Permit Fact Sheet

General Information

Permit Number	WI-0031704-10-0
Permittee Name and Address	SAXON SANITARY DISTRICT #1 P.O. BOX 5, SAXON, WI 54559
Permitted Facility Name and Address	Saxon Sanitary District #1 West of Cemetery Road NE 1/4, Section 1, T46N-R1W, Saxon Township, Iron County
Permit Term	July 01, 2026 to June 30, 2031
Discharge Location	North bank of Vaughn Creek about 820 feet west of Cemetery Road. SENE Section 1, T46N-R1W, Saxon Township in Iron County
Receiving Water	Vaughn Creek within the Potato River Watershed in the Lake Superior Drainage Basin in Iron County
Stream Flow ($Q_{7,10}$)	0.11 cfs
Stream Classification	Vaughn Creek does not have a formal water body designation in ch. NR 104 Wis. Adm Code, but a limited forage fish classification from the outfall location to approximately one mile downstream has been proposed for inclusion in the next rule revision. Further downstream Vaughn Creek supports a cold-water sport fish community as a Class 2 Trout Stream and Exceptional Resource Water (ERW). The creek is also a non-public water supply and within the ceded territory.
Wild Rice Impacts *(no specific wild rice standards exist at this time)*	No impacts identified at this location. The conclusion of no impact is based on the lack of wild rice waters inventoried near the outfall. (Evaluation completed March 2017).
Discharge Type	Existing seasonal discharger
Annual Average Design Flow (MGD)	0.014 MGD
Industrial or Commercial Contributors	N/A
Plant Classification	A4 - Ponds, Lagoons and Natural Systems; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N/A

Facility Description

The Saxon Sanitary District wastewater treatment facility serves approximately 41 households with no significant industrial contributors. The annual average design flow is 14,000 gallons per day with actual flows averaging 11,000 gallons per day over the past five years (2021-2025). Treatment consists of three stabilization ponds operated one after another (in series). Within these ponds naturally occurring bacteria and organisms already present in the wastewater metabolize and consume organic matter. The cleaned wastewater (effluent) is discharged seasonally during April, May, October, and November to Vaughn Creek in Iron County.

Proposed Permit Reissuance

The Department anticipates an effective date of July 1, 2026 for the proposed permit. Therefore, to allow a full permit term of five years, the proposed permit's expiration date is June 30, 2031. If the permit reissuance process takes more time than anticipated, the permit's dates of effectiveness and expiration may be changed accordingly.

Substantial Compliance Determination

There have been a few minor violations of effluent limits and underreporting, as well as missing PMP compliance schedule reports. However, the facility has taken the necessary actions to address those issues. The district is working with the department to generate a Final Phosphorous Report to provide a status update of the PMP activities performed during the permit term. EPA approval is needed for continued individual phosphorous variance and revised PMP. A schedule for an updated CMOM will be added to the reissued permit unless one is received by February 26th.

The District is working with the department to address permit noncompliance follow-up actions identified in this inspection report. After a desktop review of all DMRs, CMARs, land application reports, and PMP activities, and a site visit on 1/22/2026, by Eric de Venecia, WDNR, the Saxon SD has been found to be in substantial compliance with their permit.

Sample Point Descriptions

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
701	INFLUENT An average of 0.011 MGD (2021-2025 data)	Representative samples shall be collected at the last manhole in the system adjacent to the lift station.
001	EFFLUENT An average of 0.042 MGD over an average of 75 days each year. (2021-2025 data)	Representative samples shall be collected after the final secondary pond prior to discharge to Vaughn Creek.
002	SLUDGE De-sludging is not anticipated this permit term. Sludge was last removed in 1978.	Representative samples shall be collected from the accumulated sludge in the lagoons at various locations and depths that are composited for analysis.

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Total Daily	Flow is measured by ABB Water Mag Meter.
BOD5, Total		mg/L	Monthly	Grab	
Suspended Solids, Total		mg/L	Monthly	Grab	

Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and no changes were required in this section of the permit.

Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD5 and total suspended solids is required by s. NR 210.04(2), Wis. Adm. Code, to assess wastewater strengths and volumes and to demonstrate compliance with the percent removal requirements in s. NR 210.05, Wis. Adm. Code, and Standard Requirements section in the permit.

2 Surface Water - Monitoring and Limitations

2.1 Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate	Daily Max	0.08 MGD	Daily	Continuous	Flow measured by Siemens Hydro Ranger 200.
BOD5, Total	Monthly Avg	30 mg/L	Weekly	Grab	
BOD5, Total	Weekly Avg	45 mg/L	Weekly	Grab	
Suspended Solids, Total	Monthly Avg	30 mg/L	Weekly	Grab	
Suspended Solids, Total	Weekly Avg	45 mg/L	Weekly	Grab	
pH Field	Daily Max	9.0 su	2/Week	Grab	
pH Field	Daily Min	6.0 su	2/Week	Grab	
Dissolved Oxygen	Daily Min	4.0 mg/L	Weekly	Grab	
Phosphorus, Total	Monthly Avg	2.7 mg/L	Weekly	Grab	Interim Variance Limit - See Phosphorus and Schedules sections in the permit for more

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					information.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	2/Week	Grab	Enter the daily ammonia result on the eDMR and compare it to the Nitrogen, Ammonia Variable Limit column to determine compliance. Limit is effective April and May.
Nitrogen, Ammonia Variable Limit		mg/L	2/Week	See Table	Limit is effective April and May. Using the pH result look up the applicable ammonia limit using the table in the Ammonia Limitation permit section and report the variable limit on the eDMR.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	Grab	See the Nitrogen Series Monitoring permit section for testing schedule.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	Grab	See the Nitrogen Series Monitoring permit section for testing schedule.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Total Nitrogen = Total Nitrogen Kjeldahl (mg/L) + Nitrite + Nitrate Nitrogen (mg/L). See the Nitrogen Series Monitoring permit section for testing schedule.

2.1.1 Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

- The sample frequency for **flow** has been changed from "continuous" to "daily" to reflect currently acceptable practices at the facility.
- The permittee has applied for a variance from the water quality standard for **phosphorus** pursuant to s. 283.15, Wis. Stats. An interim (variance) phosphorus limit of 2.7 mg/L (monthly average) applies on the permit effective date. This variance request must be approved by U.S. EPA.
- A daily maximum **ammonia** limit effective during the April and May discharge period is required to protect water quality. The permittee was asked to choose between variable limit based on pH or a single limit of 1.3 mg/L. The permittee chose the variable limit which has been added this permit term.

- Monitoring for **pH** has increased from weekly to twice weekly to match the nitrogen ammonia sample frequency.

2.1.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated December 3, 2025.

Discharge season - The facility operates as a fill-and-draw facility and normally discharges during the months of April, May, October and November. If the permittee decides to deviate from this typical discharge schedule, limits will be adjusted accordingly at the next permit reissuance. *All samples shall be taken during normal operating conditions; therefore, monitoring is required only during periods of discharge.*

Phosphorus: Phosphorus requirements are based on NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus. The final limits are 0.225 mg/L as a monthly average, 0.075 mg/L as a six-month average and 0.050 lbs/day six-month average. These limits are beyond the capabilities of the Sanitary District's current treatment plant. Pursuant to s. 283.15, Wis. Stats., Saxon Sanitary District #1 has applied for a variance from the water quality standards for phosphorus contained in ch. NR 102, Wis. Adm. Code. The permittee has submitted documentation to show that complying with the water quality standard would result in annual average residential sewer user fees in excess of 2% of the median household income for the Town of Saxon and may cause widespread adverse social and economic impacts. As conditions of this variance Saxon Sanitary District #1 shall maintain effluent quality at or below the interim effluent phosphorus limitation of 2.7 mg/L (monthly average) from the permit effective date. Variance requests must be submitted to EPA for review and approval before the variance can be included in a WPDES permit.

PFOS and PFOA – NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Pursuant to s. NR 106.98(3)(b), Wis. Adm. Code, the department evaluated the need for PFOS and PFOA monitoring taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites and other potential sources of PFOS or PFOA. Based on information available at the time the proposed permit was drafted, the department has determined the permittee does not need to sample for PFOS or PFOA as part of this permit reissuance. The department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

Monitoring Frequencies- The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

Previously permitted monitoring frequencies for pH fell below the standard monitoring frequency outlined in guidance. It has been increased to twice a week to match nitrogen ammonia monitoring. This frequency is still below the standards but data submitted during the previous permit term shows consistent compliance with permit limitations, and the set monitoring frequency is consistent with requirements of state code. If performance levels begin to vary during the permitted term, the department may re-evaluate current sampling frequencies and implement more frequent monitoring via permit modification or at permit reissuance.

3 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	**Sludge Class (A or B)**	**Sludge Type (Liquid or Cake)**	**Pathogen Reduction Method**	**Vector Attraction Method**	**Reuse Option**	**Amount Reused/Disposed (Dry Tons/Year)**

Municipal Sludge Description						
Sample Point	**Sludge Class (A or B)**	**Sludge Type (Liquid or Cake)**	**Pathogen Reduction Method**	**Vector Attraction Method**	**Reuse Option**	**Amount Reused/Disposed (Dry Tons/Year)**
002	B	Liquid	Sludge was last removed in 1978, and removal is not anticipated this permit term. If removal is needed see the land application and schedule sections of the permit for more information.			
Does sludge management demonstrate compliance? Yes						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? The community's water supply is provided by private wells. Radium-226 levels are unknown since private water wells are not required to be tested for radium, but Radium-226 has not been found to be an issue in Iron County.						
Is a priority pollutant scan required? No						

3.1 Sample Point Number: 002- LAGOON SLUDGE

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Once	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Once	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Once	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Once	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Once	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Once	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Once	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Once	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Once	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Once	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Once	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Once	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Once	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Once	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Once	Composite	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Zinc Dry Wt	High Quality	2,800 mg/kg	Once	Composite	
Nitrogen, Total Kjeldahl		Percent	Per Application	Composite	
Nitrogen, Ammonium (NH_4-N) Total		Percent	Per Application	Composite	
Phosphorus, Total		Percent	Per Application	Composite	
Phosphorus, Water Extractable		% of Tot P	Per Application	Composite	
Potassium, Total Recoverable		Percent	Per Application	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	See the Sludge Analysis for PCBs permit section.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	See the Sludge Analysis for PCBs permit section.
PFOA + PFOS		ug/kg	Once	Calculated	Report the sum of PFOA and PFOS. See PFAS permit sections for more information.
PFAS Dry Wt			Once	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

3.1.1 Changes from Previous Permit:

Sludge limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

- **List 1** (Metals) and **PCB** monitoring is required during 2028.
- Because it's recommended that **List 2** (Nutrients) are monitored with the List 1 monitoring, they have been added to the table.
- **PFAS** monitoring is required once pursuant to s. NR 204.06(2)(b)9., Wis. Adm. Code.
- Due to changes within the land application forms, the 3400-049 ("Characteristics Report"), 3400-052 ("Other Methods of Disposal") and 3400-055 (Annual Land Application") will need to be submitted each year.

3.1.2 Explanation of Limits and Monitoring Requirements

Requirements for disposal, including land application of municipal sludge, are determined in accordance with ch. NR 204, Wis. Adm. Code. Ceiling and high-quality limits for metals in sludge are specified in s. NR 204.07(5). Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7) for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k).).

List 2 Nutrient monitoring – Monitoring for list 2 (nutrients) is highly recommended at the same time as the monitoring of List 1 (metals) in 2028. Results will assist in the determination of the acres needed for land application of sludge should it be necessary. The number of acres needed is also required for the Sludge Management Schedule (see schedules for more information).

Change in form submittal – In prior permit reissuances when it has been noted in the application that sludge would not be removed during the permit term, the department required sampling during the second year and the sludge characteristic report (3400-049) would be generated only during that year. Due to moving to electronic submittal of forms via Switchboard, forms 3400-049 ("Characteristics Report"), 3400-052 ("Other Methods of Disposal") and 3400-055 ("Annual Land Application") will now be generated by the department and the permittee will be required to submit all three reports each year of the permit term. This change was adopted to provide the permittee flexibility because many lagoon desludging projects can be unexpected, are delayed or staggered over multiple years. Additionally, it is used to officially report that no land application of sludge has occurred, and annual submittal of the forms is required per the standard requirements section of the permit.

- Sludge analysis during 2029 has been included. There are check boxes available on the electronic forms to identify if desludging didn't occur.
- Sludge characteristics report (3400-049) – at the top of the form check "yes" or "no" in the box identifying if any land application occurred that year. Complete the form if required or identify the year samples will be or have been taken in the comments section.
- 3400-052 ("Other Methods of Disposal") and 3400-055 ("Annual Land Application") - The reports are technically 2 separate forms that are now combined in one location but separated onto two different tabs. If you answer "No" to both listed questions the forms are complete. If you need to answer "Yes" to either question the corresponding form tabs will go from gray to blue indicting information can be entered on the report.

PFAS- The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA has developed a draft risk assessment to determine future land application rates and released this risk assessment in January of 2025. The department is evaluating this new information. Until a decision is made, the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS" should be followed.

Collecting sludge data on PFAS concentrations from a wide range of wastewater treatment facilities will help protect public health from exposure to elevated levels of PFAS and determine the department's implementation of EPA's recommendations. To quantitate this risk, PFAS sampling has been included in this WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9., Wis. Adm. Code.

4 Schedules

4.1 Phosphorus Pollutant Minimization Program

As a condition of the variance to the water quality-based effluent limitation (WQBEL) for phosphorus granted in accordance with s. 283.15, Wis. Stats., the permittee shall implement the Phosphorus PMP including any subsequent updates.

Required Action	Due Date
Annual Phosphorus Progress Report: Submit an annual progress report that shall discuss which phosphorus pollutant minimization measures have been implemented during the prior calendar year.	06/30/2027

The report shall include an analysis of trends in weekly average, monthly average and annual total influent and effluent phosphorus concentrations and mass discharge of phosphorus based on phosphorus sampling and flow data. The report shall provide an update on the permittee's: (1) progress in implementing pollutant minimization measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, (2) status of evaluating feasible alternatives for meeting phosphorus WQBELs. Note that the monthly average interim limitation listed in the permit's Surface Water section remains enforceable until new enforceable limits are established in the next permit reissuance. The first annual phosphorus progress report is to be submitted by the date due.	
Annual Phosphorus Progress Report #2: Submit a phosphorus progress report as defined above for the previous calendar year.	06/30/2028
Annual Phosphorus Progress Report #3: Submit a phosphorus progress report as defined above for the previous calendar year.	06/30/2029
Annual Phosphorus Progress Report #4: Submit a phosphorus progress report as defined above for the previous calendar year.	06/30/2030
Final Phosphorus Report: Submit a final report documenting the success in reducing phosphorus concentrations in the effluent, as well as the anticipated future reduction in phosphorus sources and phosphorus effluent concentrations. The report shall summarize phosphorus pollutant minimization activities that have been implemented during the current permit term and state which, if any, pollutant minimization activities from the approved pollutant minimization program plan were not pursued and why. The report shall include an analysis of trends in monthly and annual total influent and effluent phosphorus concentrations based on phosphorus sampling during the current permit term. The permittee shall also re-evaluate all available compliance options for meeting the final phosphorus WQBELs. If the report concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an adaptive management plan. If the report concludes water quality trading will be used, the submittal shall include a Water Quality Trading Plan. Additionally, if the permittee intends to seek to re-apply for a phosphorus variance per s. 283.15, Wis. Stats for the reissued permit, a detailed pollutant minimization program plan outlining the pollutant minimization activities proposed for the upcoming permit term should be submitted along with the final report.	12/31/2030
Annual Phosphorus Progress Reports After Permit Expiration: In the event that this permit is not reissued by the date the permit expires, the permittee shall continue to submit reports for the previous calendar year following the due date of annual phosphorus progress reports listed above. Annual phosphorus progress reports shall include information as defined above.	

Explanation of Schedule

Phosphorus Pollutant Minimization Plan - This schedule is included in accordance with s. 283.15, Wis. Stats, and requires Saxon Sanitary District #1, the permittee, to implement a pollutant minimization program (PMP). to work toward reducing phosphorus entering the facility and optimize operations at their current facility. The permittee is required to investigate ways to reduce phosphorus entering and leaving the WWTF with the goal of meeting WQBEL limits. Annual progress reports are required to document completion of the required items in the approved PMP plan.

4.2 Sludge Management Plan

Required Action	Due Date
Submit a Sludge Management Plan: The permittee shall submit an update to the management plan for approval if removal of sludge will occur during this permit term. The plan shall demonstrate compliance with ch. NR 204, Wis. Adm. Code and at minimum address 1) How and where is sludge sampled; 2) Available sludge storage details and location(s); 3)How will the sludge be removed with details on volume, characterization and how will the treatment plant continue to function during the drawdown; 4) Describe the type of transportation and spreading vehicles and loading and unloading practices; 5) Identify approved land application sites, apply for needed sites, site limitations, total acres needed and vegetative cover management; 6) Specify record keeping procedures including site loading; 7) Address contingency plans for adverse weather and odor/nuisance abatement; and 8) Include any other pertinent information such as other disposal options that may be used or specifications of any pretreatment processes Once approved, all sludge management activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes. No desludging may occur unless approval from the Department is obtained. Daily logs shall be kept that record where the sludge has been disposed. The plan is due at least 60 days prior to desludging.	

4.2.1 Explanation of Schedule

Sludge Management Plan - If the lagoons are to be desludged during this permit term a management plan is needed to show compliance with ch. NR 204, Wis. Adm. Code. There are outlines available to assist in plan development.

Attachments

Water Flow Schematic created August 2013
Water Quality Based Effluent Limits (WQBEL) memo, dated December 3, 2025
Phosphorus Pollutant Minimization Plan (PMP), dated December 2025
Phosphorus Variance EPA Data Sheet

Justification Of Any Waivers From Permit Application Requirements

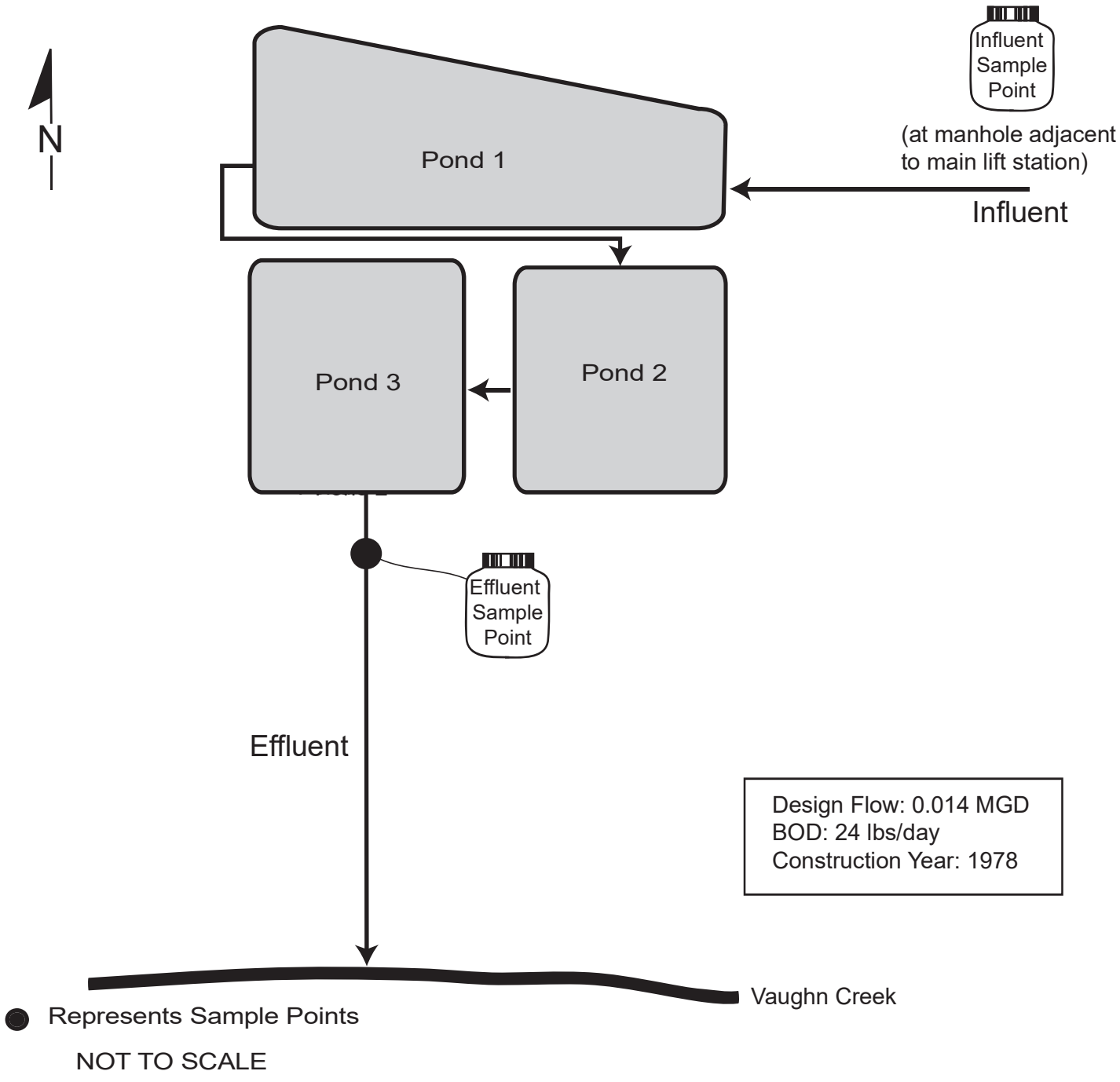
A decision has been made not to require effluent monitoring for metals in the application because:

1. The low design flow (14,000 MGD) and low actual flows (an average of 11,000 MGD) from this facility.
2. The wastewater is all domestic with no industrial contributors to the collection system.
3. The metals in the sludge are well below high quality sludge limits which correlates to low metal concentrations in the effluent.
4. Based on the total points accumulated on the WET checklist and Chapter 1.3 of the WET Guidance Document there is little likelihood the effluent is toxic.
5. The Sanitary District does not have a public water supply system and does not have any control over corrosivity in the influent wastewater.

Prepared By: Sheri A. Snowbank Wastewater Specialist **Date:** January 8, 2026

SAXON SANITARY DISTRICT
Wastewater Treatment Plant

The Saxon Sanitary District wastewater facility is designed to treat 14,000 gallons per day. The three stabilization ponds are operated in series. Fill and draw discharges to Vaughn Creek are authorized each spring and fall in April, May, October and November when receiving water flow is high and water temperature is low.



CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: December 3, 2025

TO: Sheri Snowbank – NOR/Spooner Service Center

FROM: Michael Polkinghorn – NOR/Rhinelander Service Center

SUBJECT: Water Quality-Based Effluent Limitations for the Saxon Sanitary District #1
WPDES Permit No. WI-0031704-11-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable) for the discharge from the Saxon Sanitary District #1 in Iron County. This municipal wastewater treatment facility (WWTF) discharges to Vaughn Creek, located in the Potato River Watershed in the Lake Superior Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate	0.08 MGD					1, 2
BOD_5			45 mg/L	30 mg/L		1, 2
TSS			45 mg/L	30 mg/L		1, 2
pH	9.0 s.u.	6.0 s.u.				1, 2
Dissolved Oxygen		4.0 mg/L				1, 2
Ammonia Nitrogen April – May	Single or Variable					3
Phosphorus						4
Interim				2.7 mg/L		
Final				0.225 mg/L	0.075 mg/L 0.050 lbs/day	
TKN, Nitrate+Nitrite, and Total Nitrogen						5

Footnotes:

1. No changes from the current permit.
2. These are variance limits as described in s. NR 104.02(4)(c), Wis. Adm. Code, applicable to fill and draw or domestic waste stabilization pond facilities discharging to a Limited Aquatic Life (LAL) or Limited Forage Fish (LFF) community receiving water. In absence of this variance, limits based on the LAL or LFF community of the receiving water as described in s. NR 104.02(3)(a) or (b), Wis. Adm. Code, shall apply.
3. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit of 1.3 mg/L. Saxon SD #1 shall notify the Department if the single limit or the variable limits based on effluent pH are preferred.
4. If the phosphorus variance application that was submitted is approved by EPA, an interim limit of 2.7 mg/L as a monthly average may be extended beyond the end of the compliance schedule along with a requirement for a total phosphorus pollutant minimization program.

5. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Sections 283.37(5) and 283.55(1)(e), Wis. Stats, and ss. NR 200.065(1)(g) and NR 200.065(1)(h), Wis. Adm. Codes, provide the authority to request this monitoring during the permit term. Total nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total Kjeldahl nitrogen (TKN) (all expressed as N).

No WET testing is required because information related to the discharge indicates low to no risk for toxicity. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are not required due to the non-continuous nature of the discharge.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Michael Polkinghorn at (715) 360-3379 or Michael.Polkinghorn@wisconsin.gov and Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (4) – Narrative, discharge area map, & weekly/monthly average ammonia nitrogen limits, and thermal tables.

PREPARED BY: Michael A. Polkinghorn – Water Resources Engineer

E-cc: Eric de Venecia, Regional Wastewater Engineer – NOR/Superior Service Center
Michelle BalkLudwig, Regional Wastewater Supervisor – NOR/Spooner Service Center
Diane Figiel, Water Resources Engineer – WY/3
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
Saxon Sanitary District #1

WPDES Permit No. WI-0031704-11-0

Prepared by: Michael A. Polkinghorn

PART 1 – BACKGROUND INFORMATION

Facility Description

Primary and secondary treatment are achieved by three lagoons operated in series where naturally occurring metabolizing microorganisms present in the wastewater break down organic matter until effluent limits are met. Effluent is discharged on a noncontinuous basis via Outfall 001 during April – May and October – November to the north bank of Vaughn Creek, approx. 820 ft west of Cemetery Road.

Vaughn Creek flows for approx. 8.1 miles from Outfall 001 into the Bad River Band of the Lake Superior Tribe of Chippewa Indians reservation. The reservation area has Treatment as State (TAS) status with water quality standards (WQS) approved by EPA on September 21, 2011.

Attachment #2 is a discharge area map of Outfall 001.

Existing Permit Limitations

The current permit, which expired on 09/30/2025, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate	0.08 MGD				1, 2
BOD_5			45 mg/L	30 mg/L	1, 2
TSS			45 mg/L	30 mg/L	1, 2
pH	9.0 s.u.	6.0 s.u.			1, 2
Dissolved Oxygen		4.0 mg/L			1, 2
Phosphorus Interim				5.9 mg/L	3
Ammonia Nitrogen					4
TKN, Nitrate+Nitrite, and Total Nitrogen					4
Temperature					4

Footnotes:

1. **These limitations are not being evaluated as part of this review.** Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.

2. These are variance limits as described in s. NR 104.02(4)(c), Wis. Adm. Code, applicable to fill and draw or domestic waste stabilization pond facilities discharging to a Limited Aquatic Life (LAL) or Limited Forage Fish (LFF) community receiving water. In absence of this variance, limits based on the LAL or LFF community of the receiving water as described in s. NR 104.02(3)(a) or (b), Wis. Adm. Code, shall apply.
3. The interim limit was required under the individual phosphorus variance approved by EPA.
4. Monitoring only.

Receiving Water Information

- Name: Vaughn Creek
- Waterbody Identification Code (WBIC): 2906300
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code:
  - Limited Forage Fish (LFF) community: Outfall 001 to the west border of Section 1; T46N – R1W (Clement Road crossing) for approx. 0.9 miles, Exceptional Resource Water (ERW), non-public water supply, recreational use, and not listed in ch. NR 104. The remainder of Vaughn Creek downstream from the Clement Road crossing is classified as a Cold Water (CW) community and ERW. CW and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.
  - The LFF classification is based on the proposed stream classification designation analysis dated September 1975. This classification is not listed in ch. NR 104 and but was the basis for the Saxon Sanitary District #1 WWTF design in 1978. Vaughn Creek in its entirety was included in the trout stream book in 1980 due to the presence of brook and rainbow trout at an unknown section downstream of the Carlson Road crossing. Use designation fieldwork was conducted in October 2004 for the proposed LFF section of Vaughn Creek. The stream segment was recommended to be an LFF classification and was included in the proposed revision list for ch. NR 104 dated April 2003. The Saxon Sanitary District #1 should be utilizing conventional pollutant categorical limits based on the CW classification of Vaughn Creek. An area map of the stream classifications along with the locations of Outfall 001 and the reservation border is included as attachment #2. Because an updated fish and habitat survey was not performed in time for this permit reissuance, the LFF community will be continued in this evaluation. This will be reevaluated at the next permit issuance or permit modification upon completion of an updated fish and habitat survey of Vaughn Creek. Downstream impacts to the CW classification will also be evaluated approx. 0.9 miles from Outfall 001.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The low flows of the LFF community section are estimated to be zero. The following 7-Q_{10} and 7-Q_2 values are estimated using the USGS method low-flow formula using a drainage area of 1.77 mi^2, where Outfall 001 is located.

  7-Q_{10} = 0.11 cubic feet per second (cfs)

  7-Q_2 = 0.30 cfs
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%. A mixing zone is not allowed for discharges of bioaccumulating compounds of concern (BCCs) in the Great Lakes system as described in s. NR 106.06(2)(br), Wis. Adm. Code.
- Multiple dischargers: None.
- Impaired water status: There are no known impairments to Vaughn Creek or other surface waters within a reasonable distance downstream of Outfall 001.

Effluent Information

- Design flow rate(s):
  Annual average = 0.014 million gallons per day (MGD)
  For reference, the actual average flow from January 2021 – September 2025 was 0.045 MGD excluding days discharge did not occur. The flow rate limit of 0.08 MGD is used to account for the noncontinuous nature of the discharge.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Wastewater source: Domestic wastewater with no industrial contributors.
- Water supply: Private wells.
- Additives: None.
- Effluent characterization: This facility is categorized as a minor municipality and received instructions in the application notification letter that exempt it from standard monitoring requirements. The permit required ammonia nitrogen and temperature monitoring during the current permit term.

The following table presents the average concentrations and loadings at Outfall 001 from January 2021 – September 2025 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameters with Effluent Limits

Parameter	Average Measurement*
Flow Rate	0.045 MGD
BOD_5	7.6 mg/L
TSS	17 mg/L
pH field	7.7 s.u.
Dissolved Oxygen	4.7 mg/L
Phosphorus	1.6 mg/L

*Results below the limit of detection (LOD) were included as zeroes in calculation of average.

PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P_{99}) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Mercury – The permit application did not require monitoring for mercury because Saxon SD #1 is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3., Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, "there are two or more exceedances

in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5)." However, sludge sampling is not available because the facility's lagoons have not been removed. It is not expected that there are exceedances of the high-quality mercury concentration based on similar municipal treatment plants and the lack of industries. **Therefore, mercury monitoring is not recommended during the reissued permit term.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Based on the type of discharge, the effluent flow rate, and the lack of indirect dischargers contributing to the collection system, **PFOS and PFOA monitoring is not recommended during the reissued permit term.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that Saxon SD #1 does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

Acute Limits based on 1-Q_{10}

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q_{10} receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

$$\text{Limitation} = \frac{(WQC)\,(Qs + (1-f)\,Qe) - (Qs - f\,Qe)\,(Cs)}{Qe}$$

Where:

WQC =Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.

Qs = average minimum 1-day flow which occurs once in 10 years (1-day Q_{10}) if the 1-day Q_{10} flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q_{10}).

Qe = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

Cs = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q_{10} method of limit calculation produces the most stringent daily maximum limitations and should be used while making

reasonable potential determinations. This is the case for Saxon SD #1, and the limits are set based on the 1-Q_{10} method.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)
Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The ATC for ammonia is calculated using the following equation:

$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - pH)})] + [B \div (1 + 10^{(pH - 7.204)})]$$

Where:

A = 0.411 and B = 58.4 for an LFF community, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 40 sample results were reported from April 2021 – May 2025. The maximum reported value was 9.5 s.u. (Standard pH Units). The effluent pH was 9.3 s.u. or less 95% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 9.3 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 9.2 s.u. The facility must comply with the daily maximum pH limit of 9.0 s.u. effective in the current permit. Therefore, a value of 9.0 s.u. is believed to represent the maximum reasonably expected pH and most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 9.0 s.u. into the equation above yields an ATC = 1.3 mg/L. Using the 1-Q_{10} method, the single daily maximum limit is 1.3 mg/L.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

Daily Maximum Ammonia Nitrogen Limits – LFF Community

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
$6.0 \le pH \le 6.1$	108	$7.0 < pH \le 7.1$	66	$8.0 < pH \le 8.1$	14
$6.1 < pH \le 6.2$	106	$7.1 < pH \le 7.2$	59	$8.1 < pH \le 8.2$	11
$6.2 < pH \le 6.3$	104	$7.2 < pH \le 7.3$	52	$8.2 < pH \le 8.3$	9.4
$6.3 < pH \le 6.4$	101	$7.3 < pH \le 7.4$	46	$8.3 < pH \le 8.4$	7.8
$6.4 < pH \le 6.5$	98	$7.4 < pH \le 7.5$	40	$8.4 < pH \le 8.5$	6.4
$6.5 < pH \le 6.6$	94	$7.5 < pH \le 7.6$	34	$8.5 < pH \le 8.6$	5.3
$6.6 < pH \le 6.7$	89	$7.6 < pH \le 7.7$	29	$8.6 < pH \le 8.7$	4.4
$6.7 < pH \le 6.8$	84	$7.7 < pH \le 7.8$	24	$8.7 < pH \le 8.8$	3.7
$6.8 < pH \le 6.9$	78	$7.8 < pH \le 7.9$	20	$8.8 < pH \le 8.9$	3.1
$6.9 < pH \le 7.0$	72	$7.9 < pH \le 8.0$	17	$8.9 < pH \le 9.0$	2.6

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)
The weekly and monthly average ammonia nitrogen limits calculation from the previous limit evaluation do not change because there have been no changes in the effluent and receiving water flow rates. The calculations from the previous limit evaluation (November 2019) are shown in attachment #3.

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from April 2021 – May 2025.

Ammonia Nitrogen Effluent Data

Statistics	Conc. (mg/L)
1-day P_{99}	6.5
4-day P_{99}	3.6
30-day P_{99}	2.0
Mean*	1.3
Std	1.4
Sample size	36
Range	<0.1 - 6.6

*Values lower than the limit of detection were substituted with a zero

Reasonable Potential

The need to include ammonia limits in the Saxon SD #1 permit is determined by calculating 99th upper percentile (or P_{99}) values for ammonia and comparing those to the calculated limits. **Based on this comparison, daily maximum limits are recommended during April - May.** This recommendation is based on a review of the effluent pH and ammonia nitrogen data where high values of both parameters occurred during the spring discharge season (April – May). **Saxon SD #1 shall notify the Department if the single limit or the variable limits based on effluent pH are preferred.**

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

Section NR 102.04(5), Wis. Adm. Code, states that all surface waters shall be suitable for supporting recreational use and shall meet *E. coli* criteria during the recreation season. Section NR 102.04(5)(b), Wis. Adm. Code, allows the Department to make exceptions when it determines, in accordance with s. NR 210.06(3), Wis. Adm. Code, that wastewater disinfection is not required to meet E. coli limits and protect the recreational use. Section NR 210.06(3), Wis. Adm. Code, tasks the Department with determining the need for disinfection using a site-specific analysis based on potential risk to human or animal health. It sets out the factors that must be considered in determining the necessity to disinfect municipal wastewater or to change the length of the disinfection season.

Saxon SD #1 had previously been exempted from disinfection based on the LAL or LFF community classification of the receiving water. Section NR 210.06(3)(g), Wis. Adm. Code, states that disinfection decisions may be made based on the hydrologic classifications listed in s. NR 104.02(1), Wis. Adm. Code (**not** on the water quality classifications - i.e., limited forage fish, limited aquatic life - that are defined in s. NR 104.02(3), Wis. Adm. Code). Therefore, the implementation of *E. coli* WQC and protection of the recreational use will be evaluated at Vaughn Creek.

It is recognized Saxon SD #1 potentially has a detention time of at least 180 days, in which the resulting discharged effluent is thought to not pose a risk to human and animal heath, as described in s. NR 210.06(3)(h), Wis. Adm. Code. The maximum 180-day rolling average flowrate for the facility is 0.020 MGD (April 2021 – May 2025) including days discharge did not occur. The volumetric capacity of the

lagoons is approx. 4.3 MG, calculated based on dimensions provided in the facility plan drawings included in the previous compliance inspection (June 2017). Therefore, the estimated shortest detention time for the facility is approximately 4.3 MG / 0.020 MGD = 218 days and is significantly greater than the 180-day minimum. This detention time is essentially providing disinfection where additional disinfection treatment is not expected to be needed. **Therefore, bacteria limits or monitoring are not recommended during the reissued permit term.**

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit
Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of total phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because Saxon SD #1 does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average phosphorus loading is less than 150 lbs/month, which is the threshold for municipalities in accordance with s. NR 217.04(1)(a)1, Wis. Adm. Code. **Therefore, a technology-based limit is not recommended during the reissued permit term.** In addition, the need for a WQBEL for phosphorus must be considered.

Annual Average Mass Total Phosphorus Loading

Month	Average Phosphorus Concentration (mg/L)	Total Effluent Flow (Million Gallons)	Calculated Mass (lbs/month)
Oct. 2024	1.76	1.1	16
Nov. 2024	1.54	0.32	4.0
April 2025	1.85	0.88	14
May 2025	1.77	1.3	19
		Average =	13

Total P (lbs/month) = Monthly average (mg/L) × total flow (MG/month) × 8.34 (lbs/gallon)
Where total flow is the sum of the actual flow (MGD) for that month

Water Quality-Based Effluent Limits (WQBEL)
Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

Section NR 102.06(3)(a), Wis. Adm. Code, specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. For other stream segments that are not specified in s. NR 102.06(3)(a), Wis. Adm. Code, s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.075 mg/L applies for Vaughn Creek.

The conservation of mass equation is described in s. NR 217.13(2)(a), Wis. Adm. Code, for phosphorus WQBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream phosphorus concentrations (Cs) provided below.

$$\text{Limitation} = [(WQC)(Qs+(1-f)\ Qe) - (Qs-f\ Qe)\ (Cs)]/Qe$$

Where:

WQC = 0.075 mg/L for Vaughn Creek
Qs = 100% of the 7-Q_2 of 0 cfs
Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code
Qe = effluent flow rate = 0.08 MGD = 0.12 cfs
f = the fraction of effluent withdrawn from the receiving water = 0

The effluent limit is set equal to criteria because the receiving water flow is equal to zero.

Effluent Data
The following table summarizes effluent total phosphorus monitoring data from April 2021 – May 2025.

Total Phosphorus Effluent Data

Statistics	Conc. (mg/L)
1-day P_{99}	2.71
4-day P_{99}	2.10
30-day P_{99}	1.78
Mean	1.61
Std	0.38
Sample size	44
Range	0.54 - 2.46

Reasonable Potential Determination
The discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion because the 30-day P_{99} of reported effluent total phosphorus data is greater than the calculated WQBEL**. Therefore, a phosphorus WQBEL is recommended during the reissued permit term.**

Limit Expression
According to s. NR 217.14(2), Wis. Adm. Code, because the calculated WQBEL is less than or equal to 0.3 mg/L, **the effluent limit of 0.075 mg/L may be expressed as a 6-month average.** If a concentration limitation expressed as a six-month average is included in the permit, **a monthly average concentration limitation of 0.225 mg/L, equal to three times the WQBEL calculated under s. NR 217.13, Wis. Adm. Code shall also be included in the permit.** The six-month average should be averaged during the months of May – October and November – April.

Mass Limits
A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because Vaughn Creek is an ERW. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.08 MGD = 0.050 lbs/day expressed as a 6-month average.**

Interim Limit
An interim limit is required per s. NR 217.17, Wis. Adm. Code, when a compliance schedule is needed in the permit to meet the WQBEL. The interim limit should reflect a concentration that the facility is able to meet without investing in additional "temporary" treatment but also should prevent backsliding from current conditions. **Therefore, it is recommended that the monthly average interim limit be set equal**

to 2.7 mg/L for permit reissuance along with requirements for optimization of phosphorus removal. This value reflects the 1-day P_{99} concentration of effluent phosphorus data during April 2021 – May 2025 and is required to be used with the individual phosphorus variance.

Variance Request

Saxon SD #1 currently has an EPA approved individual phosphorus variance applicable during the current permit term The interim limit of 5.9 mg/L is applicable until the end of the current permit term. The facility has reapplied for an individual variance under s. 283.15, Wis. Stats. Eligibility for the variance is not included as part of this review. If a variance is granted and reapproved by EPA**, the recommended monthly average interim limit of 2.7 mg/L may be extended beyond the current permit term.**

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

Downstream impacts with respect to the CW community section of Vaughn Creek approx. 0.9 mi downstream are also considered with weekly average temperature limits. In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from April 2021 – May 2025.

The heat loss equation as described by s. NR 106.55(5), Wis. Adm. Code, is used for discharges to storm sewer/storm water conveyance channels where the default cooling rate is estimated as 1 ^{o}F per 400 ft and is used to estimate the given cooling over the 0.9 mi between Outfall 001 and the classification change. This is considered conservative for open-channel flow especially during the winter months where the heat loss is expected to be more significant than estimated.

The following daily maximum and weekly average limits are representative of the thermal water quality protection of the LFF community and the cooling adjusted weekly average limits are representative of the protection of the CW community. Temperature monitoring was required during the current permit term but was not completed likely due to operator turnover. The complete temperature limit calculations are included as attachment #4. The calculated limits are shown in the table below:

Monthly Temperature Limits

Month	LFF Community		CW Community
	Daily Maximum (°F)	Weekly Average (°F)	Weekly Average (°F)
APR	81	63	71

Attachment #1

Month	LFF Community		CW Community
	Daily Maximum (°F)	Weekly Average (°F)	Weekly Average (°F)
MAY	84	70	76
OCT	83	63	66
NOV	80	54	64

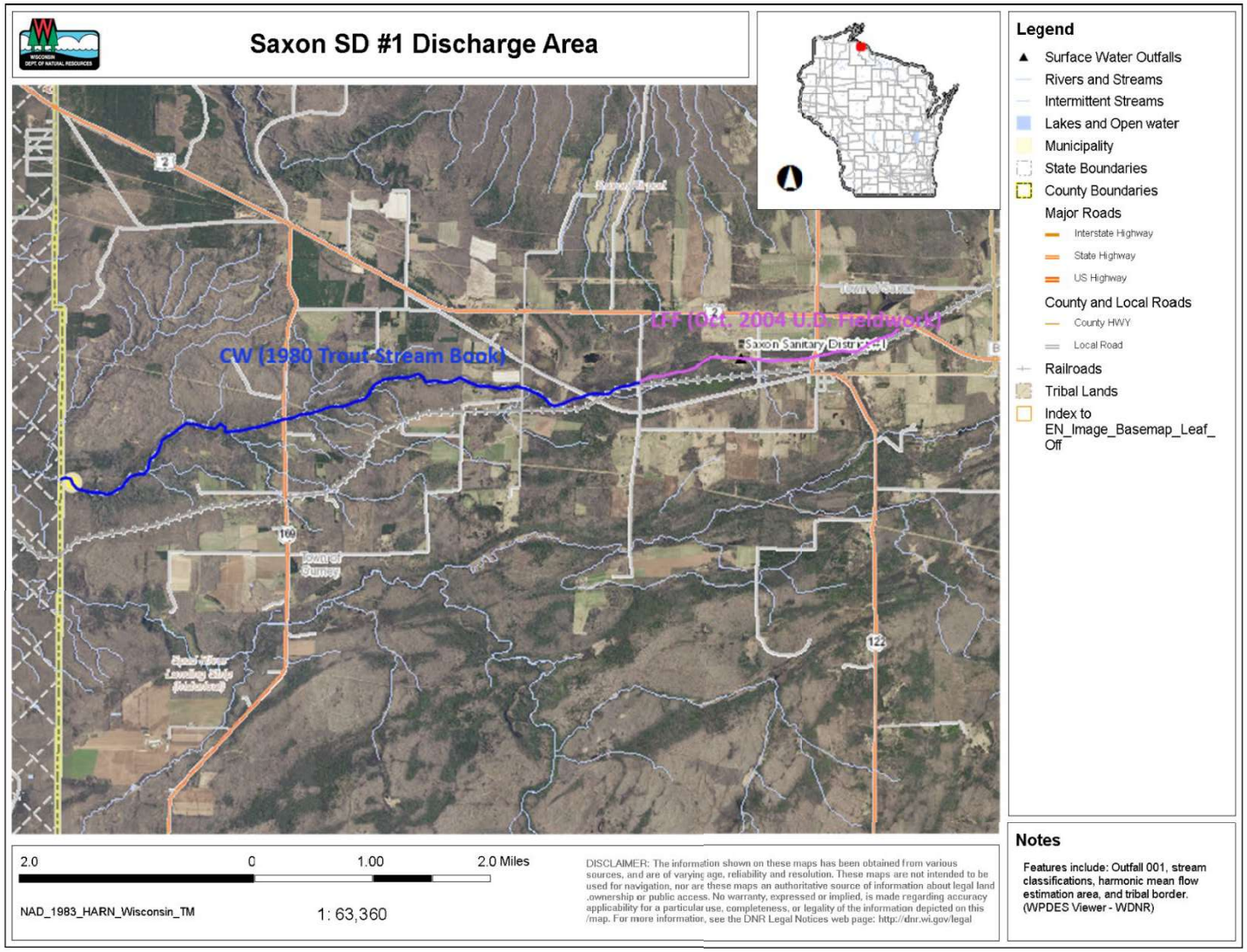
Since this facility provides hydraulic detention times of approx. 218 as a worst case scenario elevated effluent temperatures are unlikely and discharge temperatures are expected to be similar to ambient conditions. The facility uses a fill and draw method of operation with effluent discharges occurring only during the cool weather periods in spring and fall when ambient temperatures are less than 54 deg. F. **Therefore, temperature limits or monitoring are not recommended during the reissued permit term.**

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document* (2022).

Guidance in Chapter 1.11 of the WET Guidance Document (WET Testing of Minor Municipal Discharges) was consulted. This is a minor municipal discharge (< 1.0 MGD) comprised solely of domestic wastewater, no history of WET failures, no additives, and no toxic compounds detected at levels of concern. **No WET testing is recommended at this time because of the low risk in effluent toxicity.**

Attachment #2



Weekly Average & Monthly Average Limits based on Chronic Toxicity Criteria (CTC)

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria. The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Limited Forage Fish Community is calculated by the following equation.

$$CTC = E \times \{[0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})]\} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,
E = 1.0,
C = the minimum of 3.09 or $3.73 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or
$C = 3.73 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and
T = the temperature (ºC) of the receiving water – (Early Life Stages Present), or
T = the maximum of the actual temperature (ºC) and 7 - (Early Life Stages Absent)

The 4-day criterion is simply equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q_{10} (4-Q_3, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q_5 (estimated as 85% of the 7-Q_2 if the 30-Q_5 is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 ºC, 25% of the flow is used if the Temperature < 11 ºC, and 50% of the flow is used if the Temperature ≥ 11 ºC but < 16 ºC.

The rules provide a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 ºC, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in Vaughn Creek, based on field observation data available in the fisheries database. So "ELS Absent" criteria apply from November – April, and "ELS Present" criteria will apply from May – October for an LFF classification.

Since minimal ambient data is available, the "default" basin assumed values are used for Temperature, pH and background ammonia concentrations, shown in the table below, with the resulting criteria and effluent limitations. The background pH values are based on ambient hardness geomean of 37 mg/L of 7 site specific values in Iron County.

Vaughn Creek (LFF)		Summer	Winter
		May – Oct.	Nov. – April
Effluent Flow	Qe (MGD)	0.08	0.08
Background Information	7-Q_{10} (cfs)	0	0
	7-Q_2 (cfs)	0	0
	Ammonia (mg/L)	NA	NA
	Average Temperature (°C)	NA	NA
	Maximum Temperature (°C)	21	10
	pH (s.u.)	7.35	7.19
	% of Flow used	NA	NA
	Reference Weekly Flow (cfs)	0	0
	Reference Monthly Flow (cfs)	0	0
Criteria mg/L	4-day Chronic		
	Early Life Stages Present	15.6	-
	Early Life Stages Absent	-	54.6

	30-day Chronic		
	Early Life Stages Present	6.23	-
	Early Life Stages Absent	-	21.8
Effluent Limitations mg/L	Weekly Average		
	Early Life Stages Present	16	-
	Early Life Stages Absent	-	55
	Monthly Average		
	Early Life Stages Present	6.2	-
	Early Life Stages Absent	-	22

* "NA" denotes "Not Applicable" for parameters that are not necessary when the receiving water flow is zero.

Ammonia Decay

The decay rate of ammonia is considered in the limits evaluation for downstream protection because the receiving water classification changes from a variance to a non-variance classification. The more restrictive calculated limits should be used to protect at the point of discharge and downstream uses. Where the calculated limits are more restrictive based on downstream uses, ammonia decay can be considered to determine if these more restrictive limits are needed or if the ammonia will decay before it reaches the point of the classification change. The section of Vaughn Creek downstream of the Clement Road crossing, located 0.9 miles downstream of Outfall 001 is classified as a cold water community. The assumed basin background information is provided in the table below, with the resulting criteria and effluent limitations.

Vaughn Creek (CW)		**Summer May – Oct.**	**Winter Nov. – April**
Effluent Flow	Qe (MGD)	0.08	0.08
Background Information	7-Q_{10} (cfs)	0.11	0.11
	7-Q_2 (cfs)	0.30	0.30
	Ammonia (mg/L)	0.03	0.03
	Average Temperature (°C)	15	4
	Maximum Temperature (°C)	18	8
	pH (s.u.)	7.35	7.19
	% of Flow used	50	25
	Reference Weekly Flow (cfs)	0.055	0.038
	Reference Monthly Flow (cfs)	0.013	0.064
Criteria mg/L	4-day Chronic	9.95	13.6
	30-day Chronic	3.98	5.42
Effluent Limits mg/L	Weekly Average	14	17
	Monthly Average	8.0	8.2

Ammonia decay rates are dependent on temperature with in-stream nitrification essentially non-existent in the winter. In-stream decay is expected so a first order decay model will be used. Based on the available literature, a decay rate of 0.25 day^{-1} at 20°C has been suggested as a default rate. A temperature correction factor of $\theta = 1.08$ is ($k_{.t} = k_{20}\,\theta^{(T-20)}$).

$$N_{Limit} = \left(\frac{N_{down}}{EXP(-k_t T)} \right)$$

Where: N_{Limit} = Ammonia limit needed to protect downstream use (mg/L)
N_{down} = Ammonia limit calculated based on downstream classification and flow (mg/L)
$-k_t$ = Ammonia decay rate at background stream temperature (day^{-1})

T = Travel time from outfall to downstream use (day)

The velocity of receiving water is assumed to be 5 miles per day and the distance from the point of discharge to the classification change is approximately 0.9 miles for a travel time of 0.2 days. This equation shows that at the location where the classification change, 97-99% of the ammonia is remaining during the seasonal changes. After decay, the limits are increased as shown in the following table.

	LFF		CW		CW After decay		Most Restrictive Limits	
Months Applicable	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L	Weekly Average mg/L	Monthly Average mg/L
May – Oct.	16	6.2	14	8.0	15	8.3	15	6.2
Nov. – April	55	22	17	8.2	17	8.3	17	8.3

Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	Saxon SD #1		**7-Q_{10}:**	0	cfs		
Outfall(s):	001		**Dilution:**	25%		**Start:** NA	04/01/21
Date Prepared:	11/14/2025		**f:**	0		**End:** NA	05/31/25
Design Flow (Qe):	0.08	MGD	**Stream type:**	Limited forage fish community			
Storm Sewer Dist.	0	ft	**Qs:Qe ratio:**	0.0	:1		
			Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
APR	50	63	81	0	0.076	0.080	0			63	81
MAY	59	70	84	0	0.078	0.078	0			70	84
OCT	55	63	83	0	0.080	0.080	0			63	83
NOV	46	54	80	0	0.027	0.037	0			54	80

Attachment #4

Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	Saxon SD #1		**7-Q_{10}:**	0.11	cfs		
Outfall(s):	001		**Dilution:**	25%		**Start:** NA	04/01/21
Date Prepared:	11/14/2025		**f:**	0		**End:** NA	05/31/25
Design Flow (Qe):	0.08	MGD	**Stream type:**	Cold water community			
Storm Sewer Dist.	4,752	ft	**Qs:Qe ratio:**	0.2	:1		
			Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit		**Adjusted Thermal Limits**	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation	**Weekly Average**	**Daily Maximum**
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
APR	47	57	70	0	0.076	0.080	0			59	75	71	87
MAY	56	63	72	0	0.078	0.078	0			65	76	76	88
OCT	49	53	70	0	0.080	0.080	0			54	75	66	87
NOV	41	48	69	0	0.027	0.037	0			53	83	64	94

Saxon Sanitary District #1
Phosphorus Pollutant Minimization Plan (PMP)
Revised February 2026

In the Final Phosphorus Compliance Alternatives Evaluation/Abbreviated Wastewater Facility Plan, submitted in December 2017, it was determined that the technology currently used at Saxon Sanitary District #1 (SD) would not be able to meet the final calculated water quality-based effluent limits of 0.225 mg/L for a monthly average and 0.075 mg/L as a 6-month average, nor potential site-specific, flow-based limits of 0.19 mg/L six-month average and 0.57 mg/L monthly average without a significant facility upgrade. Multiple options have been considered, but due to economic restraints, the SD applied for and was granted an individual phosphorus variance June 12, 2020. Based on an evaluation of the community's current economic status, an individual phosphorus variance is being requested again this permit term.

Existing Conditions

The SD's wastewater treatment plant (WWTP) consists of three stabilization ponds operated in series with discharges occurring seasonally (April, May, October, and November) to Vaughn Creek in Iron County. The lagoons are not aerated and there is no electrical power available at the site. Phosphorus treatment is not provided at the existing WWTP.

The WWTP is located in the upper reach of the Vaughn Creek watershed which is 1.78 square miles. The watershed is dominated by undeveloped forested rural areas, agriculture, and wetlands. Upstream of the WWTP is primarily wetlands, agriculture (hayfields and pastureland), forest and residential properties. PRESTO modeling of the entire watershed shows that phosphorus contributions to the watershed are nonpoint source dominated (82% nonpoint to 18% point).

Economics

The average residential sewer charge is currently $600 per year, and according to the 2023 Census, the MHI for the Saxon Sanitary District is $41,250. Construction of a facility upgrade to reduce phosphorous concentrations in effluent is not economically feasible and would raise costs above the threshold of 2% of the MHI due to the very small user base and the existing sewer user rates that are in place.

Future Actions

Reducing Influent Sources

The SD serves 41 households. The main sources of phosphorus in the influent wastewater are regular, domestic-strength sewage from residents and small local businesses. Hauled waste is currently not accepted at this facility.

No significant point sources of phosphorous have been identified, however, the SD will continue to work with commercial users to reduce total phosphorus in their discharge and interview any new commercial users which discharge more than just sanitary waste to the collection system. Interviews will be centered around the list of questions provided by the EPA (Attachment A) and used to identify whether phosphorus-containing chemicals or products are present in their discharge.

The focus of influent source reduction efforts will be on the continued implementation of the Capacity Management Operation Maintenance (CMOM) program; implementation of the CMOM program will reduce inflow and infiltration (I/I) to the collection system, resulting in reduced strain on pumping systems and improved pond capacity and overall effluent quality. Review of CMOM goals and related activities will continue to be performed annually during the permit term. The SD will prioritize and invest in the collection system infrastructure as funds allow, including manhole rehabilitation/risers and private clearwater/sump connections.

A portion (40%) of the sanitary sewer mains (including lateral connections) were cleaned and televised in 2024; no significant I/I issues were identified. One goal that will be added to annual CMOM reviews will include televising and cleaning a certain percentage of the remaining collection system as funds allow.

Based on a visual inspection of the manholes, up to three manholes on Main Street will be raised in 2027 to eliminate leaking.

Reducing Effluent Phosphorus Concentrations and Loadings

The SD has other needs within the treatment infrastructure which will be evaluated and prioritized, including sludge removal from the lagoons which would help improve overall effluent quality. Maintaining and replacing components of the existing collection and treatment system to ensure compliance with permit requirements are the highest priority for the Saxon SD.

Sludge depth monitoring in the ponds did not occur during the current permit term but will occur during year 2 of the upcoming permit term to evaluate the need for desludging. Sludge removal and other plant maintenance and upgrade projects will be evaluated and implemented as funds allow and as dictated by permit compliance and meeting effluent limits.

Watershed Reduction Program

There may be potential trading opportunities available for phosphorus reduction in the watershed. The types of projects that may be evaluated include agricultural conservation (nonpoint source practices, taking land out of production, improving/eliminating feedlots, etc.) and urban stormwater improvements (sump connections, leaf and pet waste management through public education, etc.). Due to the economic situation in Saxon, watershed reduction projects can only be feasible if willing partners can be identified who can assist with developing a trading plan and/or identifying sources of funding. The SD must focus on no-cost or low-cost options such as urban stormwater improvements through public education.

Long-term planning for the SD may include more focus on watershed reduction projects as more of the higher priority, imminent collection and treatment system maintenance and repair projects are completed and existing loan commitments are eventually met. During each year of the upcoming permit term, potential partnerships and no-cost/low-cost watershed reduction items will be investigated and evaluated. If determined feasible, the next steps would be to develop an implementation plan and begin implementation.

Procedures and resources for implementing Water Quality Trading (WQT), including the establishment of the clearinghouse has made this a more feasible option for consideration. The SD will work with the Iron County Land Conservation Department (LCD) and the WQT clearinghouse to identify potential projects and implement WQT as funds allow.

Reevaluated the Budget

The SD raised sewer rates during the previous permit term and has no plans to initiate additional fee increases at this time. The budget will be reevaluated if additional funds can be set aside for future phosphorus reduction options.

Saxon Sanitary District #1
Phosphorus Pollutant Minimization Plan (PMP)
Revised February 2026

PMP Activities	1st Year	2nd Year	3rd Year	4th Year	5th Year
1. Reducing Influent Sources					
a. Continue to work with businesses that contribute more than sanitary waste to the collection system to identify and reduce potential phosphorus sources.	**	**	**	**	**
b. Contact and interview any new businesses that may contribute more than sanitary waste to the collection system to identify potential phosphorus sources.	X	X	X	X	X
c. Work with Wisconsin Rural Waters Association on outreach documents that can be included with annual bill to help residential users understand ways to reduce phosphorus pollution.	X	X	X	X	X
d. Continue CMOM annual audits/goals. +	X	X	X	X	X
e. If determined feasible, develop and implement options.	**	**	**	**	**
f. Up to three manholes on main street will be raised to eliminate leaking.		X			
2. Reducing Effluent TP Concentrations and Loadings					
a. Monitor sludge depths.		X			
b. Evaluate the need for desludging to maintain permit compliance and submit results in the annual PMP report.			X		
c. If feasible, develop a sludge removal plan and implement.				**	**
3. Watershed Reduction Program					
a. Contact Iron County Land Conservation Department and the Water Quality Trading Clearinghouse to investigate and evaluate potential partnerships, watershed reduction options and potential trades, and submit results in the annual PMP report.	X	X	X	X	X
b. Evaluate potential no-cost/low-cost watershed reduction options and submit results in the annual PMP report.	X	X	X	X	X
c. If determined feasible, develop and implement options.	**	**	**	**	**
4. Re-evaluation of Budget					
a. Evaluate current operating and maintenance costs and loan payments to determine if additional funds can be set aside for future phosphorus compliance.				X	
b. Submit summary of budget evaluation with the final PMP report.					X
5. Miscellaneous					
Continually explore new phosphorus reduction opportunities. In the annual PMP report, document which phosphorus reductions were explored during the previous year and any conclusions made.	X	X	X	X	X

Notes:

+ At a minimum, annual evaluation of CMOM program/goals will be performed through the compliance maintenance annual report (CMAR). One goal that will be evaluated and implemented is cleaning and televising a percentage of the system.

X Indicates action taken/started for the listed year

** Indicates follow-up action that will be taken depending on results from previous year – see detailed descriptions.

Attachment A

Phosphorus Reduction Checklist for Commercial Users

Disclaimer – Please note this is not an official document and the questions below are provided as a starting point for investigating commercial contributions of phosphorus. Mention of or referral to commercial products or services, and/or links to non-EPA sites does not imply official EPA endorsement of or responsibility for the opinions, ideas, data, or products presented at those locations, or guarantee the validity of the information provided. Mention of commercial products/services on non-EPA websites is provided solely as a pointer to information on topics related to environmental protection that may be useful to EPA staff and the public.

- **Cleaners/detergents - housekeeping, dish washing** - Are phosphorus-containing products currently used for cleaning or dish washing? Could you explore alternatives that are phosphorus free or contain a smaller percentage by weight?
- **Water conditioning** - Do you condition your water? If yes, can you consider a chemical water conditioner which contain a smaller percentage by weight?
- **Food waste - drain/garbage disposal** - How are food scraps and food waste currently disposed of? If a garbage disposal is used, are there alternatives for food waste disposal (trash, composting)?
- **Landscaping** - Are any phosphorus-containing lawn care products (e.g., fertilizers, herbicides) used by the facility? Can use of these be reduced or alternative methods be considered (e.g., mulching for weed control, reduced fertilizer application rate, use of non-phosphate fertilizer)?
- **Pet waste (for housing facilities)** - Does the facility currently have a pet waste policy? If not, could you consider implementing such a policy, which could include providing disposal bags and/or receptacles?
- **Water conservation** - Does this facility use any water conservation practices? Can you install water conservation practices such as low-flow faucets, reduced-flow toilet flushing equipment, or water-saving appliances such as dish- and clothes washers? Have you repaired all leaking faucets, toilets and pumps?
- Additional resources to find low-phosphate cleaners include but are not limited to
    - https://www.epa.gov/nutrientpollution/what-you-can-do-your-home
    - https://www.ewg.org/cleaners/

needed.

Section I: General Information

A. Name of Permittee: Saxon Sanitary District #1

B. Facility Name: Saxon Sanitary District #1 Wastewater Treatment Facility

C. Submitted by: Wisconsin Department of Natural Resources

D. State: Wisconsin **Substance:** Phosphorus **Date completed:** March 6, 2026

E. Permit #: WI-0031704-10-0 **WQST#:** (EPA USE ONLY)

F. Duration of Variance **Start Date:** July 1, 2026 **End Date:** June 30, 2031

G. Date of Variance Application: October 6, 2025

H. Is this permit a:
☐ **First time submittal for variance**
☒ **Renewal of a previous submittal for variance** *(Complete Section X)*

I. Description of proposed variance:

The effluent limit is based on the downstream impacts to Vaughn Creek. The WQC for smaller streams like Vaughn Creek is 0.075 mg/L and the phosphorus WQBEL calculation formula is cited in NR 217.13(2)(a), Wis. Adm. Code. Based on NR 102.06, Wis. Adm. Code, the effluent limits are 0.225 mg/L as a monthly average and 0.075 mg/L as a 6-month average. Because the facility is upstream of a Class 2 Trout Stream and exceptional resource water (ERW), a mass limit of 0.050 lbs/day as a 6-month average is also required per NR 217.14(1)(a), Wis. Adm. Code. Given the small size of this facility, a technology-based phosphorus limitation is not warranted. The Saxon Sanitary District #1 (Saxon) was issued a WPDES permit containing the phosphorus WQBEL on January 1, 2014. During the previous permit term, Saxon evaluated compliance options and determined that all compliance options are economically infeasible.

The effluent phosphorus concentration for this discharge is currently 2.7 mg/L (April 2021-May 2025). This phosphorus concentration reflects on-site phosphorus optimization measures that occurred during the previous permit term. The proposed permit contains a requirement to implement a phosphorus pollutant minimization program (PMP) along with an interim limit of 2.7 mg/L expressed as a monthly average.

J. List of all who assisted in the compilation of data for this form

Name	Email	Phone	Contribution
Sheri Snowbank	Sheri.Snowbank@Wisconsin.gov	715-635-4131	Permit Drafter
Eric de Venecia	Eric.deVenecia@Wisconsin.gov	715 685-4155	Compliance Engineer
Michael Polkinghorn	Michael.Polkinghorn@Wisconsin.gov	715-360-3379	Limits Calculator
Sarah Donoughe	Sarah.Donoughe@Wisconsin.gov	920-366-6076	Variance Coordinator

Section II: Criteria and Variance Information

A. Water Quality Standard from which variance is sought: 0.075 mg/L (Water Quality Criterion)

B. List other criteria likely to be affected by variance: None.

C. Source of Substance: Saxon discharges to Vaughn Creek within the Potato River Watershed. According to the Pollutant Load Ratio Estimation Tool (PRESTO) model, 82% of the phosphorus entering the creek is coming from nonpoint sources and natural background conditions. Saxon contributes the remaining 18% originating from point sources.

Citation: PRESTO is a statewide GIS-based tool that compares the average annual phosphorus loads originating from point and nonpoint sources within a watershed. More information about this model is available at http://dnr.wi.gov/topic/surfacewater/presto.html.

D. Ambient Substance Concentration: NA ☐ **Measured** ☐ **Estimated** ☐ **Default** ☒ **Unknown**

E. If measured or estimated, what was the basis? Include citation.
NA because Vaughn Creek has no assimilative capacity with a low flow of zero.

F. Average effluent discharge rate: 0.045 MGD (Jan. 2021 – Sept. 2025) **Maximum effluent discharge rate:** 0.08 MGD

G. Effluent Substance Concentration: 1-day P99 = 2.71 mg/L; 4-day P99 = 2.10 mg/L; 30-day P99 = 1.78 mg/L; Mean = 1.61 mg/L
☒ **Measured** ☐ **Estimated** ☐ **Default** ☐ **Unknown**

H. If measured or estimated, what was the basis? Include Citation. Effluent concentration data from April 2021-May 2025.

I. Type of HAC:
☐ **Type 1: HAC reflects waterbody/receiving water conditions**
☐ **Type 2: HAC reflects achievable effluent conditions**
☒ **Type 3: HAC reflects current effluent conditions**

J. Statement of HAC: The Department has determined the highest attainable condition of the receiving water is achieved through the application of the variance limit in the permit, combined with a permit requirement that the permittee implement its Phosphorus PMP. Thus, the HAC at commencement of this variance is 2.7 mg/L, which reflects the greatest phosphorus reduction achievable with the current treatment processes, in conjunction with the implementation of the permittee's Phosphorus PMP. The current effluent condition is reflective of on-site optimization measures that have already occurred. This HAC determination is based on the economic feasibility of available compliance options for the Saxon SD #1 WWTF at this time (see Economic Section below). The permittee may seek to renew this variance in the subsequent reissuance of this permit; the Department will reevaluate the HAC in its review of such a request. A subsequent HAC cannot be defined as less stringent than this HAC.

K. Variance Limit: 2.7 mg/L as a monthly average

L. Level currently achievable (LCA): 2.7 mg/L as a monthly average

M. What data were used to calculate the LCA, and how was the LCA derived? (*Immediate compliance with LCA is required.)*
LCA is equal to the 1-day P99 of effluent phosphorus data during April 2021 – May 2025 using the calculation procedure as described in s. NR 106.05(5), Wis. Adm. Code.

N. Explain the basis used to determine the variance limit (which must be ≤ LCA). Include citation.
See Section II, M.

O. Select all factors applicable as the basis for the variance provided under 40 CFR 131.10(g). Summarize justification below: ☐ **1** ☐ **2** ☐ **3** ☐ **4** ☐ **5** ☒ **6**
Saxon is currently required to monitor phosphorus but was not designed for chemical removal of phosphorus through chemical feed. During the current permit term, Saxon evaluated their compliance options and demonstrated that all available options are economically infeasible. Improving the facility and optimizing phosphorus treatment during the upcoming permit term are actions that are expected to lead to reduced phosphorus levels over the course of the variance. Given the long-term effects of phosphorus pollution, an interim monthly average limit of 2.7 mg/L is recommended along with implementation of the Phosphorus PMP.

Section III: Location Information

A. Counties in which water quality is potentially impacted: Iron

B. Receiving waterbody at discharge point: Vaughn Creek

C. Flows into which stream/river? Potato River **How many miles downstream?** ~15.3 miles

D. Coordinates of discharge point (UTM or Lat/Long): X= 487163.17, Y= 669150.63

E. What are the designated uses associated with this waterbody?
Limited Forage Fish community and Exceptional Resource Water.

F. Describe downstream waters:
Approx. 0.9 mi downstream of the discharge the designated use changes to a cold water community.

G. What is the distance from the point of discharge to the point downstream where the concentration of the substance falls to less than or equal to the applicable criterion of the substance?
Approx. 11 mi downstream of the discharge to a section of Vaughn Creek with a large amount of assimilative capacity. This section of Vaughn Creek is approx. 2 mi upstream of its confluence with the Potato River.

H. Provide the equation used to calculate that distance.
Mass balance equation for calculating phosphorus WQBELs as described in s. NR 217.13, Wis. Adm. Code.

I. Identify all other variance permittees for the same substance which discharge to the same stream, river, or waterbody in a location where the effects of the combined variances would have an additive effect on the waterbody: None.

Please attach a map, photographs, or a simple schematic showing the location of the discharge point as well as all variances for the substance currently draining to this waterbody on a separate sheet.
See the "Saxon SD #1 - Current Outfall Variance(s)" map.

J. Is the receiving waterbody on the CWA 303(d) list? If yes, please list the impairments below. ☐ Yes ☒ No ☐ Unknown

River Mile	Pollutant	Impairment
N/A		

Section IV: Pretreatment (complete this section only for POTWs with DNR-Approved Pretreatment Programs. See w:\Variances\Templates and Guidance\Pretreatment Programs.docx)

A. Are there any industrial users contributing phosphorus to the POTW? If so, please list.
N/A

B. Are all industrial users in compliance with local pretreatment limits for phosphorus? If not, please include a list of industrial users that are not complying with local limits and include any relevant correspondence between the POTW and the industry (NOVs, industrial SRM updates and timeframe, etc)
N/A

C. When were local pretreatment limits for phosphorus last calculated?
N/A

D. Please provide information on specific SRM activities that will be implemented during the permit term to reduce the industry's discharge of the variance pollutant to the POTW
N/A

Section V: Public Notice

A. Has a public notice been given for this proposed variance? ☒ Yes ☐ No

B. If yes, was a public hearing held as well? ☒ Yes ☐ No ☐ N/A

C. What type of notice was given?
☒ Notice of variance included in notice for permit ☐ Separate notice of variance

D. Date of public notice: March 19, 2026 **Date of hearing:** May 5, 2026

E. Were comments received from the public in regards to this notice or hearing? ☐ Yes ☐ No
(If yes, please attach on a separate sheet)

Section VI: Human Health

A. Is the receiving water designated as a Public Water Supply? ☐ Yes ☒ No

B. Applicable criteria affected by variance: N/A

C. Identify any expected impacts that the variance may have upon human health, and include any citations: None.

Section VII: Aquatic Life and Environmental Impact

A. Aquatic life use designation of receiving water: Limited Aquatic Life (LAL)

B. Applicable criteria affected by variance: 0.075 mg/L (Fish and Aquatic Life Criteria)

C. Identify any environmental impacts to aquatic life expected to occur with this variance, and include any citations:
Vaughn Creek does not have a formal water body designation in ch. NR 104, Wis. Adm. Code, but a limited forage fish classification from the outfall location to approximately one mile downstream has been proposed for inclusion in the next rule revision. The next six miles of Vaughn Creek supports a Cold Water (CW) community as a Class 2 Trout Stream and ERW. Agricultural, residential and urban nonpoint source pollution and background sources (forests and wetlands) have

impacted the habitat in Vaughn Creek. The PRESTO report has corroborated these nonpoint source inputs to Vaughn Creek and it's estimated that approximately 82% of the phosphorus loading is coming from nonpoint sources. On-site optimization measures will help ensure that further degradation of the environment will not occur with this variance. Continued phosphorus reduction measures will be implemented to improve water quality and minimize environmental impacts.

D. List any Endangered or Threatened species known or likely to occur within the affected area, and include any citations:

The following list contains the Federally Endangered and Threatened Species in Region 3, Wisconsin, from U.S. Fish & Wildlife Service, February 2026.

BIRDS
Piping Clover (E)
CLAMS
Higgins Eye (E)
Sheepnose Mussel (E)
Snuffbox Mussel (E)
Spectaclecase (mussel) (E)
Winged Mapleleaf (E)
MAMMALS
Indiana bat (E)
Norther Long-eared Bat (E)
REPTILES
Eastern Massasauga (T)
SNAILS
Iowa Pleistocene snail (E)
INSECTS
Hine's emerald dragonfly (E)
Karner Blue Butterfly (E)
Poweshiek skipperling (E)
Rusty Patched Bumble Bee (E)
FLOWERING PLANTS
Dwarf lake iris (T)
Eastern prairie fringed orchid (T)
Fassett's locoweed (T)
Mead's Milkweed (T)
Northern wild monkswood (T)
Pitcher's thistle (T)
Prairie Bush Clover (T)

Citation: U.S. Fish & Wildlife Service – Environmental Conservation Online System (http://www.fws.gov/endangered/) and National Heritage Index (http://dnr.wi.gov/topic/nhi/)

Section VIII: Economic Impact and Feasibility

A. Describe the permittee's current pollutant control technologies (treatment processes):

Primary and secondary treatment are achieved by three lagoons operated in series where naturally occurring metabolizing microorganisms present in the wastewater break down organic matter until effluent limits are met. Effluent is discharged on a noncontinuous basis via Outfall 001 during April – May and October – November to the north bank of Vaughn Creek, approx. 820 ft west of Cemetery Road.

B. What modifications would be necessary to comply with the current limits? List additional treatment processes and/or technologies available. Include any citations.

Saxon Sanitary District #1 WWTF does not treat for phosphorus removal. A major facility upgrade would be necessary to meet the final WQBELs. Saxon evaluated several options:

1. Upgrading the WWTF to include tertiary filtration – results in 10.64% MHI
2. Upgrading the WWTF to include a chemical feed system for phosphorus removal – results in 2.90% MHI
3. MDV – Saxon is not able to meet a limit of 1.0 mg/L without upgrading; therefore, it is economically infeasible

4. Water quality trading (WQT) – WQT alone or with chemical phosphorus removal would require upgrades; therefore, it is economically infeasible

Citation: Abbreviated Wastewater Facilities Plan dated December 2017 and the Department's Economic Justification Evaluation Worksheets for Tertiary Filtration and Chemical Feed System

C. Identify any expected environmental impacts that would result from further treatment, and include any citations:

N/A

D. Is it technically and economically feasible for this permittee to modify the treatment process to comply with the water quality-based limits? ☐ **Yes** ☒ **No**

E. If treatment is possible, is it possible to comply with the limits on the substance? ☒ **Yes** ☐ **No**

F. If yes, what prevents this from being done? Include any citations.

All evaluated compliance options are economically infeasible at this time because the cost would result in a user rate in excess of 2% MHI.

Citation: Abbreviated Wastewater Facilities Plan dated December 2017 and the Department's Economic Justification Evaluation Worksheets for Tertiary Filtration and Chemical Feed System

G. List any alternatives to current practices that have been considered, and why they have been rejected as a course of action, including any citations:

A chemical feed phosphorus removal system, tertiary filtration, the MDV and WQT were all considered and rejected because they are not economically feasible at this time.

Chemical addition for phosphorus removal alone cannot meet the final WQBELs; additional treatment would be required. In the future, chemical addition may still be a first step in conjunction with other options.

Treatment to meet the final WQBELs would require tertiary phosphorus removal. There are many methods of tertiary removal including Hydrotech disc filtration, membrane bio-reactors, ultrafiltration, algae-based treatment, ballasted clarification, and a compact clarification system. Ballasted clarification, Hydrotech disc filtration and ACTIFLO (compact clarification) were investigated due to positive field trials and costs. However, financing any such project would cause widespread adverse social and economic impacts to the Sanitary District.

Water quality trading, either alone or in conjunction with chemical phosphorus removal, was also determined to be infeasible due to costs associated with implementing phosphorus reductions in the watershed.

Citation: Abbreviated Wastewater Facilities Plan dated December 2017 and the Department's Economic Justification Evaluation Worksheets for Tertiary Filtration and Chemical Feed System

H. Describe the economic impacts of compliance: ***{applies only to municipalities; include other cost estimates for industries}***

Economic Factor		Source
MHI	$41,250	Phosphorus Variance Application for Municipal Facilities (Form 3200-143)
Calculated preliminary screener	2.9%	IPV Economic Evaluation Worksheet
Secondary score value	5	MDV Guidance – Appendix A

Section IX: Multi-Discharger Variance Feasibility *(this assumes MDV approval)*

A. Does the facility meet the economic indicators to qualify for the MDV? ☒ **Yes** ☐ **No** ☐ **Unknown**

MDV secondary indicator score: **5**

B. Is it technically and economically feasible for this permittee to comply with a phosphorus WQBEL of 1 mg/L or lower? ☐ **Yes** ☒ **No** ☐ **Unknown**

C. Justification for considering an individual variance in lieu of the MDV: The cost of a plant upgrade to meet 1.0 mg/L would increase the residential user rates to >2% of the MHI.

Section X: Compliance with Water Quality Standards

A. Describe all activities that have been, and are being, conducted to reduce the discharge of the substance into the receiving stream. This may include existing treatments and controls, consumer education, promising centralized or remote treatment technologies, planned research, etc. Include any citations.

The current permit contained PMP activities for reducing influent sources of phosphorus, a continued focus on CMOM annual audits and goals, reducing effluent total phosphorus concentrations and loadings by monitoring sludge depths and evaluating the need for desludging, investigating and evaluating watershed reductions through potential partnerships, and evaluating budgetary options such as loans and grant funding.

Citation: Final Phosphorus PMP Report (2026)

B. Describe all actions that the permit requires the permittee to complete during the variance period to ensure reasonable progress towards attainment of the water quality standard. Include any citations.

This permit contains a variance to the water quality-based effluent limit (WQBEL) for phosphorus approved in accordance with s. 283.15, Wis. Stats. As conditions of this variance the permittee shall (a) maintain effluent quality at or below the interim effluent limitation specified in the proposed permit, (b) implement the phosphorus pollutant minimization measures specified in the Pollutant Minimization Program (PMP) Plan dated February 2026, and (c) perform the actions listed in the Schedules section of the proposed permit. The Phosphorus PMP Schedule includes:

Annual Phosphorus Progress Report: Due 06/30/2027
Annual Phosphorus Progress Report #2: Due 06/30/2028
Annual Phosphorus Progress Report #3: Due 06/30/2029
Annual Phosphorus Progress Report #4: Due 06/30/2030
Final Phosphorus Report: Due 12/31/2030

Citation: Proposed Permit No. WI-0031704-10-0

Section XI: Compliance with Previous Permit *(Variance Reissuances Only)*

A. Date of previous submittal: June 8, 2020 **Date of EPA Approval:** June 12, 2020

B. Previous Permit #: WI-0031704-09-0 **Previous WQSTS #:** (EPA USE ONLY)

C. Effluent substance concentration: 2.71 mg/L (1-day P99) **Variance Limit:** 5.9 mg/L (monthly average)

D. Target Value(s): N/A **Achieved?** ☐ **Yes** ☐ **No** ☒ **Partial**

E. For renewals, list previous steps that were to be completed. Show whether these steps have been completed in compliance with the terms of the previous variance permit. Attach additional sheets if necessary.

Condition of Previous Variance	Compliance
1. Reducing Influent Sources	
a. Contact businesses that contribute more than sanitary waste to the collection system to identify potential phosphorus sources.	☒ **Yes** ☐ **No**
b. CMOM Annual audits/goals.	☒ **Yes** ☐ **No**
c. If determined feasible, develop and implement options.	☒ **Yes** ☐ **No**
2. Reducing Effluent TP Concentrations and loadings	
a. Monitor Sludge Depths	☐ **Yes** ☒ **No**
b. Evaluate need for desludging to maintain permit compliance and submit results in annual PMP.	☐ **Yes** ☒ **No**
c. If feasible, develop sludge removal plan and implement.	☐ **Yes** ☒ **No**
3. Watershed Reduction Program	

a. Contact Iron County Land Conservation Department to investigate and evaluate potential partnerships and watershed reduction options and submit results in annual PMP.	☐ **Yes** ☒ **No**
b. Evaluate potential no-cost/low-cost watershed reduction options and submit results in annual PMP.	☐ **Yes** ☒ **No**
c. If determined feasible, develop and implement options.	☐ **Yes** ☒ **No**
4. Re-evaluation of Budget	
a. Evaluate current operating costs and loan payments to determine if additional funds can be set aside for future phosphorus compliance.	☒ **Yes** ☐ **No**
b. Submit summary of budget evaluation with the final variance report.	☒ **Yes** ☐ **No**