National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio
For **City of Lancaster Water Pollution Control Facility (WPCF)**

Public Notice No.: 190221
Public Notice Date: October 5, 2023
Comment Period Ends: November 4, 2023

Ohio EPA Permit No.: **4PD00001*OD**
Application No.: **OH0026026**

Name and Address of Applicant:
City of Lancaster
104 East Main Street
Lancaster, OH 43130

Name and Address of Facility Where Discharge Occurs:
Lancaster WPCF
800 South Lawrence Street
Lancaster, OH 43130
Fairfield County

Receiving Water: **Hocking River**

Subsequent Stream Network: **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 limits for free cyanide are proposed based on reasonable potential to exceed the wasteload allocation. A 36-month compliance schedule is proposed for the permittee to attain compliance with the new limits.

Limits are proposed to be removed for cadmium, copper, and total filterable residue based on a lack of reasonable potential to exceed the wasteload allocation. Monitoring frequency for cadmium and copper is proposed to be reduced to quarterly.

Monitoring is proposed to be removed for barium and bis(2-ethylhexyl) phthalate based on a lack of reasonable potential to exceed the wasteload allocation.

Monitoring frequency for total phosphorus is proposed to be reduced to once per week.

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.

Monitoring for *E. coli* at upstream monitoring station 801 and downstream monitoring station 901 is proposed to change from summer to June-August and from monthly to once every two weeks. The higher frequency over a shorter period will facilitate impairment assessments in the receiving stream.

Monitoring for water temperature, dissolved oxygen, and pH are proposed to be removed from station 801. Monitoring for dissolved oxygen is proposed to be removed from station 901. These data are not needed for reasonable potential analyses.

Monitoring for cadmium and copper at station 901 is proposed to be removed based on a lack of reasonable potential to exceed the wasteload allocation at outfall 001.

A compliance schedule is proposed for continued implementation of the permittee's Long Term Control Plan.

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; stormwater 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 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 David Brumbaugh at david.brumbaugh@epa.ohio.gov or (614) 644-2138.

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

Lancaster WPCF discharges to Hocking River at River Mile 89.05. Figure 1 shows the approximate location of the facility.

This segment of the Hocking River is described by Ohio EPA River Code: 01-001, Hydrologic Unit Code: 05030204-04-04, County: Fairfield, Ecoregion: Erie/Ontario Lake Plains. The Hocking River is designated for the following uses under Ohio's WQS (OAC 3745-1-08): Modified Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, Primary Contact Recreation. The Hocking River at River Mile 89.0 is designated as Warmwater Habitat.

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

Lancaster WPCF was constructed in 1939 and is currently being upgraded. The average design flow is 10 million gallons per day (MGD), the secondary treatment capacity is 12 MGD, and the peak hydraulic capacity is 18 MGD. Lancaster WPCF serves a large portion of the City of Lancaster, a population of approximately 30,000. Remaining portions of the city are served by the Upper Hocking WPCF. Lancaster WPCF has the following treatment processes (Figure 2):

- Bar screen
- Grit, scum removal
- Primary sedimentation
- Activated sludge
- Secondary clarification
- Chlorination/dechlorination
- Post-aeration

Lancaster WPCF has one bypass, monitored as station 002. When influent rates exceed 12 MGD, excess flows are diverted after primary treatment to a 1.0-million gallon equalization (EQ) basin. When flow rates subside,

stored wastewater is directed back to the treatment systems. When the EQ basin is full, excess flows from the EQ basin discharge directly to the receiving stream, bypassing secondary and disinfection treatments and monitored as outfall 002.

The City of Lancaster has 92% separate sewers and 8% combined sewers in the collection system and has nine known combined sewer overflow (CSOs). The City of Lancaster "Phase II Long Term Control Plan" (LTCP) was approved by Ohio EPA in December 2014. The LTCP proposes to attain a level of control ranging from zero to four events per typical year for nine remaining CSOs, with a final completion date of December 2033. A compliance schedule for implementation of the LTCP is proposed in Part I,C of the permit. The compliance schedule includes modified dates for interim milestones, which are proposed to be modified to accommodate a post-construction monitoring period for CSO 029.

The City of Lancaster has an approved pretreatment program, which regulates seven non-categorical, significant industrial users that discharge 0.207 MGD.

Lancaster WPCF utilizes the following sewage sludge treatment processes (Figure 2):

- Gravity thickening
- Belt press dewatering
- Anaerobic digestion

Table 1 shows the last five years of sludge removed from Lancaster WPCF. Treated sludge is land applied, as monitored at station 581. Monitoring for sludge disposal in a landfill (station 586) is proposed for inclusion in the permit.

The service area for Lancaster WPCF receives drinking water supply from the City of Lancaster's South Water Plant, a reverse osmosis facility.

DESCRIPTION OF EXISTING DISCHARGE

Table 2 presents the effluent violations for Lancaster WPCF during the previous five years. Violations of ammonia and total suspended solids are associated with equipment failures, typically in the secondary clarification systems, due to aging infrastructure at Lancaster WPCF. The facility upgrades currently being implemented are expected to address the issues.

Table 3 presents the average annual effluent flow rate for Lancaster WPCF for the previous five years. Lancaster WPCF has an estimated infiltration/inflow (I/I) rate of 1 MGD which is being addressed through the LTCP.

Table 4 presents the number of SSOs reported by Lancaster WPCF for the previous five years. SSOs are reported at station 300.

Table 5 presents data characterizing bypass activity at Lancaster WPCF for the previous five years. Bypasses are reported at station 002.

Table 6 presents data characterizing CSO activity reported by Lancaster WPCF during the previous five years. Lancaster WPCF has nine known CSOs.

Table 7 presents data characterizing the annual total phosphorus load from Lancaster WPCF during the previous five years.

Table 8 presents chemical specific data compiled from data reported in annual pretreatment reports. Because this data is substantially identical to the application requirements in CFR 122.21(j), the Director has waived the requirement for submittal of supplemental effluent testing data as part of the NPDES renewal application.

Table 9 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period January 2018 through January 2023, and current permit limits are provided for comparison.

Table 10 summarizes the chemical specific data for outfall 001 by presenting the average and maximum PEQ values.

Table 11 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 Tarhe Run-Hocking River watershed assessment unit, which includes the Hocking River in the vicinity of Lancaster WPCF, is listed as impaired for aquatic life, recreation, and human health 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 Hocking River in September 2009.

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.

Impairment status is based on data collected in 2003-04. The survey determined that the Hocking River downstream of Lancaster WPCF is partially impaired for aquatic life use by low dissolved oxygen/organic enrichment and nutrient enrichment, due to effluent from Lancaster WPCF and CSO discharges. In the last five years, Lancaster WPCF has reported 18 and 4 effluent limit violations for TSS and CBOD5, respectively. The secondary treatment system is being upgraded to address these violations. The City also continues to have CSOs discharges, though frequency and volume are being reduced through implementation of the LTCP.

The Hocking River is impaired in the vicinity of the City of Lancaster due to high bacteria levels attributed to home sewage treatment systems (HSTS), CSO discharges, urban runoff, and Lancaster WPCF. Installation of the Upper Hocking WPCF has eliminated many HSTS. Lancaster WPCF has reported seven effluent limit violations for *E. coli*. The City also continues to have CSOs discharges, though frequency and volume are being reduced through implementation of the LTCP.

The 2009 TMDL did not recommend additional effluent limits for Lancaster WPCF.

The 2022 Ohio Integrated Water Quality Monitoring and Assessment Report is available through the Ohio EPA, Division of Surface Water website at:
https://epa.ohio.gov/divisions-and-offices/surface-water/reports-data/ohio-integrated-water-quality-monitoring-and-assessment-report

The Hocking River TMDL is available through the Ohio EPA, Division of Surface Water website at:
https://epa.ohio.gov/divisions-and-offices/surface-water/reports-data/hocking-river-watershed

The Biological and Water Quality Study of the Upper Hocking River and Selected Tributaries (1996) report is available through the Ohio EPA, Division of Surface Water at:
https://epa.ohio.gov/divisions-and-offices/surface-water/reports-data/biological-and-water-quality-reports

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 Lancaster WPCF 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 2018 through January 2023

Pretreatment data 2018-22

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

- Chlorine, Total Residual – 0.005 mg/L on 6/17/19; removed as low outlier
- Zinc – 230 µg/L on 11/4/22; removed as high outlier

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 10). 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 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 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.

Lancaster WPCF and Upper Hocking WPCF are considered to be interactive and were allocated together for most parameters due to the size of the plant discharges, the flows of the Hocking River and the relatively close proximity of the two plants. The exception was the ammonia WLA, which was done separately for each facility because ammonia is not considered to be a conservative pollutant.

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.

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	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. The WLA results to maintain all applicable criteria are presented in Table 15.

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. TUa and TUc) by the associated WQS Implementation Rule (OAC 3745-2-09). The translation results in a numeric value of 0.3 TUa and 1.0 TUc. 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 (TUc) and 7Q10 flow for the average and the acute toxicity unit (TUa) 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 Lancaster WPCF, the WLA values are 0.45 TU_a and 1.54 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.

When the acute WLA is less than 1.0 TU_a, it may be defined as:

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

$$\text{Downstream Dilution Ratio} = \frac{1Q10 + [\text{WWTP flow rate}]}{[\text{WWTP flow rate}]} = \frac{0.36 \text{ cfs} + 15.47 \text{ cfs}}{15.47 \text{ cfs}} = 1.02$$

The acute WLA for Lancaster WPCF can be expressed as 20% percent mortality in 100 percent effluent based on the dilution ratio of 1.02 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 15. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 10, 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 Lancaster WPCF 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, CBOD5, Dissolved Oxygen, and TSS

The limits proposed for ammonia, 5-day carbonaceous biochemical oxygen demand (CBOD5), dissolved oxygen, total suspended solids (TSS) are all based on plant design criteria and have been effective since 1997. 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.

Total Residual Chlorine

The existing daily effluent limit for total residual chlorine is proposed to continue as a plant design value which is based on protection of the inside mixing zone maximum (IMZM) and outside mixing zone maximum (OMZM) PELs. The most stringent daily maximum criterion is applied and is to be met anytime chlorine is being utilized for effluent disinfection. The limit has been evaluated using the WLA procedures and determined to be protective of WQS for chlorine toxicity. The effluent limit for chlorine is less than the quantification level of 0.050 mg/L.

Although the current WLA would allow slightly higher limits for chlorine, anti-backsliding provisions in the OAC prevent the imposition of less stringent limits than those in the existing permit unless specific conditions have been satisfied. In the case of the Lancaster WPCF, none of those conditions have been satisfied, so the

existing limits are proposed to continue. The anti-backsliding provisions of OAC 3745-33-05(F) require that an anti-degradation review must be completed before an existing permit limit can be made less stringent. The rule requires other conditions to be satisfied as well.

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

Free Cyanide
The Ohio EPA risk assessment (Table 16) places free cyanide in group 5. This placement, as well as the data in Tables 9 and 10, indicates that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. For this parameter, 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 limits are based on aquatic life criteria and the daily maximum limits are based on the OMZM.

Total Filterable Residue
The Ohio EPA risk assessment (Table 16) places total filterable residue in group 4. This placement, as well as the data in Tables 9 and 10, support that this parameter does 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 total filterable residue are proposed to be removed but monitoring will continue.

Cadmium, Chromium, Copper, Dissolved Hexavalent Chromium, Lead, Mercury, Nickel, Total Filterable Residue, and Zinc
The Ohio EPA risk assessment (Table 16) places these parameters in groups 2 and 3. This placement, as well as the data in Tables 9 and 10, 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. Limits for cadmium and copper are proposed to be removed.

Antimony, Arsenic, Barium, Bis(2-ethylhexyl) Phthalate, Molybdenum, Phenol, Selenium, Silver, Thallium, and Toluene
The Ohio EPA risk assessment (Table 16) places these parameters in groups 2 and 3. This placement, as well as the data in Tables 9 and 10, 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 and bis(2-ethylhexyl) phthalate is proposed to be removed. Data for each of these parameters will be available for future reasonable potential analyses through priority pollutant scans submitted via the approved pretreatment program.

Flow Rate and Water Temperature
Monitoring for these parameters is proposed to continue to evaluate the performance of the treatment plant.

Nitrite plus Nitrate and Total Kjeldahl Nitrogen
Municipal WWTPs discharge a nutrient load to the receiving stream, therefore monthly monitoring for nitrite + nitrate and total Kjeldahl nitrogen is proposed based on best technical judgment. Monitoring for nitrite + nitrate and total Kjeldahl nitrogen at the upstream and downstream stations also is proposed. The purpose of the monitoring is to maintain a nutrient data set for use in the future studies. Nitrite + nitrate was evaluated using WLA procedures and did not demonstrate reasonable potential to exceed the WLA.

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. Monitoring frequency for total phosphorus is proposed to be reduce to once per week.

Whole Effluent Toxicity Reasonable Potential
Based on evaluating the WET data presented in Table 11 and Attachment 1, and other pertinent data under the provisions of OAC 3745-33-07(B), the Lancaster WPCF 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
Monitoring for E. coli at upstream monitoring station 801 and downstream monitoring station 901 is proposed to change from summer to June-August and from monthly to once every two weeks. The higher frequency over a shorter period will facilitate impairment assessments in the receiving stream.

Monitoring for water temperature, dissolved oxygen, and pH are proposed to be removed from station 801. Monitoring for dissolved oxygen is proposed to be removed from station 901. These data are not needed for reasonable potential analyses.

Monitoring for cadmium and copper at station 901 is proposed to be removed based on a lack of reasonable potential to exceed the wasteload allocation at outfall 001.

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 and removal to sanitary landfill.

OTHER REQUIREMENTS

Compliance Schedule
Pretreatment Local Limits Review - A 6-month compliance schedule is proposed for the City 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 City must also submit a pretreatment program modification request. Details are in Part I, C of the permit.

LTCP Implementation - A compliance schedule is proposed for implementation of the CSO LTCP. Details are in Part I, C of the permit.

New Limits - A 36-month compliance schedule is proposed for the Lancaster WPCF to meet the new limits for free cyanide. Details are in Part I, C of the permit.

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 Lancaster WPCF to have a Class IV wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 001. These rules also require the permittee to designate one or more operator of record to oversee the technical operation of the 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.

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, as indicated in Permit Guidance 9: *Limits below Quantification*. 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 Hocking River 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.

Stormwater Compliance
To comply with industrial stormwater regulations, the permittee submitted a form for "No Exposure Certification" which was signed on June 7, 2023. The certification number is 4GRN01022*BG. Compliance with the industrial stormwater regulations must be re-affirmed every five years. No later than June 6, 2028, the permittee must submit a new form for "No Exposure Certification" or make other provisions to comply with the industrial stormwater regulations.

Figure 1. Location of Lancaster WPCF

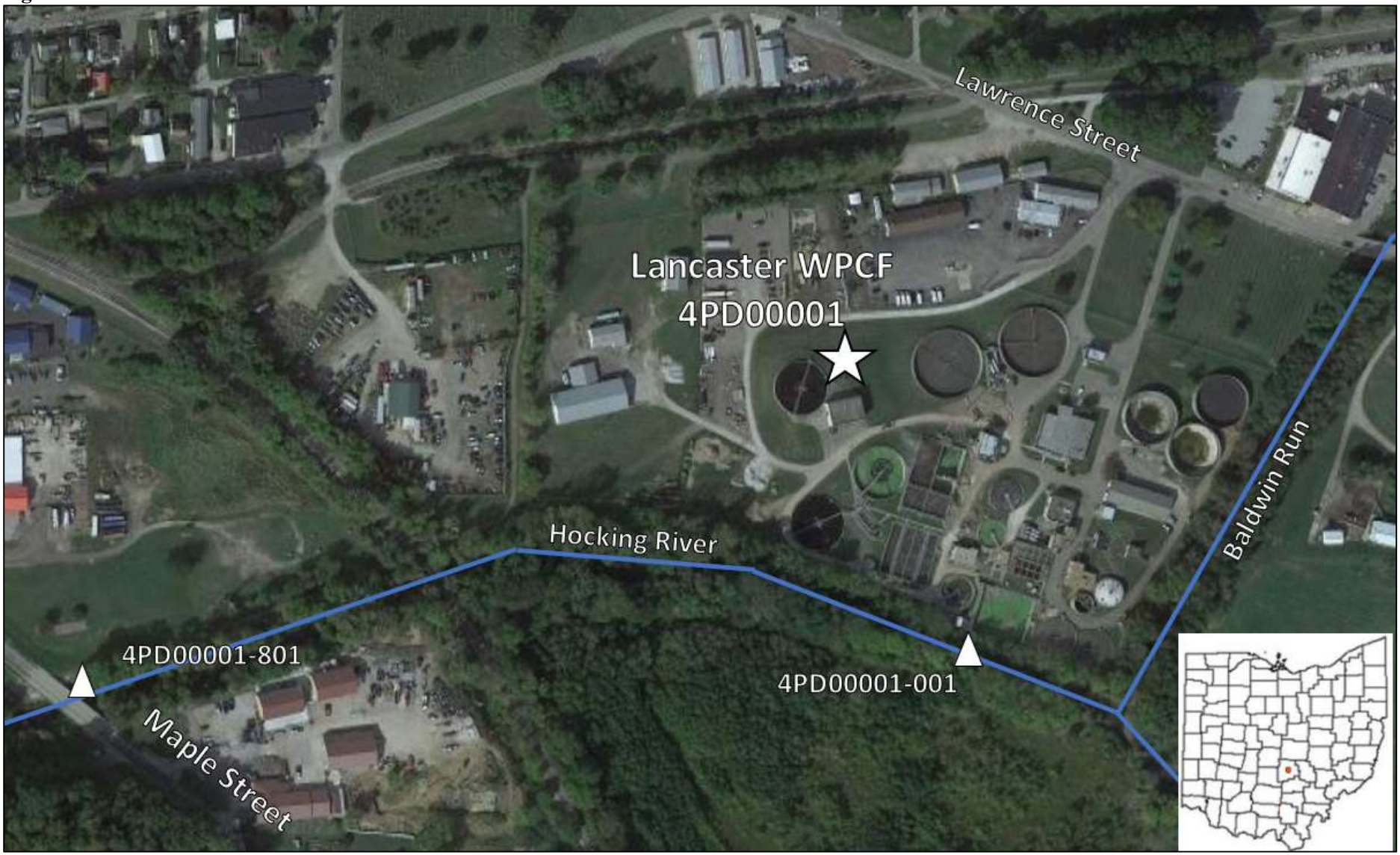


Figure 2. Diagram of Wastewater Treatment System

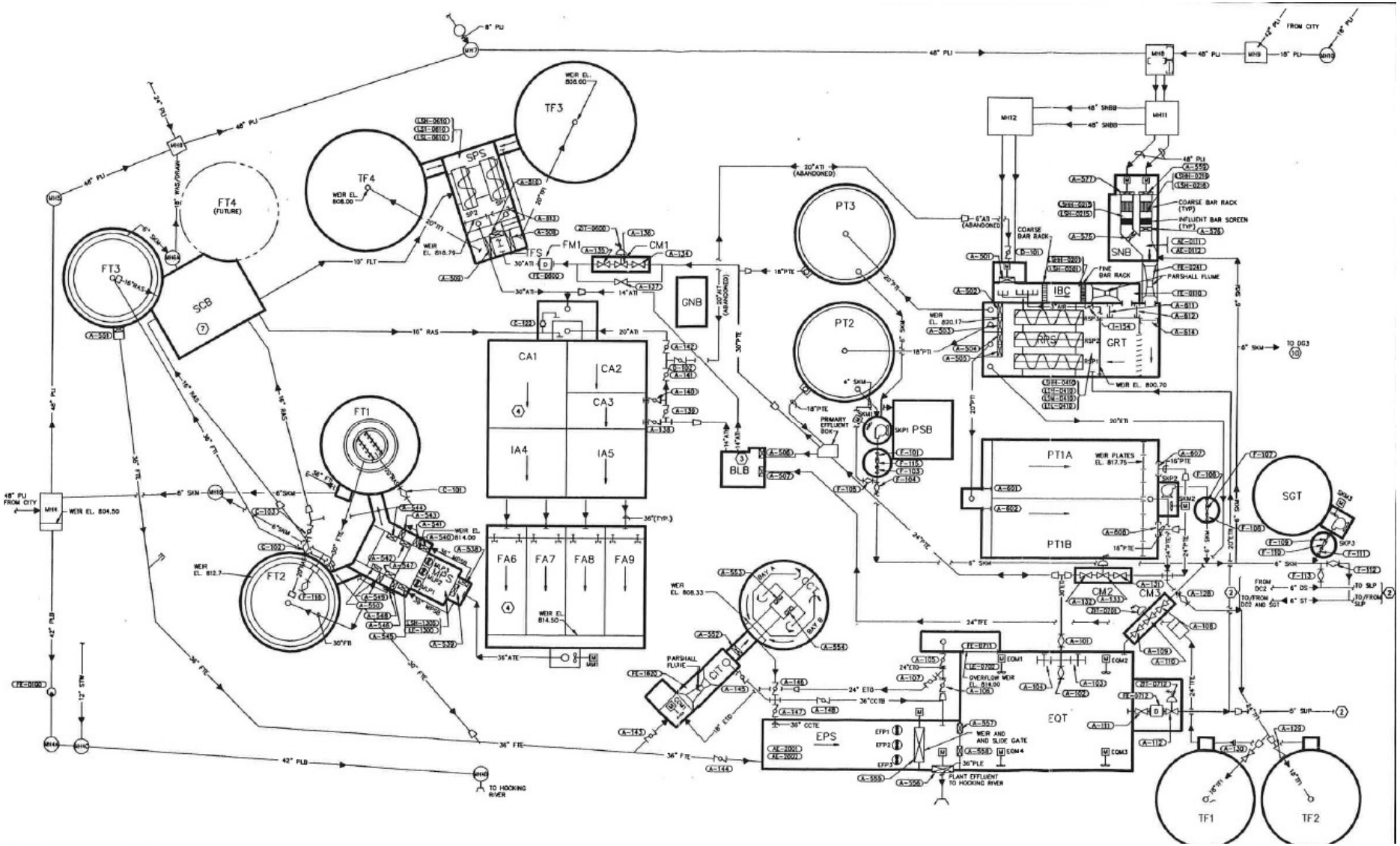
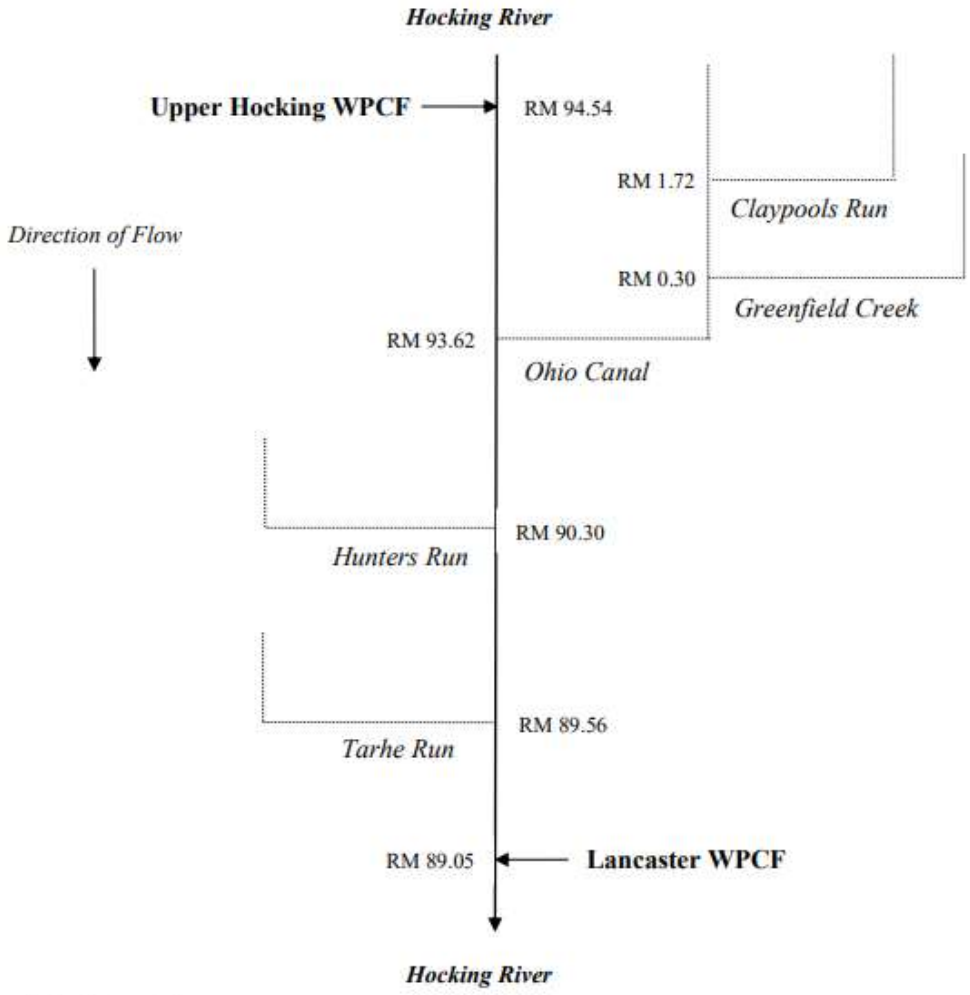


Figure 3. Hocking River Study Area



RM = River mile
WPCF= Water Pollution Control Facility

Table 1. Sewage Sludge Removal

Year	Dry Tons Removed
2018	793
2019	724
2020	1530
2021	1200
2022	1010

Table 2. Effluent Violations for Outfall 001

Parameter	2018	2019	2020	2021	2022	Total
CBOD 5 day	2	2	0	0	0	**4**
Chlorine, Total Residual	0	2	3	0	6	**11**
E. coli	3	1	0	0	3	**7**
Ammonia	0	14	1	0	31	**46**
Total Suspended Solids	6	11	0	0	6	**23**
Total	**11**	**30**	**4**	**0**	**46**	**91**

Table 3. Average Annual Effluent Flow Rates

	Annual Flow (MGD)		
Year	50th Percentile	95th Percentile	Maximum
2018	6.80	11.20	14.20
2019	7.00	11.60	15.10
2020	6.00	11.18	14.70
2021	5.10	8.98	11.70
2022	5.60	9.18	11.10

MGD = million gallons per day.

Table 4. Sanitary Sewer Overflows Discharges

Year	Occurrences
2018	2
2019	2
2020	5
2021	5
2022	0

Table 5. Bypass Discharges

Outfall	Year	Occurrences	Total Volume (Million Gallons)	Median TSS (mg/L)	Median CBOD5 (mg/L)
002	2018	56	104.9	38.5	53.4
	2019	64	106.4	32	56.8
	2020	53	54.8	37.5	48.2
	2021	20	17.6	49	55.2
	2022	63	215.8	57	83.35

Table 6. Combined Sewer Overflow Discharges

	Occurrences					Volume (MG)				
Outfall	2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
004	26	28	6	11	26	67.2	97.2	37.3	11.4	62.5
008	25	26	10	12	18					
009	55	51	49	45	44					
012	56	54	11	35	25					
013	55	53	49	37	33					
014	14	16	7	6	13					
019	29	23	13	15	24					
029	43	40	39	32	21					
033	11	16	5	2	9					
Maximum	56	54	49	45	44					

Table 7. Calculated Annual Total Phosphorus Loadings

Year	Median Phosphorus (mg/L)	Median Flow (MGD)	Median Loading (kg/day)
2018	0.93	6.80	23.94
2019	1.09	7.00	28.88
2020	1.14	6.00	25.89
2021	1.14	5.10	22.01
2022	1.01	5.60	21.30

Table 8. Effluent Characterization Using Pretreatment Data

Parameter	Units	PT 11/1/2018	PT 11/7/2019	PT 11/5/2020	PT 11/4/2021	PT 11/4/22
Antimony	µg/L	AA (5)	AA (5)	1	0.9	AA (0.41)
Arsenic	µg/L	6.3	8.9	8	9	AA (0.1)
Bis(2-ethylhexyl) phthalate	µg/L	AA (10)	AA (10)	AA (1.83)	AA (1.83)	AA (1.56)
Cadmium	µg/L	AA (3)	AA (3)	AA (0.1)	0.4	1.6
Chromium	µg/L	AA (7)	AA (7)	2.5	2.6	5
Copper	µg/L	AA (8)	AA (8)	4.1	3.8	6
Lead	µg/L	AA (10)	AA (10)	0.5	0.4	11
Mercury	ng/L	6.1	AA (0.5)	1.3	1	4.71
Molybdenum	µg/L	AA (20)	AA (20)	8.1	9.3	1
Nickel	µg/L	AA (8)	AA (8)	10	4.3	7
Phenol	µg/L	AA (10)	AA (10)	AA (0.67)	3.92	AA (0.84)
Thallium	µg/L	AA (5)	AA (5)	AA (0.1)	AA (0.1)	0.1
Toluene	µg/L	AA (5)	AA (5)	1.4	AA (0.3)	AA (0.3)
Zinc	µg/L	23	23	30	22	230

AA = not-detected (analytical method detection limit)

Table 9. Effluent Characterization Using Self-Monitoring Data

Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
		30 Day	Daily		50th	95th	
Water Temperature	°C	- - - - Monitor - - - -		1795	17	22.4	10 - 25.4
Dissolved Oxygen	mg/L	--	6.0[m]	1795	8.5	7.4**	6.05 - 10.7
TSS (summer)	kg/day	454	681[w]	394	115	351	29.5 - 863
TSS (summer)	mg/L	12	18[w]	394	5	12.4	2 - 44
TSS (winter)	kg/day	1022	1533[w]	373	182	908	53.4 - 6710
TSS (winter)	mg/L	27	41[w]	373	7	38.4	3 - 223
Oil and Grease	mg/L	--	10	119	< 2.7	< 2.7	0 - 3.04
Ammonia (Dec. - Feb.)	kg/day	197	295[w]	299	45.3	231	0 - 415
Ammonia (Dec. - Feb.)	mg/L	5.2	7.8[w]	299	1.65	7.82	0 - 21.9
Ammonia (June – Sep)	kg/day	53	79.5[w]	435	7.51	64.1	0 - 179
Ammonia (June – Sep)	mg/L	1.4	2.1[w]	435	.33	2.95	0 - 7.89
Ammonia (Mar-May & Oct-Nov)	kg/day	125	189[w]	545	16.7	305	0 - 740
Ammonia (Mar-May & Oct-Nov)	mg/L	3.3	5.0[w]	545	.67	12.7	0 - 36.6
Nitrogen Kjeldahl, Total	mg/L	- - - - Monitor - - - -		118	2.08	10	.6 - 23.2
Nitrite Plus Nitrate, Total	mg/L	- - - - Monitor - - - -		118	13.4	24.6	.67 - 31.9
Phosphorus, Total	mg/L	- - - - Monitor - - - -		513	1.09	1.84	.23 - 6.54
Orthophosphate, Dissolved	mg/L	- - - - Monitor - - - -		59	.78	1.64	.14 - 1.77
Barium, TR	µg/L	- - - - Monitor - - - -		19	106	128	42 - 140
Nickel, TR	µg/L	- - - - Monitor - - - -		19	< 12	10.3	0 - 18.8
Zinc, TR	µg/L	- - - - Monitor - - - -		19	21.6	49.8	0 - 69.9
Cadmium, TR	kg/day	0.284	0.758	59	--	--	< .0233
Cadmium, TR	µg/L	7.5	20	59	--	--	< 1.5
Lead, TR	µg/L	- - - - Monitor - - - -		19	< .69	.21	0 - 2.1
Chromium, TR	µg/L	- - - - Monitor - - - -		19	< 12	.41	0 - .5
Copper, TR	kg/day	1.18	1.94	59	< .132	.146	0 - .841
Copper, TR	µg/L	31	51	59	< 9.3	4.9	0 - 18.2
Chromium, Dissolved Hexavalent	µg/L	- - - - Monitor - - - -		19	< 1.86	.243	0 - 2.43
E. coli	#/100 mL	126	284[w]	391	35	553	3 - 16500
Bis(2-ethylhexyl) Phthalate	µg/L	- - - - Monitor - - - -		19	--	--	< 5
Flow Rate	MGD	- - - - Monitor - - - -		1795	5.9	11	3.3 - 15.1
Chlorine, Total Residual	mg/L	0.015	0.021	920	< .02	< .02	0 - .799
Mercury	ng/L	- - - - Monitor - - - -		19	1.03	2.75	.526 - 2.92
Cyanide, Free	µg/L	- - - - Monitor - - - -		19	< 3	5.48	0 - 18.8
Acute Toxicity, Ceriodaphnia dubia	TUa	- - - - Monitor - - - -		5	--	--	< .2

Parameter	Unit	Current Limits		# Obs	Percentiles		Data Range
		30 Day	Daily		50th	95th	
Chronic Toxicity, Ceriodaphnia dubia	TUc	- - - - Monitor - - - -		5	--	--	< 1
Acute Toxicity, Pimephales promelas	TUa	- - - - Monitor - - - -		5	< .2	.16	0 - .2
Chronic Toxicity, Pimephales promelas	TUc	- - - - Monitor - - - -		5	--	--	< 1
pH, Maximum	S.U.	--	9.0	1795	7.5	7.81	6.8 - 8.21
pH, Minimum	S.U.	--	6.5[m]	1795	7.3	7*	6.7 - 7.82
Residue, Total Filterable	kg/day	61800	--	118	21200	30700	12500 - 40100
Residue, Total Filterable	mg/L	1631	--	118	926	1160	532 - 1290
CBOD5 (summer)	kg/day	379	568[w]	394	77.6	174	0 - 386
CBOD5 (summer)	mg/L	10	15[w]	394	3.5	6.3	0 - 20.8
CBOD5 (winter)	kg/day	851	1279[w]	372	121	510	42.6 - 2460
CBOD5 (winter)	mg/L	22.5	33.8[w]	372	4.6	16.9	2.3 - 63.2

* = For minimum pH, 5th percentile shown in place of 50th percentile.
** = For dissolved oxygen, 5th percentile shown in place of 95th percentile.
[m] = Minimum limit
[w] = weekly average.
TR = Total Recoverable

Table 10. Projected Effluent Quality for Outfall 001

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Self-Monitoring (DMR) Data					
Ammonia (Summer)	mg/L	435	7.89	1.42	3.33
Ammonia (Winter)	mg/L	343	35.43	11.7	24.9
Barium	µg/L	20	19	136	182
Bis(2-ethylhexyl) Phthalate	µg/L	20	0	--	--
Cadmium	µg/L	51	2	1.17	1.60
Chlorine, Total Residual	mg/L	919	12	0.35	0.48
Chromium	µg/L	8	7	6.94	9.50
Chromium, Dissolved Hexavalent	µg/L	16	1	2.66	3.65
Copper	µg/L	66	17	5.75	8.56
Cyanide, Free	µg/L	20	3	19.2	26.3
Lead	µg/L	22	4	11.3	15.5
Mercury (BCC)	ng/L	25	24	3.32	5.52
Nickel	µg/L	25	9	11.1	18.7
Nitrate + Nitrite	mg/L	122	122	18.7	25.6
Nitrogen Kjeldahl, Total	mg/L	122	122	7.37	11.3
Phosphorus, Total	mg/L	522	522	0.97	1.47
Total Filterable Residue	mg/L	122	122	1067	1238
Zinc	µg/L	24	20	42.8	64.08
Pretreatment Data					
Antimony	µg/L	3	2	2.19	3
Arsenic	µg/L	5	4	15.11	20.7
Molybdenum	µg/L	3	3	20.37	27.9
Phenol	µg/L	3	1	8.585	11.76
Selenium	µg/L	5	0	--	--
Silver	µg/L	5	0	--	--
Thallium	µg/L	3	1	0.219	0.3
Toluene	µg/L	3	1	3.066	4.2

BCC = Bioaccumulative Chemical of Concern
MDL = analytical method detection limit
PEQ = projected effluent quality
* Per OAC 3745-2-04(E)(3), ammonia PEQ is based on data collected during the following months:
Summer – June through September
Winter – December through February

Table 11. Summary of Acute and Chronic Toxicity Results

	Ceriodaphnia Dubia		*Pimephales promelas*	
Date	**TU_a**	**TU_c**	**TU_a**	**TU_c**
8/5/2018	AA (0.2)	AA (1.0)	0.2	AA (1.0)
8/11/2019	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)
8/21/2020	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)
8/15/2021	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)
8/9/2022	AA (0.2)	AA (1.0)	AA (0.2)	AA (1.0)

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 12. Use Attainment Table

Location	RM	Use	Status	Cause	Source
Hocking River dst of Rock Mill Dam	96.8	WWH	Full		
Hocking River at Pierce Avenue	91.9	MWH	Full		
Hocking River at Maple Street, ust of Lancaster WPCF	89.4	MWH	Full		
Hocking River dst of Lancaster WPCF	88.9	WWH	Full		
Hocking River at U.S. Route 33	87.1	WWH	PARTIAL	Organic enrichment	Lancaster WPCF CSOs
Hocking River at Sugar Grove Road, ust of Rush Creek	81.9	WWH	Full		

Data gathered from *The Biological and Water Quality Study of the Upper Hocking River and Selected Tributaries (1996)*
RM = River mile
WWH = warmwater habitat
ust = upstream
dst = downstream

Table 13. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Ammonia (Summer)	mg/L	--	--	1.6	--	--
Ammonia (Winter)	mg/L	--	--	6.6	--	--
Antimony	µg/L	640	--	190	900	1800
Arsenic	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	µg/L	--	50	6.1	16	33
Chlorine, Total Residual	mg/L	--	--	0.011	0.019	0.038
Chromium	µg/L	--	100	220	4600	9200
Chromium, Dissolved Hexavalent	µg/L	--	--	11	16	31
Copper	µg/L	--	500	25	41	83
Cyanide, Free	µg/L	400	--	12	46	92
Lead	µg/L	--	100	28	530	1100
Mercury [b]	ng/L	12	10000	910	1700	--
Molybdenum	µg/L	--	--	20000	190000	370000
Nickel	µg/L	4600	200	140	1200	2500
Nitrate + Nitrite	mg/L	--	100	--	--	--
Phenol	µg/L	300000	--	400	4700	9400
Selenium	µg/L	4200	50	5	62	120
Silver	µg/L	--	--	1.3	12	23
Thallium	µg/L	--	--	17	79	160
Toluene	µg/L	520	--	62	560	1100
Total Filterable Residue	mg/L	--	--	1500	--	--
Zinc	µg/L	26000	25000	320	320	630

[b] Bioaccumulative Chemical of Concern
[c] = carcinogen

Table 14. Instream Conditions and Discharger Flow

Parameter	Units		Value	Basis
Upstream Flows - Hocking River				
7Q10	cfs	annual	0.48	USGS gage #03156000, 1956-1980
1Q10	cfs	annual	0.36	USGS gage #03156000, 1956-1980
30Q10	cfs	summer	0.96	USGS gage #03156000, 1956-1980
		winter	2.03	USGS gage #03156000, 1956-1980
Harmonic Mean Flow	cfs	annual	3.58	USGS gage #03156000, 1956-1980
Mixing Assumption	%	average	100	Stream-to-discharge ratio
	%	max	100	Stream-to-discharge ratio
Instream Hardness	mg/L	annual	315	Upper Hocking 901, n=20, 2018-22
Instream pH	S.U.	summer	7.8	Upper Hocking 901, n=20, 2018-23
		winter	7.6	Upper Hocking 901, n=16, 2018-23
Instream Temperature	ºC	summer	22	Upper Hocking 901, n=20, 2018-23
		winter	7.0	Upper Hocking 901, n=16, 2018-23
Discharge Flows				
Lancaster WWTP	cfs (MGD)	avg.	15.47 (10)	NPDES Permit Application
Upper Hocking WWTP	cfs (MGD)	avg.	6.19 (4)	NPDES Permit Application
Background Water Quality for the Hocking River				
Ammonia	mg/L	summer	0	Lancaster 801; n=20, 18<MDL, 2016-21
Ammonia	mg/L	winter	0	Lancaster 801; n=17, 15<MDL, 2016-21
Arsenic	µg/L	annual	1	EA3; n=3, 0<MDL, 2012
Barium	µg/L	annual	118	EA3; n=3, 0<MDL, 2012
Bis(2-ethylhexyl) Phthalate	µg/L	annual	0	No representative data available.
Cadmium	µg/L	annual	0.1	EA3; n=3, 0<MDL, 2012
Chlorine, Total Residual	mg/L	annual	0	No representative data available.
Chromium	µg/L	annual	1	EA3; n=3, 0<MDL, 2012
Chromium, Dissolved Hexavalent	µg/L	annual	0	No representative data available.
Copper	µg/L	annual	1	EA3; n=3, 0<MDL, 2012
Cyanide, Free	µg/L	annual	0	No representative data available.
Lead	µg/L	annual	1	EA3; n=3, 0<MDL, 2012
Mercury	ng/L	annual	0	No representative data available.

Parameter	Units		Value	Basis
Molybdenum	µg/L	annual	0	No representative data available.
Nickel	µg/L	annual	2.3	EA3; n=3, 0<MDL, 2012
Nitrate-N + Nitrite-N	mg/L	annual	0.247	EA3; n=3, 0<MDL, 2012
Selenium	µg/L	annual	1	EA3; 3 values, 0<MDL, 2012
Silver	µg/L	annual	0	No representative data available.
Total Filterable Residue	mg/L	annual	355	EA3; n=3, 0<MDL, 2012
Zinc	µg/L	annual	5	EA3; n=3, 0<MDL, 2012

EA3 = Ohio EPA Ecological Assessment and Analysis Application – Station 302103
MDL = analytical method detection limit
n = number of samples
NPDES = National Pollutant Discharge Elimination System
USGS = United States Geological Survey

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

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum	
		Human Health	Agri-culture	Aquatic Life	Aquatic Life	
Ammonia (Summer)	mg/L	--	--	2.65	--	--
Ammonia (Winter)	mg/L	--	--	13.03	--	--
Arsenic [B]	µg/L	--	174	166	368	680
Barium [B]	µg/L	--	--	1963	8618	15000
Bis(2-ethylhexyl) Phthalate [B]	µg/L	8.8	--	13	1656	2100
Cadmium [B]	µg/L	--	87 [A]	7.2	19	33
Chlorine, Total Residual	mg/L	--	--	0.017	0.029	0.038
Chromium [B]	µg/L	--	175	257	5233	9200
Chromium, Dissolved Hexavalent [B]	µg/L	--	--	12	17	31
Copper [B]	µg/L	--	875 [A]	29	47	83
Cyanide, Free	µg/L	700	--	13	50	92
Lead	µg/L	--	174	34	620	1100
Mercury [C]	ng/L	12	10000 [A]	910	1700	--
Molybdenum [B]	µg/L	--	--	22199	205647	370000
Nickel [B]	µg/L	8052 [A]	349	164	1341	2500
Nitrate + Nitrite	mg/L	--	174	--	--	--
Selenium [B]	µg/L	7353 [A]	88	5.5	67	120
Silver [B]	µg/L	--	--	1.4	15	23
Total Filterable Residue	mg/L	--	--	1622	--	--
Zinc [B]	µg/L	45510 [A]	43760 [A]	376	367	630

[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

[C] Bioaccumulative Chemical of Concern (BCC), WQS must be met at end-of-pipe, unless the requirements for an exclusion are met as listed in 3745-2-05(A)(2)(e)(ii)

Table 16. Parameter Assessment

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

No parameters fit this category

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

Antimony	Arsenic	Barium
Bis(2-ethylhexyl) phthalate	Cadmium	Chromium
Chromium, Dissolved Hexavalent	Copper	Molybdenum
Nickel	Nitrate + Nitrite	Phenol
Selenium	Silver	Thallium
Toluene	Zinc	

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

Lead	Mercury

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.

Ammonia (Summer)	Ammonia (Winter)	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
Chlorine, Total Residual	mg/L	Annual	0.017	0.029
Cyanide, Free	µg/L	Annual	13	50

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

Table 17. 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	6.0[m]	--	--	--	PD
TSS (summer)	mg/L	18[d]	12	681[d]	454	PD
TSS (winter)	mg/L	41[d]	27	1533[d]	1022	PD
Oil & Grease	mg/L	10	--	--	--	WQS
Ammonia (Jun-Sept)	mg/L	2.1[d]	1.4	79.5[d]	53	PD
Ammonia (Mar-May, Oct-Nov)	mg/L	5.0[d]	3.3	189[d]	125	PD
Ammonia (Dec-Feb)	mg/L	7.8[d]	5.2	295[d]	197	PD
Total Kjeldahl Nitrogen	mg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				M
Nitrate plus Nitrite	mg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				M
Phosphorus	mg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				PMR
Orthophosphate	mg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				PMR
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	- - - - - - - - - - Monitor - - - - - - - - - - -				M
E. coli	#/100 mL	284[d]	126	--	--	WQS
Flow Rate	MGD	- - - - - - - - - - Monitor - - - - - - - - - - -				M[c]
Chlorine, Total Residual	mg/L	0.021	0.015	--	--	WLA/ABS
Mercury	ng/L	- - - - - - - - - - Monitor - - - - - - - - - - -				M
Free Cyanide	µg/L	50	13	1.9	0.49	WLA
Acute Toxicity, *Ceriodaphnia dubia*	TUa	- - - - - - - - - - Monitor - - - - - - - - - - -				WET
Chronic Toxicity, *Ceriodaphnia dubia*	TUc	- - - - - - - - - - Monitor - - - - - - - - - - -				WET
Acute Toxicity, *Pimephales promelas*	TUa	- - - - - - - - - - Monitor - - - - - - - - - - -				WET
Chronic Toxicity, *Pimephales promelas*	TUc	- - - - - - - - - - Monitor - - - - - - - - - - -				WET
pH, maximum	SU	9.0	--	--	--	WQS
pH, minimum	SU	6.5[m]	--	--	--	WQS
Total Filterable Residue	mg/L	- - - - - - - - - - Monitor - - - - - - - - - - -				M
CBOD5 (summer)	mg/L	15[d]	10	568[d]	379	PD
CBOD5 (winter)	mg/L	33.8[d]	22.5	1279[d]	851	PD

[a] Effluent loadings based on average design discharge flow of 10 MGD.

[b] Definitions: ABS = Antibacksliding Rule (OAC 3745-33-05(F) and 40 CFR Part 122.44(l))
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 = 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.
[m] minimum limit

Attachment 1. Whole Effluent Toxicity Reasonable Potential Analysis

Whole effluent toxicity testing produced only non-detection results for acute and chronic toxicity in *Ceriodaphnia dubia* and chronic toxicity in *Pimephales promelas*, therefore these fall under Hazard Category 4. The reasonable potential analyses below were only performed for *Pimephales promelas* acute toxicity (TUc Cd).

Hazard Category Summary

	Ceriodaphnia dubia		***Pimephales promelas***	
	Acute	**Chronic**	**Acute**	**Chronic**
Effluent Toxicity (Table A)	4	4	4	4
	4		4	

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

Table A. Effluent Toxicity

	Ceriodaphnia dubia		***Pimephales promelas***	
	Acute	**Chronic**	**Acute**	**Chronic**
WLA	0.45	1.54	0.45	1.54
# of tests	5	5	5	5
Maximum value	AA	AA	0.2	AA
Percent of tests >WLA	--	--	0	--
Geometric mean	--	--	0.2	--
Average Exceedance (Geomean * Percent of tests >WLA)	--	--	0	--
Average Exceedance / WLA	--	--	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 TUc Cd	1	0 or 1	0 or 1
(2) Percent of tests >WLA	>30	20 to 30	10 to 20	10 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
(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	<WLA 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.

Attachment 2. 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