CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: September 19, 2024

TO: Holly Heldstab – WCR/Eau Claire

FROM: Benjamin Hartenbower – WCR/Eau Claire

SUBJECT: Water Quality-Based Effluent Limitations for the Elroy Wastewater Treatment Facility
WPDES Permit No. WI-0023931

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

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
BOD_5			45 mg/L	30 mg/L	1
TSS			45 mg/L	30 mg/L	1
pH	9.0 s.u.	6.0 s.u.			1
Ammonia Nitrogen April to May June to September October to March	 Variable Variable Variable		 70 mg/L 76 mg/L 53 mg/L	 31 mg/L 34 mg/L 24 mg/L	1,2,3
E.Coli				126 #/100 mL geometric mean	4
Temperature					
Phosphorus TMDL Limit				 1.36 lbs/day	6
TKN, Nitrate+Nitrite, and Total Nitrogen					7
Chronic WET				5.6 TUc	8,9

Footnotes:

1. No changes from the current permit.

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2. The variable daily maximum ammonia nitrogen limit table corresponding to effluent pH values. These limits apply year-round.

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

3. 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.
4. Bacteria limits apply during the disinfection season of May - September. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. Temperature monitoring for at least one year.
6. The phosphorus mass limit is based on the Total Maximum Daily Load (TMDL) for the Wisconsin River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA on April 26, 2019 with site-specific criteria approved by EPA on July 9, 2020.
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 (NO_3), nitrite (NO_2), and total kjeldahl nitrogen (TKN) (all expressed as N).
8. Annual chronic WET tests are recommended in the reissued permit. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).
9. The Instream Waste Concentration (IWC) to assess chronic test results is 18%. According to the State of Wisconsin Aquatic Life Toxicity Testing Methods Manual (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 30%, 10%, 3% & 1% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the Baraboo River.

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

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

PREPARED BY: _____ Date: 09/19/2024

Benjamin Hartenbower, PE,
Water Resources Engineer

E-cc:

Tanner Connors,Wastewater Engineer – SCR/Fitchburg
Geisa Thielen, Regional Wastewater Supervisor – WCR/Eau Claire
Diane Figiel, Water Resources Engineer – WY/3
Kurt Rasmussen, Water Quality Biologist – WCR/La Crosse
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for the Elroy Wastewater Treatment Facility WPDES Permit No. WI-0023931

Prepared by: Benjamin P. Hartenbower

PART 1 – BACKGROUND INFORMATION

Facility Description:
The Elroy Wastewater Treatment Facility treats domestic and commercial wastewater from the City of Elroy, industrial wastewater from Brunner Manufacturing (a plating company that has its own pretreatment) and digested municipal sludge from and the Villages of Kendall, Wonewoc and Union Center. The annual average design flow for this facility is 0.333 million gallons per day (MGD). Wastewater treatment involves fine screening, grit removal system, activated sludge by use of an oxidation ditch and final clarification. The effluent is disinfected via ultraviolet light prior to its discharge over a cascade aerator to the Baraboo River.

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

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
BOD_5			45 mg/L	30 mg/L	1
TSS			45 mg/L	30 mg/L	1
pH	9.0 s.u.	6.0 s.u.			1
Ammonia Nitrogen April - May June - September October - March	 Variable Variable Variable		 70 mg/L 76 mg/L 53 mg/L	 31 mg/L 34 mg/L 24 mg/L	2,3
Fecal Coliform May - September			**780 #/100 mL geometric mean**	400 #/100 mL geometric mean	3
Phosphorus Interim TMDL Limit				 3.70 mg/L 1.36 lbs/day	4
TKN, Nitrate+Nitrite, and Total Nitrogen					5
Acute WET					6
Chronic WET					7

Footnotes:

1. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.

2. The variable daily maximum ammonia nitrogen limit table corresponding to effluent pH values. These limits apply year-round.

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	108	7.0 < pH ≤ 7.1	66	8.0 < pH ≤ 8.1	14
6.1 < pH ≤ 6.2	106	7.1 < pH ≤ 7.2	59	8.1 < pH ≤ 8.2	11
6.2 < pH ≤ 6.3	104	7.2 < pH ≤ 7.3	52	8.2 < pH ≤ 8.3	9.4
6.3 < pH ≤ 6.4	101	7.3 < pH ≤ 7.4	46	8.3 < pH ≤ 8.4	7.8
6.4 < pH ≤ 6.5	98	7.4 < pH ≤ 7.5	40	8.4 < pH ≤ 8.5	6.4
6.5 < pH ≤ 6.6	94	7.5 < pH ≤ 7.6	34	8.5 < pH ≤ 8.6	5.3
6.6 < pH ≤ 6.7	89	7.6 < pH ≤ 7.7	29	8.6 < pH ≤ 8.7	4.4
6.7 < pH ≤ 6.8	84	7.7 < pH ≤ 7.8	24	8.7 < pH ≤ 8.8	3.7
6.8 < pH ≤ 6.9	78	7.8 < pH ≤ 7.9	20	8.8 < pH ≤ 8.9	3.1
6.9 < pH ≤ 7.0	72	7.9 < pH ≤ 8.0	16.8	8.9 < pH ≤ 9.0	2.6

3. Additional limits to comply with the expression of limits requirements are included in bold.
4. A compliance schedule is in the current permit to meet the TMDL Limit by January 1, 2022.
5. Monitoring only.
6. Acute WET testing required: Jan - March 2021 and Apr - June 2024.
7. Chronic WET testing required: Jan - March 2021 and Apr - June 2024. The IWC for chronic WET was 18%.

Receiving Water Information

- Name: Baraboo River
- Waterbody Identification Code (WBIC): 1271100
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: USGS for Station 05405080 at the Baraboo River in Elroy, where Outfall 001 is located.

  $7\text{-}Q_{10}$ = 9.60 cfs (cubic feet per second)
  $7\text{-}Q_2$ = 13.0 cfs

  Harmonic Mean Flow = 24.0 cfs using a drainage area of 59.4 mi^2.
  The Harmonic Mean has been estimated based on average flow and the $7\text{-}Q_{10}$ using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).
- Hardness = 167 mg/L as $CaCO_3$. This value represents the geometric mean of 18 samples collected in the Baraboo River from 07/29/1992 to 02/02/2021.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: Chloride data is from the Baraboo River. Metals data from the Kickapoo River at Oil City 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: There are other dischargers to the Baraboo River, however they are not in the immediate vicinity and the mixing zones do not overlap. Therefore, the other dischargers do not impact this evaluation.
- Impaired water status: This discharge is located within the WI River TMDL for phosphorus.

Effluent Information:

- Design Flow Rates(s):
  Annual Average = 0.333 MGD (Million Gallons per Day)
  For reference, the actual average flow from January 2020 to June 2024 was 0.162 MGD.
- Hardness = 171 mg/L as $CaCO_3$. This value represents the geometric mean of 4 effluent samples collected from 10/23/2023 to 11/02/2023.
- Acute dilution factor used in accordance with s. NR 106.06 (3) (c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water Source: Domestic wastewater with water supply from wells.
- Additives: None
- Total Phosphorus Wasteload Allocation: 344 lbs/year = 0.942 lbs/day
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus Chloride and Hardness. The permit-required monitoring for Ammonia Nitrogen and Phosphorus from January 2020 to June 2024 is used in this evaluation.

Chemical Specific Effluent Data at Outfall 001

Sample Date	Copper µg/L	Sample Date	Chloride mg/L
10/02/2023	10.8	03/08/2006	150
10/05/2023	11.2	05/11/2006	230
10/08/2023	24.2	07/25/2006	220
10/11/2023	10.1	07/27/2017	267
10/14/2023	8.6	07/31/2017	167
10/17/2023	9.3	08/03/2017	397
10/20/2023	8.2	08/07/2017	229
10/23/2023	9.3	10/23/2023	310
10/26/2023	11.1	10/26/2023	630
10/30/2023	13.1	10/30/2023	290
11/22/2023	13.2	11/22/2023	530
1-day P_{99}	25.74	1-day P_{99}	816
4-day P_{99}	17.85	4-day P_{99}	527

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.”.

The following table presents the average concentrations and loadings at Outfall 001 from January 2020 to June 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6):

Parameter Averages with Limits

	Average Measurement	Average Mass Discharged
BOD_5	4.2 mg/L*	
TSS	3.6 mg/L*	
pH	7.29 s.u.	
Ammonia Nitrogen	1.32 mg/L*	
Fecal Coliform	6#/100 mL	
Phosphorus	0.76 mg/L*	1.08 lbs/day

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

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

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

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

Acute Limits based on 1-Q_{10}

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

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

Where:

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

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

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

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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q_{10} method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for the Elroy Wastewater Treatment Facility and the limits are set based on two times the acute toxicity criteria.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 7.7 cfs, (1-Q_{10} (estimated as 80% of 7-Q_{10})), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD. mg/L	ATC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Arsenic		340		680	136	<7.7		
Cadmium	171	19.0	0.025	38.1	7.6	<0.41		
Chromium (+3)	171	2796	0.836	5591	1118	20.3		
Copper	171	25.7	1.1	51.4			25.7	24.2
Lead	171	179	0.950	359	72	2.4		
Nickel	171	738		1476	295	10.7		
Zinc	171	192	2.9	385	77	37.30		
Chloride		757	15.9	1514			816	630

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

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 2.4 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	MAX. EFFL. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		152		861	172	<7.7	
Cadmium	167	3.7	0.0253	20.7	4.1	<0.41	
Chromium (+3)	167	201	0.836	1132	226	20.3	
Copper	167	16.0	1.093	85.6			17.9
Lead	167	46	0.9501	255	51	2.4	
Nickel	167	80		455	91	10.7	
Zinc	167	188	2.935	1051	210	37.30	
Chloride		395	15.9	2161			527

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 = 6.0 cfs (¼ of the Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MAX. EFFL. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P_{99}
Cadmium	370.0	0.025	4674.0	934.8	<0.41	
Chromium (+3)	3818000	0.836	48233631	9646726	20.3	
Lead	140	0.950	1758	352	2.4	
Nickel	43000		543229	108646	10.7	

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 6.0 cfs (¼ of the Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P_{99}
Arsenic	13.3		168.0	33.6	<7.7	

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

Conclusions and Recommendations: Based on a comparison of the effluent data and calculated effluent limitations, limits are not required for toxic substances.

PFOS and PFOA
The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98, Wis. Adm. Code. PFOS and PFOA were not detected in the water supply. Based on the annual design flow and lack of nondomestic contributions, it is unlikely that the effluent will contain PFOS or PFOA. **Therefore, monitoring is not recommended.** If information becomes available that indicates PFOS or PFOA may be present in the effluent, the monitoring requirements may change.

Mercury – The permit application did not require monitoring for mercury because the Elroy Wastewater Treatment Facility is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3., Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5). A review of the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from 2020 to 2023 was 0.76 mg/kg, with a maximum reported concentration of 2.20 mg/kg. **Therefore, no mercury monitoring is recommended at Outfall 001.**

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

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

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

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

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

Where:

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

The effluent pH data was examined as part of this evaluation. A total of 1643 sample results were reported from January 2020 to June 2024. The maximum reported value was 8.10 s.u. (Standard pH Units). The effluent pH was 7.70 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 7.84 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 7.83 s.u. Therefore, a value of 7.84 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 7.84 s.u. into the equation above yields an ATC = 11.30 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	22.60
1-Q_{10}	178.70

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

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

Daily Maximum Ammonia Nitrogen Limits – WWSF

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

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

The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water.

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

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

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

Where:

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

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

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

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

Weekly and Monthly Ammonia Nitrogen Limits – WWSF

		April & May	June-September	October-March
Effluent Flow	Qe (MGD)	0.333	0.333	0.333
Background Information	7-Q_{10} (cfs)	9.6	9.6	9.6
	7-Q_2 (cfs)	13	13	13
	Ammonia (mg/L)	0.07	0.07	0.14
	Temperature (°C)	14.4	20.6	10.0
	pH (s.u.)	7.98	8.02	8.01
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	4.8	9.6	2.4
	Reference Monthly Flow (cfs)	5.5	11	2.8
Criteria mg/L	4-day Chronic			
	Early Life Stages Present	6.25	3.99	6.03
	Early Life Stages Absent	6.28	3.99	8.07
	30-day Chronic			
	Early Life Stages Present	2.50	1.60	2.41
	Early Life Stages Absent	2.51	1.60	3.23
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	64	77	
	Early Life Stages Absent			45
	Monthly Average			
	Early Life Stages Present	29	34	
	Early Life Stages Absent			20

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from January 2020 to June 2024, with those results being compared to the calculated limits to determine the need to include ammonia limits in the Elroy Wastewater Treatment Facility permit for the respective month ranges.

Attachment #1

Ammonia Nitrogen Effluent Data

Ammonia Nitrogen mg/L	April & May	June-September	October-March
1-day P_{99}	N/A	15.34	17.1
4-day P_{99}	N/A	8.45	9.1
30-day P_{99}	N/A	3.48	4.2
Mean*	0.2	0.78	2.1
Std	1.84	8.91	4.5
Sample size	85	149	235
Range	<0.2 - 5.6	<0.2 - 29	<0.2 - 19

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

Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits.

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

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

Conclusions and Recommendations

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

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April & May	Variable	70	31
June-September	Variable	76	34
October-March	Variable	53	24

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

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

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

E. coli monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Because the Elroy Wastewater Treatment Facility permit requires 2/week monitoring, the 410 counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

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

Effluent Data
The Elroy Wastewater Treatment Facility has monitored effluent *E. coli* from August 2023 to June 2024 and a total of 36 results are available. A geometric mean of 126 counts/100 mL was never exceeded, with a maximum monthly geometric mean of 11 counts/100 mL. Effluent data never exceeded 410 counts/100 mL. The maximum reported value was 41 counts/100 mL. Based on this effluent data it appears that the facility can meet new *E. coli* limits and a compliance schedule is not needed in the reissued permit.

PART 5 – PHOSPHORUS

Technology-Based Effluent Limit
Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of Total Phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because the Elroy Wastewater Treatment Facility does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average phosphorus loading is less than 150 lbs/month, which is the threshold for municipalities in accordance to s. NR 217.04(1)(a)1, Wis. Adm. Code, and therefore a technology-based limit is not required.

Annual Average Mass Total Phosphorus Loading

Attachment #1

Month	Monthly Avg. mg/L	Total Flow MG/month	Total Phosphorus lb./mo.
Jul 2023	0.66	3.69	20.34
Aug 2023	0.58	3.26	15.69
Sep 2023	0.47	2.93	11.39
Oct 2023	0.49	3.49	14.14
Nov 2023	0.45	3.31	12.48
Dec 2023	0.47	3.46	13.64
Jan 2024	0.45	3.89	14.46
Feb 2024	0.60	3.72	18.48
Mar 2024	0.54	3.71	16.77
Apr 2024	0.45	4.93	18.31
May 2024	0.43	7.73	27.98
Jun 2024	0.47	8.23	32.54
		Average =	**18.02**

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

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

TMDL Limits – Phosphorus

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

For the reasons explained in the April 30, 2012 paper entitled *Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin*, WDNR has determined that the phosphorus WQBELs set equal to WLAs would not be consistent with the assumptions and requirements of the TMDL.

Therefore, limits given to continuously discharging facilities covered by the WRB TMDL are given monthly average mass limits. If the equivalent effluent concentration is less than or equal to 0.3 mg/L, six-month average mass limits are also included. The following equation shows the calculation of equivalent effluent concentration:

$$\begin{aligned} \text{TP Equivalent Effluent Concentration} &= \text{Daily WLA} \div (\text{Flow Rate} * \text{Conversion Factor}) \\ &= 0.942 \text{ lbs/day} \div (0.333 \text{ MGD} * 8.34) \\ &= 0.34 \text{ mg/L} \end{aligned}$$

Since this value is greater than 0.3 mg/L, the WLA should be expressed as a monthly average mass limit for total phosphorus and no six-month average limit is required.

$$\text{TP Monthly Average Permit Limit} = \text{Daily WLA} * \text{Monthly average multiplier}$$
$$= 0.942 \text{ lbs/day} * 1.45$$
$$= 1.36 \text{ lbs/day}$$

The multiplier used in the monthly average calculation was determined according to TMDL implementation guidance. A coefficient of variation was calculated, based on phosphorus mass monitoring data, to be 0.8. This is greater than the CV calculated for the previous evaluation and facility is able to meet the permit limits based on the WLA, so the previous CV of 0.6 is used.This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies phosphorus monitoring as thrice weekly; if a different monitoring frequency is used, the stated limits should be reevaluated.

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

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

Total Phosphorus Statistics

	Concentration (mg/L)	**Mass Discharge (lbs/day)**
1-day P_{99}	2.73	4.51
4-day P_{99}	1.60	2.54
30-day P_{99}	1.02	1.52
Mean	0.76	1.07
Std	0.54	0.91
Sample Size	703	703
Range	<0.21 - 4.2	0.25 - 6.42

Antidegradation & Antibacksliding

Because the mass-based effluent limitation for phosphorus is consistent with the wasteload allocation and assumptions of a US EPA approved TMDL that is designed to achieve water quality standards in ch. NR 102, Wis. Adm. Code, this TMDL based limitation may be included in a permit in lieu of the current phosphorus limit. Because the TP equivalent concentration is more restrictive than the interim phosphorus limit of 3.7 mg/L, removal of the monthly average limit will not increase the concentration, level, or loading of phosphorus to the Baraboo River. Therefore, antidegradation would not be applicable. To be consistent with antibacksliding requirements, the current limit may be removed in accordance with s. NR 207.12(4)(b), Wis. Adm. Code.

Conclusions:

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

- Monthly average Total Phosphorus mass limit of 1.36 lbs/day

PART 6 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from January 2020 to June 2024.

The table below summarizes the maximum temperatures reported during monitoring from May 2012 to December 2012.

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	45	51	NA	120
FEB	44	46	NA	120
MAR	55	56	117	120
APR			81	120
MAY	62	64	88	107
JUN	70	71	102	95
JUL	74	75	NA	98
AUG	71	74	NA	111
SEP	72	72	NA	112
OCT	65	65	NA	120
NOV	55	55	103	120
DEC	51	51	NA	120

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

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

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. Based on this analysis, **temperature limits are not required**. The complete thermal table used for the limit calculation is attached. **Monitoring for at least one year is recommended in the permit.**

PART 7 – WHOLE EFFLUENT TOXICITY (WET)

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

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

- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The **IWC of 18%** shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

Qe = annual average flow = 0.333 MGD = 0.515 cfs
f = fraction of the Qe withdrawn from the receiving water = 0
Qs = ¼ of the 7-Q_{10} = 9.60 cfs ÷ 4 = 2.40 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual*, a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.

- Receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.

- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations.

WET Data History

Date	Acute Results LC_{50} %				Chronic Results IC_{25} %					Footnotes
Test Initiated	*C. dubia*	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Algae (IC_{50})	Pass or Fail?	Use in RP?	or Comments
04/26/1995					>60	>60		Pass	No	1
04/23/1996					>60					1
07/22/1997	>100	>100	Pass	No	>100					1
01/23/2002					>100	>100		Pass	No	1
02/02/2005	>100	>100	Pass	No						1
02/02/2021	>100	>100	Pass	Yes	46	>100		Pass	Yes	

Footnotes:

1. *Data Not Representative.* Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005.

- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.

  Acute Reasonable Potential = [(TUa effluent)(B)]

  According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC_{50} IC_{25} or $IC_{50} \geq 100\%$).

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

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

TUc (maximum) 100/IC25	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/46.0 = 2.2 TUc	6.2 Based on 1 detect	18%

[(TUc effluent)(B)(IWC)] = 2.4 > 1.0

Therefore, reasonable potential is shown for a chronic WET limit using the procedures in s. NR 106.08(6) and representative data from 2021.

<u>Expression of WET limits</u>

Chronic WET limit = [100/IWC] TU_c = 5.6 TU_c expressed as a monthly average

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: https://dnr.wisconsin.gov/topic/Wastewater/WET.html.

WET Checklist Summary

Attachment #1

	Acute	Chronic
AMZ/IWC	Not Applicable. **0 Points**	IWC = 18% **0 Points**
Historical Data	One tests used to calculate RP. No tests failed. **0 Points**	One tests used to calculate RP. No tests failed. **0 Points**
Effluent Variability	Phosphorus exceedances. **5 Points**	Same as Acute. **5 Points**
Receiving Water Classification	Warm Water Sport Fish (WWSF) (5 pts) **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	No reasonable potential for limits based on ATC. Ammonia nitrogen limit carried over from the current permit. Chromium, Copper, Lead, Nickel, Zinc, and Chloride detected. (3 pts) Additional Compounds of Concern: none **3 Points**	No reasonable potential for limits based on CTC. Ammonia nitrogen limit carried over from the current permit. Chromium, Copper, Lead, Nickel, Zinc, and Chloride detected. (3 pts) Additional Compounds of Concern: none **3 Points**
Additives	No biocides and one water quality conditioner (1 pt) Permittee has proper P chemical SOPs in place. **1 Point**	All additives used more than once per 4 days. **1 Point**
Discharge Category	No Industrial Contributors **0 Points**	Same as Acute. **0 Points**
Wastewater Treatment	Secondary or Better **0 Points**	Same as Acute. **0 Points**
Downstream Impacts	No impacts known. **0 Points**	Same as Acute.**0 Points**
Total Checklist Points:	**14 Points**	**14 Points**
Recommended Monitoring Frequency (from Checklist):	No acute monitoring required.	1x yearly
Limit Required?	No	Yes Limit = 5.6 Tu_c
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, annual chronic WET tests are recommended in the reissued permit. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).

- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The chronic WET limit shall be expressed as 5.6 TUc as a monthly average in the effluent limits table of the permit.

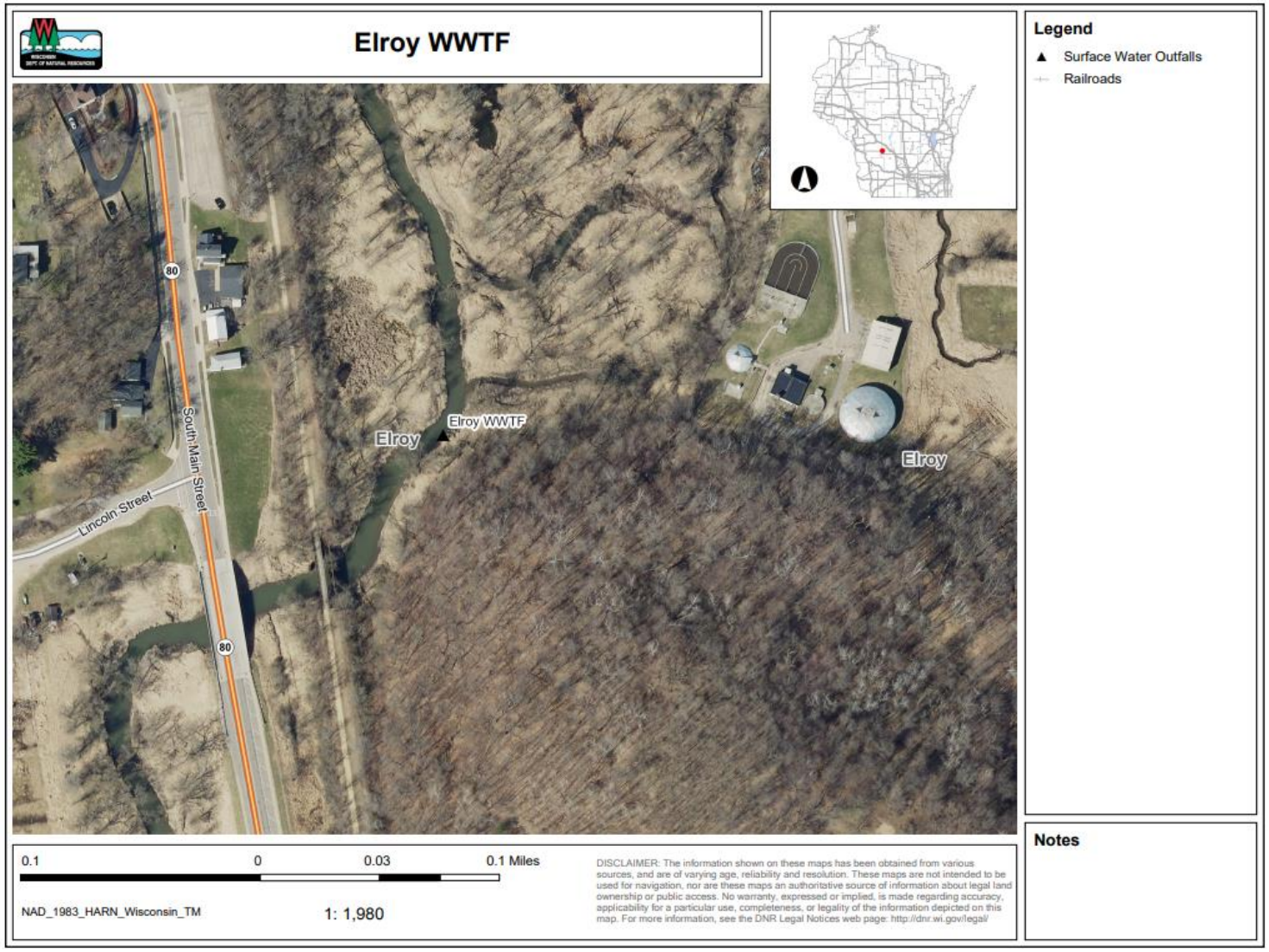
- A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.

Attachment #2

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Elroy WWTF		**7-Q_{10}:**	9.60	cfs	**Temp Dates**	**Flow Dates**
Outfall(s):	001		**Dilution:**	25%		**Start:** 05/04/11	01/01/20
Date Prepared:	08/21/2024		**f:**	0		**End:** 12/28/12	06/30/24
Design Flow (Qe):	0.333	MGD	**Stream type:**	Small warm water sport or forage fish community			
Storm Sewer Dist.	0	ft	**Qs:Qe ratio:**	4.7	:1		
			Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	2.40	0.193	0.464	0	45	51	NA	120
FEB	34	50	76	2.40	0.185	0.368	0	44	46	NA	120
MAR	38	52	77	2.40	0.335	1.201	0	55	56	117	120
APR	48	55	79	2.40	0.422	1.038	0			81	120
MAY	58	65	82	2.40	0.463	1.515	0	62	64	88	107
JUN	66	76	84	2.40	0.587	2.648	0	70	71	102	95
JUL	69	81	85	2.40	0.197	1.876	0	74	75	NA	98
AUG	67	81	84	2.40	0.254	0.970	0	71	74	NA	111
SEP	60	73	82	2.40	0.324	1.127	0	72	72	NA	112
OCT	50	61	80	2.40	0.238	0.950	0	65	65	NA	120
NOV	40	49	77	2.40	0.256	0.448	0	55	55	103	120
DEC	35	49	76	2.40	0.185	1.081	0	51	51	NA	120

Attachment #3