Permit Fact Sheet

General Information

Permit Number	WI-0036374-08-0
Permittee Name and Address	Lake Tomahawk Township Sanitary District 1 PO Box 387, Lake Tomahawk, WI 54539
Permitted Facility Name and Address	Lake Tomahawk Township Sanitary District 1 7848 Pine Road, Lake Tomahawk, Wisconsin
Permit Term	July 01, 2026, to June 30, 2031
Discharge Location	Wisconsin River ½ mile north of Birch Road just off Hwy D. (SW¼ SE¼ section 36; T39N-R7E)
Receiving Water	The Wisconsin River in the Rhinelander Flowage Watershed in the Upper Wisconsin River Drainage Basin in Oneida County
Stream Flow ($Q_{7,10}$)	127 cfs
Stream Classification	Warm Water Sport Fishery (WWSF) community, Exceptional Resource Water (ERW), non-public water supply, recreational use and within the ceded territory.
Discharge Type	Existing continuous
Annual Average Design Flow (MGD)	0.054 MGD
Industrial or Commercial Contributors	No
Plant Classification	A3 - Recirculating Media Filters; D - Disinfection; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N/A

Facility Description

The Lake Tomahawk Sanitary District owns and operates a wastewater treatment system with an annual average design flow of 54,000 gallons per day. The actual average discharge is 23,000 gallons per day (2021- 2025 data).

The sanitary district serves residential homes, small local commercial establishments and the Wisconsin Department of Corrections McNaughton Camp facility. Wastewater (influent) generated is pretreated via grinder pump pits before it is pumped to the wastewater treatment plant. Influent flows into 3 settling chambers which are also used for sludge storage. The wastewater is sent to a dosing chamber then to the recirculating sand filter (RSF). Water is evenly distributed over one or more of the five filter beds constructed of layers of fine and coarse sand. Naturally occurring microorganisms living on the sand particles within the filter beds metabolize and consume organic matter. Treated water from the filters may be sent back to the dosing chamber and filtered again. Effluent is disinfected seasonally (May – September) using an ultraviolet system and pumped through a 1.5-mile force main before being discharged to the Wisconsin River in Oneida County.

The solids from the settling chambers are pumped regularly to prevent the discharge of accumulated solids to the sand filters. These solids are considered septage and are regulated under NR 113, Wisconsin Administrative Code, for septage disposal

There are three groundwater monitoring wells that are remnants of a defunct land treatment system. Annual inspections are required until the wells are abandoned in accordance with NR 141.25 Wis. Adm. Code based upon requests by the sanitary district.

Substantial Compliance Determination

All conditions and standard requirements of the current WPDES permit are being met.

After a desk top review of all discharge monitoring reports, CMARs, compliance schedule items, and a site visit on October 28, 2025, by Brooke Klingbeil, WDNR, Lake Tomahawk Sanitary District #1 has been found to be in substantial compliance with their current 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 0.021 MGD (2021-2025 data)	Representative samples shall be collected from the influent line sanitary "T" within the first settling chamber.
003	EFFLUENT An average of 0.023 MGD (2021-2025 data)	Representative samples shall be collected from the effluent channel prior to discharge to the Wisconsin River.
990	SEPTAGE Flow is not a require parameter	Solids from the septic tank may be land applied using a licensed septage hauler. All septage activities shall be regulated under ch. NR 113, Wis. Adm. Code.

Sample Point Designation For Groundwater Monitoring Systems		
Sample Pt Number	**Well Name**	**Comments**
801	801 (MW1) BACKGROUND	Up gradient well
802	802 (MW2)	Down gradient non-enforcement standard well
804	804 (MW4)	Down gradient enforcement standard well

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	Continuous	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
BOD5, Total		mg/L	Weekly	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	Weekly	24-Hr Flow Prop Comp	

Changes from Previous Permit:

Influent 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 flow rate sample frequency was changed from "Continuous" to "Daily" to reflect currently acceptable practices at the facility.

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 the percent removal requirements in s. NR 210.05, Wis. Adm. Code, and in the Standard Requirements section of the permit.

2 Surface Water - Monitoring and Limitations

2.1 Sample Point Number: 003- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Monthly Avg	30 mg/L	Weekly	24-Hr Flow Prop Comp	
BOD5, Total	Weekly Avg	45 mg/L	Weekly	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	Weekly	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	Weekly	24-Hr Flow Prop Comp	
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Monitoring and limit effective May through September.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and limit effective May through September. See the E. coli

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					Percent Limit permit section. Enter the result in the DMR on the last day of the month.
pH Field	Daily Max	9.0 su	Weekly	Grab	
pH Field	Daily Min	6.0 su	Weekly	Grab	
Phosphorus, Total	Monthly Avg	9.3 mg/L	Weekly	24-Hr Flow Prop Comp	Interim limit expires December 31, 2029. See the Water Quality Based Effluent Limits for Total Phosphorus schedule for more information.
Phosphorus, Total	Monthly Avg	0.31 lbs/day	Weekly	Calculated	Final limit effective January 1, 2030.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of phosphorus and report on the last day of the month on the DMR. See the Total Maximum Daily Load (TMDL) Limitations permit section.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of phosphorus discharged and report on the last day of the month on the DMR. See the Total Maximum Daily Load (TMDL) Limitations permit section.
Nitrogen, Ammonia (NH3-N) Total		mg/L	Quarterly	24-Hr Flow Prop Comp	
Copper, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	Monthly monitoring is required October 1, 2026 through September 30, 2027.
Copper, Total Recoverable		ug/L	Quarterly	24-Hr Flow Prop Comp	Quarterly monitoring is required October 1, 2027 through the end of the permit term.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Hardness, Total as CaCO3		mg/L	Quarterly	24-Hr Flow Prop Comp	Quarterly monitoring begins October 1, 2026. Sampling should coincide with copper monitoring.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Total Nitrogen Testing subsection for testing schedule.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Total Nitrogen Testing subsection for testing schedule.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Total Nitrogen = Total Nitrogen Kjeldahl (mg/L) + Nitrate+ Nitrogen (mg/L). See the Total Nitrogen Testing subsection for testing schedule.

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 **flow rate** sample frequency was changed from "Continuous" to "Daily" to reflect currently acceptable practices at the facility.
- The WQBEL TMDL limit for **Phosphorus** will become effective in accordance with the "WI River TMDL Waste Load Allocation Limit for Total Phosphorus" schedule.
- **Copper** and **hardness** monitoring along with a copper schedule to comply with limits have been included. Monthly copper monitoring is required October 1, 2026, through September 30, 2027, with quarterly monitoring is required the years of the permit term. Quarterly hardness monitoring is required throughout the permit term.

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 January 12, 2026.

Copper – The WQBEL determined that based on 11 samples collected during spring 2025, effluent copper limits are needed to protect water quality. This is the first time that copper limits have been advised, and it is unknown if the limit can be met consistently. A schedule (see permit schedule 4.1, "Water Quality Based Effluent Limits (WQBELs) for Copper") and monitoring have been included this permit term to determine if the limits are attainable and if they are not what options can be implemented to reach compliance.

Copper WQBEL Limits

Daily Maximum	Weekly Average	Monthly Average
45 ug/L 0.045 lb/day	45 ug/L	45 ug/L

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 fall below the standard monitoring frequency outlined in guidance. Since 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, the reduced monitoring frequency is continued in the proposed permit. 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.

Groundwater – Monitoring and Limitations does not appear in the permit

Groundwater Monitoring System for Abandoned WWTF

Location of Monitoring system: Adjacent to Abandoned Land Treatment System

Existing Monitoring Wells: 801 (MW1) BACKGROUND, 802 (MW2), 804 (MW4)

Well Used To Calculate PALs: 801 (MW 1) PALs are not required this permit term.

Enforcement Standard Wells: 804 (MW4)

Explanation of Monitoring Requirements:

The recirculating sand filter system replaced a seepage cell system that discharged to groundwater in 1999. Due to high levels of nitrite-nitrate nitrogen in the groundwater monitoring wells surrounding the former wastewater treatment facility were required to be sampled through successive permit terms. In 2022, monitoring was replaced with annual inspections (see permit schedule 4.3 "Groundwater Monitoring Well Inspection" for more information). Overall groundwater quality has reached the point where the Department will consider a formal request from the sanitary district for well abandonment and monitoring termination.

3 Septage Management - Monitoring and Limitations

Septage management is required in accordance ch. NR 113, Wisconsin Administrative Code. Records must be kept and made available to the Department on request. Required record keeping includes volumes of septage pumped, dates when the septage was removed, land application site DNR number and method used to satisfy pathogen and vector control, and/or the treatment plant where septage is disposed. Annual reporting is required when the permittee land applies the septage. Annual reporting is also required when the permittee disposes of septage at a designated treatment facility.

3.1 Sample Point Number: 990- SEPTAGE

Changes from Previous Permit:

Septage requirements were evaluated for this permit term and no changes to this section are required.

Explanation of Limits and Monitoring Requirements

Requirements for septage management are determined in accordance with ch. NR 113, Wis. Adm. Code.

4 Schedules

4.1 Water Quality Based Effluent Limits (WQBELs) for Copper

The permittee shall comply with the WQBELs for copper 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
Sampling Standard Operating Procedure (SOP): Submit an SOP plan for approval describing the standard sampling protocols and actions required to obtain representative copper data.	11/30/2026
Operational Evaluation Report (OER): The permittee shall prepare and submit to the Department for approval an OER. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in copper discharges from the treatment plant. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications. The report shall state whether the operational improvements are expected to result in compliance with the copper limit.	11/30/2027
Compliance Alternatives Plan: If the OER and additional data concludes the limit can't be achieved the permittee shall submit a compliance alternatives plan. If upgrading of the permittee's wastewater treatment is necessary to meet final copper WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to NR 110, Wis. Adm. Code. If the OER and additional data concludes the limit can be met with operational improvements the permit will be modified so the limit will not become effective, and the permittee will not be required to comply with the remaining milestones identified in the schedule below. If the OER and additional data concludes that a variance will be pursued, the Plan shall provide information regarding the basis for the variance.	06/30/2028
Final Plans and Specifications: 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 copper WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below.	06/30/2029
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. Or as part of the application for the next reissuance, or prior to filing the application, the permittee shall submit an application for a variance.	06/30/2030
Achieve Compliance: The permittee shall complete construction of wastewater treatment system upgrades and achieve compliance with final copper WQBELs of 45 ug/L as a daily maximum, weekly average and monthly average and mass limit of 0.045 lbs/day daily maximum.	06/30/2031

Explanation of Schedule

Water Quality Based Effluent Limits (WQBELs) for Copper - A compliance schedule is included in the permit to provide time for the permittee to come into compliance with the following copper limits

Daily Maximum	Weekly Average	Monthly Average
45 ug/L 0.045 lbs/day	45 ug/L	45 ug/L

4.2 WI River TMDL Waste Load Allocation Limit 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
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 TMDL WLA limit, and a schedule for completing construction of the up-grades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to TMDL WLA limit Compliance' in the Surface Water section of the previous permit.	12/31/2026
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 TMDL WLA limit Compliance' in the Surface Water section of this permit.	03/31/2027
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus TMDL WLA limit Compliance' in the Surface Water section of the previous permit.	12/31/2027
Construction Upgrade Progress Report #2: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus TMDL WLA limit Compliance' in the Surface Water section of the previous permit.	12/31/2028
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus TMDL WLA limit Compliance' in the Surface Water section of the previous permit.	11/30/2029
Achieve Compliance: The permittee shall achieve compliance with TMDL WLA limit. Note: See 'Alternative Approaches to Phosphorus TMDL WLA limit Compliance' in the Surface Water section of the previous permit.	12/31/2029

Explanation of Schedule

WI River TMDL Waste Load Allocation Limits for Total Phosphorus - The existing treatment plant is not capable of achieving the final water quality-based effluent limits. In accordance with NR 217.17 Wis. Adm. Code a schedule for attainment of this limit has been included.

The schedule includes optimizing the facility and if that is not technologically or economically feasible, NR 217 provides for alternative means of achieving the equivalent reduction of discharged phosphorus, including pollutant trading.

4.3 Groundwater Monitoring Well Inspection

Required Action	Due Date
Inspect Wells Annually & Submit Report: The permittee shall annually inspect all groundwater monitoring wells surrounding the former land treatment system (wells 801 (MW1), 802 (MW2) and 804 (MW4)). The inspection shall determine the integrity of the wells. If any well is damaged it shall be repaired. The permittee shall maintain a record of the inspection dates, inspection findings and a record of any repairs performed, depth to groundwater and the groundwater elevation. The permittee shall submit a summary of the inspection activity by December 31 of each year.	12/31/2026
Submit Annual Inspection Report:	12/31/2027
Submit Annual Inspection Report:	12/31/2028
Submit Annual Inspection Report:	12/31/2029
Submit Annual Inspection Report:	12/31/2030
Submit Annual Inspection Report: In the event that this permit is not reissued on time, the permittee shall continue to submit annual reports.	

Explanation of Schedule

Groundwater Monitoring Well Inspection - The recirculating sand filter system replaced a seepage cell system that discharged to groundwater in 1999. Due to high levels of nitrite-nitrate nitrogen in the groundwater monitoring wells surrounding the former wastewater treatment facility, monitoring of the groundwater wells has been required annually. Overall groundwater quality has improved, and continued monitoring has been replaced with annual inspections until such time that the wells are abandoned.

Attachments

Water Flow Schematic updated September 2013

Water Quality Based Effluent Limits memo dated January 12, 2026

Justification Of Any Waivers From Permit Application Requirements

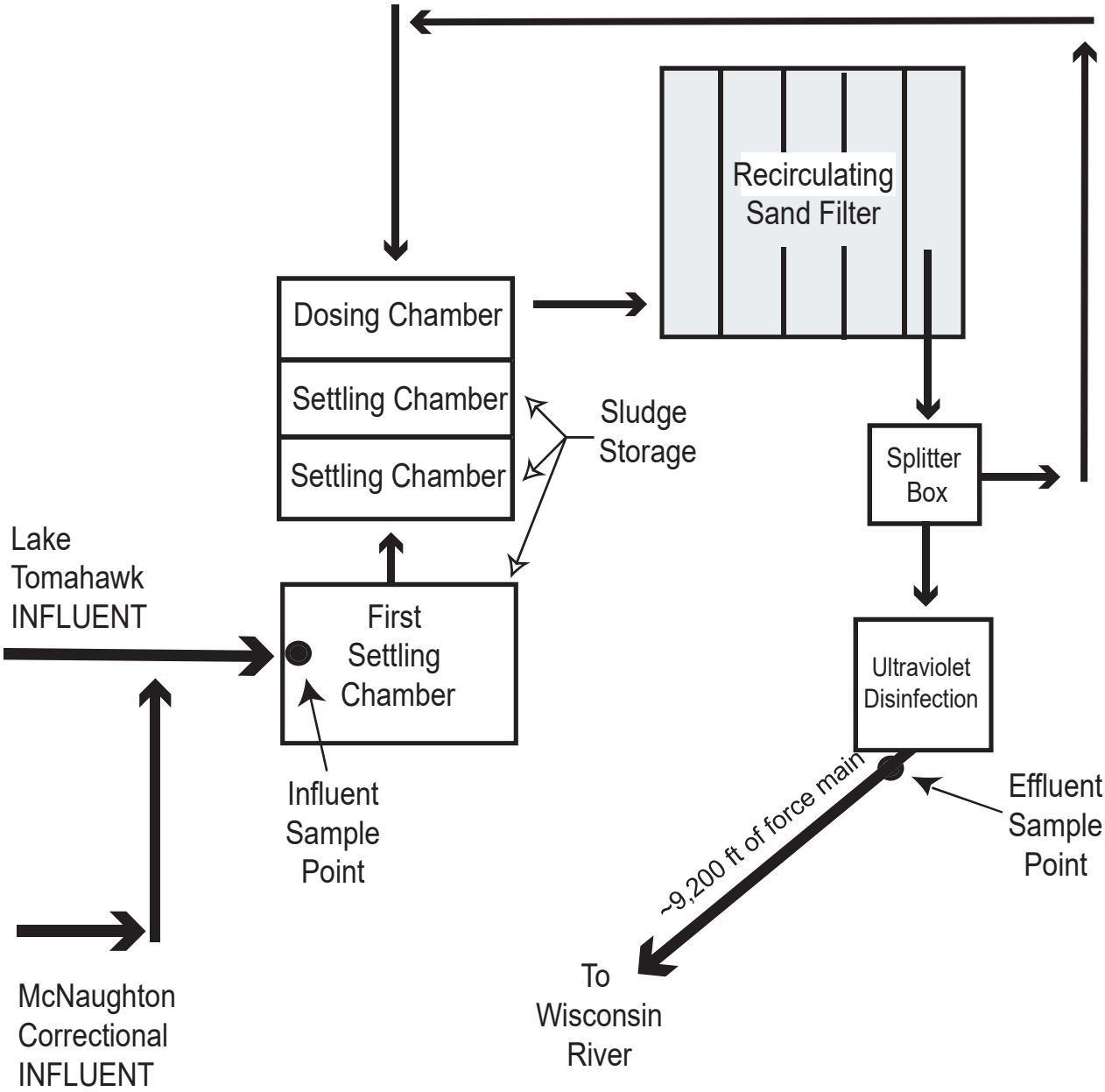
A decision has been made not to require effluent monitoring for metals in the application because:

1. The low design flow (0.054 MGD) and low actual flows (an average of 0.023 MGD) from this facility.
2. The wastewater is all domestic with no industrial contributors to the collection system.
3. Based on the ratio of stream flow to effluent flow and Chapter 1.3 of the WET Guidance Document there is little likelihood the effluent is toxic.
4. Lake Tomahawk SD #1 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:** February 4, 2026

LAKE TOMAHAWK SANITARY DISTRICT #1
Wastewater Treatment Facility

The wastewater treatment facility includes 3 chambers used for settling and sludge storage, a dosing chamber, and 5-cell recirculating sand filter followed by seasonal ultraviolet disinfection. The effluent is pumped to the Upper Wisconsin River and the sludge is land applied. A flow diagram below shows the treatment units and sampling locations.



● Represents Sample Points

NOT TO SCALE

Design Flow: 0.0537MGD
BOD: 142 lbs/day
Construction Year: 1999

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: January 12, 2026

TO: Sheri Snowbank – NOR/Spooner Service Center

FROM: Michael Polkinghorn – NOR/Rhinelander Service Center

SUBJECT: Water Quality-Based Effluent Limitations for the Lake Tomahawk Township Sanitary District 1
WPDES Permit No. WI-0036374-08-0

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 Lake Tomahawk Township Sanitary District 1 in Oneida County. This municipal wastewater treatment facility (WWTF) discharges to the Wisconsin River, located in the Rhinelander Flowage Watershed in the Upper Wisconsin River Basin. This discharge is included in the Wisconsin River Basin (WRB) Total Maximum Daily Load (TMDL) as approved by EPA on 04/26/2019 with site-specific criteria approved by EPA on 07/09/2020. 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 003:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
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
E. coli May – September				126 #/100 mL geometric mean	1, 3
Phosphorus					1, 4
Interim				9.3 mg/L	
Final				0.31 lbs/day	
Copper (Total Recoverable)	45 µg/L 0.045 lbs/day		**45 µg/L**	**45 µg/L**	5
Hardness (Total as $CaCO_3$)					6
Ammonia Nitrogen					1, 7
TKN, Nitrate+Nitrite, and Total Nitrogen					1, 8

Footnotes:

1. No changes from the current permit.
2. These limits are based on the Warm Water Sport Fish (WWSF) community of the immediate receiving water as described in s. NR 210.05(1), Wis. Adm. Code.
3. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
4. The mass limit is based on the Wisconsin River Basin Total Maximum Daily Load (WRB TMDL) area to address phosphorus water quality impairments within the TMDL area.

5. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
6. Quarterly hardness monitoring is recommended because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.
7. Quarterly monitoring is recommended to continue during the reissued permit term to determine the need for limits at the next permit reissuance.
8. 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.

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 (2) – Narrative & discharge area map.

PREPARED BY: Michael A. Polkinghorn – Water Resources Engineer

E-cc: Brooke Klingbeil, Regional Wastewater Compliance Specialist – NOR/Wausau 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
Lake Tomahawk Township Sanitary District 1

WPDES Permit No. WI-0036374-08-0

Prepared by: Michael A. Polkinghorn

PART 1 – BACKGROUND INFORMATION

Facility Description

Primary treatment consists of three settling chambers operated in series for solids and debris removal. Secondary treatment is achieved by a dosing chamber evenly distributing wastewater to five recirculating sand filters (RSFs) operating in parallel where naturally occurring metabolizing microorganisms present on sand particles break down organic matter. Flow proceeds to a splitter box where wastewater is recirculated through the sand filters multiple times until effluent limits can be met. Ultraviolet disinfection is provided seasonally during May – October. Effluent is discharged on a continuous basis via Outfall 003 via a 1.75 mile force main to the west bank of the Wisconsin River, approx.. 0.5 mi north of Birch Road. The solids from the settling chambers are pumped regularly to prevent the discharge of accumulated solids to the sand filters.

Attachment #2 is a discharge area map of Outfall 003.

Existing Permit Limitations

The current permit, expiring on 12/31/2025, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD_5			45 mg/L	30 mg/L	2, 3
TSS			45 mg/L	30 mg/L	2, 3
pH	9.0 s.u.	6.0 s.u.			2, 3
E. coli May – September				126 #/100 mL geometric mean	2, 4
Phosphorus					5
Interim				9.3 mg/L	
Final				0.31 lbs/day	
Ammonia Nitrogen					1
TKN, Nitrate+Nitrite, and Total Nitrogen					1, 6

Footnotes:

1. Monitoring only.
2. **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.
3. These limits are based on the Warm Water Sport Fish (WWSF) community of the immediate receiving water as described in s. NR 210.05(1), Wis. Adm. Code.
4. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL. These limits became effective in the current permit on 04/30/2025.
5. A compliance schedule is in the current permit to meet the final WQBEL by 12/31/2029. The mass limit is based on the Wisconsin River Basin Total Maximum Daily Load (WRB TMDL) area to address phosphorus water quality impairments within the TMDL area.
6. 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).

Receiving Water Information

- Name: Wisconsin River
- Waterbody Identification Code (WBIC): 1179900
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, Exceptional Resource Water (ERW), non-public water supply and recreational use.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q_{10} and 7-Q_2 values are from USGS for Station SW ¼, SW ¼, Section 36, T40N – R9E, where Outfall 003 is located. The 7-Q_2 value is estimated from the 7-Q_{10} value using a 7-Q_2/7-Q_{10} ratio of 1.65.

  7-Q_{10} = 127 cubic feet per second (cfs)
  7-Q_2 = 209 cfs
  Harmonic Mean Flow = 288 cfs using a drainage area of 1,683 km^2 (650 mi^2)

  The Harmonic Mean has been estimated based on average flow and the 7-Q_{10} using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).
- Hardness = 36 mg/L as $CaCO_3$. This value represents the geometric mean of data (n = 200, April 1974 – July 1997) from 6 monitoring locations on the Wisconsin River in the Upper Wisconsin River Basin.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%.
- Source of background concentration data: Metals data from the Wisconsin River from McNaughton to Rhinelander is used for this evaluation. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: There are several other dischargers to the Wisconsin River however they are not in the immediate vicinity and the mixing zones do not overlap. Therefore, the other dischargers do not

impact this evaluation.

- Impaired water status: There are no known impairments to the Wisconsin River at this location. Outfall 003 is inside the WRB TMDL area to address phosphorus water quality impairments within the TMDL area.

Effluent Information

- Design flow rate(s):
  Annual average = 0.054 million gallons per day (MGD)
  Peak daily = 0.12 MGD
  For reference, the actual average flow from January 2021 – October 2025 was 0.025 MGD.
- Hardness = 149 mg/L as $CaCO_3$. This value represents the geometric mean of four samples collected in June 2024 – March 2025 which were reported on the permit application.
- 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. Ferric chloride and soda ash slurry are proposed in a future facility upgrade.
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus chloride and hardness. The current permit required monitoring for ammonia nitrogen.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Chloride & Copper Effluent Data

Sample Date	Chloride (mg/L)	Copper (µg/L)
02/11/2025	69	30
02/18/2025	72	29
02/25/2025	72	25
03/05/2025	81	22
03/18/2025		21
04/16/2025		22
04/23/2025		29
05/07/2025		44
05/14/2025		32
05/21/2025		31
05/28/2025		25
Mean	74	
1-day P_{99}		47
4-day P_{99}		37

The following table presents the average concentrations and loadings at Outfall 003 from January 2021 – October 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

	Average Measurement*
BOD_5	11 mg/L
TSS	9.6 mg/L
pH field	6.82 s.u.
E. coli	4.3 #/100 mL**
Phosphorus	3.6 mg/L

*Any results below the limit of detection (LOD) were included as zeroes in calculation of average.
** The average measurement for bacteria is calculated as a geometric mean. Values reported below the LOD are replaced with a value of 1 for the calculation of the geometric mean.

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)

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 not the case for Lake Tomahawk Twp SD 1, and the limits are set based on two times the acute toxicity criteria.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling. All concentrations are expressed in terms of micrograms per liter (µg/L), except for hardness and chloride (mg/L).

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)
RECEIVING WATER FLOW = 102 cfs, (1-Q_{10} (estimated as 80% of 7-Q_{10})), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD. mg/L	ATC	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Arsenic		340	679.6	135.9	<1.1		<1.1
Cadmium	149	16.3	32.5	6.5	<0.17		<0.17
Chromium	149	2,496	4,992	998	<1.5		<1.5
Copper	149	22.6	**45.1**			**47**	44
Lead	149	157	313.8	62.8	<5.4		<5.4
Nickel	149	656	1,313	263	<4.7		<4.7
Zinc	149	170	340.7	68.1	24		24
Chloride (mg/L)		757	1,514	303	74		81

* The 2 × ATC method of limit calculation yields a more restrictive limit than consideration of ambient concentrations and 1-Q_{10} flow rates per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)
RECEIVING WATER FLOW = 32 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		152.2		57,988	11,598	<1.1	
Cadmium	36	1.10		419.10	83.8	<0.17	
Chromium	36	56.81		21,645	4,329	<1.5	
Copper	36	4.29	0.434	1,470			37
Lead	36	10.35	0.171	3,878	775.7	<5.4	
Nickel	36	21.83		8,317	1,663	<4.7	
Zinc	36	48.89	1.11	18,205	3,641	24	
Chloride (mg/L)		395	3.0	149,355	29,871	74	

Monthly Average Limits based on Wildlife Criteria (WC)
The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

Monthly Average Limits based on Human Threshold Criteria (HTC)
RECEIVING WATER FLOW = 72 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370		319,676	63,935	<0.17
Chromium	3,818,000		3,298,712,694	659,742,539	<1.5
Lead	140	0.171	120,811	24,162	<5.4
Nickel	43,000		37,151,557	7,430,311	<4.7

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 72 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3		11,491	2,298	<1.1

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

Conclusions and Recommendations
Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are required for copper. Limits and/or monitoring recommendations are made in the paragraphs below:

Copper – Considering available effluent data from the current permit term (February 2025 – May 2025), the 1-day P_{99} concentration is 47 µg/L. This concentration exceeds the calculated daily maximum copper WQBEL; **therefore, the daily maximum limit of 45 µg/L is recommended during the reissued permit term.**

The acute mass limitation of 0.045 lbs/day is based on the concentration limit and the peak daily design flow rate of 0.12 MGD (45 µg/L * 0.12 MGD * 8.34/1000) in accordance with s. NR 106.07(2)(a), Wis. Adm. Code.

A **weekly and monthly average limit of 45 µg/L** should be included in the permit for expression of limit requirements per s. NR 106.07(4), Wis. Adm. Code, as follows:

> Whenever a daily maximum limitation is determined necessary to protect water quality, a weekly and monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality.

Mass limitations are not subject to the limit expression requirements if concentration limits are given.

Copper Limits Summary

	Daily Maximum	Weekly Average	Monthly Average
Copper			
Concentration limit	45 µg/L	**45 µg/L***	**45 µg/L***
Mass limit	0.045 lbs/day		

* Limit needed to meet the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, in bold.

Quarterly hardness monitoring is also recommended because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.

Mercury – The permit application did not require monitoring for mercury because Lake Tomahawk Twp 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 Lake Tomahawk Twp SD 1 is a RSF facility and generates solids which are hauled away as septage. 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, 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 Lake Tomahawk Twp SD 1 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:

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

Where:

A = 0.411 and B = 58.4 for a WWSF community,

pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 235 sample results were reported from January 2021 – October 2025. The maximum reported value was 7.18 s.u. (Standard pH Units). The effluent pH was 7.14 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 7.19 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 7.18 s.u. Therefore, a value of 7.19 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 7.19 s.u. into the equation above yields an ATC = 29.8 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are calculated using the 1-Q_{10} receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q_{10} (estimated as 80 % of 7-Q_{10}) and the 2×ATC approach are shown below.

Daily Maximum Ammonia Nitrogen Determination

Method	Ammonia Nitrogen Limit (mg/L)
2×ATC	60
1-Q_{10}	36,258

The 2×ATC method yields the most stringent limits for Lake Tomahawk Twp SD 1. 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 – WWSF Community

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
$6.0 \leq pH \leq 6.1$	108	$7.0 < pH \leq 7.1$	66	$8.0 < pH \leq 8.1$	14
$6.1 < pH \leq 6.2$	106	$7.1 < pH \leq 7.2$	59	$8.1 < pH \leq 8.2$	11
$6.2 < pH \leq 6.3$	104	$7.2 < pH \leq 7.3$	52	$8.2 < pH \leq 8.3$	9.4
$6.3 < pH \leq 6.4$	101	$7.3 < pH \leq 7.4$	46	$8.3 < pH \leq 8.4$	7.8
$6.4 < pH \leq 6.5$	98	$7.4 < pH \leq 7.5$	40	$8.4 < pH \leq 8.5$	6.4
$6.5 < pH \leq 6.6$	94	$7.5 < pH \leq 7.6$	34	$8.5 < pH \leq 8.6$	5.3
$6.6 < pH \leq 6.7$	89	$7.6 < pH \leq 7.7$	29	$8.6 < pH \leq 8.7$	4.4
$6.7 < pH \leq 6.8$	84	$7.7 < pH \leq 7.8$	24	$8.7 < pH \leq 8.8$	3.7
$6.8 < pH \leq 6.9$	78	$7.8 < pH \leq 7.9$	20	$8.8 < pH \leq 8.9$	3.1
$6.9 < pH \leq 7.0$	72	$7.9 < pH \leq 8.0$	17	$8.9 < pH \leq 9.0$	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 (June 2014) are included in the table below:

Weekly & Monthly Ammonia Nitrogen Limits – WWSF Community

Wisconsin River		Summer	Winter
		May – Oct.	Nov. – April
Effluent Flow	Qe (MGD)	0.054	0.054
Background Information	7-Q_{10} (cfs)	127	127
	7-Q_2 (cfs)	209	209
	Temperature (°C)	25	3
	pH (s.u.)	7.73	7.57
	% of Flow used	100	25
	Reference Weekly Flow (cfs)	127	31.75
	Reference Monthly Flow (cfs)	209	57.75
Criteria mg/L	4-day Chronic		
	Early Life Stages Present	4.40	10.23
	Early Life Stages Absent		
	30-day Chronic		
	Early Life Stages Present	1.76	4.09
	Early Life Stages Absent		
Effluent Limitations mg/L	Weekly Average		
	Early Life Stages Present	6,600	3,900
	Early Life Stages Absent		
	Monthly Average		
	Early Life Stages Present	3,700	2,100
	Early Life Stages Absent		

Effluent Data
The following table evaluates the statistics based upon ammonia data reported from March 2021 – August 2025.

Ammonia Nitrogen Effluent Data

Statistics	Conc. (mg/L)
1-day P_{99}	42
4-day P_{99}	29
30-day P_{99}	22
Mean*	18
Std	7.6
Sample size	18
Range	3.8 - 32

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

Reasonable Potential
The need to include ammonia limits in the Lake Tomahawk Twp SD 1 permit is determined by calculating 99th upper percentile (or P_{99}) values for ammonia during the month ranges and comparing

those to the calculated limits. Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. **Therefore, ammonia nitrogen limits are not recommended during the reissued permit term. Quarterly monitoring is recommended to continue during the reissued permit term to determine the need for limits at the next permit reissuance.**

PART 4 – 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 Lake Tomahawk Twp 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)
Nov. 2024	3.1	0.702	18
Dec. 2024	3.4	0.728	20
Jan. 2025	3.4	0.721	21
Feb. 2025	3.6	0.648	19
March 2025	3.8	0.805	25
April 2025	5.4	0.752	34
May 2025	9.9	0.766	63
June 2025	5.2	0.873	38
July 2025	2.9	0.944	23
Aug. 2025	2.1	0.901	16
Sept. 2025	3.4	0.860	25
Oct. 2025	3.6	0.816	24
		Average =	27

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.

The WRB TMDL establishes TP wasteload allocations to reduce the loading in the entire watershed including WLAs to meet water quality standards, for tributaries to the Wisconsin River. Therefore, WLA-

based WQBELs are protective of immediate receiving waters and TP WQBELs derived according to s. NR 217.13, Wis. Adm. Code are not required.

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

Total Phosphorus Effluent Data

Statistics	Conc. (mg/L)
1-day P_{99}	11
4-day P_{99}	6.9
30-day P_{99}	4.7
Mean	3.6
Std	2.2
Sample size	229
Range	0.49 - 11

TMDL Limits
Total phosphorus (TP) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs (April 2020)* and are based on the annual phosphorus wasteload allocation (WLA) given in lbs/yr. This WLA is found in Table K-3 of Appendix J of the *Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin (WRB TMDL)* report dated December 21, 2018 are expressed as maximum annual loads (lbs/year) and maximum daily loads (lbs/day). For the Lake Tomahawk Twp SD 1, this WLA is 60 lbs/yr and 0.164 lbs/day.

The monthly average limit of 0.31 lbs/day was determined in the previous limit evaluation (June 2020). The monthly average multiplier of 1.90 was chosen as described in the Department TMDL Implementation guidance using a coefficient of variation (CV) of 0.6 and a weekly or less effluent monitoring frequency. The TMDL-based phosphorus WQBEL(s) will be re-evaluated if the annual phosphorus WLA is not being met as described in the prior stated guidance. This is done by comparing each rolling sum of 12 consecutive months of total monthly mass phosphorus discharges over the current permit term directly against the annual WLA. In this case, the TMDL limits are not effective because there is a compliance schedule in the current permit to meet them by 12/31/2029, so they do not need to be reevaluated at this time. **Therefore, the monthly average limit of 0.31 lbs/day will remain unchanged during the reissued permit term.**

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 9.3 mg/L for permit reissuance along with requirements for optimization of phosphorus removal.** This limit is chosen over the P_{99} statistics as the facility currently does not have any phosphorus treatment and had only exceeded this limit once during the current permit term (9.9 mg/L, May 2025).

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.

Due to the amount of upstream flow available for dilution in the limit calculation (Qs:Qe >20:1), the lowest calculated limitation is 120° F as a daily maximum as described in s. NR 106.55(6)(a), Wis. Adm. Code. At temperatures above approximately 103° F, conventional biological treatment systems do not function properly and experience upsets. There is no indication that this has ever occurred in this treatment system, so there is no reasonable potential for the discharge to exceed this limit. **Therefore, temperature limits and 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).

Chronic testing is typically not recommended where the ratio of the 7-Q_{10} to the effluent flow exceeds 100:1 and acute testing is typically not recommended if the ratio exceeds 1000:1. For the Lake Tomahawk Twp SD 1, that ratio is approximately 1,520:1. With this amount of dilution, there is believed to be little potential for acute or chronic toxicity effects in the Wisconsin River associated with the discharge from the Lake Tomahawk Twp SD 1. **Therefore, WET testing is not recommended during the reissued permit term.**

Attachment #2