

Permit Fact Sheet

General Information

Permit Number:	WI-0022187-10-0	
Permittee Name:	VILLAGE OF LIVINGSTON	
Address:	P O Box 90 330 Barber St	
City/State/Zip:	Livingston WI 53554-9747	
Discharge Location:	East bank of the Little Platte River, approx. 980 feet south of treatment plant. (Lat: 42.89138° N / Lon: 90.43493° W)	
Receiving Water:	Headwaters Little Platte River (Little Platte River Watershed, GP03 – Grant-Platte River Basin) in Grant County	
StreamFlow (Q _{7,10}):	0.03 cfs	
Stream Classification:	Limited Forage Fish (LFF)	
Discharge Type:	Existing, Continuous	
Design Flow(s)	Annual Average	0.10 MGD
Significant Industrial Loading?	None	
Operator at Proper Grade?	Facility is Basic with subclasses A1 – Suspended Growth Processes, B – Solids Separation, C – Biological Solids/Sludges, SS – Sanitary Sewage Collection System, P – Biological Nutrient Removal (Phosphorus). One operator is certified.	
Approved Pretreatment Program?	N/A	

Facility Description

The Village of Livingston operates an extended aeration activated sludge wastewater treatment facility that includes a mechanical screen, aeration basin, final clarifier, reaeration tank, and chemical phosphorus removal system. The chemical phosphorus upgrade was completed in 2021. Treated effluent is discharged to the headwaters of the Little Platte River. Sludge from the treatment process is aerobically digested prior to landspreading on DNR approved sites.

Substantial Compliance Determination

During permit term WI-0022187-09, there had been several violations of effluent limits, missed monitoring, late reporting, and treatment bypassing. However, the permittee has taken the necessary steps to correct their actions.

The permittee has met the previously required actions as part of the enforcement process. After a review of records and an onsite facility inspection on August 16, 2023, this facility is found to be in substantial compliance with their current WPDES permit.

Compliance determination entered by Caitlin O’Connell, Wastewater Engineer on August 25, 2023.

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/sample Contents and Treatment Description (as applicable)
701	N/A Monitoring not previously required	Influent: 24-Hr flow proportional composite sampler intake located prior to the Parshall flume and mechanical screen. Flow meter located at the Parshall flume before the mechanical screen.
001	0.077 MGD (October 2018 – October 2023 Average)	Effluent: 24-Hr flow proportional composite sampler intake located at the end of the final clarifier, prior to the effluent Parshall flume; pH grab samples collected from the same location as the composite sampler. DO and temperature readings collected from the reaeration tank. Flow meter located at the Parshall flume directly after the final clarifier in the main treatment building, prior to the reaeration tank.
002	19 Dry US Tons/Year (2018-2022 Average)	Aerobically digested, Liquid, Class B. Representative sludge samples shall be collected at the discharge end of the aerated digester.

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	
BOD ₅ , Total		mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	2/Week	24-Hr Flow Prop Comp	

Changes from Previous Permit:

The permittee has an influent flow meter and therefore influent flow has been added to the permit to comply with s. NR 205.07(1)(r)2, 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 210.05, Wis. Adm. Code and in the standard requirements section of the permit.

2 Surface Water - Monitoring and Limitations

Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	15 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	30 mg/L	2/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	20 mg/L	2/Week	24-Hr Flow Prop Comp	
Dissolved Oxygen	Daily Min	4.0 mg/L	5/Week	Grab	
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
Nitrogen, Ammonia Variable Limit		mg/L	2/Week	See Table	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 DMR.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	2/Week	24-Hr Flow Prop Comp	Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH ₃ -N) Total column of the eDMR. See Ammonia Limitation Section.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	6.7 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective May through September
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	9.5 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective October through April
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	3.3 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective May through September
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	9.5 mg/L	2/Week	24-Hr Flow Prop Comp	Limit effective October through April
Phosphorus, Total	Monthly Avg	1.0 mg/L	2/Week	24-Hr Flow Prop Comp	This is an interim MDV limit effective through March 31, 2026. See the MDV/Phosphorus sections

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					and phosphorus schedules.
Phosphorus, Total	Monthly Avg	0.6 mg/L	2/Week	24-Hr Flow Prop Comp	This is an interim MDV limit effective on April 01, 2026. See the MDV/Phosphorus sections and phosphorus schedules.
Phosphorus, Total		lbs/month	Monthly	Calculated	Report the total monthly phosphorus discharged in lbs/month on the last day of the month on the DMR. See Standard Requirements for 'Appropriate Formulas' to calculate the Total Monthly Discharge in lbs/month.
Phosphorus, Total		lbs/yr	Annual	Calculated	Report the sum of the total monthly discharges (for the months that the MDV is in effect) for the calendar year on the Annual report form.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring only. January - December 2028.
Temperature Maximum		deg F	3/Week	Grab	Monitoring only. January - December 2028.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.

Changes from Previous Permit

Dissolved Oxygen and pH: The sample frequency for these parameters has increased to 5/week.

Ammonia Nitrogen: The daily maximum limit was changed to a daily variable limit corresponding to various effluent pH values.

Phosphorus Second Term MDV: The permittee has applied for a multi-discharger variance (MDV) for phosphorus for this permit term and the application has been approved by the Department. A second term MDV interim limit of 0.6 mg/L has been added that goes into effect per a compliance schedule. The permittee is required to report the total amount of phosphorus discharged in lbs/month and lbs/year. By March 1 of each year the permittee shall make a payment(s) to participating county(s) of \$64.75 per pound of phosphorus discharged during the previous year in excess of the target value of 0.2 mg/L.

Chloride and Temperature: The monitoring year for these parameters has been updated.

Total Nitrogen Monitoring (TKN, NO₂+NO₃ and Total N): Annual monitoring in rotating quarters throughout the permit term was added to the proposed permit.

Explanation of Limits and Monitoring Requirements

Please refer to the Water Quality Based Effluent Limits memo for the Livingston Wastewater Treatment Facility prepared by Sarah Luck, dated January 2, 2024, and used for this reissuance.

BOD₅, Total Suspended Solids (TSS), pH, Dissolved Oxygen (DO): No changes are recommended in the permit limitations for BOD₅, TSS, pH, and DO. 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. Where the receiving water is classified as Limited Forage Fish (LFF) as defined in s. NR 104.02(3)(a), Wis. Adm. Code, the limits for BOD₅, TSS, pH, and DO are those limits enumerated in ss. NR 210.05(2)(a) – (e), 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. The daily maximum limit was changed to a daily variable limit corresponding to various effluent pH values.

Phosphorus: Phosphorus rules became effective December 1, 2010 per NR 217, Wis. Adm. Code, that required the permittee to comply with water quality based effluent limits (WQBELs) for total phosphorous. The final phosphorus WQBELs are 0.225 mg/L as a monthly average and 0.075 mg/L (0.062 lbs/day) as a six-month average and were to become effective as scheduled unless a variance was granted. For this permit term, the permittee has again applied for the Multi-Discharger Variance (MDV) for phosphorus as provided for in s. 283.16, Wis. Stats., and approved by USEPA on February 6, 2017. The permittee qualifies for the MDV because it is an existing source and a major facility upgrade is needed to comply with the applicable phosphorus WQBELs, thereby creating a financial burden for the treatment facility and community. The financial burden created meets the primary and secondary indicators for substantial and widespread adverse social and economic impacts. The permittee is located within an MDV eligible county and is located within a non-point source dominated watershed. Finally, the permittee has agreed to implement a watershed project, having selected the County Payment Option.

Conditions of the MDV require the permittee to optimize phosphorus removal throughout the proposed permit term, comply with interim limits and make annual payments to participating county(s) by March 1 of each year based on the pounds of phosphorus discharged during the previous year in excess of the specified target value. A reopener clause is included in the permit to address the current MDV's expiration date, as a permit action may be required to update or remove variance provisions if the MDV is altered or unavailable after February 6, 2027.

The "price per pound" value is \$50.00 adjusted for CPI annually during the first quarter as defined by s. 283.16(8)(a)2, Wis. Stats., and takes effect for reissued permits with effective dates starting April 1. This may differ from the "price per pound" that is public noticed; however, the "price per pound" is set upon reissuance and is applicable for the entire permit term. The participating county(s) uses these payments to implement non-point source (agricultural and urban) phosphorus control strategies at the watershed level.

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 that there is no reasonable potential to

exceed the calculated WQBELs for chloride. Monthly monitoring in 2028 is included in the proposed permit and the data collected will be used to determine reasonable potential for the next reissuance.

Thermal: Requirements for Temperature are included in NR 102 Subchapter II Water Quality Standards for Temperature and NR 106 Subchapter V Effluent Limitations for Temperature. Thermal discharges must meet the Public Health criterion of 120 degrees F and the Fish & Aquatic Life criteria which are established to protect aquatic communities from lethal and sub-lethal thermal effects. Livingston has submitted a successful DC demonstration which was approved by the Department in 2017. The facility submitted a written statement May 1, 2023 certifying that there have been no substantial changes in the findings of the DC study or the operations or thermal loadings at the facility since the DC study was approved. Therefore, temperature limits are not required, but one year of thermal monitoring is included in the proposed permit.

Dissipative cooling requests must be re-evaluated every permit reissuance. The permittee is responsible to submit an updated DC request as part of the permit application. Such a request must either include:

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

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 frequencies for dissolved oxygen and pH were increased to align Livingston 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 Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	Sludge Class (A or B)	Sludge Type (Liquid or Cake)	Pathogen Reduction Method	Vector Attraction Method	Reuse Option	Amount Reused/Disposed (Dry Tons/Year)
002	B	Liquid	Fecal Coliform	Aerobic SOUR/Incorporation	Land Application	23
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, design flow of is less than 5 MGD.						

Sample Point Number: 002- SLUDGE

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	January - December 2026
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	January - December 2026
Solids, Total		Percent	Annual	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

Changes from Previous Permit:

The new timeframe for monitoring PCBs is now 2026.

PFAS: Annual sludge 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.

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 sludge samplings has been included in the proposed WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9, Wis. Adm. Code.

4 Schedules

4.1 Phosphorus Schedule - Continued Optimization

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

Required Action	Due Date
Optimization: The permittee shall continue to implement the optimization plan as previously approved to optimize performance to control phosphorus discharges. Submit a progress report on optimizing removal of phosphorus by the Due Date.	03/31/2025
Progress Report #2: Submit a progress report on optimizing removal of phosphorus.	03/31/2026
Progress Report #3: Submit a progress report on optimizing removal of phosphorus.	03/31/2027
Progress Report #4: Submit a progress report on optimizing removal of phosphorus.	03/31/2028
Progress Report #5: Submit a progress report on optimizing removal of phosphorus.	03/31/2029

4.1.1 Explanation of Schedule

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

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

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

Required Action	Due Date
Report on Effluent Discharges: Submit a report on effluent discharges of phosphorus with conclusions regarding compliance.	04/01/2025
Action Plan: Submit an action plan for complying with the specified interim effluent limit. If construction is required, include plans and specifications with the submittal.	07/01/2025
Initiate Actions: Initiate actions identified in the plan.	10/01/2025
Complete Actions: Complete actions identified in the plan and achieve compliance with the specified interim effluent limit.	04/01/2026

4.2.1 Explanation of Schedule

Phosphorus Multi-Discharger Variance Interim Limit (0.6 mg/L): Subsection 283.16(6), Wis. Stats., establishes required interim phosphorus effluent limits that must be met for multi-discharger variance (MDV) eligibility. The schedule above provides the permittee with two years to comply with that limit.

4.3 Phosphorus Payment per Pound to County

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

Required Action	Due Date
<p>Annual Verification of Phosphorus Payment to County: The permittee shall make a total payment to the participating county or counties approved by the Department by March 1 of each calendar year. The amount due is equal to the following: (lbs of phosphorus discharged minus the permittee’s target value) times (\$64.75 per pound) or \$640,000, whichever is less. See the payment calculation steps in the Surface Water section.</p> <p>The permittee shall submit Form 3200-151 to the Department by March 1 of each calendar year indicating total amount remitted to the participating counties to verify that the correct payment was made. The first payment verification form is due by the specified Due Date.</p> <p>Note: The applicable Target Value is 0.2 mg/L as defined by s. 283.16(1)(h), Wis. Stats. The "per pound" value is \$50.00 adjusted for CPI.</p>	03/01/2025
<p>Annual Verification of Payment #2: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.</p>	03/01/2026
<p>Annual Verification of Payment #3: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.</p>	03/01/2027
<p>Annual Verification of Payment #4: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.</p>	03/01/2028
<p>Annual Verification of Payment #5: Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.</p>	03/01/2029
<p>Continued Coverage: If the permittee intends to seek a renewed variance, an application for the MDV (Multi Discharger Variance) shall be submitted as part of the application for permit reissuance in accordance with s. 283.16(4)(b), Wis. Stats.</p>	
<p>Annual Verification of Payment After Permit Expiration: In the event that this permit is not reissued prior to the expiration date, the permittee shall continue to submit Form 3200-151 to the Department indicating total amount remitted to the participating counties by March 1 each year.</p>	

4.3.1 Explanation of Schedule

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

Special Reporting Requirements

None

Other Comments:

None

Attachments:

Water Quality Based Effluent Limits dated January 2, 2024

MDV Conditional Approval Letter dated May 22, 2023

MDV Evaluation Checklist dated May 22, 2023

Expiration Date:

March 31, 2029

Justification Of Any Waivers From Permit Application Requirements

No waivers were requested or given from permit application requirements.

Prepared By: Betsyjo Howe Wastewater Specialist

Date: 1/29/2024

Updated (based on fact check comments): 2/6/2024

Updated (based on public notice comments):

Notice of reissuance to be published in the Platteville Journal, PO Box 266, Platteville, WI 53818-0266.

CORRESPONDENCE/MEMORANDUM

DATE: January 2, 2024

TO: Permit Drafter

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Water Quality-Based Effluent Limitations for the Livingston Wastewater Treatment Facility
 WPDES Permit No. WI-0022187-10-0

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 Livingston Wastewater Treatment Facility in Grant County. This municipal wastewater treatment facility (WWTF) discharges to the Little Platte River, located in the Little Platte River Watershed in the Grant-Platte River Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD ₅			30 mg/L	15 mg/L		2
TSS			30 mg/L	20 mg/L		2
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		4.0 mg/L				2
Ammonia Nitrogen May – September October – April	8.1 mg/L 8.1 mg/L		6.7 mg/L 8.1 mg/L	3.3 mg/L 8.1 mg/L		3,4
Phosphorus						5
LCA				1.0 mg/L		
HAC				0.60 mg/L		
Final				0.225 mg/L	0.075 mg/L 0.062 lbs/day	
Chloride						6
TKN, Nitrate+Nitrite, and Total Nitrogen						7
Temperature						8

Footnotes:

1. Monitoring only.
2. No changes from the current permit.
3. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values (next page) may be included in the permit in place of the single limit of 8.1 mg/L. These limits apply year-round. If the variable daily maximum daily limit table is effective in the reissued permit, the weekly and monthly average limits for October through April would be 9.5 mg/L; the weekly and monthly average limits in May through September remain 6.7 mg/L and 3.3 mg/L, respectively.

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
$6.0 \leq \text{pH} \leq 6.1$	44	$7.0 < \text{pH} \leq 7.1$	26	$8.0 < \text{pH} \leq 8.1$	5.5
$6.1 < \text{pH} \leq 6.2$	43	$7.1 < \text{pH} \leq 7.2$	24	$8.1 < \text{pH} \leq 8.2$	4.6
$6.2 < \text{pH} \leq 6.3$	42	$7.2 < \text{pH} \leq 7.3$	21	$8.2 < \text{pH} \leq 8.3$	3.8
$6.3 < \text{pH} \leq 6.4$	40	$7.3 < \text{pH} \leq 7.4$	18	$8.3 < \text{pH} \leq 8.4$	3.1
$6.4 < \text{pH} \leq 6.5$	39	$7.4 < \text{pH} \leq 7.5$	16	$8.4 < \text{pH} \leq 8.5$	2.6
$6.5 < \text{pH} \leq 6.6$	37	$7.5 < \text{pH} \leq 7.6$	14	$8.5 < \text{pH} \leq 8.6$	2.1
$6.6 < \text{pH} \leq 6.7$	36	$7.6 < \text{pH} \leq 7.7$	12	$8.6 < \text{pH} \leq 8.7$	1.8
$6.7 < \text{pH} \leq 6.8$	34	$7.7 < \text{pH} \leq 7.8$	9.7	$8.7 < \text{pH} \leq 8.8$	1.5
$6.8 < \text{pH} \leq 6.9$	31	$7.8 < \text{pH} \leq 7.9$	8.1	$8.8 < \text{pH} \leq 8.9$	1.2
$6.9 < \text{pH} \leq 7.0$	29	$7.9 < \text{pH} \leq 8.0$	6.7	$8.9 < \text{pH} \leq 9.0$	1.0

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 included in bold.
5. Under the phosphorus MDV, a level currently achievable (LCA) interim limit of 1.0 mg/L should be effective upon permit reissuance. A compliance schedule may be included in the permit until the highest attainable condition (HAC) limit of 0.60 mg/L can be met. The final WQBELs remain at 0.225 mg/L as a monthly average and six-month average limits of 0.075 mg/L and 0.062 lbs/day.
6. Monitoring during the fourth year of the permit at a frequency to ensure that 11 samples are available at the next permit issuance.
7. 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).
8. At least one year of temperature monitoring is recommended.

No WET testing is required because information related to the discharge indicates low 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 (4) – Narrative, Site Map, Ammonia Nitrogen Calculations, and Thermal Table

PREPARED BY: *Sarah Luck* Date: January 2, 2024
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**Water Quality-Based Effluent Limitations for
Livingston Wastewater Treatment Facility**

WPDES Permit No. WI-0022187

PART 1 – BACKGROUND INFORMATION

Facility Description

Livingston Wastewater Treatment Facility is an activated sludge extended aeration facility. Treatment units include a screw screen, aeration tank, final clarification, and effluent-diffused air post-aeration. The facility completed an upgrade in September 2021 for chemical phosphorus removal using aluminum sulfate (alum). Sludge is aerobically digested, stored, and then applied on DNR-approved land application sites.

Disinfection of the effluent is not required at this time. It should be noted that recreational use surveys and other information may be re-evaluated in the future to ensure the conditions of s. NR 210.06(3), Wis. Adm. Code, are being met. **This re-evaluation could result in requiring disinfection of the effluent** at that time. Disinfection would likely apply during May through September and would require *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 #2 is a map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations

The current permit, which expired on September 30, 2023, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow rate						5
BOD ₅			30 mg/L	15 mg/L		1
TSS			30 mg/L	20 mg/L		1
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		4.0 mg/L				1
Ammonia Nitrogen						3
May – September	10 mg/L		6.7 mg/L	3.3 mg/L		
October – April	9.5 mg/L		9.5 mg/L	9.5 mg/L		
Phosphorus						4
Interim				4.2 mg/L		
MDV Interim				1.0 mg/L		

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Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Final				0.225 mg/L	0.075 mg/L 0.062 mg/L	
Chloride						5
Temperature						5

Footnotes:

1. These limits are based on the Limited Forage Fish (LFF) community of the immediate receiving water as described in s. NR 104.02(3)(a), Wis. Adm. Code.
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. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, are included in bold.
4. Livingston WWTF was covered under the phosphorus multi-discharger variance (MDV). An interim limit of 4.2 mg/L was in effect until the MDV limit of 1.0 mg/L went into effect on October 1, 2022.
5. Monitoring only.

Receiving Water Information

- Name: Little Platte River
- Waterbody Identification Code (WBIC): 943800
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Limited Forage Fish (LFF) community from the outfall to New California Road (bridge), approximately 1.5 miles downstream. The classification then changes to coldwater community (class II trout stream) for four miles before then changing to a warmwater sport fish community. The Little Platte River is listed as an Exceptional Resource Water from Arthur, WI (which is just west of Rewey, WI) to the Platte River.
- 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 estimated at Highway 80, one mile south of Livingston, WI (0.5 miles south of Outfall 001).
 - 7-Q₁₀ = 0.03 cfs (cubic feet per second)
 - 7-Q₂ = 0.09 cfs
 - 90-Q₁₀ = 0.08 cfs
 - Harmonic Mean Flow = 0.2 cfs using a drainage area of 1.29 mi²
 - The Harmonic Mean has been estimated based on average flow and the 7-Q₁₀ using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).
- Hardness = 322 mg/L as CaCO₃. This value represents the geometric mean of data (n=3) from WET tests conducted at Livingston WWTF in November 2014, February 2016, and May 2017.
- % 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 Little Platte River at CTH 80 bridge (SWIMS station #223247), located approximately four miles downstream of the outfall, is used for this evaluation. 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 Little Platte River is listed as impaired for total phosphorus approximately 7.5 miles downstream from the outfall.

Effluent Information

- Flow rate:
 Design annual average = 0.10 MGD (Million Gallons per Day)
 For reference, the actual average flow from October 2018 through October 2023 was 0.077 MGD.
- Hardness = 393 mg/L as CaCO₃. This value represents the geometric mean of data (n=3) from February 2023 reported on the 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).
- Water source: Domestic wastewater with water supply from wells.
- Additives: Alum (phosphorus removal)
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness, and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Copper Effluent Data

Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)
2/16/2023	5.2	2/28/2023	6.8	3/13/2023	2.3
2/19/2023	3.1	3/3/2023	5.2	3/16/2023	<1.9
2/22/2023	3.5	3/6/2023	3.0	3/20/2023	<1.9
2/25/2023	4.0	3/9/2023	<1.9		
Mean = 4.1 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

Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)
1/25/2022	320	5/5/2022	209	9/8/2022	187
2/8/2022	375	6/14/2022	274	10/6/2022	230
3/3/2022	350	7/6/2022	285	11/8/2022	277
4/7/2022	305	8/2/2022	252	12/8/2022	256
1-day P ₉₉ = 430 mg/L					
4-day P ₉₉ = 347 mg/L					

The table on the next page presents the average concentrations and loadings at Outfall 001 from October 2018 through October 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	5 mg/L*
TSS	6 mg/L*
pH field	7.4 s.u.
Phosphorus	0.52 mg/L
Ammonia Nitrogen	0.82 mg/L*
Dissolved Oxygen	8.2 mg/L

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

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

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

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or 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.

Attachment #1

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.

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 = 0.02 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		392.5	78.5	<1.1		
Cadmium	393	49.6	0.2	57.2	11.4	<0.19		
Chromium	301	4446		5135.4	1027	<1.1		
Copper	393	56.5		65.2	13.0	4.1		
Lead	356	365		421.2	84.2	<4.3		
Nickel	268	1080		1247.8	250	<1.2		
Zinc	333	345		398.1	79.6	30		
Chloride (mg/L)		757	28	870.1			430	375

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

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

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0.0075 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Arsenic		152.2		160	31.9	<1.1	
Cadmium	175	3.82	0.2	4.00	0.8	<0.19	
Chromium	301	325.75		342	68.3	<1.1	
Copper	353	30.46		31.9	6.39	4.1	
Lead	353	94.73		99.3	19.9	<4.3	
Nickel	268	120.18		126	25.2	<1.2	
Zinc	333	344.68		361	72.3	30	
Chloride (mg/L)		395	28	413			347

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

Monthly Average Limits based on Wildlife Criteria (WC)

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

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 0.049 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	0.2	488	97.6	<0.19
Chromium (+3)	3818000		5036417	1007283	<1.1
Lead	140		185	36.9	<4.3
Nickel	43000		56722	11344	<1.2

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 0.049 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3		17.5	3.51	<1.1

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

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, **no effluent limitations are required.**

Chloride – Considering available effluent data from the current permit term (January 2022 through December 2022), the 1-day P₉₉ chloride concentration is 430 mg/L, and the 4-day P₉₉ of effluent data is 347 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 Livingston Wastewater Treatment Facility is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, “there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code.” A review of the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from September 2019 through April 2022 (n=4) was 0.3 mg/kg, with a maximum reported concentration of 1.2 mg/kg, and three of the four samples below the level of detection. 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, weekly average, and monthly average limits. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- Section NR 106.07(3), Wis. Adm. Code requires weekly and monthly average limits for municipal treatment plants.
- The maximum expected effluent pH has changed.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

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

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

Where:

A = 0.275 and B = 39.0 for a Cold-Water Category 1 fishery, and
A = 0.411 and B = 58.4 for a Limited Forage Fishery, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 529 sample results were reported from October 2018 through October 2023. The maximum reported value was 8.1 s.u. (Standard pH Units). The effluent pH was 7.9 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 7.8 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 7.7 s.u. Therefore, a value of 7.9 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 7.9 s.u. into the equation above yields an ATC = 10.13 mg/L.

Ammonia Decay

The Department must establish limits to protect downstream uses, according to s. NR 106.32(1)(b), Wis. Adm. Code. Ammonia decay may be considered when determining limits at the outfall to protect the downstream classification, according to s. NR 106.32(4)(c), Wis. Adm. Code. Where the calculated limits are more restrictive based on downstream uses, ammonia decay can be considered to determine if these more restrictive limits are needed or if the ammonia will decay before it reaches the point of the classification change.

Attachment #1

Ammonia decay rates are dependent on temperature with in-stream nitrification essentially non-existent in the winter. In-stream decay is expected so a first order decay model should be used. Based on the available literature, a decay rate of 0.25 day⁻¹ at 20°C has been suggested as a default rate. A temperature correction factor of $\theta = 1.08$ is ($k_t = k_{20} \theta^{(T-20)}$). The ammonia nitrogen decay equation is provided below.

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

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

The velocity of receiving water is assumed to be 5 miles per day, and the distance from the point of discharge to the classification change is approximately 1.5 miles for a travel time of 0.3 days. This equation shows that at the location where the classification change, 96% of the ammonia is remaining (average for year-round).

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

	2×ATC	1-Q ₁₀
LFF	20	12
Coldwater	14	7.8
Coldwater (decay consideration)	NA - 1-Q ₁₀ is more restrictive	8.1

The 1-Q₁₀ method at the downstream coldwater classification (after consideration of ammonia decay) yields the most stringent limits for Livingston Wastewater Treatment Facility (8.1 mg/L).

Presented below is a table of daily maximum limitations corresponding to various effluent pH values as an alternative to a single daily maximum limit.

Daily Maximum Ammonia Nitrogen Limits – Coldwater (adjusted for downstream decay)

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	44	7.0 < pH ≤ 7.1	26	8.0 < pH ≤ 8.1	5.5
6.1 < pH ≤ 6.2	43	7.1 < pH ≤ 7.2	24	8.1 < pH ≤ 8.2	4.6
6.2 < pH ≤ 6.3	42	7.2 < pH ≤ 7.3	21	8.2 < pH ≤ 8.3	3.8

Attachment #1

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.3 < pH ≤ 6.4	40	7.3 < pH ≤ 7.4	18	8.3 < pH ≤ 8.4	3.1
6.4 < pH ≤ 6.5	39	7.4 < pH ≤ 7.5	16	8.4 < pH ≤ 8.5	2.6
6.5 < pH ≤ 6.6	37	7.5 < pH ≤ 7.6	14	8.5 < pH ≤ 8.6	2.1
6.6 < pH ≤ 6.7	36	7.6 < pH ≤ 7.7	12	8.6 < pH ≤ 8.7	1.8
6.7 < pH ≤ 6.8	34	7.7 < pH ≤ 7.8	9.7	8.7 < pH ≤ 8.8	1.5
6.8 < pH ≤ 6.9	31	7.8 < pH ≤ 7.9	8.1	8.8 < pH ≤ 8.9	1.2
6.9 < pH ≤ 7.0	29	7.9 < pH ≤ 8.0	6.7	8.9 < pH ≤ 9.0	1.0

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

The weekly and monthly average ammonia nitrogen limits calculation from 2013 do not change because there have been no changes in the effluent or receiving water flow rates. The calculations from the 2013 WQBEL memo are shown in Attachment #3.

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from October 2018 through October 2023, with those results being compared to the calculated limits to determine the need to include ammonia limits in the Livingston Wastewater Treatment Facility permit for the respective month ranges. That need is determined by calculating 99th upper percentile (or P₉₉) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

Ammonia Nitrogen Effluent Data

	May – September mg/L	October – April mg/L
1-day P ₉₉	8.98	13.82
4-day P ₉₉	6.07	9.20
30-day P ₉₉	2.83	4.11
Mean*	0.59	0.98
Std	4.40	5.84
Sample size	217 (110 ND)	312 (132)
Range	<0.03 - 35.21	<0.03 - 41.97

*“<” 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 (ND) result.

Based on this comparison, **daily limits are required year-round**. However, since the permit currently also has weekly and monthly limits, the limits must be retained regardless of reasonable potential, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

- (b) If a permittee is subject to an ammonia limitation in an existing permit, the limitation shall be included in any reissued permit. Ammonia limitations shall be included in the permit if the permitted facility will be providing treatment for ammonia discharges.

Conclusions and Recommendations

In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended – **either** those corresponding to a single limit **or** those corresponding to a pH-variable daily limit. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm Code.

Final Ammonia Nitrogen Limits

		Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
Single Limit	May – September	8.1	6.7	3.3
	October – April	8.1	8.1	8.1
Variable Limit	May – September	Variable	6.7	3.3
	October – April	Variable	9.5*	9.5*

*The limits previously in effect are more restrictive than the greatest value in the pH-variable table and are therefore retained unless a demonstration of need in accordance with ch. NR 207, Wis. Adm. Code, is made.

Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, are denoted in bold text above.

Daily Maximum Ammonia Nitrogen Limits – Coldwater (adjusted for downstream decay)

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	44	7.0 < pH ≤ 7.1	26	8.0 < pH ≤ 8.1	5.5
6.1 < pH ≤ 6.2	43	7.1 < pH ≤ 7.2	24	8.1 < pH ≤ 8.2	4.6
6.2 < pH ≤ 6.3	42	7.2 < pH ≤ 7.3	21	8.2 < pH ≤ 8.3	3.8
6.3 < pH ≤ 6.4	40	7.3 < pH ≤ 7.4	18	8.3 < pH ≤ 8.4	3.1
6.4 < pH ≤ 6.5	39	7.4 < pH ≤ 7.5	16	8.4 < pH ≤ 8.5	2.6
6.5 < pH ≤ 6.6	37	7.5 < pH ≤ 7.6	14	8.5 < pH ≤ 8.6	2.1
6.6 < pH ≤ 6.7	36	7.6 < pH ≤ 7.7	12	8.6 < pH ≤ 8.7	1.8
6.7 < pH ≤ 6.8	34	7.7 < pH ≤ 7.8	9.7	8.7 < pH ≤ 8.8	1.5
6.8 < pH ≤ 6.9	31	7.8 < pH ≤ 7.9	8.1	8.8 < pH ≤ 8.9	1.2
6.9 < pH ≤ 7.0	29	7.9 < pH ≤ 8.0	6.7	8.9 < pH ≤ 9.0	1.0

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 Livingston Wastewater Treatment Facility currently has a monthly average phosphorus limit of 1.0 mg/L for the multi-discharger variance, that went into effect on October 1, 2022, the need for a technology-based effluent limit will not be considered further.

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

Water Quality-Based Effluent Limits (WQBEL)

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

Attachment #1

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

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

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

Where:

WQC = 0.075 mg/L for the Little Platte River

Qs = 100% of the 7-Q₂ of 0.09 cfs

Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code

Qe = effluent flow rate = 0.10 MGD = 0.16 cfs

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

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated as a median using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Code. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions.

A previous evaluation resulted in a WQBEL of 0.075 mg/L using a background concentration above criteria. Section NR 217.13(2)(d), Wis. Adm. Code, states that the determination of upstream concentrations shall be evaluated at each permit reissuance. No additional data were available to consider in estimating the background phosphorus concentration.

In stream total phosphorus data upstream of the discharge is not available; however, the following data were considered in estimating the background phosphorus concentration:

SWIMS ID	253178	253160	223299
Station Name	Monitoring station at Livingston Branch – Bridge at Enloe Rd	Monitoring station at Unnamed Trib to Livingston Branch at CTH X	Monitoring station at Little Platte River at Crosscut Rd (bridge)
Waterbody	Livingston Branch	Unnamed Tributary	Little Platte River
Sample Count	11	11	5
First Sample	06/06/2012	06/06/2012	06/15/2013
Last Sample	10/14/2013	10/14/2013	10/13/2013
Mean	0.145 mg/L	0.108 mg/L	0.143 mg/L
Median	0.113 mg/L	0.091 mg/L	0.112 mg/L
NR 217 Median	0.113 mg/L	0.091 mg/L	0.112 mg/L

Substituting a background concentration above criteria into the limit calculation equation above would result in a calculated limit that is less than the applicable criterion of 0.075 mg/L. However, s. NR 217.13(7), Wis. Adm. Code, specifies that “if the WQBEL calculated pursuant to the procedures in this

section is less than the phosphorus criterion specified in s. NR 102.06, Wis. Adm. Code, for the water body, the effluent limit shall be set equal to the criterion.”

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from October 2018 through October 2023.

Total Phosphorus Effluent Data	
	Phosphorus mg/L
1-day P ₉₉	1.87
4-day P ₉₉	1.09
30-day P ₉₉	0.69
Mean	0.52
Std	0.37
Sample size	529
Range	0.018 - 5.21

Reasonable Potential Determination

The discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion because the 30-day P₉₉ of reported effluent total phosphorus data is greater than the calculated WQBEL. Therefore, **a WQBEL is required.**

Limit Expression

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

Mass Limits

A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the discharge is to a surface water that is a phosphorus impaired water. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.10 MGD = 0.062 lbs/day expressed as a six-month average.**

Multi-Discharge Variance Interim Limit

Livingston Wastewater Treatment Facility was covered under the phosphorus multi-discharger variance (MDV) during the previous permit term and has applied for coverage again. If Livingston Wastewater Treatment Facility is approved for the MDV again, conditions of the phosphorus MDV require the facility to comply with an interim phosphorus limit in lieu of meeting the final WQBELs. The recommended interim limit during the second permit under MDV approval pursuant to s. 283.16 (6) (a), Wis. Stats., is 0.6 mg/L as a monthly average. A review of effluent phosphorus data indicates that Livingston Wastewater Treatment Facility may need a compliance schedule to meet this interim limit, but **compliance with 0.6 mg/L shall be no later than the end of the reissued permit.**

The current permit had a compliance schedule to meet the limit of 1.0 mg/L by October 1, 2022. **Therefore, 1.0 mg/L is the level currently achievable (LCA) for the discharge.** A limit of 1.0 mg/L as

a monthly average should not be exceeded during the compliance schedule.

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 October 2018 through October 2023.

The table below summarizes the maximum temperatures reported during monitoring from January 2022 through October 2023.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	46	49	55	79
FEB	45	47	55	80
MAR	48	49	57	80
APR	49	50	64	82
MAY	56	59	70	85
JUN	63	65	77	86
JUL	65	66	81	86
AUG	65	67	79	87
SEP	66	67	73	85
OCT	67	67	63	83
NOV	57	59	54	81
DEC	51	52	55	80

Reasonable Potential

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

Attachment #1

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

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. The months in which limitations are recommended are shown in bold. Based on this analysis, weekly average temperature maximum limits are necessary for the months of October and November.

However, Livingston Wastewater Treatment Facility completed a dissipative cooling (DC) study in accordance with NR 106.59, Wis. Adm. Code, which was approved on January 30, 2017. This study, which began November 23, 2016 and ended on November 27, 2016, showed that, although effluent is discharged into the headwaters of the Little Platte River at a temperature higher than the applicable sub-lethal water quality criterion, the criterion is attained within a reasonable distance of the outfall (approximately 20 feet). The study showed that the stream achieves the criterion as it continues downstream, and the stream returns to default ambient temperature within 80 feet of the outfall. In future studies, it is recommended that the permittee collect daily discharge temperature and flow to supplement the DC demonstration.

Livingston Wastewater Treatment Facility submitted a written statement on May 1, 2023 certifying that there have been no substantial changes in the findings of the DC study or the operation or thermal loadings at the facility since the DC study was approved. Therefore, **temperature limits are not required, but one year of thermal monitoring is recommended**. The complete thermal table used for this calculation is in Attachment #4.

Future WPDES Permit Reissuance

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

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

PART 6 – WHOLE EFFLUENT TOXICITY (WET)

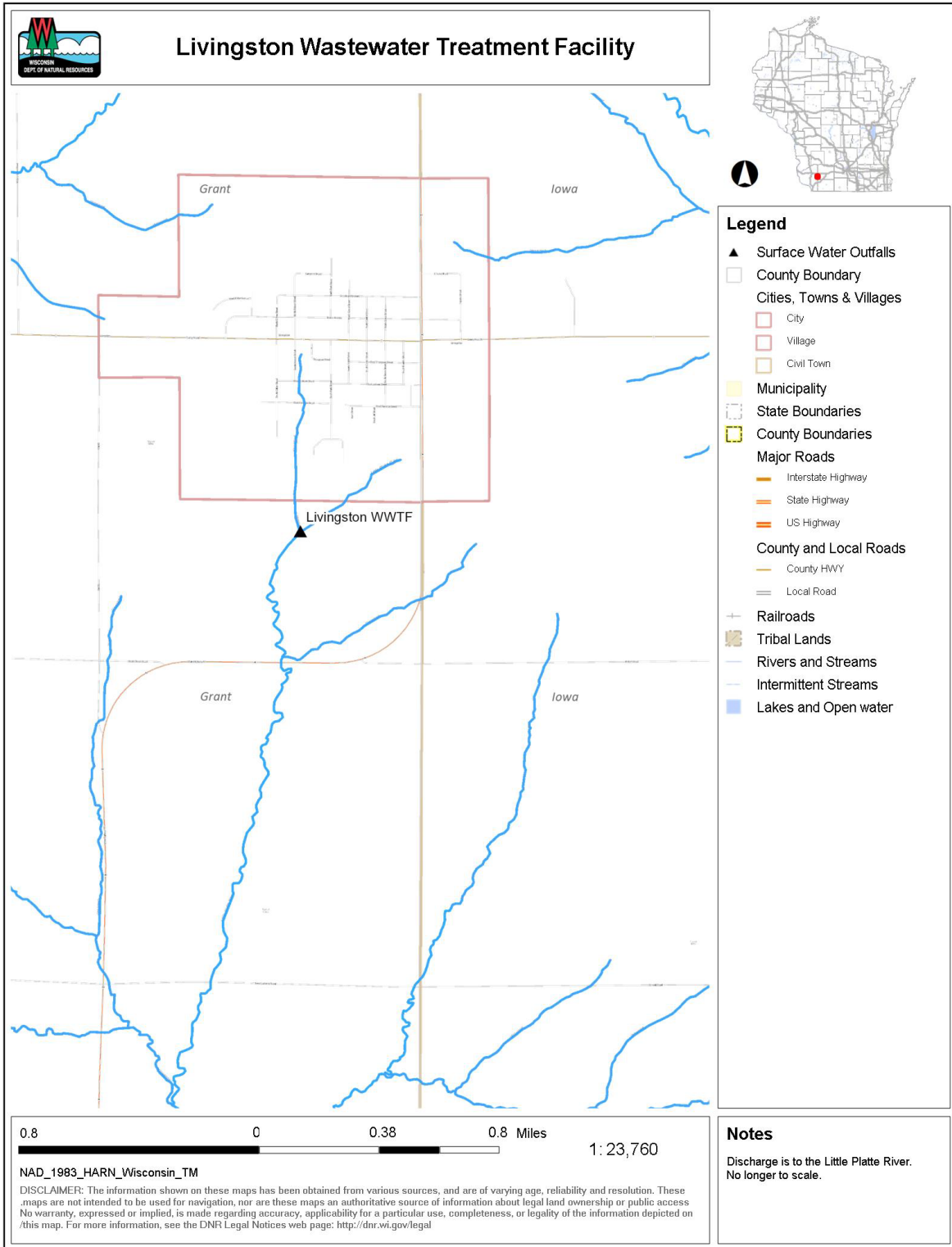
WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data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

Attachment #1

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

Guidance in Chapter 1.11 of the *WET Guidance Document* (WET Testing of Minor Municipal Discharges) was consulted. This is a minor municipal discharge (< 1.0 MGD) comprised solely of domestic wastewater, with no history of WET failures and no toxic compounds detected at levels of concern. While chemical (alum) is added to aid in phosphorus removal, the facility has approved standard operating procedures (SOP) in place. **No WET testing is recommended at this time because of the low risk in effluent toxicity.**

Attachment #2
Site Map



Ammonia Nitrogen Calculations from the WQBEL Memo Dated February 5, 2013

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

AMMONIA (as N) LIMITS		
CLASSIFICATION:	LIMITED FORAGE FISH	
EFFLUENT FLOW (mgd):	0.1	
EFFLUENT FLOW (cfs):	0.155	
MAX. EFFLUENT pH (s.u.):	8.10	
BACKGROUND INFORMATION:	<i>summer</i>	<i>winter</i>
7Q10 (cfs)	0.03	0.03
7Q2 (cfs)	0.09	0.09
Ammonia (mg/L)	0.06	0.48
Temperature (deg C)	23	3
pH (std. units)	8.21	7.97
% of river flow used:	100	100
Reference weekly flow:	0.03	0.03
Reference monthly flow:	0.0765	0.0765
CRITERIA (in mg/L):		
Acute (@ effl. pH):	6.95	6.95
4-day Chronic (@ backgrd. pH):		
early life stages present	5.60	8.06
early life stages absent	7.69	31.06
30-day Chronic (@ backgrd. pH)		
early life stages present	2.24	3.22
early life stages absent	3.08	12.42
EFFLUENT LIMITS (in mg/L):		
Weekly average		
early life stages present	6.68	9.53
early life stages absent		36.99
Monthly average		
early life stages present	3.32	4.58
early life stages absent		18.33

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

The stream flow for the coldwater section of the Little Platte River is from Station # 05414050 at SW1/4 of SW1/4 of Section 1, T4N_R1W Grant County at bridge on county Trunk A, 0.3 mile south of Arthur.

Attachment #3

AMMONIA (as N) LIMITS		
CLASSIFICATION:	COLDWATER	
EFFLUENT FLOW (mgd):	0.1	
EFFLUENT FLOW (cfs):	0.155	
MAX. EFFLUENT pH (s.u.):	8.10	
BACKGROUND INFORMATION:	<i>summer</i>	<i>winter</i>
7Q10 (cfs)	1.1	1.1
7Q2 (cfs)	1.8	1.8
Ammonia (mg/L)	0.06	0.48
Temperature (deg C)	20	3
pH (std. units)	8.21	7.97
% of river flow used:	100	100
Reference weekly flow:	1.1	1.1
Reference monthly flow:	1.53	1.53
CRITERIA (in mg/L):		
Acute (@ effl. pH):	4.64	4.64
4-day Chronic (@ backgrd. pH):		
early life stages present	3.10	6.35
30-day Chronic (@ backgrd. pH)		
early life stages present	1.24	2.54
EFFLUENT LIMITS (in mg/L):		
Weekly average		
early life stages present	24.70	48.08
Monthly average		
early life stages present	12.90	22.91

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

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

The velocity of receiving water is assumed to be 5 miles per day and the distance from the point of discharge to the classification change is approximately 1.5 miles for a travel time of 0.3 days. This equation shows that at the location where the classification change, 93% of the ammonia is remaining during summer, 98% during winter. The limits can be adjusted for decay as follows:

Ammonia Limits	Limited Forage Fish mg/L	Coldwater mg/L	Recommended Limits mg/L
May – Sept.			
Weekly average	6.68	24.7	6.7
Monthly average	3.32	12.9	3.3
Oct. – April			
Weekly average	36.99	48.08	36.99
Monthly average	18.33	22.91	18.33

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Livingston WWTF	7-Q₁₀:	0.03	cfs	Temp Dates		Flow Dates	
Outfall(s):	001	Dilution:	25%		Start:	01/03/22	10/01/18	
Date Prepared:	12/7/2023	f:	0		End:	10/31/23	10/31/23	
Design Flow (Q_e):	0.10 MGD	Stream type:	Limited forage fish community					
Storm Sewer Dist.	0 ft	Q_s:Q_e ratio:	0.0	: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	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Q _{esl}) (MGD)	Daily Maximum Flow Rate (Q _{ea}) (MGD)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)		(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	37	54	78	0.03	0.165	0.222	0	46	49	55	79
FEB	39	54	79	0.03	0.107	0.214	0	45	47	55	80
MAR	43	57	80	0.03	0.250	0.369	0	48	49	57	80
APR	50	63	81	0.03	0.118	0.139	0	49	50	64	82
MAY	59	70	84	0.03	0.214	0.234	0	56	59	70	85
JUN	64	77	85	0.03	0.142	0.168	0	63	65	77	86
JUL	69	81	86	0.03	0.220	0.366	0	65	66	81	86
AUG	68	79	86	0.03	0.112	0.134	0	65	67	79	87
SEP	63	73	85	0.03	0.362	0.510	0	66	67	73	85
OCT	55	63	83	0.03	0.481	0.573	0	67	67	63	83
NOV	46	54	80	0.03	0.195	0.212	0	57	59	54	81
DEC	40	54	79	0.03	0.133	0.156	0	51	52	55	80

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
101 S. Webster Street
Box 7921
Madison WI 53707-7921

Tony Evers, Governor
Adam N. Payne, Secretary
Telephone 608-266-2621
FAX 608-267-3579
TTY Access via relay - 711



5/22/2023

Christina Christianson
PO Box 90
Livingston, WI 53554

Subject: Conditional approval of a multi-discharger phosphorus variance
Receiving Stream: Little Platte River in Grant County
Permittee: Village of Livingston, WPDES WI-0022187

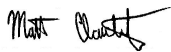
Dear Ms. Christianson:

In accordance with s. 283.16 of the Wisconsin Statutes, you have requested coverage under Wisconsin's multi-discharger phosphorus variance for the Village of Livingston Wastewater Treatment Facility in an application dated 3/12/23. Wisconsin's multi-discharger phosphorus variance was approved by EPA on February 6, 2017. Coverage under the multi-discharger phosphorus variance may only be granted to an existing source that demonstrates a major facility upgrade is necessary to achieve phosphorus compliance and the upgrade will result in economic hardship as defined in the federally approved variance. The water quality criterion for which you are seeking a variance is contained in s. NR 102.06, Wis. Adm. Code.

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

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

Sincerely,



Matt Claucherty, MDV Point Source Coordinator
Bureau of Water Quality

e-cc Gary Stuckey, Village of Livingston
Caitlin Oconnell, WDNR
Thomas Bauman, WDNR
Tim Elkins, EPA Region 5
Micah Bennett, EPA Region 5

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

Permittee Name

Village of Livingston

WPDES Permit Number

WI- 0 | 0 | 2 | 2 | 1 | 8 | 7

County

Grant

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

7. What is the current effluent level achievable?

Outfall Number(s)	Conc. (mg/L)	Method for calculation:	Does this concur with application?	
001	0.70	<input checked="" type="radio"/> 30-day P99 <input type="radio"/> Other, specify:	<input type="radio"/> Yes <input checked="" type="radio"/> No, why not: Application used different data subset	DNR staff should verify the effluent concentration value(s) provided. See Q11 on municipal form & Q12 on industrial form.

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

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

Provide Rationale:

Effluent total phosphorus data from the past three years (4/1/2020 - 3/31/2023, n=313) yield a 30-day p99 value of 0.70 mg/L. More recently, the facility has achieved effluent quality consistently below 0.4 mg/L. Treatment variability needs to be addressed before setting the interim limit at this level, however.

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

<p>9. <i>For Industries Only-</i> Where does the phosphorus in the effluent come from? (check all that apply)</p>	<p><input type="checkbox"/> Process <input type="checkbox"/> Additive Usage <input type="checkbox"/> Water supply</p> <p><i>Can intake credits be given or can the facility use an alternative water supply?</i></p> <p><input type="radio"/> Not feasible <input type="radio"/> Possibly, but further analysis needed <input type="radio"/> Not evaluated at this time</p>	<p>See Q14-15 & 19 on industrial form. If the answer is "possibly" or "not evaluated", the schedule section of the MDV permit should contain a requirement to perform this analysis.</p>
<p>10. Has this facility optimized?</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> In progress <input type="radio"/> No</p>	<p>See Q14 on municipal form & Q16 & 20 on industrial form. Facility must optimize and operate at an optimize treatment level (s. 283.16(6)(a), Wis. Stat.) If no will need compliance schedule.</p>
<p>11. Has a facility plan/compliance alternative plan been completed for the facility?</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> In progress <input type="radio"/> No</p>	<p>See Q15 on municipal form & Q17 on industrial form.</p>
<p>12. What is the projected cost for complying with phosphorus?</p> <p>Source:</p>	<p>\$ <input type="text" value="1,857,200.00"/></p> <p><input type="text" value="Site specific cost estimate - NPW"/></p>	<p>Facility must submit site-specific compliance costs. If cost projections are used from EIA, the permittee must certify that these costs are reasonable for the facility in question. See "projected compliance costs" in Section 2.02 of the MDV Implementation Guidance for details.</p>

Comments on planning efforts:

A preliminary compliance report was submitted in July 2016 and final compliance alternatives plan was submitted in August of 2017. The final alternatives plan included a discussion on chemical addition and five tertiary treatment technologies. These are still applicable as typical facility upgrades that will meet low phosphorus limits. Trading has been evaluated and may be feasible. However, at this time, trading partners have not been found. Livingston has submitted annual optimization reports during the past permit term. These discuss minor operational changes that may increase phosphorus treatment at the facility.

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

Comments on economic demonstration:

An updated tertiary filtration cost estimate was provided with the MDV application in early 2023. Capital costs totaled to \$1,500,000 with additional O&M costs of \$22,150 annually. These are in line with prior submitted costs in 2017 when inflation is applied. Capital costs financed with a 2.1% interests CWF loan over a 20 year term results in annual costs of \$91,914 for principal and interest payments. With O&M costs, \$114,064. A 93% non-commercial use rate results in residential costs of \$106,079.52. This cost, divided amongst 325 user households results in a annual average per user rate increase of \$326.40. Current rates are \$373.08, and future rates would be \$699.48. This value is 1.2% of the village's \$58,472 median household income. In Grant County with a secondary indicator score of 4, a 1% projected sewer user rate meets the primary screener. The application meets the primary screener.

15. What watershed option was selected?

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

Section 4. Watershed Plan Review

16. MDV Plan Number:

Note: This is for tracking purposes. Contact Statewide Phosphorus Implementation Coordinator for the plan number.

17. Did the point source complete Form 3200-148?

- Yes
- No

18. Is the project area in the same HUC 8 watershed as the point of discharge?

- Yes
- No. *STOP- Watershed plan must be updated.*

19. What is the annual offset required?

See Section 2.03 of the MDV implementation guidance. If this value is different from the offset target provided in form 3200-148, the watershed plan should be amended.

20. Does the plan ensure that the annual load is offset annually?

- Yes
- No. *STOP- Watershed plan must be updated.*

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

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

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

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

23. Do you have any concerns about the watershed project?

Note: Coordinate with other DNR staff as appropriate.

- Yes. *STOP- Watershed plan must be updated.*
- No.

Comments:

Section 5. Payment to the County(ies)

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

\$

See "Payment Calculator" document at [\central\water\WQWT_PROJECTS\WY_CW_Phosphorus\MDV](#).

Section 6. Determination

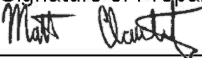
Based on the available information, the MDV application is:

- Approved
- Request for more information
- Denied

Save

Additional Justification (if needed):

Certification

Preparer Name	Title
Matt Claucherty	Water Resources Management Specialist
Signature of Preparer 	Date 5/22/2023

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

[Submit to Coordinator...](#)