

Permit Fact Sheet

General Information

Permit Number:	WI-0030431-11-0	
Permittee Name:	VILLAGE OF SUPERIOR	
Address:	6702 OGDEN AVENUE	
City/State/Zip:	SUPERIOR WI 54880	
Discharge Location:	End of Logan Ave, Superior, WI (T48-R14; SWSW section 10)	
Receiving Water:	A drainageway tributary to the Pokegama River in Douglas County (Lake Superior Drainage Basin)	
StreamFlow (Q _{7,10}):	The drainageway - zero Pokegama River - 0.02 cfs	
Stream Classification:	The drainageway - Limited aquatic life (LAL) community from the outfall to Pokegama River. Pokegama River – Limited forage fish (LFF) community from the confluence with the drainageway downstream to the St. Louis Bay. Both are non-public water supply	
Wild Rice Impacts: <i>(no specific wild rice standards exist at this time)</i>	No impacts identified. The Pokegama River has a fairly extensive rice bed where the river widens and joins the St. Louis. The wastewater permit has been in existence over a long period and the continued presence of said rice beds. (Evaluation completed March 2017)	
Discharge Type:	Existing seasonal (April, May, June, September, October and November) discharger	
Design Flow(s)	Annual Average	0.1 MGD
Significant Industrial Loading?	No	
Operator at Proper Grade?	Yes	
Approved Pretreatment Program?	N/A	

Facility Description

The Village of Superior owns and operates a domestic wastewater treatment system. A Capacity Rerating Request to change design flow from 0.087 MGD to 0.100 MGD was approved by the department in May 2023. The plant currently treats an average of 0.09 MGD (2019 – 2023 data).

The facility consists of four stabilization ponds that can be operated one after another (in series, typical mode of operation) or together (parallel). Within these ponds naturally occurring bacteria and organisms already present in the wastewater metabolize organic matter in the wastewater. The cleaned wastewater (effluent) is aerated by an effluent cascade before it is seasonally discharged (April, May, June, September, October, and November) to a drainageway tributary to the Pokegama River. Facility planning and design efforts are currently underway to relocate effluent discharge to the Nemadji River (by 2027 per permit schedule).

Substantial Compliance Determination

There have been several minor violations of effluent limits, missed samples, and late reporting. However, the facility has taken the necessary steps to correct their actions and nothing further is required.

After a desk top review of all DMRs, CMARs, and phosphorous schedule reports, and a site visit on 6/19/24 by Eric de Venecia, WDNR, the Village of Superior has been found to be in substantial compliance with their current permit.

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 0.90 MGD (2019-2023 data)	Representative influent samples shall be collected at the main lift station ahead of the ponds.
001	EFFLUENT An average of 0.320 MGD over an average of 73 days per year (2019-2023 data)	Representative samples shall be collected immediately downstream of the effluent Parshall flume. Dissolved Oxygen shall be sampled at the end of the effluent cascade. The permittee is authorized to discharge to a drainageway tributary to the Pokegama River in Douglas County during the months of April, May, June, September, October, and November.
002	SLUDGE Desludging last occurred in 1995.	Representative samples shall be collected from the accumulated sludge in the ponds at various locations and depths that are composited for analysis.

1 Influent – Monitoring Requirements

Sample Point Number: 701- INFLUENT TO PLANT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	Flow rate includes volume of leachate accepted.
BOD5, Total		mg/L	2/Month	Grab	
Suspended Solids, Total		mg/L	2/Month	Grab	
Waste Received Leachate		gal/month	Monthly	Calculated	Volume reported should also be added to the daily flow rate.

Changes from Previous Permit:

Influent limitations and monitoring requirements were re-evaluated for the proposed 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 **Flow Rate** sample frequency was changed from “Continuous” to “Daily” to better represent practices at the facility.
- The parameter “**Waste Received Leachate**” was added to provide the permittee a location to record the amount of leachate accepted from the closed construction site landfill each month.

Explanation of Limits and Monitoring Requirements

The parameters are standard for minor municipalities, as are monitoring and frequency requirements for municipal wastewater treatment plant. Tracking of BOD5, and Suspended Solids are required for percent removal requirements found in s. NR 210.05, Wis. Adm. Code.

Leachate from nearby closed demolition landfill is piped directly to the influent structure at the lagoons. Based on samples collected by the Village metals concentrations in the leachate have been detected at higher levels than typically found in municipal wastewater. The volume of leachate pumped shall be included on the monthly DMRs.

2 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Total Daily	
BOD5, Total	Daily Max	30 mg/L	Weekly	Grab	Limit effective June, September, October and November.
BOD5, Total	Weekly Avg	30 mg/L	Weekly	Grab	Limit effective April and May.
BOD5, Total	Monthly Avg	20 mg/L	Weekly	Grab	Limit effective April and May.
BOD5, Total	Monthly Avg	15 mg/L	Weekly	Grab	Limit effective June, September, October and November.
Suspended Solids, Total	Daily Max	30 mg/L	Weekly	Grab	Limit effective June, September, October and November.
Suspended Solids, Total	Weekly Avg	30 mg/L	Weekly	Grab	Limit effective April and May.
Suspended Solids, Total	Monthly Avg	20 mg/L	Weekly	Grab	Limit effective April, May, June, September, October and November.
pH Field	Daily Max	9.0 su	Weekly	Grab	
pH Field	Daily Min	6.0 su	Weekly	Grab	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Dissolved Oxygen	Daily Min	4.0 mg/L	Weekly	Grab	
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	Weekly	Grab	Limits are effective during April, October and November. Enter the daily ammonia result on the eDMR and compare to the Nitrogen, Ammonia Variable Limit column to determine compliance.
Nitrogen, Ammonia Variable Limit		mg/L	Weekly	Grab	Limits are effective during April, October and November. Using the daily pH result look up the applicable ammonia limit in the "Ammonia Limitation" section and report the variable limit on the eDMR.
Phosphorus, Total	Monthly Avg	2.3 mg/L	Weekly	Grab	Interim limit ends March 31, 2028.
Phosphorus, Total	Monthly Avg	0.225 mg/L	Weekly	Grab	Limit begins April 1, 2028.
Phosphorus, Total	6-Month Avg	0.075 mg/L	Weekly	Grab	Limit begins October 31, 2028. Compliance is evaluated every six-months on April 30 and October 31. Record the sample result on the eDMR on the last day of the month.
Phosphorus, Total	6-Month Avg	0.33 lbs/day	Weekly	Calculated	Limit begins October 31, 2028. Compliance is evaluated every six-months on April 30 and October 31. Record the sample result on the eDMR on the last day of the month.
PFOS		ng/L	Weekly	Grab	Monitoring only, up to a maximum of 6 samples per year. See PFOS/PFOA Minimization Plan Determination of Need schedule.
PFOA		ng/L	Weekly	Grab	Monitoring only, up to a

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					maximum of 6 samples per year. See PFOS/PFOA Minimization Plan Determination of Need schedule.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	Grab	See the "Nitrogen Series Monitoring" subsection for testing schedule.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	Grab	See the "Nitrogen Series Monitoring" subsection 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" subsection for testing schedule.

Changes from Previous Permit

Effluent limitations and monitoring requirements were re-evaluated for the proposed 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 **Flow** sample frequency and sample type were changed to “daily” and “total daily” respectively to better represent practices at the facility.
- **BOD5** and **Total Suspended Solids** limits were re-evaluated and the weekly and monthly average limits have changed this permit term.
- A **Variable Nitrogen Ammonia Limit** has been added this permit term and the monitoring frequency has changed to weekly.
- During the permit term the interim **Phosphorus** limit will end, and the final limits will begin.
- **PFOS & PFOA** monitoring is included this permit term.
- Annual **Total Nitrogen Monitoring (TKN, N02+N03 and Total N)** monitoring in rotating quarters throughout the permit term was added.

Explanation of Limits and Monitoring Requirements

More information on categorical and water quality based limits (WQBEL) is found in the “Water Quality-Based Effluent Limitations for the Village of Superior (WI-0030431-11)” memo dated July 8, 2024.

Discharge season - The facility has been authorized to discharge on a fill-and-draw basis April, May, June, September, October and November. All samples shall be taken during normal operating conditions; therefore, monitoring is required only during periods of discharge.

Flow - In the previous permit issuance the facility was given alternative limits for flow and BOD₅ per s. NR 104.02(4)(c), Wis. Adm. Code. Re-evaluation has determined that the permittee doesn't meet all required conditions identified in the code and alternative limits are no longer applicable. The flow limit has been removed.

BOD₅ and Total Suspended Solids - Categorical limits for BOD and TSS are required per s. NR 210.05, Wis. Adm. Code and NR 104.02(3) Wis. Adm. Code.

pH - Categorical limits for pH are required per ch. NR 210 (Subchapter II).

Dissolved Oxygen - Categorical limits for Dissolved Oxygen in a Limited Aquatic Life (marginal surface waters) are found in NR 104.02(3)(b) and 210.05(3) Wis. Adm. Code.

Ammonia – Using current acute and chronic ammonia toxicity criteria found in Tables 2C and 4B of NR 105 Wis. Adm. Code and limit calculating procedures (Subchapter IV of 106, Wis. Adm. Code ammonia limitations were calculated for the facility. Based on a reasonable potential analysis it was found ammonia limits are needed in April, October and November to ensure toxic conditions in the receiving water do not occur. Daily maximum limits expressed as a single limit or as a variable limit based on effluent pH were calculated. Expression as a variable limit was chosen by the municipality. Sample results for pH shall be used to calculate the daily variable limit. Total ammonia (NH₃-N) sampling shall occur on the same day pH levels are monitored. The applicable variable limit shall be recorded on the Electronic Discharge Monitoring Report (eDMR) in the Ammonia Variable Limit column. Report the effluent ammonia sample result in the 'Nitrogen, Ammonia (NH₃-N) Total' column. Compare the variable daily maximum ammonia limit to the reported ammonia result, record the number of exceedances in the box to the right of the 'Limit in Effect' 'Daily Max' row in the 'Summary' tables at the end of the eDMR.

Daily Maximum Ammonia Limits

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	83	7.0 < pH ≤ 7.1	51	8.0 < pH ≤ 8.1	11
6.1 < pH ≤ 6.2	82	7.1 < pH ≤ 7.2	46	8.1 < pH ≤ 8.2	8.8
6.2 < pH ≤ 6.3	80	7.2 < pH ≤ 7.3	40	8.2 < pH ≤ 8.3	7.3
6.3 < pH ≤ 6.4	78	7.3 < pH ≤ 7.4	35	8.3 < pH ≤ 8.4	6.0
6.4 < pH ≤ 6.5	75	7.4 < pH ≤ 7.5	31	8.4 < pH ≤ 8.5	5.0
6.5 < pH ≤ 6.6	72	7.5 < pH ≤ 7.6	26	8.5 < pH ≤ 8.6	4.1
6.6 < pH ≤ 6.7	69	7.6 < pH ≤ 7.7	22	8.6 < pH ≤ 8.7	3.4
6.7 < pH ≤ 6.8	65	7.7 < pH ≤ 7.8	19	8.7 < pH ≤ 8.8	2.8
6.8 < pH ≤ 6.9	60	7.8 < pH ≤ 7.9	16	8.8 < pH ≤ 8.9	2.4
6.9 < pH ≤ 7.0	56	7.9 < pH ≤ 8.0	13	8.9 < pH ≤ 9.0	2.0

Calculated Weekly Average limits and Monthly Average limits were also considered. Based on this comparison between effluent data and the calculated limits, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. Weekly and monthly average ammonia nitrogen limits are not required this permit term.

Phosphorus – Phosphorus requirements are based on the Phosphorus Rules as detailed in NR 102 (water quality standards) and NR 217, Wis. Adm. Code (effluent standards and limitations for phosphorus). Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. Currently in NR 217 Wis. Adm. Code there are three types of limit calculations used to determine if a phosphorus limit is needed: a technology based effluent limit (TBEL), a water quality-based effluent limit (WQBEL) determined by stream criteria and a WQBEL based on a Total Daily Maximum Daily Load (TMDL) allocation.

In the case of Superior Village:

- A TBEL of 1.0 mg/L is needed if a facility discharges more than the threshold of 150 pounds per month (s. NR 217.04(1)(a)1 Wis. Adm. Code). The limit memo determined that the facility discharges less than the threshold; therefore, a TBEL is not applicable this permit term.

- Based on the size and classification of the stream, the categorical water quality criterion for the Pokegama River is 75 ug/L. This criterion and instream background phosphorus data are used to calculate the stream criteria-based WQBELs. The calculated WQBELs are .225 mg/L (monthly average), 0.075 mg/L (6-month average) and 0.33 lbs/day (6-month average). *(Please note: compliance with the 6-month average is measured each April and October.)*

During the previous permit term it was determined the facility could not meet the limit and was given a 9-year schedule to achieve the stringent phosphorus limits. This permit includes the remaining 4-years of the schedule that extended past the previous permit’s expiration date. An interim limit of 2.3 mg/L monthly average is effective through the remainder of the schedule (end of the 9-year extended schedule is March 31, 2028).

- The facility does not lie within the boundaries of any approved total maximum daily load (TMDL) area, thus a phosphorus WQBEL based on a TMDL allocation is likewise not required during this permit term.

PFOS and PFOA - NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for municipal dischargers with an average flow rate less than 1 MGD, to be evaluated on a case-by-case basis to determine if monitoring is required pursuant to s. NR 106.98(2)(c), 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, it was identified that the POTW has an indirect discharger(s) that may be a potential source of PFOS/PFOA.

Monitoring is required weekly during periods of discharge. Once six samples have been taken, sampling may cease for the remainder of that calendar year.

The initial determination of the need for sampling shall be conducted for up to two years in order to determine if the permitted discharge has the reasonable potential to cause or contribute to an exceedance of the PFOS or PFOA standards under s. NR 102.04(8)(d)1, Wis. Adm. Code.

Nitrogen Series - (nitrate +nitrite, total Kjeldahl nitrogen and total nitrogen) – In 2011, the Upper Mississippi River Basin Association (UMRBA) completed the report “Upper Mississippi River Nutrient Monitoring, Occurrence, and Local Impacts: A Clean Water Act Perspective”. Among the many recommendations of this report was that the states should expand their NPDES discharge monitoring requirements to include both phosphorus and nitrogen as they have important impacts on the mainstem upper Mississippi River as well as in the Gulf of Mexico. Consequently, the department developed the “Guidance for Total Nitrogen Monitoring in WPDES Permits” document dated October 2019, where annual effluent monitoring for total nitrogen (total nitrogen = total Kjeldahl + (nitrite+nitrate)) is required for municipal and industrial facilities discharging to surface waters. Section 283.55(1)(e) Wis. Stats. allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source, and s. NR 200.065 (1)(h) Wis. Adm. Code allows for this monitoring to be collected during the permit term. The schedule for this facility is as follows:

- October – November 2025
- April – June 2026
- September 2027
- October – November 2028
- April – June 2029

Sampling Frequencies - The “[Monitoring Frequencies for Individual Wastewater Permits](#)” guidance document (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 fairness and 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. The department has determined at this time that the facility meets the guidance and no changes in the monitoring frequency is required this permit term.

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)
002	B	Liquid	Sludge has not been removed since 1995. Desludging may occur during the 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 receives its water supply from Superior Water Light & Power Company. The most recent round of samples taken April 3, 2023, were below 2 pCi/liter at 0.248 pCi/liter.						
Is a priority pollutant scan required? No						

Sample Point Number: 002- MUNICIPAL 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	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Zinc Dry Wt	Ceiling	7,500 mg/kg	Once	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Once	Composite	
Nitrogen, Total Kjeldahl		Percent	Per Application	Composite	
Nitrogen, Ammonium (NH4-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	Monitoring is required in 2026.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Monitoring is required in 2026.
PFOA + PFOS		ug/kg	Once	Calculated	Monitoring is required in 2026. 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.

Changes from Previous Permit:

Sludge limitations and monitoring requirements were re-evaluated for the proposed 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), PCB and PFOS + PFOA monitoring is required during the second full year of the permit term (2026).
- There is a potential for some desludging to occur over the permit term therefore it’s recommended that List 2 (Nutrients) are monitored with the List 1 monitoring, they have been added to the table.
- 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.

Explanation of Limits and Monitoring Requirements

Requirements for 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 recommended at the same time as the monitoring of List 1 (metals) in 2026. 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).

PCB monitoring – PCB monitoring is required this permit term per NR 204 Wis. Adm. Code.

PFAS - The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA is currently developing a risk assessment to determine future land application rates and expects to release this risk assessment by the end of 2024. In the interim, the department has developed the “Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS”.

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 the proposed WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9., Wis. Adm. Code.

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 of the permit term 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.

- Sludge analysis during the second year of the permit term 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 indicating information can be entered on the report.

4 Schedules

4.1 Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

The permittee shall comply with the WQBELs for Phosphorus as specified. No later than 14 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance. If a submittal is required, a timely submittal fulfills the notification requirement.

Required Action	Due Date
<p>Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.)</p> <p>Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	03/31/2025
<p>Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	06/30/2025
<p>Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	03/31/2026
<p>Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	03/31/2027
<p>Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	03/31/2028

4.2 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
<p>Report on Effluent Discharge: Submit a report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations. This analysis should also include a comparison to the applicable narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code.</p> <p>This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.</p>	09/30/2025
<p>Report on Effluent Discharge and Evaluation of Need: Submit a final report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations of data collected over the last 24 months. The report shall also provide a comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan.</p> <p>This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.</p> <p>The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan.</p>	09/30/2026

<p>If the Department determines a PFOS/PFOA minimization plan is needed based on a reasonable potential evaluation, the permittee will be required to develop a minimization plan for Department approval no later than 90 days after written notification was sent from the Department. The Department will modify or revoke and reissue the permit to include PFOS/PFOA minimization plan reporting requirements along with a schedule of compliance to meet WQBELs. Effluent monitoring of PFOS and PFOA shall continue as specified in the permit until the modified permit is issued.</p> <p>If, however, the Department determines there is no reasonable potential for the facility to discharge PFOS or PFOA above the narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code, no further action is required and effluent monitoring of PFOS and PFOA shall continue as specified in the permit.</p>	
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4.3 Sludge Management Plan

Required Action	Due Date
<p>Submit a Sludge Management Plan: The permittee shall submit a management plan for approval prior to sludge removal. 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</p> <p>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.</p> <p>The plan is due at least 60 days prior to desludging.</p>	

Explanation of Schedules

Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus – During the last permit issuance the permittee was giving a compliance schedule which laid out a plan and time line for the facility to investigate their ability to meet the limit and alternatives that are most feasible so that they will be able to meet the limit by the end of their schedule. This compliance schedule extends beyond the permit term as allowed by NR 217.17(2) Wis. Adm. Code. The schedule included in this reissuance is the remaining 4 years of actions that extended past the previous permit expiration date.

PFOS/PFOA Minimization Plan Determination of Need - As stated above, NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. S. NR 106.98, Wis. Adm. Code, specifies steps to generate data in order to determine the need for reducing PFOS and PFOA in the discharge. Data generated per the effluent monitoring requirements will be used to determine the need for developing a PFOS/PFOA minimization plan. As part of the schedule, the permittee is required to submit two annual Reports on Effluent Discharge.

If the Department determines that a minimization plan is needed, the permit will be modified or revoked/reissued to include additional requirements.

Sludge Management Plan - If desludging occurs 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

“Water Quality-Based Effluent Limitations for the Village of Superior (WI-0030431-11)” memo dated July 8, 2024

Expiration Date:

September 30, 2029

Justification Of Any Waivers From Permit Application Requirements

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

1. The low design flow (0.087 MGD) and low actual flows (an average of 0.09 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.

In the future this question will be re-evaluated because the design flow was re-evaluated and was raised to 0.1 MGD, the leachate accepted from the closed construction landfill may have higher metal levels than previously thought and new sludge samples are required during the permit term.

Prepared By: Sheri A. Snowbank Wastewater Specialist

Date: July 16, 2024

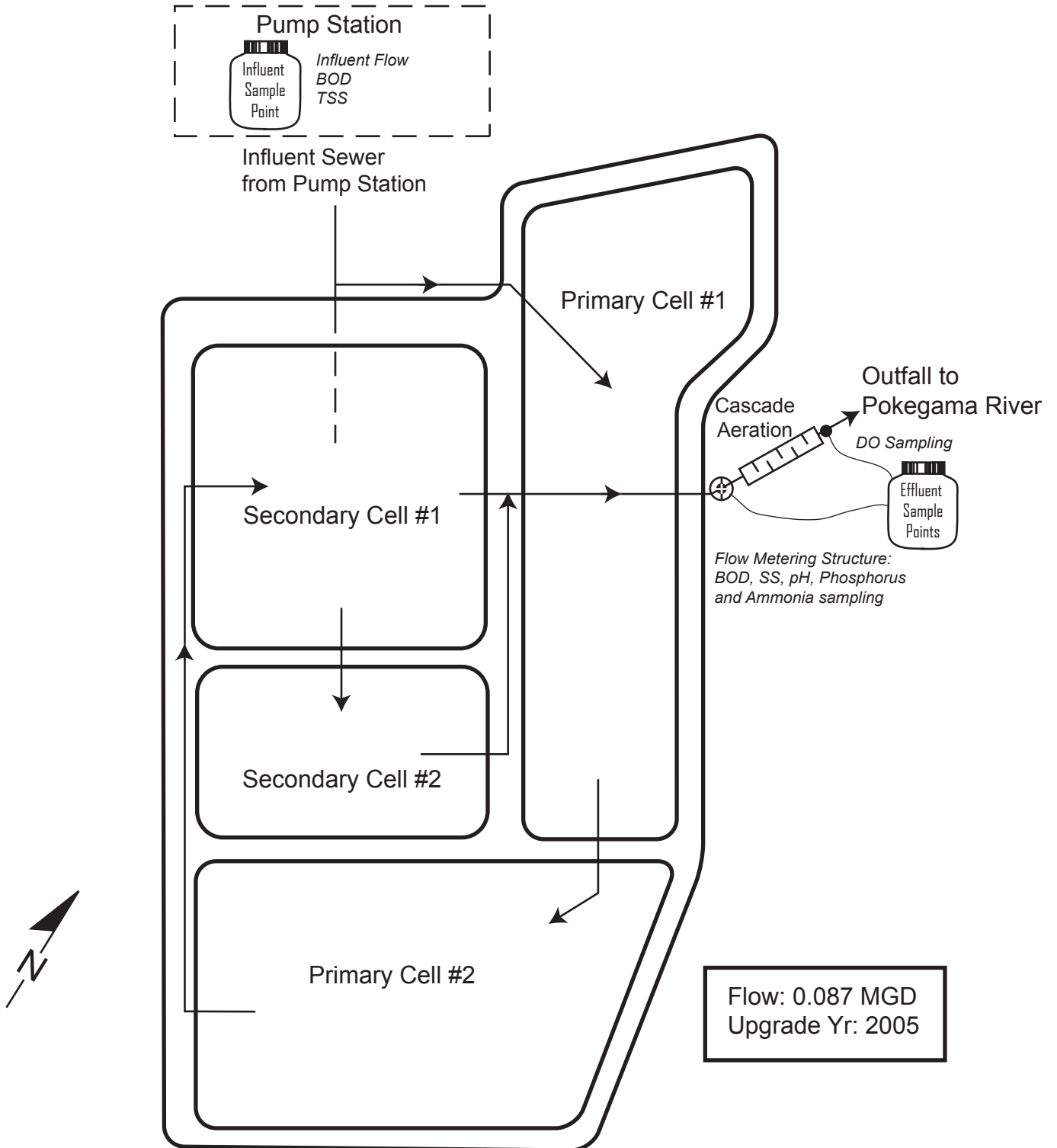
Date updated based on Factcheck comments: No comments received (August 13, 2024).

Date updated based on public notice comments:

Notice of reissuance was published in the Superior Telegram, 1226 Ogden Ave, Superior, WI 54880-1584.

Village of Superior Wastewater Treatment Plant

The Village of Superior wastewater treatment facility is designed to treat 0.087 million gallons per day (MGD). The plant consists of four stabilization ponds, that can be operated in series or parallel series on a fill and draw basis, followed by an effluent cascade for final aeration. Effluent is discharged to a drainage way tributary to the Pokegama River. A flow diagram indicating the treatment units and sampling locations is shown below.



CORRESPONDENCE/MEMORANDUM

DATE: July 8, 2024

TO: Sheri Snowbank – NOR/Spooner Service Center

FROM: Michael Polkinghorn – NOR/Rhineland Service Center *Michael Polkinghorn*

SUBJECT: Water Quality-Based Effluent Limitations for the Village of Superior
 WPDES Permit No. WI-0030431-11-0

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 Village of Superior in Douglas County. This municipal wastewater treatment facility discharges to a drainageway to the Pokegama River, located in the St. Louis 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
BOD ₅ April - May June, Sept. – Nov.	30 mg/L		30 mg/L	20 mg/L 15 mg/L		1
TSS April - May June, Sept. – Nov.	30 mg/L		30 mg/L	20 mg/L 20 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		4.0 mg/L				1
Ammonia Nitrogen April, Oct. – Nov.	2.0 mg/L or Variable					2
Phosphorus Interim				2.3 mg/L		3
Final				0.225 mg/L 0.075 mg/L 0.33 lbs/day		
PFOS and PFOA						4
TKN, Nitrate+Nitrite, and Total Nitrogen						5

Footnotes:

- Limits during April – May are based on the Limited Aquatic Life (LAL) community of the immediate receiving water as described in s. NR 104.02(3)(b), Wis. Adm. Code. Limits during June and September – November are based on the Limited Forage Fish (LFF) community of the downstream receiving water as described in s. NR 104.02(3)(a), Wis. Adm. Code.
- 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 2.0 mg/L. The Village of Superior shall notify the Department if the single limit or the variable daily maximum limits based on effluent pH are preferred.

Daily Maximum Ammonia Nitrogen Limits

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	83	7.0 < pH ≤ 7.1	51	8.0 < pH ≤ 8.1	11
6.1 < pH ≤ 6.2	82	7.1 < pH ≤ 7.2	46	8.1 < pH ≤ 8.2	8.8
6.2 < pH ≤ 6.3	80	7.2 < pH ≤ 7.3	40	8.2 < pH ≤ 8.3	7.3
6.3 < pH ≤ 6.4	78	7.3 < pH ≤ 7.4	35	8.3 < pH ≤ 8.4	6.0
6.4 < pH ≤ 6.5	75	7.4 < pH ≤ 7.5	31	8.4 < pH ≤ 8.5	5.0
6.5 < pH ≤ 6.6	72	7.5 < pH ≤ 7.6	26	8.5 < pH ≤ 8.6	4.1
6.6 < pH ≤ 6.7	69	7.6 < pH ≤ 7.7	22	8.6 < pH ≤ 8.7	3.4
6.7 < pH ≤ 6.8	65	7.7 < pH ≤ 7.8	19	8.7 < pH ≤ 8.8	2.8
6.8 < pH ≤ 6.9	60	7.8 < pH ≤ 7.9	16	8.8 < pH ≤ 8.9	2.4
6.9 < pH ≤ 7.0	56	7.9 < pH ≤ 8.0	13	8.9 < pH ≤ 9.0	2.0

3. There is a phosphorus compliance schedule to meet the final WQBELs by 03/31/2028.
4. PFOS and PFOA monitoring is recommended monthly when the discharge occurs, up to a maximum of 6 samples/yr.
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. Total nitrogen is the sum of nitrate (NO₃), nitrite (NO₂), 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 limit calculation, & thermal table.

PREPARED BY: Michael A. Polkinghorn – Water Resources Engineer

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

**Water Quality-Based Effluent Limitations for
Village of Superior**

WPDES Permit No. WI-0030431-11-0

Prepared by: Michael A. Polkinghorn

PART 1 – BACKGROUND INFORMATION

Facility Description

The Village of Superior owns and operates a domestic wastewater treatment system. The facility consists of four stabilization ponds that can be operated in series or in parallel. Effluent is discharged into a cascade on a noncontinuous basis via Outfall 001 during April – June and September – November to a drainageway to the Pokegama River.

A limit evaluation (February 2022) and limit addendum (April 2022) for facility planning purposes were prepared for Outfall 001 of the Village of Superior evaluating the potential limits for both continuing the discharge at the current location and relocating to the Nemadji River. Therefore, this evaluation will consider the limits determined from the prior stated evaluations, in addition to, the limits in the current permit (below).

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

Existing Permit Limitations

The current permit, expired on 03/31/2024, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate	0.522 MGD					1
BOD ₅ April - May June, Sept. – Nov.	30 mg/L		45 mg/L	30 mg/L 15 mg/L		1
TSS April - May June, Sept. – Nov.	30 mg/L		45 mg/L	30 mg/L 20 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		4.0 mg/L				1
Ammonia Nitrogen						2
Phosphorus Interim				2.3 mg/L		3
Final				0.225 mg/L	0.075 mg/L 0.32 lbs/day	

Footnotes:

1. These are variance limits (April – May) 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.
2. Monitoring only.
3. There is a phosphorus compliance schedule to meet the final WQBELs by 03/31/2028.

Receiving Water Information

- Name: Drainageway to the Pokegama River
- Waterbody Identification Code (WBIC): NA for drainageway. Pokegama River is 2844000.
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code:
 - o Drainageway: Limited Aquatic Life (LAL) community as described in Table 8 Row 22 of s. 104.10(2), Wis. Adm. Code, from Outfall 001 downstream to the Pokegama River. Non-public water supply.
 - o Pokegama River: Limited Forage Fish (LFF) community as described in Table 8 Row 22 of s. 104.10(2), Wis. Adm. Code, from the confluence with the drainageway downstream to St. Louis Bay. This waterbody is approx. 0.25 mi downstream of Outfall 001. Non-public water supply.
 - o Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern because the discharge is within the Great Lakes basin.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: Low flows in the drainageway are zero. The following 7-Q₁₀ and 7-Q₂ values are for the Pokegama River and are estimated via Surface Water Data Viewer:
 - 7-Q₁₀ = 0.02 cubic feet per second (cfs)
 - 7-Q₂ = 0.09 cfs
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: Not applicable where the receiving water low flows are zero. This value is 25% for the Pokegama River.
- Source of background concentration data: Background concentrations are not included because they do not impact the calculated WQBEL when the receiving water low flows are equal to zero. Background data for calculating effluent limitations for ammonia nitrogen and phosphorus are described later.
- Multiple dischargers: None.
- Impaired water status: No known impairments for the drainageway. The Pokegama River is on the Clean Water Act Section 303(d) list for a total phosphorus impairment. St. Louis Bay, approx. 5.4 mi downstream, is impaired with chronic aquatic toxicity, dieldrin/dichlorodiphenyltrichloroethane (DDT)/dioxin contaminated sediments, and mercury/polychlorinated biphenyls (PCBs) contaminated fish tissue.

Effluent Information

- Flow rate(s):
 - Flow rate limit = 0.522 million gallons per day (MGD)
 - Annual average design = 0.100 MGD
 - o The flow rate limit is used in place of the proposed annual average design flow to account for the seasonal nature of the discharge. For reference, the actual average flow from April 2019 – April 2024 was 0.320 MGD excluding days discharge did not occur. This flow becomes 0.063 MGD including days discharge did not occur.

Attachment #1

- 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).
- Water source: Domestic wastewater with no industrial contributors. Water supply from Village of Superior.
- 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 phosphorus monitoring during the current permit term.

The following table presents the average concentrations and loadings at Outfall 001 from April 2019 – April 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

	Average Measurement*
Flow rate	0.320 MGD
BOD ₅	3.7 mg/L
TSS	6.8 mg/L
pH field	7.9 s.u.
Dissolved oxygen	8.3 mg/L
Phosphorus	1.9 mg/L

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

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

Mercury – The permit application did not require monitoring for mercury because the Village of Superior 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), Wis. Adm. Code.” A review of available sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The concentration in the sludge from 09/23/2021 was 0.66 mg/kg. **Therefore, mercury monitoring is not recommended at Outfall 001 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. Available well monitoring sample data from the Superior Water, Light, & Power Company (PWS ID: 81601476) indicates a PFOS sample of 0.42 ng/L (06/07/2023, Sample ID: CB06141-01). This result is less than one fifth of the PFOS criteria (1.6 ng/L). However, based on the nondomestic contributions to the collection system, **PFOS and PFOA monitoring is recommended monthly when the discharge occurs, up to a maximum of 6 samples/yr.**

**PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR CONVENTIONAL POLLUTANTS**

The BOD₅, TSS, and flow rate limits in the current permit during April – May 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 LAL or LFF community receiving water. The current variance limits are not applicable to the Village of Superior because the drainageway has a 7-Q₁₀ low flow of zero and does not have a high flow to meet the receiving water condition as described in s. NR 104.02(4)(c)1, Wis. Adm. Code.

The designated use of the immediate receiving water (drainageway) is an LAL community as described in s. NR 104.10(2), Wis. Adm. Code. In absence of the current variance, **the following effluent limits are required to protect the LAL community water quality standards as described in s. NR 104.02(3)(b), Wis. Adm. Code:**

LAL Community Conventional Pollutant Limits

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average
BOD ₅			30 mg/L	20 mg/L
TSS			30 mg/L	20 mg/L
Dissolved Oxygen		4.0 mg/L		
pH	9.0 s.u.	6.0 s.u.		

Because the variance is no longer applicable to the Village of Superior, **the daily maximum flow rate of 0.522 MGD is recommended to be removed during the reissued permit term.**

The current permit has daily maximum and monthly average BOD₅ and TSS limits during June and September – November based on the LFF community of the Pokegama River. Those limits are either equal to or more stringent than the equivalent limits based on the LAL community of the drainageway. **Therefore, the LFF community limits during June and September – November are required to continue during the reissued permit term unless the applicable antibacksliding requirements in subch. II of NR 207, Wis. Adm. Code, are met.** The LAL community limits do not need to be applied during those months.

BOD₅

The following table summarizes effluent BOD₅ monitoring data for April and May from April 2020 – October 2023.

BOD₅ Effluent Data

Sample Date	Weekly Avg. (mg/L)	Monthly Avg. (mg/L)
04/13/2020	16.1	18.6
04/20/2020	21.0	
04/19/2021	8.7	6.0
04/26/2021	3.3	
05/03/2021	<2.0	1.9
05/10/2021	2.7	

Attachment #1

05/17/2021	2.5	
05/24/2021	2.2	
05/23/2022	7.6	5.9
05/31/2022	4.1	
05/05/2023	12.6	7.0
05/12/2023	10.8	
05/19/2023	4.7	
05/26/2023	<2.0	

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

The Village of Superior has an effluent BOD₅ monitoring frequency of weekly in the current permit where each sample is equivalent to a representative weekly average. A review of this effluent data show they would have not exceeded the 30 mg/L weekly average limit. A review of monthly average effluent BOD₅ data show they also would not have exceeded the 20 mg/L monthly average. **Therefore, a compliance schedule and an interim limit are not needed in the permit to meet the BOD₅ limits.**

TSS

The following table summarizes effluent TSS monitoring data for April and May from April 2020 – October 2023.

TSS Effluent Data

Sample Date	Weekly Avg. (mg/L)	Monthly Avg. (mg/L)
04/13/2020	28.2	25.7
04/20/2020	23.2	
04/19/2021	14.5	9.9
04/26/2021	5.2	
05/03/2021	2.4	2.7
05/10/2021	2.6	
05/17/2021	3.8	
05/24/2021	1.8	
05/23/2022	9.6	7.8
05/31/2022	6.0	
05/05/2023	25.7	16.1
05/12/2023	28.0	
05/19/2023	6.0	
05/26/2023	4.5	

The Village of Superior has an effluent TSS monitoring frequency of weekly in the current permit where each sample is equivalent to a representative weekly average. A review of this effluent data show they would have not exceeded the 30 mg/L weekly average limit. A review of monthly average effluent TSS data show they would have exceeded the 20 mg/L monthly average once. **Therefore, a compliance schedule and an interim limit are not needed in the permit to meet the TSS limits.**

**PART 4 – 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 the Village of Superior does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

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 acute toxicity criterion (ATC) for ammonia is calculated using the following equation:

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

Where:

A = 0.633 and B = 90.0 for an LAL community, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 78 sample results were reported from April 2020 – October 2023. The maximum reported value was 9.40 s.u. (Standard pH Units). The 1-day P₉₉, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 9.17 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 9.10 s.u. The facility must remain in compliance with the effective daily maximum pH limit of 9.0 s.u. in the current permit. Therefore, a value of 9.0 s.u. is believed to represent the maximum reasonably expected pH, and therefore 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 = 2.04 mg/L.

Daily Maximum Limit Calculation Method

Daily maximum effluent limitations for toxic substances are based on the ATC, listed in ch. NR 105, Wis. Adm. Code. In accordance with s. NR 106.06(3)(b), Wis. Adm. Code, limitations based on ATC are either set equal to two times the acute criteria (the final acute value) or calculated using the mass balance equation below, whichever is more restrictive.

$$\text{Limitation} = \frac{(\text{WQC}) (Q_s + (1-f) Q_e) - (Q_s - f Q_e) (C_s)}{Q_e}$$

Where:

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

Q_s = average minimum 1-day flow which occurs once in 10 years (1-day Q₁₀)
if the 1-day Q₁₀ flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q₁₀).

Q_e = 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

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

Attachment #1

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q₁₀ (estimated as 80 % of 7-Q₁₀) and the 2×ATC approaches are shown below:

Daily Maximum Ammonia Nitrogen Determination

Method	Ammonia Nitrogen Limit (mg/L)
2×ATC	4.1
1-Q ₁₀	2.0

The 1-Q₁₀ method yields the most stringent limits for the Village of Superior.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values updated using the 1-Q₁₀. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

Daily Maximum Ammonia Nitrogen Limits – LAL Community

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	83	7.0 < pH ≤ 7.1	51	8.0 < pH ≤ 8.1	11
6.1 < pH ≤ 6.2	82	7.1 < pH ≤ 7.2	46	8.1 < pH ≤ 8.2	8.8
6.2 < pH ≤ 6.3	80	7.2 < pH ≤ 7.3	40	8.2 < pH ≤ 8.3	7.3
6.3 < pH ≤ 6.4	78	7.3 < pH ≤ 7.4	35	8.3 < pH ≤ 8.4	6.0
6.4 < pH ≤ 6.5	75	7.4 < pH ≤ 7.5	31	8.4 < pH ≤ 8.5	5.0
6.5 < pH ≤ 6.6	72	7.5 < pH ≤ 7.6	26	8.5 < pH ≤ 8.6	4.1
6.6 < pH ≤ 6.7	69	7.6 < pH ≤ 7.7	22	8.6 < pH ≤ 8.7	3.4
6.7 < pH ≤ 6.8	65	7.7 < pH ≤ 7.8	19	8.7 < pH ≤ 8.8	2.8
6.8 < pH ≤ 6.9	60	7.8 < pH ≤ 7.9	16	8.8 < pH ≤ 8.9	2.4
6.9 < pH ≤ 7.0	56	7.9 < pH ≤ 8.0	13	8.9 < pH ≤ 9.0	2.0

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

The facility planning limit evaluation (February 2022) calculated weekly and monthly average ammonia nitrogen limits for both the drainageway and the Pokegama River using the effluent flow of 0.6 MGD. The limits for the Pokegama River will be reevaluated because this evaluation is utilizing the effluent flow of 0.522 MGD. The limits based on the drainageway do not change because it has no assimilative capacity. The calculations from the previous limit evaluation for the drainageway will be included as attachment #3.

In this case, the community changes from LAL to LFF approximately 0.25 mi downstream. At this distance, ammonia decay is expected to be insignificant resulting in little to no change to the calculated limits. Therefore, limits are based on the LFF community as if the Village of Superior discharged directly to the Pokegama River.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code. The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a LFF community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

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

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 (°C) of the receiving water – (Early Life Stages Present), or

T = the maximum of the actual temperature (°C) and 7 - (Early Life Stages Absent)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q₁₀ (4-Q₃, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q₅ (estimated as 85% of the 7-Q₂ if the 30-Q₅ 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 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

Background ammonia nitrogen values used are from the Lake Superior drainage basin. Background pH values used are based on streams with hardness values between 51 – 100 mg/L. Background temperature values are taken from LFF community classification column of Table 2 of ch. NR 102, Wis. Adm. Code. Background parameters and calculated limits are included in the table below:

Weekly and Monthly Ammonia Nitrogen Limits – LFF Community

		May, June, Sept.	Oct., Nov., April
Effluent Flow	Qe (MGD)	0.522	0.522
Background Information	7-Q ₁₀ (cfs)	0.02	0.02
	7-Q ₂ (cfs)	0.09	0.09
	Average Temperature (°C)	17	10
	Maximum Temperature (°C)	18	13
	pH (s.u.)	7.73	7.57
	Reference Weekly Flow (cfs)	0.02	0.005
	Reference Monthly Flow (cfs)	0.0765	0.0191
Criteria mg/L	4-day Chronic		
	Early Life Stages Present	10.98	
	Early Life Stages Absent		34.49
	30-day Chronic		
	Early Life Stages Present	4.39	
Early Life Stages Absent		13.79	
Effluent Limits mg/L	Weekly Average		
	Early Life Stages Present	11	
	Early Life Stages Absent		34
	Monthly Average		
	Early Life Stages Present	4.8	
Early Life Stages Absent		14	

The following table compares the calculated weekly and monthly average limits for both communities and shows the final ammonia nitrogen limits applicable Outfall 001:

Ammonia Nitrogen Limits Comparison – Drainageway to the Pokegama River

Months Applicable	LAL		LFF		Most Stringent Limits	
	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, June, Sept.	21	8.4	11	4.8	11	4.8
Oct., Nov., April	29	12	34	14	29	12

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from April 2020 – October 2023, with those results being compared to the calculated limits to determine the need to include ammonia limits in the Village of Superior permit for the respective month ranges. That need is determined by calculating 99th upper percentile (or P₉₉) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

Ammonia Nitrogen Effluent Data

Statistics	May, June, Sept.	Oct., Nov., April
1-day P ₉₉	0.65	5.3
4-day P ₉₉	0.41	2.9
30-day P ₉₉	0.25	1.5
Mean *	0.18	1.0
Std	0.13	1.1
Sample size	29	20
Range	<0.023 - 0.55	<0.023 - 4.6

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

Based on this comparison, daily maximum limits are needed in October, November, and April. The Village of Superior shall notify the Department if the single limit or the variable daily maximum limits based on effluent pH are preferred.

PART 5 – 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.

It is recognized the Village of Superior 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 health, as described in s. NR 210.06(3)(h), Wis. Adm. Code. The maximum 180-day rolling average flowrate for the facility is

0.170 MGD (April 2019 – April 2024) including days discharge did not occur. The volumetric capacity of the lagoons is approx. 31.35 MG, calculated based on dimensions provided by the facility. Therefore, the estimated shortest detention time for the facility is approx. 31.35 MG / 0.170 MGD = 184 days and is 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 6 – 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 Village of Superior 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 as described in 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	Monthly Avg. (mg/L)	Total Flow (MG/month)	Total Phosphorus (lb./month)
May 2023	1.5	11.2	135
June 2023	1.5	3.7	46
Sept. 2023	3.2	6.0	159
Oct. 2023	2.7	9.0	201
Average =			135

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 (MG) 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.

Phosphorus criteria in s. NR 102.06, Wis. Adm. Code, do not apply to LAL waters as described in s. NR 102.06(6)(d), Wis. Adm. Code. These waters were not included in the USGS/WDNR stream and river studies and, therefore, the Department lacked the technical basis to determine and propose applicable criteria. At some time in the future, the Department may adopt phosphorus criteria based on new studies focusing on limited aquatic life waters. The *Guidance for Implementing Wisconsin’s Phosphorus Water Quality Standards for Point Source Discharges (June 2020)* suggests that during the interim, WQBELs should be based on the criteria and flow conditions for the next stream segment downstream (or downstream lake or reservoir, if appropriate), because ss. 217.12 and 217.13, Wis. Adm. Code, state that the Department must set WQBELs to protect downstream waters. The drainageway is an LAL community

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for 0.25 mi from Outfall 001 to the Pokegama River. The Pokegama River is an LFF community and is the point phosphorus water quality standards will be applied.

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 the Pokegama River.

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 the Pokegama River.

Qs = 100% of the 7-Q₂ of 0.09 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 = 0.522 MGD = 0.808 cfs.

f = the fraction of effluent withdrawn from the receiving water = 0.

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated as a median using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Code. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions.

The facility planning limit evaluation (April 2022) resulted in a WQBEL of 0.075 mg/L using a background concentration of 0.088 mg/L. Section NR 217.13(2)(d), Wis. Adm. Code, states that the determination of upstream concentrations shall be evaluated at each permit reissuance. Additional data were considered in estimating the background phosphorus concentration.

A review of all available in stream total phosphorus data (n = 5, May 2017 – October 2017) stored in the Surface Water Integrated Monitoring System database indicates the median background total phosphorus concentration in Pokegama River upstream of Outfall 001 (SWIMS station ID: 10048396) is 0.083 mg/L.

The impaired water listing of the Pokegama River also points towards the notion that effluent phosphorus limits equal to the water quality criterion are needed to prevent the discharge from contributing to further impairment of the receiving water. *The Guidance for Implementing Wisconsin's Phosphorus Water Quality Standards for Point Source Discharges (June 2020)* suggests setting effluent limits equal to the criterion in the absence of an EPA approved total maximum daily load for discharges of phosphorus to phosphorus impaired waters.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from April 2020 – October 2023.

Total Phosphorus Effluent Data

Statistics	Conc. (mg/L)
1-day P ₉₉	3.8
4-day P ₉₉	2.8
30-day P ₉₉	2.2
Mean	1.9
Std	0.6
Sample size	49
Range	1 - 3.3

Reasonable Potential Determination

The discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion because the 30-day P₉₉ of reported effluent total phosphorus data is greater than the calculated WQBEL. **Therefore, a 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 6-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 6-month average should be averaged during the months of May – October and November – April.

Mass Limit

A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the Pokegama River has a phosphorus impairment. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.522 MGD = 0.33 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 interim limit continue at 2.3 mg/L for permit reissuance along with requirements for optimization of phosphorus removal.** In this case, the current interim limit represents the level currently achievable for Outfall 001 over the calculated statistics and monthly average phosphorus data.

PART 7 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in Chapters NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106

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(Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. The daily maximum effluent temperature limitation shall be 86 °F for discharges to surface waters classified as an LAL community according to s. NR 104.02(3)(b)1, Wis. Adm. Code, except for those classified as wastewater effluent channels and wetlands regulated under ch. NR 103 and described in s. NR 106.55(2), Wis. Adm. Code, which has a daily maximum effluent temperature limitation of 120 °F. The 86 °F limit applies because the hydrologic classification is not listed as wetland in ch. NR 104, Wis. Adm. Code.

Downstream impacts with respect to the Pokegama River approx. 0.25 mi downstream are also considered with weekly average temperature limits. 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 July 2017 – November 2021.

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 °F per 400 ft and is used to estimate the given cooling over the 0.25 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 effluent limitations are representative of the thermal water quality protection of the drainageway and the weekly average effluent limitations are representative of the protection of the Pokegama River. The complete temperature limit calculation is included as attachment #4. The cooling adjusted limits and available monitoring are shown in the table below:

Monthly Temperature Effluent Data & Limits

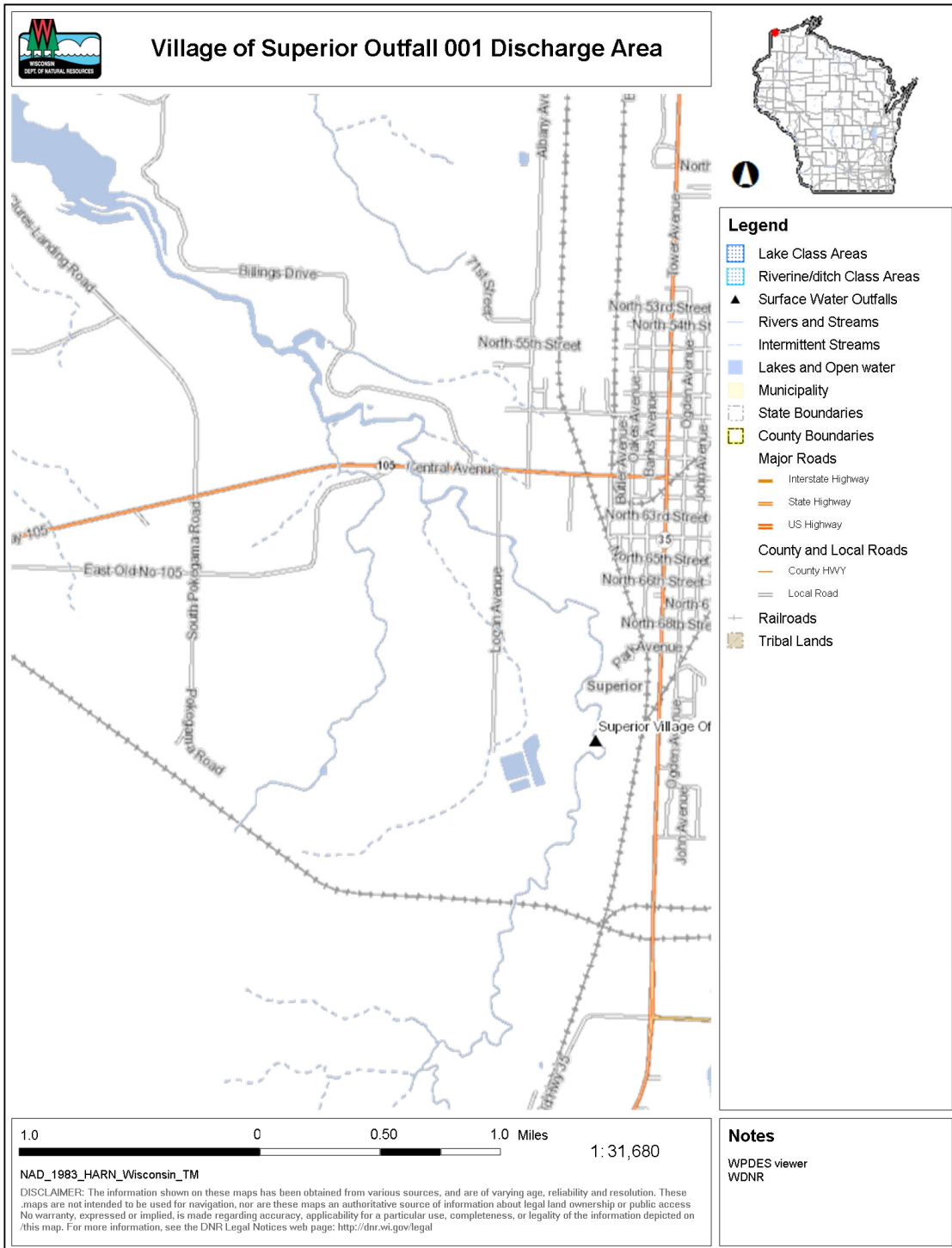
Month	Calculated Effluent Limit	
	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)
APR	66	86
MAY	73	86
JUN	80	86
SEP	76	86
OCT	66	86
NOV	57	86

Since this facility provides hydraulic detention times of at least 184 days, 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 57 deg. F. **Therefore, temperature limits or monitoring are not recommended during the reissued permit term.**

PART 8 – 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, with no history of WET failures 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 #3

Weekly & Monthly Average Ammonia Nitrogen WQBELs – February 2022 Limit Evaluation

Background ammonia nitrogen and average temperature parameters do not impact the WQBELs when the receiving water flow is zero. Background pH and maximum temperature parameters do not directly impact the WQBELs but estimates for them are still needed to calculate the CTC for ammonia nitrogen, which in turn affect the calculated limits. Background pH values used are equal to the 4-day P₉₉ of effluent pH data (April 2020 – October 2021) of 8.28 s.u. Background maximum temperature values are taken from the LFF classification column of Table 2 of ch. NR 102, Wis. Adm. Code, as LAL waters were not included in the Department background temperature monitoring effort for the table. Background parameters and calculated limits are included in the table below:

Weekly and Monthly Ammonia Nitrogen Limits – LAL

		May, June, Sept.	Oct., Nov., April
Effluent Flow	Q _e (MGD)	0.6	0.6
Background Information	7-Q ₁₀ (cfs)	0	0
	7-Q ₂ (cfs)	0	0
	Maximum Temperature (°C)	18	13
	pH (s.u.)	8.28	8.28
	Reference Weekly Flow (cfs)	0	0
	Reference Monthly Flow (cfs)	0	0
Criteria mg/L	4-day Chronic	20.88	28.82
	30-day Chronic	8.35	11.53
Effluent Limits mg/L	Weekly Average	21	29
	Monthly Average	8.4	12

Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

Facility:	Village of Superior	7-Q₁₀:	0.02 cfs	Temp Dates		Flow Dates	
Outfall(s):	001	Dilution:	25%	Start:	NA		04/10/20
Date Prepared:	6/20/2024	f:	0	End:	NA		10/31/23
Design Flow (Q_e):	0.522 MGD	Stream type:	Limited forage fish community				
Storm Sewer Dist.	1320 ft	Q_s:Q_e ratio:	0.0 :1				
		Calculation Needed?	YES				

Month	Water Quality Criteria			Receiving Water Flow Rate (Q _s) (cfs)	Representative Highest Effluent Flow Rate (Q _e)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit		Adjusted Thermal Limits	
	T _a (default) (°F)	Sub-Lethal WQC (°F)	Acute WQC (°F)		7-day Rolling Average (Q _{esl}) (MGD)	Daily Maximum Flow Rate (Q _{ea}) (MGD)		Weekly Average (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)	Weekly Average (°F)	Daily Maximum (°F)
APR	50	63	81	0.02	0.518	0.518	0			63	81	66	84
MAY	59	70	84	0.02	0.470	0.503	0			70	84	73	87
JUN	64	77	85	0.02	0.361	0.445	0			77	85	80	88
SEP	63	73	85	0.02	0.445	0.445	0			73	85	76	88
OCT	55	63	83	0.02	0.361	0.445	0			63	83	66	87
NOV	46	54	80	0.02	0.156	0.338	0			54	80	57	84