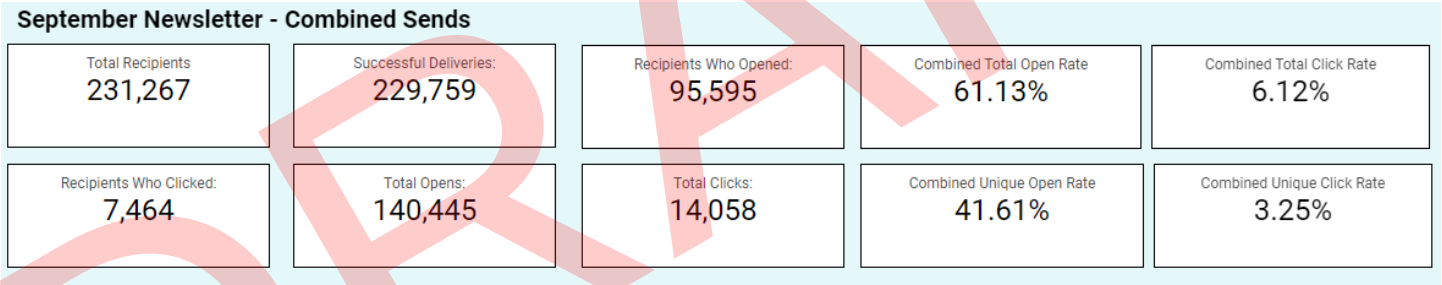
Below, you'll see 2022 sessions compared to 2019. While we continue to compare YOY as we traditionally have done, it's important to also note where we stand when looking at pre-pandemic levels. The tourism industry has embrace moon d the idea that 2019 is the last 'normal' year before COVID and is measuring against those numbers across the board. You can see our sessions have been slightly up from 2019 each month this year.



The table below highlights the conversion activity on site for the month. When the new Kentico site launched in July we established the most important conversion goals and are now tracking 9 specific goals to gauge performance of traffic on the site:

ENEWSLETTER

The September newsletter saw some great numbers, open rates have been strong and we saw a very high number of clicks. Some of the most engaged links within the newsletter for the month were the 20 things to do in fall in Door County article and the 5 chef teams article. These two links combined saw almost 7,400 clicks of the 14,058 total clicks.



PAID MEDIA

In September we continued our fall campaign including digital interactive, paid social, digital boards and EVS stations. Across all channels, we were able to generate 6.4million impressions with messaging focused on planning a fall visit as well exploring responsibly once you arrive. When it comes to website traffic, the campaigns drove 52K users to DoorCounty.com.

Google Adwords

September's campaign, YOY, saw an increase in clicks (28,411 - up 28%) but impressions were down just slightly (130,183 - down 5.6%). Compared to 2019, clicks and impressions were both up (41% and 10.7% respectively). Hotels, Resorts and Things to do ad groups saw an increase in impressions served, while Events & Festivals, Pet Friendly, Cabins,Wineries, and Romantic Getaways saw a decrease. Events and Family Attractions ad groups had the highest CTR.

Digital Interactive Ad Results

Fall digital ads ran in our primary markets and included banner, native and mobile video for the month of September. Overall, ads generated 2.23mm impressions with 4,697 clicks. Additionally, in-market display ads ran focusing on Care for Door County messaging and responsible travel serving up 260K impressions and 400 clicks to DoorCounty.com.

Paid Social Campaign

In September, we ran paid social campaigns out-of-county as well as in-market. Our in-market ads followed suite with digital interactive, focusing on Care for Door County messaging. This campaign garnered 150K impressions and 1400 clicks. Out-of-county inspired travelers to visit Door County, with 1.6mm impressions and 17K clicks.

Out of Home

Digital billboards and electric vehicle charging station ads focused on fall travel messaging from 8/22 - 9/12. Billboards ran in all 5 primary markets (Chicago, Green Bay, Madison, Milwaukee, Minneapolis) and electric vehicle charging station ads ran in Chicago only. Total impressions for out of home ads were 1MM.

Streaming Audio - In-Market

Our Care for Door County ad began running 9/12 on Pandora, reaching 128K listeners.

ORGANIC SOCIAL

FACEBOOK
Although total impressions were down 2.7% over last month, organic impressions saw a 68.3% increase! While placing an emphasis on publishing more content that keeps the users on the platform, our re-shares saw a 41.6% increase over last month.

Received Messages: 344 Private Messages

INSTAGRAM
Coming off a really high month last month with a hosted giveaway on the platform and an organic reel that did really well, metrics have dropped for this month, 18% decrease in impressions and 31% decrease in engagement. By putting more of an emphasis on video content, we did see a small 7% increase in saved content.

Received Messages: 58 Direct Messages

TWITTER
This was a great month for this platform. We saw a 224% increase in total impressions, and a 117% increase in engagement on our tweets. Users are enjoying more question and answer type posts, and beginning to engage more with our content.

Received Messages: 82 Mentions, 12 Retweets

134,087 Followers

76,731 Followers

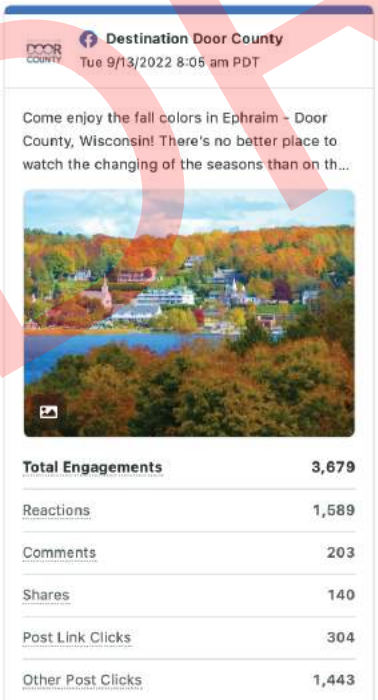
8,292 Followers

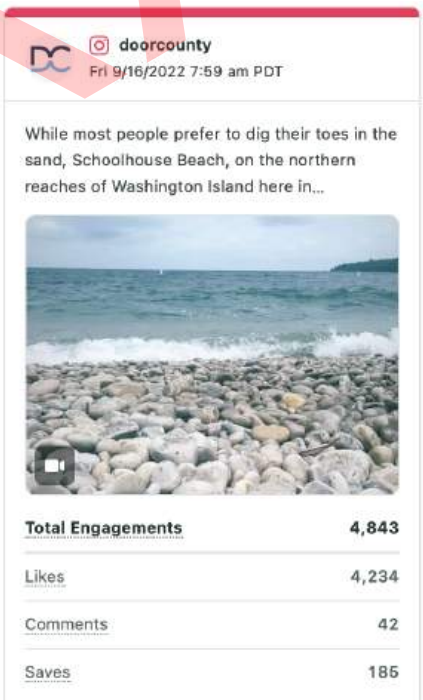
2,146 Followers

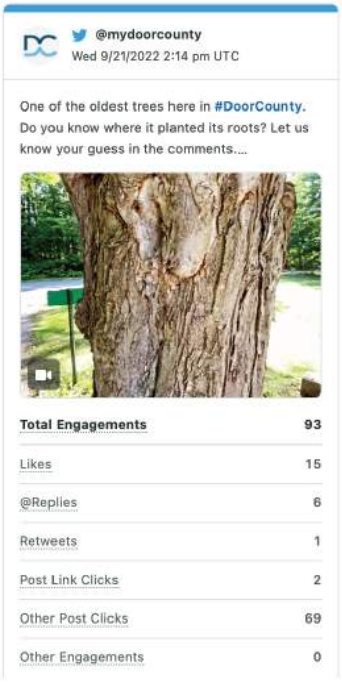
2,530 Followers

313 Followers

TOP PERFORMING POSTS







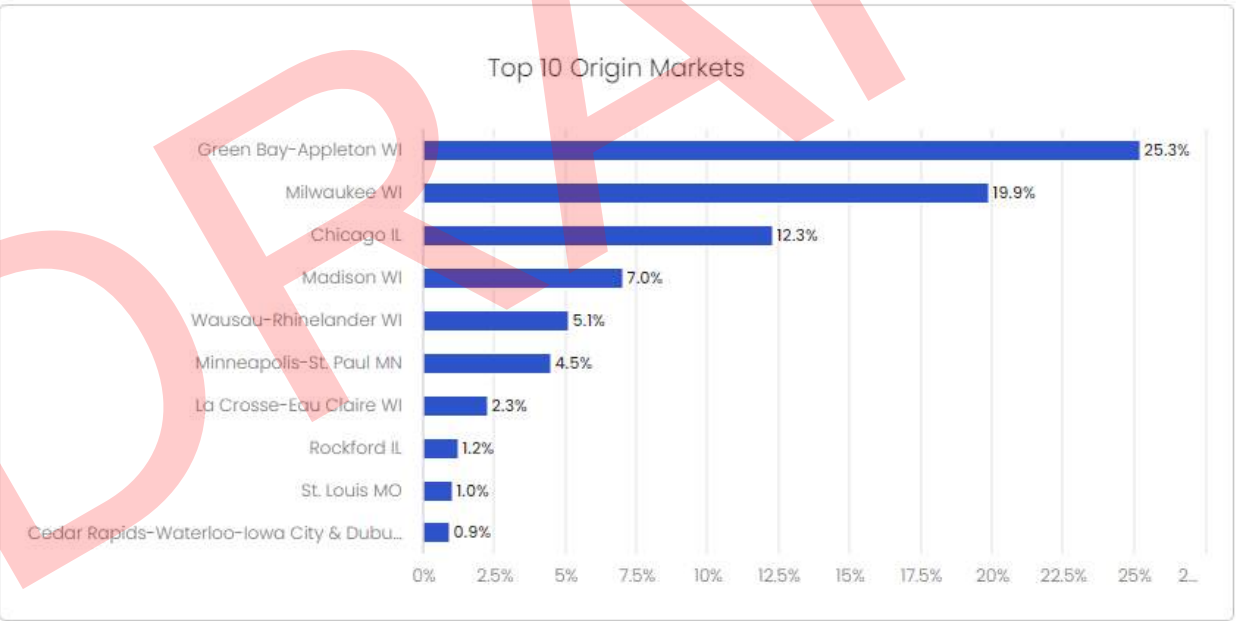
GROUP & MEETING

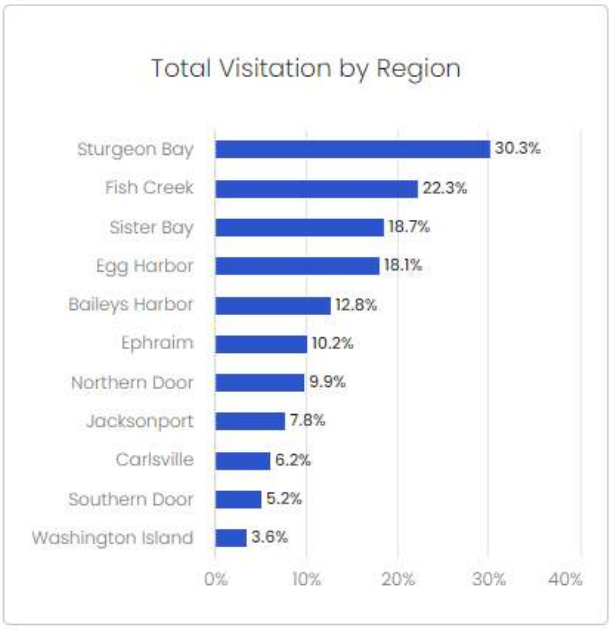
In September we were busy helping groups finalize tour plans for October and heard from a number of operators starting to plan for 2023. We provided 236 welcome bags for different bus tours that came through the county this month. Circle Wisconsin held their annual board retreat in Door County Sept 27th-28th and was hosted by Rowleys Bay Resort.

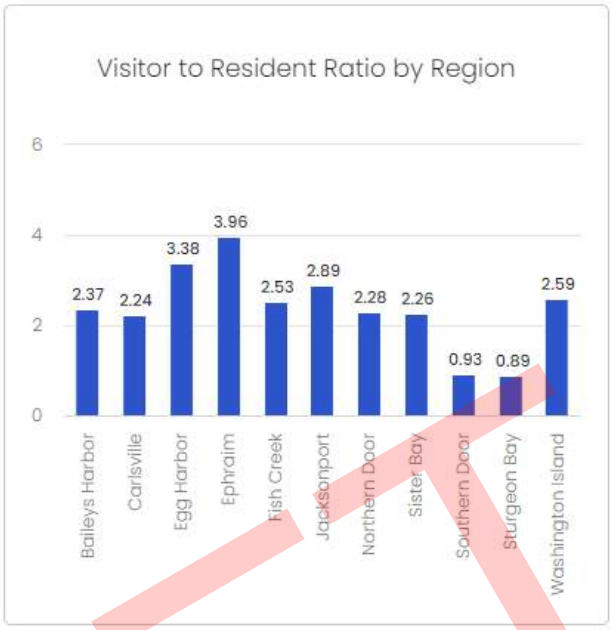
We assisted Landmark Resort in the RFP process to hopefully bring at least one of three 100+ attendee events hosted by WSAE and a larger/international association event that is considering Door County among several other cities throughout the world.

SEPTEMBER VISITATION

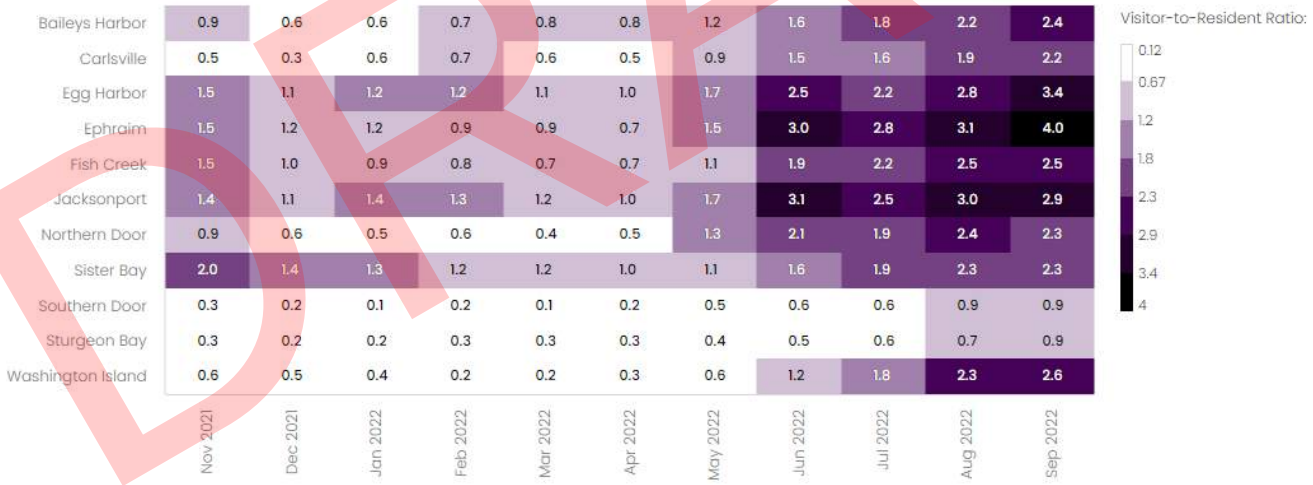
In September, the majority of our visitors came from the Green Bay/Appleton area followed by Milwaukee and then Chicago. The top communities visited were Sturgeon Bay, Fish Creek, Sister Bay and Egg Harbor. Visitor to resident ratio was high across every community with the exception of Southern Door and Sturgeon Bay that saw a more even balance closer to 1 to 1. (Note: When comparing visitor to resident ratio in various destinations, Zartico has determined a Visitor-to-Resident Ratio of less than 1, tends to have little resident friction. Between 1 & 1.5 has increasing friction and for prologued periods above 1.5 a proactive destination management plan is recommended.

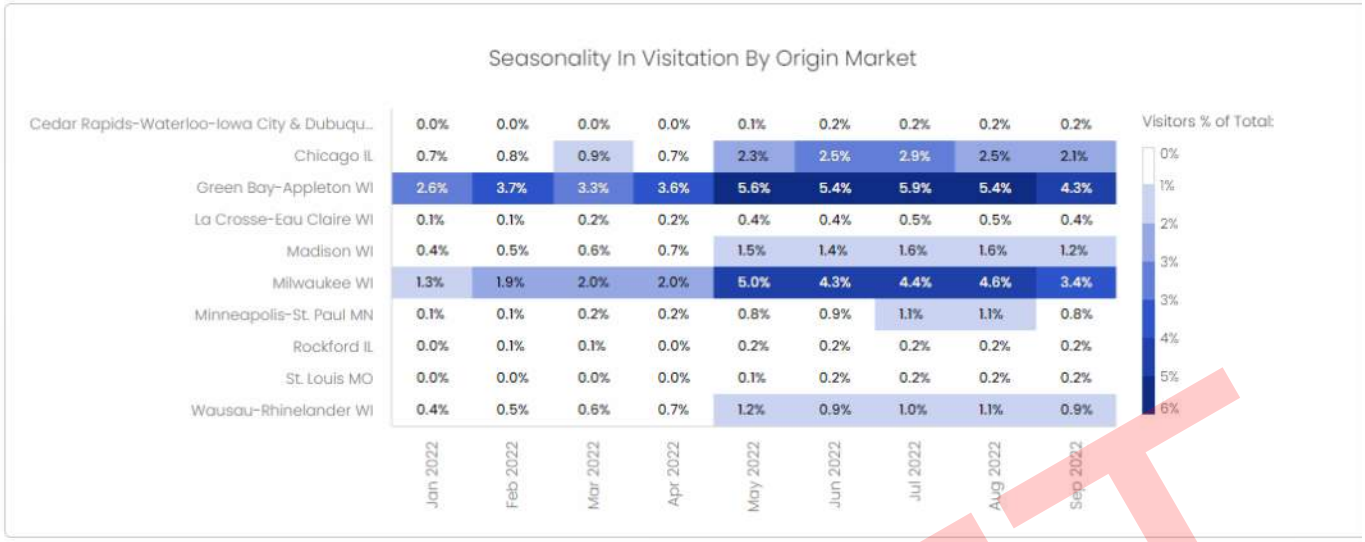


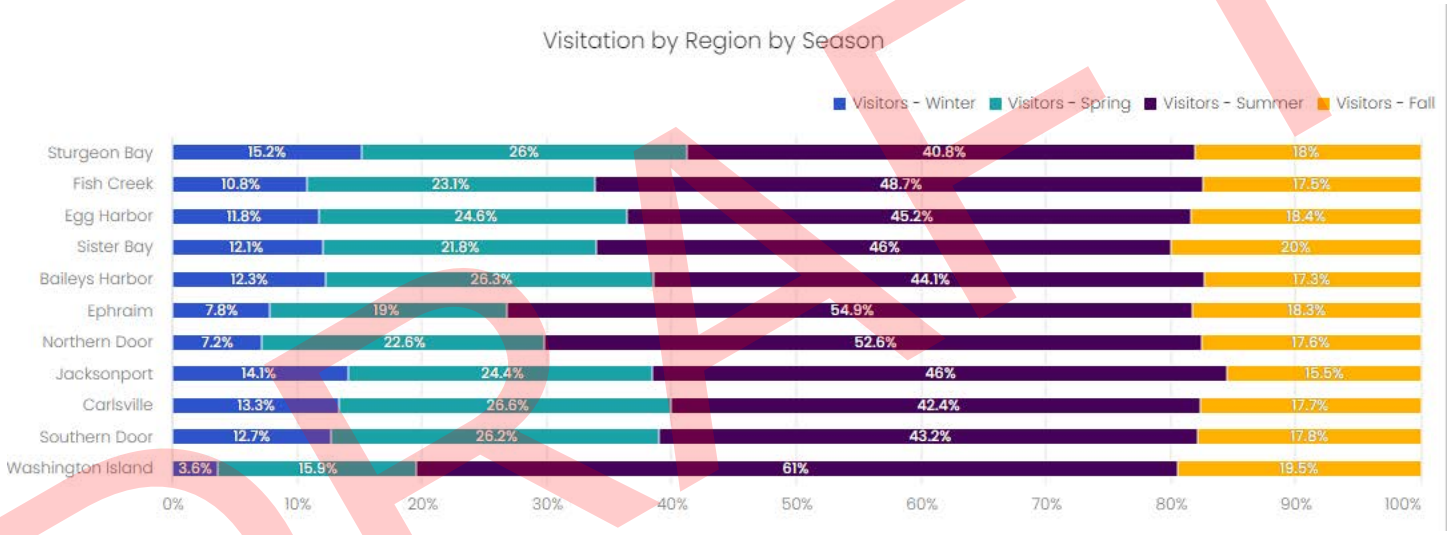




When comparing visitor to resident ratio over the past 12 months, we can see where there are opportunities to spread visitation to times and places where the visitation is less to ease resident friction during times the balance exceeds 1.5. We can also take into account where people are coming from during those times to better focus messaging.




Seasonality In Visitation By Origin Market
Cedar Rapids-Waterloo-Iowa City & Dubuqu... 0.0% 0.0% 0.0% 0.0% 0.1% 0.2% 0.2% 0.2% 0.2%
Chicago IL 0.7% 0.8% 0.9% 0.7% 2.3% 2.5% 2.9% 2.5% 2.1%
Green Bay-Appleton WI 2.6% 3.7% 3.3% 3.6% 5.6% 5.4% 5.9% 5.4% 4.3%
La Crosse-Eau Claire WI 0.1% 0.1% 0.2% 0.2% 0.4% 0.4% 0.5% 0.5% 0.4%
Madison WI 0.4% 0.5% 0.6% 0.7% 1.5% 1.4% 1.6% 1.6% 1.2%
Milwaukee WI 1.3% 1.9% 2.0% 2.0% 5.0% 4.3% 4.4% 4.6% 3.4%
Minneapolis-St. Paul MN 0.1% 0.1% 0.2% 0.2% 0.8% 0.9% 1.1% 1.1% 0.8%
Rockford IL 0.0% 0.1% 0.1% 0.0% 0.2% 0.2% 0.2% 0.2% 0.2%
St. Louis MO 0.0% 0.0% 0.0% 0.0% 0.1% 0.2% 0.2% 0.2% 0.2%
Wausau-Rhinelander WI 0.4% 0.5% 0.6% 0.7% 1.2% 0.9% 1.0% 1.1% 0.9%
Jan 2022
Feb 2022
Mar 2022
Apr 2022
May 2022
Jun 2022
Jul 2022
Aug 2022
Sep 2022
Visitors % of Total:
0%
1%
2%
3%
3%
4%
5%
6%

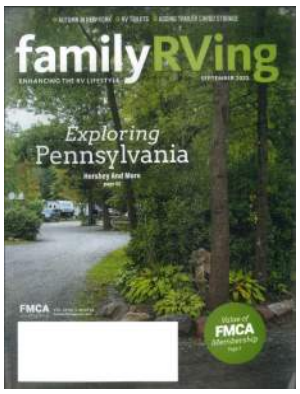

Visitation by Region by Season
Visitors - Winter
Visitors - Spring
Visitors - Summer
Visitors - Fall
Sturgeon Bay 15.2% 26% 40.8% 18%
Fish Creek 10.8% 23.1% 48.7% 17.5%
Egg Harbor 11.8% 24.6% 45.2% 18.4%
Sister Bay 12.1% 21.8% 46% 20%
Baileys Harbor 12.3% 26.3% 44.1% 17.3%
Ephraim 7.8% 19% 54.9% 18.3%
Northern Door 7.2% 22.6% 52.6% 17.6%
Jacksonport 14.1% 24.4% 46% 15.5%
Carlsville 13.3% 26.6% 42.4% 17.7%
Southern Door 12.7% 26.2% 43.2% 17.8%
Washington Island 3.6% 15.9% 61% 19.5%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

COMMUNICATIONS & ADVOCACY

- Media assistance was provided to **10** journalists/media outlets in September by providing images, information, on-air/on-camera interviews and/or support for Door County based articles/stories. Some highlights included Experience Wisconsin magazine, Lake Homes Lifestyle magazine, AAA Living Wisconsin and the Waukesha Freeman.
- **14** articles were reported from our earned media marketing program efforts in September and reached a total of **14,075,379** readers/listeners/viewers. Select media outlets that ran Door County stories during the reported time included *Southern Boating Magazine, Family RVing Magazine, FOX 7 Austin, Travel Awaits, and Matador Network*. View all program articles via our Google Drive folder at http://tinyurl.com/yafamdpg.
- In September, articles reported through our earned media marketing program generated **$213,354** worth of media coverage measured in terms of ad value equivalency. Since this program began in 2007, we've generated a total of **$36,861,737** in earned media coverage for Door County.
- The return on investment for our earned media marketing program to date is **1,301%**. For every dollar spent, we have gotten back **$13.01** worth of Door County media coverage measured in terms of ad value equivalency.
- We have two press trips remaining in 2022. Our next scheduled trip is set for October 23-26. View our complete 2022 press trip schedule. Our last trip of the year is in December.
- We welcomed 8 journalists on an arts and culinary themed press trip September 18-21.
- We hosted journalist Lori Helke on an individual press trip, September 7-9.
- We hosted journalist Rob Taylor on an individual press trip, September 25-28.
- We distributed a media release to local media encouraging tourism stakeholders to complete a special survey to help provide insight and feedback to DDC
- Views of DDC produced videos across all online platforms totaled **175,365** in September. Our most watched videos on Facebook included a video about Rock Island State Park, a video about area shipwrecks, and a video about DDC's Care for Door County program. On YouTube, the most watched video was a sponsored video about fall hiking in Door County, next was a sponsored video about summer kayaking, and third was a video about shipwrecks in Door County.

Recent Media Highlights

- *Travel Awaits* highlighted fall in Door County in a story titled, "15 Amazing Door County Experiences That Are Better in Fall." Read the story on travelawaits.com.
- Door County was highlighted in the *Milwaukee Journal Sentinel* on September 25, 2022 in a story about our "key to the door" recipient, AJ Dillon. Read the story on jsonline.com. A corresponding story gave a local perspective - "Locals give Packers' AJ Dillon suggestions on what to do and see in Door County." Read the story on jsonline.com.
- Fall in Door County was highlighted in Minnesota's *Star Tribune* in a story titled, "Door County is Wisconsin's Fall Color Capital – and it looks even better from the water." Read the story on startribune.com.
- *EATER* Chicago featured the Door County Wine Trail in a story titled, "The Midwest's Best Wine Road Trips for a Scenic Getaway From Chicago." Read the story at chicago.eater.com.
- Door County was featured in a 6-page story in the September 2022 issue of *family RVing Magazine*.
- Matador Network highlighted Door County in a story by Anela Malik. Read the story at matadornetwork.com.



Annual Dinner

Preparations for our 97th Annual Dinner, scheduled for October 18, 2022, are underway and coming together very well. Registrations came in strong reaching 149 as our deadline hit and the seating capacity at Burton's is 150. Since then, we had 20 more interested individuals request to be on the waitlist and I'm thrilled to say that Burton's has given us permission to seat additional attendees at the high-tops in the adjacent lounge area to accommodate all 20 - who were more than happy to accept seating in the bar area. I believe this is the largest gatherings we have had for a sit-down Annual Dinner in decades!

Digital Equity and Inclusion

While this committee is in the early development stages, Quantum Technologies was able to offer a series of Digital Equity and Inclusion workshops in partnership with United Way of Door County, We Are Hope, Destination Door County, Help of Door County and the Door County Library.

Workshops, led by Nathan Drager and Erin Helgeson of Quantum Technologies and hosted at the Aging and Disability Resource Center (ADRC), are intended to help anyone struggling with technology in the digital world. The workshops will cover foundational topics such as: How to Get Connected to the Internet, How to Use Wifi, How to Use an iPhone, How to Create an Email Address and How to Stay Safe Online.

The series of workshops also included an evening session with an English-Spanish translator from the United Way of Door County. Workshops were offered Oct. 4-7, and the Spanish language workshop on Oct. 6.

Our local DEI committee is a collaboration of local organizations working to create solutions and raise awareness addressing home internet access, personal devices, and local technology training and support programs throughout the community to help ensure no one in our community is left at a disadvantage by not being able to access opportunities for support, work-search and education that are available online. Watch for more developments as we create meaningful opportunities for DDC partners to make a difference in our community.

MatchUp Door County - Light Duty Workforce Initiative

Work on the development of the MatchUp Door County program is all coming together and being prepared for testing. More on this next month. Committee members include Cynthia Germain – Do Good Door County; Jewel Ouradnik – Rowleys Bay Resort; Diane Taillon – Arbor Crowne Properties; Heather Mundy – Sunshine House; Allyson Fleck – Midsummer's Music; Cathy Clark – We Are Hope, Inc.; Jeremy Paszczak – Sunshine House; Tyler Powell – Door County YMCA; and others involved with learning in retirement, and those serving clients with special needs. While the MatchUp program will offer individual support and training, the program itself is not exclusive to individuals with special needs, as it will also help area businesses identify themselves as a MatchUp employer that is trained to support and gratefully welcome applicants with limitations on time or abilities.

Aging Coalition of Door County

The Aging Coalistion of Door County (ACDC) is working with St. Norbert's College to craft a meaningful survey to better asses how our aging residents are preparing for housing and care needs as they grow older, and where any lack of preparedness or services need attention. It has been an enlightening process and I'm very proud to represent our organization and collective tourism industry at the table.

Summer Work Travel Host Employers

Fielding a lot of calls from partners who are looking for inside advice for finding the right Sponsor to work with to become a SWT Host Employer. Each scenario is so different than the next and it's very rewarding to hear their confidence restored after we have talked.

Partner Report - September 2022 EOM

Total Partners: 687

New/Rejoined Active Partners September 2022: 9

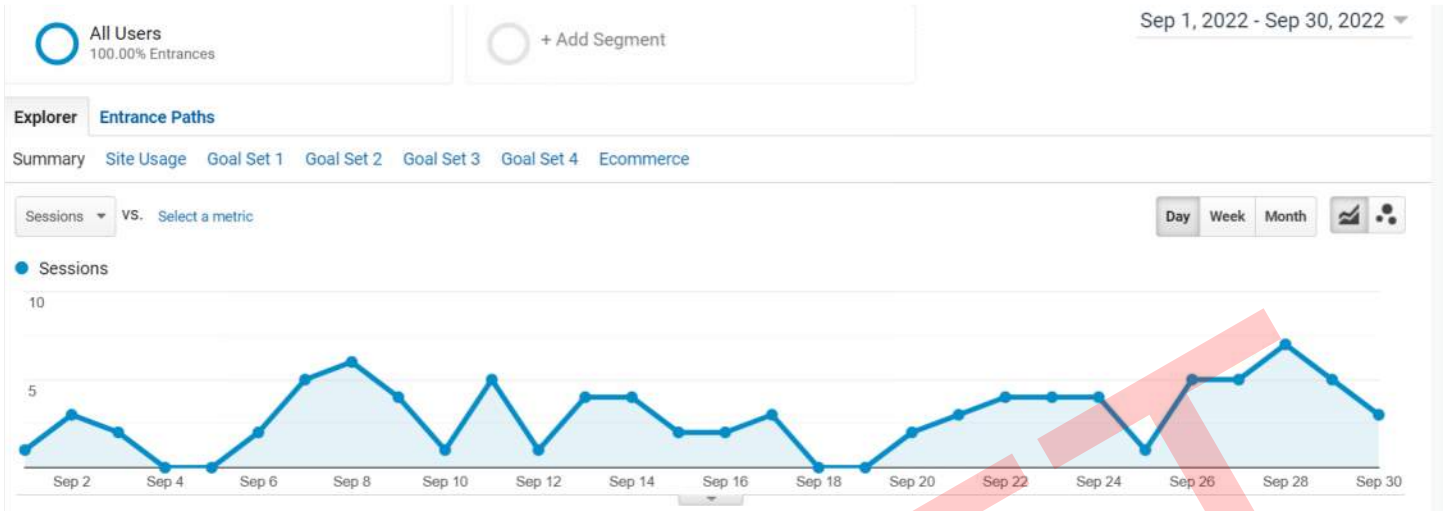
New

Category	Business Name	Physical Address	City	Date Added
Services	Enclave by Jodi Rose Studio	120 S Madison Ave	Sturgeon Bay	9/1/2022
Hotels/Motels/B&B's	Goose & Twigs Lodging and Café	2322 Mill Rd	Sister Bay	9/1/2022
Services	BOLD. hydration	714 Jefferson St	Sturgeon Bay	9/14/2022
Retail	Knit Whit's Yarn & Crafts	8024 State Highway 57	Baileys Harbor	9/21/2022
Education/Classes	The Garden Door	4312 WI Hwy 42	Sturgeon Bay	9/21/2022
Retail	The Red Geranium	8024 State Highway 57	Baileys Harbor	9/21/2022
Retail	Door County Wildwood Market	2208 Wildwood Road	Sister Bay	9/22/2022
Cottage/Home/Condo/Vacation Rental	Dragonfly Dell Cottage	12465 Cedar Dell Lane	Ellison Bay	9/27/2022
Cottage/Home/Condo/Vacation Rental	Shoreline Village Condominiums	12747 Hwy 42	Ellison Bay	9/28/2022

Inactive

Drop Reason	Category	Account Name	Address	City	Date
Closed	Restaurants/Cafes/Taverns	Parador	7829 Highway 42	Egg Harbor	9/12/2022

Partnership Web Stats for September 2022 https://www.doorcounty.com/partnership/



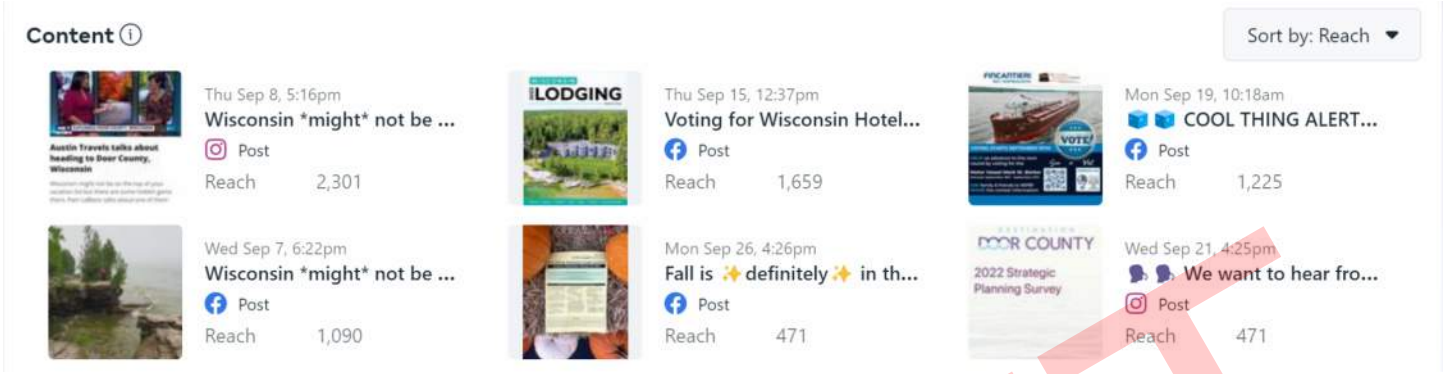
Primary Dimension: **Landing Page** Other

Plot Rows | Secondary dimension | Sort Type: Default | partnership | advanced

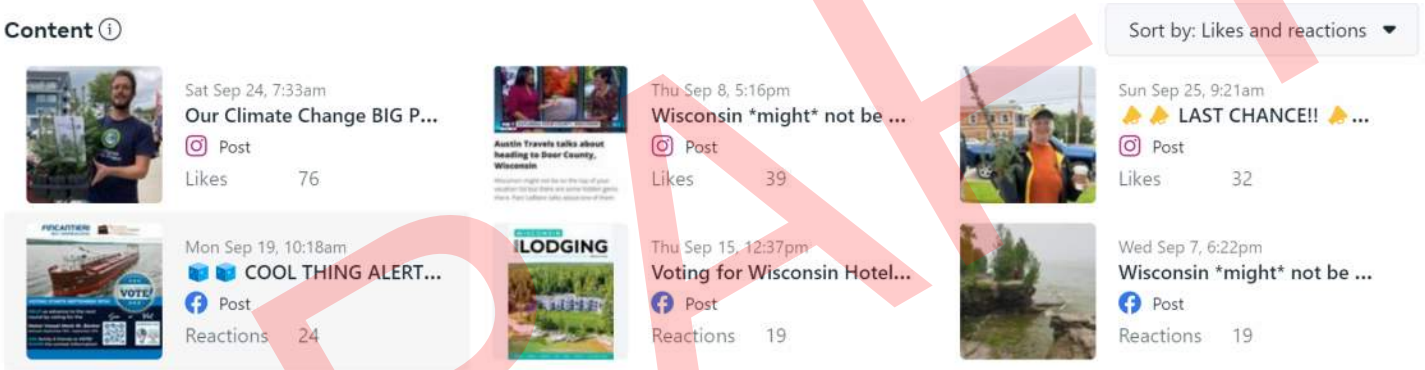
	Landing Page	Acquisition			Behavior			Conversions: Goal 3: Listing Index Book Now Button Click (Results Page)		
		Sessions ↓	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration	Listing Index Book Now Button Click (Results Page) (Goal 3 Conversion Rate)	Listing Index Book Now Button Click (Results Page) (Goal 3 Completions)	Listing Index Book Now Button Click (Results Page) (Goal 3 Value)
		88 % of Total: 0.05% (185,033)	45.45% Avg for View: 68.24% (-33.39%)	40 % of Total: 0.03% (126,266)	79.55% Avg for View: 54.73% (45.34%)	1.50 Avg for View: 2.73 (-45.11%)	00:02:16 Avg for View: 00:03:06 (-26.65%)	0.00% Avg for View: 0.00% (0.00%)	0 % of Total: 0.00% (0)	$0.00 % of Total: 0.00% ($0.00)
1.	/partnership	33 (37.50%)	54.55%	18 (45.00%)	69.70%	1.97	00:02:49	0.00%	0 (0.00%)	$0.00 (0.00%)
2.	/partnership/post-jobs	19 (21.59%)	5.26%	1 (2.50%)	84.21%	1.21	00:01:00	0.00%	0 (0.00%)	$0.00 (0.00%)
3.	/partnership/partner-resources/research-planning	14 (15.91%)	42.86%	6 (15.00%)	85.71%	1.36	00:04:31	0.00%	0 (0.00%)	$0.00 (0.00%)
4.	/partnership/spirit-of-door-county-scholarship	9 (10.23%)	88.89%	8 (20.00%)	100.00%	1.00	00:00:00	0.00%	0 (0.00%)	$0.00 (0.00%)
5.	/partnership/environmental-resources	5 (5.68%)	40.00%	2 (5.00%)	100.00%	1.00	00:00:00	0.00%	0 (0.00%)	$0.00 (0.00%)
6.	/partnership/the-power-of-tourism-in-door-county	3 (3.41%)	66.67%	2 (5.00%)	66.67%	1.33	00:01:22	0.00%	0 (0.00%)	$0.00 (0.00%)
7.	/partnership/j-1-visa-resources	2 (2.27%)	100.00%	2 (5.00%)	50.00%	1.50	00:00:09	0.00%	0 (0.00%)	$0.00 (0.00%)
8.	/discover/media-assistance/destination-door-county-forms-sustainable-tourism-partnership-with-leave-no-trace	1 (1.14%)	100.00%	1 (2.50%)	100.00%	1.00	00:00:00	0.00%	0 (0.00%)	$0.00 (0.00%)
9.	/partnership/partner-resources/annual-audit	1 (1.14%)	0.00%	0 (0.00%)	0.00%	2.00	00:20:33	0.00%	0 (0.00%)	$0.00 (0.00%)
10.	/partnership/partner-resources/research-and-planning	1 (1.14%)	0.00%	0 (0.00%)	100.00%	1.00	00:00:00	0.00%	0 (0.00%)	$0.00 (0.00%)

Partner Social Media Stats for September 2022

Farthest reaching posts:



Most post reactions:



Partner Social Media: Facebook													
Reach	January	February	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	YTD
2020	0	25	1,316	7,197	697	373	597	1,318	619	542	1,887	292	
2021	375	2,052	692	2,792	4,391	3,854	2,470	710	4,645	1,001	2,079	607	14,553
2022	4,307	9,200	3,927	6,491	10,114	3,076	1,820	2,325	3,309				28,380
YOY Growth	1048.53 %	348.34%	467.49%	132.4 9%	130.33%	-20.19%	-26.32%	227.46%	-28.76%				95.01%
2022 Goal (40%)	525	2,873	969	3,909	6,147	5,396	3,458	994	6,503	1,401	2,911	850	20,374
% to Goal	820%	320%	405%	166%	165%	57%	53%	234%	51%	0%	0%	0%	139%
Likes	January	February	March	April	May	June	July	August	Septemb er	October	Novembe r	Decembe r	Year Growth
2020	1,235	1,235	1,235	1,263	1,264	1,262	1,263	1,263	1,265	1,270	1,278	1,275	3%
2021	1,271	1,273	1,316	1,321	1,333	1,350	1,354	1,352	1,420	1,420	1,423	1,433	13%
2022	1,444	1,477	1,687	1,715	1,831	1,861	1,866	1,883	1,888				31%

Partner Social Media: Instagram													
Reach	January	February	March	April	May	June	July	August	Sept	Oct.	Nov.	Dec.	YTD
2020	329	329	329	433	18	27	196	108	290	290	406	366	
2021	499	1,059	456	1,742	1,582	1,758	1,456	1,006	1,013	1,406	1,314	1162	7,090
2022	6,616	8,793	10,144	8,283	5,386	2,225	9,789	6,919	2,863				45,856
YOY Growth	1225.85%	730.31%	2124.56%	375.49%	240.46%	26.56%	572.32%	587.77%	182.63%				546.77%
2022 Goal (100%)	998	2,118	912	3,484	3,164	3,516	2,912	2,012	2,026	2,812	2,628	2,324	14,180
% to Goal	663%	415%	1112%	238%	170%	63%	336%	344%	141%	0%	0%	0%	323%
Followers	January	February	March	April	May	June	July	August	September	October	November	December	Year Growth
2021	-	-	-	-	-	-	-	-	1,021	1,028	1,049	1,052	3%
2022	1,076	1,126	1,179	1,207	1,273	1,303	1,331	1,357	1,361				26%

OPERATIONS

SEPTEMBER PUBLICATION REQUESTS

2022 Visitor Guide Requests: 1,224
2021 Visitor Guide Requests: 848

2022 E-mail Requests Answered: 81

SEPTEMBER GIFT CERTIFICATES

2022 Door County Gift Certificates Sold: $30,585
2022 Door County Gift Certificates Redeemed: $47,475

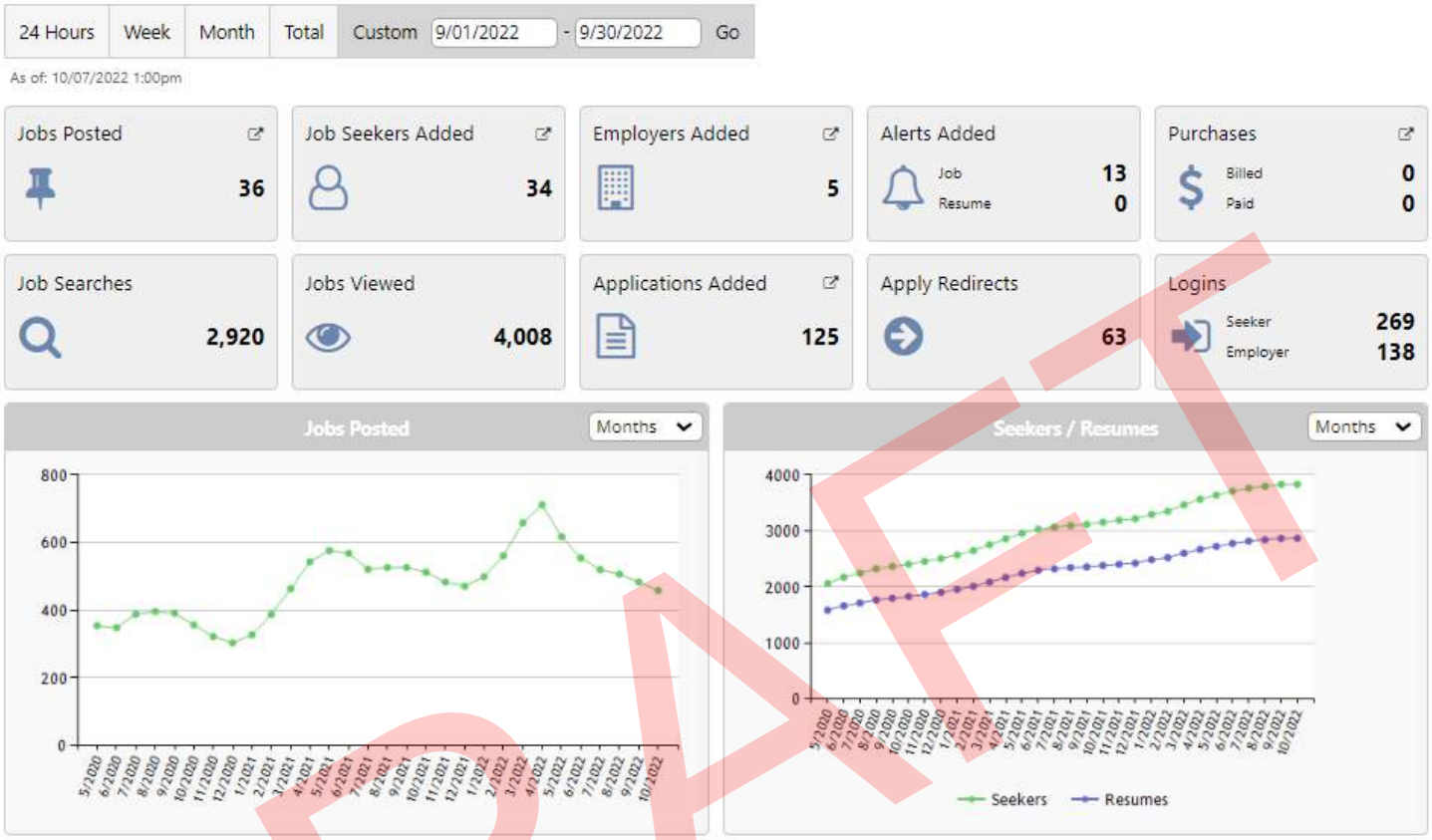
2021 Door County Gift Certificates Sold: $40,405
2021 Door County Gift Certificates Redeemed: $42,050

SEPTEMBER VISITOR CENTER DATA

2022 Welcome Center Visitors: 3,898
2021 Welcome Center Visitors: 4,681

2022 Welcome Center Calls: 1,052
2021 Welcome Center Calls: 1,516

JOB SITE STATS - JOBSINDOORCOUNTY.COM



APPENDIX E

Endangered Resources Review

Endangered Resources Preliminary Assessment

Created on **1/31/2024**. This report is good for one year after the created date.

DNR staff will be reviewing the ER Preliminary Assessments to verify the results provided by the Public Portal. ER Preliminary Assessments are only valid if the project habitat and waterway-related questions are answered accurately based on current site conditions. If an assessment is deemed invalid, a full ER review may be required even if the assessment indicated otherwise.

Results

A search was conducted of the NHI Portal within a 1-mile buffer (for terrestrial and wetland species) and a 2-mile buffer (for aquatic species) of the project area. Based on these search results, below are your follow-up actions.

No further action is necessary.

This project is covered by the Broad Incidental Take Permit/Authorization for No/Low Impact Activities (No/Low BITP/A) (https://dnr.wi.gov/topic/ERReview/ITNoLowImpact.html). This BITP/A covers projects that the DNR has determined will have no impact or a minimal impact to endangered and threatened species in the state. Due to this coverage under the No/Low BITP/A, a formal review letter is not needed and there are no actions that need to be taken to comply with state and/or federal endangered species laws, any take that may result from the proposed project is permitted/authorized.

A copy of this document can be kept on file and submitted with any other necessary DNR permit applications to show that the need for an ER Review has been met. This notice only addresses endangered resources issues. This notice does not constitute DNR authorization of the proposed project and does not exempt the project from securing necessary permits and approvals from the DNR and/or other permitting authorities.

Project Information

Landowner name	**Village of Ephraim**
Project address	**Ephraim Wastewater Treatment Facility** **10285 Townline Rd** **Ephraim, WI 54234** **NE1/4 of NE1/4 of Section 13 T31N R27E**
Project description	**WWT Facilities Plan Amendment** **Miscellaneous repairs at the existing WWTF site. Most of the work will be inside of the existing treatment buildings. Some work is anticipated to occur outside of the buildings, primarily on the existing asphalt pavement. This work primarily consists of milling and overlaying the existing asphalt pavement at the site, replacing overhead and entry doors, replacing the building roofs (if needed), and the replacement of below-grade tank access hatched. No tree or shrub removal is anticipated to occur as part of this project.**

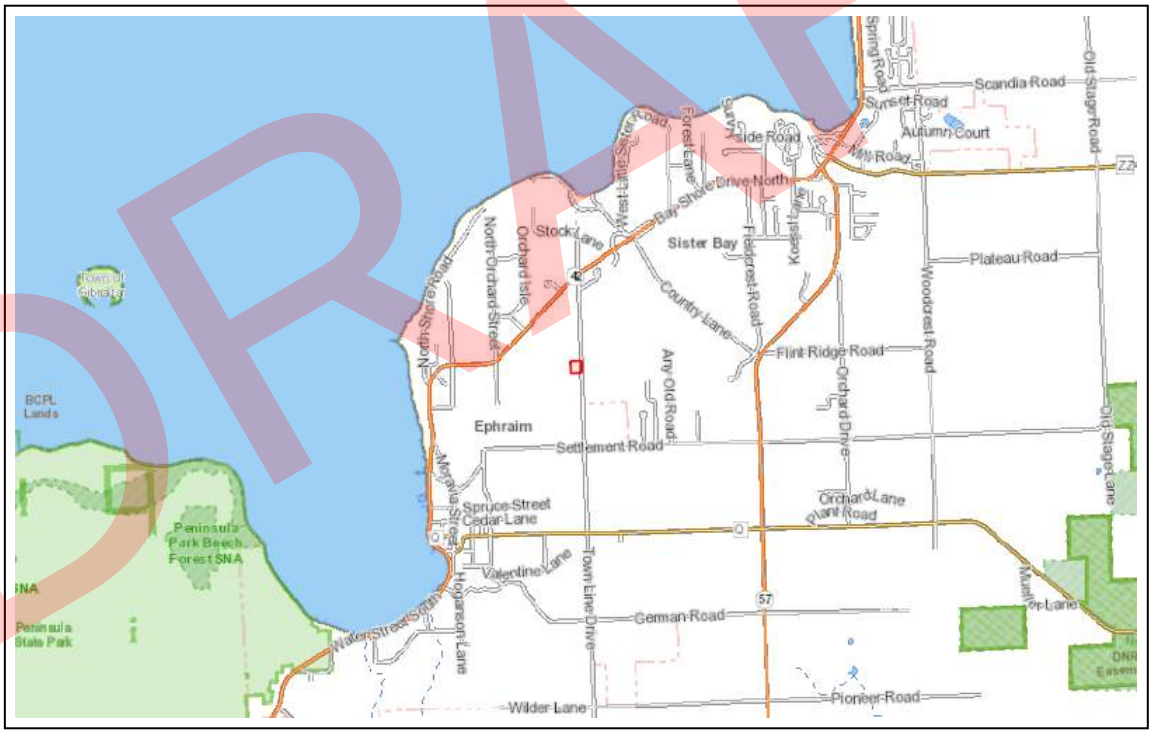
Project Questions

Does the project involve a public property?	**Yes**
Is there any federal involvement with the project?	**Yes**
Is the project a utility, agricultural, forestry or bulk sampling (associated with mining) project?	**Yes**
Is the project property in Managed Forest Law or Managed Forest Tax Law?	**No**
Project involves tree or shrub removal?	**No**
Is project near (within 300 ft) a waterbody or a shoreline?	**No**
Is project within a waterbody or along the shoreline?	**No**

Does the project area (including access routes, staging areas, laydown yards, select sites, source/fill sites, etc.) occur **entirely within** one or more of the following habitats?

Urban/residential	**Yes**
Manicured lawn	**Yes**
Artificial/paved surface	**Yes**
Agricultural land	**No**
Areas covered in crushed stone or gravel	**No**

Project Area Maps



Endangered Resources Preliminary Assessment

Created on **1/31/2024**. This report is good for one year after the created date.

DNR staff will be reviewing the ER Preliminary Assessments to verify the results provided by the Public Portal. ER Preliminary Assessments are only valid if the project habitat and waterway-related questions are answered accurately based on current site conditions. If an assessment is deemed invalid, a full ER review may be required even if the assessment indicated otherwise.

Results

A search was conducted of the NHI Portal within a 1-mile buffer (for terrestrial and wetland species) and a 2-mile buffer (for aquatic species) of the project area. Based on these search results, below are your follow-up actions.

This project is covered by the Broad Incidental Take Permit/Authorization for No/Low Impact Activities (No/Low BITP/A) (https://dnr.wi.gov/topic/ERReview/ITNoLowImpact.html) **provided that the follow-up actions below are implemented**. This BITP/A covers projects that the DNR has determined will have no impact or a minimal impact to endangered and threatened species in the state. Due to this coverage under the No/Low BITP/A, a formal review letter is not needed and only the actions listed below need to be followed to comply with state and/or federal endangered species laws, any take that may result from the proposed project is permitted/authorized for state-listed species.

Follow up actions:

The Bald Eagle (*Haliaeetus leucocephalus*) is Federally protected by the Bald & Golden Eagle Protection Act. An eagle nest has been recorded within 1 mile of the project area. Visit the USFWS Bald Eagle Management website (https://fws.gov/story/do-i-need-eagle-take-permit) for detailed guidelines and conservation measures for your specific project activity.

Visiting the website and following USFWS guidance will satisfy the project's Endangered Resources requirements.

A copy of this document can be kept on file and submitted with any other necessary DNR permit applications to show that the need for an ER Review has been met. This notice only addresses endangered resources issues. This notice does not constitute DNR authorization of the proposed project and does not exempt the project from securing necessary permits and approvals from the DNR and/or other permitting authorities.

Project Information

Landowner name	**Village of Ephraim**
Project address	**Lift Station #1 (Public Beach)** **9883 S Water St** **Ephraim, WI 54211** **SE1/4 of NE1/4 of Section 23 T31N R17E**
Project description	**WWT Facilities Plan Amendment** **The work at Lift Station #1 primarily includes the replacement of the submersible pumps, slide rail systems, discharge piping and valves, wet well access hatch, and electrical systems, controls, and telemetry. No ground-disturbing activities are anticipated to occur as part of this project.**

Project Questions

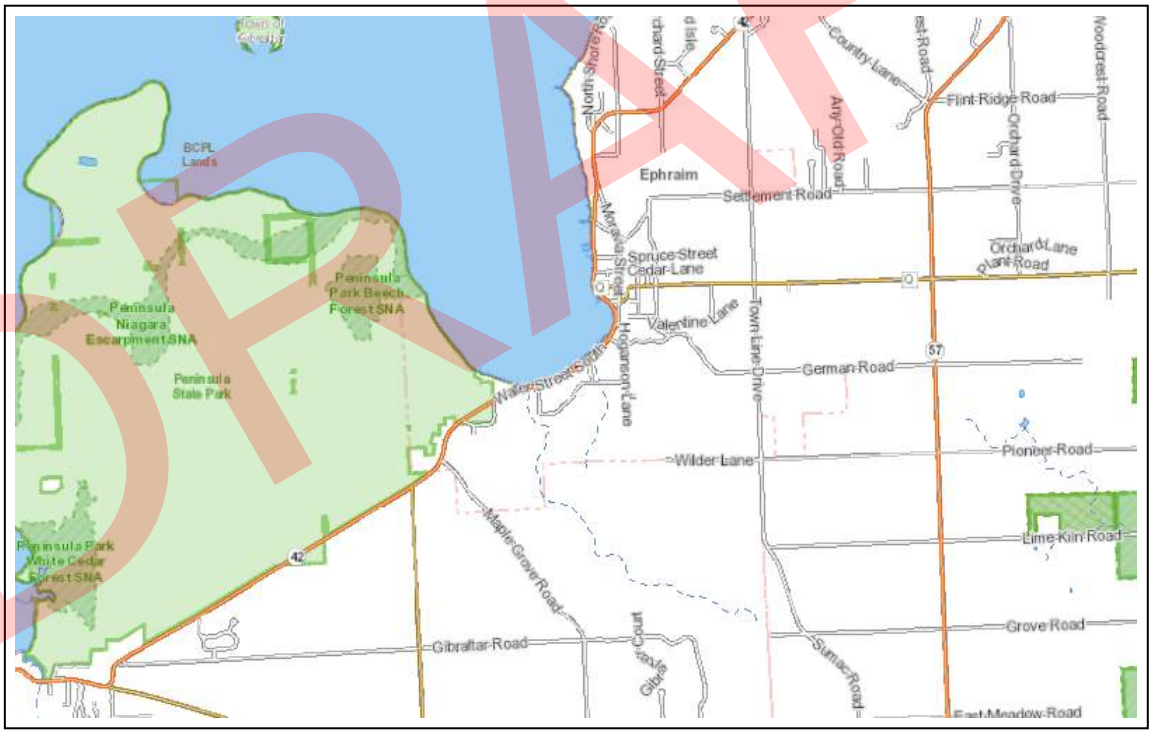
Does the project involve a public property?	**Yes**
Is there any federal involvement with the project?	**Yes**
Is the project a utility, agricultural, forestry or bulk sampling (associated with mining) project?	**Yes**
Is the project property in Managed Forest Law or Managed Forest Tax Law?	**No**

Project involves tree or shrub removal?	**No**
Is project near (within 300 ft) a waterbody or a shoreline?	**Yes**
Is project within a waterbody or along the shoreline?	**No**

Does the project area (including access routes, staging areas, laydown yards, select sites, source/fill sites, etc.) occur **entirely within** one or more of the following habitats?

Urban/residential	**Yes**
Manicured lawn	**No**
Artificial/paved surface	**Yes**
Agricultural land	**No**
Areas covered in crushed stone or gravel	**No**

Project Area Maps



Endangered Resources Preliminary Assessment

Created on **1/31/2024**. This report is good for one year after the created date.

DNR staff will be reviewing the ER Preliminary Assessments to verify the results provided by the Public Portal. ER Preliminary Assessments are only valid if the project habitat and waterway-related questions are answered accurately based on current site conditions. If an assessment is deemed invalid, a full ER review may be required even if the assessment indicated otherwise.

Results

A search was conducted of the NHI Portal within a 1-mile buffer (for terrestrial and wetland species) and a 2-mile buffer (for aquatic species) of the project area. Based on these search results, below are your follow-up actions.

No further action is necessary.

This project is covered by the Broad Incidental Take Permit/Authorization for No/Low Impact Activities (No/Low BITP/A) (https://dnr.wi.gov/topic/ERReview/ITNoLowImpact.html). This BITP/A covers projects that the DNR has determined will have no impact or a minimal impact to endangered and threatened species in the state. Due to this coverage under the No/Low BITP/A, a formal review letter is not needed and there are no actions that need to be taken to comply with state and/or federal endangered species laws, any take that may result from the proposed project is permitted/authorized.

A copy of this document can be kept on file and submitted with any other necessary DNR permit applications to show that the need for an ER Review has been met. This notice only addresses endangered resources issues. This notice does not constitute DNR authorization of the proposed project and does not exempt the project from securing necessary permits and approvals from the DNR and/or other permitting authorities.

Project Information

Landowner name	**Village of Ephraim**
Project address	**Lift Station #2** **Immediately east of N Water St and south of Spruce St** **Ephraim, WI 54211** **SW1/4 of SW1/4 of Section 13 T31N R27E**
Project description	**WWT Facilities Plan Amendment** **The work at Lift Station #2 primarily includes the complete replacement of the existing lift station. Ground-disturbing activities will include excavation for the new lift station and will be confined to the area immediately adjacent to the existing lift station.**

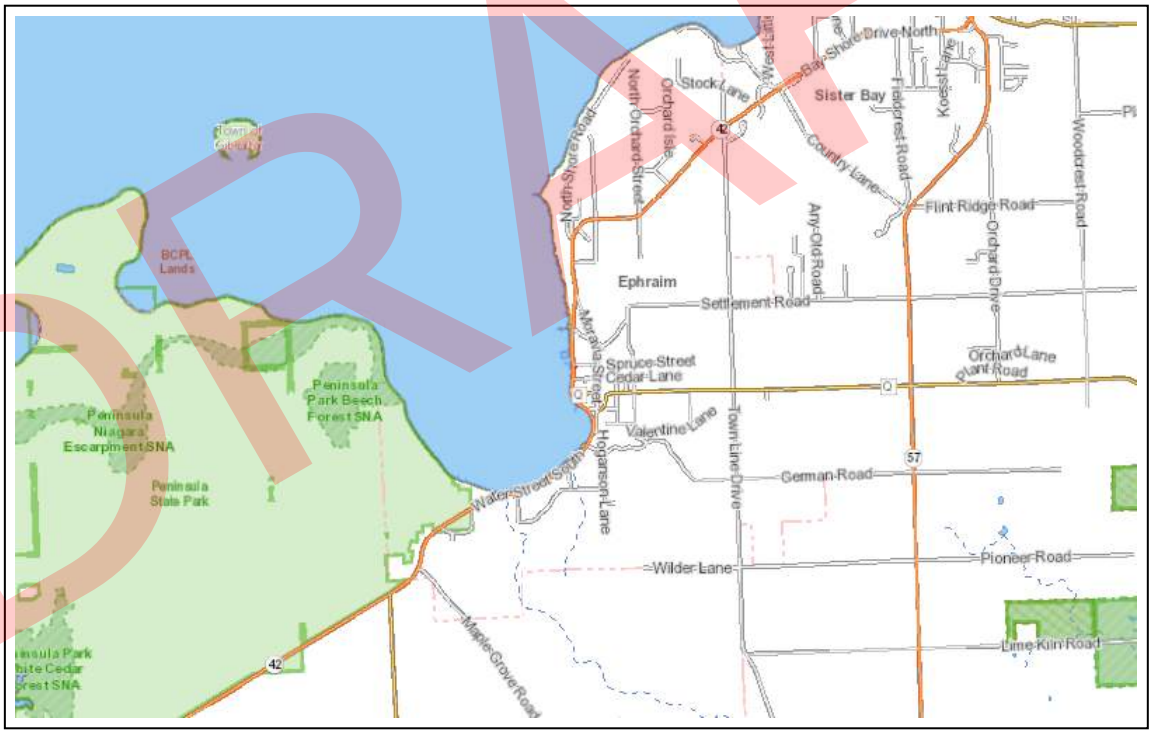
Project Questions

Does the project involve a public property?	**Yes**
Is there any federal involvement with the project?	**Yes**
Is the project a utility, agricultural, forestry or bulk sampling (associated with mining) project?	**Yes**
Is the project property in Managed Forest Law or Managed Forest Tax Law?	**No**
Project involves tree or shrub removal?	**No**
Is project near (within 300 ft) a waterbody or a shoreline?	**Yes**
Is project within a waterbody or along the shoreline?	**No**

Does the project area (including access routes, staging areas, laydown yards, select sites, source/fill sites, etc.) occur **entirely within** one or more of the following habitats?

Urban/residential	**Yes**
Manicured lawn	**Yes**
Artificial/paved surface	**Yes**
Agricultural land	**No**
Areas covered in crushed stone or gravel	**No**

Project Area Maps



APPENDIX F

Cultural Resources Review

Ethan Lang

From: Stencil, Zachary R - DNR <zachary.stencil@wisconsin.gov>
Sent: Wednesday, January 31, 2024 3:11 PM
To: Ethan Lang
Cc: Kubicek, Richard H - DNR
Subject: DO-31-27-13...WQ...Village of Ephraim WWTF Facilties Plan Amendment - Cultural Resources Review
Attachments: 2024-01-31 DNR.pdf

Cleared.

PROJECT CLEARED - project does not impact documented historic properties. Department Archaeologist Zachary Stencil has reviewed the project as a state-level undertaking. No further cultural resources evaluation is required pursuant to Wis.Stats. 44.40 and 157.70. The project is not a federal undertaking; therefore, consideration is not warranted under Section 106 of the NHPA or NEPA. If the project becomes a federal undertaking (funding, permitting, licensing, or approval), please resubmit for review.

Zachary R. Stencil
Departmental Archaeologist
Pronouns: He/Him/His

Historic Preservation Unit
Bureau of Environmental Analysis & Sustainability, EA/7
External Services Division (EX)
Wisconsin Department of Natural Resources
101 South Webster Street
Madison, WI 53703
Cell Phone: 608-225-3604
zachary.stencil@wisconsin.gov

dnr.wi.gov

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

From: Ethan Lang <ELang@mcmgrp.com>
Sent: Wednesday, January 31, 2024 2:55 PM
To: Kubicek, Richard H - DNR <richard.kubicek@wisconsin.gov>; Stencil, Zachary R - DNR <zachary.stencil@wisconsin.gov>
Subject: Village of Ephraim WWTF Facilties Plan Amendment - Cultural Resources Review

Zach and Richard,

Please see attached. Can you review State records for potential cultural, archaeological, and historic resources in the project area?

Feel free to contact me if there are any questions or if additional information is needed.

Thanks,

Ethan S. Lang, E.I.T.
Water & Wastewater Engineer

McMAHON
ENGINEERS ARCHITECTS

1445 McMahon Dr | Neenah, WI 54956
O:920.751.4200 x332 | C:920.841.3947

website | facebook | linkedin | instagram

McMAHON
ENGINEERS ARCHITECTS

January 31, 2024

Mr. Richard Kubicek, Departmental Archaeologist
Wisconsin Department of Natural Resources, Central Office
PO Box 7921
Madison, WI 53707

RE: Village of Ephraim
Wastewater Treatment Facilities
Plan Amendment
McM. No. E0035-09-22-00363.04

Dear Mr. Kubicek,

McMahon Associates, Inc. is preparing a Wastewater Treatment Facilities Plan Amendment for the Village of Ephraim. Most of the work associated with this project would be confined to the existing Wastewater Treatment Facility (WWTF) site. Outdoor work at the WWTF site would primarily include milling and overlaying the existing asphalt paving, replacing entry and overhead doors, and replacing the building roofing.

The WWTF site is located as follows:

Village of Ephraim Wastewater Treatment Facility
10285 Townline Road
Sister Bay, WI 54234
Door County
NE1/4 of NE1/4 of Section 13 T31N R27E

Additionally, this project would include work at two (2) of the influent lift stations, Lift Stations #1 and #2. The work associated with Lift Station #1 is not expected to include any ground-disturbing activities. However, some ground-disturbing activities are expected to occur as part of the work associated with Lift Station #2. This work primarily includes excavation for the construction of a new lift station immediately adjacent to the existing Lift Station #2.

These lift stations are located as follows:

Lift Station #1
Public Beach Building
9883 S Water St
Ephraim, WI 54211
Door County
SE1/4 of NE1/4 of Section 23 T31N R17E

Lift Station #2
Immediately east of N Water Street, south of Spruce Street
Ephraim, WI 54211
Door County
SW1/4 of SW1/4 of Section 13 T31N R27E

Please review State records for potential cultural, archaeological, and historic resources in the area.

Feel free to contact me if there are questions or if additional information is needed.

Respectfully,

McMahon Associates, Inc.

Ethan Lang, E.I.T.
Water & Wastewater Engineer

ESL:jlh

Enclosures: Figure #1 USGS Topographic Map
Figure #2 WWTF Site Plan
Figure #3 Lift Station #1 Location
Figure #4 Lift Station #2 Location

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map US Topo

EPHRAIM QUADRANGLE
WISCONSIN - DOOR COUNTY
7.5-MINUTE SERIES

WWTF SITE

LIFT STATION #2

LIFT STATION #1

FIGURE #1 USGS TOPOGRAPHIC MAP

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid:Universal Transverse Mercator, Zone 16T

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, September 2018 - September 2018
Roads.....U.S. Census Bureau, 2015 - 2018
Names.....GNIS, 1980 - 2021
Hydrography.....National Hydrography Dataset, 2006 - 2019
Contours.....National Elevation Dataset, 2019
Boundaries.....Multiple sources; see metadata file 2019 - 2021
Public Land Survey System.....BLM, 2020
Wetlands.....FWS National Wetlands Inventory 2009

MN
GN
4°50'
86 MILS
0°8'
2 MILS
UTM GRID AND 2019 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000 - m Square ID
DR
00
DQ
Grid Zone Designation 16T

SCALE 1:24 000
1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the
National Geospatial Program US Topo Product Standard.

WISCONSIN
QUADRANGLE LOCATION

		1
2		3
4	5	6

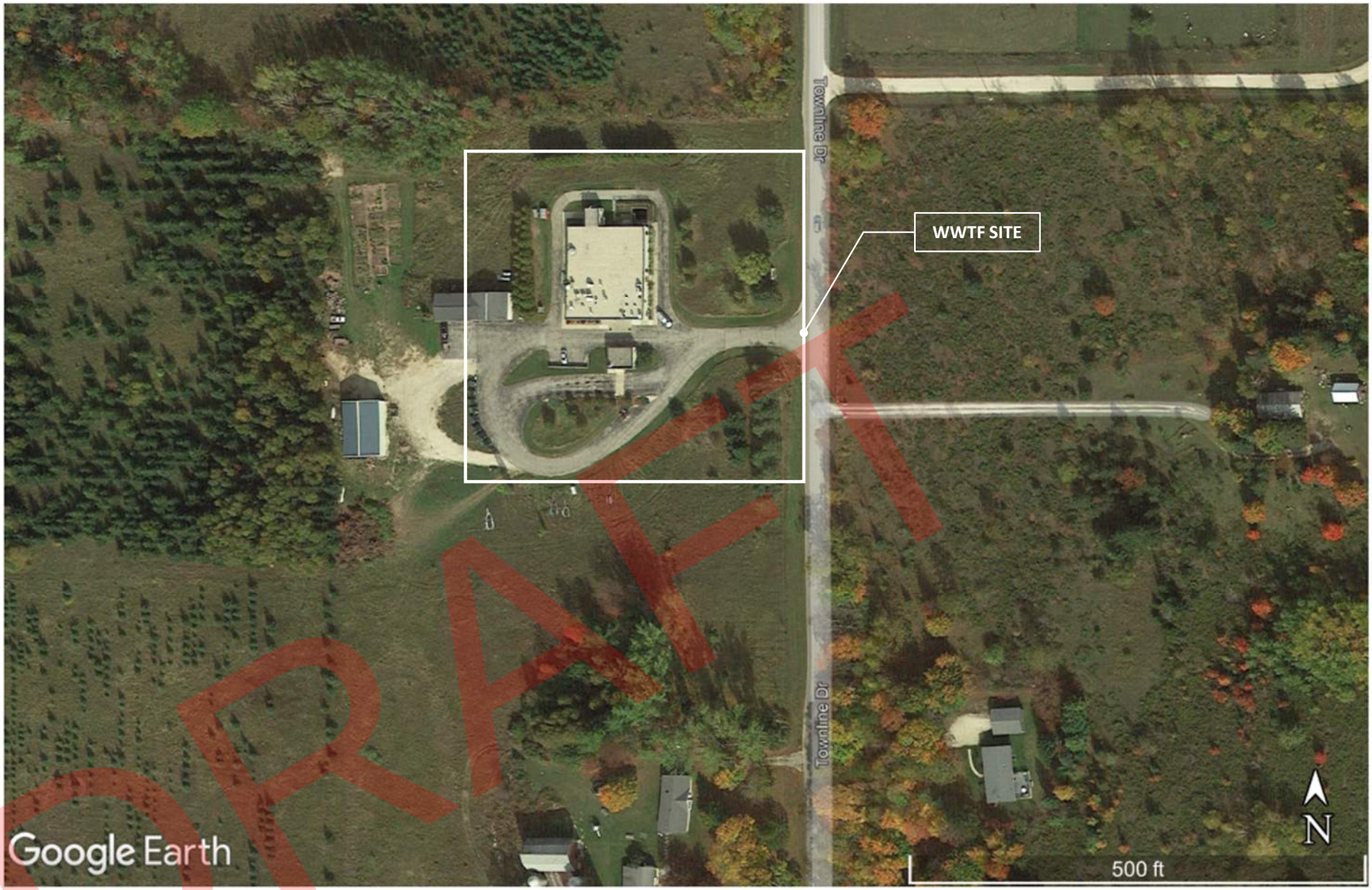
ADJOINING QUADRANGLES

1 Ellison Bay
2 Chambers Island
3 Sister Bay
4 Egg Harbor
5 Baileys Harbor West
6 Baileys Harbor East

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

EPHRAIM, WI
2022

NSN 7643016403176
NGA REF NO.USGSX24K70016



McMAHON ENGINEERS ARCHITECTS

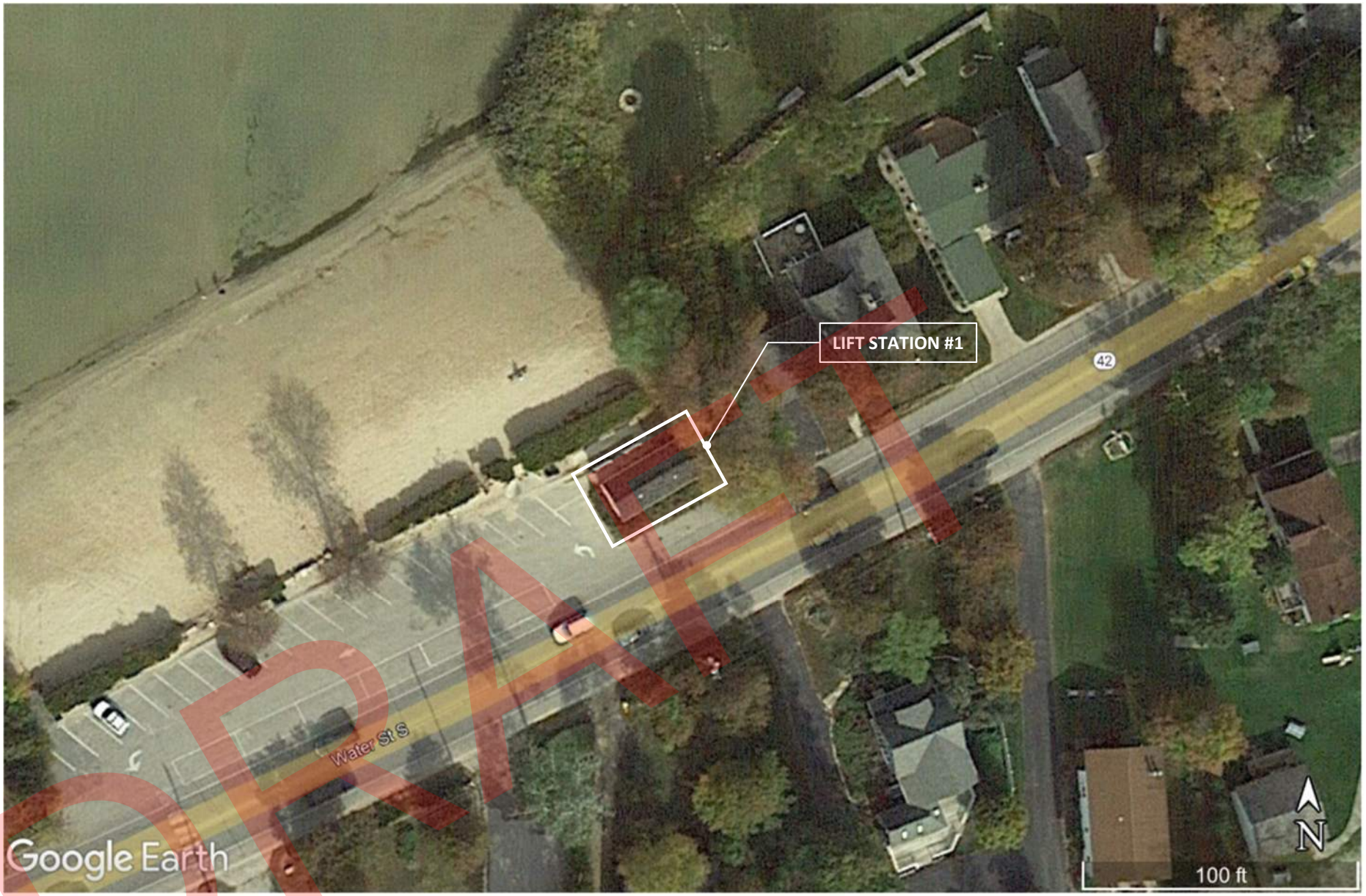
NORTH

Figure #2

WWTF Site Plan

WASTEWATER TREATMENT FACILITIES PLAN AMENDMENT
VILLAGE OF EPHRAIM, WI

McM No. E0035-09-22-00363.04 1/31/2024



McMAHON ENGINEERS ARCHITECTS

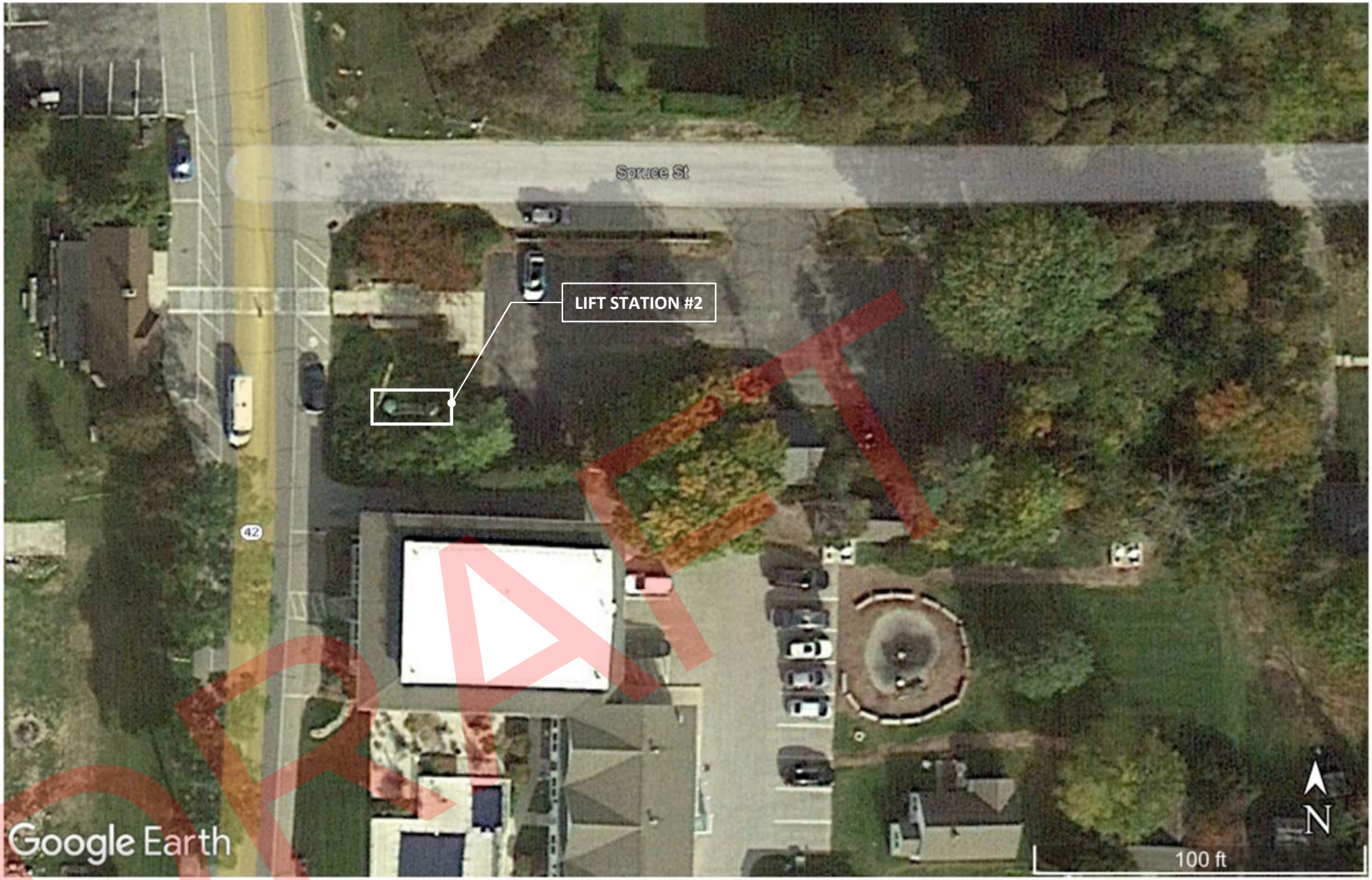
NORTH

Figure #3

Lift Station #1 Location

WASTEWATER TREATMENT FACILITIES PLAN AMENDMENT
VILLAGE OF EPHRAIM, WI

McM No. E0035-09-22-00363.04 1/31/2024



McMAHON ENGINEERS ARCHITECTS

NORTH

Figure #4

Lift Station #2 Location

WASTEWATER TREATMENT FACILITIES PLAN AMENDMENT
VILLAGE OF EPHRAIM, WI

McM No. E0035-09-22-00363.04 1/31/2024

APPENDIX G

Resources Impacts Summary

RESOURCES IMPACT SUMMARY

I. PROJECT IDENTIFICATION

Village of Ephraim
Wastewater Treatment Facility
10285 Townline Road
Ephraim, WI 54234
Door County
NE1/4 of NE1/4 of Section 13 T31N R27E

II. PROJECT DESCRIPTION

A. WHY IS THE PROJECT NEEDED?

This project is needed to extend the service life of the collection system and treatment facility, address current needs associated with the existing facilities, improve Operator safety, operability, and maintainability, and to ensure compliance with permit effluent limits.

B. PROPOSED IMPROVEMENTS

Based on opinions of probable costs for the proposed treatment improvements, it is recommended that the Village proceed with staged improvement projects. The recommended plan is discussed in further detail in Chapter IX.

C. SERVICE AREA

The service area is within the Village's municipal boundary. The population of the Village of Ephraim is not anticipated to increase over the 20-year planning period. The 2020 Decennial Census population of 345 was used as the design population.

D. DESIGN FLOWS & LOADINGS

Future flows and loadings are not expected to significantly increase over the planning period. Furthermore, the existing WWTF has an abundance of reserve capacity to handle the projected future flows and loadings. Therefore, this Facilities Plan Amendment does not aim to change the capacity of the WWTF.

Projected future "combined" influent flows and loadings to the WWTF (collection system and hauled-in wastes) compared to current flows and loadings and the original WWTF design criteria are summarized in the following Table.

PROJECTED FUTURE FLOWS & LOADINGS VS. DESIGN CRITERIA

	[1]Peak Season				Off-Season			
	[2]Current	[3]Projected Future	Rated Capacity	[4]% of Capacity	[2]Current	[3]Projected Future	Rated Capacity	[4]% of Capacity
Flow, mgd								
Average Day	0.113	0.114	0.310	37%	0.048	0.049	0.083	59%
Max Day	0.270	0.270	0.620	44%	0.197	0.198	0.165	120%
BOD_5, lbs./day								
Average Day	140	143	1,400	10%	34	35	300	12%
Max Day	466	469	2,100	22%	136	142	600	24%
TSS, lbs./day								
Average Day	150	154	1,200	13%	41	44	250	18%
Max Day	582	582	1,800	32%	298	298	500	60%
[5]Total P, lbs./day								
Average Day	-	-	48	-	-	-	10	-
Max Day	-	-	72	-	-	-	20	-

[1]Peak season is assumed to be May through October, while the off-season is assumed to be November through April.
[2]2019 through 2023 Average and Max Day values.
[3]Projected future flows and loadings assume a 5% increase in hauled-in wastes.
[4]% of Capacity based on projected future flows and loadings.
[5]Influent Total P is not monitored.

E. EFFLUENT LIMITS

The existing treatment facility discharges to Lake Michigan's Green Bay in compliance with WPDES Permit No. WI-0061271-07-1 (Appendix A), effective January 1, 2022, modified May 1, 2022.

This Facilities Plan Amendment does not aim to change the capacity of the WWTF, as the existing WWTF has an abundance of reserve capacity to handle the projected future flows and loadings, nor does it aim to significantly change any of the original unit process design criteria (e.g., no new treatment processes are proposed). Therefore, it is assumed that future effluent limitations will remain unchanged. A summary of the current effluent limitations follows.

CURRENT MONITORING REQUIREMENTS AND EFFLUENT LIMITATIONS

Parameter	Limit Type	Limit & Units	Sample Frequency	Notes
BOD_5	Weekly Avg	45 mg/L	2/Week	
	Monthly Avg	30 mg/L	2/Week	
TSS	Weekly Avg	45 mg/L	2/Week	
	Monthly Avg	30 mg/L	2/Week	
NH_3-N	Daily Max	18 mg/L	Monthly	
	Weekly Avg	18 mg/L	Monthly	
	Monthly Avg	18 mg/L	Monthly	
pH Field	Daily Min	6.0 s.u.	5/Week	
	Daily Max	9.0 s.u.	5/Week	
E. coli	Geometric Mean - Monthly	126 #/100mL	Weekly	Limit effective April through October
	% Exceedance >410 #/100mL	10% per Month	Monthly	
Phosphorus, Total	Monthly Avg	0.6 mg/L	2/Week	

F. IMPLEMENTATION

Design, bidding, and construction of proposed improvements will be in accordance with the Village's most recent WPDES Discharge Permit as well as local and State requirements.

III. AFFECTED ENVIRONMENT

A. PHYSICAL

The project is not expected to have an impact on lakes, streams, shore lands, wetlands, floodplains, groundwater, soils, or topography. Erosion control measures will be required to reduce potential impacts.

B. BIOLOGICAL

An Endangered Resources Preliminary Assessment was completed on Wisconsin DNR's Natural Heritage Inventory Public Portal. The project is not expected to have an impact on any endangered resources.

C. CULTURAL

A request was made of the DNR archaeologist to determine if any archaeological sites or historic structures/sites are present in the vicinity of the project area. The project is not expected to have an impact on zoning or land use, ethnic or cultural groups, or archaeological or historical resources.

D. OTHER RESOURCE FEATURES

The project is not expected to have an impact on parks, natural areas, or prime agricultural land.

IV. PROJECT IMPACTS

Environmental impacts are put into categories of primary and secondary impacts. Primary impacts result directly from construction activities and facility operations. Secondary impacts are indirect and occur because the project causes changes that induce actions that would not have occurred without the project. A third category is that of unavoidable, adverse impacts.

A. NOISE, ODOR & AESTHETICS

Construction of improvements at the Village of Ephraim's WWTF site and Lift Stations #1 and #2 will generate some noise and may generate some dust. These will be short-term impacts from truck travel and other associated construction activities. These short-term impacts will be a nuisance to residents living near the activities and along truck routes.

Mitigation of these impacts will be discussed in the 'Mitigation Of Impacts' section of this Chapter. A short-term aesthetic impact will be the construction of the new facilities.

B. EROSION & SEDIMENTATION

Soils exposed during construction will be subject to accelerated erosion until the surface is re-vegetated. Erosion will be mitigated by construction methods.

C. SURFACE WATER

Erosion control will be provided, as necessary, to protect nearby surface water from sedimentation due to runoff during construction.

D. GROUNDWATER

Groundwater impacts are not expected to occur as a result of this project.

E. WETLANDS & FLOODPLAINS

Impacts to wetland areas and floodplains are not expected as a result of the proposed improvements. Figure VIII-1 shows the Wisconsin DNR's mapped wetlands in relation to the WWTF site. Figures VIII-2 and VIII-3 show DNR mapped wetlands in relation to Lift Stations #1 and #2. The WWTF site is located on wetland indicator soil types, however, a mapped wetland is not present. The presence of wetland indicating soil types does not constitute any further review or permitting requirements from the DNR. Therefore, the proposed WWTF site improvements are not expected to impact any wetlands.

Figures VIII-4 through VIII-6 show FEMA mapped floodplains in relation to the WWTF site and Lift Stations #1 and #2. Although a portion of Lift Station #1 may be located within a 100-year floodplain, impacts to the floodplain are not expected, as the proposed improvements to Lift Station #1 primarily include the replacement of existing equipment within the existing Public Beach building.

F. ENDANGERED RESOURCES

An Endangered Resources Preliminary Assessment was completed on Wisconsin DNR's Natural Heritage Inventory Public Portal for the WWTF site, the Lift Station #1 site, and the Lift Station #2 site. Since all three project areas occur entirely within urban/residential, manicured lawn, and artificial/paved surfaces, these projects are covered by the Broad Incidental Take Permit/Authorization for No/Low Impact Activities (No/Low BITP/A).

A bald eagle nest was recorded within 1 mile of Lift Station #1 (Public Beach); however, this project is not expected to impact any eagles' nests. Therefore, the proposed

improvements are not expected to impact any endangered resources and no further action is necessary. The results of this assessment are provided in Appendix E.

G. AGRICULTURAL LANDS

The project and its implementation are to be located at Village-owned property, including the site of the existing Ephraim WWTF. As a result, there will be no immediate impact on agricultural lands.

H. LAND USE

This project is not expected to induce changes in previously identified land use. Development will continue to occur in the Village of Ephraim. Mitigation of growth-related impacts will be discussed in the 'Mitigation Of Impacts' section of this Chapter.

I. TRANSPORTATION

Short-term impacts will include increased truck traffic from construction activities. These activities are not expected to disrupt traffic flow or the use of short-term detours. Long-term transportation impacts are not expected.

J. ECONOMICS

Construction of the proposed improvements will lead to short-term increases in employment and purchases of goods and services in the service area.

K. CULTURAL RESOURCES

A request was made of the DNR archaeologist to determine if any archaeological sites or historic structures/sites are present in the vicinity of Lift Stations #1 and #2 and the WWTF site. The DNR archaeologist state there are no known archaeological sites or historical structures within the vicinity of these areas. This correspondence is provided in Appendix F.

L. UNAVOIDABLE ADVERSE IMPACTS

Some impacts associated with implementation of the proposed improvements cannot be avoided. The proposed improvements would have the following adverse impacts:

- Short-term construction dust, noise, and traffic.
- Minor erosion during construction.

M. IRRETRIEVABLE & IRREVERSIBLE RESOURCE COMMITMENTS

The proposed improvements would include the commitment of the following resources:

- Fossil fuel, electrical energy, and human labor for facilities construction and operation.
- User fees and/or tax dollars for construction and operation.
- Some unsalvageable construction materials.

V. MITIGATION OF IMPACTS

As previously discussed, various adverse impacts would be associated with the proposed improvements. Many of these adverse impacts could be reduced significantly by the application of mitigative measures. These mitigative measures consist of a variety of legal requirements, planning measures and design practices. The extent to which these measures are applied will determine the ultimate impact of the particular actions. Potential measures for alleviating construction, operation, and secondary effects are discussed in the following section.

A. MITIGATION OF CONSTRUCTION IMPACTS

Construction related impacts are primarily short-term effects resulting from construction activities. Mitigation measures for these impacts are the responsibility of the contractor and would be governed by requirements in the project plans and specifications and appropriate regulations.

Erosion and sediment control measures would be required by the project specifications. The specifications would require the contractor provide an erosion and sediment control program consisting of a schedule for land clearing and grading for each structure and trench excavation, along with a description of measures to be used during construction for erosion and sediment control. Adherence to the required plan will minimize adverse impacts from erosion and sedimentation.

The specifications would also require the contractor to provide dust control measures. These measures generally consist of periodic watering of the construction area.

Traffic control during construction activities will adhere to appropriate requirements.

B. MITIGATION OF OPERATION IMPACTS

Proper operation and maintenance of the collection system and WWTF will improve the reliability of the system, leading to the discharge of high-quality effluent. The new facilities will be constructed without disrupting existing treatment.

C. MITIGATION OF SECONDARY IMPACTS

Secondary impacts are principally associated with induced development associated with the improvements to the wastewater treatment system. Induced growth can be controlled with proper planning and zoning controls.

VI. ALTERNATIVES CONSIDERED

The following alternatives were considered:

A. NO ACTION ALTERNATIVE

The 'No Action' alternative consists of maintaining the status quo conditions with the WWTF. In this alternative, no WWTF improvements or modifications would be implemented.

The Village of Ephraim's WWTF can consistently meet their current effluent permit limits. However, much of the existing infrastructure is original to the 1986 construction and has surpassed its design service life, or is nearing its service life, as it approaches 40-years in service. Additionally, improvements to many of the unit treatment processes are necessary to improve efficiency, operability, maintainability, and Operator safety. Therefore, the 'No Action' alternative is not a feasible long-term solution.

B. REGIONAL TREATMENT ALTERNATIVE

The regional treatment alternative considers joint treatment with another community. Neighboring municipal WWTF's to the Village of Ephraim include the Village of Sister Bay, which is approximately 3-miles northeast from Ephraim's WWTF, the Fish Creek Sanitary District #1, which is approximately 6-miles southwest from Ephraim's WWTF, and the Town of Baileys Harbor, which is approximately 10-miles south from Ephraim's WWTF.

Neither the Fish Creek Sanitary District #1's nor the Town of Baileys Harbor's WWTF's have sufficient reserve treatment capacity to accept wastewater from the Village of Ephraim. The cost to improve their treatment facilities coupled with the cost to convey the wastewater to either municipality would far exceed the cost to upgrade the Village of Ephraim's WWTF.

The Village of Sister Bay has expressed interest in regionalizing with the Village of Ephraim. Sister Bay's WWTF was designed for a maximum month flow of 0.70 mgd and an average design BOD load of 1,780 lbs./day. The average monthly flow to Sister Bay's WWTF in 2022 was 0.2036 mgd and the maximum month flow of 0.3196 mgd occurred in July 2022. The average monthly BOD load to Sister Bay's WWTF in 2022 was 694 lbs./day and the maximum month BOD load of 1,403 lbs./day occurred in July 2022.

The projected future maximum day flow for the Village of Ephraim is 0.270 mgd and the projected maximum day load is 466 lbs./day. This would suggest that the Sister Bay WWTF has sufficient reserve capacity to handle the Village of Ephraim's wastewater flows and loadings.

Although the Village of Sister's Bay collection system and WWTF appear to have adequate reserve capacity to handle the wastewater flows and loadings from the Village of Ephraim, the Village of Ephraim is not interested in regionalization, as they already have a functional WWTF that is still in good condition. Additionally, the Village of Ephraim would need to construct approximately 1.5 miles of new sanitary sewer and purchase a portion of the capacity of Sister Bay's WWTF and collection system, which would result in the loss of control over sewer rates. Therefore, regionalization with the Village of Sister Bay will not be considered as part of this Facilities Plan Amendment.

C. WASTEWATER COLLECTION & TREATMENT FACILITIES IMPROVEMENTS

The main objective of this Facility Plan Amendment is to determine the most cost-effective means addressing the aging infrastructure and impending needs at the WWTF. Applicable wastewater treatment alternatives should: (1) extend the service life of the existing facilities, (2) improve Operator safety, (3), improve efficiency, operability, and maintainability, (4) maintain reserve treatment capacity for future growth, and (5) achieve compliance with permit effluent limits.

1. Collection System

Based on an assessment of the existing collection system facilities, improvements are needed at both lift stations, and the sections of sewer with leaking lateral stubs.

a. Lift Station #1 Improvements

- Replacement of the submersible pumps, slide rail systems, and wet well access hatch, to improve Operator safety and increase capacity.
  - Lift Station #1 has had issues with ragging and experiences extended pump run times during periods of wet weather. Therefore, the new pumps should have improved capacity and solids handling.
- Replacement of the discharge piping and valves, electrical systems, controls, and telemetry to extend service life and improve operability and maintainability.
- Replacement of the backup generator, if necessary, to operate the larger pumps.

b. Lift Station #2 Improvements

- Complete replacement of the lift station with a submersible type lift station to improve Operator safety, operability, and maintainability.
  - The existing wet well would be converted to a flow through manhole discharging to the new lift station wet well.
- Replacement of the backup generator and integration of fire and intrusion monitoring in the Smith Building to extend service life and improve security.

c. Sewer Lining

- Televising and lining the sections of sewer with leaking lateral stubs to reduce infiltration.

2. Preliminary Treatment

Based on an assessment of the existing preliminary treatment facilities, improvements are needed at the Influent Pump Station, Headworks, and Hauled-In Waste Receiving.

a. Influent Pump Station Improvements

- Modification or replacement of the wet well access hatch to a vapor tight seal when closed and fall protection grating when open to improve Operator safety.
- Replacement of the submersible pumps and provide variable speed control for the new pumps to improve operability and efficiency.
- Relocation of the MCC and controls out of the potentially hazardous and corrosive area to extend service life and improve Operator safety.
- Removal of items currently stored in the influent lift station building.

b. Headworks Improvements

- Replacement of the fine screen equipment to improve Operator safety, efficiency, operability, and maintainability.
- Replacement of the grit removal equipment, air lift type grit transfer system, and grit dewatering unit, and relocation of the grit classifier/dewatering unit to contain odors and corrosive gases.
- Complete HVAC system replacement to contain odors and remove corrosive and hazardous gases from the area to extend service life and improve Operator safety.

c. Hauled-In Waste Receiving Improvements

- Replacement of the screening equipment and holding tank access hatches to improve operability and maintainability.
- Concrete repairs to the holding tank cover and repairs to the interior of the tanks to extend service life.
- Replacement of the transfer piping valves and replacement or re-painting of the transfer piping to extend service life and improve operability.
- Installation of a direct connection for unloading hauled-in waste, including piping, a hose, and 6-inch camlock fitting to mitigate spills.
- Providing a new tanker truck.

3. Secondary Treatment

Based on an assessment of the existing secondary treatment facilities, improvements are needed to the blowers, aeration piping and mixing, secondary clarifiers, and chemical feed systems.

a. Blowers, Aeration, & Mixing Improvements

- Replacement of the existing blowers and roof silencer housing, provide new aeration basin mixers, and reconfiguration of the air supply piping to improve operability, maintainability, and efficiency.

b. Secondary Clarifier Improvements

- Replacement of the final clarifier chain and rake sludge collector components, including replacement of the sprockets, shafts, slide rails, and slide rail holders to extend service life and improve operability, maintainability, and efficiency.
- Replacement of the common clarifier drive assembly with separate drives to extend service life and improve operability.

c. Chemical Feed Improvements

- Inspection and refurbishment of the FRP alum storage tank and containment area, as necessary, to extend service life.
- Installation of an effluent orthophosphate analyzer to maintain permit compliance.

4. Tertiary Treatment & Effluent Discharge

Based on an assessment of the existing tertiary treatment and effluent discharge systems, improvements are needed to the effluent discharge pumps.

- Replacement of the effluent pumps to extend service life and improve operability and maintainability.
- Installation of a cover over the UV system to improve operability and maintainability.
- Relocation of the UV disinfection system controls out of the secondary treatment room to extend service life.
- Replacement of the UV system wiring and conduit.

5. Solids Handling

Based on an assessment of the existing solids handling facilities, the proposed improvements to the solids handling facilities include:

- Replacement of the sludge transfer pumps and associated discharge piping and valves to allow for transfer from one basin to another, to extend service life and improve operability and maintainability.
- Installation of permanent decanting pumps and transfer piping to improve sludge thickening.

6. Electrical, Controls, & SCADA

Based on an assessment of the existing electrical and controls systems, the following improvements are recommended.

- Replacement of the main MCC, plant controls, and SCADA system, including integration of the two lift stations, to extend service life and improve operability and maintainability.
- Replacement of the emergency backup generator with a new outdoor generator to extend service life.

7. Main Treatment Building & Site Improvements

Proposed improvements to the main treatment building and treatment site include:

- Replacement of the membrane roofing systems on existing buildings, if necessary.
- Painting of exposed metal surfaces.
- Inspecting all exposed piping and painting or replacing as needed.

- Replacement of entry and overhead doors that show signs of extensive corrosion.
- Completion of laboratory renovations.
- Replacement of building lighting with modern energy efficient fixtures and LED lighting.
- Milling and overlay the existing asphalt paving.
- Addressing cracks in the exterior masonry walls.

D. COSTS

Opinions of Probable Capital Costs (OPCCs) are provided in Chapter VII. User impacts analysis, financing options, and parallel cost percentage calculations are provided in Chapter IX.

E. ENVIRONMENTAL IMPACTS OF NON-SELECTED ALTERNATIVES

The environmental impacts of the 'No Action' alternative would potentially include the plant exceeding permitted effluent limits. Additionally, other impacts associated with the 'No Action' alternative include increased energy usages, increased operation and maintenance requirements, and a lack of Operator safeguards.

Environmental impacts of the other non-selected treatment alternatives would be similar to the impacts of the selected treatment alternative.

VII. CONTACTS

The following agencies have been contacted throughout the planning process:

NAME	AGENCY	PURPOSE
Zachary Stencil	Wisconsin DNR	Archaeological/Cultural Resources Review
Richard Kubicek	Wisconsin DNR	Archaeological/Cultural Resources Review
Brandon Robinson	Bay-Lake Regional Planning Commission	Population Projections

October 7th 2024
Ephraim WW, WWT, SS
Manager OIC Report

Po4 lab setup-complete with lab cleanup samples twice per week

EFF samples sent to Northern Lake Services for ammonia testing:

Ph testing: Five times per week as required.

TSS, BOD labs with lab cleanup: Twice per week as required.

8-25 11:23 PM Final effluent pump # 1 broke down.

8-29 Vacuum Pump & Compressor on-site to swap out eff pump 1 with new spare we had on hand. We ordered another eff pump to replace our spare.

9-3 Plumbed in new decant line for West Basin and installed electric hoist.

9-4 Northern electric on-site to replace electrical contactor for eff pump 1 which also went out at the time of the pump failure.

9-11 Shipped out ammonia test.

9-18 Certified new water testing media.

9-25 Repaired the water hammer dampener on East HT Pump.

9-27 Transferred W Basin to Digestor.

9-30 Decant digestor.

10-1 Sent out 5 loads of sludge to Sturgeon Bay.

In regards to sludge, we have been working with American Microbial Solutions on introducing their sludge-eating microbes into our extended air digestor. They have had success with their product in pond and lagoon anaerobic systems but never tried in an extended air facility aerobic system. We have been conducting solids tests biweekly since we started in August. Unfortunately, we did not see the results that they did in anaerobic systems. Our organic solids only dropped 1.49% from the start which is not worth the cost of the product. In the beginning, they sold us one tote and gave us another for trying the product. I asked them for a refund, they asked if we would try conducting another study and sent us two more totes free of charge. We can try the study in the west basin over the course of the winter with a lower suspended solids count and better mixing.

Reporting from 8-25-2024 to 10-2-2024:

Ephraim Well Water Testing

Number of Water Tests:	259	total for 2024 so far 1205
In-House Bacteria:	223	1136
Clean Water Testing:	36	69

Ephraim Septage Service:
Holding Tank Pump Outs: 11
Septic Pump Outs: 7
Emergency Call Ins: 0
Weather:

Precipitation:	0.99	inches
Max Temp:	87	
Min Temp:	46	

Respectfully submitted,
Brad Rasmusson

Village of Ephraim
Wastewater Manager

Brad's Notes for the 2025 Budget

Well water testing

I didn't see any reason to change the expenditure or charge amounts here. We received pricing for 2025 testing supplies and will make roughly $11.40 per bacti test.

Rates

I think we should follow our accountant's advice and raise rates across the board except for well water test by another 5%-10% so that we can meet inflation and also still contribute to the replacement fund. Last year we went up 7%.

Account	2024	X 7%	equals	Suggested 2025
Municipal Sewer Rates	$124.00	$8.68	$132.68	$133.00
Resident pump-out	$101.00	$7.07	$108.07	$110.00
Weekend emergency HT pump-out	$233.00	$16.31	$249.31	$250.00
Septic system inspection	$132.00	$9.24	$141.24	$142.00
Truck Charge	$132.00	$9.24	$141.24	$142.00
Grinder Station pump-out	$158.00	$11.06	$169.06	$170.00
Grinder pump-out after-hours	$315.00	$22.05	$337.05	$340.00
Location/ excavation fee	$105.00	$7.35	$112.35	$115.00
3-year septic inspection 11-1 to 4-1	$208.00	$14.56	$222.56	$225.00
Hauler Holding Tank per 1000 Gal	$18.00	$1.26	$19.26	$19.50
Hauler Septic per 1000 Gal	$127.00	$8.89	$135.89	$140.00
Hauler discount 10000+ gal 11-1 to 4-1	$16.00	$1.12	$17.12	$17.50
Water Test Bacti in house	$30.00	$2.10	$32.10	$30.00
Water test copies	$15.00	$1.05	$16.05	$15.00
Scheduled emergency water test	$150.00	$10.50	$160.50	$150.00
Nitrate test sent out	$60.00	$4.20	$64.20	$60.00
Storm sewer connection	$120.00	$8.40	$128.40	$130.00
Sani sewer connection	$3,900.00	$273.00	$4,173.00	$4,200.00

HAULED IN SEWER RATES 9/5/2024

	IN VILLAGE HOLDING TANK PER 1000 GALLONS	OUT OF AREA HOLDING TANK PER 1000 GALLONS	SEPTIC TANK PER 1000 GALLONS	2025 Outlook
BAILEYS HARBOR	$18.50	$18.50	$155.00	
EGG HARBOR	$11.00	$18.00	$120.00	
EPHRAIM	$18.00	$18.00	$127.00	
EPHRAIM	Holding Tank Waste $16.00 Per 1,000 gallons November 1 thru April 1 (if they bring more than 10,000 gallons)			
FISH CREEK	$25.36	$25.36	$236.40	
SISTER BAY	$15.60	$18.70	$89.00	
SISTER BAY (OUT OF AREA)		$18.70	$105.90	
STURGEON BAY	$19.07	$19.07	$84.00	No Plan to increase 2025

Not that we get a large number of haulers but, from discussion with our neighboring treatment facilities it sounds like there will be increases in hauler rates more so on septage. The information above is the current 2024 pricing.