Permit Fact Sheet

General Information

Permit Number:	WI-0024201-11-0	
Permittee Name:	Village of Hawkins	
Address:	509 Main Street P.O. Box 108	
City/State/Zip:	Hawkins WI 54530	
Discharge Location:	105 Homestead, Hawkins Wisconsin (SE ¼ of Section 14; T35N-R3W)	
Receiving Water:	The South Fork of Main Creek (WBIC - 2218000) within the Main Creek Watershed in the Upper Chippewa River Basin, Rusk County	
StreamFlow ($Q_{7,10}$):	0.13 cfs	
Stream Classification:	South Fork Main Creek is a Limited Forage Fish (LFF) community downstream approximately 1.7 miles to the county highway (CTH) M crossing. The classification changes to a Cold Water (CW) community for approximately 2.1 miles downstream. After that point South Fork Main Creek is classified as an Outstanding Resource Water (ORW). The surface water is non-public water supply and within the ceded territory.	
Wild Rice Impacts: *(no specific wild rice standards exist at this time)*	No impacts identified near the outfall. The conclusion of no impact is based on high quality of effluent discharged, low effluent volumes in comparison to the river volumes and the distance to wild rice habitat is great. (Evaluation completed March 2017)	
Discharge Type:	Existing facility that discharges on a seasonal basis	
Design Flow(s)	Annual Average	0.118 MGD
Significant Industrial Loading?	No	
Operator at Proper Grade?	Yes	
Approved Pretreatment Program?	N/A	

Facility Description

The Village of Hawkins owns and operates a domestic wastewater treatment system. The annual average design flow is 118,000 gallons per day with actual flows averaging 67,000 gallons over the past five years (2019 – 2023 data). The treatment system consists of two aerated lagoons operated one after another (in series) followed by a storage pond. Within these ponds naturally occurring bacteria and organisms already present in the wastewater metabolize organic solids. The treated wastewater (effluent) is transferred to the storage pond until discharged. Normal discharges occur in the spring and/or the fall to the South Fork of Main Creek.

Substantial Compliance Determination

Enforcement During Last Permit: There have been a several minor violations of effluent limits, missed samples, and late reporting. However, the facility has taken the necessary steps to correct their actions and nothing further is required.

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on 06/14/22, by Arthur Ryzak, WDNR, the Village of Hawkins has been found to be in substantial compliance with their current permit.

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, WasteType/sample Contents and Treatment Description (as applicable)**
701	INFLUENT An average of 0.067 MGD. (2019 – 2023 data)	Representative samples shall be taken at the Parshall flume in the control building.
002	EFFLUENT An average of 0.281 MGD during period of discharge. There has been an average of 49 days each year. (2020 – 2023 data)	Representative samples shall be collected at the flow-meter at the bridge on Main Creek.
006	SLUDGE 484 metric tons of sludge was removed 8/2/2019.	Representative samples shall be collected from the accumulated sludge in the primary pond at various locations and depths that are composited for analysis.
101	IN-PLANT Flow is not a required parameter.	The amount of precipitation as rain shall be measured each year to track potential effects of inflow and infiltration on the system.

1 Influent – Monitoring Requirements

Sample Point Number: 701- INFLUENT TO PLANT

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

Changes from Previous Permit:

Effluent limitations and monitoring requirements were re-evaluated for the proposed permit term and no changes were required in this permit section. Sampling requirements and frequencies are the same as the previous permit.

Explanation of Limits and Monitoring Requirements

The parameters are standard for minor municipalities, as are monitoring and frequency requirements for municipal wastewater treatment plant. Tracking of BOD_5, and Suspended Solids are required for percent removal requirements found in s. NR 210.05, Wis. Adm. Code.

Inplant - Monitoring and Limitations

Sample Point Number: 101- GENERAL PLANT

Changes from Previous Permit:

Effluent limitations and monitoring requirements were re-evaluated for the proposed permit term and no changes were required in this permit section. Sampling requirements and frequencies are the same as the previous permit.

Explanation of Limits and Monitoring Requirements

Precipitation – This is an operational parameter, not a permit requirement and is not listed within the permit but is available on the eDMR. Measuring wet weather events is a tool that assists the facility in maintaining a healthy treatment system.

2 Surface Water - Monitoring and Limitations

Sample Point Number: 002- SURFACE WATER DISCHARGE

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Total Daily	
BOD5, Total	Daily Max	30 mg/L	Weekly	Grab	
BOD5, Total	Monthly Avg	15 mg/L	Weekly	Grab	
Suspended Solids, Total	Daily Max	30 mg/L	Weekly	Grab	
Suspended Solids, Total	Monthly Avg	20 mg/L	Weekly	Grab	
pH Field	Daily Min	6.0 su	Weekly	Grab	
pH Field	Daily Max	9.0 su	Weekly	Grab	
Dissolved Oxygen	Daily Min	4.0 mg/L	Weekly	Grab	
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	Weekly	Grab	Enter the daily ammonia result on the eDMR and compare to the Nitrogen, Ammonia Variable Limit column to determine compliance.
Nitrogen, Ammonia Variable Limit		mg/L	Weekly	Calculated	Using the daily pH result look up the applicable ammonia limit in the Daily Maximum Ammonia Nitrogen Limits table below and report the variable limit on the eDMR.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Phosphorus, Total	Monthly Avg	4.0 mg/L	Weekly	Grab	Limit effective throughout the permit term, as it represents a minimum control level. See Water Quality Trading (WQT) sections in the permit for more information.
Phosphorus, Total		lbs/day	Weekly	Calculated	Report daily mass discharged using Equation 1a. in the Water Quality Trading (WQT) section in the 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. Available TP Credits are specified in the section table and in the approved Water Quality Trading Plan.
WQT Computed Compliance (TP)	Monthly Avg	0.32 mg/L	Monthly	Calculated	Report the WQT TP Computed Compliance value using Equation 3a. in the Water Quality Trading (WQT) section in the permit. Value entered on the last day of the month.
WQT Computed Compliance (TP)	6-Month Avg	0.11 mg/L	Monthly	Calculated	Value entered on the last day of June and December. Compliance with the six-month average limit is evaluated at the end of the six-month period on June 30 and Dec 31.
WQT Computed Compliance (TP)	Monthly Avg	0.117 lbs/day	Monthly	Calculated	Report the WQT TP Computed Compliance value using Equation 3b. in the Water Quality Trading (WQT) section in the permit.
WQT Credits Used (TP)	Annual Total	871 lbs/yr	Annual	Calculated	For the year 2025, the sum of total monthly credits used may not exceed values listed in the Available Phosphorus Credits table in the Water Quality Trading (WQT)

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					section.
WQT Credits Used (TP)	Annual Total	879 lbs/yr	Annual	Calculated	For the year 2026, the sum of total monthly credits used may not exceed the Available Phosphorus Credits table in the Water Quality Trading (WQT) section.
WQT Credits Used (TP)	Annual Total	888 lbs/yr	Annual	Calculated	For the year 2027, the sum of total monthly credits used may not exceed the Available Phosphorus Credits table in the Water Quality Trading (WQT) section.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	Grab	See the Nitrogen Series Monitoring section in the permit for testing schedule.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	Grab	See the Nitrogen Series Monitoring section in the permit for testing schedule.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Total Nitrogen = Total Nitrogen Kjeldahl (mg/L) + Nitrite + Nitrate Nitrogen (mg/L). See the Nitrogen Series Monitoring section in the permit for testing schedule.
PFOS		ng/L	Once	Grab	Monitoring is required during the 2025 calendar year.
PFOA		ng/L	Once	Grab	Monitoring is required during the 2025 calendar year.

Changes from Previous Permit

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

- The **flow** limit has been removed this permit term.
- **BOD_5** and **Total Suspended Solids** limits have been replaced by effluent limits as described in s. NR 104.02(3)(a), Wis. Adm. Code.

- Monthly average **Ammonia** limits of 7 mg/L (January) and 7.4 mg/L (February) and weekly average limits of 15 mg/L (January), 14 mg/L (February) and 16 mg/L (March) will begin at the end of the schedule in section 4.1.
- The final **phosphorus** limits used to determine computed phosphorus compliance for water quality trading have changed slightly from the last permit term.
- Annual monitoring for the **Nitrogen Series** (nitrate +nitrite, total Kjeldahl nitrogen and total nitrogen) has been added to the permit.
- Monitoring for **PFOS** and **PFOA** is required once in 2025.

Explanation of Limits and Monitoring Requirements

More information on categorical and water quality-based limits (WQBEL) is found in the "Water Quality-Based Effluent Limitations for the Village of Hawkins (WI-0024201-11)" memo dated October 23, 2024.

Discharge season - The facility has been authorized to discharge on a fill-and-draw basis during April and May or on a continuous basis during the remainder of the year. The facility normally operates during fill-and-draw months and during the fall. Fill-and-draw and continuous discharge seasons had specific limitations. Limits will now be consistent year-round. *All samples shall be taken during normal operating conditions; therefore, monitoring is required only during periods of discharge.*

Flow – In the previous permit issuance the facility was given variance limits for flow and BOD_5 per s. NR 104.02(4)(c), Wis. Adm. Code. Re-evaluation has determined that the permittee doesn't meet all required conditions and a variance is not applicable. The flow limit has been removed.

BOD_5 and **Total Suspended Solids (TSS)** - In the previous permit issuance the facility was given variance limits for flow, BOD_5 and TSS per s. NR 104.02(4)(c), Wis. Adm. Code. Re-evaluation has determined that the permittee doesn't meet all required conditions and a variance is not applicable. Year-round limits that are protective of LFF communities (s. NR 104.02(3)(a) Wis. Adm. Code) have been included in the permit.

pH - Categorical limits for pH are required per ch. NR 210 (Subchapter II).

Dissolved Oxygen - Categorical limits for Dissolved Oxygen in a Limited Forage Fish (intermediate surface waters) are found in NR 104.02(3)(a) and 210.05(2) Wis. Adm. Code.

Ammonia – ***Daily*** - Using current acute and chronic ammonia toxicity criteria found in Tables 2C and 4B of NR 105 Wis. Adm. Code and limit calculating procedures (Subchapter IV of 106, Wis. Adm. Code ammonia limitations were calculated for the facility. The facility had variable limits during the previous permit term, they continue to be protective of the receiving water and continue through this permit term. Sample results for pH shall be used to calculate the daily variable limit. Total ammonia (NH3-N) sampling shall occur on the same day pH levels are monitored. The applicable variable limit shall be recorded on the Electronic Discharge Monitoring Report (eDMR) in the Ammonia Variable Limit column. Report the effluent ammonia sample result in the 'Nitrogen, Ammonia (NH3-N) Total' column. Compare the variable daily maximum ammonia limit to the reported ammonia result, record the number of exceedances in the box to the right of the 'Limit in Effect' 'Daily Max' row in the 'Summary' tables at the end of the eDMR.

Daily Maximum Ammonia Nitrogen Limits

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
$6.0 \leq pH \leq 6.1$	61	$7.0 < pH \leq 7.1$	37	$8.0 < pH \leq 8.1$	7.8
$6.1 < pH \leq 6.2$	60	$7.1 < pH \leq 7.2$	33	$8.1 < pH \leq 8.2$	6.4
$6.2 < pH \leq 6.3$	58	$7.2 < pH \leq 7.3$	29	$8.2 < pH \leq 8.3$	5.3
$6.3 < pH \leq 6.4$	57	$7.3 < pH \leq 7.4$	26	$8.3 < pH \leq 8.4$	4.4
$6.4 < pH \leq 6.5$	55	$7.4 < pH \leq 7.5$	22	$8.4 < pH \leq 8.5$	3.6

6.5 < pH ≤ 6.6	53	7.5 < pH ≤ 7.6	19	8.5 < pH ≤ 8.6	3.0
6.6 < pH ≤ 6.7	50	7.6 < pH ≤ 7.7	16	8.6 < pH ≤ 8.7	2.5
6.7 < pH ≤ 6.8	47	7.7 < pH ≤ 7.8	14	8.7 < pH ≤ 8.8	2.1
6.8 < pH ≤ 6.9	44	7.8 < pH ≤ 7.9	11	8.8 < pH ≤ 8.9	1.7
6.9 < pH ≤ 7.0	41	7.9 < pH ≤ 8.0	9.4	8.9 < pH ≤ 9.0	1.5

Ammonia *Weekly and Monthly Limits* - Based on this comparison between effluent 99th upper percentile (P99) and calculated limits there is reasonable potential for the discharge to exceed the calculated ammonia nitrogen limits during January through March (weekly average limits) and January and February (monthly average limits). Weekly average limits of 15 mg/L (January), 14 mg/L (February) and 16 mg/L (March) and monthly average limits of 7.0 mg/L (January) and 7.4 mg/L (February) will begin at the end of the schedule found in section 4.1.

Phosphorus – Phosphorus requirements are based on the Phosphorus Rules as detailed in NR 102 (water quality standards) and NR 217, Wis. Adm. Code (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 three types of limit calculations used to determine if a phosphorus limit is needed: a technology based effluent limit (TBEL), a water quality-based effluent limit (WQBEL) determined by stream criteria and a WQBEL based on a Total Daily Maximum Daily Load (TMDL) allocation.

In the case of the Village of Hawkins:

- A TBEL of 1.0 mg/L is needed if a facility discharges more than the threshold of 150 pounds per month (s. NR 217.04(1)(a)1 Wis. Adm. Code). The limit memo concluded that the facility discharges less than the threshold value (currently they discharge approximately 82 lbs/month); therefore, a TBEL is not applicable this permit term.
- Based on the size and classification of the stream, the categorical water quality criterion for the South Fork Main Creek is 75 ug/L. This criterion and instream background phosphorus data are used to calculate the stream criteria-based WQBELs. **The calculated WQBELs are 0.34 mg/L (monthly average), 0.11 mg/L (6-month average) and 0.117 lbs/day.**

  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 0.34 mg/L).

  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-2024-0008) or approved amendments thereof. The total 'WQT TP Credits' available are designated in the approved WQT Plan. The village purchased a local 80-acre farm (68 acres were used for crops). Permanent vegetative cover was installed on all eight farm fields within the same subwatershed. This vegetative cover will continue to be maintained to generate credits for the water transfer. The applicable trade ratio is 1.2:1.

  Additional WQT subsections in the permit provide information on compliance determinations, annual reporting and re-opening of the permit.
- The facility does not lie within the boundaries of any approved total maximum daily load (TMDL) area, thus a phosphorus WQBEL based on a TMDL allocation is likewise not required during this permit term.

Nitrogen Series (nitrate +nitrite, total Kjeldahl nitrogen and total nitrogen) **–** In 2011, the Upper Mississippi River Basin Association (UMRBA) completed the report "Upper Mississippi River Nutrient Monitoring, Occurrence, and Local Impacts: A Clean Water Act Perspective". Among the many recommendations of this report was that the states should expand their NPDES discharge monitoring requirements to include both phosphorus and nitrogen as they have important impacts on the mainstem upper Mississippi River as well as in the Gulf of Mexico. Consequently, the department

developed the "Guidance for Total Nitrogen Monitoring in WPDES Permits" document dated October 2019, where annual effluent monitoring for total nitrogen (total nitrogen = total Kjeldahl + (nitrite+nitrate)) is required for municipal and industrial facilities discharging to surface waters. Section 283.55(1)(e) Wis. Stats. 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 s. NR 200.065 (1)(h) Wis. Adm. Code allows for this monitoring to be collected during the permit term during periods of discharge in the quarters listed below. If a discharge does not occur during the quarter identified a sample is not required.

- 2025: fourth quarter (October - December)
- 2026: second quarter (April – June)
- 2027: third quarter (July - September)
- 2028: fourth quarter (October - December)
- 2029: second quarter (April – June)

Nitrogen Series monitoring shall continue after the permit expiration date (until the permit is reissued) in accordance with the monitoring requirements specified in the last full calendar year of this permit. For example, the next test would be required October - December.

PFOS and **PFOA** - NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for municipal dischargers with an average flow rate less than 1 MGD, to be evaluated on a case-by-case basis to determine if monitoring is required pursuant to s. NR 106.98(2)(c), Wis. Adm. Code. The department evaluated the need for PFOS and PFOA monitoring taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites and other potential sources of PFOS or PFOA. Based on information available at the time the proposed permit was drafted, it was identified that the POTW had an indirect discharger now closed that may have been a potential source of PFOS/PFOA. To show if the legacy PFOS and PFOA remains in the collections system monitoring one time in 2025 is included. That sample shall be used to determine if the permitted discharge has the reasonable potential to cause or contribute to an exceedance of the PFOS or PFOA standards under s. NR 102.04(8)(d)1, Wis. Adm. Code.

3 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	**Sludge Class (A or B)**	**Sludge Type (Liquid or Cake)**	**Pathogen Reduction Method**	**Vector Attraction Method**	**Reuse Option**	**Amount Reused/Disposed (Dry Tons/Year)**
006	B	Liquid	484 metric tons of sludge was removed 8/2/2019. Sludge is not expected to be removed this permit term. If removal is needed see the land application and schedule sections of the permit for more information.			
Does sludge management demonstrate compliance? Yes						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No, the most recent sample (2020) was below the level of detection; therefore below 2 pCi/liter.						
Is a priority pollutant scan required? No						

Sample Point Number: 006- 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	
PFOA + PFOS		ug/kg	Once	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					information.

Changes from Previous Permit:

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

- **List 1** (Metals) monitoring is required during the second year of the permit term (2026).
- It is recommended that **List 2** (Nutrients) monitoring occur with the List 1 monitoring.
- **PFAS** monitoring is required during the second year of the permit term (2026).
- Due to changes within the land application forms, the 3400-049 ("Characteristics Report"), 3400-052 ("Other Methods of Disposal") and 3400-055 (Annual Land Application") forms will need to be submitted each year.

Explanation of Limits and Monitoring Requirements

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

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 (2026). Results will assist in the determination of the acres needed for land application of sludge should it be necessary. The number of acres needed is also required for the Sludge Management Schedule (see schedules for more information).

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

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.

- Sludge analysis during the second year of the permit term has been included. There are check boxes available on the electronic forms to identify if desludging didn't occur.
- Sludge characteristics report (3400-049) – at the top of the form check "yes" or "no" in the box identifying if any land application occurred that year. Complete the form if required or identify the year samples will be or have been taken in the comments section.
- 3400-052 ("Other Methods of Disposal") and 3400-055 ("Annual Land Application") - The reports are technically 2 separate forms that are now combined in one location but separated onto two different tabs. If you answer "No" to both listed questions the forms are complete. If you need to answer "Yes" to either question the corresponding form tabs will go from gray to blue indicting information can be entered on the report.

4 Schedules

4.1 Ammonia Effluent Limits & Facility Modifications

This compliance schedule requires the permittee to achieve compliance by the specified date.

Required Action	Due Date
Report on Effluent Discharges: Submit a report on effluent discharges of total ammonia nitrogen with conclusions regarding compliance.	12/31/2025
Action Plan or Facility Plan Amendment: Submit an action plan or facility plan amendment for treatment facility modifications for complying with the effluent limitations as needed.	12/31/2026
Initiate Actions: Initiate actions identified in the action plan or facility plan amendment. Submit plans and specifications for treatment facility modifications as needed.	12/31/2027
Progress Report: Submit a progress report summarizing actions taken to date.	12/31/2028
Complete Actions: Complete actions necessary to achieve compliance with the effluent limitations for ammonia nitrogen. **Weekly Average** - 15 mg/L (January), 14 mg/L (February) and 16 mg/L (March) **Monthly Average** - 7 mg/L (January) and 7.4 mg/L (February)	12/31/2029

4.2 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.	01/31/2025
Annual WQT Report: Submit an annual WQT report that shall cover the previous year.	01/31/2026
Annual WQT Report: Submit an annual WQT report covering the previous year.	01/31/2027
Annual WQT Report: Submit an annual WQT report that shall cover the previous year.	01/31/2028
Annual WQT Report: 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.	01/31/2029
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.	

4.3 Sludge Management Plan

Required Action	Due Date
Submit a Sludge Management Plan: The permittee shall submit an update to the management plan for approval if removal of sludge will occur during this permit term. The plan shall demonstrate compliance with ch. NR 204 Wis. Adm. Code and at minimum address 1) How and where is sludge sampled; 2) Available sludge storage details and location(s); 3)How will the sludge be removed with details on volume, characterization and how will the treatment plant continue to function during the drawdown; 4) Describe the type of transportation and spreading vehicles and loading and unloading practices; 5) Identify approved land application sites, apply for needed sites, site limitations, total acres needed and vegetative cover management; 6) Specify record keeping procedures including site loading; 7) Address contingency plans for adverse weather and odor/nuisance abatement; and 8) Include any other pertinent information such as other disposal options that may be used or specifications of any pretreatment processes Once approved, all sludge management activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes. No desludging may occur unless approval from the Department is obtained. Daily logs shall be kept that record where the sludge has been disposed. The plan is due at least 60 days prior to desludging.	

Explanation of Schedules

Ammonia Effluent Limits & Facility Modifications – The facility is currently unable to achieve the ammonia effluent monthly average limits. A schedule has been added to provide the time for the permittee to meet compliance.

Annual Water Quality Trading (WQT) Reports - Reports are required that include the following information:

- Verification that site inspections occurred;
- Brief summary of site inspection findings;
- Identification of noncompliance or failure to implement any terms or conditions of the permit or trading plan that have not been reported in discharge monitoring reports;
- Any applicable notices of termination or management practice registration; and
- A summary of credits used each month over the calendar year.

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

Attachments:

Water Flow Schematic updated May 2023

"Water Quality-Based Effluent Limitations for the Village of Hawkins (WI-0024201-11)" memo dated October 23, 2024

"Water Trading Plan WQT-2024-0008" approved March 7, 2024

Expiration Date:

December 31, 2029

Justification Of Any Waivers From Permit Application Requirements

A decision has been made not to require effluent monitoring for metals in the application because:

1. The wastewater is all domestic with no industrial contributors to the collection system.
2. The metals in the sludge are well below high quality sludge limits which correlates to low metal concentrations in the effluent.
3. Based on the total points accumulated on the WET checklist and Chapter 1.3 of the WET Guidance Document there is little likelihood the effluent is toxic.

Prepared By: Sheri A. Snowbank Wastewater Specialist

Date: October 28, 2024

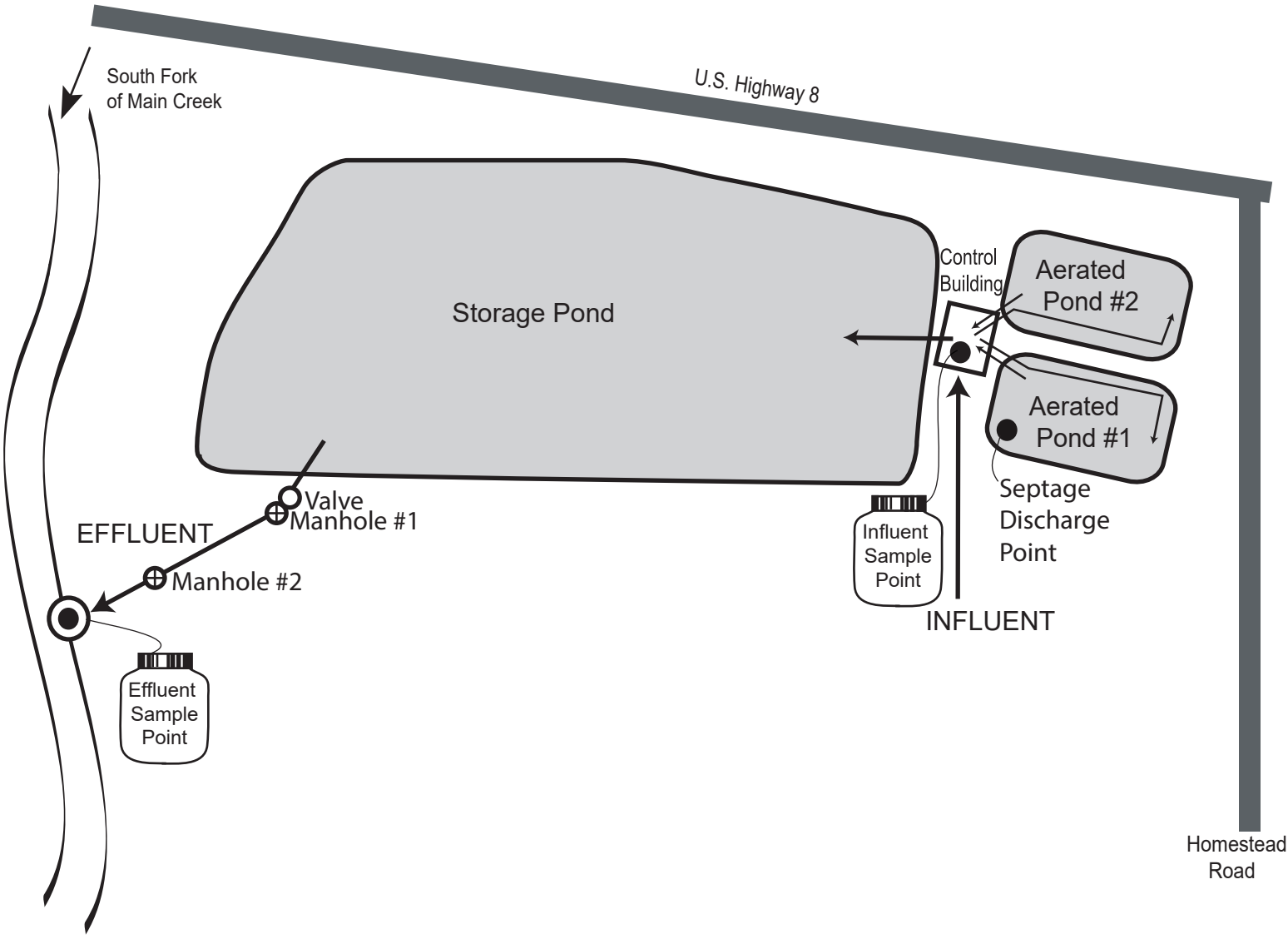
Date updated based on Factcheck comments: October 23, 2024 (Based on updated receiving water flow data final ammonia and phosphorus limits were recalculate.)

Date updated based on public notice comments:

Notice of reissuance was published in the Ladysmith News, PO Box 189, Ladysmith, WI 54848-0189.

VILLAGE OF HAWKINS
Wastewater Treatment Plant

The Village of Hawkins wastewater treatment facility consists of two aerated ponds operated in series followed by a storage pond. The treated effluent is discharged to the South Fork of Main Creek. The diagram below shows the treatment units and sampling locations.



NOT TO SCALE

● Represents Sample Points

N

Design Flow: 0.118 MGD
BOD: 150 pound/day
Construction Year: 1985

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: October 23, 2024

TO: Sheri Snowbank – NOR/Spooner Service Center

FROM: Michael Polkinghorn – NOR/Rhinelander Service Center Michael Polkinghorn

SUBJECT: Water Quality-Based Effluent Limitations for the Village of Hawkins
WPDES Permit No. WI-0024201-11-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Village of Hawkins in Rusk County. This municipal wastewater treatment facility (WWTF) discharges to the South Fork Main Creek, located in the Main Creek Watershed in the Upper Chippewa 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 002:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD_5	30 mg/L			15 mg/L		2
TSS	30 mg/L			20 mg/L		2
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		4.0 mg/L				2
Ammonia Nitrogen Year round January February March	Variable		 15 mg/L 14 mg/L 16 mg/L	 7.0 mg/L 7.4 mg/L		3
Phosphorus						4
MCL				4.0 mg/L		
Final				0.34 mg/L 0.117 lbs/day	0.11 mg/L	
TKN, Nitrate+Nitrite, and Total Nitrogen						5

Footnotes:

1. Monitor whenever the discharge occurs.
2. These limits are based on the Limited Forage Fish (LFF) community of the immediate receiving water as described in s. NR 104.02(3)(a), Wis. Adm. Code.
3. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit of 3.5 mg/L

Daily Maximum Ammonia Nitrogen Limits

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
$6.0 \leq pH \leq 6.1$	71	$7.0 < pH \leq 7.1$	43	$8.0 < pH \leq 8.1$	9.0

6.1 < pH ≤ 6.2	69	7.1 < pH ≤ 7.2	39	8.1 < pH ≤ 8.2	7.4
6.2 < pH ≤ 6.3	68	7.2 < pH ≤ 7.3	34	8.2 < pH ≤ 8.3	6.1
6.3 < pH ≤ 6.4	66	7.3 < pH ≤ 7.4	30	8.3 < pH ≤ 8.4	5.0
6.4 < pH ≤ 6.5	64	7.4 < pH ≤ 7.5	26	8.4 < pH ≤ 8.5	4.1
6.5 < pH ≤ 6.6	61	7.5 < pH ≤ 7.6	22	8.5 < pH ≤ 8.6	3.4
6.6 < pH ≤ 6.7	58	7.6 < pH ≤ 7.7	19	8.6 < pH ≤ 8.7	2.8
6.7 < pH ≤ 6.8	55	7.7 < pH ≤ 7.8	16	8.7 < pH ≤ 8.8	2.3
6.8 < pH ≤ 6.9	51	7.8 < pH ≤ 7.9	13	8.8 < pH ≤ 8.9	2.0
6.9 < pH ≤ 7.0	47	7.9 < pH ≤ 8.0	11	8.9 < pH ≤ 9.0	1.7

4. A water quality trading plan has been submitted as an alternative compliance option to offset any total phosphorus discharged from this outfall that exceed the phosphorus WQBELs. The phosphorus WQBELs may be expressed as computed compliance limits, but the minimum control level (MCL) limit must be met at the point of discharge.
5. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total kjeldahl nitrogen (TKN) (all expressed as N).

No WET testing is required because information related to the discharge indicates low to no risk for toxicity. 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.

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

Attachments (3) – Narrative, discharge area map, weekly/monthly average ammonia nitrogen limits (2), & thermal table.

PREPARED BY: Michael A. Polkinghorn – Water Resources Engineer

E-cc: Arthur Ryzak, Wastewater Engineer – NOR/Ladysmith Service Center
Michelle BalkLudwig, Regional Wastewater Supervisor – NOR/Spooner Service Center
Diane Figiel, Water Resources Engineer – WY/3
Nathaniel Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
Village of Hawkins

WPDES Permit No. WI-0024201-11-0

Prepared by: Michael A. Polkinghorn

PART 1 – BACKGROUND INFORMATION

Facility Description

The Village of Hawkins owns and operates a domestic wastewater treatment system. The treatment system consists of 2 aerated lagoons operated in series followed by a storage pond. The facility is authorized to discharge as a fill-and-draw system during April – May, and as a continuous discharger during the remaining months of the calendar year. Effluent is discharged on a noncontinuous basis via Outfall 002 to the east bank of the South Fork Main Creek on an installed walking bridge, approx. 327 ft east of the intersection of Maple Ave. and River St.

Attachment #2 is a discharge area map of Outfall 002.

The Village of Hawkins contacted USGS to provide updated annual and monthly low flows for the South Fork Main Creek. This is in response to the previous WQBEL Evaluation dated April 2024 for the 11th issuance of their permit where limit and monitoring recommendations were made based on previous low flow information for South Fork Main Creek. This evaluation will consider the updated information provided for all applicable parameters. **Determinations made for parameters in this reevaluation will supersede those made in the previous WQBEL Evaluation (April 2024).**

Existing Permit Limitations

The current permit, expired on 09/30/2023, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate	0.7 MGD					1
BOD_5						
April – May			45 mg/L	30 mg/L		1
June – March	30 mg/L			15 mg/L		
TSS						
April – May			45 mg/L	30 mg/L		1
June – March	30 mg/L			20 mg/L		
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		4.0 mg/L				1
Ammonia Nitrogen	Variable					2
Phosphorus						
MCL				4.0 mg/L		3

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Final				0.356 mg/L 0.117 lbs/day	0.119 mg/L	

Footnotes:

1. These are variance limits as described in s. NR 104.02(4)(c), Wis. Adm. Code, applicable to fill and draw or domestic waste stabilization pond facilities discharging to a Limited Aquatic Life (LAL) or Limited Forage Fish (LFF) community receiving water. In absence of this variance, limits based on the LAL or LFF community of the receiving water as described in s. NR 104.02(3)(a) or (b), Wis. Adm. Code, shall apply.
2. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Daily Maximum Ammonia Nitrogen Limits

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
$6.0 \leq pH \leq 6.1$	71	$7.0 < pH \leq 7.1$	43	$8.0 < pH \leq 8.1$	9.0
$6.1 < pH \leq 6.2$	69	$7.1 < pH \leq 7.2$	39	$8.1 < pH \leq 8.2$	7.4
$6.2 < pH \leq 6.3$	68	$7.2 < pH \leq 7.3$	34	$8.2 < pH \leq 8.3$	6.1
$6.3 < pH \leq 6.4$	66	$7.3 < pH \leq 7.4$	30	$8.3 < pH \leq 8.4$	5.0
$6.4 < pH \leq 6.5$	64	$7.4 < pH \leq 7.5$	26	$8.4 < pH \leq 8.5$	4.1
$6.5 < pH \leq 6.6$	61	$7.5 < pH \leq 7.6$	22	$8.5 < pH \leq 8.6$	3.4
$6.6 < pH \leq 6.7$	58	$7.6 < pH \leq 7.7$	19	$8.6 < pH \leq 8.7$	2.8
$6.7 < pH \leq 6.8$	55	$7.7 < pH \leq 7.8$	16	$8.7 < pH \leq 8.8$	2.3
$6.8 < pH \leq 6.9$	51	$7.8 < pH \leq 7.9$	13	$8.8 < pH \leq 8.9$	2.0
$6.9 < pH \leq 7.0$	47	$7.9 < pH \leq 8.0$	11	$8.9 < pH \leq 9.0$	1.7

3. A water quality trading plan has been submitted as an alternative compliance option to offset any total phosphorus discharged from this outfall that exceed the phosphorus WQBELs. The phosphorus WQBELs may be expressed as computed compliance limits, but the minimum control level (MCL) limit must be met at the point of discharge.

Receiving Water Information

- Name: South Fork Main Creek
- Waterbody Identification Code (WBIC): 2218000
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Limited Forage Fish (LFF) community, non-public water supply.
  - South Fork Main Creek is a LFF community from the Hawkins Millpond downstream to the county highway (CTH) M crossing. CTH M is approximately 1.7 mi downstream from Outfall 002 where the classification changes to a Cold Water (CW) community. An approx. additional 2.1 mi downstream (3.8 mi downstream of Outfall 002), South Fork Main Creek is an Outstanding Resource Water (ORW).
  - Downstream impacts with respect to ammonia nitrogen and phosphorus are considered in this evaluation.
- 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 South Fork Main Creek between the facility and Highway 8 at Hawkins, WI (USGS station ID #05362472, Lat. 45.515, Long. -90.709, drainage area = 16.2 mi^2), or approx. 0.25 mi upstream of Outfall 002. These statistics were computed by relating discharge measurements collected on South Fork Main Creek to low-flow statistics from the long term continuously recording gaging station on the Jump River at Sheldon (05362000):
  Annual 7-Q_{10} = 0.37 cubic feet per second (cfs)
  Annual 7-Q_2 = 0.97 cfs
  Annual 1-Q_{10} = 0.33 cfs
  Harmonic Mean Flow = 2.5 cfs using a drainage area of 16.2 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).

Monthly Low Flows

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q_{10} (cfs)	0.58	0.55	0.76	2.92	1.34	0.84	0.48	0.41	0.38	0.66	1.01	0.69
7-Q_2 (cfs)	1.58	1.48	2.25	9.76	4.26	2.71	1.47	1.30	1.61	2.85	3.30	2.09
1-Q_{10} (cfs)	0.53	0.51	0.67	1.33	1.04	0.70	0.42	0.37	0.35	0.53	0.89	0.63
30-Q_5 (cfs)	1.09	NA	4.26	15.0	5.36	3.26	1.36	1.15	1.19	2.36	2.88	1.51

  - The drainage area ratio of South Fork Main Creek between Outfall 002 and CTH M, where the fish and aquatic life classification changes, will be reevaluated due to the prior updated low flows. The drainage areas to South Fork Main Creek at the Outfall 002 and CTH M locations are 16.2 and 25.7 mi^2 respectively. Therefore, the drainage area ratio is approx. 1.59. This ratio will be multiplied across all updated low flow values to estimate the respective low flows at CTH M, where they will be utilized for any potential downstream impacts to the CW community section of South Fork Main Creek.
  - The following low flows previously used for the South Fork Main Creek from the previous limit evaluation (April 2024) are included for informational purposes:
    - LFF Community Section: 7-Q_{10} = 0.13 cfs and 7-Q_2 = 0.38 cfs
    - CW Community Section: 7-Q_{10} = 0.21 cfs and 7-Q_2 = 0.60 cfs
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%.
- Multiple dischargers: None.
- Impaired water status: There are no known impacts to the South Fork Main Creek. Approx. 23 mi downstream, the Holcombe Flowage is on the Clean Water Act Section 303(d) list for mercury, phosphorus, and TSS impairments.

Effluent Information

- Flow rate(s):
  Flow rate limit = 0.7 million gallons per day (MGD)
  Annual average design = 0.118 MGD
  Maximum monthly average = 0.478 MGD (April 2020)
  - The maximum monthly average flow of 0.478 MGD is used in place of the annual average design flow and the flowrate limit to account for the seasonal nature of the discharge. For reference, the actual average flow from October 2018 – October 2023 was 0.219 MGD

excluding days discharge did not occur. This flow becomes 0.049 MGD including days discharge did not occur.

- Historical limit evaluations have utilized the annual average design flow of 0.118 MGD for calculating ammonia nitrogen and phosphorus WQBELs. This flow is not appropriate for limit calculations because it does not take into account the seasonal nature of a noncontinuous discharge and is representative of a continuous discharge where it is expected to be present 24 hrs/day on a year round basis. The magnitude of a daily discharge event for a seasonal discharge is expected to be significantly higher than the equivalent for a continuous discharge. Therefore, a more appropriate flow will be utilized in this evaluation.
- Higher monthly average effluent flows than 0.478 MGD have been reported during April and May 2023 and are attributed to atypically high amounts of inflow and infiltration (I&I)-based flow to the facility. Therefore, these flows are not considered representative of the discharge and are not used in this evaluation.

- 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.
- Water source: Domestic wastewater with no industrial contributors. Water supply from municipal wells.
- Additives: None.
- Effluent characterization: This facility is categorized as a minor municipality and received instructions in the application notification letter that exempt it from standard monitoring requirements.

The following table presents the average concentrations and loadings at Outfall 002 from October 2018 – October 2023 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

Parameter	Average Measurement*	Average Mass Discharged
Flow Rate	0.219 MGD	
BOD_5	4.3 mg/L	
TSS	5.3 mg/L	
pH field	7.5 s.u.	
Dissolved Oxygen	8.8 mg/L	
Ammonia Nitrogen	3.8 mg/L	
Phosphorus	1.9 mg/L	4.2 lbs/day

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

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

Mercury – The permit application did not require monitoring for mercury because the Village of Hawkins 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 was 0.79 mg/kg (October 2018 – August 2019), with a maximum reported concentration of 1.22 mg/kg. **Therefore, mercury monitoring is not recommended during the reissued permit term.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Based on the type of discharge, the effluent flow rate, and the lack of indirect dischargers contributing to the collection system, **PFOS and PFOA monitoring is not recommended during the reissued permit term.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR CONVENTIONAL POLLUTANTS

The BOD_5, TSS, and flowrate limits in the current permit during April – May are variance limits as described in s. NR 104.02(4)(c), Wis. Adm. Code, applicable to fill and draw or domestic waste stabilization pond facilities discharging to a LAL or LFF community receiving water. These current variance limits are reevaluated at this time during April – May because the current flowrate limit of 0.7 MGD may not allow the receiving water condition as described in s. NR 104.02(4)(c)1, Wis. Adm. Code, to be met.

The designated use of the immediate receiving water (South Fork Main Creek) is an LFF community. **In absence of the current variance, the following effluent limits are required to protect the LFF community water quality standards as described in s. NR 104.02(3)(a), Wis. Adm. Code:**

LFF Community Conventional Pollutant Limits

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average
BOD_5	30 mg/L			15 mg/L
TSS	30 mg/L			20 mg/L
Dissolved Oxygen		4.0 mg/L		
pH	9.0 s.u.	6.0 s.u.		

If the variance is no longer applicable to the Village of Hawkins, **the daily maximum flowrate of 0.7 MGD is recommended to be removed during the reissued permit term.**

BOD_5 & DO

In establishing BOD_5 limitations, the primary intent is to prevent a lowering of dissolved oxygen levels in the receiving water below water quality standards as specified in ss. NR 102.04(4)(a) and (b), Wis. Adm. Codes. The 26-lb method (13-lb method for cold water community streams) is the most frequently used approach for calculating BOD_5 limits when resources are not available to develop a detailed water quality model. This simplified model was developed in the 1970's by the Wisconsin Committee on Water Pollution on the Fox, Wisconsin, Oconto, and Flambeau Rivers. Further studies throughout the 1970's

proved this model to be relatively accurate. The model has since then been used by the Department on many occasions when resources are not available to perform a site-specific model. The "26" value stems from the following equation:

$$\frac{26\ {}^{lbs}/_{day}}{{}^{ft^3}/_{sec}} * \frac{1\,day}{86{,}400\,sec} * \frac{454{,}000\,mg}{lbs} * \frac{1\,ft^3}{28.32\,L} = 4.8 = 2.4 * 2\ {}^{mg}/_{L}$$

The 4.8 mg/L has been calculated by taking 2.4 mg/L which is the number one receives when converting 26 lbs of BOD/day/cfs into mg/L, multiplied by 2.0 which is the change in the DO level for warm water community streams. Because the South Fork Main Creek is a LFF community at the point of discharge, the multiplier becomes 9.6 mg/L (2.4 × 4). A typical background DO level for Wisconsin waters is 7 mg/L, so a 4 mg/L decrease is allowed to meet the 3 mg/L standard for LFF community streams. The above relationship is temperature dependent and an appropriate temperature correction factor is applied. The 26-lb method is based on a typical 24°C summer value for warm water streams. Adjustments for temperature are made using the following equation:

$$k_t = k_{24}\left(0.967^{(T-24)}\right)$$

Where k_{24} = 26 lbs of BOD/day/cfs

Calculations based on Full Assimilative Capacity at 7-Q_{10} Conditions:

$$WA\ Limit\ \left(\frac{mg}{L}\right) = 2.4 * (DO_o - DO_{std}) * \frac{7Q_{10} + Q_e * (1-f)}{Q_e} * 0.967^{T-24}$$

Where:

Q_e = effluent flow = 0.7 MGD
DO_{stream} = background dissolved oxygen = 7.0 mg/L
DO_{eff} = 4.0 mg/L
DO_{std} = dissolved oxygen criteria from s. NR 102.04(4), Wis. Adm. Code = 3.0 mg/L
7-Q_{10} = 2.92 cfs for April and 1.34 cfs for May
f = 0
DO_o = Initial mixed river DO = $\frac{DO_{eff} * Q_e + DO_{stream} * (7 - Q_{10} - Q_e * f)}{Q_e * (1-f) + 7 - Q_{10}}$ = 6.2 mg/L (April) and 5.7 mg/L (May)
T = Receiving water temperatures from s. NR 102.25, Wis. Adm. Code.

The table below shows the calculated weekly average BOD_5 WQBELs during April and May. Monthly receiving water temperatures are from s. NR 102.25, Wis. Adm. Code:

Calculated Weekly Average BOD_5 WQBELs

Parameter	April	May
Effluent Flow (MGD)	0.7	0.7
River Flow 7-Q_{10} (cfs)	2.92	1.34
River Temperature (°F)	50	59
River Temperature (°C)	10	15

Effluent DO (mg/L)	4.0	4.0
Background DO (mg/L)	7.0	7.0
Mix DO (mg/L)	6.2	5.7
DO Criterion (mg/L)	3.0	3.0
f	0	0
Concentration Limits (mg/L)	45	19

The weekly average BOD_5 WQBEL for May in the table above is less than 45 mg/L, which is the maximum weekly average BOD_5 limit given to municipal facilities discharging to a warm or cold water community surface water. Therefore, the flowrate of 0.7 MGD does not meet the receiving water condition as described in s. NR 104.02(4)(c)1, Wis. Adm. Code. An effluent flowrate can be found to meet the conditions of the variance via an iterative calculation process by setting the limit equal to 45 mg/L. For May, this effluent flow is 0.269 MGD. The Village of Hawkins would need to have the effluent flowrate limit of 0.269 MGD during May during the reissued permit term to keep the existing BOD_5 and TSS limits for May.

Effluent BOD_5 and TSS data are available from April and May discharges during the current permit term. For April the maximum daily BOD_5 and TSS values are 9 mg/L (n = 6, April 2020 – April 2023) and 10 mg/L (n = 6, April 2020 – April 2023) respectively. For May the maximum daily BOD_5 and TSS values are 13 mg/L (n = 13, May 2020 – May 2023) and 12 mg/L (n = 13, May 2020 – May 2023) respectively. An initial review of this effluent data shows the Village of Hawkins can meet the BOD_5 and TSS limits for an LFF community without the need for the effluent limit variance category limits. **Therefore, the BOD_5 and TSS effluent limit variance category limits are not recommended during the reissued permit term.**

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has year round 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.
- The need for weekly and monthly average limits.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

The previous limit evaluation (February 2018) had determined the Village of Hawkins had reasonable potential for the need of daily maximum ammonia nitrogen limits on a year round basis. Those limits were based on the CW community classification of the receiving water approx. 1.7 mi downstream accounting for ammonia decay and using the 1-Q_{10} flow method. Daily maximum limits are only applicable for the immediate receiving water, which in this case should be based on an LFF community classification. In addition, the representative low flows for the receiving water have been updated. Therefore, daily maximum limits will be updated due to these changes.

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

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

Where:

A = 0.411 and B = 58.4 for a LFF community, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 66 sample results were reported from October 2018 – October 2023. The maximum reported value was 9.18 s.u. (Standard pH Units). The effluent pH was 9.15 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.74 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.66 s.u. Therefore, a value of 8.74 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.74 s.u. into the equation above yields an ATC = 2.07 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

Daily maximum effluent limitations for toxic substances are based on the 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.

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

Method	Ammonia Nitrogen Limit (mg/L)
2×ATC	4.1

Attachment #1

1-Q_{10}	3.5

The 1-Q_{10} method yields the most stringent limits for the Village of Hawkins.

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

Daily Maximum Ammonia Nitrogen Limits – LFF Community

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	93	7.0 < pH ≤ 7.1	56	8.0 < pH ≤ 8.1	12
6.1 < pH ≤ 6.2	91	7.1 < pH ≤ 7.2	51	8.1 < pH ≤ 8.2	9.7
6.2 < pH ≤ 6.3	89	7.2 < pH ≤ 7.3	45	8.2 < pH ≤ 8.3	8.0
6.3 < pH ≤ 6.4	87	7.3 < pH ≤ 7.4	39	8.3 < pH ≤ 8.4	6.6
6.4 < pH ≤ 6.5	84	7.4 < pH ≤ 7.5	34	8.4 < pH ≤ 8.5	5.4
6.5 < pH ≤ 6.6	80	7.5 < pH ≤ 7.6	29	8.5 < pH ≤ 8.6	4.5
6.6 < pH ≤ 6.7	76	7.6 < pH ≤ 7.7	25	8.6 < pH ≤ 8.7	3.7
6.7 < pH ≤ 6.8	72	7.7 < pH ≤ 7.8	21	8.7 < pH ≤ 8.8	3.1
6.8 < pH ≤ 6.9	67	7.8 < pH ≤ 7.9	17	8.8 < pH ≤ 8.9	2.6
6.9 < pH ≤ 7.0	62	7.9 < pH ≤ 8.0	14	8.9 < pH ≤ 9.0	2.2

These limits are less stringent than the variable daily maximum limits calculated in the previous limit evaluation (February 2018). **Therefore, the daily maximum limits in the current permit are required to continue during the reissued permit term unless antibacksliding/antidegradation requirements as described in ch. NR 207, Wis. Adm. Code, are met.**

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 (CTC) for ammonia, because those limits relate to the assimilative capacity of the receiving water. The previous weekly and monthly average ammonia nitrogen limits are based on an effluent flow of 0.118 MGD where this evaluation uses an effluent flow of 0.478 MGD. In addition, the representative low flows for the receiving water have been updated. Therefore, the weekly and monthly average limits will be updated due to these changes.

LFF Community Section
Weekly average and monthly average limits for ammonia nitrogen are based on CTC in ch. NR 105, Wis. Adm. Code. The 30-day CTC for ammonia in waters classified as a LFF 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 = 1.0,
C = the minimum of 3.09 or $3.73 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or
C = $3.73 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and
T = the temperature (ºC) of the receiving water – (Early Life Stages Present), or
T = the maximum of the actual temperature (ºC) and 7 - (Early Life Stages Absent)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q_{10} (4-Q_3, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q_5 (estimated as 85% of the 7-Q_2 if the 30-Q_5 is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 ºC, 25% of the flow is used if the Temperature < 11 ºC, and 50% of the flow is used if the Temperature ≥ 11 ºC but < 16 ºC.

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 ºC, during the winter and spring months. So "ELS Absent" criteria apply from October – April, and "ELS Present" criteria will apply from May – September for the LFF community section.

The "default" basin assumed values are used for temperature, pH and background ammonia concentrations, because minimum ambient data is available. These monthly values, criteria and effluent limits are included as attachment #3.

CW Community Section

The 30-day CTC for ammonia in waters classified for a CW 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 $1.45 \times 10^{(0.028 \times (25 - T))}$,
T = the temperature (ºC) of the receiving water

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.

The "default" basin assumed values are used for temperature, pH and background ammonia concentrations, because minimum ambient data is available. These monthly values, criteria and effluent limits are included as attachment #4.

Ammonia Decay

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

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

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

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

The velocity of receiving water is assumed to be 5 miles per day and the distance from the point of discharge to the classification change is approximately 1.7 miles for a travel time of 0.34 days. This equation shows that at the location where the classification change, 93 – 98% of the ammonia is remaining across all months. After decay, the limits are increased as shown in the following table.

Ammonia Nitrogen Decay Limits Comparison

	LFF		CW		CW After Decay		Most Stringent Limits	
Months Applicable	Weekly Average (mg/L)	Monthly Average (mg/L)	Weekly Average (mg/L)	Monthly Average (mg/L)	Weekly Average (mg/L)	Monthly Average (mg/L)	Weekly Average (mg/L)	Monthly Average (mg/L)
January	64	29	14	6.8	15	7.0	15	7.0
February	63	30	14	7.2	14	7.4	14	7.4
March	67	52	15	14	16	15	16	15
April	87	110	28	39	29	40	29	40
May	26	25	26	29	28	31	26	25
June	30	30	27	30	28	32	28	30
July	23	16	18	14	19	15	19	15
August	22	14	17	13	18	13	18	13
September	21	14	15	9.9	16	10	16	10
October	53	38	15	9.8	15	10	15	10
November	68	40	17	11	17	11	17	11
December	66	32	15	7.8	15	8.0	15	8.0

Effluent Data

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

Ammonia Nitrogen Effluent Data

Statistics (mg/L)	January – March	April - May	June - September	October – December
1-day P_{99}	37	11	4.7	3.9

4-day P_{99}	21	8.2	3.0	2.2
30-day P_{99}	12	6.4	2.0	1.2
Mean*	8.8	5.6	1.6	0.8
Std	7.4	1.9	0.89	0.8
Sample size	12	19	14	20
Range	<0.1 - 24.1	<0.1 - 8.6	<0.1 - 3	<0.1 - 2.9

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

Based on this comparison, weekly average limits are recommended during January – March and monthly average limits are recommended during January – February.

Conclusions and Recommendations

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

Final Ammonia Nitrogen Limits

	Daily Maximum (mg/L)	Weekly Average (mg/L)	Monthly Average (mg/L)
Year round	Variable		
January		15	7.0
February		14	7.4
March		16	

PART 5 – 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.

It is recognized the Village of Hawkins potentially has a detention time of at least 180 days, in which the resulting discharged effluent is thought to not pose a risk to human and animal heath, as described in s. NR 210.06(3)(h), Wis. Adm. Code. The maximum 180-day rolling average flowrate for the facility is 0.125 MGD (October 2018 – October 2023) including days discharge did not occur. The volumetric capacity of the lagoons is approximately 30 MG, calculated based on design documentation available to the Department. Therefore, the estimated shortest detention time for the facility is approximately 30 MG / 0.125 MGD = 240 days and is significantly longer than the 180-day minimum. This detention time is essentially providing disinfection where additional disinfection treatment is not expected to be needed. **Therefore, bacteria limits or monitoring are not recommended during the reissued permit term.**

PART 6 – PHOSPHORUS

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

Because the Village of Hawkins does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average phosphorus loading is less than 150 lbs/month, which is the threshold for municipalities in accordance with s. NR 217.04(1)(a)1, Wis. Adm. Code. **Therefore, the technology-based monthly average limit of 1.0 mg/L is not recommended during the reissued permit term.** In addition, the need for a WQBEL for phosphorus must be considered.

Annual Average Mass Total Phosphorus Loading

Month	Average Phosphorus Conc. (mg/L)	Total Effluent Flow (MG/month)	Calculated Mass (lbs/month)
April 2023	2.24	5.96	111
May 2023	2.17	15.8	286
June 2023	2.04	0.012	0.2
September 2023	2.20	0.332	6.1
October 2023	1.41	0.495	5.8
		Average =	**82**

Total P (lbs/month) = Monthly average (mg/L) × total flow (MG/month) × 8.34 (lbs/gallon)
Where total flow is the sum of the actual flow (MGD) for that month

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 South Fork Main 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 South Fork Main Creek.
Qs = 100% of the minimum monthly 7-Q_2 low flow applicable to Outfall 002: 1.30 cfs (August).

Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code
Qe = effluent flow rate = 0.478 MGD = 0.740 cfs.
f = the fraction of effluent withdrawn from the receiving water = 0

The Village of Hawkins has the phosphorus limits of 0.356 mg/L and 0.117 lbs/day as monthly averages and 0.119 mg/L as a 6-month average effective in the current permit. A water quality trading plan has been submitted as an alternative compliance option to offset any total phosphorus discharged from this outfall that exceed the phosphorus WQBELs. The phosphorus WQBELs may be expressed as computed compliance limits, but the minimum control level (MCL) limit must be met at the point of discharge. **The MCL limit for the Village of Hawkins is 4.0 mg/L as a monthly average and will continue during the reissued permit term.** The final phosphorus WQBELs will be reevaluated due to changes in the overall effluent flow used, updated applicable 7-Q_2 low flow, and account for any updated background phosphorus data.

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 previous limit evaluation (February 2018) resulted in a WQBEL of 0.119 mg/L using a background concentration of 0.054 mg/L and an effluent flow of 0.118 MGD. This value is an estimate of the background phosphorus concentration based on the median phosphorus concentration (n = 9, October 2005 – August 2012) of South Fork Main Creek (SWIMS IDs: 513191 and 10022283) and Bear Creek (SWIMS ID: 553171). Section NR 217.13(2)(d), Wis. Adm. Code, states that the determination of upstream concentrations shall be evaluated at each permit reissuance. Additional data were considered in estimating the background phosphorus concentration.

A review of all available in stream total phosphorus data stored in the Surface Water Integrated Monitoring System database shows there is no updated background phosphorus data for the South Fork Main Creek upstream of Outfall 002 or for Bear Creek. Therefore, the previous background concentration of 0.054 mg/L will be utilized in this evaluation. Substituting this value and an effluent flow of 0.478 MGD into the limit calculation equation above, the calculated limit is 0.11 mg/L.

Effluent Data
The following table summarizes effluent total phosphorus monitoring data from October 2018 – October 2023 for informational purposes.

Total Phosphorus Effluent Data

Statistics	Conc. (mg/L)
1-day P_{99}	5.19
4-day P_{99}	3.31
30-day P_{99}	2.36
Mean	1.91
Std	0.97
Sample size	65
Range	0.58 - 5.61

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 0.11 mg/L may be expressed as a 6-month average. If a concentration limitation expressed as a 6-month average is included in the permit, a monthly average concentration limitation of 0.34 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, the South Fork Main Creek is an ORW approx. 3.8 mi downstream of Outfall 002. This final mass limit shall be 0.11 mg/L × 8.34 × 0.478 MGD = 0.45 lbs/day expressed as a 6-month average. The monthly average limit of 0.117 lbs/day is effective in the current permit and is more stringent than the updated mass limit. **Therefore, the monthly average limit of 0.117 lbs/day is recommended to continue during the reissued permit term.**

PART 7 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from October 2018 – October 2023.

The table below summarizes the calculated daily maximum and weekly average temperature WQBELs. The complete temperature limit calculation table is included as attachment #5.

Monthly Temperature Limits

Month	Calculated Effluent Limit	
	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	65	106
FEB	64	105

Attachment #1

Month	Calculated Effluent Limit	
	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
MAR	73	120
APR	74	105
MAY	74	93
JUN	120	120
JUL	85	91
AUG*	NA	NA
SEP	78	87
OCT	70	106
NOV	64	120
DEC	66	111

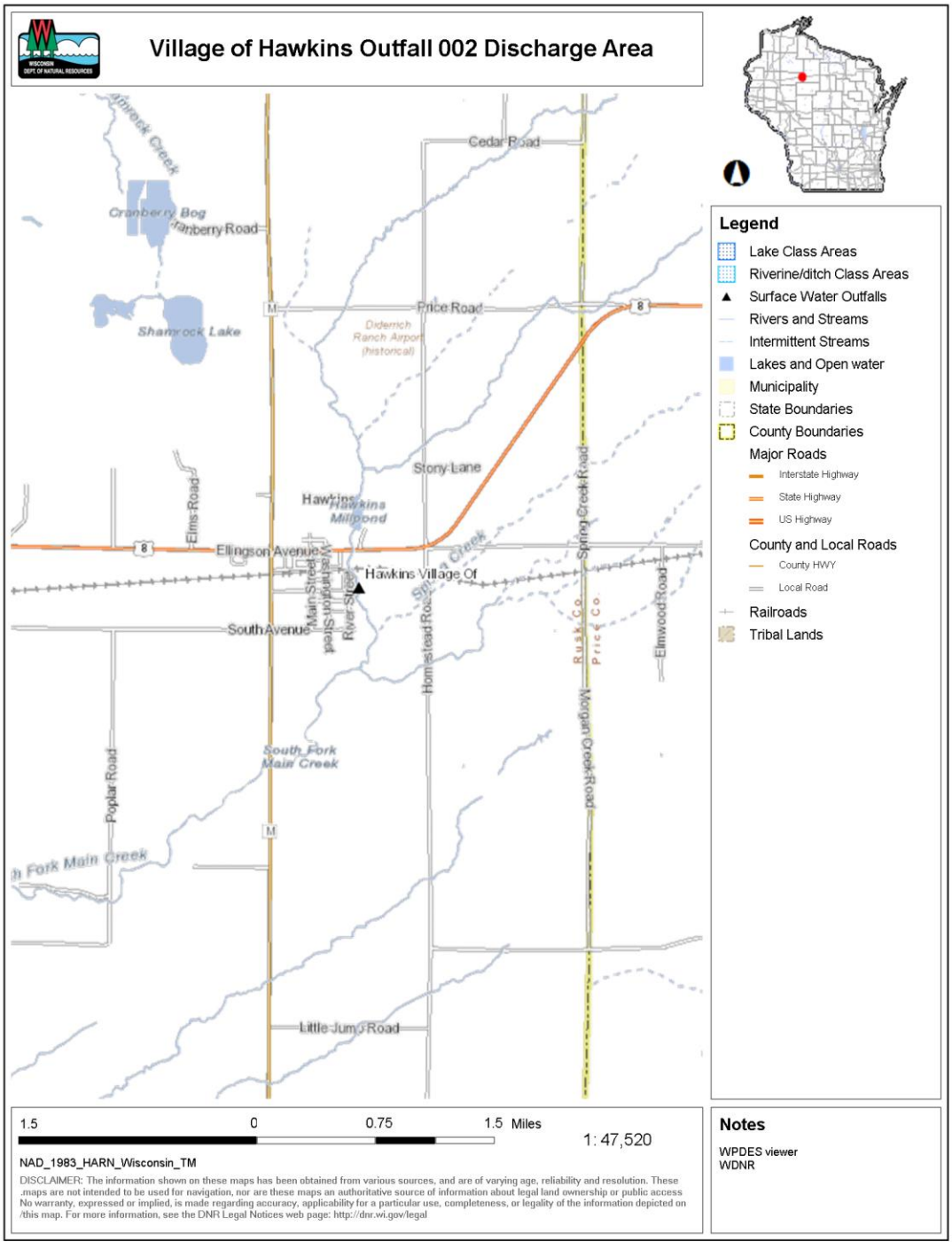
* Discharges did not occur in August during the current permit term.

This facility provides hydraulic detention times of approx. 240 days as a worst case scenario, 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 in spring and fall when ambient temperatures are less than 64 °F. **Therefore, temperature limits or monitoring are not recommended during the reissued permit term.**

PART 8 – WHOLE EFFLUENT TOXICITY (WET)

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

Guidance in Chapter 1.11 of the WET Guidance Document (WET Testing of Minor Municipal Discharges) was consulted. This is a minor municipal discharge (< 1.0 MGD) comprised solely of domestic wastewater, with no history of WET failures and no toxic compounds detected at levels of concern. **Therefore, WET testing is not recommended during the reissued permit term.**


Village of Hawkins Outfall 002 Discharge Area
Cedar Road
Cranberry Bog
Cranberry Road
Shamrock Lake
Price Road
Diderrich Ranch Airport (historical)
Stony Lane
Hawkins
Hawkins Millpond
Elms Road
Ellingson Avenue
Hawkins Village Of
Main Street
Washington Street
River Street
South Avenue
Spring Creek Road
Homestead Road
Rusk Co.
Price Co.
Morgan Creek Road
Elmwood Road
Poplar Road
South Fork Main Creek
Little Jump Road
Legend
Lake Class Areas
Riverine/ditch Class Areas
Surface Water Outfalls
Rivers and Streams
Intermittent Streams
Lakes and Open water
Municipality
State Boundaries
County Boundaries
Major Roads
Interstate Highway
State Highway
US Highway
County and Local Roads
County HWY
Local Road
Railroads
Tribal Lands
1.5 0 0.75 1.5 Miles
1: 47,520
NAD_1983_HARN_Wisconsin_TM
DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These .maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on /this map. For more information, see the DNR Legal Notices web page: http://dnr.wi.gov/legal
Notes
WPDES viewer
WDNR

Attachment #3

Weekly & Monthly Ammonia Nitrogen Limits – LFF Community

		Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Effluent Flow	Qe (MGD)	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478
Background Information	7-Q_{10} (cfs)	0.58	0.55	0.76	2.92	1.34	0.84	0.48	0.41	0.38	0.66	1.01	0.69
	30-Q_5 (cfs)	1.09	NA	4.26	15.0	5.36	3.26	1.36	1.15	1.19	2.36	2.88	1.51
	7-Q_2 (cfs)	1.58	1.48	2.25	9.76	4.26	2.71	1.47	1.3	1.61	2.85	3.3	2.09
	Ammonia (mg/L)	0.13	0.13	0.07	0.07	0.07	0.04	0.04	0.04	0.03	0.03	0.03	0.13
	Avg. Temp. (°C)	3	4	6	10	15	18	21	20	17	13	8	4
	Max. Temp. (°C)	3	4	6	10	15	18	21	20	17	13	8	4
	pH (s.u.)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	% of Flow used	25	25	25	25	50	100	100	100	100	50	25	25
	Ref. Weekly Flow (cfs)	0.15	0.14	0.19	0.73	0.67	0.84	0.48	0.41	0.38	0.33	0.25	0.17
	Ref. Monthly Flow (cfs)	0.27	0.31	1.07	3.75	2.68	3.26	1.36	1.15	1.19	1.18	0.72	0.38
Criteria (mg/L)	4-day Chronic												
	ELS Present					13.85	13.85	13.85	13.85	13.85			
	ELS Absent	53.36	53.36	53.36	43.98						36.76	50.75	53.36
	30-day Chronic												
	ELS Present					5.54	5.54	5.54	5.54	5.54			
	ELS Absent	21.34	21.34	21.34	17.59						14.71	20.30	21.34
Effluent Limitations (mg/L)	Weekly Average												
	ELS Present					26	30	23	22	21			
	ELS Absent	64	63	67	87						53	68	66
	Monthly Average												
	ELS Present					25	30	16	14	14			
	ELS Absent	29	30	52	110						38	40	32

Attachment #4

Weekly & Monthly Ammonia Nitrogen Limits – CW Community

		Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Effluent Flow	Qe (MGD)	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478	0.478
Background Information	7-Q_{10} (cfs)	0.92	0.87	1.20	4.63	2.12	1.33	0.76	0.65	0.60	1.05	1.60	1.09
	30-Q_5 (cfs)	1.73	0.00	6.75	23.8	8.50	5.17	2.16	1.82	1.89	3.74	4.57	2.39
	7-Q_2 (cfs)	2.50	2.35	3.57	15.5	6.75	4.30	2.33	2.06	2.55	4.52	5.23	3.31
	Ammonia (mg/L)	0.13	0.13	0.07	0.07	0.07	0.04	0.04	0.04	0.03	0.03	0.03	0.13
	Avg. Temp. (°C)	2	2	4	8	13	17	18	17	14	9	5	3
	Max. Temp. (°C)	2	2	4	8	13	17	18	17	14	9	5	3
	pH (s.u.)	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	% of Flow used	25	25	25	25	50	100	100	100	50	25	25	25
	Ref. Weekly Flow (cfs)	0.23	0.22	0.30	1.16	1.06	1.33	0.76	0.65	0.30	0.26	0.40	0.27
	Ref. Monthly Flow (cfs)	0.43	0.50	1.69	5.94	4.25	5.17	2.16	1.82	0.94	0.94	1.14	0.60
Criteria (mg/L)	4-day Chronic	10.91	10.91	10.91	10.91	10.91	9.50	8.84	9.16	10.91	10.91	10.91	10.91
	30-day Chronic	4.36	4.36	4.36	4.36	4.36	3.80	3.54	3.67	4.36	4.36	4.36	4.36
Effluent Limitations (mg/L)	Weekly Average	14	14	15	28	26	27	18	17	15	15	17	15
	Monthly Average	6.8	7.2	14	39	29	30	14	13	9.9	9.8	11	7.8

Attachment #5

Temperature Limits for Receiving Waters with Unidirectional Flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	Village of Hawkins		**7-Q10:**	0.37	cfs		
Outfall(s):	002		**Dilution:**	25%	**Start:**	NA	10/01/18
Date Prepared:	12/15/2023		**f:**	0	**End:**	NA	10/31/23
Design Flow (Qe):	0.478	MGD	**Stream type:**	Limited forage fish community			
Storm Sewer Dist.	0	ft	**Qs:Qe ratio:**	0.125	: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	37	54	78	0.58	0.139	0.139	0			65	106
FEB	39	54	79	0.55	0.133	0.135	0			64	105
MAR	43	57	80	0.76	0.105	0.106	0			73	120
APR	50	63	81	2.92	0.578	0.606	0			74	105
MAY	59	70	84	1.34	0.549	0.588	0			74	93
JUN	64	77	85	0.84	0.041	0.041	0			120	120
JUL	69	81	86	0.48	0.240	0.240	0			85	91
AUG	68	79	86	0.41	0	0	0			NA	NA
SEP	63	73	85	0.38	0.124	0.870	0			78	87
OCT	55	63	83	0.66	0.123	0.131	0			70	106
NOV	46	54	80	1.01	0.131	0.131	0			64	120
DEC	40	54	79	0.69	0.135	0.135	0			66	111

Village of Hawkins WQT Plan Update

To: Arthur Ryzak, Sheri Snowbank, Matt Claucherty, Wisconsin DNR

From: Pat Morrow, P.E., MSA Professional Services, Inc.

Subject: Village of Hawkins WQT Plan Update

Date: December 18, 2023 (DRAFT SUBMITTAL)

FEBRUARY 19, 2024 (Additional DNR Review Comments Addressed)

Introduction

The original Village of Hawkins Water Quality Trading Plan was prepared by Morgan & Parmley, Ltd. in November 2017 (see **Appendix A**). With the expiration of the Village's current WPDES permit in 2023, reissuance of the permit requires an update to the Water Quality Trading (WQT) Plan to continue compliance with phosphorus limits. Unless otherwise noted below, the conditions of the 2017 plan will remain in effect. Specifically, information on operating conditions and reporting contained in the 2017 plan (refer to Section D and Section F of the 2017 Plan for specifics) will remain in effect with this WQT Plan update unless otherwise indicated. A sample of the annual inspection report used by the Village is included as **Appendix B**. Previous inspection reports and photographs are included as **Appendix C**.

Throughout this report, the following distinction from DNR's WQT Plan implementation guidance should be noted. Pollutant reduction credits (or credits) are the amount (mass) of a given pollutant over a specified period that is available to the credit user in trade. Pollutant reduction credits are equal to the actual pollutant load reduction divided by the trade ratio (1.2). For example, to generate 1 lb of pollutant reduction credits, 1.2 lbs of pollutant loading to the watershed must be removed through water quality improvement projects.

Background

MSA reviewed the existing SnapPlus models for the Olson Dairy Farm provided by the Village and DNR. P-trade reports were run for the baseline model and for the permanent grass model prior to making any modifications to the original files. While verifying the inputs were the same as specified in the 2017 WQT Plan, the original values of the P-trade reports provided in the 2017 WQT Plan were unable to be reproduced with the version of SnapPlus that MSA is using. Specifically, the output for potentially tradeable phosphorus is notably less in both the baseline and permanent grass models. See attached **Table 1** for the 2017 WQT Plan summary of credits for the Olson Dairy Farm for Permit Terms #1 and #2.

Because of these inconsistencies from the previous values in the 2017 WQT Plan, the following options for SnapPlus modeling were analyzed to estimate credits generated by the Olson Dairy Farm for the years 2023 through 2027 (Permit Term #2).

Option 1
Minor modifications were made to the baseline model so that nutrient applications consistently matched year to year for a given crop type (corn silage, grass hay, pasture). There were a few instances in the years 2018 through 2022 where there was not consistent "season" or "spread method" selected for manure and/or nutrient applications. Both models were built out to include crop years 2023 to 2027. Manure and fertilizer applications in the baseline model for the years 2023 through 2027 were assigned the same values as 2018 through 2022. No manure or fertilizer applications were included in the permanent grass model for 2023 through 2027. See attached **Table 2** for the detailed summary of credits for Option 1 at the Olson Dairy Farm for Permit Terms #1 and #2.

Avg. Credits 2023 through 2027 = 864.4 lbs/year

Option 2
Option 2 is the same as Option 1, except some of the nutrient applications were modified in the years 2016 and 2017 in the baseline and permanent grass model to match what is proposed in the years 2018 through 2022 in the baseline model. There were cases where the manure or fertilizer applications in the original model did not match what was proposed. For example, corn silage, grass hay, or pasture with zero applications or corn starter fertilizer being spread on grass hay. See attached **Table 3** for the detailed summary of credits for Option 2 at the Olson Dairy Farm for Permit Terms #1 and #2.

Avg. Credits 2023 through 2027 = 871.3 lbs/year

Option 3
Option 3 is the same as Option 1, except that the permanent grass model was compared to the permanent baseline in the 2017 WQT Plan of 1109 lbs/year. See attached **Table 4** for the detailed summary of credits for Option 3 at the Olson Dairy Farm for Permit Terms #1 and #2.

Avg. Credits 2023 through 2027 = 919.6 lbs/year

Option 4
Option 4 is the same as Option 2, except that the permanent grass model was compared to the permanent baseline in the 2017 WQT Plan of 1109 lbs/year. See attached **Table 5** for the detailed summary of credits for Option 4 at the Olson Dairy Farm for Permit Terms #1 and #2.

Avg. Credits 2023 through 2027 = 918.7 lbs/year

Option 5
Option 5 is the same as Option 2, except the permanent grass model has been updated to include recommended fertilizer applications for nitrogen, phosphorus, potassium, sulfur, and lime. Phosphorus fertilizer was only added to fields 4-0, 4-1, and 6. These recommended applications have minimal effect on credit generation. If grass hay is desired to be harvested for the foreseeable future, the Village and/or renter should plan to keep up with fertilizer applications to keep the ground in good agronomic condition. See attached **Table 6** for the detailed summary of credits for Option 5 at the Olson Dairy Farm for Permit Terms #1 and #2.

Avg. Credits 2023 through 2027 = 871.0 lbs/year

The recommended fertilizer applications are shown in **Table 7**.

Table 7. Option 5 Recommended Fertilizer Applications					
Field	**Acres**	**N**	**P**	**K**	**Lime**
3	9.8	130	--	170	--
4-0	19.2	130	20	185	4
4-1	7.7	130	20	185	4
5	10.7	130	--	170	--
6	16.3	130	40	185	3
7-0	0.2	130	--	--	--
7-1	0.7	130	--	--	--
8	3.4	130	--	--	--
Total	**68.0**				

Recommendation

Option 5 is the recommended scenario for modeling credits for the years 2023 through 2027 because it closely aligns with the 2017 WQT Plan credit calculations and would allow for keeping the ground in good agronomic condition for the future. **Figure 1** shows the credit comparison between the modeled Option 5 and the 2017 WQT Plan.

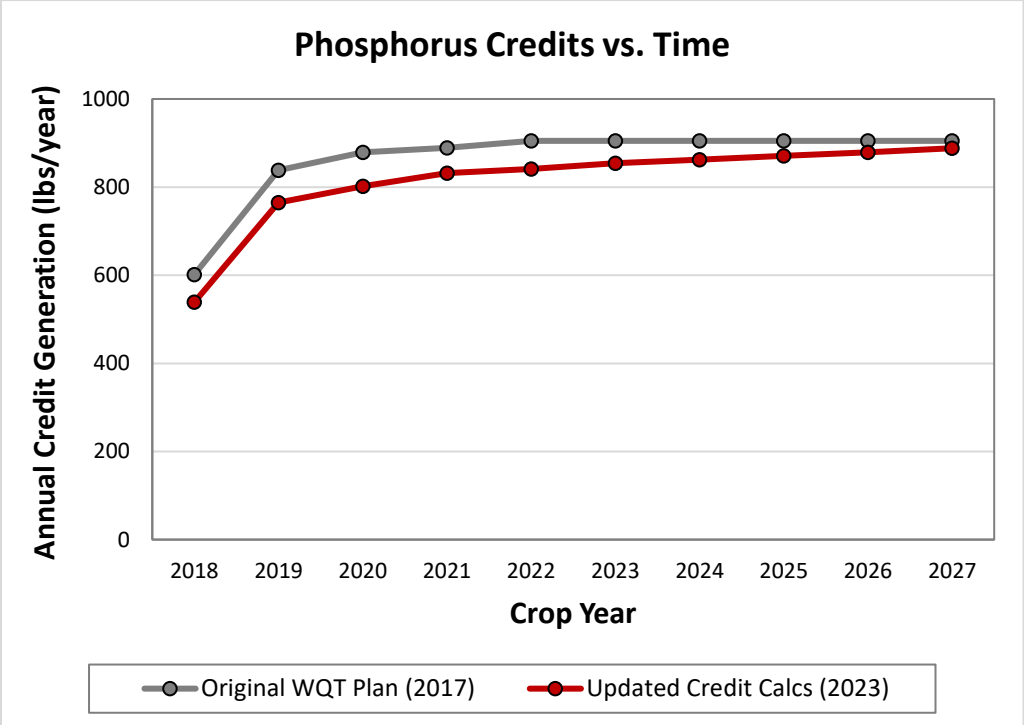


Figure 1. Credit Generation Comparison of Option 5 versus Original WQT Plan

If Option 5 is ruled out as a possible scenario, the alternative recommendation would be Option 2 for modeling credits into Permit #2 because it most closely aligns with the 2017 WQT plan credit calculations. **Figure 2** shows the credit comparison between the modeled Option 5 and the 2017 WQT Plan.

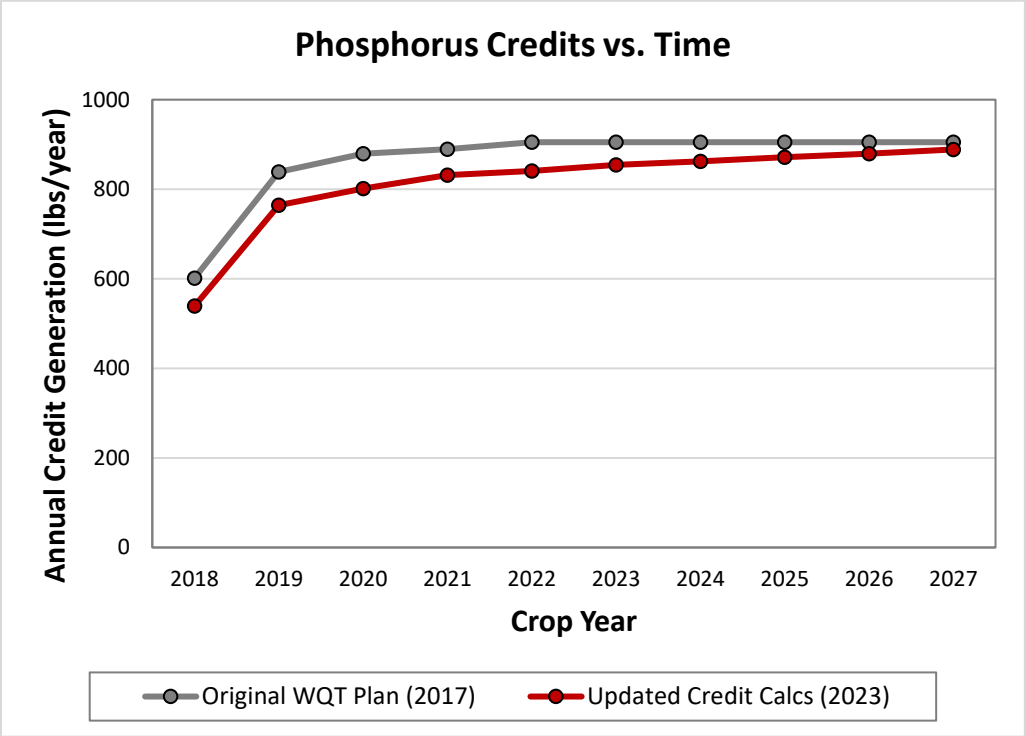


Figure 2. Credit Generation Comparison of Option 2 versus Original WQT Plan

During Permit Term #1 of WQT (2018 – 2022), the average phosphorus credits used by the Village of Hawkins was approximately 174 lbs/year. The nearby Village of Conrath purchased 44 lbs/year of credits in 2018 and 73 lbs/year of credits in 2021 and 2022 from the Village of Hawkins, which is an average of 64 lbs/year of credits. These values for WWTF credits used and credits purchased from the Village of Conrath are assumed for projections into Permit Term #2. Based on the Option 5 recommendation detailed above, the average estimated generated credits were 756 lbs/year for Permit Term #1 (2018 – 2022) and 871 lbs/year for Permit Term #2 (2023 – 2027).

Upgrades to the drinking water distribution system in the Village of Hawkins have led to discussions regarding the addition of a polyphosphate chemical to inhibit pipe corrosion. The Village intends to begin adding polyphosphate in the future after completion of the water system upgrades. It was estimated that addition of this chemical would yield a maximum phosphorus load of 184 lbs/year and is to be considered into the Village's WQT credit allocation for Permit Term #2. This discussion is further summarized in a memorandum prepared by MSA in 2023 (see **Appendix D**).

Evaluation of historical phosphorus concentrations and adjustment to include the additional phosphate from the water treatment chemical additive suggest that the 4.0 mg/L monthly average phosphorus limit

from the Village's WPDES permit will be attainable. Since the WWTF does not contain equipment for chemical phosphorus removal by chemical coagulant addition and precipitation or other means, in the event that the 4.0 mg/L limit is exceeded, the Village would need to reduce the amount of polyphosphate addition or add the ability for phosphorus removal at the WWTF. A summary of effluent phosphorus concentrations over the past ten years is included in **Figure 3**, below. Note that, at the WWTF 10-year average influent flow of 0.068 MGD, the proposed polyphosphate addition (up to 184 lbs/yr) will likely lead to an increase in phosphorus concentrations of less than 1 mg/L. Effluent phosphorus concentrations at the WWTF have not exceeded 3 mg/L since 2019, meaning the proposed polyphosphate addition will likely have little impact on the WWTF's ability to meet an effluent phosphorus limit of 4 mg/L.

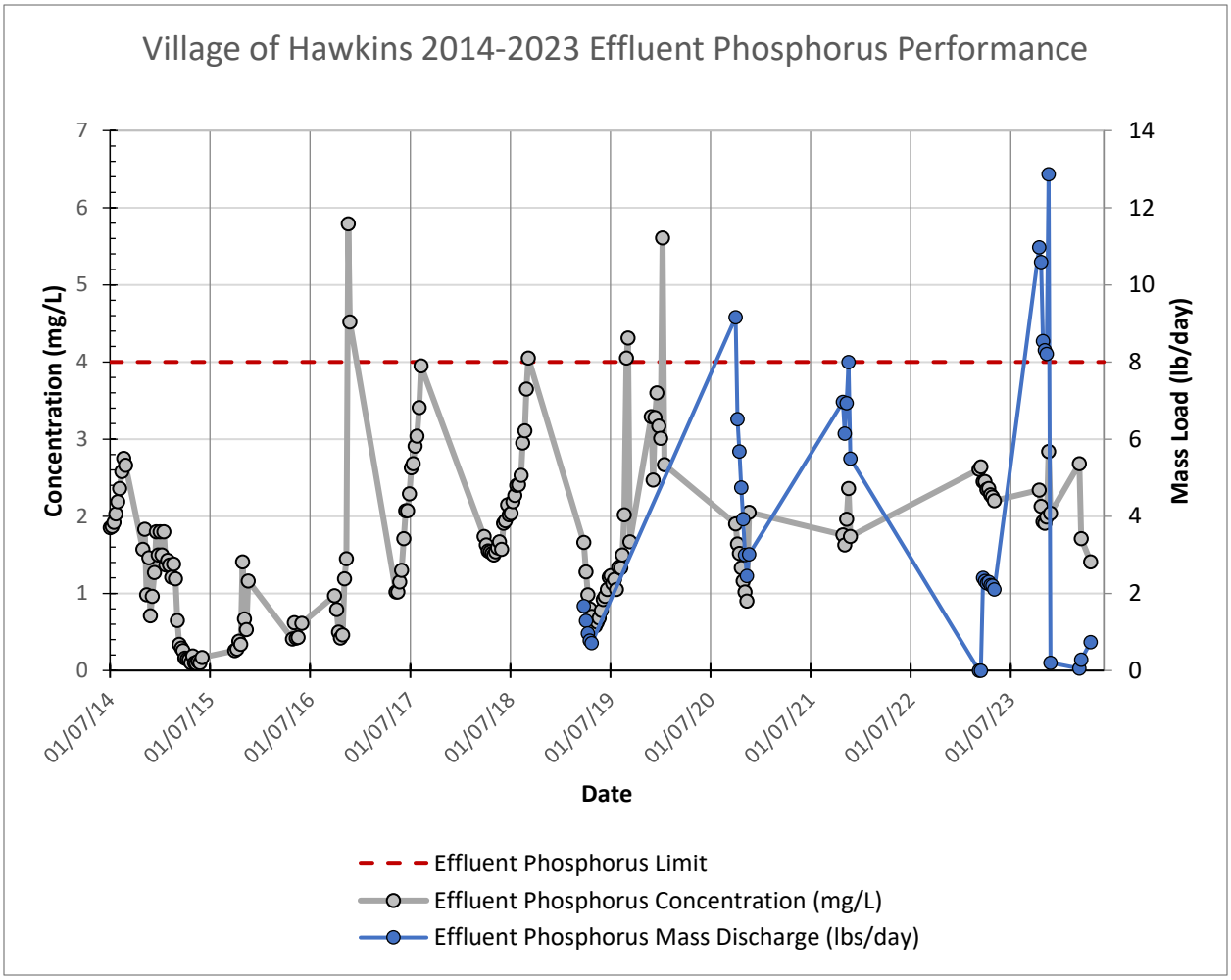


Figure 3. Historical Effluent Phosphorus Performance

Table 8 summarizes the Permit Term #1 (2018 – 2022) and estimated Permit Term #2 (2023 – 2027) credits used by the Hawkins WWTF, credits generated by Olson Dairy Farm, the credits purchased by the Village of Conrath, and the credit load estimated due to the water system polyphosphate chemical addition. Graphical representations of monthly credit usage and annual credit usage from 2018-2023 are presented in **Figure 4** and **Figure 5,** respectively. Note that WQT credit usage data is not available for every month during the previous Permit Term. As shown, the Village of Hawkins' WWTF will be able to

successfully meet phosphorus requirements through the use of WQT phosphorus credits in Permit Term #2.

Table 8. Village of Hawkins Estimated Credits Summary (Permit Terms #1 & #2)					
Year	Avg. Credits Generated (lb/yr)	Avg. Credits Used (lb/yr)	Conrath Avg. Credits Purchased (lb/yr)	Water System Corrosion Control Credits (lb/yr)	Avg. Credit Surplus (lb/yr)
Permit Term #1 2018-2022	756	174	64	--	518
Permit Term #2 2023-2027	871	174	64	184	449

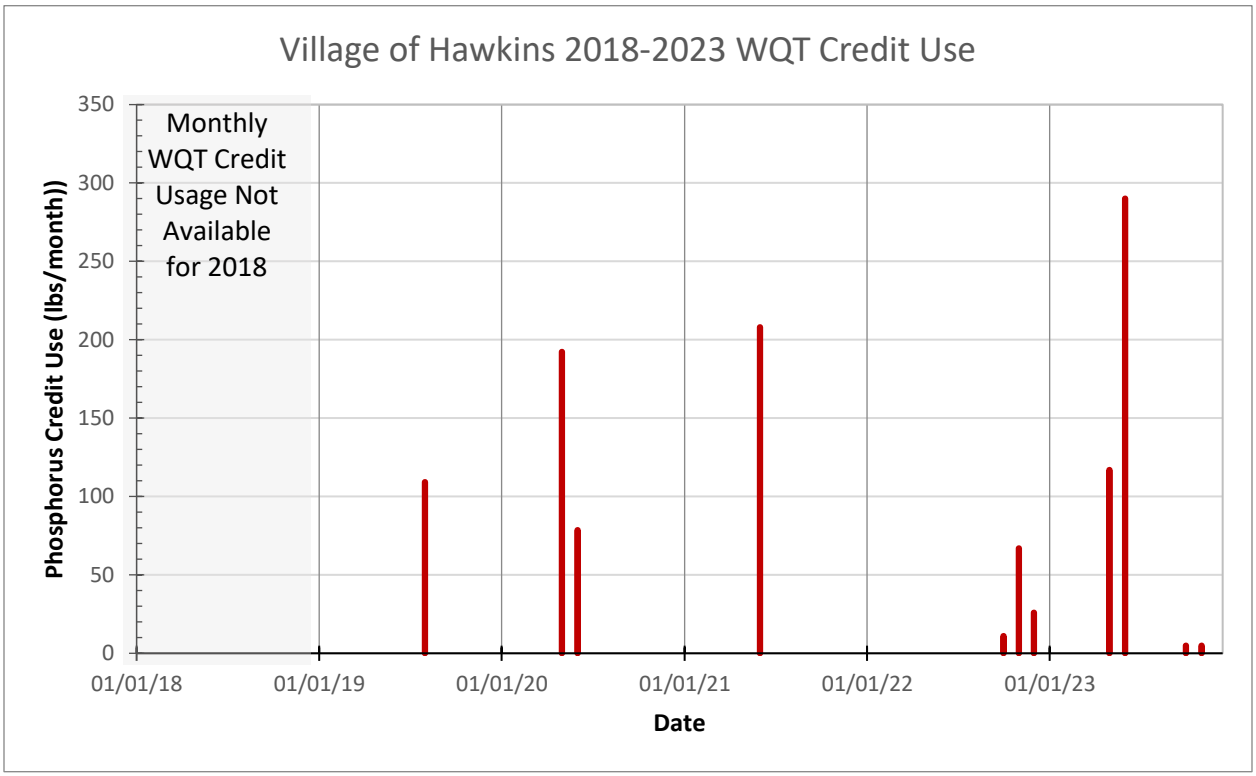


Figure 4. 2018-2023 WQT Credit Usage

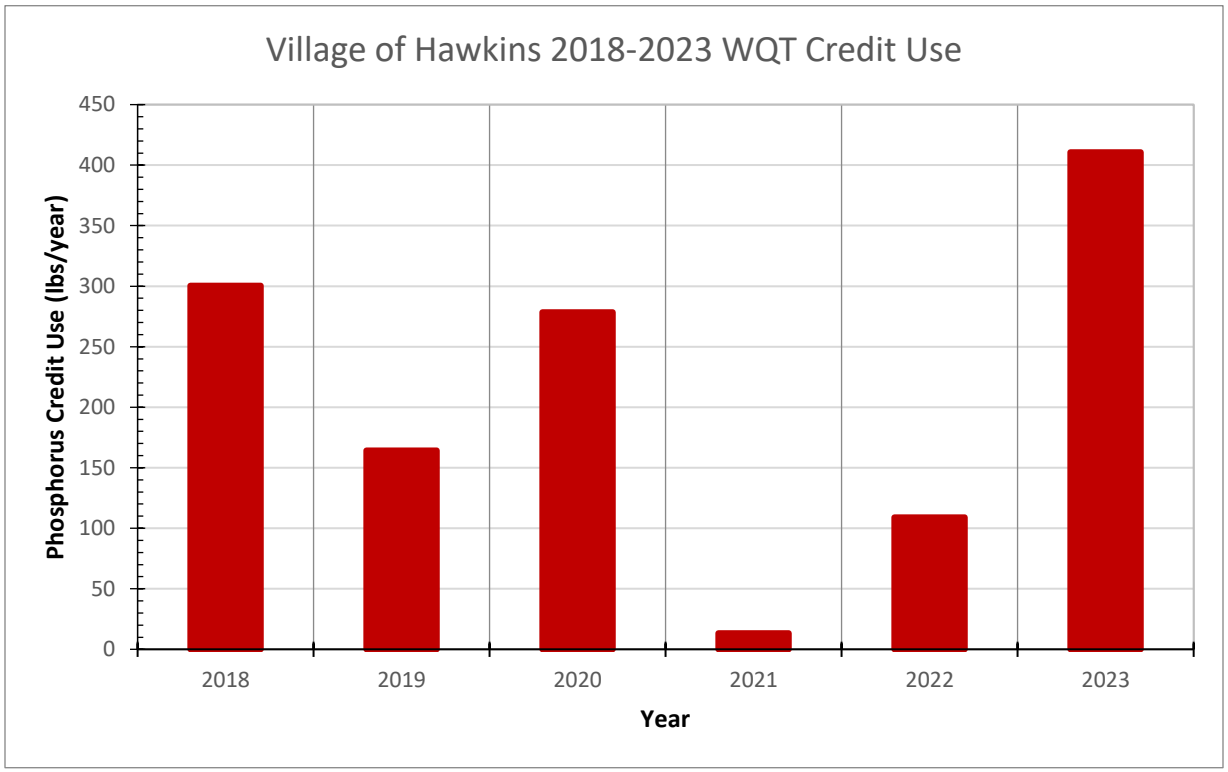


Figure 5. 2018-2023 Annual WQT Credit Usage

Table 1: Phosphorus Credit Calculations for Olson Farm (Original Calcs from 2017 WQT Plan)

Field ID	Acres	Scenario	PTP (lbs/year)									
			Permit Term #1					Permit Term #2				
			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
3	9.8	Baseline	285	285	287	289	292	292	292	292	292	292
		Permanent Grass	57	10	7	5	4	4	4	4	4	4
		Phosphorus Reduction	**228**	**275**	**280**	**284**	**288**	**288**	**288**	**288**	**288**	**288**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**190**	**229**	**233**	**237**	**240**	**240**	**240**	**240**	**240**	**240**
4-0	19.2	Baseline	328	474	502	520	525	525	525	525	525	525
		Permanent Grass	64	15	10	7	6	6	6	6	6	6
		Phosphorus Reduction	**264**	**459**	**492**	**513**	**519**	**519**	**519**	**519**	**519**	**519**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**220**	**383**	**410**	**428**	**433**	**433**	**433**	**433**	**433**	**433**
4-1	7.7	Baseline	16	15	15	16	16	16	16	16	16	16
		Permanent Grass	5	5	4	3	3	3	3	3	3	3
		Phosphorus Reduction	**11**	**10**	**11**	**13**	**13**	**13**	**13**	**13**	**13**	**13**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**9**	**8**	**9**	**11**	**11**	**11**	**11**	**11**	**11**	**11**
5	10.7	Baseline	7	7	7	7	8	8	8	8	8	8
		Permanent Grass	7	4	3	2	1	1	1	1	1	1
		Phosphorus Reduction	**0**	**3**	**4**	**5**	**7**	**7**	**7**	**7**	**7**	**7**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**0**	**3**	**3**	**4**	**6**	**6**	**6**	**6**	**6**	**6**
6	16.3	Baseline	250	249	251	232	237	237	237	237	237	237
		Permanent Grass	39	7	4	3	2	2	2	2	2	2
		Phosphorus Reduction	**211**	**242**	**247**	**229**	**235**	**235**	**235**	**235**	**235**	**235**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**176**	**202**	**206**	**191**	**196**	**196**	**196**	**196**	**196**	**196**
7-0	0.2	Baseline	5	5	6	6	6	6	6	6	6	6
		Permanent Grass	3	3	2	2	2	2	2	2	2	2
		Phosphorus Reduction	**2**	**2**	**4**	**4**	**4**	**4**	**4**	**4**	**4**	**4**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
7-1	0.7	Baseline	15	15	15	16	16	16	16	16	16	16
		Permanent Grass	9	3	2	2	2	2	2	2	2	2
		Phosphorus Reduction	**6**	**12**	**13**	**14**	**14**	**14**	**14**	**14**	**14**	**14**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**5**	**10**	**11**	**12**	**12**	**12**	**12**	**12**	**12**	**12**
8	3.4	Baseline	8	8	8	8	9	9	9	9	9	9
		Permanent Grass	8	5	4	3	3	3	3	3	3	3
		Phosphorus Reduction	**0**	**3**	**4**	**5**	**6**	**6**	**6**	**6**	**6**	**6**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**0**	**3**	**3**	**4**	**5**	**5**	**5**	**5**	**5**	**5**
Total	68.0	Baseline	914	1058	1091	1094	1109	1109	1109	1109	1109	1109
		Permanent Grass	192	52	36	27	23	23	23	23	23	23
		Phosphorus Reduction	**722**	**1006**	**1055**	**1067**	**1086**	**1086**	**1086**	**1086**	**1086**	**1086**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**602**	**838**	**879**	**889**	**905**	**905**	**905**	**905**	**905**	**905**
		Avg. Credit			**823**					**905**		

Table 2: Option 1 Phosphorus Credit Calculations for Olson Farm (Updated 11/11/2023)

Field ID	Acres	Scenario	PTP (lbs/year)									
			Permit Term #1					Permit Term #2				
			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
3	9.8	Baseline	261.0	260.1	261.4	263.5	265.6	267.8	270.0	272.2	274.4	276.7
		Permanent Grass	47.0	5.3	3.1	1.9	2.6	1.5	1.4	1.3	1.2	1.2
		Phosphorus Reduction	**214.0**	**254.7**	**258.4**	**261.5**	**263.0**	**266.3**	**268.6**	**270.9**	**273.2**	**275.5**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**178.4**	**212.3**	**215.3**	**217.9**	**219.1**	**221.9**	**223.8**	**225.8**	**227.7**	**229.6**
4-0	19.2	Baseline	293.8	432.5	459.0	476.2	480.4	487.1	491.1	496.0	500.2	504.6
		Permanent Grass	50.9	8.2	4.6	2.7	1.6	1.3	1.1	1.0	0.9	0.8
		Phosphorus Reduction	**242.9**	**424.3**	**454.4**	**473.5**	**478.8**	**485.8**	**490.0**	**495.0**	**499.3**	**503.8**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**202.4**	**353.6**	**378.6**	**394.6**	**399.0**	**404.8**	**408.3**	**412.5**	**416.1**	**419.9**
4-1	7.7	Baseline	14.4	14.2	14.1	14.1	14.2	14.2	14.2	14.3	14.3	14.4
		Permanent Grass	2.8	2.2	1.6	1.1	0.6	0.5	0.5	0.4	0.4	0.3
		Phosphorus Reduction	**11.5**	**12.0**	**12.5**	**13.1**	**13.5**	**13.7**	**13.8**	**13.9**	**14.0**	**14.0**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**9.6**	**10.0**	**10.4**	**10.9**	**11.3**	**11.4**	**11.5**	**11.6**	**11.6**	**11.7**
5	10.7	Baseline	5.8	5.7	5.7	5.7	5.8	5.8	5.8	5.8	5.9	5.9
		Permanent Grass	5.4	2.4	1.5	0.7	1.1	1.2	1.1	1.1	1.0	0.9
		Phosphorus Reduction	**0.4**	**3.3**	**4.2**	**5.0**	**4.6**	**4.6**	**4.7**	**4.8**	**4.9**	**4.9**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**0.3**	**2.8**	**3.5**	**4.2**	**3.9**	**3.8**	**3.9**	**4.0**	**4.1**	**4.1**
6	16.3	Baseline	219.6	218.7	219.8	221.5	223.2	225.0	226.9	228.7	230.6	232.4
		Permanent Grass	30.8	3.8	2.1	1.2	0.8	0.8	0.6	0.5	0.5	0.4
		Phosphorus Reduction	**188.8**	**214.8**	**217.7**	**220.2**	**222.4**	**224.3**	**226.2**	**228.2**	**230.1**	**232.1**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**157.3**	**179.0**	**181.4**	**183.5**	**185.3**	**186.9**	**188.5**	**190.1**	**191.8**	**193.4**
7-0	0.2	Baseline	4.0	4.2	4.4	4.6	4.8	5.1	5.3	5.5	5.7	6.0
		Permanent Grass	2.3	2.3	2.0	1.8	1.5	0.1	0.1	0.1	0.1	0.1
		Phosphorus Reduction	**1.7**	**1.9**	**2.4**	**2.8**	**3.3**	**5.0**	**5.2**	**5.4**	**5.7**	**5.9**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**1.4**	**1.6**	**2.0**	**2.4**	**2.8**	**4.2**	**4.3**	**4.5**	**4.7**	**4.9**
7-1	0.7	Baseline	12.4	12.6	12.8	13.1	13.4	13.7	14.1	14.4	14.7	15.0
		Permanent Grass	8.0	1.6	1.0	0.7	0.6	0.2	0.2	0.2	0.2	0.2
		Phosphorus Reduction	**4.4**	**10.9**	**11.8**	**12.4**	**12.8**	**13.5**	**13.9**	**14.2**	**14.5**	**14.8**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**3.7**	**9.1**	**9.8**	**10.4**	**10.7**	**11.3**	**11.5**	**11.8**	**12.1**	**12.3**
8	3.4	Baseline	5.8	5.8	5.8	5.8	5.9	5.9	6.0	6.0	6.1	6.1
		Permanent Grass	5.2	2.7	1.9	1.2	1.0	0.9	0.8	0.8	0.8	0.8
		Phosphorus Reduction	**0.6**	**3.1**	**3.9**	**4.6**	**4.9**	**5.0**	**5.1**	**5.2**	**5.3**	**5.4**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**0.5**	**2.6**	**3.3**	**3.8**	**4.1**	**4.2**	**4.3**	**4.3**	**4.4**	**4.5**
Total	68.0	Baseline	816.7	953.6	983.2	1004.7	1013.3	1024.6	1033.3	1042.9	1051.8	1061.1
		Permanent Grass	152.4	28.5	17.9	11.5	10.0	6.5	5.8	5.4	5.0	4.6
		Phosphorus Reduction	**664.3**	**925.1**	**965.3**	**993.2**	**1003.4**	**1018.2**	**1027.5**	**1037.5**	**1046.9**	**1056.4**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**553.6**	**770.9**	**804.4**	**827.7**	**836.1**	**848.5**	**856.2**	**864.6**	**872.4**	**880.3**
		Avg. Credit			**758.5**					**864.4**		

Table 3: Option 2 Phosphorus Credit Calculations for Olson Farm (Updated 11/11/2023)

Field ID	Acres	Scenario	PTP (lbs/year)									
			Permit Term #1					Permit Term #2				
			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
3	9.8	Baseline	261.3	259.3	263.8	265.5	268.5	270.7	273.2	275.4	277.8	280.1
		Permanent Grass	46.5	5.6	3.3	2.1	2.6	1.5	1.4	1.3	1.2	1.2
		Phosphorus Reduction	**214.8**	**253.8**	**260.5**	**263.4**	**265.9**	**269.2**	**271.8**	**274.1**	**276.6**	**278.9**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**179.0**	**211.5**	**217.1**	**219.5**	**221.6**	**224.4**	**226.5**	**228.5**	**230.5**	**232.4**
4-0	19.2	Baseline	278.6	431.7	453.5	478.1	481.6	490.5	494.4	500.0	504.3	509.0
		Permanent Grass	51.9	8.6	4.9	3.0	1.6	1.3	1.1	1.0	0.9	0.8
		Phosphorus Reduction	**226.7**	**423.2**	**448.6**	**475.2**	**480.0**	**489.2**	**493.3**	**499.0**	**503.4**	**508.1**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**188.9**	**352.7**	**373.9**	**396.0**	**400.0**	**407.7**	**411.1**	**415.9**	**419.5**	**423.5**
4-1	7.7	Baseline	14.4	14.2	14.1	14.1	14.2	14.2	14.2	14.3	14.3	14.4
		Permanent Grass	2.8	2.2	1.6	1.1	0.6	0.5	0.5	0.4	0.4	0.3
		Phosphorus Reduction	**11.5**	**12.0**	**12.5**	**13.1**	**13.5**	**13.7**	**13.8**	**13.9**	**14.0**	**14.0**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**9.6**	**10.0**	**10.4**	**10.9**	**11.3**	**11.4**	**11.5**	**11.6**	**11.6**	**11.7**
5	10.7	Baseline	5.8	5.7	5.7	5.8	5.8	5.8	5.8	5.9	5.9	5.9
		Permanent Grass	5.4	2.4	1.5	0.8	1.1	1.2	1.1	1.1	1.0	0.9
		Phosphorus Reduction	**0.4**	**3.3**	**4.2**	**5.0**	**4.6**	**4.6**	**4.7**	**4.8**	**4.9**	**5.0**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**0.3**	**2.8**	**3.5**	**4.2**	**3.9**	**3.8**	**3.9**	**4.0**	**4.1**	**4.1**
6	16.3	Baseline	217.0	217.6	220.3	222.4	224.6	226.6	228.5	230.5	232.4	234.3
		Permanent Grass	30.5	4.0	2.3	1.4	0.8	0.8	0.6	0.5	0.5	0.4
		Phosphorus Reduction	**186.4**	**213.6**	**217.9**	**221.0**	**223.8**	**225.8**	**227.9**	**229.9**	**231.9**	**233.9**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**155.4**	**178.0**	**181.6**	**184.1**	**186.5**	**188.2**	**189.9**	**191.6**	**193.3**	**194.9**
7-0	0.2	Baseline	4.2	4.4	4.6	4.8	5.1	5.3	5.5	5.7	6.0	6.2
		Permanent Grass	2.5	2.4	2.1	1.9	1.7	1.5	1.5	1.4	1.3	0.1
		Phosphorus Reduction	**1.8**	**2.0**	**2.5**	**3.0**	**3.4**	**3.8**	**4.1**	**4.3**	**4.6**	**6.1**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**1.5**	**1.7**	**2.1**	**2.5**	**2.8**	**3.2**	**3.4**	**3.6**	**3.9**	**5.1**
7-1	0.7	Baseline	12.7	12.9	13.2	13.5	13.8	14.1	14.4	14.7	15.0	15.3
		Permanent Grass	8.1	6.2	1.1	0.8	0.6	0.2	0.2	0.2	0.2	0.2
		Phosphorus Reduction	**4.6**	**6.6**	**12.0**	**12.7**	**13.1**	**13.9**	**14.2**	**14.5**	**14.8**	**15.1**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**3.8**	**5.5**	**10.0**	**10.6**	**10.9**	**11.5**	**11.8**	**12.1**	**12.3**	**12.6**
8	3.4	Baseline	5.8	5.8	5.9	5.9	5.9	6.0	6.0	6.1	6.1	6.2
		Permanent Grass	5.3	2.7	2.0	1.3	1.1	0.9	0.8	0.8	0.8	0.8
		Phosphorus Reduction	**0.5**	**3.1**	**3.9**	**4.6**	**4.9**	**5.1**	**5.2**	**5.3**	**5.3**	**5.4**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**0.4**	**2.6**	**3.3**	**3.8**	**4.1**	**4.2**	**4.3**	**4.4**	**4.5**	**4.5**
Total	68.0	Baseline	799.8	951.7	981.1	1010.1	1019.4	1033.1	1042.1	1052.6	1061.7	1071.2
		Permanent Grass	153.1	34.1	18.8	12.2	10.3	7.9	7.2	6.7	6.2	4.6
		Phosphorus Reduction	**646.7**	**917.5**	**962.2**	**997.9**	**1009.2**	**1025.2**	**1034.9**	**1045.8**	**1055.5**	**1066.6**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**538.9**	**764.6**	**801.9**	**831.6**	**841.0**	**854.4**	**862.4**	**871.5**	**879.6**	**888.8**
		Avg. Credit			**755.6**					**871.3**		

Table 4: Option 3 Phosphorus Credit Calculations for Olson Farm (Updated 11/11/2023)

Field ID	Acres	Scenario	PTP (lbs/year)									
			Permit Term #1					Permit Term #2				
			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
3	9.8	Baseline	261.0	260.1	261.4	263.5	265.6	292	292	292	292	292
		Permanent Grass	47.0	5.3	3.1	1.9	2.6	1.5	1.4	1.3	1.2	1.2
		Phosphorus Reduction	**214.0**	**254.7**	**258.4**	**261.5**	**263.0**	**290.5**	**290.6**	**290.7**	**290.8**	**290.8**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**178.4**	**212.3**	**215.3**	**217.9**	**219.1**	**242.1**	**242.2**	**242.3**	**242.3**	**242.4**
4-0	19.2	Baseline	293.8	432.5	459.0	476.2	480.4	525	525	525	525	525
		Permanent Grass	50.9	8.2	4.6	2.7	1.6	1.3	1.1	1.0	0.9	0.8
		Phosphorus Reduction	**242.9**	**424.3**	**454.4**	**473.5**	**478.8**	**523.7**	**523.9**	**524.0**	**524.1**	**524.2**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**202.4**	**353.6**	**378.6**	**394.6**	**399.0**	**436.4**	**436.6**	**436.7**	**436.7**	**436.8**
4-1	7.7	Baseline	14.4	14.2	14.1	14.1	14.2	16	16	16	16	16
		Permanent Grass	2.8	2.2	1.6	1.1	0.6	0.5	0.5	0.4	0.4	0.3
		Phosphorus Reduction	**11.5**	**12.0**	**12.5**	**13.1**	**13.5**	**15.5**	**15.5**	**15.6**	**15.6**	**15.7**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**9.6**	**10.0**	**10.4**	**10.9**	**11.3**	**12.9**	**13.0**	**13.0**	**13.0**	**13.1**
5	10.7	Baseline	5.8	5.7	5.7	5.7	5.8	8	8	8	8	8
		Permanent Grass	5.4	2.4	1.5	0.7	1.1	1.2	1.1	1.1	1.0	0.9
		Phosphorus Reduction	**0.4**	**3.3**	**4.2**	**5.0**	**4.6**	**6.8**	**6.9**	**6.9**	**7.0**	**7.1**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**0.3**	**2.8**	**3.5**	**4.2**	**3.9**	**5.6**	**5.7**	**5.8**	**5.8**	**5.9**
6	16.3	Baseline	219.6	218.7	219.8	221.5	223.2	237	237	237	237	237
		Permanent Grass	30.8	3.8	2.1	1.2	0.8	0.8	0.6	0.5	0.5	0.4
		Phosphorus Reduction	**188.8**	**214.8**	**217.7**	**220.2**	**222.4**	**236.2**	**236.4**	**236.5**	**236.5**	**236.6**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**157.3**	**179.0**	**181.4**	**183.5**	**185.3**	**196.9**	**197.0**	**197.0**	**197.1**	**197.2**
7-0	0.2	Baseline	4.0	4.2	4.4	4.6	4.8	6	6	6	6	6
		Permanent Grass	2.3	2.3	2.0	1.8	1.5	0.1	0.1	0.1	0.1	0.1
		Phosphorus Reduction	**1.7**	**1.9**	**2.4**	**2.8**	**3.3**	**5.9**	**5.9**	**5.9**	**5.9**	**5.9**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**1.4**	**1.6**	**2.0**	**2.4**	**2.8**	**4.9**	**4.9**	**4.9**	**4.9**	**4.9**
7-1	0.7	Baseline	12.4	12.6	12.8	13.1	13.4	16	16	16	16	16
		Permanent Grass	8.0	1.6	1.0	0.7	0.6	0.2	0.2	0.2	0.2	0.2
		Phosphorus Reduction	**4.4**	**10.9**	**11.8**	**12.4**	**12.8**	**15.8**	**15.8**	**15.8**	**15.8**	**15.8**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**3.7**	**9.1**	**9.8**	**10.4**	**10.7**	**13.2**	**13.2**	**13.2**	**13.2**	**13.2**
8	3.4	Baseline	5.8	5.8	5.8	5.8	5.9	9	9	9	9	9
		Permanent Grass	5.2	2.7	1.9	1.2	1.0	0.9	0.8	0.8	0.8	0.8
		Phosphorus Reduction	**0.6**	**3.1**	**3.9**	**4.6**	**4.9**	**8.1**	**8.2**	**8.2**	**8.2**	**8.2**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**0.5**	**2.6**	**3.3**	**3.8**	**4.1**	**6.8**	**6.8**	**6.8**	**6.8**	**6.9**
Total	68.0	Baseline	816.7	953.6	983.2	1004.7	1013.3	1109.0	1109.0	1109.0	1109.0	1109.0
		Permanent Grass	152.4	28.5	17.9	11.5	10.0	6.5	5.8	5.4	5.0	4.6
		Phosphorus Reduction	**664.3**	**925.1**	**965.3**	**993.2**	**1003.4**	**1102.5**	**1103.2**	**1103.6**	**1104.0**	**1104.4**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**553.6**	**770.9**	**804.4**	**827.7**	**836.1**	**918.8**	**919.3**	**919.7**	**920.0**	**920.3**
		Avg. Credit			**758.5**					**919.6**		

Table 5: Option 4 Phosphorus Credit Calculations for Olson Farm (Updated 11/11/2023)

Field ID	Acres	Scenario	PTP (lbs/year)									
			Permit Term #1					Permit Term #2				
			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
3	9.8	Baseline	261.3	259.3	263.8	265.5	268.5	292	292	292	292	292
		Permanent Grass	46.5	5.6	3.3	2.1	2.6	1.5	1.4	1.3	1.2	1.2
		Phosphorus Reduction	**214.8**	**253.8**	**260.5**	**263.4**	**265.9**	**290.5**	**290.6**	**290.7**	**290.8**	**290.8**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**179.0**	**211.5**	**217.1**	**219.5**	**221.6**	**242.1**	**242.2**	**242.3**	**242.3**	**242.4**
4-0	19.2	Baseline	278.6	431.7	453.5	478.1	481.6	525	525	525	525	525
		Permanent Grass	51.9	8.6	4.9	3.0	1.6	1.3	1.1	1.0	0.9	0.8
		Phosphorus Reduction	**226.7**	**423.2**	**448.6**	**475.2**	**480.0**	**523.7**	**523.9**	**524.0**	**524.1**	**524.2**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**188.9**	**352.7**	**373.9**	**396.0**	**400.0**	**436.4**	**436.6**	**436.7**	**436.7**	**436.8**
4-1	7.7	Baseline	14.4	14.2	14.1	14.1	14.2	16	16	16	16	16
		Permanent Grass	2.8	2.2	1.6	1.1	0.6	0.5	0.5	0.4	0.4	0.3
		Phosphorus Reduction	**11.5**	**12.0**	**12.5**	**13.1**	**13.5**	**15.5**	**15.5**	**15.6**	**15.6**	**15.7**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**9.6**	**10.0**	**10.4**	**10.9**	**11.3**	**12.9**	**13.0**	**13.0**	**13.0**	**13.1**
5	10.7	Baseline	5.8	5.7	5.7	5.8	5.8	8	8	8	8	8
		Permanent Grass	5.4	2.4	1.5	0.8	1.1	1.2	1.1	1.1	1.0	0.9
		Phosphorus Reduction	**0.4**	**3.3**	**4.2**	**5.0**	**4.6**	**6.8**	**6.9**	**6.9**	**7.0**	**7.1**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**0.3**	**2.8**	**3.5**	**4.2**	**3.9**	**5.6**	**5.7**	**5.8**	**5.8**	**5.9**
6	16.3	Baseline	217.0	217.6	220.3	222.4	224.6	237	237	237	237	237
		Permanent Grass	30.5	4.0	2.3	1.4	0.8	0.8	0.6	0.5	0.5	0.4
		Phosphorus Reduction	**186.4**	**213.6**	**217.9**	**221.0**	**223.8**	**236.2**	**236.4**	**236.5**	**236.5**	**236.6**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**155.4**	**178.0**	**181.6**	**184.1**	**186.5**	**196.9**	**197.0**	**197.0**	**197.1**	**197.2**
7-0	0.2	Baseline	4.2	4.4	4.6	4.8	5.1	6	6	6	6	6
		Permanent Grass	2.5	2.4	2.1	1.9	1.7	1.5	1.5	1.4	1.3	0.1
		Phosphorus Reduction	**1.8**	**2.0**	**2.5**	**3.0**	**3.4**	**4.5**	**4.5**	**4.6**	**4.7**	**5.9**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**1.5**	**1.7**	**2.1**	**2.5**	**2.8**	**3.8**	**3.8**	**3.8**	**3.9**	**4.9**
7-1	0.7	Baseline	12.7	12.9	13.2	13.5	13.8	16	16	16	16	16
		Permanent Grass	8.1	6.2	1.1	0.8	0.6	0.2	0.2	0.2	0.2	0.2
		Phosphorus Reduction	**4.6**	**6.6**	**12.0**	**12.7**	**13.1**	**15.8**	**15.8**	**15.8**	**15.8**	**15.8**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**3.8**	**5.5**	**10.0**	**10.6**	**10.9**	**13.2**	**13.2**	**13.2**	**13.2**	**13.2**
8	3.4	Baseline	5.8	5.8	5.9	5.9	5.9	9	9	9	9	9
		Permanent Grass	5.3	2.7	2.0	1.3	1.1	0.9	0.8	0.8	0.8	0.8
		Phosphorus Reduction	**0.5**	**3.1**	**3.9**	**4.6**	**4.9**	**8.1**	**8.2**	**8.2**	**8.2**	**8.2**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**0.4**	**2.6**	**3.3**	**3.8**	**4.1**	**6.8**	**6.8**	**6.8**	**6.8**	**6.9**
Total	68.0	Baseline	799.8	951.7	981.1	1010.1	1019.4	1109.0	1109.0	1109.0	1109.0	1109.0
		Permanent Grass	153.1	34.1	18.8	12.2	10.3	7.9	7.2	6.7	6.2	4.6
		Phosphorus Reduction	**646.7**	**917.5**	**962.2**	**997.9**	**1009.2**	**1101.1**	**1101.8**	**1102.3**	**1102.8**	**1104.4**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**538.9**	**764.6**	**801.9**	**831.6**	**841.0**	**917.6**	**918.2**	**918.6**	**919.0**	**920.3**
		Avg. Credit			**755.6**					**918.7**		

Table 6: Option 5 Phosphorus Credit Calculations for Olson Farm (Updated 11/11/2023)

Field ID	Acres	Scenario	PTP (lbs/year)									
			Permit Term #1					Permit Term #2				
			2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
3	9.8	Baseline	261.3	259.3	263.8	265.5	268.5	270.7	273.2	275.4	277.8	280.1
		Permanent Grass	46.5	5.6	3.3	2.1	2.6	1.5	1.4	1.3	1.2	1.2
		Phosphorus Reduction	**214.8**	**253.8**	**260.5**	**263.4**	**265.9**	**269.2**	**271.8**	**274.1**	**276.6**	**278.9**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**179.0**	**211.5**	**217.1**	**219.5**	**221.6**	**224.4**	**226.5**	**228.5**	**230.5**	**232.4**
4-0	19.2	Baseline	278.6	431.7	453.5	478.1	481.6	490.5	494.4	500.0	504.3	509.0
		Permanent Grass	51.9	8.6	4.9	3.0	1.6	1.3	1.3	1.2	1.2	1.1
		Phosphorus Reduction	**226.7**	**423.2**	**448.6**	**475.2**	**480.0**	**489.2**	**493.1**	**498.8**	**503.1**	**507.8**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**188.9**	**352.7**	**373.9**	**396.0**	**400.0**	**407.7**	**410.9**	**415.7**	**419.2**	**423.2**
4-1	7.7	Baseline	14.4	14.2	14.1	14.1	14.2	14.2	14.2	14.3	14.3	14.4
		Permanent Grass	2.8	2.2	1.6	1.1	0.6	0.5	0.5	0.5	0.5	0.4
		Phosphorus Reduction	**11.5**	**12.0**	**12.5**	**13.1**	**13.5**	**13.7**	**13.7**	**13.8**	**13.8**	**13.9**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**9.6**	**10.0**	**10.4**	**10.9**	**11.3**	**11.4**	**11.4**	**11.5**	**11.5**	**11.6**
5	10.7	Baseline	5.8	5.7	5.7	5.8	5.8	5.8	5.8	5.9	5.9	5.9
		Permanent Grass	5.4	2.4	1.5	0.8	1.1	1.2	1.1	1.1	1.0	0.9
		Phosphorus Reduction	**0.4**	**3.3**	**4.2**	**5.0**	**4.6**	**4.6**	**4.7**	**4.8**	**4.9**	**5.0**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**0.3**	**2.8**	**3.5**	**4.2**	**3.9**	**3.8**	**3.9**	**4.0**	**4.1**	**4.1**
6	16.3	Baseline	217.0	217.6	220.3	222.4	224.6	226.6	228.5	230.5	232.4	234.3
		Permanent Grass	30.5	4.0	2.3	1.4	0.8	0.8	0.8	0.7	0.7	0.6
		Phosphorus Reduction	**186.4**	**213.6**	**217.9**	**221.0**	**223.8**	**225.8**	**227.7**	**229.7**	**231.7**	**233.6**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**155.4**	**178.0**	**181.6**	**184.1**	**186.5**	**188.2**	**189.8**	**191.4**	**193.1**	**194.7**
7-0	0.2	Baseline	4.2	4.4	4.6	4.8	5.1	5.3	5.5	5.7	6.0	6.2
		Permanent Grass	2.5	2.4	2.1	1.9	1.7	1.5	1.5	1.4	1.3	0.1
		Phosphorus Reduction	**1.8**	**2.0**	**2.5**	**3.0**	**3.4**	**3.8**	**4.1**	**4.3**	**4.6**	**6.1**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**1.5**	**1.7**	**2.1**	**2.5**	**2.8**	**3.2**	**3.4**	**3.6**	**3.9**	**5.1**
7-1	0.7	Baseline	12.7	12.9	13.2	13.5	13.8	14.1	14.4	14.7	15.0	15.3
		Permanent Grass	8.1	6.2	1.1	0.8	0.6	0.2	0.2	0.2	0.2	0.2
		Phosphorus Reduction	**4.6**	**6.6**	**12.0**	**12.7**	**13.1**	**13.9**	**14.2**	**14.5**	**14.8**	**15.1**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**3.8**	**5.5**	**10.0**	**10.6**	**10.9**	**11.5**	**11.8**	**12.1**	**12.3**	**12.6**
8	3.4	Baseline	5.8	5.8	5.9	5.9	5.9	6.0	6.0	6.1	6.1	6.2
		Permanent Grass	5.3	2.7	2.0	1.3	1.1	0.9	0.8	0.8	0.8	0.8
		Phosphorus Reduction	**0.5**	**3.1**	**3.9**	**4.6**	**4.9**	**5.1**	**5.2**	**5.3**	**5.3**	**5.4**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**0.4**	**2.6**	**3.3**	**3.8**	**4.1**	**4.2**	**4.3**	**4.4**	**4.5**	**4.5**
Total	68.0	Baseline	799.8	951.7	981.1	1010.1	1019.4	1033.1	1042.1	1052.6	1061.7	1071.2
		Permanent Grass	153.1	34.1	18.8	12.2	10.3	7.9	7.7	7.3	6.8	5.3
		Phosphorus Reduction	**646.7**	**917.5**	**962.2**	**997.9**	**1009.2**	**1025.2**	**1034.5**	**1045.3**	**1054.9**	**1065.9**
		Trade Ratio	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Final Credit	**538.9**	**764.6**	**801.9**	**831.6**	**841.0**	**854.4**	**862.1**	**871.1**	**879.1**	**888.2**
		Avg. Credit			**755.6**					**871.0**		

M & P Project No. 12-180

Appendix A

-WATER QUATLITY TRADING PLAN (WQTP)-

for

Village of Hawkins Wastewater Treatment Facility

Hawkins Wisconsin

November, 2017

Prepared by:

MORGAN & PARMLEY, LTD.
Professional Consulting Engineers
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SECTION I - INTRODUCTION

A. EXECUTIVE SUMMARY

The Village of Hawkins will complete a Water Quality Trading Plan to comply with the phosphorus limit requirements of the WPDES Permit. The Village proposes to purchase an active dairy farm and convert the row crop farming to permanent hay. The Village will trade with themselves to meet the phosphorus requirements. On an annual basis, over the last ten years, the Village of Hawkins has discharged an average of 117 pounds per year of phosphorous. The rate varies from a low of 9 pounds per year to a maximum of 355 pounds per year. The WPDES Permit limits the phosphorous discharge to Main Creek at approximately 22 pounds per year. For design purposes, the Village proposes to mitigate (350#/year – 22#/year) X 1.2 = 400#/year of phosphorus by Water Quality Trading with themselves. Upon approval of this Water Quality Trading Report, the Village will exercise their option to purchase the Olson Farm which will generate 1,000 pounds of phosphorus credits for the Village. The Village proposes to sell the remaining 600# of phosphorus credits.

B. BACKGROUND AND NEED

The Village of Hawkins owns and operates a municipal Wastewater Treatment Facility (WWTF). This WWTF is authorized to operate by the DNR under its current WPDES Permit, No. WI 0024201-09-1 and is due to expire June 30, 2018.

The existing WWTF was constructed in 1983 and consists of a two-cell aerated lagoon system with a seasonal storage cell that can be operated as a fill & draw, or a continuous discharge. A control building is located between the cells, and an outfall pipe, with valves, is located at the west end of the seasonal storage cell. There is a flow control valve and effluent meter located at the outfall to South Fork of Main Creek. The outfall is located in HUC 070500040303.

The Village's WWTF has been meeting the WPDES Permit's effluent limits since it was placed on line, following construction in 1983. In their current WPDES Permit, issued on July 1, 2013, Item 5.2, Water Quality Based Effluent Limits (WQBELs) contained a schedule to meet the future (final) phosphorus effluent limit of 0.124 mg/L, six-month average; 0.372 mg/L, monthly average; and 0.4 lbs./day. The current phosphorus limit is 4 mg/l which is being met. This will expire on July 1, 2018.

The operator has been collecting phosphorous data in various forms since 2005. The influent and effluent concentrations vary. The average influent phosphorous concentrations were 4.3 mg/l over this period. The average effluent concentration was 1.3 mg/l (2014-2015) and the average annual pounds of phosphorous discharged is 117 (2005-2015). The pounds vary from a low of 9 in 2015 to a high of 283 pounds in 2011. However, in 2016, the average effluent phosphorous concentration varied from 0.7 to 2.7 mg/l over the spring and fall discharge periods. The 2016 average was 1.6 mg/l or 355 pounds of total phosphorus discharged to the surface water for the entire year. The average annual flow was 21.5 million gallons (2010-2015). Coupling the average annual flow to the final water quality based effluent limits of 0.124 mg/l of phosphorous yields a total permitted phosphorous discharge of only 22 pounds per year.

Since the WPDES permit will only allow 22 pounds of phosphorous to be discharged to the South Fork of Main Creek on an annual basis, and the WWTF has discharged a maximum 355 pounds, all exceedances must be mitigated. **Water Quality Trading (WQT) will be used as the method to comply with the required phosphorous effluent limits at the outfall to the South Fork of Main Creek.**

SECTION II - WATER QUALITY TRADING

A. PURPOSE:

This Water Quality Trading Plan for phosphorous will be used by the Village of Hawkins to comply with the future WPDES permit requirements for effluent phosphorous. The Village will continue to discharge to the South Fork of Main Creek but will offset the discharge limit exceedances for phosphorous at the outfall by crediting the nonpoint discharge phosphorous runoff reductions from an agricultural property. The agricultural practices on the property will be modified to reduce the phosphorus discharge from cropland by eliminating tillage and unincorporated applications of dairy herd manure.

The cropland was modeled with SnapPlus, under the farm's current management system and again under a continuous grass hay system, to quantify the potentially tradeable phosphorus. The farmstead will also be evaluated for tradeable phosphorus through the removal of a barnyard, animal housing and all impervious surfaces. The Village will purchase the property, to have complete control for the duration.

Credits generated by the above will be traded by the Village to comply with their WPDES permit, excess credits will be available for sale to other WPDES permit holders, subject to their respective trade ratios and DNR approval.

B. LOCATION:

1. **Location of Outfall**: The Village of Hawkins discharges from its WWTF outfall to the South Fork of Main Creek at approximate latitude 45.51158°, longitude 90.70847°. The discharge point is located in HUC 12, number 070500040303
2. **Location of Agricultural Property**: The property generating the phosphorus credits is located upstream of the Village of Hawkins outfall in the same HUC 12 watershed. The property discharges to an unnamed perennial waterway that splits the property. Attachment A shows the drainage area's HUC 12 map and Attachment B shows an aerial view of the Olson property. The agricultural property, Olson Farm, consists of the NE ¼ of the NW ¼, and the SE ¼ of the NW ¼, Section 7, T.35N.-R.2W., located in the Town of Kennan, Price County.

The unnamed waterway which passes through the center of the farm originates east of the farm and north of USH 8. This photo is taken looking south, down the centerline of the farm road. The unnamed waterway fills the roadway as it flows from east to west. The water flows into Stony Creek and then the South Fork of Main Creek; all in the same HUC 12 and above the WWTF outfall. This roadway will be obliterated and restored to grass during the conversion.

C. EXISTING OPERATING CONDITONS OF THE FARM:

1. **Existing Operation.** The farm has been under the management of Brian Olson as a dairy farm. The 80 acre farm is home to a continuous milking herd of approximately 50 cows plus associated dry cows and young stock. The manure from the dairy herd is applied to all the tillable acreage on the farm. The primary crop grown is corn silage due to the small land base available to the farm. Spring tillage is performed to create the seed bed for the following crop.

2. **Soil Sampling.** Soils were sampled on fields 3, 4-1, 4-2, and 5 (pasture) in November 2016, refer to Attachment E for field location. The Soils in field 6 were sampled in March 2017, the soil was not frozen at the time of sampling, field 7-0, 7-1, 8 were sampled September of 2017. Fields were divided into approximately 5 acre sections. One composite sample was made for each section; the sample is comprised of not less than 10 cores taken in the traditional "W" pattern. Composite samples were sent to the UW Soil & Forage Analysis Lab in Medford. Fields with multiple composite samples were averaged to create a single recommendations for that field. See Attachment C for results.

3. **Cropland.** There are 68± tillable acres on the Olson farm. In the 2017 crop year: approximately 45 acres were planted to corn for silage with the goal of producing 500 ton of corn silage; approximately 8 acres were in grass hay; and approximately 14 acres in pasture. In the 2016 Crop year: 26 acres of corn silage were planted but only 10 acres were harvested due to the fact that field 6 was too wet to harvest; 27 acres were in grass hay production and the remaining 14± acres were pastured.

This photograph is taken from Field 8 looking southeast into Fields 7-0 and 7-1. Concentrated feeding is done along the buildings, with runoff travelling down the farm road into the unnamed waterway.

The manure loading area receives runoff from Fields 7, 7-1, 8 and the building site. Runoff travels beneath the barn cleaner and down the farm road into the waterway. There is no filter strip, only concentrated flow on the eroded farm road.

4. Nutrients from Manure

A. 50 milking cows are confined indoors for their entire lactation. For purposes of calculation, 43- 1400 pound cows will be in their 2nd lactation and 7- 1200 pound cows will be in their first lactation. Using UW Extension guidelines:

- 1400 lb. Dairy Cow Produces 148± lb. of manure per. day
- 1200 lb. Dairy Cow Produces 127± lb. of manure per. day
- [(365 days x 148 lb. manure x 43) + (365 days x 127 lb. manure x 7)]/2000 lb.= 1324 ton of manure/53 acres of cropland = 25 ton per acre of manure spread on all cropped Fields

Verification Check: Olson's use a 400 bushel (heaped) manure spreader and spread 4 times per week. This equates to a level spreader of 1870 gallons. Therefore:

(1870/7.48 gal. per cu. ft. x 60 lb. per cu. ft. x 4 times per week) x 52 weeks /2000 lb. = 1560 ton versus 1324 ton as calculated

B. Dry cows are not confined in housing and have access to pasture. A portion of the pasture receives high density stocking around the buildings and feed bunk, the remainder of the pasture is low density stocking. The manure will be split with 50% being deposited on each type of pasture.

- (7 - 1200 lb. dry cows x 98.5± lb. of manure per day x 365 days)/2000lb.= 126 ton/year
- (7 - 1000 lb. heifers x 82± lb. of manure per day x 365 days)/2000lb.= 105ton/year
- (105 ton + 126 ton) x 50%)/0.7 ac. = application rate of 165 ton. per. acre on a high stocking density pasture **Field 7-1**
- (105 ton + 126 ton) x 50%)/10.7 ac. = application rate of 10.8 ton. per. acre on a low stocking density pasture **Field 5**

C. Young stock are not confined in housing and have access to pasture. A portion of the pasture receives high density stocking around the buildings and feed bunk, the remainder of the pasture is low density stocking. The manure will be split 50% being deposited on each type of pasture.

- (10 - 250 lb. heifers x 21± lb. of manure per day x 365 days)/2000lb.=38 ton
- (10 - 500 lb. heifers x 42± lb. of manure per day x 365 days)/2000lb.=77 ton
- (10 - 750 lb. heifers x 65± lb. of manure per day x 365 days)/2000lb.=119 ton
- (38+77+119) x 50%/3.4 ac.=34 ton per. acre on low density pasture **Field 8**
- (38+77+119) x 50%/.2 ac.=585 ton per. acre on high density pasture **Field 7-0**

5. Nutrient Sources Applied to Silage Corn

- Commercial starter fertilizer 200 lb. per acre of 9-20-30
- Commercial fertilizer 100 lb. per acre of 46-0-0
- Manure 25 ton per acre (from 4.A. above) applied containing 50 lb. N, 75 lb. P2O5, and 125 lb. K2O; based upon UW standard values @ 11-20% dry matter.

6. Summary Table of Current Farm Management Practices to be Modeled in SnapPlus

FARM INPUT SUMMARY – CURRENT PRACTICES						
		POUNDS OF NUTRIENTS APPLIED PER. ACRE				
FIELD	CROP	N	P	K	TILLAGE	YEILD GOAL
3	CORN	114	115	185	moldboard	10-15 ton
4-0	CORN	114	115	185	moldboard	10-15 ton
4-1	GRASS	50	75	125	n/a	2-3 ton
5	PASTURE	32	32	65	n/a	1-2 ton
6	CORN	114	115	185	moldboard	10-15 ton
7-0	PASTURE	1,755	1,755	3,510	n/a	1-2 ton
7-1	PASTURE	495	495	990	n/a	1-2 ton
8	PASTURE	102	102	204	n/a	1-2 ton

Note: Spread manure was estimated at a dry matter content between 11-20%, and pasture manure was estimated at >20% dry matter.

7. Potentially Tradeable Phosphorus under Current Management. SnapPlus Modeling will be used to quantify Potentially Tradeable Phosphorus. SnapPlus was used to model 8 fields under current management practices. The current management, crops and nutrient applications will be modeled out to 2022, to create a baseline, to measure the effectiveness of conservation practices implemented to reduce phosphorus leaving the farm. **The 2022 PTP is considered to be permanent baseline.** The following attachments were generated through the modeling process. Attachment C includes the following SnapPlus reports:

- Narrative and Crops Report
- Soil Test Summary
- Application Summary Report
- Manure Tracking Report
- Fields Data and 590 Assessment Plan
- Nutrient Management Report
- Spreading and Nutrient Management Sorted By Crop

- Producers Plan Report
- Phosphorous Trade Report

P Trade Report				PTP				
Field Name	Soil Series	Soil Symbol	Acres	2018	2019	2020	2021	2022
3	FREEON	757B	10	285	285	287	289	292
4-0	FREEON	757B	19	328	474	502	520	525
4-1	FREEON	757B	8	16	15	15	16	16
5	FREEON	757B	11	7	7	7	7	8
6	MAGNOR	3456A	16	250	249	251	232	237
7-0	FREEON	757B	0	5	5	6	6	6
7-1	FREEON	757B	1	15	15	15	16	16
8	FREEON	757B	3	8	8	8	8	9
Total			**68**	**914**	**1,059**	**1,092**	**1,094**	**1,109**

D. PROPOSED OPERATING CONDITONS OF THE FARM:

After the Water Quality Trading Plan has been approved by the DNR and accepted by the Village of Hawkins, the farm will be purchased from the Olson's and deeded to the Village of Hawkins. The Village has a signed purchase agreement in place, refer to Appendix J. The dairy herd will leave with the Olson's; so will the need for the home, farm buildings, and barnyard. All buildings and impervious surfaces will be demolished. The entire farm, including: former building sites, farm roads, cropland and pastures will be seeded to permanent grass cover. The only exception may be approximately 2 acres of non-farmland located adjacent to the existing well and septic system that may be reserved for a future building site.

1. **Nutrient Management.** The farm will be managed to draw down the phosphorus levels in fields testing at excessively high levels based upon the UW soil tests. This will be done by removing the grass hay crop without replacing the nutrients. The nutrients will be drawn down to the optimum level on the soil test. After which point in time, the farm operator will be allowed to fertilize in order to maintain the optimum nutrient levels on the soil test.

2. **Soil Sampling.** Soil sampling will be conducted on a 4 year schedule to monitor the nutrients and maintain them at a level no higher than the optimum range. The soil tests will be used to prescribe the proper fertilizer rate and composition. Fields will be divided into approximately 5 acre sections. One composite sample will be taken from each section and the sample will be comprised of not less than 10 cores taken in the traditional "W" pattern. Composite samples will sent to the UW Soil & Forage Analysis Lab in Medford. Fields with multiple composite samples will be averaged to make the recommendations. For a detailed description of the sampling refer to UW Extension A2809.

3. **Cropping.** Fields 3, 4-0, 4-1, 5, 6, 7-0, 7-1 and the non-wooded portion of field 8 will be cropped as follows.
    a. **Seeding year 2018**
        - **Burn Down.** Pasture lands and cropland will have an appropriate herbicide such as Glyphosate applied at a rate of 2 Qt. per acre with a surfactant. This will be done to kill all weeds and any existing grasses. Application will be made after the weeds and grasses break dormancy and are actively growing.
        - **Soil preparation.** The fields will be chisel plowed, disked/cultivated and finished by not less than 2 passes to prepare a smooth seedbed.

- **Primary Seed.** Mix and Rate, 18 lb. per acre:

30%	Perennial Ryegrass
20%	Fawn Tall Forage Fescue
20%	Timothy
30%	Reed Canarygrass

- **Nurse Crop.** 1 ½ bushel per acre of oats will be seeded with the grass mix, as a conservation practice to reduce sediments leaving the field. Oats are a cool season annual grass that will provide ground cover.
- **Seed Placement.** Seed will be sown using either a grain drill with two seed compartments or by a Brillion type seeder. Upon final seed placement a single pass shall be made with a large smooth drum roller.
- Nurse crop will be taken off as oatlage or harvested as grain at maturity

b. Year 2019-2022 (and in perpetuity)

- **Grass Hay.** Will be harvested by a local farmer and removed from the property upon harvest.

4. **Corrective Measures:** Prior to seeding in the spring of 2018, the Village of Hawkins will complete the following corrective measures to the existing farm:
   - Raze the existing farmstead improvements. All debris will be removed from the site or buried as permitted by law. The ground will be levelled, covered with topsoil, tilled and seeded. The former building sites will be converted to permanent grass.
   - The interior fences and debris on the farm will be removed so that there will be no obstructions to harvesting.
   - All debris and rock piles in the existing drainage way will be removed. The drainage way will be restored using NRCS design standards.
   - The existing farm road will be obliterated and become part of the permanent grass cover.
   - The existing stream crossing will be upgraded to a rock ford.
   - All fields shall receive 4 ton per acre of lime prior to soil preparation

5. **Potentially Tradeable Phosphorus (Permanent grass)**

P Trade Report				PTP				
Field Name	Soil Series	Soil Symbol	Acres	2018	2019	2020	2021	2022
3	FREEON	757B	10	57	10	7	5	4
4-0	FREEON	757B	19	64	15	10	7	6
4-1	FREEON	757B	8	5	5	4	3	3
5	FREEON	757B	11	7	4	3	2	1
6	MAGNOR	3456A	16	39	7	4	3	2
7-0	FREEON	757B	0	3	3	2	2	2
7-1	FREEON	757B	1	9	3	2	2	2
8	FREEON	757B	3	8	5	4	3	3
Total			68	191	52	37	27	23

There is an existing waterway that runs along the east side of the farm road. Currently there is manure in the waterway along with rock and debris. The waterway will be restored according to NRCS waterway design standards.

The exiting farm road is eroded and rutted. The farm road will be restored and converted into part of the farm fields.

The existing farm road crosses the unnamed waterway in an unimproved fashion. This crossing has eroded and grown to be about 200 hundred feet long and 1 ½ feet deep. The crossing will be corrected and stabilized. Work will be coordinated with the DNR to construct a stable rock ford.

E. TRADEABLE PHOSPHORUS

The Potentially Tradeable Phosphorus values generated through SnapPlus modeling do not reflect the trade ratios. The trade ratio is applied to determine the phosphorus credits available resulting from changes in management practices.

1. **Trade Ratio Factors**
    - **Delivery** - N/A Credit generator and user within same HUC-12
    - **Downstream** - N/A Credit generator is upstream of credit user, see Attachment D
    - **Equivalency** - N/A for Phosphorus
    - **Uncertainty** - Whole Field Management 1:1 per. Table 16, Pg. 57 of A WQT How To Manual WI DNR
    - **Habitat Adjustment** - N/A no habitat work

    The sum of the Trade ratio factors yields a 1:1 ratio, however the maximum allowed trade ratio from a nonpoint source to a point source is 1.2:1. **Therefore, a 1.2: trade ratio will be applied between the Olson Farm and the Village of Hawkins WWTF.**

2. **Phosphorus Credit Generation.** Credits are calculated as the difference between phosphorus lost under current baseline practices and phosphorus lost under the proposed practices. The credits are calculated on an annual basis. The tables below show the trade rates per field beginning in 2018 and extending to 2022. Note: the following phosphorous losses are not included in the Tradeable Phosphorus calculations:
    - Gulley erosion from the farm road
    - Losses resulting from existing manure piles
    - Losses resulting from current manure handling practices

3. Tradeable Phosphorus

Tradeable Phosphorus 2018				
Field	CURRENT PRACTICES PTP	PERMANENT GRASS HAY PTP	TRADEABLE PHOSPHORUS W/O TRADE RATIO	TRADE RATIO APPLIED 1.2:1
3	285	57	228	190
4-0	328	64	264	220
4-1	16	5	11	9
5	7	7	0	0
6	250	39	211	176
7-0	5	3	2	2
7-1	15	9	6	5
8	8	8	0	0
Total	**914**	**192**	**722**	**602**

Tradeable Phosphorus 2019				
Field	CURRENT PRACTICES PTP	PERMANENT GRASS HAY PTP	TRADEABLE PHOSPHORUS W/O TRADE RATIO	TRADE RATIO APPLIED 1.2:1
3	285	10	275	229
4-0	474	15	459	383
4-1	15	5	10	8
5	7	4	3	3
6	249	7	242	202
7-0	5	3	2	2
7-1	15	3	12	10
8	8	5	3	3
Total	**1058**	**52**	**1006**	**838**

Tradeable Phosphorus 2020				
Field	CURRENT PRACTICES PTP	PERMANENT GRASS HAY PTP	TRADEABLE PHOSPHORUS W/O TRADE RATIO	TRADE RATIO APPLIED 1.2:1
3	287	7	280	233
4-0	502	10	492	410
4-1	15	4	11	9
5	7	3	4	3
6	251	4	247	206
7-0	6	2	4	3
7-1	15	2	13	11
8	8	4	4	3
Total	**1091**	**36**	**1055**	**879**

Tradeable Phosphorus 2021				
Field	CURRENT PRACTICES PTP	PERMANENT GRASS HAY PTP	TRADEABLE PHOSPHORUS W/O TRADE RATIO	TRADE RATIO APPLIED 1.2:1
3	289	5	284	237
4-0	520	7	513	428
4-1	16	3	13	11
5	7	2	5	4
6	232	3	229	191
7-0	6	2	4	3
7-1	16	2	14	12
8	8	3	5	4
Total	**1094**	**27**	**1067**	**889**

Tradeable Phosphorus 2022				
Field	CURRENT PRACTICES PTP	PERMANENT GRASS HAY PTP	TRADEABLE PHOSPHORUS W/O TRADE RATIO	TRADE RATIO APPLIED 1.2:1
3	292	4	288	240
4-0	525	6	519	433
4-1	16	3	13	11
5	8	1	7	6
6	237	2	235	196
7-0	6	2	4	3
7-1	16	2	14	12
8	9	3	6	5
Total	**1109**	**23**	**1086**	**905**

Summary of Tradeable Phosphorus from 2018 through 2022				
Year	**CURRENT PRACTICES PTP**	**PERMANENT GRASS HAY PTP**	**TRADEABLE PHOSPHORUS W/O TRADE RATIO**	**TRADE RATIO APPLIED 1.2:1**
2018	**914**	**192**	**722**	**602**
2019	**1058**	**52**	**1006**	**838**
2020	**1091**	**36**	**1059**	**879**
2021	**1094**	**27**	**1067**	**889**
2022	**1109**	**23**	**1086**	**905**

Tradeable phosphorous in years 2023 and beyond will be based upon the 2022 Total Tradeable Phosphorus w/o Trade Ratio of 1086 pounds per year.

F. REPORTING

1. Management Practice Registration

Submit the following to the DNR to register that the management practices have been installed (2018):

- Date of land purchase
- Date corrective measures have been completed
- Date of seeding
- Date of 90% ground cover and photo verification
- Date of nurse crop harvest
- Date and photos of permanent seeding upon regrowth
- Report any deviation of the applied practices as outlined in the WQT plan, and any seeding failures that will need to be reseeded prior to the close of the first growing season

2. Monthly Reporting. Each month the Village shall report that the management practices installed are being maintained in a manner consistent with the WQT plan. This will be done by making a statement, as a comment on the monthly discharge report **certifying that management practices established are in good condition and properly maintained.**

3. Annual Reporting. The Village will file an annual report to the DNR of the status of management practices and provide an update of the overall trading project. The content of the annual report will include:

- Verification that site inspection has occurred
- Brief summary of site inspection findings
- Identification of noncompliance or failure to follow any of the terms or conditions of the trading plan that have not been previously reported
- Any application of nutrients and a copy of the soil test recommending that application
- At least 1 photo of the permanent vegetative cover, indicating condition
- A summary of credits used each month over the calendar year

4. Notification of Problems with Permanent Grass Cover. The Village shall notify the DNR within 7 days of becoming aware that the phosphorus reduction credits used by the Village are not being generated as approved in the WQT plan. The Village will work to restore the vegetative cover and update the DNR on the progress.

G. DNR RIGHT OF ENTRY

The Village of Hawkins grants to the DNR the Right to inspect the permanent grass cover management practices throughout the term of the WQT plan for the purpose of verifying that the WQT plan is being implemented.

H. COMPLIANCE WITH THE WATER QUALITY TRADING CHECKLSIT

This WQT Plan complies with the required content of a WQT Plan as outlined in the checklist located on Table 8, page 37 of Guidance for Implementing Water Quality Trading Plans, Guidance No: 3800-2013-04; Form 3400-208 is included as Attachment G. This WQT Plan falls under Credit Source Column (e) "credits obtained from a constructed project or implementation of a plan undertaken by the credit user for sources other than that covered by the credit users WPDES permit". Below are listed the checklist questions, **bold and underlined**, with the answers following.

- **Permittee's/credit user's WPDES permit number**: No. WI 0024201-09-1

• **Permittee's/credit users contact information:**	Janice Krings, Village Clerk Village of Hawkins P.O. Box 108 509 Main Street Hawkins, WI 54530 Phone 715-585-6322
• **Pollutant for which credit will be generated:**	Phosphorus
• **Amount of Credits available from each location, management practice, local government unit when acting as broker:**	See Summary Table page 11
• **Certification that the content of the trading application is accurate and correct.**	See Section J, page 14
• **Signature and date of signature of permittee's/ credit users authorized representative:**	See Section J, page 14
• **Location where credits will be generated:**	See Attachment B and E
• **Identification of methods including management practices that will be used to generate credits:**	See Section D, page 6
• **Duration of agreement with each credit generator:**	Permanent, unless the WPDES removes the phosphorous requirement
• **Schedule for installation/construction of each management practice:**	See Section D, page 6
• **Operation and Maintenance plan for each management practice,**	See Attachment I
• **Date when credits become available for each management practice:**	Upon successful seeding estimated at July, 2018
• **Models used to derive the amount of credits:**	SnapPlus, see Attachment C
• **The applicable trade ratio for each management practice including supporting technical basis:**	See section E-1.

I. Summary of Phosphorus Trading

Following is a summary of the phosphorus credits being generated by the conversion of the Olson Farm to permanent grass and the estimated credits required by the Hawkins WWTF.

SUMMARY OF PHOSPHORUS TRADING				
YEAR	**CREDITS GENERATED BY OLSON FARM**	**LBS. OF PHOS. REQD. TO BE MITIGATED FOR HAWKINS WWTF**	**PHOS. CREDITS REQD. AT A TRADING RATIO OF 1.2:1**	**EXCESS PHOS. CREDITS TO BE SOLD**
2018	**722**	**333**	**400**	**322**
2019	**1006**	**333**	**400**	**606**
2020	**1059**	**333**	**400**	**659**
2021	**1067**	**333**	**400**	**667**
2022 and beyond	**1086**	**333**	**400**	**686**

Note: The WPDES phosphorus limit is 0.124 mg/l which equals approximately 22 pounds per year. The actual phosphorus discharged per year varies from 9 to 355 pounds with an average of 117. Pounds of phosphorus to be mitigated is based upon the maximum year of 355 pounds minus the allowable discharge of 22 pounds equals 333 pounds. This provides a safety factor of 3.5 for the 10 year average phosphorus discharge of 117 pounds.

J. **Certification of The Water Quality Trading Plan**

The undersigned hereby certifies that this water Quality Trading Plan is accurate and correct to the best of my knowledge and belief.

Village of Hawkins:

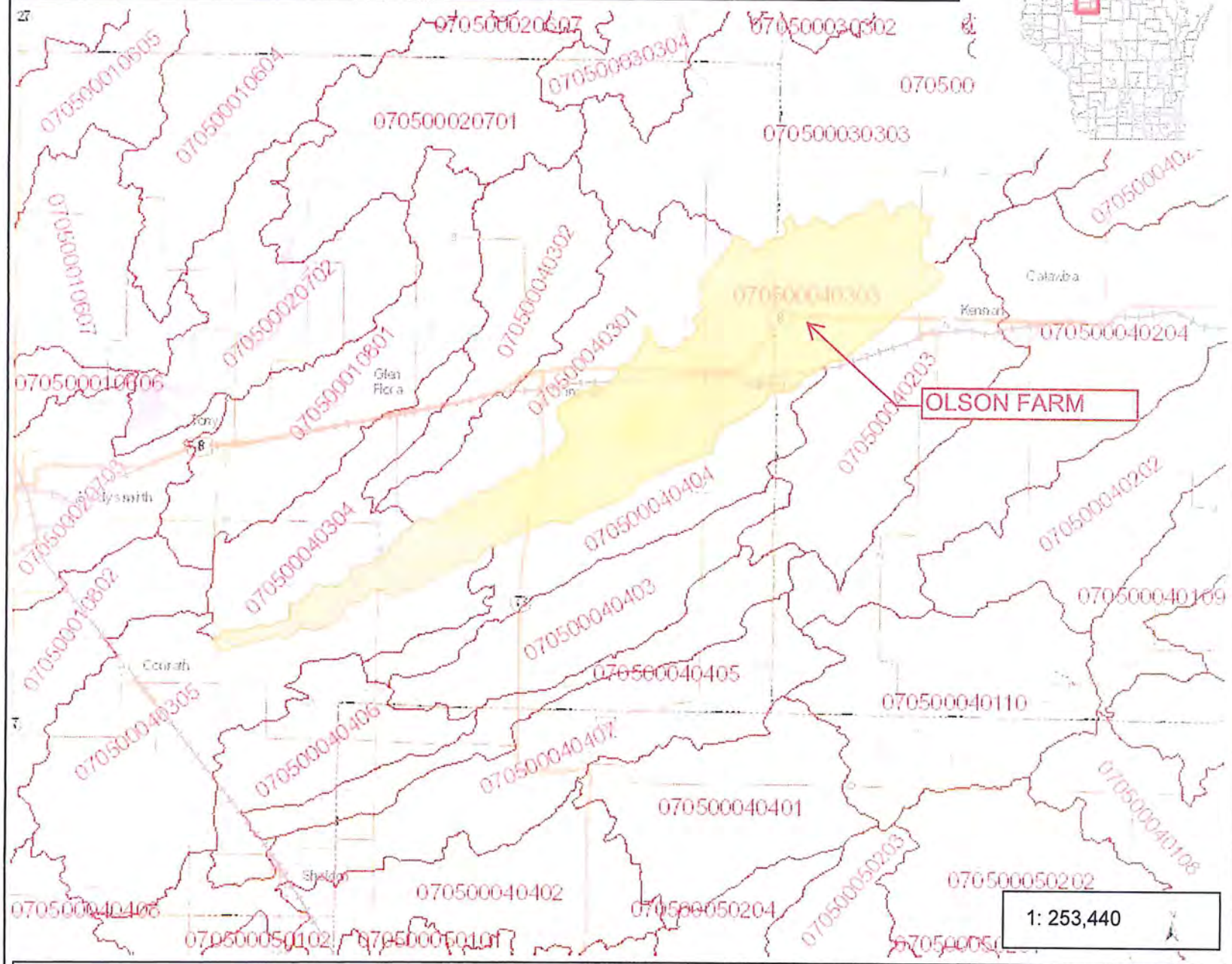
Janice Krings, Village Clerk

Project Engineer:

Larry Gotham P.E., Morgan & Parmley Ltd.

APPENDIXES

Surface Water Data Viewer 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

Notes

Hawkins WWTF HUC -12

8.0 0 4.00 8.0 Miles

NAD_1983_HARN_Wisconsin_TM

ATTACHMENT A HUC 12


ATTACHMENT B
OLSON FARM
PERENNIAL WATER
022104003000
022104005000
022104005010
022104009000
022104010000
022104108000
022104107000
022104103000
022104102000
022104109000
022104110000
022104202000
022104201000
PRICE RD
8
6
7
N
0 200 400 600ft
DISCLAIMER: This map is not guaranteed to be accurate, correct, current, or complete and conclusions drawn are the responsibility of the user.

SnapPlus Narrative and Crops Report

Starting Year 2016

Reported For Hawkins

Printed 2017-10-10

Plan Completion/Update Date: 2017-01-25

SnapPlus Version 16.3 built on 2016-10-31

M:\M Drive\2012\2012-180 Hawkins Facility Plan, Phos. Operational Evaluation Report\snap plus\snap plus from county\Entire farm snapplus \Hawkins.snapDb

Prepared for:
Hawkins
attn:Hawkins
509 Main St
Hawkins, 54530

Farm has 8 fields totalling 68 acres
Farm Narrative: None
Concentrated Flow Notes: None

3	9.8	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre
4-0	19.2	Grass hay None 2-3 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre
4-1	7.7	Grass hay None 2-3 ton/acre	Grass hay None 2-3 ton/acre	Grass hay None 2-3 ton/acre	Grass hay None 2-3 ton/acre	Grass hay None 2-3 ton/acre	Grass hay None 2-3 ton/acre	Grass hay None 2-3 ton/acre
5	10.7	Pasture, continuous stocking, low density None 1-2 ton/acre	Pasture, continuous stocking, low density None 1-2 ton/acre	Pasture, continuous stocking, low density None 1-2 ton/acre	Pasture, continuous stocking, low density None 1-2 ton/acre	Pasture, continuous stocking, low density None 1-2 ton/acre	Pasture, continuous stocking, low density None 1-2 ton/acre	Pasture, continuous stocking, low density None 1-2 ton/acre
6	16.3	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre	Corn silage Spring MB Plow 10-15 ton/acre

APPENDIX C

Field Name	Acres	2016	2017	2018	2019	2020	2021	2022
7-0	0.2	Pasture, continuous stocking, high density None 1-2 ton/acre	Pasture, continuous stocking, high density None 1-2 ton/acre	Pasture, continuous stocking, high density None 1-2 ton/acre	Pasture, continuous stocking, high density None 1-2 ton/acre	Pasture, continuous stocking, high density None 1-2 ton/acre	Pasture, continuous stocking, high density None 1-2 ton/acre	Pasture, continuous stocking, high density None 1-2 ton/acre
7-1	0.7	Pasture, continuous stocking, high density None 1-2 ton/acre	Pasture, continuous stocking, high density None 1-2 ton/acre	Pasture, continuous stocking, high density None 1-2 ton/acre	Pasture, continuous stocking, high density None 1-2 ton/acre	Pasture, continuous stocking, high density None 1-2 ton/acre	Pasture, continuous stocking, high density None 1-2 ton/acre	Pasture, continuous stocking, high density None 1-2 ton/acre
8	3.4	Pasture, continuous stocking, low density None 1-2 ton/acre	Pasture, continuous stocking, low density None 1-2 ton/acre	Pasture, continuous stocking, low density None 1-2 ton/acre	Pasture, continuous stocking, low density None 1-2 ton/acre	Pasture, continuous stocking, low density None 1-2 ton/acre	Pasture, continuous stocking, low density None 1-2 ton/acre	Pasture, continuous stocking, low density None 1-2 ton/acre

Summary by Crop:
NOTE: Yields calculated using the midpoint of the SnapPlus yield goal range for each crop.

Crops Grouped By Category		2016	2017	2018	2019	2020	2021	2022
Corn silage	Acres	26	45	45	45	45	45	45
	ton	325	563	563	563	563	563	563
Grass hay	Acres	27	8	8	8	8	8	8
	ton	68	20	20	20	20	20	20
Pasture, continuous stocking, low density	Acres	14	14	14	14	14	14	14
	ton	21	21	21	21	21	21	21
Pasture, continuous stocking, high density	Acres	1	1	1	1	1	1	1
	ton	2	2	2	2	2	2	2

SnapPlus Soil Test Report

Reported For **Hawkins**

Printed **2017-10-10**

Plan Completion/Update Date **2017-01-25**

SnapPlus Version 16.3 built on 2016-10-31

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attn:Hawkins
509 Main St
Hawkins, 54530

			Predominant					Samples				in ppm			
Field Name	Subfarm	Acres	Soil Map Symbol	Soil Name	Soil Test Date	Soil Test Lab	Lab Number	Rec. #	Actual #	pH	OM%	P	K	S	CEC
3		9.8	757B	FREEON	2016-11-08	Soil & Forage Analysis Lab	6830	2	2	5.8	5.2	78	211	0	0
4-0		19.2	757B	FREEON	2016-11-15			4	1	5.8	4.9	54	133	0	0
4-1		7.7	757B	FREEON	2016-11-15			2	1	5.8	4.9	54	133	0	0
5		10.7	757B	FREEON	2016-11-08	Soil & Forage Analysis Lab	6830	2	4	5.3	4.3	20	68	0	0
6		16.3	3456A	MAGNOR	2017-03-31	Soil & Forage Analysis Lab	1668	3	4	5.6	4.4	21	81	0	0
7-0		0.2	757B	FREEON	2017-10-02	Soil & Forage Analysis Lab	5496	1	1	8.0	11.4	371	1185	0	0
7-1		0.7	757B	FREEON	2017-10-02	Soil & Forage Analysis Lab	5496	1	1	8.0	11.4	371	1185	0	0
8		3.4	757B	FREEON	2017-10-02	Soil & Forage Analysis Lab	5496	1	1	6.2	8.9	142	345	0	0

Crop Year Soil Test Needed

Field Name	Soil Test Date	2016	2017	2018	2019	2020	2021	2022
3	2016-11-08						X	
4-0	2016-11-15						X	

Field Name	Soil Test Date	2016	2017	2018	2019	2020	2021	2022
4-1	2016-11-15						X	
5	2016-11-08						X	
6	2017-03-31						X	
7-0	2017-10-02							X
7-1	2017-10-02							X
8	2017-10-02							X

SnapPlus Application Summary Report

Starting Year 2016

Reported For Hawkins

Printed 2017-10-10

Plan Completion/Update Date: 2017-01-25

SnapPlus Version 16.3 built on 2016-10-31

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Hawkins
attn:Hawkins
509 Main St
Hawkins, 54530

Annual Manure Production And Use By Source

Total Value = $ Value of all nutrients, incorporated including S.

Source		2016	2017	2018	2019	2020	2021	2022
Dairy Grazing	Production (Tons)	0	0	0	0	0	0	0
	Used (Tons)	0	464	464	464	464	464	464
	Analysis Date	-	-	-	-	-	-	-
	Analysis (N/Ninc/Ninj-P2O5-K2O)	3/0/0-3-6	3/0/0-3-6	3/0/0-3-6	3/0/0-3-6	3/0/0-3-6	3/0/0-3-6	3/0/0-3-6
	Dry Matter (%)	13	13	13	13	13	13	13
	Total Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dairy Semi-Solid	Production (Tons)	0	0	1,237	0	0	0	0
	Used (Tons)	193	1,325	1,325	1,325	1,325	1,325	1,325
	Analysis Date	-	-	-	-	-	-	-
	Analysis (N/Ninc/Ninj-P2O5-K2O)	2/2/3-3-5	2/2/3-3-5	2/2/3-3-5	2/2/3-3-5	2/2/3-3-5	2/2/3-3-5	2/2/3-3-5
	Dry Matter (%)	15	15	15	15	15	15	15
	Total Value	0.00	0.00	1,237.00	0.00	0.00	0.00	0.00

Application Results Reported For Farm All

Annual Pounds Of Available N, P2O5 And K2O Applied From Manure and Fertilizer.

		2016	2017	2018	2019	2020	2021	2022
Produced from Manure (lb)	Ninj	0	0	3,711	0	0	0	0
	P2O5	0	0	3,711	0	0	0	0
	K2O	0	0	6,185	0	0	0	0
Total Available Manure Nutrients Applied (lb)	N	385	4,037	4,037	4,037	4,037	4,037	4,037
	P2O5	578	5,362	5,362	5,362	5,362	5,362	5,362
	K2O	963	9,409	9,409	9,409	9,409	9,409	9,409
Total Fertilizer Nutrients Applied (lb)	N	444	2,899	2,899	2,899	2,899	2,899	2,899
	P2O5	1,001	1,812	1,812	1,812	1,812	1,812	1,812
	K2O	1,515	2,718	2,718	2,718	2,718	2,718	2,718
Total Crop Removal (lb)	P2O5	2,626	2,722	2,722	2,722	2,722	2,722	2,722
	K2O	7,332	6,660	6,660	6,660	6,660	6,660	6,660
Nutrient Balance (Applied - Crop removal, lb)	P2O5	-1,047	4,452	4,452	4,452	4,452	4,452	4,452
	K2O	-4,854	5,468	5,468	5,468	5,468	5,468	5,468

SnapPlus Manure Tracking Report

Starting Year 2016

Reported For Hawkins

Printed 2017-10-10

Plan Completion/Update Date: 2017-01-25

SnapPlus Version 16.3 built on 2016-10-31

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Hawkins, 54530

Acres/ Crop Year	2016	2017	2018	2019	2020	2021	2022
Acres in plan	68.0	68.0	68.0	68.0	68.0	68.0	68.0
Acres receiving manure	7.7	53.0	53.0	53.0	53.0	53.0	53.0

Annual Manure Production And Use By Source

Total Value = $ Value of all nutrients, incorporated including S.

Source		2016	2017	2018	2019	2020	2021	2022
Dairy Grazing	Production (Tons)	0	0	0	0	0	0	0
	Used (Tons)	0	464	464	464	464	464	464
	Analysis Date	-	-	-	-	-	-	-
	Analysis (N/Ninc/Ninj-P2O5-K2O)	3/0/0-3-6	3/0/0-3-6	3/0/0-3-6	3/0/0-3-6	3/0/0-3-6	3/0/0-3-6	3/0/0-3-6
	Dry Matter (%)	13	13	13	13	13	13	13
	Total Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dairy Semi-Solid	Production (Tons)	0	0	1,237	0	0	0	0
	Used (Tons)	193	1,325	1,325	1,325	1,325	1,325	1,325
	Analysis Date	-	-	-	-	-	-	-
	Analysis (N/Ninc/Ninj-P2O5-K2O)	2/2/3-3-5	2/2/3-3-5	2/2/3-3-5	2/2/3-3-5	2/2/3-3-5	2/2/3-3-5	2/2/3-3-5
	Dry Matter (%)	15	15	15	15	15	15	15
	Total Value	0.00	0.00	1,237.00	0.00	0.00	0.00	0.00

Estimated Livestock Manure Production For 2018

Animal Type	Subfarm	Barn	# of Animals	Total No. Of Days	% Collected As Solid	% Collected As Liquid	Yearly Tons	Yearly Gallons
Dairy Lactating Cows 1200 lbs			7	365	100	0	162	0
Dairy Calf 250 lbs			10	365	0	0	0	0
Dairy Dry Cows 1200 lbs			7	365	0	0	0	0
Dairy Heifer 1000 lbs			7	365	0	0	0	0
Dairy Heifer 750 lbs			10	365	0	0	0	0
Dairy Youngstock 500 lbs			10	365	0	0	0	0
Dairy Lactating Cows 1400 lbs			43	365	100	0	1,161	0
						Farm Totals	1,323	0

Manure Storage For 2018

No Storages Found

Spreaders For 2018

No Spreaders Found

SnapPlus Field Data and 590 Assessment Plan

Reported For **Hawkins**

Printed **2017-10-10**

Plan Completion/Update Date **2017-01-25**

SnapPlus Version 16.3 built on 2016-10-31

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Prepared for:
Hawkins
attn:Hawkins
509 Main St
Hawkins, 54530

Field Data: 68 Total Acres Reported.

Field Name	Sub Farm	FSA Tract	FSA Fld	Acres	County	Critical Soil Series & Symbol	F. Slp %	F.Slp Len ft	Below Field Slope To Water %	Dist.To Water ft	N/Fld Res	Contour/ Filters	Irrig	Tiled	Rotation	Tillage	Report Period	Field "T" t/ac	Rot Avg Soil Loss t/ac	SCI	Rot Avg PI	Soil Test P ppm	Rot P2O5 Bal lb/ac	P2O5 Bal Target lb/ac
3				9.8	Price	FREEON 757B	4	150	0 - 2	0 - 300	S	No / No	No	No	Csl	SP	2021-2021	4	9.6	-0.7	29	78	70	0
4-0				19.2	Price	FREEON 757B	4	150	0 - 2	0 - 300	S	No / No	No	No	Csl	SP	2021-2021	4	9.6	-0.7	27	54	70	0
4-1				7.7	Price	FREEON 757B	4	150	0 - 2	0 - 300	S	No / No	No	No	GH	None	2021-2021	4	0	1.7	2	54	35	0
5				10.7	Price	FREEON 757B	4	150	0 - 2	0 - 300	S	No / No	No	No	Pcl	None	2016-2016	4	0.1	1.8	0	20	0	-
6				16.3	Price	MAGNOR 3456A	2	250	0 - 2	0 - 300	S	No / No	No	No	Csl	SP	2016-2016	4	5.5	-0.5	8	21	0	-
7-0				0.2	Price	FREEON 757B	4	150	0 - 2	301 - 1000		No / No	No	No	Pu-Pu-Pu-Pu	None-None-None-None	2016-2019	4	0.6	1.5	20	371	5165	-25
7-1				0.7	Price	FREEON 757B	4	150	0 - 2	301 - 1000		No / No	No	No	Pu	None	2016-2016	4	1.1	1.0	12	371	-25	-6
8				3.4	Price	FREEON 757B	4	150	0 - 2	301 - 1000		No / No	No	No	Pcl	None	2016-2016	4	0.1	1.8	1	142	-25	-6

Crop Abbreviations

Abbreviation	Crop
Csl	Corn silage
GH	Grass hay
Pcl	Pasture, continuous stocking, low density
Pu	Pasture, continuous stocking, high density

Tillage Abbreviations

Abbreviation	Tillage
None	None
SP	Spring MB Plow

Restriction Legend

Code	Description of Code
S	Field is in SWQMA
D	Drinking water well within 50 feet of field.
C	Conduit to groundwater within 200 feet upslope of field.
L	Local restrictions on nutrient applications.
%	Slope restriction for winter applications
P	High permeability N restricted soils
R	N restricted soils with less than 20 inches to bedrock
W	N restricted soils with less than 12 inches to apparent water table
+	This map unit may have any of the N restrictive features, however an on-site investigation is needed to identify which restrictions may actually be present.

SnapPlus Nutrient Management Report

Crop Year 2016

Reported For Hawkins

Printed 2017-10-10

Plan Completion/Update Date 2017-01-25

SnapPlus Version 16.3 built on 2016-10-31

M:\M Drive\2012\2012-180 Hawkins Facility Plan, Phos. Operational Evaluation Report\snap plus\snap plus from county\Entire farm snapplus \Hawkins.snapDb

Prepared for:
Hawkins
attn:Hawkins
509 Main St
Hawkins, 54530

Field data: 68 total acres reported.

Field Data				Soil Test ppm		Crop Data				Recommendations			Planned Applications and Credits			Over(+)/Under(-) UW Recs		
Field Name	Ac	Predominant Soil and N Restrictions		Avg P	Avg K	2015 Crop	2016 Crop	Yield Goal	Tillage	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac
3	9.8	FREEON	757B	78	211	missing	Corn silage	10-15	Spring MB Plow	145 0.05 /MRTN	0	25	0	0	0	-145	0	-25
4-0	19.2	FREEON	757B	54	133	missing	Grass hay	2-3	None	130	0	70	0	0	0	-130	0	-70
4-1	7.7	FREEON	757B	54	133	missing	Grass hay	2-3	None	130	0	70	50	75	125	-80	75	55
5	10.7	FREEON	757B	20	68	missing	Pasture, continuous stocking, low density	1-2	None	100	25	100	11	25	38	-89	0	-62
6	16.3	MAGNOR	3456A	21	81	missing	Corn silage	10-15	Spring MB Plow	145 0.05 /MRTN	45	160	20	45	68	-125	0	-92
7-0	0.2	FREEON	757B	371	1185	missing	Pasture, continuous stocking, high density	1-2	None	70	0	0	0	0	0	-70	0	0
7-1	0.7	FREEON	757B	371	1185	missing	Pasture, continuous stocking, high density	1-2	None	70	0	0	0	0	0	-70	0	0
8	3.4	FREEON	757B	142	345	missing	Pasture, continuous stocking, low density	1-2	None	100	0	0	0	0	0	-100	0	0

Restriction Legend

Code	Description of Code
S	Field is in SWQMA
D	Drinking water well within 50 feet of field.
C	Conduit to groundwater within 200 feet upslope of field.
L	Local restrictions on nutrient applications.
%	Slope restriction for winter applications
P	High permeability N restricted soils
R	N restricted soils with less than 20 inches to bedrock
W	N restricted soils with less than 12 inches to apparent water table
+	This map unit may have any of the N restrictive features, however an on-site investigation is needed to identify which restrictions may actually be present.

SnapPlus Nutrient Management Report

Crop Year 2017

Reported For Hawkins

Printed 2017-10-10

Plan Completion/Update Date 2017-01-25

SnapPlus Version 16.3 built on 2016-10-31

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Prepared for:
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attn:Hawkins
509 Main St
Hawkins, 54530

Field data: 68 total acres reported.

Field Data				Soil Test ppm		Crop Data				Recommendations			Planned Applications and Credits			Over(+)/Under(-) UW Recs		
Field Name	Ac	Predominant Soil and N Restrictions		Avg P	Avg K	2016 Crop	2017 Crop	Yield Goal	Tillage	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac
3	9.8	FREEON	757B	78	211	Corn silage	Corn silage	10-15	Spring MB Plow	145 0.05 /MRTN	0	25	114	115	185	-31	115	160
4-0	19.2	FREEON	757B	54	133	Grass hay	Corn silage	10-15	Spring MB Plow	145 0.05 /MRTN	0	105	114	115	185	-31	115	80
4-1	7.7	FREEON	757B	54	133	Grass hay	Grass hay	2-3	None	130	0	15	70	75	125	-60	75	110
5	10.7	FREEON	757B	20	68	Pasture, continuous stocking, low density	Pasture, continuous stocking, low density	1-2	None	100	25	100	32	32	65	-68	7	-35
6	16.3	MAGNOR	3456A	21	81	Corn silage	Corn silage	10-15	Spring MB Plow	145 0.05 /MRTN	45	160	114	115	185	-31	70	25
7-0	0.2	FREEON	757B	371	1185	Pasture, continuous stocking, high density	Pasture, continuous stocking, high density	1-2	None	70	0	0	1755	1755	3510	1685	1755	3510
7-1	0.7	FREEON	757B	371	1185	Pasture, continuous stocking, high density	Pasture, continuous stocking, high density	1-2	None	70	0	0	495	495	990	425	495	990

Hawkins

SnapPlus Nutrient Management Report

10/10/2017

Field Data			Soil Test ppm		Crop Data				Recommendations			Planned Applications and Credits			Over(+)/Under(-) UW Recs		
Field Name	Ac	Predominant Soil and N Restrictions	Avg P	Avg K	2016 Crop	2017 Crop	Yield Goal	Tillage	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac
8	3.4	FREEON 757B	142	345	Pasture, continuous stocking, low density	Pasture, continuous stocking, low density	1-2	None	100	0	0	102	102	204	2	102	204

Restriction Legend

Code	Description of Code
S	Field is in SWQMA
D	Drinking water well within 50 feet of field.
C	Conduit to groundwater within 200 feet upslope of field.
L	Local restrictions on nutrient applications.
%	Slope restriction for winter applications
P	High permeability N restricted soils
R	N restricted soils with less than 20 inches to bedrock
W	N restricted soils with less than 12 inches to apparent water table
+	This map unit may have any of the N restrictive features, however an on-site investigation is needed to identify which restrictions may actually be present.

SnapPlus Nutrient Management Report

Crop Year 2018

Reported For Hawkins

Printed 2017-10-10

Plan Completion/Update Date 2017-01-25

SnapPlus Version 16.3 built on 2016-10-31

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Prepared for:
Hawkins
attn:Hawkins
509 Main St
Hawkins, 54530

Field data: 68 total acres reported.

Field Data			Soil Test ppm		Crop Data				Recommendations			Planned Applications and Credits			Over(+)/Under(-) UW Recs		
Field Name	Ac	Predominant Soil and N Restrictions	Avg P	Avg K	2017 Crop	2018 Crop	Yield Goal	Tillage	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac
3	9.8	FREEON 757B	78	211	Corn silage	Corn silage	10-15	Spring MB Plow	145 0.05 /MRTN	0	0	134	115	185	-11	115	185
4-0	19.2	FREEON 757B	54	133	Corn silage	Corn silage	10-15	Spring MB Plow	145 0.05 /MRTN	0	25	134	115	185	-11	115	160
4-1	7.7	FREEON 757B	54	133	Grass hay	Grass hay	2-3	None	130	0	0	80	75	125	-50	75	125
5	10.7	FREEON 757B	20	68	Pasture, continuous stocking, low density	Pasture, continuous stocking, low density	1-2	None	100	18	100	43	32	65	-57	14	-35
6	16.3	MAGNOR 3456A	21	81	Corn silage	Corn silage	10-15	Spring MB Plow	145 0.05 /MRTN	0	135	134	115	185	-11	115	50
7-0	0.2	FREEON 757B	371	1185	Pasture, continuous stocking, high density	Pasture, continuous stocking, high density	1-2	None	70	0	0	2340	1755	3510	2270	1755	3510
7-1	0.7	FREEON 757B	371	1185	Pasture, continuous stocking, high density	Pasture, continuous stocking, high density	1-2	None	70	0	0	660	495	990	590	495	990

Field Data			Soil Test ppm		Crop Data				Recommendations			Planned Applications and Credits			Over(+)/Under(-) UW Recs		
Field Name	Ac	Predominant Soil and N Restrictions	Avg P	Avg K	2017 Crop	2018 Crop	Yield Goal	Tillage	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac
8	3.4	FREEON 757B	142	345	Pasture, continuous stocking, low density	Pasture, continuous stocking, low density	1-2	None	100	0	0	136	102	204	36	102	204

Restriction Legend

Code	Description of Code
S	Field is in SWQMA
D	Drinking water well within 50 feet of field.
C	Conduit to groundwater within 200 feet upslope of field.
L	Local restrictions on nutrient applications.
%	Slope restriction for winter applications
P	High permeability N restricted soils
R	N restricted soils with less than 20 inches to bedrock
W	N restricted soils with less than 12 inches to apparent water table
+	This map unit may have any of the N restrictive features, however an on-site investigation is needed to identify which restrictions may actually be present.

SnapPlus Nutrient Management Report

Crop Year 2019

Reported For Hawkins

Printed 2017-10-10

Plan Completion/Update Date 2017-01-25

SnapPlus Version 16.3 built on 2016-10-31

M:\M Drive\2012\2012-180 Hawkins Facility Plan, Phos. Operational Evaluation Report\snap plus\snap plus from county\Entire farm snapplus \Hawkins.snapDb

Prepared for:
Hawkins
attn:Hawkins
509 Main St
Hawkins, 54530

Field data: 68 total acres reported.

Field Data				Soil Test ppm		Crop Data				Recommendations			Planned Applications and Credits			Over(+)/Under(-) UW Recs		
Field Name	Ac	Predominant Soil and N Restrictions		Avg P	Avg K	2019 Crop	2019 Crop	Yield Goal	Tillage	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac
3	9.8	FREEON	757B	78	211	Corn silage	Corn silage	10-15	Spring MB Plow	145 0.05 /MRTN	0	0	144	115	185	-1	115	185
4-0	19.2	FREEON	757B	54	133	Corn silage	Corn silage	10-15	Spring MB Plow	145 0.05 /MRTN	0	0	144	115	185	-1	115	185
4-1	7.7	FREEON	757B	54	133	Grass hay	Grass hay	2-3	None	130	0	0	80	75	125	-50	75	125
5	10.7	FREEON	757B	20	68	Pasture, continuous stocking, low density	Pasture, continuous stocking, low density	1-2	None	100	11	100	48	32	65	-52	21	-35
6	16.3	MAGNOR	3456A	21	81	Corn silage	Corn silage	10-15	Spring MB Plow	145 0.05 /MRTN	0	110	144	115	185	-1	115	75
7-0	0.2	FREEON	757B	371	1185	Pasture, continuous stocking, high density	Pasture, continuous stocking, high density	1-2	None	70	0	0	2633	1755	3510	2563	1755	3510
7-1	0.7	FREEON	757B	371	1185	Pasture, continuous stocking, high density	Pasture, continuous stocking, high density	1-2	None	70	0	0	743	495	990	673	495	990

Field Data			Soil Test ppm		Crop Data				Recommendations			Planned Applications and Credits			Over(+)/Under(-) UW Recs		
Field Name	Ac	Predominant Soil and N Restrictions	Avg P	Avg K	2018 Crop	2019 Crop	Yield Goal	Tillage	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac	N lb/ac	P2O5 lb/ac	K2O lb/ac
8	3.4	FREEON 757B	142	345	Pasture, continuous stocking, low density	Pasture, continuous stocking, low density	1-2	None	100	0	0	153	102	204	53	102	204

Restriction Legend

Code	Description of Code
S	Field is in SWQMA
D	Drinking water well within 50 feet of field.
C	Conduit to groundwater within 200 feet upslope of field.
L	Local restrictions on nutrient applications.
%	Slope restriction for winter applications
P	High permeability N restricted soils
R	N restricted soils with less than 20 inches to bedrock
W	N restricted soils with less than 12 inches to apparent water table
+	This map unit may have any of the N restrictive features, however an on-site investigation is needed to identify which restrictions may actually be present.

APPENDIX B

Operation & Maintenance Plan

For Water Quality Trading
Village of Hawkins
November 2017

The goal of the operation and maintenance plan is to ensure that the perineal grass cover will persist. The primary purpose of the grass cover is to reduce the phosphorus and sediments that leave the farm and degrade the water quality on South Fork of Main Creek. The secondary purpose is to ensure that the grass cover is managed and maintained to produce a grass forage source for livestock. Success of the secondary purpose will be the best assurance that the primary goal is being met; a lush and vigorous stand of grass will have a high stem count maximizing trapped sediments and utilizing those sediments as nutrients to be removed by the following hay crop.

Section 1 - Seeding Year 2018

A. **Seeding and site preparation** will be as outlined in the Water Quality Trading Plan
   - Germination of the nurse crop generally occurs within 10-20 days of planting
   - Germination of the grass seed generally occurs within 10-30 days of planting

B. **Harvest of the nurse crop** will either be as oatlage or as grain and straw. Upon harvest of the nurse crop, the grass stand will be evaluated.
   - Areas of poor germination larger than 1000 square feet will be reseeded by hand or with a drill.
   - Areas where the seed has been lost due to erosion will be reseeded as above but covered with biodegradable erosion mat.
   - Any gulley erosion will be repaired either by tillage or importing topsoil, reseeded and covered with biodegradable erosion mat.

C. **Clipping** of the weeds/grass hay will be done if weeds become competitive with the grass, the grass shall not be mowed lower than 6" or after September 1st.

D. **Harvesting** of the grass hay will be done when the grass matures. The grass shall not be mowed lower than 6" or after September 1st.

E. **Inspection Frequency** shall be **monthly** in the seeding year. Page 4 of this Operation & Maintenance Plan is an inspection form that shall be completed for each inspection. Inspections shall be completed by the County Soil Conservationist (Price/Rusk County) or Morgan & Parmley Ltd. These records shall be kept on file with the Hawkins Village Clerk and be available for inspection by the DNR. Additionally, the Certified Waste Water Treatment Plant Operator for the Village of Hawkins shall make a statement, as a comment, on the monthly discharge report certifying the condition of the management practices and that they are being properly maintained.

Section 2 - 2019 and beyond

1. **Weed Management**,
    - Harvest of the hay will remove annual weeds, maintain perennial weeds, and prevent woody vegetation from developing.
    - Woody Vegetation - herbicide shall be applied to woody plants that encroach from the wood edged or begin to grow along the perennial water way that splits the property. If woody vegetation is allowed to persist and grow into trees it will shade out and kill the grass cover thereby creating a potential for soil erosion.
2. **Erosion control**. It is unlikely that there will be erosion issues or gully formation after the first year; the site has no highly erodible lands and no evidence of valleys or gullies in the fields. If erosion becomes evident with monthly inspections, it will be repaired as listed below:
    - Erosion will be filled by tillage or by importing topsoil
    - The area will be seeded with the original grass mix as listed in the water quality trading plan.
    - Erosion mat will be applied to the reseeded area.
    - American Excelsior Curlex Sediment logs will be placed 50' on center if the repaired erosion was a gully.
3. **Harvesting**. Forage will be harvested when the grass is mature and at a height and frequency necessary to maintain a productive stand.
    - The grass shall not be cut shorter than 4"; grass regrows from growing points at the base of the leaf blades, low cutting height removes the energy stored for regrowth in the stem, delaying regrowth of the field, and future yield potential.
    - Frequency of the cutting will be dictated by the forage quality required.
    - The field should not be harvested after September 1st to allow for winter ground cover.
    - The harvested hay will be removed from the site upon harvest and shall not be stored on the property.
4. **Nutrient Management.** The farm will be operated to draw down the phosphorus and potassium levels in fields that have excessively high levels of phosphorus or potassium as based upon UW soil tests. This will be done by removing the grass hay crop without replacing the nutrients. The nutrients will be drawn down to the optimum level on the soil test, at which point in time fertilizer will be applied to maintain the optimum level on the soil test. The fertilizer application rate recommended on the soil test report will be used to apply the correct amount of fertilizer necessary to maintain the optimum level.
5. **Soil Sampling.** Soil sampling will be completed on a 4 year schedule to monitor the nutrients and maintain them at a level no higher than the optimum range. The soil tests will be used to prescribe the correct fertilizer rate and composition. Fields will be divided into approximately 5 acre sections. One composite sample will be taken from each section. The sample will be comprised of not less than 10 cores taken in the traditional "W" pattern. Composite samples will be sent to the UW Soil & Forage Analysis Lab in Medford. Fields with multiple composite samples will be averaged to make the recommendations. For a detailed description of the sampling procedure refer to UW Extension Bulletin A2809.
6. **Inspection** is vital to successful management. As previously stated, the frequency of inspection during the seeding year shall be monthly during the growing season. The following inspection and reporting procedure shall be used:

- **Monthly Reporting (<u>seeding year</u>) -** Each month the Soil Conservationist shall file the report with the Village Clerk assuring that the management practices installed are being maintained in a manner consistent with the WQT plan. Complete the form found on page 4. Additionally, the Operator shall make a statement, as a comment, on the monthly discharge report certifying that management practices established are in good condition and properly maintained. This monthly update will also be used to record the following:
    - Harvest dates
    - Approximate hay yields to determine nutrient removal rate
- **Quarterly Reporting (<u>second year</u>)** Quarterly reporting, using the Form on page 4, shall be completed by the Soil Conservationist and the report filed with the Village Clerk. Additionally, the Operator shall continue to make a statement, as a comment, on the monthly discharge report certifying that management practices established are in good condition and properly maintained.
- **Semi-Annual Reporting (<u>third year and beyond</u>)** Semi-annual reporting, using the Form on page 4, shall be completed by the Soil Conservationist and the report filed with the Village Clerk. Additionally, the Operator shall continue to make a statement, as a comment, on the monthly discharge report certifying that management practices established are in good condition and properly maintained.
- **Notification of Problems with Permanent Grass Cover -** The Village shall notify the DNR within 7 days of becoming aware that the phosphorus reduction credits used by the Village are not being generated as approved in the WQT Plan. The Village will work to restore the vegetative cover and update the DNR on the progress of corrective measures.

WATER QUALITY TRADING INSPECTION FORM
FOR THE VILLAGE OF HAWKINS
LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: _____ Inspector: _____ Weather: _____

Inspection Frequency (circle one): Monthly Quarterly Semi-Annual

Summary of findings:

_____
_____
_____
_____
_____

Identification of Items of non-compliance:

_____
_____
_____

Corrective measures required:

_____
_____
_____

Notice of **non-compliance** to the DNR required: Yes: _____ No: _____
Phosphorus credits used by Village (annual report only): _____
Phosphorus credits available for sale (annual report only): _____
Phosphorus credits sold (annual report only):

Purchaser of Credits	Amount of Credits Sold
Total Credits Sold	

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3					
4-0					
4-1					
5					
6					
7-0					
7-1					
8					
TOTALS					

Appendix C

Village of Hawkins

WQT 2018 year-end report

The following report is a synopsis of monthly reports that were gathered in part from general remarks made on the corresponding monthly eDMRs.

July… From the start, the Village had a difficult time getting the previous owners to remove themselves including cattle, implements and personal effects from the property in a timely fashion. These were circumstances beyond either parties' control. To date 7/12/18 approximately 30% of the northern half of the fields have been cut to a level of 5 inches. The southern half is currently being worked. The rock ford was installed yesterday, in the effort to make the low lying land passible by farm equipment and eliminating the element of erosion. The farmer that is working the land, is currently on a waiting list for the initial burn down, after which will be a 10 day waiting period prior to seeding. Much of the property has been cleaned up by removing fences, buildings and debris. We have begun bulldozing to level land and are working on improving the road to the southern field. Once the field work has been completed and all steel has been removed from structures, the buildings will be raised. This in turn will create slightly less than one acre of cropland that is currently unavailable. A Price County burning permit was obtained to destroy sorted lumber from the house, garage and outbuildings. (See exhibit A)

(View between fields #4 and #5 of exhibit B facing south. Bulldozing to improve road to southern fields)

(Fields are chiseled and nearly ready for seeding. field #3 of exhibit B)

August… Many of the buildings have been razed and the grounds leveled. There are a few buildings remaining. Those will be dismantled and salvaged to help offset costs. The field work has all been completed, including disking, chisel plowing, picking rock, leveling and seeding.

(Area that the house, garage and outbuildings used to occupy)

September… The fields are all planted and the grasses are all now knee high or taller. The fields were harvested later than what was called out in the WQT Plan. For a complete explanation on this change, see Exhibit C. Some buildings still remain, but are undergoing manual teardown for the purpose of salvage. When all buildings are completely removed, the land they previously occupied will be seeded to complete the fields. In my opinion the fields are absolutely beautiful and the Village of Hawkins has commended the responsible parties for all of their hard work in the effort to transform this property into something that is truly stunning, considering what it looked like at the beginning of the year.

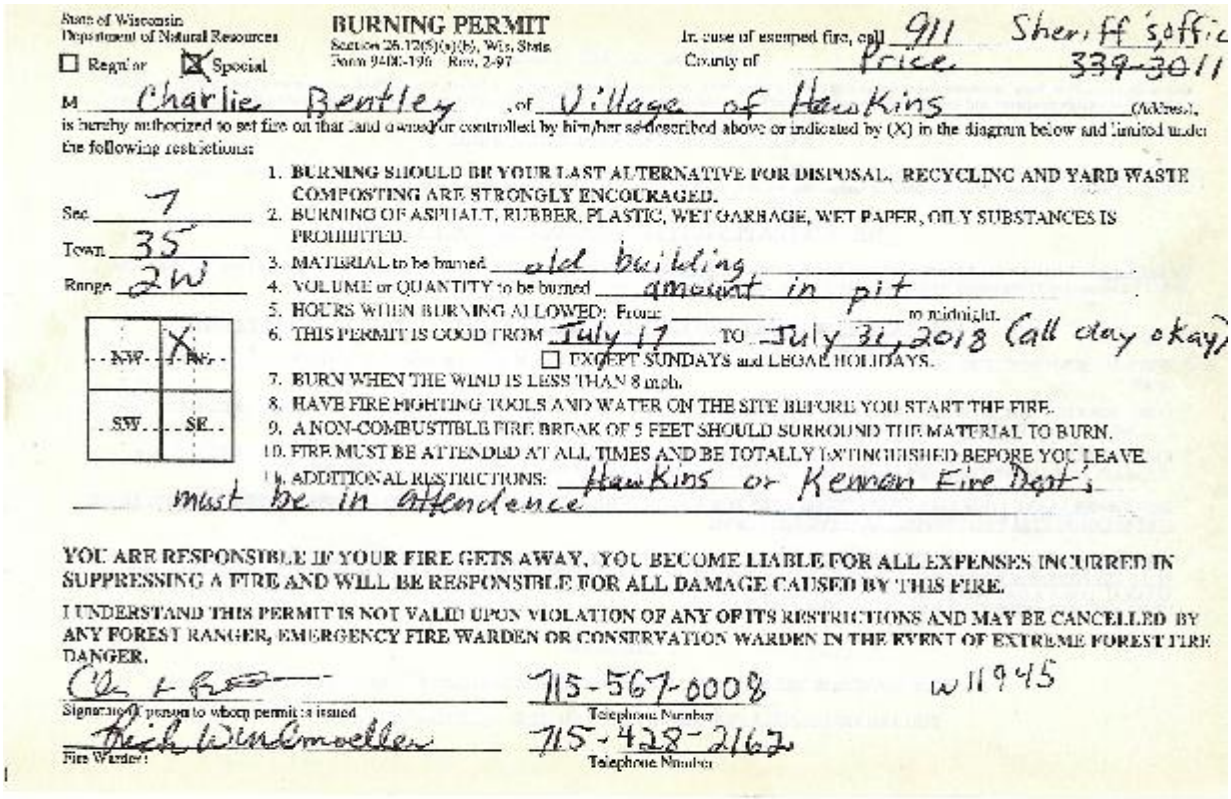
Field # 3

Field # 5

October… At this time there is not much to remark on the WQT property. One building has been completely removed and more salvage has been completed on the barn. Salvage will continue until weather is prohibitive.

(Before and after photos of water crossing)

Exhibit A (Price County Burn Permit)



State of Wisconsin
Department of Natural Resources
☐ Regular ☒ Special

BURNING PERMIT
Section 26.12(5)(a)(b), Wis. Stats.
Form 9400-196 Rev. 2-97

In case of escaped fire, call 911 Sheriff's office
County of Price 339-3011

M Charlie Bentley, of Village of Hawkins (Address), is hereby authorized to set fire on that land owned or controlled by him/her as described above or indicated by (X) in the diagram below and limited under the following restrictions:

Sec 7
Town 35
Range 2W

NW	NE
SW	SE

1. BURNING SHOULD BE YOUR LAST ALTERNATIVE FOR DISPOSAL. RECYCLING AND YARD WASTE COMPOSTING ARE STRONGLY ENCOURAGED.
2. BURNING OF ASPHALT, RUBBER, PLASTIC, WET GARBAGE, WET PAPER, OILY SUBSTANCES IS PROHIBITED.
3. MATERIAL to be burned old building
4. VOLUME or QUANTITY to be burned amount in pit
5. HOURS WHEN BURNING ALLOWED: From _____ to midnight.
6. THIS PERMIT IS GOOD FROM July 17 TO July 31, 2018 (all day okay)
   ☐ EXCEPT SUNDAYS and LEGAL HOLIDAYS.
7. BURN WHEN THE WIND IS LESS THAN 8 mph.
8. HAVE FIRE FIGHTING TOOLS AND WATER ON THE SITE BEFORE YOU START THE FIRE.
9. A NON-COMBUSTIBLE FIRE BREAK OF 5 FEET SHOULD SURROUND THE MATERIAL TO BURN.
10. FIRE MUST BE ATTENDED AT ALL TIMES AND BE TOTALLY EXTINGUISHED BEFORE YOU LEAVE.
11. ADDITIONAL RESTRICTIONS: Hawkins or Kennan Fire Dept's must be in attendence

YOU ARE RESPONSIBLE IF YOUR FIRE GETS AWAY. YOU BECOME LIABLE FOR ALL EXPENSES INCURRED IN SUPPRESSING A FIRE AND WILL BE RESPONSIBLE FOR ALL DAMAGE CAUSED BY THIS FIRE.

I UNDERSTAND THIS PERMIT IS NOT VALID UPON VIOLATION OF ANY OF ITS RESTRICTIONS AND MAY BE CANCELLED BY ANY FOREST RANGER, EMERGENCY FIRE WARDEN OR CONSERVATION WARDEN IN THE EVENT OF EXTREME FOREST FIRE DANGER.

Signature of person to whom permit is issued — 715-567-0008 Telephone Number — W11945

Fire Warden: Rich VanSmoeller — 715-428-2167 Telephone Number

Exhibit B (Field Sections)

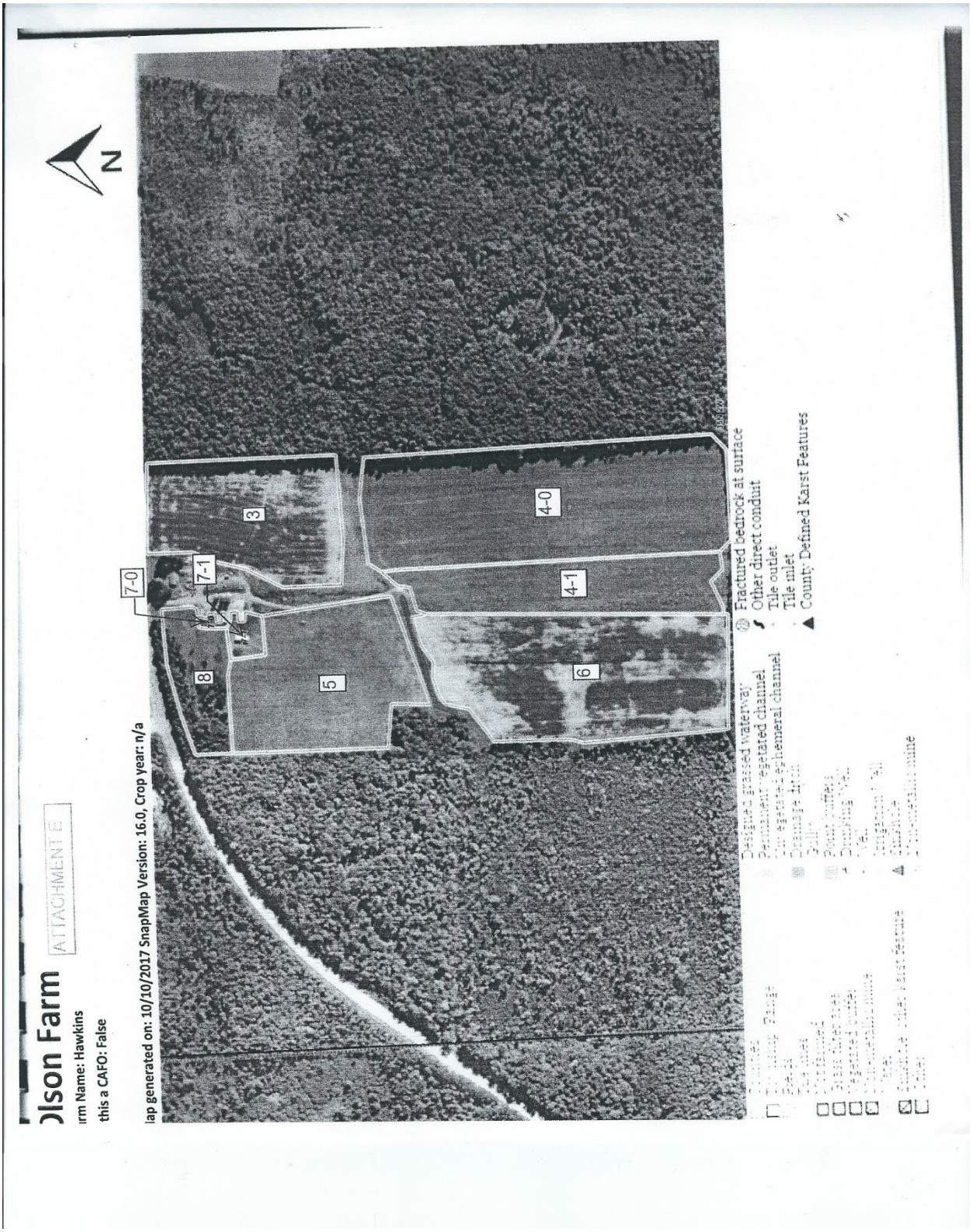


Exhibit C (Alterations to WQT Plan)

Two alterations were made to the original WQT plan. These changes are as follows;

Alteration number 1. The original plan called for very specific types of grass seed to be planted. The seed mix was changed due to the late planting operation. The farmer that was resurrecting the fields was concerned with the potential lack of moisture in the middle of July. After a phone conversation with Lonn Franson it was concluded that the type of seed could be modified from the original plan if that seed had a better chance to survive in arid soils.

The following modified seed mix was applied on all field sections at a rate of 25.83 lbs per acre

Tetraploid Perennial Ryegrass	200 lbs
Reed Canarygrass	250 lbs
Timothy	150 lbs
Birdsfoot Trefoil	100 lbs
Orchardgrass	650 lbs
Fawn Tall Fescue	200 lbs
Combined total pounds	1550 lbs divided by 60 Acres = 25.83 lbs per acre

Alteration number 2. In the original plan it was stated that the fields should not be harvested after September 1st. The fields were harvested later in September than that specific date, due to the changes in seeding mix and the threat that some of the types of grasses would not survive the winter if they were left standing on the fields in a mature state.

WATER QUALITY TRADING INSPECTION FORM
FOR THE VILLAGE OF HAWKINS
LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: 11-27-2018 Inspector: HARTMAN Weather: COOL - SNOW COVERED

Inspection Frequency (circle one): Monthly Quarterly (Semi-Annual)

Summary of findings:
ALL FIELDS IN GOOD SHAPE. AWAITING RUSK COUNTY CONSERVATIONIST "JOHN KRELL" YEAR END REPORT.

Identification of Items of non-compliance:
TYPE OF SEED WAS CHANGED FROM ORIGINAL SPECIFICATION FIELDS WERE HARVESTED AFTER SEPT. 1

Corrective measures required:
CONTACT DNR REP LONN FRANSON FOR PERMISSION TO CHANGE SEED TYPE.

Notice of **non-compliance** to the DNR required: Yes: X No: _____
Phosphorus credits used by Village (annual report only): ESTIMATE 100 lbs.
Phosphorus credits available for sale (annual report only): 602 LESS EST. OF 100
Phosphorus credits sold (annual report only): NONE TO DATE

Purchaser of Credits	Amount of Credits Sold
CONRATH, IN NEGOTIATION	EST = 44.5 lbs
Total Credits Sold	

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3	GOOD	53		27.24	
4-0					
4-1					
5					
6					
7-0					
7-1					
8					
TOTALS					

WATER QUALITY TRADING INSPECTION FORM
FOR THE VILLAGE OF HAWKINS
LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: 11/29 Inspector: JOHN KRELL RUSK COUNTY CONSERVATIONIST Weather: 27° LIGHT SNOW

Inspection Frequency (circle one): Monthly Quarterly Semi-Annual

Summary of findings:
FIELDS 3, 4, 4-1, 5, 6 ARE SEEDED AND APPEAR TO HAVE AT LEAST ONE CUTTING. NO SIGNS OF EROSION. SOME RUTTING NEAR THE TRIBUTARY. FORD CROSSING APPEARS STABLE BUT SHOULD BE REEVALUATED DURING SPRING HIGH WATER.

Identification of Items of non-compliance:
FIELDS 7-0, 7-1, 8 ARE NOT SEEDED

Corrective measures required:
7-0, 7-1, 8 NEED BURN DOWN, SOIL PREP, ETC AFTER BUILDINGS ARE RAZED. SOURCE: PAGE 6 WQTP, SECTION D

Notice of **non-compliance** to the DNR required: Yes: _____ No: _____
Phosphorus credits used by Village (annual report only): _____
Phosphorus credits available for sale (annual report only): _____
Phosphorus credits sold (annual report only):

Purchaser of Credits	Amount of Credits Sold
Total Credits Sold	

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3	GOOD				
4-0	GOOD				
4-1	GOOD				
5	GOOD				
6	GOOD				
7-0	BARNYARD + DEBRIS				
7-1	BARNYARD + DEBRIS				
8	IDLE PASTURE/WOODS				
TOTALS					

Village of Hawkins

WQT 2019 year-end report

Phosphorus Discharge Calculations.

Month Avg flow X number of days = MG X P Concentration X 8.34 = LBS per Month

Jan	0.1335 * 31 = 4.1385 * 1.16 * 8.34	=40
Feb	0.1267 * 28 = 3.5476 * 1.548 * 8.34	=45.8
Mar	0.0752 * 25 = 1.88 * 3.343 * 8.34	=53.8
Jun	0.0383 * 25 = 0.9575 * 3.16 * 8.34	=25.2
July	0.1832 * 24 = 4.3968 * 3.615 * 8.34	=132.6
	Yearly total	297.4 lbs

Generated credits = 838 lbs – 297.4 lbs of P discharged = 540.6 lbs surplus.

Tonnage Calculation of Hay Removed at WQT Site

1st Crop / July	98 ton
2nd Crop / Sept	25.5 ton
total	123.5 ton

List of items of non-compliance

1. Remove fence between fields 8 and 5

2. Obtain Price County burn permit and burn the remaining debris in area 7-1

3. Breakup and bury remaining concrete in areas 7-0 and 7-1

4. Level idle pasture area in field 8

5. Cleanup and seed all areas in fields 7-0, 7-1 and 8

This report was generated by Carl Hartman and submitted to Lonn Franson via email on…

01-27-2020 @ 1223 hrs

WATER QUALITY TRADING INSPECTION FORM
FOR THE VILLAGE OF HAWKINS
LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: 06-04-2019 Inspector: HARTMAN, CARL DPW Weather: SUN - 80°

Inspection Frequency (circle one): Monthly (Quarterly) Semi-Annual

Summary of findings:
FIELDS 4-6 ARE IN VERY GOOD CONDITION. AREAS 7-0, 7-1 ARE OCCUPIED BY A BARN, BARNYARD, OUTBUILDING, CONCRETE SLABS AND THE SILOS. AREA "A" AND "B" OF FIELD #3 DENOTE SECTIONS THAT HAVE DIED OUT OF ORIGINAL PLANTING. THIS HAS GIVEN WAY TO SOME JUVENIAL PIGWEED GROWTH. DEBRIS FROM BARN IS BEING SCATTERED

Identification of Items of non-compliance:
"A" AND "B" OF FIELD #3, FIELD 7-0, 7-1, 8 ARE NOT IMPROVED OR SEEDED.

Corrective measures required:
UPON COMPLETION OF RAZING THE FINAL PORTION OF THE BARN FIELDS 7-0, 7-1 AND 8 MUST BE IMPROVED AND SEEDED. AREAS "A AND "B" MUST BE RE-SEEDED. DEBRIS/INSULATION MUST BE PICKED UP

Notice of **non-compliance** to the DNR required: Yes: X No: _____

Phosphorus credits used by Village (annual report only): _____

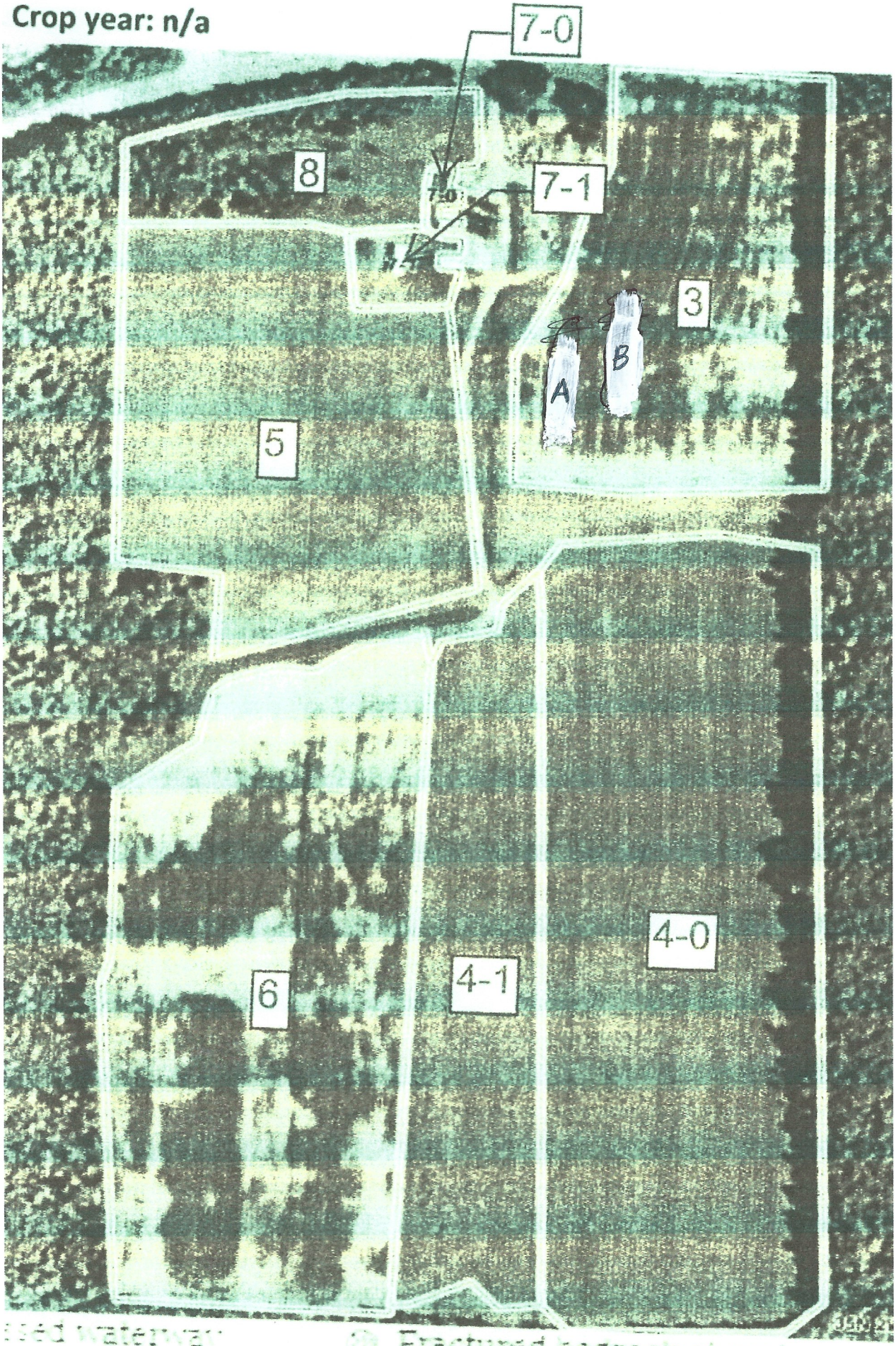
Phosphorus credits available for sale (annual report only): _____

Phosphorus credits sold (annual report only):

Purchaser of Credits	Amount of Credits Sold
Total Credits Sold	

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3	GOOD	3	NONE	NONE	
4-0	VERY GOOD	1			
4-1		1			
5		1			
6		1			
7-0	BARN AND DEBRIS	2			
7-1	" " "	2			
8	OLD PASTURE/WOODS	1			
TOTALS					

Crop year: n/a



ted waterway
getated channel
phemeral channel

Fractured bedrock at surface
Other direct conduit
Tile outlet

WATER QUALITY TRADING INSPECTION FORM
FOR THE VILLAGE OF HAWKINS
LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: 7/15/2019 8:00am Inspector: Nick Stadnyk, Rusk Co. LWCD; Carl Hartman, Village of Hawkins Weather: Partly Cloudy, 77

Inspection Frequency (circle one): Monthly Quarterly Semi-Annual

Summary of findings:
Fields 3, 4-0, 4-1, 5, and 6 all look good. Rained early morning so some standing water. Hay has been cut and baled within the last few days. Crossing and waterway are in good condition. One small area of weed growth in field 3. Fields 7-0, 7-1, and 8 have not been seeded yet because demolition of buildings is not done.

Identification of Items of non-compliance:
Seed fields 7-0, 7-1, and 8.
Remove buildings and haylage pile

Corrective measures required:
Remove buildings, prep seed bed and plant fields 7-0, 7-1, and 8
Prep and patch small area of weed growth in field 3

Notice of **non-compliance** to the DNR required: Yes: _____ No: _____
Phosphorus credits used by Village (annual report only): _____
Phosphorus credits available for sale (annual report only): _____
Phosphorus credits sold (annual report only):

Purchaser of Credits	Amount of Credits Sold
Total Credits Sold	

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3	Good, small weed area to patch	2		16.5	
4-0	Good	1		23.5	
4-1	Good	1		13.5	
5	Good	0		18.5	
6	Good	1		26	
7-0	Not seeded yet	0		n/a	
7-1	Not seeded yet	0		n/a	
8	Not seeded yet	0		n/a	
TOTALS					

WATER QUALITY TRADING INSPECTION FORM
FOR THE VILLAGE OF HAWKINS
LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: 08/27/2019 Inspector: Nick Stadnyk Weather: Partly Cloudy, Breezy, 61

Inspection Frequency (circle one): Monthly Quarterly Semi-Annual

Summary of findings:
Fields 3, 4-0, 4-1, 5, and 6 are in good condition. Second hay cutting has not occurred yet, but is planned. Crossing and waterway are in good condition. Area of weed growth in field 3 has been treated and re-seeded. May require a second broadcast seeding due to excessive rainfall after initial seeding. Buildings in fields 7-0 and 7-1 have been torn down but debris and haylage is not yet removed.

Identification of Items of non-compliance:
Remove building debris and haylage piles
Seed fields 7-0, 7-1, and 8.

Corrective measures required:
Remove building debris and haylage piles, prep seed bed, and plant fields 7-0, 7-1, and 8.

Notice of **non-compliance** to the DNR required: Yes: _____ No: _____
Phosphorus credits used by Village (annual report only): _____
Phosphorus credits available for sale (annual report only): _____
Phosphorus credits sold (annual report only):

Purchaser of Credits	Amount of Credits Sold
Total Credits Sold	

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3	Good	0			
4-0	Good	0			
4-1	Good	0			
5	Good	0			
6	Good	0			
7-0	Not seeded yet	0			
7-1	Not seeded yet	0			
8	Not seeded yet	0			
TOTALS					

WATER QUALITY TRADING INSPECTION FORM
FOR THE VILLAGE OF HAWKINS
LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: 29Sep19 Inspector: Nick Stadnyk Weather: Partly Cloudy, 39F

Inspection Frequency (circle one): Monthly Quarterly Semi-Annual

Summary of findings:
Overall site is in good condition. No erosion. Crossing is in good condition. Weed area in field 3 has been treated and seeded. Building is torn down but debris is still on-site along with an old haylage pile. Second crop has been harvested.

Identification of Items of non-compliance:
Building debris/old haylage still on-site
Fields 7-0, 7-1, and 8 have not been cleaned up/re-seeded

Corrective measures required:
Burn/remove building debris
Remove old haylage
Clean-up and re-seed fields 7-0, 7-1, and 8

Notice of **non-compliance** to the DNR required: Yes: _____ No: _____
Phosphorus credits used by Village (annual report only): _____
Phosphorus credits available for sale (annual report only): _____
Phosphorus credits sold (annual report only):

Purchaser of Credits	Amount of Credits Sold
Total Credits Sold	

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3	Good	3		4.3	
4-0	Good	1		6.1	
4-1	Good	1		3.5	
5	Good	1		4.8	
6	Good	1		6.8	
7-0	Not seeded yet	1		n/a	
7-1	Not seeded yet	2		n/a	
8	Not seeded yet	0		n/a	
TOTALS				25.5	

Field 3

Field 3 - Treated and re-seeded area

Field 3 - Close-up treated and re-seeded area

Field 4-0

Field 4-1

Field 5

Field 6

Field 7-0

Field 7-1 Debris and old haylage

Field 7-1

FOR THE VILLAGE OF HAWKINS

LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: 04-07-2020 Inspector: Carl Hartman Weather: Mild

Inspection Frequency (circle one): Monthly Quarterly Semi-Annual

Summary of findings:

A quick inspection of the property shows that there were some improvements made last fall. The debris From the barn and the rest of the outbuildings is now separated and piled ready to be burned when conditions Allow. I have been in contact with Price County Officials to arrange for a pre-burn inspection. All non-burnable Items will be hauled off site in the next coming weeks. Also the remaining fence line has been removed. This Will facilitate the levelling of the earth in that area so those remaining fields can be planted. After the debris Has been burned, an outside firm will be demolishing the concrete slabs so that those areas can be levelled and Seeded also.

_____

Identification of Items of non-compliance:

See notes above. Leveling and seeding

Corrective measures required:

See notes above

Notice of **non-compliance** to the DNR required: Yes: __X_____ No: _____

Phosphorus credits used by Village (annual report only): _____

Phosphorus credits available for sale (annual report only): _____

Phosphorus credits sold (annual report only):

Purchaser of Credits	Amount of Credits Sold
Total Credits Sold	

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3					
4-0					
4-1					
5					
6					
7-0					
7-1					
8					
TOTALS					

FOR THE VILLAGE OF HAWKINS

LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: 06-30-2020 Inspector: Carl Hartman DPW Weather: Hot and Humid

Inspection Frequency (circle one): Monthly Quarterly Semi-Annual

Summary of findings:

No hay has been cut or removed during the second quarter of 2020.
A burning permit was obtained through Price County Ranger Station.
The remaining lumber from the barn and a few outbuildings was piled on the concrete and burned.
The Village is in contact with a construction company to demolish the concrete slabs.

Identification of Items of non-compliance:

Fields 7,7-1 and 8 still need improvement and seeding to be in total compliance with the WQT Operation Plan.
The corn drying bin must be removed to facilitate demolishing the concrete footing that it is erected on.

_____

Corrective measures required:

Remove above mentioned corn drying bin
Demolish all concrete slabs
Level or remove piled silage and manure pile
Seed down the remaining field sections of 7, 7-1 and 8

Notice of **non-compliance** to the DNR required: Yes: X No: _____

Phosphorus credits used by Village (annual report only): _____ Phosphorus credits available for sale (annual report only): _____ Phosphorus credits sold (annual report only):

Purchaser of Credits	Amount of Credits Sold
Total Credits Sold	

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3	Excellent	0		0	
4-0	Excellent	0		0	
4-1	Excellent	0		0	
5	Excellent	0		0	
6	Excellent	0		0	
7-0	See Above Statement	0		0	
7-1	See Above Statement	0		0	
8	See Above Statement	0		0	
TOTALS					

FOR THE VILLAGE OF HAWKINS

LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: 9-16-2020 Inspector: Carl Hartman DPW Weather: cooler and humid

Inspection Frequency (circle one): Monthly Quarterly Semi-Annual

Summary of findings: All buildings and remaining debris have been removed. Concrete structures such as Slabs, footings and foundations have been demolished. Remaining manure piles were broadcast on the Barren ground to improve nutrients for new seeding. Remaining portions of fields 8, 7-1 and 7-0 are seeded And growing nicely. All tonnage listed below consists of first and second crop combined.

Identification of Items of non-compliance: NONE
Corrective measures required: NONE

Notice of **non-compliance** to the DNR required: Yes: _____ No: X
Phosphorus credits used by Village (annual report only): _____
Phosphorus credits available for sale (annual report only): _____
Phosphorus credits sold (annual report only):

Purchaser of Credits	Amount of Credits Sold
Total Credits Sold	

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3	Well Established	0		18	
4-0	Well Established	0		35	
4-1	Well Established	0		15	
5	Well Established	2		21	
6	Well Established	0		30	
7-0	Newly Seeded	2		N/A	
7-1	Newly Seeded	2		N/A	
8	Newly Seeded	2		N/A	
TOTALS					

Before and after… portions of field 5 and 7-1

Before and after… field 7-1

Before and after… fields 7-1 and 8

Before and after… fields 7-0 and 7-1

Before and after… field 8

WATER QUALITY TRADING INSPECTION FORM FOR THE VILLAGE OF HAWKINS
LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: 12-17-2020, 1223 hrs. Inspector: Carl Hartman, Dir. Public Works Weather: 20 degrees/ light snow cover

Inspection Frequency (circle one): Monthly Quarterly Semi-Annual Annual

Summary of findings:
Nothing to report on the fields themselves. No additional hay was removed in the fall. The Village has now installed a gate at the entrance to try and eliminate unauthorized access to the fields. (Photo included)

Identification of Items of non-compliance:
None

Corrective measures required:
None

Notice of non-compliance to the DNR required: Yes: _____ No: ___X___
Phosphorus credits used by Village (annual report only): 270.9655
Phosphorus credits available for sale (annual report only): 535.0345
Phosphorus credits sold (annual report only): 73

Purchaser of Credits	Amount of Credits Sold
Village of Conrath	73
Total Credits Sold	73

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3					
4-0					
4-1					
5					
6					
7-0					
7-1					
8					
TOTALS					

Newly installed gate at the Hawkins WQT site.

FOR THE VILLAGE OF HAWKINS
LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: 11/17/2021 Inspector: Carl Hartman Dir. Public Works Weather: Daytime temps around 30F

Inspection Frequency (circle one): Monthly Quarterly Annual

Summary of findings:
This year's inspection is the start of Annual Inspections for the WQT site. Fields were inspected and found to be lacking in nutrients as pointed out by the farmer that removes the hay from the field. The 2021 yields were considerably less than previous years.

Identification of Items of non-compliance:
There are no compliance issues for the term of this report.

Corrective measures required:
Field soil samples were taken and sent to UW Extension in Marshfield to determine how much and what commercial nutrients should be added to up production and keep grasses from dying out. A copy of that report will be sent to Arthur Ryzak, newly appointed DNR compliance engineer for Rusk County, to be filed in conjunction with this report

_____
_____
_____

Notice of **non-compliance** to the DNR required: Yes: _____ No: ___X___
Phosphorus credits used by Village (annual report only): **159.2**
Phosphorus credits available for sale (annual report only): **656.8**
Phosphorus credits sold (annual report only): **73**

Purchaser of Credits	Amount of Credits Sold
Village of Conrath	**73**
Total Credits Sold	

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3	Grasses need additional nutrient	0	0		
4-0	Grasses need additional nutrient	0	0	First and	
4-1	Grasses need additional nutrient	0	0	Second	
5	Grasses need additional nutrient	0	0	Crop	
6				Combined	
7-0				Total	
7-1					
8					
TOTALS				**62.25**	**889.0**

FOR THE VILLAGE OF HAWKINS
LOCATION: THE NE 1/4 - NW ¼ AND THE SE 1/4 – NW 1/4, SECTION 7, T.35N. – R.2W.

Date: 1/16/2023 Inspector: Matt Boehmer Director of Public Works-Water/Sewer Weather: Light Rain

Inspection Frequency (circle one): Monthly Quarterly Annual

Summary of findings:
Matt Boehmer started employment with the Village in June, 2022. He was taken to field by Gary Curtiss and was able to see a growth of grass. There were no further inspections until January 11, 2023 where it was observed to be snow covered and undisturbed. Alicia Valentine, Hawkins Clerk, stated she spoke with Dave and he mentioned due to dry conditions the hay crop was thin. Dave spread 150 lbs of Nitrogen per acre on the entire acreage.

Identification of Items of non-compliance:
Other than a more comprehensive inspection, there are no compliance issue for the term of this report.

Corrective measures required:
At this time, not sure what corrective measures would be needed. More study about the WQT is needed. Dave would like fertilizer and lime applied especially in the back field.

Notice of **non-compliance** to the DNR required: Yes: _____ No: __X__
Phosphorus credits used by Village (annual report only): 109
Phosphorus credits available for sale (annual report only): 725
Phosphorus credits sold (annual report only): 73

Purchaser of Credits	Amount of Credits Sold
Village of Conrath	73
Total Credits Sold	73

FIELD NO.	GENERAL CONDITION OF FIELD	# OF PHOTOS TAKEN	FERTILIZER ADDED	TON OF HAY REMOVED	P CREDITS
3		0	150# N / acre		240
4-0		0	150# N / acre	First and	433
4-1		0	150# N / acre	second	11
5		0	150# N / acre	crop	6
6		0	150# N / acre	combined	196
7-0		0	150# N / acre	Total	3
7-1		0	150# N / acre		12
8		0	150# N / acre		5
TOTALS				116.05	906

Village of Hawkins

WQT 2022 Year End Report

Water Quality Trading Plan: WQT-2018-0001

Phosphorus Discharge Calculations.

Month	Avg flow x days = MG X P Concentration X 8.34 =	LBS per Month
September	0.1156 x 5 = 0.578 x 2.45 x 8.34 =	11.8
October	0.1145 x 31 = 3.5495 x 2.36 x 8.34 =	69.86
November	0.1132 x 13 = 1.4716 x 2.225 x 8.34 =	27.31

2022 Year Total 108.97

Generated Credits = 906 – 108.97 lbs of P discharged = 797.3 surplus.

Tonnage Calculation of Hay Removed from WQT Site.

1st Crop / July	120-1100#bales = 66 ton
2nd Crop / September	91-1100# bales = 50.05 ton
Total - 2022	116.05 Ton

Appendix D

MSA Memo

To: Matt Boehmer, Village of Hawkins

From: Pat Morrow, P.E., Brad Stuczynski, P.E., Jacob Novitch

Subject: Village of Hawkins Water Quality Trading - Potential Need for Additional Credits

Date: 06/05/2023

MSA Professional Services, Inc. (MSA) is in the process of designing upgrades for the drinking water distribution system in the Village of Hawkins. As a part of these upgrades, the addition of a polyphosphate chemical for sequestration of manganese and inhibition of pipe corrosion in the drinking water distribution system has been proposed. Specifically, Hawkins Chemical, Inc. has proposed the addition of the proprietary chemical LPC-AM at existing Wells #2 and #3. Based on chemical analysis of the raw water from each well conducted by Hawkins Chemical, Inc. on April 25, 2023, chemical doses of 5.00 parts per million (ppm) for Well #2 and 11.74 ppm for Well #3 are recommended for effective corrosion inhibition.

Although the addition of LPC-AM at the Village's wells has the benefits of sequestering manganese and controlling corrosion of distribution system piping and appurtenances, the polyphosphate contained in the chemical adds an additional source of phosphorus entering the Village's wastewater collection system and wastewater treatment facility (WWTF). The Village's WWTF maintains compliance with Wisconsin Department of Natural Resources (DNR) phosphorus regulations through a Water Quality Trading (WQT) Plan. Based on reduction of nonpoint sources of phosphorus in the Main Creek Watershed, the Village is allocated phosphorus credits, which offset a certain mass of phosphorus discharged from the WWTF each year. Because the majority of the phosphorus added to the distribution system will eventually pass through the WWTF, phosphorus loads at the WWTF will increase and additional phosphorus credits will be required to offset the additional mass of phosphorus discharged into the Main Creek Watershed.

MSA has calculated the additional approximate mass of phosphorus that would pass through the WWTF each year due to the proposed chemical in addition. Historical operating records from the two wells were used to determine the ratio of volume pumped from each well, the total water demand. The proposed doses were combined with the total demand to yield a total mass of phosphorus entering the system as a result of chemical addition. With the proposed water system improvements project, the Village will have more ability to control the ratio of volume pumped from each well. As the manganese concentration is lower at Well 2 compared to Well 3, MSA recommends that the Village operate the wells so that 80% of the total pumpage is provided from Well #2 and 20% of the total pumpage is provided from Well #3. This scenario was also evaluated and resulted in lower additional phosphorus masses entering the system when compared to current operating conditions at the same demand. A summary of the anticipated additional phosphorus loads under both current and recommended operating conditions is presented in the below Table.

Scenario	Daily Additional Phosphorus (lbs/day)	Annual Additional Phosphorus (lbs/year)
A - Continue Well 2/3 Ratio 55/45		
Average Demand (26,000 gpd)	0.20	72
Peak Demand (84,000 gpd)	0.64	233
B - Well 2/3 Ratio 80/20		
Average Demand (26,000 gpd)	0.16	57
Peak Demand (84,000 gpd)	0.50	184

Additional phosphorus loads will likely be closer to the 57-72 lbs/year anticipated at average demand, but the peak demand scenarios are provided as conservative estimates. Based on MSA's review of the Village's current WQT plan, the Village has a historical phosphorus discharge of 333 lbs/year and was allocated 905 lbs of water quality trading credits in 2022 (the final year of the plan). It is MSA's understanding that the Village is in the process of renewing its WQT plan for the next five-year term. Although the 2022 allocation may be maintained upon renewal of the plan, changes could also occur based on current practices at the nonpoint source reduction agricultural site. In any scenario, the added phosphorus from the proposed sequestration chemicals will need to be offset by additional WQT credits in the Village's plan beyond the credits required to offset current phosphorus loads. If sufficient credits are not available in the Village's renewed WQT plan, chemical addition may need to be re-evaluated.

Based on the above information, MSA is seeking input from the Village on the current state of its WQT Plan. Specifically, after renewal of the plan, does the Village anticipate having sufficient credits to offset both the historical mass of phosphorus discharged from the WWTF and the additional mass added due to the proposed corrosion chemicals? In other words, is the anticipated WQT credit allocation at least 517 lbs/year to offset both the 333 lbs/year historical average phosphorus load and the maximum proposed additional load of 184 lbs/year (under recommended operating conditions)?

Thank you in advance for the information and your input. Please contact me at 608.355.8910 or pmorrow@msa-ps.com if you have questions upon your review of this document.