

Permit Fact Sheet

General Information

Permit Number:	WI-0035483-09-0	
Permittee Name:	HILL POINT SANITARY DISTRICT	
Address:	E4069 West Hillpoint Road	
City/State/Zip:	Hill Point WI 53937	
Discharge Location:	SE ¼ of SW ¼ & SW ¼ of SW ¼, Section 14, T11N, R3E (Groundwater) NW ¼ of NE ¼, Section 23, T11N R3E (Surface Water)	
Receiving Water:	Groundwaters of the Wisconsin River Basin and Hill Point Creek (Narrows Creek/Baraboo River Watershed, LW22 – Lower Wisconsin River Basin) in Sauk County	
StreamFlow (Q _{7,10}):	0.62 cfs	
Stream Classification:	Warm Water Sport Fish (WWSF), non-public water supply	
Discharge Type:	Existing, Seasonal	
Design Flow(s)	Annual Average	0.011 MGD
Significant Industrial Loading?	None	
Operator at Proper Grade?	Facility is Basic with subclasses A4 – Ponds, Lagoons and Natural Systems; SS – Sanitary Sewage Subclass. One operator is certified.	
Approved Pretreatment Program?	N/A	

Facility Description

The Hill Point Sanitary District Wastewater Treatment Facility serves a population of approximately 150 residents with no industrial contributors and some commercial businesses. Treatment consists of a two-cell stabilization lagoon with spray irrigation and seasonal “fill and draw” effluent discharge. In October 2023, the facility requested to change to a groundwater discharge with Outfall 001 (surface water outfall) becoming an emergency-use-only outfall. Because of this significant change to the permit and timing of the current permit (WI-0035483-08-0) expiration, the Department will revoke and reissue the permit. Hill Point Sanitary District has agreed to the revoke and reissue process.

Starting in 2024, the facility will discharge to groundwater via spray irrigation and the 6.75 acre land treatment system. The land treatment system is located adjacent to the lagoons. The spray irrigation season is April through November. Surface water discharge is restricted to the months of April, May, October, and November when stream flows are the highest to Hill Point Creek. The facility is designed to treat an annual average flow of 11,000 gallons per day, and currently treats an average of 8,800 gallons per day. There are no plans to dispose of sludge this permit term, but sampling will occur during the permit term.

Substantial Compliance Determination

After a desk top review of all discharge monitoring reports, CMARs, land app reports, compliance schedule items, and a site visit on May 02, 2024, this facility has been found to be in substantial compliance with their current permit.

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	0.0088 MGD (2023)	Influent: Representative influent grab samples shall be collected from the last influent lift station wet well. A control panel located at the influent lift station is utilized to calculate influent flow.
001	0.039 MGD (April 2020 – May 2023)	Effluent: Representative effluent grab samples shall be collected at the effluent manhole, restricted to the months of April, May, October and November (Fill & Draw), prior to discharge to Hill Point Creek. Flow monitoring occurs at the effluent manhole. INACTIVE: DEPARTMENT APPROVAL REQUIRED TO ACTIVATE OUTFALL 001. APPROVAL MUST BE RECEIVED PRIOR TO USE.
002	Sludge has not been removed from the Lagoon System	Representative sludge samples are collected from the lagoons in a grid.
005	New Outfall No effluent data	Effluent Land Treatment: Representative effluent grab samples shall be collected from the storage lagoon discharge, prior to spray irrigation on the approved field, located adjacent to the WWTF Lagoons.

Sample Point Designation For Groundwater Monitoring Systems			
System	Sample Pt Number	Well Name	Comments
Outfall 005, Spray Irrigation	801	MW-1 (801)	
	802	MW-2 (802)	
	803	MW-3 (803)	

1 Influent – Monitoring Requirements

Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	Monthly	Grab	
Suspended Solids, Total		mg/L	Monthly	Grab	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Nitrogen, Organic Total		mg/L	Monthly	Calculated	
Nitrogen, Ammonia (NH ₃ -N) Total		mg/L	Monthly	Grab	

Changes from Previous Permit:

Flow: The sample frequency and sample type were changed for eDMR reporting purposes.

BOD₅ and Total Suspended Solids: The sample frequency has changed to monthly to align with effluent monitoring.

Organic Nitrogen and Ammonia: These parameters have been added per ch. NR. 206, Wis. Adm. Code.

Explanation of Limits and Monitoring Requirements

BOD₅ and Total Suspended Solids: Tracking of BOD₅ and Suspended Solids are required for percent removal requirements found in s. NR 206.09(2), and 210.05, Wis. Adm. Code and in the standard requirements section of the permit.

2 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate	Daily Max	0.063 MGD	Daily	Total Daily	Discharge is only allowed and limit is effective April through May and October through November each year.
BOD ₅ , Total	Weekly Avg	45 mg/L	3/Week	Grab	Limit effective April through May and October through November each year.
BOD ₅ , Total	Monthly Avg	30 mg/L	3/Week	Grab	Limit effective April through May and October through November each year.
Suspended Solids, Total	Monthly Avg	60 mg/L	3/Week	Grab	Limit effective April through May and October through November each year.
pH Field	Daily Max	9.0 su	5/Week	Grab	Limit effective April

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					through May and October through November each year.
pH Field	Daily Min	6.0 su	5/Week	Grab	Limit effective April through May and October through November each year.
Nitrogen, Ammonia Variable Limit		mg/L	3/Week	Grab	Limit effective April through May and October through November each year. Look up the variable ammonia limit from the 'Variable Ammonia Limitation' table and report the variable limit in the Ammonia Variable Limit column on the eDMR.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	3/Week	Grab	Limit effective April through May and October through November each year. Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH3-N) Total column of the eDMR. See Ammonia Limitation Section.
Phosphorus, Total	Monthly Avg	2.4 mg/L	3/Week	Grab	Limit effective April through May and October through November each year.
Phosphorus, Total		lbs/day	3/Week	Calculated	See TMDL section.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of phosphorus and report on the last day of the month on the DMR. See TMDL section.
Phosphorus, Total	Rolling 12 Month Avg	11 lbs/yr	Annual	Calculated	Calculate the sum of total monthly mass of phosphorus discharged for the calendar year and report on the last day of the month on the DMR. See TMDL

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					section below.
Chloride		mg/L	3/Week	Grab	Monitoring when discharging to surface water.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	Grab	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	Grab	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Total		mg/L	/See Listed Qtr(s)	Calculated	Annual in rotating quarters. See Nitrogen Series Monitoring section. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.

Changes from Previous Permit

pH: The sample frequency for this parameter has increased.

Explanation of Limits and Monitoring Requirements

Please refer to the Water Quality Based Effluent Limits memo for Hill Point Sanitary District Wastewater Treatment Facility prepared by Sarah Luck, dated December 15, 2023, and used for this reissuance.

Discharge season: This outfall is inactive and will only be activated with permission from the department. When active the facility may only discharge from this outfall during the months of April, May, October, and November. All samples shall be taken during normal operating conditions; therefore, monitoring is required only during periods of discharge.

Flow: A limit is required as a condition of s. NR 210.07 (2), Wis. Adm. Code.

BOD₅, TSS, and pH: No changes are recommended in the permit limitations for BOD₅, TSS, and pH. Because the water quality criteria, 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. The TSS limit is a variance limit according to s. NR 210.07 (2), Wis. Adm. Code.

Ammonia: Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Tables 2C and 4B of ch. NR 105, Wis. Adm. Code. Subchapter IV of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for ammonia.

Phosphorus: Phosphorus requirements are based on the Phosphorus Rules that became effective 12/1/2010 as detailed in NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus. Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. The phosphorus concentration limit is retained to prevent backsliding. Waste load allocations specified in TMDLs are expressed as WQBELs (water quality

based effluent limits). The waste load allocated-derived WQBELs are consistent with the assumptions and requirements of the approved Wisconsin River Basin TMDL. The permittee is a non-continuous discharger, therefore the wasteload allocation is expressed as an annual limit.

Wisconsin River Total Maximum Daily Load (TMDL): The permitted facility is included within the Wisconsin River Basin Total Maximum Daily Load (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 expressed in the permit were derived from Site-Specific Criteria (SSC) for Lakes Petenwell, Castle Rock, and Wisconsin originally included in Appendix K of the TMDL report and approved by the U.S. Environmental Protection Agency on July 9, 2020. The permittee's approved SSC-based limits are consistent with the assumptions and requirements of the EPA-approved WLA in the TMDL, which is 11 lbs/yr for the permitted facility.

The approved TMDL expresses WLAs as lbs/year and lbs/day (maximum annual load divided by 365 days). As outlined in Section 4.6 of the department's *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Program*, mass limits must be given in the permit that are consistent with the TMDL WLA and the phosphorus impracticability agreement that was approved by USEPA in 2012 (see NPDES MOA Addendum dated July 12, 2012 at <https://prodoasint.dnr.wi.gov/swims/downloadDocument.do?id=167886175>). Methods for converting TMDL WLAs into permit limits for non-continuous discharges should be determined on a case-by-case basis and consistent with the assumptions in the TMDL. For controlled discharges (municipal lagoon systems) and other discharges where there is no valid statistical basis for transforming annual WLAs into shorter term limits, limits should be expressed as total annual discharge.

Chloride: Acute and chronic chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 of ch. NR 105, Wis. Adm. Code. Subchapter VII of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for chloride. The permittee's effluent data shows no reasonable potential to exceed the calculated WQBELs for chloride. Monitoring for chloride when discharging to surface water is included in the permit and data collected will be used to determine reasonable potential for the next reissuance.

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.

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

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

The department has been revisiting the sampling frequencies at every facility to evaluate whether current frequencies are appropriate or if an increase is warranted. The frequency for pH was increased to align Hill Point with other facilities of similar size to ensure fairness and in consideration of department guidance on sampling frequencies.

Requirements in administrative code (NR 108, 205, 210, and 214 Wis. Adm. Code) and Sections 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. The department has determined at this time that the aforementioned changes in monitoring frequency are warranted based on the size and type of the facility.

3 Land Treatment – Monitoring and Limitations

Sample Point Number: 005- EFFLUENT, Spray Irrigation

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		gpd	Daily	Total Daily	
Hydraulic Application Rate	Monthly Avg	5,000 gal/ac/day	Monthly	Calculated	The limit is effective April through November.
Hydraulic Application Rate	Monthly Avg	0 gal/ac/day	Monthly	Calculated	The limit is effective December through March.
BOD5, Total	Monthly Avg	50 mg/L	Monthly	Grab	
Suspended Solids, Total		mg/L	Monthly	Grab	
pH Field		su	Monthly	Grab	
Fecal Coliform		#/100 ml	Weekly	Grab	
Nitrogen, Total Kjeldahl		mg/L	Monthly	Grab	
Nitrogen, Ammonia (NH ₃ -N) Total		mg/L	Monthly	Grab	
Nitrogen, Organic Total		mg/L	Monthly	Calculated	Organic Nitrogen = Total Kjeldahl Nitrogen (mg/L) - Ammonia Nitrogen (mg/L)
Nitrogen, Nitrite + Nitrate Total		mg/L	Monthly	Grab	
Nitrogen, Total		mg/L	Monthly	Calculated	Total Nitrogen = Total Kjeldahl Nitrogen (mg/L) + (Nitrate + Nitrite) Nitrogen (mg/L)
Chloride		mg/L	Monthly	Grab	
Solids, Total Dissolved		mg/L	Monthly	Grab	
Phosphorus, Total		mg/L	Monthly	Grab	
Nitrogen, Max Applied On Any	Annual Total	100 lbs/ac/yr	Annual	Total	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Zone				Annual	
Chloride		lbs/ac/yr	Annual	Total Annual	

Changes from Previous Permit:

Spray Irrigation effluent, Outfall 005 is new this permit term.

Explanation of Limits and Monitoring Requirements

Requirements for land treatment of municipal wastewater are determined in accordance with ch. NR 206, Wis. Adm. Code.

This is the first permit term with Land Treatment, monitoring of these parameters is based on similar facilities and ch. NR 206, Wis. Adm. Code. This will be reevaluated at permit reissuance.

4 Groundwater – Monitoring and Limitations

4.1 Groundwater Monitoring System for Outfall 005, Spray Irrigation

Location of Monitoring system: Land adjacent to lagoons

Wells to be Monitored: MW-1 (801), MW-2 (802), MW-3 (803)

Well Used To Calculate PALs: N/A

Point of Standards Application Well(s): N/A

Parameter	Units	Preventative Action Limit	Enforcement Standard	Frequency
Depth To Groundwater	feet	*****	N/A	Quarterly
Groundwater Elevation	feet MSL	*****	N/A	Quarterly
Nitrogen, Nitrite + Nitrate (as N) Dissolved	mg/L	2.0	10	Quarterly
Chloride Dissolved	mg/L	125	250	Quarterly
Phosphorus, Total Dissolved	mg/L	*****	N/A	Quarterly
pH Field	su	*****	N/A	Quarterly
Nitrogen, Total Kjeldahl Dissolved	mg/L	*****	N/A	Quarterly
Nitrogen, Ammonia Dissolved	mg/L	0.97	9.7	Quarterly
Nitrogen, Organic Dissolved	mg/L	*****	N/A	Quarterly
Solids, Total Dissolved	mg/L	*****	N/A	Quarterly

Changes from Previous Permit:

Groundwater monitoring system for Outfall 005, Spray Irrigation is new this permit term.

Explanation of Limits and Monitoring Requirements

Groundwater limits and requirements are determined in accordance with ch. NR 140, Wis. Adm. Code. Indicator parameter Preventive Action Limit (PAL) values are established per s. NR 140.20 Wis. Adm. Code. Alternative Concentration Limits as allowed under s. NR 140.28 Wis. Adm. Code, are established on a case by case basis.

Background groundwater quality will be established following two years of groundwater monitoring. Indicator Parameter PALs and ACLs will be calculated and included if appropriate in the next permit term.

5 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	N/A	N/A	N/A	Lagoon System
Does sludge management demonstrate compliance? Yes						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility						
Is a priority pollutant scan required? No, design flow is less than 5 MGD. Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

Sample Point Number: 002- Lagoon Sludge

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

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Mercury Dry Wt	Ceiling	57 mg/kg	Once	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Once	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Once	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Once	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Once	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Once	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Once	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Once	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	
Nitrogen, Total Kjeldahl		Percent	Per Application	Composite	
Nitrogen, Ammonia (NH ₃ -N) Total		Percent	Per Application	Composite	
Phosphorus, Total		Percent	Per Application	Composite	
Phosphorus, Water Extractable		% of Tot P	Per Application	Composite	
Potassium, Total Recoverable		Percent	Per Application	Composite	
PFOA + PFOS		ug/kg	Once	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Once	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

Changes from Previous Permit:

List 2 Nutrients: Monitoring has been added should land application occur and for planning purposes.

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

Explanation of Limits and Monitoring Requirements

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

List 2 Nutrients: Monitoring for list 2 (nutrients) is highly recommended at the same time as the monitoring of List 1 (metals) in year 2 of the permit (2025). Results will assist in the determination of the acres needed for land application of sludge should it be necessary. The number of acres needed is also required for the Land Application Management Plan Schedule (see schedules for more information). List 2 nutrient sampling is required when land application occurs.

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.

Change in form submittal: In prior permit reissuances when it has been noted in the application that sludge would not be removed during the permit term, the department required sampling during the second year of the permit term and the sludge characteristic report (3400-049) would be generated only during that year. Due to moving to electronic submittal of forms via Switchboard, forms 3400-049 (“Characteristics Report”), 3400-052 (“Other Methods of Disposal”) and 3400-055 (“Annual Land Application”) will now be generated by the department and the permittee will be required to submit all three reports each year of the permit term. This change was adopted to provide the permittee flexibility because many lagoon desludging projects can be unexpected, are delayed or staggered over multiple years. Additionally, it is used to officially report that no land application of sludge has occurred, and annual submittal of the forms is required per the standard requirements section.

6 Schedules

6.1 Phosphorus Effluent Limit and Operations Plan

An operations plan is required for the surface water outfall.

Required Action	Due Date
Surface Water Phosphorus Discharge Operations Plan: Submit an operations plan describing how phosphorus effluent limits will be met at the surface water outfall (Outfall 001).	06/30/2025
Plans and Specifications: Submit plans and specifications for treatment plant modifications that must be constructed to achieve compliance with final phosphorus limitations at Outfall 001. If the operations plan demonstrates no additional infrastructure is needed, this schedule item is not required.	06/30/2026

Explanation of Schedule

The permittee has requested that Outfall 001 become an emergency-use-only outfall. The permittee shall submit to the department an operations plan that explains how phosphorus limits will be met when Outfall 001 is used.

6.2 Land Treatment Management Plan

A management plan is required for the land treatment system.

Required Action	Due Date
Land Treatment Management Plan Submittal: Submit a management plan to optimize the land treatment system performance and demonstrate compliance with ch. NR 206, Wis. Adm. Code. The land treatment system shall be operated in accordance with the approved management plan.	06/30/2025

Explanation of Schedule

A land treatment management plan shall be submitted to the department for approval in the first year of the permit term.

6.3 Land Application Management Plan

Required Action	Due Date
<p>Land Application Management Plan: Submit a management plan to optimize the land application system performance and demonstrate compliance with ch. NR 204, Wis. Adm. Code. This management plan shall 1) specify information on pretreatment processes (if any); 2) identify land application sites; 3) describe site limitations; 4) address vegetative cover management and removal; 5) specify availability of storage; 6) describe the type of transporting and spreading vehicle(s); 7) specify monitoring procedures; 8) track site loadings; 9) address contingency plans for adverse weather and odor/nuisance abatement; and 10) include any other pertinent information. Once approved, all landspreading activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes.</p> <p>The plan is due at least 60 days prior to land application.</p>	

Explanation of Schedule

A land application management plan shall be submitted to the department for approval 60 days prior to land application.

Special Reporting Requirements

None.

Other Comments:

None.

Attachments:

Water Quality Based Effluent Limits, dated December 15, 2023

Expiration Date:

June 30, 2029

Justification Of Any Waivers From Permit Application Requirements

Discharge from Outfall 001 was not occurring at the time of the permit application, due to dry conditions, therefore no discharge data was collected. Data from the previous permit application was used along with data submitted during the permit term on the eDMRs.

Prepared By: BetsyJo Howe, Wastewater Specialist **Date:** 5/3/2024

Updated (based on fact check comments): Editorial changes for clarity. 5/20/2024

Updated (based on public notice comments):

CORRESPONDENCE/MEMORANDUM

DATE: December 15, 2023

TO: BetsyJo Howe – SCR/Fitchburg

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Water Quality-Based Effluent Limitations for the Hill Point Sanitary District Wastewater Treatment Facility
 WPDES Permit No. WI-0035483-09-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Hill Point Sanitary District Wastewater Treatment Facility in in Sauk County. This municipal wastewater treatment facility (WWTF) discharges to Hill Point Creek, located in the Narrows Creek 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	12-month Rolling Average	Footnotes
Flow Rate	0.063 MGD					1
BOD ₅			45 mg/L	30 mg/L		1
TSS				60 mg/L		1,2
pH	9.0 s.u.	6.0 s.u.				1
Ammonia Nitrogen	Variable					1,3,4
Phosphorus Concentration Limit TMDL Mass Limit				2.4 mg/L	11 lbs/year	5
TKN, Nitrate+Nitrite, and Total Nitrogen						6
Chloride						7

Footnotes:

1. No changes from the current permit.
2. The TSS limit is a variance limit according to s. NR 210.07(2), Wis. Adm. Code, where aerated lagoons and stabilization ponds are the principal treatment processes.
3. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	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


Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.5 < pH ≤ 6.6	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

4. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, are not required due to the non-continuous nature of the discharge.
5. The phosphorus concentration limit is retained to prevent backsliding. 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 mass limit went into effect on October 1, 2023. Since Hill Point Wastewater Treatment Facility is a non-continuous discharger, the wasteload allocation is expressed as an annual limit.
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 (NO₃), nitrite (NO₂), and total kjeldahl nitrogen (TKN) (all expressed as N).
7. Monitoring for chloride when discharging to surface water.

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

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Sarah Luck (Sarah.Luck@wisconsin.gov) or Diane Figiel (Diane.Figiel@wisconsin.gov).

Attachments (3) – Narrative, Site Map, and Ammonia Nitrogen Calculations

PREPARED BY:  Date: December 15, 2023
 Sarah Luck
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**Water Quality-Based Effluent Limitations for
Hill Point Sanitary District Wastewater Treatment Facility**

WPDES Permit No. WI-0035483

PART 1 – BACKGROUND INFORMATION

Facility Description

The Hill Point Sanitary District Wastewater Treatment Facility serves a population of approximately 150 with no industries and some commercial businesses. Treatment consists of a two-cell stabilization lagoon system with seasonal “fill and draw” effluent discharge (discharge restricted to April, May, October, and November when stream flows are highest) to Hill Point Creek. Discharge during these months is limited to 63,000 gallons per day. The facility is designed to treat an average daily flow of 11,000 gallons per day.

In October 2023 the facility requested to change to a groundwater discharge with Outfall 001 (surface water outfall) becoming an emergency-use-only outfall. Since discharge was not occurring at the time of the permit application (due to dry conditions), no discharge data was collected. Therefore, data from the previous permit application was used along with data submitted during the permit term on the eDMRs.

Disinfection of the effluent for surface water discharge is not required based on the conditions of s. NR 210.06(3)(h) because the hydraulic detention time is 180 days. Ultraviolet disinfection was required as part of the new groundwater discharge.

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

Existing Permit Limitations

The current permit, expiring on March 31, 2025, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	12-month Rolling Average	Footnotes
Flow Rate	0.063 MGD					1
BOD ₅			45 mg/L	30 mg/L		2
TSS				60 mg/L		3
pH	9.0 s.u.	6.0 s.u.				2
Ammonia Nitrogen	Variable					4
Phosphorus						5
Interim				2.4 mg/L		
Final					11 lbs/year	
TKN, Nitrate+Nitrite, and Total Nitrogen						1

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	12-month Rolling Average	Footnotes
Chloride						1

Footnotes:

1. Monitoring only.
2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. The TSS limit is a variance limit according to s. NR 210.07(2), Wis. Adm. Code, where aerated lagoons and stabilization ponds are the principal treatment processes.
4. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	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

5. A compliance schedule is in the current permit to meet the final TMDL mass limit by October 1, 2023.

Receiving Water Information

- Name: Hill Point Creek
- Waterbody Identification Code (WBIC): 1277700
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low Flow: The receiving water flows used in establishing effluent limitations were obtained from the U.S. Geological Survey based on flow information at NW 1/4 of NW 1/4 of Section 23, T11N-R3E, at Hill Point, above Narrows Creek at Sauk County. The annual 7-Q₁₀ low-flow of Hill Point Creek is 0.62 cfs. However, to calculate ammonia limits the 7-Q₂ low-flow is needed. Since this is a seasonal discharge, it is relevant to use monthly 7-Q₁₀ and 7-Q₂. To estimate these low flows, estimated monthly 7-Q₁₀ data from another station (BL23), estimated by the USGS in the same basin, and the ratio of 7-Q₁₀ of the same station and at the outfall location were used and resulted in the following flows:

Annual 7-Q₁₀ = 0.62 cfs (cubic feet per second)

	Apr	May	Oct	Nov
7-Q ₁₀ (cfs)	1.6	1.14	0.87	1.04
7-Q ₂ (cfs)	2.32	1.65	1.26	1.5

Attachment #1

- Hardness = 169 mg/L as CaCO₃. This value represents the geometric mean of hardness data from SWIMS station 573076 (Baraboo River at Reedsburg) which is in the same watershed (LW22).
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: Metals data from the Kickapoo River at Oil City is used for this evaluation because there is no data available for Hill Point Creek. The Kickapoo 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: Hill Point Creek is not impaired, but Narrows Creek, located approximately 1.5 miles downstream of the outfall, is listed as impaired for total phosphorus, as is the Wisconsin River.

Effluent Information

- Flow rate:
Design annual average = 0.011 MGD (Million Gallons per Day)
Daily flow limit = 0.063 MGD
Note: The facility is designed to treat an average daily flow of 0.011 MGD, and previous limits were calculated using the design flow rate of 0.011 MGD. However, since the facility is permitted to discharge up to 0.063 MGD per day, it was determined that using the flow limit of 0.063 MGD in calculations should be used to be protective of the receiving water.
For reference, the actual average flow from April 2020 through May 2023 was 0.039 MGD when excluding zero-flows.
- Hardness = 156 mg/L as CaCO₃. This value represents the geometric mean of data (n=4) from 05/11/2019 – 05/21/2019 submitted with the 2019 permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Domestic wastewater with water supply from wells.
- Additives: None currently. Additives may be used for phosphorus removal in the future, and a standard operating procedure (SOP) document will need to be developed at that time.
- Total Phosphorus Wasteload Allocation: 11 lbs/year
- Effluent characterization: This facility is categorized as a minor municipality and received instructions in the application notification letter that exempt it from standard monitoring requirements since discharge was not occurring at the time the permit application was due. Monitoring data from the 2019 permit application was used in this evaluation since it is still considered to be representative since there have been no changes in operation or loadings at the facility.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Attachment #1

Copper Effluent Data

Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)
04/17/2019	<4.4	05/01/2019	<4.4	05/15/2019	12.7
04/20/2019	12.1	05/04/2019	<4.4	05/18/2019	9.2
04/24/2019	<4.4	05/08/2019	<4.4	05/21/2019	8.1
04/27/2019	<4.4	05/11/2019	7.4		
Mean = 4.5 µg/L					

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

Chloride Effluent Data

	Chloride (mg/L)
1-day P ₉₉	122
4-day P ₉₉	111
30-day P ₉₉	104
Mean	100
Std	8.72
Sample size	18
Range	88 - 110

The following table presents the average concentrations and loadings at Outfall 001 from April 2020 through May 2023 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

	Average Measurement
BOD ₅	16 mg/L
TSS	31 mg/L
pH field	7.7 s.u.
Phosphorus	1.7 mg/L
Ammonia Nitrogen	2.3 mg/L*

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

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

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P₉₉) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q₁₀

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q₁₀ receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

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

Where:

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

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

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

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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q₁₀ method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for Hill Point Sanitary District 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 = 0.50 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)).

SUBSTANCE	REF. HARD. mg/L	ATC	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Arsenic		340	680	140	<3.0		
Cadmium	156	17	35	6.9	<0.30		
Chromium	156	2600	5200	1000	<5.0		
Copper	156	24	47	9.5	4.5		
Lead	156	160	330	66	2.4		
Nickel	156	685	1370.5	274	<2.0		
Zinc	156	180	360	71	5.1		
Chloride (mg/L)		757	1514			122	110

* The 2 × ATC method of limit calculation yields a more restrictive limit than consideration of ambient concentrations and 1-Q₁₀ flow rates per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0.1550 cfs (¼ of the 7-Q₁₀)

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Arsenic		150		390	79	<3.0	
Cadmium	169	3.7	0.0042	9.6	1.9	<0.30	
Chromium	169	330	0.233	530	100	<5.0	
Copper	169	16	0.511	41	8.2	4.5	
Lead	169	47	0.033	120	24	2.4	
Nickel	169	81		210	42	<2.0	
Zinc	169	190	1.228	490	98	5.1	
Chloride (mg/L)		395		1020			111

Monthly Average Limits based on Wildlife Criteria (WC)

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

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 0.2951 cfs (¼ of the Harmonic Mean)

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	0.0042	1500	300	<0.30
Chromium (+3)	3800000	0.233	15000000	3000000	<5.0
Lead	140	0.033	560	110	2.4
Nickel	43000		170000	35000	<2.0

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0.2951 cfs (¼ of the Harmonic Mean)

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13		54	11	<3.0

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, **no effluent limitations are required.**

Chloride – Considering available effluent data from the current permit term (April 2023 through May 2023), the 1-day P₉₉ chloride concentration is 122 mg/L, and the 4-day P₉₉ of effluent data is 111 mg/L. These effluent concentrations are below the calculated WQBELs for chloride; therefore, **no effluent**

limits are needed. Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.

Mercury – The permit application did not require monitoring for mercury because the Hill Point Sanitary District Wastewater Treatment Facility is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, “there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code.” A review of the past three years of sludge characteristics data reveals that the single sample result that was collected was within expected analytical ranges and well below the 17 mg/kg level. The concentration in the sludge on 10/29/22 was 0.06 mg/kg. Therefore, **no mercury monitoring is recommended at Outfall 001.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Based on the type of discharge, the effluent flow rate, and lack of indirect dischargers, **PFOS and PFOA monitoring is not recommended.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has daily maximum limits. These limits are re-evaluated at this time due to the following changes:

- The maximum expected effluent pH has changed.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation:

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

Where:

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

The effluent pH data was examined as part of this evaluation. A total of 105 sample results were reported from April 2020 through May 2023. The maximum reported value was 8.3 s.u. (Standard pH Units). The effluent pH was 8.3 s.u. or less 99% of the time. The 1-day P₉₉, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.2 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 8.2 s.u. Therefore, a value of 8.3 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.3 s.u. into the equation above yields an ATC = 4.71 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code, daily maximum ammonia limitations are calculated using the 1-Q₁₀ receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q₁₀ (estimated as 80 % of 7-Q₁₀) and the 2×ATC approach are shown below.

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	9.4
1-Q ₁₀	29

The 2×ATC method yields the most stringent limits for Hill Point Sanitary District Wastewater Treatment Facility.

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

Daily Maximum Ammonia Nitrogen Limits – WWSF, WWFF & LFF

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

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

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

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from April 2020 through May 2023, with those results being compared to the calculated limits (see Attachment #3) to determine the need to include ammonia limits in the Hill Point Sanitary District Wastewater Treatment Facility permit for the respective months. That need is determined by calculating 99th upper percentile (or P₉₉) values for ammonia during April, May, and October, and comparing the 99th upper percentile values to

the calculated limits. For November, reasonable potential is determined by comparing the mean to the 1/5th of the calculated limits.

Ammonia Nitrogen Effluent Data

Ammonia Nitrogen mg/L	April	May	October	November
1-day P ₉₉	18	14	3.4	-
4-day P ₉₉	10	9.3	2.0	-
30-day P ₉₉	5.9	5.6	1.0	-
Mean*	4.0	3.9	0.6	1.8
Std	3.8	2.9	0.8	0
Sample size	42 (6 ND)	24 (6 ND)	36 (18 ND)	3
Range	<0.2 - 12	<0.2 - 9.5	<0.2 - 2.7	1.8

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

Based on this comparison, daily limits are required in April and May. However, since daily limits are included in the current permit year-round, 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, a **pH-variable daily maximum ammonia nitrogen limit is recommended year-round**. No mass limitations are recommended in accordance with s. NR 106.32(5). Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, are not required due to the non-continuous nature of the discharge.

PART 4 – 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.

Since Hill Point Sanitary District 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 with s. NR 217.04(1)(a)1, Wis. Adm. Code, and therefore **no technology-based limit is required**.

Annual Average Mass Total Phosphorus Loading

Month	Average Phosphorus Concentration (mg/L)	Total Effluent Flow (Million Gallons)	Calculated Mass (lbs/month)
April 2022	2.61	0.931	20.3
May 2022	1.67	0.340	4.7

Month	Average Phosphorus Concentration (mg/L)	Total Effluent Flow (Million Gallons)	Calculated Mass (lbs/month)
October 2022	2.21	1.055	19.4
April 2023	1.80	1.291	19.4
May 2023	1.64	0.810	11.1
Average			15.0

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* (November 16, 2013). The wasteload allocations (WLA) found in Appendix J of the *Total Maximum Daily Loads for Total Phosphorus in the Wisconsin River Basin (WRB TMDL)* report dated April 26, 2019 are expressed as maximum annual loads (lbs/year) and maximum daily loads (lbs/day). The daily WLAs in the WRB TMDL equals the annual WLA divided by the number of days in the year.

For non-continuous discharges, methods for converting WLAs into permit limits should be determined on a case-by-case basis. For example, some discharges do not occur continuously and often vary from year to year, depending on weather conditions or production processes. In these cases, it may be appropriate to express limits by season or as a total annual amount. In many cases, using shorter term limits (daily, monthly) might have the effect of unduly limiting operational flexibility and, since TMDLs are required to be protective of critical conditions, a seasonal or annual limit would be consistent with the TMDL and protective of water quality. In the case of Hill Point Sanitary District Wastewater Treatment Facility, limits are expressed as total annual as a 12-month rolling average.

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.

Site-Specific Criteria for Phosphorus

The WRB TMDL report includes two sets of WLAs. The WLA that implement statewide criteria found in Appendix J of the TMDL report are no longer applicable following approval of site-specific criteria (SSC) for Lakes Petenwell, Castle Rock, and Wisconsin. For Hill Point Sanitary District Wastewater Treatment Facility, **the statewide criteria and SSC are the same, so the WLA of 11 lbs/year remains the same.**

Effluent Data

The following table lists the statistics for effluent phosphorus levels from April 2020 through May 2023 for informational purposes. Since no mass data was reported, the annual total phosphorus mass was calculated using the concentration data and the actual effluent flow that occurred on the same day. The mass limit became effective in October 2023.

Total Phosphorus Effluent Concentration Data

	mg/L
1-day P ₉₉	3.9
4-day P ₉₉	2.7
30-day P ₉₉	2.1
Mean	1.7
Std	0.68
Sample size	105
Range	0.7 - 3.5

Annual Total Phosphorus Effluent Mass Data

	lbs/yr
2020	34.7
2021	33.5
2022	44.4
2023	30.5

- Annual Discharge: sum of total monthly discharges for the calendar year.
- Total Monthly Discharge: monthly average concentration (mg/L) x total flow for the month (MG/month) x 8.34 (see TBEL section above for example calculations).

Conclusions

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

- **Monthly average total phosphorus concentration limit of 2.4 mg/L**, based on the 4-day P₉₉ of data from October 2015 through May 2019, is retained to prevent backsliding.
- **Annual total phosphorus mass limit of 11 lbs/year** since Hill Point is a non-continuous discharger.

PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from April 2020 through May 2023.

No new temperature data was collected during the permit term. However, previous data collected is still considered to be representative since there have been no changes in operation or in thermal loads. The table below summarizes the maximum temperatures reported during monitoring from 10/03/2011-05/23/2012.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
APR	58	60	66	120
MAY	71	72	81	120
OCT	50	50	79	120
NOV	45	46	103	120

Reasonable Potential

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

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

Based on a comparison of the highest effluent temperature to the calculated effluent limitations, **no thermal limits or monitoring are recommended.**

PART 6 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC₅₀ (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.

Attachment #1

- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC₂₅ (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 37%, shown in the WET Checklist summary below, was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

Q_e = annual average flow = 0.063 MGD = 0.097 cfs

f = fraction of the Q_e withdrawn from the receiving water = 0

Q_s = ¼ of the 7-Q₁₀ = 0.62 cfs ÷ 4 = 0.16 cfs

- The IWC of 37%, calculated above, is greater than the previously used IWC of 9%. This is because the previous IWC of 9% used the design flow rate of 0.011 MGD whereas the new IWC of 37% uses the flow limit of 0.063 MGD.

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

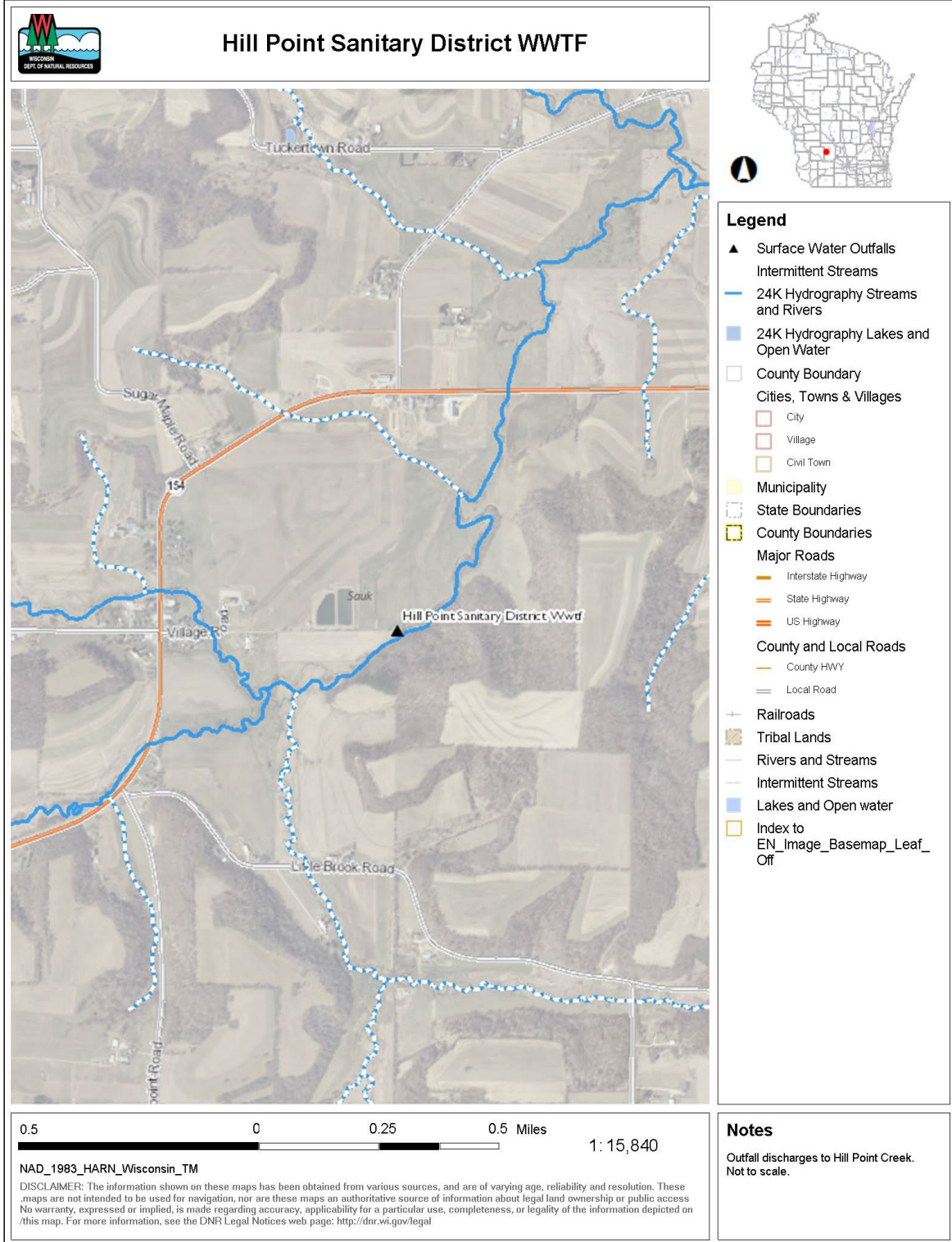
	Acute	Chronic
AMZ/IWC	Not Applicable. 0 Points	IWC = 37% 10 Points
Historical Data	No data. 5 Points	No data. 5 Points
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. 0 Points	Same as Acute. 0 Points
Receiving Water Classification	WWFF 5 Points	Same as Acute. 5 Points
Chemical-Specific Data	No reasonable potential for limits based on ATC. Ammonia nitrogen limit carried over from the current permit. Chloride, copper, lead, and zinc detected. Additional Compounds of Concern: None. 3 Points	No reasonable potential for limits based on CTC. Ammonia nitrogen, chloride, copper, lead, and zinc detected. Additional Compounds of Concern: None. 3 Points
Additives	No biocides or water quality conditioners added. 0 Points	All additives not used more than once per 4 days. 0 Points
Discharge	No industrial contributors.	Same as Acute.

Attachment #1

	Acute	Chronic
Category	0 Points	0 Points
Wastewater Treatment	Secondary or better. 0 Points	Same as Acute. 0 Points
Downstream Impacts	No impacts known. 0 Points	Same as Acute. 0 Points
Total Checklist Points:	13 Points	23 Points
Recommended Monitoring Frequency (from Checklist):	None.	2 tests during permit term.
Limit Required?	No	No
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's *WET Program Guidance Document* (2022) and other information described above, **no acute or chronic WET testing is recommended**. This decision deviates from the checklist recommendation but is made with best professional judgment since the surface water outfall will only be used as an emergency/backup solution and therefore is believed to pose low risk of toxicity to the receiving water.

Attachment #2
Site Map



Ammonia Nitrogen Calculations from the WQBEL Memo Dated October 16, 2019

		Spring		Winter	
		April	May	October	November
Effluent Flow	Qe (MGD)	0.063	0.063	0.063	0.063
Background Information	7-Q ₁₀ (cfs)	1.60	1.14	0.87	1.04
	7-Q ₂ (cfs)	2.32	1.65	1.26	1.5
	Ammonia (mg/L)	0.06	0.06	0.05	0.05
	Temperature (°C)	9	17	9	7
	pH (s.u.)	8.21	7.97	7.97	7.97
	% of Flow used	25	100	25	25
	Reference Weekly Flow (cfs)	0.4	1.14	0.2175	0.26
	Reference Monthly Flow (cfs)	0.493	1.4025	0.26775	0.31875
Criteria mg/L	4-day Chronic				
	Early Life Stages Present	4.4	5.4	6.4	6.4
	Early Life Stages Absent	6.3	5.4	9.1	10
	30-day Chronic				
	Early Life Stages Present	1.8	2.2	2.5	2.5
	Early Life Stages Absent	2.5	2.2	3.6	4.1
Effluent Limitations mg/L	Weekly Average				
	Early Life Stages Present	22	68		
	Early Life Stages Absent			29	38
	Monthly Average				
	Early Life Stages Present	10	32		
	Early Life Stages Absent			13	17