National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio
for Sycamore Creek Wastewater Treatment Plant

Public Notice No.: 21-05-002
Public Notice Date: May 3, 2021
Comment Period Ends: June 3, 2021

Ohio EPA Permit No.: 1PK00005*MD
Application No.: OH0025488

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

Name and Address of Facility Where Discharge Occurs:
Sycamore Creek Wastewater Treatment Plant
9273 Old Remington Road
Cincinnati, OH
Hamilton County

Receiving Water: Sycamore Creek

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

Outfall 003

Lower effluent limits are proposed for ammonia (summer) based upon the results of the wasteload allocation. The facility is anticipated to be able to meet the lower effluent limit for ammonia (summer) without the need for a compliance schedule.

The monitoring frequency is proposed to be decreased for cadmium, chromium, copper, cyanide (free), hexavalent chromium, lead, nickel, selenium, silver, thallium, and zinc due to a decrease in the reasonable potential for theses pollutants to exceed water quality standards.

This permit no longer authorizes the use of method 4500 CN-I from Standard Methods for free cyanide testing. The permittee must continue using method ASTM D7237-10, OIA-1677-09, or ASTM D4282-02. (Note: The use of ASTM D4282-02 requires supporting documentation that it meets the requirement of a "sufficiently sensitive" test procedure as defined in 40 CFR 122.44(i)(1)(iv)).

Annual chronic toxicity monitoring with the determination of acute endpoints is 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.

Station 601

Monitoring frequencies are being reduced to be consistent with outfall 003.

Station 604

No proposed changes.

Station 606

No proposed changes.

Outfall 004

New monitoring is being proposed for ammonia, nitrate+nitrite, total kjeldahl nitrogen and total phosphorus. The purpose of the monitoring is to maintain a data set, tracking nutrient levels in the Little Miami River drainage basin which includes Sycamore Creek.

Outfall 101
A new outfall is being proposed for storm water discharges from the facility. The storm water discharges from the facility comingle with the discharge from outfall 003 after monitoring is performed but prior to entering Sycamore Creek.

Station 801/901
Total kjeldahl nitrogen is being added to the upstream and downstream monitoring stations (801/901). The proposed monitoring of this parameter is consistent with Permit Guidance 1. The purpose of the monitoring is to maintain a data set tracking nutrient levels in the Little Miami River drainage basin which includes Sycamore Creek. It is also proposed to remove monitoring requirements for total cyanide, selenium, thallium, nickel, silver, zinc cadmium, lead chromium, copper, and hexavalent chromium from monitoring station 901.

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 Bob Ostendorf Jr., (937) 285-6107, Robert.Ostendorf@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 .) 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, a written request 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 3745-1-39. 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

The Sycamore Creek wastewater treatment plant (WWTP) discharges to Sycamore Creek at River Mile (RM) 0.26. Sycamore Creek joins the Little Miami River at RM 19.22

Figure 1 shows the approximate location of the facility.

This segment of the Sycamore Creek is described by Ohio EPA River Code: 11-007, Hydrologic Unit Code: 05090202-14-01, County: Hamilton, Ecoregion: Interior Plateau. Sycamore Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-18): Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, and Primary Contact Recreation. Sycamore Creek discharges 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 Primary Contact Recreation. In addition, the Little Miami River is designated as an Outstanding State Water in the antidegradation rule OAC 3745-01-05.

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

The Sycamore Creek WWTP is operated by the Metropolitan Sewer District of Greater Cincinnati (MSDGC). It was constructed in 1957 and last upgraded in 2009. The average design flow is 9 million gallons per day (MGD). The plant treats wastewater for a population of approximately 24,200 in the Blue Ash and Kenwood-Montgomery sub basins. The Sycamore Creek WWTP has the following treatment processes which are shown on Figure 2:

- Fine screening
- Grit removal
- Influent pumping
- Primary clarification
- Activated sludge aeration with biological phosphorus removal

- Secondary clarification
- Disc filtration

The plant has a chemically enhanced high rate treatment (CEHRT) unit for peak flows greater than 18 MGD up to a peak instantaneous flow of 50 MGD. The high rate treatment system at the Sycamore WWTP uses a ballasted flocculation process which uses a polymer to attach coagulated particles to microsand for rapid settling in a lamella tube clarifier. Mirosand is recycled for reuse via running settled flocs through a hydrocyclone to separate sludge from the microsand. The Sewer District constructed this treatment unit, which came online in 2008, as required in Section VI of the Consent Decree on Combined Sewer Overflows, Wastewater Treatment Plants and Implementation of Capacity Assurance Program Plan for Sanitary Sewer Overflows (Civil Action No. C-1-02-107, United States District Court of the Southern District of Ohio Western Division).

Flows from the CEHRT (station 604) are regulated as a bypass and are subject to the provisions of 40 CFR 122.41(m). They combine with the fully-treated effluent from the biological system, are disinfected (ultra violet) and pass through post aeration prior to discharging through station 003. Effluent pumping is available, if necessary. Figure 2 is a flow diagram for the wet stream processes at the Sycamore Creek WWTP.

The plant has two other bypasses that are included in the NPDES permit. Station 004 is an emergency plant bypass that goes directly to Sycamore Creek through a storm sewer and the station 003 outfall structure. Station 606 is the main plant bypass that recombines with treated effluent prior to disinfection. Discharges through these stations are subject to bypass prohibition regulations, 40 CFR 122.41(m). Since August 2010, MSDGC has not reported any discharges through these two bypass stations.

The Sycamore Creek WWTP is served by a separate sanitary sewer system. The plant treats wastewater for a population of approximately 24,200 in the Blue Ash and Kenwood-Montgomery sub-basins.

Abatement and reporting of sanitary sewer overflows in the Sycamore Creek service area is addressed under the same consent decree referenced above. The complete decree and accompanying exhibits are available at the following Ohio EPA Web page: http://epa.ohio.gov/dsw/enforcement/enf.aspx#126267106-federal-and-state-consent-agreements-judicial-orders-and-judgments-2001---2014---alphabetical-order
[scroll down to "Hamilton County, Board of County Commissioners and City of Cincinnati (CSO)"]. A copy of the consent decree without the exhibits can be found here:
https://epa.ohio.gov/portals/35/enforcement/MSD%20-%20CSO.pdf

The Sycamore Creek WWTP has 100% separated sewers in the collection system for its service area.

The Sewer District has an approved pretreatment program at the Sycamore Creek WWTP. There are two categorical users that discharge 0.09 MGD of flow. The Sycamore Creek WWTP does not have any significant non-categorical users within the collection system.

The Sycamore Creek WWTP service area's potable water comes from the Ohio River (Cincinnati Water Works) and groundwater (Indian Hill).

Sycamore Creek WWTP utilizes the following sewage sludge treatment processes (Figure 3):

- Gravity thickening
- Holding tank
- Transport

Treated sludge is transferred to another MSDGC facility for incineration prior to disposal in a landfill.

DESCRIPTION OF EXISTING DISCHARGE

Sycamore Creek WWTP had several effluent violations which are shown on Table 2. These violations were most likely caused by excessive flows and operational issues associated with the high rate treatment system These violations have been addressed with corrective measures being implemented with the high rate treatment system.

Sycamore Creek WWTP estimates there is an infiltration/inflow (I/I) rate to the collection system of 2.65 MGD. The average annual effluent flow rate for Sycamore Creek WWTP for the previous six years is presented on Table 3.

The Sycamore WWTP reports all SSO events in accordance with the above-mentioned consent decree. Therefore, SSO reporting requirements are not being included in the renewed NPDES permit.

Sycamore Creek WWTP reports plant bypasses at station 004 and wet weather bypasses that recombine with treated wastewater prior to UV disinfection at station 606. No bypass events were reported over the last five years.

Sycamore Creek WWTP must maintain phosphorus loading limits as part of the plant design criteria. Compliance information is presented on Table 5.

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

Table 7 presents chemical specific data compiled from data collected by Ohio EPA.

Table 8 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period January 2014 through August 2019, and current permit limits are provided for comparison.

Table 9 summarizes the chemical specific data for outfall 003 by presenting the average and maximum PEQ values.

Table 10 summarizes the results of acute and chronic WET tests of the final effluent.

Table 11 summarizes the screening results of Ohio EPA bioassay sampling of the final effluent.

ASSESSMENT OF IMPACT ON RECEIVING WATERS

The Sycamore Creek (05090202-14-01) watershed assessment unit, which includes Sycamore Creek in the vicinity of the Sycamore Creek WWTP, is listed as impaired for Aquatic Life and Recreational uses on Ohio's 303(d) list. A Total Daily Maximum Load (TMDL) report was approved for the Lower Little Miami River watershed in March 2011.

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 7-1). 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 12) 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.

At River Mile 1.10, Sycamore Creek was found to be in partial attainment and impaired for aquatic life use due to organic enrichment from urban runoff. Sycamore Creek at stations further downstream closer to the WWTP and just downstream of the WWTP were found to be in full attainment. This indicates that the Sycamore Creek WWTP is not contributing to the impairments in Sycamore Creek.

The TMDL is available through the Ohio EPA, Division of Surface Water website at:
https://epa.ohio.gov/dsw/tmdl/LittleMiamiRiver#118215923-tmdl-report

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 Sycamore Creek 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 2014 through August 2019
Pretreatment data	2014 through 2018
Ohio EPA compliance sampling data	2018 and 2019
Ohio EPA bioassay sampling data	2018 and 2019

Statistical Outliers and Other Non-representative Data
The data were examined and the following values were removed from the evaluation as non-representative data:

- three cadmium data points (0.021 ug/l - 9/9/15, 0.018 ug/l - 10/1/15, 0.022 ug/l – 11/4/15) which are more than ten times below the average value
- one lead data point (4.7 ug/l – 7/24/14) which is more than nineteen times greater than the average
- one selenium data point (31.1 ug/l 7/24/14) which is more than thirty times greater than the average
- one thallium data point (22.6 ug/l – 7/24/14) which is twenty times greater than the average value
- one dissolved hexavalent chromium data point (49 ug/l – 2/26/14) which is thirteen times the average value.

This data is evaluated statistically, and PEQ values are calculated for each pollutant. Average PEQ (PEQ_{avg}) values represent the 95th percentile of monthly average data, and maximum PEQ (PEQ_{max}) values represent the 95th percentile of all data points (see Table 9).

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_{avg} or PEQ_{max} 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 13).

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 break down 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. The following dischargers to the Little Miami River were considered interactive (see Figure 4):

- Lebanon Regional WWTP
- Warren Co. Lower Little Miami WWTP
- Clermont Co. O'Bannon Creek WWTP
- Hamilton Co. Polk Run WWTP
- Mason WWTP

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.

These outfalls were allocated together for most parameters due to the size of the plant discharges, the flows of Little Miami River, and the relatively proximity of the discharge points. The exception was the wasteload allocations (WLAs) for ammonia toxicity, which were done separately for each facility because ammonia is considered a non-conservative parameter.

The applicable waterbody uses for this facility's discharge and the associated stream design flows are as follows:

Aquatic life (Warmwater Habitat)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia-N	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 14, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The data used in the WLA are listed in Table 13 and Table 14. Table 16 includes values for all modeled interactive facilities. The WLA results to maintain all applicable criteria are presented in Table 15.

Whole Effluent Toxicity Wasteload Allocation
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_c) and 7Q10 flow for the average and the acute toxicity unit (TU_a) 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 Sycamore Creek WWTP, the WLA values are 0.3 TU_a and 1.0 TU_c.

The chronic toxicity unit (TU_c) 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_{25}):

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

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/geometric mean of No Observed Effect Concentration and Lowest Observed Effect Concentration

The acute toxicity unit (TU_a) is defined as 100 divided by the concentration in water having 50% chance of causing death to aquatic life (LC_{50}) for the most sensitive test species:

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

This equation applies outside the mixing zone for all designated waters.

REASONABLE POTENTIAL/EFFLUENT LIMITS/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 15. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 9, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [($PEQ_{avg} \div PEL_{avg}$) X 100, or ($PEQ_{max} \div PEL_{max}$) X 100)], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 16.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 17 presents the final effluent limits and monitoring requirements proposed for Sycamore Creek WWTP outfall 003 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

Outfall 003

CBOD, dissolved oxygen, TSS, total phosphorus

The limits proposed for 5-day carbonaceous biochemical oxygen demand, dissolved oxygen, total suspended solids, total phosphorus and are all based on plant design criteria. These limits are protective of WQS and are more stringent than the secondary treatment standards in 40 CFR 133.

Oil and grease, pH, Escherichia coli (E.coli)

Limits proposed for oil and grease, pH, and *E.coli* are based on WQS (OAC 3745-1-35 and 37). Primary contact recreation *E. coli* standards apply to Sycamore Creek.

Ammonia

The current ammonia limits have been evaluated using the WLA procedures. Based upon the results of the WLA, the ammonia (summer) limits are not protective of WQS and therefore lower limits are proposed. The current limits for ammonia (winter) are protective of WQS and no changes are proposed. Monitoring is proposed to continue at the same frequency.

Mercury and Total Filterable Residue

The Ohio EPA risk assessment (Table 16) places mercury and total filterable residue in group 4. This placement, as well as the data in Table 8 and Table 9, 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). Monitoring is proposed to continue at the same frequency.

Cadmium, chromium, copper, cyanide-free, hexavalent chromium, lead, nickel, selenium, silver, thallium, and zinc

The Ohio EPA risk assessment (Table 16) places cadmium, chromium, copper, cyanide (free), hexavalent chromium, lead, nickel, selenium, silver, thallium, and zinc in groups 2 and 3. This placement, as well as the data in Table 8 and Table 9, 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 cadmium, chromium, copper, cyanide (free), hexavalent chromium, lead, nickel, selenium, silver, thallium, and zinc is proposed to be reduced from monthly to quarterly. The monitoring for these parameters is proposed to document that these

pollutants continue to remain at low levels. The monitoring for these parameters is consistent with Permit Guidance 1.

Arsenic, Barium, Beryllium, bis(2-ethylhexyl)phthalate, iron, molybdenum, strontium,
The Ohio EPA risk assessment (Table 16) places arsenic, barium, beryllium, bis(2-ethylhexyl)phthalate, iron, molybdenum, and strontium in groups 2 and 3. This placement, as well as the data in Table 8 and Table 9, 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. Annual pretreatment priority pollutant scans will continue to generate effluent data for these parameters to be used in future analysis.

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

Total kjeldahl nitrogen and nitrate+nitrite
The continued monitoring for total kjeldahl nitrogen, and nitrate+nitrite is proposed based on best technical judgment. Monitoring for phosphorus and nitrate + nitrite at the upstream and downstream stations is also proposed. The purpose of the monitoring is to maintain a data set tracking nutrient levels in the Little Miami River drainage basin which includes Sycamore Creek.

Dissolved Orthophosphate
Monitoring for dissolved orthophosphate (as P) is required by Ohio Senate Bill 1 (ORC 6111.03), which was signed by the Governor on April 2, 2015. Monitoring for orthophosphate will further develop nutrient datasets for dissolved reactive phosphorus that are used in stream and watershed assessments and studies. Because Ohio EPA monitoring, as well as other in-stream monitoring, is taken by grab sample, grab samples are proposed for orthophosphate to maintain consistent data. The grab samples 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 10 and Table 11 and other pertinent data under the provisions of OAC 3745-33-07(B), the Sycamore Creek 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 toxicity testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). Annual chronic toxicity monitoring with the determination of acute endpoints is proposed for the life of the permit. The proposed monitoring will adequately characterize toxicity in the plant's effluent.

Additional Monitoring Requirements
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.

Station 601
To maintain consistency with Outfall 003, monitoring for cadmium, chromium, copper, cyanide (free), hexavalent chromium, lead, nickel, selenium, silver, thallium, and zinc is proposed to be reduced to quarterly, consistent with the monitoring schedule at Outfall 003. This monitoring is consistent with Permit Guidance 1.

Station 602
No changes proposed.

Station 604
No changes proposed.

Station 606
No changes proposed.

Outfall 004
New monitoring is proposed for total phosphorus, total kjeldahl nitrogen (TKN), nitrate+nitrite and ammonia when discharging from outfall 004. The purpose of the monitoring is to maintain a data set tracking nutrient levels in the Little Miami River drainage basin which includes Sycamore Creek.

Outfall 101
This new outfall is for storm water discharges only. There are no benchmark monitoring requirements for treatment works therefore no monitoring is being proposed for this outfall. The facility will be required to comply with best management practices as defined in their storm water pollution prevention plan to ensure the potential for the storm water to become contaminated is minimized.

Stations 801 and 901 (upstream and downstream)
Monthly monitoring is proposed for total kjeldahl nitrogen (TKN). In addition, monitoring for *E. coli* is proposed to increase from a monthly to biweekly basis. For *E. coli*, the monitoring months will be reduced to June – August. These monitoring alterations and frequencies are necessary to evaluate the nutrient and recreational impact of a POTW of this size and are consistent with Ohio EPA Permit Guidance 1. Monitoring requirements for total cyanide, selenium, thallium, nickel, silver, zinc cadmium, lead chromium, copper, and hexavalent chromium are proposed to be removed from monitoring station 901. An adequate amount of data regarding these parameters has been collected and additional monitoring is not required at this time.

Sludge
The monitoring requirements proposed for the disposal of sewage sludge by transfer to another facility with an NPDES permit are based on OAC 3745-40.

OTHER REQUIREMENTS

Compliance Schedule
Pretreatment Local Limits Review - A six-month compliance schedule is proposed for the Sewer District 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, the Sewer District 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 effective on August 15, 2018 (OAC 3745-7). These rules require the Sycamore Creek WWTP to have a Class IV wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 003. These rules also require the permittee to designate one or more operator of record to oversee the technical operation of the treatment works and sewerage system.

In accordance with OAC 3745-7-04, the permittee has requested that Ohio EPA reduce the minimum staffing requirements from 40 to 10 hours per week**.** Ohio EPA has received the request and said request is currently under review. If the reduced staffing plan is approved, any change in the criteria under which the reduced staffing plan was approved (such as enforcement status, history of compliance, or provisions included in the plan) will require that the treatment works immediately return to the minimum staffing requirements included in

OAC 3745-7-04(C)(1). The permittee is also required to designate one or more operator of record to oversee the technical operation of the treatment works and sewerage system.

Low-Level Free Cyanide Testing
Currently there are three approved methods for free cyanide listed in 40 CFR 136 that have a quantification level lower than water quality-based effluent limits:

- ASTM D7237-10, OIA-1677-09, and ASTM D4282-02. (Note: The use of ASTM D4282-02 requires supporting documentation that it meets the requirement of a "sufficiently sensitive" test procedure as defined in 40 CFR 122.44(i)(1)(iv)).

These methods will allow Ohio EPA to make more reliable water quality-related decisions regarding free cyanide. Because the quantification levels are lower than any water quality-based effluent limits, it will also be possible to directly evaluate compliance with free cyanide limits.

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

Part III
Part III of the permit details standard conditions that include monitoring, reporting requirements, compliance responsibilities, and general requirements.

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 Sycamore Creek WWTP may seek permit coverage under the general permit for industrial storm water (permit # OHR000006) or submit a "No Exposure Certification." Parts IV, V, and VI will be removed from the final permit if: 1) the Sycamore Creek 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.

Figure 1. Location of Sycamore Creek WWTP

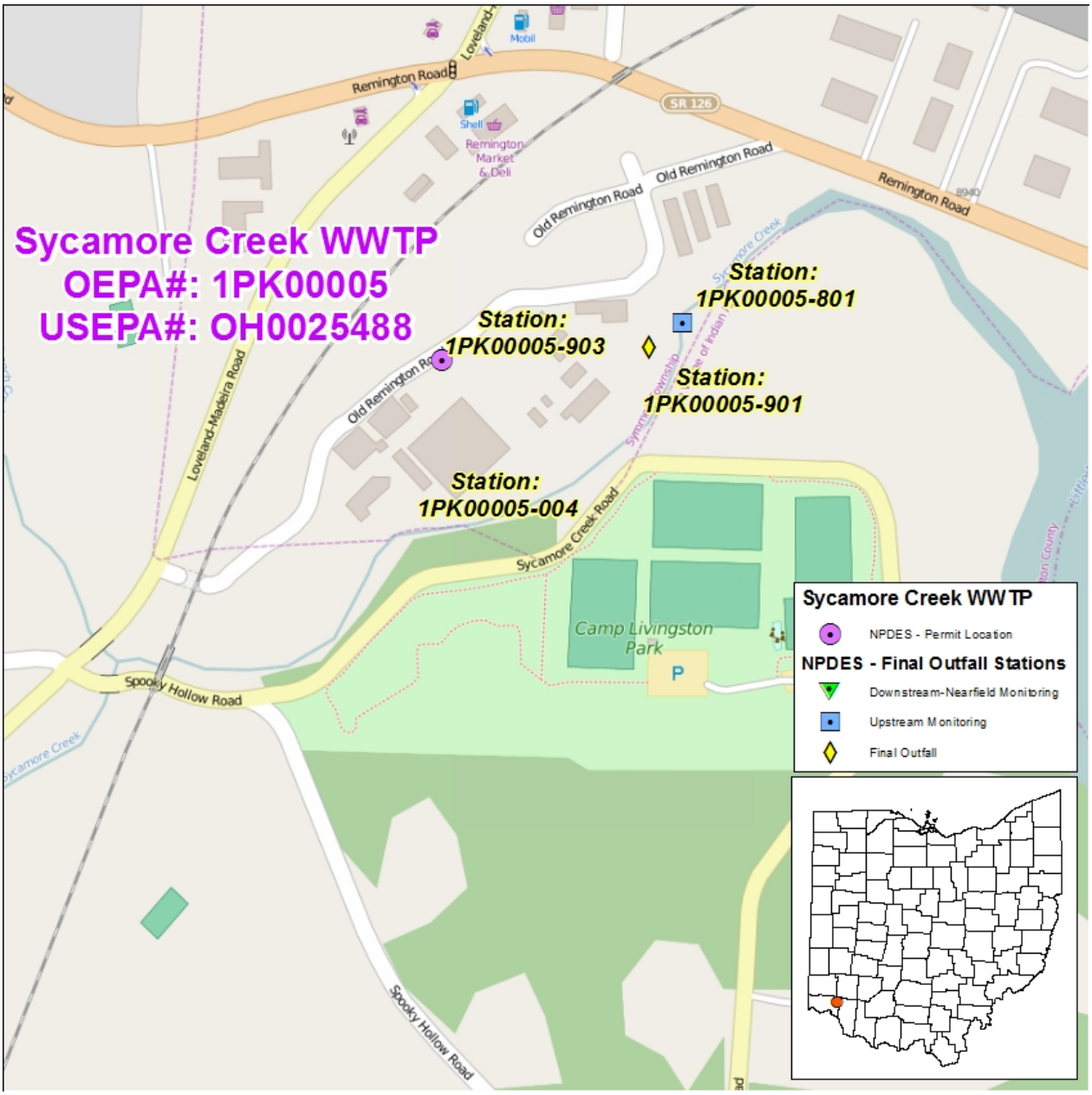

Figure 2. Diagram of Wastewater Treatment System

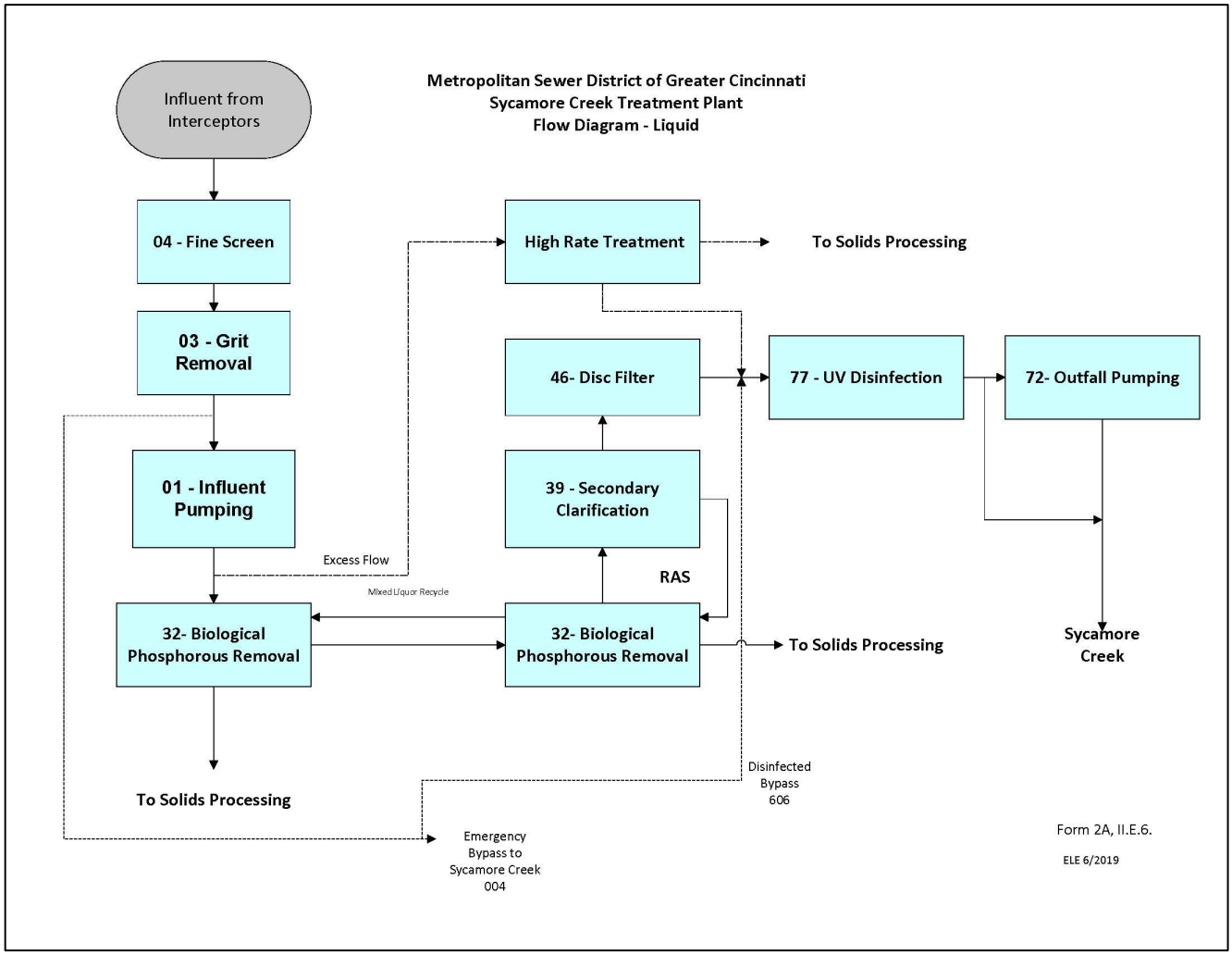

Figure 3. Sewage Sludge Treatment Diagram

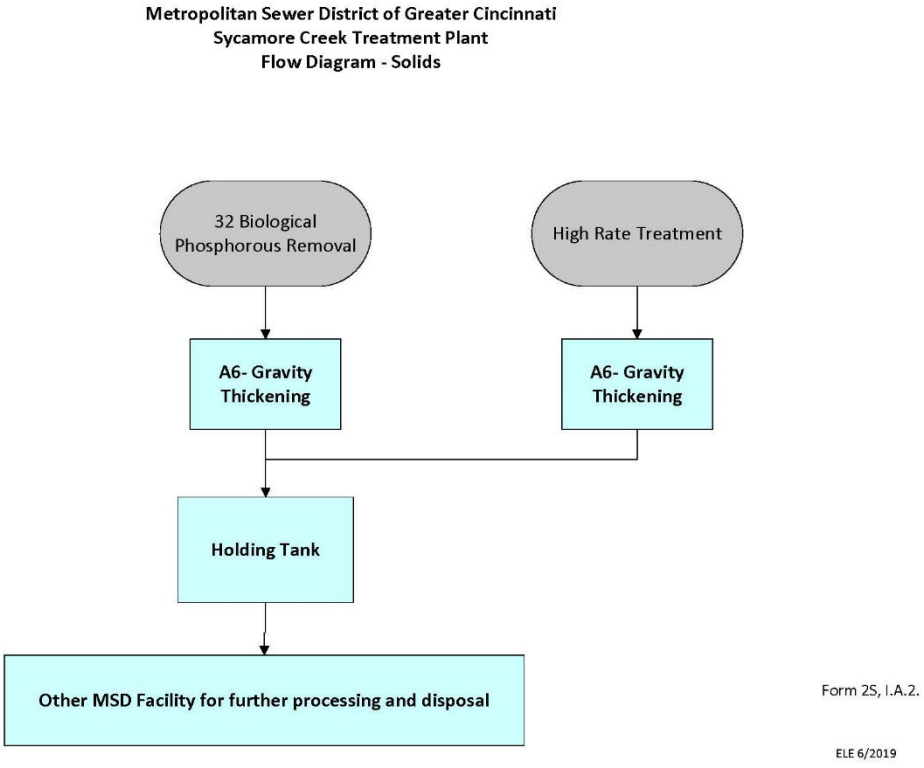

Figure 4. Little Miami River Study Area

Major dischargers are in **bold**.

Figure 2. Lower Little Miami River Study Area

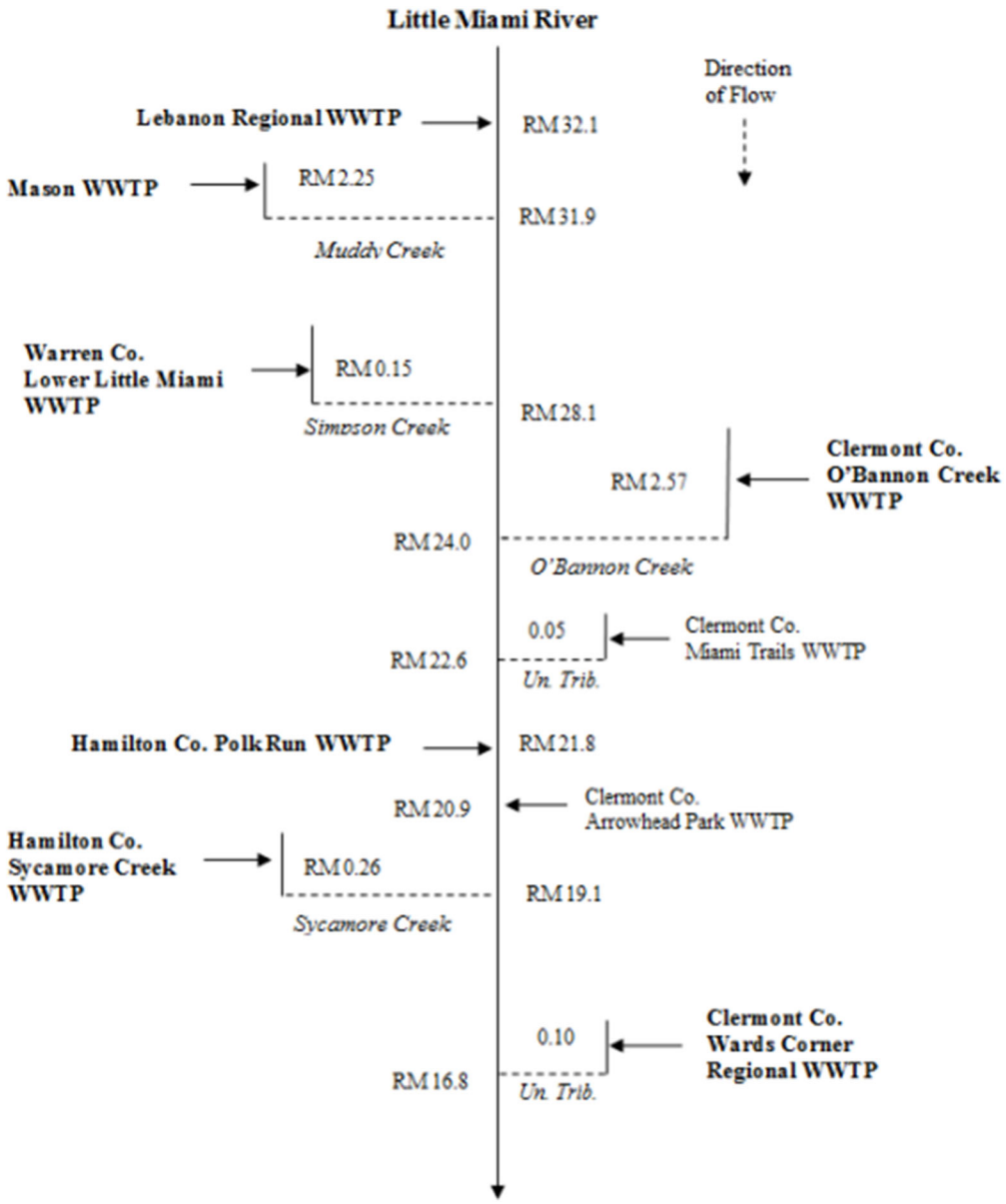

Table 1. Sewage Sludge Removal

Year	Dry Tons Removed
2014	1120
2015	1070
2016	977
2017	1120
2018	1160

Table 2. Effluent Violations for Outfall 003

Parameter	2014	2015	2016	2017	2018	2019
Dissolved Oxygen	0	0	0	0	1	0
pH (minimum)	1	0	0	0	0	0
Total Suspended Solids	1	5	1	0	3	7
Total	2	5	1	0	4	7

Table 3. Average Annual Effluent Flow Rates

Year	Annual Flow in MGD		
	50th Percentile	95th Percentile	Maximum
2014	6.56	13.688	33.14
2015	5.76	14.402	30.78
2016	6.125	12.11	23.48
2017	6.12	13.032	26.01
2018	7.34	17.926	31.88
2019	7.55	17.674	30.61

MGD = million gallons per day.

Table 4. Bypass Discharges (Station 604)

	Bypass	Bypass Volume (Million gallons)		Total Suspended Solids (mg/L)		Carbonaceous Biochemical Oxygen Demand (5 day)	
Year	Events	Average	Maximum	Average	Maximum	Average	Maximum
2014[a]	14	3.4	8	97.59	450	26.1	97
2015	18	3.1	6	47.45	647	7.2	10
2016	13	3.5	11	27.29	146	12.7	19
2017	8	2.2	5.1	105.5	380	37.5	64
2018	29	1.8	3.0	73.28	450	16.2	80
2019[b]	26	2.0	5.1	78.71	647	13.1	27

[a] = data set begins on 1/1/14
[b] = data set ends on 9/1/19

Table 5. Calculated Phosphorus Loadings from 2014 - 2019

	Median Flows for May through October		Median Daily P Concentration for May through October	Calculated Loading
Range	Flow (MGD)	Year	Phosphorus (mg/L)	Loading (kg/day)
'10-'14	5.51	2015	0.2	1.81
'11-'15	5.42	2016	0.1	2.34
'12-'16	5.56	2017	0.1	4.21
'13-'17	7	2018	0.1	3.45
'14-'18	7.305	2019	0.1	2.28

MGD = million gallons per day

Table 6. Effluent Characterization Using Pretreatment Data

Parameter (µg/l)	7/24/2014	3/10/2015	2/23/2016	4/18/2017	4/5/2018
Antimony	AA (26.9)	AA (18.8)	AA (18.8)	AA (16.5)	AE
Arsenic	AA (28.4)	AA (26.1)	AA (26.1)	AA (20.3)	AE
Beryllium	2.6	AA (1.5)	AA (1.5)	AA (1.7)	AE
Cadmium	AA (0.5)	AA (1.5)	AA (1.5)	Aa (1.5)	AE
Chromium	AA (0.9)	AA (1.7)	AA (1.7)	AA (1.7)	AE
Copper	11	49.4	8.8	5.2	AE
Lead	4.7	AA (5.1)	AA (5.1)	AA (0.33)	AE
Mercury	AA (0.004)	0.0624	0.0059	0.003	0.002
Nickel	3.4	AA (1.8)	AA (1.8)	AA (4.7)	AE
Selenium	31.1	AA (21.5)	AA (21.5)	AA (0.90)	AE
Silver	AA (1.1)	AA (1.7)	AA (1.7)	0.065	AE
Thallium	22.6	AA (9.0)	AA (9.0)	AA (0.16)	AE
Iron	NT	796	NT	NT	NT
Strontium	NT	AA (5.6)	354.6	277.5	NT
Zinc	47.7	75.5	24.2	23.2	AE
Total Cyanide	AE	6.6	5.8	AA (2.0)	6.44
Free Cyanide	NT	NT	1.9135	AA (0.256)	0.18

AA = not-detected (analytical method detection limit)
AE = analytical data not valid
NT = not tested

Table 7. Effluent Characterization Using Ohio EPA data

Parameter	Units	10/2/2018	4/8/2019
Acetone	ug/L	2.15	1.42
Aluminum	ug/L	28	89.5
Ammonia	mg/L	0.552	0.514
Antimony	ug/L	AA (0.346)	AA (<0.346)
Arsenic	ug/L	1.16	0.996
Barium	ug/L	24.5	33.2
Beryllium	ug/L	AA(0.047)	AA (<0.047)
Cadmium	ug/L	AA (0.061)	AA (<0.061)
Calcium	mg/L	71.3	90.0
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/L	4.55	4.13
Chloride	mg/L	145	198.0
Chromium	ug/L	AA (0.273)	0.342
Chemical Oxygen Demand	mg/L	28.9	43.2
Conductivity	umhos/cm	1050	1190.0
Copper	ug/L	3.51	4.72
Cyanide, Free	ug/L	3.72	3.43
Hexavalent Chromium	ug/L	AA (3.4)	
Iron	ug/L	37.5	53.0
Lead	ug/L	AA (0.251)	AA (<0.251)
Magnesium	mg/L	17.9	24.3
Manganese	ug/L	25.5	13.7
Nickel	ug/L	3.16	3.21
Nitrate+nitrite	mg/L	5.17	4.67
Oil & Grease	mg/L	AA (0.636)	AA (<0.643)
Orthophosphate, dissolved	mg/L	0.0643	AA (<0.008)
Phenolics	ug/L	AA (9.27)	AA (<9.27)
Potassium	mg/L	7.73	6.7
Selenium	ug/L	0.811	1.07
Silver	ug/L	AA (0.036)	0.036
Sodium	mg/L	105	122.0
Strontium	ug/L	315	402.0
Thallium	ug/L	AA (0.134)	0.382
Total Kjeldahl Nitrogen	mg/L	1.88	2.53
Total Dissolved Solids	mg/L	610	700.0
Total Phosphorous	mg/L	0.111	0.127
Total Suspended Solids	mg/L	AA (5)	AA (<5.0)
Zinc	ug/L	18.3	20.1

AA = not detected (analytical method detection limit)

Table 8. Effluent Characterization Using Self-Monitoring Data

Parameter	Season	Units	Current Permit Limits 30 day	Current Permit Limits Daily	# Obs.	Percentiles 50th	Percentiles 95th	Data Range
Outfall 003								
Water Temperature	Annual	°C	- - - - - Monitor - - - - -		2038	18	24	9 – 25
Dissolved Oxygen	Annual	mg/l	--	6.0[m]	2038	9	7.79*	4.4 - 11.4
Residue, Total Dissolved	Annual	mg/L	- - - - - Monitor - - - - -			15	780	1020
Total Suspended Solids	Annual	kg/day	443	682[w]	1600	90.4	439	0 – 17300
Total Suspended Solids	Annual	mg/L	13	20[w]	1600	4	9	0 – 198
Oil and Grease	Annual	mg/l	--	10	80	< 5	2	0 – 2
Ammonia (Summer)	Summer	kg/day	40.9	61.4w	420	< .197	29	0 - 76.5
Ammonia (Summer)	Summer	mg/l	1.2	1.8w	420	< .012	.836	0 - 3.54
Ammonia (Winter)	Winter	kg/day	98.8	150w	452	4.78	86.7	0 – 338
Ammonia (Winter)	Winter	mg/l	2.9	4.4w	452	.163	1.82	0 - 6.6
Total Kjeldahl Nitrogen	Annual	mg/l	- - - - - Monitor - - - - -		85	1.3	2.96	.4 - 12.4
Nitrate + Nitrite	Annual	mg/l	- - - - - Monitor - - - - -		83	5.2	7.95	2.33 - 15.5
Phosphorus (Summer)	Summer	kg/day	34.1	51.1w	171	3.03	22.7	0 - 39.8
Phosphorus (Summer)	Summer	mg/L	1.0	1.5w	171	.1	.6	0 - 1.2
Phosphorus (Winter)	Winter	mg/L	- - - - - Monitor - - - - -			169	.1	.6
Orthophosphate, Dissolved	Annual	mg/L	- - - - - Monitor - - - - -		38	.0295	.325	0 - 2.53
Cyanide, Free	Annual	mg/l	- - - - - Monitor - - - - -		18	--	--	< .005
Selenium	Annual	µg/L	- - - - - Monitor - - - - -		92	< 1	.967	0 - 1.2
Thallium	Annual	kg/day	0.219	2.69	18	--	--	< .0116
Thallium, 2014-2015	Annual	µg/L	6.4	79	18	--	--	< 1
Thallium, 2015-2019	Annual	µg/L	- - - - - Monitor - - - - -		74	< .15	< .15	0 - 1
Nickel	Annual	µg/l	- - - - - Monitor - - - - -		92	< 4.7	2	0 - 6
Silver	Annual	kg/day	0.0443	0.212	18	--	--	< .000671
Silver, 2014-2015	Annual	µg/l	1.3	6.2	18	--	--	< .5
Silver, 2015-2019	Annual	µg/l	- - - - - Monitor - - - - -		74	< .05	< .05	0 - .04
Zinc	Annual	µg/l	- - - - - Monitor - - - - -		92	38	61.8	15 - 88
Cadmium	Annual	µg/l	- - - - - Monitor - - - - -		92	< 1.5	.0215	0 - 3
Lead	Annual	µg/l	- - - - - Monitor - - - - -		92	< .214	.345	0 - .6
Chromium	Annual	µg/l	- - - - - Monitor - - - - -		92	< 1.7	.61	0 - 4
Copper	Annual	kg/day	0.818	1.33	18	.175	.36	0 - .361
Copper, 2014-2015	Annual	µg/l	24	39	18	6	11	0 - 11
Copper, 2015-2019	Annual	µg/l	- - - - - Monitor - - - - -		74	6	10	0 - 13
Hexavalent Chromium (Dissolved)	Annual	µg/l	- - - - - Monitor - - - - -		80	< 10	3.05	0 - 49
E. coli	Annual	#/100 ml	126	284[a]	402	11	123	1 - 629
Flow Rate	Annual	MGD	- - - - - Monitor - - - - -		1771	2038	6.57	15.3
Mercury	Annual	ng/l	9.9	1700	32	3.02	7.53	1.7-10.5

Table 8. Effluent Characterization Using Self-Monitoring Data

Parameter	Season	Units	Current Permit Limits 30 day	Current Permit Limits Daily	# Obs.	Percentiles 50th	Percentiles 95th	Data Range
Cyanide, Free (Low-Level)	Annual	µg/l	- - - - - Monitor - - - - -		65	.29	2.11	0 - 5.43
Acute Toxicity, *Ceriodaphnia dubia*	Annual	TU_a	- - - - - Monitor - - - - -		6	< .2	.75	0 - 1
Chronic Toxicity, *Ceriodaphnia dubia*	Annual	TUc	- - - - - Monitor - - - - -		6	< 1	3.03	0 - 3.7
Acute Toxicity, *Pimephales promelas*	Annual	TU_a	- - - - - Monitor - - - - -		6	< .2	.75	0 - 1
Chronic Toxicity, *Pimephales promelas*	Annual	TUc	- - - - - Monitor - - - - -		6	< 1	1.29	0 - 1.39
pH, Maximum	Annual	S.U.	--	9.0	2038	7.9	8.2	7.2 - 9
pH, Minimum	Annual	S.U.	--	6.5^m	2038	7.4	7*	4.5 - 8.4
Residue, Total Filterable	Annual	mg/l	- - - - - Monitor - - - - -		24	615	1040	489-1270
Carbonaceous Biochemical Oxygen Demand (5 day)	Annual	kg/day	341	511w	797	54	202	0 - 1230
		mg/L	10	15w	797	2	4	0 - 14

* = 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.
[m] = minimum limit

Table 9. Projected Effluent Quality for Outfall 003

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Self-Monitoring (DMR) Data					
Aluminum	µg/L	2	2	248.3	340.1
Ammonia (Summer)	mg/L	284	138	0.764	1.139
Ammonia (Winter)	mg/L	224	153	1.147	2.26
Arsenic	µg/L	6	2	1.778	2.436
Barium	µg/L	2	2	92.10	126.2
Beryllium	µg/L	4	1	4.935	6.76
Bis(2-ethylhexyl) phthalate	µg/L	7	2	2.161	2.96
Cadmium [A]	µg/L	79	6	1.971	2.7
Chlorides	mg/L	2	2	549	752
Chromium [A]	µg/L	98	10	0.844	1.157
Chromium, Hexavalent [A]	µg/L	80	13	5.089	5.342
Copper [A]	µg/L	97	89	9.306	12.71
Cyanide - free [A]	µg/L	65	34	1.77	2.682
Iron	µg/L	3	3	1743	2388
Lead [A]	µg/L	97	27	0.265	0.41
Mercury	ng/L	68	8	5.7209	6.5569
Nickel [A]	µg/L	98	15	2.533	3.683
Nitrate + Nitrite [A]	mg/L	85	85	7.083	9.132
Nitrogen, Total Kjeldahl	mg/L	85	85	2.268	3.119
Phosphorus	mg/L	340	285	0.355	0.561
Selenium [A]	µg/L	97	26	0.725	1.092
Silver [A]	µg/L	98	5	0.023	0.029
Strontium	µg/L	5	3	595	816
Thallium [A]	µg/L	94	2	0.657	0.9
Total Filterable Residue [A]	mg/L	81	81	834	1007
Zinc [A]	µg/L	98	98	53.45	70.95

[A] DMR data combined with Pretreatment data
[B] Combined other data sources include Pretreatment data and Ohio EPA data
DMR = Discharge Monitoring Report
MDL = analytical laboratory method detection limit
PEQ = projected effluent quality

Table 10. Summary of Acute and Chronic Toxicity Results

	Ceriodaphnia Dubia		*Pimephales promelas*	
Date	TU_a	TU_c	TU_a	TU_c
6/8/2014	AA	AA	AA	AA
6/7/2015	AA	AA	AA	AA
6/19/2016	AA	3.7	AA	AA
6/11/2017	AA	AA	AA	AA
6/10/2018	AA	AA	AA	AA
6/9/2019	AA	AA	AA	1.39

AA = non-detection; analytical method detection limit of 0.2 TU_a, 1.0 TU_c
TU_a = acute toxicity unit
TU_c = chronic toxicity unit

Table 11. Ohio EPA Toxicity Screening Results for Outfall 003

	Ceriodaphnia Dubia		*Pimephales promelas*	
Date	TU_a	TU_c	TU_a	TU_c
10/1/2018 – 10/2/2018	AA	NT	AA	NT
4/8/2019 - 4/9/2019	AA	NT	AA	NT

24-hour composite samples
AA = non-detection; analytical method detection limit of 0.2 TU_a, 1.0 TU_c
TU_a = acute toxicity unit
TU_c = chronic toxicity unit
NT = not tested

Table 12. Use Attainment Table

Location	River Mile	Use	Status	Causes	Sources
Sycamore Creek adj. Loveland Rd., dst. tributary	1.10	WWH	PARTIAL	Other*	Unspecified urban stormwater Urban runoff/storm sewers
Sycamore Creek dst. N. Fk. Sycamore Creek	0.50	WWH	FULL		
Sycamore Creek dst. Sycamore Ck. WWTP	0.10	WWH	FULL		

* "Other" as a cause refers to not readily identified impacts associated with runoff from impervious surfaces and lawns in urban settings.
Rd = road
WWH = warmwater habitat

Table 13. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria: Average: Human Health	Outside Mixing Zone Criteria: Average: Agri-culture	Outside Mixing Zone Criteria: Average: Aquatic Life	Outside Mixing Zone Criteria: Maximum Aquatic Life	Inside Mixing Zone Maximum
Aluminum	µg/L	--	--	--	--	--
Ammonia-S	mg/l	--	--	1.1	--	--
Ammonia-W	mg/l	--	--	3.3	--	--
Arsenic [D]	µg/L	--	100	150	340	680
Barium [D]	µg/L	--	--	220	2000	4000
Beryllium	µg/L	280	100	64	550	1100
Bis(2-ethylhexyl) phthalate [C D]	µg/L	59	--	8.4	1100	2100
Cadmium [D]	µg/L	--	50	5.8	16	31
Chlorides	mg/L	--	--	--	--	--
Chromium [D]	µg/L	--	100	210	4400	8900
Chromium, Hexavalent [D]	µg/L	--	--	11	16	31
Copper [D]	µg/L	1300	500	24	39	79
Cyanide, free [D]	µg/L	220000	--	12	46	92
Iron [D]	µg/L	--	5000	--	--	--
Lead [D]	µg/L	--	100	26	500	990
Manganese	µg/L	--	--	--	--	--
Mercury [B]	ng/L	12	10000	910	1700	3400
Molybdenum [D]	µg/L	--	--	--	20000	370000
Nickel [D]	µg/L	4600	200	130	1200	2400
Nitrogen, Total Kjeldahl	mg/L	--	--	--	--	--
Nitrate + Nitrite [D]	mg/L	--	100	--	--	--
Phosphorus	mg/L	--	--	--	--	--
Selenium [D]	µg/L	11000	50	5	--	--
Silver [D]	µg/L	--	--	1.3	11	21
Strontium	µg/L	--	--	21000	40000	81000
Thallium	µg/L	--	--	17	79	160
Total Filterable Residue [D]	mg/L	--	--	1500	--	--
Zinc [D]	µg/L	69000	25000	300	300	610

[B] Bioaccumulative Chemical of Concern (BCC)
[C] Carcinogen
[D] This parameter was found in the effluent of another discharger in this interactive segment.

Table 14. Instream Conditions for the Little Miami River and Selected Tributaries

Parameter	Units	Little Miami	Muddy Creek	Value Simpson Creek	O'Bannon Creek	Sycamore Creek
$_{7}Q_{10}$ annual	cfs	58.8 [A]	0.0 [B]	0.0 [B]	0.0 [B]	0.0 [B]
$_{1}Q_{10}$ annual	cfs	46.9 [A]	0.0 [B]	0.0 [B]	0.0 [B]	0.0 [B]
$_{30}Q_{10}$ summer	cfs	78.9 [A]	0.0 [B]	0.0 [B]	0.02 [B]	0.01 [B]
winter	cfs	224 [A]	0.62 [B]	0.06 [B]	2.61 [B]	1.46 [B]
Q_{HM} annual	cfs	377 [A]	0.12 [B]	0.0 [B]	0.49 [B]	0.27 [B]
Mixing Assumption	% ave	100	100	100	100	100
	% max	100	100	100	100	100
Instream Hardness	mg/l	270 [D]	249 [D]	342 [D]	215 [D]	300 [D]
Background Water Quality						
Arsenic	µg/L	2 [C]	2.6 [C]	2.6 [C]	1.47 [C]	1.2 [C]
Barium	µg/L	93 [C]	60.3 [C]	46.5 [C]	47.8 [C]	43 [C]
Bis(2-ethylhexyl) phthalate	µg/L	0.0 [E]	0.0 [E]	0.0 [E]	2.21 [C]	0.0 [E]
Cadmium	µg/L	0.0 [G]	0.1 [G]	0.0 [F]	0.1 [G]	0.0 [F]
Chromium, Hexavalent	µg/L	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]
Chromium	µg/L	15 [C]	0.0 [F]	0.0 [F]	0.0 [F]	0.0 [F]
Copper	µg/L	3.5 [C]	4.48 [C]	3.9 [C]	6.2 [C]	4.12 [C]
Cyanide, free	µg/L	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]
Indeno(1,2,3-c,d)pyrene	µg/L	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]
Iron	µg/L	468 [C]	296 [C]	191 [C]	1128 [C]	469 [C]
Lead	µg/L	1.0 [C]	0.0 [F]	0.0 [F]	1.7 [C]	1.17 [C]
Mercury	ng/L	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]
Molybdenum	µg/L	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]
Nickel	µg/L	8 [C]	15.7 [C]	0.0 [F]	0.0 [F]	0.0 [F]
Nitrate+Nitrite	mg/L	2.22 [C]	0.07 [C]	0.11 [C]	0.4 [C]	0.13 [C]
Phenanthrene	µg/L	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]
Selenium	µg/L	0.0 [F]	0.0 [F]	0.0 [F]	0.0 [F]	0.0 [F]
Silver	µg/L	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]
Thallium	µg/L	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]	0.0 [E]
Total Filterable Residue	mg/L	420 [C]	605 [C]	494 [C]	278 [C]	360 [C]
Zinc	µg/L	5 [C]	0.0 [F]	0.0 [C]	0.0 [F]	8 [C]

[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] STORET data (2007-2008)
[D] DMR 901 data (2014-2019)
[E] No representative data available.
[F] All site specific data is less than detection.
[G] Background Water Quality Report

Table 15. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

		Outside Mixing Zone Criteria				Inside
		Average			Maximum	Mixing
Parameter	Units	Human Health	Agri-culture	Aquatic Life	Aquatic Life	Zone Maximum
Ammonia-S	mg/l	--	--	1.1	--	--
Ammonia-W	mg/l	--	--	3.65	--	--
Arsenic [B]	µg/L	--	102	150	340	680
Barium	µg/L	--	--	220	2000	4000
Bis(2-ethylhexyl) phthalate	µg/L	60	--	8.4	1100	2100
Cadmium	µg/L	--	51 [A]	5.8	16	31
Chromium, Hexavalent	µg/L	--	--	11	16	31
Chromium [B]	µg/L	--	102	210	4400	8900
Copper	µg/L	1325 [A]	510 [A]	24	39	79
Cyanide, free	µg/L	224264 [A]	--	12	46	92
Iron [B]	µg/L	--	5088	--	--	--
Lead [B]	µg/L	--	102	26	500	990
Mercury	ng/L	12	10000 [A]	910	1700	3400
Molybdenum [B]	µg/L	--	--	20000	190000	370000
Nickel [B]	µg/L	4689 [A]	204	130	1200	2400
Selenium [B]	µg/L	11213	51	5	--	--
Silver [B]	µg/L	--	--	1.3	11	21
Thallium	ug/l	--	--	17	79	160
Total Filterable Residue	mg/L	--	--	1500	--	--
Zinc [B]	µg/L	70337 [A]	25484 [A]	300	300	610

[A] Allocation must not exceed the Inside Mixing Zone Maximum
[B] Parameter would not require a WLA based on reasonable potential procedures, but allocation requested by Permits Group.
[C] Bioaccumulative Chemical of Concern (BCC), WQS must be met at end-of-pipe

Table 16. Parameter Assessment

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

Aluminum	Chlorides	Manganese
Nitrogen, Total Kjeldahl		

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

Arsenic	Beryllium	Chromium
Cyanide-free	Lead	Molybdenum
Nickel	Nitrate + Nitrite	Selenium
Silver	Strontium	Thallium
Zinc		

Group 3: PEQ_{max} < 50 percent of maximum PEL and PEQ_{avg} < 50 percent of average PEL. No limit recommended; monitoring optional.

Ammonia (Winter)	Barium	Bis(2-ethylhexyl)phthalate
Cadmium	Chromium, Hexavalent	Copper
Iron		

Group 4: $PEQ_{max} \geq 50$ percent, but < 100 percent of the maximum PEL or $PEQ_{avg} \geq 50$ percent, but < 100 percent of the average PEL. Monitoring is appropriate.

Mercury	Total Filterable Residue

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

Limits to Protect Numeric Water Quality Criteria

			Recommended Effluent Limits	
Parameter	Units	Period	Average	Maximum
Ammonia (Summer)[a]	mg/L	annual	1.1	

[a] = See reasonable potential discussion, pg. 14
PEL = preliminary effluent limit
PEQ = projected effluent quality
WLA = wasteload allocation
WQS = water quality standard

Table 17. Final Effluent Limits for Outfall 003

Parameter	Units	Concentration 30 Day Average	Concentration Daily Maximum	Loading (kg/day)[a] 30 Day Average	Loading (kg/day)[a] Daily Maximum	Basis[b]
Water Temperature	°C	- - - - - - - - - - Monitor - - - - - - - - - -				M[c]
Dissolved Oxygen	mg/l	6.0 minimum		--	--	PD
Total Suspended Solids	mg/l	13	20[d]	443	682[d]	PD
Oil & Grease	mg/l	--	10	--	--	WQS
Ammonia						
Summer	mg/l	1.1	1.7[d]	37.5	58[d]	WLA
Winter	mg/l	2.9	4.4[d]	98.8	150[d]	WLA
Total Kjeldahl Nitrogen	mg/l	- - - - - - - - - - Monitor - - - - - - - - - -				BTJ
Nitrate+Nitrite	mg/l	- - - - - - - - - - Monitor - - - - - - - - - -				BTJ
Phosphorus						
Summer	mg/l	1.0	1.5[d]	34.1	51.1	PD
Winter	mg/l	- - - - - - - - - - Monitor - - - - - - - - - -				SB1
Orthophosphate, Dissolved (as P)	mg/l	- - - - - - - - - - Monitor - - - - - - - - - -				SB1
Selenium	µg/l	- - - - - - - - - - Monitor - - - - - - - - - -				M
Nickel	µg/l	- - - - - - - - - - Monitor - - - - - - - - - -				M
Silver	µg/l	- - - - - - - - - - Monitor - - - - - - - - - -				M
Thallium	µg/l	- - - - - - - - - - Monitor - - - - - - - - - -				M
Zinc	µg/l	- - - - - - - - - - Monitor - - - - - - - - - -				M
Cadmium	µg/l	- - - - - - - - - - Monitor - - - - - - - - - -				M
Lead	µg/l	- - - - - - - - - - Monitor - - - - - - - - - -				M
Chromium	µg/l	- - - - - - - - - - Monitor - - - - - - - - - -				M
Copper	µg/l	- - - - - - - - - - Monitor - - - - - - - - - -				M
Hexavalent Chromium (Dissolved)	µg/l	- - - - - - - - - - Monitor - - - - - - - - - -				M
Flow Rate	MGD	- - - - - - - - - - Monitor - - - - - - - - - -				M[c]
Mercury	ng/l	- - - - - - - - - - Monitor - - - - - - - - - -				RP
Cyanide, Free	µg/l	- - - - - - - - - - Monitor - - - - - - - - - -				M
E. coli	#/100 ml	126	284[d]	--	--	WQS
Acute Toxicity						
Ceriodaphnia dubia	TU_a	- - - - - - - - - - Monitor - - - - - - - - - -				WET
Pimephales promelas	TU_a	- - - - - - - - - - Monitor - - - - - - - - - -				WET
Chronic Toxicty						
Ceriodaphnia dubia	TU_c	- - - - - - - - - - Monitor - - - - - - - - - -				WET
Pimephales promelas	TU_c	- - - - - - - - - - Monitor - - - - - - - - - -				WET
pH	SU	6.5 - 9.0		--	--	WQS
Total Filterable Residue	mg/l	- - - - - - - - - - Monitor - - - - - - - - - -				RP
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/l	10	15[d]	341	511[d]	PD

[a] Effluent loadings based on average design discharge flow of 9.0 MGD.

[b] Definitions:
BTJ = Best Technical Judgment
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 = Minimum testing requirements for whole effluent toxicity [OAC 3745-33-07(B)(11)]
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.

Addendum 1. Acronyms

ABS	Anti-backsliding
BPJ	Best professional judgment
CFR	Code of Federal Regulations
CMOM	Capacity Management, Operation, and Maintenance
CONSWLA	Conservative substance wasteload allocation
CSO	Combined sewer overflow
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DMT	Dissolved metal translator
IMZM	Inside mixing zone maximum
LTCP	Long-term Control Plan
MDL	Analytical method detection limit
MGD	Million gallons per day
NPDES	National Pollutant Discharge Elimination System
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
ORSANCO	Ohio River Valley Water Sanitation Commission
PEL	Preliminary effluent limit
PEQ	Projected effluent quality
PMP	Pollution Minimization Program
PPE	Plant performance evaluation
SSO	Sanitary sewer overflow
TMDL	Total Daily Maximum Load
TRE	Toxicity reduction evaluation
TU	Toxicity unit
U.S. EPA	United States Environmental Protection Agency
WET	Whole effluent toxicity
WLA	Wasteload allocation
WPCF	Water Pollution Control Facility
WQBEL	Water-quality-based effluent limit
WQS	Water Quality Standards
WWTP	Wastewater Treatment Plant