# Permit Fact Sheet

## General Information

| | | |
|---|---|---|
| Permit Number: | WI-0021083-10-0 | |
| Permittee Name: | Genoa City Village | |
| Address: | 715 Walworth | |
| City/State/Zip: | Genoa City WI 53128 | |
| Discharge Location: | East bank of North Branch Nippersink Creek, 25 feet north of the state line of Wisconsin and Illinois. | |
| Receiving Water: | North Branch Nippersink Creek (White River and Nippersink Creek Watershed, Fox (IL) River Basin) in Walworth County | |
| StreamFlow ($Q_{7,10}$): | 3.9 cfs | |
| Stream Classification: | Warm water sport fish community; non-public water supply | |
| Discharge Type: | Existing, Continuous | |
| Design Flow: | Annual Average | 0.58 MGD |
| Significant Industrial Loading? | N/A | |
| Operator at Proper Grade? | Yes. Plant is rated as Basic with subclasses A1, B, C, D, L, P, and SS. | |
| Approved Pretreatment Program? | N/A | |

## Facility Description

The Village of Genoa City owns and operates a 0.58 million gallon per day annual average design flow activated sludge wastewater treatment plant. Treatment processes include mechanical fine screening, activated sludge aeration, clarification in two domed clarifiers, and ultraviolet (UV) light disinfection. Phosphorus removal is achieved by alum addition. Effluent is discharged to the North Branch of Nippersink Creek. Waste sludge from the treatment processes is stabilized in an aerobic digester, thickened with a sludge press, stored, and land applied onto Department approved agricultural fields.

## Substantial Compliance Determination

After a desk top review of all discharge monitoring reports, CMARs, compliance schedule items, and a site visit by Nick Lent on January 25, 2024, this facility has been found to be in substantial compliance with their current permit.

| Sample Point Designation | | |
|---|---|---|
| **Sample Point Number** | **Discharge Flow, Units, and Averaging Period** | **Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)** |
| 701 | 0.21 MGD (2023) | INFLUENT: 24-hour flow proportional composite samples shall be collected immediately after the Parshall flume. |
| 001 | 0.24 MGD (2020 – 2024) | EFFLUENT: 24-hour flow proportional composite samples and grab samples shall be collected at the end of plant works just prior to discharge, UV building. |
| 003 | 17 dry U.S. tons (WPDES Application, 2024) | Aerobically digested, belt press thickened, cake sludge. Samples of cake sludge shall be collected from sludge drying beds and composited. |

# 1 Influent – Monitoring Requirements

## Sample Point Number: 701- INFLUENT TO PLANT

| Monitoring Requirements and Limitations | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Limit Type** | **Limit and Units** | **Sample Frequency** | **Sample Type** | **Notes** |
| Flow Rate | | MGD | Daily | Continuous | |
| BOD5, Total | | mg/L | 3/Week | 24-Hr Flow Prop Comp | |
| Suspended Solids, Total | | mg/L | 3/Week | 24-Hr Flow Prop Comp | |

## Changes from Previous Permit:

Effluent limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section.

## Explanation of Limits and Monitoring Requirements

**Total $BOD_5$ and Total Suspended Solids:** Tracking of $BOD_5$ 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 | 18 mg/L | 3/Week | 24-Hr Flow | Limit effective May |

| Monitoring Requirements and Limitations | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Limit Type** | **Limit and Units** | **Sample Frequency** | **Sample Type** | **Notes** |
| | | | | Prop Comp | through October. |
| BOD5, Total | Weekly Avg | 25 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit effective November through April. |
| BOD5, Total | Monthly Avg | 18 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit effective May through October. |
| BOD5, Total | Monthly Avg | 25 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit effective November through April. |
| BOD5, Total | Weekly Avg | 86.5 lbs/day | 3/Week | 24-Hr Flow Prop Comp | Limit effective May through October. |
| BOD5, Total | Weekly Avg | 122 lbs/day | 3/Week | 24-Hr Flow Prop Comp | Limit effective November through April. |
| Suspended Solids, Total | Weekly Avg | 18 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit effective May through October. |
| Suspended Solids, Total | Weekly Avg | 25 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit effective November through April. |
| Suspended Solids, Total | Monthly Avg | 18 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit effective May through October. |
| Suspended Solids, Total | Monthly Avg | 25 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit effective November through April. |
| pH Field | Daily Max | 9.0 su | Daily | Grab | |
| pH Field | Daily Min | 6.0 su | Daily | 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 . Enter the result in the DMR on the last day of the month. |
| Dissolved Oxygen | Daily Min | 5.0 mg/L | 5/Week | Grab | |
| Nitrogen, Ammonia ($NH_3$-N) Total | | mg/L | 3/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 |

| Monitoring Requirements and Limitations | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Limit Type** | **Limit and Units** | **Sample Frequency** | **Sample Type** | **Notes** |
| | | | | | column on the eDMR. |
| Nitrogen, Ammonia ($NH_3$-N) Total | Daily Max - Variable | mg/L | 3/Week | 24-Hr Flow Prop Comp | Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH3-N) Total column of the eDMR. See Ammonia Limitation Section. |
| Nitrogen, Ammonia ($NH_3$-N) Total | Weekly Avg | 11 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit effective year-round. |
| Nitrogen, Ammonia ($NH_3$-N) Total | Monthly Avg | 11 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit effective November through March. |
| Nitrogen, Ammonia ($NH_3$-N) Total | Monthly Avg | 6.8 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit effective in April. |
| Nitrogen, Ammonia ($NH_3$-N) Total | Monthly Avg | 7.7 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit effective May through September. |
| Nitrogen, Ammonia ($NH_3$-N) Total | Monthly Avg | 9.8 mg/L | 3/Week | 24-Hr Flow Prop Comp | Limit effective in October. |
| Phosphorus, Total | Monthly Avg | 0.6 mg/L | 3/Week | 24-Hr Flow Prop Comp | This is an interim MDV limit effective upon permit reissuance. See the MDV/Phosphorus subsections and phosphorus schedules in permit. |
| 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 in permit for 'Appropriate Formulas' to calculate the Total Monthly Discharge in lbs/month. |
| Phosphorus, Total | | lbs/yr | Annual | Calculated | Report the sum of the total monthly discharges (for the months that the MDV is in effect) for the calendar year on the Annual report form. |
| Nitrogen, Total Kjeldahl | | mg/L | See Listed Qtr(s) | 24-Hr Flow Prop Comp | Annual in rotating quarters. See 'Nitrogen Series Monitoring' section. |
| Nitrogen, Nitrite + | | mg/L | See Listed | 24-Hr Flow | Annual in rotating quarters. See 'Nitrogen Series |

| Monitoring Requirements and Limitations | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Limit Type** | **Limit and Units** | **Sample Frequency** | **Sample Type** | **Notes** |
| Nitrate Total | | | Qtr(s) | Prop Comp | Monitoring' section. |
| Nitrogen, Total | | mg/L | See Listed Qtr(s) | Calculated | Annual in rotating quarters. See 'Nitrogen Series Monitoring' section below. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen. |
| Chloride | | mg/L | Monthly | 24-Hr Flow Prop Comp | Year-round monitoring during calendar 2027. |

## Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

**E. coli**- Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits.

**Dissolved Oxygen-** Increased sampling frequency from 3/week to 5/week.

**Ammonia Nitrogen**- A variable daily maximum limit has been added on effluent pH results.

**Phosphorus MDV:** The permittee has reapplied for a multi-discharger variance (MDV) for phosphorus for this permit term and the application has been approved by the Department. An MDV interim limit of 0.6 mg/L has been added that goes into effect upon permit reissuance. The permittee is now 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.

**Temperature**- Based on data collected in 2023, Temperature monitoring was removed from permit because there is no reasonable potential for exceeding the daily maximum limit.

**Chloride –** Updated monitoring year to 2027.

## Explanation of Limits and Monitoring Requirements

Refer to the Water Quality-Based Effluent Limitations (WQBELs) memo for the Village of Genoa City prepared by Zainah Masri dated August 21, 2024 for detailed discussions of limits and monitoring requirements.

**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 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. After evaluation, an increase in sampling frequency is warranted to align with sampling frequencies of similarly sized facilities with similar effluent quality throughout the state. The permit includes increased monitoring frequency for Dissolved Oxygen, increasing from 3/week to 5/week.

**BOD5, Total Suspended Solids and pH**- Categorical limits and WQBELs are included in the permit as outlined in ch. NR 210, Wis. Adm. Code. The effluent limitations for BOD5, Total Suspended Solids, and pH are carried over from the previous permit and are not subject to change at this time because the receiving water characteristics have not changed.

**Total Nitrogen Monitoring (NO2+NO3, TKN and Total N)-** The Department has included effluent monitoring for Total Nitrogen in the permit through the authority under §§ 283.55(1)(e), Wis. Stats., which allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source, and through s. NR 200.065(1)(h), Wis. Adm. Code, which allows for this monitoring to be collected during the permit term. More information on the justification to include total nitrogen monitoring in wastewater permits can be found in the "Guidance for Total Nitrogen Monitoring in Wastewater Permits" dated October 1, 2019. Annual tests are scheduled in the following rotating quarters: **April – June 2025; July – September 2026; October – December 2027; April – June 2028; January – March 2029.**

**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 and were to become effective as scheduled unless a variance was granted. For this permit term, the permittee has applied for the Multi-Discharger Variance (MDV) for phosphorus as provided for in s. 283.16, Wis. Stats., and approved by USEPA on February 6, 2017 for a 10-year duration. The permittee qualifies for the MDV because it is an existing source and a major facility upgrade is needed to comply with the applicable phosphorus WQBELs, thereby creating a financial burden. The interim effluent limit for total phosphorus is 0.6 mg/L as an average monthly limit.

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

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

**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.

# 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)** |
| 003 | B | Cake | Fecal Coliform | Incorporation | Land Applied | 17 Dry US 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.** | | | | | | |

## Sample Point Number: 003- Sludge from Belt Press

| Monitoring Requirements and Limitations | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Limit Type** | **Limit and Units** | **Sample Frequency** | **Sample Type** | **Notes** |
| Solids, Total | | Percent | Annual | Composite | |
| Arsenic Dry Wt | Ceiling | 75 mg/kg | Annual | Composite | |
| Arsenic Dry Wt | High Quality | 41 mg/kg | Annual | Composite | |
| Cadmium Dry Wt | Ceiling | 85 mg/kg | Annual | Composite | |
| Cadmium Dry Wt | High Quality | 39 mg/kg | Annual | Composite | |
| Copper Dry Wt | Ceiling | 4,300 mg/kg | Annual | Composite | |
| Copper Dry Wt | High Quality | 1,500 mg/kg | Annual | Composite | |
| Lead Dry Wt | Ceiling | 840 mg/kg | Annual | Composite | |
| Lead Dry Wt | High Quality | 300 mg/kg | Annual | Composite | |
| Mercury Dry Wt | Ceiling | 57 mg/kg | Annual | Composite | |
| Mercury Dry Wt | High Quality | 17 mg/kg | Annual | Composite | |
| Molybdenum Dry Wt | Ceiling | 75 mg/kg | Annual | Composite | |
| Nickel Dry Wt | Ceiling | 420 mg/kg | Annual | Composite | |
| Nickel Dry Wt | High Quality | 420 mg/kg | Annual | Composite | |
| Selenium Dry Wt | Ceiling | 100 mg/kg | Annual | Composite | |
| Selenium Dry Wt | High Quality | 100 mg/kg | Annual | Composite | |
| Zinc Dry Wt | Ceiling | 7,500 mg/kg | Annual | Composite | |
| Zinc Dry Wt | High Quality | 2,800 mg/kg | Annual | Composite | |
| Nitrogen, Total | | Percent | Annual | Composite | |

| Monitoring Requirements and Limitations | | | | | |
|---|---|---|---|---|---|
| **Parameter** | **Limit Type** | **Limit and Units** | **Sample Frequency** | **Sample Type** | **Notes** |
| Kjeldahl | | | | | |
| Nitrogen, Ammonium (NH4-N) Total | | Percent | Annual | Composite | |
| Phosphorus, Total | | Percent | Annual | Composite | |
| Phosphorus, Water Extractable | | % of Tot P | Annual | Composite | |
| Potassium, Total Recoverable | | Percent | Annual | Composite | |
| PCB Total Dry Wt | Ceiling | 50 mg/kg | Annual | Composite | Sample once during calendar year 2026. |
| PCB Total Dry Wt | High Quality | 10 mg/kg | Annual | Composite | Sample once during calendar year 2026. |
| PFOA + PFOS | | ug/kg | Annual | Calculated | Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information. |
| PFAS Dry Wt | | | Annual | Grab | Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information. |

## Changes from Previous Permit:

**PCB -** Updated monitoring year to 2026.

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

## Explanation of Limits and Monitoring Requirements

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

**PFAS-** The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA is currently developing a risk assessment to determine future land application rates and expects to release this risk assessment by the end of 2024. In the interim, the department has developed the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS".

Collecting sludge data on PFAS concentrations from a wide range of wastewater treatment facilities will help protect public health from exposure to elevated levels of PFAS and determine the department's implementation of EPA's recommendations. To quantitate this risk, PFAS sampling has been included in the proposed WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9., Wis. Adm. Code.

# 4 Schedules

## 4.1 Phosphorus Payment per Pound to County

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

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

## Explanation of Schedule

**County Payment**

Subsection 283.16(6)(b), Wis. Stats., requires permittees that have received approval for the multi-discharger variance (MDV) to implement a watershed project that is designed to reduce non-point sources of phosphorus within the HUC 8 watershed in which the permittee is located. The permittee has selected the "Payment to Counties" watershed option described in s. 283.16(8), Wis. Stats. Under this option the permittee shall make annual payment(s) to participating county(s) that are calculated based on the amount of phosphorus actually discharged during a calendar year in pounds per year less the amount of phosphorus that would have been discharged had the permittee discharged phosphorus at a target value concentration of 0.2 mg/L. The pounds of phosphorus discharged in excess of the target value is multiplied by a per

pound phosphorus charge that will equal $64.75 per pound. This schedule requires the permittee to submit Form 3200-151 to the Department indicating the total amount remitted to the participating county(s).

## 4.2 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. | 01/01/2026 |
| **Progress Report #2:** Submit a progress report on optimizing removal of phosphorus. | 01/01/2027 |
| **Progress Report #3:** Submit a progress report on optimizing removal of phosphorus. | 01/01/2028 |
| **Progress Report #4:** Submit a progress report on optimizing removal of phosphorus. | 01/01/2029 |

### Explanation of Schedule

**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.

# Special Reporting Requirements

None.

# Other Comments:

None.

# Attachments:

Water Quality Based Effluent Limitations Memo dated August 21, 2024 and prepared by Zainah Masri.
Multi-Discharger Variance Evaluation Checklist, dated September 6, 2024.
Multi-Discharger Variance Conditional Approval, dated September 6, 2024.

# Expiration Date:

December 31, 2029

# Justification Of Any Waivers From Permit Application Requirements

No waivers were requested or granted from permit application requirements.

**Prepared By:** Melanie Burns, Wastewater Specialist
**Date:** September 3, 2024
**Date Post Fact Check:** October 16, 2024 (Ammonia limits changed per request from permittee.)
**Date Post Public Notice:**

# CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: August 21, 2024

TO: Melanie Burns-Milwaukee/SER

FROM: Zainah Masri WY/3

SUBJECT: Water Quality-Based Effluent Limitations for the Village of Genoa City
WPDES Permit No. WI-0021083-10-0

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 Genoa City Village Wastewater Treatment Facility in Walworth County. This municipal wastewater treatment facility (WWTF) discharges to the North Branch Nippersink Creek located in the White Water and Nippersink River Creek Watershed in the Fox (IL) 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 | | | | | | 2 |
| $BOD_5$ | | | | | | 1,5 |
| May - October | | | 18 mg/L<br>86.5 lbs/day | **18 mg/L** | | |
| November - April | | | 25 mg/L<br>122 lbs/day | **25 mg/L** | | |
| TSS | | | | | | 1,5 |
| May - October | | | 18 mg/L | **18 mg/L** | | |
| November - April | | | 25 mg/L | **25 mg/L** | | |
| pH | 9.0 s.u. | 6.0 s.u. | | | | 1 |
| Dissolved Oxygen | | 5.0 mg/L | | | | 1 |
| Chloride | | | | | | 3 |
| Ammonia Nitrogen | | | | | | 5,6 |
| Year-round | Variable | | **11 mg/L** | | | |
| April | | | | 6.8 mg/L | | |
| May – September | | | | 7.7 mg/L | | |
| October | | | | 9.8 mg/L | | |
| November – March | | | | **11 mg/L** | | |
| Bacteria | | | | | | |
| Interim Limit<br>Fecal Coliform | | | | 400 #/100 mL<br>geometric mean | | 4 |
| Final Limit<br>*E. coli* | | | | 126 #/100 mL<br>geometric mean | | |

| Parameter | Daily Maximum | Daily Minimum | Weekly Average | Monthly Average | Six-Month Average | Footnotes |
|---|---|---|---|---|---|---|
| Phosphorus | | | | | | |
| HAC Interim Limit | | | | 0.6 mg/L | | |
| Final WQBEL | | | | 0.225 mg/L | 0.075 mg/L<br>0.36 lbs/day | 7 |
| TKN, Nitrate+Nitrite, and Total Nitrogen | | | | | | 1,8 |

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
4. Bacteria limits apply during the disinfection season of May through September. The fecal coliform interim limit will apply until the end of the compliance schedule when *E. coli* limits take effect. 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. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
6. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

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

   As an alternative; a daily maximum, weekly average and monthly average of 5.3 mg/L may be included as limits in the reissued permit year round.
7. Under the phosphorus MDV, A compliance schedule may be included in the permit until the highest attainable condition (HAC) limit of 0.6 mg/L can be met. The final WQBELs remain at 0.225 mg/L as a monthly average and 0.075 mg/L as a six-month average, as well as a respective mass limit.
8. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate ($NO_3$), nitrite ($NO_2$), and total kjeldahl nitrogen (TKN) (all expressed as N).

No WET testing is required based on Chapter 1.11 of the WET Guidance (WET Testing of Minor Municipal Discharges). This is a minor municipal (< 1.0 MGD) discharge comprised solely of domestic wastewater, with no WET failures and no toxic compounds detected at levels of concern. Because there is a very low risk of toxicity, no WET testing is recommended.

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

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

PREPARED BY: Zainah Masri, Sen. Water Resources Engineer, WY/3 Zainah Masri

APPROVED BY: Diane Figiel Date: 08/21/2024
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Water Resources Engineer

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Bryan Hartsook, Regional Wastewater Supervisor – SER/Milwaukee Office
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Kari Fleming, Environmental Toxicologist – WY/3
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

**Water Quality-Based Effluent Limitations for**
**Genoa City Village**

**WPDES Permit No. WI-0021083-10-0**

Prepared by: Zainah Masri WY/3

## PART 1 – BACKGROUND INFORMATION

### Facility Description

The Village of Genoa City owns and operates an activated sludge wastewater treatment plant. . Treatment processes include mechanical fine screening, a two-ring oxidation ditch for activated sludge treatment, clarification in two domed clarifiers, a portable dry sludge belt press thickener, and ultraviolet (UV) light disinfection. Phosphorus removal is achieved by alum addition. Effluent is discharged to the North Branch of Nippersink Creek.

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

### Existing Permit Limitations

The current permit, expiring December 2024, includes the following effluent limitations and monitoring requirements.

| Parameter | Daily Maximum | Daily Minimum | Weekly Average | Monthly Average | Six-Month Average | Footnotes |
|---|---|---|---|---|---|---|
| Flow Rate | | | | | | 3 |
| $BOD_5$<br>May-October<br><br>November- April | | | <br>18 mg/L<br>86.5 lbs/day<br>25 mg/L<br>122 lbs/day | <br>**18 mg/L**<br><br>**25 mg/L** | | 1 |
| TSS<br>May-October<br>November-April | | | <br>18 mg/L<br>25 mg/L | <br>**18 mg/L**<br>**25 mg/L** | | 1 |
| pH | 9.0 s.u. | 6.0 s.u. | | | | 1 |
| Dissolved Oxygen | | 5.0 mg/L | | | | |
| Chloride | | | | | | 3 |
| Ammonia Nitrogen<br>Year-round<br>April<br>May – September<br>October<br>November – March | <br>11 mg/L | | <br>**11 mg/L** | <br><br>6.8 mg/L<br>7.7 mg/L<br>9.8 mg/L<br>**11 mg/L** | | |
| Fecal Coliform<br>May – September | | | <br>**656#/100 mL** | <br>400#/100 mL | | |

Attachment #1

| Parameter | Daily Maximum | Daily Minimum | Weekly Average | Monthly Average | Six-Month Average | Footnotes |
|---|---|---|---|---|---|---|
| | | | **geometric mean** | geometric mean | | |
| Phosphorus<br>Interim<br>Final | | | | <br>0.7 mg/L<br>0.225 mg/L | <br><br>0.075 mg/L<br>0.36 lbs/day | 2 |
| Temperature, Maximum | | | | | | 3 |
| TKN, Nitrate+Nitrite, and Total Nitrogen | | | | | | 4 |

Footnotes:

1. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
2. A compliance schedule is in the current permit to meet the final WQBEL by December 31, 2024.
3. Monitoring only
4. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate ($NO_3$), nitrite ($NO_2$), and total kjeldahl nitrogen (TKN) (all expressed as N).

**Receiving Water Information**

- Name: North Branch of Nippersink Creek
- Waterbody Identification Code (WBIC): 742700
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-$Q_{10}$ and 7-$Q_2$ values are from USGS for Station 653114, in the North Branch of Nippersink Creek, about 0.3 miles upstream of Outfall 001.
  7-$Q_{10}$ = 3.9 cfs (cubic feet per second)
  7-$Q_2$ = 7.4 cfs
  Harmonic Mean Flow = 12.8 cfs
- Hardness = 391 mg/L as $CaCO_3$. This value represents the geometric mean of data from 04/21/1998 to 12/15/1998 from monitoring station 653114 in the North Branch of Nippersink Creek, about 0.3 miles upstream of Outfall 001.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: Metals data from the Sheboygan River at Dotyville is used for this evaluation because there is no data available for North Branch of Nippersink Creek. Sheboygan River is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations.
- Multiple dischargers: None

- Impaired water status: The receiving water is not impaired. The Fox (IL) River is downstream and

phosphors impaired.

**Effluent Information**

- Design flow rate(s):
  Annual average = 0.58 MGD (Million Gallons per Day)
  For reference, the actual average flow from January 2020 to May 2024 was 0.24 MGD
- Hardness = 416 mg/L as $CaCO_3$. This value represents the geometric mean of data (n=4) collected during the month of February 2024 from 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 for phosphorus removal and Aquahawk for polymer sludge press, both water conditioners.
- 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 and hardness.
-

**Effluent Copper Data**

| Sample Date | Copper µg/L | Sample Date | Copper µg/L | Sample Date | Copper µg/L |
|---|---|---|---|---|---|
| 02/12/2024 | 8.76 | 02/26/2024 | 10.1 | 03/11/2024 | 9.49 |
| 02/15/2024 | 10.4 | 02/29/2024 | 10.8 | 03/14/2024 | 8.69 |
| 02/19/2024 | 12.1 | 03/04/2024 | 16.8 | 03/18/2024 | 9.41 |
| 02/22/2024 | 9.36 | 03/07/2024 | 11.1 | | |
| 1-day $P_{99}$ = 17.1 µg/L | | | | | |
| 4-day $P_{99}$ = 13.6 µg/L | | | | | |

The following table presents the average concentrations and loadings at Outfall 001 from January 2020 to May 20204 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

**Parameter Averages with Limits**

| | Average Measurement | Average Mass Discharged |
|---|---|---|
| $BOD_5$ | 5.06 mg/L* | 7.38 lbs/day |
| TSS | 5.07 mg/L | |
| pH field | 7.51 s.u. | |
| Phosphorus | 0.32 mg/L | |
| Ammonia Nitrogen | 0.37 mg/L* | |

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

Attachment #1

## 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 99$^{th}$ percentile (or $P_{99}$) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

**Acute Limits based on 1-$Q_{10}$**

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-$Q_{10}$ receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

$$\text{Limitation} = \frac{(WQC)\,(Qs + (1-f)\,Qe) - (Qs - f\,Qe)\,(Cs)}{Qe}$$

Where:

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

Qs = average minimum 1-day flow which occurs once in 10 years (1-day $Q_{10}$) if the 1-day $Q_{10}$ flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day $Q_{10}$).

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

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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-$Q_{10}$ method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is the case for the Genoa City WWTF 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 for all the detected substances.

**Daily Maximum Limits based on Acute Toxicity Criteria (ATC)**

RECEIVING WATER FLOW = 3.12 cfs, (1-$Q_{10}$ (estimated as 80% of 7-$Q_{10}$)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

| SUBSTANCE | REF. HARD.* mg/L | ATC | MEAN BACK-GRD. | MAX. EFFL. LIMIT | 1/5 OF EFFL. LIMIT | MEAN EFFL. CONC. | 1-day $P_{99}$ | 1-day MAX. CONC. |
|---|---|---|---|---|---|---|---|---|
| Arsenic | | 340 | | 679.6 | 135.9 | 0.88 | | |
| Cadmium | 416 | 52.9 | 0.01 | 105.7 | 21.1 | <0.084 | | |
| Chromium | 301 | 4446 | 0.31 | 8891.1 | 1778 | <0.70 | | |
| Copper | 416 | 59.6 | 0.83 | 117.5 | | | 17.1 | 16.8 |
| Lead | 356 | 365 | 0.32 | 728.7 | 145.7 | <1.08 | | |
| Nickel | 268 | 1080 | | 2160.6 | 432 | <0.90 | | |
| Zinc | 333 | 345 | 1.18 | 687.0 | 137.4 | <26.0 | | |
| Chloride (mg/L) | | 757 | | 1514.0 | | | 429.2 | 377 |

* 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.

**Weekly Average Limits based on Chronic Toxicity Criteria (CTC)**

RECEIVING WATER FLOW = 0.975 cfs (¼ of the 7-$Q_{10}$), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

| SUBSTANCE | REF. HARD.* mg/L | CTC | MEAN BACK-GRD. | WEEKLY AVE. LIMIT | 1/5 OF EFFL. LIMIT | MEAN EFFL. CONC. | 4-day $P_{99}$ |
|---|---|---|---|---|---|---|---|
| Arsenic | | 152.2 | | 318 | 63.5 | 0.88 | |
| Cadmium | 175 | 3.82 | 0.01 | 7.96 | 1.6 | <0.084 | |
| Chromium | 301 | 325.75 | 0.31 | 679 | 135.9 | <0.70 | |
| Copper | 391 | 33.24 | 0.83 | 68.5 | | | 13.6 |
| Lead | 356 | 95.51 | 0.32 | 198.9 | 39.8 | <1.08 | |
| Nickel | 268 | 120.18 | | 251 | 50.1 | <0.90 | |
| Zinc | 333 | 344.68 | 1.18 | 718 | 143.6 | <26.0 | |
| Chloride (mg/L) | | 395 | | 824 | | | 380.2 |

* 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 = 3.2 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 | 1689 | 337.9 | <0.084 |
| Chromium (+3) | 3818000 | 0.31 | 17432197 | 3486439 | <0.70 |
| Lead | 140 | 0.32 | 638 | 127.6 | <1.08 |
| Nickel | 43000 | | 196329 | 39266 | <0.90 |

**Monthly Average Limits based on Human Cancer Criteria (HCC)**
RECEIVING WATER FLOW = 3.2 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 | | 60.7 | 12.15 | 0.88 |

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.

Copper – Considering available effluent data from the current permit term (January 2020 to December 2024), the 1-day $P_{99}$ concentration is 17.1 µg/L, with a maximum concentration of 16.8 µg/L. The maximum effluent concentration and the 1-day $P_{99}$ of the effluent data do not exceed the calculated daily maximum limit, therefore **no limit is recommended**.

Chloride – Considering available effluent data from the current permit term (January 2020 to December 2024), the 1-day $P_{99}$ chloride concentration is 429.2 mg/L, and the 4-day $P_{99}$ of effluent data is 380.2 mg/L. These effluent concentrations are below the calculated WQBELs for chloride, therefore **no effluent limits are required**. **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 Genoa City WWTF is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3., Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, "there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5)." A review of the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from September 2020 to August 2023 was 0.25 mg/kg, with a maximum reported concentration of 0.55 mg/kg. Therefore, **no mercury monitoring is recommended at Outfall 001.**

PFOS and PFOA– The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. 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. Because of the lack of nondomestic contributions, **no monitoring is required during the current permit term.** 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, 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.

**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:

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

Where:

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

The effluent pH data was examined as part of this evaluation. A total of 1612 sample results were reported from January 2020 to May 2024. The maximum reported value was 9.0 s.u. (Standard pH Units). The effluent pH was 8.6 s.u. or less 99% of the time. The 1-day $P_{99}$, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.1 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.6 s.u. Therefore, a value of 8.6 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.6 s.u. into the equation above yields an ATC = 2.65 mg/L.

**Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method**
In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are calculated using the 1-$Q_{10}$ receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-$Q_{10}$ (estimated as 80 % of 7-$Q_{10}$) and the 2×ATC approach are shown below.

**Daily Maximum Ammonia Nitrogen Determination**

| | Ammonia Nitrogen Limit mg/L |
|---|---|
| 2×ATC | 5.3 |
| 1-$Q_{10}$ | 28.8 |

The 2×ATC method yields the most stringent limits for Genoa City WWTF.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values.

**Daily Maximum Ammonia Nitrogen Limits – WWSF, WWFF & LFF**

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

**Weekly Average & Monthly Average Limits based on Chronic Toxicity Criteria (CTC)**
Weekly and monthly average limits based on chronic toxicity criteria for ammonia are also calculated to determine the weekly and monthly average limits to meet the requirements of s. NR 106.07(3). The current permit does not have any weekly limits and has monthly limits for April through October. Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria.

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

**Effluent Data**
The following table evaluates the statistics based upon ammonia data reported from January 2020 to May 2024 with those results being compared to the calculated limits to determine the need to include ammonia limits in the Village of Genoa City WWTF permit for the respective month ranges. That need is determined by calculating 99$^{th}$ upper percentile (or $P_{99}$) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

**Ammonia Nitrogen Effluent Data**

| Ammonia Nitrogen mg/L | April - May | June - September | October - March |
|---|---|---|---|
| 1-day $P_{99}$ | 1.6 | 3.2 | 1.4 |
| 4-day $P_{99}$ | 0.9 | 1.7 | 0.8 |
| 30-day $P_{99}$ | 0.49 | 0.84 | 0.46 |
| Mean* | 0.32 | 0.49 | 0.33 |
| Std | 0.34 | 0.67 | 0.28 |
| Sample size | 132 | 211 | 355 |
| Range | <0.211 - 1.88 | 0.07 - 5.14 | <0.072 - 2.15 |

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

The permit currently has daily maximum limits as well as weekly and monthly limits yearround. Where there are existing ammonia nitrogen limits in the permit, the limits must be retained regardless of reasonable potential, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

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

**Conclusions and Recommendations**

In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm Code.

**Final Ammonia Nitrogen Limits**

| | Daily Maximum mg/L | Weekly Average mg/L | Monthly Average mg/L |
|---|---|---|---|
| April | 5.3 | 11* | 6.8 |
| May – September | 5.3 | 11* | 7.7 |
| October | 5.3 | 11* | 9.8 |
| November – March | 5.3 | 11* | 11* |

* These are limits from the current permit to meet the requirements in s. NR 106.07, Wis. Adm Code. Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, are addressed in the expression of limits section of this memo.

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

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

Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

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

*E. coli* monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Because the Genoa City WWTF 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.** The permit will include a compliance schedule to meet these limits.

**Interim Limit**

At this time, there is no effluent *E. coli* data available to determine if these limits are currently met. The permit will include a compliance schedule to meet these limits. During the compliance schedule, an interim limit applies to prevent back-sliding from the current level of disinfection during the compliance schedule period. Therefore, the current **fecal coliform limit shall be included in the reissued permit as an interim limit of 400 counts/100 mL as a monthly geometric mean**. Any weekly geometric mean limit which was included in the current permit for expression of limits purposes does not need to be included in the permit as an interim limit.

## PART 5 – PHOSPHORUS

**Technology-Based Effluent Limit**

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of Total Phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit. Because the Genoa City permit currently has a limit of 1.0 mg/L, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent water quality-based concentration limit is given. 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 ch. NR 102 (s. NR 102.06), which establish phosphorus standards for surface waters. Revisions to ch. NR 217 (s. NR 217, Subchapter III) establish procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102.

Section NR 102.06(3)(a) 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), 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 North Branch of Nippersink Creek.

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):

$$\text{Limitation} = [(WQC)(Qs+(1-f)\ Qe) - (Qs-f\ Qe)\ (Cs)]/Qe$$

Where:

WQC = 0.075 mg/L for North Branch of Nippersink Creek
Qs = 100% of the 7-$Q_2$ of 7.40 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 = 0.58 MGD = 0.90 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 equal the median of at least four samples collected during the

months of May through October, and that all samples collected during a 28-day period shall be considered as a single sample and the average of these concentrations used to determine a median. Averaging begins at date of the first sample in the range of May through October.

A previous evaluation resulted in a WQBEL of 0.075 mg/L. A background concentration wasn't used because of insufficient data but based on the data that was collected upstream (0.071 mg/L and 0.276 mg/L), it was assumed that the water quality criteria was exceeded at the point of discharge. Section NR 217.13(2)(d) states that the determination of upstream concentrations shall be evaluated at each permit reissuance. Additional data were considered in estimating the background phosphorus concentration.

Genoa City WWTF conducted their own instream phosphorus sampling upstream of the facility's outfall. The samples collected are shown in the table below:

**Ambient Phosphorus Data**

| Sample Date | Ambient Phosphorus mg/L | Sample Date | Ambient Phosphorus mg/L | Sample Date | Ambient Phosphorus mg/L |
|---|---|---|---|---|---|
| 01/31/2018 | 1.0 | 07/06/2018 | 6.0 | 03/20/2018 | 1.7 |
| 02/28/2018 | 0.04 | 08/15/2018 | 0.49 | 04/18/2019 | 1.1 |
| 03/21/2018 | 3.8 | 09/26/2018 | 1.2 | 05/15/2019 | 0.04 |
| 04/25/2018 | 1.6 | 10/29/2018 | 0.95 | 06/19/2019 | 0.04 |
| 05/23/2018 | 0.66 | 12/13/2018 | 0.53 | | |
| Ch. NR 217 median (May – October) = 0.66 | | | | | |

The median concentration for samples that were collected between May and October is 0.66 mg/L which is greater than the water quality criteria of 0.075 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 water quality-based effluent limitation 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 January 2020 to May 2024.

| | Phosphorus mg/L |
|---|---|
| 1-day $P_{99}$ | 0.8 |
| 4-day $P_{99}$ | 0.5 |
| 30-day $P_{99}$ | 0.39 |
| Mean | 0.32 |
| Std | 0.16 |
| Sample Size | 687 |
| Range | 0.017 - 2.02 |

**Reasonable Potential Determination**
The calculated WQBEL of 0.075 mg/L is less than the current technology-based limit of 1.0 mg/L, so the WQBEL should be included in the permit per s. NR 217.15(2), Wis. Adm. Code.

In accordance with s. NR 217.15(2), Wis. Adm. Code, there is reasonable potential for the discharge to cause or contribute to an exceedance of the water quality criteria. The data suggest that a compliance schedule will be necessary for the facility to meet the given phosphorus limits.

**Limit Expression**
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 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**
Because the discharge is upstream to a surface water that is phosphorus impaired, a mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.58 MGD = 0.36 lbs/day expressed as a six-month average.**

**Multi-Discharge Variance Interim Limit**
Genoa City WWTF has applied for the phosphorus multi-discharger variance (MDV). Conditions of the phosphorus MDV require the facility to comply with an interim phosphorus limit in lieu of meeting the final WQBEL. Section 283.16 (6) 1, Wis. Stats. requires an interim limit of 0.6 mg/L as a monthly average for the second permit term under the MDV. However, if 0.6 mg/L does not represent the highest attainable condition, a more stringent limit should be met by the end of the permit term pursuant s. 283.16 (7), Wis. Stats. The effluent data indicates that 4-day $P_{99}$ value of 0.5 mg/L is a level currently achievable (LCA) for the discharge. **A limit of 0.6 mg/L as a monthly average** should be effective upon permit reissuance.

**TMDL Under Development**
A Total Maximum Daily Load (TMDL) is being developed for the Fox (IL) River for phosphorus. The TMDL will address phosphorus water quality impairments within the basins and provide waste load allocations (WLA) required to meet water quality standards. This TMDL will likely result in phosphorus limitations that must be included in WPDES permits, which may be different than those calculated in this WQBEL memo. TMDL-derived phosphorus limits may be included in lieu of or in addition to the calculated limits upon permit reissuance or modification once the TMDL has been approved by U.S. EPA, according to s. NR 217.16, Wis. Adm. Code.

## PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from January 1, 2020 to December 27, 2023.

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

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

The data was reported on the DMR's in Celsius and were converted to Fahrenheit in the table below.

**Reasonable Potential**
Based on the available discharge temperature data from February 2023 to December 2023 shown above, the maximum daily effluent temperature reported was 74 °F; therefore, no reasonable potential for exceeding the daily maximum limit exists, and **no limits or monitoring are recommended**.

Attachment #1

**Monthly Temperature Effluent Data & Limits**

| Month | Representative Highest Monthly Effluent Temperature | | Calculated Effluent Limit | |
|---|---|---|---|---|
| | Weekly Maximum (°F) | Daily Maximum (°F) | Weekly Average Effluent Limitation (°F) | Daily Maximum Effluent Limitation (°F) |
| JAN | - | - | 73 | 120 |
| FEB | 49 | 50 | 77 | 120 |
| MAR | 50 | 50 | 72 | 120 |
| APR | 57 | 57 | 64 | 105 |
| MAY | 64 | 64 | 72 | 101 |
| JUN | 68 | 70 | 90 | 107 |
| JUL | 69 | 72 | 101 | 109 |
| AUG | 70 | 74 | 104 | 110 |
| SEP | 59 | 61 | 96 | 118 |
| OCT | 54 | 57 | 85 | 120 |
| NOV | 56 | 59 | 70 | 120 |
| DEC | 60 | 72 | 81 | 120 |

## PART 6 – WHOLE EFFLUENT TOXICITY (WET)

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

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

## PART 7 – EXPRESSION OF LIMITS

Revisions to chs. NR 106 and 205, Wis. Adm. Code, align Wisconsin's WQBELs with 40 CFR 122.45(d), which requires WPDES permits 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.

Genoa City WWTF is a municipal treatment facility and is therefore subject to weekly average and monthly average limitations whenever limitations are determined to be necessary.

This evaluation provides additional limitations necessary to comply with the expression of limits in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code. Pollutants already compliant with these rules or that have an approved impracticability demonstration, are excluded from this evaluation including water-quality based effluent limitations for phosphorus, temperature, pH, and *E. coli* among other parameters. Mass limitations are not subject to the limit expression requirements if concentrations limits are given.

**Method for Calculation**

The methods for calculating limitations for continuous discharges subject to ch. NR 210 to conform to 40 CFR 122.45(d) are specified in s. NR 106.07(3), Wis. Adm. Code, and are as follows:

1. Whenever a daily maximum limitation is determined necessary to protect water quality, a weekly and monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality.
2. Whenever a weekly average limitation is determined necessary to protect water quality, a monthly average limitation shall also be included in the permit and set equal to the weekly average limit unless a more restrictive limit is already determined necessary to protect water quality.
3. Whenever a monthly average limitation is determined necessary to protect water quality, a weekly average limit shall be calculated using the following procedure and included in the permit unless a more restrictive limit is already determined necessary to protect water quality:

   Weekly Average Limitation = (Monthly Average Limitation × MF)

   Where:

   MF= Multiplication factor as defined in Table 1

   CV= coefficient of variation (CV) as calculated in s. NR 106.07(5), Wis. Adm. Code.

   n= the number of samples per month required in the permit

s. NR 106.07(3)€4, Table 1, Wis. Adm. Code — Multiplication Factor (for CV = 0.6)

| CV | n=1 | n=2 | n=3 | **n=4** | n=8 | n=12 | n=16 | n=20 | n=24 | n=30 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.6 | 1.00 | 1.31 | 1.51 | **1.64** | 1.95 | 2.12 | 2.23 | 2.30 | 2.36 | 2.43 |

Note: This methodology is based on the *Technical Support Document for Water Quality-based Toxics Control* (March 1991). PB91-127415.

Ammonia: The existing daily maximum limit of 5.3 mg/L is lower than the calculated weekly average limits year-round and lower than the calculated monthly average limit for November – March. Therefore, the limit of 5.3 mg/L is recommended for the weekly average limits year-round and the monthly average limit for November – March.

**Summary of Additional Limitations:**

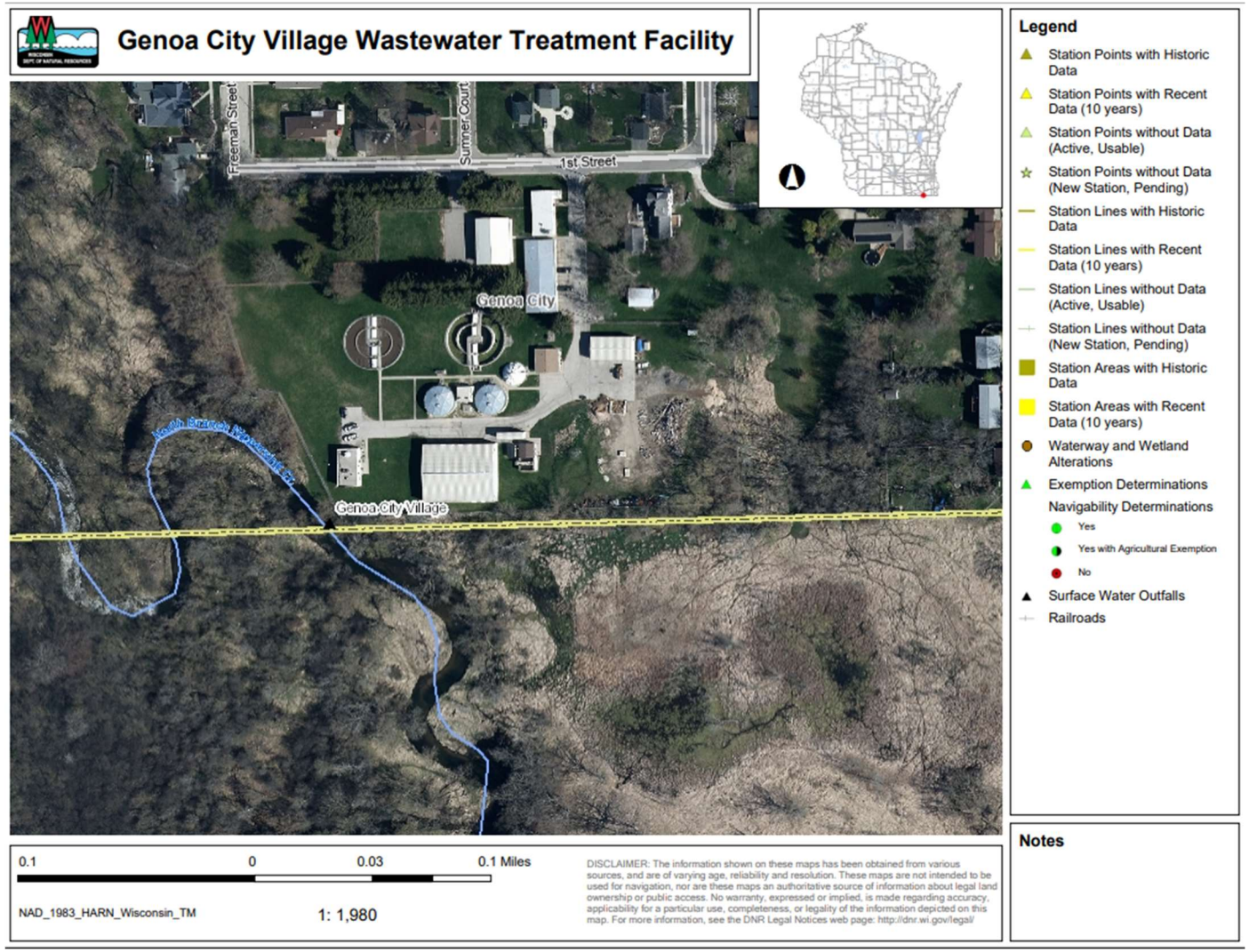
In conclusion, the following additional limitations are required to comply with ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code.

Attachment #1

**Expression of Limits Summary**

| Parameter | Daily Maximum | Weekly Average | Monthly Average |
|---|---|---|---|
| Ammonia Nitrogen | | | |
| April | 5.3 mg/L | **5.3 mg/L** | **5.3 mg/L** |
| May – September | 5.3 mg/L | **5.3 mg/L** | **5.3 mg/L** |
| October | 5.3 mg/L | **5.3 mg/L** | **5.3 mg/L** |
| November – March | 5.3 mg/L | **5.3 mg/L** | **5.3 mg/L** |

**Site Map:**


Genoa City Village Wastewater Treatment Facility
Freeman Street
Sumner Court
1st Street
Genoa City
Genoa City Village
Legend
Station Points with Historic Data
Station Points with Recent Data (10 years)
Station Points without Data (Active, Usable)
Station Points without Data (New Station, Pending)
Station Lines with Historic Data
Station Lines with Recent Data (10 years)
Station Lines without Data (Active, Usable)
Station Lines without Data (New Station, Pending)
Station Areas with Historic Data
Station Areas with Recent Data (10 years)
Waterway and Wetland Alterations
Exemption Determinations
Navigability Determinations
Yes
Yes with Agricultural Exemption
No
Surface Water Outfalls
Railroads
Notes
0.1
0
0.03
0.1 Miles
NAD_1983_HARN_Wisconsin_TM
1: 1,980
DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: http://dnr.wi.gov/legal/

Attachment #3

Ammonia Nitrogen Calculations from previous WQBEL memo dated September 24,2019:

| | | April | May-Sept | October | Nov-March |
|---|---|---|---|---|---|
| **Effluent Flow** | Qe (MGD) | 0.58 | 0.58 | 0.58 | 0.58 |
| **Background Information** | 7-$Q_{10}$ (cfs) | 3.90 | 3.90 | 3.90 | 3.90 |
| | 7-$Q_2$ (cfs) | 7.40 | 7.40 | 7.40 | 7.40 |
| | Ammonia (mg/L) | 0.09 | 0.07 | 0.09 | 0.25 |
| | Temperature (°C) | 9 | 18 | 10 | 2 |
| | Temperature (°F) | 48 | 64 | 50 | 36 |
| | pH (s.u.) | 7.71 | 7.71 | 7.73 | 7.69 |
| | % of Flow used | 25 | 100 | 25 | 25 |
| | Reference Weekly Flow (cfs) | 0.975 | 3.9 | 0.975 | 0.975 |
| | Reference Monthly Flow (cfs) | 1.57 | 6.29 | 1.57 | 1.57 |
| **Criteria mg/L** | 4-day Chronic | | | | |
| | Early Life Stages Present | 8.85 | 5.82 | | |
| | Early Life Stages Absent | | | 11.6 | 14.7 |
| | 30-day Chronic | | | | |
| | Early Life Stages Present | 3.54 | 2.33 | | |
| | Early Life Stages Absent | | | 4.63 | 5.87 |
| **Effluent Limitations mg/L** | Weekly Average | | | | |
| | Early Life Stages Present | 18.4 | 30.8 | | |
| | Early Life Stages Absent | | | 24.1 | 30.4 |
| | Monthly Average | | | | |
| | Early Life Stages Present | 9.58 | 18.2 | | |
| | Early Life Stages Absent | | | 12.6 | 15.7 |

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

# Multi-Discharger Variance Application Evaluation Checklist

Form 3200-145 (R 5/16) 

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

Permittee Name

Village of Genoa City

| WPDES Permit Number | County |
|---|---|
| **WI-** 0 \| 0 \| 2 \| 1 \| 0 \| 8 \| 3 | Walworth |

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

7. What is the current effluent level achievable?

| Outfall Number(s) | Conc. (mg/L) | Method for calculation: | Does this concur with application? | |
|---|---|---|---|---|
| 001 | 0.43 | (•) 30-day P99<br>( ) Other, specify: | ( ) Yes<br>(•) 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?

0.5 mg/L as a monthly average, pursuant to s. 283.16(7), Wis. Stats.
Target Value = 0.2 mg/L

Provide Rationale:

The past three years' total phosphorus effluent data (7/1/2021 - 6/30/2024, n=467) yields a 30-day P99 value of 0.43 mg/L. A rounded monthly average limit of 0.5 mg/L represents highest attainable condition for this permit term.

*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.*

Save

| | | |
|---|---|---|
| 9. *For Industries Only*- Where does the phosphorus in the effluent come from? (check all that apply) | ☐ Process<br>☐ Additive Usage<br>☐ Water supply<br>*Can intake credits be given or can the facility use an alternative water supply?*<br>◯ Not feasible<br>◯ Possibly, but further analysis needed<br>◯ Not evaluated at this time | *See Q14-15 & 19 on industrial form. If the answer is "possibly" or "not evaluated", the schedule section of the MDV permit should contain a requirement to perform this analysis.* |
| 10. Has this facility optimized? | ◉ Yes<br>◯ In progress<br>◯ No | *See Q14 on municipal form & Q16 & 20 on industrial form. Facility must optimize and operate at an optimize treatment level (s. 283.16(6)(a), Wis. Stat.)If no will need compliance schedule.* |
| 11. Has a facility plan/compliance alternative plan been completed for the facility? | ◉ Yes<br>◯ In progress<br>◯ No | *See Q15 on municipal form & Q17 on industrial form.* |
| 12. What is the projected cost for complying with phosphorus?<br>Source: | $ 4,240,000.00<br>Manufacturers quote from FCAP; adjusted via ENR construction cost index | *Facility must submit site-specific compliance costs. If cost projections are used from EIA, the permittee must certify that these costs are reasonable for the facility in question. See "projected compliance costs" in Section 2.02 of the MDV Implementation Guidance for details.* |

Comments on planning efforts:

The facility submitted a Final Compliance Alternatives Plan, Dated December 2018, prepared by Applied Technologies. Regionalization was evaluated with capital costs at $2,680,000.00. Alternative discharge location was evaluated and deemed not feasible due to similar phosphorus standards in other water bodies. Adaptive Management was evaluated by reviewing eligibility of the facility and required load reduction in the water body. The value of roughly 10,000 lbs/yr of needed P reduction was deemed too high to achieve given facility resources. Water quality trading was deemed currently infeasible due to lack of partners. Two site specific estimates for treatment technology installation to meet the WQBEL were provided, Disc Filtration and Reactive Sand Filtration. Disc Filtration is used in the economic demonstration, with initial compliance costs updated based on the ENR Construction Cost Index.

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

Comments on economic demonstration:

Updated compliance costs for tertiary disc filtration are $3,762,000 (capital costs) and $63,000 (annual costs). Assuming CWFP financing of capital costs at a 20-year term, the total annual costs are $307,000, and the 89% residential share of these costs is $273,230. This cost, divided amongst 1034 user households results in a per-user increase of $264.24. Current sewer user rates are $737.68 as an annual average, and future sewer user rates would average $1001.93 annually. This value is 1.39% of Genoa's $72,115 median household income. In Walworth County with a secondary score of 3, sewer rates at 1% of MHI meet the primary screener. The primary screener is met.

Save

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:<br>*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<br>( ) No |
| 18. Is the project area in the same HUC 8 watershed as the point of discharge? | ( ) Yes<br>( ) No. *STOP- Watershed plan must be updated.* |
| 19. What is the annual offset required?<br>*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<br>( ) 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?<br>*Note: Coordinate with other DNR staff as appropriate.* | ( ) Yes. *STOP- Watershed plan must be updated.*<br>( ) No. |

Comments:

## Section 5. Payment to the County(ies)

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

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

## Section 6. Determination

Based on the available information, the MDV application is:

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

Save

Additional Justification (if needed):

| Certification | | |
|---|---|---|
| Preparer Name<br>Matt Claucherty | Title<br>Water Resources Management Specialist | |
| Signature of Preparer Sign Clear | | Date<br>9/6/2024 |

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

Save

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

**Tony Evers, Governor**

**Telephone 608-266-2621**
**FAX 608-267-3579**
**TTY Access via relay - 711**

WISCONSIN DEPT. OF NATURAL RESOURCES

9/6/2024

John Cole, Public Works Superintendent
PO Box 428
Genoa City, WI 53128

Subject: Conditional approval of a multi-discharger phosphorus variance
Receiving Stream: Nippersink Creek in Walworth County
Permittee: Genoa City Village, WPDES WI-0021083

Dear Mr. Cole:

In accordance with s. 283.16 of the Wisconsin Statutes, you have requested coverage under Wisconsin's multi-discharger phosphorus variance for the Genoa City Wastewater Treatment Plant in an application dated 7/26/2024. Wisconsin's multi-discharger phosphorus variance was approved by EPA on February 6, 2017. Coverage under the multi-discharger phosphorus variance may only be granted to an existing source that demonstrates a major facility upgrade is necessary to achieve phosphorus compliance and the upgrade will result in economic hardship as defined in the federally approved variance. The water quality criterion for which you are seeking a variance is contained in s. NR 102.06, Wis. Adm. Code.

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

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

Sincerely,

Matt Claucherty, MDV Point Source Coordinator
Bureau of Water Quality

e-cc Nick Lent, WDNR
Melanie Burns, WDNR
Tim Elkins, EPA Region 5
Micah Bennett, EPA Region 5