Permit Fact Sheet

General Information

Permit Number	WI-0022926-11-0
Permittee Name and Address	Burlington Water Pollution Control City Hall 300 N. Pine St, Burlington, WI 53105
Permitted Facility Name and Address	Burlington Water Pollution Control 2100 S. Pine Street
Permit Term	October 01, 2026 to September 30, 2031
Discharge Location	2100 Pine Street, Burlington, WI (West bank of the Fox (IL) River, approximately 1 mile south of Burlington Bypass. Lat: 42.64991° N, Long: 88.24802° W)
Receiving Water	Fox (IL) River in Middle Fox River - Illinois Watershed of Fox (IL) River Basin in Racine County
Stream Flow ($Q_{7,10}$)	44 cubic feet per second (cfs)
Stream Classification	Warm Water Sport Fish (WWSF) community, non-public water supply and recreational use
Discharge Type	Existing, continuous
Annual Average Design Flow (MGD)	3.5 million gallons per day (MGD)
Industrial or Commercial Contributors	7 industrial contributors: Nestle, Echo Lake Foods, Ardagh Group, Lavelle, Matheson Tri-Gas, Packaging Corporation of America, AMS Corporation
Plant Classification	A1 - Suspended Growth Processes; A2 - Attached Growth Processes; B - Solids Separation; C - Biological Solids/Sludges; P - Total Phosphorus; D - Disinfection; L - Laboratory; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N/A

Facility Description

The City of Burlington operates a 3.50 MGD two-stage biological wastewater treatment facility. Treatment includes mechanical screening, grit removal, primary clarification, biological treatment using attached growth media in two biotowers, intermediate clarification, activated sludge aeration for ammonia removal, final clarification, seasonal disinfection by UV, and chemical phosphorus removal with ferric chloride. Waste sludge from clarifiers is anaerobically digested and sent to a gravity belt thickener. Biosolids are stored on-site and land applied onto agricultural sites approved by the Department via contract hauler. In order to comply with total phosphorus effluent limitations, Burlington will implement a Department-approved Adaptive Management Plan No. AM-2026-03 (May 2026). This effort involves

partnerships with the Watershed Protection Committee of Racine County, the Racine County Land Conservation Division, and others in the community to reduce in-stream phosphorus concentrations in the Fox River.

Burlington's facility receives waste from industrial contributors, domestic holding tank wastes, septic tank waste, commercial septage and landfill leachate. Haulers are required to provide samples to the lab. The WWTF receives wastewater from the city of Burlington as well as two satellite sewer systems, Browns Lake Sanitary District & Bohners Lake Sanitary Districts. Contractual agreements & flow limits are in-place.

Substantial Compliance Determination

Enforcement During Last Permit:

- All conditions and standard requirements of the current WPDES permit are being met.

After a desktop review of all discharge monitoring reports, compliance schedule items, and a virtual inspection on 03/18/2026, the permittee has been found to be in substantial compliance with their current WPDES permit.

Compliance determination made by Jacob Van Susteren-Wedesky on 04/06/2026.

Sample Point Descriptions

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
701	2.65 MGD, October 01, 2020-February 28, 2025	INFLUENT: 24-hour flow proportional composite samples shall be collected after grit removal and before primary clarification. Flow shall be monitored via the mag meter located before the composite sampler.
001	2.72 MGD, October 01, 2020-February 28, 2025	EFFLUENT: 24-hour flow proportional composite samples shall be collected after the ultraviolet (UV) disinfection light system, just before the Parshall flume. Grab samples shall be collected at the effluent trough, after UV disinfection. Flow shall be monitored via ultrasonic flow meter at Parshall flume in the 2nd Stage Building.
004	465.6 dry U.S. Tons/yr estimated per permit application	LIQUID SLUDGE: Anaerobically digested, gravity belt thickened, liquid sludge. Samples shall be collected from the sludge sample tap on the mixing lines prior to application on department approved sites.
103	N/A	FIELD BLANK: Mercury field blanks shall be collected using standard sample handling procedures.
601	N/A	In-stream Sampling Point 601: Representative water samples shall be collected from the Fox River. Sample point 601 is located near the railroad crossing, downstream of the Burlington WWTP Outfall and upstream of the confluence with Hoosier Creek (Lat: 42.648017, Long: -88.246669). Sample point 601 correlates with the sample location described in the approved AM Plan No. AM-2026-03 (May 2026).

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- INFLUENT TO PLANT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	5/Week	24-Hr Flow Prop Comp	
Mercury, Total Recoverable		ng/L	Quarterly	24-Hr Flow Prop Comp	See "Mercury Monitoring" section in permit.

1.1.1 Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section.

1.1.2 Explanation of Limits and Monitoring Requirements

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

Mercury monitoring is included in the proposed permit pursuant to s. NR 106.145(3)(a)(2), Wis. Adm. Code. Required field blanks for mercury monitoring are per ss. NR 106.145(9) and (10), Wis. Adm. Code, requirements.

2 Inplant - Monitoring and Limitations

2.1 Sample Point Number: 103- Mercury Effluent Blanks

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Mercury, Total Recoverable		ng/L	Quarterly	Blank	See "Mercury Monitoring" section in permit.

2.1.1 Changes from Previous Permit:

In-plant limitations and monitoring requirements were evaluated for this permit term and no changes were required in this permit section.

2.1.2 Explanation of Limits and Monitoring Requirements

Mercury Field Blank- Monitoring is included in the permit pursuant to s. NR 106.145, Wis. Adm. Code. Field blanks must meet the requirements under s. NR 106.145(9) and (10), Wis. Adm. Code. The permittee shall collect a mercury field blank for each set of mercury samples (a set of samples may include a combination of influent, effluent or other samples all collected on the same day). Field blanks are required to verify a sample has not been contaminated during collection, transportation or analysis.

3 Surface Water - Monitoring and Limitations

3.1 Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	45 mg/L	5/Week	24-Hr Flow Prop Comp	
BOD5, Total	Monthly Avg	30 mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Weekly Avg	45 mg/L	5/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total	Monthly Avg	30 mg/L	5/Week	24-Hr Flow Prop Comp	
pH Field	Daily Min	6.0 su	Daily	Grab	
pH Field	Daily Max	9.0 su	Daily	Grab	
Nitrogen, Ammonia (NH3-N) Total	Daily Max	14 mg/L	5/Week	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	14 mg/L	5/Week	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	14 mg/L	5/Week	24-Hr Flow Prop Comp	Limit effective November through September.
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	13 mg/L	5/Week	24-Hr Flow Prop Comp	Limit effective October.
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	Limit effective May-September.
E. coli	% Exceedance	10 Percent	Monthly	Calculated	Limit effective May-September. Enter the result in the DMR on the last day of the month.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Monitoring only in 2028.
Mercury, Total Recoverable		ng/L	Quarterly	Grab	See 'Mercury Monitoring' section below.
PFOS		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
PFOA		ng/L	1/ 2 Months	Grab	Monitoring only. See PFOS/PFOA Minimization Plan Determination of Need schedule.
Temperature Maximum		deg F	Daily	Continuous	Monitoring only in 2028.
Phosphorus, Total	Monthly Avg	1.0 mg/L	5/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	6-Month Avg	0.6 mg/L	5/Week	24-Hr Flow Prop Comp	This is an Adaptive Management interim limit in effect until October 31, 2029. See schedules and effluent requirements below.
Phosphorus, Total	6-Month Avg	0.5 mg/L	5/Week	24-Hr Flow Prop Comp	This is an Adaptive Management interim limit that will go into effect November 1, 2029. See schedules and effluent requirements below.
Phosphorus, Total		lbs/day	5/Week	Calculated	Calculate the daily mass discharge of phosphorus in lbs/day on the same days phosphorus sampling occurs.
Nitrogen, Total Kjeldahl		mg/L	Quarterly	24-Hr Flow Prop Comp	
Nitrogen, Nitrite + Nitrate Total		mg/L	Quarterly	24-Hr Flow Prop Comp	
Nitrogen, Total		mg/L	Quarterly	Calculated	Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
					Total Nitrite + Nitrate Nitrogen.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See 'WET Testing' section below.
Chronic WET	Monthly Avg	3.0 TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See 'WET Testing' section below.

3.1.1 Changes from Previous Permit

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

- **Nitrogen, Ammonia-** Sample frequency has been increased from 3 times per week to 5 times per week.
- **PFOS and PFOA-** Monitoring once every two months is included in the permit in accordance with s. NR 106.98(2)(b), Wis. Adm. Code.
- **Phosphorus-** Sample frequency has been increased from 3 times per week to 5 times per week. The current interim limit of 0.6 mg/L as a six-month average will be replaced by a new interim limit of 0.5 mg/L in November of 2029.

3.1.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated May 19, 2025.

Monitoring Frequencies- The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term.

Based on the factors discussed above, sample frequencies for ammonia and phosphorus were increased from three times per week to five times per week. These monitoring frequency increases are necessary in order to effectively characterize the effluent quality and variability, and to best determine compliance with effluent limitations.

Expression of Limits- In accordance with the federal regulation 40 CFR 122.45(d) and s. NR 205.065, Wis. Adm. Code, limits in this permit are to be expressed as weekly and monthly average limits whenever practicable.

PFOS and PFOA- NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. At the first reissuance of a WPDES permit after August 1, 2022, the new rule requires WPDES permits for major municipal dischargers with an average flow rate greater than 1 MGD but less than 5 MGD, at a minimum sample effluent once every two-months for PFOS and PFOA pursuant s. NR 106.98(2)(b), Wis. Adm. Code. A sample frequency of 1/2 months means one sample is taken during any two-month period. Examples of 1/2 month sample would be every other month (Jan, March, May, etc.) or back-to-back months with a break in between (February & March, May & June, Aug & Sept, etc.). DMR Short Forms will be generated for the following time periods: January-February, March-April, May-June, July-August, September-October, and November-December. At a minimum one sample result will be present on each form.

The initial determination of the need for sampling shall be conducted for up to two years in order to determine if the permitted discharge has the reasonable potential to cause or contribute to an exceedance of the PFOS or PFOA standards under s. NR 102.04(8)(d)1, Wis. Adm. Code.

Total Phosphorus- The proposed permit will be Burlington's second permit term under new administrative rules for phosphorus discharges that took effect December 1, 2010. Details regarding the administrative rules for phosphorus discharges may be found at: https://dnr.wisconsin.gov/topic/Wastewater/Phosphorus. Phosphorus rules are contained in s. NR 102.06 and ch. NR 217, Subchapter III. A monthly average limit of 1.0 mg/L is effective upon reissuance. An Adaptive Management Interim limit of 0.6 mg/L expressed as a 6-month average (averaging period of May through October and November through April) is effective upon permit issuance. A more stringent Adaptive Management Interim limit of 0.5 mg/L goes into effect November 1, 2029. The facility is not currently meeting this interim limit, but is expected to meet the limit through optimization by the scheduled effective date.

Adaptive Management for Total Phosphorus Compliance- Burlington requested and the Department approved a plan to implement a watershed adaptive management approach under s. NR 217.18, Wis. Adm. Code and s. 283.13(7) Wis. Stats. as a means for Burlington to achieve compliance with the phosphorus water quality standard in s. NR 102.06, Wis. Adm. Code. The phosphorus limitations and conditions in this permit reflect the approved Adaptive Management (AM) Plan AM-2026-03 (May 2026). The permittee shall design and implement the actions identified in the approved AM Plan No. AM-2026-03 (May 2026) in accordance with the goals and measures identified. The goal of the AM plan is to reduce phosphorus loadings within the watershed action area by at a minimum 4274 lbs/yr by the end of this permit term. In addition, annual progress reports are required. See Schedules section for more details. The Department may terminate the AM option based on the reasons enumerated in s. NR 217.18(3)(g)2, Wis. Adm. Code.

The permit contains an interim adaptive management phosphorus limit of 0.5 mg/L expressed as a six-month seasonal average and a compliance schedule for meeting the limit starting November 1, 2029. The averaging periods for the six-month average limit are May through October and November through April. Compliance with the 0.5 mg/L six-month interim limit is evaluated at the end of each six-month period on April 30 and October 31 annually. The 1.0 mg/L monthly average phosphorus limit remains in effect for the duration of the reissued permit.

Surface water monitoring requirements are included in the proposed permit in support of the goals and measures of the Adaptive Management Plan and are discussed in more detail in following subsections of this fact sheet. Sampling is required on the day(s) each week as outlined in the approved Adaptive Management Plan.

3.2 Sample Point Number: 601- Fox River - Downstream

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow River		cfs	Weekly	Measure	Provide an estimate of river flow for each day that in-stream phosphorus monitoring is performed May 1 through October 31.
Flow River		cfs	Per Occurrence	Measure	Voluntary river flow estimates for each day that in-stream phosphorus monitoring is performed November 1 through April 30.

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Phosphorus, Total		mg/L	Weekly	Grab	Collect samples weekly May 1 through October 31. See permit subsections for sampling and reporting requirements.
Phosphorus, Total		mg/L	Per Occurrence	Grab	Voluntary monitoring November 1 through April 30. See permit subsections for sampling and reporting requirements.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate and report total monthly phosphorus loads for the months of May through October. See permit subsection for calculation of total monthly loads.
Phosphorus, Total		lbs/month	Per Occurrence	Calculated	Calculated total phosphorus loads may also be reported for the months of November through April, as data is available. See Permit Subsection for calculation of total monthly loads.

3.2.1 Changes from Previous Permit

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

- **Flow-** The parameter for reporting river flow has been changed from "flow rate" to "river flow" to better represent the data that is collected at this sample point.
- **Seasonal Reporting-** Additional lines have been added with the frequency of "Per Occurrence" for the months of November through April for each parameter monitored at this sample point. This will allow the facility to report monitoring conducted between the months of November and April on the eDMR.

3.2.2 Explanation of Limits and Monitoring Requirements

As part of the Adaptive Management Plan requirements, downstream monitoring for river flow rate, in-stream phosphorus concentration and total monthly in-stream phosphorus loads is required during the months of May through October. Monitoring for these same parameters is voluntary during the months of November through April. When voluntary monitoring is completed, results must be reported on the monthly eDMR. The in-stream phosphorus concentration and river flow rate are used to calculate the total monthly loading of phosphorus in the Fox River on a monthly basis. This monitoring will allow the permittee to demonstrate reductions in phosphorus loading for each month of the year.

4 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	**Sludge Class (A or B)**	**Sludge Type (Liquid or Cake)**	**Pathogen Reduction Method**	**Vector Attraction Method**	**Reuse Option**	**Amount Reused/Disposed (Dry Tons/Year)**
004	B	Liquid	Fecal Coliform	Injection and volatile solids reduction	Land Application	465.6
Does sludge management demonstrate compliance? Yes						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? Yes						
Is a priority pollutant scan required? No Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

4.1 Sample Point Number: 004- Liquid Sludge

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

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nickel Dry Wt	High Quality	420 mg/kg	Quarterly	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Quarterly	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Quarterly	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Quarterly	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Quarterly	Composite	
Nitrogen, Total Kjeldahl		Percent	Quarterly	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Quarterly	Composite	
Phosphorus, Total		Percent	Quarterly	Composite	
Phosphorus, Water Extractable		% of Tot P	Quarterly	Composite	
Potassium, Total Recoverable		Percent	Quarterly	Composite	
Radium 226 Dry Wt		pCi/g	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Sample once in 2027.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Sample once in 2027.
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

4.1.1 Changes from Previous Permit:

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

PFAS- Monitoring is required annually pursuant to s. NR 204.06(2)(b)9., Wis. Adm. Code.

4.1.2 Explanation of Limits and Monitoring Requirements

Requirements for disposal, including land application of municipal sludge, are determined in accordance with ch. NR 204, Wis. Adm. Code. Ceiling and high-quality limits for metals in sludge are specified in s. NR 204.07(5). Requirements for

pathogens are specified in s. NR 204.07(6) and in s. NR 204.07 (7) for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k). Radium requirements are addressed in s. NR 204.07(3)(n).

PFAS- The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA has developed a draft risk assessment to determine future land application rates and released this risk assessment in January of 2025. The department is evaluating this new information. Until a decision is made, the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS" should be followed

Collecting sludge data on PFAS concentrations from a wide range of wastewater treatment facilities will help protect public health from exposure to elevated levels of PFAS and determine the department's implementation of EPA's recommendations. To quantitate this risk, PFAS sampling has been included in this WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9., Wis. Adm. Code.

5 Schedules

5.1 PFOS/PFOA Minimization Plan Determination of Need

Required Action	Due Date
Report on Effluent Discharge: Submit a report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations. This analysis should also include a comparison to the applicable narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results.	09/30/2027
Report on Effluent Discharge and Evaluation of Need: Submit a final report on effluent PFOS and PFOA concentrations and include an analysis of trends in monthly and annual average PFOS and PFOA concentrations of data collected over the last 24 months. The report shall also provide a comparison on the likelihood of the facility needing to develop a PFOS/PFOA minimization plan. This report shall include all additional PFOS and PFOA data that may be collected including any influent, intake, in-plant, collection system sampling, and blank sample results. The permittee shall also submit a request to the department to evaluate the need for a PFOS/PFOA minimization plan. If the Department determines a PFOS/PFOA minimization plan is needed based on a reasonable potential evaluation, the permittee will be required to develop a minimization plan for Department approval no later than 90 days after written notification was sent from the Department. The Department will modify or revoke and reissue the permit to include PFOS/PFOA minimization plan reporting requirements along with a schedule of compliance to meet WQBELs. Effluent monitoring of PFOS and PFOA shall continue as specified in the permit until the modified permit is issued. If, however, the Department determines there is no reasonable potential for the facility to discharge PFOS or PFOA above the narrative standard in s. NR 102.04(8)(d), Wis. Adm. Code, no further action is required and effluent monitoring of PFOS and PFOA shall continue as specified in the permit.	09/30/2028

5.1.1 Explanation of Schedule

As stated above, ch. NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Section NR 106.98, Wis. Adm. Code, specifies steps to generate data in order to determine the need for reducing PFOS and PFOA in the discharge. Data generated per the effluent monitoring requirements will be used to determine the need for developing a PFOS/PFOA minimization plan. As part of the schedule, the permittee is required to submit two annual Reports on Effluent Discharge.

If the Department determines that a minimization plan is needed, the permit will be modified or revoked/reissued to include additional requirements.

5.2 Watershed Adaptive Management Option Annual Report Submittals

The permittee shall submit annual reports on the implementation of AM Plan No. AM-2026-03 (May 2026) as specified in the "Phosphorus Limitation(s) and Adaptive Management Requirements" permit section and the following schedule.

Required Action	Due Date
Annual Adaptive Management Report # 6: Submit an annual adaptive management report. The annual adaptive management report shall: o Identify those actions from Section 6 of the approved adaptive management plan that were completed during the previous calendar year and those actions that are in progress; o Evaluate collected monitoring data; o Document progress in achieving the goals and measures identified in the approved adaptive management plan; o Describe the outreach and education efforts that occurred during the past calendar year; o Identify any corrections or adjustments to the adaptive management plan that are needed to achieve compliance with the phosphorus water quality standards specified in s. NR 102.06, Wis. Adm. Code; o Describe any updates needed to Burlington's approved phosphorus optimization plan; and o Submit results from all sample points outlined in AM plan No. AM-2026-03 (May 2026) to the Department using the Department's Laboratory Data Entry System (LDES)	01/31/2027
Annual Adaptive Management Report #7: Submit an Adaptive Management report with the required information described in this section (see above).	01/31/2028
Annual Adaptive Management Report #8: Submit an Adaptive Management report with the required information described in this section (see above).	01/31/2029
Comply with Adaptive Management Interim Limit: For the second permit term under Adaptive Management the permittee shall comply with an Adaptive Management total phosphorus interim limit no higher than 0.5 mg/L as a 6-month average, in addition to the 1.0 mg/L monthly avg already effective.	11/01/2029
Annual Adaptive Management Report #9: Submit an Adaptive Management report with the required information described in this section (see above).	01/31/2030
Final Adaptive Management Report for 2nd Permit Term: Submit the final Adaptive Management (AM) report documenting progress made during the second permit term under AM in meeting the watershed phosphorus reduction target of 8,904 lbs/yr , as well as the anticipated future reductions in phosphorus sources and phosphorus effluent concentrations, which shall be measured in	01/31/2031

accordance with the AM Plan protocols. The report shall summarize AM activities that have been implemented during the current permit term and state which, if any, actions from the approved AM plan No. AM-2026-06 (May 2026) were not pursued and why. The report shall include an analysis of trends on both a monthly and six-month average basis for concentrations and mass effluent discharged. Additionally, there shall be an analysis of any improvements to the quality of surface waters in the Adaptive Management Action Area focusing on phosphorus and flow results collected during the permit term. The surface water analysis shall evaluate how the in-stream loadings have changed over the permit term in comparison to implemented AM actions.	
Renewal of Adaptive Management Plan for Permit Reissuance: If the permittee intends to seek renewal of AM plan No. AM-2026-03 (May 2026) per s. NR 217.18, Wis. Adm. Code, for the reissued permit term, proposed AM goals and actions based on an updated AM plan shall be submitted to the Department for review and approval. The permittee may propose to adjust load reductions required by AM plan No. AM-2026-03 (May 2026) either up or down at the beginning of each WPDES permit term to reflect changes in loads associated with point and non-point sources. This schedule may be modified to incorporate any changes in AM goals and actions, removed if the AM program is terminated per the "Adaptive Management Reopener Clause" permit section, or removed if the adaptive management plan has achieved water quality standards as determined by the Department within the AM action area.	03/31/2031
Annual Adaptive Management Report #10: Submit an Adaptive Management report with the required information described in this section (see above).	01/31/2032
Annual Adaptive Management Report #11: Submit an Adaptive Management report with the required information described in this section (see above).	01/31/2033
Annual Adaptive Management Report #12: Submit an Adaptive Management report with the required information described in this section (see above).	01/31/2034
Final Adaptive Management Report: Submit the final Adaptive Management (AM) report documenting progress made throughout the AM project in meeting the watershed phosphorus reduction target of 17,827 lbs/yr, and in stream water quality standards specified in s. NR 102.06, Wis. Adm. Code. The report shall summarize AM activities that have been implemented during the current permit term and state which, if any, actions from the approved AM plan No. AM-2026-03 (May 2026) were not pursued and why. The report shall include an analysis of trends on both a monthly and six-month average basis for concentrations and mass effluent discharged. Additionally, there should be an analysis of any improvements to the quality of surface waters in the Adaptive Management Action Area focusing on phosphorus and flow results collected during the permit term. The surface water analysis shall evaluate how the in-stream loadings have changed over the permit term in comparison to implemented AM actions.	06/30/2035
Achieve Water Quality Standards and Adaptive Management Plan Success: All the receiving waters identified within the AM plan AM-2026-03 (May 2026) shall comply with water quality standards specified in s. NR 102.06, Wis. Adm. Code. The permittee shall continue to comply with applicable effluent limits (required under s. 217.18(3)(e)3. expressed as a 6-month avg and 1.0 mg/L monthly avg) and continue monitoring surface waters per AM-2026-03 (May 2026) at a minimum of monthly May through October for total phosphorus.	12/31/2035

5.2.1 Explanation of Schedule

This compliance schedule requires the permittee to submit annual adaptive management (AM) annual reports that show progress towards meeting the goals and measures contained in the approved AM plan. The final AM Report for this permit term must document the success of meeting the watershed phosphorus minimum reduction target of 4274 lbs/yr.

The compliance schedule may be modified at permit reissuance, should changes in AM goals and measures or timing necessitate different dates for schedule items.

Pursuant to s. NR 217.18(1) Wis. Adm. Code., phosphorus water quality criteria must be achieved "as soon as possible". The remaining duration for this adaptative management schedule is ~9 years. This timeframe is consistent with the approved adaptive management plan, and represents the shortest possible duration based upon the following factors that influence time required for the water body to achieve the phosphorus criterion:

- Magnitude of point and/or nonpoint source phosphorus reductions required
- Costs associated with point and/or nonpoint source phosphorus reductions
- For nonpoint source reductions, the time required to contact landowners and receive adequate participation to implement practices
- Physical characteristics of the watershed and receiving water, including landuse, soil properties, slopes, channel gradient, and level of legacy sediment/phosphorus currently in the system

5.3 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
Land Application Management Plan Submittal: Submit a management plan to optimize the land application system performance and demonstrate compliance with ch. NR 204, Wis. Adm. Code, by the Due Date. This management plan shall 1) specify information on pretreatment processes (if any); 2) identify land application sites; 3) describe site limitations; 4) address vegetative cover management and removal; 5) specify availability of storage; 6) describe the type of transporting and spreading vehicle(s); 7) specify monitoring procedures; 8) track site loading; 9) address contingency plans for adverse weather and odor/nuisance abatement; and 10) include any other pertinent information. Once approved, all landspreading activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes.	03/31/2027

5.3.1 Explanation of Schedule

An up-to-date Land Application Management Plan is required that documents how the permittee will manage the land application of biosolids consistent with ch. NR 204, Wis. Adm. Code.

Attachments

Water Quality-Based Effluent Limitations for Burlington Water Pollution Control WPDES Permit No. WI-0022926-11, May 19, 2025

City of Burlington WPDES Permit No. WI-0022926 Adaptive Management Plan - Conditional Approval, May 13, 2026

City of Burlington Adaptive Management Plan Update, May 2026

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance.

Prepared By: Amanda Perdzock, Wastewater Specialist **Date:** August 17, 2026

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 05/19/2025

TO: Amanda Perdzock – WY/3

FROM: Nicole Krueger – SER Nicole Krueger

SUBJECT: Water Quality-Based Effluent Limitations for Burlington Water Pollution Control
WPDES Permit No. WI-0022926-11

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable) for the discharge from Burlington Water Pollution Control in Racine County. This municipal wastewater treatment facility (WWTF) discharges to the Fox River, located in the Fox (IL) River Watershed in the Fox (IL) River Basin.

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

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1,2
BOD_5			45 mg/L	30 mg/L		1
TSS			45 mg/L	30 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Ammonia Nitrogen April – September October November – March	 14 mg/L 14 mg/L 14 mg/L		 **14 mg/L** **14 mg/L** **14 mg/L**	 **14 mg/L** 13 mg/L **14 mg/L**		3
E. coli May – September				126#/100 mL geometric mean		4
Chloride						1,5
Mercury						1,2
PFOS and PFOA						6
Temperature						1,2
Phosphorus AM Interim Limits Final				 1.0 mg/L 0.300 mg/L	 0.5 mg/L 0.100 mg/L 2.9 lbs/day	7,8
TKN, Nitrate+Nitrite, and Total Nitrogen						9
Acute WET						10,11
Chronic WET				3.0 TUc		10,11

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.

4. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
6. PFOS and PFOA monitoring is recommended at a frequency of once every two months in accordance with s. NR 106.98(2), Wis. Adm. Code.
7. A Total Maximum Daily Load (TMDL) is being developed for the Fox (IL) River Basin to address phosphorus water quality impairments within the TMDL area. This TMDL will likely result in limitations for TSS and phosphorus that must be included in WPDES permits, which may be different than those calculated for this reissuance. TMDL-derived limits may be included in lieu of or in addition to the calculated limits upon permit reissuance or modification once the TMDL has been approved by U.S. EPA, according to s. NR 217.16, Wis. Adm. Code.
8. Under the phosphorus Adaptive Management (AM) Plan, the interim limits (and technology-based limit (TBEL)) of 1.0 mg/L as a monthly average should be effective upon permit reissuance. A compliance schedule to meet 0.5 mg/L as a six-month average may be included in the permit. If a compliance schedule is included to meet 0.5 mg/L, the current six-month average limit of 0.6 mg/L shall be effective upon reissuance until the 0.5 mg/L is met. The final water quality based effluent limits are 0.225 mg/L as a monthly average, 0.075 mg/L as a six-month average.
9. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, quarterly total nitrogen monitoring is recommended for all municipal major permittees. Sections 283.37(5) and 283.55(1)(e), Wis. Stats, and ss. NR 200.065(1)(g) and NR 200.065(1)(h), Wis. Adm. Codes, provide the authority to request this monitoring during the permit term. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total Kjeldahl nitrogen (TKN) (all expressed as N).
10. Annual acute and chronic WET tests are recommended annually. The Instream Waste Concentration (IWC) to assess chronic test results is 33%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5%. The primary control water used in chronic WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water, upstream of the discharge.
11. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge. Testing should continue after the permit expiration date (until the permit is reissued).

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Nicole Krueger at Nicole.Krueger@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (3) – Narrative, Outfall Map, 2019 Ammonia Limits Calculation, and Thermal Table

PREPARED BY: Nicole Krueger, Water Resources Engineer – SER

E-cc: Jacob Van Susteren – Wedesky, Wastewater Engineer – SER
Diane Figiel, Water Resources Engineer – WY/3
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
Burlington Water Pollution Control

WPDES Permit No. WI-00229626-11

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

The City of Burlington operates a 3.50 MGD two-stage biological wastewater treatment facility. Treatment includes processes include mechanical screening, grit removal, primary clarification, biological treatment using attached growth media in two biotowers, intermediate clarification, activated sludge aeration for ammonia removal, final clarification, seasonal disinfection by UV, and chemical phosphorus removal with ferric chloride.

Attachment #2 is a map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations

The current permit, expiring on which expires on 09/30/2025, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD_5			45 mg/L	30 mg/L		2,3
TSS			45 mg/L	30 mg/L		2,3
pH	9.0 s.u.	6.0 s.u.				2
Ammonia Nitrogen April – May June – September October November – March	 17 mg/L 17 mg/L 17 mg/L 17 mg/L		 **17 mg/L** **17 mg/L** **17 mg/L** **17 mg/L**	 **17 mg/L** **17 mg/L** 13 mg/L **17 mg/L**		4
E. coli May – September				126#/100 mL geometric mean		5
Chloride						1
Mercury						1
Temperature						1
Phosphorus AM Interim Limits Final				 1.0 mg/L 0.300 mg/L	 0.6 mg/L 0.100 mg/L 2.9 lbs/day	
WET Acute Chronic				 3.0 TU_c		6

Footnotes:

1. Monitoring only.
2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. These limits are based on the Warm Water Sport Fish (WWSF) community of the immediate receiving water as described in s. NR 210.05(1), Wis. Adm. Code.
4. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
5. Additional limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
6. Annual acute and chronic WET tests are required. The IWC for chronic WET was 33%.

Receiving Water Information

- Name: Fox (IL) River
- Waterbody Identification Code (WBIC): 742500
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply and recreational use.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q_{10} and 7-Q_2 values are from USGS for Station F8, where Outfall 001 is located.
  7-Q_{10} = 44 cubic feet per second (cfs)
  7-Q_2 = 82 cfs
  90-Q_{10} = 69.7 cfs
  Hamonic Mean Flow = 184 cfs
  The Harmonic Mean has been estimated based on average flow and the 7-Q_{10} using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).
- Hardness = 323 mg/L as $CaCO_3$. This value represents the geometric mean of data from 10/13/2020 – 03/14/2023.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: Metals data is from the Fox River at Cth I Bridge, chloride data is from the Fox River at Congress St (station ID 10017723), background mercury was collected by Western Racine WWTF for the Fox River, phosphorus data is from the Fox River at Jefferson St (station ID 10052246). The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: Western Racine WWTF also discharges to the Fox (IL) River, upstream of Burlington. However, the mixing zones do not overlap, so this discharge is not included in this evaluation.
- Impaired water status: The Fox (IL) River is listed as impaired for phosphorus at the point of discharge.

Effluent Information

- Design flow rate(s):
  Annual average = 3.5 million gallons per day (MGD)

For reference, the actual average flow from 10/01/2020 – 02/28/2025 was 2.72 MGD.

- Hardness = 365 mg/L as $CaCO_3$. This value represents the geometric mean of 11/12/2024 – 12/17/2024 which were reported on the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Wastewater source: Domestic wastewater with 7 industrial contributors: Nestle, Echo Lake Foods, Ardagh Group, Lavelle, Matheson Tri-Gas, Packaging Corporation of America, AMS Corporation.
- Water supply: Municipality waterworks and private wells.
- Additives: Burlington has included 1 additive in the permit application:
  - Kemira ferric chloride – phosphorus removal
  - An additive review is not necessary for any additives where either the toxicity is well documented and understood, can be controlled by a WQBEL, or are not believed to be present in the discharge. This is the case upon initial review of the listed additives. Therefore, an additive review is not needed at this time.
- Effluent characterization: This facility is categorized as a major municipality, so the permit application required effluent sample analyses for all the "priority pollutants" except for the Dioxins and Furans as specified in s. NR 200.065, Table 1, Wis. Adm. Code. The permit-required monitoring for ammonia, phosphorus, chloride, and mercury from 10/01/2020 – 02/28/2025 is used in this evaluation.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Copper Effluent Data

Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)
11/12/2024	18	11/26/2024	17	12/10/2024	16
11/15/2024	14	11/29/2024	14	12/13/2024	15
11/19/2024	20	12/03/2024	17	12/18/2024	9.4
11/22/2019	21	12/06/2024	22		
1-day P_{99} = 26.8 µg/L					
4-day P_{99} = 21.3 µg/L					

Chloride Effluent Data

Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)	Sample Date	Chloride (mg/L)
01/11/2023	390	05/15/2023	370	09/11/2023	440
02/27/2023	390	06/04/2023	420	10/10/2023	440
03/20/2023	340	07/09/2023	440	11/14/2023	420
04/24/2023	440	08/01/2023	480	12/03/2023	470
1-day P_{99} = 524 mg/L					
4-day P_{99} = 470 mg/L					

Mercury Effluent Data

Sample Date	Mercury (ng/L)	Sample Date	Mercury (ng/L)	Sample Date	Mercury (ng/L)
11/16/2020	1.3	05/16/2022	2.7	12/04/2023	1.7

Attachment #1

Sample Date	Mercury (ng/L)	Sample Date	Mercury (ng/L)	Sample Date	Mercury (ng/L)
01/25/2021	1.8	09/12/2022	2.1	02/13/2024	0.93
06/03/2021	1.6	11/01/2022	1.6	04/22/2024	0.79
09/07/2021	1.2	02/27/2023	1.7	07/24/2024	0.99
12/13/2021	1.2	06/06/2023	4.7	11/19/2024	0.73
02/28/2022	1.1	09/11/2023	2.8		
1-day P_{99} = 5.1 ng/L					
4-day P_{99} = 3.1 ng/L					
30-day P_{99} = 2.2 ng/L					

The following table presents the average concentrations and loadings at Outfall 001 from 10/01/2020 – 02/28/2025 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameters with Effluent Limits

	Average Measurement
BOD_5	5.57 mg/L*
TSS	8.08 mg/L*
pH field	7.73 s.u.
Ammonia Nitrogen	0.052 mg/L*
E. coli	43.1 #/100 mL**
Phosphorus	0.54 mg/L

*Results below the limit of detection (LOD) were included as zeroes in calculation of average.
** The average measurement for bacteria is calculated as a geometric mean. Values reported below the LOD are replaced with a value of 1 for the calculation of the geometric mean.

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

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P_{99}) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q_{10}

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q_{10} receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

$$\text{Limitation} = \frac{(WQC)\,(Qs + (1-f)\,Qe) - (Qs - f\,Qe)\,(Cs)}{Qe}$$

Where:

WQC =Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.

Qs = average minimum 1-day flow which occurs once in 10 years (1-day Q_{10}) if the 1-day Q_{10} flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q_{10}).

Qe = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

Cs = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q_{10} method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for Burlington, and the limits are set based on two times the acute toxicity criteria.

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

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 35.2 cfs, (1-Q_{10} (estimated as 80% of 7-Q_{10})), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Arsenic		340	9.62	680	136	1.5		
Cadmium	365	45.5	0.21	91	18.2	<0.17		
Chromium	301	4446	4.72	8892	1778	<3.3		
Copper	365	52.6	8.37	105			27	22
Lead	356	365	4.74	729	146	<5.4		
Mercury (ng/L)		830	1.0	1660			5.1	4.7
Nickel	268	1080	3.96	2161	432	<4.7		
Zinc	333	345	9.95	689	138	20		
Chloride (mg/L)		757	122	1514			524	
Total Phenols#		150731		301462	60292	0.012		

* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

* * The 2 × ATC method of limit calculation yields a more restrictive limit than consideration of ambient concentrations and 1-Q_{10} flow rates per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016.

The limit for this substance is based on a secondary value. Acute limits are set equal to the secondary value rather than two times or using the 1-Q_{10} s. NR 106.06(3)(b)2 and s. NR 105.05(2)(f)6), Wis. Adm Code.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 11 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}
Arsenic		152	9.62	442	88.4	1.50	
Cadmium	175	3.82	0.21	11.2	2.2	<0.17	
Chromium	301	326	4.72	978	196	<3.3	
Copper	323	28.2	8.37	69			21
Lead	323	86.9	4.74	254	50.8	<5.4	
Mercury (ng/L)		440	1.0	1332			3.1
Nickel	268	120	3.96	356	71.3	<4.7	
Zinc	323	336	9.95	997	199	20	
Chloride (mg/L)		395	122	950			470
Total Phenols#		49000		148530	29706	0.012	

* The indicated hardness may differ from the receiving water hardness because the receiving water hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the chronic criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

The limit for this substance is based on a secondary value.

Monthly Average Limits based on Wildlife Criteria (WC)

RECEIVING WATER FLOW =17.4 cfs (¼ of the 90-Q_{10}), as specified in s. NR 106.06(4), Wis. Adm. Code

SUBSTANCE	WC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P_{99}
Mercury (ng/L)	1.3	1.0	2.27			2.2

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 46.2 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P_{99}
Antimony	373		3555	711	0.38	
Cadmium	370	0.21	3525	705	<0.17	
Chromium (+3)	3818000	4.72	36389929	7277986	<3.3	
Lead	140	4.74	1294	259	<5.4	
Mercury (ng/L)	1.5	1.0	5.8			2.2
Nickel	43000	3.96	409806	81961	<4.7	
Toluene	15359		146389	29278	0.59	
Total Phenols	3712		35380	7076	0.012	

Attachment #1

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 46.2 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	9.62	44.7	8.94	1.50

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

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are not required for any toxic limits in this evluation. Limits and/or monitoring recommendations are made in the paragraphs below:

Chloride – Considering available effluent data from the current permit term (01/11/2023 – 12/03/2023), the 1-day P_{99} chloride concentration is 524 mg/L, and the 4-day P_{99} of effluent data is 470 mg/L.

These effluent concentrations are below the calculated WQBELs for chloride, therefore no effluent limits are needed. **Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.**

Mercury – The most stringent calculated WQBEL for total recoverable mercury is 2.27 ng/L based on wildlife criteria using background data of 1.0 ng/L.

The current permit requires quarterly monitoring of the influent and effluent for total recoverable mercury. A total of 17 effluent sampling results are available from 11/16/2020 – 11/19/2024 for total recoverable mercury. The average concentration was 1.7 ng/L, and the maximum was 4.7 ng/L. Because the 30-day P_{99} of available data (2.2 ng/L) is less than the most stringent WQBEL of 2.27 ng/L, **no WQBEL for mercury is required for permit reissuance. Monitoring is recommended to continue in the reissued permit.**

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

Available monitoring sample data from the Burlington Waterworks (PWS ID: 25201770) is provided in the table below:

Water Supply PFAS Data

Sample Date	Sample ID	Well #	PFOS (ng/L)	PFOA (ng/L)
04/04/2023	WB01867-05	BG736	ND	ND
04/04/2023	WB01867-04	BG737	ND	ND
04/04/2023	WB01867-01	VL965	ND	ND
04/04/2023	WB01867-02	AX007	ND	ND
04/04/2023	WB01867-03	BG738	ND	ND

Attachment #1

Sample Date	Sample ID	Well #	PFOS (ng/L)	PFOA (ng/L)
		Average =	ND	ND

The limited data above shows the municipal water supply is below 1/5th of the applicable PFOS and PFOA criteria.

There are no available effluent samples from Burlington. Based on the effluent flow rate and the types of indirect dischargers contributing to the collection system, **PFOS and PFOA monitoring is recommended at a once every two months frequency.**

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

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has daily maximum, weekly average and monthly average limits. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- The maximum expected effluent pH has changed

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

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

Where:

A = 0.411 and B = 58.4 for a Warm Water Sport fishery, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 1611 sample results were reported from 10/02/2020 – 02/28/2025. The maximum reported value was 8.7 s.u. (Standard pH Units). The effluent pH was 8.1 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.1 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.1 s.u. Therefore, a value of 8.1 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.1 s.u. into the equation above yields an ATC = 7.0 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method
In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are calculated using the the 1-Q_{10} receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q_{10} (estimated as 80 % of 7-Q_{10}) and the 2×ATC approach are shown below.

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	14
1-Q_{10}	52

The 2×ATC method yields the most stringent limits for Burlington.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

Daily Maximum Ammonia Nitrogen Limits – WWSF

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

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)
The weekly and monthly average ammonia nitrogen limits calculation from the previous memo do not change because there have been no changes in the effluent and receiving water flow rates. The calculations from the previous WQBEL memo are shown in Attachment #3.

Effluent Data
The following table evaluates the statistics based upon ammonia data reported from 10/04/2020 – 02/25/2025.

Ammonia Nitrogen Effluent Data

Ammonia Nitrogen mg/L	April – May	June – September	October	November – March
1-day P_{99}	0.63	1.01	1.03	0.20
4-day P_{99}	0.35	0.58	0.62	0.10
30-day P_{99}	0.15	0.24	0.26	0.047
Mean*	0.05	0.09	0.08	0.021
Std	0.23	0.31	0.35	0.055
Sample size	106	207	67	306
Range	<0.02 - 1.436	<0.02 - 2.828	<0.02 - 2.061	<0.02 - 0.337

Reasonable Potential
The need to include ammonia limits in Burlington's permit is determined by calculating 99th upper percentile (or P_{99}) values for ammonia and comparing those to the calculated limits. Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. However, since the permit currently has weekly and monthly average limits year-round, **the limits must be retained regardless of reasonable potential**, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

> (b) If a permittee is subject to an ammonia limitation in an existing permit, the limitation shall be included in any reissued permit. Ammonia limitations shall be included in the permit if the permitted facility will be providing treatment for ammonia discharges.

Expression of Limits
Revisions to ch. NR 106, Wis. Adm. Code, in September 2016 aligned Wisconsin's WQBELs with 40 CFR § 122.45(d), which specifies that effluent limits for continuous dischargers must be expressed as weekly and monthly averages for publicly owned treatment works and as daily maximums and monthly averages for all other dischargers, unless shown to be impracticable. Because a daily maximum ammonia limit is necessary for Burlington, weekly and monthly average limits are also required under this code revision.

The methods for calculating limitations for municipal treatment facilities to conform to 40 CFR 122.45(d) are specified in s. NR 106.07(3), Wis. Adm. Code, and are as follows:

Whenever a daily maximum limitation is determined necessary to protect water quality, a weekly and monthly average limitation shall also be included in the permit and set equal to the daily maximum limit unless a more restrictive limit is already determined necessary to protect water quality. **Because the calculated daily maximum limit is 14 mg/L, the weekly average and monthly averages shall be at least as strigent as this.**

Conclusions and Recommendations
In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm Code. Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, are denoted in bold text.

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April & May	14	**14**	**14**
June – September	14	**14**	**14**
October	14	**14**	13
November – March	14	**14**	**14**

PART 4 – PHOSPHORUS

Technology-Based Effluent Limit
Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities

that discharge greater than 150 pounds of total phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because Burlington currently has a limit of 1.0 mg/L, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent WQBEL is given.

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

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

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

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

Where:

WQC = 0.100 mg/L for the Fox River
Qs = 100% of the 7-Q_2 of 82 cfs
Cs = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code
Qe = effluent flow rate = 3.5 MGD = 5.415 cfs
f = the fraction of effluent withdrawn from the receiving water = 0

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

A previous evaluation resulted in a WQBEL of 0.100 mg/L using a background concentration of 0.120 mg/L. Section NR 217.13(2)(d), Wis. Adm. Code, states that the determination of upstream concentrations shall be evaluated at each permit reissuance. Additional data were considered in estimating the background phosphorus concentration.

A review of all available in stream total phosphorus data from 112 samples from 06/07/2016 – 10/21/2024 stored in the Surface Water Integrated Monitoring System database indicates the median background total phosphorus concentration in the Fox River at Jefferson Street (SWIMS station ID 10052246) is 0.095 mg/L, just upstream from the point of discharge to the Fox River.

Substituting a median value of 0.096 mg/L into the limit calculation equation above, the calculated limit is 0.165 mg/L.

Although this is an increase from the previously calculated WQBEL, this does not meet the definition of an increased discharge in ch. NR 207, Wis. Adm. Code, because there is a compliance schedule and the limit was not in effect, therefore antidegradation does not need to be considered.

Effluent Data
The following table summarizes effluent total phosphorus monitoring data from 10/04/2020 – 02/25/2025.

Total Phosphorus Effluent Data

	Concentration mg/L	Mass lbs/day
1-day P_{99}	1.11	25.4
4-day P_{99}	0.79	18.0
30-day P_{99}	0.62	14.1
Mean	0.54	12.2
Std	0.18	4.28
Sample size	689	689
Range	0.201 - 2.4	4.76 - 52.9

Reasonable Potential Determination
The calculated WQBEL of 0.100 mg/L is less than the current technology-based limit of 1.0 mg/L, so the WQBEL must be included in the permit per s. NR 217.15(2), Wis. Adm. Code.

In accordance with s. NR 217.15(1), Wis. Adm. Code, there is reasonable potential for the discharge to cause or contribute to an exceedance of the water quality criteria. The data suggest that a compliance schedule will be necessary for the facility to meet the given phosphorus limits.

Limit Expression
According to s. NR 217.14(2), Wis. Adm. Code, because the calculated WQBEL is less than or equal to 0.3 mg/L, the effluent limit of 0.165 mg/L may be expressed as a six-month average. If a concentration limitation expressed as a six-month average is included in the permit, a monthly average concentration limitation of 0.50 mg/L, equal to three times the WQBEL calculated under s. NR 217.13, Wis. Adm. Code shall also be included in the permit. The six-month average should be averaged during the months of May – October and November – April.

Mass Limits
A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the discharge is to a surface water that is to or upstream of a phosphorus-impaired water. **This final mass limit shall be 0.165 mg/L × 8.34 × 3.5 MGD = 4.82 lbs/day expressed as a six-month average.**

Adaptive Management Interim Limit
Burlington intends to pursue adaptive management (AM) to comply with the phosphorus WQBELs. Since this is the first permit term in which AM is being pursued, the required interim limit is 0.5 mg/L, expressed as a 6-month average and 1.0 mg/L as a monthly average per s. NR 217.18(3)(e), Wis. Adm. Code. The permittee may be allowed up to five years to meet this interim limit.

A compliance schedule to be the six-month average limit of 0.5 mg/L may be included in the reissued permit. Until the 0.5 mg/L limit becomes effective, a 1.0 mg/L limit, expressed as a monthly average shall be included in the permit.

TMDL Under Development

A Total Maximum Daily Load (TMDL) is being developed for the Fox (IL) River Basin for phosphorus. The TMDL will address phosphorus water quality impairments within the basins and provide waste load allocations (WLA) required to meet water quality standards. This TMDL will likely result in phosphorus and TSS limitations that must be included in WPDES permits, which may be different than those calculated in this WQBEL memo. TMDL-derived phosphorus limits may be included in lieu of or in addition to the calculated limits upon permit reissuance or modification once the TMDL has been approved by U.S. EPA, according to s. NR 217.16, Wis. Adm. Code.

PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

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

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from 10/01/2020 – 02/28/2025.

The table below summarizes the maximum temperatures reported during monitoring from 01/01/2023 – 12/31/2023.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	55	56	86	120
FEB	53	54	86	120
MAR	53	54	81	120
APR	56	58	65	120
MAY	61	64	79	120
JUN	65	67	96	120
JUL	68	69	105	115
AUG	70	72	113	115

Attachment #1

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
SEP	69	72	106	120
OCT	67	68	87	120
NOV	61	62	68	111
DEC	58	59	83	120

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

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
  (a) The highest recorded representative daily maximum effluent temperature
  (b) The projected 99th percentile of all representative daily maximum effluent temperatures
- A sub−lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
  (a) The highest weekly average effluent temperature for the month.
  (b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

Based on the available effluent data no effluent limits are recommended for temperature. The complete thermal table used for the limit calculation is attached. **Monitoring is recommended to continue in the reissued permit.**

PART 6 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC_{50} (Lethal Concentration to 50% of the test organisms) greater than

100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.

- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The **IWC of 33%,** shown in the WET Checklist summary below, was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

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

Where:

Q_e = annual average flow = 3.5 MGD = 5.415 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = ¼ of the 7-Q_{10} = 44 cfs ÷ 4 = 11 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.
- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations. Significant changes were made to WET test methods in 2004 and these changes were assumed to be fully implemented by certified labs by no later than June 2005. Data collected before July 1, 2005 was excluded from this evaluation.

WET Data History

Date Test Initiated	Acute Results LC_{50} %				Chronic Results IC_{25} %				Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Pass or Fail?	Use in RP?	
10/10/2006	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
05/03/2007	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
01/15/2008	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
08/20/2009	>100	>100	Pass	No	>100	>100	Pass	No	1
03/18/2010	>100	>100	Pass	No	>100	>100	Pass	No	1
12/06/2011	>100	>100	Pass	Yes	93.9	>100	Pass	Yes	
05/08/2012	>100	>100	Pass	Yes	100	>100	Pass	Yes	
08/19/2014	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
04/28/2015	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/25/2016	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

Attachment #1

Date Test Initiated	Acute Results LC_{50} %				Chronic Results IC_{25} %				Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Pass or Fail?	Use in RP?	
02/28/2017	>100	>100	Pass	Yes	82.5	>100	Pass	Yes	
08/21/2018	>100	>100	Pass	Yes	82.7	>100	Pass	Yes	
02/05/2019	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/13/2020	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
05/18/2021	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
08/23/2022	>100	>100	Pass	Yes	>100	45	Pass	Yes	
03/14/2023	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/08/2024	>100	>100	Pass	Yes	>100	>100	Pass	Yes	
10/08/2024	>100	>100	Pass	Yes	>100	>100	Pass	Yes	

Footnotes:

1. *Tests done by S-F Analytical, July 2008 – March 2011.* The DNR has reason to believe that WET tests completed by SF Analytical Labs from July 2008 through March 31, 2011 were not performed using proper test methods. Therefore, WET data from this lab during this period has been disqualified and was not included in the analysis.

- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. **WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.**

  Acute Reasonable Potential = [(TUa effluent) (B)(AMZ)]
  Chronic Reasonable Potential = [(TUc effluent) (B)(IWC)]

  According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC_{50}, IC_{25} or $IC_{50} \geq 100\%$).

  Acute Reasonable Potential = 0 < 1.0, reasonable potential is not shown, and a limit is not required.

  Chronic Reasonable Potential = [(TU_c effluent) (B)(IWC)]

Chronic WET Limit Parameters

TUc (maximum) $100/IC_{25}$	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/45 = 2.2	2.6 Based on 4 detects	33%

[(TUc effluent) (B)(IWC)] = 1.9 > 1.0

Therefore, reasonable potential is shown for chronic WET limits using the procedures in s. NR 106.08(6), Wis. Adm. Code, and representative data from 10/10/2006 – 10/08/2024.

Expression of WET limits

Chronic WET limit = [100/IWC] TU_c = 3.0 TU_c expressed as a monthly average

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

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. **0 Points**	IWC = 33%. **0 Points**
Historical Data	16 tests used to calculate RP. No tests failed. **0 Points**	15 tests used to calculate RP. 4 tests failed. **0 Points**
Effluent Variability	Little variability, no violations or upsets, consistent WWTF operations. **0 Points**	Same as Acute. **0 Points**
Receiving Water Classification	WWSF **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	No reasonable potential for limits based on ATC; Ammonia nitrogen limit carried over from the current permit. Arsenic, copper, mercury, zinc, chloride, and ammonia detected. Additional Compounds of Concern: Total phenols **5 Points**	No reasonable potential for limits based on CTC; Ammonia nitrogen limit carried over from the current permit. Arsenic, opper, mercury, zinc, chloride, and ammonia detected. Additional Compounds of Concern: Total phenols **5 Points**
Additives	0 Biocides and 1 Water Quality Conditioner (ferric chloride) added. Permittee has proper P chemical SOPs in place. **1 Point**	All additives used more than once per 4 days. **1 Point**
Discharge Category	7 Industrial Contributors. **11 Points**	Same as Acute. **11 Points**
Wastewater Treatment	Secondary or Better **0 Points**	Same as Acute. **0 Points**
Downstream Impacts	No impacts known **0 Points**	Same as Acute. **0 Points**

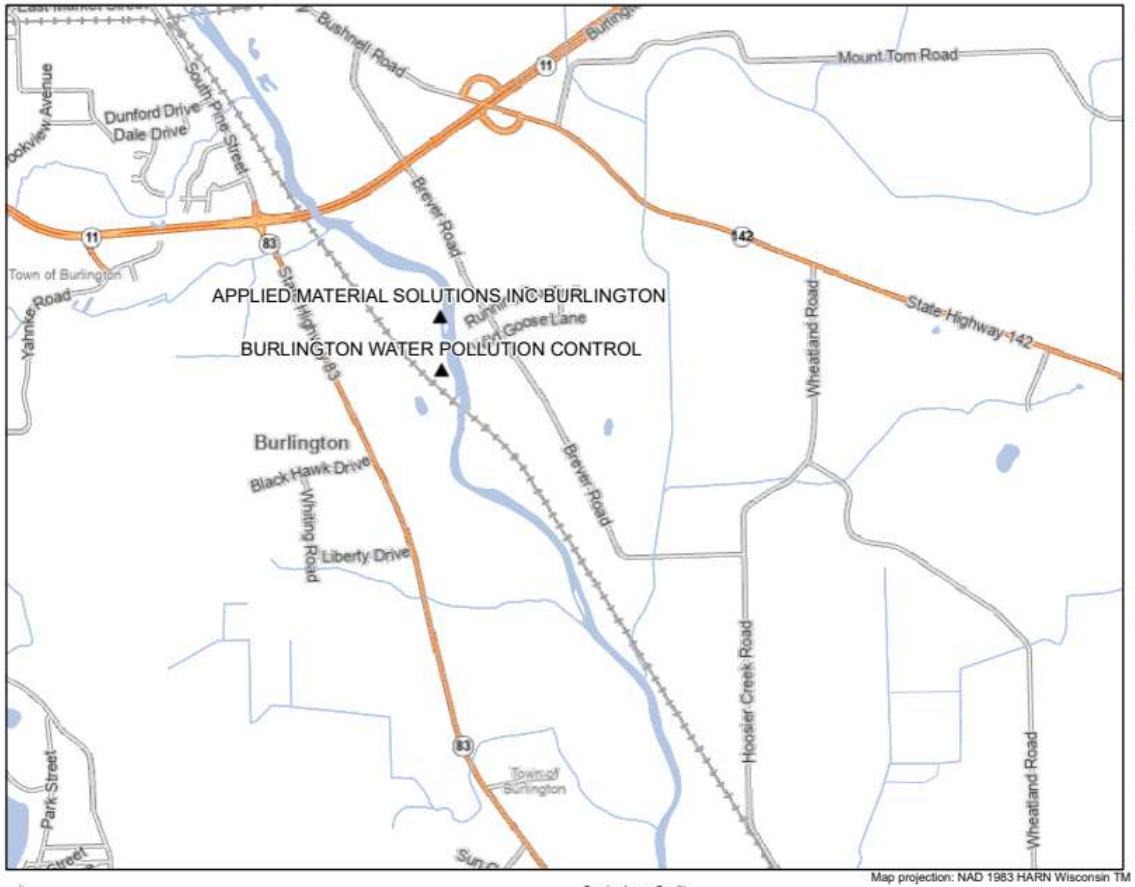
Attachment #1

	Acute	Chronic
Total Checklist Points:	**22 Points**	**22 Points**
Recommended Monitoring Frequency (from Checklist):	1x yearly	1x yearly
Limit Required?	No	Yes Limit = 3.0 TU_c
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's *WET Program Guidance Document* (2022) and other information described above, annual acute and chronic WET tests are recommended in the reissued permit. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge. Testing should continue after the permit expiration date (until the permit is reissued).
- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. The chronic WET limit shall be expressed as 3.0 TUc as a monthly average in the effluent limits table of the permit.
- A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.
- A minimum of annual acute and chronic monitoring is recommended because Burlington is a major municipal discharger with a design flow greater than 1.0 MGD. Federal regulations at 40 CFR Part 122.21(j) require at least 4 acute and chronic WET tests with each permit application on samples collected since the previous reissuance. Therefore, annual monitoring is recommended in the permit term, so that data will be available for the next permit application.

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Burlington Outfall Location



Legend: (some map layers may not be displayed)

- Surface Water Outfalls
- 24K Streams and Rivers
- 24K Lakes and Open Water
- Rivers and Streams
- Intermittent Streams
- Open Water

Latest Leaf Off Imagery

- Red: Band_1
- Green: Band_2
- Blue: Band_3

Notes:
Not to scale

Map projection: NAD 1983 HARN Wisconsin TM

N

Map: 0 2,000 4,000 Feet
0 670 1,340 Meters

Service Layer Credits:
Latest Leaf Off Imagery: , Basic Basemap (Cached):

This map is a product generated by a DNR web mapping application.

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Attachment #3

2019 Ammonia Limits Calculations

Daily Maximum Limits based on Acute Toxicity Criteria (ATC):

Daily maximum limitations are based on acute toxicity criteria, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation.

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

Where:

A = 0.411 and B = 58.4 for a Warm Water Sport fishery, and

pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 1612 sample results were reported from 01/01/2015 to 05/31/2019. The maximum reported value was 8.10 s.u. (Standard pH Units). The effluent pH was 8.00 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), is 8.07 s.u. And the mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.06 s.u. Therefore, a value of 8.00 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.00 s.u. into the equation above yields an ATC = 8.41 mg/L and a computed daily maximum limit of 16.8 mg/L using two times the ATC.

Potential changes to daily maximum Ammonia Nitrogen effluent limitations:

Updates to subchapter IV of ch. NR 106, Wis. Adm. Code (effective September 1, 2016) outline the option for the Department to implement use of the 1-Q_{10} receiving water low flow to calculate daily maximum ammonia nitrogen limits if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits would apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q_{10} (estimated as 80 % of 7-Q_{10}) and the 2×ATC approach are shown below.

	Ammonia Nitrogen Limit mg/L
2×ATC	16.8
1-Q_{10}	61.4

The 2×ATC method yields the most stringent limits for Burlington.

The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water. There is currently a monthly limit for October but not for the rest of the year, so limits will be evaluated.

Weekly and monthly average limits based on chronic toxicity criteria for ammonia are also calculated to determine the weekly and monthly average limits to meet the requirements of s. NR 106.07(3). Because

there are currently daily maximum limits, there shall also be weekly and monthly average limits included in the permit.

Ammonia limits were last calculated in 2014. Since then, the representative pH has increased slightly so new monthly and weekly limits will be evaluated.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Warm Water Sport Fish Community is calculated by the following equation.

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

Where:

pH = the pH (s.u.) of the receiving water,
E = 0.854,
C = the minimum of 2.85 or $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or
C = $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and
T = the temperature (ºC) of the receiving water – (Early Life Stages Present), or
T = the maximum of the actual temperature (ºC) and 7 – (Early Life Stages Absent)

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

The rules provide a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 ºC, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in the Fox (IL) River, based on conversations with local fisheries biologists. So “ELS Absent” criteria apply from October through March, and “ELS Present” criteria will apply from April through September for a warm water sport fish classification.

In the table below, background pH and ammonia data are site-specific for the Fox (IL) River. Since minimal temperature data is available, the “default” basin assumed values are used and shown in the table below, with the resulting criteria and effluent limitations.

Attachment #3

		Spring	Summer	Fall	Winter
		April & May	June – Sept	October	Nov – March
Effluent Flow	Qe (MGD)	3.5	3.5	3.5	3.5
Background Information	7-Q_{10} (cfs)	44	44	44	44
	7-Q_2 (cfs)	82	82	82	82
	Ammonia (mg/L)	0.09	0.07	0.09	0.25
	Temperature (°C)	12	19	10	2
	Temperature (°F)	54	66	50	36
	pH (s.u.)	7.77	7.85	7.96	7.77
	% of Flow used	50	100	25	25
	Reference Weekly Flow (cfs)	22	44	11	11
	Reference Monthly Flow (cfs)	35	70	17	17
Criteria mg/L	4-day Chronic				
	Early Life Stages Present	8.25	4.95		
	Early Life Stages Absent			8.68	13.5
	30-day Chronic				
	Early Life Stages Present	3.30	1.98		
	Early Life Stages Absent			3.47	5.39
Effluent Limitations mg/L	Weekly Average				
	Early Life Stages Present	41.4	44.6		
	Early Life Stages Absent			26.1	40.4
	Monthly Average				
	Early Life Stages Present	24.0	26.6		
	Early Life Stages Absent			14.4	22.0

Section NR 106.33(2) was also updated effective September 1, 2016. As a result, seasonal 20 and 40 mg/L thresholds for including ammonia limits in municipal discharge permits are no longer applicable under current rules. As such, s. NR 106.33(1) enables the Department to determine the need to include ammonia limits in municipal discharge permits based on the statistical comparisons in s. NR 106.05.

Antidegradation:
The calculated monthly average limit of 14 mg/L for October is less restrictive than the limit of 13 mg/L in the current permit. Without a demonstration of need for a higher limit in accordance with s. NR 207.04 Wis. Adm. Code, the current limit of 13 mg/L should be continued in the reissued permit for the month of October.

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

Ammonia Nitrogen mg/L	Daily Maximum	Weekly Average	Monthly Average
April & May	17	**17**	**17**
June – September	17	**17**	**17**

Attachment #3

Ammonia Nitrogen mg/L	Daily Maximum	Weekly Average	Monthly Average
October	17	**17**	13
November – March	17	**17**	**17**

Attachment #4

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	Burlington		**7-Q_{10}:**	44	cfs		
Outfall(s):	001		**Dilution:**	25%		**Start:**	01/01/23	10/01/20
Date Prepared:	4/16/2025		**f:**	0		**End:**	12/31/23	02/28/25
Design Flow (Qe):	3.50	MGD	**Stream type:**	Small warm water sport or forage fish co			
Storm Sewer Dist.	0	ft	**Qs:Qe ratio:**	2.0	:1		
			Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	44.00	3.060	3.213	0	55	56	86	120
FEB	34	50	76	44.00	3.154	3.904	0	53	54	86	120
MAR	38	52	77	44.00	3.469	3.766	0	53	54	81	120
APR	48	55	79	44.00	4.835	5.204	0	56	58	65	120
MAY	58	65	82	44.00	3.598	3.704	0	61	64	79	120
JUN	66	76	84	44.00	3.517	3.604	0	65	67	96	120
JUL	69	81	85	44.00	3.612	3.795	0	68	69	105	115
AUG	67	81	84	44.00	3.153	3.905	0	70	72	113	115
SEP	60	73	82	44.00	2.800	2.897	0	69	72	106	120
OCT	50	61	80	44.00	3.021	3.221	0	67	68	87	120
NOV	40	49	77	44.00	3.336	7.824	0	61	62	68	111
DEC	35	49	76	44.00	2.956	3.050	0	58	59	83	120

State of Wisconsin
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May 13, 2026

Howard Moser, Director of Public Works
City of Burlington
[sent by email only]

SUBJECT: City of Burlington WPDES Permit No. WI-0022926
Adaptive Management Plan - Conditional Approval

Dear Mr. Marchese,

The Wisconsin Department of Natural Resources (WDNR) has received the final copy of the adaptive Management (AM) Plan. The plan was received on May 13, 2026, and included updates that were requested on January 23, 2026, and April 15, 2026, from the original draft received in 2025. The WDNR has reviewed the AM plan and has no additional comments at this time.

Based on the WDNR's review, the AM Plan is in general conformance with the WDNR Adaptive Management Guidance and requirements contained in s. NR 217.18, Wis. Adm. Code. The plan indicates that the City will continue to utilize AM to comply with the effluent limitations for total phosphorus for their discharge from the City of Burlington Wastewater Treatment Plant, Outfall 001, to the Fox River. Actions outlined in the AM plan include point and nonpoint phosphorus reductions throughout the four local HUC 12 Watersheds that fall within the City of Burlington. For continued AM eligibility, phosphorus reductions undertaken by the City and its partners are expected to offset 4,274 lbs/yr to the Fox River within the second permit term. This value is found in section 7.1 of the AM plan and is equal to the annual average loading of total phosphorus from the WWTP between May 1, 2022, and February 28, 2026.

The WDNR conditionally approves the AM Plan as a basis for phosphorus compliance during the next WPDES permit term. A tracking number of AM-2026-03 has been assigned and will be referenced in the draft WPDES permit. The draft permit will contain an interim limit for phosphorus and reporting requirements consistent with s. NR 217.18, Wis. Adm. Code. The AM plan will be included as part of the public notice package for permit reissuance, and final approval is subject to public comment and EPA review.

The WDNR appreciates the City's continued interest in watershed-based phosphorus compliance. If you have any questions or comments, please contact me at (414) 897-5723 or nicholas.lent@wisconsin.gov.

Thank you,

Nick Lent

Nick Lent
Wastewater Engineer

cc: Glen Harjes, City of Burlington
Ben Blink, City of Burlington
Joe Marchese, Baxter & Woodman
Matt Claucherty, WDNR
Marissa Fleege, WDNR
Justin Meyers, WDNR
Jacob Van Susteren-Wedesky, WDNR

BAXTER & WOODMAN
Consulting Engineers

May 2026

Adaptive Management Plan Update

2600203.00

City of Burlington
Burlington, Wisconsin

www.baxterwoodman.com

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List of Abbreviations

avg	-	average
ADF	-	Average Daily Flow
BOD_5	-	five day biochemical oxygen demand
BPR	-	biological phosphorus removal
BNR	-	biological nutrient removal
$CBOD_5$	-	five day carbonaceous biochemical oxygen demand
cfd	-	cubic feet per day
cfm	-	cubic feet per minute
cfs	-	cubic feet per second
EPA	-	Environmental Protection Agency
ft	-	feet

gcd	-	gallons per capita per day
gpd	-	gallons per day
gpm	-	gallons per minute
hr	-	hour
in	-	inches
lbs	-	pounds
max	-	maximum
MDF	-	peak design flow
MG	-	million gallons (or mil gal)
MGD	-	million gallons per day
mg/L	-	milligrams per liter (parts per million in dilute solutions)
min	-	minimum
P	-	phosphorus
pcd	-	pounds per capita per day
PE	-	population equivalent
ppd	-	pounds per day (or lb/day)
SSA	-	Sewer Service Area
UV	-	Ultraviolet (disinfection)
WDNR	-	Wisconsin Department of Natural Resources
WPDES	-	Wisconsin Pollutant Discharge Elimination System
WQBEL	-	Water Quality Based Effluent Limit
WWTP	-	Wastewater Treatment Plant
yr	-	year

1. Introduction and Background

1.1. Introduction

The City of Burlington is permitted by the Wisconsin Department of Natural Resources (WDNR) to own and operate their wastewater treatment plant (WWTP). The existing WWTP is regulated under the requirements contained in WPDES Permit No. WI-0022926-10-2.

When the permit was re-issued in 2014, it included more stringent limits on the levels of phosphorus allowed to be discharged to the Fox River. The permit contained a water quality based effluent limitation (WQBEL) and compliance schedule. Compliance with the terms of the permit would have required the construction of advanced treatment units unless alternative compliance measures that achieve the water quality in the discharge stream contemplated by the WDNR. The City challenged the phosphorus WQBEL and the associated compliance schedule in a petition filed in February 2015. The City and WDNR reached an agreement regarding the Final WQBEL and a modified permit was issued effective January 1, 2018.

In order to comply with the more stringent phosphorus limits, the City chose Adaptive Management as the preferred compliance alternative. The City submitted the final Adaptive Management Plan in early April of 2020 and received conditional approval from the WDNR on May 1, 2020. Requirements for compliance with the Adaptive Management Plan were incorporated into the most current WPDES Permit which was set to expire on September 30, 2025. The City has made measurable progress towards achieving the goals and measures identified in the approved Plan and has re-applied to continue Adaptive Management throughout the upcoming permit term.

1.2. Existing Facilities

The City underwent a major upgrade in the early 1990s to serve an increased population equivalent (PE) of approximately 40,000 with an average daily flow (ADF) of 3.5 million gallons per day (MGD) and a peak design flow (MDF) of 16.5 MGD. A new influent pumping station and screening building were located at the former wastewater treatment plant (WWTP) site. At the current WWTP site, a two-stage process (trickling filtration followed by activated sludge) was constructed. The new site includes an administration building, forward flow treatment including UV disinfection, solids handling facilities including gravity belt thickening, anaerobic digestion, and liquid sludge storage.

The Burlington WWTP provides treatment for domestic wastewater generated within the Burlington Sewer Service Area (SSA), Browns Lake Sanitary District, and Bohner's Lake Sanitary District and accepts a significant amount of hauled waste. The facility also treats wastewater from several industries including Nestle, Echo Lake Packaging, and Ardagh Glass. Peak monthly flows typically occur as a result of high river stages in the Fox River. High levels of rain in the region resulted in a spike of influent flows in July of 2017. The highest maximum day flow occurred in 2017 (11.070 MGD).

The Burlington WWTP utilizes a two-stage process for the treatment of wastewater. The first stage (synthetic media tower) is designed to remove most of the BOD_5. The second stage process removes the remainder of the BOD_5 and converts ammonia to nitrate for compliance with ammonia limits. Ferric chloride is also added in this second stage process for phosphorus removal. The raw sewage pumping

station, located at the site of the old wastewater treatment plant, pumps a majority of the City's flow to the wastewater treatment facility. At the facility, the influent wastewater receives screening, grit removal, and primary sedimentation prior to flowing to the trickling filter tower. The current operation routes 25% of the primary effluent to the second stage nitrification tanks to improve overall process performance. The flow proceeds from the second stage process to secondary clarifiers where biological and phosphorus removal solids are settled out. The effluent from the second stage process is disinfected using UV (May 1 to September 30) and then discharged to the Fox River. Primary and waste activated sludges are thickened using a gravity belt thickener. These sludges are then anaerobically digested, thickened, and stored in a liquid form for beneficial reuse. Burlington contracts with a sludge hauler for the disposal of the thickened liquid sludge.

The volume of sludge produced at the Burlington WWTP is a function of the influent BOD_5 and total phosphorus loading. Sludge disposal costs are also significantly impacted by the degree of sludge thickening that is achieved. Currently, all primary and nitrification processed sludge is thickened and pumped to anaerobic digestion. Following anaerobic digestion, the digested solids are thickened and then stored in a liquid sludge storage tank. The digested solids (biosolids) are hauled and land-spread by a private sludge-hauling contractor. The sludge produced at the Burlington WWTP has consistently met the high quality metals limits contained in NR 214 of the Wisconsin Administrative Code.

The wastewater contains many pollutants and solids that influence the operation and performance of the treatment process which are monitored per the Burlington WPDES permit. The Burlington WWTP discharges a high quality effluent, which consistently exceeds the requirements of the WPDES permit. The Burlington WWTP has historically been capable of meeting the current interim limit on phosphorus of 0.6 mg/L expressed as a six-month average. The WPDES permit includes an ultimate WQBEL of 0.100 mg/L, which becomes effective at the end of four permit terms or tentatively a date of September 30, 2040. The existing facility is capable of reliably meeting the interim limit throughout the term of the current permit, but will not be capable of meeting the WQBEL for phosphorus without constructing major improvements.

The current facility uses chemical phosphorus removal to meet the monthly average effluent total phosphorus limit. The Burlington WWTP consistently and reliably meets the current effluent limit on phosphorus of 0.6 mg/L. Ferric chloride is currently the chemical being used for phosphorus removal. The facility uses approximately 44,000 gallons of ferric chloride annually or about 120 gallons daily. The annual cost for ferric chloride is approximately $130,000. Due to significant industrial loadings, the influent total phosphorus concentration is about 3 to 4 mg/L compared to a normal domestic wastewater concentration of 5 to 6 mg/L. The two-stage process provides better overall process performance since phosphorus would potentially be somewhat limiting in a single stage process which could contribute to filamentous growth.

Throughout 2025, the City conducted a pilot study of different phosphorus removal chemicals to determine if there is a more effective option. Starting in April, they began feeding Alum for a 60-day trial period. Following that, they started using rare earth elements and continued using that through the end of the year at a rate of approximately 48 gallons daily. Results of the pilot testing will be available in mid to late 2026 with a possible change to the chemical of choice soon after that.

History has shown that the Burlington WWTP is capable of complying with the interim monthly average total phosphorus limit of 0.6 mg/L without the addition of effluent filtration. The City has an on-line phosphorus analyzer to measure the real-time effluent phosphorus concentration and pace the chemical feed pumps with this output to maintain a consistent phosphorus concentration in the effluent. This allows the City to optimize its use of phosphorus removal chemical to prevent over or under feeding chemicals. Any phosphorus limit lower than about 0.5 mg/L will potentially require filtration and enhanced chemical addition to ensure the limit is met consistently.

1.3. Phosphorus Compliance Alternatives

Prior to issuance of the previous WPDES Permit, the City investigated various options for compliance with the final phosphorus limit including accepting the limit and constructing facilities, adaptive management, trading, eliminating the surface water discharge, obtaining a site specific limit, obtaining a variance, or obtaining a multi-discharger variance.

The City identified Adaptive Management as the preferred compliance alternative for the WWTP and wishes to continue with Adaptive Management through the next permit term as well. The City submitted a Watershed Adaptive Management Request Form 3200-139 with the renewal application in March of 2025; a copy of the Form is included in the Appendix.

In order to be eligible for Adaptive Management, Wisconsin Administrative Code Section NR 217.18 states that the City must meet the three eligibility conditions outlined below:

1. **The receiving water does not meet water quality criteria for total phosphorus:** The Fox River at the point of compliance has an approximate median total phosphorus concentration (May – Oct.) of 0.113 mg/L in 2025 which is slightly above the standard of 0.100 mg/L.

2. **The watershed is non-point source dominated:** Based on the WDNR's Pollutant Load Ratio Estimation Tool (PRESTO), the total phosphorus loading in the watershed upstream of the WWTP is 73 percent non-point sources and 27 percent point source.

3. **The WWTP needs filtration or an equivalent technology to meet the WQBEL:** The lowest monthly average total phosphorus concentration the City achieved in 2025 was 0.398 mg/L with an annual average of 0.543 mg/L**.** A target effluent phosphorus concentration of 0.08 mg/L would need to be maintained to provide assurance that the 6-month average limit would be met, and this would require filtration or an equivalent technology.

The City believes Adaptive Management continues to be the best alternative because the Fox River has been at or near criteria in the past and partnering with upstream non-point source contributors will have the most impact on the quality of the river. Also, several upstream point source facilities such as Sussex, Brookfield, and Waukesha are all in the process of reducing total phosphorus in the river which will also help to improve the quality of the river. The City has also been proactively participating with the Southeastern Wisconsin Fox River Commission, which works to develop and implement plans for waterways.

The Adaptive Management option is also the most cost-effective approach to achieving the phosphorus criteria goals in the river. The least expensive treatment option explored in 2017 had a capital project cost of over $8,000,000 with over $275,000 in annual operating costs; and costs now projected over $10,000,000 due to inflation. Adaptive Management provides a long-term, sustainable solution with clear environmental benefits at a cost that is much more manageable for a facility the size of Burlington.

The following sections of this report outline the steps the City needs to take to continue implementing a successful Adaptive Management Plan.

1.4. Previous Actions Taken

The City has been implementing management measures outlined in the original Adaptive Management Plan to help reduce phosphorus loads to the watershed. These measures included point source reductions, urban reductions, agricultural best management practices (BMPs), and other management measures. Annual Adaptive Management Reports have been submitted to the WDNR throughout the permit term highlighting actions taken and progress made; refer to these reports for more details. Success of the management measures has fluctuated year-to-year throughout the permit term, however, as reported in the Final Adaptive Management Report for the First Permit Term, an estimated reduction of 1,329 pounds of phosphorus per year was removed from the watershed which exceeded the requirement of 512 pounds per year stated in the WPDES Permit.

2. Identify Partners

2.1. Potential Partners

The Watershed Protection Committee of Racine County (WPCR) is a group of local farmers who are working towards erosion control, water and soil quality improvements, and providing information about conservation practices. Much of the work this group does is focused slightly east of the City but does include Hoosier Creek Watershed which is partially within city limits. More discussion on the watersheds is in Section 4. The group provides incentive programs which include payments to those who add grass buffers or cover crops. Partnering with this group will assist the City in finding potential landowners and providing public education and outreach.

The Racine County Land Conservation Department and the Walworth County Land Use and Resource Management Department work to implement and administer the County and State Soil and Water Conservation Programs. They can help provide technical assistance throughout the Adaptive Management project along with aid in communication between the City and the landowners within their respective counties. The Racine County Land Conservation Department also has a Land and Water Resource Management Program that provides funding to landowners who install best management practices.

Soil RX is a company that is focused on protecting farmland for the future. They do consulting for farmers regarding health of the soil and work to decrease soil loss and increase profitability.

Southeastern Wisconsin Regional Planning Commission (SEWRPC) has been doing research on the Upper Fox River erosion and pollutant loads. Their research has provided data showing phosphorus loads in lbs/acre/year and has created indicators for priority target areas.

USDA National Resources Conservation Service (NRCS) can provide grants such as the Regional Conservation Partnership Program which provides financial assistance for various environmental incentives. They also have existing partnerships that can be used to assist in finding landowners and other organizations needed to comply with the limits.

Other WPDES Permit holders, such as Western Racine County Sewerage District (WRCSD) and the Mukwonago Wastewater Treatment Facility, also discharge to the Upper Fox River. These facilities are actively implementing Adaptive Management as their phosphorus compliance alternative. Partnering with these communities would give the City a larger presence and access to more resources. The Village of Mukwonago has developed their own Adaptive Management Plan, however, it likely will not directly cause any land and water quality management activity downstream from their outfall near Highway 43. The WRCSD has also developed their own Adaptive Management Plan and may be willing to partner with the City in the future.

The Lyons Sanitary District, which discharges into the White River, has shown interest in collaborating with the City on the Adaptive Management Plan. Previous meetings between the two entities were held to discuss the opportunity for collaboration, however, an agreement between the two entities could not be reached, but they remain hopeful for an opportunity to collaborate in the future.

2.2. Current Relationships

The City of Burlington Wastewater Utility is the lead partner and permit holder. They will submit the AM plan to the DNR and all components are approved by them. They will be in charge of annual progress reports, financial assistance, monitoring, and are in charge of the project administration.

Baxter & Woodman is the consulting engineering firm for this project. They are in charge of any technical assistance requested by the City. The City is currently involved in the Southeastern Wisconsin Fox River Commission (SEWFRC). This group works to support projects that improve the Fox River basin. This group collects data on the Fox River, provides education, and develops and implements plans to improve the water quality and protect the recreational usage of the Fox River. Partnerships with SEWFRC provide access to the data collected and to landowners working in partnership with the organization. SEWFRC also provides financial assistance to landowners for project implementation.

2.3. Letters of Support

Several of the existing and potential partners identified above have previously provided letters of support for the implementation of the Adaptive Management Plan proposed by the City. A copy of these letters can be found in Appendix E.

3. Watershed Description and Load Reduction Goals

3.1. Watershed Description

The Burlington WWTP discharges into the subwatershed with the Hydrologic Unit Code (HUC) 12 of Spring Brook – Fox River. The city itself lies within the White River, Long Lake – Fox River, and Hoosier Creek watersheds in addition to the Spring Brook – Fox River. These are all part of the HUC 8 named the Upper Fox. Based on the PRESTO-Lite Watershed Delineation Report, this watershed is 766.14 square miles in size. The estimated nonpoint phosphorus load is 114,497 lbs per year. There are 15 facilities in the watershed with an average phosphorus load of 43,376 lbs per year. Therefore, the most likely point to nonpoint phosphorus ratio is 27:73. As mentioned earlier, Mukwonago and WRCSD are both implementing Adaptive Management as a compliance option. These two facilities are also located within the Upper Fox and would be able to help the river meet the compliance goals.

The receiving water at the WWTP outfall has an annual average flow of 673 cubic feet per second (cfs) and an instream three-year average phosphorus concentration of 0.100 mg/L.

3.2. Action Area

The action area for the City's Adaptive Management Plan will include the four HUC 12 watersheds that the City lies within, as outlined in Table 1 below. Many of the Critical Source Areas (CSAs) lie within these watersheds and many of the partners identified above already do work within these watersheds. The City believes it will see the most impact on phosphorus levels in the river by targeting these areas. If further action is required in the future, the City can expand out from here.

Table 1 – Action Area HUC 12 Watersheds

HUC and Watershed Name	**Total Area of Watershed**	
071200061002 Spring Brook – Fox River	**Acres**	**Square Miles**
	8,504	13.3
County	**Area of Watershed in the County**	**Percentage of Watershed Within the County**
Racine	7,074	83%
Kenosha	1,207	14%
Walworth	223	3%
What watershed scale was used to develop the action area? X Full HUC 12 __ Portion of the HUC 12 __ Based on TMDL Reach __ Other		

HUC and Watershed Name	Total Area of Watershed	
071200060604 White River	Acres	Square Miles
	25,428	39.7
County	**Area of Watershed in the County**	**Percentage of Watershed Within the County**
Walworth	23,771	93%
Racine	1,638	6%
Kenosha	19	<1%

What watershed scale was used to develop the action area?

X Full HUC 12
__ Portion of the HUC 12
__ Based on TMDL Reach
__ Other

HUC and Watershed Name	Total Area of Watershed	
071200060503 Honey Creek	Acres	Square Miles
	22,005	34.4
County	**Area of Watershed in the County**	**Percentage of Watershed Within the County**
Walworth	11,483	52%
Racine	10,522	48%

What watershed scale was used to develop the action area?

X Full HUC 12
__ Portion of the HUC 12
__ Based on TMDL Reach
__ Other

HUC and Watershed Name	Total Area of Watershed	
071200060707 Long Lake – Fox River	Acres	Square Miles
	7,942	12.4
County	**Area of Watershed in the County**	**Percentage of Watershed Within the County**
Racine	7,942	100%

What watershed scale was used to develop the action area?

X Full HUC 12
__ Portion of the HUC 12
__ Based on TMDL Reach
__ Other

Exhibits No. 1 and No. 2 show the action area as well as surface water details, county boundaries, HUC 12 boundaries, major highways, municipal boundaries, City monitoring points, dam locations, and WWTP locations in the proximity of the action area. The action area includes several municipalities including the City of Burlington, Town of Burlington, Town of Wheatland, Town of Lyons, Town of Bloomfield, Village of Bloomfield, Town of Spring Prairie, Town of East Troy, Town of Waterford, and Village of Rochester.

The action area includes several water bodies flowing into the Fox River. These include the Spring Brook, the White River, Honey Creek, and the Long Lake Channel. Spring Brook flows directly into the Fox River with flow from Dyer Lake and Bohner's Lake. The White River flows into Echo Lake just upstream of the confluence of the Fox River and includes inflow from Ivanhoe Lake, Geneva Lake, and several small creeks. Honey Creek also flows into Echo Lake and includes inflow from Honey Lake, Potter Lake, and several small streams. The Fox River receives inflow from Long Lake as well as numerous other sources further upstream in the HUC 8 watershed extending all the way up to the north side of Waukesha County. The Fox River generally flows south into Illinois where it flows into the Illinois River and ultimately to the Mississippi River.

Several of these water bodies flowing through the action area are impaired and identified on the EPA 303 (d) list for various pollutants. These include the White River for total phosphorus, Potter Lake for total phosphorus, a few small perennial streams for murky water/turbidity, and the Fox River itself for total phosphorus and PCBs.

3.3. Monitoring Points

The City and surrounding WWTFs have established several monitoring points for phosphorus concentrations within the proposed action area. These include several monitoring points along the Fox River and several monitoring points along the White River. These monitoring points are detailed in Table 2 below and shown on Exhibit 1. The total phosphorus data was compiled from sampling conducted from June 2016 through October 2017 for the non-Burlington monitoring points and 2023 through 2025 for the Burlington monitoring points. Monitoring points 1-3, 6-8, and 12 are sampled by the City, monitoring points 4-5 are sampled by the WRCSD, and monitoring points 9-11 are sampled by the Lyons Sanitary District.

Table 2 – Total Phosphorus Monitoring Points

Map ID	WDNR Station ID	Water Body	Location ID	Max. Total P (mg/L)	Ave. Total P (mg/L)	Min. Total P (mg/L)
1	523093	Fox River	Hwy JB	0.270	0.093	0.042
2	10052246	Fox River	Jefferson St.	0.272	0.099	0.040
3	523092	Fox River	Hwy W	0.264	0.095	0.038
4	10052205	Fox River	Hwy 36/83	0.231	0.088	0.038
5	10052207	Fox River	430 meters upstream of ID 4	0.344	0.095	0.038
6	10052247	White River	Milwaukee Ave.	0.150	0.079	0.036
7	10052245	White River	Wagner Park	0.280	0.090	0.034
8	653104	White River	Hwy JS	0.210	0.082	0.029

Map ID	WDNR Station ID	Water Body	Location ID	Max. Total P (mg/L)	Ave. Total P (mg/L)	Min. Total P (mg/L)
9		White River	Mangold Rd.	0.261	0.115	0.039
10	10052257	White River	Mill St.	0.224	0.098	0.041
11	653110	White River	Sheridan Springs	0.296	0.107	0.041
12	10054212	Fox River*	700 feet DS of Burlington WWTP Outfall	0.320	0.104	0.027

*Excludes data from September 5, 2023 due to bad data.

The WDNR has indicated that the point of compliance for determining if the City WWTP is meeting the goals of their phosphorus reduction plan should be located approximately 700 feet downstream of the WWTP outfall and just upstream of the confluence with Hoosier Creek, approximately 1.4 miles downstream. Despite very limited access to the river within this area, the City has been obtaining compliance samples near the railroad crossing, either by land or by boat. A new WDNR monitoring station was established with the previous WPDES Permit known as Compliance Point 601. Several additional monitoring points are expected to be added by the City to determine the effectiveness of certain best management practices (BMP) both prior to and following installation of the BMP.

The total phosphorus concentrations tend to be relatively consistent throughout all of the monitoring points. There are slight dips in the concentration at the confluence of waterways and just downstream of a WWTP outfall.

Flow in the Fox River tends to follow seasonal trends with the highest flows occurring in the spring and lowest flows occurring in late summer. According to the WDNR, the 7Q2 flow of the Fox River at the WWTP is approximately 82 cubic feet per second (cfs), or 53 MGD, while the annual average flow, according to the United States Geological Survey (USGS) is 673 cfs or 435 MGD. The USGS recommended using historic flow data from the New Munster gage approximately three miles downstream and reducing the flow by 4% to account for the additional drainage area between the WWTP discharge and the New Munster gage. Data from the New Munster gage shows an annual mean flow of the river of 701.3 cfs for water years 1994-2018.

The design effluent of the WWTP is 3.55 million gallons per day (MGD) or 5.49 cfs. Average daily flow over the past three years has averaged 2.826 MGD. The highest maximum day flow of 11.070 MGD occurred in 2017 when the City experienced a historic flooding event.

3.4. Load Calculations

PRESTO estimated the phosphorus load from the Burlington WWTF to be 5,432 lbs per year based on 2010-2012 data; 2023-2025 data shows an improvement down to around 4,200 lbs. per year on average. The following calculations were completed using the formulas provided in the Adaptive Management Technical Handbook on page 34.

Q_e – Maximum Effluent Flow from the WWTP that is anticipated to occur for 12 continuous months

C_e – WWTP Effluent Total Phosphorus Concentration

Q_s – Annual Average Flow of the Fox River at the WWTP discharge point as determined by USGS

C_s – Total Phosphorus Concentration in the Fox River upstream of the WWTP discharge (growing season median)

WQC – Water Quality Criterion (mg/L) for the Fox River

Current Point Source Load = *Q_e x C_e x 8.34 x 365 day/year = 3.55 MGD x 0.543 mg/L x 8.34 x 365 days/year =* ***5,868 lbs/year***.

The current phosphorus load contributed to the Fox River by the WWTP is 5,868 lbs per year based on the design average effluent flow of 3.55 MGD and an effluent phosphorus concentration of 0.543 mg/L based on 2025 data.

Current Load in Receiving Water = *Q_s x C_s x 8.34 x 365 days/year = 435 MGD x 0.110 mg/L x 8.34 x 365 days/year =* ***145,660 lbs/year***.

Based on the Fox River annual average flow of 673 cfs (435 MGD) and an upstream concentration of 0.110 mg/L, based on the 2025 sampling at the Jefferson St. monitoring point, the calculated stream load of phosphorus is 145,660 lbs/year.

Allowable Load Credit = *(Q_s + Q_e) x WQC x 8.34 x 365 days/year = (435 + 3.55) MGD x 0.10 mg/L x 8.34 x 365 days/year =* ***133,499 lbs/year***.

The criteria for the Fox River is 0.1 mg/L meaning the allowable load is 133,499 lbs/year.

Total Reductions Needed = *5,868 + 145,660 – 133,499 lbs/year =* ***18,029 lbs/year***.

Using the current point source load, current load in the receiving water, and the allowable load credit calculated above, the total reduction needed in the Fox River is 18,029 lbs/year; up from 15,700 lbs/year just five years ago. However, if 2024 data were used with a C_e of 0.457 mg/L and a C_s of 0.082 mg/L, the result is almost 20,000 lbs/year below the allowable load. A further estimate of the load reductions needed by the facility is described in Section 7.

3.5. Alternative Load Calculations

An alternative load calculation is presented as follows. The 2021-2024 four-year growing season grand median phosphorus concentration in the Fox River at sample point #601 just downstream of the WWTP discharge is 0.1015 milligrams per liter (mg/L) with an upper confidence limit of 0.1184 mg/L. The average reported flow at sample point #601 throughout the permit term is 418 cubic feet per second (cfs) or 270 million gallons per day (MGD). The annual average WWTP effluent phosphorus concentration has increased slightly from 0.449 mg/L to 0.457 mg/L.

Q_s – Annual Average Flow of the Fox River at sample point #601

WQC – Water Quality Criterion (mg/L) for the Fox River

$C_{s\text{-}wqc}$ – Total Phosphorus Concentration in the Fox River at sample point #601 (growing season grand median upper confidence limit) minus the WQC goal of 0.1 mg/L.

Additional Phosphorus Reductions Needed in Receiving Water = Q_s x $C_{s\text{-}wqc}$ x 8.34 x 365 days/year = 270 MGD x 0.0184 mg/L x 8.34 x 365 days/year = ***15,123 lbs/year****.*

This calculation method suggests that further reductions of 15,123 lbs/year are needed in the Fox River which is slightly lower than the results from above. This still shows additional progress needs to be made relative to the phosphorus levels found in the Fox River. However, the methodology in the current guidance does not recognize the success over the previous two years with median results below 0.1 mg/L at sample point #601 in 2023 and 2024. The overall data is skewed higher by one year of questionable results in 2022 and historic flooding upstream of Burlington in August of 2025; resulting in an overestimation of additional phosphorus reductions needed.

4. Watershed Inventory

Conducting a watershed inventory is an important step in better understanding the action area impacted by the adaptive management program. This will allow the City to make informed decisions about specific actions to take in the action area to help improve water quality. The watershed inventory will help identify important and unique features of the action area and organize the information in a way that summarizes a large amount of relevant data into a manageable format. Input from the City, project partners, Geographic Information System (GIS), and data from several government agencies were used to obtain much of the data presented in this section of the report. This information was then used to help identify sources of impairment in the action area and focus efforts in those areas.

4.1. Subwatersheds

The action area for the City's adaptive management plan is relatively small compared to the entire Fox River Watershed. The action area covers approximately 63,874 acres, or 100 square miles. The action area includes land from three counties as shown in Table 3 below.

Table 3 – Action Area County Breakdown

County	Approximate Land Area (acres)
Kenosha	1,226
Racine	27,176
Walworth	35,477

Exhibits No. 1 and No. 2 show the four HUC 12 subwatersheds that make up the action area; each subwatershed is described in more detail below.

4.1.1. Springbrook – Fox River

The southern end of this subwatershed is near the intersection of STH 50 and CTH P in Kenosha County and includes a small sliver of Walworth County just to the north. Spring Brook originates near this location and flows north through Dyer Lake. A dam is located at the outlet of Dyer Lake near the northeast corner. Spring Brook continues north from here to Bohner's Lake. Another dam is located at the outlet of Bohner's Lake followed shortly by another dam at the outlet to Bohner's Pond. Spring Brook continues north into the City of Burlington where it discharges into the Fox River approximately ½ mile northwest of the Burlington Bypass. The southern half of the City drains into this subwatershed.

4.1.2. White River

This subwatershed is the largest of the action area and lies mainly in eastern Walworth County with a small section in Racine County. The southern end of this watershed is in the Village of Bloomfield and encompasses Pell Lake. Spring Valley Creek originates in this area and flows north to Lake Ivanhoe. Several small tributaries, unnamed waterbodies and wetland areas flow to the north from this area as well. Spring Valley Creek continues flowing north where it meets up with the White River just south of the Burlington Bypass.

The White River enters this subwatershed just east of the City of Lake Geneva and flows northeast through Lyons. The Lyons Sanitary District WWTP discharges to the White River just east of Mill Street. Several small tributaries flow into the White River in this area including Ore Creek, Indian Run Creek, and several unnamed tributaries. The subwatershed extends north and west to near the intersection of STH 120 and STH 11, encompassing the drainage area of Indian Run Creek. The White River continues flowing northeast into the City of Burlington where it flows into Echo Lake. The northwestern quarter of the City drains into this subwatershed. The White River flows out of Echo Lake over a dam and discharges into the Fox River just north of Jefferson Street.

The Echo Lake area is a popular focal point for recreation in the City. There is a park, a wedding/conference venue, and many local festivals are held here throughout the year. The lake itself is popular for fishing, but not much else due to the shallow depth. The Echo Lake Dam is being upgraded to achieve compliance with NR 333. The dam will receive a major upgrade during the summer of 2026. Construction activities related to the dam may contribute a significant loading of phosphorus to the Fox River as phosphorus deposits are released to the downstream waterways.

4.1.3. Honey Creek

This subwatershed lies north of the City and straddles the Walworth/Racine County line. The northern end of this watershed is along Interstate 43 just south of the Waukesha County line and encompasses Potter Lake. An unnamed tributary originates from Potter Lake and discharges through a dam located at the outlet of Potter Lake near the southeast corner. This unnamed tributary flows southeasterly from here to where it meets up with Honey Creek just east of Bell School Road. Areas to the north and east also drain to Honey Creek through several unnamed tributaries.

Honey Creek continues flowing south to near Honey Lake, Delmonte Lake, and Tahoe Lake but does not actually flow through and of these bodies of water. Sugar Creek flows into Honey Lake which discharges through the Honey Lake Dam and flows into Honey Creek. From there, Honey Creek continues flowing south to the confluence with the White River just upstream of Echo Lake. This subwatershed lies mainly outside of the City with the exception of a portion of the Burlington Municipal Airport.

4.1.4. Long Lake – Fox River

This subwatershed is the smallest in the action area and lies entirely within Racine County. The northern end of this watershed begins in the Village of Rochester at the confluence of the Fox River and the Wind Lake Canal. The Fox River flows south from this point along CTH W and through the Rochester Dam. The Western Racine County Sewerage District WWTP discharges to the Fox River just west of STH 36 and Eagle Creek discharges into the Fox River just south of this. The Fox River continues flowing southwest into the City of Burlington where it picks up flow from the Long Lake Channel. The Long Lake Channel receives flow from Long Lake, Brock Lake, and several unnamed tributaries. The Fox River then flows southwest to the confluence with the White River. The northeastern quarter of the City drains into this subwatershed.

4.2. Dams

According to the WDNR Surface Water Data Viewer, there are several documented dams within the action area. These dams are shown on Exhibit No. 1. Table 4 below shows information regarding each of these dams.

Table 4 – Action Area Dam Information

Map ID	Dam	Adjacent River System	County	Key Seq. No.	Field File No.	Size	Hydraulic Height (ft.)
1	Dyer Lake	Spring Brook	Kenosha	1277	30.13	Small	3.0
2	Bohner's Lake	Spring Brook	Racine	1442	51.12	Small	2.0
3	Bohner's Pond	Spring Brook	Racine	3070	51.12	Small	6.0
4	Bloomfield Wetland Restoration	Spring Valley Creek	Walworth	5666	64.00	Small	N/A
5	Val Sauer	Spring Valley Creek	Walworth	711	64.00	Small	5.0
6	Spring Valley*	Spring Valley Creek	Walworth	4413	64.01	N/A	9.0
7	Lyons**	White River	Walworth	1527	64.12	Small	5.0
8	Echo Lake	White River	Racine	602	51.01	Large	6.0
9	Potters Lake	Honey Creek	Walworth	1534	64.28	Small	1.0
10	Shaffer, Joseph	Honey Creek	Racine	2404	51.00	Small	10.0
11	Honey Lake	Honey Creek	Walworth	316	64.21	Large	7.0
12	Rochester	Fox River	Racine	953	51.04	Large	4.0
13	Catton's Dam	Fox River	Racine	4281	51.02	N/A	3.0
14	Long Lake*	Long Lake Channel	Racine	1443	51.13	Small	1.0

*Informally Abandoned
**Formally Abandoned

4.3. Topography

The topography of the action area is generally flat with rolling hills throughout. More significant grade changes and larger hills are present in the western and northern portions of the action area. The overall topography of the action area generally slopes from west to east, but the southern two subwatersheds also tend to slope south to north while the northern two subwatersheds tend to slope north to south. The highest elevation of approximately 1,040 feet is near the western edge of the Honey Creek subwatershed near the intersection of STH 120 and STH 11 while the lowest elevation of approximately 750 feet is found near the eastern edge of the Springbrook – Fox River subwatershed near the confluence with Hoosier Creek.

4.4. Soil Characteristics

Soil data for the action area was obtained using the Web Soil Survey from the Natural Resources Conservation Service (NRCS), United States Department of Agriculture (USDA). Information relative to the adaptive management plan were obtained from the database, including the total area occupied by each soil type, soil erosion characteristics, and soil drainage characteristics.

There are over 150 different soil types present in the action area. Soils that cover over 2% of the total land area are listed in Table 5. A complete list of all of the soils is included in the Appendix. Loams and silty loams are the most common soil types in the area, with a large amount of very poorly drained hydric soil (Houghton muck) typical of floodplains and end moraines.

Table 5 – Action Area Most Common Soils

Soil Symbol	Soil Name	Area (ac)	% Cover
Ht	Houghton muck, 0 to 2 percent slopes	5,816.6	9.1%
FsB	Fox silt loam, 2 to 6 percent slopes	4,733.4	7.4%
MpB	McHenry silt loam, 2 to 6 percent slopes	2,687.8	4.2%
CeC2	Casco loam, 6 to 12 percent slopes, eroded	2,650.8	4.2%
FoA	Fox loam, 2 to 6 percent slopes	2,406.6	3.8%
CrE	Casco-Rodman complex, 20 to 30 percent slopes	1,921.7	3.0%
Sm	Sebewa silt loam, 0 to 2 percent slopes	1,873.5	2.9%
CrE2	Casco-Rodman complex, 20 to 30 percent slopes, eroded	1,818.7	2.9%
CeD2	Casco loam, 12 to 20 percent slopes, eroded	1,816.3	2.8%
FsA	Fox silt loam, 0 to 2 percent slopes	1,683.0	2.6%
W	Water	1,594.3	2.5%
WhA	Warsaw silt loam, 0 to 2 percent slopes	1,351.9	2.1%
Ph	Pella silt loam, 0 to 2 percent slopes	1,338.9	2.1%
PsB	Plano silt loam, till substratum, 2 to 6 percent slopes	1,286.3	2.0%

There are several important soil characteristics that impact water quality in nearby surface water. Most importantly is the soil erodibility based on the K factor. Soil erodibility is a good indication of how likely the different types of soil are to releasing particulate phosphorus into nearby surface waters. The soil erosion factor quantifies the tendency of soil particles to detach from the surrounding soils, as well as their ability to be transported by water. This factor is used in a number of soil loss estimation models such as the Universal Soil Loss Equation (USLE). It is a function of the soil's texture, structure, organic matter, and permeability. In general, the K values will improve with anything that enhances infiltration into the soil, impedes the transport of runoff, or improves the natural cohesion of the soil particles. Values of K range from 0.02 to 0.64, with higher values indicating a soil with higher erodibility. Another important factor is the ground slope which leads to a greater risk of soil detachment and transport due to increased velocity of runoff over the surface.

A majority of the soil in the action area contains soil types that have average to above average erodibility based on the K factors. Figure 1 below shows a distribution of the K factors and the percentage of acreage within the action area. Exhibit 3 shows a map of the action area with the different soil types shaded based on the K factor. The darker blue and yellow indicate higher K factors and a higher risk of soil erosion. The greatest area of erodibility can be found in the western and northern portions of the action area. In general, these areas are in Walworth County between STH 11 and STH 36 and along CTH D west of Honey Creek. These are the areas which may provide the greatest opportunity to implement runoff mitigation practices.

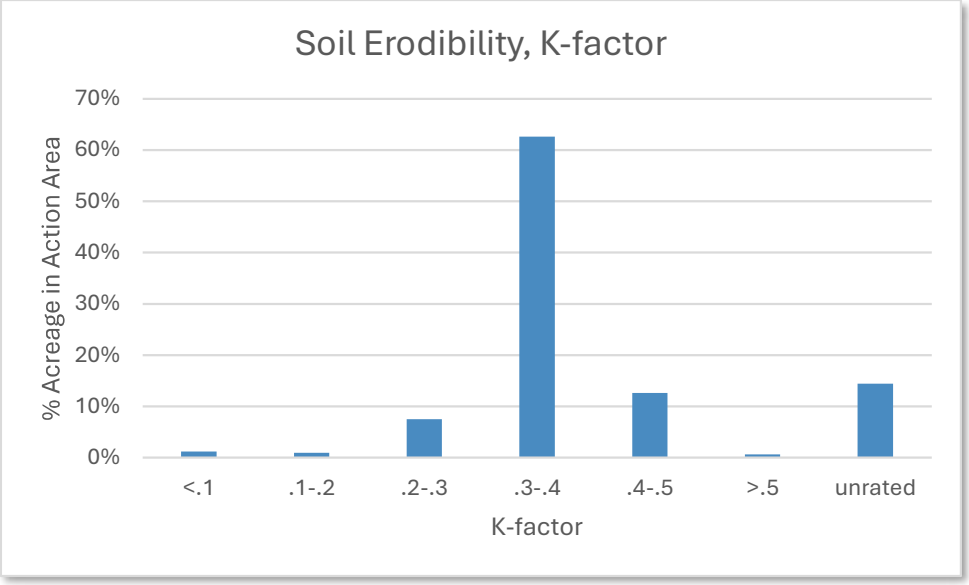


Figure 1 – K-Factor Distribution

Another soil characteristic important to the adaptive management plan is the ability for the soil to either drain or retain water. The hydrologic soil group system was developed by NRCS to describe the infiltration rate of water into the ground by dividing the soils into four categories: A, B, C, and D. Class A is characterized by high infiltration rates and low runoff potential while Class D consists of soils with low infiltration and high risk of runoff. Class A soils are typically sandy or granular, Class B soils are silts and loams, Class C soils are sandy clay loams, and Class D soils have high contents of clayey soils or a high water table. With a dual-class soil, the first letter describes the soil if it is drained by a man-made drainage system while the second letter describes the soil in its natural state.

Figure 2 below shows a distribution of the hydrologic soil groups and the percentage of acreage within the action area. The results show that the majority of the soil is Class B, which makes sense given the large amounts of silt loam in the action area. There is a lesser amount of less drainable soil in Classes C and D, with a potential for more poorly drained soil depending on the drainage condition of the dual classification. Exhibit 4 shows the hydrologic soil group ratings.

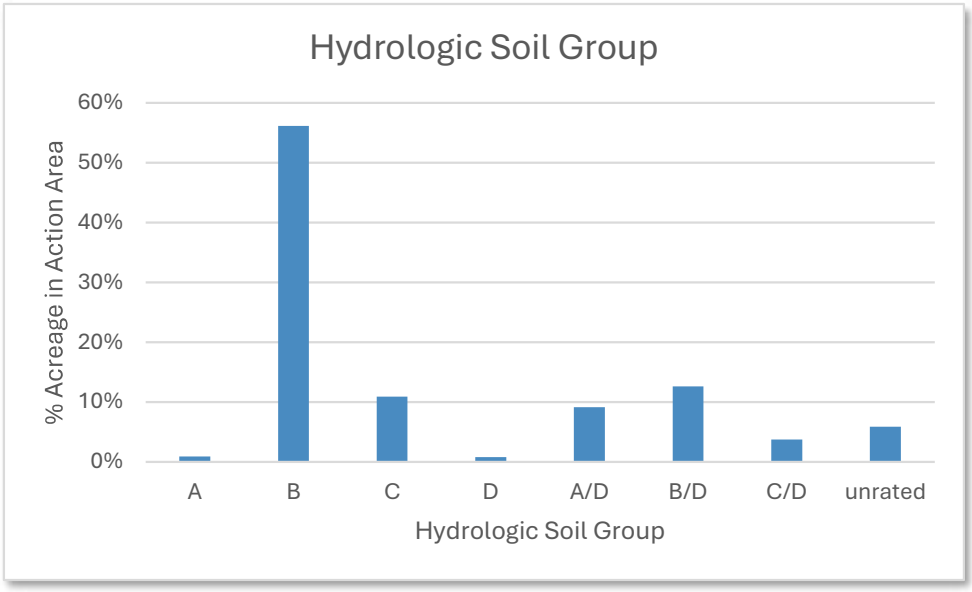


Figure 2 – Hydrologic Soil Group Distribution

The final soil characteristic analyzed for the adaptive management plan was the drainage condition of the soil. A majority of the soil in the action area is well drained or better which indicates a majority of the area is not likely to flood or will rarely flood. Figure 3 below shows a distribution of the drainage condition and the percentage of acreage within the action area.

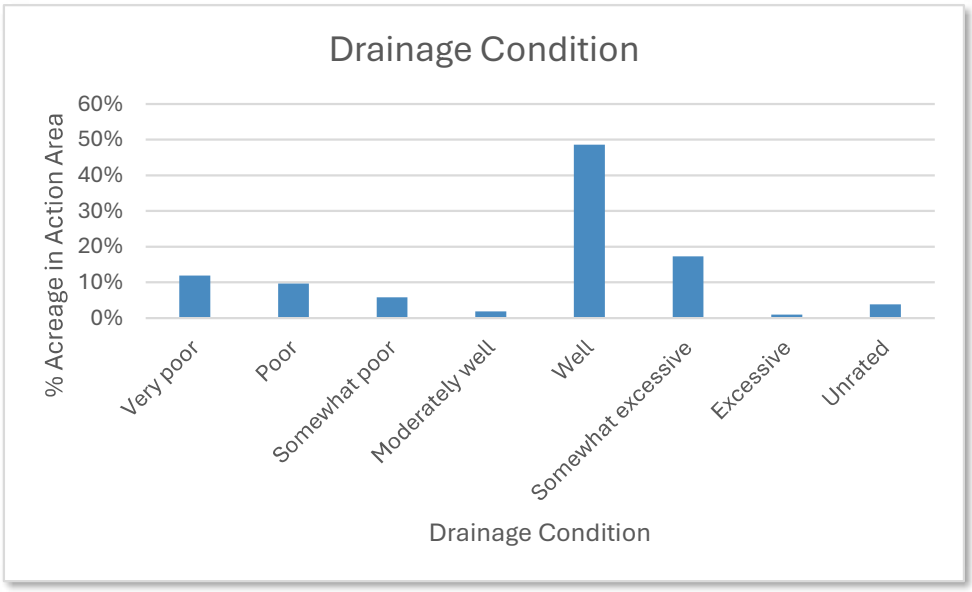


Figure 3 - Drainage Condition Distribution

4.5. Land Use

The 2024 Multi-Resolution Land Characteristics (MRLC) Consortium, was used to determine the land use and impervious area within the action area. Exhibit 5 shows the land use map for the action area, Exhibit 6 shows the wetlands, and Exhibit 7 shows the floodplains. Table 6 below summarizes the land use information and impervious area. Over half of the land cover in the action area is cropland and pasture/hay fields and only 13.4% is impervious. Agricultural statistics such as crop rotations, tillage practices, and livestock density are constantly changing and are unknown at this time.

Table 6 - Land Use and Impervious Area

Current Land Use				
Land Use	**Approximate Land Cover (ac)**	**Approximate Land Cover (%)**	**Typical Impervious Fraction/Runoff Coefficient[1]**	**Approximate Impervious Area in Watershed**
Open Water	1,175	1.8%	0.00	0.0%
Developed, Open Space	3,899	6.1%	0.20	1.2%
Developed, Low Intensity	5,008	7.8%	0.30	2.4%
Developed, Med. Intensity	1,834	2.9%	0.50	1.4%
Developed, High Intensity	442	0.7%	0.70	0.5%
Barren Land	1,071	1.7%	0.20	0.3%
Deciduous Forest	8,567	13.4%	0.08	1.1%
Evergreen Forest	50	0.1%	0.08	0.0%
Mixed Forest	504	0.8%	0.08	0.1%
Shrub/Scrub	12	0.0%	0.08	0.0%
Grassland/Herbaceous	61	0.1%	0.10	0.0%
Pasture/Hay	8,377	13.1%	0.12	1.6%
Cultivated Crops	22,235	34.8%	0.10	3.5%
Woody Wetlands (swamp)	5,747	9.0%	0.08	0.7%
Emergent Wetlands (marsh)	4,896	7.7%	0.08	0.6%
Total	**63,878**	**100.0%**		**13.4%**

[1]Runoff coefficients are used in the rational equation, which is one of the simplest methods to determine peak discharge from drainage basin runoff. These values are provided as a general approximation for decision-making purposes and should be modified as appropriate.

The land use within the action area is not expected to change much over the next several years. Areas within the action area that are located in Racine County are developing at a faster pace than the areas in Walworth County simply due to the fact that there is more existing urban land use in Racine County versus Walworth County. These urban areas will continue to expand outward but at a normal pace. The rural areas are expected to remain farmland with no major changes expected. Much of the farmland within the action area in Walworth County is included within the Walworth County Farmland Preservation Plan. This Plan identifies valuable agricultural and environmentally important land within the County so these lands can be preserved for farming and open-space use. Agriculture land uses decreased from just over 52% to just under 48% within the total action area, but the proposed management measures of agricultural land are needed to reduce non-point sources of total phosphorus and improve water quality.

4.6. Windshield Survey

The final step of the watershed inventory was to conduct a windshield survey of the action area to confirm our findings from above. Prior to the original Adaptive Management Plan, City staff drove around the action area to make direct observations of physical properties of the land from topography to soil classifications to flooding potential. They also observed land use, agricultural practices, and livestock inventory. They paid close attention to areas with greater potential for phosphorus reduction implementation discussed in greater detail in the next section of the Report.

5. Identify Reductions

5.1. Critical Source Areas

Critical Source Areas (CSAs) are those areas suspected of contributing a disproportionate amount of phosphorus to the receiving waters relative to other areas within the action area. CSAs are not only a source of phosphorus but also transports phosphorus to a receiving water. Both factors must be in play for a particular area to be identified as critical. CSAs were identified using the techniques described above in the Watershed Inventory section of this Report.

One area identified was the City of Burlington itself. The City is an MS4 with all locations in the City draining into the action area watersheds. The City identified several areas which they feel they can improve upon, beyond the requirements of the MS4, to reduce the potential for phosphorus entering the waterways through the storm sewer collection system. The City also rents land near the airport for sludge disposal and will investigate alternate sites, alternate application methods, and alternate application rates to ensure the phosphorus applied to the fields does not make its way into the nearby waterways.

With respect to agricultural lands, the City met with representatives from both the Racine County and Walworth County Land Conservation Departments for input in identifying land owners that might be interested in implementing projects with the assistance of the City. They were able to provide names of specific farmers that might be interested as well as contact information for watershed protection committees within the area. Also identified were areas with steeper slopes and minimal natural buffer between farmland and the receiving water. The windshield survey also proved to be useful by identifying critical areas that might not necessarily show up on maps and observing crop rotations and drainage patterns.

5.2. Source Factors

Phosphorus source factors include the amount of phosphorus present in the soil, the application rate of phosphorus (manure, fertilizer, etc.), as well as the application timing and method. Phosphorus levels in the soil can increase over time when the amount of phosphorus in the fertilized applied is greater than the amount of phosphorus removed through crop harvesting. Fertilizer that is injected into the soil has less of a chance of runoff compared with fertilizer that is surface applied. If fertilizer is not injected, then timing of the application matters so that it has time to be incorporated into the soil before heavy rain events or spring snowmelt. Other source factors related to agriculture include poor barnyard practices such as inadequate manure storage, unprotected manure piles, and cattle in streams. Exhibit 8 is a map from SEWRPC showing the total phosphorus contribution per year from each subwatershed. The White River subwatershed contributes the most phosphorus per year of the four subwatersheds in the action area.

5.3. Transport Factors

Phosphorus transport factors include erodibility of soil, slope of the land, flooding potential, and connectivity of the land to the receiving waters. A large portion of phosphorus found in soil is bound to

the soil particles, so wherever the soil goes, the phosphorus will go too. Areas where soil is easily detached or eroded and where runoff velocities are high or flooding is likely, are potential CSAs. The soil characteristics identified in the Watershed Inventory are all important when it comes to phosphorus transport. The connectivity of the phosphorus source to the receiving water is also important. Connectivity can occur when an area is within close proximity to a receiving water or when an area is connected through an underground drainage system or a surface drainage ditch. Connectivity can be broken if the flow path of the source area contains land cover or a landform barrier to capture runoff. Fields within 100-300 feet of a waterbody have an increased potential of transporting phosphorus to that water body.

Other transport factors include tillage practices, cropping practices (strip cropping, terraces, crop type, etc.), grazing practices, stream channel erosion, and riparian buffers.

5.4. CSA Identification

The Primary CSAs for the Adaptive Management Plan are identified in Table 7 below. Exhibit 9 is a map that shows the location of each CSA cross-referenced with Table 7 below. The CSAs identified here are for illustrative purposes only and no agreements or commitments have been made with the property owners at this time with the exception of the CSAs with an asterisk (*) which indicates the property participates in the City-sponsored Grant Program discussed later.

Table 7 - Primary Critical Source Areas

CSA #	County, Municipality	Parcel Number(s)	General Land Use	Controlled Area (Ac)	Management Measure Description	Comments
1	Racine, Burlington (T)	002031930001010	Cropland	100.6	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway.
2	Walworth, Spring Prairie (T)	O SP2400006A	Cropland	39.27	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway.
3	Walworth, Spring Prairie (T)	O SP2500001	Cropland	34.06	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway.
4	Walworth, Spring Prairie (T)	O SP2500001A	Cropland, Mining	125.12	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway. Approx. 20 acres currently used for aggregate mining.

CSA #	County, Municipality	Parcel Number(s)	General Land Use	Controlled Area (Ac)	Management Measure Description	Comments
5	Walworth, Spring Prairie (T)	O SP2500001C	Cropland	22.44	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway.
6	Walworth, Spring Prairie (T)	O SP2500002	Cropland	134.24	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway.
7	Walworth, Spring Prairie (T)	O SP2500003	Cropland, Residential	8.96	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway. Approx. 4 acres used for residential.
8	Walworth, Spring Prairie (T)	O SP2600001	Cropland, Residential, Livestock, Forest	76.76	Nutrient management; grassed waterways; conservation tillage; cover crop; livestock management.	Crops near waterway, livestock management practices review. Approx. 50% of parcel is farmed.
9	Walworth, Spring Prairie (T)	O SP2600003A	Cropland	73.5	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway.
10	Walworth, Spring Prairie (T)	O SP2600006	Cropland, Forest	62.37	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway. Approx. 11.5 acres are forest.
11	Walworth, Spring Prairie (T)	O SP2600007	Cropland	74.22	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway.
12	Walworth, Spring Prairie (T)	O SP3400006	Cropland, Residential, Forest	38.14	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop.	Crops adjacent to Indian Run Creek, steep slopes. Approx. 50% of parcel is farmed.

CSA #	County, Municipality	Parcel Number(s)	General Land Use	Controlled Area (Ac)	Management Measure Description	Comments
13	Walworth, Spring Prairie (T)	O SP3400007	Cropland, Forest	39.96	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop.	Crops adjacent to Indian Run Creek, steep slopes. Approx. 50% of parcel is farmed.
14	Walworth, Spring Prairie (T)	O SP3400008A	Cropland, Forest	19.87	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop.	Crops adjacent to Indian Run Creek, steep slopes. Approx. 50% of parcel is farmed.
15	Walworth, Spring Prairie (T)	*CB 00001	Cropland, Airport	23.50	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway. Approx. 50% of parcel is farmed.
16	Walworth, Spring Prairie (T)	*CB 00002	Cropland	29.87	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway.
17*	Racine, Burlington (C)	206031930100000	Cropland, Airport	75.5	Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.	Crops adjacent to White River. Approx. 50% of parcel is farmed.
18	Racine, Burlington (C)	206021909001000	Cropland, Forest	15.19	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop.	Crops adjacent to Fox River. Approx. 50% of parcel is farmed.
19	Racine, Burlington (C)	206021904032010	Cropland, Forest	3.5	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop.	Crops adjacent to Fox River. Approx. 25% of parcel is farmed.

CSA #	County, Municipality	Parcel Number(s)	General Land Use	Controlled Area (Ac)	Management Measure Description	Comments
20*	Walworth, Lyons (T)	O SP2100001	Cropland, Residential, Forest	52.5	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway. Approx. 50% of parcel is farmed.
21	Walworth, Lyons (T)	O SP2200002A	Cropland, Residential, Forest	40.00	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway. Approx. 50% of parcel is farmed.
22*	Walworth, Lyons (T)	O SP2200004A	Cropland, Forest	15.00	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway. Approx. 50% of parcel is farmed.
23	Walworth, Lyons (T)	N LY2400002	Cropland, Forest, Livestock	56.21	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop; livestock management.	Crops adjacent to Spring Valley Creek, steep slopes; livestock management practices review. Approx. 75% of parcel is farmed.
24*	Walworth, Lyons (T)	N LY2400002A	Cropland, Residential, Forest	30.98	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop.	Crops adjacent to Spring Valley Creek, steep slopes. Approx. 50% of parcel is farmed.
25*	Walworth, Lyons (T)	N LY2400006	Cropland	31.16	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway.
26	Walworth, Mukwonago (C)	#VM 00025	Cropland, Residential	73.66	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway.
27	Walworth, Mukwonago (C)	#VM 00026	Cropland, Residential	10.34	Nutrient management; grassed waterways; conservation tillage; cover crop.	Crops near waterway.
			TOTAL	**1,306.90**		

As part of the implementation of the Adaptive Management Plan, the City began a grant sponsor program that would assist local agricultural producers with the installation of cover crops on farm land in the action area. The City provides grants in the amount of $25/acre for implementing cover crops. Cooperation from local farmers is pivotal in offsetting the phosphorus loading into the watershed.

Just over 1,300 acres were identified as Primary CSAs for the Adaptive Management Plan. This total only includes farmed land and does not include land used for other purposes such as residential, forest, mining, livestock, or airports. The Primary CSA's are primarily farmlands which have been identified by the County Land Conservation Division as likely candidates for implementation of management measures based on previous interest in resource management and outreach to local farmers. Approximately 180 acres of farmland identified as Primary CSA's participate in the City-Sponsored Grant Program.

An additional 6,400+ acres were identified as Secondary CSAs (shown on Exhibit 9). The Secondary CSA's are primarily farmlands which have been identified by the City during the windshield survey and based on a review of aerial photos of potential targets for future implementation of management measures should the City require additional phosphorus removal beyond the initial phases of the Plan. Assuming only about 75% of this area is farmland and predicting about a 75% participation rate, this results in about 3,600 acres available to implement management measures. Approximately 263 acres of farmland identified as Secondary CSA's participate in the City-Sponsored Grant Program.

Finally, an additional 20,500+ acres of land within the action area contain soils with a soil erodibility K-Factor greater than 0.35 which would also be good targets for future implementation of management measures should the City need to go beyond the Primary and Secondary CSAs. Due to the steeper slopes and poor soils associated with these areas, approximately 50% of this area is assumed to be farmland. With a 60% participation rate, this results in about 6,150 acres available to implement management measures if additional target areas are needed. Approximately 509 acres of farmland not identified as primary or secondary CSA's participate in the City-Sponsored Grant Program.

6. Management Measures

Management measures, or practices, are those activities that will be used to reduce phosphorus loads to the watershed in order to improve water quality. There are a wide variety of management measures that can be used to reduce phosphorus, including point source reductions, urban reductions, and agricultural best management practices. Each category is described in more detail below.

The City will use existing nonpoint pollution control programs and related program partners as a resource for the design and implementation of the various management measures. Another resource the City will follow is Wisconsin Administrative Code, Chapter NR 151 – Runoff Management. This code establishes runoff pollution performance standards for non-agricultural facilities and transportation facilities and performance standards and prohibitions for agricultural facilities and practices designed to improve water quality.

The management measure the City recommends for each CSA is identified in the Table from the previous section of the Report.

6.1. Point Source Reductions

Point source phosphorus reductions typically include treatment technology optimization or construction of facilities capable of removing phosphorus to extremely low levels. The City will continue to optimize the chemical used for phosphorus removal, however, there is a limit to how much phosphorus can be removed with this method due to various factors. The City will not construct facilities to remove phosphorus at this time to due to the high cost and low overall impact associated with this option. Upstream point sources will most likely optimize their treatment technology as well, resulting a small cumulative reduction of point source phosphorus.

6.2. Urban Reductions

Urban reductions include stormwater runoff and construction site runoff that may transport high levels of phosphorus to the local water bodies. Construction sites, industrial sites, and impervious surfaces can all impact the amount of runoff generated. Storm water management practices already in place for compliance with the City's MS4 permit will be reviewed and improved where possible to help reduce phosphorus runoff. One targeted urban reduction effort the City will pursue is improving the leaf collection method. The City does not intend to go beyond the City limits at this time to pursue urban reductions. Some examples of urban best management practices include filter strips, sediment traps, streambank stabilization, managing lawn waste, infiltration basins, and porous pavement.

6.3. Agricultural Best Management Practices

Agricultural Best Management Practices (BMPs) include cropland and livestock management practices that can be used to reduce phosphorus loading to the receiving water. Racine County and Walworth County Land Conservation Departments provided input on various BMPs that could be implemented and provided contact information for farmers who have shown interest in implementing BMPs to improve overall water quality within the watershed. They also identified cost-effective partnering opportunities

and grant programs available which may make implementing BMPs more attractive to prospective farmers and land owners. The City may also benefit from working cooperatively with the County Land Conservation Departments when it comes to BMP construction oversight and maintenance due to their experience and knowledge of the performance and technical standards required to be met. Various agricultural BMPs are described in detail below.

6.3.1. Nutrient Management Plans

Nutrient management plans are required by NR 151. The purpose of the plans is for farmers to have a proactive plan for managing the amount of nutrients in the soil for optimum crop yields and also help prevent an excess of nutrients in the soil. When there is an excess of nutrients in the soil, pollutant runoff associated with soil loss is even greater. The plans consider the soil type, crop rotation, nutrient uptake of the crops, the amount and type of fertilizer applied, and other general operation details. The goal of the plans is to balance the optimum amount of nutrients required for the particular farming operation.

6.3.2. Cover Crops

Cover crops are vegetation that is typically planted in the fall after the main crop is harvested. The cover crop grows quickly and establishes a root structure near the surface of the soil to help hold the soil in place and prevent soil erosion. The crop dies in the colds weather, but the root structure remains in the soil to stabilize it during the winter months. Winter wheat and winter rye are two examples of cover crops that are typically used.

6.3.3. Riparian Vegetative Buffers

Riparian vegetative buffers are used to restrict solids transport and promote nutrient uptake from runoff originating from agricultural operations before reaching nearby surface water. Riparian vegetative buffers are typically effective at a minimum width of 75 feet. Riparian vegetative buffers are very common in the action area and have been implemented frequently in response to the USDA Farm Service Agency Conservation Reserve Program (CRP). The CRP is a land conservation program where farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality in exchange for a yearly rental payment. Contracts for land enrolled in CRP are 10-15 years in length.

6.3.4. Grassed Waterways

Grassed waterways are drainage channels in a field that are planted with grass to reduce erosion and the transport of soil to the ditch line. These are important in regards of connectivity to the downstream receiving water.

6.3.5. Retention Structures

Retention structures help capture solids and particulate phosphorus during and after a precipitation event. The structures collect the storm water and allow the solids to settle out as opposed to having the solids transported to the receiving water. Low-lying areas that are typically inundated with water after a precipitation event are potential locations for retention structures.

6.3.6. Tillage Practices

Tillage practices can affect the health of the soil and the amount of soil loss. Improvements to tillage practices could include implementing no-till or conservation tillage practices and reducing the magnitude of tilling. Tillage practices can be difficult to change especially if a farmer has be doing it a certain way for many years. Different equipment may be required and a willingness to experiment is needed before tillage practices can be changed.

6.3.7. Livestock Management

Livestock management includes practices that could be implemented in areas of concentrated livestock feeding. The action area does not currently have any large-scale concentrated feeding operations (CFAOs), however, some smaller feeding operations may still benefit from improvements. Improvements could include relocating livestock feedlots and feeding pens, controlling milking center wastewaters, relocating pasture feeding sites, alternative (off-stream) watering system, rotational grazing systems, vegetative filter strips, and relocating or improving manure holding and disposal practices.

6.4. Other Management Measures

Other management measures include wetland restoration and dam removal. Wetland restoration opportunities will need to be evaluated on a case-by-case basis by a wetland scientist. The City does not currently have any wetland restoration opportunities and will not pursue this option.

The City will, however, be upgrading Echo Lake Dam for compliance with NR 333. The dam will receive a major upgrade during the summer of 2026. Construction activities related to the dam may contribute a significant loading of phosphorus to the Fox River as phosphorus deposits are released to the downstream waterways. Removing the dam likely would have had a more beneficial impact on overall phosphorus levels in the river, however, dredging of Echo Lake is scheduled to take place in 2027 which will remove a significant quantity of accumulated biomass and phosphorus.

7. Load Reductions

The Adaptive Management Plan requires the City to quantify the phosphorus reductions needed from point and non-point sources to meet water quality goals and to approximate the phosphorus load reductions expected from non-point source management measures throughout the permit term. The Adaptive Management Plan can extend over a 15-year timeframe, up to three permit terms. In each permit term, the point source phosphorus load must be reduced through compliance with the adaptive management interim limits. These limits will be set equal to 0.6 mg/L in the first permit term, 0.5 mg/L in the second permit term, and the final WQBEL of 0.1 mg/L in the third permit term, unless the water quality in the Fox River meets criteria. The load reduction target calculated in Section 3.4 of this report should provide the final reduction goal for adaptive management.

Due to the fact that time is needed to develop partnerships with non-point sources and implement BMPs, progress is the main factor to be demonstrated in order to continue to implement the adaptive management option for the full time frame available. Load reductions should be demonstrated each permit term from both point and non-point sources to show that the success of adaptive management is likely.

7.1. Minimum Offset Required

In the first permit term, the City, at a minimum, needed to demonstrate that the contributing phosphorus load from the WWTP to the watershed would be offset through non-point or other point source reductions. The proportional reduction for the facility was found to be 512 lbs/year of phosphorus and the City surpassed that goal with an estimated 1,329 lbs/year of phosphorus removed through a combination of point source reductions, urban reductions, and agricultural BMPs.

For this upcoming permit term, the DNR recommends setting the minimum reduction equal to the annual phosphorus loading from the WWTP delivered to the receiving water in the previous permit term; this is due to the required loading reduction still being significant and a TP + TSS TMDL currently in development for the Fox IL River Basin. This approach comes from page 62 of the DNR's Adaptive Management Technical Handbook. Based on flow and phosphorus data from May 2022 through February 2026, the average flow was 2.78 MGD and the average phosphorus concentration was 0.505 mg/L. This amounts to an annual average loading of 4,274 lbs/year. So the minimum offset required to continue Adaptive Management into the third permit term should be set at 4,274 lbs/year; however, the goal will be to meet approximately half of the reductions needed as calculated in Section 3 of this report; or approximately 7,575 lbs/year.

7.2. Estimating Load Reductions

The calculations for phosphorus reductions above set the minimum reductions needed from adaptive management partners. The WDNR typically requires modeling to ensure that the needed reductions will be achieved from the management measures. Pollutant load reduction estimates from similar plans based on modeling tools were used to preliminarily estimate load reductions within the action area. SnapPlus modeling will be used in the future to show phosphorus reduction estimates. This modeling application

requires inputs that are specific to each field, which are not currently available. As the City further develops the plan details and partners, they will utilize SnapPlus modeling to project the expected phosphorus reduction associated with non-point source improvements.

The most common modeling tool is the Spreadsheet Tool for Estimating Pollutant Load (STEPL) model. This is a landscape model that estimates watershed-scale nutrient transport by accounting for land use, local precipitation data, soils data, agricultural statistics, and other related factors. Reduction factors, expressed in lbs/acre/year, derived from the STEPL model for similar plans will be uses as the basis of load reduction estimates in Table 8 below. An average phosphorus reduction factor of 1.45 lbs/acre/year has been successfully implemented on similar plans and will be applied to the various CSAs in the table below to determine an overall reduction potential in the action area.

Table 8 below also includes an estimated cost of implementation and ongoing annual costs. Most of the CSA item costs in the table are approximated on a yearly basis assuming a value of $30 per pound of phosphorus removal (Winrock International, Pay-For-Performance Conservation: A How-To Guide).

Table 8 - Primary CSA Projected Phosphorus Reduction and Associated Cost

CSA #	Controlled Area (Ac)	Management Measure Description	Reduction (lbs P/year)	Annual Cost
1	100.6	Nutrient management; grassed waterways; conservation tillage; cover crop.	146	$4,380
2	39.27	Nutrient management; grassed waterways; conservation tillage; cover crop.	57	$1,710
3	34.06	Nutrient management; grassed waterways; conservation tillage; cover crop.	49	$1,470
4	125.12	Nutrient management; grassed waterways; conservation tillage; cover crop.	181	$5,430
5	22.44	Nutrient management; grassed waterways; conservation tillage; cover crop.	33	$990
6	134.24	Nutrient management; grassed waterways; conservation tillage; cover crop.	195	$5,850
7	8.96	Nutrient management; grassed waterways; conservation tillage; cover crop.	13	$390
8	76.76	Nutrient management; grassed waterways; conservation tillage; cover crop; livestock management.	111	$3,330
9	73.5	Nutrient management; grassed waterways; conservation tillage; cover crop.	107	$3,210
10	62.37	Nutrient management; grassed waterways; conservation tillage; cover crop.	90	$2,700
11	74.22	Nutrient management; grassed waterways; conservation tillage; cover crop.	108	$3,240
12	38.14	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop.	55	$1,650

CSA #	Controlled Area (Ac)	Management Measure Description	Reduction (lbs P/year)	Annual Cost
13	39.96	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop.	58	$1,740
14	19.87	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop.	29	$870
15	23.50	Nutrient management; grassed waterways; conservation tillage; cover crop.	34	$1,020
16	29.87	Nutrient management; grassed waterways; conservation tillage; cover crop.	43	$1,290
17	75.5	Nutrient management; additional buffer; grassed waterways; conservation tillage; cover crop.	109	$3,270
18	15.19	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop.	22	$660
19	3.5	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop.	5	$150
20	52.5	Nutrient management; grassed waterways; conservation tillage; cover crop.	76	$2,280
21	40.00	Nutrient management; grassed waterways; conservation tillage; cover crop.	58	$1,740
22	15.00	Nutrient management; grassed waterways; conservation tillage; cover crop.	22	$660
23	56.21	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop; livestock management.	81	$2,430
24	30.98	Nutrient management; additional buffer grassed waterways; conservation tillage; cover crop.	45	$1,350
25	31.16	Nutrient management; grassed waterways; conservation tillage; cover crop.	45	$1,350
26	73.66	Nutrient management; grassed waterways; conservation tillage; cover crop.	107	$3,210
27	10.34	Nutrient management; grassed waterways; conservation tillage; cover crop.	15	$450
TOTALS	**1,306.90**		**1,894**	**$56,820**

Table 8 above identified a total reduction estimate of 1,894 lbs/year of total phosphorus from the Primary CSAs at an annual cost of $56,820. This is much lower than the minimum offset goal of 4,274 lbs/year for the second permit term, so the City will need to also target secondary CSAs as well in addition to implementing other reduction methods. The City does not expect all of the CSA opportunities listed to be

implemented for a number of reasons. This could include lack of farmer cooperation, not being able to reach an agreement with a farmer, or the cost associated with the improvement does not justify implementation. Future phosphorus reduction from the Secondary CSAs is estimated at 5,262 lbs/year at an annual cost of $157,860 and the ultimate CSAs (high K-factors) is estimated at 8,923 lbs/year at an annual cost of $267,690.

The City also plans to continue implementation of an improved leaf collection procedure which includes additional street sweeping passes immediately following leaf collection to ensure that more of the phosphorus-containing organic material is removed from the streets instead of being allowed to enter the stormwater collection system. The estimated impact of this is approximately 750 lbs/year of total phosphorus at an added cost of about $32,000 annually based on past success. Phosphorus sampling of the street sweeper waste following leaf collection will provide a baseline value for phosphorus removal and will allow the City to make an informed decision as to whether or not this is an effective management measure to help reduce phosphorus.

Additionally, the City may investigate options with their sludge disposal on local farms fields and increase their chemical dosage for phosphorus removal at the WWTP to ensure a consistently low value below the interim effluent limits. Additional chemical above their current dosage rates will cost up to $12,000 annually. A reduction of 0.10 mg/L of total phosphorus could result in a total phosphorus reduction of approximately 1,000 lbs/year.

The sum of the annual payments for all projects in the first phase of the Adaptive Management Plan is $100,280. The City will continue implementing each improvement identified above over the course of the upcoming permit term. Some projects may be added or removed from the list during the course of each permit cycle depending on numerous factors. The Primary CSA management measures will continue to be implemented along with the leaf collection improvements and WWTP optimization. Along with the ongoing first permit term management measures, the second permit term will add the Secondary CSA management measures along with the Echo Lake Dam replacement and dredging. The third permit term improvements, if necessary, will target additional CSAs with a soil erodibility K-Factor greater than 0.4.

Table 9 - Phosphorus Reduction Summary

Management Measures	Permit Term 1 (Goal / Actual)	Permit Term 2 (Goal)	Permit Term 3 (Goal)	Totals
Point Source Reductions	500 / 245	255	0	500
Urban Reductions	100 / 780	220	0	1,000
Agricultural BMPs	1,894 / 304	7,000	8,923	16,227
Other (Dam Upgrade/Dredging)	0	100	0	100
Totals	2,494 / 1,329	7,575	8,923	**17,827**

Table 9 summarizes the projected phosphorus reductions expected over the three permit terms. The proposed management measures to be implemented over the second permit term will significantly need to exceed the first permit term. The following permit terms will build on the success of the first permit term and incorporate additional CSAs as necessary. Ideally, the river will reach compliance after the

second permit term and only maintenance of the existing BMPs will be required to continue to keep phosphorus loads below criteria. However, if the Adaptive Management Plan is required to continue for all three permit terms, the total identified reduction of 17,827 lbs/year is greater than the 15,123 lbs/year required.

The WWTP occasionally, but not regularly, discharges phosphorus below the proposed second term interim limit of 0.5 mg/L, so the City will need to improve and maintain effluent phosphorus levels at their current levels or slightly lower based on chemical optimization. Further reduction efforts would provide little to no benefit due to the low phosphorus contribution percentage from the WWTP.

Annual modeling will be needed to show the impacts of the measures. Utilizing STEPL and SnapPlus, the field specific data can be analyzed to show if it is near the estimated offset amount. It will be imperative for the first term especially, and all following terms, to collect extensive data to be able to accurately model the impacts of the management measures.

8. Measure Success

8.1. In-Stream Sampling

In-stream sampling has been previously conducted by the City to gather baseline data for the Fox River. Instream sampling will continue to be used as a way to measure success of the Adaptive Management Plan. An additional compliance sampling point will be implemented downstream of the WWTP outfall as well as the addition of instream sampling immediately upstream and downstream of BMPs to monitor the effectiveness of some management measures. A breakdown of the sampling techniques is as follows.

8.1.1. Monitoring Locations

In-river total phosphorus concentrations will be monitored at seven different locations in three different HUC – 12's within the Fox River Watershed:

Long Lake/Fox River, 071200060707

- Fox River at CTH W, SWIMS ID: 523092

White River, 071200060604

- White River at CTH JS, SWIMS ID: 653104
- Echo Lake at Wagner Park, SWIMS ID: 10052245
- White River at Milwaukee Ave, SWIMS ID: 10052247

Spring Brook/Fox River, 071200061002

- Fox River at Jefferson St, SWIMS ID: 10052246
- Fox River at railroad crossing 700' south of WWTP outfall (Comp. Point 601), SWIMS ID: 10054212
- Fox River at CTH JB, SWIMS ID: 523093

Stream flow data will be collected at select locations within river reaches that currently have operating USGS gaging stations. A map depicting the sampling locations and USGS gaging stations is shown on Exhibit 1. Consideration will be given to making flow measurement using handheld flow meters where flow information is desirable but the location lacks an established gaging station. Additional focused/targeted monitoring locations will be necessary to help determine the effectiveness of management activities, quantify interim water quality improvements, and improve the accuracy of watershed modeling. In addition, edge of field monitoring will be considered at select locations.

8.1.2. Monitoring Parameters and Monitoring Frequency

The primary focus of the water chemistry sampling will be to characterize total phosphorus concentrations at established locations as identified above, with weekly samples being collected at approximately fixed intervals during the growing season of May through October. Additional water chemistry sampling and analysis may be done at the discretion of the utility.

Additional sampling could occur during non-growing season months and/or during storm events to more fully characterize stream conditions and pollutant loads.

8.1.3. Quality Assurance Protocols

Water chemistry grab sample collection will be done by utility staff coordinated by the utility foreman. The Utility Laboratory will perform all of the water chemistry analysis. The said laboratory is a State Certified Laboratory and follows the quality assurance protocols under Wis. Admin Code NR149. Analytical protocols, limits of detection, and limits of quantitation for the water chemistry parameters will be documented and provided as part of annual reporting requirements. Table 10 below summarizes the sampling methodology.

Table 10 - Sampling Methodology

Sampling Methodology				
Who will collect samples?	**City of Burlington Wastewater Utility**			
Lab Information	Name:	Water Pollution Control Facility		
	Lab ID:	252002630		
	Address:	2100 South Pine Street Burlington, WI 53105		
Phosphorus Analysis	Methodology Used:	4500 PE STO Methods 19th Ed.		
	LOD:	0.02 mg/l		
	LOQ:	0.07 mg/l		
Other Lab Analysis for AM				
Pollutant 1 Name:	Methodology Used:		LOD	LOQ
Chloride*	4500 Chl. - B Std. Meth. 19th		N/A	N/A
Pollutant 2 Name:	Methodology Used:		LOD	LOQ
TSS*	2540-D Std. Meth. 19th		2.0 mg/l	2.0 mg/l
Pollutant 3 Name:	Methodology Used:		LOD	LOQ
Temp.	N/A Traceable Inst.		N/A	N/A

* Frequency of analysis varies based on river conditions, weather events, and ambient temperature.

9. Financial Security

Costs involved in the Adaptive Management Plan include implementation of BMPs, optimization of the WWTP to meet current limits, education and outreach, modeling and monitoring, and administration.

The WWTP is currently discharging phosphorus at 0.543 mg/L which is lower than the current 0.6 mg/L interim limit, but will need to improve to meet the proposed 0.50 mg/L limit. Optimization changes are needed or a change of chemical, but additional treatment may be needed to reach the final limit.

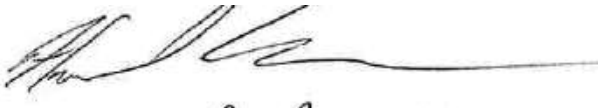
Throughout the life of the Adaptive Management Plan, education and outreach will continue to be important in order for the City to continue to have partners helping them reach their goals. It is also important that modeling and monitoring continues to ensure the goals are being met and success is shown. Table 11 summarizes the projected 15-year costs associated with each activity of the Adaptive Management Plan.

Table 11 - Project Cost Summary

Type of Activity/Practice	Components	Cost	Comments
Agricultural Management Measures	Sludge spreading improvements, nutrient management, grassed waterways, conservation tillage, cover crop, additional buffer, livestock management	$3,770,000	Assume Primary CSA BMPs are implemented for 15 years, Secondary CSA BMPs are implemented for 10 years, and ultimate CSA BMPs are implemented for 5 years.
Other Practices	MS4 Improvements	$480,000	Leaf collection improvements at $32,000/year.
Optimization of WWTP	Additional Chemical	$180,000	Assume additional chemical will be needed over the next 15-years to reduce phosphorus by an additional 0.05 mg/l.
Education and Outreach	Meetings with Farmer Leadership Group Consultant/Partner	$75,000	Meetings, materials, website postings
Modeling	Modeling costs	$150,000	Consultant @ $10,000 per year
Monitoring	Soil Testing, instream sampling	$100,000	Testing, sample collection, supplies (reagents, bottles), testing costs.
Administration	Plan oversight, meetings, DNR compliance	$225,000	Consultant at $5,000 per year, City staff at $10,000 per year.
	15-Year Total	**$4,980,000**	*based on 2020 estimate

Costs involved in the Adaptive Management Plan include implementation of BMPs, MS4 improvements, optimization of the WWTP to meet future limits, education and outreach, modeling and monitoring, and administration. The cost of the dam improvements is not included as this is not a direct management measure of the Plan. If the Fox River were to reach compliance, the costs to implement this Plan would level off as the City would simply maintain the Management Measures implemented to that point and would no longer need to seek out or implement further measures.

The City of Burlington understands and recognizes that the AM plan will last fifteen years or more and is committed to the support of the plan. The estimated $4,980,000 cost over the next fifteen years is only half the cost to construct improvements at the WWTP and therefore, makes the Plan a justifiable alternative.

Name: 

Title: Director of Public Works

Date: 4/8/2026

10. Implementation

Implementation of the Adaptive Management Plan will be immediately following approval of the Plan by the WDNR. The City will continue targeting the Primary CSAs listed in Table 8 and Secondary CSAs. These CSAs are most likely to provide the highest level of phosphorus reduction while still being relatively cost-effective.

Many of the CSAs will require agricultural contracts in order to implement the management measures identified above. Development and negotiation of these contracts may take some time as this process is new to the City. The City will rely on support from the local county land conservation departments as well as partners identified earlier in this report. Since it is unknown how long it will take to negotiate contracts or how successful the City will be with negotiations, it is critical that the City continue working at establishing these relationships.

Table 9 above identifies targeted reductions for each permit term. The minimum reduction required for the second permit term is quite high, so the City will need to continue an aggressive implementation of the Plan. The Plan will be evaluated regularly and water quality monitoring will be conducted determine the overall effectiveness of the Plan. The water quality milestone of 0.10 mg/L total phosphorus in the Fox River is anticipated to take less than 10 years.

The City will also rely on the county land conservation departments to conduct annual compliance checks with partners in the agricultural community to ensure that the management measures that have been put in place continue to be maintained and effective in pollutant loading to the receiving water.

A detailed implementation schedule with project milestones is shown in Table 12 below:

Table 12 - Project Milestones

	Incremental Pounds per Year Reduction, Year End							
Management Measures	**2021 (Actual)**	**2023 (Actual)**	**2025 (Actual)**	**2027 (Goal)**	**2029 (Goal)**	**2031 (Goal)**	**2033 (Goal)**	**2035 (Goal)**
WWTP Effluent to 0.40 mg/L	(620)	550	245	255	0	0	0	0
Improved leaf collection	550	908	780	220	0	0	0	0
Agricultural BMPs	248	265	304	2,800	2,800	3,185	3,570	3,570
Other (Dam Upgrade)	0	0	0	100	0	0	0	0
Totals	178	1,723	1,329	3,375	2,800	3,185	3,570	3,570

11. References

Agricultural and Biological Engineering, Purdue University, 2017. L-THIA for the Great Lakes Watershed Management System. Land Cover data downloaded from http://lthia.agriculture.purdue.edu/

Baxter & Woodman, Inc., City of Burlington, Wisconsin Operational Evaluation for Phosphorus and Study of Feasible Alternatives, May 2018.

Baxter & Woodman, Inc., City of Burlington, Wisconsin Preliminary Compliance Alternatives, December 2018.

Baxter & Woodman, Inc., City of Burlington, Wisconsin Adaptive Management Plan, Revised March 2020.

Baxter & Woodman, Inc., City of Burlington, Wisconsin Annual Adaptive Management Reports #1-#5 and Final Adaptive Management Report for the 1st Permit Term, Prepared annually 2021-2026.

Multi-Resolution Land Characteristics (MRLC) Consortium. Land Cover data downloaded from mrlc.gov.

Natural Resources Conservation Service, United States Department of Agriculture, 2019. Soils data downloaded from https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Racine County GIS, 2019. Parcel and GIS data downloaded from http://arcgis.racinecounty.com/MapBook/

Ruekert & Mielke, Inc., Oconomowoc Watershed Protection Program, December 2015.

Walworth County GIS, 2019. Parcel and GIS data downloaded from https://gisinfo.co.walworth.wi.us/oneview/

Winrock International, Pay-For-Performance Conservation: A How-To Guide.

Wisconsin Department of Natural Resources, Adaptive Management Technical Handbook, A Guidance Document for Stakeholder, 01/07/2013.

Wisconsin Department of Natural Resources, PRESTO-Lite Watershed Delineation Report, Watershed Name: Spring Brook-Fox River, Downloaded 01/18/2019.

Wisconsin Department of Natural Resources, 2019. Surface water data downloaded from http://dnrmaps.wisconsin.gov/imf/imf.jsp?site=SurfaceWaterViewer.

APPENDICES

APPENDIX A

ADAPTIVE MANAGEMENT REQUEST FORM

BAXTER & WOODMAN Consulting Engineers

State of Wisconsin
Department of Natural Resources
Bureau of Watershed Management
PO Box 7921, Madison WI 53707-7921
dnr.wi.gov

Watershed Adaptive Management Request

Form 3200-139 (R 01/12)

Notice: Pursuant to s. NR 217.18, Wis. Adm. Code, this form must be completed and submitted to the Department at the time of the reissuance of an existing WPDES (Wisconsin pollutant discharge elimination system) permit to request adaptive management for phosphorus water quality based effluent limits (WQBEL).Failure to provide all requested information may result in denial of your request. Personal information collected will be used for administrative purposes and may be provided to requestors to the extent required by Wisconsin Open Records law [ss. 19.31-19.39, Wis. Stats.].

Type of Request:

- (●) **This is the formal adaptive management request as required in s. NR 217.18(2)**
- ( ) **This is a preliminary adaptive management request** (to be submitted as part of facility planning.)

Facility and Permit Information

Facility Name			WPDES Permit No.	
Burlington Water Pollution Control			WI- 0 | 0 | 2 | 2 | 9 | 2 | 6	
Facility Address	**City**		**State**	**ZIP Code**
2100 S. Pine Street	Burlington		WI	53105
Receiving Water				
Fox River				

Owner Contact Information

Last Name	First	MI	Phone No. (incl. area code)
Harjes	Glenn		(262) 539-3646
Street Address			**FAX Number**
2100 S. Pine Street			

City	State	ZIP Code	E-mail address
Burlington	WI	53105	gharjes@burlington-wi.gov

Facility Information

Required for AM Request	Wis. Administrative code Reference	Conclusion	Evidence/Source of Information (attach as needed)
1. NPS contribute at least 50% of total P contribution	s. NR 217.18(2)(b)	(●) NPS contributes at least 50% ( ) NPS DOES **NOT** contribute at least 50%	PRESTO Report
2. WQBEL Requires Filtration	s. NR 217.18(2)(c)	(●) Filtration required ( ) Filtration **NOT** required	See AM Plan
3. AM Plan	s. NR 217.18(2)(d)	(●) Plan is Included - Page 3 ( ) Plan is NOT Included *For a preliminary adaptive management request, AM plan not required*	See AM Plan

Facility Operation and Performance

1. **Current P removal capability** – If the facility is currently required by a WPDES permit to monitor effluent phosphorus (P) provide a summary of the influent and effluent annual average P concentrations for each of the past three (3) years. If permit required P data is not available, the applicant should provide any other P data that may be applicable and available. If no data is available, the Department may estimate the P effluent concentration by based on data from other similar facilities

See Annual Adaptive Management Reports previously submitted.

2022 - Average Influent = 3.80 mg/L Average Effluent = 0.595 mg/L
2023 - Average Influent = 3.46 mg/L Average Effluent = 0.469 mg/L
2024 - Average Influent = 3.08 mg/L Average Effluent = 0.457 mg/L

2. **Facility Operation** - Provide a summary description of overall facility operation. If not a continuously discharging facility, describe storage procedures and the time periods when effluent discharge occurs

The City of Burlington Water Pollution Control Facility treats wastewater using preliminary screening and grit removal, followed by primary clarification. It next flows through biofilters and is clarified before it enters activated sludge aeration, then final clarification. UV Disinfection is applied prior to discharge to the river. Ferric chloride is added for phosphorus removal.

3. **Previous Studies** - Reference or attach any facility planning or evaluation study that evaluated facility performance capabilities Note - Only include studies that are recent, within 5 years, or otherwise applicable for the evaluation of the existing facility and current conditions).

Adaptive Management Plan Report - Revised March 2020
2020 Annual Adaptive Management Plan Progress Report - Dated January 11, 2021
Annual Adaptive Management Report #2 - Dated January 26, 2022
Annual Adaptive Management Report #3 - Dated January 20, 2023
Annual Adaptive Management Report #4 - Dated January 29, 2024
Final Adaptive Management Report for the 1st Permit Term - Dated January 26, 2025

Adaptive Management Plan (s. NR 217.18(d))9.25

This section should summarize the Adaptive Management Plan for internal and external review. A complete Adaptive Management Plan should be attached. Note: If this is a preliminary adaptive management request, this section is not required.

Watershed	Percent Contribution of Applicant Discharge
Upper Fox River Watershed	3.4%

Action Area (include map)
HUC 071200061002, 071200060604, 071200060503, 071200060707

Watershed Characteristics and Timeline Justification
See AM Plan

Key Proposed Actions
See AM Plan - Explore chemical treatment options for improved phosphorus removal; continue urban reduction efforts; continue outreach and funding program with local farmers for improve BMPs.

Key Goals and Measures for Determining Effectiveness
See AM Plan - Reduction of in-stream phosphorus concentrations and continue collecting in-stream phosphorus data to determine effectiveness.

Partner(s)
Local farmers - See Final Adaptive Management Report for the 1st Permit Term

Funding Sources
City of Burlington Wastewater Utility

Adaptive Management Request and Certification

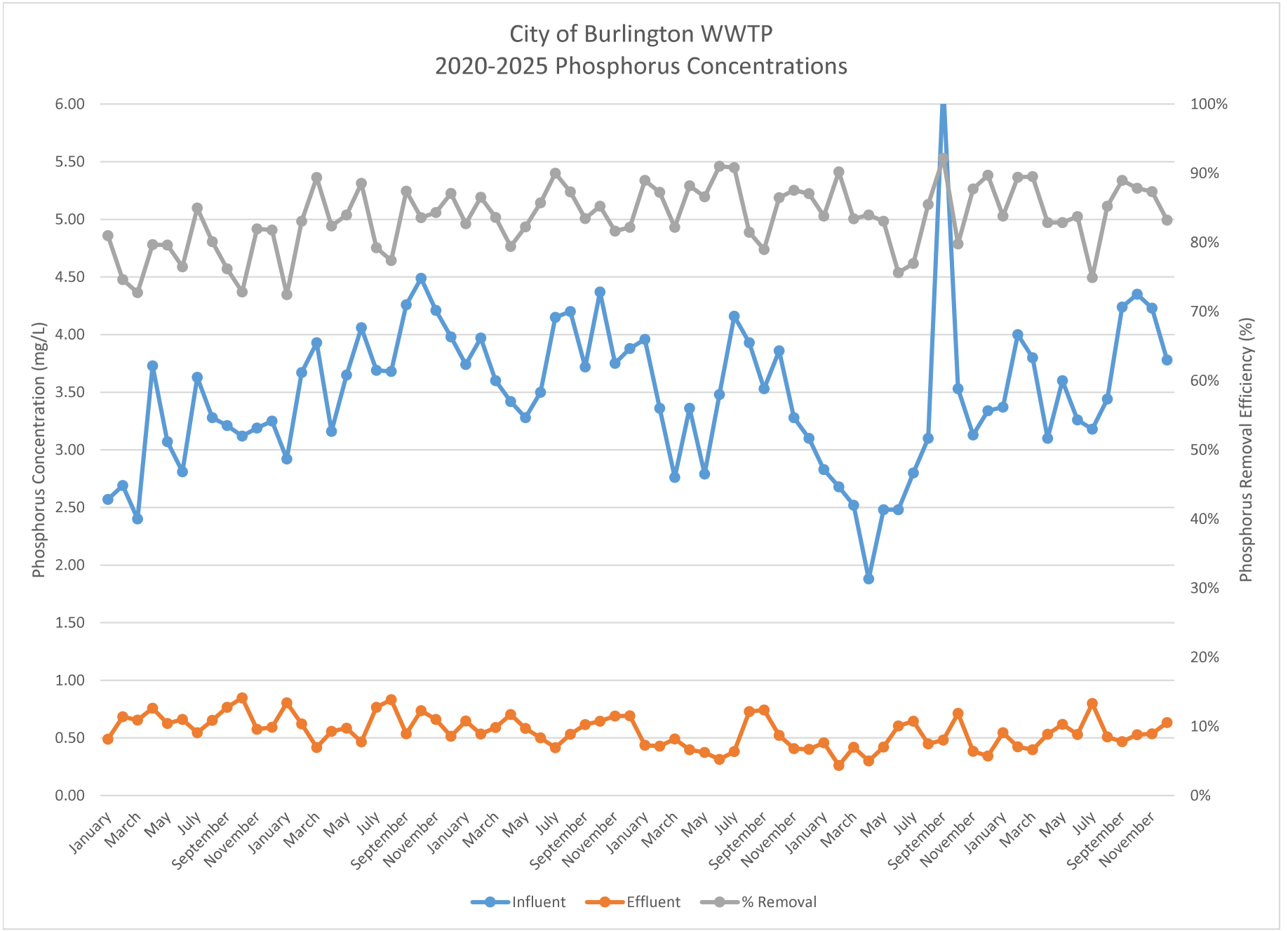
Based on the information provided, I am requesting the Watershed Adaptive Management option to achieve compliance with phosphorus water quality standards in accordance with s. NR 217.19, Wis. Adm. Code.
I certify that the information provided with this request is true, accurate and complete to the best of my knowledge.

Print or type name of person submitting request*	Title
Glenn Harjes	Utility Manager
Signature of Official	Date Signed
	03-07-2025

Influent Phosphorous Concentrations (mg/L)										
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	2.80	3.08	3.38	3.26	2.57	2.92	3.74	3.96	2.83	3.37
February	2.65	3.03	2.99	2.35	2.69	3.67	3.97	3.36	2.68	4.00
March	2.99	3.20	3.38	2.28	2.40	3.93	3.60	2.76	2.52	3.80
April	2.75	2.69	3.07	2.32	3.73	3.16	3.42	3.36	1.88	3.10
May	4.00	2.82	2.89	2.23	3.07	3.65	3.28	2.79	2.48	3.60
June	3.55	3.01	3.17	2.83	2.81	4.06	3.50	3.48	2.48	3.26
July	4.09	2.17	2.81	2.89	3.63	3.69	4.15	4.16	2.80	3.18
August	3.63	2.79	3.71	3.15	3.28	3.68	4.20	3.93	3.10	3.44
September	3.58	3.22	3.24	2.93	3.21	4.26	3.72	3.53	6.16	4.24
October	3.59	2.98	2.25	1.97	3.12	4.49	4.37	3.86	3.53	4.35
November	3.79	4.59	2.70	2.25	3.19	4.21	3.75	3.28	3.13	4.23
December	3.64	5.14	3.67	2.41	3.25	3.98	3.88	3.10	3.34	3.78
Annual Average	3.42	3.23	3.11	2.57	3.08	3.81	3.80	3.46	3.08	3.70

Effluent Phosphorous Concentrations (mg/L)										
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	0.618	0.683	0.533	0.361	0.489	0.805	0.647	0.436	0.458	0.545
February	0.558	0.401	0.677	0.313	0.683	0.621	0.534	0.428	0.262	0.423
March	0.711	0.378	0.563	0.228	0.654	0.417	0.590	0.492	0.418	0.398
April	0.653	0.487	0.520	0.304	0.758	0.557	0.704	0.397	0.301	0.531
May	0.556	0.651	0.484	0.509	0.626	0.585	0.582	0.374	0.420	0.617
June	0.720	0.540	0.368	0.655	0.661	0.465	0.500	0.313	0.604	0.530
July	0.812	0.364	0.323	0.741	0.545	0.766	0.415	0.381	0.645	0.798
August	0.618	0.432	0.436	0.685	0.652	0.832	0.532	0.728	0.449	0.508
September	0.665	0.292	0.414	0.576	0.765	0.536	0.616	0.742	0.481	0.468
October	0.658	0.337	0.542	0.841	0.847	0.737	0.645	0.522	0.714	0.529
November	0.600	0.463	0.424	0.699	0.575	0.660	0.689	0.408	0.384	0.535
December	0.578	0.360	0.494	0.675	0.592	0.514	0.691	0.401	0.343	0.634
Annual Average	0.646	0.449	0.482	0.549	0.654	0.625	0.595	0.469	0.457	0.543

Phosphorous Removal Efficiency (%)										
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	78%	78%	84%	89%	81%	72%	83%	89%	84%	84%
February	79%	87%	77%	87%	75%	83%	87%	87%	90%	89%
March	76%	88%	83%	90%	73%	89%	84%	82%	83%	90%
April	76%	82%	83%	87%	80%	82%	79%	88%	84%	83%
May	86%	77%	83%	77%	80%	84%	82%	87%	83%	83%
June	80%	82%	88%	77%	76%	89%	86%	91%	76%	84%
July	80%	83%	89%	74%	85%	79%	90%	91%	77%	75%
August	83%	85%	88%	78%	80%	77%	87%	81%	86%	85%
September	81%	91%	87%	80%	76%	87%	83%	79%	92%	89%
October	82%	89%	76%	57%	73%	84%	85%	86%	80%	88%
November	84%	90%	84%	69%	82%	84%	82%	88%	88%	87%
December	84%	93%	87%	72%	82%	87%	82%	87%	90%	83%
Annual Average	81%	85%	84%	78%	78%	83%	84%	86%	84%	85%

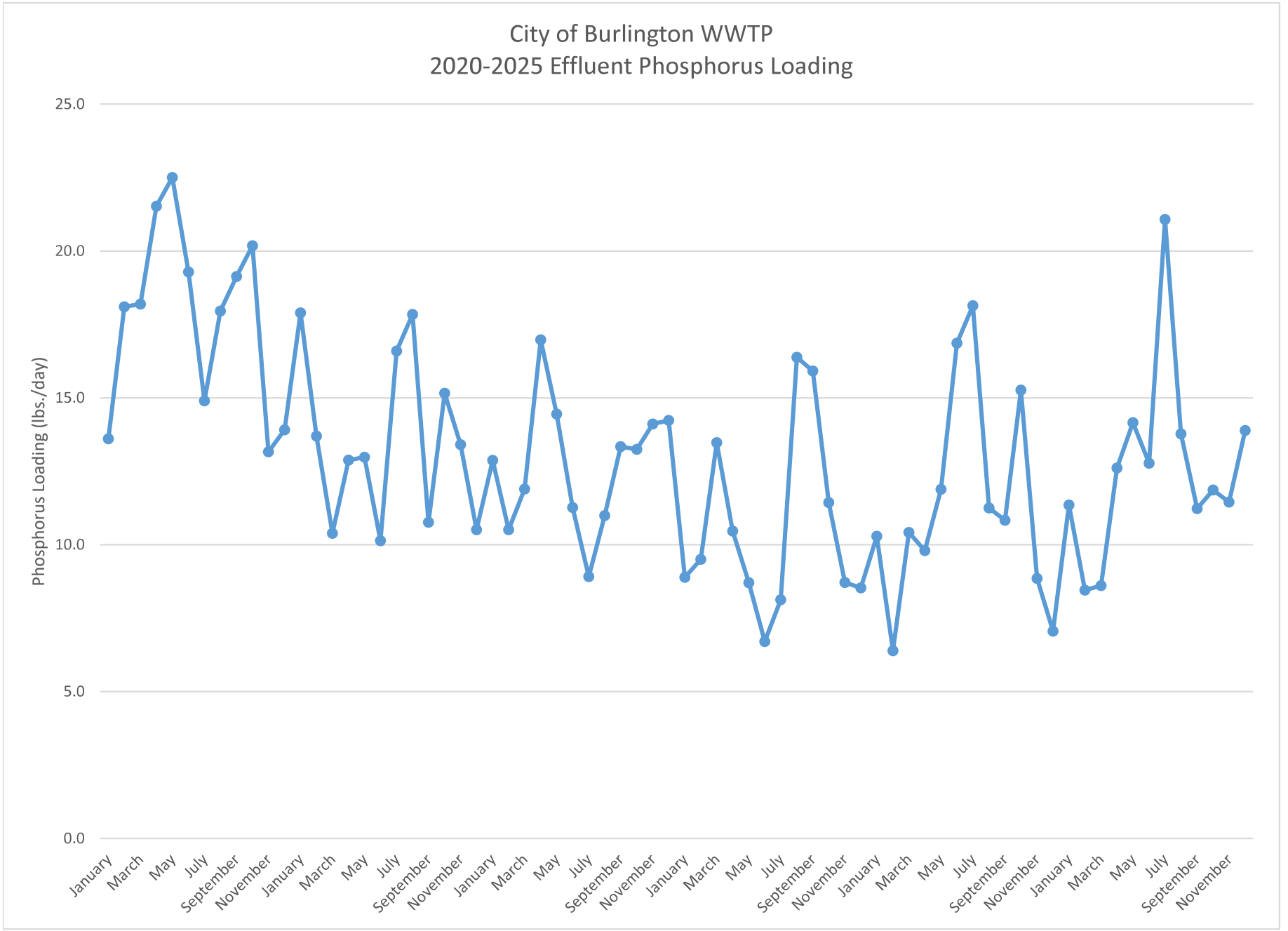

City of Burlington WWTP
2020-2025 Phosphorus Concentrations
Phosphorus Concentration (mg/L)
Phosphorus Removal Efficiency (%)
6.00
5.50
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
January
March
May
July
September
November
Influent
Effluent
% Removal

Influent Flow (mgd)										
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	2.909	2.659	2.696	2.969	3.270	2.647	2.352	2.385	2.621	2.393
February	2.809	2.631	3.070	3.405	3.130	2.646	2.328	2.592	2.858	2.307
March	2.933	2.780	2.835	3.811	3.298	2.962	2.394	3.218	2.928	2.495
April	3.188	3.380	2.805	3.370	3.371	2.755	2.861	3.111	3.841	2.751
May	2.878	3.429	3.346	4.270	4.279	2.648	2.969	2.750	3.351	2.605
June	2.703	3.056	3.281	4.140	3.471	2.595	2.688	2.508	3.293	2.714
July	2.517	5.582	3.064	3.519	3.248	2.558	2.532	2.478	3.271	2.958
August	2.464	3.607	2.739	3.050	3.236	2.519	2.418	2.617	2.895	3.032
September	2.420	2.993	3.011	3.591	2.936	2.334	2.532	2.485	2.589	2.643
October	2.377	2.913	3.776	4.407	2.791	2.382	2.397	2.536	2.445	2.467
November	2.501	2.814	3.056	3.694	2.679	2.368	2.386	2.477	2.623	2.343
December	2.470	2.648	3.037	3.313	2.766	2.386	2.410	2.462	2.405	2.404
Annual Average	2.681	3.208	3.060	3.628	3.206	2.567	2.522	2.635	2.927	2.593

Effluent Flow (mgd)										
	2016	2017	2018	2019	2020	2021	2021	2023	2024	2025
January	2.969	2.708	2.740	2.971	3.336	2.665	2.385	2.444	2.693	2.497
February	2.863	2.678	3.098	3.402	3.178	2.645	2.359	2.661	2.922	2.397
March	2.983	2.813	2.857	3.811	3.335	2.987	2.417	3.284	2.988	2.593
April	3.238	3.408	2.819	3.401	3.405	2.772	2.892	3.160	3.903	2.847
May	2.916	3.458	3.352	4.309	4.310	2.660	2.976	2.792	3.393	2.751
June	2.739	3.095	3.315	4.171	3.499	2.614	2.702	2.568	3.348	2.889
July	2.561	5.543	3.085	3.544	3.278	2.598	2.574	2.556	3.372	3.166
August	2.521	3.682	2.802	3.134	3.302	2.571	2.477	2.698	3.005	3.251
September	2.492	3.070	3.064	3.683	2.999	2.407	2.596	2.572	2.700	2.877
October	2.451	3.001	3.807	4.477	2.857	2.466	2.463	2.626	2.563	2.688
November	2.557	2.904	3.086	3.766	2.744	2.436	2.456	2.560	2.764	2.566
December	2.516	2.724	3.056	3.382	2.818	2.452	2.469	2.551	2.465	2.627
Annual Average	2.734	3.257	3.090	3.671	3.255	2.606	2.564	2.706	3.010	2.762

Influent Phosphorus Loadings (lbs./day)										
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	67.9	68.3	76.0	80.7	70.1	64.5	73.4	78.8	61.9	67.3
February	62.1	66.5	76.6	66.7	70.2	81.0	77.1	72.6	63.9	77.0
March	73.1	74.2	79.9	72.5	66.0	97.1	71.9	74.1	61.5	79.1
April	73.1	75.8	71.8	65.2	104.9	72.6	81.6	87.2	60.2	71.1
May	96.0	80.6	80.6	79.4	109.6	80.6	81.2	64.0	69.3	78.2
June	80.0	76.7	86.7	97.7	81.3	87.9	78.5	72.8	68.1	73.8
July	85.9	101.0	71.8	84.8	98.3	78.7	87.6	86.0	76.4	78.4
August	74.6	83.9	84.7	80.1	88.5	77.3	84.7	85.8	74.8	87.0
September	72.3	80.4	81.4	87.8	78.6	82.9	78.6	73.2	133.0	93.5
October	71.2	72.4	70.9	72.4	72.6	89.2	87.4	81.6	72.0	89.5
November	79.1	107.7	68.8	69.3	71.3	83.1	74.6	67.8	68.5	82.7
December	75.0	113.5	93.0	66.6	75.0	79.2	78.0	63.7	67.0	75.8
Annual Average	75.9	83.4	78.5	76.9	82.2	81.2	79.5	75.6	73.1	79.4

Effluent Phosphorus Loadings (lbs./day)										
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	15.3	15.4	12.2	8.9	13.6	17.9	12.9	8.9	10.3	11.3
February	13.3	9.0	17.5	8.9	18.1	13.7	10.5	9.5	6.4	8.5
March	17.7	8.9	13.4	7.2	18.2	10.4	11.9	13.5	10.4	8.6
April	17.6	13.8	12.2	8.6	21.5	12.9	17.0	10.5	9.8	12.6
May	13.5	18.8	13.5	18.3	22.5	13.0	14.4	8.7	11.9	14.2
June	16.4	13.9	10.2	22.8	19.3	10.1	11.3	6.7	16.9	12.8
July	17.3	16.8	8.3	21.9	14.9	16.6	8.9	8.1	18.1	21.1
August	13.0	13.3	10.2	17.9	18.0	17.8	11.0	16.4	11.3	13.8
September	13.8	7.5	10.6	17.7	19.1	10.8	13.3	15.9	10.8	11.2
October	13.5	8.4	17.2	31.4	20.2	15.2	13.2	11.4	15.3	11.9
November	12.8	11.2	10.9	22.0	13.2	13.4	14.1	8.7	8.9	11.4
December	12.1	8.2	12.6	19.0	13.9	10.5	14.2	8.5	7.1	13.9
Annual Average	14.7	12.1	12.4	17.1	17.7	13.5	12.7	10.6	11.4	12.6


City of Burlington WWTP
2020-2025 Effluent Phosphorus Loading
Phosphorus Loading (lbs./day)
25.0
20.0
15.0
10.0
5.0
0.0
January
March
May
July
September
November

APPENDIX B

PHOSPHORUS MONITORING RESULTS

BAXTER & WOODMAN Consulting Engineers

River Phosphorus Data (mg/L)

	City of Burlington												
	White River @ Hwy JS		White River @ Wagner Park		Fox River @ Veteran's Terrace		Fox River @ Jefferson Street		Fox River @ Hwy JB		Fox River @ Hwy W		Fox River @ Compliance Point 601
	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total
2016													
	03/01/16 - 01/31/17 LOD = **.029** LOQ = **.0967**												
6/7/2016	0.111	0.077	0.116	0.077	0.134	0.086	0.111	0.053	0.107	0.050	0.084	0.021	-
6/14/2016	0.102	0.067	0.091	0.047	0.089	0.043	0.074	0.035	0.092	0.060	0.072	0.035	-
6/21/2016	0.121	0.092	0.094	0.060	0.106	0.060	0.104	0.048	0.109	0.059	0.082	0.033	-
6/28/2016	0.104	0.065	0.096	0.052	0.101	0.042	0.096	0.036	0.111	0.048	0.069	0.013	-
7/5/2016	-	-	-	-	-	-	-	-	-	-	-	-	-
7/12/2016	0.080	0.047	0.119	0.059	0.097	0.042	0.099	0.025	0.092	0.018	0.104	0.015	-
7/19/2016	0.096	0.057	0.119	0.052	0.113	0.053	0.106	0.030	0.094	0.016	0.113	0.018	-
7/26/2016	0.118	0.091	0.131	0.067	0.153	0.086	0.129	0.015	0.118	0.018	0.138	0.016	-
8/2/2016	0.104	0.052	0.133	0.072	0.136	0.077	0.124	0.080	0.109	0.027	0.126	0.018	-
8/9/2016	0.074	0.052	0.084	0.040	0.097	0.055	0.092	0.027	0.094	0.033	0.102	0.015	-
8/16/2016	0.097	0.082	0.123	0.053	0.129	0.072	0.102	0.020	0.096	0.037	0.084	0.011	-
8/23/2016	0.112	0.087	0.112	0.089	0.112	0.087	0.094	0.053	0.080	0.045	0.104	0.023	-
8/30/2016	0.165	0.106	0.099	0.043	0.102	0.048	0.089	0.011	0.072	0.010	0.072	0.006	-
9/6/2016	0.084	0.052	0.069	0.037	0.087	0.032	0.079	0.006	0.062	0.015	0.121	0.015	-
9/13/2016	0.087	0.067	0.080	0.035	0.099	0.053	0.048	0.003	0.059	0.021	0.042	0.015	-
9/20/2016	0.075	0.052	0.074	0.045	0.087	0.042	0.047	0.001	0.050	0.011	0.035	0.007	-
9/27/2016	0.118	0.095	0.102	0.051	0.124	0.061	0.088	0.033	0.087	0.039	0.058	0.028	-
10/4/2016	0.108	0.095	0.087	0.071	0.113	0.066	0.071	0.050	0.097	0.063	0.068	0.046	-
10/11/2016	0.085	0.066	0.071	0.034	0.090	0.050	0.060	0.026	0.071	0.038	0.048	0.021	-
10/18/2016	0.149	0.107	0.132	0.097	0.118	0.083	0.065	0.053	0.098	0.085	0.060	0.051	-
10/25/2016	-	-	-	-	-	-	-	-	-	-	-	-	-
11/1/2016	0.092	-	0.073	-	0.087	-	0.070	-	0.078	-	0.073	-	-
11/15/2016	0.056	-	0.056	-	0.058	-	0.039	-	0.048	-	0.038	-	-
12/6/2016	0.111	-	0.126	-	0.111	-	0.143	-	0.121	-	0.101	-	-
AVG.	0.102	0.074	0.099	0.057	0.107	0.060	0.088	0.032	0.088	0.036	0.082	0.021	-

River Phosphorus Data (mg/L)

	City of Burlington												
	White River @ Hwy JS		White River @ Wagner Park		Fox River @ Veteran's Terrace		Fox River @ Jefferson Street		Fox River @ Hwy JB		Fox River @ Hwy W		Fox River @ Compliance Point 601
	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total
2017													
1/3/2017	0.039	-	-	-	0.036	-	0.028	-	0.033	-	0.048	-	-
	02/01/17 - 11/30/17 LOD = **.034** LOQ = **.1133**												
2/7/2017	0.081	-	-	-	0.080	-	0.075	-	0.081	-	0.071	-	-
2/21/2017	0.053	-	0.058	-	0.050	-	0.056	-	0.053	-	0.051	-	-
3/7/2017	0.093	-	0.076	-	0.083	-	0.066	-	0.070	-	0.063	-	-
3/21/2017	0.071	-	0.061	-	0.078	-	0.085	-	0.078	-	0.080	-	-
4/4/2017	0.078	-	0.073	-	0.083	-	0.124	-	0.103	-	0.130	-	-
4/11/2017	0.120	-	0.100	-	0.124	-	0.118	-	0.135	-	0.139	-	-
4/18/2017	0.132	-	0.117	-	0.122	-	0.145	-	0.140	-	0.137	-	-
4/25/2017	0.088	-	0.081	-	0.108	-	0.110	-	0.120	-	0.097	-	-
5/2/2017	0.162	0.103	0.172	0.115	0.184	0.122	0.157	0.100	0.176	0.113	0.145	0.093	-
5/9/2017	0.108	0.048	0.100	0.050	0.115	0.053	0.112	0.048	0.122	0.050	0.095	0.043	-
5/16/2017	0.092	0.048	0.081	0.048	0.080	0.044	0.080	0.034	0.088	0.044	0.070	0.024	-
5/23/2017	0.100	0.050	0.075	0.053	0.076	0.034	0.075	0.034	0.076	0.046	0.066	0.031	-
6/6/2017	0.108	0.070	0.090	0.058	0.085	0.038	0.108	0.056	0.102	0.053	0.095	0.055	-
6/13/2017	0.120	0.066	0.097	0.060	0.080	0.031	0.100	0.050	0.108	0.053	0.108	0.046	-
6/20/2017	0.152	0.103	0.127	0.092	0.097	0.056	0.098	0.060	0.135	0.087	0.150	0.098	-
6/27/2017	0.094	0.086	0.118	0.092	0.131	0.080	0.120	0.078	0.135	0.088	0.110	0.075	-
7/11/2017	0.199	0.174	0.198	0.169	0.213	0.135	0.187	0.176	0.177	0.169	0.196	0.186	-
	07/11 ---> 07/12 SEVERE FLOODING EVENT, FOX RIVER CRESTED AT 16.15'												
7/25/2017	0.196	0.132	0.159	0.130	0.176	0.145	0.196	0.162	0.267	0.213	0.305	0.255	-
8/1/2017	0.161	0.108	0.140	0.092	0.167	0.095	0.214	0.159	0.213	0.147	0.214	0.152	-
8/14/2017	0.100	0.075	0.125	0.076	0.125	0.081	0.117	0.075	0.117	0.070	0.117	0.073	-
8/22/2017	0.137	0.092	*0.374	0.164	0.140	0.088	0.149	0.092	0.228	0.081	0.253	0.093	-
8/29/2017	0.092	0.076	*0.421	0.349	0.088	0.066	0.105	0.076	0.103	0.078	0.102	0.080	-
9/5/2017	0.090	0.051	*0.454	0.235	0.110	0.063	0.118	0.053	0.088	0.050	0.098	0.066	-
9/12/2017	-	-	-	-	-	-	-	-	-	-	-	-	-
9/19/2017	0.110	0.064	0.170	0.084	0.190	0.124	0.139	0.067	0.119	0.050	0.095	0.025	-
9/26/2017	0.092	0.074	0.130	0.095	0.095	0.074	0.207	0.054	0.160	0.064	0.169	0.060	-
10/3/2017	0.112	0.070	0.114	0.077	0.129	0.067	0.110	0.069	0.114	0.060	0.080	0.045	-
AVG.	0.110	0.083	0.112	0.113	0.113	0.078	0.118	0.080	0.124	0.084	0.122	0.083	-

*Drawdown of echo lake caused extremely low White River levels, high solids at this sampling location

2019													
	05/14/19 - 09/30/19 LOD = **.041** LOQ = **.1367**												
5/14/2019	0.055	-	0.039	-	0.051	-	0.061	-	0.055	-	0.063	-	-
6/11/2019	0.118	-	0.086	-	0.102	-	0.099	-	0.110	-	0.094	-	-
7/9/2019	0.120	-	0.122	-	0.142	-	0.133	-	0.142	-	0.126	-	-
8/13/2019	0.078	-	0.056	-	0.080	-	0.082	-	0.086	-	0.088	-	-
9/10/2019	0.337	-	0.048	-	0.082	-	0.080	-	0.083	-	0.058	-	-
AVG.	0.142	-	0.070	-	0.091	-	0.091	-	0.095	-	0.086	-	-

River Phosphorus Data (mg/L)

	City of Burlington												
	White River @ Hwy JS		White River @ Wagner Park		Fox River @ Veteran's Terrace		Fox River @ Jefferson Street		Fox River @ Hwy JB		Fox River @ Hwy W		Fox River @ Compliance Point 601
	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total
2020													
	05/12/20 - 09/30/20 LOD = **.041** LOQ = **.1367**												
5/12/2020	0.035	-	0.028	-	0.045	-	0.056	-	0.060	-	0.053	-	-
5/19/2020	0.115	-	0.126	-	0.125	-	0.143	-	0.200	-	0.217	-	-
5/26/2020	0.091	-	0.056	-	0.073	-	0.088	-	0.091	-	0.085	-	-
6/2/2020	0.095	-	0.055	-	0.078	-	0.086	-	0.098	-	0.073	-	-
6/9/2020	0.116	-	0.095	-	0.093	-	0.110	-	0.106	-	0.106	-	-
6/16/2020	0.101	-	0.083	-	0.088	-	0.083	-	0.100	-	0.080	-	-
6/22/2020	0.093	-	0.086	-	0.100	-	0.093	-	0.078	-	0.100	-	-
6/29/2020	0.110	-	0.088	-	0.100	-	0.096	-	0.098	-	0.095	-	-
7/7/2020	0.105	-	0.096	-	0.120	-	0.133	-	0.125	-	0.130	-	-
7/14/2020	0.106	-	0.091	-	0.116	-	0.110	-	0.125	-	0.113	-	-
7/20/2020	0.095	-	0.091	-	0.123	-	0.126	-	0.135	-	0.121	-	-
7/27/2020	0.192	-	0.095	-	0.105	-	0.125	-	0.121	-	0.113	-	-
8/5/2020	0.103	-	0.103	-	0.106	-	0.115	-	0.121	-	0.115	-	-
8/10/2020	0.090	-	0.103	-	0.093	-	0.078	-	0.078	-	0.088	-	-
8/17/2020	0.123	-	0.081	-	0.096	-	0.105	-	0.140	-	0.128	-	-
8/24/2020	0.080	-	0.099	-	0.099	-	0.118	-	0.114	-	0.104	-	-
8/31/2020	0.077	-	0.097	-	0.099	-	0.096	-	0.103	-	0.099	-	-
9/8/2020	0.092	-	0.114	-	0.099	-	0.097	-	0.106	-	0.089	-	-
9/14/2020	0.097	-	0.109	-	0.106	-	0.087	-	0.099	-	0.089	-	-
9/21/2020	0.075	-	0.082	-	0.091	-	0.080	-	0.084	-	0.067	-	-
9/28/2020	0.075	-	0.096	-	0.082	-	0.065	-	0.077	-	0.051	-	-
	10/5/20- LOD = **0.045** LOQ = **0.151**												
10/5/2020	0.062	-	0.063	-	0.063	-	0.053	-	0.055	-	0.038	-	0.242
10/12/2020	0.053	-	0.074	-	0.068	-	0.063	-	0.062	-	0.050	-	0.160
10/19/2020	0.051	-	0.051	-	0.050	-	0.040	-	0.046	-	0.034	-	0.041
10/26/2020	0.079	-	0.063	-	0.096	-	0.070	-	0.082	-	0.068	-	0.116
11/2/2020	0.046	-	0.046	-	0.050	-	0.043	-	0.045	-	0.043	-	0.041
11/9/2020	0.051	-	0.048	-	0.048	-	0.051	-	0.058	-	0.041	-	0.048
11/16/2020	0.067	-	0.063	-	0.055	-	0.045	-	0.055	-	0.048	-	0.051
11/23/2020	0.055	-	0.046	-	0.038	-	0.043	-	0.045	-	0.036	-	0.041
11/30/2020	0.053	-	0.046	-	0.045	-	0.051	-	0.050	-	0.041	-	0.048
12/7/2020	0.046	-	0.043	-	0.034	-	0.036	-	0.038	-	0.036	-	0.038
12/14/2020	0.070	-	0.058	-	0.057	-	0.063	-	0.103	-	0.123	-	0.135
12/21/2020	0.045	-	0.043	-	0.036	-	0.040	-	0.043	-	0.038	-	0.038
AVG.	0.083	-	0.076	-	0.081	-	0.081	-	0.089	-	0.082	-	0.083

River Phosphorus Data (mg/L)

	City of Burlington												
	White River @ Hwy JS		White River @ Wagner Park		Fox River @ Veteran's Terrace		Fox River @ Jefferson Street		Fox River @ Hwy JB		Fox River @ Hwy W		Fox River @ Compliance Point 601
	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total
2021													
4/5/2021	0.075	-	0.060	-	0.068	-	0.094	-	0.089	-	0.086	-	0.084
4/19/2021	0.077	-	0.048	-	0.074	-	0.092	-	0.092	-	0.087	-	0.077
5/3/2021	0.087	-	0.118	-	0.082	-	0.092	-	0.097	-	0.082	-	0.086
5/10/2021	0.070	-	0.062	-	0.067	-	0.094	-	0.087	-	0.075	-	0.087
5/17/2021	0.077	-	0.087	-	0.068	-	0.077	-	0.084	-	0.070	-	0.075
5/24/2021	0.145	-	0.164	-	0.113	-	0.106	-	0.114	-	0.104	-	0.111
6/1/2021	0.103	-	0.092	-	0.106	-	0.092	-	0.103	-	0.092	-	0.096
6/7/2021	0.130	-	0.147	-	0.118	-	0.099	-	0.114	-	0.096	-	0.109
6/14/2021	0.126	-	0.179	-	0.125	-	0.135	-	0.145	-	0.131	-	0.131
6/21/2021	0.123	-	0.159	-	0.166	-	0.135	-	0.120	-	0.138	-	0.128
7/6/2021	0.101	-	0.123	-	0.167	-	0.143	-	0.152	-	0.133	-	0.137
7/19/2021	0.094	-	0.125	-	0.131	-	0.130	-	0.109	-	0.137	-	0.118
8/2/2021	0.063	-	0.118	-	0.130	-	0.128	-	0.118	-	0.128	-	0.116
8/16/2021	0.114	-	0.128	-	0.130	-	0.149	-	0.169	-	0.143	-	0.150
8/30/2021	0.120	-	0.140	-	0.131	-	0.092	-	0.106	-	0.079	-	0.111
9/13/2021	0.075	-	0.130	-	0.116	-	0.091	-	0.087	-	0.094	-	0.080
9/27/2021	0.070	-	0.097	-	0.086	-	0.092	-	0.075	-	0.068	-	0.063
10/11/2021	0.125	-	0.118	-	0.114	-	0.089	-	0.092	-	0.104	-	0.103
10/25/2021	0.120	-	0.086	-	0.077	-	0.089	-	0.176	-	0.062	-	0.086
11/15/2021	0.070	-	0.043	-	0.038	-	0.040	-	0.041	-	0.038		0.038
12/13/2021	0.082	-	0.087	-	0.068	-	0.063	-	0.051	-	0.053		0.055
AVG.	0.097	-	0.110	-	0.104	-	0.101	-	0.106	-	0.095	-	0.097
2022													
	03/14/22 LOD = **0.045** LOQ = **0.151**												
3/14/2022	0.041	-	0.038	-	0.050	-	0.045	-	0.046	-	0.048	-	0.045
4/11/2022	0.084	-	0.046	-	0.062	-	0.097	-	0.079	-	0.094	-	0.121
5/2/2022	0.137	-	0.094	-	0.099	-	0.128	-	0.116	-	0.113	-	0.220
5/18/2022	0.049	-	0.370	-	0.073	-	0.067	-	0.088	-	0.087	-	0.240
5/31/2022	0.078	-	0.071	-	0.056	-	0.057	-	0.069	-	0.063	-	0.110
6/13/2022	0.059	-	0.069	-	0.089	-	0.095	-	0.110	-	0.078	-	0.220
6/27/2022	0.070	-	0.094	-	0.085	-	0.160	-	0.130	-	0.170	-	0.220
7/11/2022	0.060	-	0.073	-	0.100	-	0.140	-	0.110	-	0.140	-	0.220
7/25/2022	0.085	-	0.096	-	0.110	-	0.120	-	0.130	-	0.099	-	0.220
8/8/2022	0.113	-	0.137	-	0.113	-	0.162	-	0.152	-	0.167	-	0.310
8/22/2022	0.079	-	0.135	-	0.114	-	0.116	-	0.116	-	0.128	-	0.121
9/6/2022	0.080	-	0.099	-	0.125	-	0.092	-	0.091	-	0.080	-	0.068
9/19/2022	0.142	-	0.133	-	0.133	-	0.157	-	0.145	-	0.166	-	0.174
10/3/2022	0.065	-	0.079	-	0.094	-	0.101	-	0.096	-	0.091	-	0.149
10/17/2022	0.043	-	0.275	-	0.079	-	0.050	-	0.050	-	0.046	-	0.048
10/31/2022	0.043	-	0.048	-	0.060	-	0.055	-	0.053	-	0.051	-	0.048
AVG.	0.077	-	0.116	-	0.090	-	0.103	-	0.099	-	0.101	-	0.158

River Phosphorus Data (mg/L)

	City of Burlington												
	White River @ Hwy JS		White River @ Wagner Park		Fox River @ Veteran's Terrace		Fox River @ Jefferson Street		Fox River @ Hwy JB		Fox River @ Hwy W		Fox River @ Compliance Point 601
	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total
2023													
5/1/2023	0.029	-	0.034	-	0.036	-	0.048	-	0.045	-	0.048	-	0.040
5/15/2023	0.057	-	0.050	-	0.062	-	0.068	-	0.068	-	0.070	-	0.065
5/30/2023	0.036	-	0.054	-	0.050	-	0.049	-	0.055	-	0.053	-	0.057
6/12/2023	0.045	-	0.051	-	0.053	-	0.070	-	0.077	-	0.051	-	0.056
6/26/2023	0.074	-	0.075	-	0.067	-	0.100	-	0.085	-	0.100	-	0.086
7/10/2023	0.092	-	0.100	-	0.099	-	0.120	-	0.100	-	0.140	-	0.100
7/24/2023	0.045	-	0.078	-	0.079	-	0.110	-	0.083	-	0.140	-	0.091
8/7/2023	0.070	-	0.082	-	0.087	-	0.095	-	0.120	-	0.089	-	0.084
8/21/2023	0.092	-	0.114	-	0.097	-	0.097	-	0.084	-	0.080	-	0.084
9/5/2023	0.047	-	0.100	-	0.084	-	0.060	-	0.070	-	0.047	-	1.250
9/18/2023	0.067	-	0.112	-	0.087	-	0.067	-	0.059	-	0.064	-	0.079
10/2/2023	0.077	-	0.095	-	0.087	-	0.082	-	0.069	-	0.080	-	0.089
10/16/2023	0.127	-	0.110	-	0.077	-	0.089	-	0.094	-	0.069	-	0.092
10/30/2023	0.060	-	0.055	-	0.045	-	0.040	-	0.043	-	0.038	-	0.042
AVG.	0.066	-	0.079	-	0.072	-	0.078	-	0.075	-	0.076	-	0.158

2024													
	05/06/24 LOD = 0.045 LOQ = 0.151												
5/6/2024	0.045	-	0.045	-	0.045	-	0.085	-	0.067	-	0.080	-	0.087
5/20/2024	0.059	-	0.079	-	0.050	-	0.060	-	0.048	-	0.065	-	0.114
6/3/2024	0.052	-	0.052	-	0.060	-	0.048	-	0.045	-	0.060	-	0.060
6/17/2024	0.049	-	0.061	-	0.048	-	0.082	-	0.079	-	0.074	-	0.097
7/1/2024	0.056	-	0.085	-	0.063	-	0.096	-	0.097	-	0.086	-	0.104
	07/15/24 LOD = 0.009 LOQ = 0.03												
7/15/2024	0.210	-	0.150	-	0.120	-	0.140	-	0.160	-	0.140	-	0.150
7/29/2024	0.100	-	0.099	-	0.096	-	0.120	-	0.110	-	0.120	-	0.120
	08/12/24 LOD = 0.045 LOQ = 0.151												
8/12/2024	0.052	-	0.055	-	0.060	-	0.074	-	0.064	-	0.074	-	0.067
8/26/2024	0.050	-	0.048	-	0.052	-	0.139	-	0.049	-	0.054	-	0.050
	09/09/24 LOD = 0.009 LOQ = 0.03												
9/9/2024	0.071	-	0.080	-	0.072	-	0.057	-	0.063	-	0.056	-	0.057
9/23/2024	0.160	-	0.280	-	0.100	-	0.120	-	0.110	-	0.110	-	0.220
10/7/2024	0.068	-	0.074	-	0.075	-	0.071	-	0.062	-	0.061	-	0.320
10/21/2024	0.044	-	0.042	-	0.043	-	0.047	-	0.042	-	0.038	-	0.027
AVG.	0.078	-	0.088	-	0.068	-	0.088	-	0.077	-	0.078	-	0.113

River Phosphorus Data (mg/L)

	City of Burlington												
	White River @ Hwy JS		White River @ Wagner Park		Fox River @ Veteran's Terrace		Fox River @ Jefferson Street		Fox River @ Hwy JB		Fox River @ Hwy W		Fox River @ Compliance Point 601
	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total	Ortho	Total
2025													
5/5/2025	0.096	-	0.076	-	0.064	-	0.102	-	0.089	-	0.101	-	0.079
5/19/2025	0.064	-	0.070	-	0.065	-	0.104	-	0.099	-	0.088	-	0.070
6/2/2025	0.076	-	0.078	-	0.080	-	0.099	-	0.109	-	0.101	-	0.161
6/16/2025	0.091	-	0.075	-	0.086	-	0.110	-	0.104	-	0.105	-	0.113
6/30/2025	0.147	-	0.153	-	0.131	-	0.142	-	0.138	-	0.144	-	0.138
7/14/2025	0.177	-	0.125	-	0.134	-	0.128	-	0.130	-	0.136	-	0.158
7/28/2025	0.094	-	0.083	-	0.089	-	0.121	-	0.121	-	0.125	-	0.090
8/11/2025	0.189	-	0.126	-	0.104	-	0.221	-	0.181	-	0.246	-	0.182
8/25/2025	0.094	-	0.094	-	0.117	-	0.272	-	0.270	-	0.264	-	0.249
9/8/2025	0.040	-	0.063	-	0.067	-	0.100	-	0.099	-	0.120	-	0.078
9/22/2025	0.110	-	0.270	-	0.150	-	0.130	-	0.120	-	0.120	-	0.160
10/6/2025	0.084	-	0.068	-	0.081	-	0.110	-	0.110	-	0.096	-	0.092
10/20/2025	0.090	-	0.073	-	0.075	-	0.084	-	0.093	-	0.083	-	0.073
AVG.	0.104	-	0.104	-	0.096	-	0.133	-	0.128	-	0.133	-	0.126

Outfall 601 Data

Sample Date	River Stage (ft.)	Adj. River Flow (CFS)	Total P (mg/L)	LBS./Day	LBS./Month
10/5/2020	6.57	353	0.242	459.65	
10/12/2020	6.44	302	0.16	259.99	
10/19/2020	6.56	349	0.041	76.99	
10/26/2020	7.95	965	0.116	602.31	10841.79
11/2/2020	7.05	537	0.041	118.47	
11/9/2020	6.65	382	0.048	98.66	
11/16/2020	6.89	470	0.051	128.97	
11/23/2020	6.59	362	0.041	79.86	
11/30/2020	7.48	726	0.048	187.50	3680.78
12/7/2020	6.91	478	0.038	97.73	
12/14/2020	7.89	931	0.135	676.27	
12/21/2020	6.98	507	0.038	103.66	9069.19
4/5/2021	6.77	424	0.084	191.64	
4/19/2021	6.88	466	0.077	193.07	5770.58
5/3/2021	6.38	281	0.086	130.03	
5/10/2021	7.01	520	0.087	243.42	
5/17/2021	6.54	341	0.075	137.61	
5/24/2021	6.52	333	0.111	198.88	5502.06
6/1/2021	6.35	271	0.096	139.98	
6/7/2021	6.09	196	0.109	114.95	
6/14/2021	5.98	170	0.131	119.83	
6/21/2021	6.33	264	0.128	181.82	4174.39
7/6/2021	6.35	271	0.137	199.77	
7/19/2021	6.04	184	0.118	116.82	4907.17
8/2/2021	5.91	155	0.116	96.74	
8/16/2021	6.81	439	0.15	354.32	
8/30/2021	6.14	209	0.111	124.83	5950.81
9/13/2021	5.83	92	0.08	39.60	
9/27/2021	5.72	41	0.063	13.90	802.50
10/11/2021	6.22	231	0.103	128.02	
10/25/2021	6.37	278	0.086	128.64	3978.26
11/15/2021	6.38	281	0.038	57.45	1723.64
12/13/2021	6.76	421	0.055	124.59	3862.254
3/14/2022	6.21	228	0.045	55.21	1711.368
4/11/2022	8.16	1090	0.121	709.65	21999.252
5/2/2022	8.58	1380	0.22	1633.56	
5/18/2022	6.84	450	0.24	581.11	
5/31/2022	7.06	542	0.11	320.79	26199.83
6/13/2022	6.45	306	0.22	362.23	
6/27/2022	6.11	201	0.22	237.93	9002.36
7/11/2022	6.05	186	0.22	220.176	
7/25/2022	6.15	211	0.22	249.77	7284.16
8/8/2022	6.11	201	0.31	335.268	
8/22/2022	5.91	155	0.121	100.91	6760.82

Sample Date	River Stage (ft.)	Adj. River Flow (CFS)	Total P (mg/L)	LBS./Day	LBS./Month
9/6/2022	5.86	115	0.068	42.08	
9/19/2022	8.47	1300	0.174	1217.10	18887.68
10/3/2022	6.36	274	0.149	219.67	
10/17/2022	6.48	317	0.048	81.87	
10/31/2022	6.41	292	0.048	75.42	3895.22
5/1/2023	7.09	641	0.04	137.96	
5/15/2023	6.58	505	0.065	176.62	
5/30/2023	5.53	235	0.057	72.07	3995.42
6/12/2023	5.46	204	0.056	61.47	
6/26/2023	5.49	210	0.086	97.17	2379.64
7/10/2023	5.35	173	0.1	93.09	
7/24/2023	5.32	148	0.091	72.47	2566.05
8/7/2023	5.55	210	0.084	94.91	
8/21/2023	6.18	338	0.084	152.77	3839.07
9/5/2023	5.57	141	1.25	948.34	
9/18/2023	6.15	327	0.079	139.00	16310.05
10/2/2023	6.75	478	0.089	228.90	
10/16/2023	7.34	671	0.092	332.16	
10/30/2023	6.48	449	0.042	101.47	6846.14
5/6/2024	8.45	914	0.087	427.86	
5/20/2024	7.47	685	0.114	420.17	13144.51
6/3/2024	7.43	727	0.06	234.70	
6/17/2024	7.43	701	0.139	524.28	11384.83
7/2/2024	7.6	715	0.1505	579.00	
7/15/2024	8.8	989	0.15	798.22	
7/29/2024	7.18	588	0.12	379.66	18154.37
8/12/2024	6.57	471	0.067	169.80	
8/26/2024	5.85	330	0.05	88.78	4007.95
9/9/2024	5.72	272	0.057	83.42	
9/23/2024	6.37	414	0.22	490.07	8602.36
10/7/2024	5.61	241	0.32	414.96	
10/21/2024	5.6	240	0.027	34.87	6972.24
5/5/2025	7.02	696	0.080	298.39	
5/19/2025	5.91	417	0.070	157.21	7061.78
6/2/2025	6.17	481	0.169	438.39	
6/16/2025	5.78	369	0.113	224.99	
6/30/2025	6.39	507	0.139	379.05	10424.26
7/14/2025	8.40	1094	0.158	931.07	
7/28/2025	6.39	507	0.091	247.95	18274.81
8/11/2025	7.91	930	0.182	911.73	
8/25/2025	10.68	2102	0.249	2821.67	57867.77
9/8/2025	5.55	303	0.078	127.17	
9/22/2025	6.02	420	0.160	361.58	7331.18
10/6/2025	5.62	325	0.092	160.88	
10/20/2025	6.19	452	0.073	177.54	5245.53

APPENDIX C

SOIL INFORMATION

Kenosha, Racine, and Walworth Counties, Wisconsin

Soil Symbol	Soil Name	Acres in Action Area	Percent of Action Area	K factor	Hydrologic Soil Group	Drainage Condition
Ac	Adrian muck, 0 to 2 percent slopes	322.3	0.50%	-	B/D	Very poorly drained
Am	Alluvial land	20.8	0.03%	0.24	-	Moderately well drained
AtA	Ashkum silty clay loam, 0 to 2 percent slopes	61.7	0.10%	0.2	C/D	Poorly drained
AzA	Aztalan loam, 0 to 2 percent slopes	400.8	0.63%	0.2	C/D	Somewhat poorly drained
AzB	Aztalan loam, 2 to 6 percent slopes	217.8	0.34%	0.2	C/D	Somewhat poorly drained
BlA	Blount silt loam, 1 to 3 percent slopes	24.4	0.04%	0.37	C/D	Somewhat poorly drained
BmC2	Boyer loamy sand, 6 to 12 percent slopes, eroded	9.4	0.01%	0.17	A	Well drained
BnB	Boyer sandy loam, 2 to 6 percent slopes	2.1	0.00%	0.28	B	Well drained
BP	Borrow pit	4.2	0.01%	-	-	-
BpB	Boyer complex, 2 to 6 percent slopes	15.7	0.02%	0.17	A	Well drained
BpC2	Boyer complex, 6 to 12 percent slopes, eroded	36.5	0.06%	0.17	A	Well drained
CcB	Casco sandy loam, 2 to 6 percent slopes	23.6	0.04%	0.28	B	Somewhat excessively drained
CcC2	Casco sandy loam, 6 to 12 percent slopes, eroded	45.3	0.07%	0.28	B	Somewhat excessively drained
CeB	Casco loam, 2 to 6 percent slopes	1,003.00	1.57%	0.32	B	Somewhat excessively drained
CeB2	Casco loam, 2 to 6 percent slopes, eroded	650.5	1.02%	0.32	B	Somewhat excessively drained
CeC2	Casco loam, 6 to 12 percent slopes, eroded	2,650.80	4.15%	0.32	B	Somewhat excessively drained
CeD2	Casco loam, 12 to 20 percent slopes, eroded	1816.3	2.84%	0.32	B	Somewhat excessively drained
CfC3	Casco soils, 6 to 12 percent slopes, severely eroded	54.6	0.09%	0.37	B	Well drained
CfD3	Casco soils, 12 to 20 percent slopes, severely eroded	243.6	0.38%	0.37	B	Well drained
CkD2	Casco-Fox loams, 12 to 20 percent slopes, eroded	17.1	0.03%	0.37	B	Well drained
ClC2	Casco-Fox silt loams, 6 to 12 percent slopes, eroded	305.3	0.48%	0.43	B	Well drained
CoC	Casco-Miami loams, 6 to 12 percent slopes	6.1	0.01%	0.32	B	Well drained
CrC	Casco-Rodman complex, 6 to 12 percent slopes	168.7	0.26%	0.32	B	Somewhat excessively drained
CrD2	Casco-Rodman complex, 12 to 20 percent slopes, eroded	970.1	1.52%	0.32	B	Somewhat excessively drained
CrE	Casco-Rodman complex, 20 to 30 percent slopes	1,921.70	3.01%	0.32	B	Somewhat excessively drained
CrE2	Casco-Rodman complex, 20 to 30 percent slopes, eroded	1,818.70	2.85%	0.32	B	Somewhat excessively drained
Cw	Colwood silt loam, 0 to 2 percent slopes	275.9	0.43%	0.32	C/D	Poorly drained
CyA	Conover silt loam, 1 to 3 percent slopes	82.2	0.13%	0.43	C/D	Somewhat poorly drained
DaA	Darroch fine sandy loam, neutral variant, 0 to 3 percent slopes	13.2	0.02%	0.17	B/D	Somewhat poorly drained
DdA	Dodge silt loam, 0 to 2 percent slopes	81.3	0.13%	0.49	C	Well drained
DdB	Dodge silt loam, 2 to 6 percent slopes	79.7	0.12%	0.49	C	Well drained
DrA	Dresden loam, 1 to 3 percent slopes	234.7	0.37%	0.28	B	Well drained
Dt	Drummer silt loam, gravelly substratum	774.6	1.21%	0.32	B/D	Poorly drained
EbA	Elburn silt loam, 0 to 3 percent slopes	139.3	0.22%	0.28	C	Somewhat poorly drained
Ed	Edwards muck, 0 to 2 percent slopes	67.5	0.11%	-	C/D	Very poorly drained
EgA	Elburn silt loam, gravelly substratum, 0 to 3 percent slopes	63.8	0.10%	0.28	C	Somewhat poorly drained
FaA	Fabius loam, 1 to 3 percent slopes	70.5	0.11%	0.32	B	Somewhat poorly drained
FmB	Fox sandy loam, 2 to 6 percent slopes	249.4	0.39%	0.32	C	Well drained

Kenosha, Racine, and Walworth Counties, Wisconsin

Soil Symbol	Soil Name	Acres in Action Area	Percent of Action Area	K factor	Hydrologic Soil Group	Drainage Condition
FmC2	Fox sandy loam, 6 to 12 percent slopes, eroded	35.3	0.06%	0.32	C	Well drained
FoA	Fox loam, 0 to 2 percent slopes	970.7	1.52%	0.32	C	Well drained
FoB	Fox loam, 2 to 6 percent slopes	2,406.60	3.77%	0.32	C	Well drained
FoC2	Fox loam, 6 to 12 percent slopes, eroded	422	0.66%	0.37	C	Well drained
FrA	Fox loam, clayey substratum, 0 to 2 percent slopes	14.5	0.02%	0.37	B	Moderately well drained
FrB	Fox loam, clayey substratum, 2 to 6 percent slopes	85.1	0.13%	0.37	B	Moderately well drained
FsA	Fox silt loam, 0 to 2 percent slopes	1638	2.56%	0.32	B	Well drained
FsB	Fox silt loam, 2 to 6 percent slopes	4,733.40	7.41%	0.32	B	Well drained
FsC2	Fox silt loam, 6 to 12 percent slopes, eroded	485.2	0.76%	0.32	B	Well drained
Gf	Granby fine sandy loam	6.8	0.01%	0.15	A/D	Very poorly drained
GP	Gravel pit	785.9	1.23%	0.02	-	-
GsB	Griswold loam, 2 to 6 percent slopes	92.9	0.15%	0.2	B	Well drained
GsC2	Griswold loam, 6 to 12 percent slopes, eroded	194.4	0.30%	0.24	B	Well drained
GsD2	Griswold loam, 12 to 20 percent slopes, eroded	36	0.06%	0.2	B	Well drained
GwA	Griswold silt loam, mottled subsoil variant, 0 to 3 percent slopes	55.1	0.09%	0.28	B	Somewhat poorly drained
HbB	Hebron sandy loam, 2 to 6 percent slopes	36.6	0.06%	0.24	C	Well drained
HeA	Hebron loam, 0 to 2 percent slopes	68.7	0.11%	0.37	C	Well drained
HeB	Hebron loam, 1 to 6 percent slopes	457.2	0.72%	0.37	C	Well drained
HeB2	Hebron loam, 2 to 6 percent slopes, eroded	361.9	0.57%	0.37	C	Well drained
HeC2	Hebron loam, 6 to 12 percent slopes, eroded	35.9	0.06%	0.37	C	Well drained
HfE	Hennepin-Miami loams, sandy loam substratum, 20 to 35 percent slopes	2.3	0.00%	0.28	C	Well drained
HmB	Hochheim loam, 2 to 6 percent slopes	186.8	0.29%	0.32	D	Well drained
HmC2	Hochheim loam, 6 to 12 percent slopes, eroded	250.5	0.39%	0.32	D	Well drained
HmD2	Hochheim loam, 12 to 20 percent slopes, eroded	46.6	0.07%	0.32	D	Well drained
Ht	Houghton muck, 0 to 2 percent slopes	5,816.60	9.11%	-	A/D	Very poorly drained
JuA	Juneau silt loam, 1 to 3 percent slopes	90.4	0.14%	0.49	B/D	Well drained
KaA	Kane loam, 1 to 3 percent slopes	70.5	0.11%	0.24	B/D	Somewhat poorly drained
KlA	Kendall silt loam, 1 to 3 percent slopes	106.8	0.17%	0.43	B/D	Somewhat poorly drained
LDF	Landfill	35.2	0.06%	-	-	-
Lp	Lawson silt loam, calcareous variant	18.7	0.03%	0.37	B/D	Somewhat poorly drained
Lu	Loamy land	75.5	0.12%	-	-	Moderately well drained
LyB	Lorenzo loam, 2 to 6 percent slopes	188.8	0.30%	0.28	B	Well drained
LyC2	Lorenzo loam, 6 to 12 percent slopes, eroded	91	0.14%	0.24	B	Well drained
LzD2	Lorenzo-Rodman complex, 12 to 20 percent slopes, eroded	59.4	0.09%	0.24	B	Well drained
Mf	Marsh	262.9	0.41%	-	-	Very poorly drained
MgA	Martinton silt loam, 1 to 3 percent slopes	225.6	0.35%	0.37	C/D	Somewhat poorly drained
MkA	Matherton loam, 1 to 3 percent slopes	475.3	0.74%	0.28	B/D	Somewhat poorly drained
MlA	Matherton loam, clayey substratum, 1 to 3 percent slopes	18.7	0.03%	0.24	B/D	Somewhat poorly drained
MmA	Matherton silt loam, 1 to 3 percent slopes	1,079.60	1.69%	0.32	B/D	Somewhat poorly drained
MpB	McHenry silt loam, 2 to 6 percent slopes	2,687.80	4.21%	0.49	B	Well drained
MpB2	McHenry silt loam, 2 to 6 percent slopes, eroded	423.2	0.66%	0.49	B	Well drained

Kenosha, Racine, and Walworth Counties, Wisconsin

Soil Symbol	Soil Name	Acres in Action Area	Percent of Action Area	K factor	Hydrologic Soil Group	Drainage Condition
MpC	McHenry silt loam, 6 to 12 percent slopes	317.1	0.50%	0.37	B	Well drained
MpC2	McHenry silt loam, 6 to 12 percent slopes, eroded	587.8	0.92%	0.49	B	Well drained
MuA	Metea loamy fine sand, 0 to 2 percent slopes	26.3	0.04%	0.28	B	Well drained
MuB	Metea loamy fine sand, 2 to 6 percent slopes	50.5	0.08%	0.28	B	Well drained
MvB	Miami sandy loam, sandy loam substratum, 2 to 6 percent slopes	0.9	0.00%	0.28	B	Well drained
MwB	Miami loam, 2 to 6 percent slopes	168.8	0.26%	0.28	B	Well drained
MwC2	Miami loam, 6 to 12 percent slopes, eroded	283.2	0.44%	0.32	B	Well drained
MwD2	Miami loam, 12 to 20 percent slopes, eroded	260.4	0.41%	0.32	B	Well drained
MxB	Miami loam, sandy loam substratum, 2 to 6 percent slopes	595.3	0.93%	0.37	B	Well drained
MxC2	Miami loam, sandy loam substratum, 6 to 12 percent slopes, eroded	1013.4	1.59%	0.37	B	Well drained
MxD2	Miami loam, sandy loam substratum, 12 to 20 percent slopes, eroded	969.2	1.52%	0.37	B	Well drained
MxE2	Miami loam, sandy loam substratum, 20 to 35 percent slopes, eroded	247.7	0.39%	0.37	B	Well drained
MyA	Miami silt loam, 0 to 2 percent slopes	114	0.18%	0.43	B	Well drained
MyB	Miami silt loam, 2 to 6 percent slopes	776.9	1.22%	0.43	B	Well drained
MyC	Miami silt loam, 6 to 12 percent slopes	18.8	0.03%	0.43	B	Well drained
MyC2	Miami silt loam, 6 to 12 percent slopes, eroded	338.4	0.53%	0.43	B	Well drained
Mzc	Montgomery silty clay	192.2	0.30%	0.24	C/D	Very poorly drained
MzeD3	Morley soils, 12 to 20 percent slopes, severely eroded	9.1	0.01%	0.37	C	Moderately well drained
MzfA	Mundelein silt loam, 0 to 3 percent slopes	203.1	0.32%	0.32	B/D	Somewhat poorly drained
Mzk	Mussey loam	103	0.16%	0.24	B/D	Poorly drained
Na	Navan silt loam	768.7	1.20%	0.37	C/D	Poorly drained
Oc	Ogden muck	48.8	0.08%	-	C/D	Very poorly drained
OzaB	Ozaukee silt loam, 2 to 6 percent slopes	265.7	0.42%	0.43	C	Moderately well drained
OzaB2	Ozaukee silt loam, 2 to 6 percent slopes, eroded	113.7	0.18%	0.43	C	Moderately well drained
OzaC	Ozaukee silt loam, 6 to 12 percent slopes	19.9	0.03%	0.43	C	Moderately well drained
OzaC2	Ozaukee silt loam, 6 to 12 percent slopes, eroded	111.6	0.17%	0.43	C	Moderately well drained
OzaD	Ozaukee silt loam, 12 to 20 percent slopes	45	0.07%	0.43	C	Moderately well drained
OzaD2	Ozaukee silt loam, 12 to 20 percent slopes, eroded	66.4	0.10%	0.43	C	Moderately well drained
OzaE	Ozaukee silt loam, 20 to 30 percent slopes	33.9	0.05%	0.43	C	Moderately well drained
OzlC3	Ozaukee silty clay loam, 6 to 12 percent slopes, severely eroded	2.1	0.00%	0.37	C	Moderately well drained
Pa	Palms muck, 0 to 2 percent slopes	825.8	1.29%	-	B/D	Very poorly drained
Ph	Pella silt loam, 0 to 2 percent slopes	1,338.90	2.10%	0.32	B/D	Poorly drained
PsA	Plano silt loam, till substratum, 0 to 2 percent slopes	461.2	0.72%	0.37	B	Well drained
PsB	Plano silt loam, till substratum, 2 to 6 percent slopes	1,286.30	2.01%	0.37	B	Well drained
PsC	Plano silt loam, till substratum, 6 to 12 percent slopes, eroded	365	0.57%	0.37	B	Well drained
PtA	Plano silt loam, gravelly substratum, 0 to 2 percent slopes	45.2	0.07%	0.37	B	Well drained
PtB	Plano silt loam, gravelly substratum, 2 to 6 percent slopes	24.9	0.04%	0.37	B	Well drained
QUA	Quarry	28.2	0.04%	-	-	-
RaA	Radford silt loam, 0 to 3 percent slopes	399.2	0.62%	0.55	B/D	Somewhat poorly drained

Kenosha, Racine, and Walworth Counties, Wisconsin

Soil Symbol	Soil Name	Acres in Action Area	Percent of Action Area	K factor	Hydrologic Soil Group	Drainage Condition
RgB	Ringwood silt loam, 2 to 6 percent slopes	165	0.26%	0.24	B	Well drained
RgC	Ringwood silt loam, 6 to 12 percent slopes	40	0.06%	0.32	B	Well drained
RsF	Rodman-Casco complex, 30 to 45 percent slopes	512.1	0.80%	0.15	A	Excessively drained
ScA	St. Charles silt loam, 0 to 2 percent slopes	84.1	0.13%	0.37	B	Well drained
ScB	St. Charles silt loam, 2 to 6 percent slopes	47.6	0.07%	0.43	B	Well drained
SeA	St. Charles silt loam, gravelly subtratum, 0 to 2 percent slopes	1,086.10	1.70%	0.37	B	Well drained
SeB	St. Charles silt loam, gravelly subtratum, 2 to 6 percent slopes	959.1	1.50%	0.43	B	Well drained
Sf	Sandy and gravelly land	131.9	0.21%	-	-	Excessively drained
Sfb	Sandy lake beaches	5.2	0.01%	-	-	Moderately well drained
Sg	Sawmill silt loam, calcareous variant	6.9	0.01%	0.37	C/D	Poorly drained
ShA	Saylesville silt loam, 0 to 2 percent slopes	224.7	0.35%	0.43	C	Well drained
ShB	Saylesville silt loam, 2 to 6 percent slopes	397.7	0.62%	0.43	C	Well drained
ShC2	Saylesville silt loam, 6 to 12 percent slopes, eroded	39.4	0.06%	0.37	C	Well drained
SkA	Saylesville silt loam, dark surface variant, 0 to 2 percent slopes	14.4	0.02%	0.37	C	Moderately well drained
SkB	Saylesville silt loam, dark surface variant, 2 to 6 percent slopes	8.2	0.01%	0.37	C	Moderately well drained
Sm	Sebewa silt loam, 0 to 2 percent slopes	1,873.50	2.93%	0.37	B/D	Poorly drained
So	Sebewa silt loam, clayey substratum	182.7	0.29%	0.32	B/D	Poorly drained
SrB	Sisson fine sandy loam, 2 to 6 percent slopes	12.6	0.02%	0.24	B	Well drained
SzA	Symerton loam, 0 to 2 percent slopes	1.2	0.00%	0.24	C	Well drained
SzB	Symerton loam, 2 to 6 percent slopes	8.5	0.01%	0.24	C	Well drained
TxA	Troxel silt loam, 0 to 3 percent slopes	49.8	0.08%	0.37	B	Moderately well drained
W	Water	1594.3	2.50%	-	-	-
Wa	Wallkill silt loam	55.5	0.09%	0.32	B/D	Very poorly drained
WeA	Warsaw loam, 0 to 2 percent slopes	519.9	0.81%	0.24	B	Well drained
WeB	Warsaw loam, 2 to 6 percent slopes	203	0.32%	0.2	B	Well drained
WgB	Warsaw loam, clayey substratum, 2 to 6 percent slopes	7.7	0.01%	0.24	B	Well drained
WhA	Warsaw silt loam, 0 to 2 percent slopes	1351.9	2.12%	0.32	B	Well drained
WhB	Warsaw silt loam, 2 to 6 percent slopes	563.6	0.88%	0.37	B	Well drained
WhC2	Warsaw silt loam, 6 to 12 percent slopes, eroded	17.3	0.03%	0.32	B	Well drained
WmA	Wasepi sandy loam, 1 to 3 percent slopes	8.3	0.01%	0.15	A/D	Somewhat poorly drained
Ww	Wet alluvial land	804.6	1.26%	0.2	-	Poorly drained
WyA	Worthen silt loam, 0 to 3 percent slopes	64.3	0.10%	0.37	B/D	Moderately well drained
YaA	Yahara fine sandy loam, 0 to 3 percent slopes	21.1	0.03%	0.17	B/D	Somewhat poorly drained
ZuA	Zurich silt loam, 0 to 2 percent slopes	102.2	0.16%	0.37	C	Moderately well drained
ZuB	Zurich silt loam, 95B, 2 to 6 percent slopes	91.2	0.14%	0.43	C	Moderately well drained
ZuC2	Zurich silt loam, 6 to 12 percent slopes, eroded	16.5	0.03%	0.37	B	Well drained
Totals for Soil Survey Area		**63,876.30**	**100%**			

APPENDIX D

SECONDARY CSAs

BAXTER & WOODMAN Consulting Engineers

Future AM Project Parcels (Secondary CSAs)

Parcel ID	County	Acres	Watershed
176-03-19-08-019-000	Racine	14.81	71200060503
176-03-19-08-013-000	Racine	11.2	71200060503
176-03-19-08-012-000	Racine	40	71200060503
176-03-19-07-007-000	Racine	33.96	71200060503
176-03-19-07-008-000	Racine	40	71200060503
176-03-19-08-015-000	Racine	40	71200060503
176-03-19-07-012-000	Racine	22.86	71200060503
176-03-19-09-043-000	Racine	16.09	71200060503
176-03-19-09-002-000	Racine	16.63	71200060503
176-03-19-09-001-000	Racine	77.98	71200060503
176-03-19-08-001-000	Racine	20	71200060503
176-03-19-09-030-000	Racine	25.26	71200060503
176-03-19-09-007-010	Racine	68.07	71200060503
176-03-19-16-008-000	Racine	80	71200060707/71200060503
176-03-19-16-011-020	Racine	45.69	71200060707
176-03-19-16-006-000	Racine	20	71200060707
002-03-19-20-003-000	Racine	55.06	71200060503
002-03-19-20-021-000	Racine	49.38	71200060503
176-03-19-18-002-000	Racine	48.02	71200060503
176-03-19-18-012-000	Racine	54.1	71200060503
002-03-19-30-001-001	Racine	52.18	71200060503
002-03-19-19-003-000	Racine	105.37	71200060503
002-03-19-19-008-000*	Racine	76	71200060503
002-03-19-19-011-000*	Racine	163.72	71200060503
002-03-19-19-005-000	Racine	18	71200060503
002-03-19-19-011-050	Racine	25.3	71200060503
002-03-19-19-004-000	Racine	36	71200060503
002-03-19-29-012-000	Racine	34.57	71200060604
002-03-19-31-003-000	Racine	42.27	71200060604
002-03-19-28-004-000	Racine	50.14	71200060707
002-03-19-23-017-000	Racine	62.78	71200060707
002-03-19-22-020-000	Racine	17.13	71200060707
206-03-19-22-002-000	Racine	116.17	71200060707
176-03-19-11-005-020	Racine	169.53	71200060707
002-03-19-21-001-000	Racine	34.77	71200060707
002-02-19-08-012-000	Racine	67.25	71200061002
002-02-19-17-002-001	Racine	27.36	71200061002
002-02-19-08-017-000	Racine	147.58	71200061002
002-02-19-08-003-000	Racine	111.32	71200061002
206-02-19-05-065-000	Racine	82.1	71200061002
002-02-19-19-011-001	Racine	86.32	71200061002/71200060604
O SP1300013	Walworth	36.07	71200060503
O SP1300002	Walworth	57	71200060503
O SP1200006	Walworth	46	71200060503
O SP2400002	Walworth	67.65	71200060503
O SP3600003*	Walworth	165	71200060604
O SP3600005	Walworth	31	71200060604
O SP2700004	Walworth	114.11	71200060604
O SP2800001	Walworth	76.68	71200060604
O SP2100002B	Walworth	53	71200060604
O SP2200004*	Walworth	81.79	71200060604
O SP2800002B	Walworth	44.04	71200060604
O SP2800002A	Walworth	35.02	71200060604
O SP2800008A	Walworth	25	71200060604

Future AM Project Parcels (Secondary CSAs)

Parcel ID	County	Acres	Watershed
O SP2700006	Walworth	111	71200060604
O SP3300001	Walworth	96.725	71200060604
O SP3300002	Walworth	78.9	71200060604
O SP3300004	Walworth	36.61	71200060604
O SP3300006	Walworth	37.68	71200060604
O SP3300005	Walworth	82.5	71200060604
O SP3400010	Walworth	137.4	71200060604
NA430800001	Walworth	80.02	71200060604
N LY 300003	Walworth	42	71200060604
N LY 300011	Walworth	67.03	71200060604
N LY 300010	Walworth	33.94	71200060604
N LY 300012	Walworth	74.16	71200060604
NA456100001	Walworth	21.05	71200060604
NA340400001	Walworth	9.46	71200060604
N LY 200004F	Walworth	35.02	71200060604
N LY 200004G	Walworth	39.83	71200060604
N LY 200004H	Walworth	44.9	71200060604
N LY 200003	Walworth	107.63	71200060604
O SP3500003	Walworth	202	71200060604
N LY1000001	Walworth	62.245	71200060604
NA288300001	Walworth	9.45	71200060604
NA288300002	Walworth	9.54	71200060604
NA288300003	Walworth	33	71200060604
N LY1100005	Walworth	100.31	71200060604
N LY1100002	Walworth	130.51	71200060604
N LY1100001	Walworth	81.9	71200060604
N LY1200003	Walworth	155	71200060604
N LY 100009	Walworth	65	71200060604
N LY 100005	Walworth	49	71200060604
N LY 100002A1	Walworth	32.35	71200060604
N LY 100003A	Walworth	12.64	71200060604
*A458700001	Walworth	70.963	71200060604
N LY1200005	Walworth	61.59	71200060604
N LY1300003	Walworth	35.82	71200060604
NA480600001	Walworth	26.02	71200060604
N LY2400003	Walworth	101.79	71200060604
N LY2400004	Walworth	160	71200060604
N LY3500001	Walworth	82.07	71200060604
N LY3500008	Walworth	83.48	71200060604
N LY3500008A	Walworth	35.01	71200060604
N LY3600006	Walworth	114.06	71200060604
N LY1600010	Walworth	72.17	71200060604
N LY1700001	Walworth	86.61	71200060604
N LY1600006	Walworth	190.5	71200060604
N LY1500003	Walworth	75	71200060604
N LY1500004	Walworth	40	71200060604
	Total	**6451.21**	

Disclaimer: The CSAs identified here are for illustrative purposes only and no agreements or commitments have been made with the property owners at this time.

*The CSAs identified are part of the City-Sponsored Grant Program.

APPENDIX E

LETTERS OF SUPPORT

Watershed Protection Committee
Of Racine County
"Healthy Soil is Sustainable Agriculture"

January 17, 2020

Donald Hefty
Utility Manager
City of Burlington Department of Public Works
2100 S. Pine Street
Burlington, WI 53105

Dear Mr. Hefty,

The Watershed Protection Committee of Racine County fully supports the implementation of the Adaptive Management Plan that is proposed by the City of Burlington. The WPCR is concerned about and focused on water quality in the Fox River Watershed as well as the sub-watersheds listed in Burlington's AM Plan.

The WPCR looks forward to evaluating potential partnering opportunities for Phosphorus reductions in Burlington's Adaptive Management Plan project area. Consider us a willing future partner to combine resources to work toward the goal of the AM Plan once implementation begins.

Sincerely,

Thomas P Greil

Tom Greil
WPCR Chairman

Racine County
WISCONSIN

Land Conservation
Public Works & Development Services
14200 Washington Avenue
Sturtevant, WI 53177
262-886-8440
fax: 262-886-8480
landconservation@racinecounty.com

January 17, 2020

Donald Hefty
Utility Manager
City of Burlington Department of Public Works
2100 S. Pine Street
Burlington, WI 53105

Dear Mr. Hefty,

The Racine County Land Conservation Department fully supports the implementation of the Adaptive Management Plan that is proposed by the City of Burlington. The Racine County LCD is concerned about and focused on water quality in the Fox River Watershed as well as the sub-watersheds listed in Burlington's AM Plan.

The Racine County LCD looks forward to evaluating potential partnering opportunities for Phosphorus reductions in Burlington's Adaptive Management Plan project area. Consider us a willing future partner to combine resources to work toward the goal of the AM Plan once implementation begins.

Sincerely,

Chad Sampson
Racine County Land Conservation

WALWORTH COUNTY
Est. 1839
WISCONSIN

Land Use and Resource
Management Department

January 17, 2020

Donald Hefty
Utility Manager
City of Burlington Department of Public Works
2100 S. Pine Street
Burlington, WI 53105

Dear Mr. Hefty,

The Walworth County Land Use and Resource Management Department fully supports the implementation of the Adaptive Management Plan proposed by the City of Burlington. Walworth County prioritizes water quality in the Fox River Watershed including the sub-watersheds listed in Burlington's Adaptive Management Plan.

The County looks forward to opportunities for partnerships to reduce Phosphorus in Burlington's Adaptive Management Plan project area. Walworth County is a willing future partner, combining resources to work toward the goal of implementing the Adaptive Management Plan.

Sincerely,

Shannon K. Haydin

Shannon K. Haydin
Deputy Director/County Conservationist

100 West Walworth Street
P.O. Box 1001
Room 222
Elkhorn, WI 53121

Planning/Zoning/Sanitation
Conservation Divisions
262.741.4972 tel
262.741.4974 fax
262.741.4973 fax

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION
W239 N1812 ROCKWOOD DRIVE • PO BOX 1607 • WAUKESHA, WI 53187-1607• TELEPHONE (262) 547-6721
FAX (262) 547-1103

Serving the Counties of:
KENOSHA
MILWAUKEE
OZAUKEE
RACINE
WALWORTH
WASHINGTON
WAUKESHA

January 28, 2020

Donald Hefty
Utility Manager
City of Burlington Department of Public Works
2100 S. Pine Street
Burlington, WI 53105

Dear Mr. Hefty:

On behalf of the Southeastern Wisconsin Regional Planning Commission, I am writing to express our support for the implementation of the Adaptive Management (AM) Plan that is proposed by the City of Burlington. We understand the main project objective is to improve the water quality in the Fox River sub-watersheds listed in the Burlington's AM Plan with additional objectives being reduced soil loss and increased quality of habitat in the watershed. The project will also serve to enhance the beautiful natural and recreational resources the Fox River watershed offers.

The Commission fully supports this plan's objectives, which also are consistent with our ongoing watershed protection planning efforts for the Fox River watershed. Hence, the Commission looks forward to providing technical support or other potential partnering opportunities to promote phosphorus reductions in Burlington's AM Plan project area.

We look forward to assisting the City of Burlington in working toward the goals of the AM Plan once implementation begins.

Sincerely,

Kevin J. Muhs, PE, AICP
Executive Director

KJM/TMS/md
#251892

THE WESTERN RACINE COUNTY SEWERAGE DISTRICT
1020 N RIVER RD **ROCHESTER, WI 53167-0177** **(262)534-6237**

January 17, 2020

Donald Hefty
Utility Manager
City of Burlington Department of Public Works
2100 S. Pine Street
Burlington, WI 53105

Dear Mr. Hefty,
The Western Racine County Sewerage District fully supports the implementation of the Adaptive Management Plan that is proposed by the City of Burlington. WRCSD is concerned about and focused on water quality in the Fox River Watershed as well as the sub-watersheds listed in Burlington's AM Plan.

WRCSD looks forward to evaluating potential partnering opportunities for Phosphorus reductions in Burlington's Adaptive Management Plan project area. Consider us a willing future partner to combine resources to work toward the goal of the AM Plan once implementation begins.

Sincerely,

Jeff Bratz, Manager
Western Racine County Sewerage District

TOWN SANITARY DISTRICT NO. 2
OF THE TOWN OF LYONS
5996 Clearwater Court
P.O. Box 237
Lyons, WI 53148
(262) 763-4627 Tel.
lyonsdt2@execpc.com

January 22, 2020

Donald Hefty

Utility Manager

City of Burlington Department of Public Works

2100 S. Pine Street

Burlington, WI 53105

Dear Mr. Hefty,

Late last year, we learned about the Adaptive Management Plan proposed by the City of Burlington. This proposal will decrease phosphorus loadings in the Fox River and in several of its tributaries, including the White River.

A central focus of the Lyons Sanitary District is to protect water quality in the White River. The goals and approaches proposed by Burlington's plan are aligned with our District's objective, and we are therefore fully in support of the proposed efforts.

As the City of Burlington begins to implement its Adaptive Management Plan, we look forward to defining the scope and relationship for our potential participation. We are optimistic about partnering with Burlington to contribute significant phosphorus reductions in the Action Area, and to improving the water quality in the White River.

Sincerely,

Bob Biedrzycki

Superintendent

Lyons Sanitary District No. 2

January 17, 2020

Donald Hefty

Utility Manager

City of Burlington Department of Public Works

2100 S. Pine Street

Burlington, WI 53105

Dear Mr. Hefty,

The Southeastern Wisconsin Fox River Commission fully supports the implementation of the Adaptive Management Plan that is proposed by the City of Burlington. SEWFRC is concerned about and focused on water quality in the Fox River Watershed as well as the sub-watersheds listed in Burlington's AM Plan.

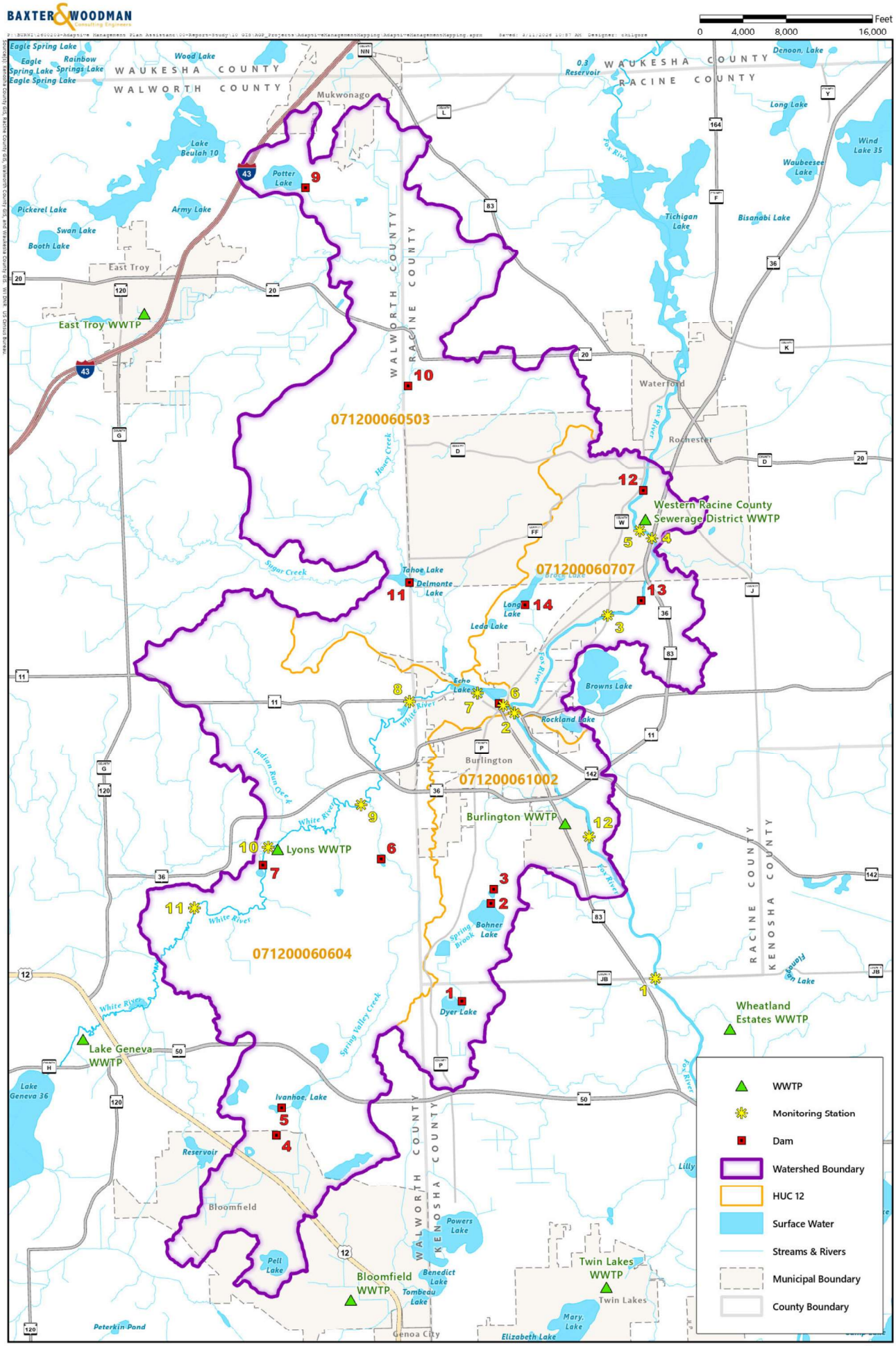
SEWFRC looks forward to evaluating potential partnering opportunities for Phosphorus reductions in Burlington's Adaptive Management Plan project area. Consider us a willing future partner to combine resources to work toward the goal of the AM Plan once implementation begins.

Sincerely,

Dean Falkner

Chairman, SEWFRC

EXHIBITS

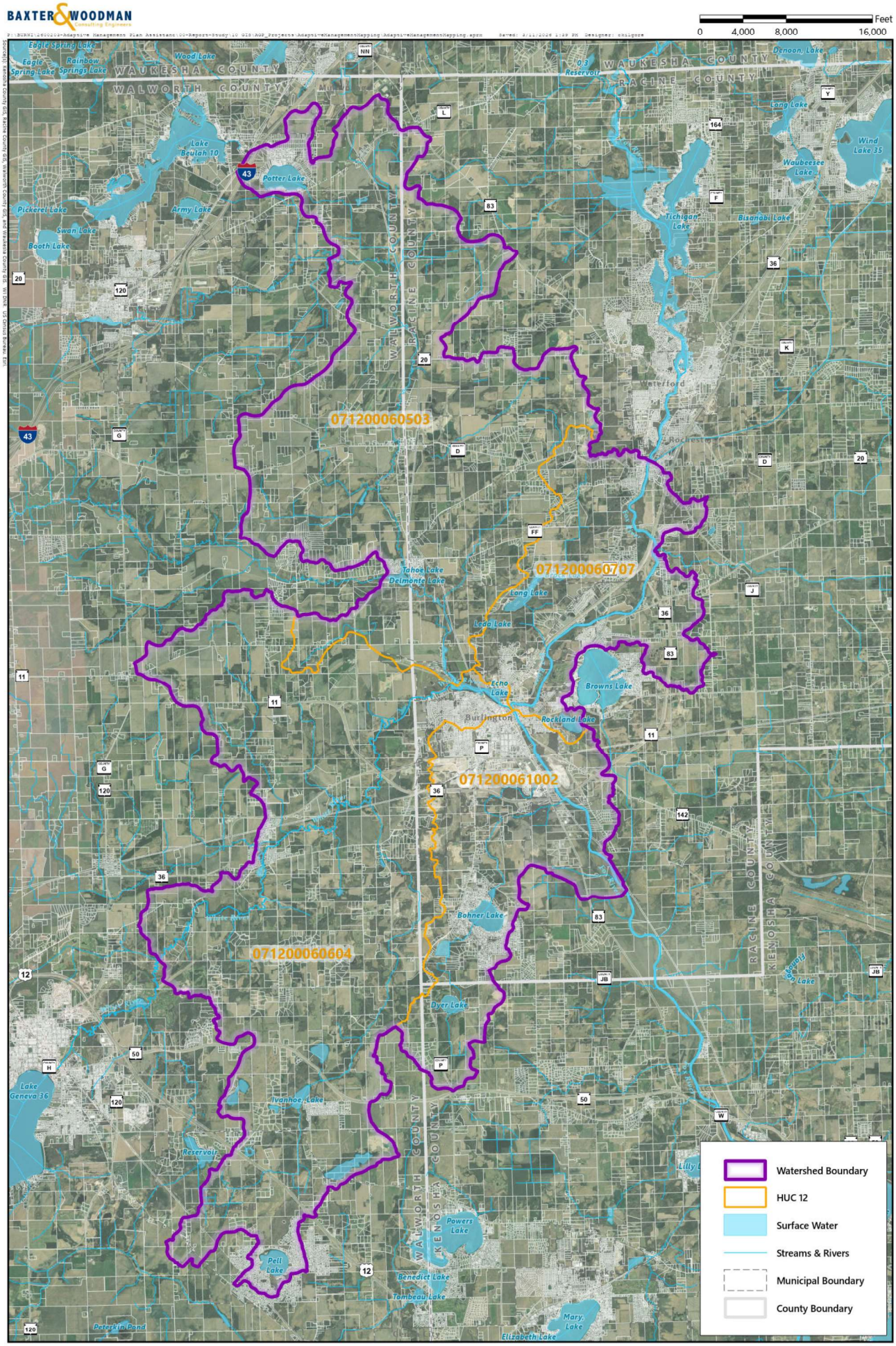


March 2026

Adaptive Management Plan Update - Burlington, WI

EXHIBIT 1

Action Area Watershed Map

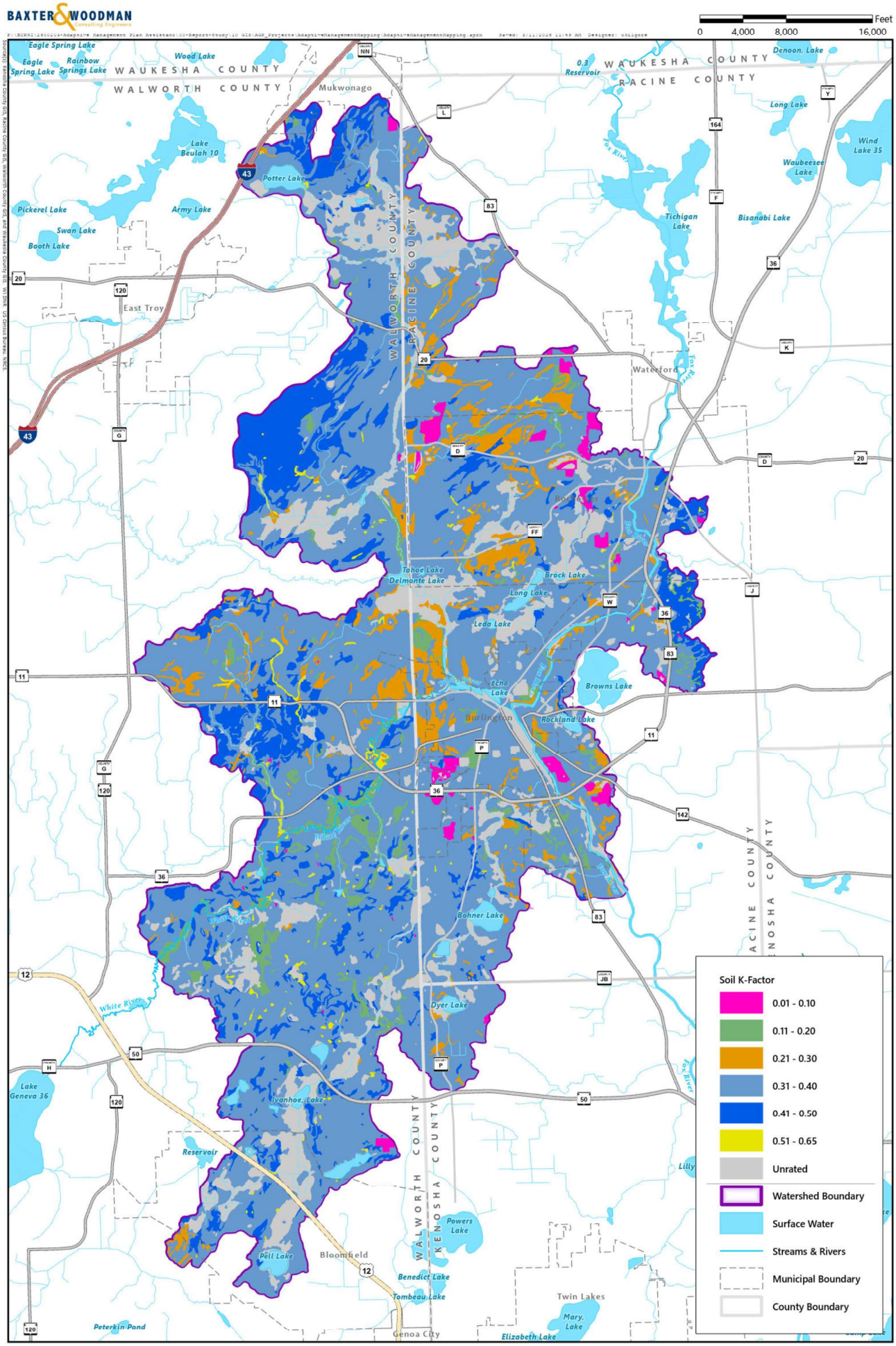


March 2026

Adaptive Management Plan Update - Burlington, WI

EXHIBIT 2

Action Area Surface Water Map

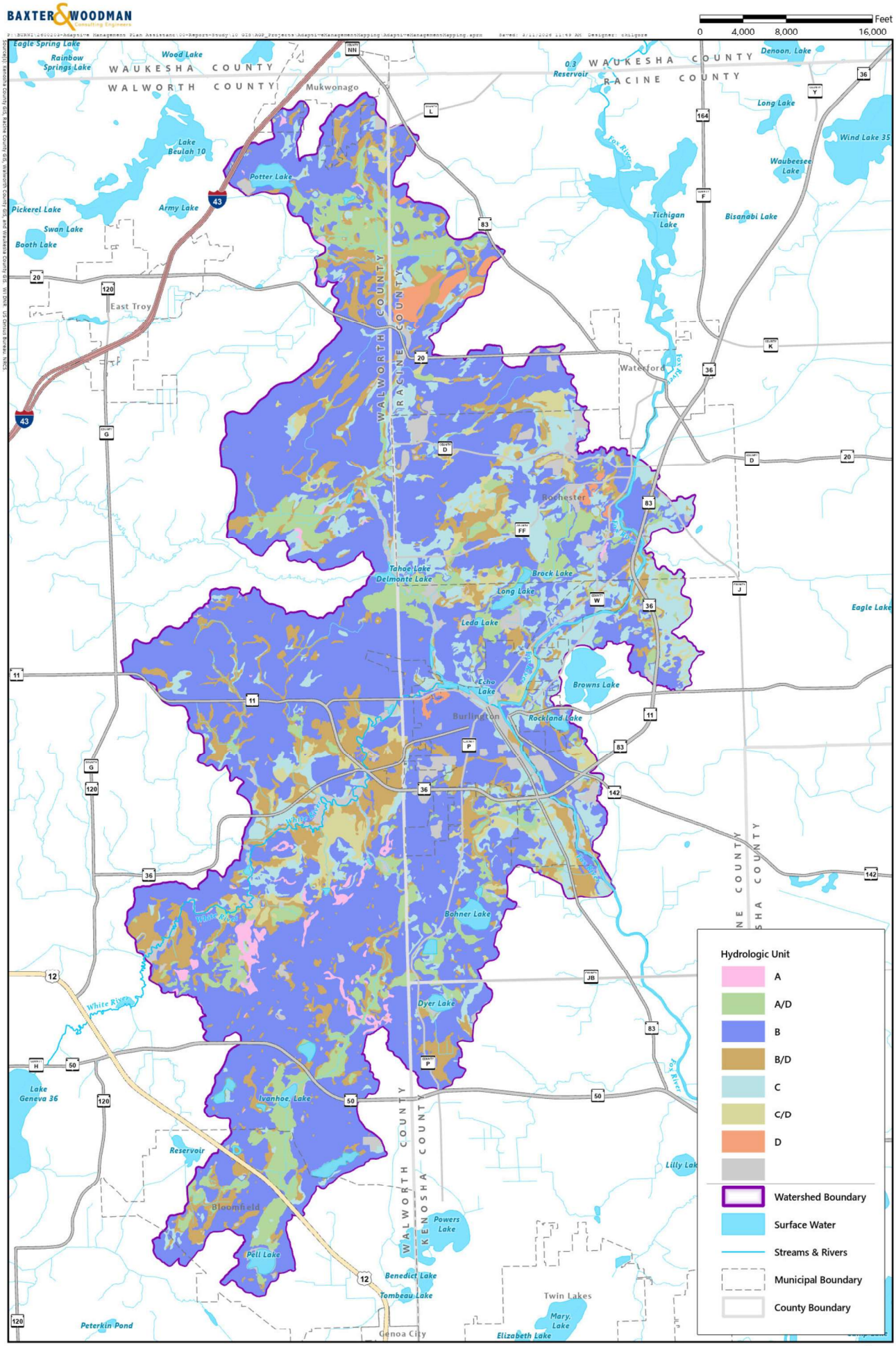


March 2026

Adaptive Management Plan Update - Burlington, WI

EXHIBIT 3

Action Area K-Factor Map



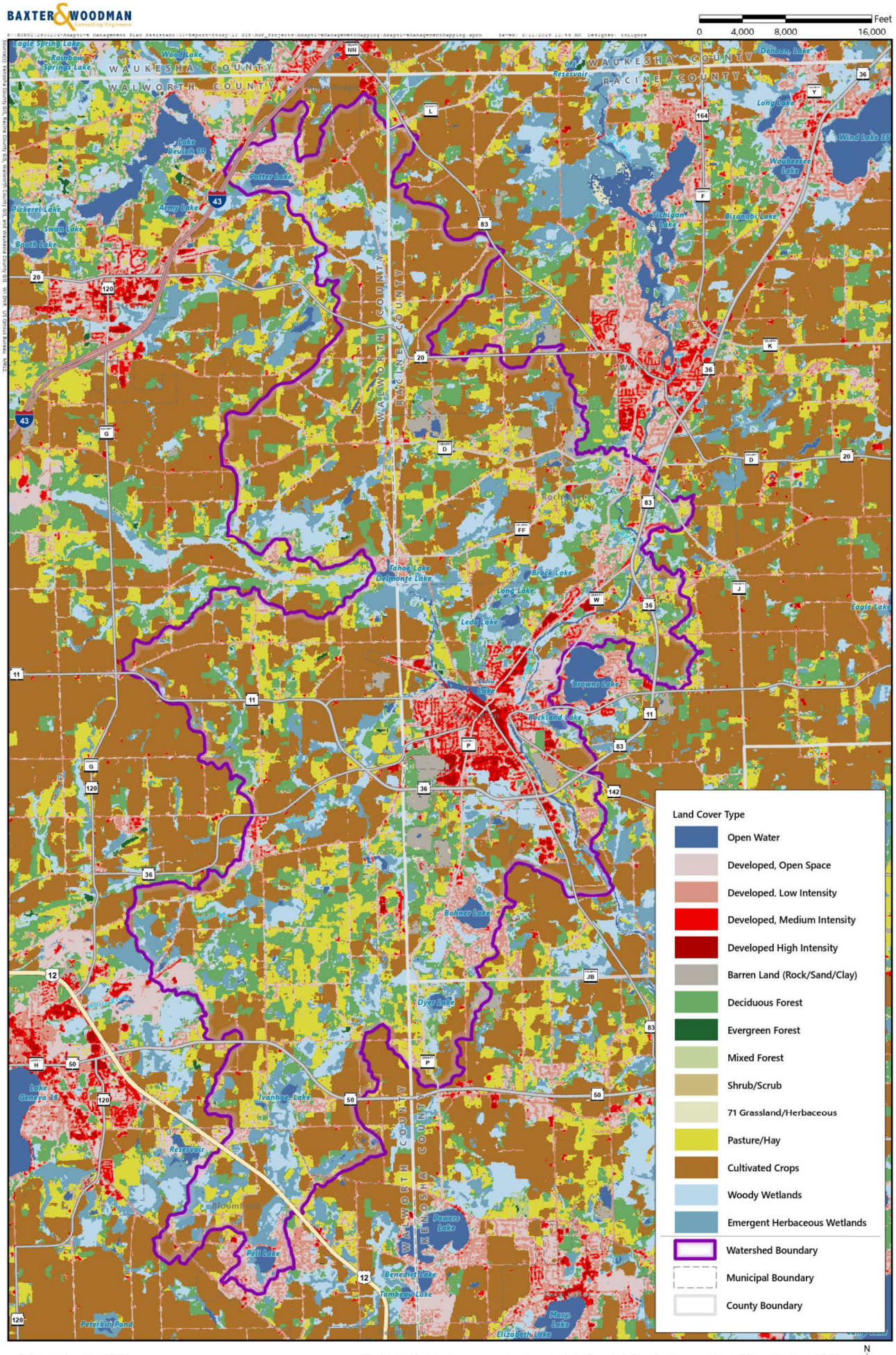
March 2026

Adaptive Management Plan Update - Burlington, WI

EXHIBIT 4

Action Area Hydric Soils Information Map

BAXTER & WOODMAN
Consulting Engineers



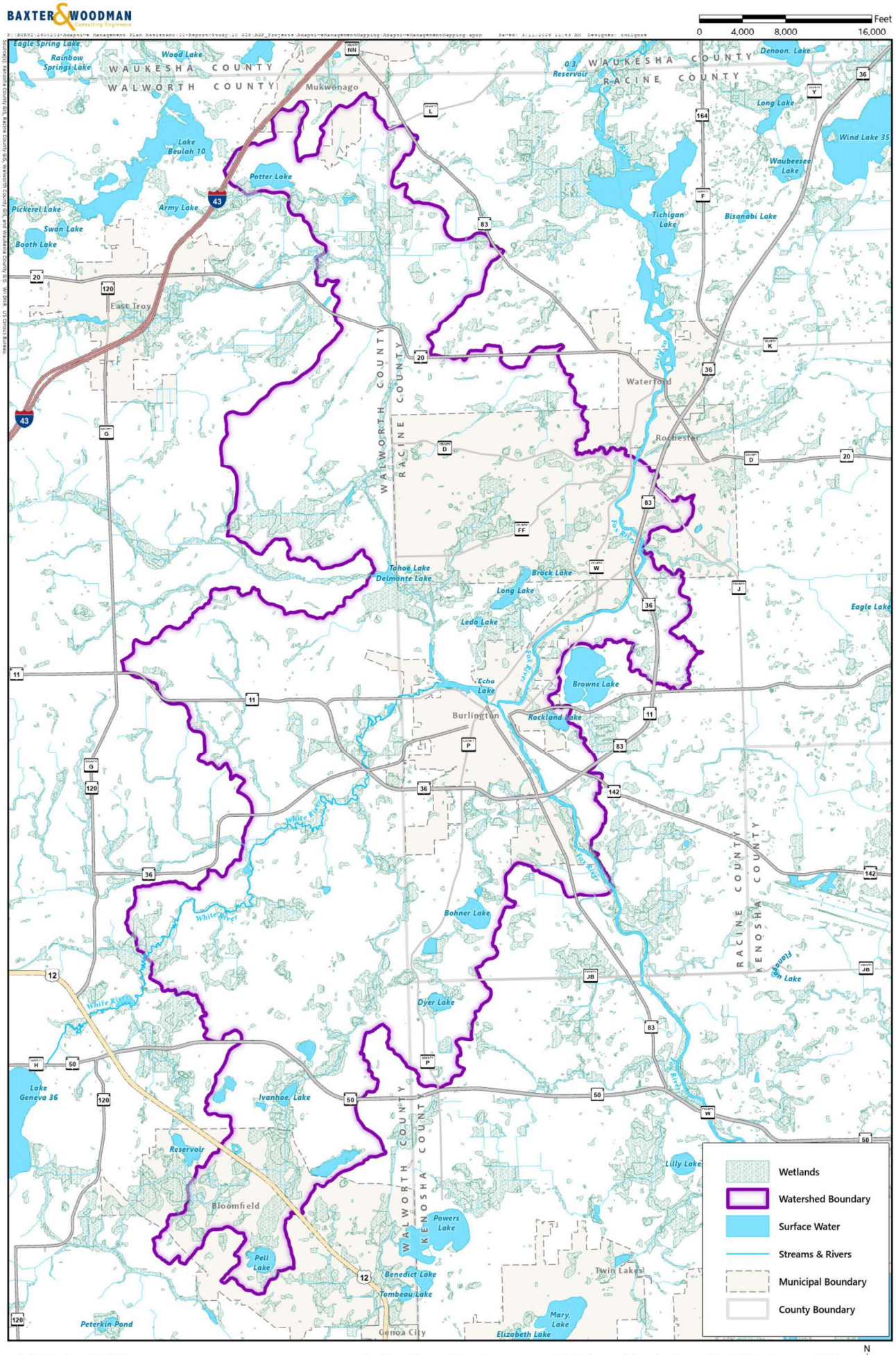
March 2026

Adaptive Management Plan Update - Burlington, WI

EXHIBIT 5

Action Area Land Use Map

BAXTER & WOODMAN
Consulting Engineers

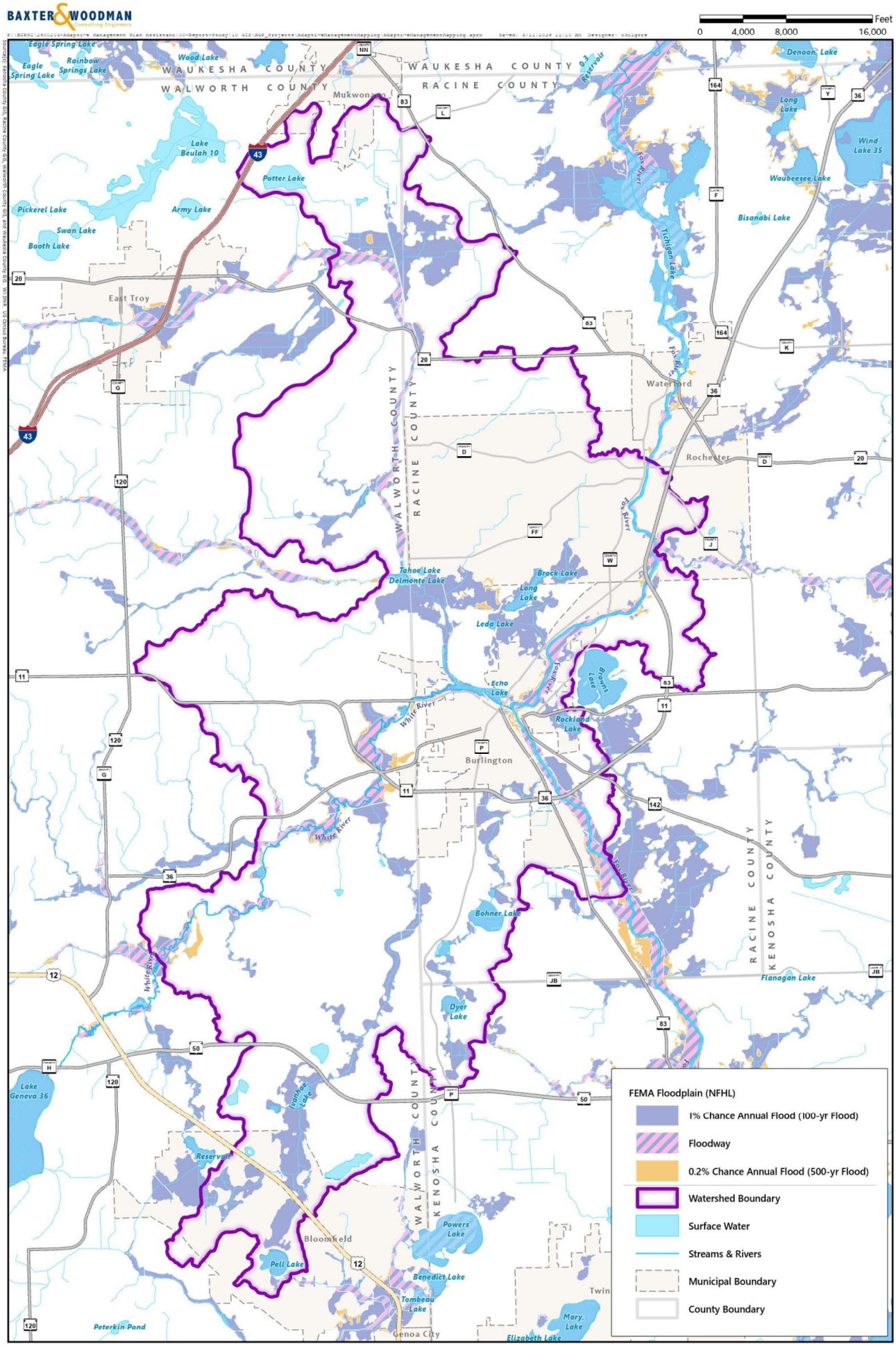


March 2026

Adaptive Management Plan Update - Burlington, WI

EXHIBIT 6

Action Area Wetlands Map



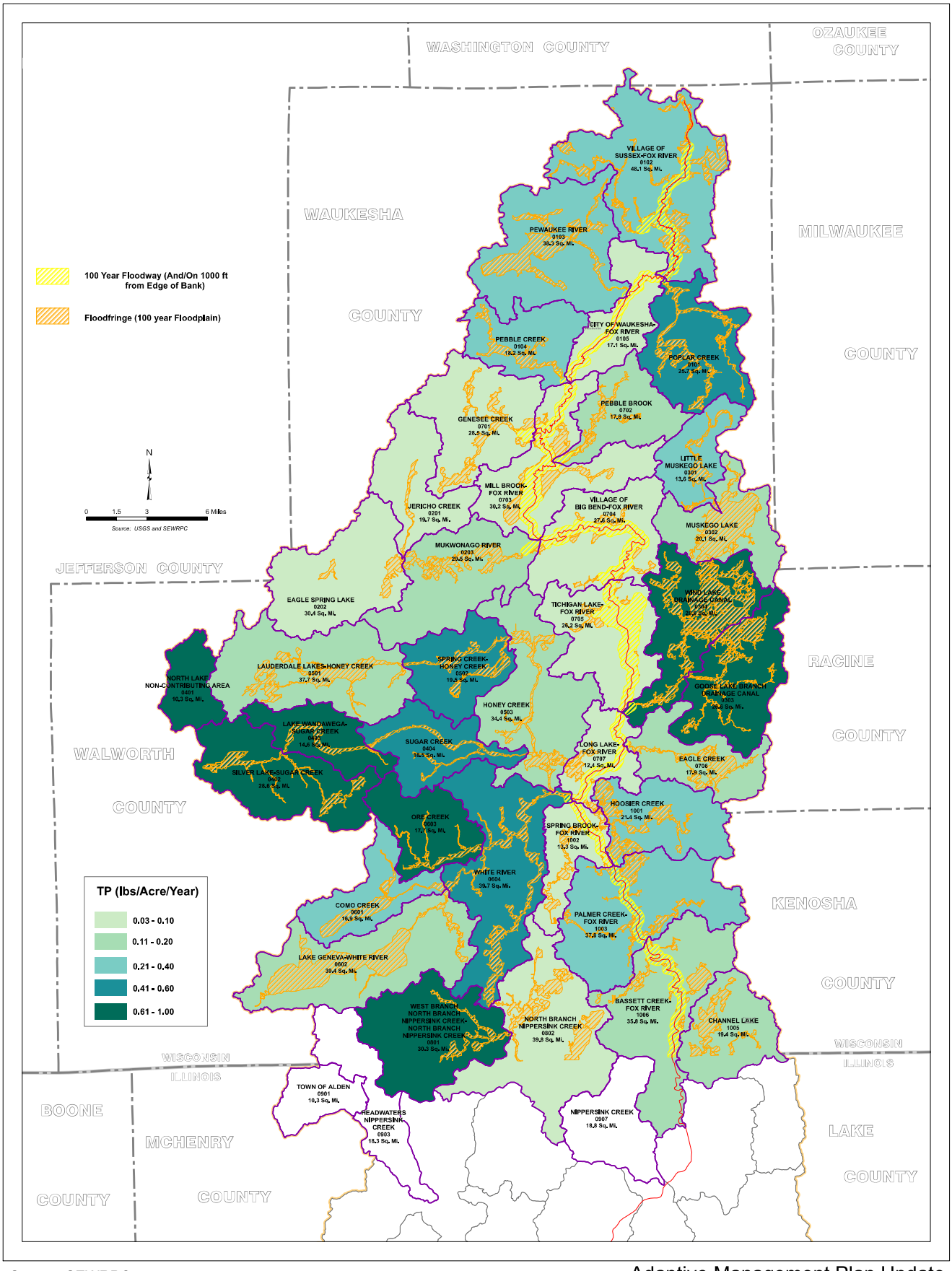
March 2026

Adaptive Management Plan Update - Burlington, WI

EXHIBIT 7

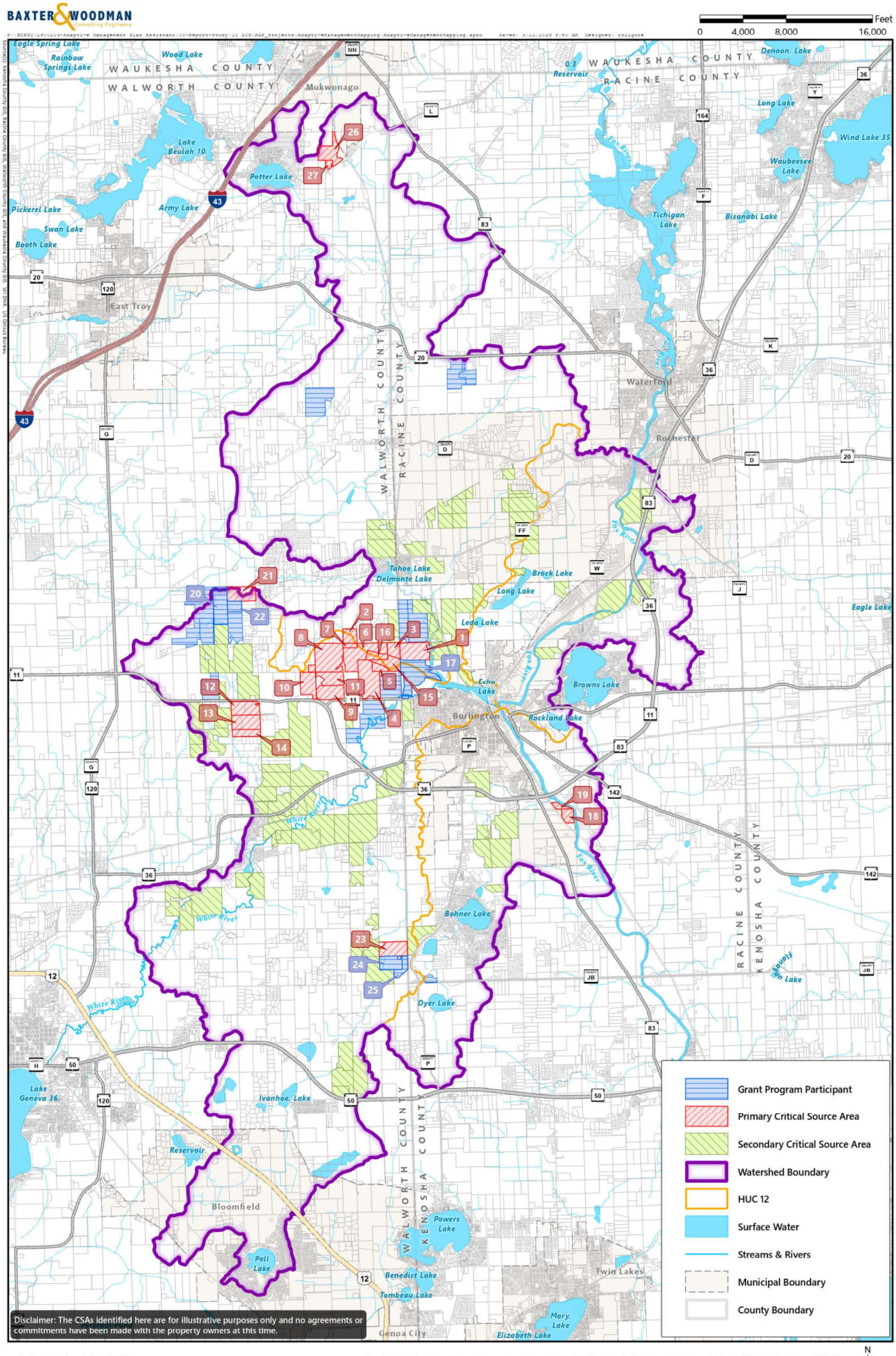
Action Area Floodplain Map

Exhibit 8
Phosphorus Contributions



Source: SEWRPC

Adaptive Management Plan Update
City of Burlington, WI
March 2026



March 2026

Adaptive Management Plan Update - Burlington, WI

EXHIBIT 9

Action Area Critical Source Areas