

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio  
for **Hamilton County Polk Run Wastewater Treatment Plant (WWTP)**

Public Notice No.: 15-08-004  
Public Notice Date: August 4, 2015  
Comment Period Ends: September 4, 2015

Ohio EPA Permit No.: **1PK00019\*HD**  
Application No.: **OH0020419**

Name and Address of Applicant:  
**Board of County Commissioners of  
Hamilton County  
138 East Court Street, Room 603  
Cincinnati, OH 45202**

Name and Address of Facility Where  
Discharge Occurs:  
**Hamilton County Polk Run WWTP  
9744 East Kemper Road  
Loveland, OH 45140  
Hamilton County**

Receiving Water: Unnamed tributary of the Little Miami River

Subsequent Stream Network: Little Miami River, Ohio River

Introduction

Development of a Fact Sheet for NPDES permits is mandated by Title 40 of the Code of Federal Regulations (CFR), Section 124.8 and 124.56. This document fulfills the requirements established in those regulations by providing the information necessary to inform the public of actions proposed by the Ohio Environmental Protection Agency (Ohio EPA), as well as the methods by which the public can participate in the process of finalizing those actions.

This Fact Sheet is prepared in order to document the technical basis and risk management decisions that are considered in the determination of water quality based NPDES Permit effluent limitations. The technical basis for the Fact Sheet may consist of evaluations of promulgated effluent guidelines, existing effluent quality, instream biological, chemical and physical conditions, and the relative risk of alternative effluent limitations. This Fact Sheet details the discretionary decision-making process empowered to the Director by the Clean Water Act (CWA) and Ohio Water Pollution Control Law (Ohio Revised Code [ORC] 6111). Decisions to award variances to Water Quality Standards (WQS) or promulgated effluent guidelines for economic or technological reasons will also be justified in the Fact Sheet where necessary.

No antidegradation review was necessary.

Effluent limits based on available treatment technologies are required by Section 301(b) of the CWA. Many of these have already been established by the United States Environmental Protection Agency (U.S. EPA) in the effluent guideline regulations (a.k.a. categorical regulations) for industry categories in 40 CFR Parts 405-499. Technology-based regulations for publicly-owned treatment works are listed in the Secondary Treatment Regulations (40 CFR Part 133). If regulations have not been established for a category of dischargers, the director may establish technology-based limits based on best professional judgment (BPJ).

Ohio EPA reviews the need for water-quality-based limits on a pollutant-by-pollutant basis. Wasteload allocations (WLAs) are used to develop these limits based on the pollutants that have been detected in the discharge, and the receiving water's assimilative capacity. The assimilative capacity depends on the flow in the water receiving the discharge, and the concentration of the pollutant upstream. The greater the upstream flow, and the lower the upstream concentration, the greater the assimilative capacity is. Assimilative capacity may represent dilution (as in allocations for metals), or it may also incorporate the break-down of pollutants in the receiving water (as in allocations for oxygen-demanding materials).

The need for water-quality-based limits is determined by comparing the WLA for a pollutant to a measure of the effluent quality. The measure of effluent quality is called Projected Effluent Quality (PEQ). This is a statistical measure of the average and maximum effluent values for a pollutant. As with any statistical method, the more data that exists for a given pollutant, the more likely that PEQ will match the actual observed data. If there is a small data set for a given pollutant, the highest measured value is multiplied by a statistical factor to obtain a PEQ; for example if only one sample exists, the factor is 6.2, for two samples - 3.8, for three samples - 3.0. The factors continue to decline as samples sizes increase. These factors are intended to account for effluent variability, but if the pollutant concentrations are fairly constant, these factors may make PEQ appear larger than it would be shown to be if more sample results existed.

### Summary of Permit Conditions

The effluent limits and monitoring requirements proposed for most parameters are the same as in the previous permit, although some monitoring frequencies have changed.

Loading limits are proposed to be reinstated for total suspended solids because the limits should not have been deleted in the previous permit.

New monitoring is proposed for total filterable residue because more data is required to determine if this parameter has the reasonable potential to exceed WQS.

New monthly monitoring is proposed for dissolved orthophosphate (as P) to satisfy the requirements of the recently signed Senate Bill 1.

Annual acute toxicity monitoring and new chronic toxicity monitoring are proposed for the life of the permit. This satisfies the minimum testing requirements of Ohio Administrative Code (OAC) 3754-33-07(B)(11) and will adequately characterize toxicity in the plant's effluent.

Metals are being removed from downstream monitoring station 901 because these are no longer required to evaluate water quality.

In Part II of the permit, special conditions are included that address operator certification, minimum staffing and operator of record; whole effluent toxicity (WET) testing; storm water compliance; pretreatment program requirements; and outfall signage.

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## Procedures for Participation in the Formulation of Final Determinations

The draft action shall be issued as a final action unless the Director revises the draft after consideration of the record of a public meeting or written comments, or upon disapproval by the Administrator of the U.S. Environmental Protection Agency.

Within thirty days of the date of the Public Notice, any person may request or petition for a public meeting for presentation of evidence, statements or opinions. The purpose of the public meeting is to obtain additional evidence. Statements concerning the issues raised by the party requesting the meeting are invited. Evidence may be presented by the applicant, the state, and other parties, and following presentation of such evidence other interested persons may present testimony of facts or statements of opinion.

Requests for public meetings shall be in writing and shall state the action of the Director objected to, the questions to be considered, and the reasons the action is contested. Such requests should be addressed to:

**Legal Records Section  
Ohio Environmental Protection Agency  
P.O. Box 1049  
Columbus, Ohio 43216-1049**

Interested persons are invited to submit written comments upon the discharge permit. Comments should be submitted in person or by mail no later than 30 days after the date of this Public Notice. Deliver or mail all comments to:

**Ohio Environmental Protection Agency  
Attention: Division of Surface Water  
Permits Processing Unit  
P.O. Box 1049  
Columbus, Ohio 43216-1049**

The Ohio EPA permit number and Public Notice numbers should appear on each page of any submitted comments. All comments received no later than 30 days after the date of the Public Notice will be considered.

Citizens may conduct file reviews regarding specific companies or sites. Appointments are necessary to conduct file reviews, because requests to review files have increased dramatically in recent years. The first 250 pages copied are free. For requests to copy more than 250 pages, there is a five-cent charge for each page copied. Payment is required by check or money order, made payable to Treasurer State of Ohio.

For additional information about this fact sheet or the draft permit, contact Sara Hise, (614) 644-4824, [sara.hise@epa.ohio.gov](mailto:sara.hise@epa.ohio.gov).

## Information Regarding Certain Water Quality Based Effluent Limits

This draft permit may contain proposed water-quality-based effluent limits (WQBELs) for parameters that **are not** priority pollutants. (See the following link for a list of the priority pollutants: [http://epa.ohio.gov/portals/35/pretreatment/Pretreatment\\_Program\\_Priority\\_Pollutant\\_Detection\\_Limits.pdf](http://epa.ohio.gov/portals/35/pretreatment/Pretreatment_Program_Priority_Pollutant_Detection_Limits.pdf).) In accordance with ORC 6111.03(J)(3), the Director established these WQBELs after considering, to the extent consistent with the Federal Water Pollution Control Act, evidence relating to the technical feasibility and economic reasonableness of removing the polluting properties from those wastes and to evidence relating to conditions calculated to result from that action and their relation to benefits to the people of the state and to accomplishment of the purposes of this chapter. This determination was made based on data and information

available at the time the permit was drafted, which included the contents of the timely submitted NPDES permit renewal application, along with any and all pertinent information available to the Director.

This public notice allows the permittee to provide to the Director for consideration during this public comment period additional site-specific pertinent and factual information with respect to the technical feasibility and economic reasonableness for achieving compliance with the proposed final effluent limitations for these parameters. The permittee shall deliver or mail this information to:

**Ohio Environmental Protection Agency  
Attention: Division of Surface Water  
Permits Processing Unit  
P.O. Box 1049  
Columbus, Ohio 43216-1049**

Should the applicant need additional time to review, obtain or develop site-specific pertinent and factual information with respect to the technical feasibility and economic reasonableness of achieving compliance with these limitations, written notification for any additional time shall be sent to the above address no later than 30 days after the Public Notice Date on Page 1.

Should the applicant determine that compliance with the proposed WQBELs for parameters other than the priority pollutants is technically and/or economically unattainable, the permittee may submit an application for a variance to the applicable WQS used to develop the proposed effluent limitation in accordance with the terms and conditions set forth in OAC 3745-33-07(D). The permittee shall submit this application to the above address no later than 30 days after the Public Notice Date.

Alternately, the applicant may propose the development of site-specific WQS pursuant to OAC 3745-1-35. The permittee shall submit written notification regarding their intent to develop site specific WQS for parameters that are not priority pollutants to the above address no later than 30 days after the Public Notice Date.

## Location of Discharge/Receiving Water Use Classification

Hamilton County Polk Run WWTP discharges to an unnamed tributary of the Little Miami River; this unnamed tributary discharges to the Little Miami River at River Mile 21.8. Figure 1 shows the approximate location of the facility.

This segment of the unnamed tributary of the Little Miami River is not specifically designated under Ohio's WQS (OAC 3745-1-18); therefore, the default use is Warmwater Habitat. The subsequent stream, the Little Miami River, is described by Ohio EPA River Code: 11-001, U.S. EPA River Reach Code: 05090202-013, County: Hamilton, Ecoregion: Eastern Corn Belt Plains.

The confluence of the unnamed tributary to the Little Miami River is so close that the Hamilton County Polk Run WWTP is considered a direct discharger to the Little Miami River. The Little Miami River is designated for the following uses under Ohio's WQS (OAC 3745-1-18): Exceptional Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, and Class A Primary Contact Recreation.

Use designations define the goals and expectations of a waterbody. These goals are set for aquatic life protection, recreation use and water supply use, and are defined in the Ohio WQS (OAC 3745-1-07). The use designations for individual waterbodies are listed in rules -08 through -32 of the Ohio WQS. Once the goals are set, numeric WQS are developed to protect these uses. Different uses have different water quality criteria.

Use designations for aquatic life protection include habitats for coldwater fish and macroinvertebrates, warmwater aquatic life and waters with exceptional communities of warmwater organisms. These uses all meet the goals of the federal CWA. Ohio WQS also include aquatic life use designations for waterbodies which cannot meet the CWA goals because of human-caused conditions that cannot be remedied without causing fundamental changes to land use and widespread economic impact. The dredging and clearing of some small streams to support agricultural or urban drainage is the most common of these conditions. These streams are given Modified Warmwater or Limited Resource Water designations.

Recreation uses are defined by the depth of the waterbody and the potential for wading or swimming. Uses are defined for bathing waters, swimming/canoeing (Primary Contact Recreation) and wading only (Secondary Contact which are generally waters too shallow for swimming or canoeing).

Water supply uses are defined by the actual or potential use of the waterbody. Public Water Supply designations apply near existing water intakes so that waters are safe to drink with standard treatment. Most other waters are designated for agricultural water supply and industrial water supply.

## Facility Description

Hamilton County Polk Run WWTP is operated by the Metropolitan Sewer District of Greater Cincinnati (MSDGC). It was constructed in 1969 and last upgraded in 2005. The average design flow is 8.0 million gallons per day (MGD). The plant has a maximum capacity of 30 MGD, but the flow would not receive full treatment. The plant has an instantaneous hydraulic capacity of 18 MGD for full treatment, and can sustain full treatment at 13-15 MGD. Flows over 18 MGD are diverted to an equalization tank and then returned to the headworks for full treatment. Hamilton County Polk Run WWTP has the following treatment processes which are shown on Figure 2:

- Fine screening
- Grit removal
- Primary sedimentation
- Activated sludge (conventional)

- Secondary clarification
- Ultraviolet disinfection

Hamilton County Polk Run WWTP does not have a plant bypass. The collection system has 100% separated sewers and 0% combined sewers in the collection system. MSDGC implements an Ohio EPA approved industrial pretreatment program at the Hamilton County Polk Run WWTP. The Hamilton County Polk Run WWTP collection system has zero categorical users, two non-categorical users that discharge 0.1285 MGD of flow, and one significant non-categorical user that discharges 0.0045 MGD of flow.

Hamilton County Polk Run WWTP treats sewage sludge by gravity thickening and transfers the sludge to other MSDGC wastewater treatment facilities.

Hamilton County Polk Run WWTP is subject to the following additional conditions: a U.S. EPA Consent Order for combined sewer overflows (CSOs) and SSOs.

#### Description of Existing Discharge

Hamilton County Polk Run WWTP estimates there is an infiltration/inflow (I/I) rate to the collection system of 1.0 MGD.

Abatement of CSOs and sanitary sewer overflows (SSOs) in the Hamilton County Polk Run WWTP service area is being addressed under the *Consent Decree on CSOs, WWTPs and Implementation of Capacity Assurance Program Plan for SSOs* (Civil Action Number C-1-02-107; U.S. District Court for the Southern District of Ohio Western Division; June 9, 2004). The complete decree and accompanying exhibits are available at the following Ohio EPA webpage: <http://epa.ohio.gov/dsw/enforcement/enf.aspx> [click on “Federal and State Consent Agreements, Judicial Orders and Judgements (2001-2013) – Alphabetical Order” and scroll down to “Hamilton County, Board of County Commissioners and City of Cincinnati (CSO)”].

Under the provisions of 40 CFR 122.21(j), the Director has waived the requirement for submittal of expanded effluent testing data as part of the NPDES renewal application. Ohio EPA has access to substantially identical information through the submission of annual pretreatment program reports and/or from Ohio EPA effluent testing conducted.

Table 1 presents chemical specific data compiled from data reported in annual pretreatment reports.

Table 2 presents chemical specific data compiled from data collected by Ohio EPA.

Table 3 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period January 2009 through January 2014, and current permit limits are provided for comparison.

Table 4 summarizes the chemical specific data for outfall 001 by presenting the average and maximum PEQ values.

Table 5 summarizes the results of acute WET tests of the final effluent.

Table 6 summarizes the screening results of Ohio EPA bioassay sampling of the final effluent.

#### Assessment of Impact on Receiving Waters

The Polk Run-Little Miami River watershed assessment unit, which includes the unnamed tributary of the Little Miami River in the vicinity of Hamilton County Polk Run WWTP, is listed as impaired for aquatic life on Ohio's 303(d) list due to nutrient enrichment and sedimentation.

A Total Daily Maximum Load (TMDL) report was approved for the lower Little Miami River watershed December 8, 2010. The March 24, 2015, Supreme Court of Ohio decision *Fairfield County Board of Commissioners v. Nally, Slip Opinion No. 2015-Ohio-991* vacated all previously approved TMDLs. As of this time, this TMDL is considered a technical guidance document pending final TMDL approval. An assessment of the impact of a permitted point source on the immediate receiving waters includes an evaluation of the available chemical/physical, biological, and habitat data which have been collected by Ohio EPA pursuant to the Five-Year Basin Approach for Monitoring and NPDES Reissuance. Other data may be used provided it was collected in accordance with Ohio EPA methods and protocols as specified by the Ohio WQS and Ohio EPA guidance documents. Other information which may be evaluated includes, but is not limited to: NPDES permittee self-monitoring data; effluent and mixing zone bioassays conducted by Ohio EPA, the permittee, or U.S. EPA.

In evaluating this data, Ohio EPA attempts to link environmental stresses and measured pollutant exposure to the health and diversity of biological communities. Stresses can include pollutant discharges (permitted and unpermitted), land use effects, and habitat modifications. Indicators of exposure to these stresses include whole effluent toxicity tests, fish tissue chemical data, and fish health biomarkers (for example, fish blood tests).

Use attainment is a term which describes the degree to which environmental indicators are either above or below criteria specified by the Ohio WQS (OAC 3745-1). Assessing use attainment status for aquatic life uses primarily relies on the Ohio EPA biological criteria (OAC 3745-1-07; Table 7-15). These criteria apply to rivers and streams outside of mixing zones. Numerical biological criteria are based on measuring several characteristics of the fish and macroinvertebrate communities; these characteristics are combined into multimetric biological indices including the Index of Biotic Integrity and modified Index of Well-Being, which indicate the response of the fish community, and the Invertebrate Community Index, which indicates the response of the macroinvertebrate community. Numerical criteria are broken down by ecoregion, use designation, and stream or river size. Ohio has five ecoregions defined by common topography, land use, potential vegetation and soil type.

Three attainment status results are possible at each sampling location -full, partial, or non-attainment. Full attainment means that all of the applicable indices meet the biocriteria. Partial attainment means that one or more of the applicable indices fails meet the biocriteria. Nonattainment means that either none of the applicable indices meet the biocriteria or one of the organism groups indicates poor or very poor performance. An aquatic life use attainment table (see Table 7) is constructed based on the sampling results and is arranged from upstream to downstream and includes the sampling locations indicated by river mile, the applicable biological indices, the use attainment status (i.e., full, partial, or non), the Qualitative Habitat Evaluation Index, and comments and observations for each sampling location.

Polk Run-Little Miami River is impaired for siltation, organic enrichment, low dissolved oxygen, direct habitat alternation, and some unknown toxicity. The river mile nearest the Hamilton County Polk Run WWTP is in full attainment. The full TMDL report can be found at this website:

[http://epa.ohio.gov/portals/35/tmdl/Lower%20LMR\\_TMDL%20Report\\_FINAL\\_FINAL\\_Nov11.pdf](http://epa.ohio.gov/portals/35/tmdl/Lower%20LMR_TMDL%20Report_FINAL_FINAL_Nov11.pdf)

#### Development of Water-Quality-Based Effluent Limits

Determining appropriate effluent concentrations is a multiple-step process in which parameters are identified as likely to be discharged by a facility, evaluated with respect to Ohio water quality criteria, and examined to determine the likelihood that the existing effluent could violate the calculated limits.

### *Parameter Selection*

Effluent data for the Hamilton County Polk Run WWTP were used to determine what parameters should undergo WLA. The parameters discharged are identified by the data available to Ohio EPA DMR data submitted by the permittee, compliance sampling data collected by Ohio EPA, and any other data submitted by the permittee, such as priority pollutant scans required by the NPDES application or by pretreatment, or other special conditions in the NPDES permit. The sources of effluent data used in this evaluation are as follows:

Self-monitoring data (DMR)	January 2009 through January 2014
Pretreatment data	2010, 2011
Ohio EPA sampling data	2013

### *Statistical Outliers and Other Non-representative Data*

The data were examined and the following values were removed from the evaluation to give a more reliable PEQ: copper, 77.1 µg/L (3/24/11) and 117 µg/L (7/29/11) because the 3/24/11 value is nearly twice the next highest value and the 7/29/11 is nearly three times as high; zinc – 252 µg/L (2/26/10) because the value is almost twice the next highest value.

This data is evaluated statistically, and PEQ values are calculated for each pollutant. Average PEQ (PEQ<sub>avg</sub>) values represent the 95<sup>th</sup> percentile of monthly average data, and maximum PEQ (PEQ<sub>max</sub>) values represent the 95<sup>th</sup> percentile of all data points (see Table 4).

The PEQ values are used according to Ohio rules to compare to applicable WQS and allowable WLA values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no WLA is done for that parameter. If either PEQ<sub>avg</sub> or PEQ<sub>max</sub> is greater than 25 percent of the applicable WQS, a WLA is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required (see Table 8).

### *Wasteload Allocation*

For those parameters that require a WLA, the results are based on the uses assigned to the receiving waterbody in OAC 3745-1. Dischargers are allocated pollutant loadings/concentrations based on the Ohio WQS (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not degrade in the receiving water. For free flowing streams, WLAs using this method are done using the following general equation: Discharger WLA = (downstream flow x WQS) - (upstream flow x background concentration). Discharger WLAs are divided by the discharge flow so that the allocations are expressed as concentrations. Several dischargers to the Little Miami River are considered to be interactive and are presented on Figure 3.

The available assimilative capacity was distributed among them using the conservative substance wasteload allocation (CONSWLA) water quality model for conservative parameters. CONSWLA is the model Ohio EPA typically uses in multiple discharger situations. CONSWLA model inputs for flow are fixed at their critical low levels and inputs for effluent flow are fixed at their design or 50th percentile levels. Background concentrations are fixed at a representative value (generally a 50th percentile). A mass balancing method is then used to allocate effluent concentrations that maintain WQS under these conditions. This technique is appropriate when data bases are unavailable to generate statistical distributions for inputs and if the parameters modeled are conservative.

Hamilton County Polk Run WWTP discharges to an unnamed tributary to the Little Miami River; however, the discharge is close enough to the confluence with the Little Miami River that it is considered a direct discharger to the Little Miami River. The applicable waterbody uses for this facility's discharge and the associated Little Miami River stream design flows are as follows:

Aquatic life (Warmwater Habitat)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia	Average	Summer 30Q10
		Winter 30Q10
Agricultural Water Supply		Harmonic mean flow
Human Health (nondrinking)		Harmonic mean flow

Allocations are developed using a percentage of stream design flow as specified in Table 9, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

Ohio’s WQS implementation rules [OAC 3745-2-05(A)(2)(d)(iv)] required a phase out of mixing zones for bioaccumulative chemicals of concern (BCCs) as of November 15, 2010. This rule applied statewide. Mercury is a BCC. The mixing zone phase-out means that as of November 15, 2010 all dischargers requiring mercury limits in their NPDES permit must meet WQS at the end-of-pipe, which for mercury are 12 ng/L (average) and 1700 ng/L (maximum) in the Ohio River basin.

The data used in the WLA are listed in Table 9 and Table 10. The WLA results to maintain all applicable criteria are presented in Table 11.

*Whole Effluent Toxicity WLA*

Whole effluent toxicity (WET) is the total toxic effect of an effluent on aquatic life measured directly with a toxicity test. Acute WET measures short term effects of the effluent while chronic WET measures longer term and potentially more subtle effects of the effluent.

WQS for WET are expressed in Ohio’s narrative “free from” WQS rule [OAC 3745-1-04(D)]. These “free froms” are translated into toxicity units (TUs) by the associated WQS Implementation Rule (OAC 3745-2-09). WLAs can then be calculated using TUs as if they were water quality criteria.

The WLA calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit (TU<sub>c</sub>) and 7Q10 flow for the average and the acute toxicity unit (TU<sub>a</sub>) and 1Q10 flow for the maximum. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. For Hamilton County Polk Run WWTP, the WLA values are 1.0 TU<sub>a</sub> and 10.2 TU<sub>c</sub>.

The chronic toxicity unit (TU<sub>c</sub>) is defined as 100 divided by the estimate of the effluent concentration which causes a 25% reduction in growth or reproduction of test organisms (IC<sub>25</sub>):

$$TU_c = 100/IC_{25}$$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations except when the following equation is more restrictive (*Ceriodaphnia dubia* only):

$$TU_c = 100/\text{geometric mean of No Observed Effect Concentration and Lowest Observed Effect Concentration}$$

The acute toxicity unit (TU<sub>a</sub>) is defined as 100 divided by the concentration in water having 50% chance of causing death to aquatic life (LC<sub>50</sub>) for the most sensitive test species:

$$TU_a = 100/LC_{50}$$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations.

#### Reasonable Potential/ Effluent Limits/Hazard Management Decisions

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 10. The average PEL ( $PEL_{avg}$ ) is compared to the average PEQ ( $PEQ_{avg}$ ) from Table 4, and the  $PEL_{max}$  is compared to the  $PEQ_{max}$ . Based on the calculated percentage of the allocated value [ $(PEQ_{avg} \div PEL_{avg}) \times 100$ , or  $(PEQ_{max} \div PEL_{max}) \times 100$ ], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 11.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 12 presents the final effluent limits and monitoring requirements proposed for Hamilton County Polk Run WWTP outfall 001 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

#### *Water Temperature and Flow Rate*

Monitoring for these parameters is proposed to continue in order to evaluate the performance of the treatment plant.

#### *Dissolved Oxygen, Ammonia, Total Suspended Solids, and Carbonaceous Biochemical Oxygen Demand (5 day)*

The limits proposed for these parameters are all based on plant design criteria. These limits are protective of WQS. New loading limits are being proposed for total suspended solids; these were mistakenly omitted in the previous permit.

#### *E. coli, Oil & Grease, and pH*

Limits proposed for oil and grease, pH, and *Escherichia coli* are based on WQS (OAC 3745-1-07) and are proposed to continue. Class A Primary Contact Recreation standard for *E. coli* apply to Hamilton County Polk Run WWTP because the discharge is so close to the Little Miami River it is considered a direct discharger.

#### *Total Filterable Residue*

The Ohio EPA risk assessment (Table 11) places this parameter in group 5, which recommends limits to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), monitoring rather than limits is proposed for these parameters. The PEQ values calculated for this parameter (Table 4) may not be representative of its actual levels in the plant effluent since they were based on one data point. The purpose of the proposed monitoring is to collect additional data on the frequency of occurrence and variability of these pollutants in the plant's effluent.

#### *Copper*

The Ohio EPA risk assessment (Table 11) places this parameter in group 4. This placement, as well as the data in Table 1, Table 2, Table 3, and Table 4, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC 3745-33-07(A)(2). The monitoring frequency is proposed to be increased.

#### *Cadmium, Chromium, Hexavalent Chromium (Dissolved), Lead, Mercury, Nickel, and Zinc*

The Ohio EPA risk assessment (Table 11) places these parameters in groups 2 and 3. This placement, as well as the data in Table 1, Table 2, Table 3, and Table 4, support that these parameters do not have the reasonable

potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring at a low frequency is proposed to document that these pollutants continue to remain at low levels.

#### *Arsenic, Barium, Free Cyanide, Iron, Molybdenum, Selenium, and Silver*

The Ohio EPA risk assessment (Table 11) places these parameters in groups 2 and 3. This placement, as well as the data in Table 1, Table 2, Table 3, and Table 4, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No new monitoring is proposed.

#### *Nitrate+Nitrite, Total Kjeldahl Nitrogen, and Phosphorus*

The 2014 Ohio Integrated Water Quality Monitoring and Assessment Report (Ohio EPA) lists the Little Miami River watershed as impaired for aquatic life. Nutrients and organic enrichment/dissolved oxygen are listed as causes. Although the Little Miami River near the Hamilton County Polk Run WWTP was in full attainment, monthly monitoring for phosphorus, nitrate + nitrite and total Kjeldahl nitrogen is proposed to continue based on best technical judgment. The purpose of the monitoring is to maintain a nutrient data set for use in the TMDL study.

#### *Dissolved Orthophosphate*

New monthly monitoring is proposed for dissolved orthophosphate (as P). This monitoring is required by Ohio Senate Bill 1, which was signed by the Governor on April 2, 2015. Monitoring for orthophosphate is proposed to further develop nutrient datasets for dissolved reactive phosphorus and to assist stream and watershed assessments and studies. Ohio EPA monitoring, as well as other in-stream monitoring, is taken via grab sample, orthophosphate is proposed to be collected by grab sample to maintain consistent data to support watershed and stream surveys. Monitoring will be done by grab sample, which must be filtered within 15 minutes of collection using a 0.45-micron filter. The filtered sample must be analyzed within 48 hours.

#### *Whole Effluent Toxicity Reasonable Potential*

Based on evaluating the WET data presented in Table 5 and Table 6 and other pertinent data under the provisions of OAC 3745-33-07(B), the Hamilton County Polk Run WWTP is placed in Category 4 with respect to WET. While this indicates that the plant's effluent does not currently pose a toxicity problem, annual acute and new chronic toxicity testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). The proposed monitoring will adequately characterize toxicity in the plant's effluent.

#### *Additional Monitoring Requirements*

Monitoring for metals is proposed to be removed at downstream monitoring station 901 because the monitoring is no longer required to assess water quality.

Additional monitoring requirements proposed at the final effluent, influent and upstream/downstream stations are included for all facilities in Ohio and vary according to the type and size of the discharge. In addition to permit compliance, this data is used to assist in the evaluation of effluent quality and treatment plant performance and for designing plant improvements and conducting future stream studies.

#### *Sludge*

Limits and monitoring requirements proposed for the disposal of sewage sludge by the following management practices are based on OAC 3745-40: transfer to another facility with an NPDES permit.

#### Other Requirements

#### *Compliance Schedule*

Pretreatment Local Limits Review - A 13 month compliance schedule is proposed for MSD to submit a technical justification for either revising its local industrial user limits or retaining its existing local limits. If

revisions to local limits are required, MSD must also submit a pretreatment program modification request. Details are in Part I.C of the permit.

#### *Operator Certification and Operator of Record*

Operator certification requirements have been included in Part II of the permit in accordance with rules adopted in December 2006 (OAC 3745-7-02). These rules require the Hamilton County Polk Run WWTP to have a Class IV wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 001. These rules also require the permittee to designate one or more operator of record to oversee the technical operation of the sewerage system.

#### *Storm Water Compliance*

Parts IV, V, and VI have been included with the draft permit to ensure that any storm water flows from the facility site are properly regulated and managed. As an alternative to complying with Parts IV, V, and VI, the Hamilton County Polk Run WWTP may seek permit coverage under the general permit for industrial storm water (permit # OHR000005) or submit a “No Exposure Certification.” Parts IV, V, and VI will be removed from the final permit if: 1) the Hamilton County Polk Run WWTP submits a Notice of Intent (NOI) for coverage under the general permit for industrial storm water or submits a No Exposure Certification, 2) Ohio EPA determines that the facility is eligible for coverage under the general permit or meets the requirements for a No Exposure Certification, and 3) the determination by Ohio EPA can be made prior to the issuance of the final permit.

#### *Outfall Signage*

Part II of the permit includes requirements for the permittee to place and maintain a sign at each outfall to the unnamed tributary of the Little Miami River providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A).

**Figure 1. Location of Hamilton County Polk Run Wastewater Treatment Plant**

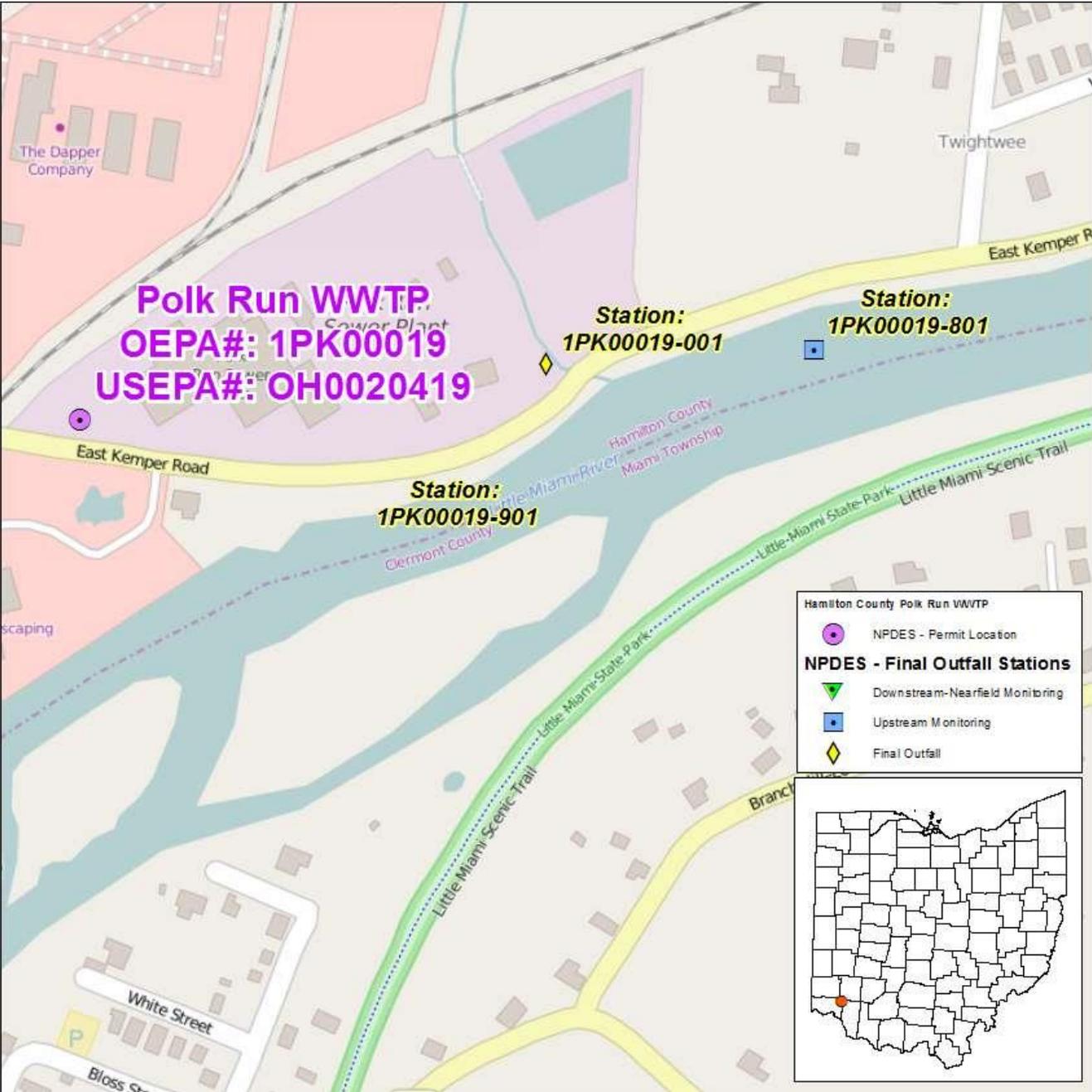
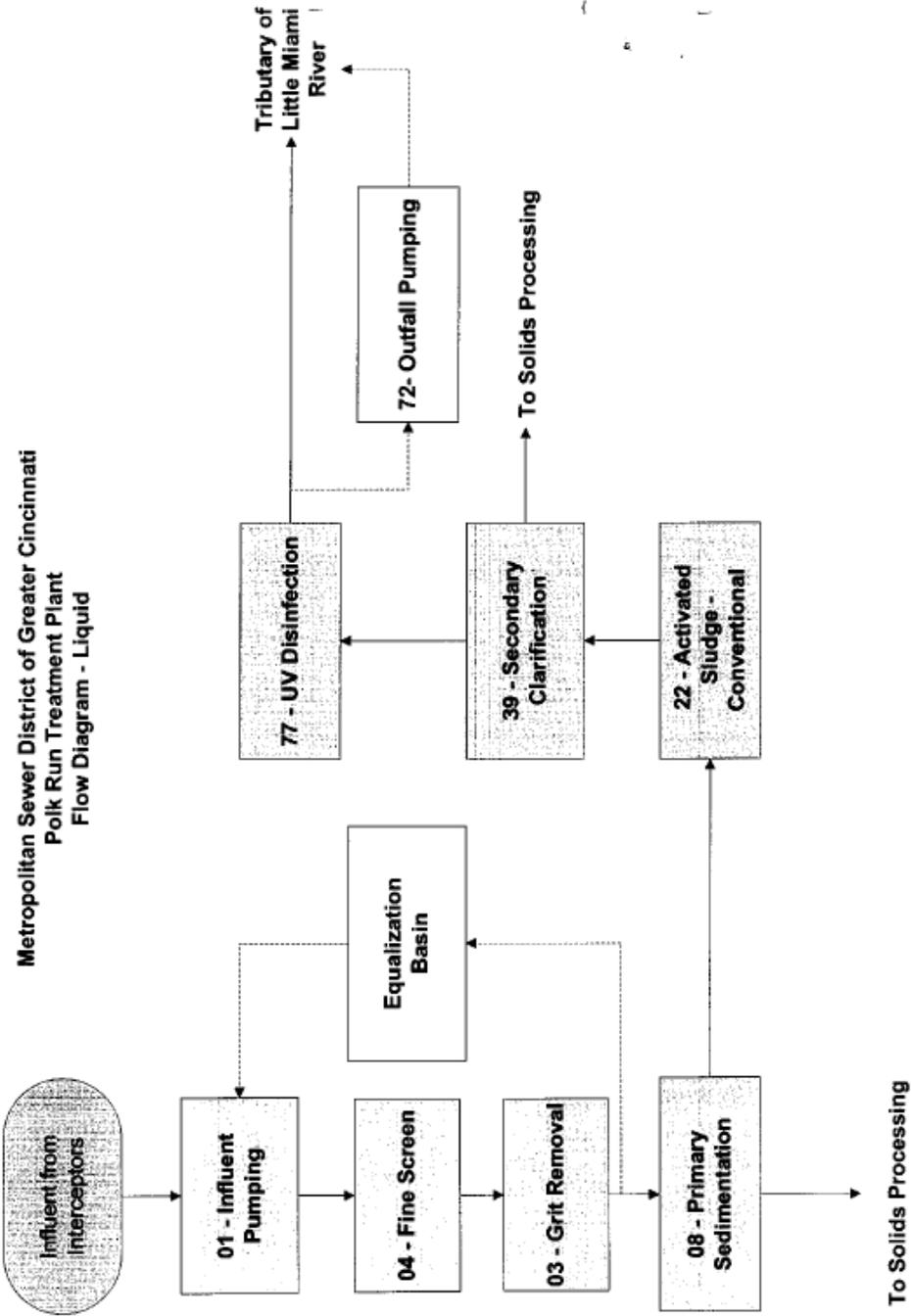
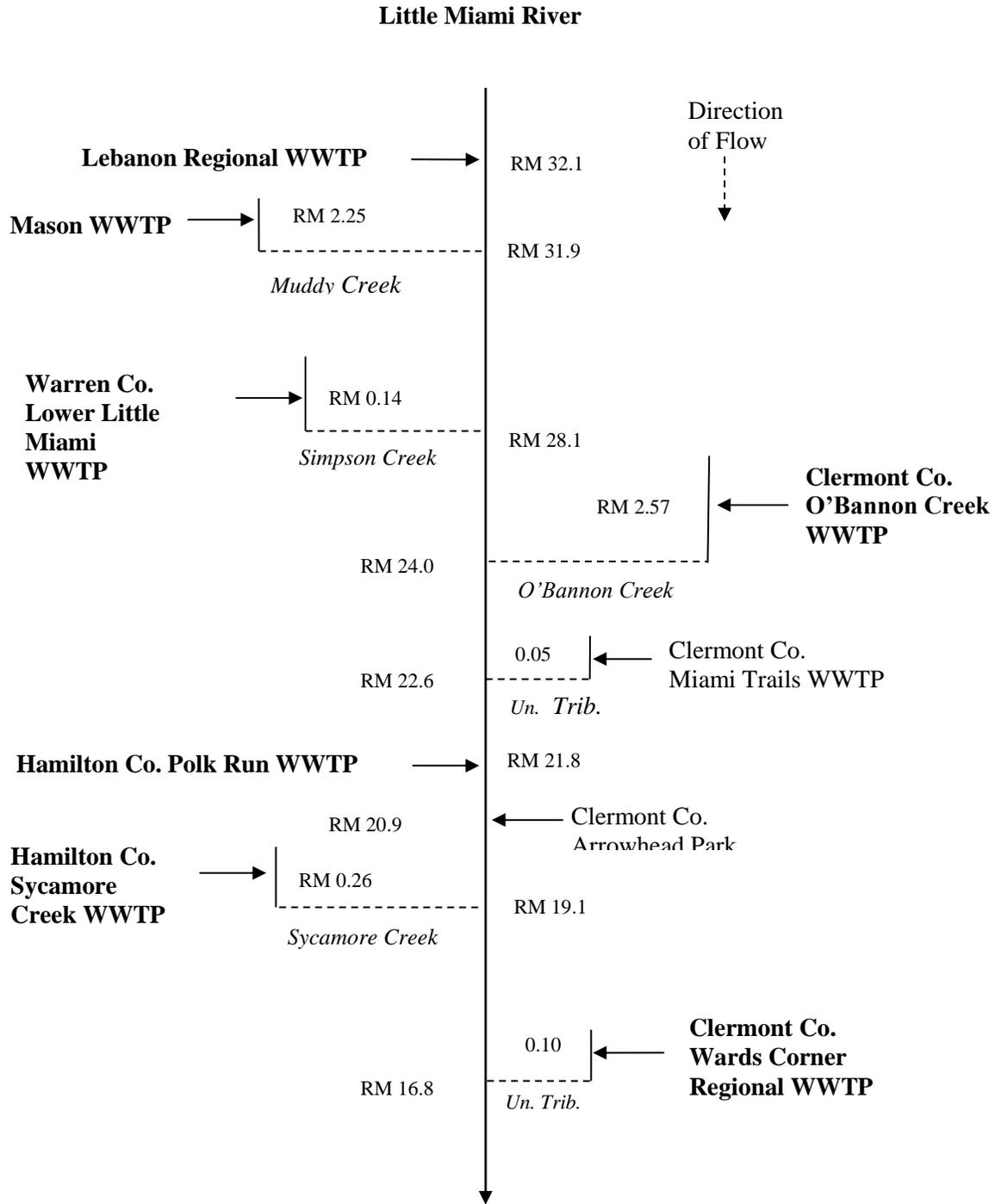


Figure 2. Diagram of Wastewater Treatment System



Form 2A, ILE.6.  
ELE 1/2015

**Figure 3. Little Miami River Study Area**



**Table 1. Effluent Characterization Using Pretreatment Data**

<b>Parameter (µg/L)</b>	<b>2/26/2010</b>	<b>7/15/2010</b>	<b>3/24/2011</b>	<b>7/29/2011</b>
Antimony	AA (50)	AA (50)	AA (50)	AA (50)
Arsenic	35.1	AA (5)	AA (5)	AA (5)
Beryllium	AA (1)	AA (1)	AA (1)	AA (1)
Cadmium	AA (2)	AA (2)	AA (2)	AA (2)
Chromium	AA (5)	AA (5)	AA (5)	AA (5)
Copper	16.2	14.5	77.1	117
Lead	AA (25)	AA (25)	AA (25)	AA (25)
Mercury	AA (0.2)	AA (0.2)	AA (0.2)	AA (0.2)
Nickel	AA (10)	AA (10)	AA (10)	25.2
Selenium	AA (50)	AA (50)	AA (50)	AA (50)
Silver	AA (3)	AA (3)	AA (3)	AA (3)
Thallium	AA (50)	AA (50)	AA (50)	AA (50)
Zinc	252	20.9	59.3	75.9

AA = not-detected (analytical method detection limit)

**Table 2. Effluent Characterization Using Ohio EPA data**

<b>Parameter</b>	<b>Units</b>	<b>4/30/2013</b>
Aluminium	µg/L	AA (200)
Ammonia	mg/L	0.345
Arsenic	µg/L	AA (2)
Barium	µg/L	28
Cadmium	µg/L	AA (0.2)
Calcium	mg/L	83
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/L	2.5
Chemical Oxygen Demand	mg/L	22
Chloride	mg/L	184
Chromium	µg/L	AA (2)
Copper	µg/L	14.7
Cyanide, Free	µg/L	AA (5)
Hardness, total	mg/L	306
Iron	µg/L	140
Lead	µg/L	AA (2)
Magnesium	mg/L	24
Manganese	µg/L	AA (10)
Nickel	µg/L	2.9
Nitrate+nitrite	mg/L	12.6
Oil & Grease	mg/L	AA (2.1)
Phenolics	µg/L	AA (10)
Phosphorus, total	mg/L	0.91
Potassium	mg/L	9
Selenium	µg/L	AA (2)
Sodium	mg/L	118
Strontium	µg/L	329
Total Filterable Residue	mg/L	704
Total Kjeldahl Nitrogen	mg/L	1.66
Total Suspended Solids	mg/L	AA (5)
Zinc	µg/L	24

AA = not-detected (analytical method detection limit)

**Table 3. Effluent Characterization Using Self-Monitoring Data**

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
<u>Outfall 001</u>								
Water Temperature	Annual	°C	----- Monitor -----		1857	18	24	11-24
Dissolved Oxygen	Annual	mg/L	--	5.0 Min.	1857	7.3	8.7	2.4-9.6
Total Suspended Solids	Summer	mg/L	12	18 <sup>a</sup>	366	4	14	1-30
	Winter	mg/L	30	45 <sup>a</sup>	372	4	16	1-38
Oil and Grease	Annual	mg/L	--	10	59	0	0.6	0-8
Ammonia	Summer	mg/L	1.5	2.3 <sup>a</sup>	366	0	1.58	0-10.7
		kg/day	45.4	69.6 <sup>a</sup>	--	--	--	--
	Winter	mg/L	15	23 <sup>a</sup>	371	0	1.9	0-5.9
		kg/day	454	696 <sup>a</sup>	--	--	--	--
Total Kjeldahl Nitrogen	Annual	mg/L	----- Monitor -----		617	1.3	3.9	0-11.9
Nitrate + Nitrite	Annual	mg/L	----- Monitor -----		617	10.3	15.5	0-19.2
Phosphorus	Annual	mg/L	----- Monitor -----		439	1.6	3.02	0-7.8
Nickel	Annual	µg/L	----- Monitor -----		20	0	5.3	0-11
Zinc	Annual	µg/L	----- Monitor -----		20	37	101	20-131
Lead	Annual	µg/L	----- Monitor -----		20	0	7.37	0-10.5
Chromium	Annual	µg/L	----- Monitor -----		20	0	0.35	0-7
Copper	Annual	µg/L	----- Monitor -----		20	15	28.6	7-39
Hexavalent Chromium (dissolved)	Annual	µg/L	----- Monitor -----		20	0	0	0-0
Cadmium	Annual	µg/L	----- Monitor -----		20	0	0	0-0
<i>E. coli</i>	Annual	#/100 mL	126	284 <sup>a</sup>	255	22	210	1-30000
Flow Rate	Annual	MGD	----- Monitor -----		1857	4.52	8.9	1.43-17.7
Mercury	Annual	ng/L	----- Monitor -----		54	0.45	2.81	0-4
Acute Toxicity, <i>Ceriodaphnia dubia</i>	Annual	TU <sub>a</sub>	----- Monitor -----		4	0	0	0-0
Acute Toxicity, <i>Pimephales promelas</i>	Annual	TU <sub>a</sub>	----- Monitor -----		4	0	0	0-0
pH, Maximum	Annual	S.U.	--	9	1857	7.1	7.5	6.8-8.4
pH, Minimum	Annual	S.U.	--	6.5	1857	7	7.2	6.5-7.4
Carbonaceous Biochemical Oxygen Demand (5 day)	Summer	mg/L	8	12 <sup>a</sup>	365	3	6.8	1-17
		kg/day	242	363 <sup>a</sup>	--	--	--	--
	Winter	mg/L	25	40 <sup>a</sup>	359	3	7	1-10
		kg/day	757	1220 <sup>a</sup>	--	--	--	--
<u>Station 581</u>								

**Table 3. Effluent Characterization Using Self-Monitoring Data**

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Sludge Weight	Annual	dry tons	----- Monitor -----		409	4.04	7.22	0.515-1040
<u>Influent Monitoring Station 601</u>								
pH	Annual	S.U.	----- Monitor -----		1280	7.3	7.6	6.1-8.2
Total Suspended Solids	Annual	mg/L	----- Monitor -----		739	188	479	23-3000
Total Kjeldahl Nitrogen	Annual	mg/L	----- Monitor -----		619	33	57.3	5.6-167
Phosphorus	Annual	mg/L	----- Monitor -----		619	4.3	10.8	0-49.9
Nickel	Annual	µg/L	----- Monitor -----		20	3.5	12.1	0-51
Zinc	Annual	µg/L	----- Monitor -----		20	116	291	47-316
Cadmium	Annual	µg/L	----- Monitor -----		20	0	2.8	0-37
Lead	Annual	µg/L	----- Monitor -----		20	1.75	11.7	0-22.6
Chromium	Annual	µg/L	----- Monitor -----		20	0	8.7	0-22
Copper	Annual	µg/L	----- Monitor -----		20	144	337	57-430
Hexavalent Chromium (Dissolved)	Annual	µg/L	----- Monitor -----		20	0	0	0-0
Mercury	Annual	ng/L	----- Monitor -----		54	61.3	220	9.4-308
pH, Maximum	Annual	S.U.	----- Monitor -----		1857	7.4	7.8	6.3-14
pH, Minimum	Annual	S.U.	----- Monitor -----		1857	7	7.3	5.7-7.6
Carbonaceous Biochemical Oxygen Demand (5 day)	Annual	mg/L	----- Monitor -----		724	110	254	16-588
<u>Upstream Monitoring Station 801</u>								
Water Temperature	Annual	°C	----- Monitor -----		60	13.3	24.5	0.1-27.5
Dissolved Oxygen	Annual	mg/L	----- Monitor -----		60	8.55	14	5.4-14.3
pH	Annual	S.U.	----- Monitor -----		60	8.1	8.51	7.3-8.8
Ammonia	Annual	mg/L	----- Monitor -----		60	0	0	0-0.6
Nitrate + Nitrite	Annual	mg/L	----- Monitor -----		60	2.1	3.18	0-3.8
Phosphorus	Annual	mg/L	----- Monitor -----		60	0	0.805	0-1.1
<i>E. coli</i>	Annual	#/100 mL	----- Monitor -----		21	275	2900	10-18900
<u>Downstream Monitoring Station 901</u>								
Water Temperature	Annual	°C	----- Monitor -----		60	14.2	24.1	1-27.4
Dissolved Oxygen	Annual	mg/L	----- Monitor -----		60	9.7	14.1	5.9-15.4
pH	Annual	S.U.	----- Monitor -----		60	8.1	8.51	7.5-8.6
Ammonia	Annual	mg/L	----- Monitor -----		60	0	0	0-0
Nitrate + Nitrite	Annual	mg/L	----- Monitor -----		60	2.02	3.22	0-3.8

**Table 3. Effluent Characterization Using Self-Monitoring Data**

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Phosphorus	Annual	mg/L	----- Monitor -----		60	0	0.705	0-1
Hardness	Annual	mg/L	----- Monitor -----		60	298	342	104-354
Nickel	Annual	µg/L	----- Monitor -----		20	0	5.7	0-19
Zinc	Annual	µg/L	----- Monitor -----		20	17.5	99.5	0-108
Cadmium	Annual	µg/L	----- Monitor -----		20	0	0	0-0
Lead	Annual	µg/L	----- Monitor -----		20	0	9.63	0-15.9
Chromium	Annual	µg/L	----- Monitor -----		20	0	0	0-0
Copper	Annual	µg/L	----- Monitor -----		20	0	7.05	0-8
Hexavalent Chromium (Dissolved)	Annual	µg/L	----- Monitor -----		20	0	0	0-0
<i>E. coli</i>	Annual	#/100 mL	----- Monitor -----		21	280	3300	14-22000

All values are based on annual records unless otherwise indicated. \* = For minimum pH, 5th percentile shown in place of 50th percentile; \*\* = For dissolved oxygen, 5th percentile shown in place of 95th percentile; a = weekly average.”

**Table 4. Projected Effluent Quality for Outfall 001**

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
<u>Self-Monitoring (DMR) Data</u>					
Ammonia (Summer)	mg/L	244	43	0.941	1.82
Ammonia (Winter)	mg/L	194	76	1.10	2.38
Cadmium <sup>A</sup>	µg/L	25	0	--	--
Chromium <sup>A</sup>	µg/L	21	1	6.64	9.1
Copper <sup>A</sup>	µg/L	23	23	27.3	40.1
Hexavalent Chromium (dissolved)	µg/L	20	0	--	--
Lead <sup>A</sup>	µg/L	18	5	10.7	14.7
Mercury <sup>A</sup>	ng/L	58	27	2.33	3.61
Nickel <sup>A</sup>	µg/L	25	9	17.6	25.4
Nitrate+Nitrite <sup>A</sup>	mg/L	618	616	8.41	11.5
Phosphorus <sup>A</sup>	mg/L	440	415	2.17	3.71
Zinc <sup>A</sup>	µg/L	24	24	87.0	135
<u>Combined Other Data<sup>B</sup></u>					
Arsenic	µg/L	5	1	58.9	80.7
Barium	µg/L	1	1	127	174
Calcium	mg/L	1	1	376	515
Chloride	mg/L	1	1	833	1141
Iron	µg/L	1	1	634	868
Magnesium	mg/L	1	1	109	149
Potassium	mg/L	1	1	40.7	55.8
Sodium	mg/L	1	1	534	732
Strontium	µg/L	1	1	1489	2040
Total Filterable Residue	mg/L	1	1	3186	4365

<sup>A</sup> = DMR data combined with Ohio Environmental Protection Agency (Ohio EPA) data and Pretreatment Program data.

<sup>B</sup> = Combined other data sources include Pretreatment Program data and Ohio EPA data.

DMR = Discharge Monitoring Report

MDL = analytical laboratory method detection limit

PEQ = projected effluent quality

**Table 5. Summary of Acute Toxicity Results**

Date	<i>Ceriodaphnia Dubia</i>	<i>Pimephales promelas</i>
	TU <sub>a</sub>	TU <sub>a</sub>
9/14/2010	AA	AA
9/6/2011	AA	AA
9/11/2012	AA	AA
9/17/2013	AA	AA

AA = non-detection; analytical method detection limit of 0.2 TU<sub>a</sub>  
 TU<sub>a</sub> = acute toxicity unit

**Table 6. Ohio EPA Toxicity Screening Results for Outfall 001**

Date	<i>Pimephales promelas</i> (%M)		<i>Ceriodaphnia dubia</i> (%M)	
	24 hours	48 hours	24 hours	48 hours
	4/29/2013	0	0	0
4/30/2013	0	0	0	0
4/29/13-4/30/13 <sup>a</sup>	0	0	0	5

<sup>a</sup> = 24-hour composite sample  
 %M = percent mortality in 100% effluent

**Table 7. A Summary of the Little Miami River and Selected Tributaries Use Designation Status, and Causes/Sources of Impairment, 2007 Survey**

Location	RM	Use Desig.	Attain. Status	Causes of Impairment	Sources of Impairment
LMR @ US 48	33	EWH	FULL		
LMR @ King's Mill Rd.	31	EWH	FULL		
LMR dst. Simpson Ck	28	EWH	FULL		
LMR upst. O'Bannon Ck	24	EWH	FULL		
LMR @ Loveland-Kemper Rd	22	EWH	FULL		
LMR adj. Lake Isabella	21	EWH	FULL		
LMR @ SR 126	18	EWH	FULL		
LMR @ Newtown Rd.	8.1	EWH	FULL		
Muddy Creek upst. Mason WWTP	2.5	WWH	PARTIAL	Natural Conditions (Flow)	Natural
Muddy Creek dst. Mason WWTP	0.5	WWH	PARTIAL	Sedimentation/Siltation, Nutrient/Organic, Enrichment(Sewage)	Municipal point source discharges
				Biological Indicators	
O'Bannon Creek @ Gibson Rd.	4.4	WWH	PARTIAL	Natural Conditions (Flow)	Natural
O'Bannon Creek @ SR 48.	0.3	WWH	FULL		
Sycamore Creek dst. N. Fk. Sycamore Ck.	0.5	WWH	FULL		
Sycamore Creek dst. Sycamore Ck. WWTP	0.1	WWH	FULL		

adj. = adjacent  
 Ck = creek  
 dst. = downstream  
 EWH = Exceptional warmwater habitat  
 Fk. = fork  
 LMR = Little Miami River  
 Rd. = road  
 SR = State Route  
 upst. = upstream  
 WWH = Warmwater habitat  
 WWTP = Wastewater treatment plant

**Table 8. Water Quality Criteria in the Study Area**

Parameter	Outside Mixing Zone Criteria					Inside Mixing Zone Maximum
	Average				Maximum Aquatic Life	
	Units	Human Health	Agri-culture	Aquatic Life		
<u>All Streams</u>						
Arsenic	µg/L	--	100	150	340	680
Barium	µg/L	--	--	220	2000	4000
Benzo(b)fluoranthene <sup>C</sup>	µg/L	0.49	--	--	--	--
Bis(2-ethylhexyl)phthalate <sup>C</sup>	µg/L	59	--	8.4	1100	2100
Bromomethane	µg/L	4000	--	16	38	75
Chlorine, Total Residual	µg/L	--	--	11	19	38
Chloroform <sup>C</sup>	µg/L	4700	--	140	1300	2600
Hexavalent Chromium (Dissolved)	µg/L	--	--	11	16	31
Cyanide, Free	µg/L	220000	--	12	46	92
Dibenzo(a,h)anthracene <sup>C</sup>	µg/L	0.49	--	--	--	--
Indeno(1,2,3-c,d)pyrene <sup>C</sup>	µg/L	0.49	--	--	--	--
Iron	µg/L	--	5000	--	--	--
Mercury <sup>B</sup>	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	20000	190000	370000
Nitrate+Nitrite	mg/L	--	100	--	--	--
Selenium	µg/L	11000	50	5	--	--
Strontium	µg/L	--	--	21000	40000	81000
Thallium	µg/L	6.3	--	17	79	160
Toluene	µg/L	200000	--	62	560	1100
Total Filterable Residue	mg/L	--	--	1500	--	--
<u>Little Miami River &amp; Simpson Creek; Hardness = 298. mg/L</u>						
Cadmium	µg/L	--	50	5.8	15	31
Chromium	µg/L	--	100	210	4400	8800
Copper	µg/L	1300	500	24	39	78
Lead	µg/L	--	100	26	490	980
Nickel	µg/L	4600	200	130	1200	2400
Silver	µg/L	--	--	1.3	10	21
Zinc	µg/L	69000	25000	300	300	600
<u>Muddy Creek; Hardness = 250. mg/L</u>						
Cadmium	µg/L	--	50	5.1	13	25
Chromium	µg/L	--	100	180	3800	7600

**Table 8. Water Quality Criteria in the Study Area**

Parameter	Outside Mixing Zone Criteria					Inside Mixing Zone Maximum
	Average				Maximum Aquatic Life	
	Units	Human Health	Agri-culture	Aquatic Life		
Copper	µg/L	1300	500	20	33	66
Lead	µg/L	--	100	21	390	790
Nickel	µg/L	4600	200	110	1000	2000
Silver	µg/L	--	--	1.3	7.7	15
Zinc	µg/L	69000	25000	260	260	520
<u>O'Bannon Creek; Hardness = 220. mg/L</u>						
Cadmium	µg/L	--	50	4.6	11	22
Chromium	µg/L	--	100	160	3400	6900
Copper	µg/L	1300	500	18	29	59
Lead	µg/L	--	100	18	330	670
Nickel	µg/L	4600	200	100	910	1800
Silver	µg/L	--	--	1.3	6.2	12
Zinc	µg/L	69000	25000	230	230	470
<u>Sycamore Creek; Hardness = 286. mg/L</u>						
Cadmium	µg/L	--	50	5.6	15	30
Chromium	µg/L	--	100	200	4300	8500
Copper	µg/L	1300	500	23	38	75
Lead	µg/L	--	100	24	470	930
Nickel	µg/L	4600	200	130	1100	2300
Silver	µg/L	--	--	1.3	9.7	19
Zinc	µg/L	69000	25000	290	290	580

B Bioaccumulative Chemical of Concern (BCC)

C Carcinogen

**Table 9. Instream Conditions and Discharger Flow**

Parameter	Units	Value				
		Little Miami	Muddy Creek	Simpson Creek	O'Bannon Creek	Sycamore Creek
7Q10 (annual)	cfs	58.8 <sup>A</sup>	0.0 <sup>B</sup>	0.0 <sup>B</sup>	0.0 <sup>B</sup>	0.0 <sup>B</sup>
1Q10 (annual)	cfs	46.9 <sup>A</sup>	0.0 <sup>B</sup>	0.0 <sup>B</sup>	0.0 <sup>B</sup>	0.0 <sup>B</sup>
30Q10 (summer)	cfs	78.9 <sup>A</sup>	0.0 <sup>B</sup>	0.0 <sup>B</sup>	0.0 <sup>B</sup>	0.01 <sup>B</sup>
30Q10 (winter)	cfs	224 <sup>A</sup>	0.62 <sup>B</sup>	0.06 <sup>B</sup>	2.61 <sup>B</sup>	1.46 <sup>B</sup>
Harmonic Mean (annual)	cfs	377 <sup>A</sup>	0.12 <sup>B</sup>	0.0 <sup>B</sup>	0.49 <sup>B</sup>	0.27 <sup>B</sup>
<b>Mixing Assumption</b>						
	% average	100	100	100	100	100
	% maximum	100	100	100	100	100
<b>Instream Hardness</b>						
	mg/L	298 <sup>C,D</sup>	250 <sup>C,D</sup>	298 <sup>C,D</sup>	220 <sup>C,D</sup>	286 <sup>C,D</sup>
<b>Background Water Quality</b>						
Arsenic	µg/L	1.0 <sup>C</sup>	3.1 <sup>C</sup>	2.6 <sup>C</sup>	1.2 <sup>C</sup>	1.0 <sup>C</sup>
Barium	µg/L	84 <sup>C</sup>	64.7 <sup>C</sup>	40 <sup>C</sup>	47.8 <sup>C</sup>	40 <sup>C</sup>
Benzo(b)fluoranthene	µg/L	0.0 <sup>E</sup>				
Bis(2-ethylhexyl)phthalate	µg/L	0.0 <sup>E</sup>				
Cadmium	µg/L	0.0 <sup>E</sup>				
Chlorine, Total Residual	µg/L	0.0 <sup>E</sup>				
Hexavalent Chromium (Dissolved)	µg/L	0.0 <sup>E</sup>				
Chromium	µg/L	15 <sup>C</sup>	0.0 <sup>F</sup>	0.0 <sup>F</sup>	0.0 <sup>F</sup>	0.0 <sup>F</sup>
Copper	µg/L	5.0 <sup>C</sup>	0.0 <sup>F</sup>	4.5 <sup>C</sup>	6.2 <sup>C</sup>	5.0 <sup>C</sup>
Cyanide, free	µg/L	0.0 <sup>E</sup>				
Dibenzo(a,h)anthracene	µg/L	0.0 <sup>E</sup>				
Ideno(1,2,3-c,d)pyrene	µg/L	0.0 <sup>E</sup>				
Iron	µg/L	453 <sup>C</sup>	198 <sup>C</sup>	258 <sup>C</sup>	330 <sup>C</sup>	248 <sup>C</sup>
Lead	µg/L	1.0 <sup>C</sup>	0.0 <sup>F</sup>	0.0 <sup>F</sup>	1.7 <sup>C</sup>	1.0 <sup>C</sup>
Molybdenum	µg/L	0.0 <sup>E</sup>				
Nickel	µg/L	20 <sup>C</sup>	0.0 <sup>F</sup>	0.0 <sup>F</sup>	0.0 <sup>F</sup>	0.0 <sup>F</sup>
Nitrate+Nitrite	mg/L	2.63 <sup>C</sup>	0.07 <sup>C</sup>	0.65 <sup>C</sup>	0.28 <sup>C</sup>	0.1 <sup>C</sup>
Selenium	µg/L	0.0 <sup>F</sup>				
Silver	µg/L	0.0 <sup>E</sup>				
Thallium	µg/L	0.0 <sup>E</sup>				
Total Filterable Residue	mg/L	414 <sup>C</sup>	630 <sup>C</sup>	450 <sup>C</sup>	297 <sup>C</sup>	360 <sup>C</sup>
Zinc	µg/L	5.0 <sup>C</sup>	0.0 <sup>F</sup>	8.7 <sup>C</sup>	7.0 <sup>C</sup>	5.0 <sup>C</sup>

A = Based on USGS gage #03245500, LMR @ Milford data (10/1/1975 - 9/30/2013)  
B = Based on USGS gage #03246500, East Fork LMR @ Williamsburg data (1949-53; 1960-74)  
C = United States Environmental Protection Agency Storage and Retrieval Database (1997-2008)  
D = Downstream Monitoring Station 901 Discharge Monitoring Report data (2009-2014)  
E = No representative data available.  
F = All site-specific data is less than detection.  
LMR = Little Miami River  
USGS = United States Geological Survey

**Table 10. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria**

Parameter	Units	Average			Maximum Aquatic Life	Inside Mixing Zone Maximum
		Human Health	Agri Supply	Aquatic Life		
Arsenic	µg/L	--	1826. <sup>A</sup>	559	1084. <sup>A</sup>	680
Barium	µg/L	--	--	665	6835. <sup>A</sup>	4000
Cadmium <sup>B</sup>	µg/L	--	922. <sup>A</sup>	22	48. <sup>A</sup>	31
Chromium <sup>B</sup>	µg/L	--	1582	763	14460. <sup>A</sup>	8800
Hexavalent Chromium (dissolved) <sup>B</sup>	µg/L	--	--	38. <sup>A</sup>	47. <sup>A</sup>	31
Copper	µg/L	20380. <sup>A</sup>	7792. <sup>A</sup>	71	105. <sup>A</sup>	78
Cyanide, Free <sup>B</sup>	µg/L	4060000 <sup>A</sup>	--	45	147. <sup>A</sup>	92
Lead	µg/L	--	1826. <sup>A</sup>	97	1620. <sup>A</sup>	980
Mercury <sup>B,C</sup>	ng/L	12	10000. <sup>A</sup>	910	1700	3400
Molybdenum <sup>B</sup>	µg/L	--	--	74870	606800. <sup>A</sup>	370000
Nickel <sup>B</sup>	µg/L	84450. <sup>A</sup>	3339. <sup>A</sup>	443	3980. <sup>A</sup>	2400
Selenium <sup>B</sup>	µg/L	202800	922	19	--	--
Silver <sup>B</sup>	µg/L	--	--	4.9	33. <sup>A</sup>	21
Total Filterable Residue	mg/L	--	--	3995	--	--
Zinc	µg/L	1112000. <sup>A</sup>	403000. <sup>A</sup>	1028. <sup>A</sup>	887. <sup>A</sup>	600

A = Allocation must not exceed the Inside Mixing Zone Maximum.

B =This parameter would not require a wasteload allocation based on reasonable potential procedures, but allocation requested by for use in pretreatment program.

C = Bioaccumulative Chemical of Concern; no mixing zone allowed after 11/15/2010, water quality standard must be met at end-of-pipe, unless requirements for an exception are met as listed in Ohio Administrative Code 3745-2-08(L).

**Table 11. Parameter Assessment**

Group 1: Due to a lack of numeric criteria, the following parameters were not evaluated at this time.

Calcium	Chloride	Magnesium
Sodium	Potassium	

Group 2: PEQ < 25% of WQS or all data below minimum detection limit; WLA not required. No limit recommended, monitoring optional.

Cadmium	Chromium	Nickel
Cyanide, free	Hexavalent Chromium (dissolved)	Mercury
Molybdenum	Nitrate+Nitrite	Iron
Selenium	Silver	Strontium

Group 3: PEQ<sub>max</sub> < 50% of maximum PEL and PEQ<sub>avg</sub> < 50% of average PEL. No limit recommended, monitoring optional.

Ammonia (Summer)	Ammonia (Winter)	Barium
Arsenic	Lead	Zinc

Group 4: PEQ<sub>max</sub> ≥ 50% but <100% of the maximum PEL or PEQ<sub>avg</sub> ≥ 50% but < 100% of the average PEL. Monitoring is appropriate.

Copper

Group 5: Maximum PEQ ≥ 100% of the maximum PEL or average PEQ ≥ 100% of the average PEL, or either the average or maximum PEQ is between 75 and 100% of the PEL and certain conditions that increase the risk to the environment are present. Limit recommended.

Limits to Protect Numeric Water Quality Criteria

<i>Parameter</i>	<i>Applicable</i>		<i>Recommended Effluent Limits</i>	
	<i>Units</i>	<i>Period</i>	<i>Average</i>	<i>Maximum</i>
Total Dissolved Solids	mg/L	annual	3995	--

PEL = preliminary effluent limit  
 PEQ = projected effluent quality  
 WLA = wasteload allocation  
 WQS = water quality standard

**Table 12. Final Effluent Limits for Outfall 001**

Parameter	Units	Concentration		Loading (kg/day) <sup>a</sup>		Basis <sup>b</sup>
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Water Temperature	°C	----- Monitor -----				M <sup>c</sup>
Dissolved Oxygen	mg/L	5.0 Minimum		--	--	EP/PD
Total Suspended Solids						
Summer	mg/L	12	18 <sup>d</sup>	364	546 <sup>d</sup>	PD
Winter	mg/L	30	45 <sup>d</sup>	909	1370 <sup>d</sup>	PD
Oil and Grease	mg/L	--	10	--	--	WQS
Ammonia						
Summer	mg/L	1.5	2.3 <sup>d</sup>	45.4	69.6 <sup>d</sup>	EP/PD
Winter	mg/L	15	23 <sup>d</sup>	454	696 <sup>d</sup>	EP/PD
Total Kjeldahl Nitrogen	mg/L	----- Monitor -----				BTJ/M <sup>c</sup>
Nitrate + Nitrite	mg/L	----- Monitor -----				BTJ/M <sup>c</sup>
Phosphorus	mg/L	----- Monitor -----				BTJ/M <sup>c</sup>
Orthophosphate, Dissolved (as P)	mg/L	----- Monitor -----				SB1
Nickel	µg/L	----- Monitor -----				EP
Zinc	µg/L	----- Monitor -----				EP
Cadmium	µg/L	----- Monitor -----				EP
Lead	µg/L	----- Monitor -----				EP
Chromium	µg/L	----- Monitor -----				EP
Copper	µg/L	----- Monitor -----				EP/WLA
Hexavalent Chromium (Dissolved)	µg/L	----- Monitor -----				EP
<i>E. coli</i>	#/100 mL	126	284 <sup>d</sup>	--	--	WQS
Flow Rate	MGD	----- Monitor -----				M <sup>c</sup>
Mercury	ng/L	----- Monitor -----				EP
Acute Toxicity, <i>Ceriodaphnia dubia</i>	TU <sub>a</sub>	----- Monitor -----				WET
Acute Toxicity, <i>Pimephales promelas</i>	TU <sub>a</sub>	----- Monitor -----				WET
pH	S.U.	6.5 - 9.0		--	--	WQS
Total Filterable Residue	mg/L	----- Monitor -----				RP
Carbonaceous Biochemical Oxygen Demand (5 day)						
Summer	mg/L	25	40 <sup>d</sup>	757	1220 <sup>d</sup>	EP/PD
Winter	mg/L	8.0	12 <sup>d</sup>	243	364 <sup>d</sup>	EP/PD

<sup>a</sup> Effluent loadings based on average design discharge flow of 8.0 MGD.

- b Definitions:
- BTJ = Best Technical Judgment
  - EP = Existing Permit
  - M = Division of Surface Water NPDES Permit Guidance 1: Monitoring frequency requirements for Sanitary Discharges
  - PD = Plant Design, OAC 3745-33-05(E)
  - RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in permits (OAC 3745-33-07(A))
  - SB1 = Implementation of Senate Bill 1 (ORC 6111.03)
  - WET = Whole Effluent Toxicity (OAC 3745-33-07(B))
  - WLA = Wasteload Allocation procedures (OAC 3745-2)
  - WQS = Ohio Water Quality Standards (OAC 3745-1)
- c Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.
- d 7 day average limit.