Modified Permit Fact Sheet

General Information

Permit Number	WI-0021598-10-1
Permittee Name and Address	City of Chetek PO Box 194, 220 Stout Street Chetek WI 54728
Permitted Facility Name and Address	City of Chetek 210 Water Street, Chetek, Wisconsin
Modified Permit Term	January 01, 2025 to September 30, 2026
Discharge Locations	**Water Street** - 210 Water Street, Chetek, Wisconsin – West bank of the Chetek River, one-quarter mile downstream of the non-operating hydro plant. (NE¼ SE¼ of Section 30; T33N-R10W) **Gotham Drive** – 399 Gotham Drive, Chetek, Wisconsin – Approximately 1,500 linear feet due east of the intersection of CTH SS and 7th Avenue on the southeast side of the Chetek River. (NW¼ NE¼ of Section 31; T33N-10W)
Receiving Water	Chetek River in Lake Chetek of Chippewa River (lower) in Barron County
Stream Flow ($Q_{7,10}$)	11 cfs
Stream Classification	Warm water sport fish (WWSF) community, non-public water supply and within the ceded territory.
Wild Rice Impacts *(no specific wild rice standards exist at this time)*	No impacts identified. No wild rice inventoried on this surface water. (Evaluation completed March 2017)
Discharge Type	Existing continuous
Annual Average Design Flow (MGD)	**Water Street** 0.385 MGD **Gotham Drive** 0.347 MGD
Industrial or Commercial Contributors	Parker Hannifin (metal finishing)
Approved Pretreatment Program?	N/A
Newspaper PN Last Published In	Chetek Alert, PO Box 5, Chetek, WI 54728-0005

Facility Description

The "old' wastewater treatment facility located on Water Street consists of fine screens, a primary clarifier, rotating biological contractors (RBCs), chemical phosphorus removal in the form of ferric chloride and final clarifiers. Prior to discharging effluent is seasonally (May through September) disinfected using UV treatment. Sludge is anaerobic digested, then stored in a holding tank until land spread a soil conditioner on land approved by the Department. Sludge drying beds are also available.

The "new" wastewater treatment facility located on Gotham Drive consists of screens and grit removal, sequencing batch reactor (SBR) (a type of activated sludge technology), chemical phosphorus removal in the form of aluminum sulfate (alum), gravity sand filters (phosphorus removal) and seasonal disinfection (May through September) using UV treatment. Sludge is aerobically digested then stored in constructed reed beds planted with native *Phragmites australis americanus.*

Once the Gotham Drive wastewater treatment facility is completely functional the permittee shall notify the department and all sample points for the Water Street facility will become inactive.

Reason for Modification

The City of Chetek has built a new wastewater treatment facility. The permit has been modified to incorporate the new sample point and outfall monitoring.

Sample Point Descriptions

Sample Point Designation		
Sample Point Number	**Sample Point Description**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
701	**Influent** – Water Street	Representative samples shall be collected on the influent line to the raw wet well after the fine screen.
702	**Influent** – Gotham Drive	Representative samples shall be collected via composite sampler in the headworks. Sampling shall occur from the influent channel following the manual bar screen prior to the grit removal system.
001	**Effluent** – Water Street	Representative samples shall be collected just ahead of the 90-degree V-notch weir at the end of the former chlorination/dechlorination tank prior to discharging to the Chetek River.
002	**Cake Sludge** – Water Street	Representative samples shall be collected from the drying bed prior to landspreading or by another approved method and location. Sample analysis is not required in years when cake sludge is not land applied.
004	**Liquid Sludge** – Water Street	Representative samples shall be collected from the anaerobically digested storage tank sludge in a manner appropriate for the specific test prior to land application.
005	**Effluent** – Gotham Drive	Representative samples shall be collected in the UV/filter building following the recirculating sand filters, but prior to the outfall.
006	**Cake Sludge** – Gotham Drive	Representative samples shall be taken from the reed beds at various locations and depths that are composited for analysis.
007	**Liquid Sludge** – Gotham Drive	Representative samples shall be taken after the activated sludge plant and composited for analysis. Department approval is needed prior to desludging via this location.

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- INFLUENT (WATER STREET) and 702- INFLUENT (GOTHAM DRIVE)

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	

1.1.1 Changes from Previous Permit:

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

- The addition of sample point 702 which will measure the influent to the Gotham Drive facility.

1.1.2 Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD5 and total suspended solids is required by s. NR 210.04(2), Wis. Adm. Code, to assess wastewater strengths and volumes and to demonstrate the percent removal requirements in s. NR 210.05, Wis. Adm. Code, and in the Standard Requirements section of the permit.

The permittee will notify the department once the Gotham Drive facility is fully operational. At that time sample point 701 will be inactivated.

2 Surface Water - Monitoring and Limitations

2.1 Sample Point Number: 001- EFFLUENT (WATER STREET)

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Suspended Solids, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	
pH Field	Daily Max	9.0 su	3/Week	Grab	
pH Field	Daily Min	6.0 su	3/Week	Grab	
Phosphorus, Total	Monthly Avg	0.8 mg/L	Weekly	24-Hr Flow Prop Comp	Interim limit expires March 31, 2025.
Phosphorus, Total	Monthly Avg	0.225 mg/L	Weekly	24-Hr Flow Prop Comp	Limit becomes effective April 1, 2025.
Phosphorus, Total	6-Month Avg	0.075 mg/L	Weekly	24-Hr Flow Prop Comp	Limit becomes effective April 1, 2025. Compliance is measured May through October and November through April.
Phosphorus, Total	Monthly Avg	4.72 lbs/day	Weekly	Calculated	See the Tainter Lake - Lake Menomin TMDL Phosphorus Allocation subsection for more information.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of phosphorus and report on the last day of the month on the DMR. See the Tainter Lake - Lake Menomin TMDL Phosphorus Allocation section for more information.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of phosphorus discharged and report on the last day of the month on the DMR. See the "Tainter Lake - Lake Menomin TMDL Phosphorus Allocation" subsection in the permit for more information.
Fecal Coliform	Geometric	400 #/100 ml	Weekly	Grab	Interim limit effective May

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
	Mean - Monthly				- September annually until the final E. coli limit goes into effect per the "Effluent Limitations for E. coli" schedule.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Monitoring and limit effective May - September annually.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and limit effective May - September annually. See the E. coli Percent Limit subsection. Enter the result in the DMR on the last day of the month.
Nitrogen, Ammonia (NH3-N) Total		mg/L	Weekly	24-Hr Flow Prop Comp	
Copper, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	Monitoring is required during the 2024 calendar year.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the "Total Nitrogen Testing" subsection in the permit for testing schedule.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the "Total Nitrogen Testing" subsection in the permit for testing schedule.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Total Nitrogen = Total Nitrogen Kjeldahl (mg/L) + Nitrate+ Nitrogen (mg/L). See the "Total Nitrogen Testing" subsection in the permit for testing schedule.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the "Whole Effluent Toxicity Testing" subsection in the permit for testing schedule.

2.1.1 Changes from Previous Permit

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

The Gotham Drive facility is scheduled to replace the Water Street facility soon, therefore, the following parameters (highlighted yellow in the table above) were removed from the modified permit.

- **Phosphorus 12 month rolling sum –** This parameter was used to calculate compliance with the Tainter Lake and Lake Menomin TMDL. All calculations used for compliance will be completed under sample point 005. Until the time that the Water Street facility is taken offline all phosphorus mass loading will be added to sample point 005.
- **Fecal coliform –** The Fecal coliform schedule has been successfully completed and Escherichia coli (E. coli) monitoring and limits are effective.
- **Copper** – Monitoring was completed as required during 2024.
- **Total Nitrogen Monitoring (TKN, N02+N03 and Total N) -** Annual monitoring has occurred. The final sample of the permit term required April - June 2025 will be taken at sample point 005.
- **Acute Wet testing** – The final Acute Wet test required July – September 2025 will be taken at sample point 005.

2.1.3 Explanation of Limits and Monitoring Requirements

The permittee will notify the department once the Gotham Drive facility is fully operational. At that time sample point 001 will be inactivated.

2.2 Sample Point Number: 005- EFFLUENT (GOTHAM DRIVE)

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Total Daily	
BOD5, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
BOD5, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	3/Week	24-Hr Flow Prop Comp	
pH Field	Daily Max	9.0 su	3/Week	Grab	
pH Field	Daily Min	6.0 su	3/Week	Grab	
Phosphorus, Total	Monthly Avg	0.8 mg/L	Weekly	24-Hr Flow Prop Comp	Interim limit expires March 31, 2025.
Phosphorus, Total	Monthly Avg	0.225 mg/L	Weekly	24-Hr Flow Prop Comp	Limit becomes effective April 1, 2025.
Phosphorus, Total	6-Month Avg	0.075 mg/L	Weekly	24-Hr Flow Prop Comp	Limit becomes effective April 1, 2025. Compliance is measured May through October and November through April.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Phosphorus, Total	Monthly Avg	4.72 lbs/day	Weekly	Calculated	See the Tainter Lake - Lake Menomin TMDL Phosphorus Allocation section for more information.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate the Total Monthly Discharge of phosphorus and report on the last day of the month on the DMR. See the Tainter Lake - Lake Menomin TMDL Phosphorus Allocation section for more information.
Phosphorus, Total		lbs/yr	Monthly	Calculated	Calculate the 12-month rolling sum of total monthly mass of phosphorus discharged and report on the last day of the month on the DMR. See the Tainter Lake - Lake Menomin TMDL Phosphorus Allocation section for more information.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Monitoring and limit effective May - September annually.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Monitoring and limit effective May - September annually. See the E. coli Percent Limit subsection. Enter the result in the DMR on the last day of the month.
Nitrogen, Ammonia (NH3-N) Total		mg/L	Weekly	24-Hr Flow Prop Comp	
Copper, Total Recoverable		ug/L	Monthly	24-Hr Flow Prop Comp	Monitoring is required during the 2025 calendar year.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring is required during the 2025 calendar year.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Temperature		deg F	Monthly	Multiple Grab	Monitoring is required during the 2025 calendar year.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Total Nitrogen Testing section for testing schedule.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Total Nitrogen Testing section for testing schedule.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Total Nitrogen = Total Nitrogen Kjeldahl (mg/L) + Nitrate+ Nitrogen (mg/L). See the Total Nitrogen Testing section for testing schedule.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See the Whole Effluent Toxicity Testing section for testing schedule.

2.2.1 Changes from Previous Permit

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

- The addition of sample point 005 which will measure the effluent discharged from the Gotham Drive facility.

2.2.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached "Facility Planning Water Quality-Based Effluent Limitations for the City of Chetek" memo dated July 28, 2021.

Phosphorus – The 12-month rolling sum of the mass phosphorus loading is used to calculate compliance with the Tainter Lake and Lake Menomin TMDL. The Gotham Drive facility is scheduled to replace the Water Street facility. All calculations used for compliance will be completed under sample point 005. Until the time that the Water Street facility is taken offline all phosphorus mass loading from that facility will be added to the total from sample point 005.

Total Nitrogen Monitoring (TKN, N02+N03 and Total N) - The Gotham Drive facility is scheduled to replace the Water Street facility prior to the final annual sample is required, therefore, the final sample required April - June 2025 will be taken at sample point 005.

Acute WET – The Gotham Drive facility is scheduled to replace the Water Street facility prior to the final scheduled WET test, therefore, the Acute Wet test required July – September 2025 will be taken at sample point 005.

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.

3 Land Application - Monitoring and Limitations

3.1 Sample Point Number: 002- ANAEROBICALLY DIGESTED CAKE; 004- STORAGE TANK SLUDGE

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 Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Potassium, Total Recoverable		Percent	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Monitoring is required during the 2023 calendar year.
PFOA + PFOS		ug/kg	Once	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Once	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

3.1.1 Changes from Previous Permit:

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

- **PCB** – Monitoring was removed (highlighted yellow in the table above) because it was completed as required during 2023.
- **PFAS** – Sludge will be removed prior to the end of the permit term. Monitoring is required once pursuant to s. NR 204.06(2)(b)9., Wis. Adm. Code (highlighted grey in the table above).

3.1.2 Explanation of Limits and Monitoring Requirements

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

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 this WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9., Wis. Adm. Code.

3.2 Sample Point Number: 006- NATIVE REED BED CAKE and 007- SLUDGE PRIOR TO REED BEDS

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Once	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Once	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Once	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Once	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Once	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Once	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Once	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Once	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Once	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Once	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Once	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Once	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Once	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Once	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Once	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Once	Composite	
Nitrogen, Total Kjeldahl		Percent	Per Application	Composite	
Nitrogen, Ammonia (NH3-N) Total		Percent	Per Application	Composite	
Phosphorus, Total		Percent	Per Application	Composite	
Phosphorus, Water Extractable		% of Tot P	Per Application	Composite	
Potassium, Total Recoverable		Percent	Per Application	Composite	

3.2.1 Changes from Previous Permit:

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

- The addition of sample point 006 which will measure cake sludge discharged from the reed beds located at the Gotham Drive facility.
- The addition of sample point 007 which will measure digested liquid sludge discharged prior to the reed beds located at the Gotham Drive facility.

3.2.2 Explanation of Limits and Monitoring Requirements

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

The sludge reed beds are newly constructed and desludging prior to the end of the permit term is highly unlikely. It is also unlikely that sludge will have accumulated enough to provide a representative composite sample. Monitoring is only required in the event desludging does occur.

Sludge removal via outfall 007 will be limited, authorization from the department will be required prior to use.

Reed Bed Requirements - This facility utilizes a reed bed system for biosolids treatment, dewatering and storage. The beds are planted with the native species *Phragmites australis americanus.*

Recommendations used in facilities using the non-native Phragmites *(Phragmites australis)* were included in the permit. The department is reviewing requirements for facilities that convert to or initially plant the native variety phragmites species. However, this review is not expected to be completed for several months. Once the review is complete and if the requirements and recommendations have changed, the permittee may request a waiver from some or all of the reed bed requirements through a written request submitted to their compliance staff.

4 Schedules

4.1 Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

Required Action	Due Date
~~Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.)~~ ~~Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.~~	~~03/31/2022~~
~~Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department~~	~~06/30/2022~~

~~pursuant to s. 281.41. Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.~~	
~~Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.~~	~~03/31/2023~~
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2024
Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2025

4.1.1 Explanation of Schedule

The permittee was given a nine-year schedule to meet the final phosphorus WQBEL during the previous permit term. The reissued schedule included the remaining actions for years 5 through 9. The first three actions have been completed; therefore, the remaining two actions are the only ones included in the modified permit.

~~Effluent Limitations for E. coli~~

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

~~Required Action~~	~~Due Date~~
~~Status Update: The permittee shall submit information within the discharge monitoring report (DMR) comment section documenting the steps taken in preparation for properly monitoring and testing for E. coli including, but not limited to, selected test method and location of sampling.~~	~~11/21/2021~~
~~Operational Evaluation Report: The permittee shall prepare and submit an Operational Evaluation Report to the Department for review and approval. The report shall include an evaluation of collected effluent data and proposed operational improvements that will optimize efficacy of disinfection at the treatment plant during the period prior to complying with final E. coli limitations and, to the extent possible, enable compliance with the final E. coli limitations. The report shall include a plan and schedule for implementation of the operational improvements. These improvements shall occur as soon as possible, but not later than April 30, 2023. The report shall state whether the operational improvements are expected to result in compliance with the final E. coli limitations.~~ ~~The permittee shall implement the operational improvements in accordance with the approved plan and schedule specified in the Operational Evaluation Report and in no case later than April 30, 2023.~~ ~~If the Operational Evaluation Report concludes that the operational improvements are expected to result in compliance with the final E. coli limitations, the permittee shall comply with the final E. coli limitations by April 30, 2023 and the permittee is not required to comply with subsequent milestones identified below in this compliance schedule ('Submit Facility Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet Limitations', 'Construction Upgrade Progress Report', 'Complete Construction', 'Achieve Compliance').~~ ~~FACILITY PLAN - If the Operational Evaluation Report concludes that operational improvements~~	~~10/31/2022~~

~~alone are not expected to result in compliance with the final E. coli limitations, the permittee shall initiate development of a facility plan for meeting final E. coli limitations and comply with the remaining required actions in this schedule of compliance.~~ ~~If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final E. coli limitations using the existing treatment system with only operational improvements, the Department may reopen and modify the permit to include an implementation schedule for achieving the final E. coli limitations sooner than April 30, 2026.~~	
~~Submit Facility Plan: If the Operational Evaluation Report concluded that the permittee cannot achieve final E. coli limitations with operational improvements alone, the permittee shall submit a Facility Plan per s. NR 110.09, Wis. Adm. Code. The permittee may submit an abbreviated facility plan if the Department determines that the modifications are minor.~~	~~04/30/2023~~
~~Final Plans and Specifications: The permittee shall submit final construction plans to the Department for approval pursuant to ch. NR 108, Wis. Adm. Code, specifying treatment plant upgrades that must be constructed to achieve compliance with final E. coli limitations and a schedule for completing construction of the upgrades by the complete construction date specified below.~~	~~03/31/2024~~
~~Treatment Plant Upgrade to Meet Limitations: The permittee shall initiate bidding, procurement, and/or construction of the project. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41. Stats., prior to initiating activities defined as construction under ch. NR 108, Wis. Adm. Code. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications.~~	~~09/30/2024~~
~~Construction Upgrade Progress Report: The permittee shall submit a progress report on construction upgrades.~~	~~09/30/2025~~
~~Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades.~~	~~03/31/2026~~
~~Achieve Compliance: The permittee shall achieve compliance with final E. coli limitations.~~	~~04/30/2026~~

Explanation of Schedule

A compliance schedule was included in the permit to provide time for the permittee to investigate options for meeting new effluent E. coli water quality-based effluent limits. All actions have been completed and it is not included in the modified permit.

4.2 Sludge Management Plan

Required Action	Due Date
Submit a Sludge Management Plan: The permittee shall submit a management plan for approval if removal of sludge will occur during this permit term. The plan shall demonstrate compliance with ch. NR 204 Wis. Adm. Code and at minimum address 1) How and where is sludge sampled; 2) Available sludge storage details and location(s); 3)How will the sludge be removed with details on volume, characterization and how will the treatment plant continue to function during the drawdown; 4) Describe the type of transportation and spreading vehicles and loading and unloading practices; 5) Identify approved land application sites, apply for needed sites, site limitations, total acres needed and vegetative cover management; 6) Specify record keeping procedures including site loading; 7) Address contingency plans for adverse weather and odor/nuisance abatement; and 8) Include any other pertinent information such as other disposal options that may be used or specifications of any	

pretreatment processes Once approved, all sludge management activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes. No desludging may occur unless approval from the Department is obtained. Daily logs shall be kept that record where the sludge has been disposed. The plan is due at least 60 days prior to desludging.	

4.2.1 Explanation of Schedule

If the lagoons are to be de-sludged during this permit term a management plan is needed to show compliance with ch. NR 204, Wis. Adm. Code. There are outlines available to assist in plan development.

Attachments

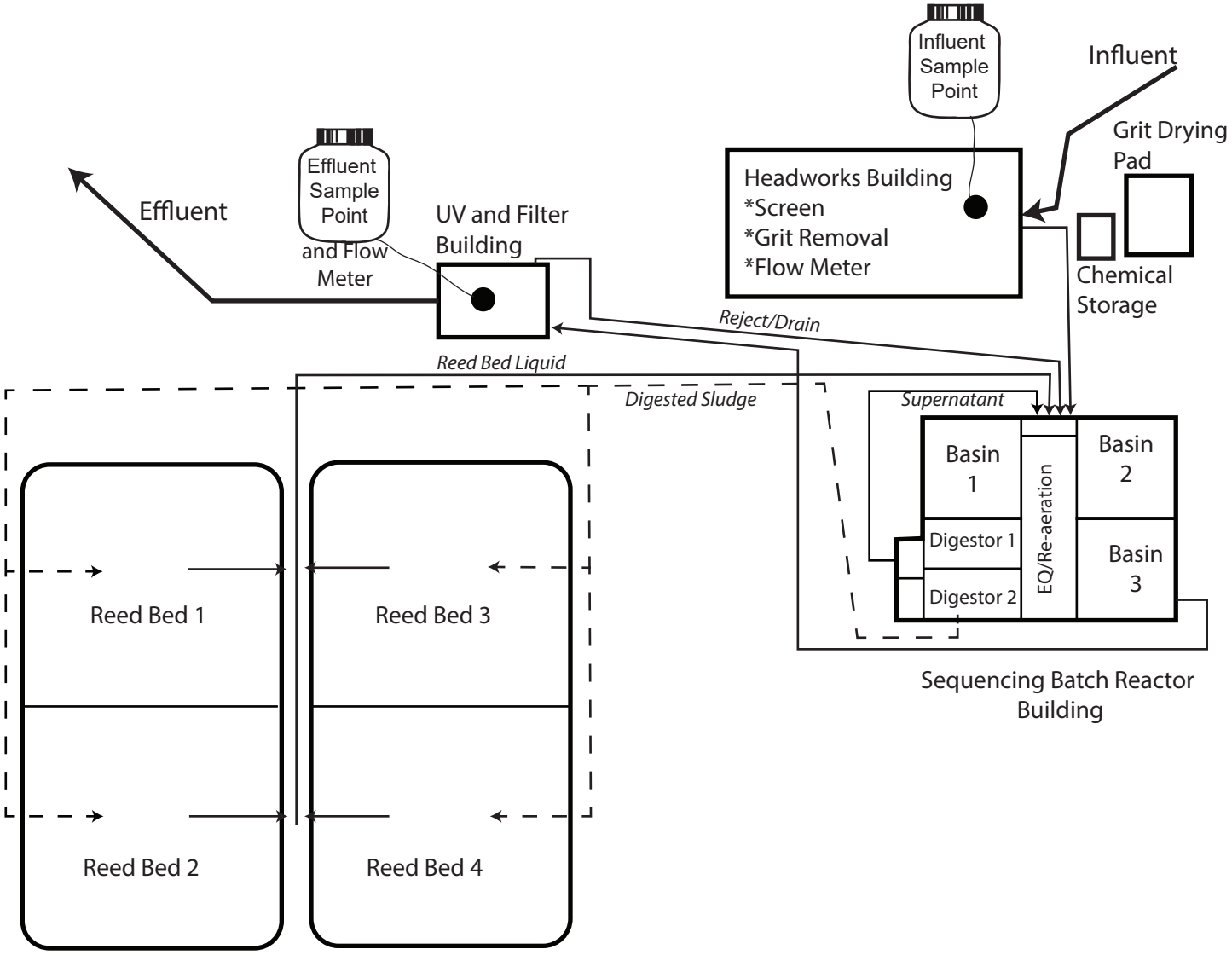
Water Flow Schematic for the Gotham Drive facility created November 2024

"Facility Planning Water Quality-Based Effluent Limitations for the City of Chetek" memo dated July 28, 2021

Prepared By: Sheri A. Snowbank **Wastewater Specialist** **Date:** November 5, 2024

City of Chetek
Wastewater Treatment Plant

The Chetek Wastewater treatment facility is designed to treat 347,000 gallons per day. The treatment system consists of a headworks building with screen and grit removal followed by a sequencing batch reactor, gravity sand filters and UV disinfection. Excess digested sludge is dewatered and stored in constructed reed beds until it is land-applied on WDNR-approved agricultural sites. The diagram below shows the wastewater flow, treament units and sampling locations.



● Sample Locations
→ Wastewater Flow
→ Sludge Path

NOT TO SCALE

Flow: 0.347 MGD
Construction year: 2024

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: July 28, 2021

TO: Ashley Brechlin – WY/3

FROM: Wade Strickland – WY/3 Diane Fisil for WS

SUBJECT: Facility Planning Water Quality-Based Effluent Limitations for the City of Chetek WPDES Permit No. WI-0021598

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) for facility planning using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the City of Chetek in Barron County. This municipal wastewater treatment facility (WWTF) discharges to the Chetek River, located in the Lake Chetek Watershed in the Lower Chippewa River Basin. This discharge is included in the Tainter Lake/Lake Menomin Total Maximum Daily Load (TMDL) report as approved by EPA on May 31, 2012. 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 the relocated outfall approximately 0.6 miles downstream of the current discharge location in the same surface waterbody:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD_5			45 mg/L	30 mg/L		2
TSS			45 mg/L	30 mg/L		2
pH	9.0 s.u.	6.0 s.u.				2
E. coli May – September				126 #/100 mL geometric mean		3
Phosphorus Interim Final TMDL				 0.80 mg/L 0.225 mg/L 4.72 lbs/day	 0.075 mg/L	4
Ammonia Nitrogen						1
Copper (Total Recoverable)						1
Chloride						1
Nitrite + Nitrate						5
Nitrogen, Total Kjeldahl						5
Total Nitrogen						5
Temperature						1

Footnotes:

1. Monitoring only.
2. No changes from the current permit.
3. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.

4. The interim limit represents the 4-day P_{99} of effluent data. The final WQBELs remain at 0.225 mg/L as a monthly average and 0.075 mg/L as a six-month average. The mass limit of 4.72 lbs/day is based on the wasteload allocation (WLA) of 1,172 lbs/yr for this facility in the Tainter Lake/Lake Menomin TMDL area.
5. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen (total Kjeldahl nitrogen and nitrate/nitrite) monitoring is recommended for all minor municipal permittees. Total nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total Kjeldahl nitrogen (all expressed as N).

The recommended limits meet the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code; therefore, additional limits are not required. Whole effluent toxicity testing frequencies are not evaluated as part of this facility planning memo.

If the City of Chetek would like to request an increase to the existing permit limits an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter by parameter basis and includes consideration of operations, maintenance, and temporary upsets. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current limits should be continued in the reissued permit.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Michael Polkinghorn at (715) 360-3379 or Michael.Polkinghorn@wisconsin.gov and Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (4) – Narrative, Map, Thermal Table, and Data Source Table

PREPARED BY: Michael A. Polkinghorn, E.I.T. – Water Resources Engineer

APPROVED BY:  Date: 07/28/2021

Diane Figiel, PE,
Water Resources Engineer

E-cc: Jordan Englebert, Wastewater Engineer – Spooner Service Center
Michelle Balk, P.E., Regional Wastewater Supervisor – Spooner Service Center
Diane Figiel, P.E., Water Resources Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
City of Chetek

WPDES Permit No. WI-0021598-10-0

Prepared by: Michael A. Polkinghorn, E.I.T.

PART 1 – BACKGROUND INFORMATION

Facility Description

The City of Chetek owns and operates a domestic wastewater treatment system. The current WWTF is designed to treat 0.385 Million Gallons per day (MGD), handles an overall average of 0.226 MGD (April 2016 – January 2021), and was constructed in 1985. The City of Chetek has submitted a facility planning limits request to the Department indicating the construction of a new WWTF and relocation of the current discharge further downstream on the Chetek River. The relocated discharge location will be approximately 0.6 miles downstream of the current discharge location in the same surface waterbody.

This evaluation will consider limits due to changes to the design flow. Reasonable potential to exceed any applicable surface water criteria based on current effluent data may not be representative of future effluent quality.

Attachment #2 is a map of the area showing the current and proposed locations of the WWTFs and discharge points.

Existing Permit Limitations

The current permit, which expired on 03/31/2021, includes the following effluent limitations and monitoring requirements. The WQBEL memorandum for permit reissuance has evaluated limits for the current WWTF's 10th permit reissuance where limits for parameters shown in the table below may differ.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						
BOD_5			45 mg/L	30 mg/L		
TSS			45 mg/L	30 mg/L		
pH	9.0 s.u.	6.0 s.u.				
Fecal Coliform May – September				400#/100 mL geometric mean		
Phosphorus Interim Final TMDL				 1.0 mg/L 0.225 mg/L 4.72 lbs/day	 0.075 mg/L	 1
Ammonia Nitrogen						2
Copper (Total Recoverable)						3

Footnotes:

1. The interim limit is a technology-based limit which also functions as an interim limit for the phosphorus compliance schedule. The mass limit is based on the Tainter Lake/Lake Menomin TMDL report to address phosphorus water quality impairments within the TMDL area. The TMDL report was approved by EPA on 05/31/2012. A compliance schedule is in the current permit to meet the final WQBELs by 03/31/2025.
2. Weekly monitoring during the current permit term.
3. Monthly monitoring during the 2019 calendar year.

Receiving Water Information:

- Name: Chetek River (approximately 0.6 miles downstream of the current discharge location in the same surface waterbody)
- WBIC: 2089000
- 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 and Watershed Management Bureau discussions based in NW ¼, SE ¼, Section 24, T33N – R10W, approximately where the current discharge is located. These flows have been used in historic limit evaluations for the current discharge location.

  7-Q_{10} = 11 cfs (cubic feet per second)
  7-Q_2 = 28 cfs
  90-Q_{10} = 24 cfs
  Harmonic Mean Flow = 39 cfs using a drainage area of 135 mi^2

  The Harmonic Mean has been estimated based on the drainage area and the 7-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).
  The low-flow location is approximately 0.6 miles upstream of the relocated discharge and provides a conservative estimate for the relocated discharge area. The current low-flows were estimated from USGS Station LC67 located at NW ¼, SW ¼, Section 31, T33N – R10W, and is approximately 0.7 miles downstream of the relocated discharge.

- Hardness = 64 mg/L as $CaCO_3$. This value represents the geometric mean of receiving water data (n = 2) from historic WET testing (October 2011 – June 2012).
- % 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 Chetek River in Barron are used for this evaluation. The numerical values are shown in the tables below. If no data are 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 and phosphorus are described later.
- Multiple dischargers: None.
- Impaired water status: The Chetek River is listed on the Clean Water Act Section 303(d) list for low dissolved oxygen levels and eutrophication (river miles 0 – 5.24). Pollutants include total phosphorus.

Effluent Information:

- Flow Rate(s):

Current annual average design = 0.385 MGD (Million Gallons per Day)
Proposed annual average design = 0.347 MGD

The projected flow is from the Chetek Effluent Limits Request for the 2040 design year.
For reference, the actual average flow from April 2016 – January 2021 was 0.226 MGD.

- Hardness = 70 mg/L as $CaCO_3$. This value represents the geometric mean of data (n = 4) 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 one categorical industrial contributor. Parker-Hannifin Corp. discharges electroplating-based process wastewater to the facility and is subject to ch. NR 261, Wis. Adm. Code, pretreatment standards.
- Total phosphorus wasteload allocation (WLA): 1,172 lbs/year = 3.21 lbs/day (see Table 5 of the TMDL report document, "*Phosphorus Total Maximum Daily Loads (TMDLs) Tainter Lake and Lake Menomin"*).
- Additives: Ferric chloride is utilized for chemical phosphorus treatment at the current treatment plant. Additives to be used at the new plant have not been identified yet.
- Effluent characterization: Toxic substances where multiple samples are available are shown in the tables below:

Sample Date	Chloride mg/L
09/25/2020	113
09/28/2020	114
10/01/2020	121
10/05/2020	122
Mean	118

	Copper µg/L
1-day P_{99}	17
4-day P_{99}	13
30-day P_{99}	11
Mean	10
Std	2.3
Sample size	12
Range	5 – 14
Date Range	Mar. 2019 – Feb. 2021

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. Adm. 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 used for limit calculation 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 then 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q_{10}) is used.

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 City of Chetek and the limits are set based on two times the acute toxicity criteria.

The following tables list the calculated water quality-based effluent limitations 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 = 8.8 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	MAX. EFFL. LIMIT*	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Copper	70	11.2	22.3			17	14
Zinc	70	89	177.2	35.4	22		22
Chloride (mg/L)		757	1514.0	303	118		122

* 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 = 2.8 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}
Copper	64	7.07	0.97	38.3			13
Zinc	64	81.48	1.72	490	98.0	22	
Chloride (mg/L)		395	4.70	2,394	478.8	118	

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 = 9.7 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		7,036	1,407.1	<3
Chromium (+3)	3,818,000		72,599,890	14,519,978	<6
Lead	140	0.61	2,651	530.2	<1
Nickel	43,000	0.79	817,638	163,528	<8

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 9.7 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		252.9	50.58	<1.0

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

Conclusions and Recommendations
Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are not needed for any toxic substances. The need for ammonia nitrogen limit will be evaluated in Part 4 of this evaluation. Monitoring recommendations are made in the following paragraphs below.

Copper – Considering available effluent data from the current permit term (March 2019 – February 2020), the 1-day P_{99}, 4-day P_{99}, and maximum values are 17, 13, and 14 µg/L, respectively. These are below the calculated WQBELs for copper; therefore, no effluent limits are recommended during the reissued permit term. Due to the low hardness in the effluent and receiving water, limits for copper are stringent enough such that the mean effluent concentration will most likely be greater than $1/5^{th}$ of the limits. Therefore, the same monitoring frequency is recommended during the reissued permit term to better determine the need for copper limits at the relocated discharge location.

Chloride – Considering available effluent data from the current permit term (September 2020 – October 2020), the mean effluent concentration and maximum values are 118 and 122 mg/L respectively. These are below $1/5^{th}$ of the calculated WQBELs for chloride; therefore, no effluent limits are recommended during the reissued permit term. 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, for the relocated discharge location.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BOD & TSS

The calculated weekly and monthly average BOD_5 and TSS could potentially increase with a decrease in the annual average design flow of the WWTF. The current permit includes BOD_5 and TSS limits of 45 mg/L as a weekly average and 30 mg/L as a monthly average. These are the highest limits the Department can give a municipal facility discharging to a WWSF classification receiving waterbody as required and described in s. NR 210.05(1), Wis. Adm. Code. Therefore, the BOD_5 and TSS limits in the current permit would also be applicable to the relocated discharge location.

PART 4 – 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 does not include ammonia nitrogen limits and the WQBEL evaluation (June 23, 2021) determined the current discharge does not have reasonable potential to exceed calculated limits at Outfall 001. Those limits will be evaluated with respect to the decreased flowrate.

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 819 sample results were reported from April 2016 – January 2021. The maximum reported value was 7.0 s.u. (Standard pH Units). The effluent pH was 6.6 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 6.6 s.u. The mean plus the standard deviation multiplied by a factor of 2.58, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 6.6 s.u. Therefore, a value of 6.6 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 6.6 s.u. into the equation above yields an ATC = 47.67 mg/L.

Potential Changes to Daily Maximum Ammonia Nitrogen Effluent Limitations:
Subchapter IV of ch. NR 106, Wis. Adm. Code (effective September 1, 2016) specifies methods for the use of the 1-Q_{10} receiving water low flow to calculate daily maximum ammonia nitrogen limits 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.

	Ammonia Nitrogen Limit mg/L
2×ATC	95
1-Q_{10}	813

The 2×ATC method yields the most stringent limits for the City of Chetek. Presented below is a table of daily maximum limitations corresponding to various effluent pH values. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

Daily Maximum Ammonia Nitrogen Limits – WWSF, WWFF & LFF

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

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC):
The current permit does not include weekly and monthly average ammonia nitrogen limits and the WQBEL evaluation (June 23, 2021) determined the current discharge does not have reasonable potential to exceed calculated limits at Outfall 001. Those limits will be evaluated with respect to the decreased flowrate keeping the remaining background parameters constant.

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 a WWSF community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

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

Where:

pH = the pH (s.u.) of the receiving water,
E = 0.854,
C = the minimum of 2.85 or $1.45 \times 10^{(0.028 \times (25 - T))}$ – (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-Q_3, 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. Burbot, an early spawning species, are not believed to be present in the Chetek River, based on conversations with local fisheries biologists. So "ELS Absent" criteria apply from November – April, and "ELS Present" criteria will apply from May – October for a WWSF classification.

Chetek River (WWSF)		**Summer**	**Winter**
		May – Oct.	**Nov. – April**
Effluent Flow	Qe (MGD)	0.347	0.347
Background Information	7-Q_{10} (cfs)	11	11
	7-Q_2 (cfs)	28	28
	Ammonia (mg/L)	0.04	0.13
	Average Temperature (°C)	17	3
	Maximum Temperature (°C)	17	3
	pH (s.u.)	8.47	7.37
	% of Flow used	100	25
	Reference Weekly Flow (cfs)	11	2.8

Attachment #1

Chetek River (WWSF)		Summer May – Oct.	Winter Nov. – April
	Reference Monthly Flow (cfs)	24	6.0
Criteria mg/L	4-day Chronic		
	Early Life Stages Present	2.52	
	Early Life Stages Absent		19.65
	30-day Chronic		
	Early Life Stages Present	1.01	
	Early Life Stages Absent		7.86
Effluent Limitations mg/L	Weekly Average		
	Early Life Stages Present	53	
	Early Life Stages Absent		120
	Monthly Average		
	Early Life Stages Present	44	
	Early Life Stages Absent		94

Effluent Data:
The following table evaluates the statistics based upon Outfall 001 ammonia data reported from April 2016 – January 2021, with those results being compared to the calculated limits to determine the need to include ammonia limits in the City of Chetek permit for the respective month ranges. That need is determined by calculating 99th 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 mg/L	May – October	November – April
1-day P_{99}	39.9	44.5
4-day P_{99}	25.5	29.7
30-day P_{99}	18.2	22.1
Mean*	14.8	18.4
Std	7.4	8.0
Sample size	119	112
Range	<0.05 - 35.2	<0.05 - 40.2

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

Based on this comparison, there is no reasonable potential for the relocated discharge to exceed any of the calculated ammonia nitrogen limits using Outfall 001 effluent data. Ammonia nitrogen monitoring is recommended for the relocated discharge to better determine the need for ammonia nitrogen limits.

PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

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

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.

2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

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

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

In accordance with s. NR 106.117(1), Wis. Adm. Code, a compliance schedule cannot be allowed for a new plant to meet limits based on existing water quality standards. The new WWTF must meet the final *E. coli* limits upon commencing discharge from the new plant with an allowed start-up period.

PART 6 – PHOSPHORUS

Technology Based Phosphorus Limit
Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of total phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit. Since the City of Chetek currently has a limit of 1.0 mg/L, because it was previously found to discharge more than 150 lbs. of phosphorus per month, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent water quality-based concentration limit is given. In addition, the need for a WQBEL for phosphorus must be considered.

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

The Tainter Lake/Lake Menomin TMDL report was written to ensure that phosphorus water quality criteria are attained in Tainter Lake and Lake Menomin and are not necessarily protective of phosphorus water quality of other surface waterbodies in the TMDL area. Therefore, the need for a phosphorus WQBEL as described in s. NR 217.13, Wis. Adm. Code, must be considered in addition to any limits required by the TMDL report.

Since the new treatment plant and relocated discharge location will be on the same receiving water downstream of the current outfall location, and the permitted entity has been authorized by a WPDES permit prior to 2010, this discharge is not considered a "new discharger" under s. NR 217.11(3), Wis. Adm. Code.

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

The phosphorus criterion of 0.075 mg/L applies for the Chetek River.

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

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

Where:

WQC = 0.075 mg/L for the Chetek River.
Qs = 100% of the 7-Q_2 = 28 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 = 0.347 MGD = 0.538 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 4 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.

The previous WQBEL evaluation (August 2015) resulted in a WQBEL of 0.075 mg/L using a background concentration of 0.094 mg/L. Section NR 217.13(2)(d), Wis. Adm. Code, states that the determination of upstream concentrations shall be evaluated at each permit reissuance. Additional data were considered in estimating the background phosphorus concentration.

A review of all available in stream total phosphorus data from May 1996 – April 1997 (n = 14) stored in the Surface Water Integrated Monitoring System database indicates the median background total phosphorus concentration in the Chetek River at Lake Chetek River Mile 4.5 (SWIMS station ID: 033037) is 0.108 mg/L, just upstream from the point of discharge to the Chetek River. It should be noted that more recent background total phosphorus data is available from June 2012 – September 2012 (n = 2) at the Chetek River below the dam (SWIMS station ID: 10030259), also just upstream of the discharge. This station itself is not used since it does not meet the minimum data requirements of s. NR 217.13(2)(d), Wis. Adm. Code. The values are 0.211 and 0.072 mg/L taken 06/05/2012 and 09/26/2012 respectively for informational purposes.

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 April 2016 – January 2021.

Attachment #1

	Phosphorus mg/L
1-day P_{99}	1.13
4-day P_{99}	0.80
30-day P_{99}	0.63
Mean	0.55
Std	0.19
Sample size	232
Range	<0 - 1.71

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 must be included in the permit as described in s. NR 217.15(1)(b), Wis. Adm. Code.

In accordance with s. NR 217.15(1)(c)1, 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:
According to s. NR 217.14 (2), Wis. Adm. Code, because the calculated WQBEL is less than or equal to 0.3 mg/L, the effluent limit of 0.075 mg/L may be expressed as a six-month average. If a concentration limitation expressed as a six-month average is included in the permit, a monthly average concentration limitation of 0.225 mg/L, equal to three times the WQBEL calculated under s. NR 217.13, Wis. Adm. Code shall also be included in the permit. The six-month average should be averaged during the months of May – October and November – April.

TMDL Limits:
The Tainter Lake/Lake Menomin TMDL established a waste load allocation (WLA) for the City of Chetek of 1,172 lbs/yr and 3.21 lbs/day. The monthly average limit of 4.72 lbs/day was determined in the WQBEL evaluation (August 2015). The multiplier of 1.47 was chosen utilizing the parameters of CV = 0.6 and a 3 samples per week effluent monitoring scheme as described in the Department guidance document, "*TMDL Development and Implementation Guidance: Integrating the WPDES and Impaired Waters Programs Edition No. 3"*.

The TMDL-based WQBEL will be re-evaluated if the annual WLA is not being met as described in the prior stated guidance. This is done by comparing the sum of the most recent 12 consecutive months of total monthly phosphorus mass discharges directly against the annual WLA. In this case, the most recent sum of 265 lbs/yr (February 2020 – January 2021) and the prior 46 sums are less than the annual WLA of 1,172 lbs/yr. Therefore, the City of Chetek is meeting their annual WLA and the TMDL-based WQBEL of 4.72 lbs/day as a monthly average is recommended to continue in the reissued permit.

Interim Limit:
An interim limit is required per s. NR 217.17, Wis. Adm. Code, when a compliance schedule is needed in the permit to meet the WQBEL. The interim limit should reflect a concentration that the facility is able to meet without investing in additional "temporary" treatment, but also should prevent backsliding from current conditions. Therefore, it is recommended that the interim limit be set equal to 0.80 mg/L for permit reissuance along with requirements for optimization of phosphorus removal. This value reflects the

4-day P_{99} concentration of 0.80 mg/L from April 2016 – January 2021 and results in 95% compliance when compared to monthly average phosphorus data for the same time period. This value would have been exceeded 3 times during the current permit term with the last exceedance occurring in July 2017.

This limit is more restrictive than the phosphorus TBEL and the final phosphorus WQBEL is concentration-based. Therefore, the phosphorus TBEL of 1.0 mg/L is not required during the reissued permit term.

PART 7 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wis. Adm. Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification. The current permit does not include temperature limits and the WQBEL evaluation (June 23, 2021) determined the current discharge does not have reasonable potential to exceed calculated limits at Outfall 001. Those limits will be evaluated based on the decreased effluent flowrate.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum effluent 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 effluent flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flows reported from April 2016 – January 2021 for Outfall 001.

The City of Chetek was not required to sample for temperature during the current permit term. The table below summarizes the maximum temperatures reported during monitoring from July 2014 – February 2015 utilized in the previous WQBEL evaluation (August 2015). The decrease in the annual average design flow results in an increase in the Q_s:Q_e ratio, however, it is not enough to alter the temperature limit calculations for the relocated discharge from Outfall 001. Therefore, temperature limits would be the same for both locations on the Chetek River. The full temperature limit calculations are included as attachment #3.

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	49	50	NA	120
FEB	47	48	NA	120
MAR	47	48	NA	120
APR			84	120
MAY			87	120
JUN			105	120

Attachment #1

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)
JUL	56	62	NA	120
AUG	58	58	NA	120
SEP	58	58	NA	120
OCT	57	57	114	120
NOV	56	56	103	120
DEC	52	53	NA	120

* NA denotes "Not Applicable" when the calculated weekly average limit is greater than or equal to 120 ºF.

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

- 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 needed during the months of July – March.

In accordance with s. NR 106.56(12), Wis. Adm. Code, when representative effluent temperature data is not available at the time of permit reissuance, the proposed permit shall include effluent temperature monitoring (for at least one year), WQBELs for temperature, and a compliance schedule to meet the temperature limits. The months of April – June are all applicable to this code requirement. However, the trend of the dataset shows weekly average temperatures reach a maximum of 58 ºF and daily maximum temperatures reach a maximum of 62 ºF. The daily maximum and weekly average temperature values for April – June are not expected to reach these values, let alone the respective temperature limits for those months. Therefore, temperature limits are not recommended during the months of April – June.

Monthly temperature monitoring is recommended for one year at the relocated discharge location to better determine the need for temperature limits.

Attachment #1

PART 8 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the WET Program Guidance Document (October 29, 2019).

The current permit did not require WET monitoring and last WQBEL evaluation (June 23, 2021) recommended 2 acute and 2 chronic WET tests for Outfall 001 using a calculated instream waste concentration (IWC) of 18%. The decrease in the annual average design flow would result in a new IWC for evaluating chronic WET tests. 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 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 updated IWC is 16% shown in the WET Checklist summary below and was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

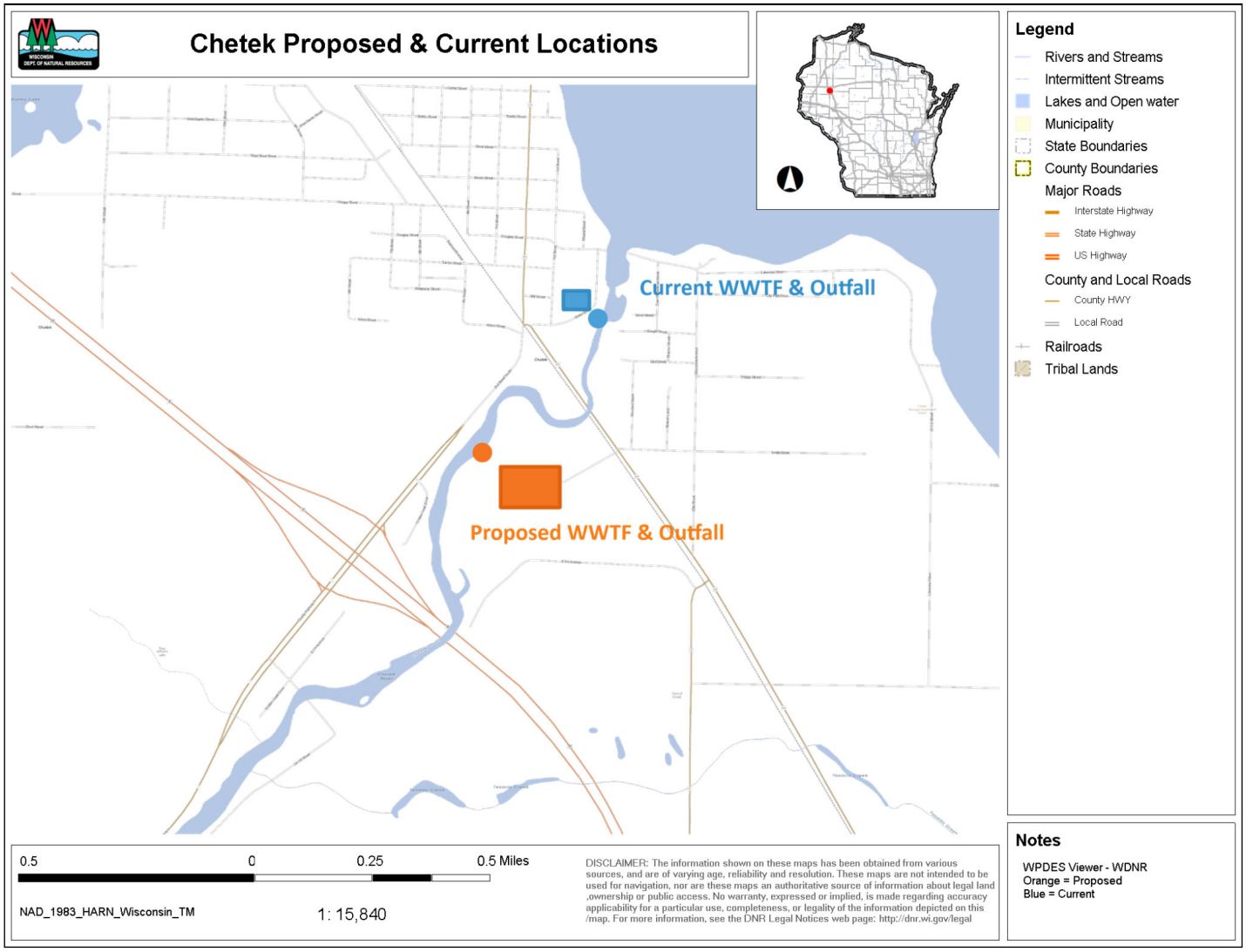
$$IWC\ (as\ \%) = Q_e \div \{(1 - f)\ Q_e + Q_s\} \times 100$$

Where:

Q_e = annual average flow = 0.347 MGD = 0.538 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = ¼ of the 7-Q_{10} = 11 cfs ÷ 4 = 2.75 cfs

This change in IWC would not change the recommended WET monitoring frequency from the WET checklist. Predictions about future WET testing frequencies are not made at this time because they are dependent on other factors which may change at the new WWTF where the expected effluent toxicity may be different from the current WWTF. Depending on when the new WWTF will commence discharge at the relocated discharge, WET tests recommended for Outfall 001 may be delayed to capture potential effluent toxicity data for the relocated discharge location.

Attachment #1


Chetek Proposed & Current Locations
Current WWTF & Outfall
Proposed WWTF & Outfall
Legend
Rivers and Streams
Intermittent Streams
Lakes and Open water
Municipality
State Boundaries
County Boundaries
Major Roads
Interstate Highway
State Highway
US Highway
County and Local Roads
County HWY
Local Road
Railroads
Tribal Lands
0.5
0
0.25
0.5 Miles
NAD_1983_HARN_Wisconsin_TM
1: 15,840
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
Notes
WPDES Viewer - WDNR
Orange = Proposed
Blue = Current

Attachment #3

Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	City of Chetek Facility Planning	**7-Q_{10}:**	11 cfs				
Outfall(s):	Relocated Outfall	**Dilution:**	25%		**Start:**	Jul. 2014	04/01/16
Date Prepared:	03/19/2021	**f:**	0		**End:**	Feb. 2015	01/31/21
Design Flow (Qe):	0.347 MGD	**Stream type:**	Small warm water sport or forage fish co				
Storm Sewer Dist.	0 ft	**Qs:Qe ratio:**	5.1 :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	11	0.219	0.228	0	49	50	NA	120
FEB	34	50	76	11	0.297	0.362	0	47	48	NA	120
MAR	38	52	77	11	0.287	0.363	0	47	48	NA	120
APR	48	55	79	11	0.432	0.494	0	NA	NA	84	**120**
MAY	58	65	82	11	0.558	0.591	0	NA	NA	87	**120**
JUN	66	76	84	11	0.623	0.670	0	NA	NA	105	**120**
JUL	69	81	85	11	0.504	0.555	0	56	62	NA	120
AUG	67	81	84	11	0.444	0.489	0	58	58	NA	120
SEP	60	73	82	11	0.451	0.515	0	58	58	NA	120
OCT	50	61	80	11	0.366	0.409	0	57	57	114	120
NOV	40	49	77	11	0.297	0.313	0	56	56	103	120
DEC	35	49	76	11	0.258	0.277	0	52	53	NA	120

Attachment #4

Data	Source	Start Date	End Date	Sample Count	Notes
Receiving Water - Chetek River					
WBIC	WPDES viewer	-	-	-	2089000
Classification	WPDES viewer	-	-	-	WWSF
Flow (Qs)	USGS/WMB - Station NW ¼ - SE ¼ of Section 24; T33N – R10W	-	-	4	
HMF Drainage Basin Area	USGS/WMB - Station NW ¼ - SE ¼ of Section 24; T33N – R10W	-	-	1	
Ammonia	Ammonia nitrogen guidance	Jan. 2020	-	2	Guidance is based by drainage basin - Chippewa
Chloride	SWIMS - NOR Background Metals Data Summary	Dec. 2005	-	1	Chetek River in Barron County
Hardness	Wet testing	Oct. 2011	Jun. 2012	2	Geometric average
Phosphorus	SWIMS ID: 033037 - Chetek River at Lake Chetek River Mile 4.5	May. 1996	Apr. 1997	14	
Copper	SWIMS - NOR Background Metals Data Summary	Dec. 2005	-	1	Chetek River in Barron County
Lead	SWIMS - NOR Background Metals Data Summary	Dec. 2005	-	1	Chetek River in Barron County
Nickel	SWIMS - NOR Background Metals Data Summary	Dec. 2005	-	1	Chetek River in Barron County
Zinc	SWIMS - NOR Background Metals Data Summary	Dec. 2005	-	1	Chetek River in Barron County
Temperature	Ch. NR 102 Table 2	-	-	36	Guidance is based by classification - Warm water small
pH	Ammonia nitrogen guidance	Jan. 2020	-	2	Guidance is based site specific values - Chetek River in Barron County
Multiple Dischargers	WPDES viewer	-	-	-	None in vicinity
Alternative % Low Flow	NR 106.06(4)(c)5	-	-	-	25% Default
Watershed/Basin	SWAMP	-	-	-	Lake Chetek/Lower Chippewa River
Impaired Water Status	WPDES viewer	-	-	-	CWA 303(d) listed - low DO and eutrophication by TP
Fish Species Determination	Infotrek - Bureau of Fisheries Management	-	-	-	Burbot is not present
Effluent - City of Chetek					
Annual Average Design Flow	Chetek effluent limits request	-	-	1	0.347 MGD
Design BOD Load	Chetek effluent limits request	-	-	1	595 lbs/day

Actual Flow (Qe)	Discharge monitoring reports	Apr. 2016	Jan. 2021	1,757	Continuous discharger
Actual BOD	Discharge monitoring reports	Apr. 2016	Jan. 2021	696	
TSS	Discharge monitoring reports	Apr. 2016	Jan. 2021	696	
Ammonia	Discharge monitoring reports	Apr. 2016	Jan. 2021	231	
Chloride	Permit application	Sept. 2020	Oct. 2020	4	
Hardness	Permit application	Sept. 2020	Oct. 2020	4	Geometric average
Phosphorus	Discharge monitoring reports	Apr. 2016	Jan. 2021	232/232/58	mg/L, lbs/day, lbs/year respectively
Phosphorus (WLA)	Tainter Lake/Lake Menomin TMDL Report Table 5	May. 2012	-	2	Annual and daily mass loading
Cadmium	Permit application	Sept. 2020	-	1	
Chromium	Permit application	Sept. 2020	-	1	
Copper	Discharge monitoring reports	Mar. 2019	Feb. 2020	12	
Lead	Permit application	Sept. 2020	-	1	
Nickel	Permit application	Sept. 2020	-	1	
Mercury	Discharge monitoring reports	Apr. 2016	Apr. 2020	5	Mass values in biosolids - concentration not monitored
Zinc	Permit application	Sept. 2020	-	1	
Max Temperature	Discharge monitoring reports	Jul. 2014	Feb. 2015	36	Temperature not monitored in current permit term
pH	Discharge monitoring reports	Apr. 2016	Jan. 2021	819	
Ammonia Max Effluent pH	Ammonia nitrogen guidance	-	-	1	Upper 99th percentile used
Additives	Permit application	-	-	-	Ferric chloride for chemical phosphorus treatment
Acute Dilution Factor (ZID)	SWAMP	-	-	-	Not applicable
Effluent Fraction Withdraw	Permit application	-	-	-	All effluent is discharged
Water Source (Wastewater)	Permit application	-	-	-	Domestic wastewater and 1 categorical industrial contributor
Water Source (Potable)	Permit application	-	-	-	City of Chetek wells #1 and #2