

Permit Fact Sheet

1 General Information

Permit Number:	WI-0021717-08-0	
Permittee Name:	Village of Iola	
Address:	180 S. Main Street P O Box 336	
City/State/Zip:	Iola WI 54945	
Discharge Location:	East bank of the South Branch of the Little Wolf River, about ¼ mile downstream of the Townline Road Bridge.	
Receiving Water:	South Branch of the Little Wolf River (WBIC=272600)	
StreamFlow (Q _{7,10}):	7.6 cfs (cubic feet per second)	
Stream Classification:	Warm Water Sport Fish (WWSF) community, non-public water supply. Approximately ¼ mile downstream from Iola's outfall, the South Branch of the Little Wolf River changes to a Class II trout stream so limits are evaluated using cold water classification to be protective of the downstream uses.	
Discharge Type:	Existing, Continuous	
Design Flow	Annual Average	0.179 MGD (Million Gallons per Day)
Significant Industrial Loading?	None	
Operator at Proper Grade?	<p>The WWTF is Advanced Level in subclasses; (A1) Biological Treatment- Suspended Growth Processes, (B) Solids Separation, (C) Biological Solids/Sludge Handling, Processing & Reuse, (D) Disinfection, (P) Nutrient Removal - Total Phosphorus, (SS) Collection System-Sanitary.</p> <p>The current Operator-In-Charge is certified at the appropriate level and subclasses to operate this plant. The operator-in-charge will have until June 30th, 2024, to obtain basic certification in subclass P -Total Phosphorus. The operator-in-charge will have until June 30th, 2026, to obtain advance certification in all subclasses of the treatment plant except for the laboratory and sanitary sewage collection system subclasses. New SS subclass certification will be needed by the end of the permit term.</p>	
Approved Pretreatment Program?	N/A	

2 Facility Description

The existing oxidation ditch activated sludge wastewater facility is owned and operated by the Village of Iola. Located in northwest Waupaca County, the facility was constructed in 2002 and placed online in December 2002. The facility annual average, dry weather, design flow is 0.179 million gallons per day (MGD) and the biochemical oxygen demand (BOD)

design is 450 pounds per day (lbs/day). The facility conveyance and treatment units include: a 12" interceptor sewer, a submersible pump lift station, a 10" force main, a mechanically cleaned rotary fine screen, an anoxic selector "process control" tank for phosphorus removal, an oxidation ditch- Carrousel system, a final clarifier, and an Ultraviolet Radiation (UV) system for effluent disinfection. Treated effluent flows by gravity through a 10" outfall sewer and enters the South Branch of the Little Wolf River via outfall 003.

Finally, an onsite concrete tank stores waste activated sludge prior to land application. Influent and effluent flow measurement devices and flow proportional composite samplers are present, and a natural gas standby generator is also available.

3 Substantial Compliance Determination

Enforcement During Last Permit: There were no formal enforcement actions taken during the previous permit term. The facility has completed all previously required actions as part of the enforcement process.

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on 12/08/21, this facility has been found to be in substantial compliance with their current permit.

Compliance determination entered by Roy Van Gheem, Wastewater Engineer, on December 23, 2023.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)
703	0.108 MGD (January, 2019-November, 2023)	Influent - Representative samples shall be collected from the automatic sampling device drawing samples from the influent channel, prior to the rotary screen.
003	0.106 MGD (January, 2019-November, 2023)	Effluent - Representative samples of the effluent from the oxidation ditch wastewater treatment facility shall be collected after the ultraviolet radiation disinfection process.
004	1,870 Metric tons land applied in 2022	Aerobic Sludge - Representative samples of the liquid sludge that has been aerobically digested in the oxidation ditch shall be collected from the sludge storage tank.

4 Influent – Monitoring Requirements

4.1 Sample Point Number: 703- Influent

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	2/Week	24-Hr Flow Prop Comp	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Phosphorus, Total		mg/L	2/Month	24-Hr Flow Prop Comp	

4.1.1 Changes from Previous Permit:

No changes made from previous permit.

4.1.2 Explanation of Limits and Monitoring Requirements

Influent monitoring is needed to assess loading to the facility and treatment performance. Requirements for flow, BOD, and TSS are established in accordance with ch. NR 210.04(2), Wis. Adm. Code.

5 Surface Water - Monitoring and Limitations

5.1 Sample Point Number: 003- Effluent

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Monthly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	
BOD5, Total	Weekly Avg	45 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	38 lbs/day	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	57 lbs/day	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of TSS and report on the last day of the month on the DMR. See TMDL Calculations section in the permit.
Suspended Solids, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of TSS discharged

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					and report on the last day of the month on the DMR. See TMDL Calculations section in the permit.
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Limit effective May through September annually.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit effective May through September annually. See the E. coli Percent Limit section in the permit. Enter the result in the DMR on the last day of the month.
Nitrogen, Ammonia (NH ₃ -N) Total		mg/L	Monthly	24-Hr Flow Prop Comp	
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section in the permit.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section in the permit.
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.
Phosphorus, Total	Monthly Avg	1.9 mg/L	Weekly	24-Hr Flow Prop Comp	
Phosphorus, Total	Monthly Avg	2.8 lbs/day	Weekly	Calculated	Interim mass limit. Final TMDL-based mass limits go into effect per the phosphorus compliance

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					schedule. See Phosphorus TMDL section in the permit.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of phosphorus and report on the last day of the month on the DMR. See TMDL Calculations section in the permit.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of phosphorus discharged and report on the last day of the month on the DMR. See TMDL Calculations section in the permit.
Temperature Maximum		deg F	Monthly	Multiple Grab	Monitoring only in 2027.

5.1.1 Changes from Previous Permit

Total Suspended Solids TMDL Limits- Mass based TSS limits of 57 lbs/day as a weekly average, and 38 lbs/day as a monthly average have been added to the permit to comply with requirements of the Upper Fox Wolf River TMDL. Effluent concentration (mg/L) shall be monitored and reported two times per week upon permit reissuance and will be used to calculate amounts reported for mass-based limits. An additional reporting requirement for lbs/month will be used to calculate the facility's 12-month rolling sum of total monthly discharge, which can be compared directly to the facility's designated WLA.

Phosphorus TMDL Limits- An interim limit of 1.9 mg/L goes into effect upon reissuance and will remain in effect unless a more stringent limit is required at a future permit issuance by ss. NR 217.13 and NR 217.16(2), Wis. Adm. Code, or the limit is relaxed following procedures outlined in ch. NR 207, Wis. Adm. Code. Discharge effluent concentration (mg/L) shall be reported weekly upon permit reissuance and will be used to calculate amounts reported for mass-based parameters. An additional reporting requirement for lbs/month will be used to calculate the facility's 12-month rolling sum of total monthly discharge, which can be compared directly to the facility's designated WLA. Final TMDL WLA-based effluent limits of 0.99 lbs/day as a monthly average and 0.33 lbs/day as a six-month average will go into effect in accordance with compliance schedule 4.1.

Temperature- One year of temperature monitoring is required in 2027 to collect enough data to determine reasonable potential for the next reissuance.

5.1.2 Explanation of Limits and Monitoring Requirements

Refer to the WQBEL memo for the detailed calculations, prepared by the Water Quality Bureau dated May 16, 2023 used for this reissuance.

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.

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

Upper Fox Wolf River Total Maximum Daily Load (TMDL): The permitted facility is located within the Upper Fox Wolf River Basin Total Maximum Daily Load (TMDL), which was approved by EPA February 27, 2020. The TMDL establishes Waste Load Allocations (WLAs) for point source dischargers and determines the maximum amounts of phosphorus and total suspended solids that can be discharged and still protect water quality. The final effluent limits and monitoring expressed in the permit were derived from and comply with the applicable water quality criterion and are consistent with the assumptions and requirements of the EPA-approved WLAs in the TMDL, which are 93 lbs/yr for phosphorus and 8,722 lbs/yr for TSS for the permitted facility.

The approved TMDL expresses WLAs as lbs/year and lbs/day (maximum annual load divided by 365 days). As outlined in Section 4.6 of the department's 2020 *TMDL Implementation Guidance for Wastewater Permits*, TMDL limits must be given in the permit that are consistent with the TMDL WLA permit limits derived from TMDL and need to be expressed as specified by 40 CFR 122.45 (d), s. NR 212.76 (4), and s. NR 205.065 (7), Wis. Adm. Code, unless determined to be impracticable. Impracticability has already been determined for phosphorus limits as laid out in the phosphorus impracticability agreement that was approved by USEPA in 2012 (see NPDES MOA Addendum dated July 12, 2012 at <https://prodoasint.dnr.wi.gov/swims/downloadDocument.do?id=167886175>).

For phosphorus, continuously discharging facilities covered by the UFWRB TMDL are given monthly average mass limits. If the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits (averaging period of May through October and November through April) are also included. The equivalent effluent concentration of 0.17 mg/L was calculated for the facility, thus, TMDL based mass limits are expressed as a six-month average and a monthly average equal to three times the six-month average limits.

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

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

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

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.

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 ss. 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: July – September 2024; January – March 2025; October – December 2026; and April – June 2027; and July – September 2028.

Thermal- Requirements for Temperature are included in NR 102 Subchapter II Water Quality Standards for Temperature and NR 106 Subchapter V Effluent Limitations for Temperature. Thermal discharges must meet the Public Health criterion of 120 degrees F and the Fish & Aquatic Life criteria which are established to protect aquatic communities from lethal and sub-lethal thermal effects.

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.

6 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)
004	B	Liquid	Fecal Coliform	Incorporation	Land Application	18 dry U.S. tons
Does sludge management demonstrate compliance? Yes						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No						
Is a priority pollutant scan required? No						
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: 004- Aerobic Sludge

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Annual	Composite	Monitoring required only when sludge is land applied.
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	Monitoring required only when sludge is land

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					applied.
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	Monitoring required only when sludge is land applied.
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	Monitoring required only when sludge is land applied.
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Composite	Monitoring required only when sludge is land applied.
Phosphorus, Total		Percent	Annual	Composite	Monitoring required only when sludge is land applied.
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	Monitoring required only when sludge is land applied.
Potassium, Total Recoverable		Percent	Annual	Composite	Monitoring required only when sludge is land applied.
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2025.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2025.
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS permit sections for more information.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

6.1.1 Changes from Previous Permit:

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

6.1.2 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”.

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.

7 Schedules

7.1 TMDL Based Effluent Limits for Total Phosphorus

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

Required Action	Due Date
Operational Evaluation Report: The permittee shall prepare and submit to the Department for approval an operational evaluation report. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by March 31, 2027. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than March 31, 2027 and state whether the measures, improvements, and modifications	03/31/2025

<p>will enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report.</p> <p>If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by March 31, 2027 and is not required to comply with the milestones identified below for years 3 through 9 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance').</p> <p>STUDY OF FEASIBLE ALTERNATIVES - If the Operational Evaluation Report concludes that the permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than March 31, 2031.</p>	
<p>Compliance Alternatives, Source Reduction, Improvements and Modifications Status: The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.</p>	03/31/2026
<p>Preliminary Compliance Alternatives Plan: The permittee shall submit a preliminary compliance alternatives plan to the Department.</p> <p>If the plan concludes upgrading of the permittee's wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design report.</p> <p>If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan.</p> <p>If water quality trading will be undertaken, the plan must state that trading will be pursued.</p>	03/31/2027
<p>Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department.</p> <p>If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code.</p> <p>If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code.</p> <p>If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners.</p>	03/31/2028

Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	
Progress Report on Plans & Specifications: Submit progress report regarding the progress of preparing final plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2029
Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2030
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	06/30/2030
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2031
Construction Upgrade Progress Report #2: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2032
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2033
Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	04/30/2033

7.1.1 Explanation of Schedule

This schedule has been included to provide the permittee time to evaluate and implement the means to come into compliance with TMDL-based effluent limits for phosphorus pursuant to s. NR 217.17, Wis. Adm. Code.

7.2 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
Land Application Management Plan Submittal: Submit an update to the management plan to optimize the land application system performance and demonstrate compliance with ch. NR 204, Wis. Adm. Code, by the due date. This management plan shall 1) specify information on pretreatment	03/31/2026

processes (if any); 2) identify land application sites; 3) describe site limitations; 4) address vegetative cover management and removal; 5) specify availability of storage; 6) describe the type of transporting and spreading vehicle(s); 7) specify monitoring procedures; 8) track site loading; 9) address contingency plans for adverse weather and odor/nuisance abatement; and 10) include any other pertinent information. Once approved, all landspreading activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes.	
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7.2.1 Explanation of Schedule

This schedule requires the submittal of a Land Application Management Plan that documents how the permittee will manage the land application of sludge, consistent with ch. NR 204, Wis. Adm. Code.

7.3 Sanitary Sewage Collection System Operator Certification

Required Action	Due Date
Basic Certification Subclass P -Total Phosphorus: The permittee shall have an operator-in-charge of its collection system who is certified in the collection subclass P- Total Phosphorus by the due date.	06/30/2024
Advance Certification: The permittee shall have an operator-in-charge of its collection system who is certified Advanced in all subclasses of the treatment plant, except for the laboratory and sanitary sewage collection system subclasses, by the due date.	06/30/2026
Subclass SS: The permittee shall have an operator-in-charge of its collection system who is certified in the subclass SS by the due date.	03/31/2029

7.3.1 Explanation of Schedule

On June 14th, 2023, a letter with the subject of “Plant Classification Change” was sent to the Village of Iola informing the permittee of updates needed to the certification of the Operator in Charge for the facility. This schedule outlines the certifications listed within the July 2023 notification and includes due dates to align with the timelines outlined within the notification. A new subclass SS was not included in this letter, but was included in the inspection report dated January 3, 2022, as being needed by the end of this permit term.

7.4 Capacity, Management, Operation and Maintenance (CMOM) Program

Required Action	Due Date
Revised CMOM Program: Review and revise the Capacity, Management, Operation and Maintenance (CMOM) Program to meet the requirements of s. NR 210.23, Wis. Adm. Code. A revised copy of the program shall be submitted to the department by the due date.	03/31/2026

7.4.1 Explanation of Schedule

This schedule gives the facility time to review and revise the current CMOM program.

8 Attachments:

Water Quality-Based Effluent Limitations for the Iola Wastewater Treatment Facility, WPDES Permit No. WI-0021717-08; May 16, 2023; Nicole Krueger, Water Resources Engineer

9 Expiration Date:

March 31, 2029

Justification Of Any Waivers From Permit Application Requirements

No waivers have been given from permit application requirements.

Prepared By: Amanda Perdsock, Wastewater Specialist

Date: January 22, 2024

Notice of reissuance was published in the Waupaca County Post, PO Box 408, Waupaca, WI 54981.

CORRESPONDENCE/MEMORANDUM

DATE: 03/13/2023 – updated 05/16/2023 to correct phosphorus effluent table

TO: Sarah Adkins – NER

FROM: Nicole Krueger – SER *Nicole Krueger*

SUBJECT: Water Quality-Based Effluent Limitations for the Iola Wastewater Treatment Facility
WPDES Permit No. WI-0021717-08

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 Iola Wastewater Treatment Facility in Waupaca County. This municipal wastewater treatment facility (WWTF) discharges to the South Branch of the Little Wolf River, located in the Little Wolf River Watershed in the Wolf River Basin. This discharge is included in the Upper Fox and Wolf River Basin TMDL as approved by EPA in February 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 003:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD ₅			45 mg/L	30 mg/L		1
TSS			45 mg/L 57 lbs/day	30 mg/L 38 lbs/day		1,3
pH	9.0 s.u.	6.0 s.u.				1
Bacteria <i>E. coli</i>				126 #/100 mL geometric mean		4
Ammonia Nitrogen						1,2
Phosphorus Concentration Limit TMDL Mass Limit				1.9 mg/L 0.99 lbs/day	0.33 lbs/day	3,5
TKN, Nitrate+Nitrite, and Total Nitrogen						6
Temperature						7

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. The TSS and phosphorus mass limits are based on the Total Maximum Daily Load (TMDL) for the Upper Fox and Wolf River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in February 2020.
4. Bacteria limits apply during the disinfection season of May through September. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. The monthly average phosphorus concentration limit functions as an interim limit for the phosphorus compliance schedule but is recommended to continue when the mass limits become effective to prevent backsliding.
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 only for one year.

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

The recommended limits meet the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, and additional limits are not required.

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

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

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Roy Van Gheem, Wastewater Engineer – NER
Heidi Schmitt Marquez, Regional Wastewater Supervisor – NER
Diane Figiel, Water Resources Engineer – WY/3
Laura Dietrich, Wastewater Specialist – WY/Waukesha

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

WPDES Permit No. WI-0021717-08

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

The existing oxidation ditch, advanced activated sludge wastewater facility is owned and operated by the Village of Iola. The facility conveyance and treatment units include: a 12" interceptor sewer, a submersible pump lift station, a 10" force main, a mechanically cleaned rotary fine screen, an anoxic selector tank for phosphorus removal, an oxidation ditch-Carrousel system, a final clarifier, and an Ultraviolet Radiation (UV) system for effluent disinfection.

An onsite concrete tank stores waste activated sludge prior to land application. Influent and effluent flow measurement devices and flow proportional composite samplers are present, and a natural gas standby generator is also available.

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

Existing Permit Limitations

The current permit, which expired on 06/30/2022, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					
BOD ₅			45 mg/L	30 mg/L	2,3
TSS			45 mg/L	30 mg/L	2,3
pH	9.0 s.u.	6.0 s.u.			3
Fecal Coliform May – September			656#/100 mL geometric mean	400#/100 mL geometric mean	
Ammonia Nitrogen					1
Phosphorus				1.9 mg/L 2.8 lbs/day	4

Footnotes:

1. Monitoring only.
2. The BOD₅ and TSS limits are
3. 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.
4. The phosphorus limits became effective January 1, 2022.

Receiving Water Information

- Name: South Branch of the Little Wolf River

Attachment #1

- Waterbody Identification Code (WBIC): 272600
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply. Approximately ¼ mile downstream from Iola’s outfall, the South Branch of the Little Wolf River changes to a Class II trout stream so limits are evaluated using cold water classification to be protective of the downstream uses.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q₁₀ and 7-Q₂ values are from USGS for Station W53, where Outfall 001 is located.
 $7\text{-}Q_{10} = 7.6 \text{ cfs (cubic feet per second)}$
 $7\text{-}Q_2 = 10 \text{ cfs}$
- Hardness = 250 mg/L as CaCO₃. This value represents the geometric mean of data from the Little Wolf River at Elm Valley from 03/05/1997 – 11/11/1997.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%.
- Source of background concentration data: Metals data from the Wolf River at Lily is used for this evaluation because there is no data available for the South Branch of the Little Wolf River. The Wolf 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 immediate receiving water is not impaired. Poygan Lake, approximately 50 miles downstream, is 303(d) listed as impaired for total phosphorus, TSS, and PCBs.

Effluent Information

- Design flow rate(s):
 Annual average = 0.179 MGD (Million Gallons per Day)
 For reference, the actual average flow from 07/01/2017 – 01/31/2023 was 0.11 MGD.
- Hardness = 332 mg/L as CaCO₃. This value represents the geometric mean of data from 12/01/2021 – 12/13/2021.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Domestic wastewater with water supply from wells.
- Additives:
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness, and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Effluent Copper Data

Sample Date	Copper µg/L	Sample Date	Copper µg/L	Sample Date	Copper µg/L
12/01/2021	6.75	12/17/2021	3.26	01/02/2022	6.52
12/05/2021	6.29	12/21/2021	6.66	01/06/2022	3.74
12/09/2021	6.97	12/25/2021	5.19	01/10/2022	4.69
12/13/2021	6.26	12/29/2021	4.69		

Attachment #1

Sample Date	Copper µg/L	Sample Date	Copper µg/L	Sample Date	Copper µg/L
1-day P ₉₉ = 9.2 µg/L					
4-day P ₉₉ = 7.2 µg/L					

Effluent Chloride Data

Sample Date	Chloride mg/L
12/01/2021	230
12/05/2021	264
12/09/2021	266
12/13/2021	249
Average	252

The following table presents the average concentrations and loadings at Outfall 003 from 07/01/2017 – 01/31/2023 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

	Average Measurement
BOD ₅	2.43 mg/L*
TSS	2.36 mg/L*
pH field	7.55 s.u.
Phosphorus	0.94 mg/L
Fecal coliform	51.1 #/100 mL*

*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 Iola 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 = 6.08 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Arsenic		340		680	136	0.99		
Cadmium	332	17.2	0.01	34	6.9	0.03		
Chromium	301	4446	0.60	8892	1778	0.99		
Copper	332	48.1	0.38	96.2			9.24	6.97
Lead	332	340	0.20	681	136	4.3		
Nickel	268	1080		2161	432	0.04		
Zinc	332	343		687	137	20		
Chloride (mg/L)		757	0.96	1514	303	252		

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

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

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 1.90 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

Attachment #1

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Arsenic		148		1163	233	0.99	
Cadmium	175	3.82	0.01	30.0	6.0	0.03	
Chromium	250	183	0.60	1431	286	0.99	
Copper	250	22.7	0.38	176			7.22
Lead	250	67.9	0.20	532	106	4.30	
Nickel	250	113		891	178	0.04	
Zinc	250	268		2108	422	20	
Chloride (mg/L)		395	0.96	3098	620	252	

* 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 = 3.75 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	0.01	5380	1076	0.03
Chromium (+3)	3818000	0.60	55512965	11102593	0.99
Lead	140	0.20	2033	407	4.30
Nickel	43000		625212	125042	0.04

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 3.75 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	193	38.7	0.99

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

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are not required for toxic substances in this section.

Mercury – The permit application did not require monitoring for mercury because Iola is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3,

Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, “there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code.” A review of the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from 01/01/2018 – 07/27/2022 was 1.3 mg/kg, with a maximum reported concentration of 4.43 mg/kg. Therefore, **no mercury monitoring is recommended at Outfall 003.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(3)(b), Wis. Adm. Code. Based on the effluent flow rate and the lack of industrial discharges contributing to the collection system, **PFOS and PFOA monitoring is not recommended.** PFOS and PFOA monitoring may be required in the future if information becomes available that indicates PFOS or PFOA may be present in the discharge.

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

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that Iola does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

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 1456 sample results were reported from 07/03/2017 – 01/31/2023. The maximum reported value was 7.88 s.u. (Standard pH Units). The effluent pH was 7.71 s.u. or less 99% of the time. The 1-day P₉₉, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 7.74 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 7.74 s.u. Therefore, a value of 7.74 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.74 s.u. into the equation above yields an ATC = 9.0 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.

Attachment #1

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	18
1-Q ₁₀	206

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

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

Weekly and monthly average limits are not included in the current permit but are being evaluated here due to changes to ch. NR 106, Wis. Adm. Code.

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 for a Cold-Water 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 $1.45 \times 10^{(0.028 \times (25 - T))}$,

T = the temperature (°C) of the receiving water

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-Q₁₀ (4-Q₃, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q₅ (estimated as 85% of the 7-Q₂ if the 30-Q₅ 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 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

The “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, because minimum ambient data is available. These values are shown in the table below, with the resulting criteria and effluent limitations.

Weekly and Monthly Ammonia Nitrogen Limits – CW

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
Effluent Flow	Q _e (MGD)	0.179	0.179	0.179
Background Information	7-Q ₁₀ (cfs)	7.6	7.6	7.6
	7-Q ₂ (cfs)	10	10	10
	Ammonia (mg/L)	0.04	0.03	0.07
	Average Temperature (°C)	11	16	4
	Maximum Temperature (°C)	13	18	9

Attachment #1

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
	pH (s.u.)	8.39	8.43	8.19
	% of Flow used	25	100	25
	Reference Weekly Flow (cfs)	1.9	7.6	1.9
	Reference Monthly Flow (cfs)	2.125	8.5	2.125
Criteria mg/L	4-day Chronic	3.31	2.48	4.59
	30-day Chronic	1.32	0.99	1.84
Effluent Limits mg/L	Weekly Average	25.7	69.8	35.6
	Monthly Average	11.2	30.6	15.4

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from 01/02/2018 – 01/04/2023, with those results being compared to the calculated limits to determine the need to include ammonia limits in Iola’s permit. That need is determined by calculating 99th upper percentile (or P₉₉) values for ammonia and comparing the daily maximum values to the daily maximum limit. Data from February 2022 – June 2022 was removed from this evaluation because the facility was updating their phosphorus treatment which affected effluent ammonia and is not representative of normal conditions.

Ammonia Nitrogen Effluent Data

	Ammonia Nitrogen mg/L
1-day P ₉₉	6.63
4-day P ₉₉	4.15
30-day P ₉₉	1.77
Mean*	0.50
Std	2.46
Sample size	64
Range	<0.06 – 12

*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. **No limits are needed; however, monitoring is recommended to continue.**

**PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS
FOR BACTERIA**

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Code, became effective which replace fecal coliform limits with new *Escherichia coli* (*E. coli*) limits for protection of recreational uses. Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.
2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

Attachment #1

E. coli monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Because Iola’s permit requires weekly monitoring, the 410 counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

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

Effluent Data

Iola has monitored effluent *E. coli* from 05/05/2021 – 09/21/2021 and a total of 23 results are available. A geometric mean of 126 counts/100 mL was not exceeded. The maximum monthly geometric mean was 34 counts/100 mL. Effluent data did not exceed 410 counts/100 mL. The maximum reported value was 140 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 Iola does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average phosphorus loading is less than 150 lbs/month, which is the threshold for municipalities in accordance to s. NR 217.04(1)(a)1, Wis. Adm. Code, and therefore **no technology-based limit is required.**

Annual Average Mass Total Phosphorus Loading

Month	Average mg/L	Total Flow MG/month	Total Phosphorus lb./mo.
Feb 2022	0.49	2.57	10
Mar 2022	0.17	3.05	4.3
April 2022	0.31	3.16	8.0
May 2022	0.24	2.86	5.7
June 2022	0.22	2.68	4.8
July 2022	0.30	3.24	8.0
Aug 2022	2.55	3.63	77
Sept 2022	0.57	3.15	15
Oct 2022	0.23	2.88	5.5
Nov 2022	0.23	2.91	5.5
Dec 2022	0.29	2.68	6.5
Jan 2023	0.39	2.70	8.7
Average			13.3

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* (April 2020) and are based on the annual phosphorus wasteload allocation (WLA) given in pounds per year. This WLA found in Appendix H of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Upper Fox and Wolf River Basins (UFW TMDL)* report dated February 2020 are expressed as maximum annual loads (lbs/year). The annual WLA for Iola is 93 lbs/year.

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

$$\begin{aligned} \text{TP Equivalent Effluent Concentration} &= \text{WLA} \div (\text{365 days/yr} * \text{Flow Rate} * \text{Conversion Factor}) \\ &= 93 \text{ lbs/yr} \div (\text{365 days/yr} * \text{0.179 MGD} * \text{8.34}) \\ &= \text{0.17 mg/L} \end{aligned}$$

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

$$\begin{aligned} \text{TP 6-Month Average Permit Limit} &= \text{WLA} \div \text{365 days/yr} * \text{multiplier} \\ &= (93 \text{ lbs/yr} \div \text{365 days/yr}) * \text{1.30} \\ &= \text{0.33 lbs/day} \end{aligned}$$

$$\begin{aligned} \text{TP Monthly Average Permit Limit} &= \text{TP 6-Month Average Permit Limit} * \text{3} \\ &= \text{0.33 lbs/day} * \text{3} \\ &= \text{0.99 lbs/day} \end{aligned}$$

The multiplier used in the six-month average calculation was determined according to the implementation guidance. A coefficient of variation was calculated, based on phosphorus mass monitoring data, to be 0.99. This is the standard deviation divided by the mean of mass data. However, it is believed that the optimization of the wastewater treatment system to achieve the WLA-derived permit limits will reduce effluent variability. Thus, the maximum anticipated coefficient of variation expected by the facility is 0.6. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies phosphorus monitoring as 2/monthly, but the EPA recommends that permit limits be derived using a frequency of at least weekly.

Six-month average and monthly average mass effluent limits are recommended for this discharge. The limits are equivalent to a concentration of 0.22 mg/L and 0.67 mg/L, respectively, at the facility design flow of 0.179 MGD.

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

Therefore, WLA-based WQBELs are protective of immediate receiving waters and TP WQBELs derived according to s. NR 217.13, Wis. Adm. Code are not required.

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

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from 07/12/2017 – 01/17/2013.

Total Phosphorus Effluent Data

	Phosphorus mg/L	Phosphorus lbs/day
1-day P ₉₉	4.33	4.26
4-day P ₉₉	2.39	2.33
30-day P ₉₉	1.37	1.31
Mean	0.94	0.88
Std	0.88	0.87
Sample size	134	134
Range	0.11 – 4.45	0.096 – 5.13

Interim Limit – Phosphorus

An interim limit is needed when a compliance schedule is included in the permit to meet the TMDL limits. This limit should reflect a value which the facility is able to currently meet; however, it should also consider the receiving water quality, keeping the water from further impairment. It’s recommended that the interim limit be set equal to 1.9 mg/L, expressed as a monthly average. This value is equivalent to the current monthly average concentration limit. This value is recommended instead of the 30-day P₉₉ concentration of 1.37 mg/L to allow operational flexibility when the facility begins to initiate phosphorus treatment optimization activities to meet the TMDL-based limits, which often consist of trial and error.

PART 6 – TOTAL SUSPENDED SOLIDS

Total Suspended Solids (TSS) effluent limits in lbs/day are calculated as recommended in the *TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs* (April 2020). This WLAs found in Appendix I of the *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids in the Upper Fox and Wolf Basins (UFW TMDL)* report dated February 2020 are expressed as maximum annual loads (lbs/year). The annual WLA for Iola is 8,722 lbs/year.

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

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

Attachment #1

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

$$\begin{aligned} \text{TSS Weekly Average Permit Limit} &= \text{WLA} \div 365 \text{ days/yr} * \text{multiplier} \\ &= (8,722 \text{ lbs/yr} \div 365 \text{ days/yr}) * 2.37 \\ &= 57 \text{ lbs/day} \end{aligned}$$

$$\begin{aligned} \text{TSS Monthly Average Permit Limit} &= \text{WLA} \div 365 \text{ days/yr} * \text{multiplier} \\ &= (8,722 \text{ lbs/yr} \div 365 \text{ days/yr}) * 1.59 \\ &= 38 \text{ lbs/day} \end{aligned}$$

The multiplier used in the weekly average and monthly average calculation was determined according to implementation guidance. A coefficient of variation was calculated, based on TSS mass monitoring data, to be 1.3. This is the standard deviation divided by the mean of mass data. However, it is believed that the optimization of the wastewater treatment system to achieve the WLA-derived permit limits will reduce effluent variability. Thus, the maximum anticipated coefficient of variation expected by the facility is 0.6. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies TSS monitoring as 3/week; if a different monitoring frequency is used, the stated limits should be reevaluated.

Weekly average and monthly average mass effluent limits are recommended for this discharge. The limits are equivalent to a concentration of 38 mg/L and 25 mg/L, respectively, at the facility design flow of 0.179 MGD.

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

Effluent Data

The following table summarizes effluent total suspended solids monitoring data from 07/05/2017 – 01/31/2023,

Total Suspended Solids Effluent Data

	TSS mg/L	TSS lbs/day
1-day P ₉₉	13.7	12.3
4-day P ₉₉	7.70	6.89
30-day P ₉₉	3.92	3.49
Mean*	2.36	2.09
Std	3.09	2.78
Sample size	583	583
Range	<1 – 42	0 – 42

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

Iola can currently meet the TSS mass limits, and a compliance schedule is not needed.

PART 7 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from 07/01/2017 – 12/31/2022.

Monthly Temperature Effluent Data & Limits

Month	Calculated Effluent Limit	
	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	NA	120
FEB	NA	120
MAR	NA	120
APR	NA	120
MAY	NA	120
JUN	111	120
JUL	92	120
AUG	84	120
SEP	83	120
OCT	85	120
NOV	106	120
DEC	NA	120

Section NR 106.59(2)(b), Wis. Adm. Code, allows the use of temperature effluent data, on a case-by-case basis, from at least two other POTWs within a 100-mile radius that utilize similar wastewater treatment technology and have a similar ratio of domestic to industrial waste stream composition, or representative data of the POTW. Nichols WWTF is a similar facility which had a maximum effluent temperature measurement of 81 deg F in the past nine years. Rosendale WWTF is another similar facility which had a maximum effluent temperature measurement of 73 deg F in the past twelve years. Using data from these two facilities, there is not reasonable potential for Iola to exceed the most stringent calculated weekly average limit of 83° F. **Monitoring for one year is recommended in the reissued permit to determine reasonable potential for the next reissuance.**

PART 8 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC₅₀ (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC₂₅ (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of **13%** 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:

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

Where:

Q_e = annual average flow = 0.179 MGD = 0.277 cfs

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

Q_s = ¼ of the 7-Q₁₀ = 7.6 cfs ÷ 4 = 1.9 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 003 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 003. 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.

WET Data History

Date Test Initiated	Acute Results LC ₅₀ %				Chronic Results IC ₂₅ %				Footnotes or Comments
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Used in RP?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RP?	
02/08/2000	>100	>100	Pass	Yes	49.4	81.7	Pass	No	1
10/31/2000	>100	>100	Pass	Yes	41.8	>30	Pass	No	1

Footnotes:

1. *Data Not Representative.* The treatment plant was upgraded in 2002 so data prior to this is not representative of current conditions.

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 = 13%. 0 Points
Historical Data	0 tests used to calculate RP. No tests failed. 5 Points	0 tests used to calculate RP. No tests failed. 5 Points
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. 0 Points	Same as Acute. 0 Points
Receiving Water Classification	Warmwater sport fish. 5 Points	Same as Acute. 5 Points
Chemical-Specific Data	Reasonable potential for limits for no substances based on ATC; Arsenic, cadmium, chromium, copper, lead, nickel, zinc, chloride, and ammonia detected. Additional Compounds of Concern: None. 3 Points	Reasonable potential for limits for no substances based on CTC; Arsenic, cadmium, chromium, copper, lead, nickel, zinc, chloride, and ammonia detected. Additional Compounds of Concern: None. 3 Points
Additives	No additives used. 0 Points	No additives used. 0 Points
Discharge	0 Industrial Contributors.	Same as Acute.

Attachment #1

	Acute	Chronic
Category	0 Points	0 Points
Wastewater Treatment	Secondary 0 Points	Same as Acute. 0 Points
Downstream Impacts	No impacts known 0 Points	Same as Acute. 0 Points
Total Checklist Points:	13 Points	13 Points
Recommended Monitoring Frequency (from Checklist):	None	None
Limit Required?	No	No
TRE Recommended? (from Checklist)	No	No

- No WET testing is required because information related to the discharge indicates the potential for effluent toxicity is believed to be low.

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Iola WWTF	7-Q₁₀:	7.60 cfs	Temp Dates		Flow Dates	
Outfall(s):	003	Dilution:	25%	Start:	01/00/00	End:	07/01/17
Date Prepared:	2/20/2023	f:	0	End:	01/00/00		12/22/22
Design Flow (Q_e):	0.18 MGD	Stream type:	Cold water community				
Storm Sewer Dist.	0 ft	Q_s:Q_e ratio:	6.9 :1				
		Calculation Needed?	YES				

Month	Water Quality Criteria			Receiving Water Flow Rate (Q _s) (cfs)	Representative Highest Effluent Flow Rate (Q _e)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	T _a (default) (°F)	Sub-Lethal WQC (°F)	Acute WQC (°F)		7-day Rolling Average (Q _{es}) (MGD)	Daily Maximum Flow Rate (Q _{ea}) (MGD)		Weekly Average (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	35	47	68	7.60	0.137	0.163	0			NA	120
FEB	36	47	68	7.60	0.119	0.126	0			NA	120
MAR	39	51	69	7.60	0.166	0.272	0			NA	120
APR	47	57	70	7.60	0.151	0.167	0			NA	120
MAY	56	63	72	7.60	0.134	0.147	0			NA	120
JUN	62	67	72	7.60	0.139	0.172	0			111	120
JUL	64	67	73	7.60	0.149	0.174	0			92	120
AUG	63	65	73	7.60	0.132	0.157	0			84	120
SEP	57	60	72	7.60	0.162	0.170	0			83	120
OCT	49	53	70	7.60	0.153	0.159	0			85	120
NOV	41	48	69	7.60	0.147	0.152	0			106	120
DEC	37	47	69	7.60	0.126	0.142	0			NA	120

