Public Noticed Hillsboro Draft Permit Fact Sheet

General Information

Permit Number:	WI-0020583-11-0	
Permittee Name:	City of Hillsboro	
Address:	P O Box 447	
City/State/Zip:	Hillsboro WI 54634	
Discharge Location:	Hillsboro Wastewater Treatment Facility, E Madison St., Hillsboro, WI 54634 SE bank of west branch Baraboo River, 475 ft NE of East Madison Street bridge	
Receiving Water:	West Branch of the Baraboo River in the Seymour Creek and Upper Baraboo River Watershed of the Lower Wisconsin River Basin in Vernon County	
Stream Flow ($Q_{7,10}$):	3.4 cfs	
Stream Classification:	Warmwater Sport Fish, Non-Public Water Supply	
Discharge Type:	Continuous, Existing	
Design Flow(s)	Annual Average	0.185 MGD
Significant Industrial Loading?	Ornua, Land O Lakes Dairy	
Operator at Proper Grade?	Yes	
Approved Pretreatment Program?	N/A	

Facility Description

The City of Hillsboro owns and operates an activated sludge type wastewater treatment facility which treats domestic wastewater from the City of Hillsboro and industrial wastewater from Ornua (produces imitation cheese) and Land 'O Lakes (produces butter). Both industrial contributors are required to meet pretreatment limits before discharging to the wastewater treatment facility. The wastewater facility consists of a raw sewage pump station, septage receiving station, fine screen, an aeration basin, a final clarifier, an aerobic digester, chemical storage and handling equipment for phosphorus removal via alum, and aerated sludge storage tank. The facility has an annual average design flow of 0.185 MGD (million gallons per day). The actual annual average influent flow for the facility in 2023 was 0.163 MGD. Prior to discharge to the West Branch of the Baraboo River, effluent is disinfected via ultraviolet radiation. The facility also produces sludge that is aerobically digested and land applied on Department approved sites by contracted haulers. No major operational changes occurred during the last permit term. Major limit and/or monitoring changes for this issuance are 1) new influent flow monitoring, 2) increased effluent ammonia nitrogen and phosphorus monitoring frequency to 3/week, 3) lower effluent phosphorus interim limits associated with an approved multi-discharger variance for phosphorus (MDV) and compliance schedules to comply with s. 283.16, Wis. Stats. requirements for phosphorus, 4) fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits, 5) effluent monitoring for

PFOS and PFOA every other month has been added in accordance with s. NR 106.98(2)(c), Wis. Adm. Code, 4) Acute WET tests have been reduced from 3/permit to 2/permit term, and 5) to quantitate the risk, PFAS sludge sampling has been included in the permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9., Wis. Adm. Code.

Substantial Compliance Determination

Enforcement During Last Permit: An NON, and later an NOV, for multiple effluent limit exceedances (BOD, Ammonia, Phosphorus, and TSS) were issued in 2020. Another NOV was issued in 2021 for continued effluent limit violations. Enforcement was closed out in June 2022. Since 2022, the facility had minor violations for late submittals, phosphorus effluent limit violations, and missing samples. In July 2024, the facility was issued an NON for failure to act on poor CMAR grades. The facility has responded that they will submit a Facility Plan to address influent flows and loadings by April 2025. The facility has completed all previously required actions as part of the enforcement process.

After a desktop review of all discharge monitoring reports, CMARs, land app reports, and a site visit on January 30, 2024, this facility has been found to be in substantial compliance with their current permit.

Compliance determination entered by Katie Jo Jerzak, wastewater compliance engineer, on November 1, 2024.

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	0.163 MGD (2023)	Representative influent samples shall be collected as 24-hour flow proportional composites at the influent channel to the package treatment plant after screening.
001	0.161 MGD (2023)	Representative effluent samples shall be collected in the effluent channel between UV disinfection and the cascade aerator prior to discharge.
002	80 tons	Representative liquid sludge composite samples shall be collected annually from the aerated sludge storage tank and monitored for Lists 1, 2, 3, 4, PFAS, and once in 2026 for PCBs.

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	
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 has been added to better evaluate the influent and meet code requirements.

Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD5 and total suspended solids is required by s. NR 210.04(2), Wis. Adm. Code, to assess wastewater strengths and volumes and to demonstrate the percent removal requirements in s. NR 210.05, Wis. Adm. Code, and in the Standard Requirements section of the permit.

2 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT to W. BRANCH BARABOO

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Monthly Avg	25 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies May-Oct
BOD5, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies Nov-Apr
BOD5, Total	Weekly Avg	25 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies May-Oct
BOD5, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies Nov-Apr
BOD5, Total	Daily Max	74 lbs/day	3/Week	Calculated	Limit applies year round
Suspended Solids, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies Nov-Apr
Suspended Solids, Total	Monthly Avg	25 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies May-Oct
Suspended Solids, Total	Weekly Avg	25 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies May-Oct
Suspended Solids, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	Limit applies Nov-Apr
pH Field	Daily Max	9.0 su	Daily	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
Dissolved Oxygen	Daily Min	7.0 mg/L	Daily	Grab	
Nitrogen, Ammonia (NH3-N) Total	Daily Max	17 mg/L	3/Week	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	5.3 mg/L	3/Week	24-Hr Flow Prop Comp	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	3.1 mg/L	3/Week	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	6.5 mg/L	3/Week	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	11 mg/L	3/Week	24-Hr Flow Prop Comp	
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit applies May-Sept. Enter the result in the DMR on the last day of the month. See E. coli section.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Limit applies May-Sept.
Phosphorus, Total	Monthly Avg	0.8 mg/L	3/Week	24-Hr Flow Prop Comp	This is an interim MDV limit effective through 12/31/2027. See the MDV/Phosphorus subsections and phosphorus schedules.
Phosphorus, Total	Monthly Avg	0.6 mg/L	3/Week	24-Hr Flow Prop Comp	This is an interim MDV limit effective on 01/01/2028. See the MDV/Phosphorus subsections 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.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section below.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section below.
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.
PFOS		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
PFOA		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET section below.
Chronic WET	Monthly Avg	4.0 TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET section below.

Changes from Previous Permit

1) Increased ammonia nitrogen and phosphorus monitoring frequency to 3/week, 2) lower phosphorus interim limits associated with an approved multi-discharger variance for phosphorus (MDV) and compliance schedules to comply with s. 283.16, Wis. Stats. requirements for phosphorus, 3) fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits, 4) monitoring for PFOS and PFOA every other month has been added in accordance with s. NR 106.98(2)(c), Wis. Adm. Code, 4) Acute WET tests have been reduced from 3/permit to 2/permit term.

Explanation of Limits and Monitoring Requirements

The effluent monitoring frequency for all parameters were considered. Monitoring frequencies are based on the size and type of the facility and are established to best characterize effluent quality and variability, to detect events of noncompliance, and to ensure fairness and consistency in permits issued across the state. Requirements in administrative code (NR 108, 205, 210 and 214 Wis. Adm. Code) and Section 283.55, Wis. Stats. were considered, where applicable, when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. For more information see the March 22, 2021 version of the Bureau of Water Quality Program Guidance Document “Monitoring Frequencies for Individual Wastewater Permits”. Using the criteria previously stated, the

department has determined phosphorus, and ammonia nitrogen will be increased from 2/week to 3/week to conform to standard sampling requirements of similar facilities.

MUNICIPAL EFFLUENT LIMITS –In accordance with the federal regulation 40 CFR 122.45(d), and to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, limits in this permit are to be expressed as weekly average and monthly average limits whenever practicable which applies to ammonia nitrogen limits of 46 mg/L monthly and weekly averages.

Limits were determined for this existing discharge using chs. NR 102, 104,105, 106, 207, 210, 212 and 217 of the Wisconsin Administrative Code (where applicable). For additional information on any of the limits see the September 12, 2024 memo from Ben Hartenbower to Angela Parkhurst titled "Water Quality-Based Effluent Limitations for the Hillsboro Wastewater Treatment Facility WPDES Permit No. WI-0020583".

BOD, TSS and pH: Monitoring and limits for BOD, TSS and pH correspond to the requirements in the current permit since the facility has not increased the capacity of the wastewater treatment system since the last permit issuance, nor are increases expected during the term of the proposed permit.

Ammonia: Water quality-based effluent limitations were evaluated for Ammonia Nitrogen based upon water quality criteria in ch. NR 105 (as revised March 2004), including acute toxicity criteria (ATC) and chronic toxicity criteria (CTC). Effluent limitations for ammonia are calculated using the procedures in s. NR 106.32, Wis. Adm. Code and are shown in the WQBEL memo referenced above.

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 limits and 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 also apply.

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. Hillsboro is included within the Wisconsin River Basin TMDL, which was approved by EPA April 26, 2019. The TMDL establishes Waste Load Allocations (WLAs) for point source dischargers and determines the maximum amounts of phosphorus that can be discharged and still protect water quality. The final effluent limits and monitoring are 1.37 lbs/day monthly average and 0.46 lbs/day 6-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 for a 10-year duration. 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. The monthly average interim effluent limit for total phosphorus of 0.8 mg/L carries over from the current permit and will lower to 0.6 mg/L per the associated compliance schedule. The permittee was reapproved for the MDV on May 23, 2024.

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. A reopener clause is included in the permit to address the current MDV's expiration date, as a permit action may be required to update or remove variance provisions if the MDV is altered or unavailable after February 6, 2027.

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 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 the following rotating quarters:

January – March 2025

October - December 2026

July – September 2027

October – December 2028

April - June 2029

PFOS and PFOA: – NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for municipal dischargers with an average flow rate less than 1 MGD, to be evaluated on a case-by-case basis to determine if monitoring is required pursuant to s. NR 106.98(2)(c), 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, it was identified that the POTW has an indirect discharger(s) that may be a potential source of PFOS/PFOA.

Therefore, monitoring once every two months is included. A sample frequency of 1/2 months means one sample is taken during any two-month period. Examples of 1/2 month sample would be every other month (Jan, March, May, etc.) or back-to-back months with a break in between (February & March, May & June, Aug & Sept, etc.). DMR Short Forms will be generated for the following time periods: January-February, March-April, May-June, July-August, September-October, and November-December. At a minimum one sample result will be present on each form.

The initial determination of the need for sampling shall be conducted for up to two years in order to determine if the permitted discharge has the reasonable potential to cause or contribute to an exceedance of the PFOS or PFOA standards under s. NR 102.04(8)(d)1, Wis. Adm. Code.

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)). Two Acute tests and annual Chronic tests (with a monthly avg limit of 4.0) are required this permit term in the following quarters:

Acute:

January – March 2025

July - September 2027

April - June 2029

Chronic:

January – March 2025

April – June 2026

July – September 2027

October – December 2028

April – June 2029

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	Incorporation	Land Applied	80
Does sludge management demonstrate compliance? yes						
Is additional sludge storage required? yes						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? no						
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- 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	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
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 (NH4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Sample once in 2026
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Sample 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:

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). Requirements for pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7) for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k). Radium requirements are addressed in s. NR 204.07(3)(n).)

PFAS- The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA 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.

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

4 Schedules

4.1 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.	12/31/2025
Progress Report #2: Submit a progress report on optimizing removal of phosphorus.	12/31/2026
Progress Report #3: Submit a progress report on optimizing removal of phosphorus.	12/31/2027
Progress Report #4: Submit a progress report on optimizing removal of phosphorus.	12/31/2028
Progress Report #5: Submit a progress report on optimizing removal of phosphorus.	12/31/2029

4.2 Phosphorus Multi-Discharger Variance Interim Limit (0.6 mg/L)

This compliance schedule requires the permittee to achieve compliance with the specified MDV interim effluent limit in accordance with s. 283.16(6), Wis. Stats., by the due date.

Required Action	Due Date
Report on Effluent Discharges: Submit a report on effluent discharges of phosphorus with conclusions regarding compliance.	12/31/2025
Action Plan: Submit an action plan for complying with the specified interim effluent limit. If construction is required, include plans and specifications with the submittal.	09/30/2026

Initiate Actions: Initiate actions identified in the plan.	06/30/2027
Complete Actions: Complete actions identified in the plan and achieve compliance with the specified interim effluent limit.	12/31/2027

4.3 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 pound" value is $50.00 adjusted for CPI.	03/01/2025
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.	

4.4 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
Report on Effluent Discharge: Submit a report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations. This	12/31/2025

analysis should also include a comparison to the applicable narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results. Please submit the laboratory analysis sheets with the report.	
Report on Effluent Discharge and Evaluation of Need: Submit a final report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations of data collected over the last 24 months. Please submit the laboratory analysis sheets with the report. The report shall also provide a comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results. The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan. If the Department determines a PFOS/PFOA minimization plan is needed based on a reasonable potential evaluation, the permittee will be required to develop a minimization plan for Department approval no later than 90 days after written notification was sent from the Department. The Department will modify or revoke and reissue the permit to include PFOS/PFOA minimization plan reporting requirements along with a schedule of compliance to meet WQBELs. Effluent monitoring of PFOS and PFOA shall continue as specified in the permit until the modified permit is issued. If, however, the Department determines there is no reasonable potential for the facility to discharge PFOS or PFOA above the narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code, no further action is required and effluent monitoring of PFOS and PFOA shall continue as specified in the permit.	12/31/2026

Explanation of Schedules

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.

Interim Limit

Subsection 283.16(6), Wis. Stats., establishes required interim phosphorus effluent limits that must be met for multi-discharger variance (MDV) eligibility. The schedule above provides the permittee with three years to comply with that limit.

County Payment

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).

PFOS/PFOA Minimization Plan Determination of Need

As stated above, NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. S. NR 106.98, Wis. Adm. Code, specifies steps to generate data in order to determine the need for reducing PFOS and PFOA in the discharge. Data generated per the effluent monitoring requirements will be used to determine the need for developing a PFOS/PFOA minimization plan. As part of the schedule, the permittee is required to submit two annual Reports on Effluent Discharge.

If the Department determines that a minimization plan is needed, the permit will be modified or revoked/reissued to include additional requirements.

Other Comments:

TBD

Attachments:

Water Quality Based Effluent Limits memo dated September 12, 2024 from Ben Hartenbower to Angela Parkhurst titled "Water Quality-Based Effluent Limitations for the Hillsboro Wastewater Treatment Facility WPDES Permit No. WI-0020583".

MDV checklist and conditional approval dated 05/22/2024.

Expiration Date:

12/31/2029

Justification Of Any Waivers From Permit Application Requirements

Not applicable

Prepared By: Angela Parkhurst Wastewater Specialist Date: 11/11/24

Notice of reissuance will be published in the Hillsboro Sentry-Enterprise, PO Box 469, Hillsboro, WI 54634-0469**.**

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: September 12, 2024

TO: Angela Parkhurst– WCR/Eau Claire

FROM: Benjamin Hartenbower – WCR/Eau Claire

SUBJECT: Water Quality-Based Effluent Limitations for the Hillsboro Wastewater Treatment Facility WPDES Permit No. WI-0020583

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 Hillsboro Wastewater Treatment Facility in Vernon County. This municipal wastewater treatment facility (WWTF) discharges to the West Branch of the Baraboo River, located in the Seymour Creek and Upper Baraboo River Watershed in the Lower Wisconsin River Basin. This discharge is included in the Wisconsin River TMDL as approved by EPA on April 26, 2019 with site-specific criteria approved by EPA on July 9, 2020. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD_5 May - October November - April	 74 lbs/day 74 lbs/day		 25 mg/L 45 mg/L	 25 mg/L 30 mg/L		1
TSS May - October November - April			 25 mg/L 45 mg/L	 25 mg/L 30 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		7.0 mg/L				1
Ammonia Nitrogen April to May June to September October to March	 17 mg/L		 11 mg/L 6.5 mg/L 11 mg/L	 5.3 mg/L 3.1 mg/L 5.3 mg/L		1
E. Coli				126 #/100 mL geometric mean		3
PFOS and PFOA						4
Phosphorus LCA Interim Limit HAC Interim Limit Final WQBEL				 0.8 mg/L 0.6 mg/L 1.37 lbs/day	 0.46 lbs/day	5
TKN, Nitrate+Nitrite, and Total Nitrogen						6
Acute WET						7
Chronic WET				4.0 TUc		7,8

Footnotes:

1. No changes from the current permit.
2. Monitoring only.

3. Bacteria limits apply during the disinfection season of May - September. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
4. Monitoring once every two months is required in accordance with s. NR 106.98(2), Wis. Adm. Code.
5. Under the phosphorus MDV, a level currently achievable (LCA) interim limit of 0.8 mg/L should be effective upon permit reissuance. A compliance schedule may be included in the permit until the highest attainable condition (HAC) limit of 0.6 mg/L can be met. The final WQBELs remain at 1.37 lbs/day as a monthly average and 0.46 lbs/day as a six-month average. The phosphorus mass limit is based on the Total Maximum Daily Load (TMDL) for the Wisconsin River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA on April 26, 2019 with site-specific criteria approved by EPA on July 9, 2020.
6. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total kjeldahl nitrogen (TKN) (all expressed as N).
7. Two acute and annual chronic WET tests are recommended in the reissued permit. 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. The Instream Waste Concentration (IWC) to assess chronic test results is 25%. 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%, 30%, 10%, 3% & 1% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the West Branch of the Baraboo River.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Benjamin Hartenbower at (715) 225-4705 or Benjamin.Hartenbower@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (3) – Narrative, Thermal Table, & Map

PREPARED BY: _____ Date: 09/12/2024

Benjamin Hartenbower, PE,
Water Resources Engineer

E-cc:

Katie Jo Jerzak, Wastewater Engineer – WCR/Eau Claire
Geisa Thielen, Regional Wastewater Supervisor – WCR/Eau Claire
Diane Figiel, Water Resources Engineer – WY/3
Kim Kuber, Water Quality Biologist – SCR/Dodgeville
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for the Hillsboro Wastewater Treatment Facility WPDES Permit No. WI-0020583

Prepared by: Benjamin P. Hartenbower

PART 1 – BACKGROUND INFORMATION

Facility Description:
The wastewater treatment facility includes an influent mechanical fine screen; an influent pump station; a "package plant" activated sludge process with secondary clarifier; chemical addition for phosphorus removal; ultraviolet (UV) light disinfection; flow metering, and effluent re-aeration followed by discharge to the West Branch of the Baraboo River. Waste sludge from the final clarifier is pumped to an aerobic digester/storage tank. Digested sludge is land applied on Department-approved agricultural sites.

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

Existing Permit Limitations
The current permit, expiring on December 31, 2024, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1,2
BOD_5					1,3
May - October	74 lbs/day		25 mg/L	25 mg/L	
November - April	74 lbs/day		45 mg/L	30 mg/L	
TSS					1
May - October			25 mg/L	25 mg/L	
November - April			45 mg/L	30 mg/L	
pH	9.0 s.u.	6.0 s.u.			1
Dissolved Oxygen		7.0 mg/L			1
Ammonia Nitrogen					4
April - May			11 mg/L	5.3 mg/L	
June - September			6.5 mg/L	3.1 mg/L	
October - March	17 mg/L		11 mg/L	5.3 mg/L	
Fecal Coliform					4
May - September			**656 #/100 mL geometric mean**	400 #/100 mL geometric mean	
Temperature					2
Phosphorus					5
Interim				1.00 mg/L	
MDV Interim				0.800 mg/L	
TKN, Nitrate+Nitrite, and Total Nitrogen					2
Acute WET					6
Chronic WET				4.0 TUc	7

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. The BOD_5 mass limit recommendation is from the October 10, 2005 Facility Planning memo and is approximately equal to 75% of the value predicted by the 26-lb method. This limit is included because of the waterbody listing as impaired for Biological Oxygen Demand.
4. Additional limits to comply with the expression of limits requirements are included in bold.
5. Under the phosphorus MDV, a highest attainable condition (HAC) limit of 0.8 mg/L was effective January 1, 2022.
6. Acute WET testing required: Apr - June 2020, July - Sept 2021, and Apr - June 2024.
7. Chronic WET testing required: Apr - June 2020, July - Sept 2021, Oct - Dec 2022, Jan - March 2023, and Apr - June 2024. The IWC for chronic WET was 25%.

Receiving Water Information

- Name: West Branch of the Baraboo River
- Waterbody Identification Code (WBIC): 1288400
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
  Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: USGS for Station 05404116, in the West Branch Baraboo River at Hillsboro

  $7\text{-}Q_{10}$ = 3.40 cfs (cubic feet per second)
  $7\text{-}Q_2$ = 5.40 cfs

  Harmonic Mean Flow = 11.6 cfs using a drainage area of 39.1 mi^2.
  The Harmonic Mean has been estimated based on average flow and the $7\text{-}Q_{10}$ using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).
- Hardness = 259 mg/L as $CaCO_3$. This value represents the geometric mean of 14 samples collected in the receiving water for WET testing from 05/07/1996 to 07/06/2021.
- % 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: Chloride data is from the West Branch Baraboo River. Metals data from the Kickapoo River at Oil City is used for this evaluation because there is no data available for the West Branch of the Baraboo River and the West Branch Baraboo 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 West Branch of the Baraboo River is listed as impaired for Total Phosphorus, Total Suspended Solids, and Dissolved Oxygen. This discharge is located within the WI River TMDL for phosphorus.

Effluent Information:

- Design Flow Rates(s):
  Annual Average = 0.185 MGD (Million Gallons per Day)
  For reference, the actual average flow from January 2021 to July 2024 was 0.166 MGD.
- Hardness = 181 mg/L as $CaCO_3$. This value represents the geometric mean of 4 effluent samples collected from 08/18/2023 to 08/29/2023.
- 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 the wells and non-domestic contribution from Land O' Lakes and Ornua Ingredients.
- Additives: Aluminum Sulfate used for phosphorus removal.
- Total Phosphorus Wasteload Allocation: 128 lbs/year = 0.350 lbs/day
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus Chloride and Hardness. The permit-required monitoring for Ammonia Nitrogen, Temperature, and Phosphorus from January 2021 to July 2024 is used in this evaluation.

Chemical Specific Effluent Data at Outfall 001

Sample Date	Copper µg/L	Sample Date	Chloride mg/L
07/25/2023	5.5	09/18/2023	500
07/28/2023	7.3	09/22/2023	330
08/01/2023	12.5	09/25/2023	350
08/04/2023	8.8	09/29/2023	260
08/08/2023	6.9	04/06/2024	390
08/11/2023	13.2	04/09/2024	290
08/15/2023	8.9	04/12/2024	350
08/18/2023	8.2	04/15/2024	290
08/22/2023	7.8	04/18/2024	220
08/25/2023	5.2	04/21/2024	240
08/29/2023	8.6	04/24/2024	250
1-day P_{99}	15.92	1-day P_{99}	550
4-day P_{99}	11.78	4-day P_{99}	421

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.”.

Attachment #1

The following table presents the average concentrations and loadings at Outfall 001 from January 2021 to July 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6):

Parameter Averages with Limits

	Average Measurement	Average Mass Discharged
BOD_5	6.7 mg/L*	9.73 lbs/day
TSS	7.4 mg/L*	
pH	7.47 s.u.	
Dissolved Oxygen	8.95 mg/L	
Ammonia Nitrogen	0.37 mg/L*	
Fecal Coliform	55#/100 mL	
Phosphorus	0.41 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 not the case for the Hillsboro Wastewater Treatment Facility and the limits are set based on two times the acute toxicity criteria.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 2.7 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	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	<7.7		
Cadmium	181	20.3	0.025	40.7	8.1	<0.41		
Chromium (+3)	181	2930	0.836	5859	1172	<1.1		
Copper	181	27.1	1.1	54.3			15.9	13.2
Lead	181	190	0.950	379	76	<1.4		
Nickel	181	775		1549	310	4.5		
Zinc	181	202	2.9	404	81			
Chloride		757	6.6	1514			550	500

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

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)
RECEIVING WATER FLOW = 0.9 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	MAX. EFFL. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		152		604	121	<7.7	
Cadmium	175	3.8	0.0253	15.1	3.0	<0.41	
Chromium (+3)	259	288	0.836	1140	228	<1.1	
Copper	259	23.4	1.093	89.5			11.8
Lead	259	70	0.9501	276	55	<1.4	
Nickel	259	117		463	93	4.5	
Zinc	259	277	2.935	1089	218		
Chloride		395	6.64	1548			421

* 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 = 2.9 cfs (¼ of the Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MAX. EFFL. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P_{99}
Cadmium	370.0	0.025	4110.6	822.1	<0.41	
Chromium (+3)	3818000	0.836	42419780	8483956	<1.1	
Lead	140	0.950	1546	309	<1.4	
Nickel	43000		477750	95550	4.5	

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 2.9 cfs (¼ of the Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P_{99}
Arsenic	13.3		147.8	29.6	<7.7	

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, limits are not required for toxic substances.

PFOS and PFOA

The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98, Wis. Adm. Code. PFOS and PFOA were not detected in the water supply. Based on the nondomestic contributions, **PFOS and PFOA monitoring is recommended once every two months.**

Mercury – The permit application did not require monitoring for mercury because the Hillsboro 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). 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 2021 to 2023 was 0.45 mg/kg, with a maximum reported concentration of 0.71 mg/kg. **Therefore, no mercury monitoring is recommended at Outfall 001.**

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.

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

Where:

A = 0.411 and B = 58.4 for a 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 1308 sample results were reported from January 2021 to July 2024. The maximum reported value was 8.70 s.u. (Standard pH Units). The effluent pH was 8.30 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 8.19 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.17 s.u. Therefore, a value of 8.30 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 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}	48.85

The 2×ATC method yields the most stringent limits for the Hillsboro Wastewater Treatment Facility.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

Daily Maximum Ammonia Nitrogen Limits – WWSF

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

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)
The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as Warm Water Sport Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{[0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})]\} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,
E = 0.854,
C = the minimum of 2.85 or $1.45\times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or
$C = 1.45\times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and
T= the temperature (ºC) of the receiving water – (Early Life Stages Present), or
T = the maximum of the actual temperature (ºC) and 7 - (Early Life Stages Absent)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q_{10} (4-Q3, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q_5 (estimated as 85% of the 7-Q_2 if the 30-Q_5 is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 ºC, 25% of the flow is used if the Temperature < 11 ºC, and 50% of the flow is used if the Temperature ≥ 11 ºC but < 16 ºC.

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 ºC, during the winter and spring months. Based on a review of the DNR Fisheries database, burbot, an early spawning species, are not believed to be present in the West Branch of the Baraboo River. So "ELS Absent" criteria apply from October through March, and "ELS Present" criteria will apply from April through September for a WWSF classification.

The "default" basin assumed values are used for temperature and background ammonia concentrations, because minimum ambient data is available. The values for pH are based on data collected from the West Branch Baraboo River. These values are shown in the table below, with the resulting criteria and effluent limitations.

Weekly and Monthly Ammonia Nitrogen Limits – WWSF

		April & May	June-September	October-March
Effluent Flow	Qe (MGD)	0.185	0.185	0.185
Background Information	7-Q_{10} (cfs)	3.4	3.4	3.4
	7-Q_2 (cfs)	5.4	5.4	5.4
	Ammonia (mg/L)	0.07	0.07	0.14
	Temperature (°C)	14.4	20.6	10.0
	pH (s.u.)	7.95	8.19	8.06
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	1.7	3.4	0.85
	Reference Monthly Flow (cfs)	2.3	4.6	1.1
Criteria mg/L	4-day Chronic			
	Early Life Stages Present	6.54	3.07	5.53
	Early Life Stages Absent	6.57	3.07	7.41
	30-day Chronic			
	Early Life Stages Present	2.62	1.23	2.21
	Early Life Stages Absent	2.63	1.23	2.96
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	45	39	
	Early Life Stages Absent			29
	Monthly Average			
	Early Life Stages Present	23	20	
	Early Life Stages Absent			14

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from January 2021 to July 2024, with those results being compared to the calculated limits to determine the need to include ammonia limits in the Hillsboro Wastewater Treatment Facility permit for the respective month ranges.

Ammonia Nitrogen Effluent Data

Ammonia Nitrogen mg/L	April & May	June-September	October-March
1-day P_{99}	9.36	5.05	6.23
4-day P_{99}	4.96	2.46	3.04
30-day P_{99}	2.07	1.01	1.2
Mean*	0.71	0.3	0.29
Std	3.36	2.13	3.21
Sample size	68	122	178
Range	<0.2 - 11	<0.02 - 6.9	<0.2 - 11

*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. 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, **the current limits and monitoring for ammonia nitrogen are recommended to continue.**

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April & May		11	5.3
June-September		6.5	3.1
October-March	17	11	5.3

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

Section NR 102.04(5), Wis. Adm. Code, states that all surface waters shall be suitable for supporting recreational use and shall meet *E. coli* criteria during the recreation season. Section NR 102.04(5)(b), Wis. Adm. Code, allows the Department to make exceptions when it determines, in accordance with s. NR 210.06(3), Wis. Adm. Code, that wastewater disinfection is not required to meet *E. coli* limits and protect the recreational use. Section NR 210.06(3), Wis. Adm. Code, tasks the Department with determining the need for disinfection using a site-specific analysis based on potential risk to human or animal health. It sets out the factors that must be considered in determining the necessity to disinfect municipal wastewater or to change the length of the disinfection season.

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. The Hillsboro Wastewater Treatment Facility permit requires weekly 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 required disinfection season.

Effluent Data
The Hillsboro Wastewater Treatment Facility has monitored effluent *E. coli* from September 2023 to July 2024 and a total of 15 results are available. A geometric mean of 126 counts/100 mL was never exceeded, with a maximum monthly geometric mean of 4 counts/100 mL. Effluent data never exceeded 410 counts/100 mL. The maximum reported value was 26 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 the Hillsboro Wastewater Treatment Facility does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average phosphorus loading is less than 150 lbs/month, which is the threshold for municipalities in accordance to s. NR 217.04(1)(a)1, Wis. Adm. Code, and therefore a technology-based limit is not required.

Annual Average Mass Total Phosphorus Loading

Month	Monthly Avg. mg/L	Total Flow MG/month	Total Phosphorus lb./mo.
Aug 2023	0.11	4.81	4.22
Sep 2023	0.06	4.30	2.26
Oct 2023	0.13	4.34	4.58
Nov 2023	0.23	3.37	6.47
Dec 2023	0.17	3.69	5.31
Jan 2024	0.19	3.79	6.15
Feb 2024	0.10	4.03	3.48
Mar 2024	0.31	3.83	9.89
Apr 2024	0.10	5.38	4.29
May 2024	0.13	8.29	9.28
Jun 2024	0.19	6.60	10.55
Jul 2024	0.12	7.96	7.91
		Average =	**6.20**

Total P (lbs/month) = Monthly average (mg/L) × total flow (MG/month) × 8.34 (lbs/gallon)
Where total flow is the sum of the actual (not design) flow (in MGD) for that month

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

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

For 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 continuously discharging facilities covered by the WRB 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 are also included. The following equation shows the calculation of equivalent effluent concentration:

TP Equivalent Effluent Concentration = Daily WLA ÷ (Flow Rate * Conversion Factor)
= 0.350 lbs/day ÷ (0.185 MGD * 8.34)
= 0.23 mg/L

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.

TP 6-Month Average Permit Limit = Daily WLA * 6-Month average multiplier
= 0.350 lbs/day * 1.30
= 0.46 lbs/day

TP Monthly Average Permit Limit = TP 6-Month Average Permit Limit * 3
= 0.46 lbs/day * 3
= 1.37 lbs/day

The multiplier used in the six-month average calculation was determined according to TMDL implementation guidance. A standard coefficient of variation (CV) of 0.6, along with monitoring frequency, is used to select the multiplier. The current permit specifies phosphorus monitoring as weekly; if a different monitoring frequency is used, the stated limits should be reevaluated.

The WRB TMDL establishes TP wasteload allocations to reduce the loading in the entire watershed including WLAs to meet water quality standards for tributaries to the Wisconsin River. Therefore, WLA-based WQBELs are protective of immediate receiving waters and TP WQBELs derived according to s. NR 217.13, Wis. Adm. Code are not required.

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

Effluent Data

The following table lists the statistics for effluent phosphorus levels from January 2021 to July 2024 for informational purposes. In the cases where reporting the mass discharge is not required in the current permit, the mass is calculated using the reported phosphorus concentration and the effluent flow rate for that day.

Total Phosphorus Statistics

	Concentration (mg/L)	Mass Discharge (lbs/day)
1-day P_{99}	2.43	4.00
4-day P_{99}	1.32	2.17
30-day P_{99}	0.67	1.06
Mean	0.41	0.61
Std	0.51	0.85
Sample Size	366	366
Range	<0.21 - 3.9	0.03 - 8.00

Conclusions:
In summary, the following limits are recommended by this evaluation:

- Monthly average Total Phosphorus mass limit of 1.37 lbs/day
- Six-month average Total Phosphorus mass limit of 0.46 lbs/day

Multi-Discharge Variance Interim Limit
With the permit application, the City of Hillsboro has re-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. The recommended interim limit during the 2nd permit under MDV approval, pursuant to s. 283.16 (6) (a), Wis. Stats., is 0.6 mg/L as a monthly average. A compliance schedule may be appropriate to meet this interim limit but compliance with 0.6 mg/L shall be no later than the end of the reissued permit. The previous interim limit of 0.8 mg/L should not be exceeded during the compliance schedule.

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from January 2021 to July 2024.

The table below summarizes the maximum temperatures reported during monitoring from January 2023 to December 2023.

Attachment #1

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	62	63	94	120
FEB	62	63	98	120
MAR	57	64	75	100
APR	63	68	65	95
MAY	72	73	72	94
JUN	78	79	93	98
JUL	77	80	99	92
AUG	81	84	104	89
SEP	80	80	111	90
OCT	78	78	98	101
NOV	73	73	78	120
DEC	71	71	89	97

Reasonable Potential

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

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

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. Based on this analysis, temperature limits are not required. The complete thermal table used for the limit calculation is attached. **Therefore, no thermal limits or monitoring are required.**

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

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

- 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 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 25% 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:

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

  Where:

  Qe = annual average flow = 0.185 MGD = 0.286 cfs
  f = fraction of the Qe withdrawn from the receiving water = 0
  Qs = ¼ of the 7-Q_{10} = 3.40 cfs ÷ 4 = 0.85 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual*, 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.

- 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	Algae (IC_{50})	Pass or Fail?	Use in RP?	
05/07/1996	>100	>100	Pass	No	>100					1
05/13/1997	>100	>100	Pass	No	>100					1
02/15/2000	>100	>100	Pass	No	>100	72		Pass	No	1
05/22/2001	>100	>100	Pass	No	>100	>100		Pass	No	1
07/23/2002	>100	>100	Pass	No	>100	>100		Pass	No	1
09/21/2004	>100	>100	Pass	No	>100	>100		Pass	No	1
10/27/2005	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
02/23/2006	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
07/27/2010	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
11/06/2012	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
04/23/2013					61.8	>100		Pass	Yes	
09/09/2015	>100	>100	Pass	Yes						
02/21/2018	>100	>100	Pass	Yes						
06/09/2020	>100	>100	Pass	Yes	66.6	30.9		Pass	Yes	
07/06/2021	>100	>100	Pass	Yes	>100	>100		Pass	Yes	
10/04/2022					5.2	>100		Fail	Yes	
11/29/2022					>100	>100		Pass	Yes	
12/13/2022					>100	>100		Pass	Yes	
01/11/2023					>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.

- 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)]

  According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa effluent values are equal to zero whenever toxicity is not detected (i.e. when the $LC_{50} \geq 100\%$).

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

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

Chronic WET Limit Parameters

TUc (maximum) 100/IC25	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/5.2 = 19.2 TUc	3.0 Based on 3 detects	25%

[(TUc effluent)(B)(IWC)] = 14.5 > 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 2005 to 2023.

Expression of WET limits

Chronic WET limit = [100/IWC] TU_c = 100/25 = **4.0 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.

WET Checklist Summary

	Acute	**Chronic**
AMZ/IWC	Not Applicable. **0 Points**	IWC = 25% **0 Points**
Historical Data	Eight tests used to calculate RP. No tests failed. **0 Points**	Eight tests used to calculate RP. 1/11 tests failed. **0 Points**
Effluent Variability	BOD_5, Phosphorus, and TSS exceedances. NONs sent in 2020. NOVs sent in 2020 and 2021. **5 Points**	Same as Acute. **5 Points**
Receiving Water Classification	Warm Water Sport Fish (WWSF) (5 pts) **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	No reasonable potential for limits based on ATC.	No reasonable potential for limits based on CTC.

Attachment #1

	Acute	Chronic
	Ammonia nitrogen limit carried over from the current permit. Copper, Nickel, and Chloride detected. (3 pts) Additional Compounds of Concern: none **3 Points**	Ammonia nitrogen limit carried over from the current permit. Copper, Nickel, and Chloride detected. (3 pts) Additional Compounds of Concern: none **3 Points**
Additives	No biocides and one water quality conditioner (1 pt) added. Permittee has proper P chemical SOPs in place. **1 Point**	All additives used more than once per 4 days. **1 Point**
Discharge Category	Two Industrial Contributors (6 pts) **6 Points**	Same as Acute. **6 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:	**20 Points**	**20 Points**
Recommended Monitoring Frequency (from Checklist):	2 tests during permit term	1x yearly
Limit Required?	No	Yes Limit = 4.0 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 and annual chronic WET tests are recommended in the reissued permit. 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).

- 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 4.0 TUc as a monthly average in the effluent limits table of the permit.

Attachment #2

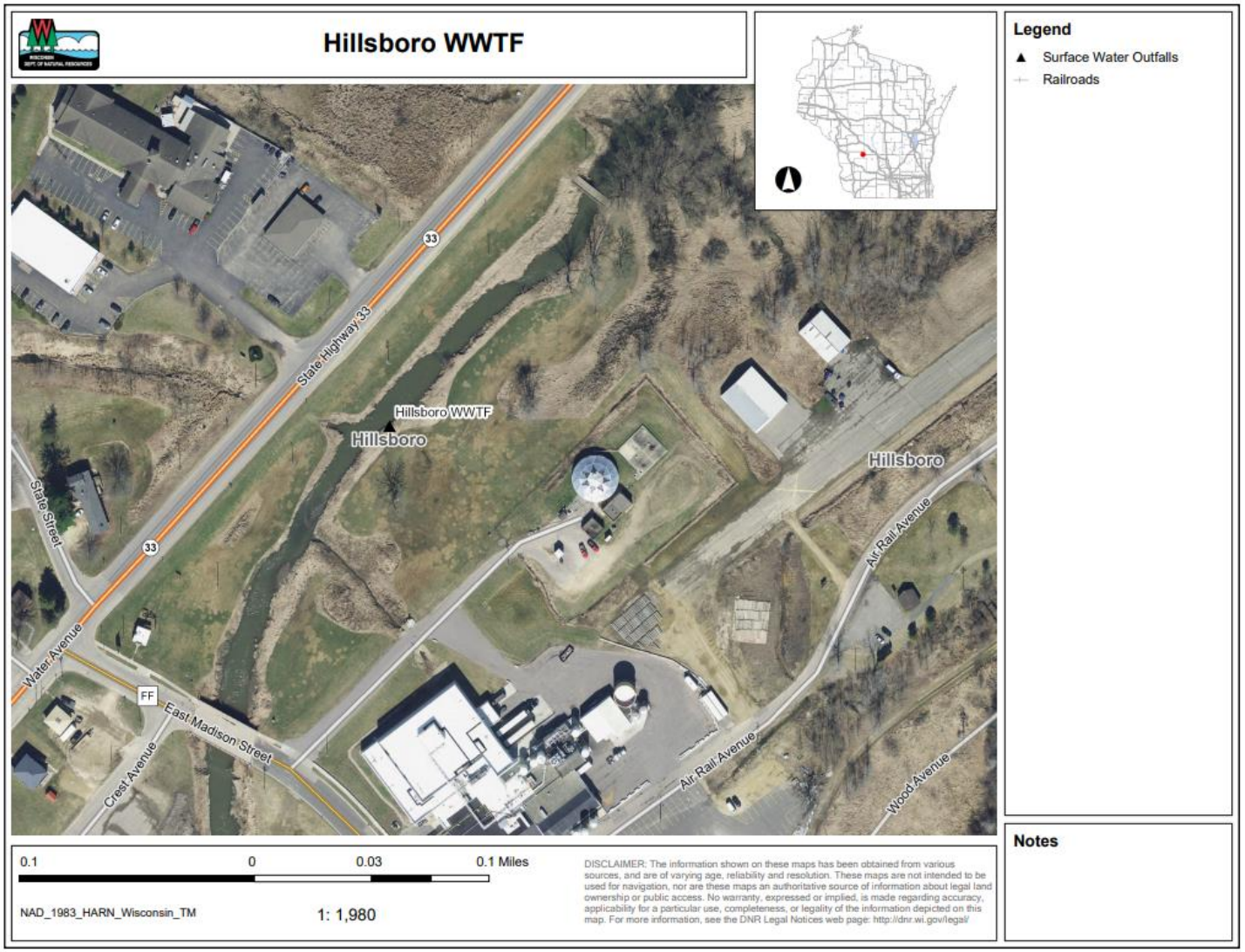
Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	Hillsboro WWTF		**7-Q_{10}:**	3.40	cfs		
Outfall(s):	001		**Dilution:**	25%		**Start:**	01/01/23	01/01/21
Date Prepared:	08/22/2024		**f:**	0		**End:**	12/31/23	07/31/24
Design Flow (Qe):	0.185	MGD	**Stream type:**	Small warm water sport or forage fish community			
Storm Sewer Dist.	0	ft	**Qs:Qe ratio:**	3.0	: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	33	49	76	0.85	0.197	0.483	0	62	63	94	120
FEB	34	50	76	0.85	0.183	0.438	0	62	63	98	120
MAR	38	52	77	0.85	0.331	0.946	0	57	64	75	100
APR	48	55	79	0.85	0.394	1.097	0	63	68	65	95
MAY	58	65	82	0.85	0.517	1.145	0	72	73	72	94
JUN	66	76	84	0.85	0.323	0.705	0	78	79	93	98
JUL	69	81	85	0.85	0.366	1.185	0	77	80	99	92
AUG	67	81	84	0.85	0.331	1.900	0	81	84	104	89
SEP	60	73	82	0.85	0.187	1.547	0	80	80	111	90
OCT	50	61	80	0.85	0.163	0.790	0	78	78	98	101
NOV	40	49	77	0.85	0.169	0.447	0	73	73	78	120
DEC	35	49	76	0.85	0.193	1.057	0	71	71	89	97

Attachment #3



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WISCONSIN DEPT. OF NATURAL RESOURCES

5/23/2024

Joshua Finch, City Administrator
P O Box 447
Hillsboro, WI 54634

Subject: Conditional approval of a multi-discharger phosphorus variance
Receiving Stream: South Branch of Baraboo River in Vernon County
Permittee: City of Hillsboro, WPDES WI-0020583

Dear Mr. Finch:

In accordance with s. 283.16 of the Wisconsin Statutes, you have requested coverage under Wisconsin's multi-discharger phosphorus variance for the Hillsboro Wastewater Treatment Facility in an application dated 3/22/2024. Wisconsin's multi-discharger phosphorus variance was approved by EPA on February 6, 2017. Coverage under the multi-discharger phosphorus variance may only be granted to an existing source that demonstrates a major facility upgrade is necessary to achieve phosphorus compliance and the upgrade will result in economic hardship as defined in the federally approved variance. The water quality criterion for which you are seeking a variance is contained in s. NR 102.06, Wis. Adm. Code.

After review of the application materials, the Department is tentatively approving coverage under the phosphorus multi discharger variance because the applicant has demonstrated that a major facility upgrade would be required to comply with the phosphorus water quality based effluent limitation, and the applicant meets the economic hardship eligibility criteria delineated in the federally approved variance. In addition, the permitted facility has agreed to comply with the interim limitations that will be included in the WPDES permit, and has agreed to reduce the amount of phosphorus entering surface waters by making payments to the counties pursuant to s. 283.16(6)(b)1., Wis. Stats.

Public comment on this decision will be solicited at the time of permit reissuance after which a final decision will be made. The Department appreciates your attention and interest in Wisconsin's multi-discharger phosphorus variance. Should you have further questions regarding this matter, please contact me at (608) 400 – 5596 or by email at matthew.claucherty@wisconsin.gov.

Sincerely,

Matt Claucherty, MDV Point Source Coordinator
Bureau of Water Quality

e-cc Michael Lange, City of Hillsboro
Dan Greve, MSA
Greg Gunderson, MSA
Katie Jo Jerzak, WDNR
Angela Parkhurst, WDNR
Tim Elkins, EPA Region 5
Micah Bennett, EPA Region 5

State of Wisconsin
Department of Natural Resources
Bureau of Water Quality
Permits Section - WQ/3

Multi-Discharger Variance Application Evaluation Checklist

Form 3200-145 (R 5/16)

Notice: This checklist is meant to be a tool to help Department of Natural Resources (DNR) staff review municipal and industrial multi-discharger variance (MDV) applications (Forms 3200-149 and 3200-150). Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31-19.39, Wis. Stats.).

Permittee Name

City of Hillsboro

WPDES Permit Number	County
WI- 0 | 0 | 2 | 0 | 5 | 8 | 3	Vernon

1. Did the point source apply for the MDV at the appropriate time?	(•) Yes ( ) No. *STOP- facility not eligible at this time.*	*See Questions 1-3.*
2. This operation is (check one):	( ) New or relocated outfall. *STOP- facility not eligible.* (•) Existing outfall	*See Questions 5-6.*
3. Is the point source is located in an MDV eligible area?	(•) Yes ( ) No. *STOP- facility not eligible.*	*Apply County information to Appendix H. Additional information provided in Q7 on municipal form & Q7-8 on industrial form.*
4. The secondary indicator score for the county (counties) the discharge is located is:	5	*See Appendices A-F. If the score is less than 2, stop; the facility is not eligible. See Q23 on municipal form & Q28 on industrial form.*
5. Is a major facility upgrade required to comply with phosphorus limits?	(•) Yes ( ) No. *STOP- facility not eligible.*	*See Q8 on municipal form/Q9 on industrial form.*
6. List the months where phosphorus limits cannot be achieved during the permit term:	☒ All ☒ Jan ☒ Apr ☒ Jul ☒ Oct ☒ Feb ☒ May ☒ Aug ☒ Nov ☒ Mar ☒ Jun ☒ Sep ☒ Dec	*Consider checking with limit calculator. If this does not match information in application, the application should be updated prior to approval.*

7. What is the current effluent level achievable?

Outfall Number(s)	Conc. (mg/L)	Method for calculation:	Does this concur with application?	
001	0.73	(•) 30-day P99 ( ) Other, specify:	(•) Yes ( ) No, why not:	*DNR staff should verify the effluent concentration value(s) provided. See Q11 on municipal form & Q12 on industrial form.*

8. What is the appropriate interim limitation(s) for the permit term?

0.6 mg/L as a monthly average, pursuant to s. 283.16(6)(a)2, Wis. Stats.
Target Value = 0.2 mg/L

Provide Rationale:

The past three years' effluent total phosphorus data (4/1/2020 - 3/30/2024, n=306) yield a 30-day P99 value of 0.73 mg/L. This value includes periods of poor treatment caused by chemical feed equipment malfunctions. With these issues recently addressed, malfunction conditions are not representative of future treatment performance.

Note: See description in Section 2.02 of the MDV implementation guidance. Interim limitations should reflect the "highest attainable condition" for the permittee in question pursuant to s. 283.16(7), Wis. Stat.

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9. *For Industries Only*- Where does the phosphorus in the effluent come from? (check all that apply)	☐ Process ☐ Additive Usage ☐ Water supply *Can intake credits be given or can the facility use an alternative water supply?* ◯ Not feasible ◯ Possibly, but further analysis needed ◯ Not evaluated at this time	*See Q14-15 & 19 on industrial form. If the answer is "possibly" or "not evaluated", the schedule section of the MDV permit should contain a requirement to perform this analysis.*
10. Has this facility optimized?	◉ Yes ◯ In progress ◯ No	*See Q14 on municipal form & Q16 & 20 on industrial form. Facility must optimize and operate at an optimize treatment level (s. 283.16(6)(a), Wis. Stat.)If no will need compliance schedule.*
11. Has a facility plan/compliance alternative plan been completed for the facility?	◉ Yes ◯ In progress ◯ No	*See Q15 on municipal form & Q17 on industrial form.*
12. What is the projected cost for complying with phosphorus? Source:	$ 5,100,000.00 March 2024 tertiary disc filtration update - see notes below regarding itemized costs	*Facility must submit site-specific compliance costs. If cost projections are used from EIA, the permittee must certify that these costs are reasonable for the facility in question. See "projected compliance costs" in Section 2.02 of the MDV Implementation Guidance for details.*

Comments on planning efforts:

A 2019 final compliance alternatives plan was filed by MSA professional services, inc. on behalf of Hillsboro. The plan evaluates options for meeting the low-level final WQBEL for phosphorus. Neighboring communities, experiencing similar challenges with phosphorus removal, were not viable for regionalization purposes. The report indicated an assessment of land availability for land application of wastewater was carried out and no opportunities were present. The report lists several technologies that could meet the final WQBEL. During the current permit term, Hillsboro has improved phosphorus treatment by adding an orthophosphate analyzer and adding chemical feed rate control.

13. Are adaptive management and water quality trading viable?	◯ Yes ◉ Perhaps. Additional analysis required. ◯ No	*See Q18-21 on municipal form & Q22-25 on industrial form. If additional analyses required, the applicant may need to complete this analysis during the MDV permit term.*
14. Has the point source met the appropriate primary screener?	⊗ Yes ◯ No. *STOP- facility not eligible.*	*See Q4 of this form in addition to the "eligibility" guidance in Section 2.01 of the MDV Implementation Guidance.*

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Comments on economic demonstration:

A cost estimate for disc filtration at $5.1 M is mentioned on the MDV application, but no details are provided. The EIA addendum, Appendix G, provides the compliance cost of $2,128,177.80 (capital) and $11,662.66 (O&M). These can be updated to 2024 values using the ENR construction cost index. Updated values are $3,022,012.48 (capital) $16,560.98 (O&M). Assuming 20 year CWFP financing rate of 2.1 % on capital costs, annual payments would be $185,177.00. Total costs amount to $201,737.98 after O&M. The residential portion is 35%, or $70,608.29. Divided amongst 549 households, the per-user cost increase is $128.61 annually. With current rates averaging $464.77 annually, future rates are projected to be $593.38, or 1.12% of Hillboro's $52,917 median household income. In Vernon County with a secondary indicator score of 5, sewer rates at 1% of MHI meet the primary screener. The applicant meets the primary screener.

15. What watershed option was selected?

- (•) County project option. *Complete Section 5.*
- ( ) Binding, written agreement with the DNR to construct a project or implement a watershed plan. *Complete Section 4.*
- ( ) Binding, written agreement with another person that is approved by the DNR to construct a project or implement a watershed plan. *Complete Section 4.*

Section 4. Watershed Plan Review

16. MDV Plan Number: *Note: This is for tracking purposes. Contact Statewide Phosphorus Implementation Coordinator for the plan number.*	_____
17. Did the point source complete Form 3200-148?	( ) Yes ( ) No
18. Is the project area in the same HUC 8 watershed as the point of discharge?	( ) Yes ( ) No. *STOP- Watershed plan must be updated.*
19. What is the annual offset required? *See Section 2.03 of the MDV implementation guidance. If this value is different from the offset target provided in form 3200-148, the watershed plan should be amended.*	_____
20. Does the plan ensure that the annual load is offset annually?	( ) Yes ( ) No. *STOP- Watershed plan must be updated.*

21. Are projects occurring on land owned/operated by a CAFO or within a permitted MS4 boundary?

- ( ) Yes. *Work with appropriate DNR staff to ensure projects are not working towards other permit compliance.*
- ( ) No.

22. Are other funding sources being used as part of the MDV watershed project?

- ( ) Yes. *Work with appropriate DNR staff to ensure that funding sources can be appropriately used in the plan area.*
- ( ) No.

23. Do you have any concerns about the watershed project? *Note: Coordinate with other DNR staff as appropriate.*	( ) Yes. *STOP- Watershed plan must be updated.* ( ) No.

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Comments:

Section 5. Payment to the County(ies)

24. At this time, the appropriate per pound payment is: $ 64.75

See "Payment Calculator" document at *\\central\water\WQWT_PROJECTS\WY_CW_Phosphorus\MDV*.

Section 6. Determination

Based on the available information, the MDV application is:

- (•) Approved
- ( ) Request for more information
- ( ) Denied

Additional Justification (if needed):

Certification

Preparer Name	Title
Matt Claucherty	Water Resources Management Specialist

Signature of Preparer	Date
Matt Claucherty	5/23/2024

A copy of this completed checklist should be saved in SWAMP, and a notification of the decision should be sent to the Phosphorus Implementation Coordinator.

Save