WATERSHED ADAPTIVE MANAGEMENT PLAN

Village of Blue Mounds, Wisconsin
Wastewater Treatment Facility

February 2019

TOWN & COUNTRY
ENGINEERING, INC.

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1. INTRODUCTION AND BACKGROUND

1.1 Introduction

In 2010 the State of Wisconsin modified NR 102 and NR 217 to include new water quality based effluent limits for phosphorus. As a result, wastewater treatment facilities (WWTF) have begun to receive water quality based phosphorus limits in their new or re-issued Wisconsin Pollutant Discharge Elimination System (WPDES) permits from the Department of Natural Resources (DNR). As a part of the new rule, WPDES permits include a compliance schedule to evaluate compliance with these new effluent limits. The Blue Mounds WWTF received a re-issued permit in December of 2013. The current permit includes an interim phosphorus limit of 7.5 mg/L for monthly averages, a compliance schedule of 7-9 years with annual requirements, and target effluent limits of 0.075 mg/L for a 6-month average and 0.225 mg/L for monthly averages.

The Village of Blue Mounds evaluated compliance options in the January 2018 Phosphorus Compliance Alternatives Plan and selected Adaptive Management, after a pilot study with SorbX, (RE-100) did not achieved the WWTF's goal of consistently reaching phosphorus concentrations below 0.075 mg/L.

1.2 Existing Facilities

The Village of Blue Mounds WWTF is located on the southwest side of the Village and was constructed in 1996. In the spring of 2015, the Village completed the installation of a new mechanical bar screen and enclosure structure at the headworks of the facility. Following screening, wastewater flows by gravity to the two-channel oxidation ditch for treatment. Mixed liquor flows from the ditch to a splitter box where flow is diverted to the 24-foot diameter final clarifier before being discharged to the headwaters of the Williams-Barneveld Creek. Effluent disinfection is currently not required at the facility. Effluent flow is measured and sampled before flowing by gravity to the receiving water.

Biological or chemical phosphorus treatment was not designed for this facility; therefore any uptake of phosphorus that is currently occurring within the oxidation ditch is inherent to the activated sludge process. Solids are removed by the center clarifier and wasted solids are pumped to aerobic digesters. Liquid decant from the digesters is returned for processing. Thickened sludge is pumped to sludge storage until land application occurs. A site plan of the treatment plant is included in Appendix A.

Wastewater flowing to the WWTF comes from a combination of residential and commercial sources. The population of the Village is 895 people based upon the 2015 Department of Administration (DOA) population estimate. The Village does not include any significant industrial dischargers and hauled waste is limited to holding tank waste from Dairyfood, USA, a user that is not connected to the sewer

system. Current flow and loadings based on data from the past 3 years are summarized in Table 1-1, along with design values for the facility.

Table 1-1
Blue Mounds WWTF Loadings Summary

Parameter	Current	Design	% Design
Average Flow (MGD)	0.056	0.101	55%
BOD (lbs/day)	104	238	44%
TSS (lbs/day)	124	235	53%

1.3 Phosphorus Compliance Evaluation

Per the requirements of the 2013 WPDES permit Phosphorus Compliance Schedule, the Village of Blue Mounds conducted a phosphorus compliance evaluation for the treatment facility which consisted of a series of annual reports.

The year one report consisted of generating an Optimization Plan for the facility. This Optimization Plan identified the following "Action Plans" to improve (reduce) phosphorus discharges from the WWTF:

1. Influent Phosphorus Testing
    a. Bi-weekly sampling of influent
2. Collect Hauled Waste Data
3. Review and Optimize Aerobic Digestion Decant

The year two report consisted of a phosphorus planning update, which summarized the progress on the plant optimization, as well as identified the possible compliance options for the facility. The compliance options included:

1. Mechanical upgrade to the existing facility
2. New treatment technologies-alternate chemical addition
3. Consolidation with nearby sewerage system
4. Alternative discharge locations
5. Watershed based approaches
    a. Water Quality Trading
    b. Watershed Adaptive Management
6. Water quality variance
7. Multi-discharger phosphorus variance

The year three report consisted of a Phosphorus Compliance Alternatives Plan. In this plan, the alternatives from the year two report were evaluated based on economic and non-economic factors. Economic evaluations considered capital and operational costs through a present worth analysis. Non-economic evaluation considered the feasibility, long term benefit to the Village, and environmental benefits of each alternative.

The lowest cost, feasible alternative was found to be Advanced Treatment using SorbX® (now RE-100), Water Quality Trading without treatment, followed by Watershed Quality Trading with treatment. It was recommended that RE-100 be pilot tested to confirm that it can effectively remove phosphorus to achieve the

0.075 mg/L WQBEL. In summer of 2017, a pilot test for RE-100 was completed onsite for four months. The intent of the pilot study was to determine the feasibility and dose required to achieve an effluent total phosphorus concentration less than the proposed 6 month average limit of 0.075 mg/L. The average effluent total phosphorus concentration during the study was 0.10 mg/L, with only 3 of the 18 sample results having a concentration less than 0.075 mg/L. Based on the results of the pilot test using RE-100, achieving future permit limits does not appear to be feasible based upon the originally estimated dosages.

The year four report consisted an updated evaluation of the compliance alternatives, with RE-100 having been ruled out as a feasible option. The results of the alternatives comparison were that the lowest cost feasible alternatives for compliance with the Blue Mounds WWTF's WPDES permit effluent phosphorus limit of 0.075 mg/L was Water Quality Trading, followed by Water Quality Trading with supplemental traditional treatment, then Watershed Adaptive Management. These alternatives had a present worth value within 10%, and therefore were deemed equal in terms of estimated costs. The recommended alternative was to pursue a Watershed Adaptive Management Plan. This alternative was the lowest cost commitment for the Village's next permit term and allowed the Village to better assess the viability of the plan after the first 5 years.

1.4 Adaptive Management Eligibility

A permittee is eligible for Watershed Adaptive Management (WAM) as long as the following three requirements are met:

1. The receiving water is exceeding the applicable water quality criterion (WQC) for phosphorus, which is 0.075 mg/L for Williams-Barneveld Creek.
2. Filtration or equivalent technology would be required to meet the proposed/new phosphorus limit.
3. Nonpoint sources contribute at least 50% of the total phosphorus entering the receiving water.

Based on these requirements, the Village of Blue Mounds is eligible for WAM. It is expected that tertiary filtration (such as deep bed, continuously backwashing sand filtration, cloth media filtration, or membrane filtration) or an equivalent technology, in conjunction with chemical coagulation and/or polymer additions, would be required to meet the 0.075 mg/L limit. Based on in-stream sampling conducted by the Village between June and October of 2018, the receiving water is exceeding the applicable phosphorus criteria of 0.075 mg/L. Per the DNR's PRESTO-Lite report, Appendix C, the point to non-point source phosphorus ratio is 4:96 for the 35.4 square mile watershed upstream of the compliance point.

Only three data points for Williams-Barneveld Creek in-stream phosphorus concentrations are available from the DNR's Surface Water Data Viewer mapping software, the nearest one at Station 10012833 Williams-Barneveld Creek-Prairie Grove Rd, which is approximately 4.5 miles downstream of the WWTF compliance point. The total phosphorus concentrations at this point were 0.080 mg/L when

sampled in September 2010, and 0.05 mg/L when sampled in August 2010. The other sampling point is at Station 10020973 Williams-Barneveld Creek at Mounds View Road, which is approximately 6 miles downstream of the WWTF compliance point. The total phosphorus concentrations at this point was 0.193 mg/L when sampled in June 2007. The Village has collected five sets of samples between June 2018 and October 2018 upstream of the Blue Mounds outfall, at the outfall, and at the proposed compliance point, as shown in Appendix I. The respective median in-stream phosphorus concentrations were 0.18 mg/L, 2.16 mg/L and 0.65 mg/L. The points provide limited data for evaluation of the total phosphorus concentration in Williams-Barneveld Creek, so additionally sampling will be taken to confirm eligibility, as described in Section 3.3.2.

The Village plans on meeting the interim phosphorus limit by Jan 1 2022, and will submit an abbreviated facilities plan to the DNR for the phosphorus treatment upgrade prior to the beginning of the project.

1.5 Adaptive Management Plan Components

The DNR has created a guideline for a successful Adaptive Management Program, which is outlined below and addressed in the subsequent chapters. The components to develop a successful management plan include:

1. Identify partners
2. Describe the watershed and set load reduction goals
3. Conduct a watershed inventory
4. Identify where reductions will occur
5. Describe management measures
6. Estimate load reductions expected by permit term
7. Measuring success
8. Financial security
9. Implementation schedule with milestones

A schedule of where these components will be addressed is included in Table 1-2.

Table 1-2
DNR Adaptive Management Components

Component	Addressed in
Identify Partners	Section 4.1
Describe the watershed and set load reduction goals	Sections 2 & 3
Conduct a watershed inventory	Section 3
Identify where reductions will occur	Section 4.2
Describe management measures	Section 4.3
Estimate load reductions expected by permit term	Section 3.4
Measuring success	Sections 3.3.2, 5.8 & 5.9
Financial security	Section 6
Implementation schedule with milestones	Section 5.10

2. WATERSHED DESCRIPTION

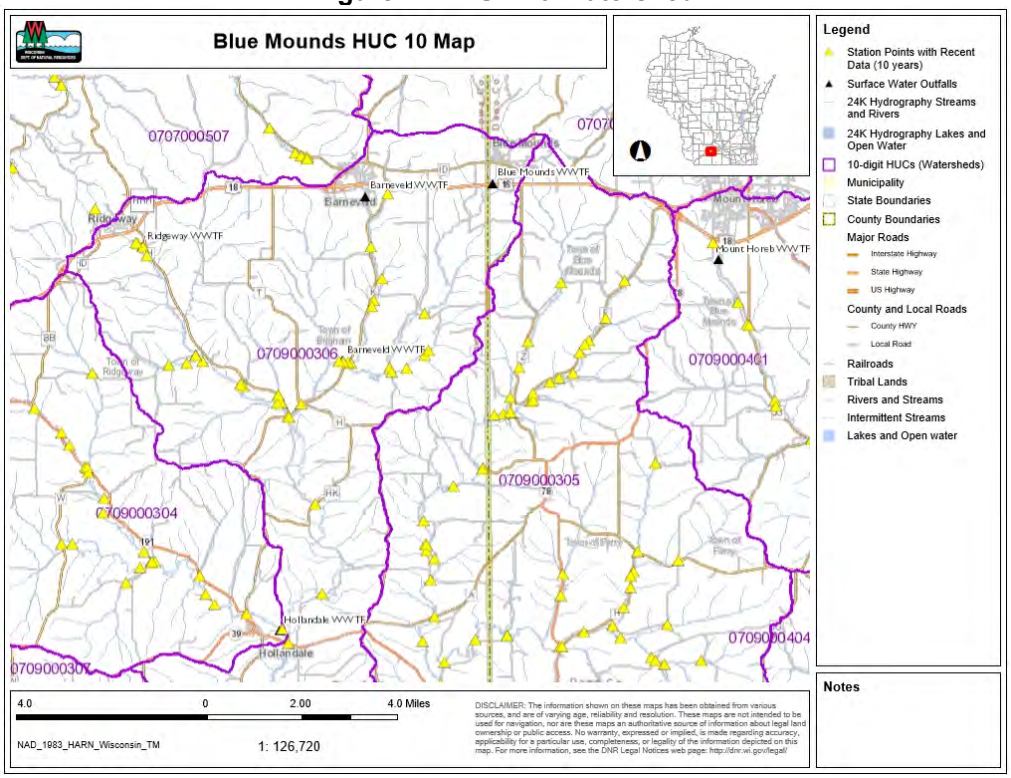
The Blue Mounds WWTF is located in the Upper East Branch Pecatonica River Watershed of the Sugar-Pecatonica River Basin. The WWTF discharges to the headwaters of Williams-Barneveld Creek. According to the DNR website, Williams-Barneveld Creek is a spring fed stream which begins on the Military Ridge and flows southerly into the upper section of the East Branch of the Pecatonica River. Throughout this report, the term “Williams-Barneveld Creek watershed” will be used to refer to the watershed upstream of this compliance point, which will be the action area for the adaptive management plan.

This section presents general information about the Williams-Barneveld Creek watershed characteristics, which are important when evaluating phosphorus loading conditions and modeling future phosphorus reduction strategies. Data were collected from on-line tools and geographic information systems (GIS), such as the DNR Surface Water Data Viewer, and the Nations Resources Conservation Service (NRCS) Web Soil Survey. The data included watershed boundaries, soil data, land use, land cover, and temperature and precipitation statistics.

2.1 HUC and Watershed Information

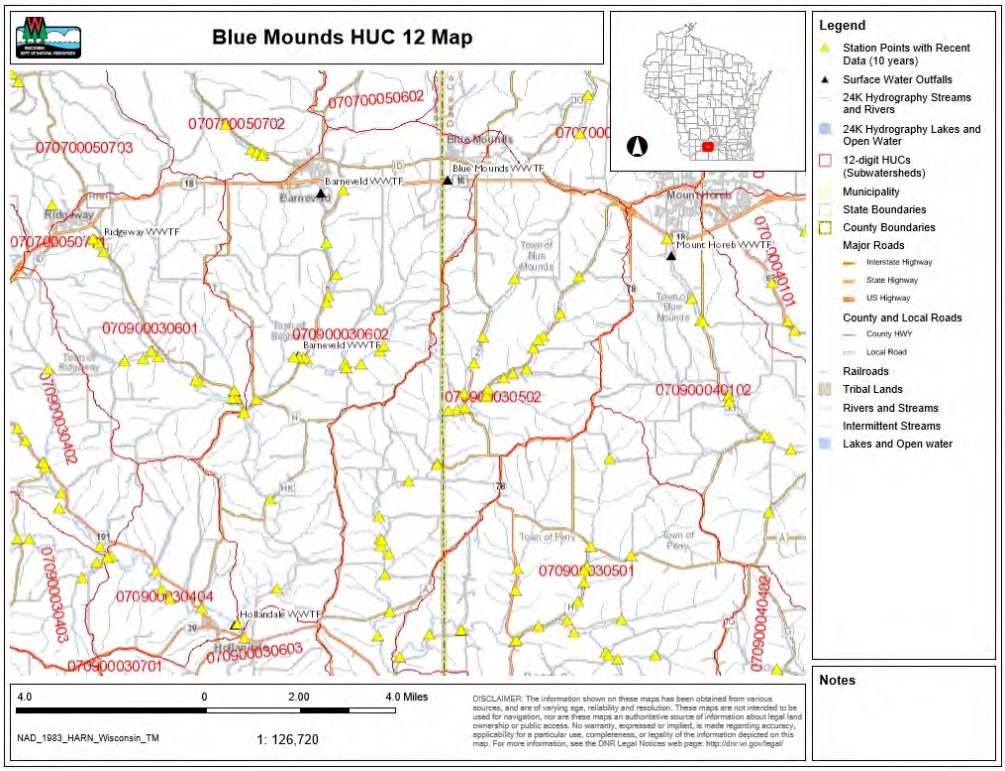
Maps of the HUC 10 (# 0709000306) and HUC 12 (# 070900030602) watersheds for the Blue Mounds WWTF are shown below in Figures 2-1 and Figures 2-2 and are included in Appendix B.

Figure 2-1: HUC 10 Watershed



This figure was provided by the DNR's Surface Water Data Viewer Application.

Figure 2-2: HUC 12 Watershed



This figure was provided by the DNR's Surface Water Data Viewer Application.

Figure 2-3 shows the Williams-Barneveld Creek watershed area, which is approximately 35.4 square miles.

Figure 2-3: Williams-Barneveld Creek Watershed

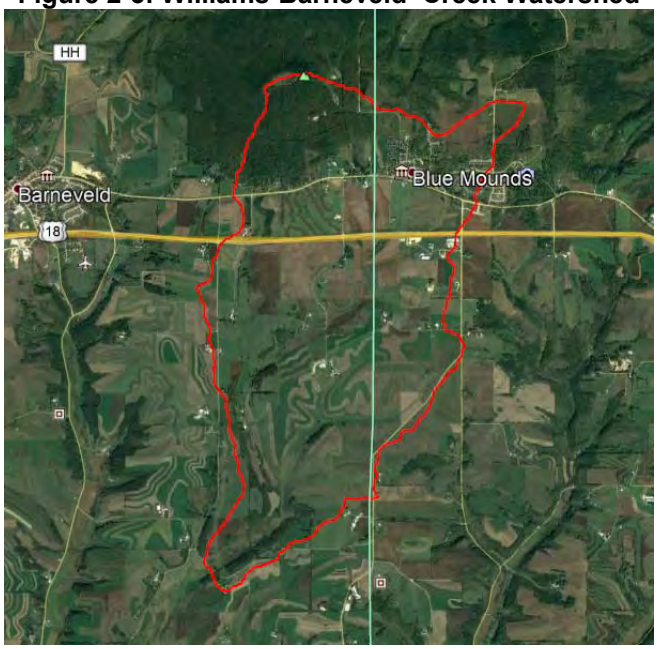


Figure from Purdue University Long Term Hydrologic Impact Analysis (L-THIA) on-line tool.

2.2 Receiving Water Description

As mentioned previously, the Blue Mounds WWTF discharges to the headwaters of Williams-Barneveld Creek. At the point of discharge, the tributary is classified as a LFF (Limited Forage Fish) community. A complete map of the impaired waters in the Williams-Barneveld Creek watershed is included in Appendix C. Per NR 102.06 Section (3) Paragraph (a), Williams-Barneveld Creek is not listed as having a total phosphorus criterion of 0.1 mg/L, so it shall meet a total phosphorus WQC of 0.075 mg/L.

2.3 Climate and Precipitation

Climatological information can play an important role when modeling phosphorus loads in runoff and calculating phosphorus reductions. Climate and precipitation data for the Williams-Barneveld Creek watershed from 2000 to 2017 were obtained from the National Oceanic and Atmospheric Administration (NOAA). Data from the Dodgeville weather station were selected to represent the watershed. Average monthly temperatures range from a high of 71°F in July to a low of 18°F in January. Average monthly precipitation (both rainfall and snowfall) ranged from a high of 5.88 inches in June to a low of 1.22 inches in January. The average annual precipitation over the 17 years reported was 37.34 inches. Table 2-1 presents average monthly data for the reporting period.

Table 2-1
NOAA Climate Data

Month	Temperature			Precipitation		
	Min (°F)	Max (°F)	Average (°F)	Min (inches)	Max (inches)	Average (inches)
Jan	-13	73	18.3	0	2.95	1.22
Feb	-15	74	21.0	0.31	3.43	1.42
Mar	-29	77	33.2	0.4	4.43	2.16
Apr	-18	86	46.2	0.93	8.44	3.80
May	-14	86	57.5	1.52	10.80*	4.31
June	17	93	67.5	0.57	10.98*	5.88
July	27	96	70.8	1.57	9.45	3.87
Aug	38	96	68.2	0.48	20.02*	4.62
Sept	27	101	60.5	0.76	7.23	2.76
Oct	-21	92	46.5	0.72	6.34	3.02
Nov	-7	95	35.6	0.2	7.91	2.20
Dec	-11	87	23.4	0.07	5.65	2.09

(*) The three largest precipitation amounts occurred in August of 2007, June of 2013, and May of 2004.

It is important to recognize the impact of extreme weather events on erosion and subsequent transport of sediment, including phosphorus, into surface water. Extreme precipitation can result in excessive loads of phosphorus entering surface water, carried by runoff.

2.4 Soil Types

Data on soil types was available through the NRCS's Web Soil Survey (WSS) and Soil Survey Geographic Database (SSURGO). The predominant soil types in the watershed were silt loam and sandy loam. Soil data was used in conjunction with additional data, such as land cover, in several modeling applications. Soil data can be used in calculating the Phosphorus Index (PI) of the land, selecting locations for phosphorus reducing projects, and modeling future phosphorus reductions. A complete map and table of soil types for the Williams-Barneveld Creek watershed is attached in Appendix D.

2.5 Land Use

Land use data was obtained through Purdue University's long Term Hydrologic Impact Analysis (L-THIA) model. As with soil type, land use was used in the modeling of phosphorus loads and reduction, as well as to help determine where management measures should take place. The Williams-Barneveld Creek watershed is primarily made up of pasture/hay, agricultural, and deciduous forest. These major land use types make up 39%, 32%, and 15% of the watershed, respectively. A complete breakdown of land use for the Williams-Barneveld Creek watershed, as well as the HUC 12 watershed, is included in Appendix E.

2.6 Wetlands

The HUC 12 is spotted with several scrub-shrub wetlands, which make up 2.8% of the watershed by area. A complete map of the wetland results from the Surface Water Data Viewer is attached in Appendix F. It is important to remember that wetland can be both a source of phosphorus or can aid in phosphorus reduction. For these reasons, wetland areas should be evaluated before starting any wetland restoration projects.

3. WATERSHED INVENTORY

This watershed inventory for the Williams-Barneveld Creek watershed expands on the watershed characteristics from the previous section to provide insight into where phosphorus management measures could be implemented.

3.1 Point Sources-Current Phosphorus Loads

The EPA defines point sources as "any single identifiable source of pollution from which pollutants are discharged, such as a pipe, ditch, ship or factory smokestack." With respect to water pollution, common point sources are municipal WWTFs and industries/factories. In the Williams-Barneveld Creek watershed, there are no other point sources besides the Blue Mounds WWTF.

3.1.1 Municipal WWTFs

Current effluent phosphorus data for the Blue Mounds WWTF are provided in Appendix G and summarized in Table 3-1. Values for the daily and annual loads were calculated by using annual averages for flow and phosphorus concentration.

Table 3-1
Effluent Phosphorus Summary

Year	Annual Average Flow	Annual Average Phosphorus Concentration	Daily Phosphorus. Loading	Annual Phosphorus. Loading
	MGD	mg/L	lbs/ day	lbs/ year
2014	0.044	4.58	1.68	613
2015	0.045	5.21	1.76	642
2016*	0.052	4.82	1.80	657
2017	0.082	1.41	0.97	354

*Excludes October, November, and December 2016, data not available

3.2 Nonpoint Sources of Phosphorus

According to the EPA, "Nonpoint source pollution generally results from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modification. Nonpoint source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters and ground waters."

In the Williams-Barneveld Creek watershed, typical NPS pollution originates from erosion of farmland and streambanks, as well as runoff from barnyards.

3.2.1 Areas of High Erosion

One way to prioritize areas within a watershed that may be vulnerable to water erosion is with the DNR Erosion Vulnerability Assessment for

Agricultural Lands (EVAAL) tool, which was used in correlation with soil, land cover and watershed data. This tool allows for the identification of areas that may be most vulnerable to erosion. The EVAAL tool results in a graphic and tabular data set that depicts areas of high vulnerability and can be used to prioritize and focus efforts by identifying fields with high nutrient and sediment transportation.

In order to use the EVAAL tool, the following datasets had to be obtained: LiDAR-based Digital Elevation Model, Area of Interest Boundary, USDA-NRCS Soil Survey Geographic, and Culvert Lines. Using these datasets and the DNR's EVAAL tool, an EVAAL map for the watershed was created and is provided in Appendix H.

The results of the EVAAL tool revealed the highest vulnerability areas to be various farm fields throughout the watershed where gully erosion is evident. A map showing only the high priority areas (i.e. areas with the highest erosion vulnerability) and their proximity to the Williams-Barneveld Creek, and its tributaries, was generated to identify potential CSAs and is included in Appendix H. This map shows that the high priority areas are spread out fairly evenly across farms in the watershed, so it would be beneficial to seek out areas where multiple parcels are owned by the same landowner. Although areas that may be highly vulnerable to erosion should be targeted for management measures, the accessibility of the land ultimately determines which areas can be targeted.

3.2.2 CAFOs

CAFOs (Concentrated Animal Feeding Operations) may generate a substantial amount of manure, which naturally contains phosphorus. This manure is typically disposed of by land applying it as fertilizer. This fertilizer can subsequently be washed off after a large storm event and enter surface water. The fact that the fertilizer is land applied played a large part in the U.S. Court of Appeals case that led to the EPA creating its 2008 CAFO rule. This rule states that agricultural stormwater is exempted from being considered a point source, but the EPA may treat the land application of excessive manure as a point source. The result of the rule is that while CAFOs are not considered a point source, they may have to apply for a NPDES permit, or in Wisconsin, a WPDES permit.

Currently in the Williams-Barneveld Creek watershed, there are no outfalls defined as CAFOs with a WPDES permit.

3.2.3 Barnyards

Outdoor dairy and beef cattle lots can be a significant source of phosphorus entering into surface water. Since Wisconsin has a large beef and dairy industry, it is important that barnyards be examined as a possible target area to reduce phosphorus concentrations.

Barnyards are present in the Williams-Barneveld Creek watershed, but a barnyard inventory has not yet been performed. An initial inventory using aerial photography was conducted and identified 9 possible barnyards within the watershed and can be viewed in Appendix M. Of these 9 barnyards, four appear to be directly adjacent or near the Williams-Barneveld Creek and its tributaries. These barnyards appear to be possible Critical Source Areas.

A more detailed barnyard inventory will be conducted, based on landowner cooperation, with priority placed on those barnyards that are adjacent or near the Williams-Barneveld Creek. This inventory will include the number of animals on the lot, type of animal (dairy or beef), average animal weight, and information on the lot (paved lot size, earth lot size, and lot use.) Information from this inventory may then be used for the BARNY model to access the potential phosphorus reductions available, aiding the City and landowners in making decisions for potential projects.

3.2.4 Streambanks

Streambank erosion can be a source of sediment and nutrients entering into surface water, as well as having a damaging effect on the habitat. Sedimentation can fill pore spaces, reduce oxygen content, and increase turbidity. Excessive phosphorus loading to streams can lead to eutrophication.

The Williams-Barneveld Creek was inspected using aerial photography to attempt to identify areas that are in need of streambank repair, such as ox bows and steep banks. Several potential CSAs were identified within the watershed and can be viewed in Appendix N.

Additional inspections of the potential CSAs will need to be conducted to determine their state of erosion. These inspections will be conducted on foot (when possible) and with the use of an aerial drone to inspect non-accessible lengths of the streambank. During an inspection, the banks will be carefully examined to determine any loss of vegetation or bare soil on the bank, absence of soil at the toe of the bank, turbulent or high-velocity flow, as well as erosion of the outer bank of a bend. This information will help determine which areas of the streambank are critical. Ideally, these inspections will be conducted in the spring or late fall when vegetation is less developed.

3.2.5 Phosphorus Nonpoint Source Summary

According to the DNR PRESTO-Lite model results, non-point sources are estimated to contribute approximately 69% of the phosphorus load within the Williams-Barneveld Creek watershed. The PRESTO-Lite watershed

delineation report for the Williams-Barneveld Creek watershed is provided in Appendix C. While the quantities of phosphorus contributed from each of the nonpoint sources listed above are not known, it is recognized that erosion of land and streambanks, as well as runoff from barnyards and feedlots are all potential targets for phosphorus management measures.

In order to identify sources of nonpoint phosphorus, an agricultural inventory will be conducted which will include agricultural practices that relate to buffers, cropping practices, and nutrient management. This inventory will be started with conducting a windshield survey to obtain general information, and will gather more specific information from individual landowners (when possible). Additionally, available information about current nutrient management plans and other viable data will be gathered from both the Dane County LWRD and Iowa County LCD. Efforts will be made to identify and prioritize the low risk-high yield opportunities, which will result in the highest reduction in phosphorus for the effort.

3.3 Stream Monitoring Program

3.3.1 Historic Phosphorus Data

As stated in Section 1.4, only three data points for Williams-Barneveld Creek in-stream phosphorus concentrations are available from the DNR's Surface Water Data Viewer mapping software. The average of these sampling points resulted in a concentration of 0.11 mg/L.

3.3.2 In-Stream Sampling Program

For Adaptive Management, the only required monitoring parameters are in-stream phosphorus and flow. The only required sampling area is at the point of compliance.

One sampling point is proposed for monitoring in-stream phosphorus concentrations, where the Williams-Barneveld Creek crosses Prairie Grove Rd, which has been defined as the Watershed Adaptive Management point of compliance for the Village of Blue Mounds, and is located at 42°58'16.98"N and 89°51'53.10"W An up-stream sampling point is also proposed and is located just up-stream of the WWTF outfall, at 43°00'41.82"N and 89°50'05.86"W. No SWIMS IDs are currently associated with either of these points. Appendix I includes maps of the proposed point of compliance and both sampling locations. As described above, five set of samples were collected at these points between June 2018 and October 2018 to establish a baseline prior to beginning Adaptive Management. The Village will seek DNR review and approval of the proposed sampling point prior to additional sampling in May 2019.

Samples will be taken at both points two times a month, on every other Wednesday, from May to October. Samples will be collected from the center

of the stream (or the portion of the stream with the strongest flow) at a depth of 3 to 6 inches below the surface, and then placed into preserved sample bottles for future analysis by (method SM4500-PE 20 ed.). Phosphorus samples will meet the preservation requirements in ch. NR 219, Wis. Adm. Code, Table F, by having acidified sample bottles and a cooler with ice present for sample collection. Care will be taken while sampling to avoid disturbing the sampling site. The samples will be sent to the Dane-Iowa WWTF lab (#313002470) with a total phosphorus limit of detection/limit of quantification (LOD/LOQ) of 0.034/0.114 mg/L in 2016, 0.013/0.043 mg/L in 2017 and 0.014/0.045 mg/L in 2018.

In-stream flow measurements will be taken at Prairie Grove Road. Town and Country has contacted the USGS in order to establish a stage-flow relationship for this point in the stream. Once established, the Village will measure the stage of the river during sampling events to determine the flow.

In addition to in-stream phosphorus sampling, the Blue Mounds WWTF staff will continue to collect composite effluent phosphorus samples at the outfall two times a month, in accordance with the WPDES permit.

3.4 Required Phosphorus Load Reduction

Following the guidance for Adaptive Management, phosphorus reductions were calculated for the first permit term. Although the calculation will be for the minimum reduction per permit term, it may be advantageous to offset more than the minimum reduction required to improve the chances of success for Adaptive Management.

Variables for calculations:

- Average flow (2015-2017) of the Blue Mounds WWTF= **0.060 MGD**
- 3-year (2015-2017) monthly average effluent phosphorus concentration =**3.81 mg/L**
- Annual mean flow of Williams-Barneveld Creek (from DNR Surface Water Data Viewer) at the Point of Compliance= **1.78 MGD**
- Median phosphorus concentration of Williams-Barneveld Creek (as calculated from the June 2018- October 2018 sampling results) **= 0.18 mg/L**
- 8.34= unit conversion
- Water Quality Criterion for phosphorus= **0.075 mg/L**

Term1:
Step 1: Calculate the current discharge as an annual load.

$$0.060\ MGD x\ 3.81\ \frac{mg}{L} *\ 8.34\ *\ 365 \frac{days}{year}\ = \mathbf{696}\ \frac{\boldsymbol{pounds}}{\boldsymbol{year}}$$

Step 2: Calculate the current load in the receiving water just downstream from the discharge

$$696\frac{pounds}{year} + \left(1.78\,MGD * 0.18\,\frac{mg}{L} * 8.34 * 365\frac{days}{year}\right) = \mathbf{1,671}\frac{\boldsymbol{pounds}}{\boldsymbol{year}}$$

Step 3: Calculate the applicant's percent contribution of load.

$$\frac{696\frac{pounds}{year}}{1{,}671\frac{pounds}{year}} * 100 = \mathbf{41.7}\,\%$$

Step 4: Calculate the allowable load in the receiving water.

$$(0.060MGD + \ 1.78MGD) * 0.075\frac{mg}{L} * 8.34 * 365\frac{days}{year} = \mathbf{406}\frac{\boldsymbol{pounds}}{\boldsymbol{year}}$$

Step 5: Calculate the needed reduction in the receiving water

$$1{,}671\frac{pounds}{year} - 406\frac{pounds}{year} = \mathbf{1,265}\frac{\boldsymbol{pounds}}{\boldsymbol{year}}$$

Step 6: Calculate the applicant's proportional share of the needed reduction.

$$1{,}265\frac{pounds}{year} * 41.7\% = \mathbf{528}\frac{\boldsymbol{pounds}}{\boldsymbol{year}}$$

For the first permit term of 5 years, the Blue Mounds WWTF needs to reduce at least 528 pounds of phosphorus a year throughout the Adaptive Management program. This will be accomplished by phosphorus removal technology installed at the wastewater treatment plant, as well as a combination of management measures described in Section 4.3, with the majority of the reductions occurring at the wastewater treatment plant. In order to calculate the expected phosphorus load reductions, modeling tools (such as SnapPlus and BARNY) will be employed. If measures employed during the first permit term of Adaptive Management do not show water quality improvement, the Adaptive Management plan will be modified in subsequent permit terms to offset more of the phosphorus load than required for the first permit term.

To calculate the phosphorus load reduction for the second term, the phosphorus load of the receiving water will be monitored and recorded. Once the new load is determined, the allowable load of the receiving water will be subtracted from the new phosphorus loading, and the remaining phosphorus load will be the reduction needed for Permit Term 2. Currently, the Village of Blue Mounds is planning to have a phosphorus reduction of approximately 900 pounds a year by the end of the second term.

To calculate the phosphorus load reduction for the third permit term, any remaining phosphorus load above the water quality criterion will be the reduction needed for Permit Term 3. The ultimate goal of Permit Term 3 will be to get the receiving water to a phosphorus concentration of 0.075 mg/L. Currently, the Village of Blue

Mounds is planning to have the full quantity of phosphorus reductions required to result in the allowable load of phosphorus in the receiving water by the end of the third permit term, which is 1,265 pounds a year.

3.5 Sensitivity Analysis

In order to estimate the total acreage needed for management measures, a sensitivity analysis was constructed. For each acre of land, varying amounts of phosphorus reduction were assumed in order to calculate total acreage. Table 3-2 shows the total acreage needed to meet the minimum reduction needed for the Blue Mounds WWTF's first permit term of Adaptive Management if only field-based practices are utilized.

Table 3-2
Phosphorus Reduction Sensitivity Analysis

Pounds of P reduction/ acre	Acres needed for Permit Term 1
0.5	1056
1	528
2	264
3	176

For the first permit term, between 176 and 1056 acres would be needed for management measures, assuming between 0.5 and 3 pounds per acre reduction. These numbers are based on previous experience with phosphorus reduction in Wisconsin, but soil testing and additional modeling will be completed by the Village, Iowa County LCD and Dane County LWRD to determine the actual reductions from management measures.

4. PROJECT PLANNING

4.1 Partners

The success of Adaptive Management depends on the joint effort of many partners, and it is import to identify the roles and responsibilities of each partner at the onset of the project. For the Blue Mounds Adaptive Management Plan, the following governmental, professional, and local partners have been identified:

4.1.1 WPDES Permit Holder

The Blue Mounds WWTF is operated by the Village of Blue Mounds and treats domestic wastewater from the Village of Blue Mounds with no significant industries and ample capacity for current and future loads. Treatment includes raw wastewater screening, an oxidation ditch, and final clarifier.

The Village of Blue Mounds will be responsible for financial matters, sampling, stream monitoring, meeting the facility's interim phosphorus limits, generating annual reports, and working with landowners to establish management practices.

4.1.2 Town and Country Engineering

Town and Country Engineering is a consulting firm that was organized in 1981, and works with municipalities in Wisconsin. They have experience in wastewater treatment analysis and design, as well as the design and analysis of water and sewer systems, wells and water treatment facilities, stormwater management, and general municipal engineering.

Town and Country designed the Blue Mounds WWTF upgrade in 1996 and since has assisted with upgrades and operations. Town & Country works with the Village to ensure that the treatment plant is operating most efficiently, and has assisted the Village with its phosphorus compliance evaluations.

With respect to Adaptive Management, Town & Country's role will include modeling, mapping, budget review, Adaptive Management Plan development, and evaluation of effluent and stream data.

4.1.3 Dane County Land and Water Resources Department

The Dane County Land and Water Resources Department (LWRD) is a governmental agency committed to ensuring the protection and enhancement of Dane County's natural, cultural, and historical resources. The LWRD supports citizens, communities, and local governments in their resource management and protection activities.

Dane County LWRD has worked with other communities with respect to agricultural conservation practices, and was contacted by the Village of Blue Mounds to assist with several aspects of the adaptive management process.

For non-urban practices Dane County LWRD will act as the broker between the Village and landowners in establishing cost sharing agreements and will assist in field-verifying adaptive management practices. Their responsibilities will include modeling with SnapPlus and BARNY (and any other models required), assisting with grants, mapping, estimating load reductions, and conducting site inspections. A letter of intent from the Dane County LWRD is included in Appendix J. A service agreement will be developed in the future for any projects requiring Dane County LWRD's assistance.

4.1.4 Iowa County Land Conservation Department (LCD)

The Iowa County Land Conservation Department (LCD) is a governmental agency that works under the direction of the Land Conservation Committee and coordinates natural resource management and environmental enhancement activities within county boundaries and administers a variety of county, state, and federal initiatives. The LCD places particular emphasis on soil conservation, water quality improvement, groundwater protection, and strives to promote the awareness of natural resources and their value to the citizens of Iowa County.

Iowa County LCD has worked with landowners with respect to nutrient management programs, conservation planning, Land and Water Resource Management (LWRM) cost share programs, and Conservation Reserve Enhancement Program (CREP). The LCD was contacted by the Village of Blue Mounds to assist with several aspects of the adaptive management process.

For non-urban practices Iowa County LCD will act as the broker between the Village and landowners in establishing cost sharing agreements and will assist in field-verifying adaptive management practices. Their responsibilities will include modeling with SnapPlus and BARNY (and any other models required), assisting with grants, mapping, estimating load reductions, and conducting site inspections. A letter of intent from the Iowa County LCD is included in Appendix J. A service agreement will be developed in the future for any projects requiring Iowa Country LCD's assistance.

4.1.5 Local Landowners and Agricultural Producers

Farmers in the Williams-Barneveld Creek watershed are typically dairy farmers, cash croppers, or raise livestock. According to the land use data

obtained by L-THIA, agricultural land makes up 32% of land in the Williams-Barneveld Creek watershed.

The Village of Blue Mounds and the Dane County LWCD will establish contracts with landowners to install or implement management measures. If established in the contract, it will be up to the landowners and farmers to maintain the management measures outlined in their contract, with verification and inspection of the management being conducted by the Dane County LWCD.

4.1.6 Other Stakeholders/Partners

There are several other organizations that could have interest or play a role in future Adaptive Management projects, including:

- *Gathering Waters Conservancy*: is an alliance that helps land trusts, landowners and communities by advocating for funding and policies that support land conservation, and fostering a community of practices that promotes land trust excellence and advancement.

- *Natural Resources Conservation Service (NRCS):* is the federal agency that works with landowners on private lands to conserve natural resources. NRCS is part of the U.S. Department of Agriculture. They were formerly called the Soil Conservation Service or "SCS".

- *Farm Service Agency (FSA):* is a federal agency that administers farm commodity, crop insurance, credit, environmental, conservation, and emergency assistance programs for farmers and ranchers.

- *United States Geological Survey (USGS):* is a scientific agency of the United States government. The USGS works in cooperation with more than 2,000 organizations across the country to provide reliable, impartial scientific information to resource managers, planners, and other customers.

- *The Nature Conservancy:* is an international conservation organization working to protect ecologically important lands for nature and people.

Currently, there is no association between these organizations and the projects for the Blue Mounds Adaptive Management Plan.

4.1.7 Summary of Partners

The current partners for the Blue Mounds Adaptive Management plan, along with their roles and responsibilities are summarized in Table 4-1.

Table 4-1
Roles and Responsibilities

Party	Roles/Responsibilities
Blue Mounds Wastewater Treatment Facility	• Financial matters • Stream and Wastewater Sampling • Stream monitoring • Meeting the facility's interim P limits • Verification of implemented urban practices • Annual Reporting
Town & Country Engineering	• Modeling • Mapping • Budget review • Adaptive Management Plan development • Assisting with grants • Data evaluation (effluent and stream)
Iowa County Land Conservation Department and Dane County Land and Water Conservation Department	• Modeling • Assisting with grants • Mapping • Estimating load reductions • Conducting site inspections • Negotiating cost-share agreements • Verification of implemented rural practices
Landowners and Agricultural Producers	• Maintaining management measures

4.2 Areas of Phosphorus Reduction

For the Williams-Barneveld Creek watershed, both point and nonpoint source phosphorus reductions will occur. Traditional point source reductions will occur at the Blue Mounds WWTF, through an upgrade at the facility which would include installation of a new chemical feed system and chemical building. Currently, Blue Mounds is averaging 1.4 mg/L to 5.6 mg/L of effluent phosphorus, but they feel optimistic that through chemical treatment they will be able to meet the interim limits assigned to them for each permit term, which are 0.60 mg/L for the first term and second term, and 0.50 mg/L for the third term. Nonpoint source reductions are described in the following sections.

4.3 Nonpoint Source Management Measures

Nonpoint reductions will be obtained using a combination of Best Management Practices (BMPs) that are described in the following sections. Information about BMPs was obtained from the NRCS website. Most of these BMP's apply only to agricultural land, but some may also be used in urban areas.

4.3.1 Nutrient Management Planning

Nutrient management plans match nutrient inputs to crop demand, in order to maximize the return on nutrients while simultaneously limiting the nutrient loss. Typically, nutrient management plans are devised using analysis from

SnapPlus modeling. Currently, many farmers are already utilizing nutrient management plans, so there may not be many opportunities to reduce phosphorus loading further with this method. The Dane County LWCD and Iowa County LCD will help identify target areas for nutrient management planning, depending on the location of the project.

4.3.2 Cover Crops

According to the USDA NRCS factsheet, "A cover crop is grasses, legumes, forbs or other herbaceous plants that are established for seasonal cover and conservation purposes. Cover crops are planted in the late summer or fall around harvest and before spring planting of the following year's crops. Common cover crops used in Wisconsin include winter hardy plants such as barley, rye and wheat."

Cover crops are used after harvesting, when the soil is loose and vulnerable to erosion. Roots from the cover crop increase the stability of the soil, while the additional vegetation can act as a filter to separate out suspended soils from stormwater runoff. Additional benefits of cover crops include increased soil porosity and infiltration, reduction of soil compaction, and improved soil health.

For the Williams-Barneveld Creek watershed, cover crops may be used at any locations where cover crops are not currently being utilized. Determination of feasibility for this management measure will be made on a case-by-case basis, following initial site inspections.

4.3.3 Conservation Buffers

Referring to the USDA NRCS factsheet, "Conservation buffers are small areas of land in permanent vegetation, designed to intercept pollutants and manage other environmental concerns. Types of buffers include riparian buffers, filter strips, grassed waterways, contour grass strips, field borders, and vegetative barriers. Strategically placed buffer strips in the agricultural landscape can effectively mitigate the movement of sediment, nutrients, and pesticides within farm fields and from farm fields. When coupled with appropriate upland treatments, buffer strips should allow farmers to achieve a measure of environmental sustainability in their operations.

Buffers slow water runoff, trap sediment, and enhance filtration within the buffer. Buffers also trap fertilizers, pesticides, pathogens, and heavy metals, and they help trap snow and cut down on blowing soil in areas with strong winds."

Several types of conservation buffers may be implemented within the Williams-Barneveld Creek watershed. These buffers include grassed waterways, contour grass strips, and buffer strips. Details about these

buffers and how each of these buffers may be utilized in the Williams-Barneveld Creek watershed are provided below.

Grassed Waterways
Grassed waterways are broad, shallow channels designed to move surface water across farmland without causing soil erosion. The vegetative cover in waterways slows the water flow and protects the channel surface from rill and gully erosion. Grassed waterways can be used in conjunction with harvestable buffers and cover crops to increase phosphorus reductions. The current use of grassed waterways and their potential use for the future will be assessed during the site visits.

Contour Grass Strips
Contour grass strips are strips of perennial vegetation alternated down the slope with wider cultivated strips that are farmed on the contour. These strips are usually narrower than the cultivated strips. Vegetation in these strips consists of species of grasses or a mixture of grasses and legumes. Contour grass strips established on the contour can significantly reduce sheet and rill erosion, as well as slow runoff and trap sediment. Since the Williams-Barneveld Creek watershed has some areas of steep slopes, contour grass strips may be a viable option for these parcels. Farm parcels will be evaluated during site visits to determine the effectiveness of contour grass strips.

Buffer Strips
Buffer strips create soil stability between areas that are utilized for crops and streams or water features. They are designed to intercept sediment and other pollutants before they enter the stream. One program that has been used in Dane County is the FSA Conservation Reserve Enhancement Program (CREP) that allows farmers to establish a perennial grass cover in return for an annual payment. Eligible land must have a crop history (been planted with a commodity crop in 2 out of the last 5 years) or meet the qualifications of marginal pastureland. Potential buffer strip areas will be assessed for eligibility during site visits.

4.3.4 Tillage Changes

Changing the tillage practices on cropland can provide effective control to erosion and can improve soil properties and soil quality. A common option is no till practices, which allows a farmer to plant the crop and control weeds without turning the soil. Traditional plowing reduces the farm's long-term productivity by exposing organic-matter-rich top soil to the surface and breaking up clods that slowly and naturally form in the soil.

High organic matter and good clod formation are both crucial aspects of fertile soil. Organic matter attracts and holds onto water, and its slow breakdown releases vital nutrients into the soil. When soil is turned, the organic matter is exposed to the atmosphere and oxidized into carbon dioxide. Less organic matter in the soil means less water retention, less nutrient release and less clod formation. The broken up clods are exposed to rainfall, which further breaks down the clods and forms a soil crust on the field surface, causing surface runoff and soil erosion.

No-till agriculture uses a disk or chisel plow to prepare the field for seeding. These plows create a narrow furrow, just large enough for the seed to be injected. After the seed and fertilizer is injected, an attachment closes up the furrow. This way the farm field can be seeded with minimal soil disturbance and less potential for runoff and nutrient loss. As with other management measures, the potential for no till practices will be evaluated during the preliminary site visits.

4.3.5 Manure Management

Phosphorus is present naturally in animal manure, and when subsequently applied to agricultural land, can be a primary source of phosphorus to surface and groundwater. This phosphorus reaches surface waters by being carried in runoff if the manure is not properly stored. Runoff control practices can be installed to reduce the amount of manure, and therefore phosphorus, entering surface water. The most common practices for manure management include improved collection and storage, as well as optimizing application rates. The need for and feasibility of manure management will be assessed on a case-by-case basis upon recommendations by the Dane County LWCD.

4.3.6 Runoff Control from Barnyards

Barnyards and feedlots can be a substantial source of phosphorus. This is due to the presence of manure and the phosphorus naturally occurring in it, as well as the phosphorus that has accumulated in the soil. If not managed correctly, manure that accumulates in barnyards can be carried via runoff to surface waters from storm events. These storm events can cause erosion and carry a significant amount of soil in the runoff, which is an additional source of phosphorus in the surface water. In order to reduce phosphorus pollution, it is important to manage the runoff coming through barnyards.

Runoff management allows for the direction of rainwater and other runoff water away from manure storage facilities. Additionally, the barnyard should be on a surface that can be cleaned so that manure may be removed, limiting the quantity of manure that can potentially be washed off. Roof gutters, surface water diversions and drip trenches can also keep water clean, and away from the barnyard. The need for and feasibility of barnyard

runoff management will be assessed on a case-by-case basis upon recommendations by the Dane County LWCD and Iowa County LCD.

4.3.7 Streambank Restoration

Streambank restoration is accomplished by reinforcing the streambank and reestablishing the general structure and function of the stream. Streambank restoration reduces erosion and phosphorus loading from soil loss, but can be a costly management measure. However, restoration can have other benefits such as improvements of fish habitats and aesthetic improvements that may be desirable to landowners and watershed stakeholders. Streambank restoration can be used in both urban and rural areas and may be feasible for parts of the Williams-Barneveld Creek watershed.

4.3.8 Check Dams and Stormwater Ponds

A check dam is a small, sometimes temporary, dam that is constructed across a swale or a drainage ditch to counter erosion by slowing the velocity of runoff. These check dams can be constructed of rock, gravel bags, sand bags or even logs. Check dams can also improve the water quality of runoff by trapping sediment in the structure, or causing the sediment to settle out in the ponding conditions created behind the check dam.

Runoff can also be collected in stormwater detention or infiltration basins, which are typically installed in urban settings. The most beneficial type of basin for phosphorus reduction is a wet detention basin or pond, which is constructed to collect, detain, treat and release stormwater runoff. A wet detention basin consists of a permanent pool of water with designed dimensions, inlets, outlets and storage capacity.

Potential locations for check dams and ponds will be identified during site visits.

4.4 Prioritization of Management Measures

It is recommended that phosphorus reductions target “critical source areas” or CSAs, which are areas that contribute a disproportional amount of phosphorus to the receiving water. These areas typically store and transport phosphorus, and both factors come into play when locating CSAs. In the process of identifying CSAs, the EVAAL tool and site visits will be used to find areas of high erosion and significant sources of phosphorus.

The Village feels that the most important aspect of identifying and establishing potential projects is communication and building a relationship with landowners. The Village will start by hosting meetings or one on one conversations with local landowners to begin a conversation that will identify opportunities. At these meetings members of the Village, Town and Country, Dane County LWRD, and Iowa County LCD may be in attendance to guide the conversation and answer any questions that arise. Separate meetings with area non-profits will take place to

identify land purchase opportunities. It is through these meetings that the Village will identify which parcels have the potential for projects, and then site visits will be arranged to gather further information on the identified parcels.

During the site visits, source factors and transport factors will be identified. Source factors include phosphorus soil tests, application rate of phosphorus fertilizer and manure, and application method of phosphorus fertilizer and manure. Transport factors include erosion potential (identified visually to be used in conjunction with EVAAL data), runoff, and connectivity to receiving water.

A representative from the Village and Dane County LWCD or Iowa County LCD will conduct site visits with each of the land owners to gather data and assess options for each parcel. Following the enrollment of the initial project partners, the process of identifying CSAs and conducting site visits will be repeated as the Adaptive Management program is expanded.

4.5 Potential Nonpoint Source Projects

Based on preliminary discussions between the Village, Iowa County LCD and Dane County LWRD, the following practices have been identified as the most likely types of projects for the initial implementation of Adaptive Management in the Williams-Barneveld Creek watershed:

- Nutrient Management Planning
- Streambank Stabilization
- Buffer strips or taking agricultural land out of production
- Barnyard practices and managed grazing systems

The Village intends to begin conducting site visits to identify interested landowners and potential projects in early 2019. The Village is also investigating the possibility of implementing some streambank stabilization projects within the Village and will continue to determine if these are viable projects.

5. PROJECT IMPLEMENTATION

This section presents the steps that will be taken to implement phosphorus reduction projects during the first permit term of Adaptive Management. As the Village and its partners develop experience with Adaptive Management implementation in the Williams-Barneveld Creek watershed, these project implementation steps may be refined or revised.

5.1 Preliminary Site Visits

Following the identification of potential project areas, the first step to implementation is conducting site visits to evaluate options and feasibility. Prior to any site visit, a relationship should be established with the land owner by the Village or Dane County LWCD, so they are informed about Adaptive Management, and understand how they could play a role in the plan. Site visits should occur in the spring or fall, when the land cover will be more easily identifiable. Site visits will be arranged by the Village, and could include members of the Village and WWTF staff, Town & Country Engineering, Dane County LWCD, and the land owners themselves.

A typical site visit will usually take approximately 1-2 hours, depending on the size, and consist of a general assessment of areas of concern. These concerns could include streambank erosion, gully erosion, tillage, crop rotations, or nutrient management. General site information and observations will be documented.

5.2 Identification of Reasonable Measures

During the site visits, the most suitable measures for each site will be identified and discussed. Possible management measures are described in Section 4.3. As appropriate, additional management measures may be selected to result in further phosphorus reductions. The reasonable and feasible management measures will depend on the needs of the land owner and the physical properties of the land. These properties include soil type, slope, current land use/cropping practices, and proximity to water bodies/streams. Additional priority may be placed on larger parcels, or parcels with a greater expected phosphorus reduction. This would minimize the initial number of projects in order to gain the same total pounds of phosphorus reduction.

5.3 Data Collection for Modeling

Following the initial site visit, once possible management measures have been identified, there may be a need for additional data. Data collected by the Dane County LWCD will be based on the model being utilized and the resource concern that is being assessed. Typical models used include SnapPlus, BARNY, WinSLAMM, P-8 Urban Catchment Model, Phosphorus Index, gully erosion calculator, and streambank erosion calculator. Data could include soil samples, survey data, crop practices and other information.

5.4 Modeling

Modeling will be used to estimate expected phosphorus reductions for various management measures that are being considered. The models that will most commonly be used are described below.

5.4.1 SnapPlus

SnapPlus (Soil Nutrient Application Planner) was designed as a means to streamline the preparation of Comprehensive Nutrient Management Plans (CNMP) for CAFOs. These CNMPs consist of five components: a conservation plan, a nutrient management plan, a record-keeping program, a manure manager, and feed management. Typically, several software programs were needed to generate these components, so SnapPlus was designed to incorporate these programs into one software package. SnapPlus is used to prepare nutrient management plans in accordance with Wisconsin's Nutrient Management Standard Code 590.

SnapPlus can be used to calculate crop nutrient recommendations for all fields on a farm, a rotational Phosphorus Index (PI) value for all fields as required for using the PI for phosphorus management, and a rotational phosphorus balance using soil test P as the criteria for phosphorus management. The PI is calculated by estimating average runoff phosphorus delivery from each field to the nearest surface water in a year given the field's soil conditions, crops, tillage, manure and fertilizer applications, and long-term weather patterns. The higher the PI number, the greater the likelihood that that field is contributing phosphorus to local water bodies.

For this application, SnapPlus will be used to calculate the expected phosphorus reductions for field-based management measures compared to the baseline for current practices. All SnapPlus modeling will be completed by the Dane County LWCD.

5.4.2 BARNY

The Wisconsin Barnyard Runoff Model (BARNY) is used to estimate loads of phosphorus and chemical oxygen demand in stormwater runoff from individual barnyards. It can also evaluate the impacts of buffers on reducing these loads. The main use of the BARNY model is to evaluate phosphorus transportation from barnyards and evaluate phosphorus load reductions due to barnyard management activities.

If it is determined that barnyard improvements could be an efficient source of phosphorus reductions, the Dane County LWCD will run BARNY modeling to estimate the reduction in phosphorus loads.

5.4.3 WinSLAMM

WinSLAMM (Source Loading and Management Model for Windows) was developed to evaluate nonpoint source pollutant loadings in urban areas using small storm hydrology. The model determines the runoff from a series of normal rainfall events and calculates the pollutant loading created by these rainfall events. The user is also able to apply a series of control devices, such as infiltration/biofiltration, street sweeping, wet detention ponds, grass swales, porous pavement, or catchbasins to determine how effectively these devices remove pollutants.

If urban stormwater practices are planned within the Village, WinSLAMM may be used by Town & Country Engineering to estimate phosphorus reductions.

5.4.4 P-8 Urban Catchment Model

P-8 is a model for predicting the generation and transport of storm water runoff pollutants in urban watersheds. The model has been developed for use in designing and evaluating runoff treatment schemes for existing or proposed urban developments. Simulated BMP types include detention ponds (wet, dry, extended), infiltration basins, swales, and buffer strips. The model is used to examine the water quality implications of alternative treatment objectives.

If urban stormwater practices are planned within the Village, P-8 may be used by Town & Country Engineering to estimate phosphorus reductions.

5.5 Determine Load Reduction

Once the planned management measures have been identified, the load reductions will be determined using the modeling previously discussed. Then the Village and Dane County LWCD will be able to determine the total load reduction expected for each project area. As stated in Section 3.4, the Village is required to provide a reduction of at least 528 pounds/year of phosphorus during the first permit term of Adaptive Management. If the calculated reductions for the planned management measures are less than the required amount, the Village will seek out additional project partners. After the first permit term of Adaptive Management, the Village may need to install additional management measures if the initial measures do not provide a sufficient reduction in phosphorus loading to Williams-Barneveld Creek.

5.6 Cost-Share Agreements

Cost share agreements or contracts will be established between the landowners and the Village for the management measures to be installed. Contracts will be drawn up by the Village or Dane County LWCD and made with landowners for a term 15 years or perpetuity. Once the contract is signed, the landowner will be paid with a lump sum incentive and annual payments for the length of the contract.

It will be up to the Village to determine the rates for each type of management measure. These rates will be based on typical cost-share models and information provided by the Dane County LWCD. Cost-share rates that have not been previously established will be estimated based on demand, local land rental rates, and crop yields.

These cost-share agreements could serve as trade agreements to allow for the ability to transition to Water Quality Trading (WQT). Additionally, practices will be registered upon implementation to further ease the transition from Adaptive Management to WQT. Example cost share contracts from the LWRD are included in Appendix K.

5.7 Installation of Management Measures

Once the cost share agreements have been signed between the landowner and the Village, it will be the responsibility of the landowner to install and maintain the agreed upon management measures. These measures may consist of one or more of the practices previously described in Section 4.3.

5.8 Verification of Installed Management Measures

Dane County LWCD will verify the status of rural practices installed for management measures. The Village will be responsible for verifying urban management measures installed within Village limits. These practices will be verified once per permit term after initial establishment has been verified. Annual inspections will be conducted by landowners, in which they will report and photograph the condition of the management measure to the Village. Annual inspection forms will be created by Dane County LWRD, Iowa County LCD, and the Village for use by landowners. In addition, in-stream phosphorus monitoring will be conducted by the WWTF staff to monitor the progress toward meeting the WQC, as described in Section 3.3.2.

Records and data for these practices will be cataloged by Town and County Engineering, with practices recorded spatially though GIS software along with LWCD's Conservation Planning System software.

Inspection of the installed management measures will include various steps to ensure that these measures are valid, and that the phosphorus reductions can be claimed for the Adaptive Management program. The steps for these inspections are as follows.

1. *Determine status of management measure*
2. *Issue status determination to landowner*
3. *Take corrective measures as needed*
4. *Document that required corrective measures (if any) are completed*
5. *Update data for modeling, as needed*

5.9 Annual Reporting

In order to ensure the Village's accountability, the DNR requires annual reporting on Adaptive Management progress. These reports should evaluate the monitoring data that has been collected (including instream phosphorus loadings as well as effluent loadings), describe the management measures that have been installed in the prior year, include landowner annual inspection forms and photographs, and describe any outreach and education that has been completed. Annual reporting will be completed by the Village, with assistance from Town & Country Engineering, the Iowa County LCD, and the Dane County LWCD, as needed.

These annual reports can also be used to help adjust Adaptive Management actions, such as any changes that would require permit modifications. Changes that would require permit modification would include changes to the action area size, adjustments to the minimum monitoring requirements, and changes to the amount of phosphorus being offset in the current permit term. In summary, these reports will be used as a line of communication between the Village and the DNR.

5.10 Implementation Schedule

In order to ensure that the Village meets the minimum required phosphorus loading reduction for the first Adaptive Management permit term, they will follow the implementation schedule in Table 5-1. This schedule will ensure that any management measures will be installed, verified, and inspected during the first permit term. Additionally, annual reporting will be performed to maintain communication between the Village and the DNR, as well as to reinforce accountability.

Table 5-1
Permit Term 1 Implementation Schedule

Action	Date
Site Inspections	Spring 2018-Fall 2018
Begin Monthly In-stream Sampling	Spring 2018
Data Collection and Modeling	Spring 2018
Cost Share Agreements Signed	Fall 2018
Management Measures Installed	Spring 2019, 2020, and as needed
Annual Adaptive Annual Report	January 1, 2020
Annual Adaptive Annual Report	January 1, 2021
Blue Mounds WWTF meets interim limits for effluent phosphorus	January 1, 2022
Annual Adaptive Annual Report	January 1, 2022
Annual Adaptive Annual Report	January 1, 2023
Minimum Phosphorus Reduction of 528 lbs/year	January 1, 2024
End of Permit Term 1	January 1, 2024

Permit Term 2 Implementation Schedule

Action	Date
Data Collection and Modeling	Spring 2023 – Fall 2028, as needed
Cost Share Agreements Signed	Fall 2023 – Fall 2028, as needed
Management Measures Installed	Spring 2024, 2025, and as needed
Annual Adaptive Annual Report	January 1, 2025
Annual Adaptive Annual Report	January 1, 2026
Annual Adaptive Annual Report	January 1, 2027
Annual Adaptive Annual Report	January 1, 2028
Total Phosphorus Reduction of 900 lbs/year	January 1, 2029
End of Permit Term 2	January 1, 2029

Permit Term 3 Implementation Schedule

Action	Date
Data Collection and Modeling	Spring 2028 - Fall 2033, as needed
Cost Share Agreements Signed	Fall 2028 - Fall 2033, as needed
Management Measures Installed	Spring 2029, 2030, and as needed
Annual Adaptive Annual Report	January 1, 2030
Annual Adaptive Annual Report	January 1, 2031
Annual Adaptive Annual Report	January 1, 2032
Annual Adaptive Annual Report	January 1, 2033
Total Phosphorus Reduction of 1,265 lbs/year	January 1, 2034
Williams-Barneveld Creek meets in stream criteria of 0.075 mg/L of phosphorus	January 1, 2034
End of Permit Term 3	January 1, 2034

6. FINANCIAL EVALUATION

The section presents the projected costs for implementation of Adaptive Management for the first permit term and well as certification of the financial security of the Adaptive Management Program.

6.1 Cost Estimate

Table 6-1 presents a breakdown of estimated annual costs associated with Adaptive Management in the Williams-Barneveld Creek watershed for the next permit term. Costs include the implementation of nonpoint source management measures, outreach and education, modeling, sampling, and other administrative duties. Factors relating to these costs and the responsible parties are listed in Table 6-1.

6.2 Funding Sources

Currently, the Blue Mounds WWTF will assume sole financial responsibility for Adaptive Management in the Williams-Barneveld Creek watershed and will fund these costs through user fees and cash on hand, but additional sources of funding will be explored. Grants and other funding opportunities will be researched to see if they are applicable to Blue Mound's Adaptive Management program. Possible grant sources include the following:

- NRCS Regional Conservation Partnership Program (RCPP)
- NRCS Environmental Quality Incentives Program (EQIP)
- Department of Agriculture, Trade and Consumer Protection (DATCP)
- Producer-Led Watershed Protection Grants
- Wisconsin DNR Targeted Runoff Management (TRM) Grants
- Trout Unlimited
- FSA Conservation Reserve Enhancement Program (CREP)

The Dane County LWCD will assist the Village with identifying and applying for applicable grants, ensuring that the funding source is eligible for use for WPDES permit compliance activities.

6.3 Financial Security

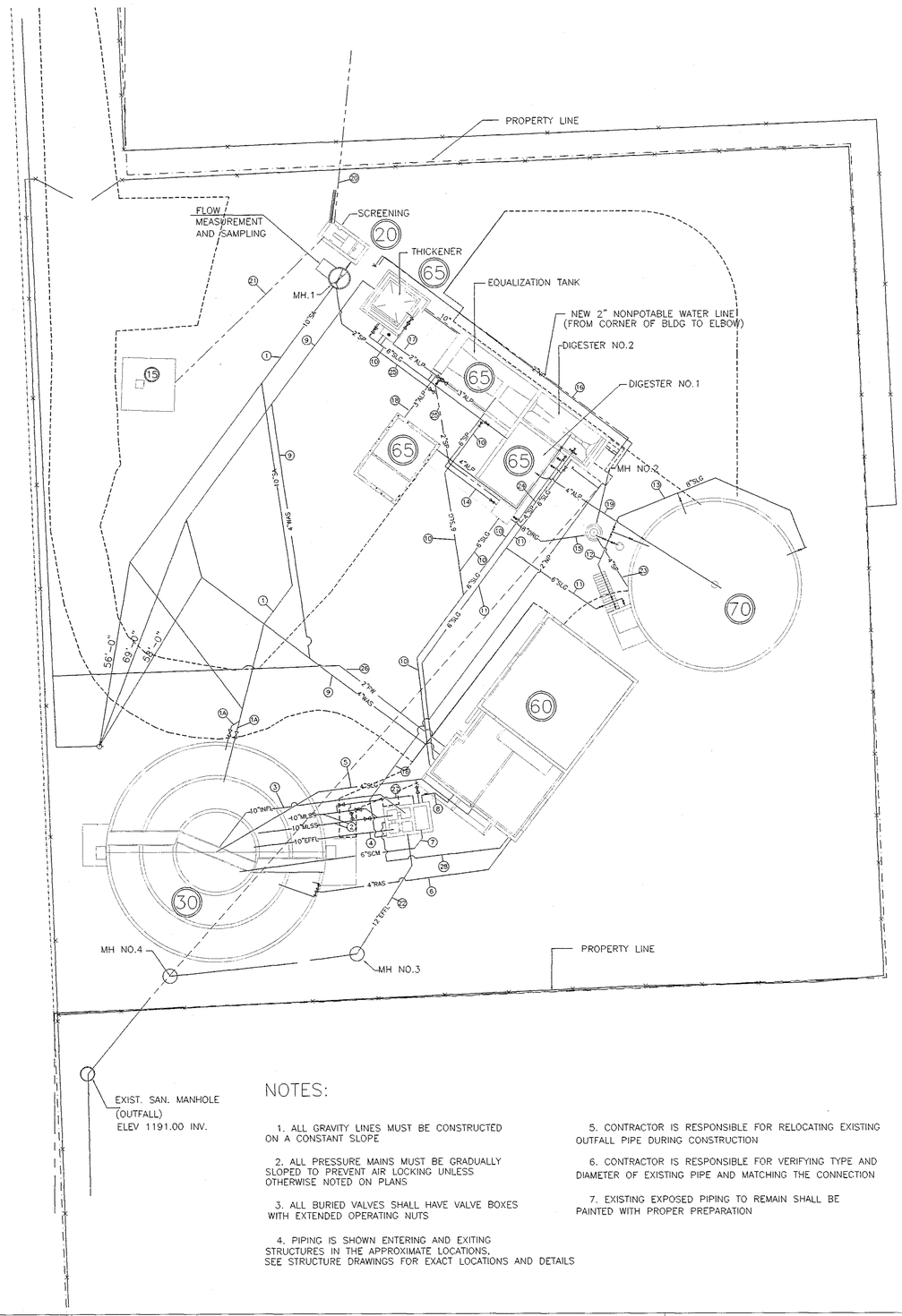
As required by the DNR, this Adaptive Management Plan contains a written statement from the Village validating that the financial needs to implement Adaptive Management are feasible. This statement is provided in Appendix L.

Table 6-1
Adaptive Management Cost Estimate

Permit Year	Responsible	0	1	2	3	4	5
Year	Party	2018	2019	2020	2021	2022	2023
Treatment Upgrades Capital Cost	Village						
Treatment Operating and Maintenance Costs							
Additional Sludge Hauling	Village						
Additional Chemicals	Village						
Adaptive Management Planning							
Report Preparation/Revision	T&C	$15,000					
Site Visits and Practice Identification	T&C	$5,000	$3,000	$3,000	$3,000	$3,000	$5,000
Modeling and Technical Support							
Dane County Modeling Costs	County		$3,000	$2,000	$2,000	$2,000	$2,000
Engineering Support	T&C		$3,000	$2,000	$2,000	$2,000	$2,000
BMP Implementation Costs							
Practice Brokering	County	$3,000	$3,000	$1,000	$1,000	$1,000	$1,000
Practice Brokering/Implementation Support	T&C	$2,000	$2,000	$1,000	$1,000	$1,000	$1,000
Cost Share Rates	Village		$50,000	$20,000	$20,000	$20,000	$20,000
Outreach and Education							
Meetings with Public/Stakeholders	T&C		$1,000	$1,000	$1,000	$1,000	$1,000
Communication about AM in watershed	Village		$1,000	$1,000	$1,000	$1,000	$1,000
In-Stream and Effluent Sampling							
Sample Collection	Village	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000
Sample Analysis	Village	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000
Compliance Checking							
Practice Verification	County		$5,000	$5,000	$5,000	$5,000	$5,000
Compliance Notifications	Village		$1,000	$1,000	$1,000	$1,000	$1,000
Administration							
Annual Reports	Village		$5,000	$5,000	$5,000	$5,000	$5,000
Meetings/Correspondence with DNR	T&C		$2,000	$2,000	$2,000	$2,000	$2,000
Total		**$31,000**	**$85,000**	**$50,000**	**$50,000**	**$50,000**	**$52,000**

Appendix A

Site Plan



N

PIPE LEGEND

SA	RAW WASTEWATER
SLG	SLUDGE
RAS	RETURN ACTIVATED SLUDGE
WAS	WASTE ACTIVATED SLUDGE
DRG	DRAIN LINE
ALP	AIR (LOW PRESSURE)
PW	POTABLE WATER
NP	NON-POTABLE WATER
EFF	EFFLUENT
INF	INFLUENT
OV	OVERFLOW
SP	SUPERNATANT
MLSS	MIXED LIQUOR SUSPENDED SLUDGE
SCM	SCUM

EXISTING TO REMAIN

ABANDON OR REMOVE

NEW PIPES

STRUCTURE SCHEDULE

- (15) SEPTAGE RECEIVING STATION
- (20) SCREENING
- (30) OXIDATION DITCH/CLARIFIER
- (60) MAIN SERVICE BUILDING
- (65) SLUDGE THICKENING/DIGESTION
- (70) SLUDGE STORAGE TANK

MANHOLE DATA

	RIM ELEV.	INV. ELEV.	DEPTH	DIAMETER
MANHOLE NO.1	1214.66	1209.33	5.33	6.00
MANHOLE NO.2	1203.50	1197.50	6.00	4.00
MANHOLE NO.3	1198.50	1192.50	6.00	4.00
MANHOLE NO.4	1198.00	1191.50	6.50	4.00

PIPE NO	PIPE IDENTIFICATION	SIZE	TYPE	CLASS	JOINT	FROM	TO	COMMENTS	GRAVITY
1	INFLUENT SEWER	10"	D.I.	52	P.O./M.J.	STR. NO. 20	STR NO.30		YES
1A	INFLUENT SEWER (2 LINES)	8"	D.I.	52	P.O./M.J.	STR. NO. 20	STR NO.30		YES
2	OXIDATION DITCH MLSS (2 LINES)	10"	D.I.	52	P.O./M.J.	STR. NO. 30	SPLITTER BOX		YES
3	CLARIFIER INFLUENT	10"	D.I.	52	P.O./M.J.	SPLITTER BOX	CLARIFIER		YES
4	CLARIFIER EFFLUENT	10"	D.I.	52	P.O./M.J.	CLARIFIER TROUGH	SPLITTER BOX		YES
5	SLUDGE	4"	D.I.	52	P.O./M.J.	CLARIFIER SUMP	RAS PUMPS		NO
6	RAS	4"	D.I.	52	P.O./M.J.	RAS PUMPS	DITCH		NO
7	SCUM	6"	D.I.	52	P.O./M.J.	CLAR. SCUM TROUGH	SPLITTER BOX		YES
8	SCUM SUCTION LINE	4"	D.I.	52	P.O./M.J.	SPLITTER BOX	SLUDGE PUMP		NO
9	WAS LINE	4"	D.I.	52	P.O./M.J.	SLUDGE PUMP	THICKENER STR.65		NO
10	SLUDGE LINE	6"	D.I.	52	P.O./M.J.	STR.NO.65	SLUDGE PUMPS	PART EXISTING	YES
11	SLUDGE LINE	6"	D.I.	52	P.O./M.J.	SLUDGE PUMPS	STR NO.65/70		NO
12	SLUDGE LOADING LINE	8"	D.I.	52	P.O./M.J.	STR. NO. 70	LOADING STAND		NO
13	SLUDGE RECIRCULATION LINE	8"	D.I.	52	P.O./M.J.	SLUDGE LOAD PUMP	STR. NO. 70		NO
14	SUPERNATANT RETURN LINE	6"	D.I.	52	P.O./M.J.	STR 65 EQUAL. TANK	SUPERNATANT PIT STR 65		YES
15	DRAIN LINE	8"	D.I.	52	P.O./M.J.	MANHOLE 2	SUPERNATANT PIT STR 65		YES
16	NON-POTABLE WATER	2"	P.V.C.	SCH 80	SOLV. WELD	SPLITTER BOX	YARD HYDRANTS	PART EXISTING	NO
17	AIR	2"'	STEEL	SCH 40	WELDED	BLOWERS	THICKENER		NO
18	AIR	3"	STEEL	SCH 40	WELDED	BLOWERS	EQUALIZ. TANK		NO
19	AIR	4"	STEEL	SCH 40	WELDED	BLOWERS	DIGESTERS/SLUDGE TANK	PART EXISTING	NO
20	INFLUENT SEWER	8"				SEWER SYSTEM	STR 20	EXISTING	YES
21	INFLUENT SEWER					STR. NO 15	STR. 20	EXISTING	NO
22	EFFLUENT SEWER	12"	D.I.	52	P.O./M.J.	SPLITTER BOX	MANHOLES NO.3 & NO.4		YES
23	SUPERNATANT	4"	D.I.	52	P.O./M.J.	SLUDGE TANK	MANHOLE NO.2		YES
24	SUPERNATANT	4"	D.I.	52	P.O./M.J.	DIGESTER NO.1	SLUDGE PIT		YES
25	SUPERNATANT	2"	P.V.C.	SCH 80	SOLV. WELD	SLUDGE PIT	FLOW MEASURE. STR. 20		NO
26	POTABLE WATER	2"	COPPER		SOLV. WELD	WATER MAIN	SERVICE BUILDING		NO
27	DRAIN LINE	4"	D.I.	52	P.O./M.J.	PIPE NO.2	SPLITTER BOX		YES
28	POLYMER CARRIER PIPE	2"	PVC	SCH 80	SOLV. WELD	SERVICE BUILDING	SPLITTER BOX		

NOTES:

1. ALL GRAVITY LINES MUST BE CONSTRUCTED ON A CONSTANT SLOPE
2. ALL PRESSURE MAINS MUST BE GRADUALLY SLOPED TO PREVENT AIR LOCKING UNLESS OTHERWISE NOTED ON PLANS
3. ALL BURIED VALVES SHALL HAVE VALVE BOXES WITH EXTENDED OPERATING NUTS
4. PIPING IS SHOWN ENTERING AND EXITING STRUCTURES IN THE APPROXIMATE LOCATIONS. SEE STRUCTURE DRAWINGS FOR EXACT LOCATIONS AND DETAILS
5. CONTRACTOR IS RESPONSIBLE FOR RELOCATING EXISTING OUTFALL PIPE DURING CONSTRUCTION
6. CONTRACTOR IS RESPONSIBLE FOR VERIFYING TYPE AND DIAMETER OF EXISTING PIPE AND MATCHING THE CONNECTION
7. EXISTING EXPOSED PIPING TO REMAIN SHALL BE PAINTED WITH PROPER PREPARATION

Record Drawings
November, 1998

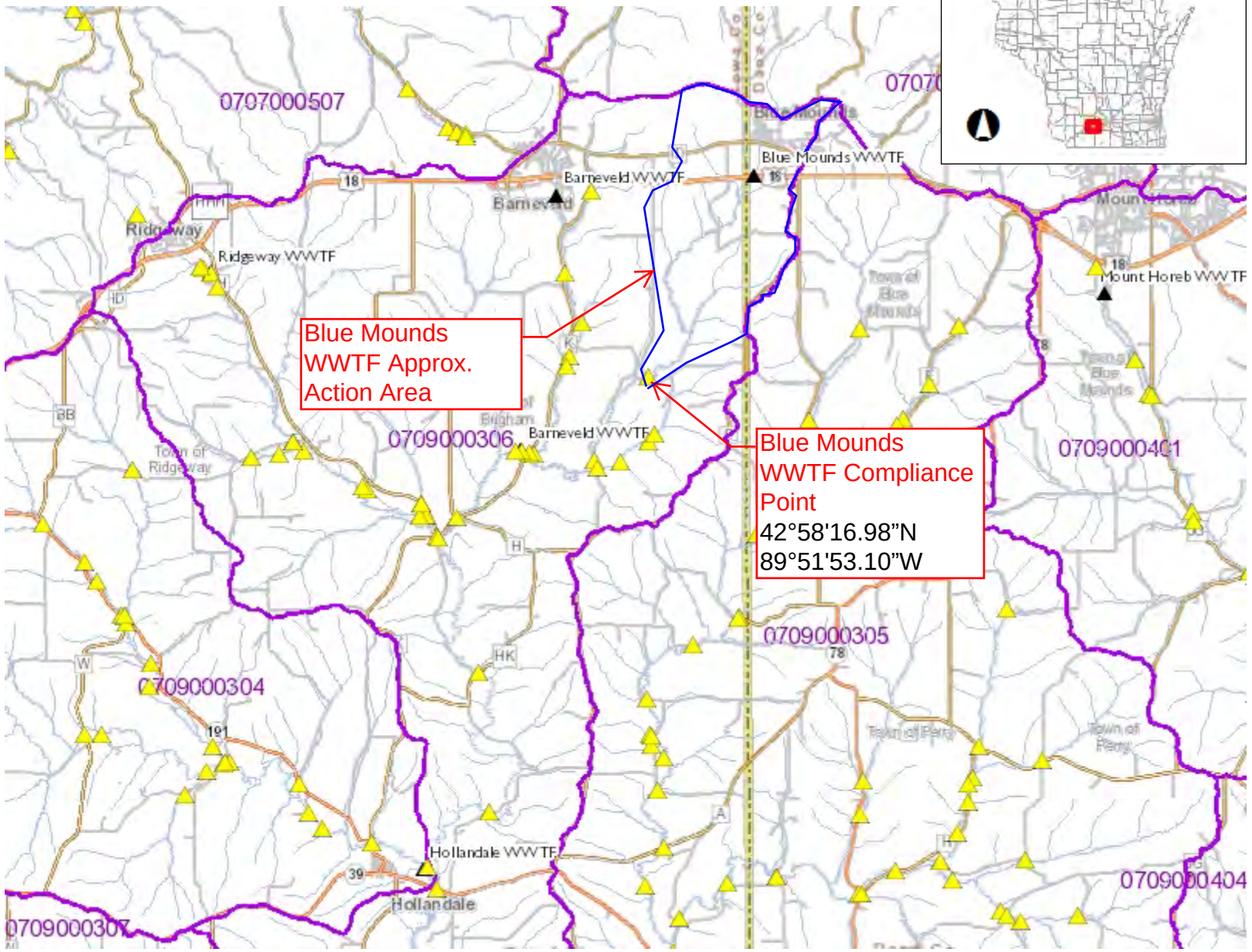
DRAWN BY: G.J.D.	REVISIONS: 5/96	PROJECT: WASTEWATER TREATMENT PLANT MODIFICATIONS VILLAGE OF BLUE MOUNDS, WISCONSIN	SHEET DESCRIPTION: SITE EXTERIOR PIPING PLAN/SCHEDULE
CHECKED BY: E.A.L.	DATE: 6/95		GRAPHIC SCALE: 0' 5' 10' 15' 20' 30' 40'
PROJ. NO: BM 13	SCALE: 1" = 20'		SHEET NO: 05-CM-03

Town & Country Engineering, Inc.
5225 VERONA ROAD, BUILDING NO. 4
P.O. BOX 44451 MADISON, WI 53744
(608) 273-3350

Appendix B

Watershed Maps

Blue Mounds HUC 10 Map



Legend

- Station Points with Recent Data (10 years)
- Surface Water Outfalls
- 24K Hydrography Streams and Rivers
- 24K Hydrography Lakes and Open Water
- 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

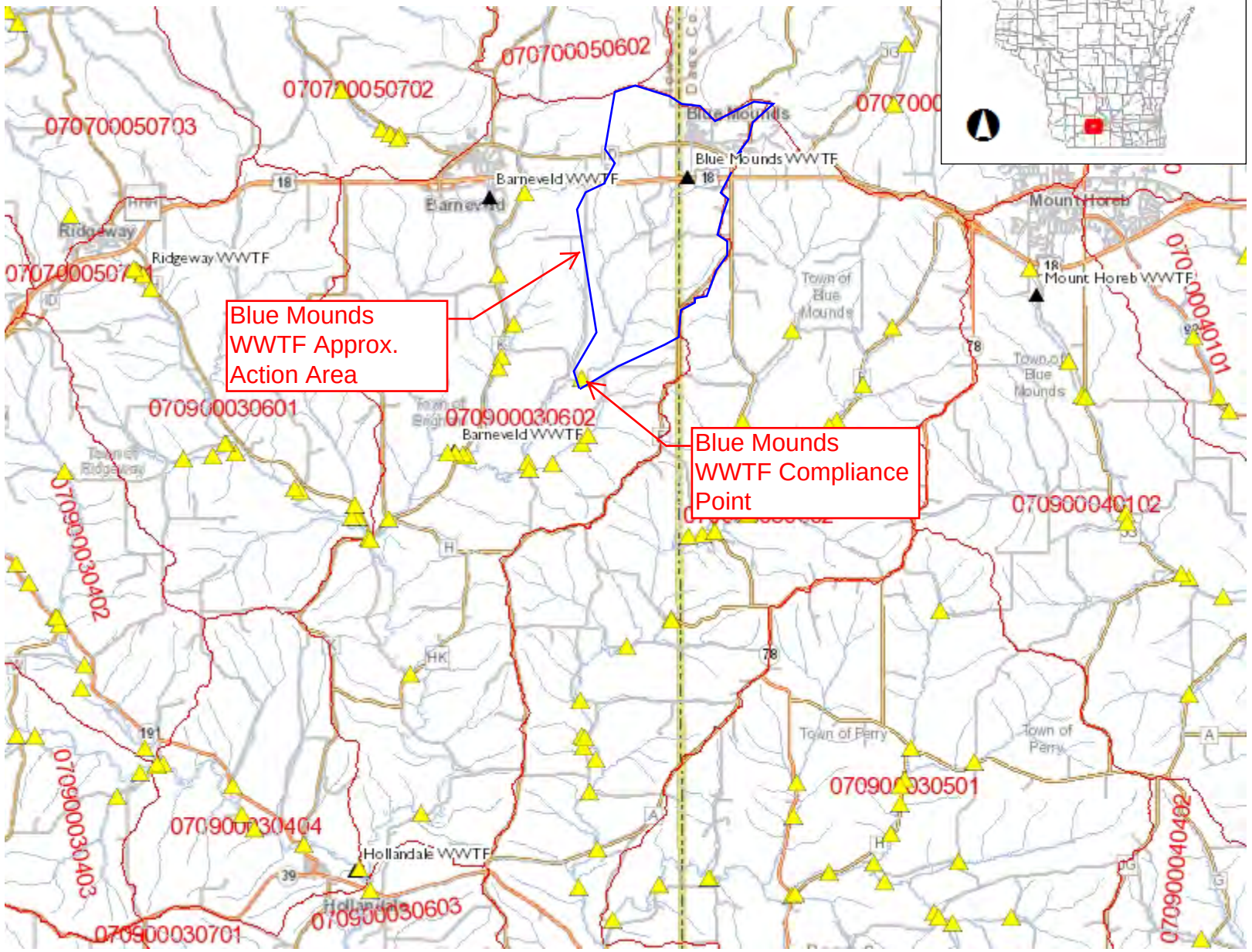
Notes

4.0 0 2.00 4.0 Miles

NAD_1983_HARN_Wisconsin_TM

1: 126,720

Blue Mounds HUC 12 Map



Legend

- Station Points with Recent Data (10 years)
- Surface Water Outfalls
- 24K Hydrography Streams and Rivers
- 24K Hydrography Lakes and Open Water
- 12-digit HUCs (Subwatersheds)
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

Notes

4.0 0 2.00 4.0 Miles

NAD_1983_HARN_Wisconsin_TM

1: 126,720

Appendix C

Receiving Water Information

Barneveld-Williams Creek Impaired Waters

Legend

TMDL Category Lines

- Other or Multiple Factors
- Contaminated Sediment Dominated
- Atmospheric Deposition Dominated
- Physical or Habitat Dominated
- Nonpoint Source Dominated
- Point and Nonpoint Source Blend
- Point Source
- Proposed for 303d listing

TMDL Category Areas

- Other or Multiple Factors
- Contaminated Sediment Dominated
- Atmospheric Deposition Dominated
- Physical or Habitat Dominated
- Nonpoint Source Dominated
- Point and Nonpoint Source Blend
- Point Source
- Proposed for 303d listing

- 12-digit HUCs (Subwatersheds)
- Municipality
- State Boundaries
- County Boundaries

Major Roads

- Interstate Highway
- State Highway
- US Highway

County and Local Roads

- County HWY
- Local Road

- Railroads
- Tribal Lands

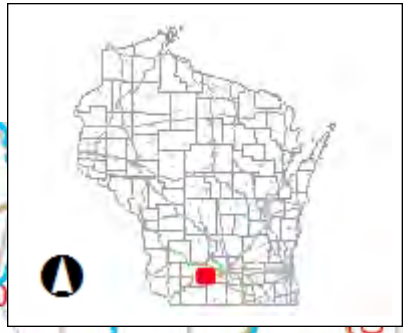
Notes

3.0 0 1.50 3.0 Miles

NAD_1983_HARN_Wisconsin_TM

1: 95,040

Barneveld-Williams Creek Trout Streams



Legend

- Smallmouth Bass Streams
  - Non-Wadable Coarse Substrate
  - Non-Wadable Fine Substrate
  - Wadable Cool Water
  - Wadable Nursery Waters
  - Wadable Warm Water
- Walleye Waters
  - Natural Reproduction Only
  - Natural Reproduction and Stocking Equal
  - Stocking Plus Natural Reproduction
- Trout Stream Lines
  - Class 1
  - Class 2
  - Class 3
- Trout Spring Ponds
  - Class 1
  - Class 2
  - Class 3
- 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

Notes

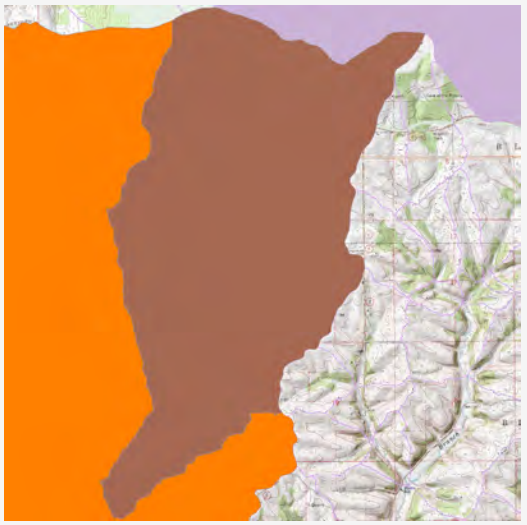
3.0 0 1.50 3.0 Miles

NAD_1983_HARN_Wisconsin_TM

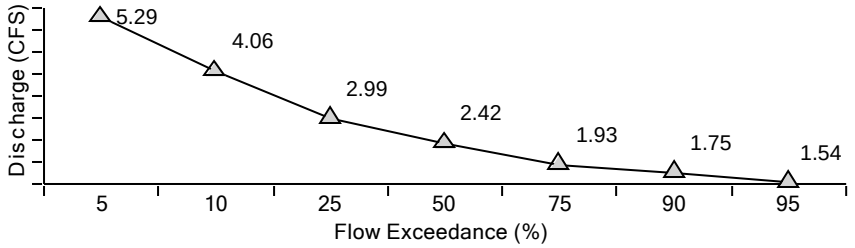
1: 95,040

PRESTO-Lite Watershed Delineation Report

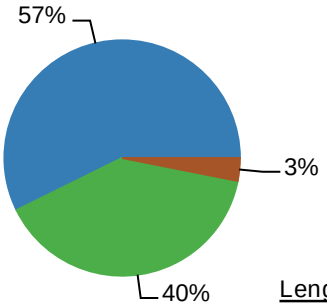
Reach ID: 200021150
Watershed Name: Williams Creek-East Branch Pecatonica River
Waterbody Name: Williams-Barneveld Creek
HUC08: Pecatonica River
Watershed Area: 6.19 mi²
Average Annual Precipitation: 35.39in



Stream Flow

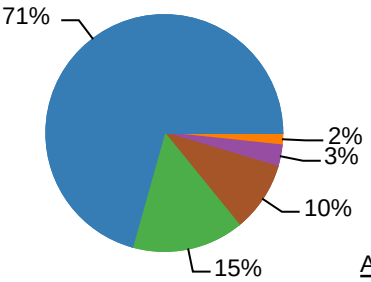


Tributary Stream Type



Type	Length
Cool-Cold Headwater	14920 ft
Coldwater	10312 ft
Macroinvertebrates	808 ft
Cool-Cold Mainstem	0 ft
Cold Headwater	0 ft
Cold Mainstem	0 ft
Large River	0 ft
Warm Headwater	0 ft
Warm Mainstem	0 ft

Landcover



Type	Area
Agriculture	4.37 mi²
Forest	0.94 mi²
Urban	0.59 mi²
Barren	0.18 mi²
Grassland	0.1 mi²

PRESTO Phosphorus Load Estimate

Avg. Annual Nonpoint Phosphorous Load (80% Confidence Interval)	14,101 (5,843 - 34,029) lbs
Number of Facilities (Individual Facility Information below)	1
Avg. Annual Point-source Phosphorous Load (2010 - 2012 total of all facilities)	610lbs
Most Likely Point : Nonpoint Phosphorous Ratio	4% : 96%
Low Estimate Point : Nonpoint Phosphorous Ratio (Adaptive Management)	2% : 98%

Adaptive Management Results

Facilities Discharging to the Williams Creek-East Branch Pecatonica River Watershed:

Facility Name	Permit #	Outfall #	Waste Type	Receiving Water	Avg. Phosphorus Load (lbs.) (2010 - 2012)
BLUE MOUNDS WASTEWATER TREATMENT FACILITY	0031658	001	Municipal	Unnamed	610

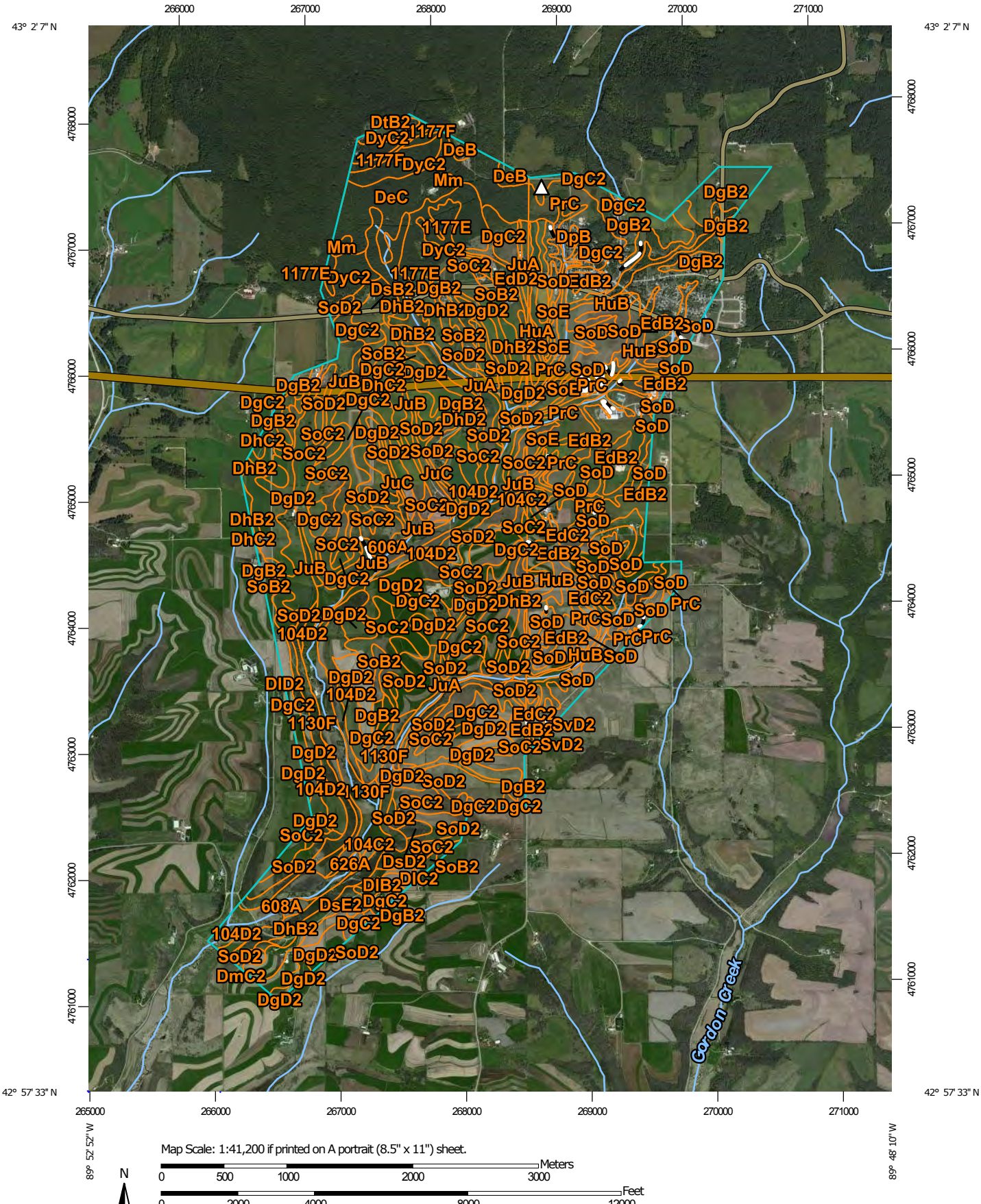
Watershed Analysis Limitations

- This analysis relies on pre-defined catchments from the Wisconsin Hydrography Data-Plus and may not delineate from the exact location required. When assessing phosphorus loads for specific facility in support of efforts such as adaptive management, care should be taken to ensure that additional downstream point sources do not exist. For adaptive management information related to specific facilities please reference the PRESTO website http://dnr.wi.gov/topic/surfacewater/presto.html
- Delineation of watersheds is based on a topographic assessment and therefore do not account for modified drainage networks such as stormwater sewer systems and ditched agriculture.
- If a watershed requires delineation from an exact location the user may use the desktop version of PRESTO that requires ESRI ArcGIS. The PRESTO tool and default datasets can be downloaded at http://dnr.wi.gov/topic/surfacewater/presto.html
- Data sources for this report originate from the WDNR's Wisconsin Hydrography Data-Plus value-added dataset and the point and non-point source loading information including in the WDNR's PRESTO model.
- If you have questions about the report generated from the PRESTO-Lite application please contact: DNRWATERQUALITYMODELING@wisconsin.gov

Appendix D

Watershed Soils Data

Soil Map—Dane County, Wisconsin, and Iowa County, Wisconsin
(Williams-Barneveld Creek Soils Map)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:15,800 to 1:20,000.

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

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

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

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

Soil Survey Area: Dane County, Wisconsin
Survey Area Data: Version 16, Oct 5, 2017

Soil Survey Area: Iowa County, Wisconsin
Survey Area Data: Version 12, Oct 5, 2017

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

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

Date(s) aerial images were photographed: Apr 29, 2011—Sep 10, 2011

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DgB2	Derinda silt loam, 2 to 6 percent slopes, eroded	107.3	2.7%
DgC2	Derinda silt loam, 6 to 12 percent slopes, eroded	166.9	4.2%
DpB	Dodgeville silt loam, 2 to 6 percent slopes	2.5	0.1%
EdB2	Edmund silt loam, 2 to 6 percent slopes, eroded	153.3	3.8%
EdC2	Edmund silt loam, 6 to 12 percent slopes, eroded	129.4	3.2%
EdD2	Edmund silt loam, 12 to 20 percent slopes, eroded	16.4	0.4%
HuA	Huntsville silt loam, 0 to 2 percent slopes	10.8	0.3%
HuB	Huntsville silt loam, 2 to 6 percent slopes	87.6	2.2%
NeE2	Newglarus silt loam, moderately deep, 20 to 30 percent slopes, moderately eroded	0.4	0.0%
PrC	Port Byron silt loam, 6 to 12 percent slopes	151.6	3.8%
SoD	Sogn silt loam, 2 to 20 percent slopes	335.5	8.4%
SoE	Sogn silt loam, 20 to 35 percent slopes	13.1	0.3%
SvD2	Seaton silt loam, driftless valley, 12 to 20 percent slopes, moderately eroded	0.3	0.0%
Subtotals for Soil Survey Area		**1,175.2**	**29.4%**
Totals for Area of Interest		**3,993.4**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
104C2	Lindstrom silt loam, 6 to 12 percent slopes, moderately eroded	19.7	0.5%
104D2	Lindstrom silt loam, 12 to 20 percent slopes, moderately eroded	54.8	1.4%
606A	Huntsville silt loam, 0 to 3 percent slopes, occasionally flooded	44.8	1.1%
608A	Lawson silt loam, 0 to 3 percent slopes, occasionally flooded	51.8	1.3%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
626A	Arenzville silt loam, 0 to 3 percent slopes, occasionally flooded	6.3	0.2%
628A	Orion silt loam, 0 to 3 percent slopes, occasionally flooded	72.0	1.8%
1130F	Lacrescent-Dunbarton complex, very stony, 30 to 60 percent slopes	91.8	2.3%
1177E	Derinda-Rock outcrop-Elizabeth complex, 20 to 30 percent slopes, rubbly	53.5	1.3%
1177F	Derinda-Rock outcrop-Elizabeth complex, 30 to 60 percent slopes, rubbly	6.9	0.2%
DeB	Derinda stony silt loam, 2 to 6 percent slopes	13.5	0.3%
DeC	Derinda stony silt loam, 6 to 12 percent slopes	133.8	3.4%
DgB2	Dodgeville silt loam, 2 to 6 percent slopes, moderately eroded	117.7	2.9%
DgC2	Dodgeville silt loam, 6 to 12 percent slopes, moderately eroded	503.6	12.6%
DgD2	Dodgeville silt loam, 12 to 20 percent slopes, moderately eroded	392.6	9.8%
DhB2	Dodgeville silt loam, deep, 2 to 6 percent slopes, moderately eroded	44.9	1.1%
DhC2	Dodgeville silt loam, deep, 6 to 12 percent slopes, moderately eroded	53.5	1.3%
DhD2	Dodgeville silt loam, deep, 12 to 20 percent slopes, moderately eroded	54.5	1.4%
DlB2	Dodgeville silt loam, shallow, 2 to 6 percent slopes, moderately eroded	16.6	0.4%
DlC2	Dodgeville silt loam, shallow, 6 to 12 percent slopes, moderately eroded	0.1	0.0%
DlD2	Dodgeville silt loam, shallow, 12 to 20 percent slopes, moderately eroded	0.0	0.0%
DmC2	Dodgeville soils, 6 to 12 percent slopes, moderately eroded	0.6	0.0%
DmD2	Dodgeville soils, 12 to 20 percent slopes, moderately eroded	3.8	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DsB2	Newglarus silt loam, moderately deep, 2 to 6 percent slopes, moderately eroded	13.0	0.3%
DsC2	Newglarus silt loam, moderately deep, 6 to 12 percent slopes, moderately eroded	11.3	0.3%
DsD2	Newglarus silt loam, moderately deep, 12 to 20 percent slopes, moderately eroded	6.2	0.2%
DsE2	Newglarus silt loam, moderately deep, 20 to 30 percent slopes, moderately eroded	30.1	0.8%
DtB2	Palsgrove silt loam, 2 to 6 percent slopes, moderately eroded	12.3	0.3%
DyC2	Newglarus-Dunbarton silt loams, 6 to 12 percent slopes, moderately eroded	141.7	3.5%
DyD2	Newglarus-Dunbarton silt loams, 12 to 20 percent slopes, moderately eroded	3.8	0.1%
JuA	Judson silt loam, 0 to 2 percent slopes	105.3	2.6%
JuB	Judson silt loam, 2 to 6 percent slopes	23.3	0.6%
JuC	Judson silt loam, 6 to 12 percent slopes	11.9	0.3%
Mm	Millsdale silty clay loam, shale variant	6.0	0.1%
NoD2	Northfield sandy loam, 12 to 20 percent slopes, moderately eroded	5.6	0.1%
SoB2	Sogn and Dodgeville silt loams, shallow, 2 to 6 percent slopes, moderately eroded	48.7	1.2%
SoC2	Sogn and Dodgeville silt loams, shallow, 6 to 12 percent slopes, moderately eroded	229.6	5.7%
SoD2	Sogn and Dodgeville silt loams, shallow, 12 to 20 percent slopes, moderately eroded	432.7	10.8%
Subtotals for Soil Survey Area		**2,818.2**	**70.6%**
Totals for Area of Interest		**3,993.4**	**100.0%**

Appendix E

Land Use Data

Blue Mounds WWTP - Williams Creek Watershed Land Usage

Land use	Soil group	Area (acres)	Combined Acres	% of Total Acres
Open Space/Park	B	108		
Open Space/Park	C	44	229	5.8%
Open Space/Park	D	77		
Low-Density Residential (general 1/3 - 2 ac lots)	B	60		
Low-Density Residential (general 1/3 - 2 ac lots)	C	40	139	3.5%
Low-Density Residential (general 1/3 - 2 ac lots)	D	38		
High-density Residential (townhomes to 1/4 ac lots)	B	2		
High-density Residential (townhomes to 1/4 ac lots)	C	2	8	0.2%
High-density Residential (townhomes to 1/4 ac lots)	D	5		
Commercial/Industrial/Transportation	D	0	0	0.0%
Barren Land	B	2	3	0.1%
Barren Land	D	1		
Deciduous Forest	B	250		
Deciduous Forest	C	206	594	15.2%
Deciduous Forest	D	138		
Evergreen Forest	B	2	2	0.0%
Shrub; Scrub	B	46		
Shrub; Scrub	C	28	110	2.8%
Shrub; Scrub	D	37		
Grassland; Herbaceous	B	52	66	1.7%
Grassland; Herbaceous	D	13		
Pasture/Hay	B	852		
Pasture/Hay	C	77	1,505	38.5%
Pasture/Hay	D	576		
Cropland generalized agriculture	B	536		
Cropland generalized agriculture	C	147	1,257	32.1%
Cropland generalized agriculture	D	573		
Total		3,912 acres		

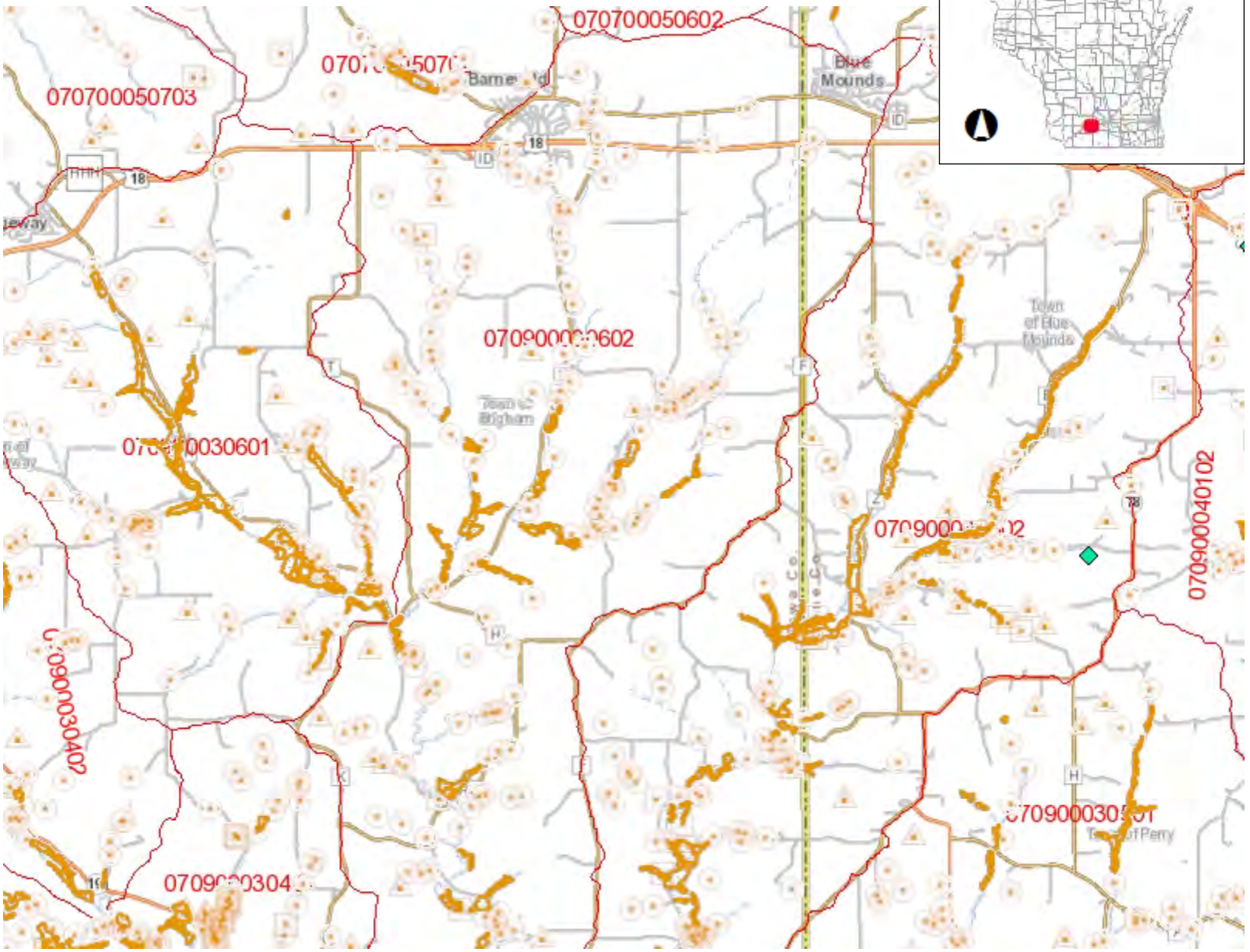
Blue Mounds WWTP - HUC 12 Land Usage

Land use	Soil group	Area (acres)	Combined Acres	% of Total Acres
Open Space/Park	B	618		
Open Space/Park	C	89	992	
Open Space/Park	D	284		4.4%
Low-Density Residential (general 1/3 - 2 ac lots)	B	196		
Low-Density Residential (general 1/3 - 2 ac lots)	C	41	360	
Low-Density Residential (general 1/3 - 2 ac lots)	D	122		1.6%
High-density Residential (townhomes to 1/4 ac lots)	B	10		
High-density Residential (townhomes to 1/4 ac lots)	C	2	43	
High-density Residential (townhomes to 1/4 ac lots)	D	30		0.2%
Commercial/Industrial/Transportation	B	1	3	
Commercial/Industrial/Transportation	D	2		0.0%
Barren Land	B	7	16	
Barren Land	D	9		0.1%
Deciduous Forest	A	9		
Deciduous Forest	B	2,012	4,269	
Deciduous Forest	C	408		
Deciduous Forest	D	1,840		18.8%
Evergreen Forest	B	17	20	
Evergreen Forest	D	3		0.1%
Mixed Forest	B	2	3	
Mixed Forest	D	0		0.0%
Shrub; Scrub	B	377		
Shrub; Scrub	C	45	605	
Shrub; Scrub	D	183		2.7%
Grassland; Herbaceous	B	314		
Grassland; Herbaceous	C	1	390	
Grassland; Herbaceous	D	74		1.7%
Pasture/Hay	A	8		
Pasture/Hay	B	6,766	9,906	
Pasture/Hay	C	293		
Pasture/Hay	D	2,839		43.6%
Cropland generalized agriculture	A	2		
Cropland generalized agriculture	B	4,108	5,996	
Cropland generalized agriculture	C	339		
Cropland generalized agriculture	D	1,547		26.4%
Woody Wetlands (swamp)	B	54		
Woody Wetlands (swamp)	C	11	75	
Woody Wetlands (swamp)	D	10		0.3%
Emergent Wetlands (marsh)	B	25		
Emergent Wetlands (marsh)	C	15	47	
Emergent Wetlands (marsh)	D	7		0.2%
Total		22,726 acres		

Appendix F

Wetlands Information

Blue Mounds Wetland Map



Legend

- Wetland Identifications and Confirmations
- Wetland Class Points
  - Dammed pond
  - Excavated pond
  - Filled excavated pond
  - Filled/drained wetland
  - Wetland too small to delineate
- Filled Points
- Wetland Class Areas
  - Wetland
  - Upland
- Filled Areas
- 12-digit HUCs (Subwatersheds)
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

Notes

3.0 0 1.50 3.0 Miles

NAD_1983_HARN_Wisconsin_TM

1: 95,040

Williams-Barneveld Creek Watershed Wetlands

Legend

- Wetland Identifications and Confirmations
- Wetland Class Points
  - Dammed pond
  - Excavated pond
  - Filled excavated pond
  - Filled/drained wetland
  - Wetland too small to delineate
- Filled Points
- Wetland Class Areas
  - Wetland
  - Upland
- Filled Areas
- Wetland Class Points
  - Dammed pond
  - Excavated pond
  - Filled excavated pond
  - Filled/drained wetland
  - Wetland too small to delineate
- Filled Points
- Wetland Class Areas
  - Wetland
  - Upland
- Filled Areas
- 12-digit HUCs (Subwatersheds)
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY

Notes

1.5 0 0.75 1.5 Miles

NAD_1983_HARN_Wisconsin_TM

1: 47,520

Appendix G

WWTF Effluent Phosphorus Data

Blue Mounds WWTF

Effluent Phosphorus Sampling				
Month	Average Concentration (mg/L)	Maximum Concentration (mg/L)	Average Load (lbs/day)	Maximum Load (lbs/day)
Nov-14	4.90	6.58	1.41	2.32
Dec-14	6.25	14.9	2.26	7.97
2014 Annual Average	**5.58**	**10.74**	**1.84**	**5.14**
Jan-15	5.51	7.25	1.39	1.84
Feb-15	4.93	5.78	1.34	1.59
Mar-15	4.82	5.88	1.32	1.81
Apr-15	4.56	6.93	1.73	2.35
May-15	4.43	5.00	1.62	2.31
Jun-15	4.86	5.50	2.11	2.35
Jul-15	5.43	5.98	2.01	2.40
Aug-15	7.61	9.18	2.47	3.39
Sep-15	6.06	6.60	1.86	2.43
Oct-15	6.58	8.80	2.04	2.35
Nov-15	4.76	6.00	1.69	2.24
Dec-15*	2.99	4.35	1.58	2.01
2015 Annual Average	**5.21**	**6.44**	**1.76**	**2.26**
Jan-16	4.24	4.60	1.43	1.66
Feb-16	5.43	6.28	1.69	2.12
Mar-16	3.48	5.60	1.80	2.79
Apr-16	3.50	5.38	1.68	2.70
May-16	5.00	6.20	1.81	2.95
Jun-16	3.82	5.35	1.86	2.43
Jul-16	5.12	6.73	2.13	2.80
Aug-16	6.16	7.58	1.89	2.74
Sep-16	6.61	9.03	1.89	3.41
Oct-16	-	-	-	-
Nov-16	-	-	-	-
Dec-16	-	-	-	-
2016 Annual Average	**4.82**	**6.31**	**1.80**	**2.62**
Jan-17	2.17	2.45	0.87	0.96
Feb-17	2.67	2.73	1.22	1.23
Mar-17	3.29	3.30	2.17	2.26
Apr-17	1.90	2.40	1.28	1.68
May-17	1.92	5.08	1.58	2.20
Jun-17	0.12	0.13	0.05	0.06
Jul-17	0.09	0.09	0.07	0.07
Aug-17	0.07	0.07	0.03	0.04
Sep-17	0.49	0.52	0.19	0.20
Oct-17	4.99	5.08	1.50	1.57
Nov-17	4.57	4.63	1.50	1.57
Dec-17	3.90	3.95	1.12	1.14
2017 Annual Average	**1.41**	**1.86**	**0.83**	**0.97**
Data Average	**3.13**	**4.19**	**1.34**	**1.86**
Jan-18	3.82	3.85	1.28	1.37
Feb-18	3.03	3.48	1.44	2.20
Mar-18	4.72	4.90	1.44	1.52
Apr-18				
May-18				
Jun-18				
Jul-18				
Aug-18				
Sep-18				
Oct-18				
Nov-18				
Dec-18				
2018 Annual Average	**3.85**	**4.08**	**1.38**	**1.70**
Data Average	**4.07**	**5.21**	**1.49**	**2.08**

Appendix H

EVAAL Results

Blue Mounds EVAAL
Village of Blue Mounds

Town of Vermont
Town of Blue Mounds
Blue Mound State Park
Brigham P
Pleasure Valley Creek
Mounds View Park
Village of Blue Mounds
Village of Blue Mounds
Town of Blue Mounds
Village of Blue Mounds
Town of Blue Mounds
Iowa
Dane

LEGEND

World Boundaries and Places

Watershed

EVAAL

Value

High : 9.53856

Low : -2.85945

N

0 360 720 1,440

Feet

Town & Country Engineering, Inc.
2912 Marketplace Drive
Suite 103
Madison, WI 53719
(608) 273-3350
www.tcengineers.net

Date: 4/25/2018
Path: J:\JOB#'S\Blue Mounds\BM-00-00\Mapping\Blue Mounds Working Map.mxd

High Priority Areas
Village of Blue Mounds

High Erosion Vulnerability Areas

Approximate Stream Location

LEGEND

Parcels

N

0 350 700 1,400

Feet

Town & Country Engineering, Inc.
2912 Marketplace Drive
Suite 103
Madison, WI 53719
(608) 273-3350
www.tcengineers.net

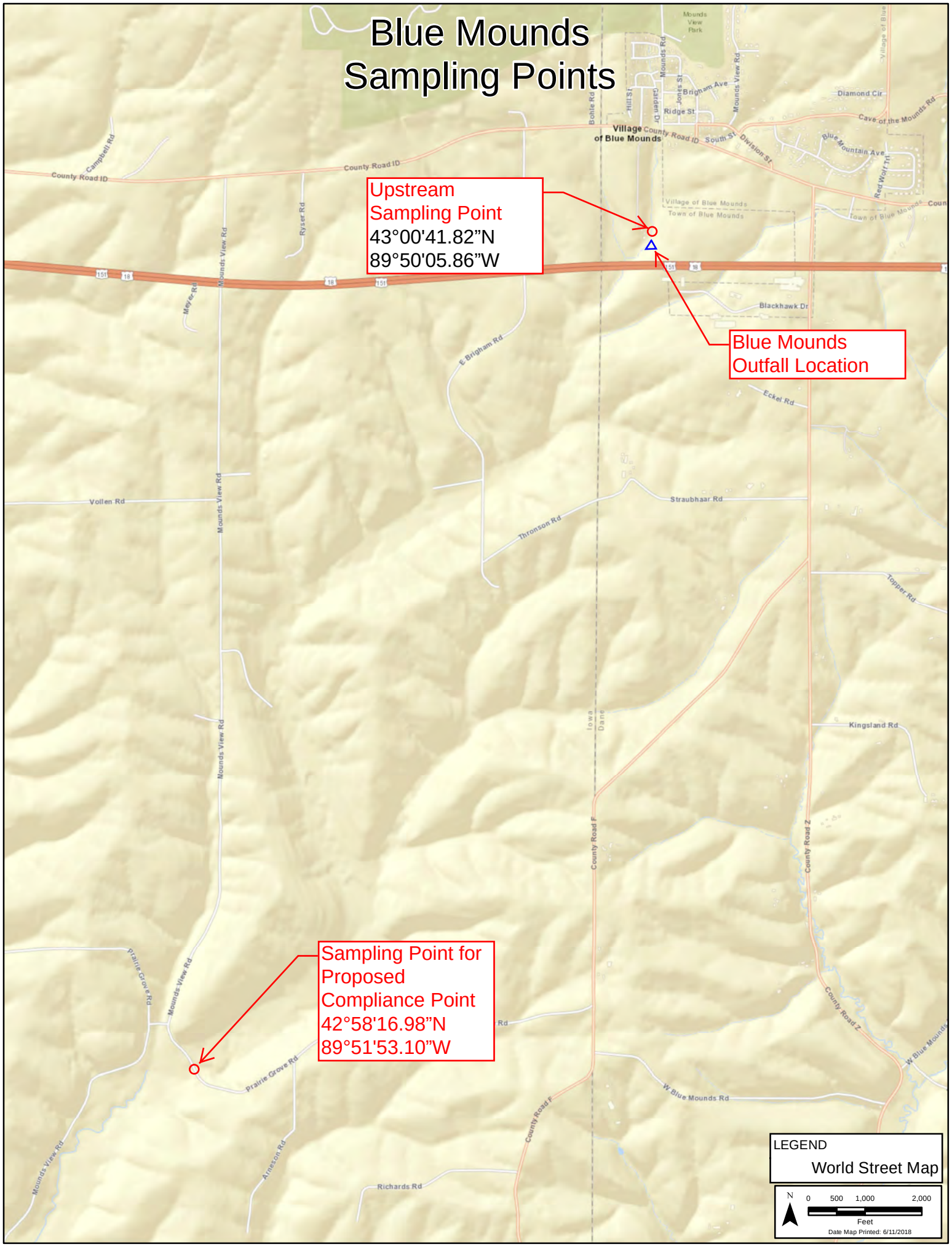
Date: 10/30/2018

Path: J:\JOB#'s\Blue Mounds\BM-00-00\Mapping\Blue Mounds Working Map.mxd

Source: Esri, DigitalGlobe, GeoEye, Earthstar G
Getmapping, Aerogrid, IGN, IGP, swisstopo, an

Appendix I

Proposed In-stream Sampling Locations


Blue Mounds
Sampling Points
Upstream
Sampling Point
43°00'41.82"N
89°50'05.86"W
Blue Mounds
Outfall Location
Sampling Point for
Proposed
Compliance Point
42°58'16.98"N
89°51'53.10"W
Village of Blue Mounds
County Road ID
Mounds View Rd
Brigham Ave
Ridge St
South St
Division St
Blue Mountain Ave
Cave of the Mounds Rd
Diamond Cir
Blackhawk Dr
E Brigham Rd
Eckel Rd
Straubhaar Rd
Thronson Rd
Vollen Rd
Topper Rd
Kingsland Rd
County Road F
County Road Z
W Blue Mounds Rd
Prairie Grove Rd
Richards Rd
Ryser Rd
Meyer Rd
Campbell Rd
Bohle Rd
Hill St
Jones St
Red Wolf Trl
Village of Blue Mounds
Town of Blue Mounds
Mounds View Park
Iowa
Dane
LEGEND
World Street Map
N
0
500
1,000
2,000
Feet
Date Map Printed: 6/11/2018

Blue Mounds
In-Stream Sampling Locations

Legend

- Surface Water Outfalls
- 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

Approx. Upstream Sampling Point
43°00'41.82"N
89°50'05.86"W
425 feet NW of Outfall location

0.0 0 0.02 0.0 Miles

1: 990

NAD_1983_HARN_Wisconsin_TM

Notes

Blue Mounds
In-Stream Sampling Locations

Legend

- Surface Water Outfalls
- 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

0.1 0 0.03 0.1 Miles

NAD_1983_HARN_Wisconsin_TM

1: 1,980

Blue Mounds In-Stream Phosphorus Results

Date	2157 Blue Mounds UP mg/L	2158 Blue Mounds Outfall mg/L	2159 Blue Mounds DS mg/L
06/14/2018	0.09	0.21	0.19
07/02/2018	0.21	2.16	1.12
08/09/2018	0.18	2.24	0.65
09/13/2018	0.18	3.28	0.11
10/11/2018	0.33	0.48	0.98
Median Value	0.18	2.16	0.65

Appendix J

Commitment Letters from Dane County LWRD and Iowa County LCD

DANE COUNTY LAND&WATER RESOURCES DEPARTMENT

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

Land Conservation • Office of Lakes & Watersheds • Parks • Water Resource Engineering

June 29, 2018

Ms. Cassie Elmer
Town & Country Engineering, Inc.
2912 Marketplace Drive, Suite 103
Madison, Wisconsin 53719

SUBJECT: Blue Mounds Adaptive Management Plan

Dear Ms. Elmer:

Dane County Land & Water Resources Department (LWRD) intends to assist the Blue Mounds Wastewater Treatment Plant and Commission with implementation of their proposed adaptive management plan within the scope of the services typically provided by LWRD to landowners. A service agreement is proposed be developed between Blue Mounds WWTP and Dane County and approved by the appropriate boards and commissions identifying services to be provided by LWRD as a broker for the Blue Mounds adaptive management plan.

If you have additional questions, please contact me at (608) 224-3740 or callis.amy@countyofdane.com.

Sincerely,

Amy S. Callis, County Conservationist
Land Conservation Division
Dane County Land & Water Resources Department

cc: Amy Garbe, Wisconsin Department of Natural Resources

IOWA County GOVERNMENT
WISCONSIN

LAND CONSERVATION DEPARTMENT
1124 Professional Drive Suite 500
Dodgeville, WI 53533
Phone: (608) 930-9891

October 30, 2018

Ms. Cassie Elmer
Town & Country Engineering Inc.
2912 Marketplace Drive Suite 103
Madison WI 53719

Dear Ms. Elmer,

The Iowa County Land Conservation Department (LCD) intends to assist the Blue Mounds Wastewater Treatment Plant (WWTP) and Commission with implementation of their proposed phosphorus Adaptive Management plan, within the scope of services normally provided by the LCD.

A service agreement will be developed in the future between Iowa County and Blue Mounds WWTP detailing the services to be provides.

If you have any questions please contact me at 608-930-9893 or katherine.abbott@iowacounty.org.

Sincerely,

Katie Abbott

Katie Abbott
County Conservationist
Iowa County Land Conservation Department

Appendix K

LWRM Contract Template

COST-SHARE CONTRACT NO.:

SOIL AND WATER RESOURCE MANAGEMENT GRANT PROGRAM

Sec. 92.14, Wis. Stats

COST-SHARE CONTRACT

(DATCP approval required for cost-share amounts over $50,000)

This contract is made and entered into by and between **Dane** County Land Conservation Committee, and landowner(s) _____ and grant recipient(s) **N/A**. **This contract is complete and valid as of the date signed by the county representative.**

In consideration of the terms and conditions herein, the parties agree to this contract as set forth in the following Sections 1, 2, and 3, and any addenda that are annexed and made a part hereof.

NOTE 1: It is **not** necessary to notarize the spouse's signature unless this contract will be recorded. However, the spouse must sign his or her own name. If there are additional landowners or any grant recipients, check here ☐ and attach Exhibit A1. **NOTE 2:** Only properly authorized person(s) can sign in a representative capacity and must sign in such capacity if the landowner is a corporation, trust, estate, partnership, limited partnership, or limited liability company.

Recording Area

Agency Name & Return Address
Dane County Land & Water Resources
5201 Fen Oak Drive, Room 208
Madison, WI 53718

Parcel Identification Number

_____ _____
LANDOWNER/REPRESENTATIVE **DATE**
PRINT OR TYPE NAME: JAMES M. LUNDE

State of Wisconsin)
) ss.
_____County)

This instrument was acknowledged before me on _____ (date)

by _____
(name of landowner or representative)

as _____
(representative's position or type of authority, if applicable)

for _____
(name of entity on behalf of whom instrument was executed, if applicable)

_____ _____
SIGNATURE **PRINT NAME**
Notary Public, State of Wisconsin
My commission expires _____ (is permanent).

_____ _____
LANDOWNER/REPRESENTATIVE **DATE**
PRINT OR TYPE NAME: SHARON LUNDE

State of Wisconsin)
) ss.
_____County)

This instrument was acknowledged before me on _____ (date)

by _____
(name of landowner or representative)

as _____
(representative's position or type of authority, if applicable)

for _____
(name of entity on behalf of whom instrument was executed, if applicable)

_____ _____
SIGNATURE **PRINT NAME**
Notary Public, State of Wisconsin
My commission expires _____ (is permanent).

_____ _____
SIGNATURE OF COUNTY REPRESENTATIVE **DATE**
PRINT OR TYPE NAME: _____

State of Wisconsin)
) ss.
_____County)
This instrument was acknowledged before me on _____ (date)

by _____
(name of county representative)

as _____of _____

_____ _____
SIGNATURE **PRINT NAME**
Notary Public, State of Wisconsin
My commission expires _____ (is permanent)

This document was drafted by the Wisconsin Department of Agriculture, Trade and Consumer Protection.

Personal information you provide may be used for purposes other than that for which it was originally collected (Sec. 15.04(1) (m), Wis. Stats.)

COST-SHARE CONTRACT NO.:

SECTION 1A. COUNTY INFORMATION	PAGE 2 of 5
NAME OF COUNTY AGENCY **Dane County Land & Water Resources**	**TELEPHONE NUMBER** **608-224-3730**
ADDRESS **5201 Fen Oak Drive, Room 208**	**CITY, STATE, ZIP CODE** **Madison WI 53718**
NAME OF AUTHORIZED REPRESENTATIVE **Amy Callis – County Conservationist**	

SECTION 1B. LANDOWNER and GRANT RECIPIENT INFORMATION

TOTAL DATCP COST-SHARE AMOUNT (refer to page 5)	**NON-DATCP FUNDING BY SOURCE (refer to page 5)** ☐ **County $** ☐ **Other State Agency $** ☐ **Federal $** ☐ **Non-Profit or Other $**
NAME OF LANDOWNER (Check the description that best applies: ☒ **Individual (Note: Spouse must be included)** ☐ **Corporation** ☐ **Limited Liability Company** ☐ **Trust, Estate or Partnership** ☐ **Local Unit of Government)**	
ADDRESS	
CITY, STATE, ZIP CODE **WI**	**TELEPHONE NUMBER**

LOCATION OF COST-SHARED PRACTICE(S) (Locate by providing parcel numbers(s) or coordinates below or attach required information as Exhibit B)

Parcel Identification Number(s):

Latitude and longitude (degrees and minutes):
° . ' N ° ' W

Note: If this document will be recorded, attach a legal description of the location of the cost-shared practice(s) that meets the requirements of ss. 706.05(2m)(a) and 66.0217(1)(c), Wis. Stats.

NAME OF GRANT RECIPIENT, if different than above. NOTE: SPOUSE MUST BE INCLUDED **N/A**	
ADDRESS	
CITY, STATE, ZIP CODE	**TELEPHONE NUMBER**

INSTALLATION PERIOD

Each practice must be installed, and all costs associated with the practice must be incurred, by December 31st of the cost-share contract year, or December 31st of the year of an approved extension. This contract may provide cost-sharing for more than one year for the following items as long as the parties record the number of years of cost-sharing in the appropriate column in Section 3:

a. **To install and maintain contour farming, cover and green manure crop, nutrient management, pest management, residue management, and strip-cropping (up to 4 years).**
b. **For land taken out of production for 10 years or other period specified in Section 3.**
c. **For riparian land taken out of production for 15 years or in perpetuity as specified in Section 3.**

Disclosure of non-DATCP funding: By signing this contract, the landowner or grant recipient agrees to disclose all information related to any non-DATCP funding that has been or will be obtained to pay for practices described in this contract, and to authorize the county and DATCP to access files related to this funding, including release of county and federal files in accordance with the provisions of 16 U.S.C. 3844(b) (2) (D) (i).

Appeal Rights: The landowner or grant recipient may appeal to the county, in writing, any decision of the county land conservation department regarding this grant. The county will determine if the grantee is eligible for a hearing under Chapter 68, Wis. Stats.

Landowner Initials	Date	Spouse Initials	Date	Grant Recipient Initials	Date	Spouse Initials	Date	County Reps. Initials	Date

ADDENDA MAY BE ATTACHED TO THIS DOCUMENT TO RECORD SPECIAL CONDITIONS

A. The landowner/grant recipient agrees:

1. To install and maintain cost-shared practice(s) listed in Section 3, consistent with the plans and specifications referenced in Section 3, during periods identified in Section 3.
2. To make all payments for which the landowner/grant recipient (hereinafter referred to as "landowner") is obligated under this contract, as specified in Section 3. Landowners are responsible for all payments for state or local administrative permit fees.
3. To provide the county with evidence of payment, as applicable, for services, supplies, and practices performed or installed pursuant to this contract. Proof of payment may be in the form of a statement or invoice, or receipts or cancelled checks with the related vendor contract. For services provided by the landowner, the landowner shall submit a detailed invoice or cost-estimate for those services.
4. To maintain the cost-shared practice for at least 10 years from the date of installation, except for these "soft" practices: contour farming, cover and green manure crop, nutrient management, pest management, residue management, and strip-cropping. Soft practices must be maintained for each year cost-share funds are provided, as specified in Section 3. Extended maintenance periods apply if land is taken out of production for more than 10 years, as specified in Section 3.
5. To operate and maintain each cost-shared practice for the required maintenance period following the certification of installation or replace it with an equally effective practice. To refrain, during the maintenance period, from actions that may reduce a practice's effectiveness, or result in water quality problems. The landowner agrees to follow an operation and maintenance (O&M) plan or other maintenance requirements including those in ATCP 50.62, Wis. Admin. Code. All nutrient management plans must comply with s. ATCP 50.04(3), Wis. Admin. Code.
6. To repay cost-share funds immediately, upon demand by the county, if the landowner fails to operate and maintain the cost-shared practice according to the contract. Repayment of grant funds shall not be required if a practice(s) is rendered ineffective during the required maintenance period due to circumstances beyond the control of the landowner.
7. To the recording of this contract, including the legal description of the subject property, with the deed to the subject property, if cost-sharing exceeds $14,000 unless this contract cost-shares only practices listed in s. ATCP 50.08 (5) (b). This contract shall be recorded before the county makes any cost-share payment to the landowner. Upon recording, this contract constitutes a covenant running with the land described in Section 1B, and is binding on subsequent owners, heirs, executors, administrators, successors, trustees, and assigns, and users of the land for the period set forth in Section 3.
8. To comply with (i) the performance standards, prohibitions, conservation practices and technical standards under s. 281.16, Stats., (ii) plans approved under ss. 92.14, 92.15 (1985 Stats.), 92.10 and 281.65, Stats., and (iii) the practices necessary to meet the requirements of this contract, and to continue such compliance after the term of this contract, without further cost-sharing, if the landowner has received cost-sharing for compliance at least equal to the cost-sharing required under s. ATCP 50.08, Wis. Admin. Code. There is no requirement for continuing compliance for land that is taken out of production unless cost-sharing is provided.
9. To acknowledge receipt of a notice provided by the county explaining continuing compliance requirements arising out of the installation of specific cost-shared practices. (Initial here _____, _____, _____, _____.)
10. Not to discriminate against contractors because of age, race, religion, color, handicap, gender, physical condition, developmental disability, or national origin, in the performance of responsibilities under this contract.
11. To make any changes to this contract, including changes in project components and costs, according to the procedures set forth in Section 2.C.3.
12. To the county's right to stop work, or withhold cost-share grant funds, if it is found that the landowner, grant recipient, or construction contractor in their employ has violated ch. 92, Wis. Stats., ch. ATCP 50, Wis. Admin. Code, or has breached this contract.

Landowner Initials	Date	Spouse Initials	Date	Grant Recipient Initials	Date	Spouse Initials	Date	County Reps. Initials	Date

B. The county agency agrees:

1. To enter this cost-share contract only after the Land Conservation Committee has authorized the cost-sharing of this project.
2. To provide technical assistance for the design, construction, and installation of cost-shared practice(s) according to applicable standards in ch. ATCP 50, Wis. Admin. Code. The county agrees to provide written notice, when applicable, to inform each landowner and grant recipient of the full ramifications of a cost-share contract, including future compliance obligations. The county further agrees to ensure that cost-shared practices are maintained as required in II. A. 4 by securing O&M plans and performing site checks as needed.
3. To use the most cost-effective methods to address the water quality concerns of this project, and apply cost containment procedures, consistent with ch. ATCP 50, Wis. Admin. Code, when estimating and paying for cost-shared practice(s).
4. To provide cost-share funds to the landowner, in the amounts specified in Section 3 and any amendments, upon proof that (i) the landowner has made all payments for which the landowner is responsible under the contract, (ii) the practice(s) are designed and installed according to standards in ch. ATCP 50, Wis. Admin. Code and this contract, including compliance with applicable construction site erosion control standards, and (iii) nutrient management plans comply with s. ATCP 50.04(3) Wis. Admin. Code. The county may make payments to third parties as provided in s. ATCP 50.40(13), Wis. Admin. Code.
5. To collect and retain all contract-related documents regarding operation and maintenance, proof of certification of design and installation, change orders, receipts and payments, and other referenced materials for a minimum of three years after making the last cost-share payment to the landowner, or for the duration of the maintenance period of this contract, whichever is longer. Records may be retained longer to demonstrate that a landowner meets the cost-sharing exemption under s. ATCP 50.08(5), Wis. Admin Code. Payment records from the landowner and county must provide proof of payment in full for all cost-shared practices installed. Copies of records shall be made available to DATCP upon request.
6. To record this contract, including the legal description of the subject property, with the deed to the subject property, as required under Section 2.A.7. Contracts may be recorded if not required under Section 2.A.7.
7. To coordinate eligibility for DATCP cost-share funding, and to follow required reimbursement procedures to facilitate timely cost-share payment(s) to the landowner, including the submission of certification forms to DATCP documenting that cost-shared practice(s) have been properly installed in accordance with this contract and paid for.

C. General conditions of the contract

1. State cost-share reimbursement amounts in Section 3 are contingent on receiving DATCP funding. The county may cancel this contract, in whole or in part, due to non-availability of DATCP funds. A county is responsible for contract grant amounts when the county makes cost-share commitments beyond the amount of its DATCP annual allocation or the county fails to obtain DATCP approval required under 2.C.2.
2. Written approval from DATCP shall be obtained before this contract is executed or amended if the DATCP cost-share amount exceeds $50,000, and such approval shall be attached to, and made part of, this contract.
3. This contract may be amended, by mutual written agreement of the parties, during the installation or maintenance periods, if the proposed changes will provide equal or greater control of water pollution. For any changes in practice components or costs, the county will determine eligibility and whether to approve such changes. Counties must use a "Cost-Share Contract Change Order" form (ARM-LR-166) for changes prior to or during the installation and maintenance periods. Except as otherwise provided in the "Change Order" form, any completed "Change Order" form must be attached to, and made part of, this contract. Changes to this contract that increase the DATCP cost-share amount over $14,000 or $50,000 are subject to requirements in Sections 2.A.7., regarding recording and 2.C.2., regarding DATCP approval, respectively.
4. This contract is void if, prior to installation, the county determines that due to a material change in circumstances the proposed practices will not provide cost-effective water quality benefits.

Landowner Initials	Date	Spouse Initials	Date	Grant Recipient Initials	Date	Spouse Initials	Date	County Reps. Initials	Date

COST-SHARE CONTRACT NO.: LWRM #2 (2017)

SECTION 3. PRACTICES, COST, COST-SHARE AMOUNTS, AND INSTALLATION SCHEDULE

The parties agree to the following related to the conservation practices, technical design and specifications, eligible costs, cost-share rates and amounts, and rate set forth below.

Name of Person Preparing Technical Design: **Representing:** (COUNTY OR PRIVATE ENGINEERING FIRM) **Dane County Land & Water Resources**	**Technical Standards Used in the Design:** (LIST NAME AND DATE OF NRCS, DNR OR OTHER STANDARDS EMPLOYED IN THE DESIGN)	**USE OF THE 3 BOXES BELOW IS OPTIONAL** **REPRESENTING:** / **DATE OF APPROVAL:** **AMOUNT OF COST-SHARE CONTRACT APPROVED: $**

*	**Cost-Shared Item Description** ss. ATCP 50.62 to 50.98, 50.40 (15) & (18), & 50.08 (3) and (4)	**Yrs of CS****	**Quantity (Use Standard Units)**	**Unit Cost or Flat Rate $**	**Estimated Total Cost $**	**COST-SHARE RATE**			**ESTIMATED COST-SHARE AMOUNTS**		
						State %* **	**Grantee %**	**County/ other %**	**DATCP $**	**Grantee $**	**County/other $**
☐											
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				TOTALS							

* Must check if the 50% maximum rate applies based on the installation of a practice after January 1, 2014 under one of these two conditions:
a. The practice is installed on land owned by a local governments
b. Cost-sharing is provided for access roads (ATCP 50.65) , roof runoff system (ATCP 50.85), stream bank or shoreline protection (ATCP 50.88), stream crossing (s. ATCP 50.885), or wetland development or restoration (ATCP 50.98) and the practice does not implement a farm performance standard.
** Enter the number of years the practice is cost-shared only if the contract provides for (a) more than one year of cost-sharing for soft practices (contour farming, cover and green manure crop, nutrient management, pest management, residue management, and strip-cropping), (b) land taken out of production for more than one year, or (c) CREP equivalent payments for riparian land taken out of production. For "soft practice" payments, the landowner receives the full contract amount after the practice is certified, and has a contractual obligation to maintain the practice for the number of years cost-shared. For "land out of production" payments under ATCP 50.08(3) (d), the landowner receives the sum of the landowner's annual cost for the period specified in the contract. A landowner's annual cost equals the number of affected acres multiplied by the per-acre weighted average soil rental rate in the county on the date of the cost-share contract. For CREP equivalent payments authorized under ATCP 50.08(4), the landowner receives an amount equal to the amount that would be offered under the CREP program if the affected lands were enrolled in that program. To receive a CREP- equivalent payment, a landowner must keep riparian land out of production for 15 years, or in perpetuity, and must agree to contract terms similar to those imposed by the CREP program. Insert "P" if the land is taken out of production in perpetuity. Cost-share practices must be operated and maintained in accordance with O&M plans and other requirements that may apply
*** May exceed 70 percent only if the farm landowner qualifies for economic hardship.

Landowner Initials	Date	Spouse Initials	Date	Grant Recipient Initials	Date	Spouse Initials	Date	County Rep. Initials	Date

Appendix L

Financial Security Statement

VILLAGE OF BLUE MOUNDS
STATEMENT OF FINANCIAL SERCURITY

WHEREAS, the Village of Blue Mounds, Dane County, Wisconsin (the "Village") owns and operates a municipal wastewater treatment system; and

WHEREAS, the Commission intends to implement an Adaptive Management Program (the "Project"); to comply with the water quality based effluent limits for phosphorus established by NR 102 and NR 217 and its Wisconsin Pollutant Discharge Elimination System (WPDES) permit; and

WHEREAS, the Commission expects to finance the Project with existing funds and user charges;

NOW, THEREFORE, the Village of Blue Mounds, Dane County, Wisconsin confirms that the Commission has the financial means to implement the project during the next WPDES permit term, beginning in January 2019.

Signed this 29 day of JUNE, 2018.

Director of Public Works - Village of Blue Mounds

Appendix M

Potential Barnyard Inventory

Barnyards
Village of Blue Mounds

Town & Country Engineering, Inc.
2912 Marketplace Drive
Suite 103
Madison, WI 53719
(608) 273-3350
www.tcengineers.net

Date: 6/4/2018
Path: J:\JOB#S\Blue Mounds\BM-00-00\Mapping\Blue Mounds Working Map.mxd

Appendix N

Potential Streambank Projects

Possible Streambank CSAs
Blue Mounds Adaptive

LEGEND

- Polygon
- World Imagery
- Low Resolution 15m Imagery
- High Resolution 60cm Imagery
- High Resolution 30cm Imagery
- Citations

N

0 360 720 1,440

Feet

TOWN & COUNTRY ENGINEERING, INC.
2912 Marketplace Drive
Suite 103
Madison, WI 53719
(608) 273-3350
www.tcengineers.net

Date: 6/14/2018
Path: J:\JOB#'S\Blue Mounds\BM-00-00\Mapping\Blue Mounds Working Map.mxd