Waumandee Sanitary District #1 Public Noticed Permit Fact Sheet

General Information

Permit Number	WI-0061646-05-0
Permittee	Waumandee Sanitary District #1, S1991 County Rd U, Waumandee, WI 54622
Permitted Facility	Waumandee Sanitary District #1, S1991 County Rd. U, Waumandee, WI
Permit Term	October 01, 2025 to September 30, 2030
Discharge Location	The north edge of the Waumandee Sanitary District, east bank of Waumandee Creek, 425 feet west of CTH "U". SW1/4, SE1/4, Section 10, T21NR11W, Town of Waumandee, Buffalo County, WI
Receiving Water	Waumandee Creek in Waumandee Creek Watershed of Buffalo-Trempealeau River Basin in Buffalo County
Stream Flow ($Q_{7,10}$)	7.8 cfs
Stream Classification	Warm Water Sport Fish, non-public water supply
Discharge Type	Existing, seasonal fill and draw
Annual Average Design Flow (MGD)	0.079 MGD
Industrial or Commercial Contributors	None
Plant Classification	A4 - Ponds, Lagoons and Natural Systems; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N/A

Facility Description

Waumandee Sanitary District treats domestic wastewater from the Village of Waumandee. The wastewater treatment facility has an influent design flow of 0.0125 million gallons per day (MGD), a maximum effluent discharge rate of 0.246 MGD during discharge and had actual influent flows that averaged 0.0028 MGD in 2024. The community has a pressure sewer system that includes 30 grinder pump units that serve 175 people, stores, bars, church and a school (30 pupils in 2005). The wastewater treatment system includes a stabilization pond that is operated on a fill and draw basis with effluent discharged to Waumandee Creek. The Department has approved water quality trading (WQT) as the method of complying with effluent phosphorus limits at Outfall 001. The Waumandee Sanitary District #1 submitted a WQT Plan (WQT-2023-0007) that provides details of the trade. The plan provides calculations and a table that shows the amount of phosphorus credits that will be available each year. Even with phosphorus credits available, there is still a phosphorus monthly average concentration effluent limit of 1 mg/L that acts as the minimum control level and applies to outfall 001. Other significant effluent monitoring and/or limit changes this permit term are as follows: 1) the addition of annual monitoring for total nitrogen, nitrite + nitrate nitrogen and total Kjeldahl nitrogen, 2) the sample frequency for flow (at influent and effluent) has been changed from “continuous” to “daily” for eDMR reporting purposes, and 3) the variable daily maximum ammonia limit table has been expanded to include applicable limits at a lower effluent pH. Clarification language has been added notifying the permittee they must monitor sludge for List 2 nutrients and meet the requirements of List 3 (Pathogen Control) and List 4 (Vector Attraction Reduction) prior to landspreading if they remove sludge from

the pond(s). A schedule has been included requiring the permittee submit a sludge management plan prior to removal and land application of sludge from the pond(s). Additionally, to quantitate the risk, PFAS sludge sampling has been included in the permit pursuant to ss. NR214.18(5)(b) and NR 204.06(2)(b)9., Wis. Adm. Code. A schedule has also been added that requires the permittee have an operator certified in the SS Subclass (Sanitary Sewage Collection System).

Substantial Compliance Determination

Waumandee Sanitary District #1 submitted monthly DMR's late 5 times in 2022. In August a pre-enforcement email was sent, and no reports have been submitted late since. Phosphorus limits were exceeded in 2019 and 2021. The facility is experimenting with chemical batch treatment and expecting that to be complete 12/31/2023. They are trending downward and met phosphorus limits in 2022, but exceeded again in 2023. WQT is their final compliance measure, and the plan and implementation were completed in October 2024. The facility failed to take permit application samples, which delayed reissuance a year until the next discharge period. Samples were collected in 2024 in response to an NON delivered in May of 2024.

After a desk top review of all Discharge monitoring reports, Land application reports, and compliance schedule items, and an inspection on 10/07/2024, Waumandee Sanitary District has been found to be in substantial compliance with their current permit.

Compliance determination made by Jenna Monahan on 11/01/2024.

Sample Point Descriptions

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
701	Influent: 0.0028 MGD (2024)	Representative influent samples shall be collected from the lagoon inlet manhole.
001	Effluent: 0.2299 MGD (during days of discharge, which was only 13 days in 2024)	Representative effluent samples shall be collected from the discharge pipe after the second pond.
002	Pond Sludge: Sludge was not removed from the pond last permit term and removal is not anticipated this permit term	Representative composite sludge samples shall be collected in 2026 and monitored for the parameters as listed in the table below. If the permittee plans to remove sludge, they shall monitor sludge for Lists 1, 2, 3 & 4 prior to land application. The Department shall be notified at least 30 days in advance of sludge removal so that appropriate monitoring forms can be provided. Approval of landspreading sites must be completed prior to sludge removal.

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- @ LAGOON INLET MANHOLE

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	2/Month	Grab	
Suspended Solids, Total		mg/L	2/Month	Grab	

1.1.1 Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and the only change made from the previous permit is the sample frequency for flow has been changed from "continuous" to "daily" for eDMR reporting purposes.

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.

2 Surface Water - Monitoring and Limitations

2.1 Sample Point Number: 001- EFFLUENT TO WAUMANDEE CREEK

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate	Daily Max	0.246 MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	45 mg/L	Weekly	Grab	
BOD5, Total	Monthly Avg	30 mg/L	Weekly	Grab	
Suspended Solids, Total	Weekly Avg	45 mg/L	Weekly	Grab	
Suspended Solids, Total	Monthly Avg	30 mg/L	Weekly	Grab	
pH Field	Daily Min	6.0 su	Daily	Grab	
pH Field	Daily Max	10 su	Daily	Grab	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Ammonia Variable Limit		mg/L	Weekly	See Table	Look up the variable ammonia limit from the 'Variable Daily Max Ammonia Limitation' table below and report the variable limit in the Ammonia Variable Limit column on the eDMR.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	Weekly	Grab	Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH3-N) Total column of the eDMR. See Ammonia Limitation Section in the permit.
Phosphorus, Total	Monthly Avg	1.0 mg/L	3/Week	Grab	Limit effective throughout the permit term, as it represents a minimum control level.
Phosphorus, Total		lbs/day	3/Week	Calculated	Report daily mass discharged using Equation 1a. in the Water Quality Trading (WQT) section of permit.
WQT Credits Used (TP)		lbs/month	Monthly	Calculated	Report WQT TP Credits used per month using Equation 2c. in the Water Quality Trading (WQT) section of the permit. Available TP Credits are specified in Table 2 and in the approved Water Quality Trading Plan.
WQT Computed Compliance (TP)	Monthly Avg	0.225 mg/L	Monthly	Calculated	Report the WQT TP Computed Compliance value using Equation 3a. in the Water Quality Trading (WQT) section of the permit. Value entered on the last day of the month.
WQT Computed Compliance (TP)	6-Month Avg	0.075 mg/L	Monthly	Calculated	Compliance with the six-month average limit is evaluated at the end of the

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					six-month period on June 30 and Dec 31.
WQT Computed Compliance (TP)	6-Month Avg	0.049 lbs/day	Monthly	Calculated	Report the WQT TP Computed Compliance value using Equation 3b. in the Water Quality Trading (WQT) section of the permit. Compliance with the six-month average limit is evaluated at the end of the six-month period on June 30 and Dec 31.
WQT Credits Used (TP)	Annual Total	71 lbs/yr	Annual	Calculated	The sum of total monthly credits used may not exceed Table 2 values listed below.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Monitoring required annually in 4th quarter (Oct – Dec). See Nitrogen Series Monitoring section in the permit.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	

2.1.1 Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit.:

- Flow- The sample frequency for flow has been changed from “continuous” to “daily” for eDMR reporting purposes.
- Total Nitrogen Monitoring (TKN, N02+N03 and Total N)- Annual monitoring is required in specific quarters as outlined in the permit.
- The department approved the Water Quality Trading Plan (WQT-2023-0007) submitted by the permittee as a way to demonstrate compliance with water quality based effluent limits (WQBELs) for total phosphorus.

2.1.2 Explanation of Limits and Monitoring Requirements

Monitoring Frequencies- The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term and it was determined no monitoring frequency changes are needed.

Limits were determined for Waumandee SD’s existing discharge to Waumandee Creek using chs. NR 102, 104, 105, 106, 207, 210, 212 and 217 of the Wisconsin Administrative Code (where applicable). For additional information on any of the

limits see the May 22, 2025 memo from Ben Hartenbower to Holly Heldstab titled "Water Quality-Based Effluent Limitations for the Waumandee Sanitary District #1 WPDES Permit No. WI-0061646".

Expression of Limits: Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are not required due to the non-continuous nature of the discharge.

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

Total Nitrogen Monitoring (NO2+NO3, TKN and Total N)- The Department has included effluent monitoring for Total Nitrogen in the permit through the authority under §§ 283.55(1)(e), Wis. Stats., which allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source, and through s. NR 200.065(1)(h), Wis. Adm. Code, which allows for this monitoring to be collected during the permit term. More information on the justification to include total nitrogen monitoring in wastewater permits can be found in the "Guidance for Total Nitrogen Monitoring in Wastewater Permits" dated October 1, 2019. Annual tests are scheduled in fourth quarter, as this is when the permittee usually discharges effluent (fill and draw system).

Phosphorus – Phosphorus requirements are based on the Phosphorus Rules that became effective December 1, 2010 as detailed in NR 102 Water Quality Standards and NR 217 Effluent Standards and Limitations for Phosphorus. Chapter NR 217 of the Wis. Adm. Code addresses point source dischargers of phosphorus to surface waters. Currently in NR 217 Wis. Adm. Code there are two methods used to determine if a phosphorus limit is needed: a technology based effluent limit (TBEL) and a water quality based effluent limit (WQBEL). Based on the size and classification of the stream, the water quality criteria for the Waumandee Creek is 0.075 mg/L. In this case, the WQBEL is 0.225 mg/L (monthly average), 0.075 mg/L & 0.049 lbs/day (6-month average). 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 it is impracticable to express the phosphorus WQBEL for the permittee as a maximum daily, weekly or monthly value. The final effluent limit for phosphorus is expressed as a six-month average. It is also expressed as a monthly average equal to three times the derived WQBEL (which equates to 0.225 mg/L). This final effluent limit was derived from and complies with the applicable water quality criterion. A phosphorus concentration limit is necessary to prevent backsliding during the term of the permit. The TBEL limit of 1.0 mg/L will be retained in the permit as a minimum control level.

The wastewater treatment facility is not able to meet the WQBEL. This permit authorizes the use of trading as a tool to demonstrate compliance with the phosphorus WQBELs. This permit includes terms and conditions related to the Water Quality Trading Plan (WQT-2023-0007) or approved amendments thereof. The total 'WQT TP Credits' available are designated in the approved WQT Plan. The Sanitary District installed streambank stabilization practices. The WQT Plan proposes the generation of a range of 71 lbs/yr of phosphorus credits for the next five years.

Additional WQT subsections in the permit provide information on compliance determinations, annual reporting and re-opening of the permit.

PFOS and PFOA: NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Pursuant to s. NR 106.98(3)(b), Wis. Adm. Code, the department evaluated the need for PFOS and PFOA monitoring taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites and other potential sources of PFOS or PFOA. Based on information available at the time the permit was drafted, the department has determined the permittee does not need to sample for PFOS or PFOA as part of this permit reissuance. The department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

3 Land Application - Sludge

3.1 Sample Point Number: 002- LAGOON SLUDGE

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	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	
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 permit term and the following changes were made from the previous permit:

List 2 Nutrient monitoring – Monitoring for list 2 (nutrients) is highly recommended at the same time as the monitoring of List 1 (metals) in year 2 of the permit. Results will assist in the determination of the acres needed for land application of sludge should it be necessary.

Change in form submittal – In prior permit reissuances when it has been noted in the application that sludge would not be removed during the permit term, the department required sampling during the second year of the permit term and the sludge characteristic report (3400-049) would be generated only during that year. Due to moving to electronic submittal of forms via Switchboard, forms 3400-049 ("Characteristics Report"), 3400-052 ("Other Methods of Disposal") and 3400-055 ("Annual Land Application") will now be generated by the department and the permittee will be required to submit all three reports each year of the permit term. This change was adopted to provide the permittee flexibility because many lagoon desludging projects can be unexpected, are delayed or staggered over multiple years. Additionally, it is used to officially report that no land application of sludge has occurred, and annual submittal of the forms is required per the standard requirements section.

PFAS – Monitoring for PFAS has been added once during the permit term pursuant s. NR 204.06(2)(b)9., Wis. Adm. Code.

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). Radium requirements are addressed in s. NR 204.07(3)(n).

PFAS- The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA has developed a draft risk assessment to determine potential risks associated with land applying residuals which contain PFOA and/or PFOS. The DNR is evaluating this information and may alter the current approach based on this review. 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.

4 Schedules

4.1 Annual Water Quality Trading (WQT) Report

Required Action	Due Date
Annual WQT Report: Submit an annual WQT report that shall cover the first year of the permit term. The WQT Report shall include: The number of pollutant reduction credits (lbs/month) used each month of the previous year to demonstrate compliance; The source of each month's pollutant reduction credits by identifying the approved water quality trading plan that details the source; A summary of the annual inspection of each nonpoint source management practice that generated any of the pollutant reduction credits used during the previous year; and Identification of noncompliance or failure to implement any terms or conditions of this permit with respect to water quality trading that have not been reported in discharge monitoring reports.	01/31/2026
Annual WQT Report #2: Submit an annual WQT report that shall cover the previous year.	01/31/2027
Annual WQT Report #3: Submit an annual WQT report that shall cover the previous year.	01/31/2028
Annual WQT Report #4: Submit an annual WQT report that shall cover the previous year.	01/31/2029
Annual WQT Report #5: Submit the 4th annual WQT report. If the permittee wishes to continue to comply with phosphorus limits through WQT in subsequent permit terms, the permittee shall submit a revised WQT plan including a demonstration of credit need, compliance record of the existing WQT, and any additional practices needed to maintain compliance over time.	01/31/2030
Annual WQT Report Required After Permit Expiration: In the event that this permit is not reissued by the expiration date, the permittee shall continue to submit annual WQT reports by January 31 each year covering the total number of pollutant credits used, the source of the pollution reduction credits, a summary of annual inspection reports performed, and identification of noncompliance or failure to implement any terms or conditions of the approved water quality trading plan for the previous calendar year.	

Explanation of Annual WQT Plan Report Schedule: The permittee shall submit annual WQT reports by January 31 each year covering the total number of pollutant credits used, the source of the pollution reduction credits, a summary of annual inspection reports performed, and identification of noncompliance or failure to implement any terms or conditions of the approved water quality trading plan for the previous calendar year.

4.2 Sludge Management Plan

Required Action	Due Date
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.	

Explanation of Sludge Management Plan 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 that clearly explains how the sludge will be safely removed, what contingencies are in place, the type of equipment that will be used and how the sludge will be land applied to ensure the proper precautions are in place to prevent any negative impacts to surface water or groundwater.

4.3 Operator Certification- SS Subclass

Required Action	Due Date
Operator Certification- SS Subclass: Per s. NR 114.53 Wis. Adm. Code, the permittee shall have an operator in charge certified in the SS Subclass (Sanitary Sewage Collection System) by the due date. Within 30 days of receiving certification, the permittee shall notify the department in writing of the certified operator's name and certification number with the SS Subclass certification.	12/31/2025

Explanation of Operator Certification Schedule: Per s. NR 114.53 Wis. Adm. Code, Dorchester WWTF must have an operator in charge that holds all certifications at the proper level.

Other Comments

Publishing Newspaper: Buffalo County News, 123 W Main Street, Mondovi, WI, 54755

Attachments

- Water Quality-Based Effluent Limitations for the Waumandee Sanitary District #1 WPDES Permit No. WI-0061646 dated May 22, 2025
- Water Quality Trading Plan, WQT-2023-0007

- Water Quality Trading Conditional Plan Approval letter dated October 18, 2023 from Jenna Monahan to Greg Mueller, President of Waumandee Sanitary District 1

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance

Prepared By: Holly Heldstab, Wastewater Specialist **Date:** June 2, 2025

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: May 22, 2025

TO: Holly Heldstab – WCR/Eau Claire

FROM: Benjamin Hartenbower – WCR/Eau Claire

SUBJECT: Water Quality-Based Effluent Limitations for Waumandee Sanitary District #1
WPDES Permit No. WI-0061646

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 Waumandee Sanitary District #1 in Buffalo County. This municipal wastewater treatment facility (WWTF) discharges to Waumandee Creek, located in the Waumandee Creek Watershed in the Buffalo - Trempealeau River Basin.

The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate	0.246 MGD					1
BOD_5			45 mg/L	30 mg/L		1,2
TSS			45 mg/L	30 mg/L		1,2
pH	10.0 s.u.	6.0 s.u.				1,3
Ammonia Nitrogen	Variable					1,4
Phosphorus MCL WQT Computed (TP)				 1.0 mg/L 0.225 mg/L	 0.075 mg/L, 0.049 lbs/day	5
TKN, Nitrate+Nitrite, and Total Nitrogen						6,7

Footnotes:

1. No changes from the current permit.
2. These limits are based on the Warm Water Sport Fish (WWSF)/Cold Water (CW) community of the immediate receiving water as described in s. NR 210.05(1), Wis. Adm. Code.
3. The effluent pH limitations have been adjusted according to s. NR 210.07(3), Wis. Adm. Code, where inorganic chemicals are not added as part of the treatment process and industrial sources do not cause the pH of the effluent to be less than 6.0 or greater than 9.0.

4. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit. 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	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	9.0 < pH ≤ 9.1	2.3
6.1 < pH ≤ 6.2	106	7.1 < pH ≤ 7.2	59	8.1 < pH ≤ 8.2	11	9.1 < pH ≤ 9.2	2.0
6.2 < pH ≤ 6.3	104	7.2 < pH ≤ 7.3	52	8.2 < pH ≤ 8.3	9.4	9.2 < pH ≤ 9.3	1.7
6.3 < pH ≤ 6.4	101	7.3 < pH ≤ 7.4	46	8.3 < pH ≤ 8.4	7.8	9.3 < pH ≤ 9.4	1.6
6.4 < pH ≤ 6.5	98	7.4 < pH ≤ 7.5	40	8.4 < pH ≤ 8.5	6.4	9.4 < pH ≤ 9.5	1.4
6.5 < pH ≤ 6.6	94	7.5 < pH ≤ 7.6	34	8.5 < pH ≤ 8.6	5.3	9.5 < pH ≤ 9.6	1.3
6.6 < pH ≤ 6.7	89	7.6 < pH ≤ 7.7	29	8.6 < pH ≤ 8.7	4.4	9.6 < pH ≤ 9.7	1.2
6.7 < pH ≤ 6.8	84	7.7 < pH ≤ 7.8	24	8.7 < pH ≤ 8.8	3.7	9.7 < pH ≤ 9.8	1.1
6.8 < pH ≤ 6.9	78	7.8 < pH ≤ 7.9	20	8.8 < pH ≤ 8.9	3.1	9.8 < pH ≤ 9.9	1.1
6.9 < pH ≤ 7.0	72	7.9 < pH ≤ 8.0	17	8.9 < pH ≤ 9.0	2.6	9.9 < pH ≤ 10	1.0

5. WQT computed compliance limits also require corresponding Minimum Control Levels (MCL) that are to be met at the discharge.
6. Monitoring only.
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.Sections 283.37(5) and 283.55(1)(e), Wis. Stats, and ss. NR 200.065(1)(g) and NR 200.065(1)(h), Wis. Adm. Codes, provide the authority to request this monitoring during the permit term. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total Kjeldahl nitrogen (TKN) (all expressed as N).

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: 05/22/2025

Benjamin Hartenbower, PE,
Water Resources Engineer

E-cc: Jenna Monahan, Wastewater Engineer – WCR/Eau Claire
Geisa Bittencourt, Regional Wastewater Supervisor – WCR/Eau Claire
Diane Figiel, Water Resources Engineer – WY/3
Nate Willis, Wastewater Engineer – WY/3
Kurt Rasmussen, Water Quality Biologist – WCR/La Crosse

Attachment #1

Water Quality-Based Effluent Limitations for
Waumandee Sanitary District #1

WPDES Permit No. WI-0061646

Prepared by: Benjamin P. Hartenbower

PART 1 – BACKGROUND INFORMATION

Facility Description

The Waumandee Sanitary District operates a stabilization pond treatment system on a fill and draw basis and utilizes water quality trading to meet final phosphorus limits. The outfall is located on the West bank of Waumandee Creek, 425 ft East of CTY RD U.

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

Existing Permit Limitations

The current permit, which expired on 09/30/2024, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate	0.246 MGD					1
BOD_5			45 mg/L	30 mg/L		1,2
TSS			45 mg/L	30 mg/L		1,2
pH	10.0 s.u.	6.0 s.u.				1,3
Ammonia Nitrogen	Variable					4
Phosphorus Interim MDV Interim Final WQBEL				 1.3 mg/L 1.0 mg/L 0.225 mg/L	 0.075 mg/L	5

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. These limits are based on the Warm Water Sport Fish (WWSF) community of the immediate receiving water as described in s. NR 210.05(1), Wis. Adm. Code.
3. The effluent pH limitations have been adjusted according to s. NR 210.07(3), Wis. Adm. Code, where inorganic chemicals are not added as part of the treatment process and industrial sources to not cause the pH of the effluent to be less than 6.0 or greater than 9.0.

4. 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
pH ≤ 7.5	No Limit	8.7 < pH ≤ 8.8	3.7
7.5 < pH ≤ 7.6	34	8.8 < pH ≤ 8.9	3.1
7.6 < pH ≤ 7.7	29	8.9 < pH ≤ 9.0	2.6
7.7 < pH ≤ 7.8	24	9.0 < pH ≤ 9.1	2.3
7.8 < pH ≤ 7.9	20	9.1 < pH ≤ 9.2	2.0
7.9 < pH ≤ 8.0	17	9.2 < pH ≤ 9.3	1.7
8.0 < pH ≤ 8.1	14	9.3 < pH ≤ 9.4	1.6
8.1 < pH ≤ 8.2	11	9.4 < pH ≤ 9.5	1.4
8.2 < pH ≤ 8.3	9.4	9.5 < pH ≤ 9.6	1.3
8.3 < pH ≤ 8.4	7.8	9.6 < pH ≤ 9.7	1.2
8.4 < pH ≤ 8.5	6.4	9.7 < pH ≤ 9.8	1.1
8.5 < pH ≤ 8.6	5.3	9.8 < pH ≤ 9.9	1.1
8.6 < pH ≤ 8.7	4.4	9.9 < pH ≤ 10	1.0

5. A compliance schedule is in the current permit to meet the MDV Interim Limit by September 30, 2024.

Receiving Water Information

- Name: Waumandee Creek
- Waterbody Identification Code (WBIC): 1808300
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q_{10} and 7-Q_2 values are from USGS for Station 05378050 near Waumandee, in Waumandee Creek.
  7-Q_{10} = 7.8 cubic feet per second (cfs)
  7-Q_2 = 13 cfs
  Harmonic Mean Flow = 18 cfs using a drainage area of 41.6 mi^2
  The Harmonic Mean has been estimated based on average flow 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).
- Hardness = 129 mg/L as $CaCO_3$. This value represents the geometric mean of data collected in the Waumandee Creek Watershed from 04/11/1991 to 08/05/2010 (n = 13).
- % 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 are from the Waumandee Creek Watershed. Metals data from the Kickapoo River at Oil City are used for this evaluation, because there is no data available for Waumandee Creek. The Kickapoo River is within the same ecological landscape so ambient water quality characteristics are expected to be similar.
- Impaired water status: Waumandee Creek is impaired for Total Phosphorus from mile 0 to 12.4.

Effluent Information

- Design flow rate:
  Annual average = 0.079 million gallons per day (MGD)
  For reference, the actual average flow from 11/16/2019 to 10/20/2024 during discharge periods was 0.209 MGD. Due to the fill and draw operation of this facility, the permitted maximum flow rate of 0.246 MGD is used in the limit calculations.
- Hardness = 165 mg/L as $CaCO_3$ This value represents the geometric mean of four samples collected in October 2024 which were reported on the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Wastewater source: Domestic wastewater.
- Water supply: Municipal water supply from the Waumandee Sanitary District.
- Additives: None.
- 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 11/01/2019 to 10/17/2024 is used in this evaluation.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Effluent Data

Sample Date	Copper (µg/L)	Sample Date	Chloride (mg/L)
10/08/2024	<6	10/05/2024	138
10/09/2024	45	10/08/2024	138
10/10/2024	7	10/11/2024	139
10/11/2024	<6	10/17/2024	139
10/12/2024	<6		
10/13/2024	<6		
10/15/2024	<6		
10/16/2024	<6		
10/17/2024	<6		
10/18/2024	6		
01/14/2025	<6		
Mean	5 µg/L	Mean	139 mg/L

"<" means that the pollutant was not detected at the indicated limit of detection. The mean concentration was calculated using zero in place of the non-detected results.

The following table presents the average concentrations and loadings at Outfall 001 from November 2019 to October 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameters with Effluent Limits

	Average Measurement
BOD_5	4.9 mg/L
TSS	3.7 mg/L
pH	8.50 su
Ammonia Nitrogen	0.30 mg/L

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 Waumandee Sanitary District #1, and the limits are set based on two times the acute toxicity criteria.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 6.2 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	6.5		
Cadmium	165	18.27	0.0253	36.54	7.31	<1		
Chromium (+3)	165	2714	0.8360	5427	1085	<2		
Copper	165	24.85	1.0930	49.70	9.94	5		45
Lead	165	173.20	0.9501	346.39	69.28	<1		
Nickel	165	715.72		1431.43	286.29	<9		
Zinc	165	186.26	2.9350	372.52	74.50	<6		
Chloride (mg/L)		757	16	1514	303	139		139

* * 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 = 2.0 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	REF. HARD. mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		152		932	186	6.5	
Cadmium	129	3.00	0.0253	18.24	3.65	<1	
Chromium (+3)	129	162	0.8360	990	198	<2	
Copper	129	12.84	1.0930	73.03	14.61	5	
Lead	129	35.72	0.9501	213.89	42.78	<1	
Nickel	129	64.59		395.54	79.11	<9	
Zinc	129	150.03	2.9350	903.77	180.75	<6	
Chloride (mg/L)		395	16	2336	467	139	

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 Threshold Criteria (HTC)
RECEIVING WATER FLOW = 4.5 cfs (¼ of the 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.	30-day P_{99}
Cadmium	370.00	0.0253	4069.75	813.95	<1	
Chromium (+3)	3818000	0.8360	41997992	8399598	<2	
Lead	140.0	0.9501	1530.5	306.1	<1	
Nickel	43000		473000	94600	<9	

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 4.5 cfs (¼ of the 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.	30-day P_{99}
Arsenic	13.30		146.30	29.26	6.5	

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 limits are not required for toxic substances.

Mercury - The permit application did not require monitoring for mercury because Waumandee Sanitary District #1 is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, "there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code." A review of the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from 2020 was below detection. **Therefore, no monitoring is recommended for Outfall 001.**

PFOS and PFOA - The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code.

Based on the annual design flow and lack of nondomestic contributions, it is unlikely that the effluent will contain PFOS or PFOA. **Therefore, monitoring is not recommended.**

The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

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

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has variable daily maximum 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:

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

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 79 sample results were reported from 11/16/2019 to 10/19/2024. The maximum reported value was 10.00 s.u. (Standard pH Units). The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 10.00 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 9.91 s.u. Therefore, a value of 10.00 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 10.00 s.u. into the equation above yields an ATC = 0.50 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 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	1.01
1-Q_{10}	7.60

The 2xATC method yields the most stringent limits for Waumandee Sanitary District #1.

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. The table has been expanded from the table in the current permit to included ammonia nitrogen limits throughout the pH range.

Daily Maximum Ammonia Nitrogen Limits – WWSF/WWFF

Effluent pH s.u.	Limit mg/L	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	9.0 < pH ≤ 9.1	2.3
6.1 < pH ≤ 6.2	106	7.1 < pH ≤ 7.2	59	8.1 < pH ≤ 8.2	11	9.1 < pH ≤ 9.2	2.0
6.2 < pH ≤ 6.3	104	7.2 < pH ≤ 7.3	52	8.2 < pH ≤ 8.3	9.4	9.2 < pH ≤ 9.3	1.7
6.3 < pH ≤ 6.4	101	7.3 < pH ≤ 7.4	46	8.3 < pH ≤ 8.4	7.8	9.3 < pH ≤ 9.4	1.6
6.4 < pH ≤ 6.5	98	7.4 < pH ≤ 7.5	40	8.4 < pH ≤ 8.5	6.4	9.4 < pH ≤ 9.5	1.4
6.5 < pH ≤ 6.6	94	7.5 < pH ≤ 7.6	34	8.5 < pH ≤ 8.6	5.3	9.5 < pH ≤ 9.6	1.3
6.6 < pH ≤ 6.7	89	7.6 < pH ≤ 7.7	29	8.6 < pH ≤ 8.7	4.4	9.6 < pH ≤ 9.7	1.2
6.7 < pH ≤ 6.8	84	7.7 < pH ≤ 7.8	24	8.7 < pH ≤ 8.8	3.7	9.7 < pH ≤ 9.8	1.1
6.8 < pH ≤ 6.9	78	7.8 < pH ≤ 7.9	20	8.8 < pH ≤ 8.9	3.1	9.8 < pH ≤ 9.9	1.1
6.9 < pH ≤ 7.0	72	7.9 < pH ≤ 8.0	17	8.9 < pH ≤ 9.0	2.6	9.9 < pH ≤ 10	1.0

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, because 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 a 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 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 of the receiving (ºC) – (Early Life Stages Present), or
T = the maximum of actual temperature (ºC) and 7 – (Early Life Stages Absentt)

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 Waumandee Creek, based on data in the Fisheries Management Information System. So “ELS Absent” criteria apply from October through December, and “ELS Present” criteria will apply from January through September for a Warm Water Sport Fish Community classification.

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

Attachment #1

Weekly and Monthly Ammonia Nitrogen Limits – WWSF/WWFF

		April & May	June - September	October - March
Effluent Flow	Qe (MGD)	0.246	0.246	0.246
Background Information	7-Q_{10} (cfs)	7.8	7.8	7.8
	7-Q_2 (cfs)	13	13	13
	Ammonia (mg/L)	0.22	0.18	0.39
	Average Temperature (°C)	11.7	18.6	3.5
	Maximum Temperature (°C)	14.4	20.6	10.0
	pH (s.u.)	7.99	7.90	7.89
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	3.9	7.8	2.0
	Reference Monthly Flow (cfs)	5.5	11.1	2.8
Criteria mg/L	4-day Chronic			
	Early Life Stages Present	6.20	4.75	7.07
	Early Life Stages Absent	6.23	4.75	9.46
	30-day Chronic			
	Early Life Stages Present	2.48	1.90	2.83
	Early Life Stages Absent	2.49	1.90	3.79
Effluent Limitations mg/L	Weekly Average			
	Early Life Stages Present	68	98	41
	Early Life Stages Absent			
	Monthly Average			
	Early Life Stages Present	35.4	51.8	20.6
	Early Life Stages Absent			

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from November 2019 to October 2024.

Ammonia Nitrogen Effluent Data

Sample Date	Ammonia Nitrogen mg/L	Sample Date	Sample Date	Ammonia Nitrogen mg/L
11/19/2019	0.1	10/19/2021	10/15/2024	0.7
11/26/2019	0.1	10/04/2022		
12/03/2019	0.1	10/11/2022		
10/13/2020	0.1	10/03/2023		
10/19/2020	0.1	10/10/2023		
10/13/2021	0.1	10/08/2024		
Mean	0.3			

Reasonable Potential
The need to include ammonia limits in the Waumandee Sanitary District #1 permit is determined by calculating 99th upper percentile (or P_{99}) values for ammonia and comparing those to the calculated limits. Based on this comparison, daily limits are required.

Conclusions and Recommendations
In summary, the upadated variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values is recommended be included in the permit. These limits apply year-round.

Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are not required due to the non-continuous nature of the discharge.

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Codes, 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.

The last permit term's flow data shows that, as a rolling average, > 180-d detention time was provided at all times during the permit term. The greatest 180 day rolling average at Outfall 001 was 0.0237 MGD (November 2019 to May 2020). Using a total pond volume of 6.3 million gallons, the minimum detention time was 266 days. Since data shows that the facility provides > 180-d detention time, disinfection is not required and **effluent limits and monitoring are not needed in the permit.**

$$\text{Detention Time [days]} = \frac{\text{Total Pond Volume [MG]}}{\text{180-d average flow rate[mgd]}}$$

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.

Since Waumandee Sanitary District #1 already has a phosphorus limit of 1.0 mg/L in effect, the need for a TBEL will not be considered further.

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

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

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 Waumandee Creek.

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

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

Where:

WQC = 0.075 mg/L for Waumandee Creek
Qs = 100% of the 7-Q_2 of 13 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 = 0.079 MGD = 0.122 cfs
f = the fraction of effluent withdrawn from the receiving water = 0

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

The following data were considered in estimating the background phosphorus concentration:

SWIMS ID	10030617
Station Name	Monitoring station at Waumandee Creek at Waumandee Creek Road
Waterbody	Waumandee Creek
Sample Count	11
First Sample	06/26/2020
Last Sample	07/29/2021
Mean	0.180 mg/L
Median	0.149 mg/L
NR 217 Median	0.149 mg/L

Substituting a background concentration above criteria into the limit calculation equation above would result in a calculated limit that is less than the applicable criterion of 0.075 mg/L. However, s. NR 217.13(7), Wis. Adm. Code, specifies that "if the WQBEL calculated pursuant to the procedures in this section is less than the phosphorus criterion specified in s. NR 102.06, Wis. Adm. Code, for the water body, the effluent limit shall be set equal to the criterion."

The impaired water listing of Waumandee Creek also points towards the notion that effluent phosphorus limits equal to the water quality criterion are needed to prevent the discharge from contributing to further impairment of the receiving water. *The Guidance for Implementing Wisconsin's Phosphorus Water Quality Standards for Point Source Discharges (2020)* suggests setting effluent limits equal to the criterion in the absence of an EPA approved total maximum daily load for discharges of phosphorus to phosphorus impaired waters.

Effluent Data

The following table summarizes effluent total phosphorus monitoring data from November 2019 to October 2024.

Total Phosphorus Effluent Data

	Phosphorus mg/L
1-day P_{99}	2.49
4-day P_{99}	1.75
30-day P_{99}	1.36
Mean	1.17
Std	0.42
Sample size	39
Range	0.39 - 1.89

Reasonable Potential Determination
Since the 30-day P_{99} of reported effluent total phosphorus data is greater than the calculated WQBEL, the discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion. Therefore, **a WQBEL is required.**

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

Mass Limits
A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the discharge is to a surface water that is to or upstream of a phosphorus impaired waterbody. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.079 MGD = 0.049 lbs/day expressed as a six-month average.**

Water Quality Trading Minimum Control Level
A Water Quality Trading (WQT) plan has been submitted as an alternative compliance option to offset any total phosphorus discharged from Outfall 001 that exceed the phosphorus WQBELs. The phosphorus WQBELs may be expressed as computed compliance limits, but a Minimum Control Level (MCL) must be set as a limit not to be exceeded at the outfall location. Therefore, the current phosphorus limit of **1.0 mg/L as a monthly average is recommended during the reissued permit term to serve as the MCL.**

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 November 2019 to October 2024.

Attachment #1

Monthly Temperature Effluent Limits

Month	Calculated Effluent Limit	
	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN		
FEB		
MAR		
APR		
MAY		
JUN		
JUL		
AUG		
SEP		
OCT	118	120
NOV	96	120
DEC	NA	120

* NA denotes "not applicable" when the calculated weekly average limit is greater than or equal to 120˚F.

Since this facility provides hydraulic detention times of at least 266 days, elevated effluent temperatures are unlikely and discharge temperatures are expected to be similar to ambient conditions. The facility uses a fill and draw method of operation with effluent discharges occurring only during the cool weather periods when ambient temperatures are less than 50˚F. **Therefore, temperature limits and monitoring are not recommended.**

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 LC_{50} (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 16%**, shown in the WET Checklist summary below, was calculated according to the follow 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 = 0.246 MGD = 0.381 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = ¼ of the 7-Q_{10} = 7.80 cfs ÷ 4 = 1.95 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit. The 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 Test Initiated	Acute Results LC50 %				Chronic Results IC25 %					Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Algae (IC50)	Pass or Fail?	Use in RP?	
04/19/2005	>100	>100	Pass	Yes	>100	>100		Pass	Yes	

- 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.

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

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. **0 Points**	IWC = 16%. **0 Points**
Historical Data	One test used to calculate RP. No tests failed. **0 Points**	One test used to calculate RP. No tests failed. **0 Points**
Effluent Variability	Little variability, no upsets, consistent WWTF operations. Three phosphorus exceedances. **0 Points**	Same as Acute. **0 Points**
Receiving Water Classification	WWSF (5 pts) **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	Reasonable potential for Ammonia limits based on ATC.(5 pts) Arsenic, Copper and Chloride detected. (3 pts) Additional Compounds of Concern: None **8 Points**	No reasonable potential for limits based on CTC. Ammonia, Arsenic, Copper and Chloride detected. (3 pts) Additional Compounds of Concern: None **3 Points**
Additives	No additives. **0 Points**	**0 Points**

Attachment #1

	Acute	Chronic
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 pts) **0 Points**	Same as Acute. **0 Points**
Total Checklist Points:	**13 Points**	**8 Points**
Recommended Monitoring Frequency (from Checklist):	No acute monitoring recommended.	No chronic monitoring recommended.
Limit Required?	No	No
TRE Recommended? (from Checklist)	No	No

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

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	Waumandee Sanitary District #1		**7-Q10:**	7.80	cfs		
Outfall(s):	001		**Dilution:**	25%		**Start:**	N/A	11/16/19
Date Prepared:	04/28/2025		**f:**	0		**End:**	N/A	10/20/24
Design Flow (Qe):	0.25	MGD	**Stream type:**	Small warm water sport or			
Storm Sewer Dist.		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	1.95							
FEB	34	50	76	1.95							
MAR	38	52	77	1.95							
APR	48	55	79	1.95							
MAY	58	65	82	1.95							
JUN	66	76	84	1.95							
JUL	69	81	85	1.95							
AUG	67	81	84	1.95							
SEP	60	73	82	1.95							
OCT	50	61	80	1.95	0.241	0.245	0			118	120
NOV	40	49	77	1.95	0.240	0.249	0			96	120
DEC	35	49	76	1.95	0.240	0.237	0			NA	120

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Waumandee Sanitary District

Legend: (some map layers may not be displayed)

- Surface Water Outfalls
- County Boundaries

County and Local Roads

- County HWY

Latest Leaf Off Imagery

Notes:

Map projection: NAD 1983 HARN Wisconsin TM

N

Map: 0 430 860 Feet
0 125 250 Meters

Service Layer Credits:
Latest Leaf Off: , Permits & Determinations: WI DNR Bureau of Watershed Management, Cities, Roads & Boundaries:

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Date Printed: 4/10/2025 11:52 AM

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October 18, 2023

Greg Mueller, President
Waumandee Sanitary District 1
S2002B Cty Rd U
Waumandee, WI 54622

Subject: Waumandee WWTF - WPDES Permit WI- 0061646
Water Quality Trading Plan – CONDITIONAL APPROVAL

Dear Mr. Mueller:

The Department recently received a water quality trading plan (WQT Plan) for compliance with phosphorus effluent limits at the Waumandee WWTF. The initial plan was received in March of 2023 and an updated version were received in October of 2023. Based on WDNR review, the final WQT Plan (dated October 2023) is in general conformance with the WDNR Water Quality Trading Guidance and Section 283.84 of the Wisconsin Statutes. The WQT plan proposes installation of streambank stabilization in three separate areas. The timeline for practice installation, as set forth in the WQT plan, indicates practices will be installed by June 30, 2024. Credits generated from approved practices result in available credit quantities shown in Table 1. These credits will be incorporated into the reissued WPDES permit and will be used to demonstrate compliance with final phosphorus effluent limits beginning October 1st, 2024.

As a condition of approval, please note the following:

The department requests updated photos prior to start of the work on the streambank restoration projects.

Credits are prorated for the first year the practices are installed. If the streambank stabilization practices are not completed by the listed date, the credits available in 2024 may be less.

Table 1: Total Phosphorus Credits Available per WQT-2023-0007

Year	Available Credits (lbs/yr) – Total
2023	0
2024	35
2025	71
2026	71
2027	71
2028	71

The Department conditionally approves the WQT Plan as a basis for water quality trading during the next WPDES permit term. The Department has assigned the WQT plan a tracking number of WQT-2023-0007 and will be referenced as such in the draft WPDES permit. The final WQT plan will be included as part of the public notice package for permit reissuance. The draft WPDES permit will include a requirement for an annual trading report and effluent monitoring for total phosphorus.

If you have any questions or comments, please contact me at 715-492-4323 or at jenna.monahan@wisconsin.gov.

Thank You,

Jenna Monahan

Jenna Monahan, P.E.
Wastewater Engineer – West Central Region
Wisconsin Department of Natural Resources

e-CC:

Joe Helwig, Operator
Carson Hackett, P.E., Davy Engineering
Matt Claucherty, WDNR

WATER QUALITY TRADING PLAN

WASTEWATER STABILIZATION POND

WAUMANDEE SANITARY DISTRICT #1

WAUMANDEE, WI

MARCH 2023
REVISED OCTOBER 2023

1813-032.012

TABLE OF CONTENTS
WQT PLAN
WAUMANDEE SANITARY DISTRICT #1

APPENDICES

1 EXECUTIVE SUMMARY

The WPDES Permit for the Waumandee wastewater treatment plant (WWTP) proposes a future phosphorus effluent limit of 0.075 mg/L. The existing limit is 1.3 mg/L. Within this Permit term, by September 30, 2024, the Sanitary District plans to meet the limit by offsetting the entire phosphorous mass with WQT projects.

From 2020-2022, the total flow discharged from the Waumandee WWTP averaged 2.46 MG. At the average 1.3 mg/L, the effluent phosphorous mass loading is 27 lbs./year. At the same annual average flow of 2.46 MG, the future 0.075 mg/L limit will reduce the required phosphorous mass loading to 1.5 lbs./year, a reduction of 25 lbs./year. WQT will require a 2:1 or 3:1 Trade Ratio, which means Waumandee would need to secure approximately 50 to 76 lbs/year of phosphorus credit to meet the base trade amount via Water Quality Trade (WQT) with a continued 1.3 mg/L phosphorus effluent.

Waumandee has an interim limit of 1.0 mg/L going into effect October 31, 2023. At 1.0 mg/L, the mass loading is approximately 19 lbs/year. Waumandee would need to obtain approximately 38 to 57 lbs of credits if the full WQT cannot be constructed by the interim limit date.

Both above conditions assume the current wastewater Flow rate for future conditions. No growth is expected for the Waumandee sewer service area.

The WWTP discharge is piped to the Waumandee Creek in the Waumandee Creek Watershed of the Buffalo-Trempealeau River Basin.

2 BACKGROUND SUPPORTING THE WATER QUALITY TRADE PLAN

2.1 *Purpose of Water Quality Trading*

The purpose of this Water Quality Trading Plan is to describe how the Waumandee WWTP will utilize water quality trading (WQT) to comply with the phosphorus limits of WPDES permit WI-0061646-04-0, which expires on September 30, 2024. This Water Quality Trading Plan will require a Water Quality Trade Agreement with the landowners. The agreement will be developed pursuant to a Notice of Intent (form 3400-206) to conduct a WQT. The Notice of Intent (NOI) was filed in March 2020 and is included in **Appendix 2-1** of this plan.

2.2 *Background of the Total Phosphorous Permit Requirements for the WWTP Outfall*

The outfall is located on Waumandee Creek and is authorized to discharge through WPDES permit WI-0061646-04-0. The permit is effective from October 1, 2019, to September 30, 2024. The total phosphorus limits are summarized as follows:

- October 1, 2019 to September 30, 2023 1.3 mg/L
- October 1, 2023 to September 30, 2024 1.0 mg/L
- October 1, 2024 to September 30, 2039 0.075 mg/L (proposed)

In accordance with s. 283.15, Wis. Stats., the outfall for permit WI-0061646-04-0 currently is under a Multi-Discharger Variance (MDV) phosphorus variance. The conditions of the variance include the following requirements:

- Optimization: The permittee shall continue to optimize performance to control phosphorous discharges in accordance with s. 283.16(6), Wis. Stats. See the schedules section of the permit for optimization requirements.
- Watershed Provisions: The permittee is required to implement watershed measures to reduce the amount of phosphorous entering the receiving water.

- Payment to County for Phosphorous Reduction: The permittee shall make payments for phosphorous reduction to the county or counties approved by the Department per s. 283.16(8), Wis. Stats. The permittee shall make a total payment by March 1 of each year in the amount equal to the per pound amount of $53.01 times the number of pounds by which the effluent phosphorous discharged during the previous year exceeded the permittee's target value. The target value is 0.2 mg/L per s. 283.16(1)(h), Wis. Stats., and is applicable year-round. With Flow at 2.46 GPD and effluent P at 1.3 mg/L, the estimated annual payment is $1,198.64. With the 1.0 mg/L effluent P achievable with the pilot chemical fed, the estimated annual MDV payment is reduced to $871.74.

2.3 Location of WWTP Outfall

The stabilization pond outfall discharges to Waumandee Creek, which is located in the Waumandee Creek Watershed in the Buffalo-Trempealeau River Basin in Buffalo County. Waumandee Creek flows to the southwest and discharges to the Mississippi River approximately 10 miles southeast of the Waumandee WWTP outfall location. The outfall location is located east of the intersection of CTH U and WWTP service entrance road within the Town of Waumandee. See **Appendix 2-2** for the Waumandee WWTP Outfall Location Map.

2.4 Location of Restoration Project in Comparison to the WWTP Outfall

The WQT project locations are on Waumandee Creek within the Town of Waumandee. The Reuter project site is 500 feet upstream of the WWTP discharge. The Reglin/Brommer streambank restoration project is approximately 1,500 feet downstream of the WWTP discharge location. See **Appendix 2-3** for a map of the two locations.

3 DESCRIPTION OF EXISTING LAND USES IN VICINITY OF WQT PROJECTS

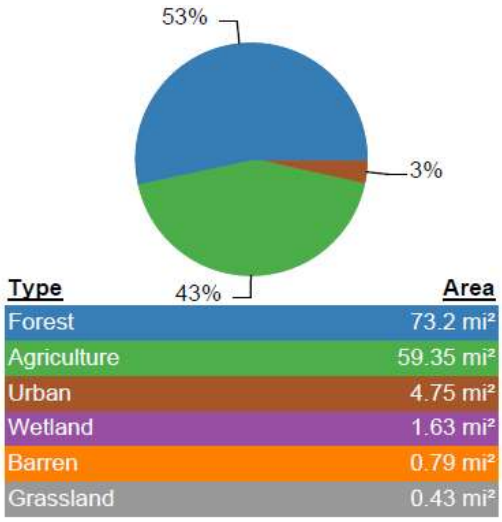
3.1 Waumandee Creek in Waumandee

Waumandee Creek is 34-mile long; 7 miles of the creek is a Class III brook trout stream. The remaining 27 miles are a warm water fishery. Per the WI DNR website, "This watershed is ranked High for runoff impacts on streams, Low for runoff impacts on lakes and High for runoff impacts on groundwater and therefore has an overall rank of High." Waumandee Creek is considered a "Cool-Warm Mainstem" stream under the state's Natural Community Determinations.

The soil type at each project site is identified as Orion Silt Loam, see **Appendix 3-1** for the Soils Map.

Per the DNR website under Watershed Characteristics, "Waumandee Creek is located in the Irish Valley – Waumandee Creek watershed which is 140.24 mi². Land use in the watershed is primarily forest (53%), agricultural (43%), urban (3%) and other uses (1%). This watershed has 842 stream miles, 357 lake acres and 8,254 wetland acres."

WAUMANDEE CREEK WATERSHED CHARACTERISTICS



Type	Area
Forest	73.2 mi²
Agriculture	59.35 mi²
Urban	4.75 mi²
Wetland	1.63 mi²
Barren	0.79 mi²
Grassland	0.43 mi²

4 MANAGEMENT PRACTICES USED TO GENERATE CREDITS

Streambank Stabilization. The 1,075 lineal feet streambank stabilization sites for the Reuter, Reglin, and Brommer Waumandee Creek projects were chosen as good sites to generate WQT credits through a riprap project, as these sections of streambank have very high-velocity waters that rapidly erode the banks during flood events. A very conservative annual recession rate of 0.5 feet per year was determined, but over the last few years the sites have lost many feet of streambank during flood events. The basis for determining the recession rate is to use the definitions defined by NRCS (see **Appendix 4-1** for the NRCS recession rate reference material used). The sites also have high levels of nonpoint source pollutants entering from farm practices. Working with the landowners to install conservation practices would greatly reduce those pollutants. Stabilizing and riprapping the creek banks to armor the banks is the best solution to limit future erosion on the Reuter, Reglin, and Brommer properties.

4.1 Duration of Management Practice

The duration of the streambank restoration management practice can be 50+ years if maintained properly and no extreme wet weather events occur. The construction will require shaping of the streambank and placement of properly sized rip rap. The landowners will enter into contracts with the County and the District that requires the landowner to maintain the streambank protection. The operation and maintenance are discussed in more detail in Section 13 of this plan.

4.2 Description of Best Management Practices Used

Streambank Stabilization. The streambank stabilization BMP will be designed by the County Land Conservation Dept. and follow the NRCS 580 Code. The bends where higher tractive forces are required to maintain vegetation will implement riprap armor. The County will design the riprap to follow NRCS standards by including geotextile fabric under the riprap and properly sized stones. The BMP will be designed such that the riprap should not migrate due to the flow of the stream.

5 AMOUNT OF CREDIT BEING GENERATED

This Water Quality Trading Plan is to trade for the pollutant of phosphorus. Throughout the year, sediment is transported in the stream from erosion of the streambanks. The sediment contains phosphorus, which causes poor water quality. NRCS has developed a spreadsheet that estimates the annual runoff of erosion based upon whether the impaired bank is a streambank, gully, or ephemeral gully. The estimated annual sediment volume is converted to an amount of phosphorus based upon the percent of leachable phosphorus in the soil, as determined by soil sample testing results. After installing BMPs, such as revegetation of a streambank or an armored riprap streambank, the sediment transport from the erosion has been theoretically eliminated. The estimated amount of annual phosphorus due to erosion can be calculated to determine the amount of credit generated by the BMP.

Calculations show that an estimated 154 pounds of phosphorus per year would be prevented from entering Waumandee Creek by constructing the Reuter, Brommer, and Regling WQT projects along Waumandee Creek. See **Appendix 5-1** for the Phosphorus Loss Calculation.

Additional credit can be generated with a "Habitat Adjustment" on the streambank restoration projects as further described in Section 6.5.

6 DESCRIPTION OF APPLICABLE TRADE RATIO PER AGREEMENT/MANAGEMENT PRACTICE

The Wisconsin Department of Resources will make the ultimate decision on the Trade Ratio to be applied to the project. The estimated ratio is derived from the following formula:

Trade Ratio = Delivery + Downstream + Equivalency + Uncertainty – Habitat Adjustment:1

6.1 Delivery Factor

The delivery factor is determined by the following equation:

Delivery Factor = (1 / SPARROW delivery fraction) – 1

The SPARROW delivery fraction is determined by a model developed for the USGS. The WDNR has implemented the Sparrow trade factors onto the Water Surface Data Viewer on their website. Upon review of the website the delivery factor was shown to be a 1:1 ratio (a zero in the trade ratio equation).

Waumandee Creek. The credit user and credit generator are located in the same HUC 12 basin, though two of the credit generators, Brommer and Reglin, are downstream of the credit user. The Brommer and Reglin sites are located approximately 1,500 feet downstream from the Waumandee discharge. The Reuter project is located approximately 350 feet upstream from the Waumandee discharge.

Per the *Guidance for Implementing Water Quality Trading in WPDES Permits*, the Delivery Factor in section 2.11.1 states "The delivery factor accounts for the distance between trading partners and the impact that this distance has on the fate and transport of the traded pollutant in surface waters" (pg. 26). The delivery factor is often zero when in the same HUC 12, see **Appendix 6-1** for the HUC 12 Watershed Basin Map. The sites for the Waumandee Creek projects are within the same HUC 12. However, two of the project sites are located downstream of the credit generator. DNR guidance shows a 1:1 ratio, therefore the delivery factor will be zero.

The Delivery Factor is zero (0).

6.2 Downstream Factor

The DNR WQT Guidance (2013) states, "The downstream factor is used to help prevent a violation of water quality criteria in the receiving water between the credit user and generator." (pg. 27). The downstream factor is only measured when the credit generator is downstream of the credit user. If the credit generator is upstream of the user, then the downstream factor is zero.

Two of the credit generators are downstream of the credit user (WWTP). The downstream trading factor is a function of the average annual pollutant load discharged by the credit user when compared to the overall total pollutant load at the credit user's point of standards application. The total phosphorus within the watershed was estimated using DNR's PRESTO tool. Following is the phosphorus load estimate from PRESTO for the Waumandee Creek watershed:

PRESTO Phosphorus Load Estimate	
Avg. Annual Nonpoint Phosphorous Load (80% Confidence Interval)	85,751 (40,185 - 182,987) lbs
Number of Facilities (Individual Facility Information below)	2
Avg. Annual Point-source Phosphorous Load (2010 - 2012 total of all facilities)	1,295lbs
Most Likely Point : Nonpoint Phosphorous Ratio	1% : 99%
Low Estimate Point : Nonpoint Phosphorous Ratio (Adaptive Management)	1% : 99%

Waumandee discharged an average of approximately 27 lbs/year of phosphorus from 2020-2022. As noted from the PRESTO phosphorus load estimate, the total average annual nonpoint phosphorus load is approximate 85,751 lbs. Waumandee contributes less than 1% of the total phosphorus load in the watershed. The downstream trading factor for the numerous credit user load allocations is indicated in the *Guidance for Implementing Water Quality Trading in WPDES Permits* (pg. 28).

The Waumandee Creek Downstream Factor is 0.1.

6.3 Equivalency Factor

The WQT for the credit user is based upon total phosphorus (TP). According to the *Guidance for Implementing Water Quality Trading in WPDES Permits* (2013), when accounting for the equivalency factor for TP, the equivalency factor is zero. This is because the differences between the soluble and sediment-bound P have been accounted for in the delivery factor (pg. 28).

The Equivalency Factor is zero (0).

6.4 Uncertainty Factor

The uncertainty factor is used to compensate for the uncertainty of the effectiveness of the WQT project/plan. The uncertainty, especially with non-point discharges, is because many factors which are not controllable determine the effectiveness of the implementation, such as climate, potential inaccuracies from field testing or the reliability of the management practice to perform under various hydrological conditions. The WDNR has established a table to help assign values to the uncertainty variable of the equation. The table is on page 151 in the *Guidance for Implementing Water Quality Trading in WPDES Permits.*

6.4.1 Bank Stabilization

For bank stabilizations, WDNR has assigned a value of a two (2) with aquatic habitat restoration (this accounts for the subtraction of the habitat adjustment) and a three (3) without aquatic habitat restoration; therefore, this project has an uncertainty value of three (3). The habitat adjustment will be considered in the following section.

The Uncertainty Factor is three (3).

6.5 Habitat Adjustment

Waumandee Creek. The habitat adjustment factor is the same as the habitat restoration discussed in section 6.4 above. To be eligible to claim credit for habitat restoration, the surface water where the project work is taking place must be listed by WDNR as an impaired water body due to the pollutant which the credit user is attempting to mitigate.

Per the WDNR website, https://dnr.wi.gov/water/waterDetail.aspx?key=1439074, Waumandee Creek is considered an impaired system due to phosphorus. The total phosphorus data exceeds the WisCALM listing criteria for the Fish and Aquatic Life use. Because the total phosphorus exceeds the WisCALM criteria, this stream would qualify for Aquatic Habitat Adjustment.

In order to obtain the habitat adjustment, habitat best management practices must be implemented and established as part of the project. Per Table 4, pg. 21 of the *Guidance for Implementing Water Quality Trading in WPDES Permits*, the uncertainty factor for Waumandee Creek can be reduced from a three (3) to a two (2) with aquatic habitat restoration. Helping to restore aquatic restoration can come in many forms.

The following example habitat structure alternatives are from the *NRCS Companion Document 580-15, EFH Notice 210-WI-122* (August 2011). This document can be seen in **Appendix 6-2**.

- **Random Boulder Placement.** This type of structure is placed within the streambed and will create micro habitat for several species of fish, but primarily it benefits trout. It will create mini scour holes, but care needs to be taken with the placement of the boulders, because if they are placed ineffectively then the currents can be deflected toward the streambanks causing erosion.
- **Cross-Channel Logs**. Logs and rock placed perpendicular to the stream flow create a pool area (scour holes) which provides habitat for all species of fish and can potentially provide for both snakes and turtles as well. This practice is best situated downstream of a riffle area and are best fit for slow moving areas within the stream. One of the disadvantages of these practices is the cost to install. The rock will need to be hauled to the site and the layout needs to be precise; therefore, the installation can be labor intensive which drives up the cost.
- **Trout Lunker & Mini-Trout Lunker.** This is a built habitat, which is unique to trout. It is essentially a shelter on the side of the stream bank. These structures are best suited for corners but can be placed anywhere if there is enough stream velocity to prevent sedimentation build up within the structure. These structures need to be incorporated during the streambank stabilization work, as the habitat is incorporated into the bank.
- **Root Wads.** Root wads are a structure placed at the bank toe to provide additional microhabitat and cover for several species including fish, amphibians, and reptiles. Root wads provide toe support for bank revegetation and collect sediment and debris that will enhance the streambank structure over time. Root wads are comprised of approximately 10' long tree trunks (boles) buried into the streambank with treetops removed. Boles are placed perpendicular to the flow channel with root fans still attached and oriented parallel to the channel. Due to their size, root wads typically require the use of heavy equipment for collection, transport, and installation.

Habitat structures will be included in the proposed Waumandee Creek WQT projects on the Reuter, Brommer, and Reglin properties.

The Habitat Adjustment is one (1).

Table 6.1 below summarizes the calculated Trade Ratios for the Reuter, Brommer, and Reglin WQT Projects.

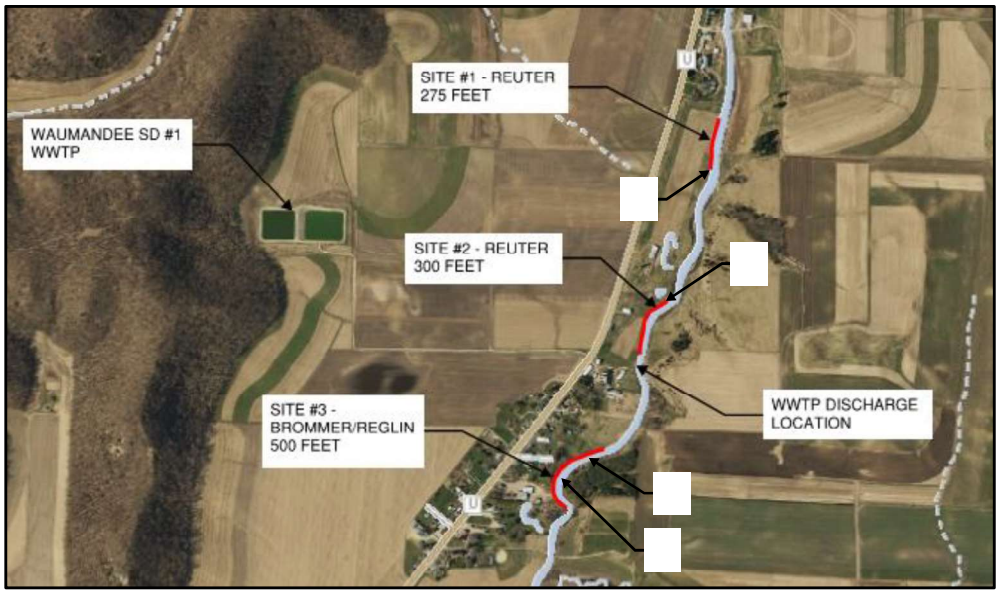
TABLE 6.1: WATER QUALITY TRADING FACTORS

1	Reuter	0	0	0	3	-1	**2**
2	Brommer / Reglin	0	0.1	0	3	-1	**2.1**

7 LOCATION WHERE CREDITS WILL BE GENERATED

Credits will be generated in the same HUC 12 as the Waumandee WWTP HUC 12. The credits will be generated on the same body of water upstream and downstream. The Waumandee Creek will be used to generate credits in this plan.

Waumandee Creek. The project sites are best described as both banks of the Reuter property and the west bank of the Brommer / Reglin properties along Waumandee Creek. The project has been broken into three sites. Site #1 is the Reuter property and includes approximately 200 feet along the creek immediately upstream of the WWTP discharge. Site #2 is also on the Reuter property and includes approximately 300 feet of streambank immediately upstream of the WWTP outfall. Site #3 is downstream of Sites #1, #2 and the WWTP outfall, and is approximately 500 feet of streambank. See the red lines along the map below.



8 TIMELINE FOR CREDITS AND AGREEMENTS

The credit generation must occur before the credit user can claim the credit, per the *Water Quality Trading How To Manual* (pg. 15). Construction is planned in 2023; therefore, the available date for the credits is 2023.

Streambank Stabilization. While performing as designed, the project will continue to generate credits on an annual basis. Regular inspection and maintenance of the riprap is essential.

The completed WQT Agreements with Waumandee, the County and the Reuter, Reglin, and Brommer are included in **Appendix 8-1**.

9 METHOD FOR QUANTIFYING CREDITS

Streambank Stabilization. Existing phosphorus loss for the streambank projects was produced using the NRCS Soil Loss Spreadsheet recommended by the DNR, which can be seen in **Appendix 5-1**. Buffalo County representatives collected data for the streambank project, including the linear feet and the average stream bank height in feet. A composite soil sample was collected for testing for total soil phosphorus concentration (% P) (see **Appendix 9-1** for soil test lab report from the University of Wisconsin Soil Science Laboratory) to determine the phosphorus loss in pounds per year. Soil samples were collected on November 23, 2020, for the Reuter project and on December 12, 2022, for the Brommer/Reglin projects. Soil samples were gathered by taking several individual grab samples and combining them into one large composite soil sample for every 200 feet (minimum) of stream. The average % P over the samples gathered was 0.05%. Thus, it was deemed that this project would withhold **154 pounds of phosphorus** from entering Waumandee Creek each year that the bank stabilization functions as planned. The three (3) sections of the creek were calculated separately and added together to determine the total pounds of phosphorus reduction.

A conservative recession rate of 0.5 feet/year was used for preliminary calculations. The methodology to determine the recession rates typically utilizes historical LIDAR data overlaid atop recent topographical survey data of the eroded streambanks. AutoCAD can then be used to perform earthwork calculations to determine the volume between the two surfaces. The amount of fill between the two surfaces represents the volumetric quantity that has eroded between the LIDAR conditions and the surveyed conditions. This is a total volume; therefore, the average annual erosion can be determined by dividing the volumetric amount by the number of years between the LIDAR and survey data. The recession rate is the volumetric eroded quantity divided by the eroded bank area. The eroded area is calculated from actual field measurements and the eroded volumetric quantity is the volume calculation determined through AutoCAD. Because Buffalo County does not have updated LIDAR, the conservative recession rate of 0.5 feet/year was used.

10 TRACKING PROCEDURES

This project progress will be tracked with photography before, during, and after riprap installation. The project sites will be inspected annually to monitor the preservation of the project site and BMP installations. The landowner will inspect the bank stabilization site after flood events and annually. The Buffalo County Department of Land Management will annually inspect the site to document that the banks are stable, and phosphorus was prevented from entering the water each year. At that time, the County will note debris that may have gathered in the stream and make assessments as to whether the debris is impeding flow or has become a fish habitat. The impeding debris will be removed, as discussed in Section 13.

11 CONDITIONS UNDER WHICH THE MANAGEMENT PRACTICES MAY BE INSPECTED

The riprap and vegetation should be inspected at least once per year and immediately after flood events. The velocity of Waumandee Creek increases greatly during flood events, and these portions of the streambank have been eroding at alarming rates during heavy rains. The landowners should work with the Buffalo County Department of Land Management to ensure that these high-velocity locations are properly maintained and should request technical assistance if there are any concerns regarding maintenance.

12 REPORTING REQUIREMENTS SHOULD THE MANAGEMENT PRACTICE FAIL

If the bank stabilization fails at any part of these sites, the landowners should immediately report the situation to the Buffalo County Department of Land Management so they can develop a remediation action plan.

13 OPERATION AND MAINTENANCE PLAN FOR EACH MANAGEMENT PRACTICE

Maintenance of the riprap will be the responsibility of the landowner with technical assistance from the Buffalo County Department of Land Management. Maintenance will consist of the following:

Inspect riprap annually and after heavy storms for any erosion or displacement of rocks. Repairs should be done immediately.

1. Debris will be removed to prevent clogging or rerouting of water in the channel. Channel clearing to remove stumps, fallen trees, debris, and sediment bars will only be performed when they are causing or could cause unacceptable bank erosion, flow restriction, or damage to structures. Habitat forming elements that provide cover, food, pools, and water turbulence shall be retained or replaced to the extent possible.
2. Check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and re-vegetated as soon as possible.
3. Periodically cut grass to control weeds and invading brush.
4. Restore or add riprap as needed.
5. Eliminate burrowing animals and repair damage.

14 LOCATION OF CREDIT GENERATOR IN PROXIMITY TO RECEIVING WATER AND CREDIT USER

Waumandee Creek. The Reuter WQT project is located directly upstream of the Waumandee WWTP discharge. The Brommer and Reglin projects are located downstream of the WWTP discharge. See **Appendix 6-1** for a Location Map.

15 PRACTICE REGISTRATION DOCUMENTS, IF AVAILABLE

The construction of the Waumandee Creek projects has not yet begun. Registration documents will be completed by the County and submitted to the DNR upon completion of construction in Fall 2023.

16 HISTORY OF PROJECT SITE(S)

Waumandee Creek. This Reuter project site has been privately owned by the Reuter family for decades. Similarly, the Brommer and Reglin properties have been privately owned for decades with no changes in land use over time. The streambanks of Waumandee Creek have seen an exponential increase of erosion problems due to an increasing number of flood events and heavy rainfalls, which is evident in the photographs seen in **Appendix A**.

17 REQUIRED PHOSPHORUS CREDITS

The goal is to fully comply with the future 0.075 mg/L phosphorus limits with WQT only, without any modifications to the wastewater treatment process to reduce effluent phosphorus. At the 2020-2022 Average Total Flow of 2.46 MG, the phosphorus mass loadings and the required WQT are summarized in the following table:

TABLE 17.1: REQUIRED PHOSPHORUS MASS OFFSET

Description	Units	Quantity
Waumandee Annual Average Total Flow	MG	2.46
Estimated Effluent Phosphorus Concentration	mg/L	1.3
WQT Target Concentration	mg/L	0.075
Annual Mass of Phosphorus	lbs/year	26.7
WQT Target Mass of Phosphorus	lbs/year	1.5
Baseline Mass (Existing - Target)	**lbs/year**	**25.2**

The total credits generated from each site are summarized in the following table:

TABLE 17.2: REQUIRED PHOSPHORUS MASS OFFSET

Project Description	BMP Type	Trade Ratio TR	P lbs/year	TR x P lbs/year
Reuter – 1	Streambank Stabilization	2	30	15
Reuter – 2	Streambank Stabilization	2	32	16
Brommer / Reglin	Streambank Stabilization	2.1	85	40.5
Total			**154**	**71.5**

The Waumandee Creek WQT Projects will generate 71 lbs./year in P credits, approximately 21 lbs./year more credits than necessary. The estimated project cost for the bank stabilization projects is **$65,000.00**. This does not include the associated Engineering costs. The cost estimate is included in **Appendix 17-1**.

17.1 Summary

Waumandee Sanitary District #1 cannot meet the new phosphorus limits with the technology currently employed at the WWTP, as discussed in the Facility Plan. Water quality trading is the most economical solution for meeting compliance with the new regulations. This plan has discussed the proposed project along with the associated calculations to provide enough detail to show the compliance will be met by the Sanitary District.

18 COMPLIANCE WITH WATER QUALITY TRADING CHECKLIST

This Water Quality Trading Plan was produced in accordance with the Wisconsin Department of Natural Resources, *Guidance for Implementing Water Quality Trading in WPDES Permits* based upon Table 5 (p. 45). Table 5 contains several columns of checklist items, but this plan must adhere to column (e), which states "credits are obtained from a construction project or implementation of a plan undertaken by the credit user for sources other than that covered by the credit user's WPDES permit." The Waumandee Sanitary District #1 will be installing bank stabilization at several locations to generate credits for the WWTP.

Below is a list of the requirements to be included in a WQT plan per column (e) of Table 5. This list includes a brief statement of where to find the information in this plan.

- Permittee's / credit user's WPDES Permit number. The Waumandee Sanitary District #1 WWTP WPDES permit number is WI-0061646-04-0 and is referenced in Section 2.
- Permittee's / credit user's contact information. The contact information is included in Section 19.
- Pollutants for which credits will be generated. Credits will be generated for total phosphorus, which is discussed in Section 5.
- Amounts of credits available from each location / management practice / local governmental unit when acting as a broker. The amount of credit available is discussed in Section 17.
- Certification that the content of the trading application is accurate and correct. The certification is included in Section 19.
- Signature and date of the permittee's / credit user's authorized representative. The signature of the authorized representative is included in Section 19.
- Location where credits will be generated (i.e. map of site where management practice will be applied including major drainage ways from the project). The location where credits are generated are discussed in Section 7 and 14. A map is located in both Section 7 and **Appendix 14-1**.
- Identification of method(s) including management practice(s) that will be used to generate credits at each location. Identifications of methods are discussed in Section 9.
- Duration of agreement (i.e. the design life of the management practice) with each credit generator. The duration of the agreement is discussed in Section 4.1.
- Schedule for installation / construction of each management practice. The schedule is discussed in Section 8.
- Operation and maintenance plan for each management practice used to generate credits. The operation and maintenance plan are discussed in Section 13.
- Date when credits become available for each management practice (i.e., when practice is established and effective). The date when the credits become effective is in 2023 when the permit is modified.
- Models used to derive the amount of credits. The model used to derive the amount of credits is a scientific equation for phosphorus loss and is the approved spreadsheet from WDNR. This is discussed in Section 9.
- The applicable trade ratio for each management practice including supporting technical basis. The applicable trade ratio is 3:1 and the technical basis and calculation of the trade ratio is discussed in Section 6. The habitat adjustment reduces the trade ratio to a 2:1, which is also discussed in Section 6.

19 CERTIFICATION OF WATER QUALITY TRADING PLAN

This plan was prepared by Davy Engineering Co., Inc. This Water Quality Trading Plan is complete, accurate and correct, to the best of our knowledge and belief.

Prepared By: Davy Engineering Co., Inc.

By: _____

Carson R Hackett, P.E.
Project Engineer
Davy Engineering Co.
115 6th Street South
La Crosse, WI 54601
Telephone: 608-782-3130

Owner: Waumandee Sanitary District #1

By: _____

Greg Mueller
President
Waumandee Sanitary District
S2002B County Road U
Cochrane, WI 54622
Telephone: 608-626-2279

References

United States Department of Agriculture. (August 2011). *Stream Habitat Development, Companion Document 580-15.* Natural Resources Conservation Services. doi:EFH Notice 210-WI-122

Wisconsin Department of Natural Resources. (2020). *A Water Quality Trading How To Manual.* doi:Guidance Number: 3400-2013-03

Wisconsin Department of Natural Resources. (2013). *Guidance for Implementing Water Quality Trading in WPDES Permits.* doi:Guidance Number: 3800-2013-04

APPENDIX A

PHOTOGRAPHS

REUTER PROJECT SITES

SITE 2

SITE 1

REGLIN/BROMMER PROJECT SITES

SITE 1

SITE 1

APPENDIX 2-1

WAUMANDEE NOTICE OF INTENT (NOI)

State of Wisconsin
Department of Natural Resources
101 South Webster Street
Madison WI 53707-7921
dnr.wi.gov

Notice of Intent to Conduct Water Quality Trading

Form 3400-206 (1/14)

Notice: Pursuant to s. 283.84, Wis. Stats., and ch. NR 217 Wis. Adm. Code, this form must be completed by any WPDES permittee that is using water quality trading as a method of complying with a permit limitation. Failure to complete this form would not result in penalties. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31 - 19.39, Wis. Stats.).

Applicant Information

Permittee Name	Permit Number	Facility Site Number
Waumandee Sanitary District #1	WI- 0061646-04-0	

Facility Address	City	State	ZIP Code
S1991 County Road U	Waumandee	WI	54622

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Joe Helwig	W889 County Road E	Cochrane	WI	54622

Project Name
Waumandee Water Quality Trade

Receiving Water Name	Parameter(s) being traded	HUC 12(s)
Waumandee Creek	Phosphorus	070400030403, 070400030401

Is the permittee in a point or nonpoint source dominated watershed? (See PRESTO results - http://dnr.wi.gov/topic/surfacewater/presto.html)
- ○ Point source dominated
- ◉ Nonpoint source dominated

Credit Generator Information

Credit generator type (select all that apply):
- ☐ Permitted Discharge (non-MS4/CAFO)
- ☐ Permitted MS4
- ☐ Permitted CAFO
- ☒ Urban nonpoint source discharge
- ☒ Agricultural nonpoint source discharge
- ☐ Other - Specify:

Are any of the credit generators in a different HUC 12 than the applicant?
- ○ Yes; HUC 12:
- ○ No
- ◉ Unsure

Are any of the credit generators downstream of the applicant?
- ○ Yes
- ○ No
- ◉ Unsure

Will a broker/exchange be used to facilitate trade?
- ◉ Yes; Name: Buffalo County Land Conservation
- ○ No
- ○ Unsure

Point to Point Trades (Traditional Municipal / Industrial Discharge, MS4, CAFO)

Discharge Type	Permit Number	Name	Contact Address	Is the point source credit generator currently in compliance with their permit requirements?
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure

Point to Nonpoint Trades (Non-permitted Agricultural, Non-Permitted Urban, etc.)

List the practices that will be used to generate credits:

Streambank Stabilization
Improved Farming Practices
Land Cover Conversion

Method for quantifying credits generated:
- ☐ Monitoring
- ☒ Modeling, Names: Streambank P calc., Snapplus
- ☐ Other:

Projected date credits will be available: 09/30/2024

The preparer certifies all of the following:

- I am familiar with the specifications submitted for this application, and I believe all applicable items in this checklist have been addressed.
- I have completed this document to the best of my knowledge and have not excluded pertinent information.

Signature of Preparer	Date Signed
Bruce A Nelson	2/20/2020

Authorized Representative Signature

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision. Based on my inquiry of those persons directly responsible for gathering and entering the information, the information is, to the best of my knowledge and belief, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative	Date Signed
Larry Mulder	2/20/2020

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APPENDIX 2-2

WWTP DISCHARGE LOCATION MAP

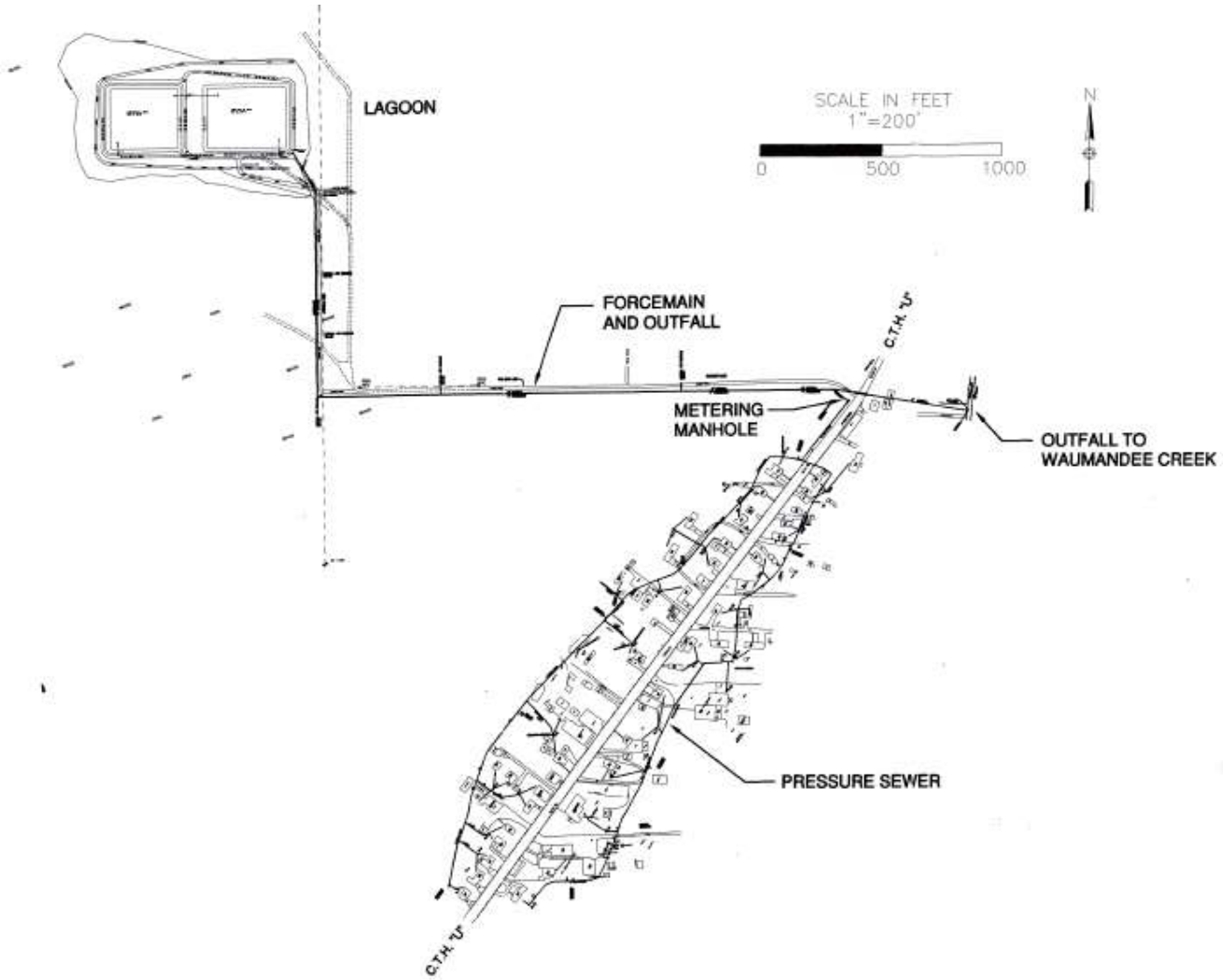
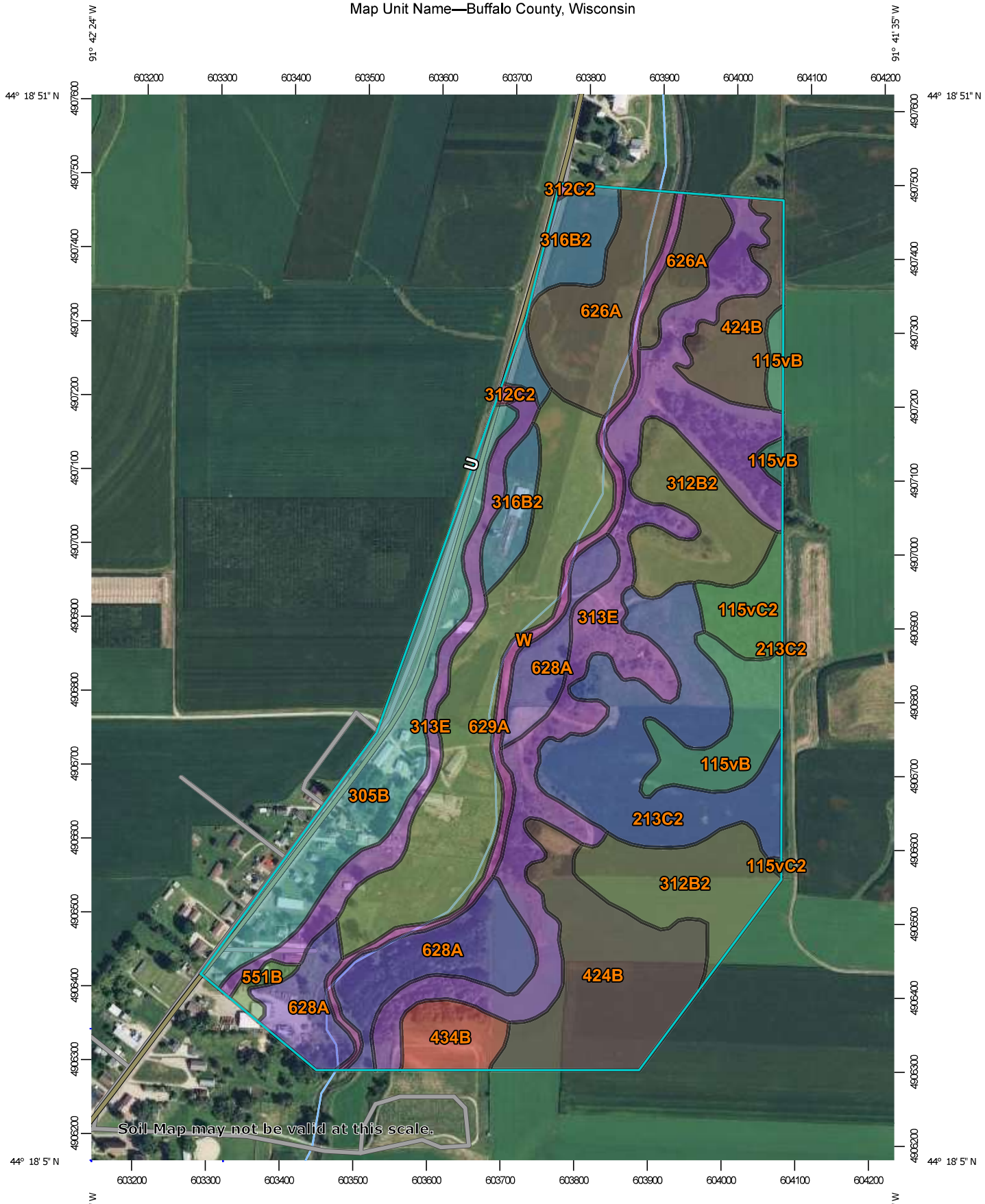


Figure 2-2
Waumandee SD #1
Sewer Service Area Map

APPENDIX 3-1

SOIL MAP



Map Scale: 1:7,020 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Arenzville silt loam, 0 to 3 percent slopes, occasionally flooded
- Bilson sandy loam, 1 to 6 percent slopes
- Ella silt loam, 1 to 6 percent slopes, moderately eroded
- Ettrick silt loam, 0 to 2 percent slopes, frequently flooded
- Festina silt loam, 1 to 6 percent slopes, moderately eroded
- Festina silt loam, 6 to 12 percent slopes, moderately eroded
- Hixton silt loam, 6 to 12 percent slopes, moderately eroded
- Impact sand, 2 to 6 percent slopes
- Merit silt loam, 1 to 6 percent slopes
- Orion silt loam, 0 to 3 percent slopes, occasionally flooded
- Plumcreek silt loam, 20 to 45 percent slopes
- Richwood silt loam, 1 to 6 percent slopes
- Seaton silt loam, driftless valley, 2 to 6 percent slopes
- Seaton silt loam, driftless valley, 6 to 12 percent slopes, moderately eroded
- Water
- Not rated or not available

Soil Rating Lines

- Arenzville silt loam, 0 to 3 percent slopes, occasionally flooded
- Bilson sandy loam, 1 to 6 percent slopes
- Ella silt loam, 1 to 6 percent slopes, moderately eroded
- Ettrick silt loam, 0 to 2 percent slopes, frequently flooded
- Festina silt loam, 1 to 6 percent slopes, moderately eroded
- Festina silt loam, 6 to 12 percent slopes, moderately eroded
- Hixton silt loam, 6 to 12 percent slopes, moderately eroded
- Impact sand, 2 to 6 percent slopes
- Merit silt loam, 1 to 6 percent slopes
- Orion silt loam, 0 to 3 percent slopes, occasionally flooded
- Plumcreek silt loam, 20 to 45 percent slopes
- Richwood silt loam, 1 to 6 percent slopes
- Seaton silt loam, driftless valley, 2 to 6 percent slopes
- Seaton silt loam, driftless valley, 6 to 12 percent slopes, moderately eroded
- Water
- Not rated or not available

Soil Rating Points

- Arenzville silt loam, 0 to 3 percent slopes, occasionally flooded
- Bilson sandy loam, 1 to 6 percent slopes
- Ella silt loam, 1 to 6 percent slopes, moderately eroded
- Ettrick silt loam, 0 to 2 percent slopes, frequently flooded
- Festina silt loam, 1 to 6 percent slopes, moderately eroded
- Festina silt loam, 6 to 12 percent slopes, moderately eroded
- Hixton silt loam, 6 to 12 percent slopes, moderately eroded
- Impact sand, 2 to 6 percent slopes
- Merit silt loam, 1 to 6 percent slopes
- Orion silt loam, 0 to 3 percent slopes, occasionally flooded
- Plumcreek silt loam, 20 to 45 percent slopes
- Richwood silt loam, 1 to 6 percent slopes
- Seaton silt loam, driftless valley, 2 to 6 percent slopes
- Seaton silt loam, driftless valley, 6 to 12 percent slopes, moderately eroded
- Water
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads

MAP INFORMATION

Local Roads

Background

Aerial Photography

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Buffalo County, Wisconsin
Survey Area Data: Version 16, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 16, 2020—Sep 23, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Name

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
115vB	Seaton silt loam, driftless valley, 2 to 6 percent slopes	Seaton silt loam, driftless valley, 2 to 6 percent slopes	6.0	4.1%
115vC2	Seaton silt loam, driftless valley, 6 to 12 percent slopes, moderately eroded	Seaton silt loam, driftless valley, 6 to 12 percent slopes, moderately eroded	3.0	2.0%
213C2	Hixton silt loam, 6 to 12 percent slopes, moderately eroded	Hixton silt loam, 6 to 12 percent slopes, moderately eroded	14.0	9.5%
305B	Richwood silt loam, 1 to 6 percent slopes	Richwood silt loam, 1 to 6 percent slopes	12.0	8.2%
312B2	Festina silt loam, 1 to 6 percent slopes, moderately eroded	Festina silt loam, 1 to 6 percent slopes, moderately eroded	14.0	9.5%
312C2	Festina silt loam, 6 to 12 percent slopes, moderately eroded	Festina silt loam, 6 to 12 percent slopes, moderately eroded	0.3	0.2%
313E	Plumcreek silt loam, 20 to 45 percent slopes	Plumcreek silt loam, 20 to 45 percent slopes	27.3	18.5%
316B2	Ella silt loam, 1 to 6 percent slopes, moderately eroded	Ella silt loam, 1 to 6 percent slopes, moderately eroded	6.0	4.1%
424B	Merit silt loam, 1 to 6 percent slopes	Merit silt loam, 1 to 6 percent slopes	16.6	11.3%
434B	Bilson sandy loam, 1 to 6 percent slopes	Bilson sandy loam, 1 to 6 percent slopes	2.9	2.0%
551B	Impact sand, 2 to 6 percent slopes	Impact sand, 2 to 6 percent slopes	0.7	0.5%
626A	Arenzville silt loam, 0 to 3 percent slopes, occasionally flooded	Arenzville silt loam, 0 to 3 percent slopes, occasionally flooded	10.2	6.9%
628A	Orion silt loam, 0 to 3 percent slopes, occasionally flooded	Orion silt loam, 0 to 3 percent slopes, occasionally flooded	13.0	8.8%
629A	Ettrick silt loam, 0 to 2 percent slopes, frequently flooded	Ettrick silt loam, 0 to 2 percent slopes, frequently flooded	17.3	11.7%
W	Water	Water	4.1	2.8%
Totals for Area of Interest			**147.4**	**100.0%**

Description

A soil map unit is a collection of soil areas or nonsoil areas (miscellaneous areas) delineated in a soil survey. Each map unit is given a name that uniquely identifies the unit in a particular soil survey area.

Rating Options

Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

APPENDIX 4-1

NRCS RECESSION RATES

RAP-M

Rapid Assessment, Point Method

&

BATHMASTER

Bathymetric Depth Mapping

Erosion and Sediment
Inventory Procedures
Illinois
August 2002

NRCS Natural Resources Conservation Service

William J. Gradle, State Conservationist

Lateral Recession Rates

Streambank Erosion

Lateral Recession Rate (ft/yr)	Ave. (ft/yr)	Category	Description
0.01 - 0.05	0.03	Slight	Some bare bank but active erosion not readily apparent. No vegetative overhang. No exposed tree roots. Bank height minimal.
0.06 - 0.2	0.13	Moderate	Bank is predominantly bare with some vegetative overhang. Some exposed tree roots. No slumping evident.
0.3 - 0.5	0.40	Severe	Bank is bare with very noticeable vegetative overhang. Many tree roots exposed and some fallen trees. Slumping or rotational slips are present. Some changes in cultural features, such as missing fence posts and realignment of roads.
0.5 - 2.0	1.5	Very Severe	Bank is bare and vertical or nearly vertical. Soil material has accumulated at base of slope or in water. Many fallen trees and/or extensive vegetative overhang. Cultural features exposed or removed or extensively alterered. Numerous slumps or rotational slips present. Generally silty or sandy bank material, NOT glacial till or exposed shale bedrock.
2.0 - 5.0	3.5	Extremely Severe	Bank is bare and vertical. Soil material has accumulated at base of slope and oftentimes still contains living grass or other vegetative material. Extensive cracking of the earth parallel to the exposed face above the bank. Generally evidence of "block-size" material that has either recently fallen in or is about to fall in. Can be "pillars" of soil materials that have already been loosened by stream and indicate imminent failure into the stream. Trees have been undercut and lie in stream, often with root balls intact. Silty or sandy bank material, NOT glacial till or exposed shale bedrock. (These rates should be verified with several observations or with actual streambank monitoring.)

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APPENDIX 5-1

NRCS PHOSPHORUS SOIL LOSS CALCULATIONS

NRCS Streambank and Irrigation Ditch Erosion Estimator (Direct Volume Method)

Farmer / Cooperator Name:	Waumandee Sanitary District	Evaluated By:	Carson Hackett
Tract Number:		Evaluation Date:	December 12, 2022

Field Number	Eroding Strmbnk Reach #; or Ditch Side/Bottom	Eroding Bank or Ditch Length (Feet)	Eroding Bank Height; or Ditch Bottom Width* (Feet)	Area of Eroding Strmbank or Ditch (FT^2)	Lateral or Ditch Bottom Recession Rate (Estimated) (FT / Year)	Estimated Volume (FT^3) Eroded Annually	Soil Texture	Approximate Pounds of Soil per FT^3	Estimated Soil Loss (Tons/Year)
	Reuter 1	275.0	5.0	1,375	0.50	687.5	Silt Loam	85	29.2
			Total Estimated Annual Streambank or Ditch Erosion Soil Loss (Tons):						29.2
			Percent Leachable Phosphorus in the Soil (nitric/peroxide):						0.06%
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons):						0.018
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):						**37**

Field Number	Eroding Strmbnk Reach #; or Ditch Side/Bottom	Eroding Bank or Ditch Length (Feet)	Eroding Bank Height; or Ditch Bottom Width* (Feet)	Area of Eroding Strmbank or Ditch (FT^2)	Lateral or Ditch Bottom Recession Rate (Estimated) (FT / Year)	Estimated Volume (FT^3) Eroded Annually	Soil Texture	Approximate Pounds of Soil per FT^3	Estimated Soil Loss (Tons/Year)
	Reuter 2	300.0	5.0	1,500	0.50	750.0	Silt Loam	85	31.9
	Reglin / Brommer	500.0	8.0	4,000	0.50	2,000.0	Silt Loam	85	85.0
			Total Estimated Annual Streambank or Ditch Erosion Soil Loss (Tons):						116.9
			Percent Leachable Phosphorus in the Soil (nitric/peroxide):						0.05%
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons):						0.058
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):						**117**

Total Phosphorus Loss for sum of reaches (lbs/yr):	**154**

* Eroding bank height is measured along the bank, not the vertical height of bank.

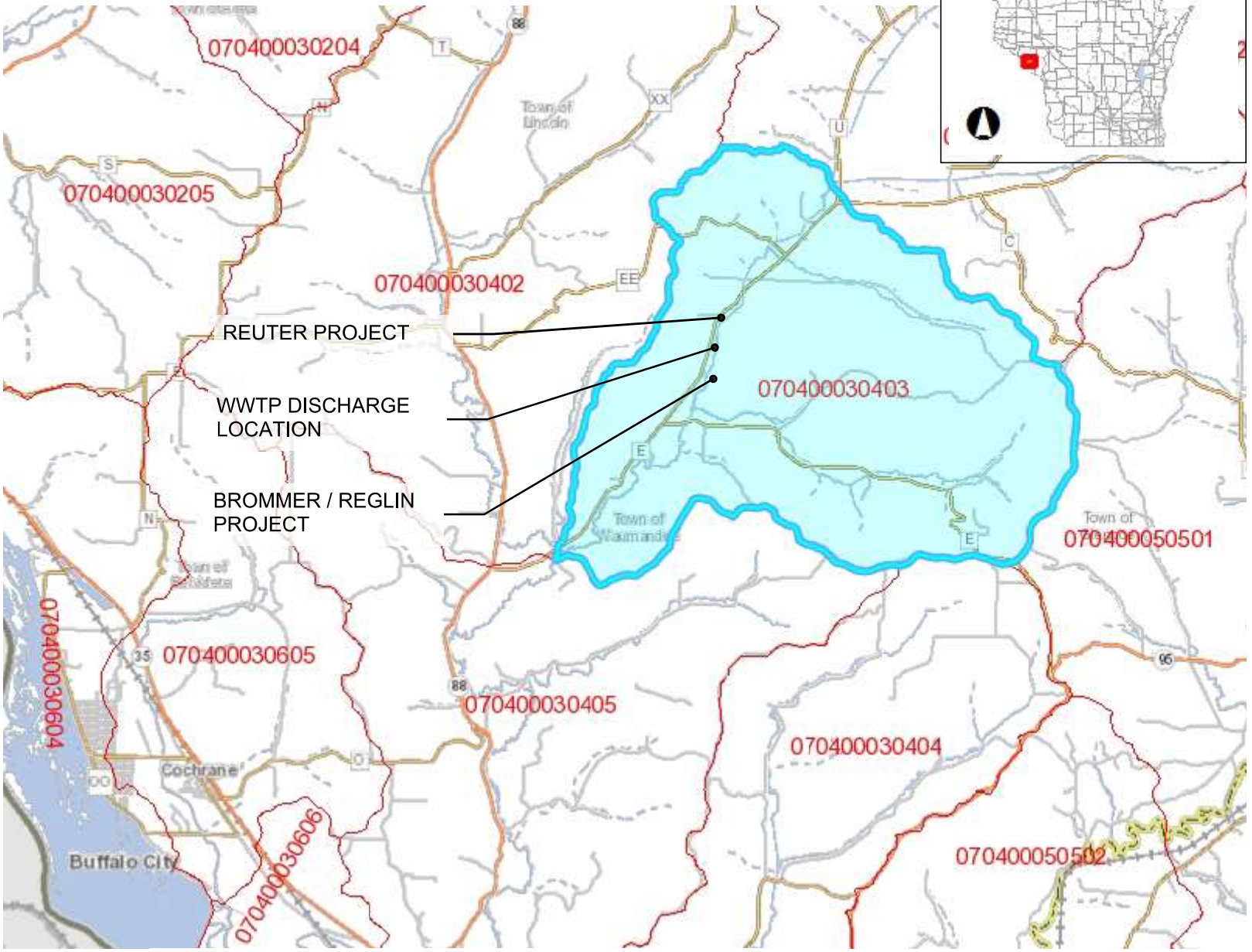
Streambank or Ditch Erosion Calculation Formula:

$$\frac{\text{Eroding Bank/Ditch Length} \times \text{Eroding Bank Ht or Ditch Bottom Width} \times \text{Lateral or Ditch Bottom Recession Rate (FT/YR)} \times \text{Soil Weight (lbs/ft}^3\text{)}}{2000} = \text{Estimated Soil Loss Per Year (Tons)}$$

APPENDIX 6-1

HUC 12 WATERSHED BASIN MAP

HUC 12 WATERSHED MAP



Legend

- 12-digit HUCs (Subwatersheds)
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

Notes

4.0 0 2.00 4.0 Miles

NAD_1983_HARN_Wisconsin_TM

1: 126,720

APPENDIX 6-2

NRCS COMPANION DOCUMENT, EFH NOTICE

Stream Habitat Development

Introduction

One of the purposes of streambank protection is to improve and protect wildlife habitat and biodiversity. Although adding stream and stream corridor habitat is not a required component of a protection project, these practices come with multiple benefits to a number of species.

This guide will explore some of the common habitat development practices that have been successfully implemented by the NRCS in Wisconsin. It includes recommendations on where each particular practice should be installed to maximize utility, and also a discussion of the pros and cons of each technique. All corresponding WI Standard Drawings are also included.

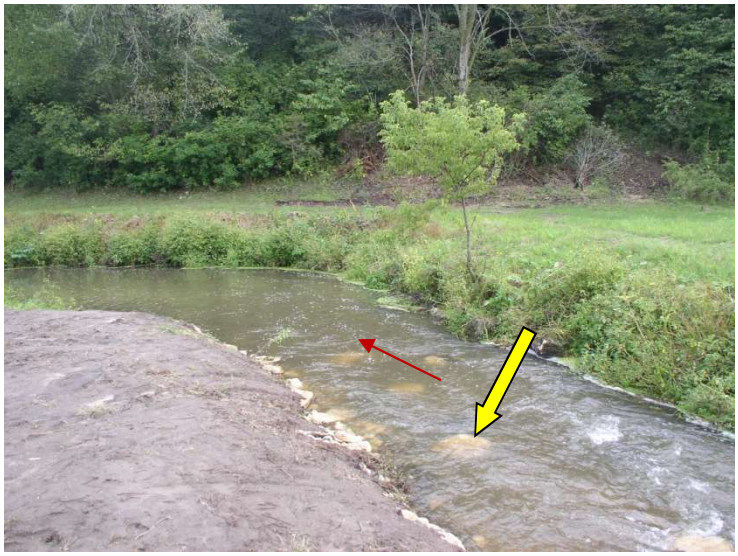
Knowledge of the fishery and fishery potential for a stream is essential when selecting the type of habitat development to install. The Field Office Technical Guide, Practice Standard 395 *Stream Habitat Improvement and Management* outlines criteria for installing habitat in streams. These plans require approval of the DNR fish manager. Be sure to review these criteria and coordinate with the DNR fish manager before beginning to plan habitat development.

There are many additional resources available on habitat development. The last page of this guide lists some them.

Table of Contents

Habitat Development Practices

Random Boulder Placement



Purpose:
Encourages additional scouring and provides micro habitat for several species.

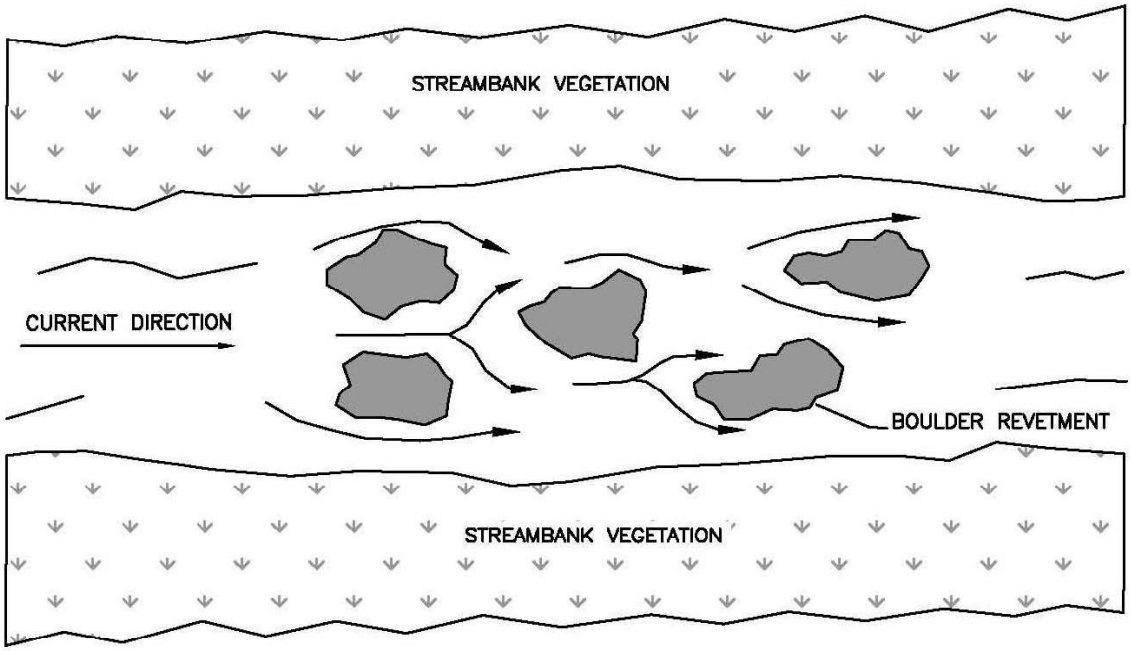
Location:
In runs and/or in existing scour holes.

Species:
The scouring and small overhangs primarily benefit trout but have the potential to benefit all fish species. If scouring down to native gravel beds is accomplished it can benefit all macro-invertebrates. If a shadow in the current creates deposition of fine sediments, it could be over-wintering habitat for turtles such as the Wood, Map and Blanding's. Also if placed so some boulders protrude from water during normal flows can be loafing and perching areas for birds.

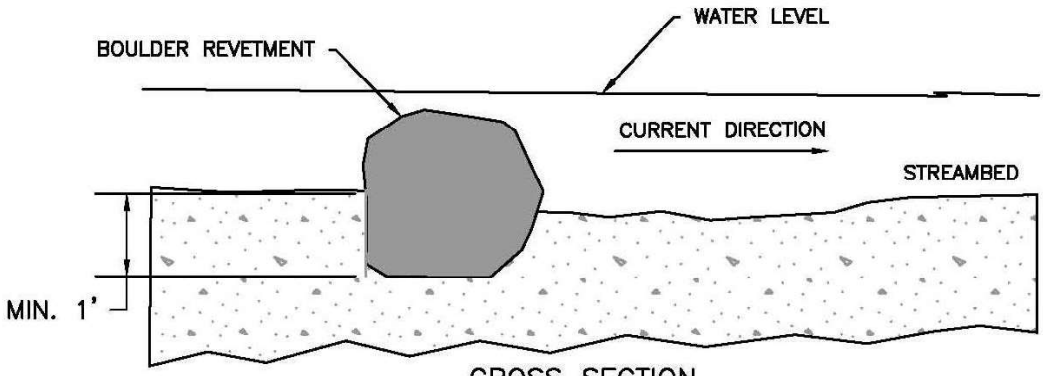
Caution:
Care needs to be taken in placement to ensure that currents are not deflected into stream banks, and also that the boulders will not catch flood debris which could cause stream bank erosion.

Pros	Cons
• Easy and inexpensive to install • Very versatile-can be installed in almost any setting • Potential to benefit many different species	• Only creates small amounts of habitat

See next page for Standard Drawing WI-937.



PLAN VIEW



CROSS SECTION

- AVERAGE ROCK SIZE– 1.5'–3.5' DIA.–ROCK, SIZE IS SITE DEPENDENT.
- A MINIMUM OF ONE BOULDER PER SET OF BOULDER REVETMENTS SHOULD PROTRUDE FROM WATER SURFACE DURING TIMES OF ORDINARY FLOW TO ACT AS MID–STREAM PERCHING/LOAFING SITES.
- USE BOULDERS WITH IRREGULARITIES OR MULITPLE BOULDERS TOGETHER TO PROVIDE SLIGHT OVERHANGING COVER.
- PLACE BOULDER REVETMENT SO CURRENT WILL NOT BE DEFLECTED INTO UNPROTECTED STREAM BANKS.

NRCS Natural Resources Conservation Service United States Department of Agriculture	RANDOM BOULDER PLACEMENT CLIENT: _____ COUNTY: _____	Date Designed _____ Drawn _____ Checked _____ Approved _____	Drawing Name WI–937 Date 12/2010 Sheet of

Cross-Channel Logs

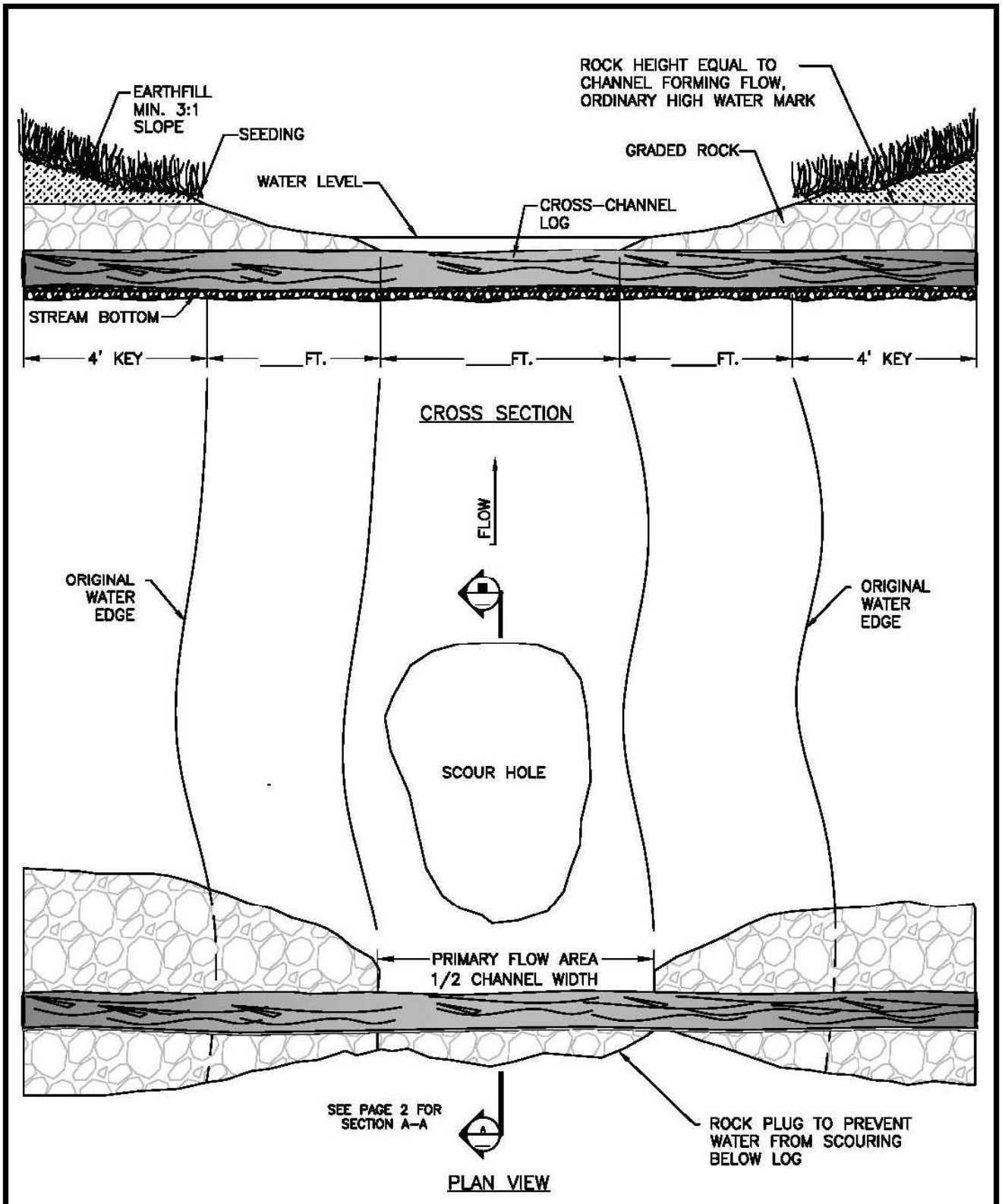
Purpose:
Creates and maintains pools (scour holes) to re-connect a stream's natural riffle pool sequence while providing habitat for several species. They can also be used to deflect water away from eroding banks or towards other stabilization structures.

Location:
Primarily installed immediately downstream of riffle areas. They are occasionally used in slow runs to add variances in habitat.

Species:
The scour holes created benefit all fish species. When used in conjunction with other habitat structures, this practice can also benefit turtle and snake species.

Pros	Cons
• Multi-purpose • Can easily be used with other structures like escape logs and boulder retards • Potential to benefit many different species • Can use on site woody material – reduces cost	• Hauled in rock needed for proper installation – higher project costs • Exact placement of rock needs to be precise and can require additional labor and expertise • Does not maintain as large of a scour hold as a vortex weir

See next page for Standard Drawing WI-935.



NRCS
Natural Resources Conservation Service
United States Department of Agriculture

CROSS CHANNEL LOG

CLIENT: ----

COUNTY: ----

Designed ----- Date ----

Drawn

Checked

Approved

DWG Name/Date WI-935/7-10

Page 1 of 2

Sheet XX of ----

Vortex Weir

Purpose:
Creates and maintains scour holes which serve as habitat for fish. They also re-connect a stream's natural riffle pool sequence.

Locations:
Primarily used immediately downstream of riffle areas. They can occasionally be used in slow runs to add variances in habitat.

Species:
All fish species are benefitted from the creation of the large scour hole. With the addition of other habitat development structures like escape logs or root wads, vortex weirs can also benefit turtle and amphibian species.

Pros

- Most effective practice for creating and maintaining scour holes
- Can easily be used with other structures like escape logs, root wads, or random boulder placements
- Potential to benefit many different species

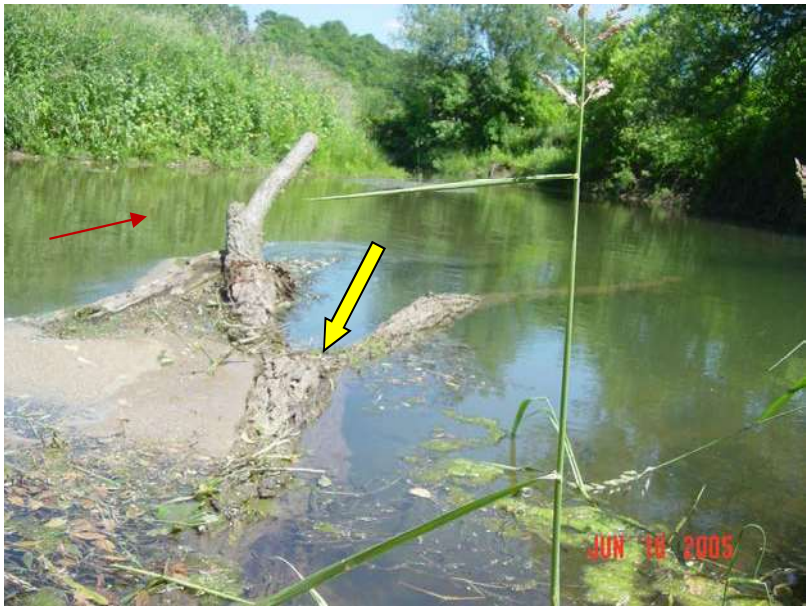
Cons

- Hauled in rock needed for proper installation – higher project costs
- Exact placement of rock needs to be precise and can require additional labor and expertise
- More difficult to install on narrow streams

See next page for Standard Drawing WI-932.

Escape Logs

Purpose:
Provide sunning areas for snakes, turtles and amphibians.



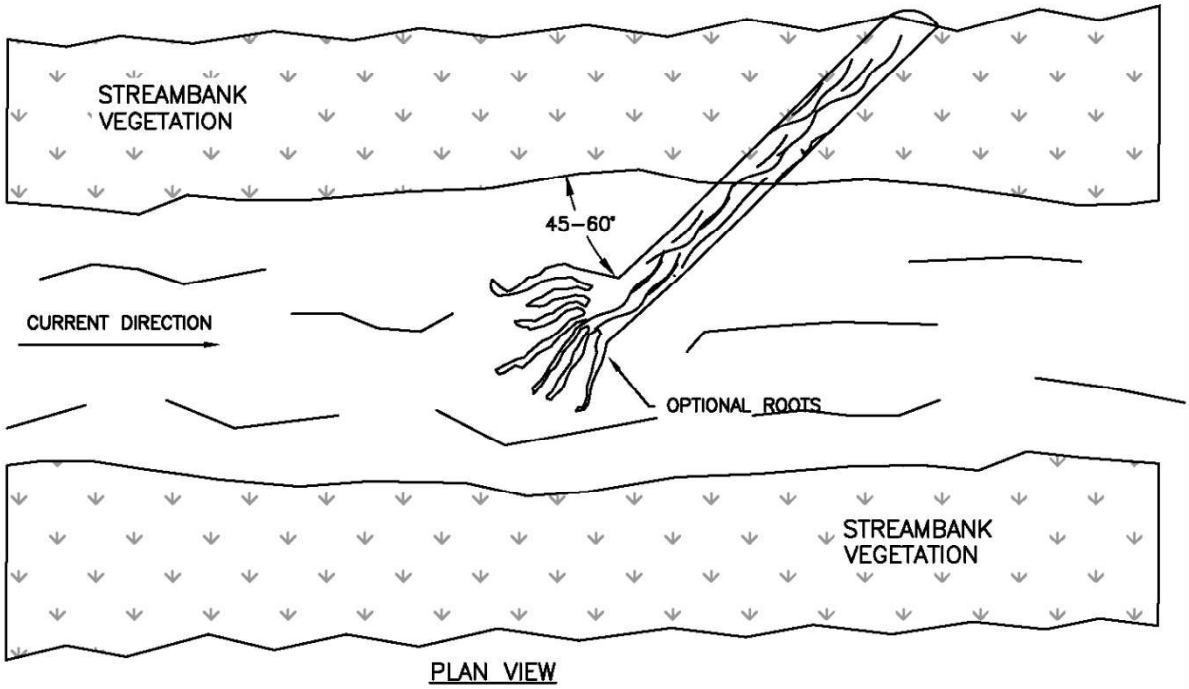
Location:
Installed in areas with deep, slow moving water.

Species:
All water dwelling snake, turtle and amphibian species benefitted. They can also serve as bird perches and provide minor overhead cover for fish.

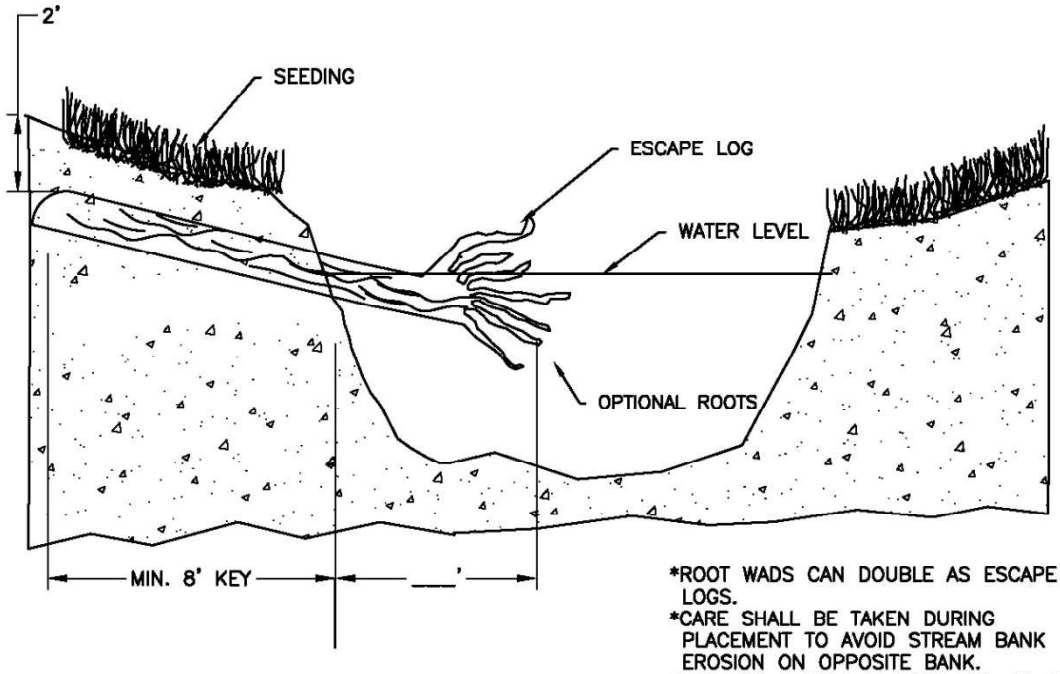
Caution:
Care needs to be taken in placement to ensure that currents are not deflected into stream banks.

Pros	Cons
• Potential to benefit many different species • Can use on site woody material – reduces cost	• Since logs are exposed to the atmosphere, they will not have as long of a lifetime as structures that are fully submerged

See next page for Standard Drawing WI-942.



PLAN VIEW



CROSS SECTION

*ROOT WADS CAN DOUBLE AS ESCAPE LOGS.
*CARE SHALL BE TAKEN DURING PLACEMENT TO AVOID STREAM BANK EROSION ON OPPOSITE BANK.
*THE LOG SHOULD EMERGE MIN. 3'–4' FROM EDGE OF STREAM BANK.
*ROOTS/LIMBS SHALL BE TRIMMED SO AS TO BE BELOW THE ORDINARY HIGH WATER MARK.

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

ESCAPE LOG

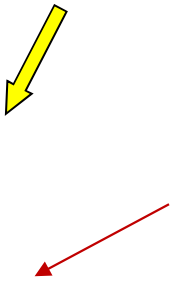
CLIENT: _____

COUNTY: _____

	Date	Drawing Name
Designed		WI–942
Drawn		Date 11/2013
Checked		
Approved		Sheet of

Log Deflectors

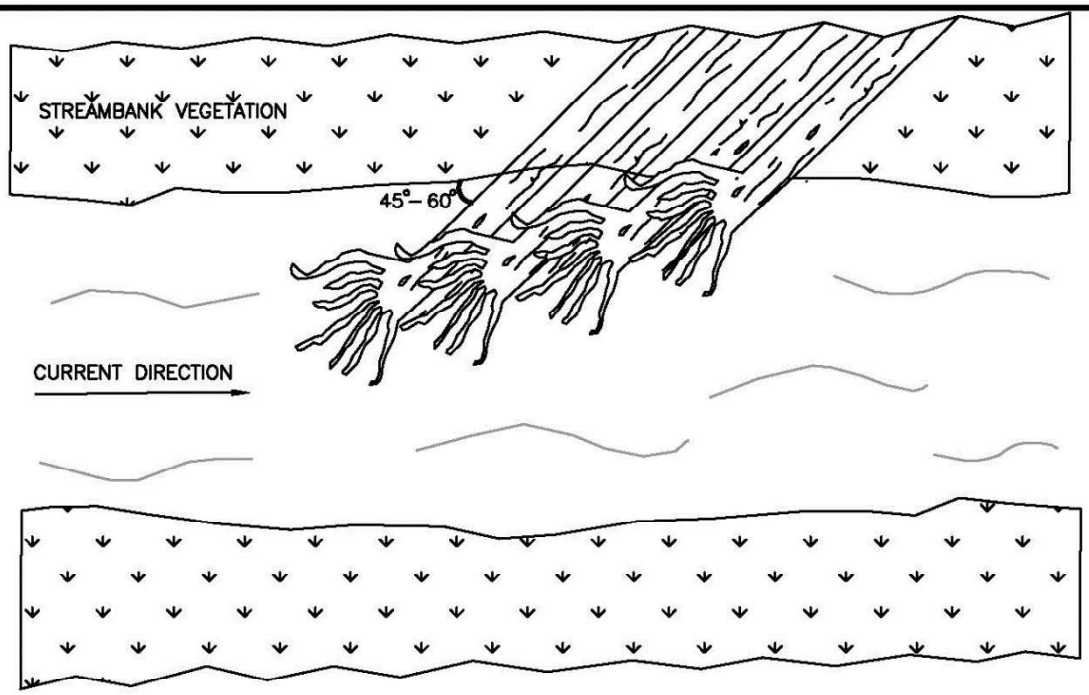
Purpose and Location:
Log deflectors have many functions depending on their location.
They are most commonly placed on eroding stream banks to guide the water away from the affected area. In long, wide stagnant runs they can narrow the stream and recreate some meander. In all settings given enough time, they encourage the development of a mudflat downstream of the structure.



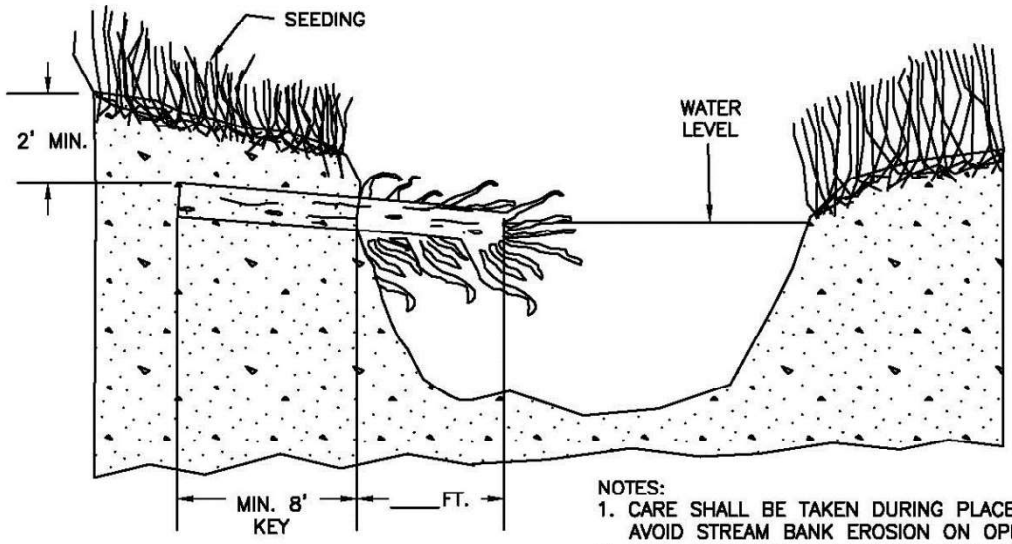
Species:
Root wads on the logs can serve as cover for reptile, amphibian, and fish species or as a perching area for birds. The mudflat that develops downstream can be utilized by amphibians and turtles as a basking area, as well as a feeding ground for shore birds.

Pros	Cons
• Multi-purpose • Can be used in many different areas • Potential to benefit many different species • Can use on site woody material – reduces cost	• More difficult to install – requires expertise from the equipment operator • Effectiveness of this technique could vary between streams and from flood event to flood event • Since portions of the logs are exposed to the atmosphere, they will not have as long of a lifetime as structures that are fully submerged

See next page for Standard Drawing WI-934.



PLAN



CROSS SECTION

NOTES:
1. CARE SHALL BE TAKEN DURING PLACEMENT TO AVOID STREAM BANK EROSION ON OPPOSITE BANK.
2. ROOT WADS MUST BE PRESENT ON EACH LOG.
3. THE LOG DEFLECTOR SHALL CONSIST OF THREE LOGS AT A MIN 24" DBH OR FIVE LOGS OF APPROX. 16" DBH.
4. THE MAJORITY OF THE LOG SHALL BE SUBMERGED WITH APPROX. 15% OF THE LOG EMERGED. CARE SHALL BE TAKEN TO KEEP THE LOG BELOW THE OHWM.

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

LOG DEFLECTOR

CLIENT: _____

COUNTY: _____

	Date	Drawing Name
Designed		WI–934
Drawn		Date
Checked		11/13
Approved		Sheet of

Rock Deflectors

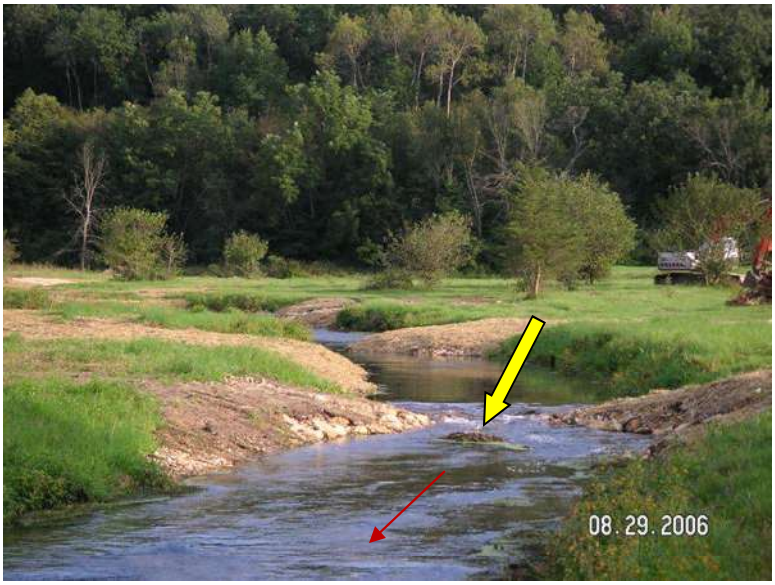
Purpose and Location:
Rock deflectors have many functions depending on their location.
They are most commonly placed on eroding stream banks to guide the water away from the affected area. In long, wide stagnant runs they can narrow the stream and recreate some meander. In all settings with time, they encourage the development of a mudflat downstream of the structure. They are also used often to redirect current into another habitat structure, such as a set of lunker structures.

Species:
The mudflat that develops downstream can be utilized by amphibians and turtles as a basking area, as well as a feeding ground for shore birds.

Pros	Cons
• Multi-purpose • Immediate, permanent solution to erosion problems • Can be used in many different areas • Potential to benefit many different species • Natural in appearance after establishment of vegetation	• More difficult to install – requires expertise from the equipment operator • More expensive since they can require large quantities of rock • Improper placement can cause serious erosion to banks on opposite side of the stream

See next page for Standard Drawing WI-933.

Root Wads



Purpose:
Provide additional micro-habitat and cover for several species. They can also serve as escape logs and sunning areas.

Location:
Placed in deep scour holes, and often used in conjunction with other structures like vortex weirs or cross channel logs.

Species:
Provides overhead cover and micro-habitat for fish, amphibians, and reptiles.

Pros	Cons
• Can be used in along with other habitat structures • Potential to benefit many different species • Can use on site woody material – reduces cost	• If improving public recreation (fishing) is the purpose of the project, a root wad decreases the fishability of the scour hole

See next page for Standard Drawing WI-936.

Snake Hibernaculum

Purpose:
Provides a unique habitat for snake species that require a high humidity or saturated over-wintering area with temperatures above freezing.

Location:
Placed outside of the primary floodplain in an area that will provide 2'-3' of ordinary summer water table at the bottom of the trench with a minimum of 5' of soil cover from the top of the ordinary summer water table to the soil surface to provide necessary temperature buffering. The entrance should be placed with a southerly or westerly exposure. Also, if site conditions allow, a snake hibernaculum could be incorporated in the beginning or end section of Rip-Rap. Only one hibernaculum needed per roughly 1-2 mile segment of stream.

Species:
Snake species such as Milk, Garter and Western Fox snakes with the unique over-wintering needs mentioned above.

Caution:
Proper trench safety construction protocol should always be followed.

Pros	Cons
• Provides a unique habitat for snake species that would not normally be accommodated	• Requires a large amount of rock – increased project cost

See next page for Standard Drawing WI-941.

Turtle Hibernaculum

Purpose:
When stream bank stabilization practices occur such shaping and rip-rapping, turtle habitat is destroyed. Installing these lunkers provides an alternative habitat location for snapping turtles to over-winter.

Location:
These lunkers should be installed within a reasonable distance from bank stabilization projects and should be positioned in the shadow of the current. Best results are achieved if the lunker is installed adjacent to a structure that deflects flow (such as a rock deflector) and creates a back eddy to promote sedimentation.

Species:
The snapping turtle will be the primary species of benefit since they over-winter in tall eroding stream corners.

Special Notes:
- The hibernaculum should have no rock behind them
- A dredged hole should be dug in front of the lunker to serve as a sediment trap to catch fine sediments – this is where the turtles will burrow down to over-winter
- Care needs to be taken to ensure that no stream current will prevent sedimentation from occurring

Pros	Cons
• Provides a unique over-wintering habitat for snapping turtles • Contractors familiar with stream habitat restoration should be able to complete these project fairly easily	• This is a new practice, therefore there is no research to confirm the effectiveness of the technique

See next page for Standard Drawing WI-940.

Trout Lunker & Mini-Trout Lunker

Purpose:
To provide a unique habitat for trout.

Location:
Primarily placed on eroding stream corners while stream bank stabilization techniques such as shaping and rip-rap are being performed, but can be placed in any location where stream flow will pass through the lunker keeping them clean of sediment deposition.

Species:
Primarily Brown Trout, but will also be utilized by Brook Trout.

Pros	Cons
• Very effective habitat development technique – they have proven to increase the holding capacity for trout in a proper stream	• Favors Brown Trout over other fish species • Relatively expensive to install

See next pages for Standard Drawings WI-930 and WI-930A.

Brush Bundle

Purpose:
Induces sedimentation to allow the stream to constrict itself naturally. Adds woody material to the stream which serves as cover for many species.

Location:
In sections of stream in the shadow of the current, such as behind point bars or deflector structures.

Species:
Benefits reptile and amphibian species by adding cover.

Pros	Cons
• Can use on-site woody material – reduced cost • Relatively easy to install • Potential to benefit several species	• There have not been enough of these structures installed to determine the overall effectiveness – it is possible that there would be a minimal effect on sedimentation.

Other Resources

Glossary of Wisconsin Trout Habitat Development Techniques by Robert L. Hunt, illustrations by Ruth King, has been published by the Wisconsin Department of Natural Resources, 1987.

Unit Construction Of Trout Habitat Improvement Structures For Wisconsin Coulee Streams by David M. Vetrano, Administrative Report No. 27, 1988.

Driftless Riparian Habitat Guide prepared by Jeff Hastings with Trout Unlimited. Report No. 060109, 2009.

APPENDIX 8-1

WATER QUALITY TRADE AGREEMENTS

8027282
Tx:4017183

276579

CAROL J BURMEISTER
REGISTER OF DEEDS
BUFFALO COUNTY, WI
RECORDED ON
07/23/2021 08:34 AM

REC FEE: 30.00
PAGES: 7

Document Number	Water Quality Trading Agreement: Waumandee Sanitary District #1 and Rick Reuter

Recording Area

Name and Return Address
Buffalo County Land Conservation Department
407 S. 22nd Street
Alma, WI 54610

Parcel Identification Number (PIN)
034003230000
034003240000

Real property in the County of Buffalo, Town of Waumandee, State of Wisconsin, being that part of the NW ¼ of the SE ¼ and the SW ¼ of the SE ¼ of Section 10, Township 21 North, Range 11 West, Buffalo County, Wisconsin, lying easterly of County Road U.

THIS PAGE IS PART OF THIS LEGAL DOCUMENT – DO NOT REMOVE

This document was drafted by:
Click or tap here to enter text.

Water Quality Trading Agreement: Waumandee Sanitary District #1 and Rick Reuter

PermitteeInformation

Credit User Name (Permittee)	Permit Number
Waumandee Sanitary District #1	WI-0061646-04-0

Credit User Address
W889 County Road E, Cochrane, WI 54622

Broker Name	Trade Agreement Number
Buffalo County Land Conservation Division	WQT-0061646-01

Broker Address

Street Address	City	State	ZIP Code
407 S 2nd St, PO Box 58	Alma	WI	54610

Project Name
Rick Reuter Waumandee Creek Bank Stabilization

Name of Credit Generator (Landowner/Operator) (Last, First, M.I.)
Reuter, Rick & Jean

Street Address	City	State	ZIP Code
S2099 Cty Rd E	Cochrane	WI	54622

PropertyInformation

Name of Landowner(s) (if not Operator) (Last, First, M.I.)

Street Address	City	State	ZIP Code

Legal Description of Property - Contiguous sites under the same ownership: (add additional sheets if necessary)

Parcel Identification Numbers (PIN): 034003240000, 034003230000

Parcel ID(s):
034003240000, 034003230000

Site Locator for Construction Projects

County	Township	Range E/ W	Section	Quarter/Quarter (e.g., NW ¼ of the NE ¼)
Buffalo County	21N	11W	15	NE ¼ of the NW 1/4
	N			
	N			
	N			

Agreement

The property described above is enrolled in a Water Quality Trading Agreement. Funding is provided by the credit user to pay for the installation of best management practices (BMPs) on the described property which are designed to reduce phosphorous, a nonpoint source of pollution. This agreement commits the landowner/operator, their heirs or successors and assigns to maintain the BMPs and fulfill the trade agreement until a satisfaction or release is filed by the credit user or 20 years, whichever occurs first

Plans which describe the BMPs, costs, installation schedule, and conditions are hereby incorporated into this agreement, are on file with the credit user and may be given to Wisconsin Department of Natural Resources (DNR) upon request by the DNR.

Landowner/Operator

Signed this 21 day of July 20 21.

Signature of Landowner/Operator

Rick Reuter
Typed Name of Landowner/Operator

Signature of Landowner/Operator

Jean Reuter
Typed Name of Landowner/Operator

STATE OF WISCONSIN)
) ss.
Buffalo County)

Personally came before me this 21st day of July, 2021.

The above named Rick Reuter & Jean Reuter to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public — Brenda Pronschinske
Typed Name of Notary Public

Notary Public Buffalo County, Wisconsin

My commission (is permanent) (expires 5-19-2023).

Landowners (if not operator)

If the landowner section is not completed, check (X) one or both of the following that apply

☒ Landowner is also operator

☐ Trade agreement contains only high residue management, nutrient management, pesticide management, cropland protection cover (green manure)

Signed this 21 day of July 2021.

Signature of Landowner (if not operator)

Rick Reuter
Typed Name of Landowner (if not operator)

Signature of Landowner (if not operator)

Jean Reuter
Typed Name of Landowner (if not operator)

STATE OF WISCONSIN)
) ss.
Buffalo County)

Personally came before me this 21st day of July, 2021.

The above named Rick Reuter & Jean Reuter to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public — Brenda Pronschinske
Typed Name of Notary Public

Notary Public Buffalo County, Wisconsin

My commission (is permanent) (expires 5-19-2023)

Credit User

Signed this 21 day of July, 2021.

Signature of credit user

Waumandee Sanitary District #1
Typed Name of credit user/broker/exchange

STATE OF WISCONSIN)
) ss.
Buffalo County)

Personally came before me this 21st day of July, 2021.

The above named Greg Mueller to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public — Brenda Pronschinske

Notary Public Buffalo County, Wisconsin

My commission (is permanent) (expires 5-19-2023)

Other Signer- Specify title or relationship: Buffalo County Land Conservation Division – Broker

Signed this 23 day of July, 2021.

Signature

Kristen Foehringer, Land Conservation Manager
Typed Name

Signature

Kristin Foehringer
Typed Name

STATE OF WISCONSIN)
Buffalo County) ss.
)

Personally came before me this 23rd day of July, 2021.

The above named Kristin Foehringer to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Sonya J Hansen
Signature of Notary Public

Sonya J Hansen
Typed Name of Notary Public

Notary Public Buffalo County, Wisconsin

My commission (is permanent) (expires 7-12-2022).

Other Signer- Specify title or relationship:

Signed this day of, 20.

Signature

Typed Name

Signature

Typed Name

STATE OF WISCONSIN)
County) ss.
)

Personally came before me this day of, 20.

The above named to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public County, Wisconsin

My commission (is permanent) (expires).

Other Signer- Specify title or relationship:

Signed this day of, 20.

Signature

Typed Name

Signature

Typed Name

STATE OF WISCONSIN)
County) ss.
)

Personally came before me this day of, 20.

The above named to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public County, Wisconsin

My commission (is permanent) (expires).

☐ Check this box if this page is purposely left blank.

Section A – General Requirements

1. The following relationship has been established for this Water Quality Trading Agreement:
   - The Waumandee Sanitary District #1 will hereby be known as the Credit User.
   - The Buffalo County Land Conservation Department will be known as the Broker.
   - Rick Reuter will be known as the Landowner/Operator.
2. This contract may be amended, by written mutual agreement of the parties, during the installation or maintenance period, if the proposed changes will provide equal or greater control of water pollution. For any changes in practice components or costs, the broker will determine eligibility and whether to approve such changes. Any increases to the project cost shall be approved in advance in writing by the Credit User.
3. The Credit User reserves the right to terminate this agreement if the Wisconsin Department of Natural Resources (DNR) does NOT approve the Water Quality Trading Plan (WQT Plan). The WQT identifies this project for phosphorus credits to help the Credit User's wastewater treatment facility (WWTF). These credits will be established in the WQT Plan and analyzed to determine if it is a cost-effective project. Should the DNR either deny or reduce the project credits which results in a higher cost per pound of phosphorus credit, then the Credit User may terminate the agreement.
4. The Broker reserves the right to enter the property to verify the information on the inspection report is accurate.
5. Any duly authorized officer, employee or representative of WDNR shall have the right to access and inspect the practices pursuant to Wis. Stat. 283.55(2) so long as this Agreement remains in effect.
6. **Hold Harmless.** The Credit User shall defend, indemnify and hold the Broker, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the negligence of the Broker.

Section B – Credit User

1. The Credit User is responsible for a share of the monetary costs incurred with the BMP practice installation, which includes but is not limited to site preparation, clearing, ensuring planned grades; stream bank shaping; rock riprap and installation; liming, fertilizing, seeding and mulching. The Credit User's share of the monetary costs will not be distributed until the WDNR has approved the WQT Plan and credits. If the project is constructed prior to WDNR approval of the WQT Plan, then the Landowner shall pay for the construction and be partially reimbursed by the Credit User after the WQT plan has been approved by the WDNR.
2. The Credit User reserves the right to analyze the cost per pound of phosphorus credit, to determine if the project is a good fit financially. The Credit User's share shall consider the cost per pound of phosphorus.
3. The Credit User shall have the right to access the property for inspection or maintenance. If a natural disaster impacts the BMPs and causes damage that reduces phosphorus credits and The Landowner/Operator does not take corrective action, the Credit User has the option of paying the cost of repairs or releasing this agreement.

Section C – Landowner/Operator Shall:

1. If any land covered by this agreement is transferred or otherwise changes ownership, this agreement will be held in obligation with the land in perpetuity and the new owners will be obligated to comply with this agreement. Landowners are obligated to notify any prospective buyers of this agreement and their responsibilities under this agreement and applicable law.
2. The Landowner/Operator agrees to repay reimbursed project costs to the Credit User, upon demand by the Broker, if the Landowner fails to comply with the terms of this agreement. Repayment shall not be required if a practice(s) is rendered ineffective due to circumstances which are beyond the control of the Landowner/Operator.
3. The Landowner/Operator shall inspect the riprap and streambank at least annually and after heavy storms. Any erosion or displacement of rocks shall be repaired. The Broker should be contacted immediately and directly if any damage has occurred.
4. The Landowner/Operator shall ensure that debris is removed from the channel and that vegetation is controlled around the channel only when the vegetation or obstructions are threatening stream function. Invasive vegetation should be controlled, and channel obstructions deemed harmful may be removed. Channel clearing to remove stumps, fallen trees, debris, and sediment bars shall only be performed when they are causing or could cause unacceptable bank erosion, or flow restriction.
5. The Landowner/Operator shall check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and replanted by Landowner as soon as possible with a seed mix pre-approved by the broker.
6. Periodically mow the vegetative buffer to control weeds and invading brush. All farm equipment and row crops must remain outside of the agreed upon 20-foot buffer from the top of the bank.
7. The Landowner/Operator shall eliminate all burrowing rodents and repair damage caused by them.
8. The Landowner/Operator shall maintain the project consistent with NRCS technical standard 580.
9. The Landowner/Operator shall work with the Broker in the preparation of a Livestock Management Plan.
10. Installation of these practices brings the Landowner into compliance with the applicable state and local performance standards listed below. Compliance with these performance standards shall be in perpetuity. These practices must be maintained or

replaced with a practice which ensures continued compliance with the following N.R. 151 performance standards:

- N.R. 151.06 Clean Water Diversion

Section D. Broker

1. The Broker will be responsible for regulation of applicable performance standards, annual inspections, and monitoring of landowners' obligations in the form of performing on-site checks as needed. The Broker shall not have any financial obligation for this project except as expressly stated in this agreement.
2. The Broker will ensure the contract is recorded in the Buffalo County Register of Deeds office, the Landowner/Operator shall be responsible for the $30 filing fee.
3. The Broker agrees to complete annual inspections.

TA Number	Typed Name of Landowner/Operator	Initials of Landowner/Operator	Date
	Rick Reuter	RR	7/21/21

The cost-share recipient shall implement and maintain all best management practices listed in this Contract, unless otherwise amended in accordance with this agreement.

Installation Period — From (MM/YYYY): ______ To (MM/YYYY): ______

Field #	DNR BMP Code	Practice Name	Quantity	Unit	Unit Cost	Total Cost	Reimbursement Rate (%)	Cost-Share Amount	Cost-Share Amt. From Other Programs*	Year Installed
	NRCS 580	Limestone rock riprap D50 size 8" Diameter				$ 7,100.00				2020
					TOTALS	$ 7,100.00	$ -	$ -	$ -	

* Identify Program Names:

CSA Number	Typed Name of Landowner / Operator	Initials of Landowner/Operator	Date
	Rick Reuter		

DocId:8037307
Tx:4023733

281908

CAROL J BURMEISTER
REGISTER OF DEEDS
BUFFALO COUNTY, WI
RECORDED ON
03/28/2023 11:31 AM

REC FEE: 30.00
PAGES: 7

Document Number	Water Quality Trading Agreement: Waumandee Sanitary District #1 and Jeff Reglin

Recording Area

Name and Return Address
Buffalo County Land Conservation Department
407 S. 22nd Street
Alma, WI 54610

Parcel Identification Number (PIN)
034004280000

Real property in the County of Buffalo, Town of Waumandee, State of Wisconsin, being that part of the NE ¼ of the NW ¼ Section 15, Township 21 North, Range 11 West, Buffalo County, Wisconsin, lying easterly of County Road U.

THIS PAGE IS PART OF THIS LEGAL DOCUMENT – DO NOT REMOVE

This document was drafted by:

Water Quality Trading Agreement: Waumandee Sanitary District #1 and Jeff Reglin

Permittee Information

Credit User Name (Permittee)	Permit Number
Waumandee Sanitary District #1	WI-0061646-04-0

Credit User Address
S1991 County Road U, Waumandee, WI 54622

Broker Name	Trade Agreement Number
Buffalo County Land Conservation Division	WQT-0061646-02

Broker Address

Street Address	City	State	ZIP Code
407 S 2nd St, PO Box 58	Alma	WI	54610

Project Name
Jeff Reglin Waumandee Creek Bank Stabilization

Name of Credit Generator (Landowner/Operator) (Last, First, M.I.)
Reglin, Jeff

Street Address	City	State	ZIP Code
S2012 Cty Rd U	Waumandee	WI	54622

Property Information

Name of Landowner(s) (If not Operator) (Last, First, M.I.)
Reglin, Jeff

Street Address	City	State	ZIP Code
S2012 Cty Rd U	Waumandee	WI	54622

Legal Description of Property - Contiguous sites under the same ownership: (add additional sheets if necessary)

Parcel Identification Numbers (PIN): 034004280000

Parcel ID(s):
034004280000

Site Locator for Construction Projects

County	Township	Range E/W	Section	Quarter/Quarter (e.g., NW ¼ of the NE ¼)
Buffalo County	21N	11W	15	NE ¼ of the NW ¼
	N			
	N			
	N			

Agreement

The property described above is enrolled in a Water Quality Trading Agreement. Funding is provided by the credit user to pay for the installation of best management practices (BMPs) on the described property which are designed to reduce phosphorous, a nonpoint source of pollution. This agreement commits the landowner/operator, their heirs or successors and assigns to maintain the BMPs and fulfill the trade agreement until a satisfaction or release is filed by the credit user or 20 years, whichever occurs first

Plans which describe the BMPs, costs, installation schedule, and conditions are hereby incorporated into this agreement, are on file with the credit user and may be given to Wisconsin Department of Natural Resources (DNR) upon request by the DNR.

Landowner/Operator

Signed this 13th day of February, 20 23.

Jeff Reglin
Signature of Landowner/Operator

Signature of Landowner/Operator

Jeff Reglin
Typed Name of Landowner/Operator

Typed Name of Landowner/Operator

STATE OF WISCONSIN)
Buffalo County) ss.
)

Personally came before me this 13th day of February, 20 23.

The above named Jeffrey Reglin to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Brenda Pronschinske
Signature of Notary Public

Brenda Pronschinske
Typed Name of Notary Public

Notary Public Buffalo County, Wisconsin

My commission (is permanent) (expires 5-19-2023.

Landowners (if not operator)

If the landowner section is not completed, check (X) one or both of the following that apply

☒ Landowner is also operator

☐ Trade agreement contains only high residue management, nutrient management, pesticide management, cropland protection cover (green manure)

Signed this _____ day of _____, 20 23.

Signature of Landowner (if not operator)

Signature of Landowner (if not operator)

Typed Name of Landowner (if not operator)

Typed Name of Landowner (if not operator)

STATE OF WISCONSIN)
_____ County) ss.
)

Personally came before me this _____ day of _____, 20 23.

The above named _____ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public _____ County, Wisconsin

My commission (is permanent) (expires _____).

Credit User

Signed this 13 day of Feb, 20 23.

Signature of credit user

Waumandee Sanitary District #1
Typed Name of credit user/broker/exchange

STATE OF WISCONSIN)
Buffalo County) ss.
)

Personally came before me this 13th day of February, 20 23.

The above named Greg Mueller to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Brenda Pronschinske
Signature of Notary Public

Notary Public Buffalo County, Wisconsin

My commission expires 5-19-2023

Other Signer- Specify title or relationship: Buffalo County Land Conservation Division – Broker

Signed this 21 day of March, 2023.

Signature

Signature

Cale Severson, Land Conservation Manager
Typed Name

Typed Name

STATE OF WISCONSIN)
) ss.
Buffalo County)

Personally came before me this 21st day of March 2023

The above named _____ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Lea Krolewski
Typed Name of Notary Public

Notary Public Buffalo County, Wisconsin

My commission (is permanent) (expires 03-16-2024)

KRALEWSKI NOTARY PUBLIC STATE OF WISCONSIN

Other Signer- Specify title or relationship: _____

Signed this _____ day of _____, 20____.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN)
) ss.
_____ County)

Personally came before me this _____ day of _____, 20____.

The above named _____ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public _____ County, Wisconsin

My commission (is permanent) (expires _____).

Other Signer- Specify title or relationship: _____

Signed this _____ day of _____, 20____.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN)
) ss.
_____ County)

Personally came before me this _____ day of _____, 20____.

The above named _____ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public _____ County, Wisconsin

Section A – General Requirements

1. The following relationship has been established for this Water Quality Trading Agreement:
   - The Waumandee Sanitary District #1 will hereby be known as the Credit User.
   - The Buffalo County Land Conservation Department will be known as the Broker.
   - Jeff Reglin will be known as the Landowner/Operator.
2. This contract may be amended, by written mutual agreement of the parties, during the installation or maintenance period, if the proposed changes will provide equal or greater control of water pollution. For any changes in practice components or costs, the broker will determine eligibility and whether to approve such changes. Any increases to the project cost shall be approved in advance in writing by the Credit User.
3. The Credit User reserves the right to terminate this agreement if the Wisconsin Department of Natural Resources (DNR) does NOT approve the Water Quality Trading Plan (WQT Plan). The WQT identifies this project for phosphorus credits to help the Credit User's wastewater treatment facility (WWTF). These credits will be established in the WQT Plan and analyzed to determine if it is a cost-effective project. Should the DNR either deny or reduce the project credits which results in a higher cost per pound of phosphorus credit, then the Credit User may terminate the agreement.
4. The Broker reserves the right to enter the property to verify the information on the inspection report is accurate.
5. Any duly authorized officer, employee or representative of WDNR shall have the right to access and inspect the practices pursuant to Wis. Stat. 283.55(2) so long as this Agreement remains in effect.
6. **Hold Harmless**. The Credit User shall defend, indemnify and hold the Broker, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the negligence of the Broker.

Section B – Credit User

1. The Credit User is responsible for a share of the monetary costs incurred with the BMP practice installation, which includes but is not limited to site preparation, clearing, ensuring planned grades; stream bank shaping; rock riprap and installation; liming, fertilizing, seeding and mulching. The Credit User's share of the monetary costs will not be distributed until the WDNR has approved the WQT Plan and credits. If the project is constructed prior to WDNR approval of the WQT Plan, then the Landowner shall pay for the construction and be partially reimbursed by the Credit User after the WQT plan has been approved by the WDNR.
2. The Credit User reserves the right to analyze the cost per pound of phosphorus credit, to determine if the project is a good fit financially. The Credit User's share shall consider the cost per pound of phosphorus.
3. The Credit User shall have the right to access the property for inspection or maintenance. If a natural disaster impacts the BMPs and causes damage that reduces phosphorus credits and The Landowner/Operator does not take corrective action, the Credit User has the option of paying the cost of repairs or releasing this agreement.

Section C – Landowner/Operator Shall:

1. If any land covered by this agreement is transferred or otherwise changes ownership, this agreement will be held in obligation with the land in perpetuity and the new owners will be obligated to comply with this agreement. Landowners are obligated to notify any prospective buyers of this agreement and their responsibilities under this agreement and applicable law.
2. The Landowner/Operator agrees to repay reimbursed project costs to the Credit User, upon demand by the Broker, if the Landowner fails to comply with the terms of this agreement. Repayment shall not be required if a practice(s) is rendered ineffective due to circumstances which are beyond the control of the Landowner/Operator.
3. The Landowner/Operator shall inspect the riprap and streambank at least annually and after heavy storms. Any erosion or displacement of rocks shall be repaired. The Broker should be contacted immediately and directly if any damage has occurred.
4. The Landowner/Operator shall ensure that debris is removed from the channel and that vegetation is controlled around the channel only when the vegetation or obstructions are threatening stream function. Invasive vegetation should be controlled, and channel obstructions deemed harmful may be removed. Channel clearing to remove stumps, fallen trees, debris, and sediment bars shall only be performed when they are causing or could cause unacceptable bank erosion, or flow restriction.
5. The Landowner/Operator shall check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and replanted by Landowner as soon as possible with a seed mix pre-approved by the broker.
6. Periodically mow the vegetative buffer to control weeds and invading brush. All farm equipment and row crops must remain outside of the agreed upon 20-foot buffer from the top of the bank.
7. The Landowner/Operator shall eliminate all burrowing rodents and repair damage caused by them.
8. The Landowner/Operator shall maintain the project consistent with NRCS technical standard 580.
9. The Landowner/Operator shall work with the Broker in the preparation of a Livestock Management Plan.
10. Installation of these practices brings the Landowner into compliance with the applicable state and local performance standards listed below. Compliance with these performance standards shall be in perpetuity. These practices must be maintained or

replaced with a practice which ensures continued compliance with the following N.R. 151 performance standards:

- N.R. 151.06 Clean Water Diversion

Section D. Broker

1. The Broker will be responsible for regulation of applicable performance standards, annual inspections, and monitoring of landowners' obligations in the form of performing on-site checks as needed. The Broker shall not have any financial obligation for this project except as expressly stated in this agreement.
2. The Broker will ensure the contract is recorded in the Buffalo County Register of Deeds office, the Landowner/Operator shall be responsible for the $30 filing fee.
3. The Broker agrees to complete annual inspections.

TA Number	Typed Name of Landowner/Operator	Initials of Landowner/Operator	Date
	Jeff Reglin	JMR	2-13-23

DocId:8037306
Tx:4023733

281907

CAROL J BURMEISTER
REGISTER OF DEEDS
BUFFALO COUNTY, WI
RECORDED ON
03/28/2023 11:31 AM

REC FEE: 30.00
PAGES: 7

Document Number

Water Quality Trading Agreement: Waumandee Sanitary District #1 and Daniel Brommer

Recording Area

Name and Return Address
Buffalo County Land Conservation Department
407 S. 22nd Street
Alma, WI 54610

Parcel Identification Number (PIN)
034004260000

Real property in the County of Buffalo, Town of Waumandee, State of Wisconsin, being that part of the NE ¼ of the NW ¼ Section 15, Township 21 North, Range 11 West, Buffalo County, Wisconsin, lying easterly of County Road U.

THIS PAGE IS PART OF THIS LEGAL DOCUMENT – DO NOT REMOVE

This document was drafted by:

Water Quality Trading Agreement: Waumandee Sanitary District #1 and Daniel Brommer

PermitteeInformation

Credit User Name (Permittee)	Permit Number
Waumandee Sanitary District #1	WI-0061646-04-0

Credit User Address
S1991 County Road U, Waumandee, WI 54622

Broker Name	Trade Agreement Number
Buffalo County Land Conservation Division	WQT-0061646-02

Broker Address

Street Address	City	State	ZIP Code
407 S 2nd St, PO Box 58	Alma	WI	54610

Project Name

Daniel Brommer Waumandee Creek Bank Stabilization

Name of Credit Generator (Landowner/Operator) (Last, First, M.I.)

Brommer, Daniel

Street Address	City	State	ZIP Code
W869 Korte Drive	Waumandee	WI	54622

PropertyInformation

Name of Landowner(s) (If not Operator) (Last, First, M.I.)

Brommer, Daniel

Street Address	City	State	ZIP Code
W869 Korte Drive	Waumandee	WI	54622

Legal Description of Property - Contiguous sites under the same ownership: (add additional sheets if necessary)

Parcel Identification Numbers (PIN): 034004260000

Parcel ID(s):
034004260000

Site Locator for Construction Projects

County	Township	Range E/W	Section	Quarter/Quarter (e.g., NW ¼ of the NE ¼)
Buffalo County	21N	11W	15	NE ¼ of the NW ¼
	N			
	N			
	N			

Agreement

The property described above is enrolled in a Water Quality Trading Agreement. Funding is provided by the credit user to pay for the installation of best management practices (BMPs) on the described property which are designed to reduce phosphorous, a nonpoint source of pollution. This agreement commits the landowner/operator, their heirs or successors and assigns to maintain the BMPs and fulfill the trade agreement until a satisfaction or release is filed by the credit user or 20 years, whichever occurs first

Plans which describe the BMPs, costs, installation schedule, and conditions are hereby incorporated into this agreement, are on file with the credit user and may be given to Wisconsin Department of Natural Resources (DNR) upon request by the DNR.

Landowner/Operator

Signed this 20th day of March, 20 23.

Daniel Brommer
Signature of Landowner/Operator

Signature of Landowner/Operator

Daniel Brommer
Typed Name of Landowner/Operator

Typed Name of Landowner/Operator

STATE OF WISCONSIN)
) ss.
_____ County)

Personally came before me this 20th day of March, 20 23.

The above named Daniel Brommer to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Karla R. Olson
Signature of Notary Public

Karla R. Olson
Typed Name of Notary Public

Karla R. Olson
Notary Public - State of Wisconsin

Notary Public Buffalo County, Wisconsin

My commission (is permanent) (expires 09/06/2023).

Landowners (if not operator)

If the landowner section is not completed, check (X) one or both of the following that apply

☒ Landowner is also operator

☐ Trade agreement contains only high residue management, nutrient management, pesticide management, cropland protection cover (green manure)

Signed this _____ day of _____, 20 23.

Signature of Landowner (if not operator)

Signature of Landowner (if not operator)

Typed Name of Landowner (if not operator)

Typed Name of Landowner (if not operator)

STATE OF WISCONSIN)
) ss.
_____ County)

Personally came before me this _____ day of _____, 20 23.

The above named _____ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public _____ County, Wisconsin

My commission (is permanent) (expires _____).

Credit User

Signed this 13 day of February, 20 23.

Signature of credit user

Waumandee Sanitary District #1
Typed Name of credit user/broker/exchange

STATE OF WISCONSIN)
) ss.
Buffalo County)

Personally came before me this 13th day of February, 20 23.

The above named Greg Mueller to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Brenda Pronschinske
Signature of Notary Public

Notary Public Buffalo County, Wisconsin

My Commission expires 5-19-2023

NOTARY PUBLIC STATE OF WISCONSIN

Other Signer- Specify title or relationship: Buffalo County Land Conservation Division – Broker

Signed this 21 day of March, 2023.

Signature

Cale Severson, Land Conservation Manager
Typed Name

Signature

Typed Name

STATE OF WISCONSIN)
) ss.
Buffalo County)

Personally came before me this 21st day of March 2023

The above named _____ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Lea Krolewski
Signature of Notary Public

Lea Krolewski
Typed Name of Notary Public

Notary Public Buffalo County, Wisconsin

My commission (is permanent) (expires 03-16-2024)

LEA KRALEWSKI NOTARY PUBLIC STATE OF WISCONSIN

Other Signer- Specify title or relationship: _____

Signed this _____ day of _____, 20____.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN)
) ss.
_____ County)

Personally came before me this _____ day of _____, 20____.

The above named _____ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public _____ County, Wisconsin

My commission (is permanent) (expires _____).

Other Signer- Specify title or relationship: _____

Signed this _____ day of _____, 20____.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN)
) ss.
_____ County)

Personally came before me this _____ day of _____, 20____.

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Signature of Notary Public

Typed Name of Notary Public

Notary Public _____ County, Wisconsin

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Section B – Credit User

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Section C – Landowner/Operator Shall:

1. If any land covered by this agreement is transferred or otherwise changes ownership, this agreement will be held in obligation with the land in perpetuity and the new owners will be obligated to comply with this agreement. Landowners are obligated to notify any prospective buyers of this agreement and their responsibilities under this agreement and applicable law.
2. The Landowner/Operator agrees to repay reimbursed project costs to the Credit User, upon demand by the Broker, if the Landowner fails to comply with the terms of this agreement. Repayment shall not be required if a practice(s) is rendered ineffective due to circumstances which are beyond the control of the Landowner/Operator.
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4. The Landowner/Operator shall ensure that debris is removed from the channel and that vegetation is controlled around the channel only when the vegetation or obstructions are threatening stream function. Invasive vegetation should be controlled, and channel obstructions deemed harmful may be removed. Channel clearing to remove stumps, fallen trees, debris, and sediment bars shall only be performed when they are causing or could cause unacceptable bank erosion, or flow restriction.
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6. Periodically mow the vegetative buffer to control weeds and invading brush. All farm equipment and row crops must remain outside of the agreed upon 20-foot buffer from the top of the bank.
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8. The Landowner/Operator shall maintain the project consistent with NRCS technical standard 580.
9. The Landowner/Operator shall work with the Broker in the preparation of a Livestock Management Plan.
10. Installation of these practices brings the Landowner into compliance with the applicable state and local performance standards listed below. Compliance with these performance standards shall be in perpetuity. These practices must be maintained or

replaced with a practice which ensures continued compliance with the following N.R. 151 performance standards:

- N.R. 151.06 Clean Water Diversion

Section D. Broker

1. The Broker will be responsible for regulation of applicable performance standards, annual inspections, and monitoring of landowners' obligations in the form of performing on-site checks as needed. The Broker shall not have any financial obligation for this project except as expressly stated in this agreement.
2. The Broker will ensure the contract is recorded in the Buffalo County Register of Deeds office, the Landowner/Operator shall be responsible for the $30 filing fee.
3. The Broker agrees to complete annual inspections.

TA Number	Typed Name of Landowner/Operator	Initials of Landowner/Operator	Date
	Daniel Brömmer	DB	03/20/2023

APPENDIX 9-1

PHOSPHORUS SOIL TEST RESULTS

Soil and Forage Analysis Lab
COLLEGE OF AGRICULTURAL & LIFE SCIENCES
UNIVERSITY OF WISCONSIN-MADISON

2611 Yellowstone Drive
Marshfield WI 54449
715-387-2523
http://uwlab.soils.wisc.edu

Buffalo County Land Conservation
Davy Engineering

Waumandee WQT

Date 11/23/2020
Account # 558654
Report # 4528

Soil Total Mineral Analysis

Sample ID	*P* %
Site 1 - 1	0.08
Site 1 - 2	0.06
Site 1 - 3	0.05
Site 2 - 1	0.08
Site 2 - 2	0.04
Site 2 - 3	0.05

Soil and Forage Analysis Lab
WISCONSIN STATE LABORATORY OF HYGIENE
UNIVERSITY OF WISCONSIN-MADISON

4702 University Avenue
Madison, WI 53705
608-262-4364
http://uwlab.soils.wisc.edu

Joe Krumrie
Buffalo County LCD
407 S 2nd St
Alma, WI 54610

Date 12/12/2022
Account # 559083
Report # 4120

Soil Total Phosphorus Analysis

Sample ID	*TP* %
1	0.05

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APPENDIX 17-1

WATER QUALITY TRADE PRELIMINARY COST ESTIMATES

The cost-share recipient shall implement and maintain all best management practices listed in this Addendum, unless otherwise amended in accordance with this agreement.							Installation Period			
							From (MM/YY)		To (MM/YY)	
Field #	DNR BMP Code	Practice Name	Quantity	Unit	Unit Cost	Estimated Total Cost	Reimbursement Rate (%)	Estimated Cost-Share Amount	Cost-Share Amt. From Other Programs*	Estimated Year to be Installed
	NRCS 580	Mobilization	1	L.S.	$ 7,500.00	$ 7,500.00				2022
	NRCS 580	Site Preparation, clearing, and grading	1	L.S.	$ 2,250.00	$ 2,250.00				2022
	NRCS 580	Limestone rock riprap D50 size 8" Diameter	30	cu. yd.	$ 50.00	$ 1,500.00				2022
	NRCS 580	Geotexile Fabric, Type SAS	225	sq. yd.	$ 3.00	$ 680.00				2022
	NRCS 580	Liming, fertilizing, seeding and mulching	150	sq. yd.	$ 5.00	$ 750.00				2022
	NRCS 580	Erosion Control	1	L.S.	$ 6,000.00	$ 6,000.00				2022
	NRCS 580	Tracking Pad	1	L.S.	$ 1,500.00	$ 1,500.00				2022
		Sub-Total				**$ 20,180.00**				
		Contingencies (10%)				$ 2,020.00				
Note: These estimates are based on an overall project of three parcels of land. The estimated values were broken up through an assumed percentage of land. The exact values in the field may differ from above.										
* Identify Program Names:					**TOTALS**	**$ 22,200.00**	**$ -**	**$ -**	**$ -**	

CSA Number	Typed Name of Landowner / Operator	Initials of Landowner/Operator	Date
	Ricky Reuter		

The cost-share recipient shall implement and maintain all best management practices listed in this Addendum, unless otherwise amended in accordance with this agreement.							Installation Period			
							From (MM/YY)		To (MM/YY)	
Field #	DNR BMP Code	Practice Name	Quantity	Unit	Unit Cost	Estimated Total Cost	Reimbursement Rate (%)	Estimated Cost-Share Amount	Cost-Share Amt. From Other Programs*	Estimated Year to be Installed
	NRCS 580	Mobilization	1	L.S.	$ 7,500.00	$ 7,500.00				2022
	NRCS 580	Site Preparation, clearing, and grading	1	L.S.	$ 2,250.00	$ 2,250.00				2022
	NRCS 580	Limestone rock riprap D50 size 8" Diameter	50	cu. yd.	$ 50.00	$ 2,500.00				2022
	NRCS 580	Geotexile Fabric, Type SAS	315	sq. yd.	$ 3.00	$ 950.00				2022
	NRCS 580	Liming, fertilizing, seeding and mulching	250	sq. yd.	$ 5.00	$ 1,250.00				2022
	NRCS 580	Erosion Control	1	L.S.	$ 6,000.00	$ 6,000.00				2022
	NRCS 580	Tracking Pad	1	L.S.	$ 1,500.00	$ 1,500.00				2022
		Sub-Total				**$ 21,950.00**				
		Contingencies (10%)				$ 2,200.00				
Note: These estimates are based on an overall project of three parcels of land. The estimated values were broken up through an assumed percentage of land. The exact values in the field may differ from above.										
* Identify Program Names:					**TOTALS**	**$ 24,150.00**	**$ -**	**$ -**	**$ -**	
CSA Number		Typed Name of Landowner / Operator Brommer / Reglin				Initials of Landowner/Operator			Date	