Permit Fact Sheet

General Information

Permit Number:	WI-0031348-11	
Permittee Name:	VILLAGE OF RIDGEWAY	
Address:	206 Kirby St	
City/State/Zip:	Ridgeway WI 53582	
Discharge Location:	NW ¼ of SE ¼, Section 14, T6N R4E (Lat: 42.99152º N / Lon: 89.98097º W)	
Receiving Water:	Smith-Conley Creek (Upper East Branch Pecatonica River Watershed, SP06 – Sugar-Pecatonica River Basin) in Iowa County	
Stream Flow ($Q_{7,10}$):	0.2 cfs	
Stream Classification:	Limited Forage Fish, non-public water supply	
Design Flow(s)	Daily Maximum	0.162 MGD
	Annual Average	0.045 MGD
Significant Industrial Loading?	None	
Operator at Proper Grade?	Facility is Basic with subclasses A1 – Suspended Growth Processes, B – Solids Separation, C – Biological Solids/Sludges, D – Disinfection, SS – Sanitary Sewage Collection System. Consultant is acting as temporary OIC until OIT is certified at the level and in all subclasses of the plant. Currently, neither the OIC nor OIT hold the SS subclass.	
Approved Pretreatment Program?	N/A	

Facility Description

The Village of Ridgeway operates a wastewater treatment facility that serves a population of approximately 660 residents with no major industrial contributors. In October 2019, the Village commissioned an Aero-MOD treatment facility equipped with a new mechanical fine screen, activated sludge treatment, chemical addition for phosphorus removal, and UV disinfection before discharge to Smith-Conley Creek. Aerobically digested liquid is sent from the sludge storage tank to the geo tube filter system for dewatering. Cake sludge is then hauled offsite to a landfill, another facility or land applied on department approved sites.

Substantial Compliance Determination

Enforcement During Last Permit: A notice of noncompliance was issued June 22, 2020 for effluent limit exceedances, discharge of floating solids, and a missing compliance schedule report. The facility has completed all previously required actions as part of the enforcement process.

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on April 18, 2023, this facility has been found to be in substantial compliance with their current permit.

Compliance determination entered by Amy Garbe on June 7, 2023.

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	0.041 MGD (January 2019 – June 2024 Average)	Influent: Magmeter and 24-hr flow proportional sampler located after the mechanical fine screen.
001	N/A	Effluent: 24-hr flow proportional samples shall be taken prior to UV disinfection. Grab samples shall be taken from the outfall prior to discharge to Smith-Conley Creek.
003	30 Dry US Tons (2023 Permit Application)	Aerobically digested, Liquid, Class B. Representative sludge samples shall be collected from the sludge storage tank.
004	New outfall	Aerobically digested, Cake, Class B. Minimum of 3 grab samples shall be collected and then combined for one composite sample from each geo tube prior to land application.

1 Influent – Monitoring Requirements

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	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp	

Changes from Previous Permit:

Flow rate sample frequency and type were swapped incorrectly. This error was fixed.

Sampling frequency increased.

Explanation of Limits and Monitoring Requirements

BOD_5 and Total Suspended Solids – Tracking of BOD_5 and Total Suspended Solids are required for percent removal requirements found in s. NR 210.05, Wis. Adm. Code and Standard Requirements section of the permit. Sampling frequency is set equal to effluent frequency.

2 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
BOD5, Total	Weekly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Weekly Avg	9.4 lbs/day	3/Week	Calculated	
Suspended Solids, Total	Weekly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	9.4 lbs/day	3/Week	Calculated	
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
Dissolved Oxygen	Daily Min	6.0 mg/L	Daily	Grab	
Nitrogen, Ammonia Variable Limit		mg/L	3/Week	See Table Note	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	3/Week	24-Hr Flow Prop Comp	Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH3-N) Total column of the eDMR. See Ammonia Limitation Section.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	8.6 mg/L	3/Week	24-Hr Flow Prop Comp	May through September
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	17 mg/L	3/Week	24-Hr Flow Prop Comp	October through April
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	4.0 mg/L	3/Week	24-Hr Flow Prop Comp	May through September
Nitrogen, Ammonia	Monthly Avg	8.6 mg/L	3/Week	24-Hr Flow	October through April

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
(NH3-N) Total				Prop Comp	
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	May through September
E. coli	% Exceedance	10 Percent	Monthly	Calculated	May through September. Enter the result on the last day of the month on the DMR.
Phosphorus, Total	Monthly Avg	0.5 mg/L	3/Week	24-Hr Flow Prop Comp	This is an interim MDV limit. See the MDV/Phosphorus sections and phosphorus schedules.
Phosphorus, Total		lbs/month	Monthly	Calculated	Report the total monthly phosphorus discharged in lbs/month on the last day of the month on the DMR. See Standard Requirements for 'Appropriate Formulas' to calculate the Total Monthly Discharge in lbs/month.
Phosphorus, Total		lbs/yr	Annual	Calculated	Report the sum of the total monthly discharges (for the months that the MDV is in effect) for the calendar year on the Annual report form.
Temperature Maximum	Weekly Avg	63 deg F	Daily	Continuous	Monitoring effective upon reissuance. Limit effective in October starting in 2028. See Temperature schedule.
Temperature Maximum	Weekly Avg	54 deg F	Daily	Continuous	Monitoring effective upon reissuance. Limit effective in November starting in 2028. See Temperature schedule.
Temperature Maximum		deg F	Daily	Continuous	January through December 2028.
Chloride		mg/L	4/Month	24-Hr Flow Prop Comp	Monitoring only in 2028. Samples shall be collected 4 consecutive days.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					Monitoring section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Annual in rotating quarters. See Nitrogen Series Monitoring section. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET section.
Chronic WET		1.7 TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET section.

Changes from Previous Permit

BOD_5 and Total Suspended Solids – Sample frequency increased.

pH – Sample frequency increased.

Dissolved Oxygen – Sample frequency increased.

Ammonia- Sample frequency increased.

E. coli - Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

Phosphorus MDV - The permittee has applied for a multi-discharger variance (MDV) for phosphorus for this permit term and the application has been approved by the Department. An MDV interim limit of 0.5 mg/L has been added that goes into effect per a compliance schedule. The permittee is now required to report the total amount of phosphorus discharged in lbs/month and lbs/year. By March 1 of each year the permittee shall make a payment(s) to participating county(s) of $64.75 per pound of phosphorus discharged during the previous year in excess of the target value of 0.2 mg/L. Sample frequency increased.

Temperature – The limits in October and November starting in 2028 and schedule to meet those limits added along with monitoring for a full year in 2028.

Chloride - The sample frequency changed and monitoring year updated.

Total Nitrogen Monitoring (TKN, N02+N03 and Total N) - Annual monitoring in rotating quarters throughout the permit term was added to the proposed permit.

WET – Acute and Chronic WET tests, as well as Chronic WET limits added.

Explanation of Limits and Monitoring Requirements

Please refer to the Water Quality Based Effluent Limits memo dated November 5, 2024, prepared by Zainah Masri for the detailed calculations and explanation.

BOD_5, Total Suspended Solids (TSS), pH, and Dissolved Oxygen (DO) - Standard municipal wastewater requirements for BOD_5, TSS, pH, and DO are included based on ch. NR 210 requirements for discharges to fish and aquatic life streams. Ch. NR 102 'Water Quality Standards for Surface Waters' also specifies requirements for pH for fish and aquatic life streams.

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 fairness and consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

Previously permitted monitoring frequencies for pH fell below the standard monitoring frequency outlined in guidance and sample frequency was increased to 5/week.

Expression of Limits- In accordance with the federal regulation 40 CFR 122.45(d) and s. NR 205.065, Wis. Adm. Code. limits in this permit are to be expressed as weekly average and monthly average limits whenever practicable.

Ammonia- Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Tables 2C and 4B of ch. NR 105, Wis. Adm. Code. Subchapter IV of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for ammonia. No changes to the ammonia limits were required.

Chloride-Acute and chronic chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 of ch. NR 105, Wis. Adm. Code. Subchapter VII of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for chloride. If the permittee's effluent data shows that a calculated WQBEL for chloride cannot be met, then the permit will include a chloride effluent limitation. s. NR 106.83 of subchapter VII also provides for some permittees to obtain temporary relief from a chloride WQBEL through the use of a "chloride variance". (See chloride guidance dated March 2010 at this link: Implementation plan for the chloride rule). Chloride sampling 4/month for one year in 2028 is required to ensure adequate and representative data for permit reissuance purposes.

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.

E. coli monitoring is required at the permit effective date. E. coli limits of 126 #/100 ml as a monthly geometric mean that may not be exceeded and 410 #/100 ml as a daily maximum that may not be exceeded more than 10 percent of the time in any calendar month will apply upon reissuance.

Thermal- Requirements for Temperature are included in NR 102 Subchapter II Water Quality Standards for Temperature and NR 106 Subchapter V Effluent Limitations for Temperature. Thermal discharges must meet the Public Health criterion of 120 degrees F and the Fish & Aquatic Life criteria which are established to protect aquatic communities from lethal and sub-lethal thermal effects. The permittee has shown reasonable potential to exceed temperature limits in October and November. A compliance schedule has been included for meeting these limits and the permittee may opt to complete a dissipate cooling (DC) study as part of the compliance schedule. Monitoring in October and November required upon reissuance with the limits effective per the schedule. Monitoring for the full calendar year is required in 2028 for permit reissuance purposes.

Phosphorus – Phosphorus rules became effective December 1, 2010 per NR 217, Wis. Adm. Code, that required the permittee to comply with water quality based effluent limits (WQBELs) for total phosphorous. The final phosphorus WQBELs are 0.23 mg/L as a monthly average and 0.075 mg/L (0.047 lbs/day) as a six-month average and were to become effective as scheduled unless a variance was granted. For this permit term, the permittee has applied for the Multi-Discharger Variance (MDV) for phosphorus as provided for in s. 283.16, Wis. Stats., and approved by USEPA on February 6, 2017 until February 5, 2027. The permittee qualifies for the MDV because it is an existing source and a major facility upgrade is needed to comply with the applicable phosphorus WQBELs, thereby creating a financial burden.

Conditions of the MDV require the permittee to optimize phosphorus removal throughout the proposed permit term, comply with interim limits and make annual payments to participating county(s) by March 1 of each year based on the pounds of phosphorus discharged during the previous year in excess of the specified target value. The "price per pound" value is $50.00 adjusted for CPI annually during the first quarter as defined by s. 283.16(8)(a)2, Wis. Stats and takes effect for reissued permits with effective dates starting April 1. This may differ from the "price per pound" that is public noticed; however, the "price per pound" is set upon reissuance and is applicable for the entire permit term. The participating county(s) uses these payments to implement non-point source (agricultural and urban) phosphorus control strategies at the watershed level.

Total Nitrogen Monitoring (NO2+NO3, TKN and Total N)- The Department has included effluent monitoring for Total Nitrogen in the permit through the authority under §§ 283.55(1)(e), Wis. Stats., which allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source, and through s. NR 200.065(1)(h), Wis. Adm. Code, which allows for this monitoring to be collected during the permit term. More information on the justification to include total nitrogen monitoring in wastewater permits can be found in the "Guidance for Total Nitrogen Monitoring in Wastewater Permits" dated October 1, 2019. Annual tests are scheduled in rotating quarter.

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

Whole Effluent Toxicity- Whole effluent toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised August 2016. (See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at http://dnr.wi.gov/topic/wastewater/wet.html. Acute WET tests as well as Chronic WET tests are required and a chronic WET limit is effective upon reissuance.

3 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	**Sludge Class (A or B)**	**Sludge Type (Liquid or Cake)**	**Pathogen Reduction Method**	**Vector Attraction Method**	**Reuse Option**	**Amount Reused/Disposed (Dry Tons/Year)**
003	B	Liquid	Fecal Coliform	Injection	Land Application/Hauled to Another Facility/Landfill	30
004	B	Cake	Fecal	Incorporation	Land	New outfall

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)**
			Coliform		Application/Hauled to Another Facility/Landfill	

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? **Yes**

If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility

Is a priority pollutant scan required? **No**, design flow is less than 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.

Sample Point Number: 003- SLUDGE & 004 - SLUDGE

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	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
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	Only required if land application occurs.
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Composite	Only required if land application occurs.
Phosphorus, Total		Percent	Annual	Composite	Only required if land application occurs.
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	Only required if land application occurs.
Potassium, Total Recoverable		Percent	Annual	Composite	Only required if land application occurs.
Radium 226 Dry Wt		pCi/g	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2026.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2026.
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.

Changes from Previous Permit:

New time frame for monitoring PCBs is now calendar year 2026.

PFAS – Annual monitoring is included in the permit pursuant s. NR 204.06(2)(b)9, Wis. Adm. Code.

Explanation of Limits and Monitoring Requirements

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

Limitations for PCBs are addressed in s. NR 204.07(3)(k), Wis. Adm. Code. Radium requirements are addressed in s. NR 204.07(3)(n), Wis. Adm. Code.

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

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

4 Schedules

4.1 Phosphorus Schedule - Continued Optimization

The permittee is required to optimize performance to control phosphorus discharges per the following schedule.

Required Action	Due Date
Optimization: The permittee shall continue to implement the optimization plan as previously approved to optimize performance to control phosphorus discharges. Submit a progress report on optimizing removal of phosphorus by the Due Date.	01/01/2026
Progress Report #2: Submit a progress report on optimizing removal of phosphorus.	01/01/2027
Progress Report #3: Submit a progress report on optimizing removal of phosphorus.	01/01/2028
Progress Report #4: Submit a progress report on optimizing removal of phosphorus.	01/01/2029

4.1.1 Explanation of Phosphorus Schedule – Continued Optimization

Per s. 283.16(6)(a), Wis. Stats. the Department may include a requirement that the permittee optimize the performance of a point source in controlling phosphorus discharges, which may be necessary to achieve compliance with multi-discharger variance interim limits. This compliance schedule requires the permittee to continue to implement the optimization plan that was approved during the previous permit term.

4.2 Phosphorus Payment per Pound to County

The permittee is required to make annual payments for phosphorus reductions to the participating county or counties in accordance with s. 283.16(8), Wis. Stats, and the following schedule. The price per pound will be set at the time of permit reissuance and will apply for the duration of the permit.

Required Action	Due Date
Annual Verification of Phosphorus Payment to County: The permittee shall make a total payment to the participating county or counties approved by the Department by March 1 of each calendar year. The amount due is equal to the following: [(lbs of phosphorus discharged minus the permittee's target value) times $64.75 per pound)] or $640,000, whichever is less. See the payment calculation steps in the Surface Water section. The permittee shall submit Form 3200-151 to the Department by March 1 of each calendar year indicating total amount remitted to the participating counties to verify that the correct payment was made. The first payment verification form is due by the specified Due Date. Note: The applicable Target Value is 0.2 mg/L as defined by s. 283.16(1)(h), Wis. Stats. The "per	03/01/2025

pound" value is $50.00 adjusted for CPI.	
Annual Verification of Payment #2: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.	03/01/2026
Annual Verification of Payment #3: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.	03/01/2027
Annual Verification of Payment #4: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.	03/01/2028
Annual Verification of Payment #5: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.	03/01/2029
Continued Coverage: If the permittee intends to seek a renewed variance, an application for the MDV (Multi Discharger Variance) shall be submitted as part of the application for permit reissuance in accordance with s. 283.16(4)(b), Wis. Stats.	
Annual Verification of Payment After Permit Expiration: In the event that this permit is not reissued prior to the expiration date, the permittee shall continue to submit Form 3200-151 to the Department indicating total amount remitted to the participating counties by March 1 each year.	

4.2.1 Explanation of Phosphorus Payment per Pound to County

Subsection 283.16(6)(b), Wis. Stats., requires permittees that have received approval for the multi-discharger variance (MDV) to implement a watershed project that is designed to reduce non-point sources of phosphorus within the HUC 8 watershed in which the permittee is located. The permittee has selected the "Payment to Counties" watershed option described in s. 283.16(8), Wis. Stats. Under this option the permittee shall make annual payment(s) to participating county(s) that are calculated based on the amount of phosphorus actually discharged during a calendar year in pounds per year less the amount of phosphorus that would have been discharged had the permittee discharged phosphorus at a target value concentration of 0.2 mg/L. The pounds of phosphorus discharged in excess of the target value is multiplied by a per pound phosphorus charge that will equal $64.75 per pound. This schedule requires the permittee to submit Form 3200-151 to the Department indicating the total amount remitted to the participating county(s).

4.3 Temperature Limits and Dissipative Cooling Evaluation

This compliance schedule requires the permittee to achieve compliance by the specified date.

Required Action	Due Date
Report on Effluent Discharges: Submit a report on effluent temperature with conclusions regarding compliance. Informational Note: Refer to the Surface Water subsections regarding 'Determination of Need for Effluent Limits' and 'Dissipative Cooling Demonstration - Weekly Average Limits' concerning requests for a Department determination on the need for limits and follow-up procedures for demonstration of dissipative cooling per NR 106.59, as well as re-evaluation of the limits pursuant to NR 106 Subchapters V & VI or NR 102.26, Wis. Adm. Code.	01/31/2026
Action Plan: Submit an action plan for complying with all effluent temperature limits that remain following the Department's review for necessity.	01/31/2027
Construction Plans: Submit construction plans (if construction is required for complying with effluent temperature limits) and include plans and specifications with the submittal.	06/30/2027
Initiate Actions: Initiate actions identified in the plan.	01/31/2028
Complete Actions: Complete actions necessary to achieve compliance with effluent temperature	10/01/2028

limits.	

Explanation of Schedules

This schedule provides the permittee with time to determine compliance options for temperature limits in October and November. If the permittee chooses to complete a DC study, that study should be completed in the months limits are effective.

4.4 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
Land Application Management Plan Submittal: Submit an update to the management plan to optimize the land application system performance and demonstrate compliance with ch. NR 204, Wis. Adm. Code, by the Due Date. This management plan shall 1) specify information on pretreatment processes (if any); 2) identify land application sites; 3) describe site limitations; 4) address vegetative cover management and removal; 5) specify availability of storage; 6) describe the type of transporting and spreading vehicle(s); 7) specify monitoring procedures; 8) track site loading; 9) address contingency plans for adverse weather and odor/nuisance abatement; and 10) include any other pertinent information. Once approved, all landspreading 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.	01/31/2026

Explanation of Schedules

An updated land application management plan is required to ensure land application practices are documented and appropriate.

Special Reporting Requirements

None

Other Comments:

None

Attachments:

Water Quality Based Effluent Limits dated November 5, 2024

Expiration Date:

December 31, 2029

Justification Of Any Waivers From Permit Application Requirements

None

Prepared By: Jennifer Jerich, Wastewater Specialist

Date: 11/5/2024

Date post Fact Check: 11/13/2024

Date post Public Notice:

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: November 5, 2024

TO: Jennifer Jerich – SCR/Horicon

FROM: Zainah Masri – WY/3

SUBJECT: Water Quality-Based Effluent Limitations for the Ridgeway Wastewater Treatment Facility WPDES Permit No. WI-0031349-11-0

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 Ridgeway Wastewater Treatment Facility in Iowa County. This municipal wastewater treatment facility (WWTF) discharges to Smith Conley Creek, located in the Upper East Branch Pecatonica River Watershed in the Sugar-Pecatonica Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD_5			15 mg/L 9.4 lbs/day	**15 mg/L**		1,5
TSS			15 mg/L 9.4 lbs/day	**15 mg/L**		1,5
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		6.0 mg/L				1
Ammonia Nitrogen Year round October – April May – September	Variable		 17 mg/L 8.6 mg/L	 8.6 mg/L 4.0 mg/L		1,6
Chloride						4
Bacteria						3
E. coli May-September				126 #/100 mL geometric mean		
Phosphorus						8
Interim				0.5 mg/L		
Final				0.225 mg/L	0.075 mg/L 0.028 lbs/day	
Temperature October November			 63 ºF 54 ºF			7

Printed on Recycled Paper

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
TKN, Nitrate+Nitrite, and Total Nitrogen						9
Acute WET						10,12
Chronic WET				1.7 TU_c		11,12

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. Bacteria limits apply during the disinfection season of May through September. 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. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
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. Variable daily maximum ammonia nitrogen limits.

Effluent pH s.u.	**NH_3-N Limit mg/L**	**Effluent pH s.u.**	**NH_3-N Limit mg/L**	**Effluent pH s.u.**	**NH_3-N Limit mg/L**
6.0 < pH ≤ 6.1	54	7.0 < pH ≤ 7.1	33	8.0 < pH ≤ 8.1	6.9
6.1 < pH ≤ 6.2	53	7.1 < pH ≤ 7.2	29	8.1 < pH ≤ 8.2	5.7
6.2 < pH ≤ 6.3	52	7.2 < pH ≤ 7.3	26	8.2 < pH ≤ 8.3	4.7
6.3 < pH ≤ 6.4	51	7.3 < pH ≤ 7.4	23	8.3 < pH ≤ 8.4	3.9
6.4 < pH ≤ 6.5	49	7.4 < pH ≤ 7.5	20	8.4 < pH ≤ 8.5	3.2
6.5 < pH ≤ 6.6	47	7.5 < pH ≤ 7.6	17	8.5 < pH ≤ 8.6	2.7
6.6 < pH ≤ 6.7	45	7.6 < pH ≤ 7.7	14	8.6 < pH ≤ 8.7	2.2
6.7 < pH ≤ 6.8	42	7.7 < pH ≤ 7.8	12	8.7 < pH ≤ 8.8	1.8
6.8 < pH ≤ 6.9	39	7.8 < pH ≤ 7.9	10	8.8 < pH ≤ 8.9	1.6
6.9 < pH ≤ 7.0	36	7.9 < pH ≤ 8.0	8.4	8.9 < pH ≤ 9.0	1.3

7. Temperature limits apply during the months of October and November. Year round monitoring is recommended in the final year of the permit term, to determine need for limits at the next permit issuance.
8. Under the phosphorus MDV, an interim limit of 0.5 mg/L as a monthly average should be effective upon permit reissuance. The final WQBELs remain at 0.225 mg/L as a monthly average and 0.075 mg/L as a six-month average, as well as a respective mass limit.
9. 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_3), nitrite (NO_2), and total kjeldahl nitrogen (TKN) (all expressed as N).
10. Two acute WET tests are required during the 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.

11. Annual chronic WET testing is required. The Instream Waste Concentration (IWC) to assess chronic test results is 58%. 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 Smith Conley Creek.
12. 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 Zainah Masri at Zainah.Masri@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (4) – Narrative, Ammonia Nitrogen Calculations, Map and Thermal Table

PREPARED BY: Zainah Masri – WY/3 Zainah Masri

APPROVED BY: Diane Figiel Date: 11/05/2024
Diane Figiel, PE,
Water Resources Engineer

E-cc: Kenzie Ostien, Wastewater Engineer – SCR/Fitchburg
Adebowale Adesanwo, Acting Regional Supervisor – WCR/Eau Claire
Diane Figiel, Water Resources Engineer – WY/3
Kari Fleming, Environmental Toxicologist – WY/3
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
Ridgeway Wastewater Treatment Facility

WPDES Permit No. WI-0031349-11-0

Prepared by: Zainah Masri – WY/3

PART 1 – BACKGROUND INFORMATION

Facility Description

The Village of Ridgeway operates a wastewater treatment facility that serves a population of approximately 660 residents with no major industrial contributors. In October 2019, the Village commissioned an Aero-MOD treatment facility equipped with a new mechanical fine screen, activated sludge treatment, chemical addition for phosphorus removal, and UV disinfection before discharge to Smith Conley Creek. Aerobically digested liquid sludge is typically sent from the sludge storage tank to the geo tube filter system for dewatering. Cake sludge is then hauled offsite to a landfill, another facility, or land applied on department-approved sites.

The plans and specifications for the new package plant and associated improvements were approved in March of 2018 based upon the design annual average of 0.045 MGD. Previous limits were calculated using a design annual average flow rate of 0.075 MGD.

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

Existing Permit Limitations

The current permit, which expired on December 31, 2023, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD_5			15 mg/L 9.4 lbs/day	15 mg/L		1
TSS			15 mg/L 9.4 lbs/day	15 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		6.0 mg/L				1
Ammonia Nitrogen Year round October – April May – September	Variable		 17 mg/L 8.6 mg/L	 8.6 mg/L 4.0 mg/L		4
Fecal Coliform May – September			**656#/100 mL** **geometric mean**	400#/100 mL geometric mean		3

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Chloride						5
Temperature						5
Phosphorus LCA Interim Final				 3.0 mg/L 1.0 mg/L 0.225 mg/L	 0.075 mg/L 0.047 lbs/day	6

Footnotes:

1. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
2. Monitoring only.
3. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7) are included in bold.
4. Variable daily maximum ammonia nitrogen limits.

Effluent pH s.u.	**NH_3-N Limit mg/L**	**Effluent pH s.u.**	**NH_3-N Limit mg/L**	**Effluent pH s.u.**	**NH_3-N Limit mg/L**
$6.0 < pH \leq 6.1$	54	$7.0 < pH \leq 7.1$	33	$8.0 < pH \leq 8.1$	6.9
$6.1 < pH \leq 6.2$	53	$7.1 < pH \leq 7.2$	29	$8.1 < pH \leq 8.2$	5.7
$6.2 < pH \leq 6.3$	52	$7.2 < pH \leq 7.3$	26	$8.2 < pH \leq 8.3$	4.7
$6.3 < pH \leq 6.4$	51	$7.3 < pH \leq 7.4$	23	$8.3 < pH \leq 8.4$	3.9
$6.4 < pH \leq 6.5$	49	$7.4 < pH \leq 7.5$	20	$8.4 < pH \leq 8.5$	3.2
$6.5 < pH \leq 6.6$	47	$7.5 < pH \leq 7.6$	17	$8.5 < pH \leq 8.6$	2.7
$6.6 < pH \leq 6.7$	45	$7.6 < pH \leq 7.7$	14	$8.6 < pH \leq 8.7$	2.2
$6.7 < pH \leq 6.8$	42	$7.7 < pH \leq 7.8$	12	$8.7 < pH \leq 8.8$	1.8
$6.8 < pH \leq 6.9$	39	$7.8 < pH \leq 7.9$	10	$8.8 < pH \leq 8.9$	1.6
$6.9 < pH \leq 7.0$	36	$7.9 < pH \leq 8.0$	8.4	$8.9 < pH \leq 9.0$	1.3

5. Monitoring only in the fourth year of the permit term.
6. Under the phosphorus MDV, a level currently achievable (LCA) interim limit of 3.0 mg/L was effective January 1, 2019 through December 31, 2022. An MDV interim limit of 1.0 mg/L became effective January 1, 2023. The final water quality based effluent limits remain at 0.225 mg/L as a monthly average and 0.075 mg/L as a six-month average, as well as a respective mass limit of 0.047 lbs/day.

Receiving Water Information

- Name: Smith Conley Creek
- Waterbody Identification Code (WBIC): 914100
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Limited Forage Fish from Ridgeway STP to south boundary of Sec. 14, T6N, R4E, approximately 0.5 miles downstream. At the classification change, Smith Conley creek is considered a Cold Water community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q_{10} and 7-Q_2 values are from the USGS flow equations for the Sugar-Pecatonica Watersheds, where Outfall

001 is located.

7-Q_{10} = 0 cfs (cubic feet per second)

7-Q_2 = 0 cfs

Downstream Low Flows

Cold Water Classification

7-Q_{10} = 0.2 cfs

7-Q_2 = 0.35 cfs

- Hardness = 342 mg/L as $CaCO_3$. This value represents the geometric mean (n=4) of data from April and May 2023 from the permit application. Effluent hardness is used in place of receiving water because there is no receiving water flow upstream of the discharge.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: Not Applicable at point of discharge as receiving water flow is zero. Ammonia limits for downstream impacts use 100% mixing.
- Source of background concentration data: Background concentrations are not included because they don't impact the calculated WQBEL when the receiving water low flows are equal to zero.
- Multiple dischargers: There are no other dischargers to the Smith Conley Creek.
- Impaired water status: Smith Conley Creek is not listed as impaired. Approximately 6.5 miles downstream the East Branch of the Pecatonica River is listed as impaired for phosphorus.

Effluent Information

- Flow rate(s):

  Design annual average = 0.045 MGD (Million Gallons per Day)

  Peak daily =0.162 MGD

  Peak weekly = 0.153 MGD

  Peak monthly = 0.114 MGD

  Previous limits were calculated using a design annual average flow rate of 0.075 MGD. However, the facility was upgraded in 2019 and the design annual average decreased to 0.045 MGD. The peak design flows specified above are from the plans and specifications approval letter from the Department dated March 22, 2018.

  For reference, the actual average flow from January 2019 to June 2024 was 0.04 MGD.

  - Hardness = 342 mg/L as $CaCO_3$ This value represents the geometric mean (n=4) of data from April and May 2023 from the permit application
  - Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable.
  - Water source: Domestic wastewater with water supply from wells.
  - Additives: Alum, a water conditioner added for phosphorus removal.
  - 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.

Attachment #1

Effluent Copper Data

Sample Date	Copper µg/L	Sample Date	Copper µg/L	Sample Date	Copper µg/L
04/27/2023	3.7	05/16/2023	9.3	05/28/2023	<1.9
05/01/2023	4.3	05/19/2023	5.1	05/31/2023	<1.9
05/04/2023	6.3	05/22/2023	3.7	06/07/2023	2.7
05/08/2023	5.3	05/25/2023	<1.9		
Mean = 3.7 µg/L					

"<" means that the pollutant was not detected at the indicated level of detection. The average concentration was calculated using zero in place of the non-detected results.

Effluent Chloride Data

Sample Date	Chloride mg/L	Sample Date	Chloride mg/L	Sample Date	Chloride mg/L
2/16/2022	185	7/13/2022	276	12/7/2022	254
3/16/2022	177	8/10/2022	285	1/4/2023	293
4/13/2022	376	9/7/2022	165	2/1/2023	287
5/4/2022	310	10/19/2022	367		
6/22/2022	252	11/9/2022	259		
1-day P_{99} = 455 g/L					
4-day P_{99} = 353 µg/L					

The following table presents the average concentrations and loadings at Outfall 001 from January 2019 to June 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_5	5.0 mg/L*	1.7 lbs/day*
TSS	6.7 mg/L*	2.3 lbs/day*
pH field	7.6 s.u.	
Phosphorus	0.44 mg/L	
Ammonia Nitrogen	0.65 mg/L*	
Fecal Coliform	46 #/100 mL	
DO	8.2 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 P_{99}) value

exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)

3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q_{10}

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

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

Where:

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

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

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

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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q_{10} method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for Ridgeway Wastewater Treatment Facility and the limits are set based on the 1-Q_{10}.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0 cfs, (1-Q_{10} (estimated as 80% of 7-Q_{10})), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Arsenic		340	339.8	68.0	<1.1		
Cadmium	342	42.2	42.2	8.4	<0.19		
Chromium	301	4446	4445.8	889	<1.1		
Copper	342	49.5	49.5	9.9	3.7		

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.
Lead	342	351	350.8	70.2	<4.3		
Nickel	268	1080	1080.3	216	1.5		
Zinc	333	345	344.7	68.9	39		
Chloride (mg/L)		757	757			455	376

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

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)
RECEIVING WATER FLOW = 0 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		152.2	152	30.4	<1.1	
Cadmium	175	3.82	3.82	0.8	<0.19	
Chromium	301	325.75	326	65.2	<1.1	
Copper	342	29.64	29.6	5.9	3.7	
Lead	342	91.88	91.9	18.4	<4.3	
Nickel	268	120.18	120	24.0	1.5	
Zinc	333	344.68	345	68.9	39	
Chloride (mg/L)		395	395			353

* 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 = 0 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	373	373	74.6	<0.19
Chromium (+3)	370	370	74	<1.1
Lead	140	140	28	<4.3
Nickel	43000	43000	8600	1.5

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 0 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	13.3	2.66	<1.1

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

Conclusions and Recommendations
Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are not required.**

Chloride – Considering available effluent data from January 2019 to June 2024, the 1-day P_{99} chloride concentration is 455 mg/L, and the 4-day P_{99} of effluent data is 353 mg/L. These effluent concentrations are below 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 the Ridgeway Wastewater Treatment Facility 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 five 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 concentration in the sludge from May 3, 2023 was 0.65 mg/kg. **Therefore, no mercury monitoring is recommended at Outfall 001.**

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 for Outfall 001. 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.

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

The effluent pH data was examined as part of this evaluation. A total of 562 sample results were reported from January 2019 to June 2024. The maximum reported value was 8.0 s.u. (Standard pH Units). The effluent pH was 8.0 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.4 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 8.3 s.u. Therefore, a value of 8.3 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 8.3 s.u. into the equation above yields an ATC = 4.71 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-Q_{10} receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

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

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	9.43
1-Q_{10}	4.71

The 1-Q_{10} method yields the most stringent limits for Ridgeway Wastewater Treatment Facility.

The current permit has variable daily maximum effluent limits based on effluent pH, presented below.

Daily Maximum Ammonia Nitrogen Limits – LFF

Effluent pH s.u.	NH_3-N Limit mg/L	Effluent pH s.u.	NH_3-N Limit mg/L	Effluent pH s.u.	NH_3-N Limit mg/L
6.0 < pH ≤ 6.1	54	7.0 < pH ≤ 7.1	33	8.0 < pH ≤ 8.1	6.9
6.1 < pH ≤ 6.2	53	7.1 < pH ≤ 7.2	29	8.1 < pH ≤ 8.2	5.7
6.2 < pH ≤ 6.3	52	7.2 < pH ≤ 7.3	26	8.2 < pH ≤ 8.3	4.7
6.3 < pH ≤ 6.4	51	7.3 < pH ≤ 7.4	23	8.3 < pH ≤ 8.4	3.9
6.4 < pH ≤ 6.5	49	7.4 < pH ≤ 7.5	20	8.4 < pH ≤ 8.5	3.2
6.5 < pH ≤ 6.6	47	7.5 < pH ≤ 7.6	17	8.5 < pH ≤ 8.6	2.7
6.6 < pH ≤ 6.7	45	7.6 < pH ≤ 7.7	14	8.6 < pH ≤ 8.7	2.2
6.7 < pH ≤ 6.8	42	7.7 < pH ≤ 7.8	12	8.7 < pH ≤ 8.8	1.8
6.8 < pH ≤ 6.9	39	7.8 < pH ≤ 7.9	10	8.8 < pH ≤ 8.9	1.6
6.9 < pH ≤ 7.0	36	7.9 < pH ≤ 8.0	8.4	8.9 < pH ≤ 9.0	1.3

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)
Generally a decrease in flow rate would result in an increase in limits. However, without a demonstration of need consistent with ch. NR 207, Wis. Adm. Code, **the current permit limits should be retained in the reissued permit.** The calculations from the previous WQBEL memo are shown in Attachment #2.

Effluent Data
The following table evaluates the statistics based upon ammonia data reported from January 2019 to June 2024, with those results being compared to the calculated limits to determine the need to include ammonia limits in the Ridgeway Wastewater Treatment Facility permit for the respective month ranges. That need is determined by calculating 99th upper percentile (or P_{99}) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

Ammonia Nitrogen mg/L	October – April	May - September
1-day P_{99}	9.6	2.0
4-day P_{99}	5.8	1.1
30-day P_{99}	2.45	0.50
Mean*	0.98	0.25
Std	2.44	0.45
Sample size	328	227
Range	<0.03-16.9	<0.03-4.6

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

The permit currently has daily maximum limits, weekly, and monthly 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.

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
Year round	Variable		
October – April		17 mg/L	8.6 mg/L
May – September		8.6 mg/L	4.0 mg/L

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 Ridgeway Wastewater Treatment Facility 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 through September**. No changes are recommended to the current recreational period and the required disinfection season**.**

Effluent Data

Ridgeway Wastewater Treatment Facility has monitored effluent *E. coli* from July 2022 to June 2024 and a total of 37 results are available. A geometric mean of 126 counts/100 mL was never exceeded during the disinfection season, with a maximum monthly geometric mean of 14.8 counts/100 mL. Effluent data has exceeded 410 counts/100 mL one time (which is 3% of the total sample results). The maximum reported value was 800 counts/100 mL. Based on this effluent data, it appears that the facility can meet new *E. coli* limits and **a compliance schedule is not needed in the reissued permit.**

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 Ridgeway Wastewater Treatment Facility's current permit includes a monthly average limit of 1.0 mg/L, the need for the TBEL will not be evaluated further.

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

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

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

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

Where:

WQC = 0.075 mg/L for Smith Conley Creek
Qs = 100% of the 7-Q_2 of 0 cfs
Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code
Qe = effluent flow rate = 0.045 MGD = 0.070 cfs
f = the fraction of effluent withdrawn from the receiving water = 0

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

Effluent Data
The following table summarizes effluent total phosphorus monitoring data from January of 2020 to June 2024, when chemical addition for phosphorus removal was implemented.

Total Phosphorus Effluent Data

	Phosphorus mg/L
1-day P_{99}	0.90
4-day P_{99}	0.50
30-day P_{99}	0.33
Mean	0.25
Std	0.18
Sample size	457
Range	0.01 - 1.51

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

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

Mass Limits
A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the discharge is to a surface water that is to or upstream of the phosphorus impaired East Branch Pecatonica River. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.045 MGD = 0.028 lbs/day expressed as a six-month average.**

Multi-Discharge Variance Interim Limit
Ridgway has applied for the phosphorus multi-discharger variance (MDV). Conditions of the phosphorus MDV require the facility to comply with an interim phosphorus limit in lieu of meeting the final WQBEL. Section 283.16 (6)(a)2, Wis. Stats. requires an interim limit of 0.6 mg/L as a monthly average for the second permit term under the MDV. However, if 0.6 mg/L does not represent the highest attainable condition, a more stringent limit should be met by the end of the permit term pursuant s. 283.16 (7), Wis. Stats. The effluent data 4-day P_{99} value indicates 0.5 mg/L is a level currently achievable (LCA) for the discharge. **A limit of 0.5 mg/L as a monthly average** should be effective upon permit reissuance.

PART 5 – 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 January 2019 to June 2024.

The table below summarizes the maximum temperatures reported during monitoring from February 2022 to February 2023.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	45	48	54	78
FEB	48	49	54	79
MAR	47	50	57	80
APR	49	51	63	81
MAY	57	60	70	84
JUN	65	66	77	85
JUL	70	70	81	86
AUG	68	70	79	86
SEP	65	66	73	85
OCT	70	73	**63**	83
NOV	60	79	**54**	80
DEC	47	49	54	79

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. The months in which limitations are recommended are shown in bold. Based on this analysis, **weekly average temperature limits are necessary for the months of October and November**. **Year round monitoring is recommended in the final year of the permit term**, to determine need for limits at the next permit issuance. The complete thermal table used for the limit calculation can be found in Attachment #4.

The following general options are available for a facility to explore potential relief from the temperature limits:

- Effluent monitoring data: Verification or additional effluent monitoring (flow and/or temperature) may be appropriate if there were questions on the representativeness of the current effluent data.
- Monthly low receiving water flows: Contract with USGS to generate monthly low flow estimates for the receiving water to be used in place of the annual low flow.
- Dissipative cooling demonstration: Effluent limitations based on sub-lethal criteria may be adjusted based on the potential for heat dissipation from municipal treatment plants as described in s. NR 106.59(4), Wis. Adm. Code.
- Collection of site-specific ambient temperature: default background temperatures for streams in Wisconsin, so actual data from the direct receiving water may provide for relaxed thermal limits but only if the site-specific temperatures are lower than the small stream defaults used in the above tables.
- A variance to the water quality standard: This is typically considered to be the least preferable and most complex option as it requires the evaluation of the other alternatives.

These options are explained in additional detail in the August 15, 2013, Department *Guidance for Implementation of Wisconsin's Thermal Water Quality Standard*
https://dnr.wisconsin.gov/topic/Wastewater/Thermal.html

PART 6 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET

limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document* (2022).

- 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_{50} (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_{25} (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 58% 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:

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

Where:

Q_e = annual average flow 0.045 MGD = 0.070 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = ¼ of the 7-Q_{10} = 0.2 cfs ÷ 4 = 0.05 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.

Attachment #1

WET Data History

Date Test Initiated	Acute Results LC_{50} %				Chronic Results IC_{25} %				Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Pass or Fail?	Use in RP?	
08/24/1999	>100	>100	Pass	No	>100	>100	Pass	No	1
09/09/2008	68.3	48.69	Fail	No	28.23	29.92	Fail	No	2
10/28/2008	>100	>100	Pass	No	>100	>100	Pass	No	2; Retest
12/16/2008	>100	>100	Pass	No	>100	>100	Pass	No	2; Retest
12/08/2009	>100	>100	Pass	No	>100	>100	Pass	No	2
05/18/2010	-	-	-	-	>100	>100	Pass	No	2
08/14/2012	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/23/2012	>100	>100	Pass	Yes	52.9	>100	Fail	Yes	3
04/07/2015	-	-	-	-	>100	>100	Pass	Yes	
06/21/2016	-	-	-	-	>100	>100	Pass	Yes	
08/15/2017	-	-	-	-	>100	>100	Pass	Yes	

Footnotes:

1. *Data Not Representative.* 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. It may be appropriate to exclude data collected before July 1, 2005, unless 1) it shows repeated toxicity that was never resolved or 2) older data is all that is available, and no significant changes have occurred which obviously make it unrepresentative. Ammonia limits were added to the permit in 2005 based on updated water quality criteria.
2. *Tests done by S-F Analytical, July 2008 – March 2011.* The DNR has reason to believe that WET tests completed by SF Analytical Labs from July 2008 through March 31, 2011 were not performed using proper test methods. Therefore, WET data from this lab during this period has been disqualified and was not included in the analysis.
3. The IWC at the time of testing was 37%, and considered a pass at that time, but would be a failure using the updated IWC of 58%.

- 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.**

Acute Reasonable Potential = [(TUa effluent) (B)(AMZ)]

According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC50, IC25 or IC50 ≥ 100%).

Acute Reasonable Potential = 0 < 1.0, reasonable potential is not shown, and **an acute WET limit is not required.**

Chronic Reasonable Potential = [(TU_c effluent) (B)(IWC)]

Attachment #1

Chronic WET Limit Parameters

TUc (maximum) $100/IC_{25}$	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/52.9 = 1.9 TU_c	6.2 Based on 1 detect	58%

[(1.9 TUc) (6.2)(0.58)] = 6.8 > 1.0

Therefore, **reasonable potential is shown for a chronic WET limit** using the procedures in s. NR 106.08(6) and representative data from August 2012 to August 2017.

Expression of WET limits

Chronic WET limit = [100/IWC] TU_c = 100/58 TU_c = **1.7 TU_c expressed as a monthly average**

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: https://dnr.wisconsin.gov/topic/Wastewater/WET.html

Attachment #1

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. **0 Points**	IWC = 58% **10 Points**
Historical Data	No acute tests available within past 5 years. **5 Points**	No chronic tests available within past 5 years. **5 Points**
Effluent Variability	BOD and TSS effluent limit exceedances throughout the permit term. 2019 and 2020 of Ammonia Nitrogen exceedances due to the start-up of the new WWTF. **5 Points**	Same as Acute. **5 Points**
Receiving Water Classification	LFF community within 4 miles of a non-variance community. **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	No reasonable potential for limits based on ATC. Ammonia nitrogen limit carried over from the current permit. Chloride, Copper, Nickel, and Zinc detected. No additional compounds of concern. **3 Points**	No reasonable potential for limits based on CTC. Ammonia nitrogen limits carried over from the current permit. Chloride, Copper, Nickel, and Zinc detected. No additional compounds of concern. **3 Points**
Additives	No Biocides and 1 Water Quality Conditioner added. Permittee has proper P chemical SOPs in place: Yes. **1 Point**	All additives used more than once per 4 days. **1 Point**
Discharge Category	No industrial contributors. **0 Points**	Same as Acute. **0 Points**
Wastewater Treatment	Secondary or Better **0 Points**	Same as Acute. **0 Points**
Downstream Impacts	No impacts known. **0 Points**	Same as Acute. **0 Points**
Total Checklist Points:	**19 Points**	**29 Points**
Recommended Monitoring Frequency (from Checklist):	2 tests required during permit term	3 tests during permit term
Limit Required?	No	Yes Limit = 1.7 TU_c
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, **two acute WET tests and annual 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).
- 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 1.7 TUc 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.

Ammonia Nitrogen Calculations from WQBEL dated July 13, 2007

Ammonia Nitrogen: Water quality-based effluent limitations are evaluated in this report for Ammonia Nitrogen based upon water quality criteria in ch. NR 105 (as revised in March, 2004).

The following table summarizes the effluent limitations for ammonia nitrogen. Effluent limitations were calculated in accordance with revised chs. NR 106.05 (Wis. Adm. Code) for a limited forage fish community.

Acute ammonia limits are function of the effluent pH and may be necessary depending on the effluent pH. Using pH data (DMR's) in SWAMP from October 2002 through the present, the 99th percentile value for effluent pH resulted in one day P99 of 7.8 s.u.

The following sections summarize the effluent quality and associated limitations calculated for ammonia in accordance with chs. NR 105, and 106 (Wis. Adm. Code) for two different stream classifications.

AMMONIA (as N) LIMITS		
CLASSIFICATION:	LIMITED FORAGE FISH	
EFFLUENT FLOW (mgd):	0.075	
EFFLUENT FLOW (cfs):	0.116	
MAX. EFFLUENT pH (s.u.):	7.80	
BACKGROUND INFORMATION:	*summer*	*winter*
7Q10 (cfs)	0	0
7Q2 (cfs)	0	0
Ammonia (mg/L)	0.06	0.19
Temperature (deg C)	23	3
pH (std. units)	7.8	7.8
% of river flow used:	100	100
Reference weekly flow:	0	0
Reference monthly flow:	0	0
CRITERIA (in mg/L):		
Acute (@ effl. pH):	12.14	12.14
4-day Chronic (@ backgrd. pH):		
early life stages present	10.10	10.10
early life stages absent	13.87	38.91
30-day Chronic (@ backgrd. pH)		
early life stages present	4.04	4.04
early life stages absent	5.55	15.56

	summer	winter
EFFLUENT LIMITS (in mg/L):		
Daily maximum (also see below)	24.28	24.28
Weekly average		
early life stages present	10.10	10.10
early life stages absent	13.87	38.91
Monthly average		
early life stages present	4.04	4.04
early life stages absent	5.55	15.56

Note: Early life stages present limits apply during the months of May through September and the early life stages absent limits apply to October through April for limited forage fish community streams where burbot are not expected to be present.

The stream flow for the cold water section of the Smith–Conley Creek is from SW1/4 of SE1/4 of Section 14, T6N_R4E.

AMMONIA (as N) LIMITS	**DRAFT APPROACH**	
CLASSIFICATION:	**COLDWATER**	
EFFLUENT FLOW (mgd):	0.075	
EFFLUENT FLOW (cfs):	0.116	
MAX. EFFLUENT pH (s.u.):	7.80	
f (withdrawal factor)	0.00	
BACKGROUND INFORMATION:	*summer*	*winter*
7Q10 (cfs)	0.2	0.2
7Q2 (cfs)	0.35	0.35
Ammonia (mg/L)	0.06	0.19
Temperature (deg C)	20	3
pH (std. units)	8.21	7.97
% of river flow used:	100	100
Reference weekly flow:	0.2	0.2
Reference monthly flow:	0.2975	0.2975
CRITERIA (in mg/L):		
Acute (@ effl. pH):	8.11	8.11
4-day Chronic (@ backgrd. pH):		
early life stages present	3.10	6.35
30-day Chronic (@ backgrd. pH)		
early life stages present	1.24	2.54

		summer	winter
EFFLUENT LIMITS (in mg/L):			
Daily maximum (also see below)		16.21	16.21
Weekly average			
early life stages present		8.33	16.97
Monthly average			
early life stages present		4.26	8.57

Note: Early life stages present limits apply year-round in coldwater streams.

Acute ammonia limits are function of the effluent pH and it may be necessary depending on the effluent pH. The following table provides daily maximum limits throughout the pH range:

Daily Maximum Ammonia Limitations (mg/L)(LFF)					
pH	Criterion	Limit	pH	Criterion	Limit
6	54.99	109.98	7.6	17.03	34.06
6.2	53.17	106.34	7.8	**12.14**	**24.28**
6.4	50.53	101.06	8	8.41	16.82
6.6	46.84	93.69	8.2	5.73	11.45
6.8	42.00	83.99	8.4	3.88	7.77
7	36.09	72.19	8.6	2.65	5.30
7.2	29.54	59.08	8.8	1.84	3.69
7.4	22.97	45.94	9	1.32	2.65

Daily Maximum Ammonia Limitations (mg/L)(CW)					
pH	Criterion	Limit	pH	Criterion	Limit
6	36.72	73.44	7.6	11.37	22.75
6.2	35.51	71.02	7.8	**8.11**	**16.21**
6.4	33.74	67.49	8	5.62	11.23
6.6	31.28	62.57	8.2	3.83	7.65
6.8	28.05	56.09	8.4	2.59	5.19
7	24.10	48.21	8.6	1.77	3.54
7.2	19.73	39.45	8.8	1.23	2.46
7.4	15.34	30.68	9	0.88	1.77

Ammonia Decay: The more restrictive calculated limits should be used in order to protect at the point of discharge and downstream uses. Where the calculated limits are more restrictive based on downstream uses, ammonia decay can be considered to determine if these more restrictive limits are needed or if the ammonia will decay before it reaches the point of the classification change.

Ammonia decay rates are dependent on temperature with in-stream nitrification essentially non-existent in the winter. In-stream decay is expected so a first order decay model will be used. Based

on the available literature, a decay rate of 0.25 day^{-1} at 20°C has been suggested as a default rate. A temperature correction factor of $\theta = 1.08$ is ($k_{-t} = k_{20}\,\theta^{(T-20)}$).

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

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

The velocity of receiving water is assumed to be 5 miles per day and the distance from the point of discharge to the classification change is approximately 0.5 mile for a travel time of 0.1 days. This equation shows that at the location where the classification changes, 97% of the ammonia is remaining during summer, 99% during winter. The limits can be adjusted for decay as follows:

Ammonia Limits	Limited Forage Fish mg/L	Cold water mg/L	Recommended Limits mg/L
May – Sept.			
Daily max.	24.28	16.21	**16.7 (CW / 0.97)**
Weekly average	10.1	8.33	**8.6 (CW / 0.97)**
Monthly average	4.04	4.26	**4.0 (LFF)**
Oct. - April			
Daily max.	24.28	16.21	**16.3 (CW / 0.99)**
Weekly average	38.91	16.97	**17.1 (CW / 0.99)**
Monthly average	15.56	8.57	**8.6 (CW / 0.99)**

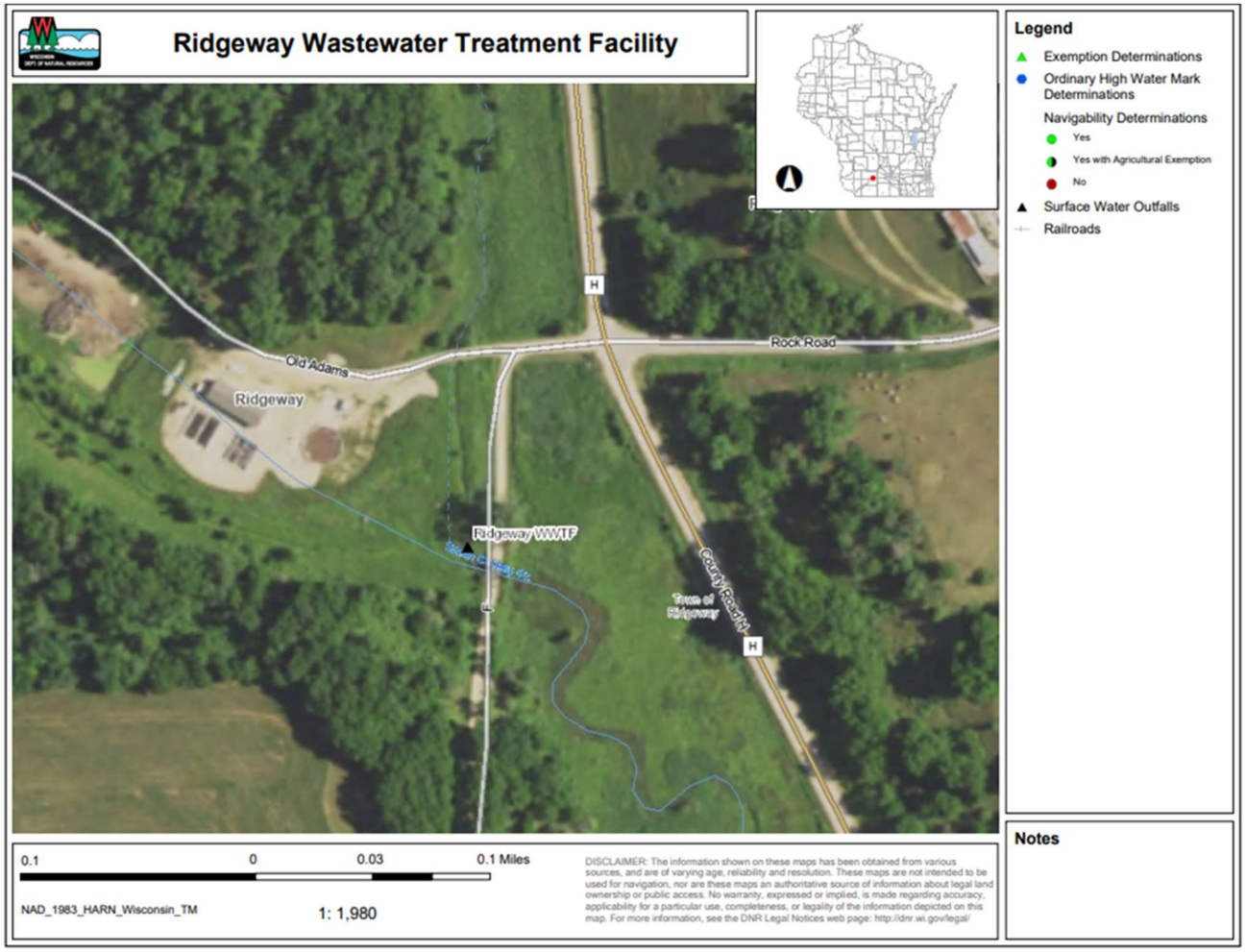
RECOMMENDED AMMONIA LIMITATIONS:
Using the available information summarized earlier and pursuant to NR 106.33(2), the ammonia limitations would be as follows.

Recommended Ammonia Nitrogen Effluent Limits			
	Daily Max.	**Weekly Avg.**	**Monthly Avg.**
May - September	17 mg/L	8.6 mg/L	4.0 mg/L
October - April	16 mg/L	no limit (weekly > daily)	8.6 mg/L

*- Limits are rounded

Antidegradation Review: An antidegradation analysis is needed pursuant to ch. NR 207 for every limitation that is greater than the corresponding limit in the existing WPDES permit. After a comparison of existing weekly limitations and the calculated ammonia limits based on the new rule, the weekly ammonia limits increased but limits are exempt from antidegradation under s. NR 207.03(1) because the increased limits are solely based on the change in criteria. In addition, the

Site Map:


Ridgeway Wastewater Treatment Facility
Legend
Exemption Determinations
Ordinary High Water Mark Determinations
Navigability Determinations
Yes
Yes with Agricultural Exemption
No
Surface Water Outfalls
Railroads
Notes
Rock Road
Old Adams
Ridgeway
Ridgeway WWTF
H
0.1
0
0.03
0.1 Miles
NAD_1983_HARN_Wisconsin_TM
1: 1,980
DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: http://dnr.wi.gov/legal/

Thermal Table:

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	0		**7-Q_{10}:**	0.00 cfs		**Temp Dates** / **Flow Dates**
Outfall(s):	001		**Dilution:**	25%	**Start:**	02/21/22 / 01/01/19
Date Prepared:			**f:**	0	**End:**	02/28/23 / 12/31/20
Design Flow (Qe):	0.05 MGD		**Stream type:**	Limited forage fish community		
Storm Sewer Dist.	0 ft		**Qs:Qe ratio:**	0.0 :1		
			Calculation Needed?	YES		

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	37	54	78	0.00	0.056	0.070	0	45	48	54	78
FEB	39	54	79	0.00	0.043	0.075	0	48	49	54	79
MAR	43	57	80	0.00	0.137	0.172	0	47	50	57	80
APR	50	63	81	0.00	0.066	0.079	0	49	51	63	81
MAY	59	70	84	0.00	0.081	0.106	0	57	60	70	84
JUN	64	77	85	0.00	0.062	0.065	0	65	66	77	85
JUL	69	81	86	0.00	0.068	0.074	0	70	70	81	86
AUG	68	79	86	0.00	0.035	0.044	0	68	70	79	86
SEP	63	73	85	0.00	0.073	0.073	0	65	66	73	85
OCT	55	63	83	0.00	0.194	0.314	0	70	73	**63**	83
NOV	46	54	80	0.00	0.046	0.055	0	60	79	**54**	80
DEC	40	54	79	0.00	0.044	0.054	0	47	49	54	79