Water Quality Trading Plan

Village of Cross Plains, Wisconsin
Wastewater Treatment Facility

April 2020

TOWN & COUNTRY
ENGINEERING, INC.

WATER QUALITY TRADING PLAN

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1. EXECUTIVE SUMMARY

1.1 Introduction

The Village of Cross Plains submitted to the DNR in November 2018 a Phosphorus Preliminary Compliance Alternatives Plan which concluded that the lowest cost, feasible alternative for compliance with a future stringent Water Quality-Based Effluent Limit (WQBEL) for phosphorus was Water Quality Trading (WQT). Water Quality Trading involves working within the watershed to reduce phosphorus loading and arrange trades to offset the difference between the Wastewater Treatment Facility (WWTF) discharge of phosphorus and the allowable discharge to comply with a WQBEL.

The Village of Cross Plains has selected WQT as its compliance alternative. Provided in the Appendices of this plan is the Village's signed DNR Form 3400-206 (Notice of Intent to Conduct Water Quality Trading) and a signed DNR Form 3400-208 (WQT Checklist) for this plan.

1.2 Point Source and Receiving Waters

The Cross Plains WWTF has a design capacity of 0.593 MGD. The WWTF provides wastewater treatment through mechanical screening, selector basins for biological phosphorus removal, two single channel oxidation ditches, two final clarifiers, ultraviolet light disinfection, and effluent reaeration. The WWTF has an existing phosphorus removal chemical feed system as a backup to its biological phosphorus removal system but this system is currently in disrepair.

The Cross Plains WWTF discharges its effluent into Black Earth Creek. Black Earth Creek is within the Lower Wisconsin River Basin, is classified as a cold water community due to numerous cold water springs upstream of the Village, and is listed by the WDNR site as a Class 1 Trout Stream and an Outstanding Resource Water.

1.3 Target Phosphorus Water Quality Trading Credits

Based on phosphorus sampling taken from Black Earth Creek, the DNR has determined that 0.327 mg/L is the future phosphorus WQBEL for the Cross Plains WWTF. The Village has calculated on a monthly basis over the past 10 years the amount of phosphorus in its effluent at concentrations above this future WQBEL. The highest annual total occurred in 2015 when a total of 105.4 pounds of phosphorus at concentrations above the anticipated WQBEL were discharged. The Village of Cross Plains intends to use 105.4 pounds of phosphorus as the target annual water quality trading credits during its upcoming permit term beginning on October 1, 2020.

The Village intends to obtain a total number of phosphorus WQT credits in excess of the target so as to have a suitable reserve in the event of changed conditions or unforeseen events. In the event that the Village is unable to obtain sufficient phosphorus WQT credits, it intends to implement chemical phosphorus removal at the WWTF to ensure compliance with its WPDES permit.

1.4 Phosphorus Water Quality Trade

The Village is pursuing one water quality trade with the property owners of a farm upstream of the Cross Plains WWTF in a different HUC-12 subwatershed. The owner of the farm property is referred to as "Landowner A" throughout this plan for privacy reasons. The farm includes a

barnyard of four concrete lots that hold a total of 118 cattle. The management practice that shall generate the water quality trading credits is removal of all but five cattle from the property, which was estimated by the Dane County Land & Water Resources Department as resulting in 147.3 pounds of reduced phosphorus discharge per year. The WQT has a delivery factor of 0.18 and an uncertainty factor of 1, resulting in a trade ratio of 1.2. Therefore, the WQT will provide the Village of Cross Plains with a phosphorus WQT credit of 122.75 pounds per year.

1.5 Implementation

A Water Quality Easement has been established between the Village of Cross Plains and Landowner A. This legal document has been signed by the property owners and representatives of the Village of Plains, notarized by a Notary Public, and recorded by the Dane County Register of Deeds. The Water Quality Easement restricts the property owners from having more than five beef cattle or other livestock on the property for a period of thirty years. It also gives the Village of Cross Plains the right to prevent inconsistent uses, the right to enter the property to monitor or to enforce the terms of the easement, and the right to prevent and correct violations of the provisions of the Easement. Operations and maintenance for this WQT management practice consists of enforcement of the Water Quality Easement, which will be done by Dane County Land & Water Resources Department acting on behalf of and in partnership with the Village of Cross Plains.

The Appendices contain a signed DNR Form 3400-207 (Water Quality Practice Registration) for the WQT.

This WQT Plan is hereby submitted to the DNR for inclusion in the Village's reissued WPDES permit. Based on feedback received from the Department on the Village's Draft WQT Plan, this Final WQT Plan clarifies items associated with the uncertainty factor and downstream practices.

The Village expects for the WQT Plan to be public noticed in conjunction with its WPDES permit within the next six months.

The current WPDES permit for the Cross Plains WWTF will expire on September 30, 2020. If this WQT plan is approved by the DNR, the next WPDES permit will contains provisions recognizing WQT as the Village's implemented phosphorus compliance strategy.

2. INTRODUCTION

2.1 Selected Phosphorus Compliance Alternative

The current discharge permit for the Cross Plains Wastewater Treatment Facility (WWTF) is Wisconsin Permit Discharge Elimination System (WPDES) number WI-0020788-09-0 is in Appendix A. It has an effective date October 1, 2015 and an expiration date of September 30, 2020.

The Village of Cross Plains was required by their WWTF's current discharge permit to develop a Phosphorus Preliminary Compliance Alternatives Plan to evaluate compliance alternatives with a future stringent Water Quality-Based Effluent Limit (WQBEL). Submitted to the DNR in November 2018, the Village's Phosphorus Preliminary Compliance Alternatives Plan concluded that the lowest cost, feasible alternative for compliance with a future stringent WQBEL was found to be Water Quality Trading (WQT). Water quality trading involves working within the watershed to reduce phosphorus loading and arrange trades to offset the difference between the WWTF's discharge of phosphorus and the allowable discharge to comply with a WQBEL.

The Village of Cross Plains has selected WQT as its compliance alternative, and Appendix B contains the Village's signed DNR Form 3400-206 (Notice of Intent to Conduct Water Quality Trading).

Appendix C contains a signed DNR Form 3400-208 (WQT Checklist) for this WQT plan.

2.2 Community Background

The Village of Cross Plains is located in western Dane County, Wisconsin, roughly ten miles west of Madison. The population of the Village of Cross Plains was found to be 3,538 during the 2010 census, and is estimated by the Wisconsin Department of Administration to be 3,974 as of January 1, 2018. The Village is expected to grow steadily in the future, reaching a projected population of 4,320 in 2040.

2.3 Existing Wastewater Facilities

The Cross Plains WWTF is located at 100 Main Street, on the southern side of U.S. Highway 14, and east of Black Earth Creek.

Wastewater flows to the Cross Plains WWTF from a combination of residential and commercial sources from the Village. There are no significant industrial sources of wastewater within the Village, and the WWTF does not accept hauled waste.

The Cross Plains WWTF was last upgraded in 2007 which included the construction of a new headworks, selector basins, oxidation ditch, final clarifier, and disinfection structure and associated equipment. Wastewater treatment is achieved through preliminary and secondary processes, along with ultraviolet light disinfection and effluent reaeration. Preliminary treatment processes include mechanical screening only. Secondary treatment is achieved through the use of two single channel oxidation ditches and final clarifiers. Phosphorus removal is accomplished through a biological treatment process within a series of selector basins post-screening and prior to the oxidation ditches.

The treatment process achieves biological nutrient removal (BNR) through the arrangement of anaerobic, anoxic and aerobic zones within the selector basins and oxidation ditches. The anaerobic zone promotes the production of volatile fatty acids (VFAs) and the initial release of phosphorus into the mixed liquor. In addition the configuration of these different zones promotes the growth of phosphorus accumulating organisms (PAOs) which have been identified as being crucial to the biological nutrient removal mechanism. These PAOs release stored polyphosphates while in the anaerobic environments and in contact with VFAs. These PAOs then take up phosphorus while in the aerobic zone, which includes not only the previously released polyphosphates, but additional phosphorus in the influent wastewater. This is termed luxury uptake of phosphorus and results in a net decrease in the amount of soluble phosphorus in the liquid stream. Phosphorus is removed from the liquid process through wasting of settled bio-mass from the final clarifiers and processing in the solids treatment system.

The Village previously had the ability to add phosphorus removal chemicals (PRCs) to enhance phosphorus removal as a backup to the biological phosphorus removal system. The PRC could be added to the wastewater at the influent to either of the oxidation ditches or at the oxidation ditch effluent through the effluent splitter box, upstream of the final clarifiers. The WWTF has not needed PRCs for treatment since the 2007 upgrade and as a result the PRC system has fallen into disrepair.

Biosolids are wasted from the final clarifiers to the aerobic digester for stabilization prior to thickening. Digested sludge is pumped to a gravity belt thickener where thickened sludge is then stored temporarily before hauling to the Dane-Iowa WWTF for Class A treatment and storage.

The current design capacity of the Cross Plains WWTF is shown in Table 2-1.

Table 2-1
Design Capacity Cross Plains WWTF

Parameter	Design Capacity
Annual Average Flow (MGD)	0.593
BOD (lbs/day)	1,376
Suspended Solids (lbs/day)	1,493
Ammonia (lbs/day)	155
Phosphorus (lbs/day)	44.0

2.4 Cross Plains WWTF Effluent Discharge Summary

Table 2-2 is a summary of the effluent discharge from the Cross Plains WWTF from January 2013 to September 2018. This data was previously provided in the November 2018 Phosphorus Preliminary Compliance Alternatives Plan.

Table 2-2
Cross Plains WWTF Effluent Discharge Summary

Parameter	Max Year	Average Year	Min Year	Max Month	Min Month
Annual Average Flow (MGD)	0.50	0.40	0.31	0.88	0.25
BOD (lbs/day)	30.6	21.8	17.3	77.8	6.6
Suspended Solids (lbs/day)	26.4	15.4	9.8	83.4	6.8
Ammonia (lbs/day)	2.4	1.3	0.6	12.8	0.1
Phosphorus (mg/L)	0.34	0.29	0.19	1.10	0.09
Phosphorus (lbs/day)	1.4	0.9	0.5	5.2	0.2

2.5 Applicable Effluent Limits

The Village of Cross Plains' current WPDES permit includes interim phosphorus limit of 1.4 mg/L on a monthly average, and a future WQBEL in the absence of an approved phosphorus compliance alternative of 0.075 mg/L six-month seasonal average limit, with averaging periods of May through October and November through April, and a 0.225 mg/L monthly average limit.

The Cross Plains WWTF conducted in-stream water quality sampling for total phosphorus upstream of their discharge in Black Earth Creek at the County Highway KP bridge during May to October of 2016 and 2017 as approved by the DNR. The median value of this sampling was 0.042 mg/L. A map showing the sampling location and data are provided in Appendix D.

Appendix D also includes a May 9, 2019 e-mail from Sarah Luck, Water Resources Engineer, Wisconsin DNR to Evan Chambers and Ben Heidemann with Town & Country Engineering describing the DNR's calculation of the future WQBEL for the Cross Plains WWTF. Using the aforementioned Black Earth Creek sampling data, the DNR calculated an ambient background concentration of 0.042 mg/L using procedures specified in Section NR 217.13(2)(d), Wis. Adm. Code. Ms. Luck's e-mail states that the DNR anticipates the new phosphorus WQBEL for Cross Plains WWTF will be 0.327 mg/L as a monthly average concentration and 1.6 lbs/day as a monthly average mass limit. The assumptions used when calculating this future WQBEL were 7Q2 (lowest 7-day average flow that occurs on average once every 2 years) of 7.0 cfs, design flow of 0.593 MGD, and a phosphorus criterion of 0.075 mg/L for Black Earth Creek.

Throughout this plan, 0.327 mg/L will be used as the future phosphorus WQBEL for the Cross Plains WWTF.

2.6 Receiving Water Description and Conditions

Black Earth Creek is the receiving stream for the Cross Plains WWTF's effluent discharge. Black Earth Creek generally flows from east to west through the Village of Cross Plains.

Black Earth Creek is located within the Black Earth Creek Watershed (LW17) within the Lower Wisconsin River Basin. (Additional information on the Black Earth Creek Watershed is available at https://dnr.wi.gov/topic/watersheds/basins/lowerwis/.) Black Earth Creek is classified as a cold water community due to numerous cold water springs upstream of Cross Plains, and is listed by the DNR site as a Class 1 Trout Stream and an Outstanding Resource Water. The 7-day / 10-year (7Q10) low flow at the discharge point is 4.6 cfs according to the Cross Plains WWTF's permit fact sheet.

Appendix E includes a map and land use data on the HUC-12 subwatershed in which the Cross Plains WWTF is located, as well as for the watershed upstream of the WWTF's discharge point.

2.7 Watershed Description and Condition

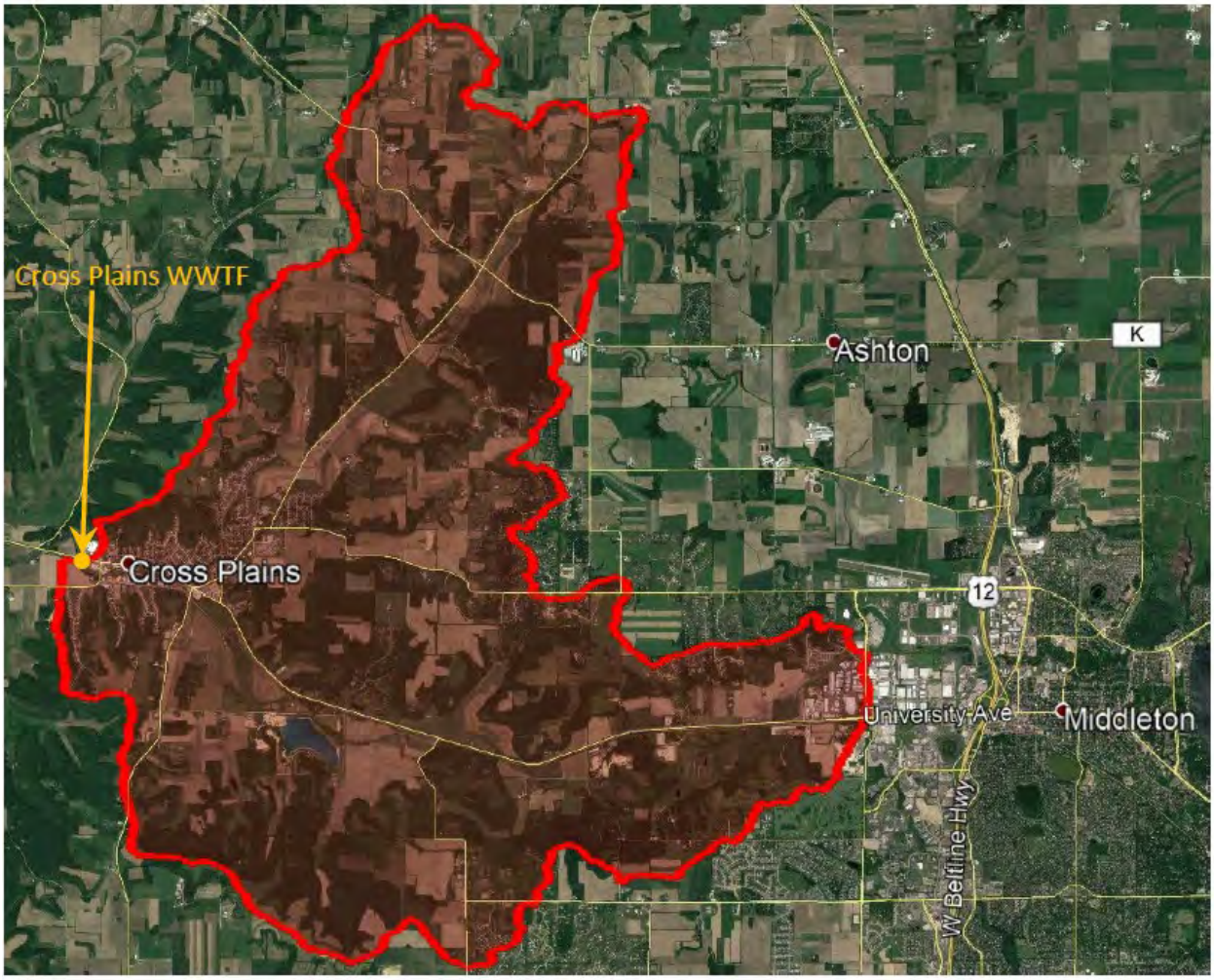
The DNR's Pollutant Load Ratio Estimation Tool (PRESTO) model states that the watershed area upstream of the Cross Plains WWTF's effluent discharge into Black Earth Creek is 26.6 square miles or 17,024 acres. The PRESTO model states that the upstream watershed is non-point source dominated with a ratio of point source to non-point source phosphorus of 3:97 using a total phosphorus load of 443 pounds per year for the Cross Plains WWTF. The PRESTO results are provided in Appendix E.

Maps of the watershed upstream of the Cross Plains WWTF outfall were created using Purdue University's Long Term Hydrologic Impact Analysis (L-THIA) on-line tool. One of these maps is shown in Figure 2-1. Appendix E contains two maps of the watershed upstream of the Cross Plains WWTF's discharge, and data of land use within the watershed. The watershed upstream of the Cross Plains WWTF outfall is 16,039 acres, consisting mainly of deciduous forest (31.0%), cropland generalized agriculture (28.6%), and pasture/hay (24.8%).

The USGS has divided watersheds into smaller hydrologic units that are classified by Hydrologic Unit Codes (HUC), with the smallest unit being the HUC-12 subwatershed. Water quality trading is most favorable when trading with upstream sources within the same HUC-12 subwatershed.

The Cross Plains WWTF is located in HUC-12 subwatershed 070700050502. Appendix E includes a map and land use data for this subwatershed, which encompasses 24,272 acres, of which the largest land uses are deciduous forest (38.9%), cropland generalized agriculture (26.5%), and pasture/hay (24.1%). The Wagner Dairy Farm has the only other permitted surface water outfall within the HUC-12 subwatershed.

Figure 2-1 Watershed Upstream of Cross Plains WWTF Outall



3. WATER QUALITY TRADING BACKGROUND

This chapter provides background on WQT, including calculation of the target number of WQT credits, pollution reduction activities that can result in WQT credits, trade ratios, and a description of additional environmental benefits of WQT. Subsequent chapters will describe the Village of Cross Plains' phosphorus WQT strategy.

Wisconsin Statutes Section 283.84 and Chapter NR 217 of the Wisconsin Administrative Code allows for alternative compliance through two watershed-based compliance alternatives – WQT and watershed adaptive management (WAM). Both alternatives involve working outside of the service boundaries of the WWTF (and potentially the municipal limits) to reduce phosphorus discharges to the receiving water, allowing for an increase in the mass of phosphorus discharged.

Water quality trading credits must be generated before they can be used to offset a permit limit. In other words, pollution reduction practices must be established and effective before a reduced permit limit takes effect.

3.1 Calculation of Target Water Quality Trading Credits

The target amount of WQT credits can be calculated by comparing the amount of phosphorus discharged by the WWTF to the amount allowed by the WQBEL.

A reduction in WWTF effluent concentrations through additional phosphorus treatment could significantly reduce the amount of WQT credits required. However, the cost of additional phosphorus removal at the WWTF would need to be balanced against the cost of WQT. Once WQT has been selected as the phosphorus compliance alternative, a municipality generally commits itself to achieving the necessary reductions primarily through WQT, but additional phosphorus treatment can be used as necessary if a sufficient number of WQT credits cannot be obtained.

3.2 Pollution Reduction Activities to Generate Trading Credits

Water quality trades can occur on either a point-to-point or nonpoint-to-point basis, as described below.

3.2.1 Point-to-Point Source Water Quality Trading

Point-to-point water quality trading involve trading credits with other point sources within the same watershed as the discharger who has selected WQT as a phosphorus compliance alternative. The point source with whom trading is to occur must have excess water quality credits to trade.

3.2.2 Nonpoint-to-Point Source Water Quality Trading

Nonpoint-to-point water quality trading involves trading credits with nonpoint sources within the same watershed as the discharger who has selected WQT as a phosphorus compliance alternative.

Nonpoint source management practices that can generate trading water quality credits include agricultural practices, urban practices, and lake/reservoir dredging or wetland restoration. Agricultural practices include whole field management / nutrient

management planning, planting of companion crops, changes in tilling options, buffers strips and conservation easements, barnyard improvements, and streambank stabilization. Urban practices include stormwater infiltration structures, sedimentation devices, and detention ponds. Dredging is intended to remove in-situ sediment and nutrients to the original or native soil layer, and may be done in concert with water quality treatment (e.g., use of alum as a coagulant) and restoration of lake/reservoir aquatic habitat or installation of streambank buffer strips.

The credits generated by the practice are determined by using modeling to predict the difference in phosphorus load between the improved condition and the baseline prior to improvements.

3.3 Trade Ratios

Water quality trading has a higher level of uncertainty associated with it as compared to treatment-based compliance alternatives due to the need for a large number of outside partnerships with trading partners, particularly non-point source contributors. Obtaining the required reductions/credits for WQT generally requires partnering with several landowners in the watershed and a significant effort by municipalities to identify practices, broker agreements, negotiate cost sharing, inspect and verify implementation, and prepare annual reports to the Wisconsin DNR. A municipality pursuing WQT as a phosphorus compliance alternative would be ultimately responsible for obtaining the required credits and must devote the necessary staff and resources required to support these efforts and to meet the timeline required for permit compliance.

Given inherent uncertainties with WQT, trade ratios must to be applied to provide to each WQT project to provide certainty that water quality is actually being improved. A trade ratio is like a multiplier, such that a trade ratio of 3:1 means three pounds of pollution reduction is needed to take one pound of WQT credit.

Trade ratios can vary between 1 and 5 (or higher) depending upon the type of practice installed, location within the watershed, and type of trade being performed. Point-to-point trades generally have the lowest trade ratios (a minimum of 1.1) while nonpoint-to-point trades have higher trade ratios (1.2 to 5). Further, trade ratios are most favorable for phosphorus credits generated upstream of the WWTF discharge and within the same HUC-12 subwatershed, with pollution reduction practices that have a high probability of success.

Trade ratios are calculated for each WQT project, and are based on five factors: delivery, downstream, equivalence, uncertainty, and habitat adjustment. The trade ratio for a particular WQT project is calculated by adding the delivery, downstream, equivalence and uncertainty factors, while subtracting the habitat adjustment factor.

3.3.1 Delivery Factor

A delivery factor is required if trading partners are located in different HUC-12 subwatersheds to account for the fate and transport of the traded pollutant in the surface water. The delivery factor would be zero for trades within the same HUC-12 subwatershed, except if there is a lake or reservoir between the credit generator and user. If a delivery factor is necessary, it would be calculated during the Total Maximum Daily Load (TMDL) development process or using the computer model known as SPARROW (Spatially Referenced Regressions On Watershed Attributes).

A TMDL is in essence a pollution "budget" for a water body or watershed that establishes reductions needed from each pollutant source to meet water quality goals. Information on Wisconsin's TMDL development process is available online at https://dnr.wi.gov/topic/TMDLs/.

SPARROW is a USGS model that relates in-stream water quality measurements to spatially referenced characteristics of watersheds, including contaminant sources and factors influencing terrestrial and aquatic transport. SPARROW empirically estimates the origin and fate of contaminants in river networks and quantifies uncertainties in model predictions. Additional information concerning SPARROW is available online at http://water.usgs.gov/nawqa/sparrow/ and the Great Lakes, Ohio, Upper Mississippi, Red River Basins (MRB3) SPARROW Mapper is accessible online at https://wim.usgs.gov/sparrowmrb3/sparrowmrb3mapper.html# The output from SPARROW is the SPARROW number. A delivery factor can be calculated using the following formula: (Delivery Factor) = [1 / (SPARROW #)] - 1

3.3.2 Downstream Factor

A downstream factor is necessary if the credit generator is downstream of the credit user. The downstream factor is a function of the difference between the average annual load discharged by the credit user to the overall load at the credit user's point of discharge, and ranges from 0.1 to 0.8. If the credit generator is upstream of the credit user, then the downstream factor is zero.

3.3.3 Equivalence Factor

An equivalence factor is not needed (or zero) for phosphorus water quality trades.

3.3.4 Uncertainty Factor

An uncertainty factor accounts for uncertainties associated with nonpoint source trades that originate from climatic variability, potential inaccuracies in field testing or modeling of the amount of pollutant controlled by a management practice, and the reliability of the management practice to perform. A list of example uncertainty factors are shown in Table 3-1.

The uncertainty factor applicable for each management practice may vary depending on how it is implemented. A more descriptive table of uncertainty factors is provided in DNR's "A Water Quality Trading How To Manual", available online at https://dnr.wi.gov/topic/SurfaceWater/tools.html

Table 3-1
Example Uncertainty Factors

Pollution Reduction Activities	Uncertainty Factor
Agricultural Management Practices	
Whole Field Management	1
Companion Crops	1
Conservation Easement	1
Nutrient Management	2 - 3
Production Area Diversion or Roof Runoff Structure	2
Vegetated Treatment System or Constructed Wetland	4
Sediment Control Basin	2
Streambank Stabilization & Shoreline Protection	2 - 3
Dredging, Lake Treatment and Wetland Restoration	
Dredging Lakes or Reservoirs	2 - 3
Dredging Rivers or Streams	1 - 3
Wetland Restoration	1
Urban Practices	
Infiltration, Stormwater Sedimentation Devices, Detention Ponds	2

3.3.5 Habitat Adjustment Factor

A habitat adjustment factor is only used for aquatic habitat restoration efforts that meet applicable DNR and NRCS technical standards. If no aquatic habitat restoration is done as part of a trade, this factor is zero.

3.4 Environmental Benefits

Water quality trading offers greater environmental benefit through nonpoint source reductions as compared to additional wastewater treatment. Water quality trading results in greater theoretical reduction of phosphorus loadings within the watershed, and therefore, greater potential environmental benefit. In addition, nonpoint source phosphorus reduction activities have the potential to improve the efficiency of the agricultural practices within the watershed including reducing fertilizer application rates and energy required to create, transport, and apply the fertilizer.

4. TARGET PHOSPHORUS WATER QUALITY TRADING CREDITS

The amount of phosphorus WQT credits required can be calculated by comparing the amount of phosphorus discharged by a WWTF to the amount allowed by the WQBEL.

4.1 Cross Plains WWTF's Current Phosphorus Effluent Discharge

Table 4-1 tabulates the monthly average effluent flowrate from the Cross Plains WWTF for January 2010 to September 2019.

Table 4-1
Monthly Average Effluent Flowrate (MGD)

Month	Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
January	0.33	0.41	0.38	0.31	0.32	0.32	0.27	0.31	0.33	0.58
February	0.30	0.44	0.35	0.31	0.28	0.25	0.27	0.32	0.36	0.56
March	0.37	0.57	0.37	0.33	0.30	0.27	0.30	0.35	0.34	0.76
April	0.37	0.55	0.35	0.55	0.39	0.36	0.31	0.42	0.37	0.65
May	0.38	0.43	0.35	0.45	0.34	0.27	0.29	0.51	0.50	0.71
June	0.48	0.42	0.32	0.57	0.39	0.25	0.34	0.52	0.53	0.60
July	0.57	0.40	0.29	0.65	0.39	0.27	0.35	0.70	0.58	0.75
August	0.55	0.46	0.31	0.43	0.40	0.35	0.31	0.50	0.88	0.69
September	0.48	0.47	0.29	0.37	0.39	0.38	0.33	0.47	0.65	0.59
October	0.42	0.50	0.30	0.35	0.32	0.37	0.31	0.47	0.81	0.64
November	0.41	0.54	0.29	0.82	0.29	0.38	0.26	0.45	0.59	
December	0.41	0.43	0.33	0.34	0.29	0.34	0.30	0.39	0.59	
Annual Average	**0.42**	**0.47**	**0.33**	**0.46**	**0.34**	**0.32**	**0.30**	**0.45**	**0.54**	**0.65**
Max	0.57	0.57	0.38	0.82	0.40	0.38	0.35	0.70	0.88	0.76
Min	0.30	0.40	0.29	0.31	0.28	0.25	0.26	0.31	0.33	0.56

Table 4-2 tabulates the monthly average phosphorus effluent concentrations from the Cross Plains WWTF for January 2010 to September 2019.

Table 4-2
Monthly Average Effluent Phosphorus Concentration (mg/L)

Month	Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
January	0.20	0.19	0.19	0.33	0.10	0.51	0.28	0.76	0.33	0.40
February	0.29	0.36	0.23	0.36	0.15	0.39	0.54	1.10	0.57	0.43
March	0.22	0.43	0.88	0.58	0.18	0.25	0.33	0.25	0.22	0.39
April	0.19	0.43	0.16	0.42	0.26	0.96	0.22	0.17	0.26	0.26
May	0.12	0.56	0.13	0.28	0.38	0.35	0.22	0.16	0.40	0.24
June	0.19	0.14	0.13	0.25	0.17	0.38	0.21	0.13	0.21	0.28
July	0.12	0.12	0.14	0.32	0.12	0.15	0.13	0.19	0.14	0.29
August	0.10	0.12	0.14	0.66	0.14	0.16	0.11	0.15	0.46	0.23
September	0.19	0.21	0.17	0.50	0.10	0.16	0.12	0.11	0.37	0.30
October	0.12	0.12	0.27	0.21	0.29	0.18	0.15	0.09	0.29	
November	0.10	0.15	0.31	0.13	0.23	0.13	0.20	0.31	0.19	
December	0.18	0.15	0.25	0.10	0.13	0.14	0.36	0.42	0.18	
Annual Average	**0.17**	**0.25**	**0.25**	**0.35**	**0.19**	**0.31**	**0.24**	**0.32**	**0.30**	**0.31**
Max	0.29	0.56	0.88	0.66	0.38	0.96	0.54	1.10	0.57	0.43
Min	0.10	0.12	0.13	0.10	0.10	0.13	0.11	0.09	0.14	0.23

The Cross Plains WWTF discharged an average of 0.27 mg/L of phosphorus over the period of January 2010 to September 2019. Typical effluent phosphorus concentrations are 0.45 mg/L or less on average, which indicates the plant's biological nutrient removal system is operating efficiently.

Table 4-3 tabulates the monthly average phosphorus loading from the Cross Plains WWTF for January 2010 to September 2019.

Table 4-3
Monthly Average Effluent Phosphorus Loading (ppd)

Month	Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
January	0.56	0.66	0.53	0.76	0.42	1.19	0.60	1.97	0.87	1.83
February	0.73	1.28	0.59	0.81	0.40	0.78	1.12	2.65	1.60	1.96
March	0.61	1.92	2.69	1.27	0.56	0.47	0.83	0.71	0.60	2.61
April	0.58	1.81	0.42	1.83	1.15	2.34	0.52	0.58	0.78	1.39
May	0.34	1.91	0.35	0.98	0.46	0.97	0.52	0.68	1.47	1.33
June	0.72	0.46	0.31	1.73	0.36	0.74	0.63	0.55	0.92	1.35
July	0.51	0.37	0.31	1.64	0.43	0.31	0.37	1.15	0.66	1.61
August	0.46	0.46	0.34	2.10	0.31	0.43	0.25	0.63	5.23	1.11
September	0.76	0.80	0.38	1.27	0.85	0.44	0.32	0.42	1.76	1.52
October	0.39	0.49	0.61	0.52	0.54	0.50	0.38	0.36	2.00	
November	0.33	0.64	0.71	1.04	0.29	0.38	0.41	1.07	0.97	
December	0.61	0.49	0.55	0.23	0.38	0.36	0.92	1.32	0.83	
Annual Average	**0.55**	**0.94**	**0.65**	**1.18**	**0.51**	**0.74**	**0.57**	**1.01**	**1.47**	**1.63**
Max	0.76	1.92	2.69	2.10	1.15	2.34	1.12	2.65	5.23	2.61
Min	0.33	0.37	0.31	0.23	0.29	0.31	0.25	0.36	0.60	1.11

The Cross Plains WWTF discharged an average of 0.91 pounds per day of phosphorus over the period of January 2010 to September 2019.

4.2 Amount of Phosphorus Discharge Allowed by WQBEL

Using sampling data collected from Black Earth Creek between May to October in both 2016 and 2017, the DNR calculated an ambient background concentration of 0.042 mg/L using procedures specified in Section NR 217.13(2)(d), Wis. Adm. Code. Given this background concentration, the DNR calculated a future phosphorus WQBEL for the Cross Plains WWTF of 0.327 mg/L as a monthly average concentration and 1.6 lbs/day as a monthly average mass limit. The assumptions used when calculating the limit were: 7-Q2 of 7.0 cfs, design flow of 0.593 MGD, and a phosphorus criterion of 0.075 mg/L for Black Earth Creek. Appendix D contains a map of the sampling location, the phosphorus data, and an e-mail from Ms. Sara Luck, Wastewater Engineer, DNR describing the WQBEL calculation.

Therefore, 0.327 mg/L will be used as the future phosphorus WQBEL for the Cross Plains WWTF.

4.3 Calculation of Target Phosphorus Water Quality Trading Credits

In order to calculate the target of phosphorus WQT credits, the monthly average effluent flowrate and phosphorus concentrations for the period of January 2010 to September 2019 were used to calculate the monthly amount of phosphorus above the future WQBEL of 0.327 mg/L discharged by the Cross Plains WWTF. Then, each month's total were summed to provide an annual target of phosphorus WQT credits.

Table 5-4 shows the monthly phosphorus effluent loading above the future WQBEL of 0.327 mg/L from the Cross Plains WWTF, along with the annual total. The highest

annual total occurred in 2015 when a total of 105.4 pounds of phosphorus at concentrations above the future WQBEL were discharged. This number (105.4 pounds/year) shall be used as the target for phosphorus WQT credits each year during the Cross Plains WWTF's upcoming permit term.

Table 4-4
Phosphorus Effluent Loading Above Future WQBEL

Year	Month (lbs/month)												Total (lbs / yr)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
2010	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	3.3	14.9	14.1	26.2	0	0	0	0	0	0	0	58.5
2012	0	0	53.0	0	0	0	0	0	0	0	0	0	53.0
2013	0.4	2.0	21.3	13.3	0	0	0	37.3	15.7	0	0	0	90.4
2014	0	0	0	5.2	0	0	0	0	0	0	0	0	5.2
2015	15.0	3.6	0	81.6	1.6	3.6	0	0	0	0	0	0	105.4
2016	0	14.2	0.5	0	0	0	0	0	0	0	0	2.7	17.4
2017	35.3	58.5	0	0	0	0	0	0	0	0	0	9.6	103.4
2018	0.4	20.3	0	0	10.0	0	0	29.2	6.4	0	0	0	66.3
2019	11.6	14.1	12.8	0	0	0	0	0	0				38.5

Note: Data analyzed for the period January 2010 through September 2019 inclusive

4.4 Additional Phosphorus Treatment If Required

A reduction in effluent concentrations through additional phosphorus treatment could significantly reduce the amount of WQT credits required. However, the cost of additional phosphorus treatment needs to be balanced against the cost for WQT trading.

The most likely form of additional phosphorus treatment at the Cross Plains WWTF is the addition of PRCs through its existing chemical feed system. Considerations of phosphorus chemical feed treatment at the Cross Plains WWTF are shown in Table 4-5.

Table 4-5
Considerations with Phosphorus Chemical Feed Treatment

Advantages	Disadvantages
Ensures Permit Compliance	New Chemical Feed Pumps Required
Flexible Operation	High Ongoing Cost for PRCs
High Reliability	Requires Routine O&M Cost/Time
Compatible with Biological Phosphorus Removal	Higher Cost than WQT

If the Village of Cross Plains is unable to obtain sufficient phosphorus WQT credits, or if more of a reserve is desired, the Village's intent is to update the existing chemical feed system at the Cross Plains WWTF with new pumps so operators can add PRCs on an intermittent basis to eliminate phosphorus spikes in the effluent.

4.5 Target Phosphorus WQT Credits with Safety Factor

The Village of Cross Plains desires to have a safety factor of at least 15% of its phosphorus WQT credit target in the event that the trades do not generate sufficient credits. With a phosphorus WQT credit target of 105.4 pounds per year, a 15% safety factor would mean the Village needs at least 121.2 pounds per year of credits.

5. WATER QUALITY TRADES

The Village of Cross Plains has pursued one WQT for phosphorus, as described below.

5.1 Barnyard Area of Farm at Landowner A Property

The WQT is with the private landowner of a farm north of Cross Plains referred to throughout this plan as Landowner A. The name and address of the property owned by Landowner A is not included within this plan for privacy reasons.

The farm is located upstream of the Cross Plains WWTF in a different HUC-12 subwatershed. The WWTF is located in HUC-12 subwatershed 070700050502, while the farm is located in HUC-12 subwatershed 070700050501. Both the WWTF and the farm are located within the same HUC-10 watershed 0707000505. Maps showing the location of the farm and land use data are provided in Appendix E.

The property currently consists of an active farm consisting in part of a barnyard, two feed storage areas, and a pasture. Runoff from the farm flows into Brewery Creek before entering Black Earth Creek. Aerial photographs of the farm owned by Landowner A and surrounding areas are in Appendix F.

Phosphorus is believed to be currently discharged from the barnyard, the feed storage areas, and two erosional gullies on the property. The Dane County Land & Water Resources Department performed a site visit on April 10, 2019 and subsequently calculated the current phosphorus discharge from the property as well as the phosphorus credits if recommended conservation practices were adopted. The memorandum from Dane County, dated April 18, 2019, with their calculations is provided in Appendix G. Note that the name of Landowner A have been redacted from this document for privacy reasons.

Phosphorus credits are only proposed for the barnyard. No phosphorus credits are proposed for either the feed storage area or the gullies due to the property owners' preference to continue existing land use practices in these areas.

The barnyard consists of four concrete lots that hold a total of 118 cattle. The barnyard consists of four lots, denoted Lot #1 through Lot #4. Lot #1 is 470 square feet in size and currently holds twenty 800 pound animals. Lot #2 is 550 square feet in size and currently holds eighteen 500 pound animals. Lot #3 is 2,850 square feet in size and currently holds ten 1,400 pound animals. Lot #4 is 14,180 square feet in size and currently holds eighty-five 1,400 pound animals.

Photographs of the barnyard area are provided in Appendix H. Additional photographs are provided in the Dane County memorandum provided in Appendix G.

BARNY is a computer model that is used to evaluate the discharge of phosphorus from concentrated livestock areas in Wisconsin. BARNY is a Wisconsin adapted version of the USDA Agricultural Research Service's feedlot runoff model, and is not an acronym. BARNY was used to estimate the phosphorus discharge from the barnyard under current conditions as well as after all animals have been removed except for five.

Lot #1 has an estimated phosphorus discharge to be 2.7 pounds per year. Lot #2 had an estimated phosphorus discharge of 6.6 pounds per year. Lot #3 has an estimated phosphorus discharge of 28.3 pounds per year. Lot #4 has an estimated phosphorus discharge of 133.0 pounds per year. The total current estimated phosphorus discharge from the barnyard is 170.6 pounds per year.

The proposed WQT involves removing all but five cattle from the barnyard, with the remaining cattle only permitted on Lot #3. This will result in a reduction of 147.3 pounds per year of phosphorus per year being discharged downstream of the barnyard area.

Table 5-1 summarizes the calculation of the trade ratio for the WQT.

Table 5-1
Calculation of Trade Ratio for Water Quality Trade

Delivery Factor	Downtream Factor	Equivalence Factor	Uncertainty Factor	Habitat Factor	Sum of Factors	**Trade Ratio**
0.18	0	0	1.0	0	1.18	1.2

Using the SPARROW computer model, the fraction of load delivered to downstream is 0.8482. Appendix E contains screenshots from SPARROW's MRB3 mapper showing the result for the HUC-10 watershed number 0707000505 that contains the farm of Landowner A. Using a SPARROW number of 0.8482 results in a calculated delivery factor of 0.18.

The downstream factor for the proposed WQT is zero because the barnyard is located upstream of the Cross Plains WWTF.

The equivalence factor is zero because no equivalence factor is used when trading phosphorus.

The uncertainty factor for removal of the cattle from the barnyard is (1) because of the low risk of phosphorus loadings being generated by a concrete barnyard with cattle removed and the lot cleaned and maintained in a cleaned state. Contracts have been put in place to give the Village the legal authority to require this. Although the practice does not explicitly fall into a category listed in Table 3-1, the cleaned concrete lots does not have the potential to generate any phosphorus loadings. As a part of both the Water Quality Trading Agreement and Water Quality Easement with Landowner A, livestock are to be removed from the property and the concrete lots cleaned by December 31st, 2019. Two specific restrictions are set forth in the easement, signed by Landowner A (the Grantor).

1. For a period of 30 years from the date of this Easement, Grantor shall have no milking cows on the Premises and shall have no more than 5 beef cattle or other livestock on the Premises at any given time.
2. The removal of milking cows from the Premises and the subsequent cleaning of the concrete barnyard on the Premises shall occur no later than December 31, 2019. The concrete barnyard shall be maintained in clean condition during the duration of this Easement.

The conditions of the contractual agreements with Landowner A are such that no loadings shall be generated from the concrete lots following removal and cleaning, which occurred in December of 2019. The Village of Cross Plains has also, through the

contractual agreements, received the right to enter the Premises to monitor and enforce activity inconsistent with the terms of the Agreement and Easement. Beyond the extents of the existing concrete lots, the site is drained by two gullies. Identified in Dane County's memorandum, located in Appendix G, it is noted that gully #2 is downstream of the barnyard. Runoff travels across approximately 140' of the property before reaching the gully. At the edge of the concrete lots, the continued practice of seeding and maintaining as lawn will be utilized, such that gully erosion is not occurring at the barnyard itself. Additionally, Appendix I contains an e-mail from Amy Garbe, Wastewater Engineer with the DNR, addressing the fate of the livestock and evaluation of the uncertainty factor to be utilized.

The habitat adjustment factor is zero because no habitat will be added as part of the WQT.

The trade ratio determined by summing the delivery, downstream, equivalence, uncertainty, and habitat factors is 1.18. But the lowest trade ratio for a non-point source trade is 1.2, therefore 1.2 is used as the trade ratio.

Table 5-2 summarizes the proposed water quality trade, including a phosphorus WQT credit of 122.75 pounds per year. The WQT produces phosphorus credits in excess of both the 105.4 pounds per year target and 121.2 pounds per year with safety factor.

Table 5-2
Summary of Proposed Water Quality Trade

Location	Calculated Reduction in Phosphorus Discharge	Trade Ratio	Phosphorus WQT Credit
Barnyard Area	147.3 pounds per year	1.2	122.75 lbs/year
Total Phosphorus Trading Credits			122.75 lbs/year

A Water Quality Easement has been established between the Village of Cross Plains and Landowner A. This legal document has been signed by both property owners and representatives of the Village of Plains, notarized by a Notary Public, and recorded by the Dane County Register of Deeds. The Water Quality Easement restricts the property owners from having more than five beef cattle or other livestock on the property for a period of thirty years. It also gives the Village of Cross Plains the right to prevent inconsistent uses, the right to enter the property to monitor or to enforce the terms of the easement, and the right to prevent and correct violations of the provisions of the Easement.

Appendix J contains a certification statement of the existence of the Water Quality Trading Agreement and Water Quality Easement between the Village of Cross Plains and the credit generator, Landowner A.

Operations and maintenance for this WQT management practice consists of enforcement of the Water Quality Easement. The Village of Cross Plains will dedicate sufficient resources to ensure compliance with the Water Quality Trading Agreement.

Appendix K contains a signed DNR Form 3400-207 (Water Quality Practice Registration) for the WQT.

5.2 Future Water Quality Trades

The Village of Cross Plains will pursue additional WQT(s) in the future if needed to meet regulatory requirements.

6. IMPLEMENTATION SCHEDULE & MILESTONES

6.1 Implementation Timeline

The proposed implementation timeline for this phosphorus WQT plan is as follows:

Preliminary Compliance Alternatives Plan Submitted	November 28, 2018
Submit WQT Notice of Intent to DNR	September 30, 2019
Submit Draft WQT Plan to DNR	September 30, 2019
Submit Management Practice Registration Form to DNR	September 30, 2019
Implement WQT Management Practice	September 30, 2019
Submit Final WQT Plan to DNR	April, 2020
Permit and WQT Plan Public Comment Period	August, 2020
Cross Plains WWTF WPDES Permit Expires	September 30, 2020

6.2 Water Quality Trade Practice Installation and Registration

A signed DNR Form 3400-207 (WQT Management Practice Registration) form for the proposed water quality trade with Landowner A is provided in Appendix K.

The Village of Cross Plains will submit additional forms to the DNR for each non-point source WQT to certify that the selected pollution reduction practices have been successfully installed.

The purpose of the WQT management practice registration is to ratify to DNR that a management practice identified in the plan has been properly installed and is effective. This information is expected to be used by the DNR to track implementation progress, verify compliance, and perform audits, as necessary.

Management practice registration forms will not be submitted for point-to-point source trades. Any point-to-point source water quality trade will be demonstrated via effluent monitoring and will have documentation and effective date requirements specified in the WPDES permits.

6.3 Tracking, Verification, and Inspection

The Dane County Land & Water Resource Department, acting in partnership with and on behalf of Village of Cross Plains, will verify the performance of its WQT at the barnyard area of Landowner A by performing regular unannounced site inspections to ensure the terms of the Water Quality Easement are being complied with. The Village will take necessary action in the event that it is notified of any non-compliance by Landowner A. In addition, the Village of Cross Plains will make its personnel available to assist the DNR with any inspections it chooses to perform of the WQT location.

6.4 Annual Water Quality Trade Report

The Village of Cross Plains will submit an annual report to the DNR for each of its water quality trades. The purpose of the annual report is to inform the DNR of the status of management practices, provide the DNR with an update of the trading project overall, and submit any needed changes to the plan to DNR. The annual report will include

verification that site inspections occurred, a brief summary of site inspection findings, any applicable notices of termination or practice registration, the amount of credit used each month over the calendar year; and other requirements as stated in the WPDES permit.

6.5 Notification of Termination

If the Water Quality Easement or this WQT Plan needs to be modified or terminated during the permit term, the Village of Cross Plains will submit DNR Form 3400-209 (Notice of Water Trade Agreement Termination) to the DNR. If the Water Quality Easement is modified or terminated, the phosphorus WQT credits it generates will change accordingly and may result in non-compliance with the Village of Cross Plains WPDES permit. The information on the notice of termination form will to be used by the DNR to determine if a permit modification is required due to the termination, the termination will result in non-compliance, or other permit actions are required due to the termination.

An unsigned version of the notice of termination form is provided in Appendix L. If this form is to be used, details concerning the nature of the termination will need to be added and the form signed by the Village's authorized representative.

Appendix A

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
South Central Region Headquarters
3911 Fish Hatchery Road
Fitchburg, WI 53711-5397

Scott Walker, Governor
Cathy Stepp, Secretary
Mark Aquino, Regional Director
Telephone (608) 275-3266
FAX (608) 275-3338
TDD (608) 275-3231

Matt Schuenke, Village Administrator
VILLAGE OF CROSS PLAINS
2417 Brewery Rd
PO Box 97
Cross Plains, WI 53528-0097

SUBJECT: WPDES Permit Reissuance No. WI-0020788-09-0
Cross Plains Wastewater Treatment Facility, 1000 MAIN STREET (USH 14), CROSS PLAINS, WISCONSIN

Dear Permittee:

Your Wisconsin Pollutant Discharge Elimination System (WPDES) Permit is enclosed. The conditions of the enclosed permit reissuance were determined using the permit application, information from your WPDES permit file, other information available to the Department, comments received during the public notice period, and applicable Wisconsin Administrative Codes. All discharges from this facility and actions or reports relating thereto shall be in accordance with the terms and conditions of the enclosed permit.

This enclosed permit requires you to submit monitoring results to the Department on a periodic basis. Monitoring forms, which must be submitted electronically, are available on the Department's web page. Go to the DNR Switchboard page at http://dnr.wi.gov/topic/switchboard/ to log in and access your monitoring forms. For your convenience, there is a 'Summary of Reports Due' at the end of the enclosed permit that shows a synopsis of the required reports and monitoring forms.

The WPDES permit program has been approved by the Administrator of the U.S. Environmental Protection Agency pursuant to Section 402(b) of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. Section 1342 (b)). The terms and conditions of the enclosed permit are accordingly subject to enforcement under ss. 283.89 and 283.91, Stats., and Section 309 of the Federal Act (33 U.S.C. Section 1319).

The Department has the authority under chs. 160 and 283, Stats., to establish effluent limitations, monitoring requirements, and other permit conditions for discharges to groundwater and surface waters of the State. The Department also has the authority to issue, reissue, modify, suspend, or revoke WPDES permits under ch. 283, Stats.

The enclosed permit contains water quality-based effluent limitations that are necessary to ensure the water quality standards for Black Earth Creek (Black Earth Creek Watershed, LW17 – Lower Wisconsin River Basin) in Dane County (SE ¼ of NE ¼ of Section 4, T7N_R7E) are met. You may apply for a variance from the water quality standard used to derive the limitations pursuant to s. 283.15, Stats., by submitting an application to the Director of the Bureau of Water Quality, P.O. Box 7921, Madison, Wisconsin 53707 within 60 days of the date the permit was issued (see "Date Permit Signed/Issued" after the signature on the front page of the enclosed permit). This statute also allows the permittee to apply for a variance to the water quality standard when applying for reissuance of the permit. Subchapter III of ch. NR 200, Wis. Adm. Code, specifies the procedures that must be followed and the information that must be included when submitting an application for a variance.

If your permit contains a stringent Water Quality Based Effluent Limit for Phosphorus, there is a Compliance Schedule requirement to complete a Phosphorus Operational Evaluation and Optimization Report. To streamline the Report preparation and review process the Department has prepared a Worksheet which should be used to develop the report. The worksheet may be found at : http://dnr.wi.gov/topic/surfacewater/phosphorus.html.

To challenge the reasonableness of or necessity for any term or condition of the enclosed permit, s. 283.63, Stats., and ch. NR 203, Wis. Adm. Code, require that you file a verified petition for review with the Secretary of the Department of Natural Resources within 60 days of the date the permit was issued (see "Date Permit Signed/Issued" after the signature on the front page of the enclosed permit). For permit-related decisions that are not reviewable pursuant to s. 283.63, Stats., it may be possible for permittees or other persons to obtain an administrative review pursuant to s. 227.42, Stats., and s. NR 2.05(5), Wis. Adm. Code, or a judicial review pursuant to s. 227.52, Stats. If you choose to pursue one of these options, you should know that Wisconsin Statutes and Administrative Code establish time periods within which requests to review Department decisions must be filed.

Sincerely,

Tim Ryan
Wastewater Field Supervisor

Dated:_____

cc: Legal Permit File
Cyndi Barr, WT/3
U.S. Fish and Wildlife Service (Electronic Copy via Email)
Amy Garbe

STATE OF WISCONSIN DEPARTMENT OF NATURAL RESOURCES

NOTICE OF FINAL DETERMINATION TO REISSUE

A WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM (WPDES) PERMIT No. WI-0020788-09-0

Permittee: VILLAGE OF CROSS PLAINS, 2417 Brewery Road, Cross Plains, WI, 53528-0097

Facility Where Discharge Occurs: Cross Plains Wastewater Treatment Facility, 1000 MAIN STREET (USH 14), CROSS PLAINS, WISCONSIN

Receiving Water And Location: Black Earth Creek (Black Earth Creek Watershed, LW17 – Lower Wisconsin River Basin) in Dane County (1000 Main Street (USH 14), Cross Plains WI (SE ¼ of NE ¼ of Section 4, T7N_R7E - Lat: 43.1142/Lon: -89.6638))

Brief Facility Description: Cross Plains operates a wastewater treatment facility (WWTF) that provides secondary treatment and nutrient removal to primarily domestic wastewater. The system provides treatment for a population of approximately 3,700 and some commercial businesses. Treatment units include mechanical influent step screening, selector basins to enhance biological phosphorus removal, two oxidation ditches for activated sludge secondary treatment, final clarification, seasonal ultraviolet disinfection and effluent diffused and cascade aeration. The Cross Plans plant has an annual average design flow of 0.593 MGD and presently treats approximately 0.343 MGD of wastewater annually. Biosolids are aerobically digested and thickened with a gravity belt thickener before being hauled to another facility. The facility does not have 180 days of biosolids storage on-site; however, biosolids are hauled to the Dane-Iowa WWTF for further Class A sludge treatment and eventual land application on Department-approved agricultural fields.

Permit Drafter's Name, Address and Phone: Phillip Spranger, DNR, SCR Headquarters, 3911 Fish Hatchery Rd, , Fitchburg, WI, 53711, (608) 273-5969

Basin Engineer's Name, Address, and Phone: Amy Garbe, 3911 Fish Hatchery Road, Fitchburg, WI 53711, (262) 574-2135

Date Permit Signed/Issued: September 28, 2015
Date of Effectiveness: October 1, 2015
Date of Expiration: September 30, 2020

Following the public notice period the Department has made a final determination to reissue the WPDES permit for the above-named permittee for this existing discharge. The permit application information from the WPDES permit file, comments received on the proposed permit and applicable Wis. Adm. Codes were used as a basis for this final determination.

The Department has the authority to issue, modify, suspend, or revoke WPDES permits and to establish effluent limitations and permit conditions under ch. 283, Stats.

Following is a summary of significant comments and any significant changes which have been made in the terms and conditions set forth in the draft permit:

Comments Received from the Applicant, Individuals or Groups and Any Permit Changes as Applicable
Comments were received by email on September 14, 2015 from Matthew G Schuenke on behalf of the Village of Cross Plains.

Cross Plains Comment #1 – Ammonia limits: In the previous permit, a proposed daily maximum limit of 5.2 mg/L was increased to 16 mg/L due to excessive historical violations of the proposed limit. At that time, weekly and monthly average limit were neither reevaluated nor included; but have since been included in the draft permit. The Village has evaluated effluent ammonia data from 2010 through 2015 and found effluent ammonia exceeded the proposed limits four times and was within 85% of the proposed limits two times. The Village requests an ammonia compliance schedule be included in the permit to allow for additional study of the receiving stream and WWTP operations.

DNR Response #1 – Cross Plains has demonstrated that there is reasonable potential to exceed the weekly and monthly average ammonia limitations. These limitations should have been included in the previous permit once the increase to the daily maximum limit was effective, since the daily maximum limit was no longer the most stringent limit. Based on these points, a compliance schedule for complying with the new weekly and monthly limitations will be granted. The required action items and due dates will be as follows:

4.4 Ammonia Effluent Limits & Facility Modifications

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

Required Action	Due Date
Preliminary Compliance Report: Submit a preliminary compliance report indicating alternatives to achieve the final weekly average and monthly average ammonia limits.	12/31/2016
Action Plan: Submit an action plan for complying with all applicable effluent ammonia limits.	12/31/2017
Construction Plans: Submit construction plans (if construction is required for complying with effluent ammonia limits) and include plans and specifications with the submittal.	06/30/2018
Initiate Actions: Initiate actions identified in the plan.	12/31/2018
Complete Actions: Complete actions necessary to achieve compliance with effluent ammonia limits.	12/31/2019

In addition to the new ammonia compliance schedule, the following changes have been made to the table notes for ammonia parameters in the surface water monitoring table at subsection 2.2.1 for sample point 001:

For the parameter "Nitrogen, Ammonia (NH_3-N) Total" with the "Daily Max" limit type the following clarifying table note was added: "Ammonia monitoring required 3/week on the permit effective date. Daily maximum limit applies year-round."

For the parameters "Nitrogen, Ammonia (NH3-N) Total" with limit types of "Weekly Avg" and "Monthly Avg" the following text has been added to the end of each existing table note: ", beginning January 1 2020. See ammonia compliance schedule at subsection 4.4."

Cross Plains Comment #2 – Thermal Limits: Weekly average effluent thermal limits have been proposed in the draft permit for the months of August through November. Effluent temperature has been historically monitored and ambient stream temperature has been monitored by USGS and the Village at 5 locations on Black Earth Creek. The Village has evaluated available effluent and stream temperature data from 2010 through 2014. Data collected during this period indicates effluent temperature exceeded proposed limits 38 times. Of those 38 exceedances, the water temperature downstream exceeded the sub lethal water quality criteria only three times. Further, all three exceedances of the sub lethal water quality criteria occurred when an upstream gauge indicated that the upstream water temperature exceeded the sub lethal water quality criteria. Based upon the monitoring data, the Village would like to request that effluent thermal limits be removed from their permit as it does not appear that the WWTP discharge is resulting in an exceedance of the sub lethal water quality criteria within Black Earth Creek.

DNR Response #2 – The Village of Cross Plains has been granted a 4 year compliance schedule to meet final thermal limitations. Per subsection 2.2.1.7 of the proposed permit, the Village may conduct a Dissipative Cooling Demonstration to determine if the effluent thermal load adequately dissipates. Ambient stream temperature can be evaluated as part of a DC study or for potential alternative limits. Since the Village will be performing a mixing zone study during the permit term to assist with compliance with new ammonia limits, the Department will evaluate the ambient stream temperature as part of the mixing zone/DC study within the permit term. Per subsection 2.2.1.7, if reevaluation of the limits determines that temperature limits are no longer needed, the permit will be modified per s. 283. 53, Stats. No changes will be made to the permit based on this comment.

Cross Plains Comment #3 – Thermal Limit Compliance Schedule and Dissipative Cooling Evaluation: In the event that thermal limits remain in the permit, the Village requests a time extension in the compliance schedule which will be needed to adequately perform a Dissipative Cooling Study during the months in which limits apply. The request for the schedule modifications are as follows:

Required Action	Due Date	Revised Due Date
Preliminary Compliance Report	09/30/2016	12/31/2016
Action Plan	09/30/2017	12/31/2017
Construction Plans	03/31/2018	09/30/2018
Initiate Actions	09/30/2018	03/31/2019
Complete Actions	09/30/2019	03/31/2020

DNR Response #3 – Thermal limitations and applicable compliance schedule have been retained in the proposed permit. The action items for Section 4.2 "Temperature Limits Compliance and Dissipative Cooling Evaluation" will be pushed out an additional 3 months to allow for a Dissipative Cooling study to occur in November and have the following dates:

Required Action	Due Date	Revised Due Date
Preliminary Compliance Report	**09/30/2016**	**12/31/2016**
Action Plan	**09/30/2017**	**12/31/2017**
Construction Plans	**03/31/2018**	**06/30/2018**
Initiate Actions	**09/30/2018**	**12/31/2018**
Complete Actions	**09/30/2019**	**12/31/2019**

In addition, subsection 2.2.1.6 will be updated to reflect the changes to the compliance schedule. The thermal limitations will become effective on January 1, 2020.

The "Temperature Maximum" parameters for August, September, October and November have been removed from the surface water monitoring table at subsection 2.2.1 of the permit and are now listed in a table at subsection 2.2.1.6 of the permit.

Cross Plains Comment #4 – The proposed phosphorus water quality based effluent limitation was calculated based on a conservation of mass approach which requires background phosphorus concentration in Black Earth Creek. In 2014 the Village partnered with USGS to complete a comprehensive monitoring program. USGS sampling and gauging stations were installed at three locations. Automated sampling occurs monthly to gather base flow data and on regular intervals during storm events.

In the WQBEL memo dated May 22, 2105, the background phosphorus concentration in Black Earth Creek is listed as 0.214 mg/L based on data collected between 6/16/14 and 09/22/14. The Village has evaluated this data and feels that the Department has misunderstood the method of sampling. It is the Village's understanding that the "background" phosphorus concentration represents a "base flow" type sample and should not be significantly biased by storm events. The Village feels that background phosphorus concentrations for Black Earth Creek should be calculated based upon base flow sampling only and that flow weighted data from the two upstream sites should be used. The estimated flow weighted background concentration for the two upstream sites using base flow sampling only is 0.045 mg/L using data from June 2014 through October 2014. The Village requests the background phosphorus concentration be reevaluated by the Department.

DNR Response #4 – S. NR 217.13(2)(d), Wis. Adm. Code describes the background concentrations used to determine representative concentrations in a receiving stream. The WisCALM recommends collecting data at a standard increment of time to prevent dataset bias. By taking a 28-day average, this should adjust for certain storm events. Due to the nature of the USGS gauge stations taking multiple samples a day during a storm event, it is emphasizing storm events and skewing the data up. However, just looking at baseflow skews the median down; therefore some of the storm event data will be used to determine the median background phosphorus concentration. After looking at the various gauging stations on Black Earth Creek, it was determined that USGS site number #05406500 is the most representative for determining flow. It is located downstream of the treatment plant outfall, but there are no major tributaries flowing into the system downstream of the plant and the upstream gauging station does not factor in the flow from Brewery Creek.

Evaluating flow data from November 2014 through April 2015, it was determined that flows <60 cfs would be representative of the combined receiving waters. This translated to a flow of 15 cfs for Black Earth Creek when data from USGS site #05406479 is extrapolated. So in addition to the baseflow data set presented in the comments from Cross Plains, additional background concentrations (cells shaded grey) produced at a stream flow of < 15 cfs have been included generating the following table:

Brewery Creek				Black Earth Creek				Combined Upstream		
Date	Base	28-day avg	Flow	Date	Base	28-day avg	Flow	Date	Base	28-day avg
06/16/2014	0.06	0.06	1.6	06/16/2014	0.05	0.05	9.3	06/16/2014	0.0515	0.0515
06/22/2014				06/22/2014	0.14	0.14	15	06/22/2014	0.14*	0.10*
07/21/2014	0.07	0.07	1.2	07/21/2014	0.04	0.09	10	07/21/2014	0.0432	0.0432
08/14/2014	0.07	0.07	1.1	08/14/2014	0.05	0.0766667	8.4	08/14/2014	0.0523	0.0478
08/26/2014				08/26/2014	0.54	0.20	12	08/26/2014	0.54*	0.30*
09/22/2014	0.05	0.05	1.1	09/22/2014	0.02	0.28	10	09/22/2014	0.0230	0.2815
05/14/2015	0.04	0.04	1	05/14/2015	0.06	0.06	7.3	05/14/2015	0.0576	0.0576
05/24/2015	1.07	0.54	2.6	05/24/2015	0.07	0.07	9.35	05/24/2015	0.29	0.17

***- This value is solely based on the in-stream concentration and flow of Black Earth Creek given the absence of data for Brewery Creek. Given that the in-stream concentrations in Brewery Creek are typically higher than the concentrations in Black Earth Creek for both base flow and storm events, this concentration may actually under-estimate the combined TP concentration upstream of the discharge.**

The median value of the revised dataset (combined 28-day average) is 0.0939 mg/L. Based on this, it is appropriate to conclude that the in-stream phosphorus concentration in Black Earth Creek exceeds the phosphorus criteria pursuant to s. 217.13(2)(d), Wis. Adm. Code. No change will be made to the permit based on this comment.

Cross Plains Comment #5 – The Village of Cross Plains hauls thickened sludge to the Dane Iowa Wastewater Treatment Facility in Mazomanie for further treatment and eventual land disposal. Dane Iowa produces a Class A exceptional quality sludge through pasteurization and alkaline stabilization. In similar situations the Department has approved eliminating sludge testing requirements for WWTP's hauling sludge to other permitted facilities as sufficient sampling is performed under the other facility's WPDES permit. Therefore, the Village is requesting that hauled sludge sampling be removed from their permit.

DNR Response #5 –SS. NR 204.06(2)(c)(5) Wis Adm. Code, allows the frequency of monitoring to be reduced after 2 years of sludge monitoring. The Village of Cross Plains has been sampling their sludge consistently in the past and therefore meets the 2 year requirement. Since the Village does not land apply under their own permit and Dane Iowa further treats the sludge to a Class A product, Outfall 002 will be made inactive for contingency use only. The sample point designation for Outfall 002 shall now read:

"This outfall has been included as a contingency plan if Cross Plains needs to land apply under their own permit. If all biosolids are hauled to another treatment plant during a calendar year, no sampling needs to be performed by the facility. Hauled sludge reports shall be submitted on Form 3400-52 'Other Methods of Disposal or Distribution Report' following each year that the sludge is hauled to another facility. In the event sludge is land applied directly by the permittee instead of hauled to another facility, Aerobically digested, Thickened, Liquid, Class B. Representative sludge samples shall be collected from the discharge of the gravity belt thickener. Sludge samples shall be collected prior to land application and test results shall be reported on Form 3400-49 'Waste Characteristics Report'. The permittee shall contact the DNR Basin Engineer for approval and requirements prior to landspreading."

Nutrient sampling will be added to the Hauled Sludge monitoring table for sample point 002 at subsection 3.2.1 of the permit since nutrient sampling is required if Cross Plains was to land apply under their own permit.

The following additions have been included at the end of section 3 of the permit relating to Land Application Requirements: a table titled "Other Sludge Requirements; and subsections 3.2.1.1 through 3.2.15. These conditions must be met if Cross Plains was to land apply under their own permit.

Comments Received from EPA or Other Government Agencies and Any Permit Changes as Applicable

No comments received

As provided by s. 283.63, Stats., and ch. 203, Wis. Adm. Code, persons desiring further adjudicative review of this final determination may request a public adjudicatory hearing. A request shall be made by filing a verified petition for review with the Secretary of the Department of Natural Resources within 60 days of the date the permit was signed (see permit signature date above). Further information regarding the conduct and nature of public adjudicatory hearings may be found by reviewing ch. NR 203, Wis. Adm. Code, s. 283.63 Stats., and other applicable law, including s. 227.42, Stats.

Information on file for this permit action may be inspected and copied at either the above named permit drafter's address or the above named basin engineer's address, Monday through Friday (except holidays), between 9:00 a.m. and 3:30 p.m. Information on this permit action may also be obtained by calling the permit drafter at (608) 273-5969 or by writing to the Department. Reasonable costs (usually 20 cents per page) will be charged for copies of information in the file other than the public notice and fact sheet. Pursuant to the Americans with Disabilities Act, reasonable accommodation, including the provision of informational material in an alternative format, will be made to qualified individuals upon request.

WPDES PERMIT

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

PERMIT TO DISCHARGE UNDER THE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM

VILLAGE OF CROSS PLAINS

is permitted, under the authority of Chapter 283, Wisconsin Statutes, to discharge from a facility located at
1000 MAIN STREET (USH 14), CROSS PLAINS, WISCONSIN
to
BLACK EARTH CREEK (BLACK EARTH CREEK WATERSHED, LW17 – LOWER WISCONSIN RIVER BASIN) IN JEFFERSON COUNTY
(SE ¼ of NE ¼ of Section 4, T7N_R7E – Lat: 43.1142/Lon: -89.6638)

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in this permit.

The permittee shall not discharge after the date of expiration. If the permittee wishes to continue to discharge after this expiration date an application shall be filed for reissuance of this permit, according to Chapter NR 200, Wis. Adm. Code, at least 180 days prior to the expiration date given below.

State of Wisconsin Department of Natural Resources
For the Secretary

By _____
Tim Ryan
Wastewater Field Supervisor

_____
Date Permit Signed/Issued

PERMIT TERM: EFFECTIVE DATE - October 01, 2015 **EXPIRATION DATE - September 30, 2020**

TABLE OF CONTENTS

1 Influent Requirements

1.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
701	Representative influent samples shall be collected from the influent wet well after mechanical screening.

1.2 Monitoring Requirements

The permittee shall comply with the following monitoring requirements.

1.2.1 Sampling Point 701 - INFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Continuous	Continuous	
BOD_5, Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp	

2 Surface Water Requirements

2.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
001	Representative effluent samples shall be collected prior to UV disinfection, with fecal coliform grab samples collected after UV and dissolved oxygen grab samples collected after the cascade aerator, prior to discharge to Black Earth Creek.

2.2 Monitoring Requirements and Effluent Limitations

The permittee shall comply with the following monitoring requirements and limitations.

2.2.1 Sampling Point (Outfall) 001 - EFFLUENT

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Continuous	Continuous	
BOD_5, Total	Weekly Avg	23 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect May 1 through October 31 annually.
BOD_5, Total	Weekly Avg	34 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect November 1 through April 30 annually.
BOD_5, Total	Monthly Avg	23 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect May 1 through October 31 annually.
BOD_5, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect November 1 through April 30 annually.
BOD_5, Total	Weekly Avg	112.5 lbs/day	3/Week	Calculated	Limit in effect May 1 through October 31 annually.
BOD_5, Total	Weekly Avg	168.9 lbs/day	3/Week	Calculated	Limit in effect November 1 through April 30 annually.
Suspended Solids, Total	Weekly Avg	23 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect May 1 through October 31 annually.
Suspended Solids, Total	Weekly Avg	34 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect November 1 through April 30 annually.
Suspended Solids, Total	Monthly Avg	23 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect May 1 through October 31 annually.
Suspended Solids, Total	Monthly Avg	30 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect November 1 through April 30 annually.

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Suspended Solids, Total	Weekly Avg	112.5 lbs/day	3/Week	Calculated	Limit in effect May 1 through October 31 annually.
Suspended Solids, Total	Weekly Avg	168.9 lbs/day	3/Week	Calculated	Limit in effect November 1 through April 30 annually.
Nitrogen, Ammonia (NH_3-N) Total	Daily Max	16 mg/L	3/Week	24-Hr Flow Prop Comp	Ammonia monitoring required 3/week on the permit effective date. Daily maximum limit applies year-round
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	14 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect October 1 through April 30 annually, beginning January 1, 2020. See ammonia compliance schedule at subsection 4.4.
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	6.5 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect October 1 through April 30 annually, beginning January 1, 2020. See ammonia compliance schedule at subsection 4.4.
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	11 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect May annually, beginning January 1, 2020. See ammonia compliance schedule at subsection 4.4.
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect June annually, beginning January 1, 2020. See ammonia compliance schedule at subsection 4.4.
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	8.9 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect July annually, beginning January 1, 2020. See ammonia compliance schedule at subsection 4.4.
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	9.5 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect August annually, beginning January 1, 2020. See ammonia compliance schedule at subsection 4.4.
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	12 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect September annually, beginning January 1, 2020. See ammonia compliance schedule at subsection 4.4.

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Fecal Coliform	Geometric Mean	400 #/100 ml	Weekly	Grab	Limit in effect May 1 through September 30 annually.
pH Field	Daily Max	9.0 su	3/Week	Grab	
pH Field	Daily Min	6.0 su	3/Week	Grab	
Dissolved Oxygen	Daily Min	7.0 mg/L	3/Week	Grab	
Phosphorus, Total	Monthly Avg	1.4 mg/L	3/Week	24-Hr Flow Prop Comp	This is an interim limit. The final water quality based effluent limits are 0.075 mg/L 6-month avg. & 0.225 mg/L monthly avg. & go into effect at the end of the compliance schedule at subsection 4.1. See subsections 2.2.1.2 through 2.2.1.4 for details.
Phosphorus, Total		lbs/day	3/Week	Calculated	Calculate mass discharge of phosphorus on same days phosphorus sampling occurs. Daily mass (lbs/d) = daily conc. (mg/L) x daily flow (MGD) x 8.34. Final water quality based mass limit is 0.43 lbs/day 6-month avg. See subsection 2.2.1.2 for effective date.
Temperature Maximum		deg F	3/Week	Continuous	Monitoring required year-round. See subsections 2.2.1.5 for temperature monitoring requirements, 2.2.1.6 for temperature limits and effective date of limits, 2.2.1.7 for information on dissipative cooling and 4.2 for the temperature compliance schedule.
Chronic WET		rTU_c	See Listed Qtr(s)	24-Hr Flow Prop Comp	See subsection 2.2.1.8 for Whole Effluent Toxicity (WET) Testing monitoring dates and WET requirements.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring Only Jan 1, 2019 - Dec 31, 2019

2.2.1.1 Average Annual Design Flow

The average annual design flow of the permittee's wastewater treatment facility is 0.593 MGD.

2.2.1.2 Phosphorus Water Quality Based Effluent Limitation(s)

The final water quality based effluent limits for phosphorus are **0.075 mg/L as a six-month average (0.43 lbs/day) and 0.225 mg/L as a monthly average** and go into effect **September 30, 2024** unless:

(A) As part of the application for the next reissuance, or prior to filing the application, the permittee submits either: 1.) a watershed adaptive management plan and a completed Watershed Adaptive Management Request Form 3200-139; or 2.) an application for water quality trading; or 3.) an application for a variance; or 4.) new information or additional data that supports a recalculation of the numeric limitation; and

(B) The Department modifies, revokes and reissues, or reissues the permit to incorporate a revised limitation before the expiration of the compliance schedule*.

Note: The permittee may also submit an application for a variance within 60 days of this permit reissuance, as noted in the permit cover letter, in accordance with s. 283.15, Stats.

If Adaptive Management or Water Quality Trading is approved as part of the permit application for the next reissuance or as part of an application for a modification or revocation and reissuance, the plan and specifications submittal, construction, and final effective dates for compliance with the total phosphorus WQBEL may change in the reissued or modified permit. In addition, the numeric value of the water quality based effluent limit may change based on new information (e.g. a TMDL) or additional data. If a variance is approved for the next reissuance, interim limits and conditions will be imposed in the reissued permit in accordance with s. 283.15, Stats., and applicable regulations. A permittee may apply for a variance to the phosphorus WQBEL at the next reissuance even if the permittee did not apply for a phosphorus variance as part of this permit reissuance.

Additional Requirements: If a water quality based effluent limit has taken effect in a permit, any increase in the limit is subject to s. NR 102.05(1) and ch. NR 207, Wis. Adm. Code. When a six-month average effluent limit is specified for Total Phosphorus the applicable averaging periods are May through October and November through April.

*Note: The Department will prioritize reissuances and revocations, modifications, and reissuances of permits to allow permittees the opportunity to implement adaptive management or nutrient trading in a timely and effective manner.

2.2.1.3 Alternative Approaches to Phosphorus WQBEL Compliance

Rather than upgrading its wastewater treatment facility to comply with WQBELs for total phosphorus, the permittee may use Water Quality Trading or the Watershed Adaptive Management Option, to achieve compliance under ch. NR 217, Wis. Adm. Code, provided that the permit is modified, revoked and reissued, or reissued to incorporate any such alternative approach. The permittee may also implement an upgrade to its wastewater treatment facility in combination with Water Quality Trading or the Watershed Adaptive Management Option to achieve compliance, provided that the permit is modified, revoked and reissued, or reissued to incorporate any such alternative approach. If the Final Compliance Alternatives Plan concludes that a variance will be pursued, the Plan shall provide information regarding the basis for the variance.

2.2.1.4 Submittal of Permit Application for Next Reissuance and Adaptive Management or Pollutant Trading Plan or Variance Application

The permittee shall submit the permit application for the next reissuance at least 6 months prior to expiration of this permit. If the permittee intends to pursue adaptive management to achieve compliance with the phosphorus water quality based effluent limitation, the permittee shall submit with the application for the next reissuance: a completed Watershed Adaptive Management Request Form 3200-139, the completed Adaptive Management Plan and final plans for any system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code. If the permittee intends to pursue pollutant trading to achieve compliance, the permittee shall submit an application for water quality

trading with the application for the next reissuance. If system upgrades will be used in combination with pollutant trading to achieve compliance with the final water quality-based limit, the reissued permit will specify a schedule for the necessary upgrades. If the permittee intends to seek a variance, the permittee shall submit an application for a variance with the application for the next reissuance.

2.2.1.5 Effluent Temperature Monitoring

For manually measuring effluent temperature, grab samples should be collected at 6 evenly spaced intervals during the 24-hour period. Alternative sampling intervals may be approved if the permittee can show that the maximum effluent temperature is captured during the sampling interval. For monitoring temperature continuously, collect measurements in accordance with s. NR 218.04(13). This means that discrete measurements shall be recorded at intervals of not more than 15 minutes during the 24-hour period. In either case, report the maximum temperature measured during the day on the DMR.

2.2.1.6 Effluent Temperature Limitations

Limits for Temperature, Maximum: The effluent limitations for "Temperature, Maximum" become effective on **January 1, 2020** as specified in the Schedules section. Monitoring is required 3X/week upon permit reissuance. Daily maximum temperatures shall be reported so that applicable daily maximum limits can be compared to the reported daily maximum temperatures and applicable weekly average limits can be compared to the weekly averages of the reported daily maximum temperatures.

Effluent Limitations for 'Temperature Maximum' (Effective per the Schedules section):

Month	Weekly Avg. Limitation
	(°F)
AUG	68
SEP	65
OCT	61
NOV	52

2.2.1.7 Dissipative Cooling Demonstration – POTW Weekly Average Limits

If weekly average effluent temperature limitations are needed, the permittee may submit all additional necessary information with a request that the Department account for dissipative cooling of the effluent pursuant to s. NR 106.59, Wis. Adm. Code. If the Department determines that weekly average effluent limitations for temperature are not necessary based on dissipative cooling the Department shall modify the permit to remove the weekly average effluent limitations pursuant to s. NR 106.59(4)(e). Monitoring frequency shall remain 3X/week and the remainder of the permit schedule for weekly average temperature limits shall be discontinued at that time. If after reviewing the data the Department determines that weekly average effluent limitations for temperature are still necessary because the thermal load from the effluent is not adequately dissipated, the requirement to meet the effluent limitations according to the permit schedule will not be removed and the monitoring frequency specified in the permit shall continue to apply. A re-evaluation of the limits may then be requested pursuant to NR 106 – 'Subchapters V & VI Effluent Limitations for Temperature' or NR 102.26 – Site Specific Ambient Temperature.

2.2.1.8 Whole Effluent Toxicity (WET) Testing

Primary Control Water: Black Earth Creek upstream/out of the influence of the mixing zone and any other known discharge

Instream Waste Concentration (IWC): 44%

Dilution series: At least five effluent concentrations and dual controls must be included in each test.

- **Chronic:** 100, 75, 50, 25, 12.5% and any additional selected by the permittee.

WET Testing Frequency:

Chronic tests shall be conducted once every other year in rotating quarters in order to collect seasonal information about the discharge. Tests are required during the following quarters.

- **Chronic:** *July 1– September 30, 2016; April 1–June 30, 2018; and January 1–March 31, 2020 (three tests total)*

Chronic WET testing shall continue once every other year after the permit expiration date (until the permit is reissued) in accordance with the WET requirements specified in this permit. For example, the next test would be required in October 1–December 31, 2022.

Testing: WET testing shall be performed during normal operating conditions. Permittees are not allowed to turn off or otherwise modify treatment systems, production processes, or change other operating or treatment conditions during WET tests.

Reporting: The permittee shall report test results on the Discharge Monitoring Report form, and also complete the "Whole Effluent Toxicity Test Report Form" (Section 6, "*State of Wisconsin Aquatic Life Toxicity Testing Methods Manual, 2nd Edition*"), for each test. The original, complete, signed version of the Whole Effluent Toxicity Test Report Form shall be sent to the Biomonitoring Coordinator, Bureau of Water Quality, 101 S. Webster St., P.O. Box 7921, Madison, WI 53707-7921, within 45 days of test completion. The Discharge Monitoring Report (DMR) form shall be submitted electronically by the required deadline.

Determination of Positive Results: A chronic toxicity test shall be considered positive if the Relative Toxic Unit - Chronic (rTU_c) is greater than 1.0 for either species. The rTU_c shall be calculated as follows: If $IC_{25} \geq$ IWC, then $rTU_c = 1.0$. If $IC_{25} <$ IWC, then $rTU_c = IWC \div IC_{25}$.

Additional Testing Requirements: Within 90 days of a test which showed positive results, the permittee shall submit the results of at least 2 retests to the Biomonitoring Coordinator on "Whole Effluent Toxicity Test Report Forms". The 90 day reporting period shall begin the day after the test which showed a positive result. The retests shall be completed using the same species and test methods specified for the original test (see the Standard Requirements section herein).

3 Land Application Requirements

3.1 Sampling Point(s)

The discharge(s) shall be limited to land application of the waste type(s) designated for the listed sampling point(s) on Department approved land spreading sites or by hauling to another facility.

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
002	This outfall has been included as a contingency plan if Cross Plains needs to land apply under their own permit. If all biosolids are hauled to another treatment plant during a calendar year, no sampling needs to be performed by the facility. Hauled sludge reports shall be submitted on Form 3400-52 'Other Methods of Disposal or Distribution Report' following each year that the sludge is hauled to another facility. In the event sludge is land applied directly by the permittee instead of hauled to another facility, Aerobically digested, Thickened, Liquid, Class B, Representative sludge samples shall be collected from the discharge of the gravity belt thickener. Sludge samples shall be collected prior to land application and test results shall be reported on Form 3400-49 'Waste Characteristics Report'. The permittee shall contact the DNR Basin Engineer for approval and requirements prior to landspreading.

3.2 Monitoring Requirements and Limitations

The permittee shall comply with the following monitoring requirements and limitations.

3.2.1 Sampling Point (Outfall) 002 - HAULED SLUDGE

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

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH_4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	

Other Sludge Requirements	
Sludge Requirements	**Sample Frequency**
List 3 Requirements – Pathogen Control: The requirements in List 3 shall be met prior to land application of sludge.	**Annual**
List 4 Requirements – Vector Attraction Reduction: The vector attraction reduction shall be satisfied prior to, or at the time of land application as specified in List 4.	**Annual**

3.2.1.1 List 2 Analysis

If the monitoring frequency for List 2 parameters is more frequent than "Annual" then the sludge may be analyzed for the List 2 parameters just prior to each land application season rather than at the more frequent interval specified.

3.2.1.2 Changes in Feed Sludge Characteristics

If a change in feed sludge characteristics, treatment process, or operational procedures occurs which may result in a significant shift in sludge characteristics, the permittee shall reanalyze the sludge for List 1, 2, 3 and 4 parameters each time such change occurs.

3.2.1.3 Multiple Sludge Sample Points (Outfalls)

If there are multiple sludge sample points (outfalls), but the sludges are not subject to different sludge treatment processes, then a separate List 2 analysis shall be conducted for each sludge type which is land applied, just prior to land application, and the application rate shall be calculated for each sludge type. In this case, List 1, 3, and 4 and PCBs need only be analyzed on a single sludge type, at the specified frequency. If there are multiple sludge sample points (outfalls), due to multiple treatment processes, List 1, 2, 3 and 4 and PCBs shall be analyzed for each sludge type at the specified frequency.

3.2.1.4 Sludge Which Exceeds the High Quality Limit

Cumulative pollutant loading records shall be kept for all bulk land application of sludge which does not meet the high quality limit for any parameter. This requirement applies for the entire calendar year in which any exceedance of Table 3 of s. NR 204.07(5)(c), is experienced. Such loading records shall be kept for all List 1 parameters for each site land applied in that calendar year. The formula to be used for calculating cumulative loading is as follows:

[(Pollutant concentration (mg/kg) x dry tons applied/ac) ÷ 500] + previous loading (lbs/acre) = cumulative lbs pollutant per acre

When a site reaches 90% of the allowable cumulative loading for any metal established in Table 2 of s. NR 204.07(5)(b), the Department shall be so notified through letter or in the comment section of the annual land application report (3400-55).

3.2.1.5 Lists 1, 2, 3, and 4

List 1 **TOTAL SOLIDS AND METALS** See the Monitoring Requirements and Limitations table above for monitoring frequency and limitations for the List 1 parameters
Solids, Total (percent)
Arsenic, mg/kg (dry weight)
Cadmium, mg/kg (dry weight)
Copper, mg/kg (dry weight)
Lead, mg/kg (dry weight)
Mercury, mg/kg (dry weight)
Molybdenum, mg/kg (dry weight)
Nickel, mg/kg (dry weight)
Selenium, mg/kg (dry weight)
Zinc, mg/kg (dry weight)

List 2 **NUTRIENTS** See the Monitoring Requirements and Limitations table above for monitoring frequency for the List 2 parameters
Solids, Total (percent)
Nitrogen Total Kjeldahl (percent)
Nitrogen Ammonium (NH4-N) Total (percent)
Phosphorus Total as P (percent)
Phosphorus, Water Extractable (as percent of Total P)
Potassium Total Recoverable (percent)

List 3
PATHOGEN CONTROL FOR CLASS B SLUDGE

The permittee shall implement pathogen control as listed in List 3. The Department shall be notified of the pathogen control utilized and shall be notified when the permittee decides to utilize alternative pathogen control.

The following requirements shall be met prior to land application of sludge.

Parameter	Unit	Limit
Fecal Coliform*	MPN/gTS or CFU/gTS	2,000,000
OR, ONE OF THE FOLLOWING PROCESS OPTIONS		
Aerobic Digestion	Air Drying	
Anaerobic Digestion	Composting	
Alkaline Stabilization	PSRP Equivalent Process	

***** The Fecal Coliform limit shall be reported as the geometric mean of 7 discrete samples on a dry weight basis.

List 4
VECTOR ATTRACTION REDUCTION

The permittee shall implement any one of the vector attraction reduction options specified in List 4. The Department shall be notified of the option utilized and shall be notified when the permittee decides to utilize an alternative option.

One of the following shall be satisfied prior to, or at the time of land application as specified in List 4.

Option	Limit	Where/When it Shall be Met
Volatile Solids Reduction	≥38%	Across the process
Specific Oxygen Uptake Rate	≤1.5 mg O_2/hr/g TS	On aerobic stabilized sludge
Anaerobic bench-scale test	<17 % VS reduction	On anaerobic digested sludge
Aerobic bench-scale test	<15 % VS reduction	On aerobic digested sludge
Aerobic Process	>14 days, Temp >40°C and Avg. Temp > 45°C	On composted sludge
pH adjustment	>12 S.U. (for 2 hours) and >11.5 (for an additional 22 hours)	During the process
Drying without primary solids	>75 % TS	When applied or bagged
Drying with primary solids	>90 % TS	When applied or bagged
Equivalent Process	Approved by the Department	Varies with process
Injection	-	When applied
Incorporation	-	Within 6 hours of application

4 Schedules

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

The permittee shall comply with the WQBELs for Phosphorus as specified. No later than 30 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance. If a submittal is required, a timely submittal fulfills the notification requirement.

Required Action	Due Date
Operational Evaluation Report: The permittee shall prepare and submit to the Department for approval an operational evaluation report. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by September 30, 2018. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than September 30, 2018 and state whether the measures, improvements, and modifications will enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report. If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by September 30, 2018 and is not required to comply with the milestones identified below for years 3 through 9 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance'). STUDY OF FEASIBLE ALTERNATIVES - If the Operational Evaluation Report concludes that the permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than September 30, 2024.	09/30/2016
Compliance Alternatives, Source Reduction, Improvements and Modifications Status: The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.	09/30/2017
Preliminary Compliance Alternatives Plan: The permittee shall submit a preliminary compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee’s wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design	09/30/2018

report. If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan. If water quality trading will be undertaken, the plan must state that trading will be pursued.	
Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code. If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code. If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2019
Progress Report on Plans & Specifications: Submit progress report regarding the progress of preparing final plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2020
Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2021
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41. Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2021
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2022
Construction Upgrade Progress Report #2: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2023
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface	08/31/2024

Water section of this permit.	
Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2024

4.2 Temperature Limits Compliance and Dissipative Cooling Evaluation

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

Required Action	Due Date
Preliminary Compliance Report: Submit a preliminary compliance report indicating alternatives to achieve the final temperature limits. Informational Note: Refer to the Surface Water subsection titled 'Dissipative Cooling Demonstration - POTW Weekly Average Limits' regarding requests for Department consideration of dissipative cooling per NR 106.59, Wis. Adm. Code, as well as re-evaluation of the limits pursuant to NR 106 Subchapters V & VI or NR 102.26, Wis. Adm. Code.	12/31/2016
Action Plan: Submit an action plan for complying with all applicable effluent temperature limits.	12/31/2017
Construction Plans: Submit construction plans (if construction is required for complying with effluent termperature limits) and include plans and specifications with the submittal.	06/30/2018
Initiate Actions: Initiate actions identified in the plan.	12/31/2018
Complete Actions: Complete actions necessary to achieve compliance with effluent temperature limits.	12/31/2019

4.3 CMOM (Capacity, Management, Operation and Maintenance) Program Development

Required Action	Due Date
Complete Program Development: Complete development of CMOM Program by August 1, 2016. See CMOM requirements in the Standard Requirements section.	08/01/2016

4.4 Ammonia Effluent Limits & Facility Modifications

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

Required Action	Due Date
Preliminary Compliance Report: Submit a preliminary compliance report indicating alternatives to achieve the final weekly average and monthly average ammonia limits.	12/31/2016
Action Plan:: Submit an action plan for complying with all applicable effluent ammonia limits.	12/31/2017
Construction Plans: Submit construction plans (if construction is required for complying with effluent ammonia limits) and include plans and specifications with the submittal.	06/30/2018
Initiate Actions: Initiate actions identified in the plan.	12/31/2018
Complete Actions: Complete actions necessary to achieve compliance with effluent ammonia limits.	12/31/2019

5 Standard Requirements

NR 205, Wisconsin Administrative Code: The conditions in ss. NR 205.07(1) and NR 205.07(2), Wis. Adm. Code, are included by reference in this permit. The permittee shall comply with all of these requirements. Some of these requirements are outlined in the Standard Requirements section of this permit. Requirements not specifically outlined in the Standard Requirement section of this permit can be found in ss. NR 205.07(1) and NR 205.07(2).

5.1 Reporting and Monitoring Requirements

5.1.1 Monitoring Results

Monitoring results obtained during the previous month shall be summarized and reported on a Department Wastewater Discharge Monitoring Report. The report may require reporting of any or all of the information specified below under 'Recording of Results'. This report is to be returned to the Department no later than the date indicated on the form. A copy of the Wastewater Discharge Monitoring Report Form or an electronic file of the report shall be retained by the permittee.

Monitoring results shall be reported on an electronic discharge monitoring report (eDMR). The eDMR shall be certified electronically by a principal executive officer, a ranking elected official or other duly authorized representative. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

If the permittee monitors any pollutant more frequently than required by this permit, the results of such monitoring shall be included on the Wastewater Discharge Monitoring Report.

The permittee shall comply with all limits for each parameter regardless of monitoring frequency. For example, monthly, weekly, and/or daily limits shall be met even with monthly monitoring. The permittee may monitor more frequently than required for any parameter.

5.1.2 Sampling and Testing Procedures

Sampling and laboratory testing procedures shall be performed in accordance with Chapters NR 218 and NR 219, Wis. Adm. Code and shall be performed by a laboratory certified or registered in accordance with the requirements of ch. NR 149, Wis. Adm. Code. Groundwater sample collection and analysis shall be performed in accordance with ch. NR 140, Wis. Adm. Code. The analytical methodologies used shall enable the laboratory to quantitate all substances for which monitoring is required at levels below the effluent limitation. If the required level cannot be met by any of the methods available in NR 219, Wis. Adm. Code, then the method with the lowest limit of detection shall be selected. Additional test procedures may be specified in this permit.

5.1.3 Recording of Results

The permittee shall maintain records which provide the following information for each effluent measurement or sample taken:

- the date, exact place, method and time of sampling or measurements;
- the individual who performed the sampling or measurements;
- the date the analysis was performed;
- the individual who performed the analysis;
- the analytical techniques or methods used; and
- the results of the analysis.

5.1.4 Reporting of Monitoring Results

The permittee shall use the following conventions when reporting effluent monitoring results:

- Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 0.1 mg/L, report the pollutant concentration as < 0.1 mg/L.

- Pollutant concentrations equal to or greater than the limit of detection, but less than the limit of quantitation, shall be reported and the limit of quantitation shall be specified.

- For purposes of calculating NR 101 fees, the 2 mg/l lower reporting limits for BOD_5 and Total Suspended Solids shall be considered to be limits of quantitation

- For the purposes of reporting a calculated result, average or a mass discharge value, the permittee may substitute a 0 (zero) for any pollutant concentration that is less than the limit of detection. However, if the effluent limitation is less than the limit of detection, the department may substitute a value other than zero for results less than the limit of detection, after considering the number of monitoring results that are greater than the limit of detection and if warranted when applying appropriate statistical techniques.

5.1.5 Compliance Maintenance Annual Reports

Compliance Maintenance Annual Reports (CMAR) shall be completed using information obtained over each calendar year regarding the wastewater conveyance and treatment system. The CMAR shall be submitted by the permittee in accordance with ch. NR 208, Wis. Adm. Code, by June 30, each year on an electronic report form provided by the Department.

In the case of a publicly owned treatment works, a resolution shall be passed by the governing body and submitted as part of the CMAR, verifying its review of the report and providing responses as required. Private owners of wastewater treatment works are not required to pass a resolution; but they must provide an Owner Statement and responses as required, as part of the CMAR submittal.

A separate CMAR certification document, that is not part of the electronic report form, shall be mailed to the Department at the time of electronic submittal of the CMAR. The CMAR certification shall be signed and submitted by an authorized representative of the permittee. The certification shall be submitted by mail. The certification shall verify the electronic report is complete, accurate and contains information from the owner's treatment works.

5.1.6 Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit for a period of at least 3 years from the date of the sample, measurement, report or application. All pertinent sludge information, including permit application information and other documents specified in this permit or s. NR 204.06(9), Wis. Adm. Code shall be retained for a minimum of 5 years.

5.1.7 Other Information

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or correct information to the Department.

5.2 System Operating Requirements

5.2.1 Noncompliance Reporting

Sanitary sewer overflows and sewage treatment facility overflows shall be reported according to the 'Sanitary Sewer Overflows and Sewage Treatment Facility Overflows' section of this permit.

The permittee shall report the following types of noncompliance by a telephone call to the Department's regional office within 24 hours after becoming aware of the noncompliance:

- any noncompliance which may endanger health or the environment;
- any violation of an effluent limitation resulting from a bypass;
- any violation of an effluent limitation resulting from an upset; and
- any violation of a maximum discharge limitation for any of the pollutants listed by the Department in the permit, either for effluent or sludge.

A written report describing the noncompliance shall also be submitted to the Department's regional office within 5 days after the permittee becomes aware of the noncompliance. On a case-by-case basis, the Department may waive the requirement for submittal of a written report within 5 days and instruct the permittee to submit the written report with the next regularly scheduled monitoring report. In either case, the written report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; the steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and if the noncompliance has not been corrected, the length of time it is expected to continue.

A scheduled bypass approved by the Department under the 'Scheduled Bypass' section of this permit shall not be subject to the reporting required under this section.

NOTE: Section 292.11(2)(a), Wisconsin Statutes, requires any person who possesses or controls a hazardous substance or who causes the discharge of a hazardous substance to notify the Department of Natural Resources **immediately** of any discharge not authorized by the permit. **The discharge of a hazardous substance that is not authorized by this permit or that violates this permit may be a hazardous substance spill**. **To report a hazardous substance spill, call DNR's 24-hour HOTLINE at 1-800-943-0003.**

5.2.2 Flow Meters

Flow meters shall be calibrated annually, as per s. NR 218.06, Wis. Adm. Code.

5.2.3 Raw Grit and Screenings

All raw grit and screenings shall be disposed of at a properly licensed solid waste facility or picked up by a licensed waste hauler. If the facility or hauler are located in Wisconsin, then they shall be licensed under chs. NR 500-536, Wis. Adm. Code.

5.2.4 Sludge Management

All sludge management activities shall be conducted in compliance with ch. NR 204 "Domestic Sewage Sludge Management", Wis. Adm. Code.

5.2.5 Prohibited Wastes

Under no circumstances may the introduction of wastes prohibited by s. NR 211.10, Wis. Adm. Code, be allowed into the waste treatment system. Prohibited wastes include those:

- which create a fire or explosion hazard in the treatment work;
- which will cause corrosive structural damage to the treatment work;

- solid or viscous substances in amounts which cause obstructions to the flow in sewers or interference with the proper operation of the treatment work;
- wastewaters at a flow rate or pollutant loading which are excessive over relatively short time periods so as to cause a loss of treatment efficiency; and
- changes in discharge volume or composition from contributing industries which overload the treatment works or cause a loss of treatment efficiency.

5.2.6 Bypass

This condition applies only to bypassing at a sewage treatment facility that is not a scheduled bypass, approved blending as a specific condition of this permit, a sewage treatment facility overflow or a controlled diversion as provided in the sections titled 'Scheduled Bypass', 'Blending' (if approved), 'SSO's and Sewage Treatment Facility Overflows' and 'Controlled Diversions' of this permit. Any other bypass at the sewage treatment facility is prohibited and the Department may take enforcement action against a permittee for such occurrences under s. 283.89, Wis. Stats. The Department may approve a bypass if the permittee demonstrates all the following conditions apply:

- The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
- There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities or adequate back-up equipment, retention of untreated wastes, reduction of inflow and infiltration, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance. When evaluating feasibility of alternatives, the department may consider factors such as technical achievability, costs and affordability of implementation and risks to public health, the environment and, where the permittee is a municipality, the welfare of the community served; and
- The bypass was reported in accordance with the Noncompliance Reporting section of this permit.

5.2.7 Scheduled Bypass

Whenever the permittee anticipates the need to bypass for purposes of efficient operations and maintenance and the permittee may not meet the conditions for controlled diversions in the 'Controlled Diversions' section of this permit, the permittee shall obtain prior written approval from the Department for the scheduled bypass. A permittee's written request for Department approval of a scheduled bypass shall demonstrate that the conditions for bypassing specified in the above section titled 'Bypass' are met and include the proposed date and reason for the bypass, estimated volume and duration of the bypass, alternatives to bypassing and measures to mitigate environmental harm caused by the bypass. The department may require the permittee to provide public notification for a scheduled bypass if it is determined there is significant public interest in the proposed action and may recommend mitigation measures to minimize the impact of such bypass.

5.2.8 Controlled Diversions

Controlled diversions are allowed only when necessary for essential maintenance to assure efficient operation. Sewage treatment facilities that have multiple treatment units to treat variable or seasonal loading conditions may shut down redundant treatment units when necessary for efficient operation. The following requirements shall be met during controlled diversions:

- Effluent from the sewage treatment facility shall meet the effluent limitations established in the permit. Wastewater that is diverted around a treatment unit or treatment process during a controlled diversion shall be recombined with wastewater that is not diverted prior to the effluent sampling location and prior to effluent discharge;
- A controlled diversion does not include blending as defined in s. NR 210.03(2e), Wis. Adm. Code, and as may only be approved under s. NR 210.12. A controlled diversion may not occur during periods of excessive flow or other abnormal wastewater characteristics;

- A controlled diversion may not result in a wastewater treatment facility overflow; and
- All instances of controlled diversions shall be documented in sewage treatment facility records and such records shall be available to the department on request.

5.2.9 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit. The wastewater treatment facility shall be under the direct supervision of a state certified operator as required in s. NR 108.06(2), Wis. Adm. Code. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training as required in ch. NR 114, Wis. Adm. Code, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

5.3 Sewage Collection Systems

5.3.1 Sanitary Sewage Overflows and Sewage Treatment Facility Overflows

5.3.1.1 Overflows Prohibited

Any overflow or discharge of wastewater from the sewage collection system or at the sewage treatment facility, other than from permitted outfalls, is prohibited. The permittee shall provide information on whether any of the following conditions existed when an overflow occurred:

- The sanitary sewer overflow or sewage treatment facility overflow was unavoidable to prevent loss of life, personal injury or severe property damage;
- There were no feasible alternatives to the sanitary sewer overflow or sewage treatment facility overflow such as the use of auxiliary treatment facilities or adequate back-up equipment, retention of untreated wastes, reduction of inflow and infiltration, or preventative maintenance activities;
- The sanitary sewer overflow or the sewage treatment facility overflow was caused by unusual or severe weather related conditions such as large or successive precipitation events, snowmelt, saturated soil conditions, or severe weather occurring in the area served by the sewage collection system or sewage treatment facility; and
- The sanitary sewer overflow or the sewage treatment facility overflow was unintentional, temporary, and caused by an accident or other factors beyond the reasonable control of the permittee.

5.3.1.2 Permittee Response to Overflows

Whenever a sanitary sewer overflow or sewage treatment facility overflow occurs, the permittee shall take all feasible steps to control or limit the volume of untreated or partially treated wastewater discharged, and terminate the discharge as soon as practicable. Remedial actions, including those in NR 210.21 (3), Wis. Adm. Code, shall be implemented consistent with an emergency response plan developed under the CMOM program.

5.3.1.3 Permittee Reporting

Permittees shall report all sanitary sewer overflows and sewage treatment overflows as follows:

- The permittee shall notify the department by telephone, fax or email as soon as practicable, but no later than 24 hours from the time the permittee becomes aware of the overflow;
- The permittee shall, no later than five days from the time the permittee becomes aware of the overflow, provide to the department the information identified in this paragraph using department form number 3400-184. If an overflow lasts for more than five days, an initial report shall be submitted within 5 days as required in this paragraph and an updated report submitted following cessation of the overflow. At a minimum, the following information shall be included in the report:

◦The date and location of the overflow;
◦The surface water to which the discharge occurred, if any;
◦The duration of the overflow and an estimate of the volume of the overflow;
◦A description of the sewer system or treatment facility component from which the discharge occurred such as manhole, lift station, constructed overflow pipe, or crack or other opening in a pipe;
◦The estimated date and time when the overflow began and stopped or will be stopped;
◦The cause or suspected cause of the overflow including, if appropriate, precipitation, runoff conditions, areas of flooding, soil moisture and other relevant information;
◦Steps taken or planned to reduce, eliminate and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
◦A description of the actual or potential for human exposure and contact with the wastewater from the overflow;
◦Steps taken or planned to mitigate the impacts of the overflow and a schedule of major milestones for those steps;
◦To the extent known at the time of reporting, the number and location of building backups caused by excessive flow or other hydraulic constraints in the sewage collection system that occurred concurrently with the sanitary sewer overflow and that were within the same area of the sewage collection system as the sanitary sewer overflow; and
◦The reason the overflow occurred or explanation of other contributing circumstances that resulted in the overflow event. This includes any information available including whether the overflow was unavoidable to prevent loss of life, personal injury, or severe property damage and whether there were feasible alternatives to the overflow.

NOTE: A copy of form 3400-184 for reporting sanitary sewer overflows and sewage treatment facility overflows may be obtained from the department or accessed on the department's web site at http://dnr.wi.gov/topic/wastewater/SSOreport.html. As indicated on the form, additional information may be submitted to supplement the information required by the form.

- The permittee shall identify each specific location and each day on which a sanitary sewer overflow or sewage treatment facility overflow occurs as a discrete sanitary sewer overflow or sewage treatment facility overflow occurrence. An occurrence may be more than one day if the circumstances causing the sanitary sewer overflow or sewage treatment facility overflow results in a discharge duration of greater than 24 hours. If there is a stop and restart of the overflow at the same location within 24 hours and the overflow is caused by the same circumstance, it may be reported as one occurrence. Sanitary sewer overflow occurrences at a specific location that are separated by more than 24 hours shall be reported as separate occurrences; and
- A permittee that is required to submit wastewater discharge monitoring reports under NR 205.07 (1) (r) shall also report all sanitary sewer overflows and sewage treatment facility overflows on that report.

5.3.1.4 Public Notification

The permittee shall notify the public of any sanitary sewer and sewage treatment facility overflows consistent with its emergency response plan required under the CMOM (Capacity, Management, Operation and Maintenance) section of this permit and s. NR 210.23 (4) (f), Wis. Adm. Code. Such public notification shall occur promptly following any overflow event using the most effective and efficient communications available in the community. At minimum, a daily newspaper of general circulation in the county(s) and municipality whose waters may be affected by the overflow shall be notified by written or electronic communication.

5.3.2 Capacity, Management, Operation and Maintenance (CMOM) Program

- The permittee shall by August 1, 2016 submit to the Department verification that a CMOM program for the sewage collection system has been developed which is consistent with the requirements of NR 210.23, Wis. Adm. Code.
- The permittee shall develop and maintain written documentation of the CMOM program components, and shall verify each year with the submittal of the Compliance Maintenance Annual Report required under the 'Compliance Maintenance Annual Reports' section of this permit that the CMOM program documentation is current and meets the requirements in NR 210.23, Wis. Adm. Code.
- The permittee shall implement a CMOM program consistent with the permittee's program documentation and with the requirements of NR 210.23, Wis. Adm. Code.
- The permittee shall annually conduct a self-audit of activities to ensure the CMOM program is being implemented as necessary to meet the requirements contained in the CMOM program documentation.
- The permittee shall make available CMOM program documentation, a record of implementation activities and the results of the self-audit to the Department on request.

5.3.3 Sewer Cleaning Debris and Materials

All debris and material removed from cleaning sanitary sewers shall be managed to prevent nuisances, run-off, ground infiltration or prohibited discharges.

- Debris and solid waste shall be dewatered, dried and then disposed of at a licensed solid waste facility.
- Liquid waste from the cleaning and dewatering operations shall be collected and disposed of at a permitted wastewater treatment facility.
- Combination waste including liquid waste along with debris and solid waste may be disposed of at a licensed solid waste facility or wastewater treatment facility willing to accept the waste.

5.4 Surface Water Requirements

5.4.1 Permittee-Determined Limit of Quantitation Incorporated into this Permit

For pollutants with water quality-based effluent limits below the Limit of Quantitation (LOQ) in this permit, the LOQ calculated by the permittee and reported on the Discharge Monitoring Reports (DMRs) is incorporated by reference into this permit. The LOQ shall be reported on the DMRs, shall be the lowest quantifiable level practicable, and shall be no greater than the minimum level (ML) specified in or approved under 40 CFR Part 136 for the pollutant at the time this permit was issued, unless this permit specifies a higher LOQ.

5.4.2 Appropriate Formulas for Effluent Calculations

The permittee shall use the following formulas for calculating effluent results to determine compliance with average concentration limits and mass limits and total load limits:

Weekly/Monthly/Six-Month/Annual Average Concentration = the sum of all daily results for that week/month/six-month/year, divided by the number of results during that time period. [Note: When a six-month average effluent limit is specified for Total Phosphorus the applicable periods are May through October and November through April.]

Weekly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the week.

Monthly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the month.

Six-Month Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the six-month period. [Note: When a six-month average effluent limit is specified for Total Phosphorus the applicable periods are May through October and November through April.]

Annual Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the entire year.

Total Monthly Discharge: = monthly average concentration (mg/L) x total flow for the month (MG/month) x 8.34.

Total Annual Discharge: = sum of total monthly discharges for the calendar year.

12-Month Rolling Sum of Total Monthly Discharge: = the sum of the most recent 12 consecutive months of Total Monthly Discharges.

5.4.3 Effluent Temperature Requirements

Weekly Average Temperature – The permittee shall use the following formula for calculating effluent results to determine compliance with the weekly average temperature limit (as applicable): Weekly Average Temperature = the sum of all daily maximum results for that week divided by the number of daily maximum results during that time period.

Cold Shock Standard – Water temperatures of the discharge shall be controlled in a manner as to protect fish and aquatic life uses from the deleterious effects of cold shock. 'Cold Shock' means exposure of aquatic organisms to a rapid decrease in temperature and a sustained exposure to low temperature that induces abnormal behavior or physiological performance and may lead to death.

Rate of Temperature Change Standard – Temperature of a water of the state or discharge to a water of the state may not be artificially raised or lowered at such a rate that it causes detrimental health or reproductive effects to fish or aquatic life of the water of the state.

5.4.4 Visible Foam or Floating Solids

There shall be no discharge of floating solids or visible foam in other than trace amounts.

5.4.5 Surface Water Uses and Criteria

In accordance with NR 102.04, Wis. Adm. Code, surface water uses and criteria are established to govern water management decisions. Practices attributable to municipal, industrial, commercial, domestic, agricultural, land development or other activities shall be controlled so that all surface waters including the mixing zone meet the following conditions at all times and under all flow and water level conditions:

a) Substances that will cause objectionable deposits on the shore or in the bed of a body of water, shall not be present in such amounts as to interfere with public rights in waters of the state.

b) Floating or submerged debris, oil, scum or other material shall not be present in such amounts as to interfere with public rights in waters of the state.

c) Materials producing color, odor, taste or unsightliness shall not be present in such amounts as to interfere with public rights in waters of the state.

d) Substances in concentrations or in combinations which are toxic or harmful to humans shall not be present in amounts found to be of public health significance, nor shall substances be present in amounts which are acutely harmful to animal, plant or aquatic life.

5.4.6 Percent Removal

During any 30 consecutive days, the average effluent concentrations of BOD_5 and of total suspended solids shall not exceed 15% of the average influent concentrations, respectively. This requirement does not apply to removal of total suspended solids if the permittee operates a lagoon system and has received a variance for suspended solids granted under NR 210.07(2), Wis. Adm. Code.

5.4.7 Fecal Coliforms

The limit for fecal coliforms shall be expressed as a monthly geometric mean.

5.4.8 Seasonal Disinfection

Disinfection shall be provided from May 1 through September 30 of each year. Monitoring requirements and the limitation for fecal coliforms apply only during the period in which disinfection is required. Whenever chlorine is used for disinfection or other uses, the limitations and monitoring requirements for residual chlorine shall apply. A dechlorination process shall be in operation whenever chlorine is used.

5.4.9 Whole Effluent Toxicity (WET) Monitoring Requirements

In order to determine the potential impact of the discharge on aquatic organisms, static-renewal toxicity tests shall be performed on the effluent in accordance with the procedures specified in the *"State of Wisconsin Aquatic Life Toxicity Testing Methods Manual, 2nd Edition" (PUB-WT-797*, November 2004) as required by NR 219.04, Table A, Wis. Adm. Code). All of the WET tests required in this permit, including any required retests, shall be conducted on the *Ceriodaphnia dubia* and fathead minnow species. Receiving water samples shall not be collected from any point in contact with the permittee's mixing zone and every attempt shall be made to avoid contact with any other discharge's mixing zone.

5.4.10 Whole Effluent Toxicity (WET) Identification and Reduction

This standard requirement applies only to acute or chronic WET monitoring that is not accompanied by a WET limit. Within 60 days of a retest which showed positive results, the permittee shall submit a written report to the Biomonitoring Coordinator, Bureau of Water Quality, 101 S. Webster St., PO Box 7921, Madison, WI 53707-7921, which details the following:

- A description of actions the permittee has taken or will take to remove toxicity and to prevent the recurrence of toxicity;

- A description of toxicity reduction evaluation (TRE) investigations that have been or will be done to identify potential sources of toxicity, including some or all of the following actions:

  (a) Evaluate the performance of the treatment system to identify deficiencies contributing to effluent toxicity (e.g., operational problems, chemical additives, incomplete treatment)
  (b) Identify the compound(s) causing toxicity
  (c) Trace the compound(s) causing toxicity to their sources (e.g., industrial, commercial, domestic)
  (d) Evaluate, select, and implement methods or technologies to control effluent toxicity (e.g., in-plant or pretreatment controls, source reduction or removal)

- Where corrective actions including a TRE have not been completed, an expeditious schedule under which corrective actions will be implemented;

- If no actions have been taken, the reason for not taking action.

The permittee may also request approval from the Department to postpone additional retests in order to investigate the source(s) of toxicity. Postponed retests must be completed after toxicity is believed to have been removed.

5.5 Land Application Requirements

5.5.1 Sludge Management Program Standards And Requirements Based Upon Federally Promulgated Regulations

In the event that new federal sludge standards or regulations are promulgated, the permittee shall comply with the new sludge requirements by the dates established in the regulations, if required by federal law, even if the permit has not yet been modified to incorporate the new federal regulations.

5.5.2 General Sludge Management Information

The General Sludge Management Form 3400-48 shall be completed and submitted prior to any significant sludge management changes.

5.5.3 Sludge Samples

All sludge samples shall be collected at a point and in a manner which will yield sample results which are representative of the sludge being tested, and collected at the time which is appropriate for the specific test.

5.5.4 Land Application Characteristic Report

Each report shall consist of a Characteristic Form 3400-49 and Lab Report. The Characteristic Report Form 3400-49 shall be submitted electronically by January 31 following each year of analysis.

Following submittal of the electronic Characteristic Report Form 3400-49, this form shall be certified electronically via the 'eReport Certify' page by a principal executive officer, ranking elected official or duly authorized representative. The 'eReport Certify' page certifies that the electronic report is true, accurate and complete. The Lab Report must be sent directly to the facility's DNR sludge representative or basin engineer unless approval for not submitting the lab reports has been given.

The permittee shall use the following convention when reporting sludge monitoring results: Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 1.0 mg/kg, report the pollutant concentration as < 1.0 mg/kg .

All results shall be reported on a dry weight basis.

5.5.5 Calculation of Water Extractable Phosphorus

When sludge analysis for Water Extractable Phosphorus is required by this permit, the permittee shall use the following formula to calculate and report Water Extractable Phosphorus:
Water Extractable Phosphorus (% of Total P) =
[Water Extractable Phosphorus (mg/kg, dry wt) ÷ Total Phosphorus (mg/kg, dry wt)] x 100

5.5.6 Annual Land Application Report

Land Application Report Form 3400-55 shall be submitted electronically by January 31, each year whether or not non-exceptional quality sludge is land applied. Non-exceptional quality sludge is defined in s. NR 204.07(4), Wis. Adm. Code. Following submittal of the electronic Annual Land Application Report Form 3400-55, this form shall be certified electronically via the 'eReport Certify' page by a principal executive officer, ranking elected official or duly authorized representative. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

5.5.7 Other Methods of Disposal or Distribution Report

The permittee shall submit electronically the Other Methods of Disposal or Distribution Report Form 3400-52 by January 31, each year whether or not sludge is hauled, landfilled, incinerated, or exceptional quality sludge is distributed or land applied. Following submittal of the electronic Report Form 3400-52, this form shall be certified electronically via the 'eReport Certify' page by a principal executive officer, ranking elected official or duly authorized representative. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

5.5.8 Approval to Land Apply

Bulk non-exceptional quality sludge as defined in s. NR 204.07(4), Wis. Adm. Code, may not be applied to land without a written approval letter or Form 3400-122 from the Department unless the Permittee has obtained permission from the Department to self approve sites in accordance with s. NR 204.06 (6), Wis. Adm. Code. Analysis of sludge characteristics is required prior to land application. Application on frozen or snow covered ground is restricted to the extent specified in s. NR 204.07(3) (l), Wis. Adm. Code.

5.5.9 Soil Analysis Requirements

Each site requested for approval for land application must have the soil tested prior to use. Each approved site used for land application must subsequently be soil tested such that there is at least one valid soil test in the four years prior to land application. All soil sampling and submittal of information to the testing laboratory shall be done in accordance with UW Extension Bulletin A-2100. The testing shall be done by the UW Soils Lab in Madison or Marshfield, WI or at a lab approved by UW. The test results including the crop recommendations shall be submitted to the DNR contact listed for this permit, as they are available. Application rates shall be determined based on the crop nitrogen recommendations and with consideration for other sources of nitrogen applied to the site.

5.5.10 Land Application Site Evaluation

For non-exceptional quality sludge, as defined in s. NR 204.07(4), Wis. Adm. Code, a Land Application Site Request Form 3400-053 shall be submitted to the Department for the proposed land application site. The Department will evaluate the proposed site for acceptability and will either approve or deny use of the proposed site. The permittee may obtain permission to approve their own sites in accordance with s. NR 204.06(6), Wis. Adm. Code.

5.5.11 Sludge Hauling

If sludge is hauled to another facility, the permittee is required to submit Form 3400-52 to the Department. Information shall include the quantity of sludge hauled, the name, address, phone number, contact person, and permit number of the receiving facility. Form 3400-52 shall be submitted annually by January 31 following each year sludge is hauled.

6 Summary of Reports Due

FOR INFORMATIONAL PURPOSES ONLY

Description	Date	Page
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Operational Evaluation Report	September 30, 2016	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Compliance Alternatives, Source Reduction, Improvements and Modifications Status	September 30, 2017	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Preliminary Compliance Alternatives Plan	September 30, 2018	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Final Compliance Alternatives Plan	September 30, 2019	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Progress Report on Plans & Specifications	September 30, 2020	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Final Plans and Specifications	September 30, 2021	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Treatment Plant Upgrade to Meet WQBELs	December 31, 2021	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Construction Upgrade Progress Report #1	December 31, 2022	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Construction Upgrade Progress Report #2	December 31, 2023	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Complete Construction	August 31, 2024	14
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Achieve Compliance	September 30, 2024	14
Temperature Limits Compliance and Dissipative Cooling Evaluation - Preliminary Compliance Report	December 31, 2016	14
Temperature Limits Compliance and Dissipative Cooling Evaluation - Action Plan	December 31, 2017	14
Temperature Limits Compliance and Dissipative Cooling Evaluation - Construction Plans	June 30, 2018	14
Temperature Limits Compliance and Dissipative Cooling Evaluation - Initiate Actions	December 31, 2018	14
Temperature Limits Compliance and Dissipative Cooling Evaluation - Complete Actions	December 31, 2019	14
CMOM (Capacity, Management, Operation and Maintenance) Program Development -Complete Program Development	August 1, 2016	14
Ammonia Effluent Limits & Facility Modifications -Preliminary	December 31, 2016	14

Compliance Report		
Ammonia Effluent Limits & Facility Modifications -Action Plan	December 31, 2017	14
Ammonia Effluent Limits & Facility Modifications -Construction Plans	June 30, 2018	14
Ammonia Effluent Limits & Facility Modifications -Initiate Actions	December 31, 2018	14
Ammonia Effluent Limits & Facility Modifications -Complete Actions	December 31, 2019	14
Compliance Maintenance Annual Reports (CMAR)	by June 30, each year	16
General Sludge Management Form 3400-48	prior to any significant sludge management changes	24
Characteristic Form 3400-49 and Lab Report	by January 31 following each year of analysis	24
Land Application Report Form 3400-55	by January 31, each year whether or not non-exceptional quality sludge is land applied	24
Report Form 3400-52	by January 31, each year whether or not sludge is hauled, landfilled, incinerated, or exceptional quality sludge is distributed or land applied	25
Wastewater Discharge Monitoring Report	no later than the date indicated on the form	15

Report forms shall be submitted electronically in accordance with the reporting requirements herein. Any facility plans or plans and specifications for municipal, industrial, industrial pretreatment and non industrial wastewater systems shall be submitted to the Bureau of Water Quality, P.O. Box 7921, Madison, WI 53707-7921. All other submittals required by this permit shall be submitted to:
Southeast Region - Waukesha, 141 NW Barstow St., Room 180, Waukesha, WI 53188

Appendix B

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

Notice of Intent to Conduct Water Quality Trading

Form 3400-206 (1/14)

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

Applicant Information

Permittee Name	Permit Number	Facility Site Number
Village of Cross Plains	WI- 0020788-09-0	

Facility Address	City	State	ZIP Code
100 Main Street (USH 14)	Cross Plains	WI	53528

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Jerry Gray	100 Main Street (USH 14)	Cross Plains	WI	53528

Project Name: Cross Plains WWTP Phosphorus Water Quality Trading Plan

Receiving Water Name	Parameter(s) being traded	HUC 12(s)
Black Earth Creek	Total Phosphorus	070700050502

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

Credit Generator Information

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

Are any of the credit generators in a different HUC 12 than the applicant?
- ◉ Yes; HUC 12: 070700050501
- ○ No
- ○ Unsure

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

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

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

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

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

List the practices that will be used to generate credits:

Removal of livestock from barnyard area of privately owned farm.

Method for quantifying credits generated:
- ☐ Monitoring
- ☒ Modeling, Names: BARNY
- ☐ Other: _____

Projected date credits will be available: 10/01/2020

The preparer certifies all of the following:

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

Signature of Preparer	Date Signed
Britt Schmitt	9/26/19

Authorized Representative Signature

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

Signature of Authorized Representative	Date Signed
Jerry Haag V of CP	9/24/19

Appendix C

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

Water Quality Trading Checklist

Form 3400-208 (1/14)

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

Applicant Information

Permittee Name	Permit Number	Facility Site Number
Village of Cross Plains	WI- 0020788-09-0	

Facility Address	City	State	ZIP Code
100 Main Street (USH 14)	Cross Plains	WI	53528

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Jerry Gray	100 Main Street (USH 14)	Cross Plains	WI	53528

Project Name
Cross Plains WWTP Phosphorus Water Quality Trading Plan Development

Receiving Water Name	Parameter(s) being traded	HUC 12(s)
Black Earth Creek	Total Phosphorus	070700050502

Credit Generator Information

Credit generator type (select all that apply):

- ☐ Permitted Discharge (non-MS4CAFO)
- ☐ Permitted MS4
- ☐ Permitted CAFO
- ☐ Urban nonpoint source discharge
- ☒ Agricultural nonpoint source discharge
- ☐ Other - Specify:

Are any of the credit generators in a different HUC 12 than the applicant?
- ◉ Yes; HUC 12: 070700050501
- ○ No

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

Will a broker/exchange be used to facilitate trade?
- ○ Yes *(include description and contact information in WQT plan)*
- ◉ No

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

Are each of the point source credit generators identified in this section in compliance with their WDPES permit requirements?
- ○ Yes
- ○ No

Discharge Type	Permit Number	Name	Contact Information	Trade Agreement Number
○ Traditional ○ MS4 ○ CAFO				
○ Traditional ○ MS4 ○ CAFO				
○ Traditional ○ MS4 ○ CAFO				
○ Traditional ○ MS4 ○ CAFO				
○ Traditional ○ MS4 ○ CAFO				

Point to Point Trades (Traditional Municipal / Industrial, MS4, CAFO) *cont.*

Does plan have a narrative that describes:			Plan Section
a. Summary of discharge and existing treatment including optimization	○ Yes	○ No	
b. Amount of credit being generated	○ Yes	○ No	
c. Timeline for credits and agreements	○ Yes	○ No	
d. Method for quantifying credits	○ Yes	○ No	
e. Tracking and verification procedures	○ Yes	○ No	
f. Location of credit generator in proximity to receiving water and credit user	○ Yes	○ No	
g. Other: ______	○ Yes	○ No	

Point to Nonpoint Trades (Non-Permitted Urban, Agricultural, Other)

Discharge Type	Practices Used to Generate Credits	Method of Quantification	Trade Agreement Number	Have the practice(s) been formally registered?
○ Urban NPS ◉ Agricultural NPS ○ Other	Livestock Removal	BARNY Computer Model	N/A	◉ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part

Does plan have a narrative that describes:			Plan Section
a. Description of existing land uses	◉ Yes	○ No	2.7
b. Management practices used to generate credits	◉ Yes	○ No	5.1
c. Amount of credit being generated	◉ Yes	○ No	5.1
d. Description of applicable trade ratio per agreement/management practice	◉ Yes	○ No	5.1
e. Location where credits will be generated	◉ Yes	○ No	5.1
f. Timeline for credits and agreements	◉ Yes	○ No	5.1
g. Method for quantifying credits	◉ Yes	○ No	5.1

Does plan have a narrative that describes:			Plan Section
h. Tracking procedures	◉ Yes	○ No	6.3
i. Conditions under which the management practices may be inspected	◉ Yes	○ No	6.3
j. Reporting requirements should the management practice fail	◉ Yes	○ No	6.5
k. Operation and maintenance plan for each management practice	◉ Yes	○ No	5.1
l. Location of credit generator in proximity to receiving water and credit user	◉ Yes	○ No	5.1
m. Practice registration documents, if available	◉ Yes	○ No	Appendix K
n. History of project site(s)	◉ Yes	○ No	5.1
o. Other: _____	○ Yes	○ No	

The preparer certifies all of the following:

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

Signature of Preparer	Date Signed
Britt Lochmidt	9/26/19

Authorized Representative Signature

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

Signature of Authorized Representative	Date Signed
Jerry Gray VP/CP	9/24/19

Appendix D

Surface Water Data Viewer Map

Legend

- Station Points with Recent Data (10 years)
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

Notes

0.5 0 0.25 0.5 Miles

NAD_1983_HARN_Wisconsin_TM

1: 15,840

Table: In-Stream Sampling in Black Earth Creek Upstream of Discharge

Month	Total Phosphorus Concentration [mg/L]
May '16	0.027
June '16	0.4
July '16	0.039
August '16	0.05
September '16	0.065
October '16	0.044
May '17	0.04
June '17	0.037
July '17	0.11
August '17	0.037
September '17	0.038
October '17	0.051
MEDIAN	0.042

J:\TCDead\Cross Plains\CP-104-W1 2017 Black Earth Creek\Data\In-Stream Conc\

From:	Evan Chambers
To:	Brett Schmidt
Subject:	FW: Black Earth Creek Study data
Date:	Thursday, September 19, 2019 3:29:18 PM

Evan
Evan D. Chambers, P.E.
echambers@tcengineers.net
Town & Country Engineering, Inc.
2912 Marketplace Drive, Suite 103
Madison, WI 53719
(608) 273-3350

From: Luck, Sarah D - DNR [mailto:Sarah.Luck@wisconsin.gov]
Sent: Thursday, May 9, 2019 4:31 PM
To: Evan Chambers <echambers@tcengineers.net>; Ben Heidemann <ben@tcengineers.net>
Cc: ted@cross-plains.wi.us; Garbe, Amy M - DNR <Amy.Garbe@wisconsin.gov>; Connors, Tanner J - DNR <Tanner.Connors@wisconsin.gov>
Subject: RE: Black Earth Creek Study data

Hi Evan and Ben,

The Department has evaluated the sampling data you submitted for Black Earth Creek, collected between May-October 2016 and 2017, and have calculated the ambient background concentration to be 0.042 mg/L using procedures specified in Section NR 217.13(2)(d), Wis. Adm. Code. Given this background concentration, we anticipate the new phosphorus limits for Cross Plains WWTF will be 0.327 mg/L as a monthly average concentration and 1.6 lbs/day as a monthly average mass limit.

The assumptions used when calculating the limit were: 7-Q_2 of 7.0 cfs, design flow of 0.593 MGD, and a phosphorus criterion of 0.075 mg/L for Black Earth Creek.

Thank you for your patience and quick responses to my questions. If you need anything further from me, please let me know.

Sarah Luck
Phone: (608) 275-3230
Sarah.Luck@Wisconsin.gov

From: Evan Chambers <echambers@tcengineers.net>
Sent: Wednesday, April 3, 2019 9:41 AM
To: Luck, Sarah D - DNR <Sarah.Luck@wisconsin.gov>; Ben Heidemann <ben@tcengineers.net>
Cc: ted@cross-plains.wi.us
Subject: RE: Black Earth Creek Study data

Hi Sarah,

You should be able to download the documents from the link below. Please let me know if there are any issues. Thanks!

https://personal.filesanywhere.com/fs/v.aspx?v=8d726a885d6575af9da6

Evan
Evan D. Chambers, Staff Engineer
echambers@tcengineers.net
Town & Country Engineering, Inc.
2912 Marketplace Drive, Suite 103
Madison, WI 53719
(608) 273-3350 Fax: (608) 273-3391

From: Luck, Sarah D - DNR [mailto:Sarah.Luck@wisconsin.gov]
Sent: Wednesday, April 3, 2019 9:37 AM
To: Evan Chambers <echambers@tcengineers.net>; Ben Heidemann <ben@tcengineers.net>
Cc: ted@cross-plains.wi.us
Subject: Black Earth Creek Study data

Good morning,

I am writing to request the raw data/lab slips from the in-stream sampling study that has been conducted on Black Earth Creek over the past 4+ years on behalf of Cross Plains WWTF. My colleague, Amy Garbe, spoke with the facility last week, and they are interested in having their water quality based effluent limit recalculated using the new background concentration data from this study.

Thanks very much, and please let me know if you have any questions.

Sarah Luck
Water Resources Engineer
Wisconsin Department of Natural Resources
3911 Fish Hatchery Road
Fitchburg, WI 53711
Phone: (608) 275-3230
Sarah.Luck@Wisconsin.gov

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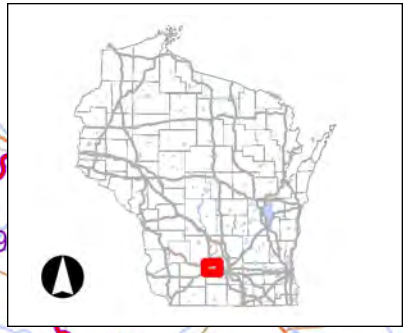
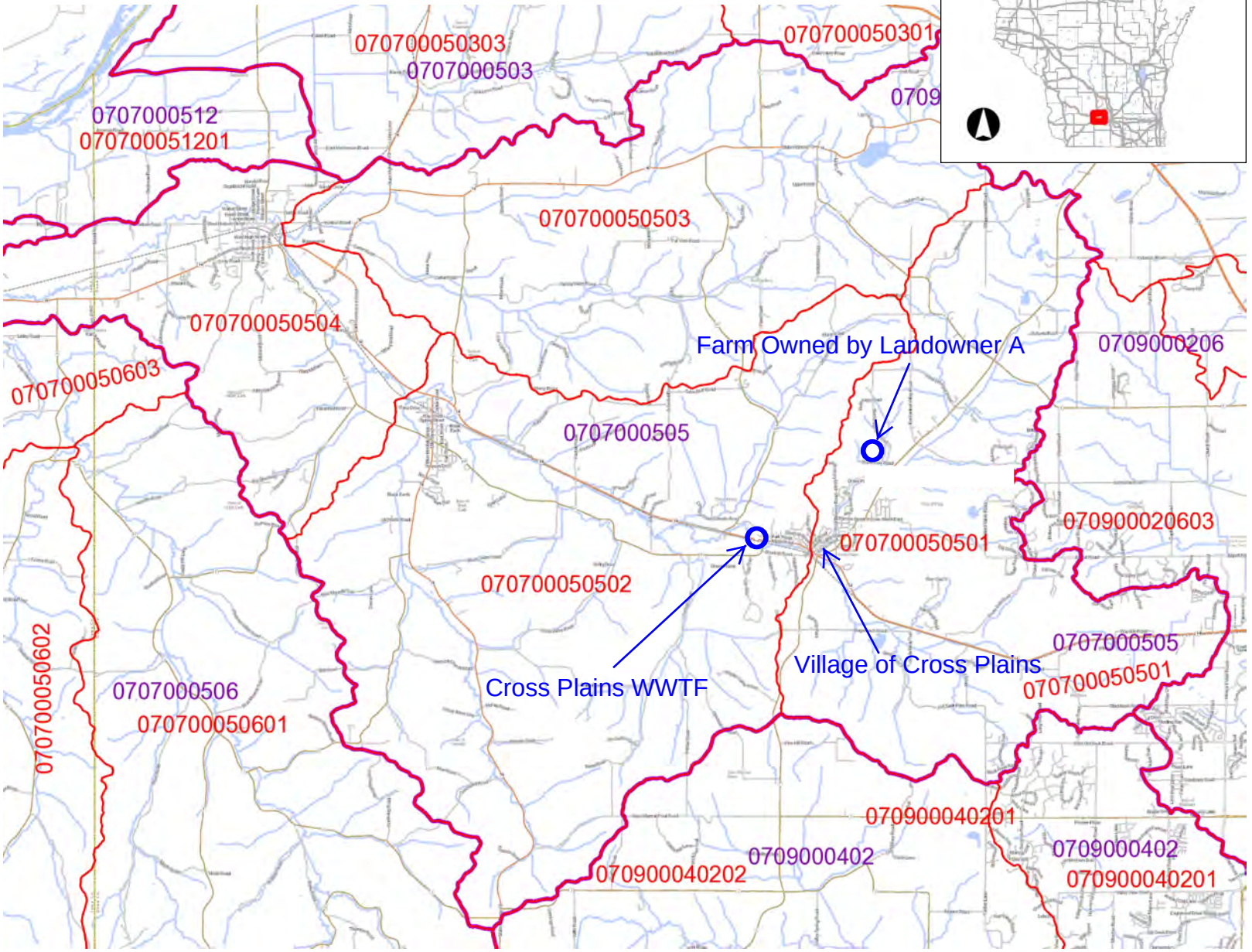
dnr.wi.gov

Appendix E

Sample Point ID	Permit No.	Facility Name	Receiving Water	Major Basin	Watershed Area	Nonpoint Load *	2009-2011 Avg. Upstream Point Source Load	2009-2011 Avg. Point Source Load	Total Load *	Point : Nonpoint Source Ratio *	Nonpoint Source Dominated?	Model Flag
					(mi^2)	(lbs)	(lbs)	(lbs)	(lbs)	(%)		**
52178	61271	EPHRAIM WASTEWATER TREATMENT FACILITY	Lake Michigan	Twin - Door - Kewaunee				45			No Result	
50309	35203	FISH CREEK SD1 WASTEWATER TREATMENT FACILITY	Lake Michigan	Twin - Door - Kewaunee				67			No Result	
49549	28894	FORESTVILLE WASTEWATER TREATMENT FACILITY	Ahnapee River	Twin - Door - Kewaunee	42.2	11411	0	449	11860	4:96	Yes	
47542	20176	KEWAUNEE WASTEWATER TREATMENT FACILITY	Kewaunee River	Twin - Door - Kewaunee	141.4	247710	357	165	248232	0:100	Yes	
50337	35874	KOSSUTH SANITARY DISTRICT NO. 2 WWTF	Unnamed	Twin - Door - Kewaunee	0.9	2314	0	28	2342	1:99	Yes	
58099	61051	MARIBEL WASTEWATER TREATMENT FACILITY	Unnamed	Twin - Door - Kewaunee	2.1	5732	0	254	5986	4:96	Yes	
48044	21369	MISHICOT WASTEWATER TREATMENT FAC	East Twin River	Twin - Door - Kewaunee	114.0	88454	316	0	88770	0:100	Yes	
52224	70581	PACKERLAND WHEY PRODUCTS INC	Unnamed	Twin - Door - Kewaunee	1.9	4527	0	93	4620	2:98	Yes	
49186	26654	SEVASTOPOL SD NO 1 WWTF	Donlans Creek	Twin - Door - Kewaunee	6.6	3524	0	39	3563	1:99	Yes	
48276	22071	SISTER BAY WASTEWATER TREATMENT FACILITY	Lake Michigan	Twin - Door - Kewaunee				133			No Result	
47954	21113	STURGEON BAY UTILITIES WWTF	Lake Michigan	Twin - Door - Kewaunee				1681			No Result	
49174	26590	TWO RIVERS WASTEWATER TREATMENT FACILITY	West Twin River	Twin - Door - Kewaunee	305.9	388941	1149	2928	393018	1:99	Yes	
49653	29343	WI DNR PENINSULA STATE PARK WWTF	Tennison Bay Marsh	Twin - Door - Kewaunee				91			No Result	
48569	23141	ABBOTSFORD WASTEWATER TREATMENT FACILITY	Unnamed	Wisconsin River	0.5	43	63	516	622	93:7	Speak with WDNR Basin Engineer	
86919	57436	ABBYLAND FOODS INC ABBOTSFORD PLANT	Unnamed	Wisconsin River	0.5	33	0	63	96	66:34	Speak with WDNR Basin Engineer	
48571	23159	ADAMS WASTEWATER TREATMENT FACILITY	Little Roche a Cri Creek	Wisconsin River	57.8	5899	0	324	6223	5:95	Yes	
48301	22144	ANTIGO CITY OF	Spring Brook	Wisconsin River	37.8	2364	0	1437	3801	38:62	Yes	
50034	31267	ARPIN WASTEWATER TREATMENT FACILITY	Hemlock Creek	Wisconsin River	5.3	1013	0	589	1602	37:63	Yes	
48365	22365	ATHENS WASTEWATER TREATMENT FACILITY	Black Creek	Wisconsin River	52.8	15762	0	1503	17265	9:91	Yes	
48386	22411	AUBURNDALE WASTEWATER TREATMENT FACILITY	Little Bear Creek	Wisconsin River	1.3	225	0	1227	1452	85:15	Speak with WDNR Basin Engineer	
51916	60151	AVOCA WASTEWATER TREATMENT FACILITY	Morrey Creek	Wisconsin River	18.6	8802	0	481	9283	5:95	Yes	
50818	43974	BADGER ARMY AMMUNITION PLANT	Wisconsin River	Wisconsin River	9010.5	1862130	248920	3320	2114370	12:88	Yes	
47737	20605	BARABOO WASTEWATER TREATMENT FACILITY	Baraboo River	Wisconsin River	573.8	419248	13637	1052	433937	3:97	Yes	
55843	31313	BETHEL CENTER WWTF	Unnamed	Wisconsin River	1.8	178	0	202	380	53:47	Speak with WDNR Basin Engineer	
50165	31950	BLENKER SHERRY SANITARY DISTRICT WWTP	Mill Creek	Wisconsin River	41.8	14454	9271	248	23973	40:60	Yes	
48634	23418	BLUE RIVER WASTEWATER TREATMENT FACILITY	Blue River	Wisconsin River	10614.7	2849180	270204	258	3119642	9:91	Yes	
50410	36749	BOAZ WASTEWATER TREATMENT FACILITY	Mill Creek	Wisconsin River	59.0	62265	0	106	62371	0:100	Yes	
48291	22110	BOSCOBEL WASTEWATER TREATMENT FACILITY	Wisconsin River	Wisconsin River	10762.7	2932360	270462	325	3203147	8:92	Yes	
48298	22136	BROKAW WASTEWATER TREATMENT FACILITY	Wisconsin River	Wisconsin River	3024.9	296700	60605	21	357326	17:83	Yes	
48656	23523	CAMBRIA WASTEWATER TREATMENT FACILITY	North Branch Duck Creek	Wisconsin River	8.7	4624	0	646	5270	12:88	Yes	
50132	31801	CAZENOVIA WASTEWATER TREATMENT FACILITY	Little Baraboo River	Wisconsin River	60.9	65477	0	551	66028	1:99	Yes	
53006	50245	CEDAR GROVE CHEESE FACTORY	Honey Creek	Wisconsin River	43.0	32083	1070	27	33180	3:97	Yes	
49979	30961	CHILI WASTEWATER TREATMENT FACILITY	Unnamed	Wisconsin River	0.7	514	0	252	766	33:67	Yes	
48680	23655	COLBY CITY WWTF	Dill Creek	Wisconsin River	12.9	3897	0	314	4211	7:93	Yes	
52176	61263	CROCKETT'S RESORT	Wisconsin River	Wisconsin River	7763.9	1347750	225538	20	1573308	14:86	Yes	
47811	20788	CROSS PLAINS WASTEWATER TREATMENT FACILITY	Black Earth Creek	Wisconsin River	26.6	12272	0	443	12715	3:97	Yes	
55376	49616	DANE IOWA WASTEWATER COMMISSION WWTF	Black Earth Creek	Wisconsin River	101.9	68697	445	731	69871	2:98	Yes	
49178	26620	DEL MONTE FOODS CAMBRIA PLANT #108	North Branch Duck Creek	Wisconsin River	11.0	6250	686	504	7440	16:84	Yes	
47375	3620	DOMTAR A W LLC	Wisconsin River	Wisconsin River	5543.1	743030	190926	22726	956682	22:78	Yes	
49094	26042	DOMTAR PAPER CO LLC	Wisconsin River	Wisconsin River	3987.6	469069	73114	9982	552165	15:85	Yes	
48251	22004	EAGLE RIVER CITY OF	Eagle River	Wisconsin River	237.7	18506	1142	451	20099	8:92	Yes	
50412	36765	EASTMAN WASTEWATER TREATMENT FACILITY	Pine Creek	Wisconsin River	12.8	13859	0	381	14240	3:97	Yes	
48191	21784	EDGAR WASTEWATER TREATMENT FACILITY	Scotch Creek	Wisconsin River	15.2	7335	0	948	8283	11:89	Yes	
48740	23931	ELROY WASTEWATER TREATMENT FACILITY	Baraboo River	Wisconsin River	65.5	75277	551	1404	77232	3:97	Yes	
47355	3565	ERCO WORLDWIDE (USA) INC - PORT EDWARDS	Wisconsin River	Wisconsin River	5548.6	744793	213873	1826	960492	22:78	Yes	
50061	31411	FENWOOD WASTEWATER TREATMENT FACILITY	Fenwood Creek	Wisconsin River	16.3	7355	0	18	7373	0:100	Yes	
61012	49964	FISH, CRYSTAL AND MUD LAKE REHABILITATION DISTRICT	Wisconsin River	Wisconsin River	9032.0	1863530	252240	387	2116157	12:88	Yes	
47467	4413	FOREMOST FARMS USA - RICHLAND CENTER	Pine River	Wisconsin River	191.1	175589	11939	0	187528	6:94	Yes	
52926	3859	FOREMOST FARMS USA COOP PLOVER	Wisconsin River	Wisconsin River	5163.6	661101	118956	3215	783272	16:84	Yes	
47423	3875	FOREMOST FARMS USA COOP ROTHSCHILD	Wisconsin River	Wisconsin River	4002.2	470291	83096	466	553853	15:85	Yes	
44787	35	FOREMOST FARMS USA REEDSBURG	Baraboo River	Wisconsin River	386.8	314608	5858	38	320504	2:98	Yes	
48337	22268	GAYS MILLS WASTEWATER TREATMENT FACILITY	Kickapoo River	Wisconsin River	616.1	577675	4497	557	582729	1:99	Yes	
50352	35998	GOETZ COMPANIES INC (PORTAGE PETRO TRAVEL P)	Baraboo River	Wisconsin River	648.5	447878	14689	141	462708	3:97	Yes	
51359	51764	GRANDE CHEESE CORP WYOCENA	Unnamed	Wisconsin River	74.6	22121	1190	34	23345	5:95	Yes	
50037	31275	HEWITT SANITARY DISTRICT WWTP	Mill Creek	Wisconsin River	10.3	1596	8683	588	10867	85:15	Speak with WDNR Basin Engineer	
50417	36790	HIGHLAND WASTEWATER TREATMENT FACILITY	Unnamed	Wisconsin River	0.3	163	0	460	623	74:26	Speak with WDNR Basin Engineer	
50316	35483	HILL POINT SANITARY DISTRICT WWTF	Hill Point Creek	Wisconsin River	9.4	11849	0	143	11992	1:99	Yes	
47726	20583	HILLSBORO WASTEWATER TREATMENT FACILITY	West Branch Baraboo River	Wisconsin River	39.3	34508	0	439	34947	1:99	Yes	
51147	49689	HUB ROCK SANITARY DISTRICT #1 WWTF	Pine River	Wisconsin River	121.1	120796	0	231	121027	0:100	Yes	
50183	32085	HUSTLER WASTEWATER TREATMENT FACILITY	Little Lemonweir River	Wisconsin River	37.9	60511	0	103	60614	0:100	Yes	
49401	28070	JUNCTION CITY WASTEWATER TREATMENT FACILITY	Unnamed	Wisconsin River	0.7	280	0	139	419	33:67	Yes	
47704	20516	KENDALL WASTEWATER TREATMENT FACILITY	Baraboo River	Wisconsin River	16.0	18548	0	551	19099	3:97	Yes	
48816	24465	LA FARGE WASTEWATER TREATMENT PLANT	Kickapoo River	Wisconsin River	301.6	287653	2237	560	290450	1:99	Yes	
49545	28878	LA VALLE WASTEWATER TREATMENT FACILITY	Baraboo River	Wisconsin River	307.8	267080	4643	225	271948	2:98	Yes	
52374	36374	LAKE TOMAHAWK TOWNSHIP SANITARY DISTRICT 1	Wisconsin River	Wisconsin River	745.5	47832	1593	460	49885	4:96	Yes	
48514	22837	LAKELAND SANITARY DISTRICT	Tomahawk River	Wisconsin River	71.6	2127	12	502	2641	19:81	Yes	
51824	57738	LAKESIDE FOODS INC. - REEDSBURG	Baraboo River	Wisconsin River	385.7	314535	4868	990	320393	2:98	Yes	
47308	3450	LIGNOTECH USA INC	Wisconsin River	Wisconsin River	3987.3	469036	72778	336	542150	13:87	Yes	
50391	36447	LIME RIDGE WASTEWATER TREATMENT FACILITY	Narrows Creek	Wisconsin River	0.9	462	0	58	520	11:89	Yes	
48538	22918	LODI WASTEWATER TREATMENT FACILITY	Spring Creek	Wisconsin River	37.7	11501	0	986	12487	8:92	Yes	
49604	29114	LOGANVILLE WASTEWATER TREATMENT FACILITY	Narrows Creek	Wisconsin River	43.3	51798	201	284	52283	1:99	Yes	
54387	60488	LYNDON STATION WASTEWATER TREATMENT FACILITY	Lyndon Creek	Wisconsin River	6.8	2012	0	306	2318	13:87	Yes	
47589	20273	MARATHON WATER & SEWER DPT WW TREATMNT PLANT	Big Rib River	Wisconsin River	370.4	110935	2582	813	114330	3:97	Yes	
64228	21024	MARSHFIELD WASTEWATER TREATMENT FACILITY	Mill Creek	Wisconsin River	8.5	1105	0	8683	9788	89:11	Speak with WDNR Basin Engineer	
48848	24635	MAUSTON WASTEWATER TREATMENT FACILITY	Lemonweir River	Wisconsin River	567.0	250955	3782	755	255492	2:98	Yes	
51632	54518	MCCAIN FOODS USA, INC., PLOVER	Wisconsin River	Wisconsin River	5314.4	701691	133627	11250	846568	17:83	Yes	
47532	20150	MERRILL CITY OF	Wisconsin River	Wisconsin River	2750.1	248984	52848	2587	304419	18:82	Yes	

Village of Cross Plains WWTF HUC 10





Legend

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

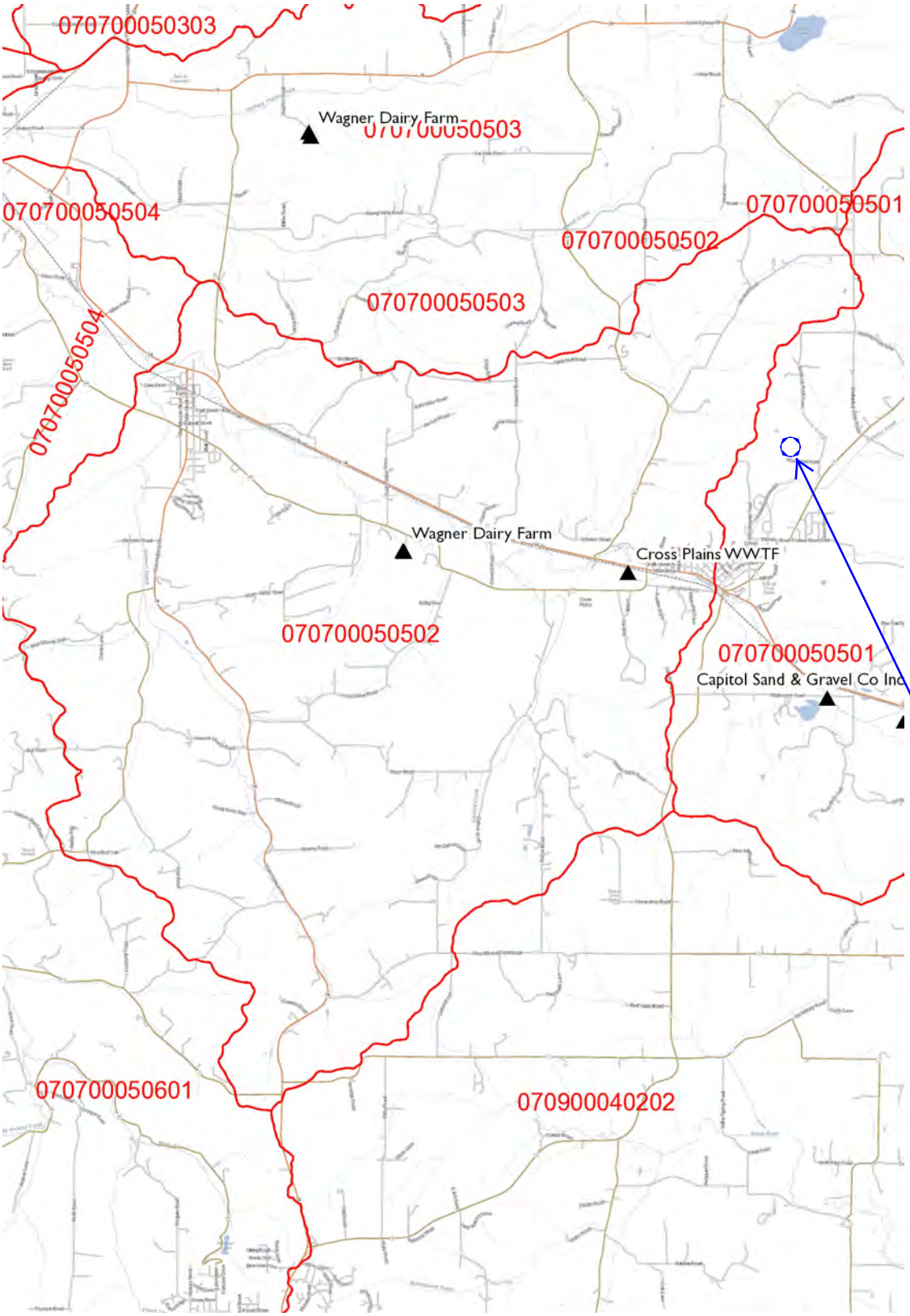
Notes

4.0 0 2.00 4.0 Miles

NAD_1983_HARN_Wisconsin_TM

1: 126,720

Village of Cross Plains WWTF HUC 12



Legend

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

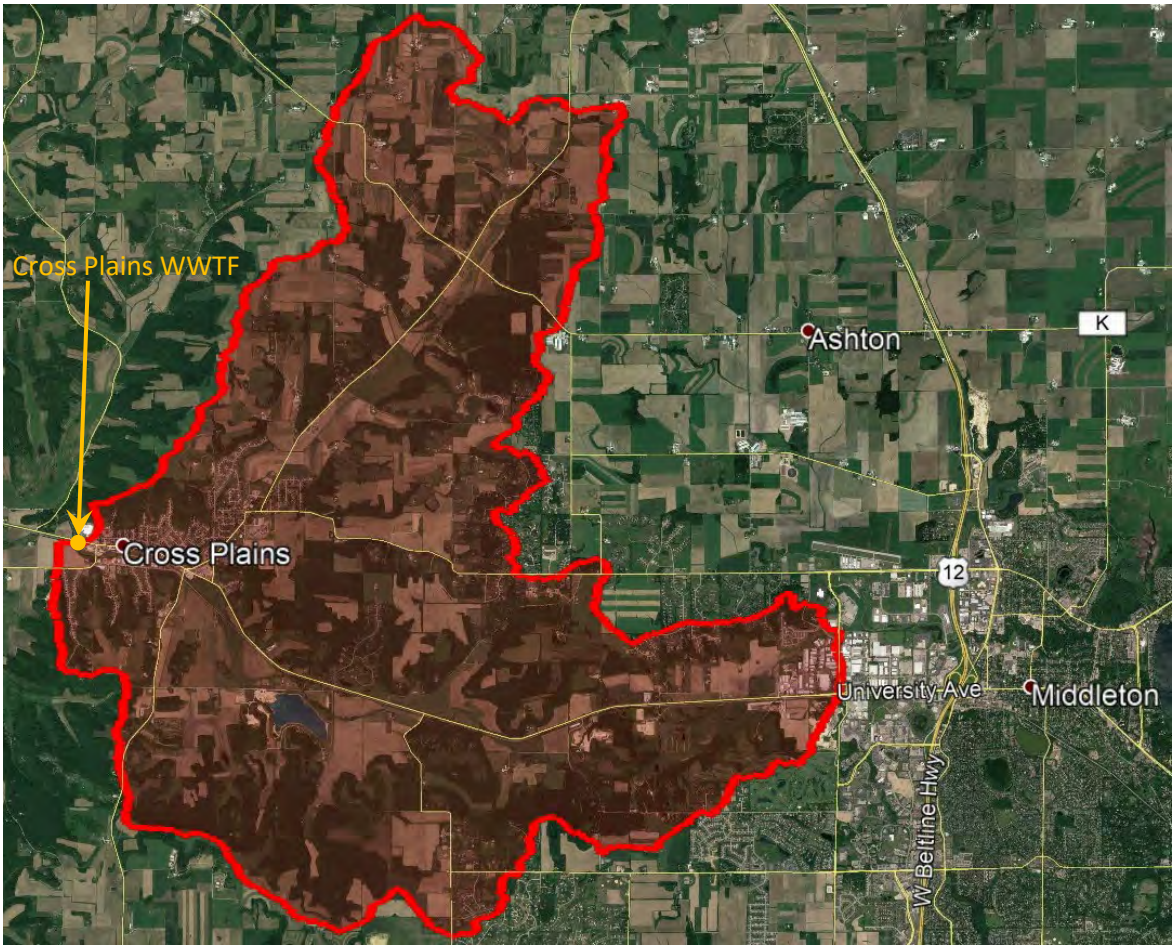
3.0 0 1.50 3.0 Miles

1: 95,040

NAD_1983_HARN_Wisconsin_TM

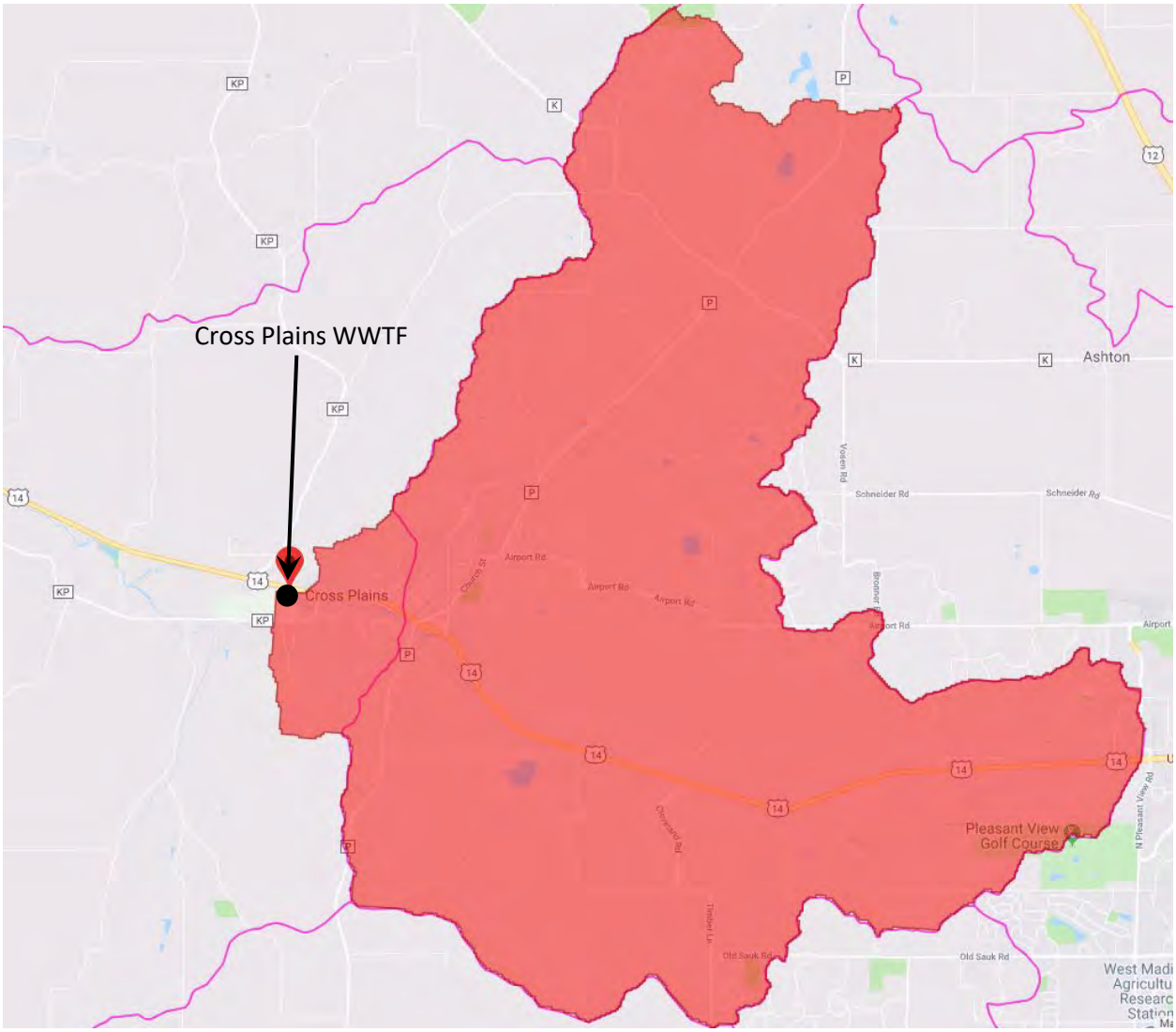
Notes

Map #1 of Watershed Upstream from Cross Plains WWTP



Source: Purdue University's Long-Term Hydrologic Impact Analysis (L-THIA) Model -- http://lthia.agriculture.purdue.edu/

Map #2 of Watershed Upstream from Cross Plains WWTP



Source: Purdue University's Long-Term Hydrologic Impact Analysis (L-THIA) Model -- http://lthia.agriculture.purdue.edu/

Table -- Land Use in HUC-10 (0707000505) Watershed with Cross Plains WWTF and Farm Owned by Landowner A

Land Use	Soil Group	Area [acres]	Sub-Total [acres]	% of Watershed
Open Water	A	6.23		
Open Water	B	178.36	202.60	0.3%
Open Water	D	18.01		
Open Space/Park	A	211.05		
Open Space/Park	B	2004.44	3,023.00	4.5%
Open Space/Park	C	195.26		
Open Space/Park	D	612.25		
Low-Density Residential (general 1/3 - 2 ac lots)	A	190.15		
Low-Density Residential (general 1/3 - 2 ac lots)	B	1264.54	1,712.22	2.5%
Low-Density Residential (general 1/3 - 2 ac lots)	C	40.25		
Low-Density Residential (general 1/3 - 2 ac lots)	D	217.28		
High-density Residential (townhomes to 1/4 ac lots)	A	26.46		
High-density Residential (townhomes to 1/4 ac lots)	B	180.81	227.29	0.3%
High-density Residential (townhomes to 1/4 ac lots)	C	5.34		
High-density Residential (townhomes to 1/4 ac lots)	D	14.68		
Commercial/Industrial/Transportation	A	20.46		
Commercial/Industrial/Transportation	B	66.50	98.97	0.1%
Commercial/Industrial/Transportation	C	5.34		
Commercial/Industrial/Transportation	D	6.67		
Barren Land	A	12.90		
Barren Land	B	14.23	28.91	0.0%
Barren Land	D	1.78		
Deciduous Forest	A	550.65		
Deciduous Forest	B	10509.49	21,969.27	32.7%
Deciduous Forest	C	946.29		
Deciduous Forest	D	9962.84		
Evergreen Forest	A	37.58		
Evergreen Forest	B	138.33	520.17	0.8%
Evergreen Forest	C	20.68		
Evergreen Forest	D	323.58		
	A	2.67		
Mixed Forest	B	44.26	170.36	0.3%
Mixed Forest	C	2.89		
Mixed Forest	D	123.21		
Shrub; Scrub	A	54.71		
Shrub; Scrub	B	543.76	979.66	1.5%
Shrub; Scrub	C	68.28		
Shrub; Scrub	D	312.91		
Grassland; Herbaceous	A	27.13		
Grassland; Herbaceous	B	154.56	317.13	0.5%
Grassland; Herbaceous	C	53.15		
Grassland; Herbaceous	D	109.42		
Pasture/Hay	A	525.30		
Pasture/Hay	B	11601.45	16,699.63	24.8%
Pasture/Hay	C	818.19		
Pasture/Hay	D	3754.69		
Cropland generalized agriculture	A	1627.04		
Cropland generalized agriculture	B	13251.40	20,647.14	30.7%
Cropland generalized agriculture	C	998.33		
Cropland generalized agriculture	D	4770.37		
Woody Wetlands (swamp)	A	8.01		
Woody Wetlands (swamp)	B	26.24	110.31	0.2%
Woody Wetlands (swamp)	C	6.45		
Woody Wetlands (swamp)	D	77.62		
Emergent Wetlands (marsh)	A	18.90		
Emergent Wetlands (marsh)	B	92.96	509.95	0.8%
Emergent Wetlands (marsh)	C	45.81		
Emergent Wetlands (marsh)	D	371.18		
Total		**67,273.30**	**acres**	

Source: Purdue Univ's Long-Term Hydrologic Impact Analysis (L-THIA) Model -- http://lthia.agriculture.purdue.edu/

Table -- Land Use in HUC-12 (070700050502) Watershed with Cross Plains WWTF

Land Use	Soil Group	Area [acres]	Sub-Total [acres]	% of Watershed
Open Water	B	4.89	4.89	0.0%
Open Space/Park	A	0.44		
Open Space/Park	B	582.90	1,015.46	4.2%
Open Space/Park	C	149.23		
Open Space/Park	D	282.89		
Low-Density Residential (general 1/3 - 2 ac lots)	A	1.78		
Low-Density Residential (general 1/3 - 2 ac lots)	B	349.38	455.69	1.9%
Low-Density Residential (general 1/3 - 2 ac lots)	C	10.01		
Low-Density Residential (general 1/3 - 2 ac lots)	D	94.52		
High-density Residential (townhomes to 1/4 ac lots)	A	0.22		
High-density Residential (townhomes to 1/4 ac lots)	B	64.72	71.61	0.3%
High-density Residential (townhomes to 1/4 ac lots)	C	0.22		
High-density Residential (townhomes to 1/4 ac lots)	D	6.45		
Commercial/Industrial/Transportation	B	11.56		
Commercial/Industrial/Transportation	C	0.22	13.11	0.1%
Commercial/Industrial/Transportation	D	1.33		
Barren Land	B	6.45	6.89	0.0%
Barren Land	D	0.44		
Deciduous Forest	A	9.12		
Deciduous Forest	B	3,222.95	9,449.56	38.9%
Deciduous Forest	C	652.28		
Deciduous Forest	D	5,565.21		
Evergreen Forest	A	0.22		
Evergreen Forest	B	25.80	166.79	0.7%
Evergreen Forest	C	20.68		
Evergreen Forest	D	120.09		
Mixed Forest	B	12.45		
Mixed Forest	C	2.89	54.70	0.2%
Mixed Forest	D	39.36		
Shrub; Scrub	A	1.56		
Shrub; Scrub	B	174.36	427.23	1.8%
Shrub; Scrub	C	61.16		
Shrub; Scrub	D	190.15		
Grassland; Herbaceous	B	38.70		
Grassland; Herbaceous	C	44.92	158.57	0.7%
Grassland; Herbaceous	D	74.95		
Pasture/Hay	A	3.78		
Pasture/Hay	B	2,904.03	5,839.42	24.1%
Pasture/Hay	C	585.57		
Pasture/Hay	D	2,346.04		
Cropland generalized agriculture	A	9.12		
Cropland generalized agriculture	B	3,395.08	6,428.99	26.5%
Cropland generalized agriculture	C	709.44		
Cropland generalized agriculture	D	2,315.35		
Woody Wetlands (swamp)	B	6.00		
Woody Wetlands (swamp)	C	6.23	41.36	0.2%
Woody Wetlands (swamp)	D	29.13		
Emergent Wetlands (marsh)	B	19.79		
Emergent Wetlands (marsh)	C	44.70	137.44	0.6%
Emergent Wetlands (marsh)	D	72.95		
Total		**24,271.73**	**acres**	

Source: Purdue Univ's Long-Term Hydrologic Impact Analysis (L-THIA) Model -- http://lthia.agriculture.purdue.edu/

Table -- Land Use in HUC-12 (070700050501) Watershed with Farm Owned by Landowner A

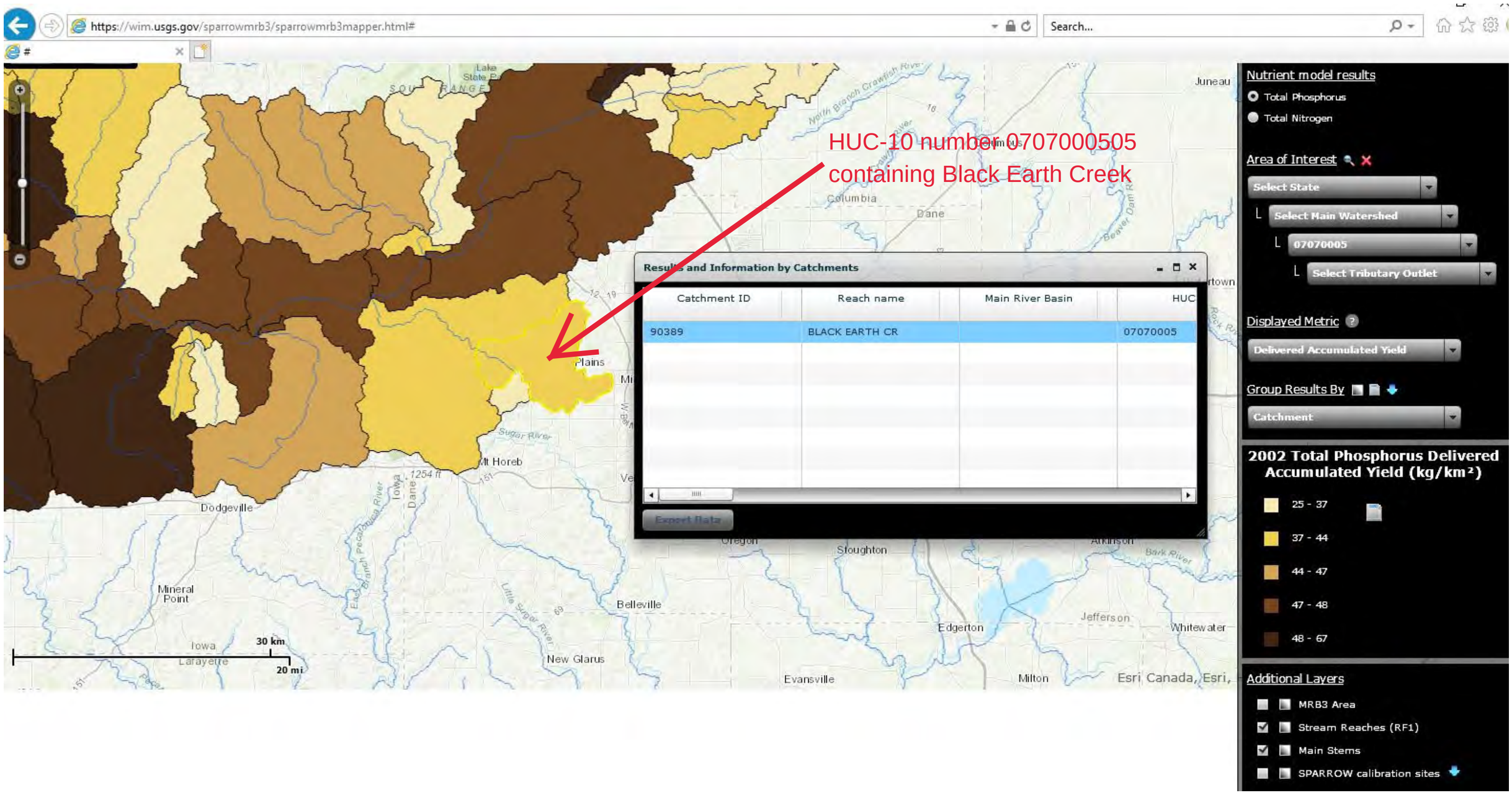
Land Use	Soil Group	Area [acres]	Sub-Total [acres]	% of Watershed
Open Water	A	6.23		
Open Water	B	65.38	75.84	0.5%
Open Water	D	4.23		
Open Space/Park	A	7.56		
Open Space/Park	B	685.2	831.53	5.1%
Open Space/Park	C	17.12		
Open Space/Park	D	121.65		
Low-Density Residential (general 1/3 - 2 ac lots)	A	7.56		
Low-Density Residential (general 1/3 - 2 ac lots)	B	647.61	745.46	4.6%
Low-Density Residential (general 1/3 - 2 ac lots)	C	22.46		
Low-Density Residential (general 1/3 - 2 ac lots)	D	67.83		
High-density Residential (townhomes to 1/4 ac lots)	A	1.11		
High-density Residential (townhomes to 1/4 ac lots)	B	84.51	97.41	0.6%
High-density Residential (townhomes to 1/4 ac lots)	C	5.12		
High-density Residential (townhomes to 1/4 ac lots)	D	6.67		
Commercial/Industrial/Transportation	B	50.71		
Commercial/Industrial/Transportation	C	5.12	61.17	0.4%
Commercial/Industrial/Transportation	D	5.34		
Barren Land	A	2		
Barren Land	B	3.11	6.44	0.0%
Barren Land	D	1.33		
Deciduous Forest	A	9.12		
Deciduous Forest	B	3508.06	4,744.14	29.2%
Deciduous Forest	C	52.49		
Deciduous Forest	D	1174.47		
Evergreen Forest	B	65.83	71.17	0.4%
Evergreen Forest	D	5.34		
Mixed Forest	B	10.23	11.34	0.1%
Mixed Forest	D	1.11		
Shrub; Scrub	A	2.22		
Shrub; Scrub	B	214.83	279.54	1.7%
Shrub; Scrub	C	1.11		
Shrub; Scrub	D	61.38		
Grassland; Herbaceous	B	60.94		
Grassland; Herbaceous	C	2	78.95	0.5%
Grassland; Herbaceous	D	16.01		
Pasture/Hay	A	23.8		
Pasture/Hay	B	3912.81	4,372.95	27.0%
Pasture/Hay	C	62.72		
Pasture/Hay	D	373.62		
Cropland generalized agriculture	A	57.38		
Cropland generalized agriculture	B	3867.22	4,735.45	29.2%
Cropland generalized agriculture	C	43.14		
Cropland generalized agriculture	D	767.71		
Woody Wetlands (swamp)	B	6.45	9.79	0.1%
Woody Wetlands (swamp)	D	3.34		
Emergent Wetlands (marsh)	A	2.89		
Emergent Wetlands (marsh)	B	17.35	100.97	0.6%
Emergent Wetlands (marsh)	D	80.73		
Total		**16,222.15**	**acres**	

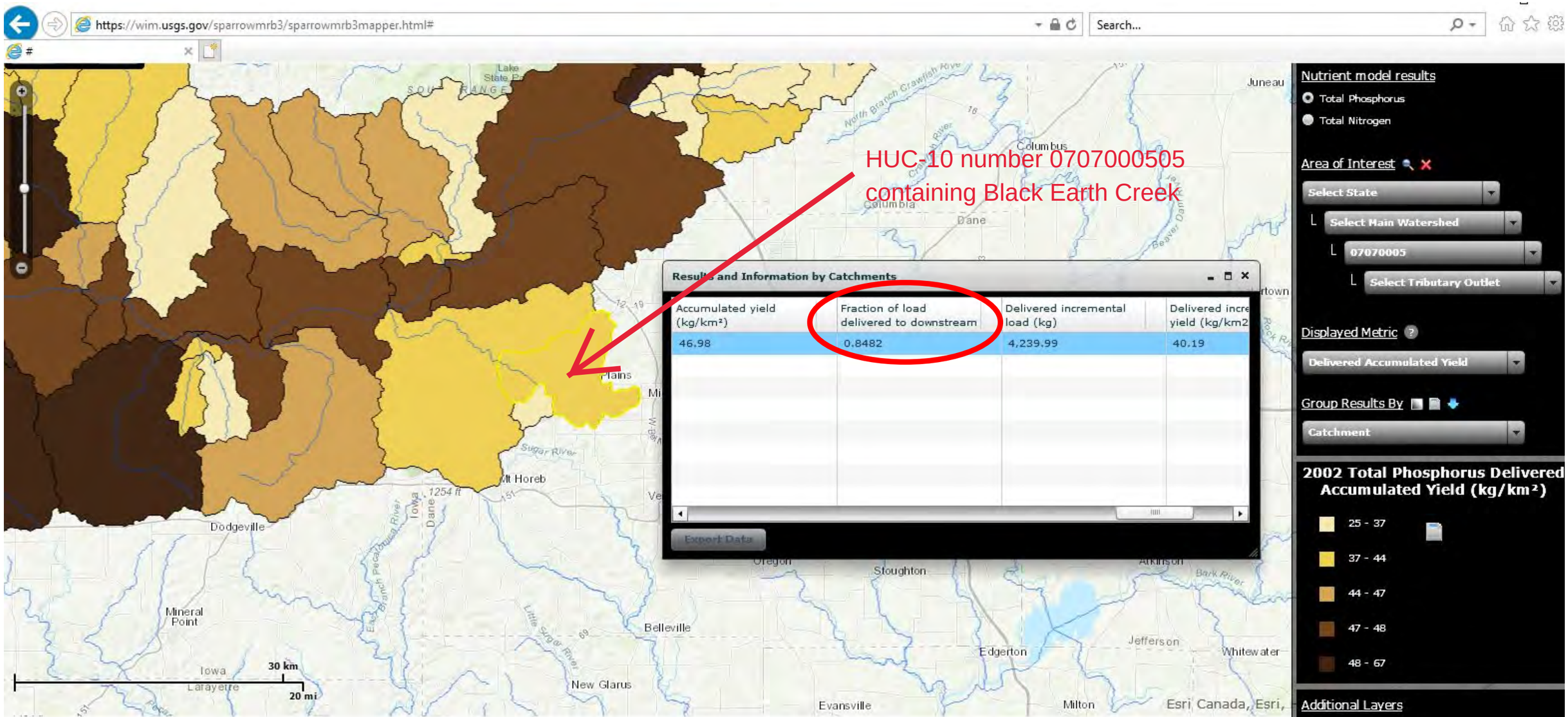
Source: Purdue Univ's Long-Term Hydrologic Impact Analysis (L-THIA) Model -- http://lthia.agriculture.purdue.edu/

Table -- Land Use in Watershed Upstream of Cross Plains WWTF's Discharge Point

Land Use	Soil Group	Area [acres]	Sub-Total [acres]	% of Watershed
Open Water	A	6.23	68.51	0.4%
Open Water	B	58.05		
Open Water	D	4.23		
Open Space/Park	A	7.56	822.42	5.1%
Open Space/Park	B	665.41		
Open Space/Park	C	18.24		
Open Space/Park	D	131.21		
Low-Density Residential (general 1/3 - 2 ac lots)	A	8.45	816.64	5.1%
Low-Density Residential (general 1/3 - 2 ac lots)	B	710.11		
Low-Density Residential (general 1/3 - 2 ac lots)	C	22.91		
Low-Density Residential (general 1/3 - 2 ac lots)	D	75.17		
High-density Residential (townhomes to 1/4 ac lots)	A	1.33	129.66	0.8%
High-density Residential (townhomes to 1/4 ac lots)	B	113.87		
High-density Residential (townhomes to 1/4 ac lots)	C	5.34		
High-density Residential (townhomes to 1/4 ac lots)	D	9.12		
Commercial/Industrial/Transportation	B	55.38	66.06	0.4%
Commercial/Industrial/Transportation	C	5.34		
Commercial/Industrial/Transportation	D	5.34		
Barren Land	A	2.00	7.33	0.0%
Barren Land	B	4.00		
Barren Land	D	1.33		
Deciduous Forest	A	9.12	4,973.63	31.0%
Deciduous Forest	B	3,505.83		
Deciduous Forest	C	52.26		
Deciduous Forest	D	1,406.42		
Evergreen Forest	B	66.27	83.62	0.5%
Evergreen Forest	D	17.35		
Mixed Forest	B	11.79	14.01	0.1%
Mixed Forest	D	2.22		
Shrub; Scrub	A	2.22	293.11	1.8%
Shrub; Scrub	B	213.28		
Shrub; Scrub	C	1.11		
Shrub; Scrub	D	76.50		
Grassland; Herbaceous	B	60.27	82.06	0.5%
Grassland; Herbaceous	C	2.00		
Grassland; Herbaceous	D	19.79		
Pasture/Hay	A	23.80	3,979.99	24.8%
Pasture/Hay	B	3457.35		
Pasture/Hay	C	62.72		
Pasture/Hay	D	436.12		
Cropland generalized agriculture	A	58.93	4,593.56	28.6%
Cropland generalized agriculture	B	3,695.76		
Cropland generalized agriculture	C	42.92		
Cropland generalized agriculture	D	795.95		
Woody Wetlands (swamp)	B	6.45	9.79	0.1%
Woody Wetlands (swamp)	D	3.34		
Emergent Wetlands (marsh)	A	2.89	98.52	0.6%
Emergent Wetlands (marsh)	B	14.90		
Emergent Wetlands (marsh)	D	80.73		
Total		**16,038.89**	**acres**	

Source: Purdue Univ's Long-Term Hydrologic Impact Analysis (L-THIA) Model -- http://lthia.agriculture.purdue.edu/


https://wim.usgs.gov/sparrowmrb3/sparrowmrb3mapper.html#
Search...
HUC-10 number 0707000505
containing Black Earth Creek
Results and Information by Catchments
Catchment ID
Reach name
Main River Basin
HUC
90389
BLACK EARTH CR
07070005
Export Data
Nutrient model results
Total Phosphorus
Total Nitrogen
Area of Interest
Select State
Select Main Watershed
07070005
Select Tributary Outlet
Displayed Metric
Delivered Accumulated Yield
Group Results By
Catchment
2002 Total Phosphorus Delivered Accumulated Yield (kg/km²)
25 - 37
37 - 44
44 - 47
47 - 48
48 - 67
Additional Layers
MRB3 Area
Stream Reaches (RF1)
Main Stems
SPARROW calibration sites
Juneau
Columbia
Dane
Plains
Mt Horeb
Dodgeville
Mineral Point
Belleville
Oregon
Stoughton
Edgerton
Jefferson
Whitewater
Milton
Evansville
New Glarus
Lafayette
Iowa
30 km
20 mi
Esri Canada, Esri,


https://wim.usgs.gov/sparrowmrb3/sparrowmrb3mapper.html#
Search...
HUC-10 number 0707000505
containing Black Earth Creek
Results and Information by Catchments
Accumulated yield (kg/km²)
Fraction of load delivered to downstream
Delivered incremental load (kg)
Delivered incre yield (kg/km2
46.98
0.8482
4,239.99
40.19
Export Data
Nutrient model results
Total Phosphorus
Total Nitrogen
Area of Interest
Select State
Select Main Watershed
07070005
Select Tributary Outlet
Displayed Metric
Delivered Accumulated Yield
Group Results By
Catchment
2002 Total Phosphorus Delivered Accumulated Yield (kg/km²)
25 - 37
37 - 44
44 - 47
47 - 48
48 - 67
Additional Layers
MRB3 Area
Stream Reaches (RF1)
Main Stems
SPARROW calibration sites
Juneau
Columbus
Columbia
Dane
Sugar River
Mt Horeb
Dodgeville
Mineral Point
Iowa
Lafayette
30 km
20 mi
Belleville
New Glarus
Stoughton
Oregon
Edgerton
Jefferson
Whitewater
Evansville
Milton
Esri Canada, Esri,

Appendix F

Aerial Photo of Village of Cross Plains

Legend

- Intermittent Streams
- 24K Hydrography Streams and Rivers
- 24K Hydrography 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
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water
- Index to EN_Image_Basemap_Leaf_Off

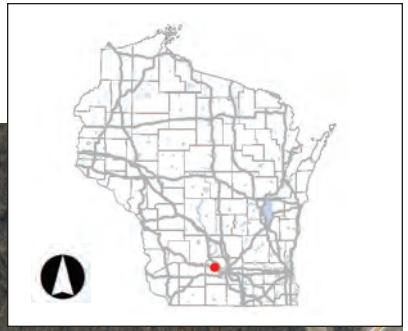
Notes

0.8 0 0.38 0.8 Miles

NAD_1983_HARN_Wisconsin_TM

1: 23,760

Aerial Photo of Property Owner A's Farm



Legend

- Intermittent Streams
- 24K Hydrography Streams and Rivers
- 24K Hydrography 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
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water
- Index to EN_Image_Basemap_Leaf_Off

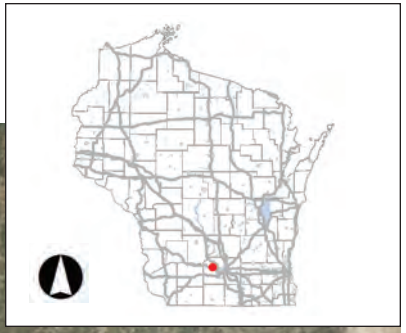
Notes

0.3 0 0.13 0.3 Miles

NAD_1983_HARN_Wisconsin_TM

1: 7,920

Aerial Photo of Barnyard Owned by Property Owner A



Legend

- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

Notes

0.0 0 0.02 0.0 Miles

NAD_1983_HARN_Wisconsin_TM

1: 990

Appendix G

LAND&WATER RESOURCES DEPARTMENT

Laura M. Hicklin, Director
Joe Parisi, Dane County Executive

Administration • Land Conservation • Parks • Water Resource Engineering

April 18, 2019

Note from Town & Country Engineering:
The name of Landowner A have been redacted from this document for privacy reasons. Redactions are shown as follows: [redacted]

Village of Cross Plains
ATTN: Jerry Gray
2417 Brewery Rd
P.O. Box 97
Cross Plains, WI 53528

SUBJECT: **Notice of Potential Conservation Projects and Credit Generation**

Dear Mr. Gray,

On April 10, 2019 Dane County Land & Water Resources Department staff met with the Village of Cross Plains, Town and Country Engineering Inc. and [redacted] to identify any existing sources of total phosphorus being lost from the livestock production area of [redacted]'s Farm. The following is a summary of the sources that were identified along with calculated total phosphorus losses, using best available models, and recommended conservation practices that would generate total phosphorus credits.

1. **Barnyard**
   Four concrete lots were identified on the farmstead. Individual barnyard models (BARNY) were completed to quantify the current total phosphorus loses for each lot (Attachment A). Summary of phosphorus losses are as follows:
   - Lot 1 is 470 ft^2 in size and has twenty 800 pound animals. The current total phosphorus loss from this lot is 2.7 pounds per year.
   - Lot 2 is 550 ft^2 in size and has eighteen 500 pound animals. The current total phosphorus loss from this lot is 6.6 pounds per year.
   - Lot 3 is 2,850 ft^2 in size and has ten 1,400 pound animals. The current total phosphorus loss from this lot is 28.3 pounds per year.
   - Lot 4 is 14,180 ft^2 in size and has eighty five 1,400 pound animals. The current total phosphorus loss from this lot is 133.0 pounds per year.

   Total from Lots = 170.6 pounds of total phosphorus per year

   Recommended Conservation Practices
   Based on discussions with both [redacted] and the Village of Cross Plains parties have agreed that removal and relocation of the existing animals from the Barnyard facilities is appropriate to generate total phosphorus credits. [redacted] has indicated that he would like to keep up to five beef animals on Lot 3. Total phosphorus losses from Lot 3 under

this management scenario shows that 23.3 pounds will continue to be lost annually. Additional conservation practices may result in this loss being further reduced.

Accounting for the relocation of existing animals and the use of Lot 3 for five beef animals' results in 147.3 pounds of total phosphorus being reduced. Note that this does not account for trade ratios. Attachment A shows the total phosphorus loss for Lot 3 under the five beef animal scenario.

Available Pounds of Total Phosphorus from Lots Not Accounting for Trade Ratios = 147.3 pounds per year

2. **Gully Erosion**

Two gullies were identified during the walkover of the farmstead. One gully was located directly downslope of the feed storage area and outlets to an intermittent stream. This gully is identified as Gully #1.The second gully, identified as Gully #2, was located downslope of the barnyard and cuts across the existing pasture. This gully outlets to a road ditch that flows east for about 700 feet before discharging to an intermittent stream. See Attachment C for total phosphorus loss calculations.

- Gully #1 = 9.4 pounds of total phosphorus per year
- Gully #2 = 6.9 pounds of total phosphorus per year

Total from Gully Erosion = 16.3 pounds of total phosphorus per year

Recommended Conservation Practices

Recommended conservation practices to address these sources of phosphors include the design and construction of either a grassed or lined waterway (NRCS 412 or 468). Installation of either of these practices would result in a stable channel to convey the water to an outlet. Stabilization of the cannel would result in the gully erosion no longer occurring and a reduction of 16.3 total pounds of phosphorus being reduced.

Available Pounds of Total Phosphorus from Gully Erosion Not Accounting for Trade Ratios = 16.3 pounds per year

3. **Feed Storage Area**

The farmstead also has two feed storage areas containing silage in plastic bags. These areas are disturbed and have little vegetation with visible signs of runoff and erosion. Currently the Land & Water Resources Department is unaware of any models that are available for calculating phosphorus losses from feed leachate stored in silage bags. However, our staff determined that it was appropriate to use SNAP Plus in modeling current phosphorus losses from the site specifically as it relates to the disturbed area and soil loss. These calculated total phosphorus losses are likely underestimates of the phosphors losses since nutrients associated with the feed are not being accounted for in the model. Model results are in Attachment C.

- Storage Area 1 is 0.31 acres = 2.8 pounds of total phosphorus per year
- Storage Area 2 is 0.16 acres = 1.4 pounds of total phosphorus per year

Total from Feed Storage Areas = 4.2 pounds of total phosphorus per year

Recommended Conservation Practices

Assuming the number of animals on the farmstead will be reduced the continued use of the feed storage areas will likely no longer be needed. If this is the case one potential solution would be to abandon the storage sites and establish permanent vegetation (NRCS 342 – Critical Area Seeding). Should the permanent vegetation be restored the total phosphorus reductions from these areas would be 4.2 pounds.

Available Pounds of Total Phosphorus from Feed Storage Areas Not Accounting for Trade Ratios = 4.2 pounds per year

Should you have any questions regarding the information or calculations provided above please contact Kyle Minks at the Dane County Land & Water Resources Department. My contact information is below.

Sincerely,

Kyle Minks
Dane County Land and Water Resources
5201 Fen Oak Drive, Room 208
Madison, WI 53718
608-224-3675
Minks.kyle@countyofdane.com

Enclosure:
[redacted] Attachments

Cc: Ben Heidemann, Vice President – Town and Country Engineering, Inc.

Attachment A

EXISTING BUFFER P OUTPUT (Based on BARNY)

Farmer: [redacted] Planner/Designer: Lambert Date: 4/15/19

Barny 1

	Input	Output	
Closest City of similar climate:	1		1 Madison 2 Appleton 3 Wausau 4 Eau Claire
Paved lot area:	470		sq ft
Earth lot area:	0		sq ft
Animal Lot size:		470	sq ft
Is there a designed settling basin?	2		Yes= 1; No= 2
Animals on lot:	20 number		number
Type of animal:	1		(Dairy = 1;Beef=2)
Ave. Animal Weight:	800 lbs		lbs
Lot Use:	1		1= Heavy;2=Med;3= Light)

TRIBUTARY AREAS

Tributary area:	sq ft		sq ft
Runoff Curve Number:			← See RCN tab below for typical values
Roof Trib. area:	sq ft		

2.7 lbs P per year at downstream lot edge

Enter Existing Buffer Data:

Length:		ft
Width:		ft
Buffer area:		
Slope:		%
c value		For c values see table below

P Output: lb

EXISTING BUFFER P OUTPUT (Based on BARNY)

Farmer: [redacted] Planner/Designer: Lambert Date: 4/15/19

Barny 2

	Input	Output	
			1 Madison 2 Appleton
Closest City of similar climate:	1		3 Wausau 4 Eau Claire
Paved lot area:	550		sq ft
Earth lot area:	0		sq ft
Animal Lot size:		550	sq ft
Is there a designed settling basin?	2		Yes= 1; No= 2
Animals on lot:	18 number		number
Type of animal:	1		(Dairy = 1;Beef=2)
Ave. Animal Weight:	500 lbs		lbs
Lot Use:	1		1= Heavy;2=Med;3= Light)

TRIBUTARY AREAS

Tributary area:		sq ft	sq ft
Runoff Curve Number:			← See RCN tab below for typical values
Roof Trib. area:	375	sq ft	

6.6 lbs P per year at downstream lot edge

Enter Existing Buffer Data:

Length:		ft
Width:		ft
Buffer area:		
Slope:		%
c value		For c values see table below

P Output: lb

EXISTING BUFFER P OUTPUT (Based on BARNY)

Farmer: [redacted] Planner/Designer: Lambert Date: 4/15/19

Barny 3

	Input		
			1 Madison 2 Appleton
Closest City of similar climate:	1		3 Wausau 4 Eau Claire
Paved lot area:	2,850	sq ft	
Earth lot area:	0	sq ft	
Animal Lot size:		2,850 sq ft	
Is there a designed settling basin?	2	Yes= 1; No= 2	

Animals on lot:	10	number	number	
Type of animal:	1			(Dairy = 1;Beef=2)
Ave. Animal Weight:	1,400	lbs	lbs	
Lot Use:	2			1= Heavy;2=Med;3= Light)

TRIBUTARY AREAS

Tributary area:	900	sq ft	sq ft	
Runoff Curve Number:	82			← See RCN tab below for typical values
Roof Trib. area:	1,705	sq ft		

28.3 lbs P per year at downstream lot edge

Enter Existing Buffer Data:

Length:		ft
Width:		ft
Buffer area:		
Slope:		%
c value		For c values see table below

P Output: lb

EXISTING BUFFER P OUTPUT (Based on BARNY)

Farmer: [redacted] Planner/Designer: Lambert Date: 4/15/19

Barny 4

	Input		
			1 Madison 2 Appleton
Closest City of similar climate:	1		3 Wausau 4 Eau Claire
Paved lot area:	14,180	sq ft	
Earth lot area:	0	sq ft	
Animal Lot size:		14,180 sq ft	
Is there a designed settling basin?	2	Yes= 1; No= 2	

Animals on lot:	85	number		number
Type of animal:	1			(Dairy = 1;Beef=2)
Ave. Animal Weight:	1,400	lbs		lbs
Lot Use:	1			1= Heavy;2=Med;3= Light)

TRIBUTARY AREAS

Tributary area:	1,065	sq ft		sq ft
Runoff Curve Number:	98		←	See RCN tab below for typical values
Roof Trib. area:	4,515	sq ft		

133.0 lbs P per year at downstream lot edge

Enter Existing Buffer Data:

Length:		ft
Width:		ft
Buffer area:		
Slope:		%
c value		For c values see table below

P Output: lb

EXISTING BUFFER P OUTPUT (Based on BARNY)

Farmer: [redacted] Planner/Designer: Lambert Date:

Barny 3 with Beef

	Input		
			1 Madison 2 Appleton 3 Wausau 4 Eau Claire
Closest City of similar climate:	1		
Paved lot area:	2,850	sq ft	
Earth lot area:	0	sq ft	
Animal Lot size:		2,850 sq ft	
Is there a designed settling basin?	2		Yes= 1; No= 2
Animals on lot:	5 number		number
Type of animal:	2		(Dairy = 1;Beef=2)
Ave. Animal Weight:	1,400 lbs		lbs
Lot Use:	3		1= Heavy;2=Med;3= Ligh

TRIBUTARY AREAS

Tributary area:	900	sq ft		sq ft
Runoff Curve Number:	82			← See RCN tab b for typical value
Roof Trib. area:	1,705	sq ft		

23.3 lbs P per year at downstream lot edg

Enter Existing Buffer Data:

Length:		ft
Width:		ft
Buffer area:		
Slope:		%
c value		For c values see table below

P Output: lb

Attachment B

Gully#	A	B	C	D	E	F	G	H	I	J	Phosphorus Reduction (pounds)
#1	2.5	3.0	1.5	150	95	5	3.4	67	8.0	1.17	9.36
#2	2.5	3.5	1.75	270	95	20	4.4	128	4.2	1.65	6.93
Total											16.3

SOIL LOSS FROM GULLY = A x [(B + C) / 2] x D x E ÷ 2000 (pounds/ton) ÷ F

INITIAL SURFACE TOTAL PHOSPHORUS = $[13 + (2.7 \times G) + (0.03 \times H)]^2 \times 0.002$ (lbs/ton).

PHOSHORUS REDUCTION = I x J

A = Channel Depth (feet)

B = Top Channel Width (feet)

C = Bottom Channel Width (feet)

D = Channel Length (feet)

E = Soil Weight (pounds/feet^3)

F = Formation Time (years)

G = organic matter % from soil test

H = soil test P (ppm)

I = Soils Loss from Gully (tons/year)

J = Initial Surface Total Phosphorus (pounds/ton of soil)

Attachment C

NM3: Field Data and 590 Assessment Plan

Reported For	Feed Storage Area
Printed	2019-04-17
Plan Completion/Update Date	2019-04-17
SnapPlus Version 18.1 built on 2019-01-08	
H:\LCD\Projects\Cross Plains\[redacted]Feed Storage Area.snapDb	

Prepared for:
Feed Storage Area
attn:Feed Storage Area

Field Data: 0 Total Acres Reported.

Field Name	SubFarm	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	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
Storage Area 1				0.3	Dane	KIDDER KrE2	8	60	6.1 - 12	1001 - 5000	No / No	No	No	Pdl-Pdl	None-None	2019-2020	5	7.9	-0.3	9	67	0	0
Storage Area 2				0.1	Dane	KIDDER KrE2	8	60	6.1 - 12	1001 - 5000	No / No	No	No	Pdl-Pdl	None-None	2019-2020	5	7.9	-0.3	9	67	0	0

Crop Abbreviations	
Abbreviation	Crop
Pdl	Pasture, dry lot, exercise area

Tillage Abbreviations	
Abbreviation	Tillage
None	None

Site Photos

Lot 1

Lot 2

Lot 3

Lot 4

Barnyards

Gully #1

Gully #2

Storage Area 1

Storage Area 2

Appendix H

Photographs of Barnyard Area of Farm Owned by Landowner A

Photographs of Barnyard Area of Farm Owned by Landowner A

Photographs of Barnyard Area of Farm Owned by Landowner A

Photographs of Barnyard Area of Farm Owned by Landowner A

Photographs of Barnyard Area of Farm Owned by Landowner A

Photographs of Barnyard Area of Farm Owned by Landowner A

Photographs of Barnyard Area of Farm Owned by Landowner A

Appendix I

From: Garbe, Amy M - DNR [mailto:Amy.Garbe@wisconsin.gov]
Sent: Thursday, March 28, 2019 4:14 PM
To: Ben Heidemann <ben@tcengineers.net>; Evan Chambers <echambers@tcengineers.net>
Subject: Cross Plains WQT Follow-up Clarification

Hello,

I was able to confer with the other trading coordinators after our discussion on Cross Plains today.

1) Cattle – it is not necessary to sell the cattle outside of the watershed to generate credits. If the farmer was going to move the animals to a different field/barnyard than additional conversations would need to take place to make sure the pollutant isn't just being "shifted" to a different area. In the case of the cows being sold and the barnyard going out of production, no further tracking of the animal is needed and no special selling requirements are needed
2) Uncertainty factor – the Village of Hawkins received an uncertainty factor of 1 due to going to perennial vegetation. A similar uncertainty factor can be applied here; however, it will ultimately depend on what the final land use will be and the details surrounding the actual abandoning of the barnyard. There is a potential that it could go up to an uncertainty factor of 2.

Let me know if you have any other questions.

Thanks,

Amy Garbe

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Amy Garbe, P.E.
Wastewater Engineer
Wisconsin Department of Natural Resources
South Central Region
141 NW Barstow St Rm 180
Waukesha, WI 53188
Phone: (262) 574-2135
Amy.Garbe@wisconsin.gov

Appendix J

Village of Cross Plains
Department of Public Facilities

P.O. Box 97
Cross Plains, WI 53528

Jerry Gray
Director of Public Facilities

PH 608.235.1054
FAX 608.798.0314

April 8, 2020

Wisconsin Department of Natural Resources
Bureau of Water Quality
P.O. Box 7921
Madison, WI 53707-7921

RE: Certification Statement of Water Quality Trading Agreement
WPDES Permit No. WI-0020788-09-0
Facility Address: 1000 Main Street (USH 14)

To Whom It May Concern,

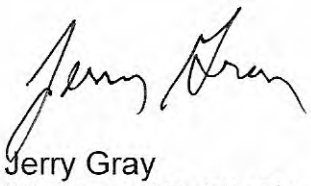
I, Jerry Gray, Director of Public Facilities for the Village of Cross Plains, hereby attest that the Village of Cross Plains, the Credit User, has entered a legally binding Water Quality Trading Agreement for phosphorus credits with the Credit Generator, Landowner A. A Water Quality Easement has also been established between the parties. Both documents were entered into on the 6th of May, 2019 for a duration of 30 years.

Specific restrictions of the Credit Generator under this agreement are as follows:

- For a period of 30 years from the date of this Easement, Grantor shall have no milking cows on the Premises and shall have no more than 5 beef cattle or other livestock on the Premises at any given time.
- The removal of the milking cows from the Premises and the subsequent cleaning of the concrete barnyard on the Premises shall occur no later than December 31, 2019. Verified clean on October 30, 2019. The concrete barnyard shall be maintained in clean condition during the duration of this Easement.

Sincerely,

Village of Cross Plains



Jerry Gray
Director of Public Facilities – Village of Cross Plains

Enclosures

cc: Mr. Bill Chang, Village of Cross Plains Administrator/Clerk *(via email)*
Mr. Ben Heidemann, Town & Country Engineering *(via email)*

Appendix K

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

Water Quality Trading Management Practice Registration

Form 3400-207 (R 1/14)

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

Applicant Information

Permittee Name	Permit Number	Facility Site Number
Village of Cross Plains	WI- 0020788-09-0	

Facility Address	City	State	ZIP Code
100 Main Street (USH 14)	Cross Plains	WI	53528

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Jerry Gray	100 Main Street (USH 14)	Cross Plains	WI	53528

Project Name
Cross Plains WWTP Phosphorus Water Quality Trading Plan

Broker/Exchange Information (if applicable)

Was a broker/exchange be used to facilitate trade? ○ Yes ◉ No

Broker/Exchange Organization Name	Contact Name	
Address	Phone Number	Email

Trade Registration Information (Use a separate form for each trade agreement)

Type	Trade Agreement Number	Practices Used to Generate Credits	Anticipated Load Reduction	Trade Ratio	Method of Quantification
○ Urban NPS ◉ Agricultural NPS ○ Other		Removal of Livestock from Barnyard Area of Farm	147.3	1.2	BARNY Computer Model

County	Closest Receiving Water Name	Land Parcel ID(s)	Parameter(s) being traded
Dane	Brewery Creek	004/0807-352-8030-0	Total Phosphorus

The preparer certifies all of the following:

- I have completed this document to the best of my knowledge and have not excluded pertinent information.
- I certify that the information in this document is true to the best of my knowledge.

Signature of Preparer	Date Signed
Brett Schitt	9/26/19

Authorized Representative Signature

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

Signature of Authorized Representative	Date Signed
Jerry Gray VP CP	9/24/19

Leave Blank – For Department Use Only

Date Received		Trade Docket Number
Entered in Tracking System ☐ Yes	Date Entered	Name of Department Reviewer

Appendix L

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

Notification of Water Trade Agreement Termination

Form 3400-209 (1/14)

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

Applicant Information

Permittee Name	Permit Number	Facility Site Number
Village of Cross Plains	WI- 0020788-09-0	

Facility Address	City	State	ZIP Code
100 Main Street (USH 14)	Cross Plains	WI	53528

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Jerry Gray	100 Main Street (USH 14)	Cross Plains	WI	53528

Project Name
Cross Plains WWTP Phosphorus Water Quality Trading Plan

Credit Generator Information

Credit generator type (select all that apply):

- ☐ Permitted Discharge (non-MS4/CAFO)
- ☐ Permitted MS4
- ☐ Permitted CAFO
- ☐ Urban nonpoint source discharge
- ☒ Agricultural nonpoint source discharge
- ☐ Other - Specify:

Trade Agreement number(s) to be terminated including affected land parcel ID(s):

Amount of trading credit being terminated	Effective date of termination

Reason for termination

Is this agreement being updated or replaced?

- ◯ Yes
- ◯ No
- ◯ Unsure

Will this termination result in non-compliance with the effective limit or other permit requirements?

- ◯ Yes; Name: _____
- ◯ No
- ◯ Unsure

The preparer certifies all of the following:

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

Signature of Preparer	Date Signed

Authorized Representative Signature

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

Signature of Authorized Representative	Date Signed