

Permit Fact Sheet

General Information

Permit Number:	WI-0021679-10-0	
Permittee Name:	Howards Grove Village	
Address:	1111 Alcott Ave. Howards Grove WI 53083	
Discharge Location:	West bank of the Pigeon River one quarter mile upstream of the Millersville Road (CTY JJ, Garton Rd) Bridge.	
Receiving Water:	Pigeon River (Pigeon River Watershed – Sheboygan River Basin)	
StreamFlow (Q _{7,10}):	1.0 cfs	
Stream Classification:	Warm water sport fishery, non-public water supply	
Discharge Type:	Existing, Continuous	
Design Flow(s)	Annual Average	0.380
Significant Industrial Loading?	None.	
Operator at Proper Grade?	Yes.	
Approved Pretreatment Program?	N/A	

Facility Description

The Village of Howards Grove operates a WWTP with an annual average design flow of 0.380 MGD. Treatment consists of bar screen, fine screen, grit removal, 4 compact package plants - two consist of aerobic sludge digesters, MLSS aerated digesters, and a center clarifier, the other two have an MLSS aeration section and a center clarifier, polymer and aluminum sulfate addition before disc filters, UV disinfection, step aeration and discharge to the Pigeon River. Alum is also added after grit removal at the splitter box. Sludge is aerobically digested and thickened with a GBT. Badger State Waste hauls the sludge and land applies under their permit.

Substantial Compliance Determination

Enforcement During Last Permit: No formal enforcement was taken during the last permit term.

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items and a facility inspection on May 5, 2023, conducted by DNR Wastewater Engineer, Curt Nickels, this facility has been found to be in substantial compliance with their current permit, WI-0021679-09-1.

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	0.36 MGD (2023)	Influent: 24-Hr flow proportional composite sampler located prior to screening and grit removal. Flow monitor located at vertical pipe prior to pretreatment.
001	0.35 MGD (2023)	Effluent: 24-Hr flow proportional composite sampler located after filtration prior to disinfection. Grab samples collected after post aeration and disinfection. Flow meter located at filtration.
002	49.5 dry U.S. tons (WPDES Permit Application, 2023)	Aerobically digested, Thickened Liquid, Class B. Representative sludge samples shall be collected from prior to land application.

1 Influent – Monitoring Requirements

Sample Point Number: 701- INFLUENT TO PLANT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD ₅ , 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:

Changes highlighted in table above.

Flow Rate- Sample frequency changed to Daily.

Explanation of Limits and Monitoring Requirements

Flow Rate sample frequency changed to daily from continuous for eDMR reporting purposes.

BOD₅ and Total Suspended Solids: Tracking of BOD₅ and Total Suspended Solids are required for percent removal requirements found in s. NR 210.05, Wis. Adm. Code and in the ‘Standard Requirements’ section of the permit.

2 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies November through April.
BOD5, Total	Weekly Avg	5.0 mg/L	3/Week	24-Hr Flow Prop Comp	Limits applies May through October.
BOD5, Total	Monthly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies November through April.
BOD5, Total	Monthly Avg	5.0 mg/L	3/Week	24-Hr Flow Prop Comp	Limits applies May through October.
Suspended Solids, Total	Weekly Avg	26 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	93 lbs/day	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	66 lbs/day	3/Week	24-Hr Flow Prop Comp	
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 below.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Limit effective May through September annually.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit effective May

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					through September annually. Enter the result in the DMR on the last day of the month.
Nitrogen, Ammonia (NH3-N) Total	Daily Max	34 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies November - April.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies November - March.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	4.5 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies for April.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	2.7 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies for May through September.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	9.2 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies for October.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	4.9 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies November - March.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.1 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies for April.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	1.8 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies May - September.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	4.3 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies for October.
Dissolved Oxygen	Daily Min	7.0 mg/L	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
pH Field	Daily Max	9.0 su	Daily	Grab	
Phosphorus, Total	Monthly Avg	0.225 mg/L	3/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	6-Month Avg	0.075 mg/L	3/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	Monthly Avg	3.0 lbs/day	3/Week	Calculated	
Phosphorus, Total	6-Month Avg	0.238 lbs/day	3/Week	Calculated	
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.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
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 Calculations section below.
Chloride		mg/L	4/Month	24-Hr Flow Prop Comp	Four samples per month on consecutive days.
Temperature Maximum		deg F	Daily	Continuous	Monitoring in 2027 only.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series 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 below. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.
Chronic WET		TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET section.

Changes from Previous Permit

Changes highlighted in table above.

Flow Rate- Sample frequency changed to daily from continuous for eDMR reporting purposes.

Total Suspended Solids TMDL Limits- Mass based TSS limits of 93 lbs/day as a weekly average and 66 lbs/day as a monthly average have been added to the permit to comply with requirements of the Northeast Lakeshore TMDL. Effluent concentration (mg/L) shall be monitored and reported 3 times per 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.

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 TMDL Limits- Mass based phosphorus limits of 0.238 lbs/day as a six-month average and 3 lbs/day as a monthly average have been added to the permit to comply with requirements of the Northeast Lakeshore TMDL. Effluent concentration (mg/L) shall be monitored and reported 3 times per 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.

Temperature- Temperature monitoring year updated to 2027 and increased frequency to daily.

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

Copper- Copper monitoring was removed from permit. The 1-day P99 and 4-day P99 of effluent data were well below the calculated daily maximum and weekly average limits, so copper monitoring is not recommended.

Explanation of Limits and Monitoring Requirements

Categorical Limits

Total BOD5, Total Suspended Solids, DO and pH- Tracking of BOD5 and Total Suspended Solids are required for percent removal requirements found in s. NR 210.05, Wis. Adm. Code and in the 'Standard Requirements' section of the permit.

Water Quality Based Limits, WET Requirements, and Disinfection

Refer to the "Water Quality-Based Effluent Limitations for the Howards Grove Wastewater Treatment Facility" prepared by Nicole Krueger, dated December 15, 2023 and used for this reissuance.

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.

Northeast Lakeshore Total Maximum Daily Load (TMDL)- The permitted facility is located within the Northeast Lakeshore Total Maximum Daily Load (NEL TMDL), which was approved by EPA October 30, 2023. 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 308 lbs/yr for phosphorus and 16.339lbs/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 2023 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 the 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://prodoasint.dnr.wi.gov/swims/downloadDocument.do?id=167886175>).

For phosphorus, continuously discharging facilities covered by the NEL 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 0.238 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.

For TSS, continuously discharging municipal facilities covered by the NEL TMDL are given weekly average and monthly average mass limits.

Facilities with NEL 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-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. Chloride monitoring, four samples per month on consecutive days, is carried over from the last permit. This allows for averaging of the results to compare with the interim limit and allows the use of the average in determining future interim limits, and degree of success with chloride reduction measures.

Temperature- 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. One year of monitoring in year 2027 is recommended to continue in the proposed permit.

Total Ammonia Nitrogen- Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Table 2C and Table 4B of ch. NR 105, Wis. Adm. Code (effective March 1, 2004). Subchapter IV of ch. NR 106 establishes procedures for calculating water quality-based effluent limitations (WQBELs) for ammonia (effective March 1, 2004).

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 the following rotating quarters: **October – December 2024; January – March 2025; April – June 2026; July – September 2027; October – December 2028.**

Whole Effluent Toxicity- Whole effluent toxicity (WET) testing requirements 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>).

Chronic tests shall be conducted twice during the permit term in rotating quarters in order to collect seasonal information about the discharge. WET testing shall occur concurrently with chloride monitoring. Tests are required during the following quarters: **April 1 – June 30, 2025 and October 1 – December 31, 2028.**

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. Based on information available at the time the proposed permit was drafted, the department has determined the permittee does not need to sample the effluent 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.

Monitoring Frequency - Monitoring frequency for a permitted sewage treatment work is evaluated on a case-by-case basis pursuant [NR 210.04](#), Wis. Adm. Code. Appropriate monitoring is evaluated based on the size and type of facility, the ability to characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Monitoring frequency for flows, emerging contaminants, and pollutants with final effluent limits has been evaluated for this facility and will be reflected in the proposed permit. After evaluation, an increase in sampling frequency is warranted to capture changes in treatment due to facility upgrades and to align with sampling frequencies of similarly sized facilities with similar effluent quality throughout the state. The proposed permit will include an increased monitoring frequency for temperature. In addition to this increase, monitoring will be required for PFOS/PFOA (pursuant [NR 106.98\(2\)\(c\)](#), Wis. Adm. Code).

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	Fecal Coliform	Injection	Land Application	49.5
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.						
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.						
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: 002- Prior To Land Application

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2025.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2025.
Solids, Total		Percent	Annual	Composite	

Monitoring Requirements and Limitations

Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
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	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH ₄ -N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
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:

Changes highlighted in table above.

PCB: Sample frequency year was updated to 2025.

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

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 updated 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.	90 Days Prior to Land Application

Explanation of Schedule

A compliance schedule is included in the permit to submit a Land Application Management Plan for the permittee to outline how sludge would be land applied if the permittee decides to land apply under their permit instead of under a contract hauler's. The plan is required to be submitted for approval 90 days prior to land application.

Special Reporting Requirements

None.

Other Comments:

None.

Attachments:

Water Quality-Based Effluent Limitations Memo dated 12/15/2023 and prepared by Nicole Krueger.

Expiration Date:

March 31, 2029

Justification Of Any Waivers From Permit Application Requirements

No waivers were requested or granted from permit application requirements.

Prepared By: Melanie Burns, Wastewater Specialist

Date: January 29, 2024

Date (Post Fact Check): February 9, 2024

Date (Post Public Notice):

CORRESPONDENCE/MEMORANDUM

DATE: 12/15/2023

TO: Melanie Burns – SER

FROM: Nicole Krueger – SER *Nicole Krueger*

SUBJECT: Water Quality-Based Effluent Limitations for Howards Grove Wastewater Treatment Facility
 WPDES Permit No. WI-0021679-10

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 Howards Grove in Sheboygan County. This municipal wastewater treatment facility (WWTF) discharges to the Pigeon River, located in the Pigeon River Watershed in the Sheboygan River Basin. This discharge is included in the Northeast Lakeshore Basin as approved by EPA in November 2023. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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 November – April May – October			10 mg/L 5.0 mg/L	10 mg/L 5.0 mg/L		1,3
TSS			26 mg/L 93 lbs/day	10 mg/L 66 lbs/day		4
Bacteria <i>E. coli</i>				126 #/100 mL geometric mean		5
Ammonia Nitrogen November – March April May – September October	34 mg/L 34 mg/L		10 mg/L 4.5 mg/L 2.7 mg/L 9.2 mg/L	4.9 mg/L 2.1 mg/L 1.8 mg/L 4.3 mg/L		1
Dissolved Oxygen		7.0 mg/L				1
pH	9.0 s.u.	6.0 s.u.				1
Phosphorus s. NR 217.13 TMDL				0.225 mg/L 3.0 lbs/day	0.075 mg/L 0.238 lbs/day	4
Chloride						1,2
Temperature						1,2
Chronic WET						6,7
TKN, Nitrate+Nitrite, and Total Nitrogen						8

Footnotes:

1. No changes from the current permit.

2. Monitoring only.
3. Limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, are included in bold.
4. The TSS and monthly phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Northeast Lakeshore Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in November 2023.
5. Bacteria limits apply during the disinfection season of May through September. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
6. 2x/permit term chronic testing is recommended. The Instream Waste Concentration (IWC) to assess chronic test results is 70%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the Pigeon River.
7. 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).
8. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO₃), nitrite (NO₂), and total kjeldahl nitrogen (TKN) (all expressed as N).

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, Thermal Table & Map

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Curt Nickels, Wastewater Engineer – SER
Bryan Hartsook, Regional Wastewater Supervisor – SER
Diane Figiel, Water Resources Engineer – WY/3

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

WPDES Permit No. WI-0021679-10

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

The Village of Howards Grove operates a wastewater treatment facility with an annual average design flow of 0.380 MGD. The facility serves an estimated population of 3,200 people, and there are no significant or categorical industrial users. Wastewater treatment consists of grit removal, screening, conventional activated sludge, disc filtration, and ultra-violet light disinfection. Aluminum sulfate is added to remove phosphorus. Sludge is aerobically digested, and land applied to approved land application sites or hauled to an approved facility. Howards Grove recently upgraded their sand filters to disc filters to meet phosphorus limits.

Attachment #3 is a map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations

The current permit, expiring on 12/31/2023, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD ₅ November – April May – October			10 mg/L 5.0 mg/L	10 mg/L 5.0 mg/L		2,3
TSS			26 mg/L	10 mg/L		2
Fecal Coliform May – September			656#/100 mL geometric mean	400#/100 mL geometric mean		2
Ammonia Nitrogen November – March April May – September October	34 mg/L 34 mg/L		10 mg/L 4.5 mg/L 2.7 mg/L 9.2 mg/L	4.9 mg/L 2.1 mg/L 1.8 mg/L 4.3 mg/L		
Dissolved Oxygen		7.0 mg/L				2
pH	9.0 s.u.	6.0 s.u.				2
Phosphorus				0.225 mg/L	0.075 mg/L 0.238 lbs/day	4
Chloride						1
Temperature						1
Copper						1
Chronic WET						5

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. Limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, are included in bold.
4. These phosphorus limits became effective on October 1, 2022.
5. The IWC for chronic WET is 70%. Tests are required 2x/permit term.

Receiving Water Information

- Name: Pigeon River
- Waterbody Identification Code (WBIC): 62300
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply. Note: Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q₁₀ and 7-Q₂ values are from USGS for Station #04086000, updated 08/24/2018, where Outfall 001 is located.

7-Q₁₀ = 1.0 cfs (cubic feet per second)

7-Q₂ = 2.4 cfs

Harmonic Mean Flow = 7.01 cfs using a drainage area of 48.7 mi²

The Harmonic Mean has been estimated based on average flow and the 7-Q₁₀ using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q₁₀ (cfs)	1.7	1.7	3.0	7.9	3.3	2.0	1.5	1.2	1.2	1.5	2.1	1.9
7-Q₂ (cfs)	4.8	5.1	11	17	8.7	5.2	3.4	3.1	3.0	4.1	5.8	5.5

- Hardness = 343 mg/L as CaCO₃. This value represents the geometric mean of data from chronic WET testing from 09/23/2014 – 06/02/2020.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: Metals data from the Sheboygan River is used for this evaluation because there is no data available for Silver Creek. The Sheboygan River is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: None.
- Impaired water status: The direct receiving water is 303(d) listed as impaired for total phosphorus.

Effluent Information

- Design flow rate(s):
Annual average = 0.38 MGD (Million Gallons per Day)

Attachment #1

Peak weekly = 0.87 MGD

For reference, the actual average flow from 01/01/2019 – 08/31/2023 was 0.37 MGD.

- Hardness = 315 mg/L as CaCO₃. This value represents the geometric mean of data from 06/09/2023 – 06/23/2023 from the permit reissuance application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Domestic wastewater with water supply from wells.
- Additives: Aluminum sulfate is used for phosphorus removal. Sulfuric acid and sodium hypochlorite are used intermittently for cleaning filter media.
- 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.

Copper Effluent Data

	Copper µg/L
1-day P ₉₉	14.0
4-day P ₉₉	9.18
30-day P ₉₉	6.73
Mean	5.56
Std	2.55
Sample size	41
Range	2.5 – 18.5

Chloride Effluent Data

	Chloride mg/L
1-day P ₉₉	556
4-day P ₉₉	463
30-day P ₉₉	410
Mean	381
Std	64.6
Sample size	224
Range	181 – 596

The following table presents the average concentrations and loadings at Outfall 001 from 01/01/2019 – 08/31/2023 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	1.63 mg/L*	
TSS	2.03 mg/L*	

Attachment #1

	Average Measurement	Average Mass Discharged
pH field	7.2 s.u.	
Phosphorus	0.54 mg/L*	1.7 lbs/day
Ammonia Nitrogen	0.24 mg/L*	
Dissolved oxygen	9.74 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)

Acute Limits based on 1-Q₁₀

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-Q₁₀ receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

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

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.

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q₁₀ method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for Howards Grove and the limits are set based on two times the acute toxicity criteria.

Attachment #1

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 = 0.80 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	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Arsenic		340		680	136	<5		
Cadmium	315	38.4	0.01	77	15.4	<0.2		
Chromium	301	4446	0.82	8892	1778	<1.7		
Copper	315	45.8	0.34	92			14	18.5
Lead	315	324	0.12	648	130	<5		
Nickel	268	1080		2161	432	0.9		
Zinc	315	328	0.56	657	131	28.2		
Chloride (mg/L)		757	21	1514			556	596

* 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 = 0.25 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	4-day MAX. CONC.
Arsenic		152		217	43.4	<5		
Cadmium	175	3.82	0.01	5.44	1.09	<0.2		
Chromium	301	326	0.82	464	92.8	<1.7		
Copper	343	29.7	0.34	42.2			9.2	
Lead	343	92.0	0.12	131.1	26.2	<5		
Nickel	268	120		171	34.3	0.9		
Zinc	333	345	0.56	491	98.2	28.2		
Chloride (mg/L)		395	21	554			463	569

* 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.

Attachment #1

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 1.75 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	0.01	1472	294.4	<0.2
Chromium (+3)	3818000	0.82	15192207	3038441	<1.7
Lead	140	0.12	557	111.3	<5
Nickel	43000		171101	34220	0.9

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 1.75 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		52.9	10.6	<5

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

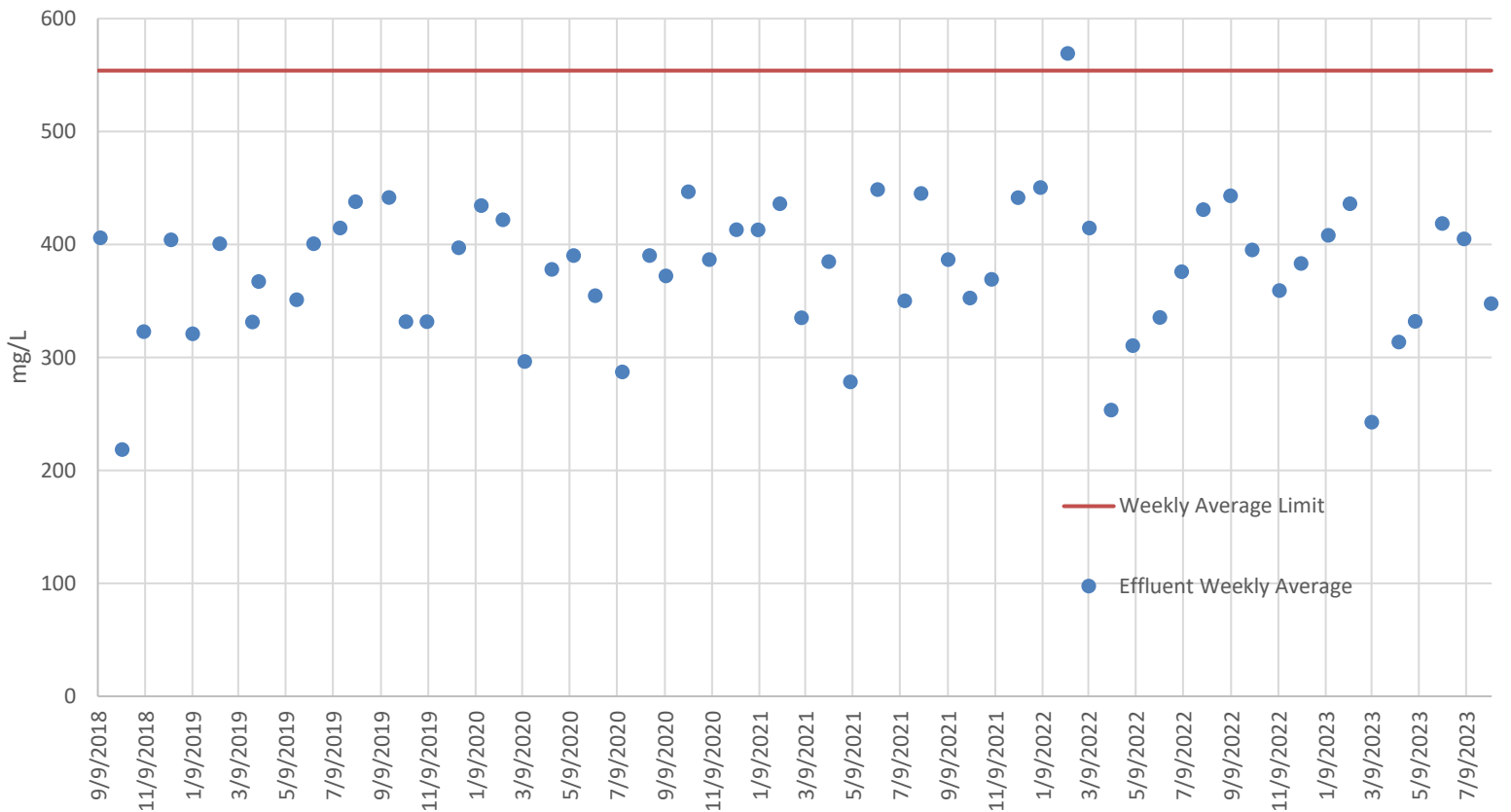
Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are required for chloride.

Chloride – Considering available effluent data from the current permit term (01/06/2019 – 08/10/2023), the 1-day P₉₉ chloride concentration is 556 mg/L and the 4-day P₉₉ of effluent data is 463 mg/L.

Because the highest weekly average concentration of 569 mg/L exceeds the calculated weekly average WQBEL, an effluent limit is needed in accordance with s. NR 106.05(4)(b), Wis. Adm. Code. A graph of the effluent weekly average chloride data is shown below compared to the calculated weekly average limit.

Chloride Data



There was one week in March 2022 that had a chloride weekly average higher than the calculated weekly limit. During this week, there was a 4-inch snow fall and rain which caused salt to get into the sanitary system. Because this event is not representative of normal conditions, this data is not used in the evaluation. All other weekly averages and the 4-day P₉₉ are below the calculated limits, so **chloride limits are not recommended in the reissued permit.**

Chloride Monitoring Recommendations

Four samples per month (on consecutive days) are recommended. This allows for averaging of the results to compare with the interim limit and allows the use of the average in determining future interim limits, and degree of success with chloride reduction measures.

Mercury – The permit application did not require monitoring for mercury because Howards Grove 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 average concentration in the sludge from 06/13/2018 – 11/30/2022 was 0.29 mg/kg, with a maximum reported concentration of 0.45 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, the effluent flow rate, the types of indirect dischargers contributing to the collection system, PFOS and PFOA monitoring is not recommended. PFOS and PFOA monitoring may be required in the future if information becomes available that indicates 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 1704 sample results were reported from 01/02/2019 – 08/31/2023. The maximum reported value was 7.6 s.u. (Standard pH Units). The effluent pH was 7.5 s.u. or less 99% of the time. The 1-day P₉₉, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 7.5 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 7.5 s.u. Therefore, a value of 7.5 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.5 s.u. into the equation above yields an ATC = 20 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are either set equal to two times the nitrogen limits 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	40
1-Q ₁₀	47

The 2×ATC method yields the most stringent limits for Howards Grove.

This limit is greater than the current daily maximum limit of 34 mg/L. If Howards Grove would like to request an increase to the existing permit limits an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter-by-parameter basis and includes consideration of operations, maintenance and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits must be continued in the reissued permit. The Department would be unable to increase the limit due to the lack of need as shown via the antidegradation rule (ch. NR 207, Wis. Adm. Code) because the highest reported concentration was 5.2 mg/L during the previous permit term. No changes are recommended in any of the permit limits for ammonia.

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 #2. The current limits are shown below:

Current Ammonia Nitrogen Limits

	Weekly Average mg/L	Monthly Average mg/L
November – March	10	4.9
April	4.5	2.1
May – September	2.7	1.8
October	9.2	4.3

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 01/01/2019 – 08/31/2023, with those results being compared to the calculated limits to determine the need to include ammonia limits in Howard’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	November – March	April	May – September	October
1-day P ₉₉	1.86	3.37	2.70	1.43
4-day P ₉₉	1.02	1.84	1.57	0.85
30-day P ₉₉	0.46	0.85	0.65	0.36
Mean*	0.23	0.44	0.22	0.14
Std	0.45	0.82	0.88	0.40

Attachment #1

Ammonia Nitrogen mg/L	November – March	April	May – September	October
Sample size	293	62	303	49
Range	<0.017 – 2.73	<0.017 – 2.63	<0.017 – 5.23	<0.017 – 2.25

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

Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits.

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.

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
November – March	34	10	4.9
April	34	4.5	2.1
May – September		2.7	1.8
October		9.2	4.3

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Code, 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 Howard Grove’s permit requires weekly monitoring, the 410 counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

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

Effluent Data

Howards Grove has monitored effluent *E. coli* from 07/31/2023 – 09/25/2023 and a total of 9 results are available. A geometric mean of 126 counts/100 mL was not exceeded, with a maximum monthly geometric mean of 35 counts/100 mL but this includes one data point of 1,650 counts/100 mL which was collected on a day that the UV bulbs were not working so is unrepresentative of normal disinfection conditions. The maximum reported value when the UV bulbs were working was 51 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 Howards Grove currently has a limit of 0.225 mg/L which is lower than the TBEL, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent WQBEL is given.

TMDL Limits – Phosphorus

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 K of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Northeast Lakeshore Region* report 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 Northeast Lakeshore Basin 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:

$$\begin{aligned} \text{TP Equivalent Effluent Concentration} &= \text{WLA} \div (\text{365 days/yr} * \text{Flow Rate} * \text{Conversion Factor}) \\ &= 308 \text{ lbs/yr} \div (\text{365 days/yr} * \text{0.38 MGD} * \text{8.34}) \\ &= 0.27 \text{ mg/L} \end{aligned}$$

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.

$$\text{TP 6-Month Average Permit Limit} = \text{WLA} \div \text{365 days/yr} * \text{multiplier}$$

$$\begin{aligned} & \text{Attachment \#1} \\ & = (308 \text{ lbs/yr} \div 365 \text{ days/yr}) * 1.17 \\ & = 0.99 \text{ lbs/day} \end{aligned}$$

$$\begin{aligned} \text{TP Monthly Average Permit Limit} & = \text{TP 6-Month Average Permit Limit} * 3 \\ & = 0.99 \text{ lbs/day} * 3 \\ & = 3.0 \text{ lbs/day} \end{aligned}$$

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 0.7. 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 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 phosphorus monitoring as 3/week; 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 concentrations of 0.31 mg/L and 0.93 mg/L, respectively, at the facility design flow of 0.38 MGD.

The TMDL establishes TP wasteload allocations to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries in the Northeast Lakeshore Basin. 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.

Current Limits

The current permit has a monthly average limit of 0.225 mg/L and six-month average limits of 0.075 mg/L and 0.238 lbs/day.

The six-month average TMDL-based limit of 0.99 lbs/day is less stringent than the current six-month average mass limit of 0.238 lbs/day, therefore the current limit is recommended to continue. Howards Grove has upgraded the facility. If Howards Grove would like to request an increase to the existing permit limits an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter-by-parameter basis and includes consideration of operations, maintenance and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits must be continued in the reissued permit.

The TMDL-based monthly average limit of 3.0 lbs/day is recommended to be included in the reissued permit.

Effluent Data

The table below summarizes the effluent data from the current permit term (01/01/2019 – 08/30/2023) for

informational purposes.

Total Phosphorus Statistics

	Concentration (mg/L)	Mass Discharge (lbs/day)
1-day P ₉₉	1.84	5.80
4-day P ₉₉	1.10	3.45
30-day P ₉₉	0.71	2.21
Mean	0.54	1.66
Std	0.36	1.14
Sample Size	708	723
Range	<0.017 – 2.14	0 – 6.98

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 Northeast Lakeshore Region* report 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.

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

$$\begin{aligned} \text{TSS Monthly Average Permit Limit} &= \text{WLA} \div 365 \text{ days/yr} * \text{multiplier} \\ &= (16,339 \text{ lbs/yr} \div 365 \text{ days/yr}) * 1.47 \\ &= 66 \text{ lbs/day} \end{aligned}$$

$$\begin{aligned} \text{TSS Weekly Average Permit Limit} &= \text{WLA} \div 365 \text{ days/yr} * \text{multiplier} \\ &= (16,339 \text{ lbs/yr} \div 365 \text{ days/yr}) * 2.07 \\ &= 93 \text{ lbs/day} \end{aligned}$$

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 2.7. 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 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 3/week; if a different monitoring frequency is used, the stated limits should be reevaluated.

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Weekly average and monthly average mass effluent limits are recommended for this discharge. The limits are equivalent to concentrations of 29 mg/L and 21 mg/L, respectively, at the facility design flow of 0.38 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 suspended solids monitoring data from 01/01/2019 – 08/31/2023.

Total Suspended Solids Effluent Data

	TSS mg/L	TSS lbs/day
1-day P ₉₉	17.9	61.9
4-day P ₉₉	9.64	33.5
30-day P ₉₉	4.28	14.5
Mean*	2.03	6.45
Std	4.77	17.2
Sample size	711	711
Range	<1.0 – 39	0 – 123

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

Howards Grove can currently meet the TSS mass limits and a compliance schedule is not needed.

**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.

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 01/01/2019 – 08/31/2023.

The table below summarizes the maximum temperatures reported during monitoring from 01/03/2022 – 12/31/2022.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	55	55	55	88
FEB	52	55	59	90
MAR	51	51	60	90
APR	51	51	69	120
MAY	55	57	69	89
JUN	60	65	83	92
JUL	64	65	87	89
AUG	66	66	85	87
SEP	66	67	78	89
OCT	65	65	65	86
NOV	61	62	54	93
DEC	57	60	56	91

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 maximum limits are necessary for the months of October, November, and December.

Howards Grove completed a dissipative cooling study in 2013 which demonstrated there is rapid cooling and a zone of free passage below their outfall. The facility has confirmed that there has not been a change in thermal loading since the DC study was completed.

Future WPDES Permit Reissuance

Dissipative cooling requests must be re-evaluated every permit reissuance. The permittee is responsible for submitting an updated DC request prior to permit reissuance. Such a request must either include:

- a) A statement by the permittee that there have been no substantial changes in operation of, or thermal loadings to, the treatment facility and the receiving water; or
- b) New information demonstrating DC to supplement the information used in the previous DC determination. If significant changes in operation or thermal loads have occurred, additional DC data must be submitted to the Department.

PART 8 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document (2022)*.

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

- 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 LC₅₀ (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 IC₂₅ (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 70% shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

- Q_e = annual average flow = 0.38 MGD = 0.59 cfs
- f = fraction of the Q_e withdrawn from the receiving water = 0
- Q_s = ¼ of the 7-Q₁₀ = 1.0 cfs ÷ 4 = 0.25 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

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chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.

- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations. Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. Data collected prior to July 2005 was not included in this evaluation.

WET Data History

Date Test Initiated	Chronic Results IC ₂₅ %			
	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?
02/20/2007	>100	>100	Pass	Yes
06/16/2009	>100	>100	Pass	Yes
09/28/2010	>100	>100	Pass	Yes
02/07/2012	>100	>100	Pass	Yes
09/23/2014	>100	>100	Pass	Yes
06/02/2015	>100	>100	Pass	Yes
05/02/2017	>100	>100	Pass	Yes
06/02/2020	>100	>100	Pass	Yes

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

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

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%).

Chronic Reasonable Potential = 0 < 1.0, reasonable potential is not shown, and a limit is not required.

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

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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>.

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. 0 Points	IWC = 70%. 15 Points
Historical Data	No tests are available. 0 Points	8 tests used to calculate RP. No tests failed. 0 Points
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. 0 Points	Same as Acute. 0 Points
Receiving Water Classification	Warmwater sport fish. 5 Points	Same as Acute. 5 Points
Chemical-Specific Data	Reasonable potential for limits for no substances based on ATC; Ammonia nitrogen limit carried over from the current permit. Copper, nickel, zinc, chloride, and ammonia detected. Additional Compounds of Concern: None 3 Points	Reasonable potential for limits for no substances based on CTC; Ammonia nitrogen limit carried over from the current permit. Copper, nickel, zinc, chloride and ammonia detected. Additional Compounds of Concern: None 3 Points
Additives	0 Biocides and 1 Water Quality Conditioners 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	0 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:	9 Points	24 Points
Recommended Monitoring Frequency (from Checklist):	No testing recommended.	2/permit term
Limit Required?	No	No
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, no acute and 2x/permit term chronic WET tests are

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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).

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2007 Ammonia Limits Calculations

Ammonia: Overview of Ammonia Rule Changes: The changes to ch. NR 105 establish acute (daily) and chronic (weekly and monthly) criteria for ammonia in-stream, based on updated information on ammonia toxicity. Acute criteria are dependent on the classification of the receiving water and on the pH of the discharge. Chronic criteria are dependent on the classification, temperature and pH of the receiving water. In addition, the chronic criteria for most classifications of receiving water are dependent on the presence or absence of early life stages of fish. For fish species other than burbot, the presence of early life stages is assumed in April and when the average temperature is equal to or greater than 14.6 degrees Celsius. Burbot are known to reproduce in colder water beginning in January of the year. There have been a large number of surveys in the Southeastern Wisconsin river basins over the years, and no burbot have been found (communication with Sue Beyler, SER Fisheries Biologist). In addition, the Department's Master Fish file and Becker's Fishes of Wisconsin have no record of burbot in the Sheboygan River basin above the first impoundment. Therefore the criteria for the Pigeon River will not be determined to protect the early life stages of burbot.

The changes to ch. NR 106 establish procedures for determining effluent limitations. For acute (daily maximum) limits, the limit equals twice the acute criterion established in conformance with ch. NR 105, unless a zone of initial dilution has been approved for a discharger. The acute limit is dependent on the maximum effluent pH, which in this case is represented by the maximum of 7.6 s.u.

For chronic (weekly average) limits, the limit is a mass balance based on the average annual design flow of the plant and a percentage of the average minimum 7-day flow that occurs once every ten years (7Q10). The percentage of stream flow used is related to the temperature of the stream. When the geometric average of the stream temperature is less than 11 degrees C., 25% of the stream flow is used. When the geometric average stream temperature is equal to or less than 16 degrees C., 50% of the stream flow is used. When the geometric average stream temperature is greater than 16 degrees C., 100% of the stream flow is used. Since the rate of breakdown of ammonia increases with increasing temperature, a greater percentage of the stream flow can be used.

For the purposes of determining ammonia limits, additional stream data is used:

Receiving Water Temperature:

May through September = 23 degrees C
April and October = 9 degrees C.
November-March = 3 degrees C.

(based on default temperature data for small streams in Wisconsin)

Background Ammonia Levels:

April = 0.09 mg/L
May-September = 0.07 mg/l
October = 0.1 mg/l
November-March = 0.17 mg/l

(based on ambient ammonia concentrations for the Sheboygan River Basin)

River pH:

May-September = 8.21 su
Other months = 7.97 su

(based on stream default pH data)

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Based on the criteria in ch. NR 105, the procedures for limit determinations in ch. NR 106, and the effluent and stream data noted above, the calculated limitations for ammonia are:

Calculated Limitations for Ammonia	
Month(s)	Limitations
Year Round	34 mg/l, daily maximum
April	4.5 mg/l, weekly average; 2.1 mg/l, monthly average
May-September	2.7 mg/l, weekly average; 1.8 mg/l, monthly average
October	9.2 mg/l, weekly average; 4.3 mg/l, monthly average
November-March	10 mg/l, weekly average; 4.9 mg/l, monthly average

Which Limits Apply? Ch. NR 106.32(2) specifies that, for a sewage treatment works treating primarily domestic waste, limits greater than 20 mg/l are not imposed for the months of May through October. Therefore, daily maximum limits are not necessary for these months, and the proposed limitations for Howards Grove are:

Proposed Limitations for Ammonia	
Month(s)	Limitations
Year Round	34 mg/l, daily maximum; limit applies for months of November through April
April	4.5 mg/l, weekly average; 2.1 mg/l, monthly average
May-September	2.7 mg/l, weekly average; 1.8 mg/l, monthly average
October	9.2 mg/l, weekly average; 4.3 mg/l, monthly average
November-March	10 mg/l, weekly average; 4.9 mg/l, monthly average

In accordance with s. NR 106.32 (5), no mass limitations are recommended for ammonia.

Applicability of NR 207 (Antidegradation): The proposed weekly average limitations for ammonia are greater than those in Howards Grove's current permit. Chs. NR 106.34 and NR 207.03(1) specify that the requirements of NR 207 are not applicable if the sole basis for the increase in limitations is due solely to a change in the water quality criterion. The change in the water quality criterion is the sole basis for the increase for the ammonia limitations for Howards Grove, so a NR 207 review is not required.

