

Permit Fact Sheet

General Information

Permit Number:	WI-0020397-09-0	
Permittee Name:	East Troy Village	
Address:	2015 Energy Drive	
City/State/Zip:	East Troy WI 53120	
Discharge Location:	North bank of Perennial Stream B (a tributary to Honey Creek). Approximately 500 feet south of the WWTP and 2500 feet east of the bridge at Hwy G.	
Receiving Water:	Perennial Stream B, a tributary to Honey Creek (Sugar and Honey Creek Watersheds, Fox (IL) River Basin) in Walworth County	
Stream Flow (Q _{7,10}):	0.0 cfs	
Stream Classification:	Warm water forage fishery, non-public water supply	
Design Flow(s)	Daily Maximum	1.28 MGD
	Weekly Maximum	0.98 MGD
	Monthly Maximum	0.92 MGD
	Annual Average	0.81 MGD
Significant Industrial Loading?	No significant industrial loading.	
Operator at Proper Grade?	Yes, Mike Miller, Director of Public Works. The treatment plant requires the following operator certifications – Advanced: A1, B,C,D, P and L.	
Pretreatment Program Approval Date:	Not applicable	

Facility Description

The Village of East Troy operates a 0.81 MGD (annual average design flow) “Cannibal” process wastewater treatment facility and serves approximately 5,100 people and at least one industry. The wastewater treatment plant was upgraded in 2008 and consists of fine screening and grit removal followed by the “Cannibal” treatment system that includes a side-stream interchange bioreactor and solids separation system to reduce production of sludge. Alum is added to the aerobic tank for chemical phosphorus treatment before flowing to the clarifier. After clarification the wastewater is treated through tertiary filtration (sand filters), and finally UV disinfection prior to discharge to Perennial Stream B. Biosolids are treated through aerobic digestion, thickened with a belt press and stored as cake in drying beds before being land applied onto Department approved agricultural fields.

The Department has found the facility to be in substantial compliance with the current permit.

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	0.33 MGD (2015 Average)	Influent: 24-Hr flow proportional composite samples shall be taken from the raw wastewater flow channel after screening. Flow metered before screening and after pump stations.
001	Not monitored	Effluent composite samples shall be collected from the effluent automatic sampler, drawing from a point after tertiary filtration but before the ultraviolet (UV) light disinfection. Grab samples shall be collected after the UV light disinfection but prior to the effluent outfall pipe.
002	61 dry U.S. tons (2012 permit application)	Aerobically digested, Class B, cake sludge. Belt press thickened and stored onsite in drying beds. Samples shall be taken and composited from the drying beds.

1 Influent - Proposed Monitoring

1.1 Sample Point Number: 701- INFLUENT 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	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp	

1.1.1 Changes from Previous Permit:

No changes from previous permit.

1.1.2 Explanation of Limits and Monitoring Requirements

These are standard municipal wastewater requirements. Tracking of BOD and TSS is required for percent removal requirements.

2 Surface Water - Proposed Monitoring and Limitations

2.1 Sample Point Number:001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD5, Total	Weekly Avg	25 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective November - April annually
BOD5, Total	Weekly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective May - October annually
BOD5, Total	Monthly Avg	25 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective November - April annually
BOD5, Total	Monthly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective May - October annually
BOD5, Total	Weekly Avg	147 lbs/day	3/Week	Calculated	Limit effective November - April annually
BOD5, Total	Weekly Avg	59 lbs/day	3/Week	Calculated	Limit effective May - October annually
Suspended Solids, Total	Weekly Avg	25 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective November - April annually
Suspended Solids, Total	Weekly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective May - October annually
Suspended Solids, Total	Monthly Avg	25 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective November - April annually
Suspended Solids, Total	Monthly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective May - October annually
Suspended Solids, Total	Weekly Avg	147 lbs/day	3/Week	Calculated	Limit effective November - April annually
Suspended Solids, Total	Weekly Avg	59 lbs/day	3/Week	Calculated	Limit effective May - October annually
pH Field	Daily Max	9.0 su	Daily	Grab	Year round limit
pH Field	Daily Min	6.0 su	Daily	Grab	Year round limit
Dissolved Oxygen	Daily Min	6.0 mg/L	Daily	Grab	Year round limit
Fecal Coliform	Geometric Mean	400 #/100 ml	2/Week	Grab	Limit effective May - September annually
Nitrogen, Ammonia Variable Limit		mg/L	3/Week	Calculated	Report the calculated variable Ammonia limit on the DMR year round. See Maximum Ammonia Limits

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					Table below.
Nitrogen, Ammonia (NH3-N) Total	Daily Max – Variable	mg/L	3/Week	24-Hr Flow Prop Comp	Report Ammonia effluent value on the DMR year round.
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	10 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective November - March annually
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	6.4 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective April annually
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	2.6 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective May - September annually
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	9.1 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective October annually
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	4.1 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective November - March annually
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	2.5 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective April annually
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	1.0 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective May - September annually
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	3.6 mg/L	3/Week	24-Hr Flow Prop Comp	Limit effective October annually
Phosphorus, Total	Monthly Avg	1.0 mg/L	3/Week	24-Hr Flow Prop Comp	This is an interim limit. The final water quality based effluent limits are 0.075 mg/L (six-month average) and 0.225 mg/L (monthly average) and take effect at the end of the compliance schedule. See Phosphorus subsections in permit.
Phosphorus, Total		lbs/day	3/Week	Calculated	The final water quality based effluent limit is 0.51 lbs/day (six month average) and takes effect at the end of the phosphorus compliance schedule. See phosphorus subsections of the permit.
Chloride	Weekly Avg	482 mg/L	4/Month	24-Hr Flow Prop Comp	Sampling shall be done on four consecutive days. This is an interim limit. See

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					'Chloride Variance' subsection in permit and 'Schedules' section for the applicable chloride target value.
Chloride			4/Month	Calculated	Chloride mass discharge shall be calculated using the daily concentration (mg/L) x daily flow (MGD) x 8.34.
Temperature Maximum		deg F	3/Week	Continuous	Monitoring in calendar year 2020 (January 1 to December 31)
Chronic WET		rTUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	Three tests during permit term. See 'Whole Effluent Toxicity (WET) Testing' subsection in permit for monitoring dates and WET requirements.

2.1.1 Changes from Previous Permit

- **Ammonia (NH₃-N) Total Nitrogen:** Based on a review of the effluent ammonia data and at the request of the permittee, the sample frequency was decreased from 5/Week to 3/Week. This sample frequency is the same frequency as BOD₅, TSS, Phosphorus and Temperature. At the request of the permittee a daily maximum pH dependent variable ammonia limit is included in the proposed permit.
- **Total Phosphorus:** The existing technology-based limit of 1.0 mg/L is retained as an interim limit in the proposed permit. Final water quality based effluent limits are 0.075 mg/L, six-month average (November – April and May – October) and 0.225 mg/L monthly average and 0.51 lbs/day as a six-month average as specified in conjunction with the Phosphorus compliance schedule.
- **Total Residual Chlorine:** Chlorine monitoring and limitations are removed from the proposed permit. The permittee no longer uses chlorine for disinfection and has installed UV disinfection.
- **Chloride:** Calculation and reporting of the chloride mass discharge is included in the proposed permit.
- **Copper, Chromium and Nickel:** The industrial surface water discharge to perennial stream B has ceased and concentrations of these substances at the WWTF have not changed and are below a level of concern. Monitoring for these parameters is not required in the proposed permit but shall be included as part of the next permit application for reissuance.
- **Temperature Maximum:** 3/Week continuous monitoring included for calendar year 2020 (fourth year of proposed permit).

2.1.2 Explanation of Limits and Monitoring Requirements

Categorical Limits

- **BOD₅, TSS, DO, pH, fecal coliforms:** Standard municipal wastewater requirements for BOD₅, total suspended solids, dissolved oxygen, pH, and fecal coliforms are included based on ch. NR 210 Wis. Adm. Code ‘Sewage Treatment Works’ requirements for discharges to fish and aquatic life streams. Chapter NR 102, Wis. Adm. Code ‘Water Quality Standards for Surface Waters’ also specifies requirements for pH for fish and aquatic life streams.

Water Quality Based Limits and WET Requirements and Disinfection (if applicable)

Refer to the Water Quality-Based Effluent Limitations (WQBELs) memo for the Village of East Troy, prepared by Nick Lent dated January 26, 2016 and used for reissuance.

- **Ammonia (NH₃-N) Total Nitrogen:** Current acute and chronic ammonia toxicity criteria for the protection of aquatic life are included in Table 2C and Table 4B of Ch. NR 105, Wis. Adm. Code (effective March 1, 2004). Subchapter IV of Ch. NR 106 established procedures for calculating water quality-based effluent limitations (WQBELs) for ammonia (effective March 1, 2004).

A change in effluent pH from 8.2 to 8.3 s.u. resulted in a recalculation of the daily maximum ammonia limit to 9.4 mg/L. Based on effluent ammonia data reported during the current permit term there is reasonable potential to exceed the calculated water quality based limit of 9.4 mg/L under s. NR 106.05(3), Wis. Adm. Code. Therefore, the daily maximum ammonia limit is reduced from 11 mg/L to 9.4 mg/L. The calculated weekly average and monthly average limits are retained in the proposed permit. In accordance with s. NR 106.32(5), Wis. Adm. Code, mass limits for ammonia are not included. At the request of the permittee a daily maximum pH dependent variable ammonia limit is included in the proposed permit. See table below for pH variable daily maximum ammonia limits.

Effluent pH - su	NH ₃ -N Limit - mg/L	Effluent pH - su	NH ₃ -N Limit - mg/L
pH ≤ 7.5	40+	8.2 < pH ≤ 8.3	9.4
7.5 < pH ≤ 7.6	34	8.3 < pH ≤ 8.4	7.8
7.6 < pH ≤ 7.7	29	8.4 < pH ≤ 8.5	6.4
7.7 < pH ≤ 7.8	24	8.5 < pH ≤ 8.6	5.3
7.8 < pH ≤ 7.9	20	8.6 < pH ≤ 8.7	4.4
7.9 < pH ≤ 8.0	17	8.7 < pH ≤ 8.8	3.7
8.0 < pH ≤ 8.1	14	8.8 < pH ≤ 8.9	3.1
8.1 < pH ≤ 8.2	11	8.9 < pH ≤ 9.0	2.6

- **Total Phosphorus:** Revisions to the administrative rules for phosphorus discharge took effect on December 1, 2010. These revisions require an evaluation of the need for water quality based effluent limits. As a result, the recommended water quality-based limit for East Troy is 0.075 mg/L. The six-month limits will be expressed as averages covering the periods of November - April and May - October. In addition, a monthly average limit of 0.225 mg/L is recommended year-round. A mass limit is also required at East Troy under s. NR 217.14(1)(a)(3), Wis. Adm. Code, since the discharge is upstream of surface water that is impaired for total phosphorus, a mass limit of 0.51 lbs/day is also included. The 1.0 mg/L technology-based limit is retained in the proposed permit as an interim limit.

These final water quality-based limits are based on s. NR 217.14 (2), Wis. Adm. Code, with subsequent updates to associated guidance. For the reasons explained in the April 30, 2012 paper entitled ‘Justification for Use of Monthly, Growing Season and Annual Average Periods for Expression of WPDES Permit Limits for Phosphorus Discharges in Wisconsin’, WDNR has determined that it is impracticable to express the phosphorus WQBEL for the permittee as a maximum daily or weekly value. The final effluent limit for phosphorus is expressed as a six-month average. It is also expressed as a monthly average equal to three times the derived WQBEL. This final

effluent limit was derived from and complies with the applicable water quality criterion. Please see the phosphorus compliance schedule included in the Schedules section.

- **Chloride:** The 1-day P99 effluent concentrations for chloride were below the applicable acute limitation, so a daily maximum limit is not required. The 4-day P99 of 487.6 mg/L was above the applicable chronic limitation of 400 mg/L, so a chronic (weekly average) limit needs to be continued for the reissued permit. However, the permittee has re-applied for a variance from the chronic chloride water quality criterion, which requires EPA approval. The interim limit of 482 mg/L is continued from the current permit. As a condition of this variance a target value of 430 mg/L and the implementation of chloride source reduction measures, intended to lead to compliance with the target value by the end of the permit term, are also included in the proposed permit. See the schedules section below for the chloride compliance schedule. Acute and chronic chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 of ch. NR 105, Wis. Adm. Code; Subchapter IV of ch. NR 106 establishes the procedure for calculating water quality based effluent limitations (WQBELs) for chloride.

Chloride Source Reduction Measures

1. Continue to educate homeowners, commercial establishments, and installers by sending them a copy of the Chloride Reduction Letter that has been developed in the past. Update the letter as needed.
 2. Investigate streets and other areas that require high salt use in winter whereby salt is entering the collection system and conduct appropriate maintenance.
 3. Continue to inspect manholes during street maintenance activities. Upgrade manholes as needed.
 4. Test collection system by zones to identify reductions or sources of Chlorides based on original 2008 testing.
 5. Require Significant Commercial and Industrial contributors to evaluate their water treatment systems with regard to softened water requirements, with the result of that evaluation being the basis for potential restrictions to chloride inputs.
 6. Mandate a DIR and high salt efficiency standard for new residential softeners
 7. Request voluntary reductions in chloride from other industrial and commercial contributors and investigate chloride sources from car washes.
 8. Revise the agreement between the Village and dischargers outside the Village to include additional items to reduce chloride discharges.
 9. Investigate lab protocols for Chloride Analyses.
 10. Investigate the feasibility (technical and economic) of implementing lime softening as a means of achieving the WQBEL for chloride. The investigation may include an assessment of the existing infrastructure of the drinking water treatment plant, feasibility of installing a centralized lime softening system, applicability of lime softening and a cost analysis to determine expenses associated with centralized lime softening.
 11. Evaluate the elimination of discharge to “perennial stream B” by constructing a force main from the current outfall locations to Honey Creek.
- **Temperature Maximum:** Available temperature data indicated the apparent need for sub-lethal weekly average temperature limitations for the months of September through April pursuant to the procedures in ch. NR 106, Wis. Adm. Code. Therefore, sub lethal weekly average effluent limitations were recommended in the Water Quality-Based Effluent Limits (WQBEL) memo for East Troy. However, ch. NR 106.59(4), Wis. Adm. Code, allows

publicly operated treatment works to perform a dissipative cooling (DC) demonstration, which if successful, justifies exclusion of sub lethal weekly average effluent temperature limits in municipal discharge permits. East Troy has submitted a successful DC demonstration which was approved by the Department on January 22, 2016. The proposed permit includes 3/Week temperature maximum monitoring in the fourth year of the permit, calendar year 2020 and will be used for the next permit reissuance. In addition, dissipative cooling requests must be re-evaluated every permit reissuance. The permittee is responsible to submit an updated DC request as part of the permit application. Such a request must either include:

- a) A statement by the permittee that there have been no substantial changes in operation of, or thermal loadings to, the treatment facility and the receiving water; or
- b) New information demonstrating DC to supplement the information used in the previous DC determination. If significant changes in operation or thermal loads have occurred, additional DC data must be submitted to the Department.

It is also important to note that the Department’s stream biologist for Walworth Count indicated that the macroinvertebrate population in Perennial Stream B appears to be more adversely affected by the elevated discharge temperatures than the fish population. Therefore, another full stream assessment by the Department is recommended along with the updated DC request.

- **Chronic WET:** Whole Effluent Toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09, Wis. Adm. Code. See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist. The WET Guidance Document was used to determine appropriate test frequencies. (A completed checklist for outfall 001 is provided in the Department’s WQBEL memo dated January 26, 2016 and the website <http://dnr.wi.gov/topic/wastewater/WETChecklist.html> provides the WET checklist and instructions for its use.) Chronic WET tests are scheduled in the following rotating quarters: October - December 2016; April – June 2018; January - March 2020.

3 Land Application - Proposed 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)
002	B	Cake	Fecal Coliform	Incorporation when land applying	Land apply	61 dry U.S. tons (2012 permit application)
Does sludge management demonstrate compliance? Yes						
Is additional sludge storage required? No						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? No						
Is a priority pollutant scan required? No						

3.1 Sample Point Number:002- Bed dried cake sludge

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Solids, Total		Percent	Annual	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Monitor once in calendar year 2017. See subsection 3.2.1.5 below.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Monitor once in calendar

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					year 2017. See subsection 3.2.1.5 below.

3.1.1 Changes from Previous Permit:

No changes from previous permit.

3.1.2 Explanation of Limits and Monitoring Requirements

Requirements for land application of municipal sludge are determined in accordance with ch. NR 204 Wis. Adm. Code. Ceiling and high quality limits for metals in sludge are specified in s. NR 204.07(5), Wis. Adm. Code. Monitoring frequencies are in accordance with NR 204.06(2), Wis. Adm. Code. Limitations for PCBs are addressed in s. NR 204.07(3)(k), Wis. Adm. Code.

Land application of waste shall be done in accordance with the permit conditions and applicable codes. All land application sites shall be approved prior to their use. To receive a list of approved sites, or to be notified of potential approvals, contact the basin engineer.

4 Schedules

4.1 Chloride Target Value

As a condition of the variance to the water quality based effluent limitation(s) for chloride granted in accordance with s. NR 106.83(2), Wis. Adm. Code, the permittee shall perform the following actions.

Required Action	Due Date
<p>Annual Chloride Progress Report: Submit an annual chloride progress report. The annual chloride progress report shall:</p> <p>Indicate which chloride source reduction measures or activities in the approved Source Reduction Plan have been implemented;</p> <p>Include an analysis of trends in weekly, monthly and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data; and</p> <p>Include an analysis of how influent and effluent chloride varies with time and with significant loadings of chloride such as loads from industries or road salt intrusion into the collection system.</p> <p>After the first progress report is submitted, the permittee may submit a written request to the department to waive further annual progress reports. If after evaluating the progress of the source reduction measures, the department decides to accommodate the request, the department shall notify the permittee in writing that the subsequent annual reports are waived. The Final Chloride Report cannot be waived and shall be submitted by the Date Due.</p> <p>Note that the interim limitation of 482 mg/L remains enforceable until new enforceable limits are established in the next permit issuance. The first annual chloride progress report is to be submitted by the Date Due.</p>	01/31/2017
Annual Chloride Progress Report #2: Submit the chloride progress report as defined above.	01/31/2018
Annual Chloride Progress Report #3: Submit the chloride progress report as defined above.	01/31/2019

Annual Chloride Progress Report #4: Submit the chloride progress report as defined above.	01/31/2020
<p>Final Chloride Report: Submit the final chloride report documenting the success in meeting the chloride target value of 430 mg/L, as well as the anticipated future reduction in chloride sources and chloride effluent concentrations. The report shall summarize chloride source reduction measures that have been implemented during the current permit term and state which, if any, source reduction measures from the approved Source Reduction Plan were not pursued and why. The report shall include an analysis of trends in weekly, monthly and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data covering the current permit term. The report shall also include an analysis of how influent and effluent chloride varies with time and with significant loadings of chloride such as loads from industries or road salt intrusion into the collection system.</p> <p>Additionally the report shall include proposed target values and source reduction measures for negotiations with the department if the permittee intends to seek a renewed chloride variance per s. NR 106.83, Wis. Adm. Code, for the reissued permit.</p> <p>Note that the target value is the benchmark for evaluating the effectiveness of the chloride source reduction measures, but is not an enforceable limitation under the terms of this permit.</p>	01/31/2021
Annual Chloride Reports After Permit Expiration: In the event that this permit is not reissued on time, the permittee shall continue to submit annual chloride reports each year covering source reduction measures implemented and chloride concentration and mass discharge trends.	

4.1.1 Explanation of Schedule

Chloride Target Value

This compliance schedule is a condition of receiving a variance from the chronic water quality based chloride limit of 400 mg/L. Since a compliance schedule is being granted, an interim limit is required, and for East Troy that limit is established at 482 mg/L, which is continued from the current permit term. The schedule requires that annual reports shall indicate which source reduction measures East Troy has implemented during each calendar year, and an analysis of chloride concentration and mass discharge data based on chloride sampling and flow data. The annual reports shall document progress made towards meeting the chloride target value of 430 mg/L by the end of the permit term.

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

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

Required Action	Due Date
<p>Operational Evaluation Report: The permittee shall prepare and submit to the Department for approval an operational evaluation report. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by September 30, 2019. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than September 30, 2019 and state whether the measures, improvements, and modifications will enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report.</p>	09/30/2017

<p>If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by September 30, 2019 and is not required to comply with the milestones identified below for years 3 through 9 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance').</p> <p>STUDY OF FEASIBLE ALTERNATIVES - If the Operational Evaluation Report concludes that the permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than September 30, 2025.</p>	
<p>Compliance Alternatives, Source Reduction, Improvements and Modifications Status: The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.</p>	09/30/2018
<p>Preliminary Compliance Alternatives Plan: The permittee shall submit a preliminary compliance alternatives plan to the Department.</p> <p>If the plan concludes upgrading of the permittee's wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design report.</p> <p>If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan.</p> <p>If water quality trading will be undertaken, the plan must state that trading will be pursued.</p>	09/30/2019
<p>Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department.</p> <p>If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code.</p> <p>If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code.</p> <p>If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners.</p> <p>Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.</p>	09/30/2020

Progress Report on Plans & Specifications: Submit progress report regarding the progress of preparing final plans and specifications. Note: See ‘Alternative Approaches to Phosphorus WQBEL Compliance’ in the Surface Water section of this permit.	09/30/2021
Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2022
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2022
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2023
Construction Upgrade Progress Report #2: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2024
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	08/31/2025
Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2025

4.2.1 Explanation of Schedule

Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

Subsection NR 217.17, Wis. Adm. Code, allows the department to provide a schedule of compliance for water quality based phosphorus limits where the permittee cannot immediately achieve compliance. This compliance schedule requires the permittee to comply with the final water quality based phosphorus limits within 9 years. The duration of this compliance schedule will be re-evaluated upon permit reissuance to determine if the compliance schedule length is still necessary and appropriate.

It is probable that, in order to consistently comply with the concentration and mass limits, the permittee will need to evaluate and implement any number of the following approaches: plant optimization and phosphorus source reduction, pilot testing of new or additional treatment processes, obtaining financing for construction and the potential for adaptive management and/or pollutant trading with upstream contributors, and the implementation of such trades. The Department believes that the compliance schedule suggested in the draft permit (9 years) provides the appropriate length of time for the permittee to evaluate these options, implement the chosen option and meet the final phosphorus limits (WQBELs).

4.3 Land Application Management Plan

Required Action	Due Date
Management Plan: Submit a management plan to optimize the land application system performance and demonstrate compliance with ch. NR 204, Wis. Adm. Code. This management plan shall address: 1) specify information on pretreatment processes (if any), 2) land application site identification, 3) description of site limitations, 4) vegetative cover management and removal, 5) availability of storage, 6) type of transporting and spreading vehicle, 7) monitoring procedures, 8) tracking of site loading, 9) contingency plans for adverse weather or odor/nuisance abatement, and 10) any other pertinent information. Once approved, all landspreading activity must be completed in accordance with the plan.	11/30/2016

4.3.1 Explanation of Schedule

Land Application Management Plan

This management plan is being required to optimize the permittee’s land application processes and assure compliance with ch. NR 204, Wis. Adm. Code, for East Troy’s sludge outfall.

5 Attachments:

Substantial Compliance Determination – dated January 22, 2016, prepared by Amy Garbe-WDNR, Compliance Staff

Water Quality Based Effluent Limits – dated January 26, 2016, prepared by Nick Lent-WDNR, Effluent Limits Calculator

6 Proposed Expiration Date:

June 30, 2021

Prepared By:

Laura Dietrich, WDNR-Wastewater Permits Specialist

Date: March 15, 2016

Updated: April 25, 2016

Substantial Compliance Determination

Permittee Name: East Troy Village		Permit Number: 0020397-09-0
	Compliance?	Comments
Discharge Limits	Yes	BOD violations in 2008 due to being under construction. Ammonia violations in 2011 due to cold weather. TSS violations in 2014 due to a possible lab error. Minor chloride violations in 2009 and 2011-2014. Chloride source reduction measures are being taken.
Sampling/testing requirements	Yes	Influent and effluent samples are being gathered and tested as required by the current permit. Some missed samples in 2008 and 2011 but not a chronic issue.
Groundwater standards	NA	No groundwater requirements in current WPDES permit.
Reporting requirements	Yes	Reports are submitted correctly, but some are submitted late. Not a chronic issue.
Compliance schedules	Yes	Five reports were required as part of Chloride variance in current permit. Reports were submitted on time and correctly.
Management plan	NA	No required management plans in current permit. However, as part of new variance guidance, a source reduction plan will be required.
Other:	Yes	Due to some missing soil tests and site approvals, it is recommended that a land application management plan be included in the upcoming permit.
Enforcement Considerations	None	
In substantial compliance?	<p>Yes</p> <p>Comments: After review of report results and a site visit on 07/09/2015, the treatment plant has been found to be in substantial compliance with their current WPDES permit.</p> <p>Signature: Amy Garbe Date: 1/22/2016</p> <p>Concurrence: _____ Date: _____</p>	

CORRESPONDENCE/MEMORANDUM

DATE: January 26, 2016

FILE REF: 3200

TO: Laura Dietrich – SER

FROM: Nick Lent – SER *Nick Lent 01/26/2016*

SUBJECT: Water Quality-Based Effluent Limitations for the East Troy Wastewater Treatment Facility WPDES Permit No. WI-0020397-09

This is in response to your request for an evaluation of the need for water quality-based effluent limitations using Chapters NR 102, 104, 105, 106, 207, 210 and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the East Troy wastewater treatment facility in Walworth County. This municipal WWTF discharges to Perennial Stream B, a tributary to Honey Creek, located in the Sugar and Honey Creeks Watershed in the Fox (IL) River Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

No changes are recommended in the permit limitations for BOD₅, Total Suspended Solids, Dissolved Oxygen, pH, & Fecal Coliforms. Based on our review, the following recommendations are made on a chemical-specific basis:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Monthly Geometric Mean	Footnotes
BOD ₅ , Total: May - October Nov - April			10 mg/L, 59 lbs/day 25 mg/L, 147 lbs/day	10 mg/L 25 mg/L			1
TSS: May – October Nov – April			10 mg/L, 59 lbs/day 25 mg/L, 147 lbs/day	10 mg/L 25 mg/L			1
Nitrogen, Ammonia April May - September October November - March	9.4 mg/L 9.4 mg/L 9.4 mg/L 9.4 mg/L		6.4 mg/L 2.6 mg/L 9.1 mg/L 10 mg/L	2.5 mg/L 1.0 mg/L 3.6 mg/L 4.1 mg/L			
Dissolved Oxygen		6.0 mg/L					1
pH	9.0 s.u.	6.0 s.u.					1
Fecal Coliforms May – September						#400/100 mL	1
Chloride			400 mg/L 2700 lb./day				2
Phosphorus Interim Final				1.0 mg/L 0.225 mg/L	0.075 mg/L (0.51 lbs/day)		

Temperature								3
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Footnotes

1. These limitations are not being evaluated as part of this review. Since the reference effluent flow rates and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
2. This is the water quality-based effluent limitation for chloride. An interim effluent limitation of 482 mg/L (equal the current permit's interim limit), as a weekly average may be included in the permit in place of this limit if the chloride variance application that was submitted is approved by EPA.
3. 12 consecutive months of daily maximum effluent temperature monitoring is recommended. See Part 5 of the memo for more information.

Along with the chemical-specific recommendations mentioned above, the need for acute and chronic whole effluent toxicity (WET) monitoring and limits has also been evaluated for the discharge from East Troy. Following the guidance provided in the Department's January 27, 2014 *Whole Effluent Toxicity Program Guidance Document - Revision #10*, **no acute WET tests and three chronic WET tests are recommended in the reissued permit.** Tests should be done in rotating quarters, in order to collect seasonal information about this discharge.

Sampling concurrently with any chemical-specific toxic substances is also recommended. The chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5%. The Instream Waste Concentration to assess chronic test results is 100%. The primary control and dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from Perennial Stream B, upstream of Outfall 001, unless flow upstream of the outfall is insufficient to collect a sample, in which case synthetic lab water may be used.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Nick Lent at (414) 263-8623 or Nicholas.Lent@wisconsin.gov.

Attachments (3) – Water Quality-Based Effluent Limits, Thermal Effluent Limit Calculation Table, Site Map

PREPARED BY: Nick Lent - Wastewater Engineer, Effluent Limits Calculator

cc: Amy Garbe – Compliance Staff for Walworth County 2015, Waukesha office
 Theera Ratarasarn – Compliance Staff for Walworth County 2016, Milwaukee office
 Tim Ryan - Wastewater Field Supervisor, Fitchburg Office
 Amanda Minks – Water Resource Management Specialist, WY/3, E-copy only
 Diane Figiel – Water Resources Engineer, Effluent Limits Coordinator, WY/3

Attachment #1
**Water Quality-Based Effluent Limitations for
 East Troy Wastewater Treatment Facility**

WPDES Permit No. WI-0020397-09

Prepared by: Nick Lent

PART 1 – BACKGROUND INFORMATION

Facility Description:

The Village of East Troy operates a 0.81 million gallons per day (annual average design flow) “Cannibal” process wastewater treatment facility. The wastewater treatment plant was upgraded in 2008 and consists of preliminary (bar screen, grit removal and cleaning) treatment, secondary treatment (Cannibal system includes a side-stream interchange bioreactor and solids separation system to reduce production of sludge), chemical phosphorus treatment, secondary clarification, tertiary filtration (sand filters), and UV disinfection prior to discharge to Perennial Stream B. Biosolids are treated with aerobic digestion, thickened with a belt press, stored as cake in drying beds and land applied on approved sites and includes a side-stream interchange bioreactor and solids separation system to reduce production of sludge. The facility also has four sand filters, and uses ultraviolet light for disinfection. The WWTF serves approximately 700 people, and at least one industry.

Existing Permit Limitations:

The current permit, which expired on June 30th, 2013, includes the following effluent limitations:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Monthly Geometric Mean	Monitoring Only
BOD ₅ , Total: May - October			10 mg/L, 59 lbs/day	10 mg/L		
November - April			25 mg/L, 147 lbs/day	25 mg/L		
Suspended Solids, Total May - October			10 mg/L, 59 lbs/day	10 mg/L		
November - April			25 mg/L, 147 lbs/day	25 mg/L		
Dissolved Oxygen		6.0 mg/L				
pH	9.0 s.u.	6.0 s.u.				
Fecal Coliforms (May – September)					#400/100 mL	
Chloride ¹			482 mg/L			
Chlorine, Total Residual	38 µg/L		7.3 µg/L			
Copper, Total Recoverable						X
Chromium, Total Recoverable						X

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Nickel, Total Recoverable						X
Phosphorus				1.0 mg/L		
Nitrogen, Ammonia						
April	11 mg/L		6.4 mg/L	2.5 mg/L		
May - September	11 mg/L		2.6 mg/L	1.0 mg/L		
October	11 mg/L		9.1 mg/L	3.6 mg/L		
November - March	11 mg/L		10 mg/L	4.1 mg/L		

Footnotes:

1. This is an EPA-approved interim chloride limit. The final water quality-based effluent limit was calculated to be 400 mg/L in 2008.

Receiving Water Information:

- Name: Perennial Stream B
- Classification: Since Perennial Stream B is not listed as a variance water in ch. NR 104, Wis. Adm. Code, the receiving water is classified as a Fish and Aquatic Life water. Non-public water supply. Since there have been some long standing questions relating to the correct classification of Perennial Stream B, the Department performed a fish survey in August 2014 and an invertebrate survey in October 2014. Conversation with the local Water Quality Biologist and designated use staff in central office have confirmed that the suggested classification is a warm water forage fishery, which means the surface water is capable of supporting a diverse community of forage fish and other aquatic life.
- Flow: The following 7-Q₁₀ and 7-Q₂ values were estimated by Steve Galarneau, Aquatic Biologist, SE Region, WDNR. The Harmonic Mean has been estimated as recommended in *State of Wisconsin Water Quality Rules Implementation Plan* (Publ. WT-511-98)
 - 7-Q₁₀ = 0 cfs (cubic feet per second)
 - 7-Q₂ = 0 cfs
 - Harmonic Mean Flow = 0 cfs
- Hardness = 399 mg/L as CaCO₃. This value is the geometric mean of data in the permit application. Effluent hardness data is used since the receiving water low-flow is 0 cfs
- % of flow used to calculate limits: 25%
- Source of background concentration data: Background concentrations are not included since they don't impact the calculated WQBEL when the receiving water low-flows are equal to zero.
- Multiple dischargers: None. Plymouth Tube ceased discharging directly to Perennial Stream B in March 2015, and now discharges to East Troy's sanitary sewer.

Effluent Information:

- Flow: The following values have been rounded to two decimal places, from the original four that were listed in the May 13, 2008 WQBEL memo.
 - Annual average design flow = 0.81 MGD (Million Gallons per Day)
 - Peak daily design flow = 1.28 MGD
 - Peak weekly design flow = 0.98 MGD
 - Peak monthly design flow = 0.92 MGD
 For reference, the actual average (influent) flow from July 2008 through November 2015 was 0.36 MGD.
- Hardness = 399 mg/L as CaCO₃. This value is the geometric mean of data in the permit application.
- Effluent characterization: This facility is categorized as a minor municipality so the permit

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application required effluent sample analyses for a limited number of common pollutants, primarily metal substances plus nitrogen and hardness. In addition to the permit limitations, the current permit required additional monitoring for chromium, copper, and nickel. The results of all available toxics data is summarized in the tables in Part 2. Separate ammonia nitrogen and phosphorus data summaries are provided in Part 3 and Part 4 of this memo respectively. Effluent temperature data is listed in Part 5, and the results of whole effluent toxicity tests are listed in Part 6.

- Water Source: Village of East Troy wells
- Additives: At the WWTF, alum is used for phosphorus removal.

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

In general, permit limits for toxic substances are recommended 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 99th upper percentile (or P₉₉) 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).

The following tables list the water quality-based effluent limitations for this discharge along with the results of effluent sampling for all of the detected substances at the city WWTF. All concentrations are expressed in term of micrograms per Liter (µg/L), except for hardness and chloride (mg/L). “<” means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of any non-detected results.

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

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Arsenic		399.8	679.60	135.92	< 2.0		
Cadmium	399	50.40	100.80	20.16	< 0.5		
Chromium (+6)		16.02	32.04	6.41	0.85		
Copper	399	57.26	144.52			8.42	6
Lead	356	364.66	729.32	145.86	< 2		
Nickel	268	1048.88	2097.76	419.55	2.62		11
Zinc	333	344.68	689.36	137.87	33		33
Chloride - mg/L		757	1514			539.18	614

* 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.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC):RECEIVING WATER FLOW = 0 cfs (¼ of the 7-Q₁₀)

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		152.20		152.20	30.44	< 2.0	
Cadmium	175	3.82		3.82	0.76	< 0.5	
Chromium (+6)		10.98		10.98	2.20	0.85	
Copper	399	33.82		33.82			5.53
Lead	356	95.51		95.51	19.10	< 2	
Nickel	268	120.18		120.18		2.62	
Zinc	333	344.68		344.68	68.94	33	
Chloride - mg/L		395		395			487.6

* 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.

Monthly Average Limits based on Wildlife Criteria (WC):

The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

Monthly Average Limits based on Human Threshold Criteria (HTC):

RECEIVING WATER FLOW = 0 cfs (¼ of the Harmonic Mean)

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370		370	75	< 0.5
Lead	140		140	28	< 2
Nickel	43,000		43,000	8,600	2.62

Monthly Average Limits based on Human Cancer Criteria (HCC):

RECEIVING WATER FLOW = 0 cfs (¼ of the Harmonic Mean)

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3		13.3	2.7	< 2.0

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 effluent data is available for only one substance for which Human Cancer Criteria exists, and it was below the level of detection in the effluent, determination of the cumulative cancer risk is not needed.

Conclusions and Recommendations: On an individual basis, the following recommendations are made based on a comparison of effluent data and calculated effluent limitations:

Chloride – Considering available effluent data from the current permit term (July 2008 through

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November 2015), the 1-day P₉₉ for chloride is under the applicable ATC-based limit of 1514 mg/l, however the 4-day P₉₉ of 487.6 mg/l was over the CTC-based effluent limit of 395 mg/l, so a chronic (weekly average) limit needs to be continued for the reissued permit. East Troy's current permit includes a variance under subchapter VII of ch. NR 106, Wis. Adm. Code, and the village has reapplied for a variance in the reissued permit term. Similar to what was included in the current permit, the variance may be granted subject to the following conditions:

- 1) The permit shall include an "Interim" limitation intended to prevent an increase in the discharge of Chlorides;
- 2) The permit shall specify "Source Reduction Measures" to be implemented during the course of the permit term, with periodic progress reports; and
- 3) The permit shall include a "Target Limit" or "Target Value" to gage the effectiveness of the Source Reduction Measures, and progress toward the water quality-based effluent limitations.

Interim Limit for Chloride: Section NR 106.82(9), Wis. Adm. Code, defines a "weekly average interim limitation" as either the 4-Day P₉₉ concentration or no more than 105% of the highest weekly average concentration of the representative data. The 4-Day P₉₉ concentration is 487.6 mg/L. Using the same set of data, 105% of the highest weekly average concentration is 585.6 mg/L. This is based on the highest calculated weekly average of 557.75 mg/L which occurred in February 2009. Considering that the 4-day P₉₉ of current data is so close to the current interim limit (482 mg/L), **the current interim limit of 482 mg/L is recommended for reuse in permit reissuance.** Four samples per month (on consecutive days) are still recommended.

In the absence of a variance, East Troy would be subject to the water quality-based effluent limitations of 400 mg/L (395, rounded) and 2700 lb./day (395 mg/L x 0.81 mgd x 8.34 = 2670, rounded); and an alternative wet weather mass limit.

Chlorine – Since chlorine has been replaced by an ultraviolet system to disinfect seasonally, and is not believed to be present in the effluent, **chlorine effluent limitations are no longer necessary.**

Chromium, Copper, and Nickel – The current and past permits have included monitoring for these substances because a nearby industrial discharger was known to discharge these pollutants to the same receiving water as the WWTF. However since that industrial surface water discharge has ceased as of mid-2015 and has been directed to the WWTF collection system, and concentrations of these substances at the WWTF have not changed and are below a level of concern, **monitoring for these substances at the WWTF is no longer recommended in the reissued permit.** Instead, the effluent should be tested for these substances as part of the next permit application.

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

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.

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

Where:

A = 0.411 and B = 58.4 for a Warmwater Sport fishery, and
 pH (su) = maximum reasonably expected pH of the effluent

The current daily maximum limit of 11 mg/L was based on the assumption that the maximum reasonably expected pH of the effluent (estimated as the upper 99th percentile) was 8.2 s.u. (from January 1999 through February 2008). However, a facility upgraded was completed in 2008 that has had an effect on the maximum reasonably expected pH of the effluent. A review of daily pH values reported since 2010 shows the pH was ≥ 8.2 s.u. for 141 out of 2,160 reported days. Based on data from 2010 to current, the upper 99th percentile of daily maximum effluent pH is 8.3 s.u. Substituting a value of 8.3 s.u. into the equation above yields an ATC = 4.71 mg/L and a computed daily maximum limit of 9.4 mg/L. Since an effluent ammonia nitrogen concentration of greater than 9.4 mg/l was reported 12 times in January 2011, there is reasonable potential to exceed the water quality - based effluent limit under ch. NR 106.05(3), Wis. Adm. Code. As such, **the calculated daily maximum limit of 9.4 mg/L is recommended for the reissued permit term.** In addition to the reasonable potential determination, ammonia limits are often adjusted in other WPDES permits regardless of reasonable potential, because the facility has equipment in place for ammonia removal, and can easily meet the limit.

The rules allow manipulation of the effluent pH in order to comply with daily maximum limits for ammonia nitrogen. Consequently, 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 Limits – WWSF

Effluent pH - su	NH ₃ -N Limit – mg/L	Effluent pH - su	NH ₃ -N Limit – mg/L
pH ≤ 7.5	40+	8.2 < pH ≤ 8.3	9.4
7.5 < pH ≤ 7.6	34	8.3 < pH ≤ 8.4	7.8
7.6 < pH ≤ 7.7	29	8.4 < pH ≤ 8.5	6.4
7.7 < pH ≤ 7.8	24	8.5 < pH ≤ 8.6	5.3
7.8 < pH ≤ 7.9	20	8.6 < pH ≤ 8.7	4.4
7.9 < pH ≤ 8.0	17	8.7 < pH ≤ 8.8	3.7
8.0 < pH ≤ 8.1	14	8.8 < pH ≤ 8.9	3.1
8.1 < pH ≤ 8.2	11	8.9 < pH ≤ 9.0	2.6

Weekly and Monthly Average Limits Based on Chronic Toxicity Criteria (CTC):

The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, since those limits relate to the assimilative capacity of the receiving water. Chronic criteria are dependent on the classification, temperature and pH of the receiving water, as well as the presence or absence of early life stages of fish (ELS). Since these parameters have not changed since the current limits were calculated in 2008, the current limits are still applicable.

Attachment #1

Calculated ammonia nitrogen limits in the current permit

Ammonia Limitations (mg/L)	Weekly Average	Monthly Average
April	6.4	2.5
May-September	2.6	1.0
October	9.1	3.6
November - March	10	4.1

Where there are existing ammonia nitrogen limits in the permit, the limits are recommended to be retained regardless of reasonable potential, consistent with available draft language that has been prepared for a code revision/update to ch. NR 106.33, 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.

In summary, the following ammonia nitrogen limits are recommended for permit reissuance.

Ammonia Limitations (mg/L)	Daily Maximum	Weekly Average	Monthly Average
April	9.4	6.4	2.5
May-September	9.4	2.6	1.0
October	9.4	9.1	3.6
November - March	9.4	10	4.1

PART 4 –PHOSPHORUS

Technology Based Limit

The current permit contains a technology based effluent phosphorus limitation of 1.0 mg/L. This limit should remain in effect unless a more stringent limit is recommended.

Water Quality Based Effluent Limits

Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to ch. NR 102 (s. NR 102.05) Wis. Adm. Code, which establish phosphorus standards for surface waters. Revisions to ch. NR 217 (s. NR 217, Subchapter III), Wis. Adm. Code, establish procedures for determining water quality based effluent limits 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 reaches of rivers 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), s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.075 mg/L applies for Perennial Stream B, and Honey Creek.

The limit calculation formula is described in s. NR 217.13 (2)(a), Wis. Adm. Code, for phosphorus water quality based effluent limitations (WQBELs):

$$\text{Limitation} = [(WQC)(Q_s + (1-f)Q_e) - (Q_s - fQ_e)(C_s)] / Q_e$$

Where:

Attachment #1

WQC = 0.075 mg/L for Perennial Stream B.

Qs = 100% of the 7-Q₂ of 0 cfs.

Cs = median background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code.

Qe = effluent flow rate of 1.25 cfs.

f = the fraction of effluent withdrawn from the receiving water = 0

No background phosphorus concentration data upstream of the discharge is available at this time. However, upstream phosphorus concentrations don't have an effect on the final calculated limit when the receiving stream low-flow (7-Q₂) is zero cfs, since there is no possibility of dilution or assimilative capacity in the receiving water (when Qs = 0 in the above equation, (Qs-fQe)(Cs) also equals zero). In situations where there is no verified low-flow, the reasonable potential evaluation only includes analysis of effluent phosphorus concentration data. The following table lists a summary of the effluent concentrations of total phosphorus at East Troy from July 2008 through November 2015.

Total Phosphorus, mg/L	
1-day P ₉₉	1.47
4-day P ₉₉	0.85
30-day P ₉₉	0.53
Mean	0.39
Standard Deviation	0.29
Range	0.07 – 6.28
Sample Size	1350

Since the 30-day P₉₉ of effluent total phosphorus concentrations is 0.53 mg/L, the discharge has reasonable potential to exceed the calculated limit. In other words, the discharger has the reasonable potential to contribute to an exceedance of the applicable water quality standard in the receiving water. Therefore, the **recommended water quality-based effluent limitation is 0.075 mg/L as a six month average** and, due to s. NR 217.14(2), Wis. Adm. Code, **0.225 mg/L as a monthly average** is also applicable. A six month average should be averaged during the months of May – October and November – April.

Also, per s. NR 217.14 (1)(a)(3), Wis. Adm. Code, a mass limit is required since the discharge is upstream of a surface water that has a phosphorus impairment. **This final mass limit shall be 0.075 mg/L x 8.34 x 0.81 MGD = 0.51 lbs./day.** Although Perennial Stream B and Honey Creek are not specifically listed as impaired from excessive total phosphorus on the 303(d) list, Sugar Creek and the Fox (IL) River are, and are within 10 and 15 miles downstream of East Troy's discharge, respectively.

In-stream total phosphorus data from Honey Creek: This discussion is given since East Troy's consultant has collected in-stream total phosphorus data from Honey Creek at multiple locations upstream of Perennial Stream B for the past four years. A summary of that data was submitted to the Department for consideration on January 4, 2016.

- The median concentration of data from Townline Road (which is about 1.7 miles upstream of the East Troy's discharge to Perennial Stream B, and just upstream from the backwaters of a 29 acre

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impoundment held by the East Troy Dam) during the growing seasons in 2012 to 2015 ranged from 0.039 to 0.053 mg/L.

- The median concentration of data from downstream of the impoundment from the same time period ranged from 0.070 to 0.112 mg/L.

The submittal suggests that the impoundment is a significant contributor of phosphorus to Honey Creek, and notes that the impoundment was drawn down in late 2015 for a safety inspection, and will remain drawn down until October 2016. East Troy is planning on collecting phosphorus data downstream from the dam in 2016, in order to gauge whether or not dam removal could improve total phosphorus water quality in the downstream reaches of Honey Creek. The submittal also noted that the Village is considering relocating the outfall to Honey Creek in order to receive relaxed effluent limitations.

Considering neither of these actions have taken place at the time of this memo, and the current permit has been expired for over two years, the scope of this memo does not cover these potential changes. This memo is intended for immediate use by the permit drafter.

Interim Limit

Available effluent total phosphorus data suggests that a compliance schedule will be necessary in order for the facility to meet the water quality-based effluent limitation discussed earlier. An interim limit is needed when a compliance schedule is included in the permit. This limit should reflect a value which the facility is able to currently meet; however, it should also consider the receiving water quality, keeping the water from further impairment. Therefore, **an interim total phosphorus effluent limitation of 1.0 mg/L is recommended for permit reissuance.** This interim limit is the same as the current limit, but the proposed permit will include requirements for optimization of phosphorus removal.

PART 5 – THERMAL

New surface water quality standards for temperature took effect on October 1, 2010. These new 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.

In discharge situations when there is a non-zero receiving water low-flow, the highest daily maximum and weekly average flow rates are used in a mass balance equation in order to determine an allowable discharge temperature (“limits”) without violating in stream temperature standards beyond the regulatory mixing zone. However since Perennial Stream B has a 0 cfs low-flow, the limits are equal to the criterion for each month. A reasonable potential determination in this case involves comparing the highest daily maximum and weekly average discharge temperatures to the acute and sub lethal criteria listed in ch. NR 102, Wis. Adm. Code. In most cases with 0 cfs low-flow, publicly owned treatment works (POTW) temperature data will trigger effluent limits for the months of October through December. In cases where there effluent temperature is a little higher than average, limits may also be triggered for the months of September, and January through April. The latter is the case for East Troy, as shown in the following table.

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Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit (= criteria)	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	55	56	49	76
FEB	53	54	50	76
MAR	58	59	52	77
APR	59	60	55	79
MAY	63	64	65	82
JUN	69	71	76	84
JUL	74	75	81	85
AUG	73	74	81	84
SEP	74	77	73	82
OCT	*69	*70	61	80
NOV	*61	*62	49	77
DEC	58	59	49	76

*Note on temperature data- currently, effluent temperature data is still incomplete for the months of October and November from East Troy. However data from a nearby POTW (Bristol) is used per the allowance in ch. NR 106.59(2)(b), Wis. Adm. Code.

A complete effluent temperature limit calculation summary is provided in Attachment # 2.

Since preliminary calculations showed the need for sub-lethal weekly average limits from September through April at East Troy, Department staff encouraged the facility to perform a Dissipative Cooling (DC) demonstration as allowed in s. NR 106.59(4), Wis. Adm. Code. The purpose of the DC demonstration is to show that the discharge does not elevate the downstream temperature of the receiving water above the applicable criterion. East Troy performed a DC demonstration downstream of their discharge to Perennial Stream B from November 17th to 24th of 2015. The DC demonstration was submitted to the Department on January 5th, 2016, and approved by the Department on January 22nd, 2016. The submittal and subsequent evaluation are available in SWAMP. The DC demonstration showed that dissipative cooling of the effluent occurs as it travels down the receiving stream. Although the extent of the cooling during the week of the demonstration was less than expected based upon what has been observed from other facilities, a warm front brought air temperatures significantly above normal from November 14th through the 19th which likely skewed the data. During more normal conditions, a greater extent of dissipative cooling is expected since the average air temperatures are less than the sub-lethal weekly average criterion. Also, the DC demonstration was performed during the month of November as a conservative measure since that is when the difference between effluent temperatures and the calculated weekly average temperature limits are the greatest. Therefore, the sub-lethal weekly average criteria for other months which limits are triggered using the spreadsheet are expected to be attained closer to the point of discharge than exhibited in the in stream data collected November 17th to 24th of 2015. **No effluent temperature limits are recommended for East Troy's discharge to Perennial Stream B for permit reissuance.** Consistent with other facilities that have submitted DC

demonstrations, **12 consecutive months of daily maximum effluent temperature monitoring is recommended** to provide updated information relative to the next permit reissuance.

Additional Discussion - Future WPDES Permit Reissuance

The Department's stream biologist for Walworth County indicates that the macroinvertebrate population of Perennial Stream B appears to be more adversely affected by the elevated discharge temperature than the fish population (which has been reaffirmed to be at least a warm water forage fishery). **Therefore, another full stream assessment by the Department and an updated DC demonstration by the permittee are recommended in approximately 5 years, or shortly before the next permit reissuance.**

The compliance staff should communicate with the effluent limit calculator approximately two years before permit expiration/reissuance so that details of the appropriate actions can be communicated with the permittee and Department staff. In general, the updated DC demonstration must either include:

- a) A statement by the permittee that there have been no substantial changes in operation of, or thermal loadings to, the treatment facility and the receiving water; or
- b) New information demonstrating DC to supplement the information used in the previous DC determination. If significant changes in operation or thermal loads have occurred, additional DC data must be submitted to the Department.

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.

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. In order to assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC₅₀ (Lethal Concentration to 50% of the test organisms) greater than 100% effluent.
- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. In order to assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC₂₅ (25% Inhibition Concentration) greater than the instream waste concentration (IWC). The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of 100% 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:

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

Where:

Q_e = annual average design flow = 1.25 cfs

f = fraction of the Q_e withdrawn from the receiving water = 0

Q_s = ¼ of the 7-Q₁₀ = 0 cfs

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (referenced in s. NR 219.04, Wis. Adm. Code), the default acute dilution series is: 6.25, 12.5, 25, 50, 100%, and the default chronic dilution series is 12.5, 25, 50, 75, 100%. The permittee or Department staff may choose other dilution series, but alternate dilution series must be specified in the WPDES permit. For guidance on

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selecting an alternate dilution series, see Chapter 2.11 of the WET Guidance Document.

- Also according to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual*, receiving water must be used as the dilution water and primary control in 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 Perennial Stream B, upstream of Outfall 001, unless flow upstream of the outfall is insufficient to collect a sample, in which case synthetic lab water may be used. The receiving water location must be specified in the WPDES permit.
- Below is a tabulation of all available WET data for Outfall 001. Efforts are made to insure that decisions about WET monitoring and limits are made based on representative data. Data which is no longer believed to be representative of the discharge is not included in Reasonable Potential Factor (RPF) calculations. The table below differentiates between tests used and not used in RPF calculations.

Date Initiated	Acute Results				Chronic Results				Footnotes
	LC ₅₀ % (% survival in 100% effluent)				IC ₂₅ %				
	<i>C. dubia</i>	Fathead minnow	Pass or Fail?	Use in RPF?	<i>C. dubia</i>	Fathead Minnow	Pass or Fail?	Use in RPF?	
10/09/2001	100	100	Pass	Yes	100	100	Pass	Yes	
1/18/2005	100	100	Pass	Yes		100	Pass	Yes	
4/06/2007	100	100	Pass	Yes	100	100	Pass	Yes	
7/13/2007	100	100	Pass	Yes	100	100	Pass	Yes	
1/21/2010					100	100	Pass	No	1
4/11/2011					100		Pass	No	1
9/13/2011						100	Pass	Yes	

1- The DNR has reason to believe that whole effluent toxicity 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 Reasonable Potential Factor (RPF) analysis

The WET Checklist has been developed to assist DNR staff when deciding whether WET limits and monitoring are needed. The Checklist recommends acute and chronic WET limits (as needed) based on the Reasonable Potential Factor (RPF), as required by s. NR 106.08, Wis. Adm. Code. Monitoring frequencies are based on points accumulated during the Checklist analysis. As toxicity potential increases, more points accumulate and more monitoring is needed to insure that toxicity is not occurring. The completed WET Checklist and monitoring recommendations are summarized in the following table. For more information on the RPF and WET Checklist, see Chapter 1.3 of the WET Guidance Document, at: <http://dnr.wi.gov/topic/wastewater/documents/Chap1x3MonitoringLimits.pdf>

WET Checklist Summary

	Acute	Chronic
1. INSTREAM WASTE CONCENTRATION	1A. Not Applicable TOTAL POINTS = 0	1B. IWC = 100 % TOTAL POINTS = 15
2. HISTORICAL DATA	2A. Passed 4 out of 4 acute WET tests considered, RPF=0.00 TOTAL POINTS = 0	2B. Passed 5 out of 5 chronic WET tests considered, RPF=0.00 TOTAL POINTS = 0

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3. EFFLUENT VARIABILITY	3A. No history of violations or upsets TOTAL POINTS = 0	3B. Same as Acute TOTAL POINTS = 0
4. STREAM CLASSIFICATION	4A. Warmwater Forage Fish is the attainable use, but with no specification listed in ch. NR 104, Wis. Adm. Code, default FAL TOTAL POINTS = 5	4B. Same as Acute TOTAL POINTS = 5
5. CHEMICAL SPECIFIC DATA	5A. No new ATC limits (0 pts). Detects but no limits for Chloride, Cadmium, Chromium, Copper, and Zinc TOTAL POINTS = 3	5B. CTC Chloride limit still needed (5 pts). Detects but no limits for Cadmium, Chromium, Copper, and Zinc TOTAL POINTS = 8
6. ADDITIVES	6A. Alum used for phosphorus removal TOTAL POINTS = 1	6B. Same as Acute TOTAL POINTS = 1
7. DISCHARGE CATEGORY	7A. 1 Industrial contributor TOTAL POINTS = 5	7B. Same as Acute TOTAL POINTS = 5
8. WASTEWATER TREATMENT	8A. Secondary Treatment or better TOTAL POINTS = 0	8B. Same as Acute TOTAL POINTS = 0
9. DOWNSTREAM IMPACTS	9A. None noted TOTAL POINTS = 0	9B. Same as Acute TOTAL POINTS = 0
TOTAL POINTS	14	34

- Based upon the point totals generated in the WET checklist above and guidance provided in the Department's January 27, 2014 *WET Program Guidance Document - Revision #10*, **no acute WET tests and three chronic WET tests are recommended during the next permit term.**

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	East Troy WWTF	Data Range	7Q10 or 4B3:	0 cfs
Outfall(s):	001	Start:	Dilution:	25%
Date Prepared:	16-Dec-15	End:	f:	0
Design Flow (Qe):	0.81 mgd	Stream type:	Small warm water sport or forage fish community	
Region:	SE	Qs:Qe ratio:	0.0 :1	

Calculation Needed? **YES**

Month	Water Quality Criteria		Receiving Water Flow Rate (Qs) (cfs)	Representative Highest Effluent Flow Rate (Qe)		Representative Highest Monthly Effluent Temperature		99th Percentile of Representative Data		Calculated Effluent Limits	
	Ta (default) (°F)	Sub-Lethal WQC (°F)		Acute WQC (°F)	7-day Rolling Ave (Qesl) (mgd)	Daily Max Flow Rate (Qea) (mgd)	Weekly Ave (°F)	Daily Max (°F)	Weekly Ave (°F)	Daily Max* (°F)	Weekly Ave Limit (°F)
JAN	33	49	76	0.519	0.987	55	56	54	55	49	76
FEB	34	50	76	0.436	0.530	53	54	53	55	50	76
MAR	38	52	77	0.486	0.657	58	59	55	60	52	77
APR	48	55	79	0.590	0.788	59	60	58	62	55	79
MAY	58	65	82	0.498	0.586	63	64	62	65	65	82
JUN	66	76	84	0.557	0.626	69	71	67	70	76	84
JUL	69	81	85	0.511	0.567	74	75	72	NA	81	85
AUG	67	81	84	0.421	0.462	73	74	72	74	81	84
SEP	60	73	82	0.416	0.491	74	77	73	75	73	82
OCT	50	61	80	0.384	0.413	69	70	68	71	61	80
NOV	40	49	77	0.390	0.405	61	62	61	64	49	77
DEC	35	49	76	0.413	0.451	58	59	58	60	49	76

*NA - Indicates that there are greater than 100 daily maximum values, therefore 99th percentile would be a value less than the recorded daily maximum.

Thermal Effluent Limit Calculation Table

Attachment 403



East Troy Area Site Map