

Permit Fact Sheet

General Information

Permit Number	WI-0032077-09-0
Permittee Name and Address	Village of Oxford PO Box 122, Oxford, WI 53952
Permitted Facility Name and Address	Oxford Wastewater Treatment Facility Fandrich Street / 2nd Court, Section 20, T15N, R8E, Marquette County, Wisconsin
Permit Term	July 01, 2026 to June 30, 2031
Discharge Location	Southwest of the Village on Fandrich Street, North of Fox Road (Lat: 43.7675°N, Long: 89.5744°W)
Receiving Water	Neenah Creek in Neenah Creek Watershed of Upper Fox River Basin in Marquette County
Stream Flow (Q _{7,10})	26 cfs
Stream Classification	Coldwater (CW), non-public water supply
Discharge Type	Existing and Continuous
Annual Average Design Flow (MGD)	0.064 MGD
Industrial or Commercial Contributors	None
Plant Classification	Basic; A4 - Ponds, Lagoons and Natural Systems; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N/A

Facility Description

The facility consists of two primary stabilization lagoons and a single secondary lagoon followed by a pair of sand filters that are not in use but are maintained for potential use. Discharge from the lagoons enters an effluent ditch to Neenah Creek approximately 320 ft to the east of the facility, approximately 0.83 mile downstream from the creek crossing at W. Chauncey St. A greater than 180-day detention time is maintained. The last sludge removal event was in 2006. Sludge removal is expected in this permit term.

Substantial Compliance Determination

No enforcement during previous permit term

After a desk top review of all discharge monitoring reports, CMARs, land app reports, compliance schedule items, and a site visit on **5/8/2026**, this facility has been found to be in substantial compliance with their current permit.

Compliance determination made by Jordan Main, Compliance Engineer on 5/8/26.

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	0.042 MGD (2025)	Influent – Representative influent samples shall be collected from the influent diversion box. Influent flow is measured by Doppler flow meter at the influent well.
001	0.053 MGD (2025)	Effluent -Representative effluent samples shall be obtained from the outfall manhole prior to discharge to the effluent ditch to Neenah Creek. Effluent flow is measured by ultrasonic meter at the outfall manhole.
002	None was distributed in previous permit term.	Lagoon Sludge - A representative composite grab shall be collected from the lagoons once per permit term and prior to sludge removal and distribution. If a lagoon is scheduled for desludging, a composite grab sample of just that lagoon sludge may be needed prior to removal and distribution or land spreading.

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	
BOD5, Total		mg/L	2/Week	Grab	
Suspended Solids, Total		mg/L	2/Week	Grab	

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. BOD and TSS sampling frequency updated to match effluent.

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: 001- Effluent

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	45 mg/L	2/Week	Grab	
BOD5, Total	Monthly Avg	30 mg/L	2/Week	Grab	
Suspended Solids, Total	Weekly Avg	45 mg/L	2/Week	Grab	
Suspended Solids, Total	Monthly Avg	30 mg/L	2/Week	Grab	
Suspended Solids, Total	Weekly Avg	27 lbs/day	2/Week	Calculated	
Suspended Solids, Total	Monthly Avg	16 lbs/day	2/Week	Calculated	
Suspended Solids, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of TSS and report on the last day of the month on the DMR. See TMDL Calculations section.
Suspended Solids, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of TSS discharged and report on the last day of the month on the DMR. See TMDL Calculations section.
pH Field	Daily Min	6.0 su	5/Week	Grab	
pH Field	Daily Max	9.0 su	5/Week	Grab	
Nitrogen, Ammonia Variable Limit		mg/L	2/Week	Grab	Look up the variable ammonia limit from the 'Variable Ammonia Limitation' table and report the variable limit in the Ammonia Variable Limit column on the eDMR.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	2/Week	Grab	Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH3-N) Total column of the eDMR. See Ammonia

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					Limitation Section.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	34 mg/L	2/Week	Grab	
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	34 mg/L	2/Week	Grab	
Phosphorus, Total	Monthly Avg	2.9 mg/L	2/Week	Grab	
Phosphorus, Total	Monthly Avg	0.25 lbs/day	2/Week	Calculated	Monitoring only upon permit effective date. Final TMDL-based mass limits go into effect per the phosphorus compliance schedule. See Phosphorus TMDL section.
Phosphorus, Total	6-Month Avg	0.082 lbs/day	2/Week	Calculated	Monitoring only upon permit effective date. Final TMDL-based mass limits go into effect per the phosphorus compliance schedule. See Phosphorus TMDL section.
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 TMDL Calculations 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 TMDL Calculation section.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring only in 2029.
E. coli		#/100 ml	Weekly	Grab	Monitoring only May - September 2029 and 2030
E. coli		Percent	Monthly	Calculated	Monitoring only May - September 2029 and 2030. See the E. coli Percent Limit section. Enter the

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					result in the DMR on the last day of the month.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Monitoring Series section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Monitoring Series section.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Annual in rotating quarters. See Nitrogen Monitoring Series section. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite.

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.

BOD, TSS, pH, Ammonia, Phosphorus: Sample frequency updated.

Chloride – Monitoring in 2029 added.

E. Coli – Monitoring for 2 disinfection seasons added.

Total Suspended Solids TMDL Limits: Mass based TSS limits of 27 lbs/day as a weekly average and 16 lbs/day as a monthly average have been added to the permit to comply with requirements of the Upper Fox Wolf River TMDL. Effluent concentration (mg/L) shall be monitored and reported 2/week upon permit reissuance and will be used to calculate amounts reported for mass-based limits. An additional reporting requirement for lbs/month will be used to calculate the facility’s 12-month rolling sum of total monthly discharge, which can be compared directly to the facility’s designated WLA.

Phosphorus TMDL Limits: An interim limit of 2.9 mg/L goes into effect upon reissuance and will remain in effect unless a more stringent limit is required at a future permit issuance by ss. NR 217.13 and NR 217.16(2), Wis. Adm. Code, or the limit is relaxed following procedures outlined in ch. NR 207, Wis. Adm. Code. Discharge effluent concentration (mg/L) shall be reported 2/week upon permit reissuance and will be used to calculate amounts reported for mass-based parameters. An additional reporting requirement for lbs/month will be used to calculate the facility’s 12-month rolling sum of total monthly discharge, which can be compared directly to the facility’s designated WLA. Final TMDL WLA-based effluent limits of 0.082 lbs/day as a six-month average and 0.25 lbs/day as a monthly average will go into effect in accordance with the TMDL Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus compliance schedule.

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 4/01/2024.

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. The sampling frequency for BOD5, TSS, Ammonia, and Phosphorus have been updated to the standard frequencies based the guidance document.

Upper Fox Wolf River Basin (UFWRB) Total Maximum Daily Load (TMDL): The permitted facility is located within the UFWRB Total Maximum Daily Load (TMDL), which was approved by EPA February 27, 2020. The TMDL establishes Waste Load Allocations (WLAs) for point source dischargers and determines the maximum amounts of phosphorus and total suspended solids that can be discharged and still protect water quality. The final effluent limits and monitoring expressed in the permit were derived from and comply with the applicable water quality criterion and are consistent with the assumptions and requirements of the EPA-approved WLAs in the TMDL, which are 23 lbs/yr for phosphorus and 3,119 lbs/yr for TSS for the permitted facility.

The approved TMDL expresses WLAs as lbs/year and lbs/day (maximum annual load divided by 365 days). As outlined in Section 4.6 of the department's 2020 TMDL Implementation Guidance for Wastewater Permits, TMDL limits must be given in the permit that are consistent with the TMDL WLA permit limits derived from TMDL and need to be expressed as specified by 40 CFR 122.45 (d), s. NR 212.76 (4), and s. NR 205.065 (7), Wis. Adm. Code, unless determined to be impracticable. Impracticability has already been determined for phosphorus limits as laid out in the phosphorus impracticability agreement that was approved by USEPA in 2012 (see NPDES MOA Addendum dated July 12, 2012 at <https://apps.dnr.wi.gov/swims/Documents/DownloadDocument?id=167886175>). For phosphorus, continuously discharging facilities covered by the UFWRB TMDL are given monthly average mass limits. If the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits (averaging period of May through October and November through April) are also included. The equivalent effluent concentration of 2.9 mg/L was calculated for the facility, thus, TMDL based mass limits are expressed as a six-month average and a monthly average equal to three times the six-month average limits.

Facilities with UFWRB TMDL based effluent limits for phosphorus and TSS must report the 12-month rolling sum of total monthly discharge (lbs/yr). If reported 12-month rolling sums exceed the facility's max annual WLA, the facility's mass limits (monthly average and six-month average) may be recalculated using more appropriate CVs or monitoring frequencies when the permit is reissued to bring discharge levels into compliance with the facility's given WLA.

Chloride: Considering available effluent data from the permit reissuance application, the average of 4 data points is 92.4 mg/L which is less than 1/5th of the calculated WQBELs for chloride, therefore no effluent limits are needed. 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.

E. Coli: Revisions to bacteria surface water quality criteria to protect recreational uses and accompanying E. coli WPDES permit implementation procedures became effective May 1, 2020. The new rule requires that WPDES permits for facilities with required disinfection include monitoring for E. coli while facilities are disinfecting during the recreation period, and establish effluent limitations for E. coli established in s. NR 210.06 (2), Wis. Adm Code. The administrative code rule changes included the following actions: revised the bacteria water quality criteria from fecal coliform to E. coli to protect recreation in ch. NR 102, Wis. Adm. Code.; removed fecal coliform criteria for certain individual waters from ch. NR 104, Wis. Adm. Code.; revised permit requirements for publicly and privately owned sewage treatment works in ch. NR 210, Wis. Adm. Code.; and, updated approved analytical methods for bacteria in ch. NR 219, Wis. Adm. Code.

Because of previous high results of fecal coliform, E. coli monitoring is included in the reissued permit to determine if Oxford can meet the E. Coli limits in s. NR 210.06(2)(a)1, Wis. Adm. Code, without disinfection.

PFAS: Based on information available at the time the proposed permit was drafted, the department has determined the permittee does not need to sample for PFOS or PFOA in their effluent as part of this permit reissuance. The department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

3 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	Sludge Class (A or B)	Sludge Type (Liquid or Cake)	Pathogen Reduction Method	Vector Attraction Method	Reuse Option	Amount Reused/Disposed (Dry Tons/Year)
002	B	Liquid				
Does sludge management demonstrate compliance? Yes						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No						
Is a priority pollutant scan required? No, flow <5 MGD						
Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

3.1 Sample Point Number: 002- Lagoon Sludge

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

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Nickel Dry Wt	High Quality	420 mg/kg	Once	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Once	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Once	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Once	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Once	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Once	Composite	
Nitrogen, Total Kjeldahl		Percent	Once	Composite	Monitoring required only when land application occurs.
Nitrogen, Ammonia (NH3-N) Total		Percent	Once	Composite	Monitoring required only when land application occurs.
Phosphorus, Total		Percent	Once	Composite	Monitoring required only when land application occurs.
Phosphorus, Water Extractable		% of Tot P	Once	Composite	Monitoring required only when land application occurs.
Potassium, Total Recoverable		Percent	Once	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Analysis required 2027. See Sludge Analysis for PCBs section.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Analysis required 2027. See Sludge Analysis for PCBs section.
PFOA + PFOS		ug/kg	Once	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Once	Calculated	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

Changes from Previous Permit:

Sludge limitations and monitoring requirements were 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.

PCBs - Monitoring for PCBs in the year 2027 added.

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

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). Radium requirements are addressed in s. NR 204.07(3)(n).

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

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

PCBs: PCBs are not expected to be present due to the lack of any industrial or commercial discharges. Pursuant to s. NR 204.06(2)(c), Wis Adm. Code, PCB monitoring may be included with a monitoring frequency of ‘once’ every other permit term.

Water Extractable Phosphorus: Water extractable phosphorus (WEP) is the coefficient for determining plant available phosphorus from measured total phosphorus. In Wisconsin, the Penn State Method is utilized and is expressed in percent. While a total P may be significant, the WEP may show that only a small percentage of the P is available to plants because of factors such as treatment processes and chemical addition that “tie-up” phosphorus limiting the amount of phosphorus that is plant available. As part of the Wisconsin’s nutrient management plan (NMP) requirements, the accounting of all fertilizers must be included over the NMP cycle. The fertilizer value of the waste needs to be communicated to the farmer and accounted for in the NMP.

4 Schedules

4.1 Sludge Management Plan

A management plan is required for the land application system.

Required Action	Due Date
<p>Submit a Sludge Management Plan: The permittee shall submit a management plan for approval if removal of sludge from the treatment lagoons will occur during this permit term. The plan shall demonstrate compliance with ch. NR 204 Wis. Adm. Code and at minimum address 1) How and where is sludge sampled; 2) Available sludge storage details and location(s); 3)How will the sludge be removed with details on volume, characterization and how will the treatment plant continue to function during the drawdown; 4) Describe the type of transportation and spreading vehicles and loading and unloading practices; 5) Identify approved land application sites, apply for needed sites,</p>	

<p>site limitations, total acres needed and vegetative cover management; 6) Specify record keeping procedures including site loading; 7) Address contingency plans for adverse weather and odor/nuisance abatement; and 8) Include any other pertinent information such as other disposal options that may be used or specifications of any pretreatment processes</p> <p>Once approved, all sludge management activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes. No desludging may occur unless approval from the Department is obtained. Daily logs shall be kept that record where the sludge has been disposed.</p> <p>Submit an updated management plan 60 days prior to intended removal of sludge.</p>	
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Explanation of Schedule

The permittee has indicated sludge removal may occur in the permit term. A management plan is being required per s. [NR 204.11\(1\)](#) for review and approval prior to any sludge removal, distribution, or land application. The plan must be submitted at least 60 days prior to the sludge being removed.

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

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

Required Action	Due Date
<p>Operational Evaluation Report: The permittee shall prepare and submit to the Department for approval an operational evaluation report. 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 phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by June 30, 2033. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than June 30, 2033 and state whether the measures, improvements, and modifications will enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report.</p> <p>If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by December 31, 2027 and is not required to comply with the milestones identified below for years 3 through 9 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance').</p> <p>STUDY OF FEASIBLE ALTERNATIVES - If the Operational Evaluation Report concludes that the permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and</p>	<p>12/31/2026</p>

determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than June 30, 2033.	
Compliance Alternatives, Source Reduction, Improvements and Modifications Status: The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.	03/31/2027
Preliminary Compliance Alternatives Plan: The permittee shall submit a preliminary compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design report. If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan. If water quality trading will be undertaken, the plan must state that trading will be pursued.	12/31/2027
Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code. If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code. If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2028
Progress Report on Plans & Specifications: Submit progress report regarding the progress of preparing final plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2028
Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section	06/30/2029

of this permit.	
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2030
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2031
Construction Upgrade Progress Report #2: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2032
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2032
Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2033

Explanation of Schedule

Subchapter NR 217.17, Wis. Adm. Code, allows the department to provide a schedule of compliance for water quality-based phosphorus limits where the permittee cannot immediately achieve compliance. This compliance schedule requires the permittee to comply with the final water quality-based phosphorus limits within 7 years.

The permittee may be required to meet the final phosphorus WQBEL sooner than June 30, 2033 (less than 7 years) if the required “Operational Evaluation Report” concludes that the phosphorus WQBEL can be met using the existing treatment system with only source reduction measures, operational improvements and minor facility modifications. Also, the permittee will conduct a “Study of Feasible Alternatives” to determine whether Water Quality Trading or Adaptive Management, either alone or in combination with plant upgrades will allow the plant to meet the phosphorus WQBEL.

The department believes that the compliance schedule suggested in the draft permit provides the appropriate length of time for the permittee to evaluate these options, implement the chosen option and meet the final phosphorus limits (WQBELs).

4.3 Subclass SS - Sanitary Sewage Collection System Operator Certification

Required Action	Due Date
Wastewater Operator Certification for Subclass SS: : The permittee shall have at least one operator on staff obtain certification for Subclass SS - Sanitary Sewage Collection System as soon as possible and before the due date.	06/30/2027

Attachments

Water Quality Based Effluent Limits dated 04/01/2024

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance

Prepared By: Marissa Fleege Wastewater Specialist

Date: 4/24/26

Date Amended Post Public Notice:

CORRESPONDENCE/MEMORANDUM

DATE: 04/01/2024

TO: Sarah Adkins – NER

FROM: Nicole Krueger – SER *Nicole Krueger*

SUBJECT: Water Quality-Based Effluent Limitations for Oxford Wastewater Treatment Facility
WPDES Permit No. WI-0032077-09

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 Oxford Wastewater Treatment Facility in Marquette County. This municipal wastewater treatment facility (WWTF) discharges to Neenah Creek, located in the Neenah Creek Watershed in the Upper Fox and Wolf River Basin. This discharge is included in the Upper Fox Wolf River Basin TMDL as approved by EPA. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD ₅			45 mg/L	30 mg/L		1
TSS TMDL			45 mg/L 27 lbs/day	30 mg/L 16 lbs/day		3
pH	9.0 s.u.	6.0 s.u.				1
Ammonia Nitrogen	Variable		34 mg/L	34 mg/L		4,5
Phosphorus Interim TMDL				2.9 mg/L 0.25 lbs/day	0.082 lbs/day	3,6
TKN, Nitrate+Nitrite, and Total Nitrogen						7
E. coli						2

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Upper Fox Wolf River to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in February 2020
4. 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. These limits apply year-round.

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	72	7.0 < pH ≤ 7.1	44	8.0 < pH ≤ 8.1	9.3
6.1 < pH ≤ 6.2	71	7.1 < pH ≤ 7.2	39	8.1 < pH ≤ 8.2	7.6
6.2 < pH ≤ 6.3	69	7.2 < pH ≤ 7.3	35	8.2 < pH ≤ 8.3	6.3
6.3 < pH ≤ 6.4	67	7.3 < pH ≤ 7.4	31	8.3 < pH ≤ 8.4	5.2
6.4 < pH ≤ 6.5	65	7.4 < pH ≤ 7.5	27	8.4 < pH ≤ 8.5	4.3

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.5 < pH ≤ 6.6	63	7.5 < pH ≤ 7.6	23	8.5 < pH ≤ 8.6	3.5
6.6 < pH ≤ 6.7	60	7.6 < pH ≤ 7.7	19	8.6 < pH ≤ 8.7	3.0
6.7 < pH ≤ 6.8	56	7.7 < pH ≤ 7.8	16	8.7 < pH ≤ 8.8	2.5
6.8 < pH ≤ 6.9	52	7.8 < pH ≤ 7.9	14	8.8 < pH ≤ 8.9	2.1
6.9 < pH ≤ 7.0	48	7.9 < pH ≤ 8.0	11	8.9 < pH ≤ 9.0	1.8

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. The interim monthly average phosphorus limit of 2.9 mg/L shall be effective during the phosphorus compliance schedule to meet the TMDL limits.
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 (NO₃), nitrite (NO₂), and total kjeldahl nitrogen (TKN) (all expressed as N).

No WET testing is required because information related to the discharge indicates low to no risk for toxicity.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Nicole Krueger at Nicole.Krueger@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (3) – Narrative, Outfall Map, & 2011 Ammonia Calculations

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Barti Oumarou, Wastewater Engineer – NER
 Heidi Schmitt Marquez, Regional Wastewater Supervisor – NER
 Diane Figiel, Water Resources Engineer – WY/3
 Nate Willis, Wastewater Engineer – WY/3

Attachment #1
**Water Quality-Based Effluent Limitations for
Oxford Wastewater Treatment Facility**

WPDES Permit No. WI-0032077-09

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

The facility consists of two primary stabilization lagoons and a single secondary lagoon followed by a pair of sand filters that are kept unused. The valves are exercised to keep them available if needed. Sludge that accumulates in the treatment lagoons is occasionally removed and land applied to agricultural fields.

Disinfection of the effluent is not required based on the conditions of s. NR 210.06(3)(h), Wis. Adm. Code because the lagoons provide a detention time of greater than 180 days. Disinfection may be required in future reissuances if the detention time changes or additional information is made available.

Attachment #2 is a map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations

The current permit, expiring on 12/31/2022, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD ₅			45 mg/L	30 mg/L		2
TSS			45 mg/L	30 mg/L		2
pH	9.0 s.u.	6.0 s.u.				2
Ammonia Nitrogen	Variable		34 mg/L	34 mg/L		3
Fecal Coliform						1
Phosphorus						1

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. The variable daily maximum ammonia limits are shown below:

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
pH ≤ 7.5	> 34	8.3 < pH ≤ 8.4	7.8
7.5 < pH ≤ 7.6	34	8.4 < pH ≤ 8.5	6.4
7.6 < pH ≤ 7.7	29	8.5 < pH ≤ 8.6	5.3
7.7 < pH ≤ 7.8	24	8.6 < pH ≤ 8.7	4.4
7.8 < pH ≤ 7.9	20	8.7 < pH ≤ 8.8	3.7

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
7.9 < pH ≤ 8.0	17	8.8 < pH ≤ 8.9	3.1
8.0 < pH ≤ 8.1	14	8.9 < pH ≤ 9.0	2.6
8.1 < pH ≤ 8.2	11	pH > 9.0	< 2.6
8.2 < pH ≤ 8.3	9.4		

Receiving Water Information

- Name: Neenah Creek
- Waterbody Identification Code (WBIC): 173800
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Coldwater (CW), non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q₁₀ and 7-Q₂ values are from USGS for Station UR28, 1.2 miles south of the town of Oxford, where Outfall 001 is located.
 - 7-Q₁₀ = 26 cfs (cubic feet per second)
 - 7-Q₂ = 29 cfs
- Hardness = 177 mg/L as CaCO₃. This value represents the geometric mean of data from the White River near Neshkoro from 02/24/1997 – 10/30/1997.
- % 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: Background data for chloride used in this evaluation is from Neenah Creek at Highway 23 used for this evaluation. Metals data from the Fox River at Berlin 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.
- 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: The Fox River approximately 20 miles downstream of Outfall 001 is 303(d) listed as impaired for PCBs.

Effluent Information

- Design flow rate(s):
 - Annual average = 0.064 MGD (Million Gallons per Day)
 - For reference, the actual average flow from 01/01/2018 – 07/31/2022 was 0.064 MGD.
- Hardness = 191 mg/L as CaCO₃. This value represents the geometric mean of data from 03/28/2022 – 04/07/2022.
- 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 water supply from wells.
- Additives: None.
- 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 ammonia, chloride,

hardness and phosphorus.

- 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.

Effluent Copper Data

Sample Date	Copper µg/L	Sample Date	Copper µg/L	Sample Date	Copper µg/L
03/28/2022	4.97	04/11/2022	3.55	04/25/2022	2.77
03/31/2022	6.55	04/14/2022	2.90	04/28/2022	1.93
04/04/2022	5.20	04/18/2022	2.90	05/02/2022	3.19
04/07/2022	3.93	04/21/2022	2.52		
1-day P ₉₉ = 8.0 µg/L					
4-day P ₉₉ = 5.6 µg/L					

Effluent Chloride Data

Sample Date	Chloride mg/L
03/28/2022	93.7
03/31/2022	91.9
04/04/2022	91.6
04/07/2022	92.4
Average	92.4

The following table presents the average concentrations and loadings at Outfall 001 from 01/01/2018 – 07/31/2022 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Averages of Parameters with Limits

	Average Measurement
BOD ₅	8.7 mg/L*
TSS	9.0 mg/L*
pH field	7.75 s.u.
Phosphorus	2.14 mg/L
Ammonia Nitrogen	3.65 mg/L*

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

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

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 P₉₉) 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)

Daily Maximum Limit Calculation Method

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

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

Where:

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

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

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

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

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

In this case, limits set equal to two times the acute criteria are more restrictive and this method is used to calculate the daily maximum limits shown in the table below.

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 = 20.8 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), 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	680	136	0.98		
Cadmium	191	9.2	18.3	3.66	<0.084		
Chromium	191	3063	6126	1225	<0.70		
Copper	191	28.6	57.1			8.0	6.55
Lead	191	200	400	79.9	<1.08		
Nickel	191	811	1622	324	<0.90		
Zinc	191	212	424	84.8	<29		
Chloride (mg/L)		757	1514	303	92.4		

* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

** The 2 × ATC method of limit calculation yields a more restrictive limit than consideration of ambient concentrations and 1-Q₁₀ 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 = 6.50 cfs (¼ of the 7-Q₁₀), 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		148	2	9731	1946	0.98	
Cadmium	175	3.82		255	50.9	<0.084	
Chromium	177	138	13	8316	1663	<0.7	
Copper	177	16.9	3	927			5.6
Lead	177	48.6		3240	648	<1.08	
Nickel	177	85		5638	1128	<0.9	
Zinc	177	198		13217	2643	<29	
Chloride (mg/L)		395	5.4	25968	5194	92.4	

* The indicated hardness may differ from the receiving water hardness because the receiving water hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the chronic criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

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 = 7.39 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		27982	5596	<0.084
Chromium (+3)	3818000	13	288742538	57748508	<0.70
Lead	140		10588	2118	<1.08
Nickel	43000		3251946	650389	<0.90

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 7.39 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	2	857	171	0.98

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 not required for these toxic substances.

Chloride – Considering available effluent data from the permit reissuance application, the average of 4 data points is 92.4 mg/L which is less than 1/5th of the calculated WQBELs for chloride, therefore no effluent limits are needed. **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.**

Mercury – The permit application did not require monitoring for mercury because Oxford 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 Oxford is a lagoon facility that has not removed sludge in the previous 5 years. 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. **No monitoring is recommended.**

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 and the effluent flow rate, PFOS and PFOA monitoring is not recommended. 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 daily maximum, weekly average and monthly average limits. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- Section NR 106.07(3), Wis. Adm. Code requires weekly and monthly average limits for municipal treatment plants.
- 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:

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

Where:

A = 0.411 and B = 58.4 for a Warm Water Sport fishery, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 1152 sample results were reported from 01/02/2018 – 07/29/2022. The maximum reported value was 8.1 s.u. (Standard pH Units). The effluent pH was 8.0 s.u. or less 99% of the time. The 1-day P₉₉, calculated in accordance with s. NR

Attachment #1

106.05(5), Wis. Adm. Code, is 8.0 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 8.0 s.u. Therefore, a value of 8.0 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.0 s.u. into the equation above yields an ATC = 5.6 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 the 1-Q₁₀ 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-Q₁₀ (estimated as 80 % of 7-Q₁₀) and the 2×ATC approach are shown below.

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	17
1-Q ₁₀	1770

The current permit has variable daily maximum effluent limits based on effluent pH. Presented below is a table of daily maximum limitations corresponding to various effluent pH values updated using the 1-Q₁₀.

Daily Maximum Ammonia Nitrogen Limits – Cold water

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	72	7.0 < pH ≤ 7.1	44	8.0 < pH ≤ 8.1	9.3
6.1 < pH ≤ 6.2	71	7.1 < pH ≤ 7.2	39	8.1 < pH ≤ 8.2	7.6
6.2 < pH ≤ 6.3	69	7.2 < pH ≤ 7.3	35	8.2 < pH ≤ 8.3	6.3
6.3 < pH ≤ 6.4	67	7.3 < pH ≤ 7.4	31	8.3 < pH ≤ 8.4	5.2
6.4 < pH ≤ 6.5	65	7.4 < pH ≤ 7.5	27	8.4 < pH ≤ 8.5	4.3
6.5 < pH ≤ 6.6	63	7.5 < pH ≤ 7.6	23	8.5 < pH ≤ 8.6	3.5
6.6 < pH ≤ 6.7	60	7.6 < pH ≤ 7.7	19	8.6 < pH ≤ 8.7	3.0
6.7 < pH ≤ 6.8	56	7.7 < pH ≤ 7.8	16	8.7 < pH ≤ 8.8	2.5
6.8 < pH ≤ 6.9	52	7.8 < pH ≤ 7.9	14	8.8 < pH ≤ 8.9	2.1
6.9 < pH ≤ 7.0	48	7.9 < pH ≤ 8.0	11	8.9 < pH ≤ 9.0	1.8

Section NR 106.33(2), Wis. Adm. Code, was updated effective September 1, 2016. As a result, seasonal 20 and 40 mg/L thresholds for including ammonia limits in municipal discharge permits are no longer applicable under current rules. As such, the table has been expanded from the table in the current permit to included ammonia nitrogen limits throughout the pH range.

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

The weekly and monthly average ammonia nitrogen limits calculation from the previous memo do not change because there have been no changes in the effluent and receiving water flow rates. The calculations from the previous WQBEL memo are shown in Attachment #3 and shown below:

Ammonia Nitrogen Limits

	Weekly Average mg/L	Monthly Average mg/L
Year round	34	34

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 03/05/2019 – 01/30/2024, with those results being compared to the calculated limits to determine the need to include ammonia limits in Oxford’s permit for the respective month ranges. That need is determined by calculating 99th upper percentile (or P₉₉) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

Effluent Ammonia Data

Ammonia Nitrogen mg/L	April - May	June - September	October - March
1-day P ₉₉	11.6	9.08	19.6
4-day P ₉₉	6.50	4.91	11.5
30-day P ₉₉	3.87	2.57	7.21
Mean *	2.73	1.61	5.32
Std	2.33	1.89	3.89
Sample size	40	71	109
Range	0.07 - 9.68	0.12 - 7.51	<0.06 - 13.9

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

Based on this comparison, daily maximum limits are required in the months of October – March based on the single calculated daily maximum limit of 17 mg/L.

The permit currently has daily maximum, weekly average, 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.

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 meet the requirements in s. NR 106.07, Wis. Adm Code, are shown below in bold which are equivalent to the current daily maximum variable limit.

Attachment #1

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
Year round	Variable*	34	34

***Variable Daily Maximum 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	72	7.0 < pH ≤ 7.1	44	8.0 < pH ≤ 8.1	9.3
6.1 < pH ≤ 6.2	71	7.1 < pH ≤ 7.2	39	8.1 < pH ≤ 8.2	7.6
6.2 < pH ≤ 6.3	69	7.2 < pH ≤ 7.3	35	8.2 < pH ≤ 8.3	6.3
6.3 < pH ≤ 6.4	67	7.3 < pH ≤ 7.4	31	8.3 < pH ≤ 8.4	5.2
6.4 < pH ≤ 6.5	65	7.4 < pH ≤ 7.5	27	8.4 < pH ≤ 8.5	4.3
6.5 < pH ≤ 6.6	63	7.5 < pH ≤ 7.6	23	8.5 < pH ≤ 8.6	3.5
6.6 < pH ≤ 6.7	60	7.6 < pH ≤ 7.7	19	8.6 < pH ≤ 8.7	3.0
6.7 < pH ≤ 6.8	56	7.7 < pH ≤ 7.8	16	8.7 < pH ≤ 8.8	2.5
6.8 < pH ≤ 6.9	52	7.8 < pH ≤ 7.9	14	8.8 < pH ≤ 8.9	2.1
6.9 < pH ≤ 7.0	48	7.9 < pH ≤ 8.0	11	8.9 < pH ≤ 9.0	1.8

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

Oxford’s current permit requires fecal coliform monitoring for one year due to an abnormally high data point of 3,922 counts/100 mL (09/07/2016). From the current permit term (06/25/2019 – 09/24/2019), the maximum reported value was 449 counts/100 mL and the maximum monthly geometric mean was 32.5 counts/100 mL. The data is summarized below.

Effluent Fecal Coliform

Sample Date	#/100 mL	Sample Date	#/100 mL	Sample Date	#/100 mL
6/25/2019	58	8/6/2019	10	9/10/2019	449
7/9/2019	144	8/13/2019	19	9/17/2019	125
7/16/2019	134	8/20/2019	15	9/24/2019	2
7/23/2019	20	8/29/2019	6		
7/31/2019	2	9/4/2019	10		

The ponds have a total volume of approximately 18 million gallons. Based on this and the average flow rate, the detention time is approximately 290 days. Disinfection is not recommended based on the conditions of s. NR 210.06(3)(h), Wis. Adm. Code because the lagoons provide a detention time of more than 180 days.

$$Detention\ Time\ (days) = \frac{Total\ Pond\ Volume\ (MG)}{180 - day\ average\ flow\ rate\ (mgd)}$$

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.

It is recommended that E. coli monitoring be included in the reissued permit to determine if Oxford can meet the E. Coli limits in s. NR 210.06(2)(a)1, Wis. Adm. Code, without disinfection.

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 Oxford 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 to s. NR 217.04(1)(a)1, Wis. Adm. Code, and therefore no technology-based limit is required.

Annual Average Mass Total Phosphorus Loading

Month	Monthly Avg. mg/L	Total Flow MG/month	Total Phosphorus lb./mo.
Mar 2021	1.61	2.06	27.6
Apr 2021	1.23	1.23	12.6
May 2021	1.09	2.77	25.2
Aug 2021	1.51	2.21	27.9
Sep 2021	0.84	2.27	15.8
Oct 2021	0.82	2.47	16.8
Nov 2021	0.54	1.56	7.10
Dec 2021	1.08	2.50	22.6
Average			19.4

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 (not design) flow (in MGD) for that month

In addition, the need for a WQBEL for phosphorus must be considered.

Total Maximum Daily Load (TMDL)

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 pounds per year. This WLA found in Appendix H of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Upper Fox and Wolf River Basins (UFW TMDL)* report dated February 2020 are expressed as maximum annual loads (lbs/year).

For the reasons explained in the April 30, 2012 paper entitled *Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin*, WDNR has determined that the phosphorus WQBELs set equal to WLAs would not be consistent with the assumptions and requirements of the TMDL. Therefore, limits given to facilities included in the Upper Fox and Wolf River Basins TMDL are given monthly average mass limits and, if the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits are also included. The following equation shows the calculation of equivalent effluent concentration:

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$$\begin{aligned} \text{TP Equivalent Effluent Concentration} &= \text{WLA} \div (\text{365 days/yr} * \text{Flow Rate} * \text{Conversion Factor}) \\ &= 23 \text{ lbs/yr} \div (\text{365 days/yr} * 0.064 \text{ MGD} * 8.34) \\ &= 0.12 \text{ mg/L} \end{aligned}$$

Since this value is less than 0.3 mg/L, both a six-month average mass limit and a monthly average mass limit are applicable for total phosphorus. The monthly average limit is set equal to three times the six-month average limit.

$$\begin{aligned} \text{TP 6-Month Average Permit Limit} &= \text{WLA} \div \text{365 days/yr} * \text{multiplier} \\ &= (23 \text{ lbs/yr} \div \text{365 days/yr}) * 1.30 \\ &= 0.082 \text{ lbs/day} \end{aligned}$$

$$\begin{aligned} \text{TP Monthly Average Permit Limit} &= \text{TP 6-Month Average Permit Limit} * 3 \\ &= 0.082 \text{ lbs/day} * 3 \\ &= 0.25 \text{ lbs/day} \end{aligned}$$

The multiplier used in the six-month average calculation was determined according to the implementation guidance. A coefficient of variation was calculated, based on phosphorus mass monitoring data, to be 0.6. This is the standard deviation divided by the mean of mass data. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies phosphorus monitoring as monthly but EPA recommends a monitoring frequency of at least 4/month when deriving TMDL-based permit limits. Therefore, a multiplier based on weekly monitoring is used to calculate the 6-month average and monthly average limits; if a different monitoring frequency is used, the stated limits should be reevaluated.

Six-month average and monthly average mass effluent limits are recommended for this discharge. The limits are equivalent to a concentration of 0.15 mg/L and 0.46 mg/L at the facility design flow of 0.064 MGD.

The UFW TMDL establishes TP wasteload allocations to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries to the Upper Fox and Wolf 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.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from 03/23/2021 – 12/28/2021.

Total Phosphorus Effluent Data

	Phosphorus mg/L	Phosphorus lbs/day
1-day P ₉₉	3.75	1.98
4-day P ₉₉	2.86	1.19
30-day P ₉₉	2.39	0.80

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	Phosphorus mg/L	Phosphorus lbs/day
Mean	2.14	0.62
Std	0.55	0.38
Sample size	27	27
Range	1.15 – 3.25	0.139 – 1.77

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 be set equal to 2.9 mg/L for permit reissuance along with requirements for optimization of phosphorus removal.** This value reflects the 4-day P₉₉ concentration of 2.9 mg/L from the current permit term. This value is recommended instead of the 30-day P₉₉ concentration of 2.4 mg/L to allow operational flexibility when the facility begins to initiate phosphorus treatment optimization activities, which often consist of trial and error.

PART 6 – TOTAL SUSPENDED SOLIDS

Total Suspended Solids (TSS) 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). This WLAs found in Appendix I of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Upper Fox and Wolf Basins (UFW TMDL)* report dated February 2020 are expressed as maximum annual loads (lbs/year).

Revisions to chs. NR 106 and 205, Wis. Adm. Code align Wisconsin water quality-based effluent limits with 40 CFR 122.45(d), which requires WPDES permits to contain the following concentration limits, whenever practicable and necessary to protect water quality:

- Weekly average and monthly average limitations for continuous discharges subject to ch. NR 210.
- Daily maximum and monthly average limitations for all other discharges.

Oxford is a municipal treatment facility and is therefore subject to weekly average and monthly average TSS limits derived from TSS annual WLAs.

$$\begin{aligned} \text{TSS Weekly Average Permit Limit} &= \text{WLA} \div 365 \text{ days/yr} * \text{multiplier} \\ &= (3,119 \text{ lbs/yr} \div 365 \text{ days/yr}) * 3.11 \\ &= 27 \text{ lbs/day} \end{aligned}$$

$$\begin{aligned} \text{TSS Monthly Average Permit Limit} &= \text{WLA} \div 365 \text{ days/yr} * \text{multiplier} \\ &= (3,119 \text{ lbs/yr} \div 365 \text{ days/yr}) * 1.90 \\ &= 16 \text{ lbs/day} \end{aligned}$$

The multiplier used in the weekly average and monthly average calculation was determined according to implementation guidance. A coefficient of variation was calculated, based on TSS mass monitoring data, to be 1.0. This is the standard deviation divided by the mean of mass data. However, it is believed that the optimization of the wastewater treatment system to achieve the WLA-derived permit limits will reduce

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effluent variability. Thus, the maximum anticipated coefficient of variation expected by the facility is 0.6. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies TSS monitoring as 2/month but EPA recommends a monitoring frequency of at least 4/month when deriving TMDL-based permit limits. Therefore, a multiplier based on weekly monitoring is used to calculate the weekly and monthly average limits; if a different monitoring frequency is used, the stated limits should be reevaluated.

Weekly average and monthly average mass effluent limits are recommended for this discharge. The limits are equivalent to concentrations of 50 mg/L and 30 mg/L, respectively, at the facility design flow of 0.064 MGD.

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 TSS. Rolling 12-month sums can be compared directly to the annual wasteload allocation.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from 01/09/2018 – 07/26/2022.

Total Suspended Solids Effluent Data

	TSS mg/L	TSS lbs/day
1-day P ₉₉	41.6	25.2
4-day P ₉₉	23.5	13.8
30-day P ₉₉	13.3	7.67
Mean	9.02	5.10
Std	8.58	5.13
Sample size	110	100
Range	0 – 49	0 – 27.5

Oxford can currently meet the TMDL-based limits so the limits are recommended to be effective upon permit reissuance and no compliance schedule is needed. The current weekly and monthly concentration limits of 45 mg/L and 30 mg/L are also recommended to continue in the reissued permit.

PART 7 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in 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 (s. NR 106.55(6)(a), Wis. Adm. Code).

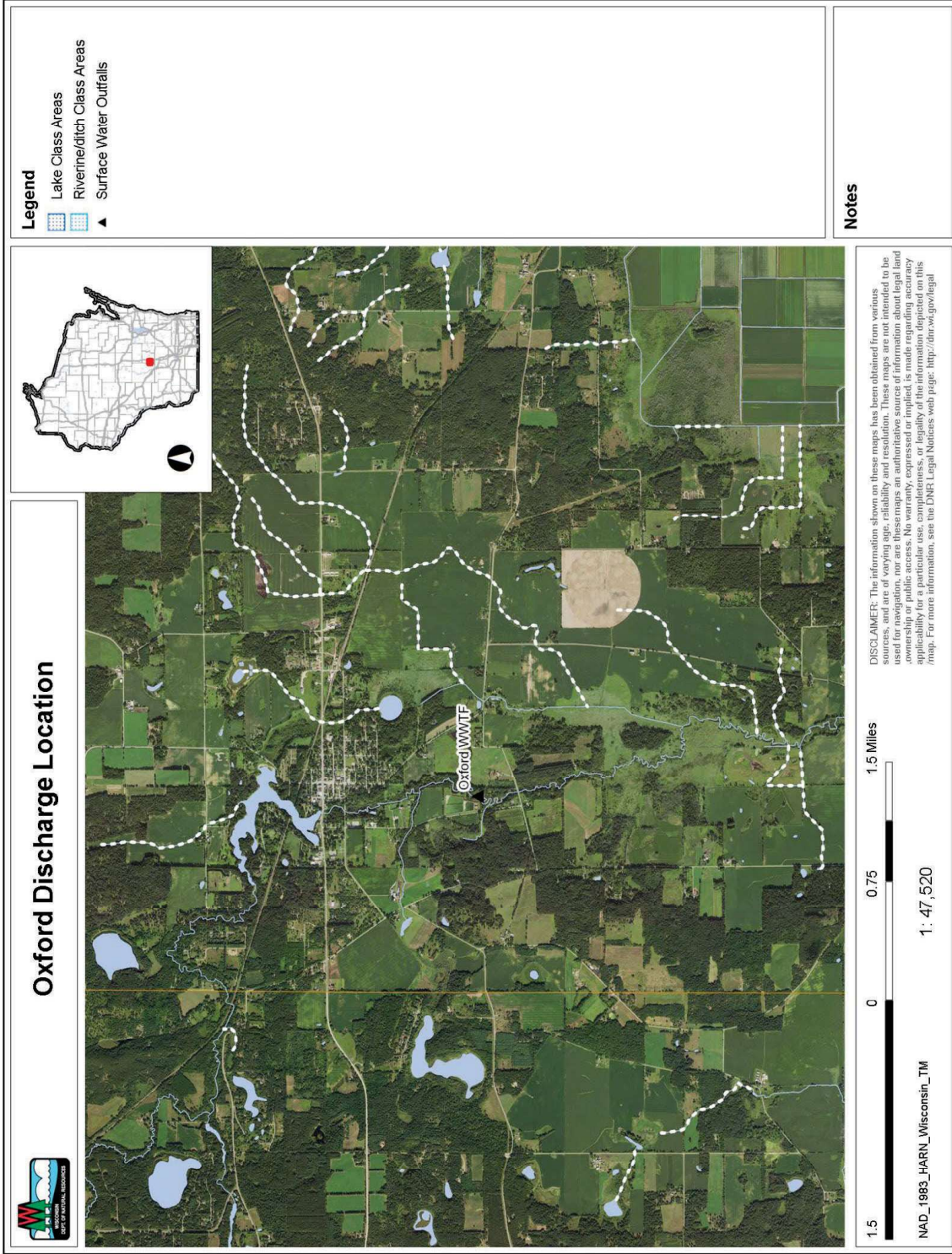
At temperatures above ~103°F, conventional biological treatment systems stop functioning properly and

experience upsets. There is no indication that this has ever occurred at this treatment system. Also, due to the long detention time in the lagoons, effluent temperature is likely similar to ambient water temperatures. **Therefore, no limits or monitoring is recommended to be included in the reissued permit for temperature.**

PART 8 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document (October 29, 2019)*.

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



2011 Ammonia Limits Calculations

Ammonia was evaluated in the previous effluent limit memo, but will be looked at again here based on new effluent pH and ammonia data to determine what limits are and if they are needed in the permit. Daily maximum limits are calculated using the upper 99th percentile effluent pH and the criteria in Table 2C of ch. NR 105, Wis. Adm. Code, for Coldwater Category 5 since according to the fish stocking summary, rainbow trout was not stocked in Neenah Creek. As a result, the applicable water quality criteria would be for Category 5 in Table 2C of ch. NR 105. A total of 1,290 results were reported since the previous permit was issued on July 1, 2006. From that data, the 99th upper percentile value is 8.2; only 10 results are 8.3 or higher and those 10 results represent less than 1% of the database so the 99th percentile is considered to be 8.2. The calculated acute toxicity criteria from Table 2C of ch. NR 105 is 5.73 mg/L, which translates into a daily maximum effluent limit of 11.5 mg/L. In the effluent ammonia data summary on page 2 of this report, the reported maximum effluent concentration is 21.4 mg/L and the 99th percentile effluent value is 24.74 mg/L. Since both concentrations are in excess of the daily maximum limit, it is necessary to include a daily maximum limit in the permit pursuant to s. NR 106.32(2), Wis. Adm. Code.

However, it is also noted that the effluent pH values at Oxford are highly variable. The 1,290 results collected since July 1, 2006 range from 6.8 to 8.4, and the daily maximum limit based on that pH range go from 84 mg/L at pH 6.8 down to 7.8 mg/L at pH 8.4. In fact, on the day in which the effluent ammonia concentration of 21.4 mg/L was reported (02/03/2009), the effluent pH was only 7.5, so the daily maximum limit on that day would have been 39.8 mg/L and a permit limit wouldn't have been needed. Because of other days with nearly as high ammonia concentrations but higher pH values, limits are still recommended for the upcoming permit.

Instead of a single daily maximum limit being recommended for Oxford's permit, because of the range of effluent pH values being reported in the past, the recommended daily maximum limits shall be given in the form of a table based on effluent pH. This table was provided for information purposes in the previous effluent limit recommendation memo from 2006, but because of the highly variable pH results, it is recommended that this table be included in the permit.

Daily Maximum Limits – “Coldwater 5” Category

Effluent pH - s.u.	NH ₃ -N Limit – mg/L	Effluent pH - s.u.	NH ₃ -N Limit – mg/L
pH ≤ 7.5	No Limit	8.2 < pH ≤ 8.3	9.4
7.5 < pH ≤ 7.6	34*	8.3 < pH ≤ 8.4	7.8
7.6 < pH ≤ 7.7	29*	8.4 < pH ≤ 8.5	6.4
7.7 < pH ≤ 7.8	24*	8.5 < pH ≤ 8.6	5.3
7.8 < pH ≤ 7.9	20*	8.6 < pH ≤ 8.7	4.4
7.9 < pH ≤ 8.0	17	8.7 < pH ≤ 8.8	3.7
8.0 < pH ≤ 8.1	14	8.8 < pH ≤ 8.9	3.1
8.1 < pH ≤ 8.2	11	8.9 < pH ≤ 9.0	2.6

* During the months of May through October if the pH is less than or equal to 7.9 there is no daily maximum limit for NH₃-N for municipal WWTF's treating primarily domestic wastewater. Limits shown in the table above with an asterisk* would apply from November through April only.

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Weekly and monthly average ammonia limits may also be calculated based on 4-day and 30-day chronic criteria in ch. NR 105. However, because of the high dilution rate and relatively low background pH values available in Neenah Creek, the calculated weekly and monthly average limits are much greater than the daily maximum limits in the above table. This evaluation was made in the 2006 effluent limit recommendation memo for Oxford and the results have not changed since then. No weekly or monthly average limits are recommended at this time.