

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

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

Public Notice No.: 190789
Public Notice Date: October 18, 2023
Comment Period Ends: November 17, 2023

Ohio EPA Permit No.: 4PB00017*QD
Application No.: OH0031119

Name and Address of Applicant:
City of Pickerington
100 Lockville Road
Pickerington, OH 43147

Name and Address of Facility Where
Discharge Occurs:
Pickerington Wastewater Treatment Plant
525 Hill Road South
Pickerington, OH 43147
Fairfield County

Receiving Water: Sycamore Creek

Subsequent Stream Network: Walnut Creek to Scioto River to 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.

Antidegradation provisions in Ohio Administrative Code (OAC) Chapter 3745-1 describe the conditions under which water quality may be lowered in surface waters. 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/or monitoring requirements proposed for all parameters are the same as in the current permit, except those listed below.

New effluent limits are proposed for dissolved hexavalent chromium and selenium at outfall 4PB00017001 because of the wasteload allocation placing these parameters in group 5, displaying reasonable potential to exceed water quality standards. A compliance schedule has been included in Part I. C of the permit for these parameters.

New monitoring is proposed for dissolved hexavalent chromium, mercury, and selenium at outfall 4PB00017601 based on the limits proposed for the parameters at outfall 4PB00017001 and to better categorize the concentration and amounts of these parameters coming into the facility.

New monitoring is proposed for free cyanide because of the wasteload allocation placing free cyanide in group 5. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), monitoring rather than limits is proposed.

Limits are proposed to be removed for bis (2-ethylhexyl) phthalate due to it being placed in group 4 in the wasteload allocation. Monitoring is proposed to continue on a quarterly basis.

In accordance with Ohio Administrative Code (OAC) 3745-33-07, it has been determined that the effluent from Pickerington WWTP shows potential chronic toxicity to *Ceriodaphnia Dubia*. Increased monitoring frequency is proposed.

Nitrate + nitrite is proposed to be added to upstream/downstream monitoring stations 801/901. Phosphorus is proposed to be added to upstream station 801. These proposals are to better categorize nutrients within the Sycamore Creek.

Total filterable residue is proposed to be removed from both upstream/downstream monitoring stations 4PB00017801 / 4PB00017901. This is because total filterable residue was added to these stations as a part of the 4b option in the 2010 TMDL for Walnut Creek. The 4b option was closed in the 2020 integrated report based on a survey done by Ohio EPA in 2019. The survey indicated Sycamore Creek was fully attaining its water

quality standard for total filterable residue. Pickerington WWTP has had no violations for total filterable residue in the past 5 years.

E. coli is proposed to be changed from monitored 1/month to 1 / 2 weeks at the upstream/downstream stations 4PB00017801 / 4PB00017901. Water temperature, dissolved oxygen, and pH are proposed to be removed from upstream station 4PB00017801. All of these changes are based on updated monitoring guidance for wastewater treatment plants.

Toxicity monitoring for Ceriodaphnia Dubia and Pimephales Promelas are proposed to be removed from upstream/downstream monitoring stations 4PB00017801 / 4PB00017901 because the Sycamore Creek is now in attainment of its uses and the 4b option was cleared.

To ensure that data is obtained that allows Ohio EPA to make water quality-related decisions regarding dissolved hexavalent chromium, free cyanide, and selenium, a special condition is proposed in Part II of the permit that provides guidance on the analytical method detection limits (MDLs) the permittee should use in analyzing for these contaminants.

In Part II of the permit, special conditions are included that address sanitary sewer overflow (SSO) reporting; operator certification, minimum staffing and operator of record; whole effluent toxicity (WET) testing; storm water compliance; supplemental effluent data; 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 emailed to HClerk@epa.ohio.gov or mailed 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 by email to epa.dswcomments@epa.ohio.gov (preferred method) or delivered 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 James Morris, (614) 644-2146, James.Morris@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: https://epa.ohio.gov/static/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 email to epa.dswcomments@epa.ohio.gov (preferred method) or 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

Pickerington WWTP discharges to Sycamore Creek at River Mile 4.5. Figure 1 shows the approximate location of the facility.

This segment of the Sycamore Creek is described by Ohio EPA River Code: 02-085, Hydrologic Unit Code: 05060001-17-04, County: Fairfield, Ecoregion: Eastern Corn Belt Plains. The Sycamore Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-09): Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, 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

Pickerington WWTP was constructed in 1988 and last upgraded in 2009. The average design flow is 3.2 million gallons per day (MGD). Pickerington WWTP serves the City of Pickerington. Pickerington WWTP has the following treatment processes (Figure 2):

- Influent Pumping
- Bar Screen
- Grit Removal
- Activated sludge-extended aeration
- Biological nitrification-separate stage
- Secondary Clarification
- Tertiary cloth media disk filters
- Ultraviolet Disinfection
- Post Aeration

The City of Pickerington operates a reverse osmosis (RO) water treatment plant that has effluent blended with the Pickerington WWTP at Outfall 4PB00017001. Due to the inorganic nature of RO plant wastewater, the water plant discharge does not go through the WWTP because the object is to dilute the total filterable residue in

the water plant effluent. The Pickerington WWTP redirects flows from the RO plant to the post aeration tank and blends with WWTP flow. The WWTP's operating parameters are limited at the discharge from the treatment plant (internal station 602). Flows from the water plant are monitored at internal station 603 and the final discharge (and all water quality-based limits) are monitored at Outfall 001. Monitoring and limits are necessary at Outfall 602 in order to judge compliance with secondary treatment standards and Ohio Best Available Demonstrated Control Technology standards.

Pickerington WWTP has no bypasses. The City of Pickerington has 100% separate sewers.

The City of Pickerington does not have an approved pretreatment program. The City of Pickerington does not have any industrial users.

The City of Pickerington's potable water comes from groundwater processed by the City's reverse osmosis (RO) water treatment plant (WTP), which came online in 2011.

Pickerington WWTP utilizes the following sewage sludge treatment processes:

- Mechanical Dewatering – filter press
- Aerobic Digestion - air

Table 1 shows the last five years of sludge removed from Pickerington WWTP. Treated sludge is land applied.

Pickerington WWTP is covered under the following additional NPDES permit: industrial storm water general permit 4GR00373*GG.

DESCRIPTION OF EXISTING DISCHARGE

Table 2 presents the effluent violations for Pickerington WWTP during the previous five years. These violations were not caused by a known process error or upset condition.

Table 3 presents the average annual effluent flow rate for Pickerington WWTP for the previous five years. Pickerington WWTP has an estimated infiltration/inflow (I/I) rate of 0.26 MGD that does not cause known problems in the collection system.

No SSOs were reported over the past five years.

Table 4 presents data characterizing the seasonal total phosphorus load from Pickerington WWTP during the previous five years.

Table 7 presents chemical specific data compiled from supplemental effluent testing data submitted as part of the NPDES renewal application.

Table 6 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period July 2017 – April 2023, and current permit limits are provided for comparison.

Table 7 summarizes the chemical specific data for outfall 001 by presenting the average and maximum PEQ values.

Table 8 summarizes the results of acute and chronic Whole Effluent Toxicity (WET) tests of the final effluent, using the water flea (*Ceriodaphnia dubia*) and fathead minnow (*Pimephales promelas*) as test organisms.

ASSESSMENT OF IMPACT ON RECEIVING WATERS

Pursuant to Section 303(d) of the Clean Water Act, each state is required to develop and submit a list to US EPA of its impaired and threatened waters (e.g. stream/river segments, lakes). For each water on the list, the state identifies the pollutant(s) causing the impairment, when known. The Sycamore Creek watershed assessment unit, which includes the Sycamore Creek in the vicinity of Pickerington WWTP, is listed as impaired for human health, recreation, and aquatic life uses on Ohio's 303(d) list.

The Total Maximum Daily Load (TMDL) program focuses on identifying and restoring polluted rivers, streams, lakes and other surface water bodies. A TMDL is a written, quantitative assessment of water quality problems in a water body and contributing sources of pollution. It specifies the amount a pollutant needs to be reduced to meet water quality standards (WQS), allocates pollutant load reductions, and provides the basis for taking actions needed to restore a water body. A Total Daily Maximum Load (TMDL) report was approved for the Walnut Creek in February, 2010.

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 9) 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.

The 2010 TMDL lists multiple sections of the Sycamore Creek, as impaired for recreation use due to high fecal coliform counts. Within the vicinity of Pickerington WWTP, the Sycamore Creek is not impaired due to fecal

coliform. Pickerington WWTP has not had any effluent violations for *E. coli* in the past 5 years, indicating that they are not contributing to recreational impairment in the watershed.

Sycamore Creek in the vicinity of Pickerington WWTP was impaired for aquatic life due to total dissolved solids (TDS) and total toxicity. The elevated TDS discharges were cited as the cause of toxicity. Pickerington WWTP was the cited source. As part of the 2010 TMDL, a category 4B option was used as a plan was already in place to address these issues. In 2011, a reverse osmosis system was installed in Pickerington WTP, this resulted in a decrease in TDS in Pickerington's effluent. Since the installation of the reverse osmosis system, Pickerington WWTP has had no effluent violations for TDS. In 2019, Ohio EPA surveyed Sycamore Creek as part of the category 4B plan and found the Sycamore Creek to be attaining the water quality standard for TDS. The 2020 Ohio Integrated Water Quality Monitoring and Assessment Report closed out the Category 4B plan.

The TMDL states that Walnut Creek is impaired for human health uses due to high levels of polychlorinated biphenyl (PCB) found in fish tissue sampled in 1999. In 2005, Ohio EPA sampled fish tissues again and no PCBs were detected in eighteen samples of fish tissues. Another round of sampling without detection is required to de list the waterbody from the impairment list. As such, the Sycamore Creek within the vicinity of the Pickerington WWTP is listed as impaired for PCB. In 2016, Ohio EPA analyzed a sample of Pickerington WWTP's effluent and no PCBs were detected.

The 2010 TMDL can be found here:

https://epa.ohio.gov/static/Portals/35/tmdl/WalnutCreekTMDL_final_feb10_wo_app.pdf

The 2020 Integrated Report can be found here:

https://epa.ohio.gov/static/Portals/35/tmdl/2020intreport/2020_Final_IR_CompleteReport_May2020.pdf?ver=2020-05-11-150221-420

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 Pickerington 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)
Pretreatment data

July 2017 through April 2023
2022-2023

Statistical Outliers and Other Non-representative Data

The data were examined, and the following values were removed from the evaluation as non-representative data: Total Mercury (Low Level) – 28.1 ng/l, 10/25/2018. This data point was removed from consideration due to it being 15 times higher than the next closest data point. Bis (2-ethylhexyl) phthalate – 36.3 ug/l, 7/6/2017; 38.8 ug/l, 10/19/2017; 37.9 ug/l, 1/11/2018; 36.3 ug/l, 7/5/2018; 45 ug/l, 1/10/2019; and 25.4 ug/l, 10/1/2020.

On October 4, 2021, Pickerington WWTP submitted a control strategy for Bis (2-ethylhexyl) phthalate which involved replacing their automatic sampler tubing with a Teflon coated tube and changing their automatic sampler container from plastic to glass. Since their changes were put in place, there have been 2 detections for bis (2-ethylhexyl) phthalate (1.28 ug/l, 5/3/2022 and 1.84, 3/9/2023). The above values have been attributed to sampling errors and have been removed from the reasonable potential analysis.

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 7). See Modeling Guidance #1 for more information on PEQ calculations, available through the Ohio EPA, Division of Surface Water website at: <https://www.epa.ohio.gov/portals/35/guidance/model1.pdf>

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 10).

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 calculated 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.

Allocations are developed using a percentage of stream design flow as specified in Table 11, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The data used in the WLA are listed in Table 10 and Table 11. The WLA results to maintain all applicable criteria are presented in Table 12.

Whole Effluent Toxicity Wasteload Allocation

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 (i.e. TU_a and TU_c) by the associated WQS Implementation Rule (OAC 3745-2-09). The translation results in a numeric value of 0.3 TU_a and 1.0 TU_c. WLAs can then be calculated using these values as if they were water quality criteria.

There are two separate reasonable potential procedures in Ohio - one for the Lake Erie watershed and one for the Ohio River watershed. Dischargers in the Ohio River watershed are assessed using OAC 3745-33-07(B). Dischargers in the Lake Erie watershed are assessed in accordance with the "Great Lakes Water Quality Initiative Implementation Procedures" contained in 40 CFR Part 132, Appendix F, Procedure 6.

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. WET

WLAs are based on meeting the values of 0.3 TUa and 1.0 TUc downstream of the discharge, and include any available dilution. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. WLAs for acute toxicity are capped at 1.0 TUa unless the discharger demonstrates that an Area-of-Initial-Mixing (AIM) exists under OAC 3745-1-06, or that one of the factors in OAC 3745-33-07(B)(5)-(9) allows a higher TUa limit to be granted. For the purposes of establishing WET limitations, the values of 1.0 TUa and 1.0 TUc are the most restrictive limitations that can be applied in NPDES permits [OAC 3745-33-07(B)(10)].

For Pickerington WWTP, the WLA values for outfall 001 are 0.3 TUa and 1.12 TUc.

The chronic toxicity unit (TUc) is defined as 100 divided by the estimate of the effluent concentration which causes a 25% reduction in growth or reproduction of test organisms (IC25):

$$TUc = 100/IC25$$

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):

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

The acute toxicity unit (TUa) is defined as 100 divided by the concentration in water having 50% chance of causing death to aquatic life (LC50) for the most sensitive test species:

$$TUa = 100/LC50$$

This equation applies outside the mixing zone for all designated waters. Based on the above, a value of 1.0 TUa is the lowest value that can be calculated using the equation. TUa values between 0.2 and 1.0 are based on an interpolation of toxic effects where an LC50 cannot be identified.

When the acute WLA is less than 1.0 TUa, it may be defined as a ratio of the stream dilution to the effluent flow:

Acute Dilution Ratio (downstream flow to discharger flow)	Allowable Effluent Toxicity (percent effects in 100% effluent)
up to 2 to 1	30
greater than 2 to 1 but less than 2.7 to 1	40
2.7 to 1 to 3.3 to 1	50

$$\text{Acute Dilution Ratio} = \frac{1Q10 + [\text{WWTP flow rate}]}{[\text{WWTP flow rate}]} = \frac{[0.582] \text{ cfs} + [4.95] \text{ cfs}}{[4.95] \text{ cfs}} = [1.12]$$

The acute WLA for Pickerington WWTP can be expressed as 30 percent mortality in 100 percent effluent based on the dilution ratio of 1.12 to 1. If the acute dilution ratio is less than 3.3 to 1.0, and there is evidence that effluent values between 0.3 TUa and 1.0 TUa cause or contribute to violations of WQS, the permittee may be required to investigate and remediate toxicity in this range.

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 12. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 7, 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 13.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 14 presents the final effluent limits and monitoring requirements proposed for Pickerington 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.

Ammonia, dissolved oxygen, total suspended solids, 5-day carbonaceous biochemical oxygen demand (CBOD5)

The limits proposed for ammonia, dissolved oxygen, total suspended solids, and 5-day carbonaceous biochemical oxygen demand (CBOD5) are all based on plant design criteria. The TSS and CBOD5 limits are more stringent than the Secondary Treatment Standards in 40 CFR Part 133. The current ammonia limits have been evaluated using the WLA procedures and are protective of WQS for ammonia toxicity. The current dissolved oxygen limit is protective of WQS.

Oil and grease, pH, and *Escherichia coli*

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

Nitrate + nitrite, and total kjeldahl nitrogen

Municipal WWTPs discharge a nutrient load to the river, therefore monthly monitoring for nitrate + nitrite and total kjeldahl nitrogen is proposed. The purpose of the monitoring is to maintain a nutrient data set for use in a future water quality study. Nitrate + nitrite was analyzed for reasonable potential and was placed into group 2 in the Ohio EPA risk assessment (Table 13).

Hexavalent chromium and selenium

The Ohio EPA risk assessment (Table 13) places hexavalent chromium and selenium in group 5. This placement, as well as the data in Table 6 and Table 7, indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For these parameters, the PEQ is greater than 100 percent of the WLA. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1). The thirty-day average concentration limit for hexavalent chromium and selenium is based on the WLA. The daily maximum concentration limit, the thirty-day average loading limit, and the daily maximum loading limit for hexavalent chromium and selenium are based on the water quality criteria in the Sycamore Creek.

Free cyanide

The Ohio EPA risk assessment (Table 13) places free cyanide 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 free cyanide (Table 11) may not be representative of its actual levels in the plant effluent since they were based on 2 data points. 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.

In addition, the free cyanide actual value falls within 75 percent of the WLA. Parameters from small data sets with values greater than 75 percent of the WLA need a tracking requirement in the permit that specifies

reductions in pollutant concentrations if effluent concentrations exceed the WLA. The tracking/reduction requirements are included in Part II of the permit.

Considering the magnitude of the reported values compared to the WLA, a tracking provision is proposed in Part II of the permit that requires the Pickerington WWTP to notify Ohio EPA if a sample result exceeds the preliminary effluent limit (Table 14). If certain conditions are met, the City is required to take steps to reduce the discharge level of this pollutant.

Bis (2-ethylhexyl) phthalate

The Ohio EPA risk assessment (Table 13) places bis (2-ethylhexyl) phthalate in group 4. This placement, as well as the data in Table 6 and Table 7, support that this parameter 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). Limits for bis (2-ethylhexyl) phthalate are proposed to be removed but monitoring will continue at a quarterly frequency.

Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Nitrate + Nitrite, Total Filterable Residue and Zinc

The Ohio EPA risk assessment (Table 13) places cadmium, chromium, copper, lead, mercury, nickel, nitrate + nitrite, total filterable residue and zinc in groups 2 and 3. This placement, as well as the data in Table 6 and Table 7, 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 is proposed to document that these pollutants continue to remain at low levels.

Antimony, Arsenic, Barium, Iron, Methylene Chloride, Phenol, Silver, Strontium, and Styrene

The Ohio EPA risk assessment (Table 13) places antimony, arsenic, barium, iron, methylene chloride, phenol, silver, strontium and styrene in group 2. This placement, as well as the data in Table 6 and Table 7, 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. Monitoring for barium is proposed to be removed.

Dissolved Orthophosphate and Total Phosphorus

Monitoring for dissolved orthophosphate (as P) and total phosphorus is required by ORC 6111.03. This monitoring will further develop nutrient datasets that are used in stream and watershed assessments and studies. Because Ohio EPA monitoring, as well as other in-stream monitoring, for dissolved orthophosphate 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.

Additivity of Carcinogens

Bis (2-ethylhexyl) phthalate is a carcinogen, which require the evaluation of the additive effect of this pollutant. OAC 3745-33-07(A)(8) states that a pollutant may be removed from the consideration of additivity if the PEL for the pollutant is less than the quantification level for that pollutant. For Bis (2-ethylhexyl) phthalate, the average PEL is less than the respective quantification level, so this parameter is removed from additivity consideration. As a result, there is no additive effect and carcinogenic additivity is not proposed for inclusion in the permit.

Whole Effluent Toxicity Reasonable Potential

Based on evaluating the WET data presented in Table 8, Attachment 1, and other pertinent data under the provisions of OAC 3745-33-07(B), the Pickerington WWTP is placed in Category 3 with respect to WET. No

limits are proposed but increased acute and chronic testing is proposed for *Ceriodaphnia Dubia* for the duration of the permit.

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: land application, removal to sanitary landfill or transfer to another facility with an NPDES permit.

OTHER REQUIREMENTS

Compliance Schedule

New Limits - A 36-month compliance schedule is proposed for the Pickerington WWTP to meet the new daily max and monthly average concentration and loading limits for dissolved hexavalent chromium and selenium.

Sanitary Sewer Overflow Reporting

Provisions for reporting SSOs are again proposed in this permit. These provisions include: the reporting of the system-wide number of SSO occurrences on monthly operating reports; telephone notification of Ohio EPA and the local health department, and 5-day follow up written reports for certain high risk SSOs; and preparation of an annual report that is submitted to Ohio EPA and made available to the public. Many of these provisions were already required under the “Noncompliance Notification”, “Records Retention”, and “Facility Operation and Quality Control” general conditions in Part III of Ohio NPDES permits.

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 Pickerington WWTP to have a Class III wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 00X. 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.

Sufficiently Sensitive Method

Part II of the permit includes a condition requiring the Pickerington WWTP to use laboratory analytical methods with a sufficiently sensitive MDL.

Method Detection Limit Reporting

When submitting monitoring results in eDMR, the permittee must report all detected concentration values above the method detection limit (MDL), even if that value is below the quantification level to implement ORC 6111.13 and OAC 3745-33-07(C)., A detection above the MDL indicates the presence of a pollutant with strong confidence, which must be considered in reasonable potential analyses. Per OAC 3745-33-07(C)(2)(c), for the purpose of assessing compliance, any value reported below the quantification level shall be considered in compliance with an effluent limit.

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).

NPDES Renewal Application Supplemental Effluent Data

The permittee must submit supplemental effluent data as part of the next NPDES permit renewal application. A minimum of three samples must be tested for 101 parameters, each collected within four and one-half years of the application submission date. The complete list of parameters to be analyzed is contained in Table 2 of "Appendix J to Part 122 - NPDES Permit Testing Requirements for Publicly Owned Treatment Works (§122.21(j))." Existing effluent data may be used, if available, in lieu of sampling performed solely for the purpose of the renewal application. See Part II of the permit for details.

Part III

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

Storm Water Compliance

To comply with industrial storm water regulations, the permittee requested coverage under the industrial storm water general permit. Permit 4GR00373*GG became effective on 08/01/22. No later than 90 days after the effective date of the renewed general permit, the permittee must request renewed coverage under the industrial storm water general permit or make other provisions to comply with the industrial storm water regulations.

Figure 1. Location of Pickerington WWTP



Figure 2. Diagram of Wastewater Treatment System

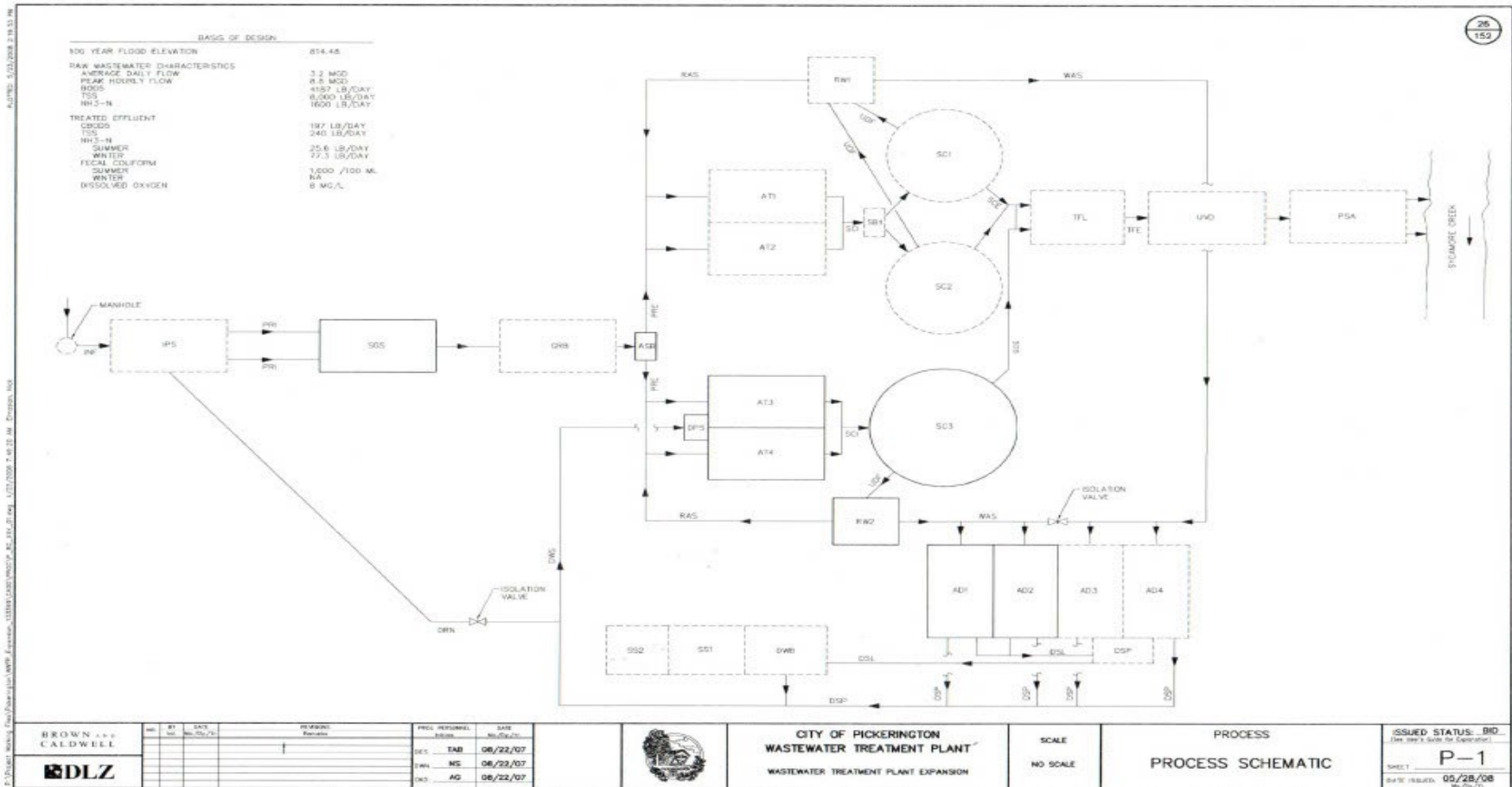


Table 1. Sewage Sludge Removal

Year	Dry Tons Removed
2017	123
2018	287
2019	330
2020	277
2021	234
2022	263

Table 2. Effluent Violations for Outfall 001

Parameter	2017	2018	2019	2020	2021	2022	Total
Bis (2-ethylhexyl) Phthalate	0	0	0	0	2*	0	2
Total Suspended Solids	2	0	0	0	0	0	2
Total	0	0	0	0	2	0	4

*These effluent violations occurred before Pickerington WWTP had implemented changes to their sampling methods and are believed to have been caused by errors in sampling procedure.

Table 3. Average Annual Effluent Flow Rates

Year	Annual Flow (MGD)		
	50th Percentile	95th Percentile	Maximum
2017*	1.95	2.62	5.89
2018	2.16	2.99	4.03
2019	2.71	9.35	9.95
2020	2.48	3.41	7.31
2021	2.34	3.25	4.62
2022	2.54	3.64	5.69
2023*	2.55	3.56	4.79

MGD = million gallons per day.

*Data set begins on 07/01/2017

**Data set ends on 04/31/2023

Table 4. Calculated Seasonal Total Phosphorus Loadings

Year	n	Median Phosphorus (mg/L)	Median Flow (MGD)	Median Loading (kg/day)
2017 ^a	16	1.8	1.69	10.9
2018	24	1.48	1.87	9.4
2019	35	1.8	2.79	20.4
2020	24	1.86	2.24	15.7
2021	24	2.06	2.25	17.6
2022	24	1.70	2.543	17.7

^a = data set begins on 07/1/17

MGD = million gallons per day

n = number of samples

Table 5. Effluent Characterization Using Ohio EPA/Supplemental Effluent Data

Parameter	Units	5/03/2022	2/9/2023	3/9/2023
Chromium	µg/L	0.0708	0.0067	AA (0.8)
Copper	µg/L	3.9	3.17	4
Cyanide, free	µg/L	2.96	NT	4
Iron	µg/L	110	175	NT
lead	µg/L	AA (2.0)	0.0804	AA (4.0)
Magnesium	mg/L	56.5	53.6	NT
Manganese	µg/L	15	34.9	NT
Methylene Chloride	µg/L	AA (0.5)	0.375	AA (0.2)
Nickel	µg/L	2.82	3.23	3
Nitrate-Nitrite	mg/L	12.5	10.7	11.4
Phenol	µg/L	1.04	AA (1.78)	AA (0.7)
Selenium	µg/L	AA (0.766)	AA	AA (7.0)
Silver	µg/L	0.0253	AA (0.0104)	AA (0.6)
Strontium	µg/L	1430	1250	NT
Styrene	µg/L	0.134	AA (0.5)	NT
Total Filterable Residue	mg/L	926	972	NT
Zinc	µg/L	32.8	20	16

AA = not-detected (analytical method detection limit)

NT = not tested

Table 6. Effluent Characterization Using Self-Monitoring Data

Outfall	Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
			30 Day	Daily		50th	95th	
001	Water Temperature	°C	Monitoring Only		2117	16.3	20.4	9 - 21.9
	Dissolved Oxygen	mg/L	--	8.0 ^m	1935	9.41	8.65*	8.02 - 11.8
	Total Suspended Solids	mg/L	9.0	14 ^w	324	1.4	4.4	0 - 47
	Oil and Grease	mg/L	--	10	81	< 5	< 5	0 - 5.9
	Nitrogen, Ammonia - Summer - 2018-2019	mg/L	0.91	1.4 ^w	132	.03	.199	.01 - 2.4
	Nitrogen, Ammonia - Summer - 2017-2017	mg/L	0.96	1.4 ^w	48	.03	.0565	.01 - .5
	Nitrogen, Ammonia - Winter	mg/L	2.6	3.9 ^w	144	.02	.3	.01 - .74
	Nitrogen Kjeldahl, Total	mg/L	Monitoring Only		73	< 2	3.28	0 - 4.4
	Nitrite Plus Nitrate, Total	mg/L	Monitoring Only		73	11.2	14.4	1.56 - 16.7
	Phosphorus, Total	mg/L	Monitoring Only		287	1.72	2.46	.53 - 3.4
	Orthophosphate, Dissolved	mg/L	Monitoring Only		71	1.71	3.09	.48 - 1390
	Selenium, TR	µg/L	Monitoring Only		62	< 30	< 30	0 - 9
	Barium, TR	µg/L	Monitoring Only		8	67.5	75.7	61 - 76
	Nickel, TR	µg/L	Monitoring Only		23	< 10	2.9	0 - 3
	Zinc, TR	µg/L	Monitoring Only		23	20	47.5	14 - 74
	Cadmium, TR	µg/L	Monitoring Only		65	--	--	< 5
	Lead, TR	µg/L	Monitoring Only		23	--	--	< 20
	Chromium, TR	µg/L	Monitoring Only		23	--	--	< 10
	Copper, TR	µg/L	Monitoring Only		23	3	9.8	0 - 14
	Chromium, Dissolved Hexavalent	µg/L	Monitoring Only		20	< 10	2	0 - 40
	E. coli - 2018-2022	#/100 mL	126	284 ^w	393	< 50	16.8	0 - 326
	E. coli - 2017-2017	#/100 mL	161	362 ^w	48	8	29.7	0 - 127
	Bis(2-ethylhexyl) Phthalate - Quarterly - Tox1	µg/L	Monitoring Only		3	37.9	38.7	36.3 - 38.8
	Bis(2-ethylhexyl) Phthalate - Quarterly-tox1	µg/L	9.2	1188	20	< 5	36.7	0 - 45
	Flow Rate	MGD	Monitoring Only		2130	2.4	3.56	1.05 - 9.95

	Mercury, Total	ng/L	Monitoring Only		25	.65	1.39	0 - 28.1
	Acute Toxicity, Ceriodaphnia dubia	TUa	Monitoring Only		7	--	--	< .2
	Chronic Toxicity, Ceriodaphnia dubia	TUc	Monitoring Only		7	1.12	1.12	0 - 1.12
	Acute Toxicity, Pimephales promelas	TUa	Monitoring Only		7	< .2	.14	0 - .2
	Chronic Toxicity, Pimephales promelas	TUc	Monitoring Only		7	--	--	< 1
	pH, Maximum	S.U.	--	9.0	2117	7.83	8.01	1.25 - 8.72
	pH, Minimum	S.U.	--	6.5 ^m	2117	7.66	7.31*	6.98 - 9.1
	Residue, Total Filterable - 2017-2018	mg/L	1628	--	96	1030	1130	607 - 1200
	Residue, Total Filterable - 2018-2023	mg/L	Monitoring Only		144	918	1110	.02 - 1390
	CBOD 5 day	mg/L	7.4	11 ^w	324	2.9	4.29	2 - 6.7
601	pH	S.U.	Monitoring Only		2117	7.71	7.88	7.12 - 9.15
	Total Suspended Solids	mg/L	Monitoring Only		840	184	368	32 - 876
	CBOD 5 day	mg/L	Monitoring Only		839	114	170	30 - 444
602	Dissolved Oxygen	mg/L	--	8.0 ^m	152	8.64	7.9*	7.56 - 9.66
	Total Suspended Solids	mg/L	9.0	14.0 ^w	504	3	6.6	.2 - 13.4
	Nitrogen, Ammonia - Summer	mg/L	0.91	1.4 ^w	228	.03	.06	.01 - 1.9
	Nitrogen, Ammonia - Winter	mg/L	2.6	3.9 ^w	276	.02	.0775	0 - 2.2
	Flow Rate	MGD	Monitoring Only		1278	1.97	3	.677 - 6.93
	Residue, Total Filterable	mg/L	Monitoring Only		44	539	865	388 - 1060
	CBOD 5 day	mg/L	7.4	11 ^w	504	3.2	4.5	.5 - 6.4

*= For pH minimum and dissolved oxygen, 5th percentile shown in place of 95th percentile

TR = Total Recoverable

^w = weekly average

^m = Minimum limit

Table 7. Projected Effluent Quality for Outfall 001

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Aluminum	µg/L	2	1	240.23	329.08
Ammonia (Summer)	mg/L	144	144	1.11	1.52
Ammonia (Winter)	mg/L	145	145	0.045	0.089
Antimony	µg/L	2	1	0.99	1.36
Arsenic - TR	µg/L	2	2	6.52	8.93
Barium	µg/L	10	10	92.44	114.17
Bis(2-ethylhexyl)phthalate	µg/L	4	2	3.49	4.78
Cadmium - TR	µg/L	2	2	0.06	0.08
Chlorides	mg/L	2	2	247.16	338.58
Chromium - TR	µg/L	27	0	--	--
Hexavalent Chromium (Dissolved)	µg/L	21	1	37.96	52
Copper - TR	µg/L	27	16	8.54	13.81
Cyanide, Free	µg/L	2	2	11.10	15.2
Dissolved Solids	mg/L	244	244	708.8	970.9
Iron - TR	µg/L	2	2	485.45	665
Lead - TR	µg/L	1	1	0.36	0.50
Manganese - TR	µg/L	2	2	96.81	132.62
Magnesium	mg/L	2	2	156.73	214.7
Mercury - TR (BCC)	ng/L	24	19	1.47	2.32
Methylene chloride (Dichloromethane)	µg/L	2	1	1.04	1.43
Nickel - TR	µg/L	27	9	2.83	3.88
Nitrate-N + Nitrite-N	mg/L	77	77	10.97	15.03
Phenol (wwh,ewh,mwh)	µg/L	2	1	2.88	3.95
Selenium - TR	µg/L	66	2	6.57	9
Silver	µg/L	2	1	0.07	0.10
Strontium	µg/L	2	2	3966.82	5434
Styrene	µg/L	2	1	0.37	0.51
Zinc - TR	µg/L	27	27	36.38	51.34

MDL = analytical method detection limit

PEQ = projected effluent quality

Table 8. Summary of Acute and Chronic Toxicity Results

Date	<i>Ceriodaphnia Dubia</i>		<i>Pimephales promelas</i>	
	TU _a	TU _c	TU _a	TU _c
7/2/2017	AA	1.12	AA	AA
7/15/2018	AA	AA	AA	AA
7/1/2019	AA	1.12	AA	AA
7/12/2020	AA	1.12	0.2	AA
7/6/2021	AA	AA	AA	AA
7/11/2022	AA	AA	AA	AA

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 9. Use Attainment Table

Location	RM	Use	Status	Cause	Source
Sycamore Cr at State Route 204	12.2	WWH	Partial	Organic Enrichment	Urban septic systems
Sycamore Cr at Refugee Rd	9.6	WWH	Full		
Ust of Pickerington WWTP	4.7	WWH	Full		
Dst of Pickerington WWTP*	4.2	WWH	Full		
Sycamore Cr At Busey Rd*	2.6	WWH	Full		
Sycamore Cr at Benadum Rd	0.2	WWH	Full		

*Data gathered from 2020 Integrated Report based on survey results conducted in 2019 by the Ohio EPA.

Ust = upstream

Dst = downstream

Cr = creek

Rd = road

RM = river mile

WWH = warmwater habitat

WWTP = wastewater treatment plant

Table 10. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Aluminum	µg/L	--	--	--	--	--
Ammonia (Summer)	mg/L	--	--	1.1	--	--
Ammonia (Winter)	mg/L	--	--	3	--	--
Antimony	µg/L	640	--	190	900	1800
Arsenic - TR	µg/L	--	100	150	340	680
Barium	µg/L	--	--	1700	7500	15000
Bis(2-ethylhexyl)phthalate	µg/L	3.7 ^c	--	8.4	1100	2100
Cadmium - TR	µg/L	--	50	6.1	17	33
Chlorides	mg/L	--	--	--	--	--
Chromium - TR	µg/L	--	100	220	4600	9300
Hexavalent Chromium (Dissolved)	µg/L	--	--	11	16	31
Copper - TR	µg/L	--	500	25	41	83
Cyanide, Free	µg/L	400	--	12	46	92
Dissolved Solids	mg/L	--	--	1500	--	--
Iron - TR	µg/L	--	5000	--	--	--
Lead - TR	µg/L	--	100	28	530	1100
Manganese - TR	µg/L	--	--	--	--	--
Magnesium	mg/L	--	--	--	--	--
Mercury - TR (BCC)	ng/L	12	10000	910	1700	3400
Methylene chloride (Dichloromethane)	µg/L	10000 ^c	--	1900	11000	22000
Nickel - TR	µg/L	4600	200	140	1200	2500
Nitrate-N + Nitrite-N	mg/L	--	100	--	--	--
Phenol (wwh,ewh,mwh)	µg/L	300000	--	400	4700	9400
Selenium - TR	µg/L	4200	50	5	62	120
Silver	µg/L	--	--	1.3	12	23
Strontium	µg/L	--	--	93000	240000	490000
Styrene	µg/L	--	--	32	290	570
Zinc - TR	µg/L	26000	25000	320	320	640

^c = carcinogen

Table 11. Instream Conditions and Discharger Flow

Parameter	Units	Season	Value	Basis
Stream Flows				
1Q10	cfs	annual	0.582	USGS 03228700*
7Q10	cfs	annual	0.616	USGS 03228700*
		summer	0.538	USGS 03228700*
		winter	1.03	USGS 03228700*
30Q10	cfs	summer	0.685	USGS 03228700*
		winter	1.773	USGS 03228700*
Harmonic Mean	cfs	annual	1.66	Previous WLA + Upstream WRF 50 th percentile flow
Mixing Assumption	%	average	100	
		maximum	100	
Hardness, OMZ	mg/L	annual	316	901 station 50% July 2017- April 2023
Hardness, IMZ	mg/L	annual	316	901 station 50% July 2017- April 2023
pH	S.U.	summer	8.16	901 station 75% July 2017- April 2023
		winter	8.2	901 station 75% July 2017- April 2023
Temperature	°C	summer	22.7	901 station 75% July 2017- April 2023
		winter	7.18	901 station 75% July 2017- April 2023
Pickerington WWTP flow	cfs	annual	4.9511	Renewal Application
Background Water Quality				
Ammonia (Summer)	mg/L		0.02	801 monitoring station; 2017-2023; n=24;; 50th percentile
Ammonia (Winter)	mg/L		0.01	801 station; 2017-2023; n=18; 801 50th percentile
Barium	µg/L		91	V08S30 2000-20005 median; n=11;
Bis(2-ethylhexyl)phthalate	µg/L			No representative data available.
Cadmium - TR	µg/L		0	V08S30 2000-2005 median; n=11; 11<MDL
Chromium - TR	µg/L		0	V08S30 2000-2005; n=11; 11<MDL;
Hexavalent Chromium (Dissolved)	µg/L			No representative data available.
Copper - TR	µg/L		1	V08S30 2000-2005; n=11; 1<MDL
Dissolved Solids	mg/L		524	V08S30 2000-2005 median; n=11;
Lead - TR	µg/L		0	V08S30 2000-2005 median; n=11; 11<MDL;
Mercury - TR (BCC)	ng/L			No representative data available.
Nickel - TR	µg/L		0	V08S30 2000-2005 median; n=11; 11<MDL;
Nitrate-N + Nitrite-N	mg/L		2.43	V08S30 2000-2005 median; n=11; 5<MDL;
Selenium - TR	µg/L		0	V08S30 2000-2005 median; n=11; 11<MDL;
Zinc - TR	µg/L		15	V08S30 2000-2005 median; n=11; 5<MDL;

* USGS Gauge 03228700 located on Blacklick Creek near Pickerington, flows adjusted for drainage area, 50th percentile flow added from upstream Sycamore Creek water reclamation facility

MDL = analytical method detection limit

n = number of samples

Table 12. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Aluminum	µg/L	--	--	--	--	--
Ammonia (Summer)	mg/L	--	--	1.25	--	--
Ammonia (Winter)	mg/L	--	--	4.07	--	--
Antimony	µg/L	855	--	214	1006	1800
Arsenic - TR	µg/L	--	133	168	380	680
Barium	µg/L	--	--	1900	8371	15000
Bis(2-ethylhexyl)phthalate	µg/L	4.9	--	9.4	1229	2100
Cadmium - TR	µg/L	--	67	6.9	19	33
Chlorides	mg/L	--	--	--	--	--
Chromium - TR	µg/L	--	134	247	5141	9300
Hexavalent Chromium (Dissolved)	µg/L	--	--	12	18	31
Copper - TR	µg/L	--	667	28	46	83
Cyanide, Free	µg/L	534	--	13	51	92
Dissolved Solids	mg/L	--	--	1621	--	--
Iron - TR	µg/L	--	6604	--	--	--
Lead - TR	µg/L	--	134	31	592	1100
Manganese - TR	µg/L	--	--	--	--	--
Magnesium	mg/L	--	--	--	--	--
Mercury, Total - Low Level (BCC)	ng/L	12	10000	910	1700	3400
Methylene chloride (Dichloromethane)	µg/L	13353	--	2136	12293	22000
Nickel - TR	µg/L	6142	267	157	1341	2500
Nitrate-N + Nitrite-N	mg/L	--	133	--	--	--
Phenol (wwh,ewh,mwh)	µg/L	400584	--	450	5252	9400
Selenium - TR	µg/L	5608	67	5.6	69	120
Silver	µg/L	--	--	1.5	13	23
Strontium	µg/L	--	--	104483	268129	490000
Styrene	µg/L	--	--	36	324	570
Zinc - TR	µg/L	34712	33377	358	356	640

Bioaccumulative Chemical of Concern (BCC); no mixing zone allowed after 11/15/2010, WQS must be met at end-of-pipe, unless requirements for an exception are met as listed in OAC 3745-2-05(A)(2)(e)(ii)

Table 13. Parameter Assessment

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

Aluminum	Chlorides	Manganese - TR
Magnesium		

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

Copper - TR	Antimony	Arsenic - TR
Barium	Cadmium - TR	Iron - TR
	Mercury, Total – Low Level	
Lead - TR	(BCC)	Methylene chloride
Nickel - TR	Nitrate-N + Nitrite-N	Phenol
Silver	Strontium	Styrene
Zinc - TR	Chromium - TR	Dissolved solids (ave)

Group 3: PEQmax < 50 percent of maximum PEL and PEQavg < 50 percent of average PEL.
No limit recommended; monitoring optional.

No Parameters fell in this category

Group 4: PEQmax ≥ 50 percent, but < 100 percent of the maximum PEL or
PEQavg ≥ 50 percent, but < 100 percent of the average PEL. Monitoring is appropriate.

Bis (2-ethylhexyl)
phthalate

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

<i>Parameter</i>	<i>Units</i>	<i>Recommended Effluent Limits</i>	
		<i>Average</i>	<i>Maximum</i>
Hexavalent Chromium (Dissolved)	µg/L	12	18
Cyanide, Free (monitor only)	µg/L	--	--
Selenium - TR	µg/L	5.6	69

Cyanide, Free becomes a Group 5 parameter based upon the loading test [OAC 3745-2-06(B)].

PEL = preliminary effluent limit

PEQ = projected effluent quality

WLA = wasteload allocation

WQS = water quality standard

Table 14. Final Effluent Limits for Outfall 001

Parameter	Units	Concentration		Loading (kg/day) ^a		Basis ^b
		Daily Maximum	30 Day Average	Daily Maximum	30 Day Average	
Water Temperature	°C	----- Monitor -----				M ^c
Dissolved Oxygen	mg/L	8.0 ^m	--	--	--	PD
TSS	mg/L	14 ^d	9.0	170 ^d	109	PD
Oil & Grease	mg/L	10	--	--	--	WQS
Ammonia (summer)	mg/L	1.4 ^d	0.91	17 ^d	11.1	PD
Ammonia (winter)	mg/L	3.9 ^d	2.6	47.3 ^d	31.5	PD
Total Kjeldahl Nitrogen	mg/L	----- Monitor -----				BTJ
Nitrate plus Nitrite	mg/L	----- Monitor -----				BTJ
Phosphorus	mg/L	----- Monitor -----				PMR
Orthophosphate	mg/L	----- Monitor -----				PMR
Selenium	µg/L	69	5.6	0.84	0.068	WLA/RP
Nickel	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
Dissolved Hexavalent Chromium	µg/L	18	12	0.22	0.15	WLA/RP
<i>E. coli</i>	#/100 mL	284 ^d	126	--	--	WQS
Bis (2-ethylhexyl) Phthalate	µg/L	--	--	--	--	WLA/RP
Flow Rate	MGD	----- Monitor -----				M ^c
Mercury	ng/L	--	--	--	--	M
Free Cyanide	µg/L	--	--	--	--	WLA
Acute Toxicity, <i>Ceriodaphnia dubia</i>	TUa	----- Monitor -----				WET
Chronic Toxicity, <i>Ceriodaphnia dubia</i>	TUc	----- Monitor -----				WET
Acute Toxicity, <i>Pimephales promelas</i>	TUa	----- Monitor -----				WET
Chronic Toxicity, <i>Pimephales promelas</i>	TUc	----- Monitor -----				WET
Total Filterable Residue	mg/L	----- Monitor -----				M
pH, maximum	SU	9.0	--	--	--	WQS
pH, minimum	SU	6.5 ^m	--	--	--	WQS
CBOD5	mg/L	11 ^d	7.4	133 ^d	89.6	PD

^a Effluent loadings based on average design discharge flow of 3.2 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))

PMR = Phosphorus monitoring requirements (ORC 6111.03)

RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in permits (OAC 3745-33-07(A))

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.
- ^m minimum limit

Attachment 1. Whole Effluent Toxicity Reasonable Potential Analysis

The reasonable potential analyses were performed for *Ceriodaphnia dubia* and *Pimephales promelas*, acute TUa Cd/Pp and chronic toxicity TUc Cd/Pp.

Hazard Category Summary

	<i>Ceriodaphnia dubia</i>		<i>Pimephales promelas</i>	
	Acute	Chronic	Acute	Chronic
Effluent Toxicity (Table A)	4	3	4	4
	3		4	

Hazard Categories: 1: Toxicity adequately documented 3: Toxicity possible
2: Toxicity strongly suspected 4: No toxicity

Table A. Effluent Toxicity

	<i>Ceriodaphnia dubia</i>		<i>Pimephales promelas</i>	
	Acute	Chronic	Acute	Chronic
WLA	0.3	1.12	0.3	1.12
# of tests	6	6	6	6
Maximum value	AA	1.12	0.2	AA
Percent of tests >WLA 0.6	--	0	0	--
Geometric mean	--	1.06	0.6	--
Average Exceedance (Geomean * Percent of tests >WLA)	--	0	0	--
Average Exceedance / WLA	--	0	0	--

Attribute Evaluated	Hazard Category 1	Hazard Category 2	Hazard Category 3	Hazard Category 4
Degree of Toxicity	Adequately Documented	Strongly Suspected	Possible	None
(1) Minimum number of tests	3 TUa Pp TUc Cd	1	0 or 1	0 or 1
(2) Percent of tests >WLA	>30	20 to 30	10 to 20	10 TUa Pp TUc Cd
(3) Average Exceedance/WLA ¹ (Tables B and C data not available)				
(a) Acute ²	> 0.3	≥ 0.3	≥ 0.2	< 0.2 TUa Pp
(b) Chronic	> 0.3	≥ 0.3	≥ 0.2	< 0.2 TUc Cd
(4) Maximum TU value (Tables 3B and 3C data not available)	≥(3xWLA)	≥WLA	≥WLA TUc Cd	<WLA TUa Pp

Table B. Far-Field Toxicity

Attribute Evaluated	Hazard Category 1	Hazard Category 2	Hazard Category 3	Hazard Category 4
Degree of Toxicity	Adequately Documented	Strongly Suspected	Possible	None
(1) Aquatic life use impairment (Ohio EPA biological criteria)	Yes ⁵	Yes or partial ⁵	Partial	None TUa Pp TUc Cd
(2) Stream community impact implied toxicologically ³	Significant effect	Significant effect	Unknown or slight effect	None N/A
(3) Other indicators	Stress indicated	Stress indicated	Stress indicated	No stress TUa Pp TUc Cd

¹ Compare (per cent exceedances x geometric mean TU) to table factor.

² Use 0.3 x WLA for situations where AIM exists.

³ Results of ambient toxicity test are not binding or required for classification as to category but, if available, will be interpreted under the weight of evidence principle giving due consideration as to sampling location and conditions.

⁴ Based on effluent data. May not be appropriate for situations where AIM exists.

⁵ Lack of attainment due to toxic, complex or unidentifiable type of impact.

⁶ The LC50-based criteria are used only for pollutant parameters that do not have numeric criteria.

Addendum 1. Acronyms

ABS	Anti-backsliding
BPJ	Best professional judgment
CFR	Code of Federal Regulations
CSO	Combined sewer overflow
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DMT	Dissolved metal translator
IMZM	Inside mixing zone maximum
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
PEL	Preliminary effluent limit
PEQ	Projected effluent quality
SSO	Sanitary sewer overflow
TMDL	Total Daily Maximum Load
TU	Toxicity unit
U.S. EPA	United States Environmental Protection Agency
WET	Whole effluent toxicity
WLA	Wasteload allocation
WQBEL	Water-quality-based effluent limit
WQS	Water Quality Standards
WWTP	Wastewater Treatment Plant