

## Permit Fact Sheet

### General Information

Permit Number	WI-0022837-11-0
Permittee Name and Address	LAKELAND SANITARY DISTRICT 8780 MORGAN ROAD, MINOCQUA WI 54548
Permitted Facility Name and Address	Lakeland Sanitary District 8780 Morgan Road, Minocqua, Wisconsin
Permit Term	April 01, 2025 to March 31, 2030
Discharge Location	The Tomahawk River within the Tomahawk River Watershed in the Upper Wisconsin River Drainage Basin in Oneida County.
Receiving Water	Tomahawk River in Upper Tomahawk River of Wisconsin River (upper) in Oneida county
Stream Flow (Q <sub>7,10</sub> )	6.5 cfs
Stream Classification	Warm Water Sport Fish (WWSF) community, non-public water supply and within the ceded territory
Wild Rice Impacts: <i>(no specific wild rice standards exist at this time)</i>	No impacts identified. No wild rice waters inventoried near the outfall. (Evaluation completed March 2017)
Discharge Type	Existing continuous
Annual Average Design Flow (MGD)	0.75 MGD
Industrial or Commercial Contributors	No
Plant Classification	A1 - Suspended Growth Processes; B - Solids Separation; C - Biological Solids/Sludges; P - Total Phosphorus; D - Disinfection; L - Laboratory; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N/A

### Facility Description

The Lakeland Sanitary District operates a wastewater treatment facility that accepts domestic wastewater from Woodruff, Minocqua, and Arbor Vitae. The plant is designed to treat 750,000 gallons per day and currently treats an average of 350,000 gallons per day (July 2019- August 2024 data). The treatment system consists of an influent fine screen, aerated grit chamber, grit removal, chemical phosphorus removal using alum, followed by two oval oxidation ditches, final clarification, and ultraviolet disinfection.

The settled solids (sludge) removed from the clarifier are either returned as activated sludge to reseed the oxidation ditches or wasted to a screw thickening unit prior to an autothermophilic aerobic digestion (ATAD) system. After the ATAD the sludge is further dewatered using polymer and a Somat screw press before being stored in cake form. The sludge meets Class A and EQ criteria and is distributed to the general public in the spring.

The treated wastewater (effluent) is seasonally disinfected (May 1 through September 31 annually) by a UV system before being discharged to the Tomahawk River.

New equipment will be installed beginning in summer 2025 specifically a new ATAD unit. Additionally, the thickened waste activated sludge (TWAS) storage volume will be increased. Then, a new storage nitrification denitrification reactor (SNDR) tank will be added to the system. During the transition from old equipment to new an outfall for Class B (Outfall 006) is being added to the WPDES permit to provided flexibility to the facility should the facility not be able to meet Class A & EQ sludge requirements during the construction.

Sample Point 005 represents the existing ATAD sludge treatment equipment sample point. Sample Point 007 represents the proposed ATAD sludge treatment equipment sample point. These sample points require meeting the class A pathogen treatment requirements and a pre-land application (aka treatment method) vector attraction reduction method to allow for exceptional quality distribution. Outfall 003 is the cake sludge outfall and is located at the biosolids storage building.

## Substantial Compliance Determination

After a site visit by Michelle BalkLudwig on 6-14-23 and a follow up desktop review on 1-28-25 of all discharge monitoring reports, CMARs, land application reports, and compliance schedule items, the Lakeland Sanitary District wastewater facility 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)
702	<b>Influent</b> – An average of 0.278 MGD (2020-2024 data)	Representative samples shall be collected after the fine screen prior to the grit chamber.
001	<b>Effluent</b> – An average of 0.338 MGD (2020-2024 data)	Representative samples shall be collected after the ultraviolet disinfection unit.
003	<b>Sludge Class A</b> – An estimated 215 dry US tons per year. Information provided in the application.	ATAD Cake Storage (Class A) - Representative cake sludge samples shall be collected from the sludge storage building after dewatering, stockpiling and prior to land application or public distribution and analyzed for metals (List 1), nutrients (List 2), pathogen control (List 3) and vector attraction (List 4) parameters. Pathogen testing shall be performed on no less than 7 discrete samples to be collected and reported individually, not as a geometric mean. The samples must be taken at least annually and generally more than three weeks later than Sample Point 005 samples to ensure regrowth of organisms has not occurred while in storage. Compliance with Pathogen Control for Class A Sludge requirements shall be demonstrated in addition to the 7 samples above, immediately following the Autothermal Thermophilic Aerobic Digestion (ATAD) treatment process samples reported from Sample Point 005.
005	Process treatment sample associated with the existing facility. Flow is not a required parameter.	Process Treatment Sludge (Class A) - Representative samples of treated sludge shall be collected immediately following the existing ATAD process and analyzed for fecal coliforms at a minimum of 7 discrete samples to be collected and reported individually throughout the calendar year, not as a geometric mean. It is recommended sampling twice a quarter to demonstrate compliance

<b>Sample Point Designation</b>		
<b>Sample Point Number</b>	<b>Discharge Flow, Units, and Averaging Period</b>	<b>Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)</b>
		<p>with pathogen and vector attraction requirements. Quarterly operational monitoring for metals (List 1) is recommended to determine potential metal issues.</p> <p><i>The permittee shall notify the department when the existing ATAD is disconnected, and the outfall is not longer in use. The department will inactivate the sample point.</i></p>
006	<p><b>Sludge Class B</b> - New temporary sample point that will be utilized during construction through startup of the new ATAD.</p>	<p>Cake Storage (Class B) - Representative non-exceptional quality (EQ) cake sludge samples shall be collected from the sludge storage building after dewatering, stockpiling and prior to land application and analyzed for metals (List 1), nutrients (List 2), pathogen control (List 3) and vector attraction (List 4) parameters. Pathogen testing shall be performed on no less than 7 discrete samples to be collected and reported as a geometric mean.</p> <p><i>This outfall is added to provide additional flexibility should the Proposed ATAD unit not meet the requirements to allow for EQ distribution. Use of this outfall will require notification to the department of the facility's intent and an update to the sludge management plan shall be submitted to and approved by the department.</i></p>
007	<p>New process treatment sample associated with the upgraded facility. Flow is not a required parameter.</p>	<p>Process Treatment Sludge (Class A) - Representative samples of treated sludge shall be collected immediately following the upgraded ATAD process and analyzed for fecal coliforms at a minimum of 7 discrete samples to be collected and reported individually throughout the calendar year, not as a geometric mean. It is recommended sampling twice a quarter to demonstrate compliance with pathogen and vector attraction requirements. Quarterly operational monitoring for metals (List 1) is recommended to determine potential metal issues.</p> <p><i>The permittee shall notify department when the existing ATAD is operational, and the outfall is ready for use.</i></p>
101	<p><b>Unloading Station</b> (Operational parameter only)</p> <p><b>Septage</b> – An average of 4,121 gallons per day over an average of 162 days per year.</p> <p><b>Holding tank</b> – An average of 2,761 gallons per day over an average of 42 days per year.</p> <p><b>Vault</b> – An average of 4,627 gallons per day over an average of 5 days per year.</p>	<p>Record total volume of waste received daily at unloading station.</p>

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
	(2020-2024 data)	
102	New in plant sample point. Flow is not a required parameter.	Representative samples shall be taken after the TWAS Storage and before the <u>existing</u> ATAD.  <i>Volatile solids reduction (VSR) requires before and after measurements for calculated reduction percentage.</i>
103	New in plant sample point. Flow is not a required parameter.	Representative samples shall be taken after the TWAS Storage and before the <u>new</u> ATAD.  <i>Volatile solids reduction (VSR) requires before and after measurements for calculated reduction percentage.</i>

## Permit Requirements

### 1 Influent – Monitoring Requirements

#### 1.1 Sample Point Number: 702- INFLUENT TO PLANT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Continuous	Continuous	
BOD5, Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp	

##### 1.1.1 Changes from Previous Permit:

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

##### 1.1.2 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 Inplant - Monitoring and Limitations

### 2.1 Sample Point Number: 101- UNLOADING STATION

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Waste Received Septage		gal	Per Agreement	Measure	
Waste Received Holding Tank		gal	Per Agreement	Measure	
Waste Received Vault		gal	Per Agreement	Measure	

#### 2.1.1 Changes from Previous Permit:

In-plant limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section.

#### 2.1.2 Explanation of Limits and Monitoring Requirements

Recording the amounts of Septage, Holding Tank and Vault waste received at the unloading station is an operational parameter that is not a permit requirement. The information may be used in plant upset investigations and other influent studies.

### 2.2 Sampling Point 102 - PRE- ATAD (EXISTING) and 103- PRE- ATAD (NEW)

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Volatile Solids Reduction		Percent	Monthly	Grab	

#### 2.2.1 Changes from Previous Permit:

These are new In-plant sample points added this permit term.

#### 2.2.2 Explanation of Limits and Monitoring Requirements

Recording the volatile solids reduction is an operational parameter and not a permit requirement. This data does not need to be submitted, but the data for determining VSR shall remain onsite. The permittee will use this to collect volatile solids reduction (VSR) across the existing (102) and new (103) ATAD units to comply with vector attraction reduction (VAR). Sample point 102 will be inactivated once the permittee notifies the department the new ATAD is fully operational.

### 3 Surface Water - Monitoring and Limitations

#### 3.1 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	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective November - April.
BOD5, Total	Weekly Avg	31 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective May - October.
BOD5, Total	Weekly Avg	194 lbs/day	3/Week	Calculated	Limit effective May - October.
Suspended Solids, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	
pH Field	Daily Max	9.0 su	3/Week	Grab	
pH Field	Daily Min	6.0 su	3/Week	Grab	
Dissolved Oxygen	Daily Min	6.0 mg/L	3/Week	Grab	
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective January - April.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	16 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective May - October.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	25 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective November - December.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	29 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective January - April.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	27 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective May - October.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	47 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective November - December.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	3/Week	24-Hr Flow Prop Comp	Enter the daily ammonia result on the eDMR and compare to the Nitrogen, Ammonia Variable Limit column to determine

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					compliance.
Nitrogen, Ammonia Variable Limit		mg/L	3/Week	See Table	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	1.0 mg/L	3/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	Monthly Avg	3.4 lbs/day	3/Week	Calculated	See the Total Maximum Daily Load (TMDL) Limitations section for more information.
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 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 section.
Fecal Coliform	Geometric Mean - Monthly	400 #/100 ml	Weekly	Grab	Interim limit effective May - September annually until the E. coli limit goes into effect per the Effluent Limitations for E. coli Schedule.
E. coli		#/100 ml	Weekly	Grab	Monitoring only May - September annually until the final limit goes into effect per the Effluent Limitations for E. coli

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					Schedule.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Limit effective May - September annually per the Effluent Limitations for E. coli Schedule.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit effective May - September annually per the Effluent Limitations for E. coli Schedule. See the E. coli Percent Limit section. Enter the result in the DMR on the last day of the month.
Sulfate, Total		mg/L	Monthly	24-Hr Flow Prop Comp	
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Nitrogen Series Monitoring section for testing schedule.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Nitrogen Series Monitoring section for testing schedule.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Total Nitrogen = Total Nitrogen Kjeldahl (mg/L) + Nitrite + Nitrate Nitrogen (mg/L). See the Nitrogen Series Monitoring section for testing schedule.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring is required during the 2028 calendar year.
Temperature Maximum		deg F	3/Week	Multiple Grab	Monitoring is required during the 2028 calendar year.
Chronic WET	Monthly Avg	2.4 TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual monitoring is required. See the Whole Effluent Toxicity (WET) section for testing schedule.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	Two tests are required during the permit term. See the Whole Effluent Toxicity (WET) section for



Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					testing schedule.

### 3.1.1 Changes from Previous Permit

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

- Variable daily maximum limits for **nitrogen ammonia** have been included.
- Fecal coliform monitoring and limits are being replaced with **Escherichia coli** (E. coli) monitoring and limits.
- Annual monitoring for **total nitrogen (TKN, N02+N03 and Total N)** monitoring is required in rotating quarters as outlined in the permit.
- Monitoring for **temperature** and **chloride** is required during the 2028 calendar year.
- Annual **chronic WET tests** and two **acute WET tests** are required as outlined in the permit.

### 3.1.3 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 November 7, 2024.

**Sulfate** –The Lac du Flambeau band of the Lake Superior Tribe of Chippewa Indians Water Quality Standards (WQS) effective July 2010 list a criterion of 10mg/L for sulfate that is applicable to the Tomahawk River (provision 105 F(2)). Monthly effluent monitoring will continue. The Lac du Flambeau WQS can be viewed at [http://water.epa.gov/scitech/swguidance/standards/wqslibrary/upload/ldf\\_wqs\\_0001\\_070110.pdf](http://water.epa.gov/scitech/swguidance/standards/wqslibrary/upload/ldf_wqs_0001_070110.pdf).

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

Previously permitted monitoring frequencies for pH and dissolved oxygen fall below the standard monitoring frequencies 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.

## 4 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)
003	A	Cake	Fecal Coliform & Autothermophilic Aerobic Digestion or time/temp	Volatile Solids Reduction	Land application or public distribution	215 dry US tons/year
006	B	Cake	Fecal Coliform & Autothermophilic Aerobic Digestion or time/temp	Volatile Solids Reduction	Land application	New outfall
Does sludge management demonstrate compliance? Yes, the facility meets Class A exceptional quality sludge under the criteria of s. NR 204.07(6), Wis. Adm. Code.						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No, the most recent samples (2020) for the municipal well were below the limits of detection.						
Is a priority pollutant scan required? No						

### 4.1 Sample Point Number: 003- CLASS A, ATAD, CAKE STORAGE

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

<b>Monitoring Requirements and Limitations</b>					
<b>Parameter</b>	<b>Limit Type</b>	<b>Limit and Units</b>	<b>Sample Frequency</b>	<b>Sample Type</b>	<b>Notes</b>
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH <sub>4</sub> -N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	See the Sludge Analysis for PCBs section.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	See the Sludge Analysis for PCBs section.
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

#### **4.1.1 Changes from Previous Permit:**

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

**PFAS** –Monitoring is required once during the permit term pursuant to s. NR 204.06(2)(b)9., Wis. Adm. Code.

#### 4.1.2 Explanation of Limits and Monitoring Requirements

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

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

#### 4.2 Sample Point Number: 005- CLASS A, LIQUID FROM EXISTING ATAD and 007- CLASS A, LIQUID FROM NEW ATAD

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Fecal Coliform	Daily Max	1,000 MPN/g TS	Quarterly	Grab	
Solids, Total		Percent	Quarterly	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Quarterly	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Quarterly	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Quarterly	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Quarterly	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Quarterly	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Quarterly	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Quarterly	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Quarterly	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Quarterly	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Quarterly	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Quarterly	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Quarterly	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Quarterly	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Quarterly	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Quarterly	Composite	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Zinc Dry Wt	Ceiling	7,500 mg/kg	Quarterly	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Quarterly	Composite	

#### 4.2.1 Changes from Previous Permit:

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.

- It is recommended that metals (List 1) parameters are sampled quarterly, but it is not a permit requirement.
- Sample point 007 is new this permit term.

#### 4.2.2 Explanation of Limits and Monitoring Requirements

The facility meets Class A exceptional quality sludge under the criteria found in s. NR 204.07(6), Wis. Adm. Code. For Class A sludge, all samples across the ATAD treatment process and prior to public distribution must meet the fecal coliform or salmonella sp. numerical limit of 1,000 NPN/g TS. Cake sludge is distributed to the public as a soil conditioner.

**Fecal Coliform** – It is recommended monitoring twice a quarter to obtain 7 discrete samples.

**Metal (List 1) analysis** – Monitoring is recommended as an operational measurement to determine if there are potential metals issues. This is not a permit requirement.

**Sample point 005 vs 007** – The permittee shall notify department when the existing ATAD is operational, and the outfall is ready for use. Data shall be collected upon start-up of the replacement ATAD unit and demonstrate to the department that the biosolids meet EQ requirements prior to distribution. The department shall verify operational data and operation then sample point 005 will be inactivated.

#### 4.3 Sample Point Number: 006- CLASS B, CAKE SLUDGE - TEMP

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Annual	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	

<b>Monitoring Requirements and Limitations</b>					
<b>Parameter</b>	<b>Limit Type</b>	<b>Limit and Units</b>	<b>Sample Frequency</b>	<b>Sample Type</b>	<b>Notes</b>
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	

#### **4.3.1 Changes from Previous Permit:**

This outfall is added to the WPDES permit to provide additional flexibility to the treatment facility should the Proposed ATAD unit not meet the requirements to allow for EQ distribution. Use of this outfall will require notification to the department of the facility's intent and an update to the sludge management plan shall be submitted to and approved by the department. Additionally, if this outfall is used for land application, land application sites will need to be submitted to and approved by the department prior to land application including describing the land application procedures. If landfilling is planned, a landfill acceptance shall be provided to the department prior to discharge. Should the treatment facility transfer the sludge to another to another treatment facility for additional treatment, the department shall be copied on the approval prior to discharge. All disposal efforts shall be consistent with the sludge management plan.

#### **4.3.2 Explanation of Limits and Monitoring Requirements**

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

This sample point will remain inactive until a sludge management plan is submitted. This plan shall explain how the permittee will discharge/dispose their non- exceptional quality sludge 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.

## 5 Schedules

### 5.1 Effluent Limitations for E. coli

The permittee shall comply with surface water limitations for E. coli 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

Required Action	Due Date
<p>Status Update: The permittee shall submit information within the discharge monitoring report (DMR) comment section documenting the steps taken in preparation for properly monitoring and testing for E. coli including, but not limited to, selected test method and location of sampling.</p>	05/21/2025
<p>Operational Evaluation Report: The permittee shall prepare and submit an Operational Evaluation Report to the Department for review and approval. The report shall include an evaluation of collected effluent data and proposed operational improvements that will optimize efficacy of disinfection at the treatment plant during the period prior to complying with final E. coli limitations and, to the extent possible, enable compliance with the final E. coli limitations. The report shall include a plan and schedule for implementation of the operational improvements. These improvements shall occur as soon as possible, but not later than April 30, 2026. The report shall state whether the operational improvements are expected to result in compliance with the final E. coli limitations.</p> <p>The permittee shall implement the operational improvements in accordance with the approved plan and schedule specified in the Operational Evaluation Report and in no case later than April 30, 2026.</p> <p>If the Operational Evaluation Report concludes that the operational improvements are expected to result in compliance with the final E. coli limitations, the permittee shall comply with the final E. coli limitations by April 30, 2026 and the permittee is not required to comply with subsequent milestones identified below in this compliance schedule ('Submit Facility Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet Limitations', 'Construction Upgrade Progress Report', 'Complete Construction', 'Achieve Compliance').</p> <p>FACILITY PLAN - If the Operational Evaluation Report concludes that operational improvements alone are not expected to result in compliance with the final E. coli limitations, the permittee shall initiate development of a facility plan for meeting final E. coli limitations and comply with the remaining required actions in this schedule of compliance.</p> <p>If the Department disagrees with the conclusion of the report and determines that the permittee can achieve final E. coli limitations using the existing treatment system with only operational improvements, the Department may reopen and modify the permit to include an implementation schedule for achieving the final E. coli limitations sooner than April 30, 2029.</p>	11/30/2025
<p>Submit Facility Plan: If the Operational Evaluation Report concluded that the permittee cannot achieve final E. coli limitations with operational improvements alone, the permittee shall submit a Facility Plan per s. NR 110.09, Wis. Adm. Code. The permittee may submit an abbreviated facility</p>	04/30/2026

plan if the Department determines that the modifications are minor.	
Final Plans and Specifications: The permittee shall submit final construction plans to the Department for approval pursuant to ch. NR 108, Wis. Adm. Code, specifying treatment plant upgrades that must be constructed to achieve compliance with final E. coli limitations and a schedule for completing construction of the upgrades by the complete construction date specified below.	03/31/2027
Treatment Plant Upgrade to Meet Limitations: The permittee shall initiate bidding, procurement, and/or construction of the project. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats., prior to initiating activities defined as construction under ch. NR 108, Wis. Adm. Code. 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.	09/30/2027
Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades.	09/30/2028
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades.	03/31/2029
Achieve Compliance: The permittee shall achieve compliance with final E. coli limitations.	04/30/2029

### 5.1.1 Explanation of Schedule

*E. coli*- A compliance schedule is included in the permit to provide time for the permittee to investigate options for meeting new effluent E. coli water quality-based effluent limits while coming into compliance with the limits as soon as reasonably possible.

### 5.2 Sludge Management Plan

A management plan is required for the land application system.

Required Action	Due Date
<p><b>Sludge Management Plan Submittal:</b> Submit a sludge management plan (SMP) to optimize the sludge management performance and demonstrate compliance with Ch. NR 204, Wis. Adm. Code, by the Due Date. This management plan shall include sufficient detail of the sludge management program for the facility. The plan shall include separate sections for each type of sewage sludge included in this permit. The SMP shall provide standardized information for communication to operators and the department including but not limited to the following:</p> <ol style="list-style-type: none"> <li>1. Specify information on the sludge treatment processes for each sampling point and outfall;</li> <li>2. Show and describe sample point and outfall monitoring locations on a schematic and provide photos of the specific sampling points;</li> <li>3. Show, describe and tabulate the monitoring requirements at each sampling point and outfall locations;</li> <li>4. Show, describe and explain sampling protocols for each location listing parameters to be monitored including: Pollutants, Nutrients, Pathogen treatment process requirements including treatment temperature, moisture content (total solids) and pathogen densities (fecal concentrations), Vector Reduction appropriate for the pathogen treatment process such as but not limited to temperatures, volatile solids reduction, moisture content, etc. as required by the WPDES permit and Ch. NR 204, Wis. Adm. Code;</li> <li>5. Monitoring frequencies at each sample point and outfall;</li> <li>6. Analytical methods with appropriate hold times and chain of custody procedures;</li> </ol>	09/30/2025



7. Documentation relating to temperature monitoring data recording, retrieval and printing out the data when requested;
8. Storage, verification monitoring, loading, transportation and discharge details associated with all outfalls;
9. Collection, storage, disposal information for sludge detailing pickups including loading and similar details;
10. Collection, storage and disposal processes of sludge when the sludge does not meet minimum requires to meet Class A and EQ requirements. [Note: EQ and Class A are similar, but are different. Explain.]
11. Identify land application sites;
12. Describe site limitations;
13. Address vegetative cover management and removal including loading to crop needs, crop harvesting;
14. Specific the availability of storage for sludge;
15. Describe the type of transportation and spreading vehicles;
16. Track site loadings to facility's land application sites;
17. Address contingency plans for adverse weather and odor/nuisance abatement;
18. Address construction contingencies when treatment equipment is out of service; and
19. Include any other pertinent information.

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. [Note: The SMP is a living document and should be designed and constructed to allow for future updates. Consider providing an overview to explain the facilities solids flow processes, then using sections and appendices to provide more details. The use of appendices to explain start up, operation and shutdown of the sludge treatment units is encouraged to show that all sludge particles meet Class A requirements.]

### 5.2.1 Explanation of Schedule

*Sludge Management Plan* - An up-to-date Sludge Management Plan is required that documents how the permittee will manage the land application of biosolids consistent with ch. NR 204, Wis. Adm. Code

## Attachments

Water Flow Schematic updated January 2025

Water Quality Based Effluent Limits memo dated November 7, 2024

## Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance.

Prepared By: Sheri A. Snowbank

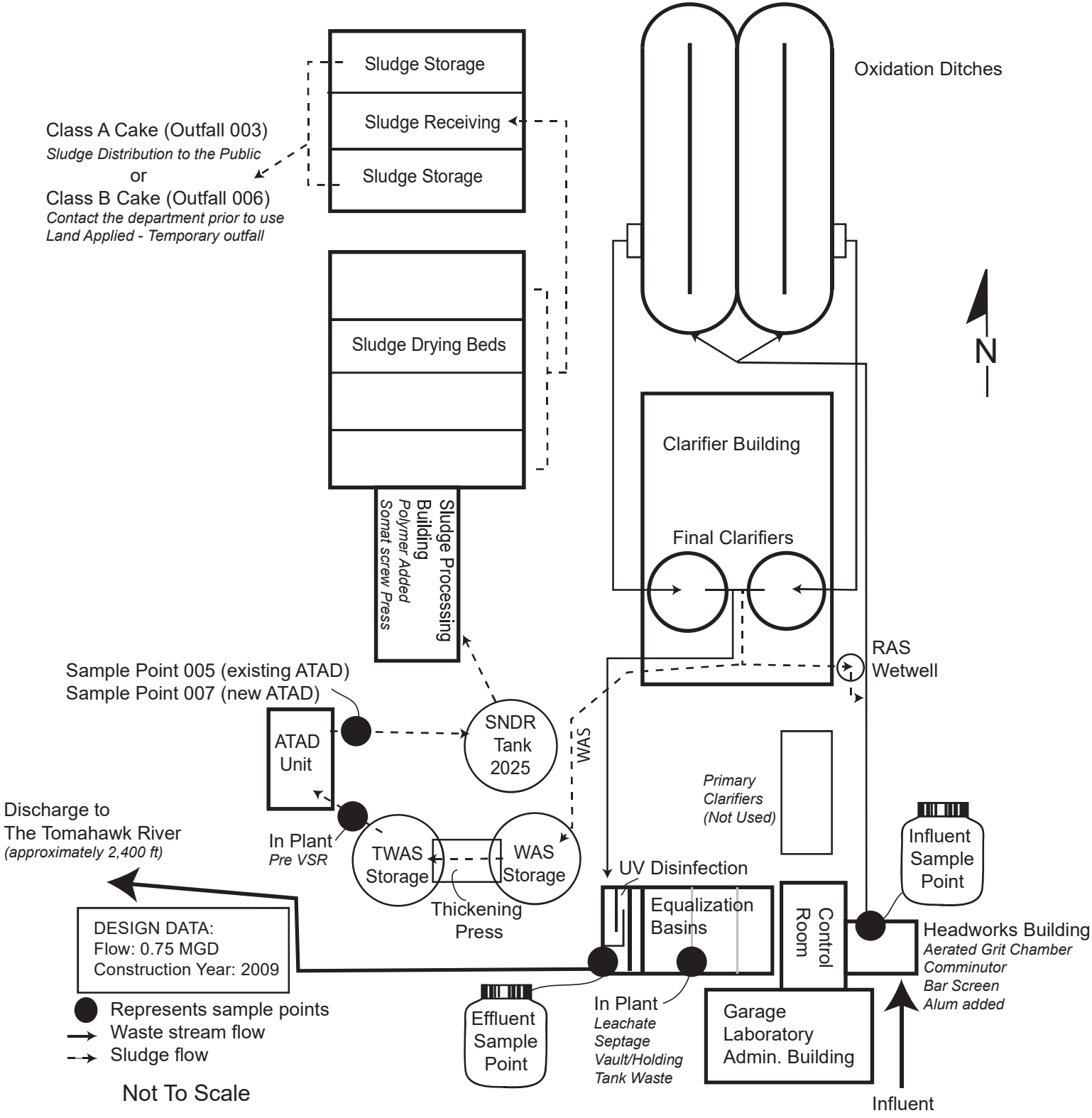
Wastewater Specialist

Date: January 28, 2025

# LAKELAND SANITARY DISTRICT NO. 1

## WASTEWATER TREATMENT FACILITY DESCRIPTION AND FLOW DIAGRAM

This wastewater treatment facility includes comminution, aerated grit chamber, grit removal, chemical phosphorus removal, oxidation ditches, final clarification, and ultraviolet disinfection. Effluent is discharged to the Tomahawk River. The sludge is processed through an autothermophilic aerobic digestion system (ATAD) and dewatered before being stored in cake form for public distribution. There will be a facility upgrade in 2025 which will install a new ATAD, increase the thickened waste activated sludge (TWAS) storage and install a new Storage Nitrification Denitrification Reactor (SNDR) tank. The flow diagram below represents the treatment units and sampling locations.



# CORRESPONDENCE/MEMORANDUM

DATE: November 7, 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 Lakeland Sanitary District  
WPDES Permit No. WI-0022837-11-0

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 Lakeland Sanitary District in Oneida County. This municipal wastewater treatment facility (WWTF) discharges to the Tomahawk River, located in the Tomahawk River Watershed in the Upper Wisconsin River Basin. This discharge is included in the Wisconsin River TMDL as approved by EPA on April 26, 2019 with site-specific criteria approved by EPA on July 9, 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 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD <sub>5</sub> November – April May – October			45 mg/L 31 mg/L 194 lbs/day	30 mg/L 30 mg/L	1, 2
TSS			45 mg/L	30 mg/L	1, 2
pH	9.0 s.u.	6.0 s.u.			1, 2
Dissolved Oxygen		6.0 mg/L			1, 2
Bacteria					3
Interim Limit Fecal Coliform				400 #/100 mL geometric mean	
Final Limit <i>E. coli</i>				126 #/100 mL geometric mean	
Ammonia Nitrogen					4, 5
Single January – April May – October November – December	16 mg/L		29 mg/L <b>16 mg/L</b> <b>47 mg/L</b>	15 mg/L 16 mg/L 25 mg/L	
Variable January – April May – October November – December	Variable Variable Variable		29 mg/L <b>27 mg/L</b> <b>47 mg/L</b>	15 mg/L 16 mg/L 25 mg/L	
Phosphorus				1.0 mg/L 3.4 lbs/day	1, 6
Chloride					1
Sulfate					1
TKN, Nitrate+Nitrite,					7

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
and Total Nitrogen					
Temperature					8
Acute WET					9, 11
Chronic WET				2.4 TUc	10, 11

Footnotes:

1. No changes from the current permit.
2. These limits are based on the Warm Water Sport Fish community of the immediate receiving water as described in s. NR 210.05(1), Wis. Adm. Code.
3. Bacteria limits apply during the disinfection season of May – September. The fecal coliform interim limit will apply until the end of the compliance schedule when *E. coli* limits take effect. 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. 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.
5. Lakeland SD shall notify the Department if the single limit or the variable daily maximum limits based on effluent pH are preferred. 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 16 mg/L.

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

6. The concentration limit is a technology-based limit as described in subch. II of NR 217, Wis. Adm. Code. The mass limit is based on the WRB TMDL to address phosphorus water quality impairments within the TMDL area.
7. 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 (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and total Kjeldahl nitrogen (TKN) (all expressed as N).
8. Monthly temperature monitoring for 1 year is recommended during the reissued permit term to have updated temperature data to determine the need for temperature limits at the next permit reissuance.
9. Annual acute whole effluent toxicity (WET) testing is recommended during the reissued permit term. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR

219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests. If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then acute WET testing can be reduced to 2 tests in the reissued permit.

10. Annual chronic WET testing is recommended during the reissued permit term. According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The Instream Waste Concentration (IWC) to assess chronic test results is 42%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the Tomahawk River upstream of the confluence of Outfall 001.
11. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).

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 calculations, & thermal table.

PREPARED BY: Michael A. Polkinghorn – Water Resources Engineer

E-cc: 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  
Lakeland Sanitary District**

**WPDES Permit No. WI-0022837-11-0**

Prepared by: Michael A. Polkinghorn

**PART 1 – BACKGROUND INFORMATION**

**Facility Description**

Lakeland Sanitary District (Lakeland SD) operates a wastewater treatment facility that accepts domestic wastewater from the Towns of Minocqua, Woodruff, and Arbor Vitae. The treatment consists of fine screening, aerated grit chamber, alum addition into the influent line for chemical phosphorus removal, 2 oxidation ditches, secondary clarifiers, and seasonal UV disinfection. Effluent is discharged on a continuous basis via Outfall 001 to the east bank of the Tomahawk River, approx. 0.5 mi north of Highway 70.

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

**Existing Permit Limitations**

The current permit, expired on 06/30/2024, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD <sub>5</sub> November – April May – October			45 mg/L 31 mg/L 194 lbs/day	30 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
Dissolved Oxygen		6.0 mg/L			2, 3
Fecal Coliform May – September			<b>656#/100 mL geometric mean</b>	400#/100 mL geometric mean	4
Ammonia Nitrogen January – April May – October November – December			29 mg/L <b>27 mg/L</b> 47 mg/L	15 mg/L 16 mg/L 25 mg/L	4
Phosphorus				1.0 mg/L 3.4 lbs/day	5
Chloride					1
Sulfate					1
Chronic WET					6

Footnotes:

1. Monitoring only.
2. These limits are based on the Warm Water Sport Fish community of the immediate receiving water as described in s. NR 210.05(1), Wis. Adm. Code.
3. **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.
4. 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.
5. The concentration limit is a technology-based limit as described in subch. II of NR 217, Wis. Adm. Code. The mass limit is based on the WRB TMDL to address phosphorus water quality impairments within the TMDL area and became effective in the current permit on 10/01/2020.
6. Two chronic whole effluent toxicity (WET) tests were required during the current permit term. The IWC for chronic WET was 42%.

**Receiving Water Information**

- Name: Tomahawk River
- Waterbody Identification Code (WBIC): 1515800
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q<sub>10</sub> and 7-Q<sub>2</sub> values are from USGS for Station NW 1/4, SE 1/4, SEC. 9, T39N-R6E, Oneida County, at Highway 70, 1.8 miles W of Minocqua. This is approx. 0.4 mi upstream of Outfall 001.  
7-Q<sub>10</sub> = 6.5 cubic feet per second (cfs)  
7-Q<sub>2</sub> = 12 cfs  
Harmonic Mean Flow = 31.2 cfs using a drainage area of 85.7 mi<sup>2</sup> and a 7-Q<sub>10</sub> low flow of 11.3 cfs. The Harmonic Mean has been estimated based on average flow and the 7-Q<sub>10</sub> 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). Low flow and drainage area are estimated at the section of the Tomahawk River just upstream of the Lac du Flambeau tribal land border. This location is approx. 2.5 mi downstream of Outfall 001.
- % 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: Sulfate data is from Minocqua Lake (SWIMS Station #: 443134, n = 26, October 1974 – May 1996). 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: None.
- Impaired water status: There are no known impairments to the Tomahawk River or a nearby downstream surface waters. Outfall 001 is included in the WRB TMDL which addresses phosphorus water quality impairments within the TMDL area.

**Effluent Information**

- Design flow rate(s):  
Annual average = 0.75 million gallons per day (MGD)

Attachment #1

For reference, the actual average flow from July 2019 – August 2024 was 0.35 MGD.

- 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 2 municipal wells.
- Total Phosphorus Wasteload Allocation: 837 lbs/yr, 2.29 lbs/day (*Appendix K of Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin, April 2019, page 23*).
- Additives: Alum for chemical phosphorus treatment.
- 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. Chloride and sulfate monitoring was required during the current permit term.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, 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 Effluent Data**

Sample Date	Conc. (mg/L)
03/04/2021	240
03/09/2021	210
03/10/2021	210
04/13/2021	90
05/04/2021	160
06/09/2021	180
07/07/2021	190
08/03/2021	180
09/14/2021	190
10/12/2021	110
11/16/2021	190
12/04/2021	240
1-day P <sub>99</sub>	313
4-day P <sub>99</sub>	242

**Sulfate Effluent Data**

Statistics	Conc. (mg/L)
1-day P <sub>99</sub>	118
4-day P <sub>99</sub>	87
30-day P <sub>99</sub>	71
Mean	63
Std	18
Sample size	62
Range	19 - 120



Attachment #1

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

**Parameter Averages with Limits**

	Average Measurement*	Average Mass Discharged
BOD <sub>5</sub>	5.7 mg/L	13 lbs/day
TSS	8.2 mg/L	
pH field	7.1 s.u.	
Dissolved Oxygen	10.5 mg/L	
Fecal Coliform	173 #/100 mL	
Ammonia Nitrogen	1.8 mg/L	
Phosphorus	0.65 mg/L	1.7 lbs/day

\*Any 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**

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 99<sup>th</sup> percentile (or P<sub>99</sub>) 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<sub>10</sub>**

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<sub>10</sub> 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.

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

Where:

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

Q<sub>s</sub> = average minimum 1-day flow which occurs once in 10 years (1-day Q<sub>10</sub>)  
 if the 1-day Q<sub>10</sub> flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q<sub>10</sub>).

Q<sub>e</sub> = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis.

Attachment #1

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<sub>10</sub> 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 Lakeland SD and the limits are set based on two times the ATC.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling. All concentrations are expressed in milligrams per liter (mg/L).

**Daily Maximum Limits based on Acute Toxicity Criteria (ATC)**

RECEIVING WATER FLOW = 5.2 cfs, (1-Q<sub>10</sub> (estimated as 80% of 7-Q<sub>10</sub>)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	ATC	MAX. EFFL. LIMIT*	1-day P <sub>99</sub>	1-day MAX. CONC.
Chloride	757	1,514	313	240
Sulfate**	612	612	118	120

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

\*\* The limit for this substance is based on a secondary value. Acute limits are set equal to the secondary value rather than two times or using the 1-Q<sub>10</sub> s. NR 106.06(3)(b)2 and s. NR 105.05(2)(f)6, Wis. Adm Code.

**Weekly Average Limits based on Chronic Toxicity Criteria (CTC)**

RECEIVING WATER FLOW = 1.6 cfs (¼ of the 7-Q<sub>10</sub>), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	4-day P <sub>99</sub>
Chloride	395		948	242
Sulfate*	407	3.74	972	87

\* The limit for this substance is based on a secondary value.

**Monthly Average Limits based on Wildlife Criteria (WC)**

The effluent characterization did not include any effluent sampling results for substances for which WC exist.

**Monthly Average Limits based on Human Threshold Criteria (HTC)**

The effluent characterization did not include any effluent sampling results for substances for which HTC exist.

**Monthly Average Limits based on Human Cancer Criteria (HCC)**

The effluent characterization did not include any effluent sampling results for substances for which HCC exist.

**Conclusions and Recommendations**

Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are not recommended for any toxic substances.** Monitoring recommendations are made in the paragraphs below:

Chloride – Considering available effluent data from the current permit term (March 2021 – December 2021), the 1-day and 4-day P<sub>99</sub> concentrations are 313 and 242 mg/L respectively. These effluent concentrations are below the calculated chloride WQBELs; **therefore effluent limits are not recommended during the reissued permit term. Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.**

Sulfate – Considering available effluent data from the current permit term (July 2019 – August 2024), the 1-day and 4-day P<sub>99</sub> concentrations are 118 and 87 mg/L respectively. These effluent concentrations are below the calculated sulfate WQBELs based on state secondary values; **therefore, effluent limits are not recommended during the reissued permit term.**

In addition the Lac du Flambeau Tribe has a numeric water quality standard for sulfate. The sulfate WQC used for the limit calculation is 10 mg/L at all times, based on the water quality standard for wild rice from the *Lac du Flambeau Tribe Water Quality Standards* of 2015. The previous limit evaluation (April 2019) determined the appropriate parameters to provide the best available estimation to downstream sulfate impacts in the tribal waters section of the Tomahawk River. Using the effluent design flow, harmonic mean flow, water quality criteria, and background concentration, the water quality-based limit is calculated below per NR 106.06(3), Wis. Adm. Code:

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

Where:

- WQC = 10 mg/L for the Lac du Flambeau Tribal Waters.
- Q<sub>s</sub> = 100% of Harmonic Mean Flow = 31.2 cfs
- C<sub>s</sub> = 3.74 mg/L
- Q<sub>e</sub> = Effluent Flow Rate = 0.75 MGD = 1.16 cfs
- f = 0, the fraction of effluent withdrawn from the receiving water.

Inserting all the variables in the equation above, the calculated daily maximum limit is 178 mg/L. The 1-day P<sub>99</sub> and 1-day maximum concentration of effluent sulfate data are 118 and 120 mg/L respectively. **Therefore, sulfate limits are not recommended during the reissued permit term. Sulfate monitoring is recommended to continue during the reissued permit term per our agreement with the Lac du Flambeau tribe.**

Mercury – The permit application did not require monitoring for mercury because the Lakeland SD 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 the past 4 years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from April 2020 – May 2023 was 1.5 mg/kg, with a maximum reported

concentration of 2 mg/kg. **Therefore, mercury monitoring is not recommended at 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 monitoring sample data from the Lakeland SD 1 (PWS ID: 74401162) is provided in the table below:

Sample Date	Sample ID	Well #	PFOS (ng/L)	PFOA (ng/L)
06/05/2023	CB05920-01	BG532	0.4	0.81
09/25/2023	CB11841-03	BG532	0.51	2
05/21/2024	CC05572-02	BG532	ND	1.1
Average =			0.3	1

The limited data above shows the municipal water supply is below 1/5<sup>th</sup> of the applicable PFOS and PFOA criteria. Based on the type of discharge, the effluent flow rate, the lack of indirect dischargers contributing to the collection system and known levels of PFOS/PFOA in the source water; **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. The current permit has weekly average and monthly average limits year round. These limits are re-evaluated at this time due to the following changes:

- The maximum expected effluent pH has changed.

#### **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, and  
 pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 809 sample results were reported from July 2019 – August 2024. The maximum reported value was 9.96 s.u. (Standard pH Units). The effluent pH was 7.73 s.u. or less 99% of the time. The 1-day P<sub>99</sub>, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.04 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 8.00 s.u. Therefore, a value of 8.04 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 8.04 s.u. into the equation above yields an ATC = 7.75 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 either set equal to two times the ATC or mass balance based on the 1-Q<sub>10</sub> 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<sub>10</sub> (estimated as 80 % of 7-Q<sub>10</sub>) and the 2×ATC approach are shown below.

**Daily Maximum Ammonia Nitrogen Determination**

Method	Ammonia Nitrogen Limit (mg/L)
2×ATC	16
1-Q <sub>10</sub>	42

The 2×ATC method yields the most stringent limits for Lakeland SD.

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 ≤ pH ≤ 6.1	108	7.0 < pH ≤ 7.1	66	8.0 < pH ≤ 8.1	14
6.1 < pH ≤ 6.2	106	7.1 < pH ≤ 7.2	59	8.1 < pH ≤ 8.2	11
6.2 < pH ≤ 6.3	104	7.2 < pH ≤ 7.3	52	8.2 < pH ≤ 8.3	9.4
6.3 < pH ≤ 6.4	101	7.3 < pH ≤ 7.4	46	8.3 < pH ≤ 8.4	7.8
6.4 < pH ≤ 6.5	98	7.4 < pH ≤ 7.5	40	8.4 < pH ≤ 8.5	6.4
6.5 < pH ≤ 6.6	94	7.5 < pH ≤ 7.6	34	8.5 < pH ≤ 8.6	5.3
6.6 < pH ≤ 6.7	89	7.6 < pH ≤ 7.7	29	8.6 < pH ≤ 8.7	4.4
6.7 < pH ≤ 6.8	84	7.7 < pH ≤ 7.8	24	8.7 < pH ≤ 8.8	3.7
6.8 < pH ≤ 6.9	78	7.8 < pH ≤ 7.9	20	8.8 < pH ≤ 8.9	3.1
6.9 < pH ≤ 7.0	72	7.9 < pH ≤ 8.0	17	8.9 < pH ≤ 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 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 (March 2013) are shown in attachment #3.

**Effluent Data**

The following table evaluates the statistics based upon ammonia data reported from July 2019 – August 2024, with those results being compared to the calculated limits to determine the need to include

ammonia limits in the Lakeland SD permit for the respective month ranges. That need is determined by calculating 99<sup>th</sup> upper percentile (or P<sub>99</sub>) 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	Jan. – April	May – Oct.	Nov. – Dec.
1-day P <sub>99</sub>	5.36	18	2.44
4-day P <sub>99</sub>	2.90	9.89	1.36
30-day P <sub>99</sub>	1.54	4.88	0.62
Mean*	0.97	2.84	0.31
Std	1.11	3.88	0.55
Sample size	258	420	131
Range	0.03 - 7.02	0.01 - 29.18	0.02 - 3.9

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

**Based on this comparison, daily maximum limits are recommended during May – October.** The permit currently has weekly and monthly average limits year round. **Where there are existing ammonia nitrogen limits in the permit, the limits must be retained regardless of reasonable potential, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:**

(b) If a permittee is subject to an ammonia limitation in an existing permit, the limitation shall be included in any reissued permit. Ammonia limitations shall be included in the permit if the permitted facility will be providing treatment for ammonia discharges.

**Lakeland SD shall notify the Department if the single limit or the variable daily maximum limits based on effluent pH are preferred. If the variable limits are preferred, then they will be implemented year round per Department policy.**

**Expression of Limits**

Revisions to ch. NR 106, Wis. Adm. Code, in September 2016 aligned Wisconsin’s WQBELs with 40 CFR § 122.45(d), which specifies that effluent limits for continuous dischargers must be expressed as weekly and monthly averages for publicly owned treatment works and as daily maximums and monthly averages for all other dischargers, unless shown to be impracticable. Because a daily maximum limit is necessary for Lakeland SD, weekly and monthly average limits are also required under this code revision.

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.

- If the variable limits are preferred, then no additional weekly and monthly average limits are needed during the reissued permit term.
- **If the single limit is preferred, then the weekly average limit of 16 mg/L is recommended to satisfy the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes.**

**Conclusions and Recommendations**

In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm

Code. 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.

**Final Ammonia Nitrogen Limits**

Month Range	Daily Maximum (mg/L)	Weekly Average (mg/L)	Monthly Average (mg/L)
Single			
January – April		29	15
May – October	16	<b>16</b>	16
November – December		<b>47</b>	25
Variable			
January – April	Variable	29	15
May – October	Variable	<b>27</b>	16
November – December	Variable	<b>47</b>	25

**PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA**

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Codes, became effective which replace fecal coliform limits with new *Escherichia coli* (*E. coli*) limits for protection of recreational uses. Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.
2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

*E. coli* monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Because Lakeland SD’s permit requires weekly monitoring, the 410 counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

These limits are required during May – September. No changes are recommended to the current recreational period and the required disinfection season.

**Interim Limit**

At this time, there is no effluent *E. coli* data available to determine if these limits are readily attainable. The permit will include a compliance schedule to meet these limits. During the compliance schedule, an interim limit applies to prevent back-sliding from the current level of disinfection during the compliance schedule period. **Therefore, the current fecal coliform limit shall be included in the reissued permit as an interim limit of 400 counts/100 mL as a monthly geometric mean.** Any weekly geometric mean limit which was included in the current permit for expression of limits purposes does not need to be included in the permit as an interim limit.

Attachment #1  
**PART 5 – PHOSPHORUS**

**Technology-Based Effluent Limit**

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of total phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit. **Because Lakeland SD currently has a limit of 1.0 mg/L, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent WQBEL is given.**

**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* (May 2020). The wasteload allocations (WLA) that implement site-specific criteria for Lakes Petenwell, Castle Rock, and Wisconsin are found in Appendix K of the *Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin (WRB TMDL)* report dated April 26, 2019 and are expressed as maximum annual loads (lbs/year) and maximum daily loads (lbs/day). The WLA that implement statewide criteria found in Appendix J of the TMDL report are no longer applicable following approval of these site-specific criteria. The daily WLAs in the WRB TMDL equals the annual WLA divided by the number of days in the year. Therefore, the daily WLA is an annual average. Since the derivation of daily WLAs from annual WLAs does not take effluent variability or monitoring frequency into consideration, maximum daily WLAs from the WRB TMDL should not be used directly as permit effluent limits. For Lakeland SD, this WLA is 837 lbs/year and 2.29 lbs/day.

The monthly average limit of 3.4 lbs/day was determined in the previous limit addendum (May 2019). The monthly average multiplier of 1.47 was chosen as described in the Department TMDL Implementation guidance using a coefficient of variation (CV) of 0.6 and a 3x/wk effluent monitoring frequency.

This TMDL-based WQBEL will be re-evaluated if the annual 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 discharges over the current permit term directly against the annual WLA. In this case, the annual WLA of 837 was exceeded once out of the 37 available 12-month rolling sums during August 2021 – August 2024 since the TMDL limit became effective in the current permit in 10/01/2021. This value was 842 lbs/yr (July 2021 – June 2022). **Therefore, the monthly average limit of 3.4 lbs/day will remain unchanged during the reissued permit term.**

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.**

Since wasteload allocations are expressed as annual loads (lbs/yr), permits with TMDL-derived monthly average permit limits should require the permittee to calculate and report rolling 12-month sums of total monthly loads for TP. Rolling 12-month sums can be compared directly to the annual wasteload allocation.



Attachment #1

The following table lists the statistics for concentration and mass-based effluent phosphorus levels (October 2020 – August 2024) for informational purposes since the TMDL limit became effective in the current permit.

**Phosphorus Effluent Data**

Statistics	Conc. (mg/L)	Mass (lbs/day)
1-day P <sub>99</sub>	1.9	10
4-day P <sub>99</sub>	1.2	5.63
30-day P <sub>99</sub>	0.81	2.80
Mean	0.64	1.64
Std	0.36	2.20
Sample Size	610	613
Range	0.03 - 2.49	0.06 - 50

**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.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from July 2019 – August 2024.

The table below summarizes the maximum temperatures reported during monitoring from January 2013 – June 2018. The full thermal calculations are included as attachment #4.

**Monthly Temperature Effluent Data & Limits**

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	51	51	97	120
FEB	52	52	89	120
MAR	52	52	87	120

Attachment #1

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
APR	56	57	73	120
MAY	62	64	80	120
JUN	70	70	92	110
JUL	73	74	103	112
AUG	73	73	109	116
SEP	70	72	101	120
OCT	67	68	89	120
NOV	60	61	75	120
DEC	54	54	89	120

**Reasonable Potential**

Permit limits for temperature are recommended based on the procedures in s. NR 106.56, Wis. Adm. Code.

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
  - (a) The highest recorded representative daily maximum effluent temperature
  - (b) The projected 99th percentile of all representative daily maximum effluent temperatures
- A sub-lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
  - (a) The highest weekly average effluent temperature for the month.
  - (b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. Based on this analysis, **temperature limits are not recommended during the reissued permit term. Monthly temperature monitoring for 1 year is recommended during the reissued permit term to have updated temperature data to determine the need for temperature limits at the next permit reissuance.**

**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

Attachment #1

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)*.

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC<sub>50</sub> (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC<sub>25</sub> (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 42% shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

$$IWC \text{ (as \%)} = Q_e \div \{(1 - f) Q_e + Q_s\} \times 100$$

Where:

- Q<sub>e</sub> = annual average flow = 0.75 MGD = 1.2 cfs
- f = fraction of the Q<sub>e</sub> withdrawn from the receiving water = 0
- Q<sub>s</sub> = ¼ of the 7-Q<sub>10</sub> = 6.5 cfs ÷ 4 = 1.6 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations. Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. Therefore, only WET tests conducted from June 2005 to present are shown in the table below:

**WET Data History**

Date Test Initiated	Chronic Results IC <sub>25</sub> %				Footnotes or Comments
	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?	

Attachment #1

09/27/2011	59.3	>100	Pass	Yes	QA Restart
01/24/2012	>100	>100	Pass	Yes	
05/19/2020	>100	>100	Pass	Yes	
07/18/2023	56	>100	Pass	Yes	

- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.

$$\text{Chronic Reasonable Potential} = [(TUc \text{ effluent}) (B)(IWC)]$$

**Chronic WET Limit Parameters**

TUc (maximum) 100/IC <sub>25</sub>	B (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/56 = 1.79	3.8 Based on 2 detects	42%

$$[(TUc \text{ effluent}) (B)(IWC)] = 2.9 > 1.0$$

Therefore, reasonable potential is shown for a chronic WET limit using the procedures in s. NR 106.08(6), Wis. Adm. Code, and representative data from September 2011 – July 2023.

Expression of WET limits

Chronic WET limit =  $[100/IWC] TU_c = 2.4 TU_c$  expressed as a monthly average.

**WET Checklist Summary**

	Acute	Chronic
<b>AMZ/IWC</b>	Not applicable. <b>0 Points</b>	IWC = 42%. <b>10 Points</b>
<b>Historical Data</b>	No acute tests performed within last 5 yrs. <b>5 Points</b>	Four tests used to calculate RP. No tests failed. <b>0 Points</b>
<b>Effluent Variability</b>	Limit exceedances for phosphorus, DO, fecal coliform, and pH. Otherwise, little variability, violations or upsets, consistent WWTF operations. <b>5 Points</b>	Same as acute. <b>5 Points</b>
<b>Receiving Water Classification</b>	WWSF community. <b>5 Points</b>	Same as acute. <b>5 Points</b>
<b>Chemical-Specific Data</b>	Reasonable potential for ammonia nitrogen limits based on ATC; chloride and sulfate detected. No additional compounds of concern.	No reasonable potential for limits based on CTC; ammonia nitrogen limit carried over from the current permit. Chloride and sulfate detected.

Attachment #1

	Acute	Chronic
	<b>7 Points</b>	No additional compounds of concern. <b>3 Points</b>
<b>Additives</b>	No biocides and 1 water quality conditioner added. Permittee has proper P chemical SOPs in place: No. <b>16 Points</b>	All additives used more than once per 4 days. <b>16 Points</b>
<b>Discharge Category</b>	No industrial contributors. <b>0 Points</b>	Same as acute. <b>0 Points</b>
<b>Wastewater Treatment</b>	Secondary or better. <b>0 Points</b>	Same as acute. <b>0 Points</b>
<b>Downstream Impacts</b>	No impacts known. <b>0 Points</b>	Same as acute. <b>0 Points</b>
<b>Total Checklist Points:</b>	<b>38 Points</b>	<b>39 Points</b>
<b>Recommended Monitoring Frequency (from Checklist):</b>	Annual acute tests recommended.	Annual chronic tests recommended.
<b>Limit Required?</b>	No.	Limit = 2.4 TU <sub>c</sub>
<b>TRE Recommended? (from Checklist)</b>	No.	No.

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, **annual acute and chronic WET tests are recommended in the reissued permit.** Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued). **If a satisfactory phosphorus chemical SOP is established and implemented at the facility prior to permit reissuance, then acute WET testing can be reduced to 2 tests in the reissued permit.**
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The chronic WET limit shall be expressed as 2.4 TU<sub>c</sub> as a monthly average in the effluent limits table of the permit. A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.



**WISCONSIN  
DEPARTMENT OF  
NATURAL RESOURCES**

# Lakeland SD Outfall 001 Discharge Area



### Legend

- Permits
  - Surface Water Outfalls
    - ▲
- Basemaps
- Hydro
  - 24K Hydro (Cached) Inland Water Resources
    - Rivers and Streams
      - Intermittent Streams
    - Open Water
    - Great Lakes water

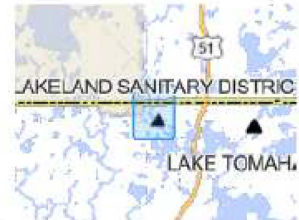
### Notes

WPDES viewer, WDNR

Service layer credits:  
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1:18,890



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Date Printed: 10/14/2024

**Weekly & Monthly Average Ammonia Nitrogen Limit (March 2013 Limit Eval)**

<b>Ammonia Limit Calculations Summary - Lakeland Sanitary District</b>			
Classification:	WWSF (Tomahawk River)		
Effluent Flow (MGD):	0.75		
Maximum Effluent pH (std. units)	7.40 (2019 evaluation)		
<u>Background Info:</u> 7Q10 = 6.5 cfs and 7Q2 = 12 cfs Ammonia (mg/L, default) Temp. (deg C, default) pH (std. units, default) % of river flow used:	Summer	Winter	Spring
	0.04	0.08	0.08
	25	3	10
	7.79	7.38	7.38
	100	25	25
<u>Criteria (in mg/L):</u>	Summer	Winter	Spring
Acute	26.54	26.54	26.54
4-day Chronic (ELS present)	4.10	12.01	12.01
4-day Chronic (ELS absent)	-	19.50	-
30-day Chronic (ELS present)	1.64	4.80	4.80
30-day Chronic (ELS absent)	-	7.80	-
<u>Effluent Limitations (in mg/L):</u>	Summer	Winter	Spring
Daily Maximum	46	46	46
Weekly Average (ELS present)	27		29
(ELS absent in Nov. and Dec.)	-	47	-
Monthly Average (ELS present)	16		15
(ELS absent in Nov. and Dec.)	-	25	-

**Temperature Limits for Receiving Waters with Unidirectional Flow**

(calculation using default ambient temperature data)

<b>Facility:</b>	Lakeland SD	<b>7-Q<sub>10</sub>:</b>	6.5	cfs	<b>Temp Dates</b>	<b>Flow Dates</b>
<b>Outfall(s):</b>	001	<b>Dilution:</b>	25%		<b>Start:</b>	NA
<b>Date Prepared:</b>	10/14/2024	<b>f:</b>	0		<b>End:</b>	NA
<b>Design Flow (Q<sub>e</sub>):</b>	0.75	MGD	<b>Stream type:</b> Small warm water sport or forage fish			
<b>Storm Sewer Dist.</b>	0	ft	<b>Q<sub>s</sub>:Q<sub>e</sub> ratio:</b>	1.4	:1	
			<b>Calculation Needed?</b>	<b>YES</b>		

Month	Water Quality Criteria			Receiving Water Flow Rate (Q <sub>s</sub> ) (cfs)	Representative Highest Effluent Flow Rate (Q <sub>e</sub> )		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	T <sub>a</sub> (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Q <sub>esl</sub> ) (MGD)	Daily Maximum Flow Rate (Q <sub>ea</sub> ) (MGD)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)		(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	6.5	0.351	0.415	0			97	120
FEB	34	50	76	6.5	0.427	0.464	0			89	120
MAR	38	52	77	6.5	0.415	0.657	0			87	120
APR	48	55	79	6.5	0.409	0.462	0			73	120
MAY	58	65	82	6.5	0.479	0.513	0			80	120
JUN	66	76	84	6.5	0.678	0.741	0			92	110
JUL	69	81	85	6.5	0.574	0.618	0			103	112
AUG	67	81	84	6.5	0.518	0.553	0			109	116
SEP	60	73	82	6.5	0.483	0.567	0			101	120
OCT	50	61	80	6.5	0.419	0.448	0			89	120
NOV	40	49	77	6.5	0.358	0.385	0			75	120
DEC	35	49	76	6.5	0.364	0.411	0			89	120