National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio
for the **City of Ravenna Wastewater Treatment Plant**

Public Notice No.: 188605
Public Notice Date: September 7, 2023
Comment Period Ends: October 7, 2023

Ohio EPA Permit No.: **3PD00018*PD**
Application No.: **OH0023221**

Name and Address of Applicant:

City of Ravenna
210 Park Way Drive
Ravenna, Ohio 44266

Name and Address of Facility Where Discharge Occurs:

City of Ravenna WWTP
3722 Hommon Road
Ravenna, Ohio 44266
Portage County

Receiving Water: **Hommon Road Ditch (aka Hommon Avenue Ditch)**

Subsequent Stream Network: **Wahoo Ditch, Breakneck Creek, Cuyahoga River, Lake Erie**

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.

The reasonable potential analysis placed mercury in Group 5. The data indicates that this parameter has the reasonable potential to exceed WQS and, therefore, limits are necessary. The variance-based 30-day average limit is recommended to be decreased in accordance with the data presented as part of the facility's mercury variance renewal request.

The reasonable potential analysis placed copper in Group 4. Based on this placement, the existing effluent limits are recommended to be removed; monthly monitoring will continue.

Based on a review of Whole Effluent Toxicity (WET) data, reasonable potential to exceed WQS has been demonstrated. As such, chronic and acute toxicity limits for *Ceriodaphnia dubia* (water flea) and *Pimephales promelas* (fathead minnow) are recommended to continue.

A compliance schedule is proposed for the facility to continue implementation of treatment and/or control strategies to reduce the discharge of phosphorus.

The monitoring frequencies for *E. coli* have been changed from 1/month (Summer) to 1/ 2 weeks (June - August) at the upstream and downstream monitoring stations. The increased frequency over a shorter duration will facilitate impairment assessments.

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; and outfall signage.

This permit renewal is proposed for a term of approximately 5 years.

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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 Rebecca Werner at 330-963-1106 or Rebecca.Werner@epa.ohio.gov.

INFORMATION REGARDING CERTAIN WATER QUALITY BASED EFFLUENT LIMITS

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

accomplishment of the purposes of this chapter. This determination was made based on data and information available at the time the permit was drafted, which included the contents of the timely submitted NPDES permit renewal application, along with any and all pertinent information available to the Director.

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

The City of Ravenna Wastewater Treatment Plant ("Ravenna WWTP") discharges to Hommon Road Ditch via Outfall 3PD00018001 at River Mile 0.85. Hommon Road Ditch ("Hommon Ditch") subsequently flows into Wahoo Ditch, followed by Breakneck Creek and the Cuyahoga River. The approximate location of the facility is shown in Figure 1.

This segment of Hommon Road Ditch is described by Ohio EPA River Code: 19-028-003. Watershed Assessment Unit (WAU) Code: 04110002-02-02, County: Portage, Ecoregion: Erie/Ontario Lake Plain Ecoregion.

For aquatic life use, Hommon Ditch is designated limited resource waters (LRW), Wahoo Ditch is designated modified warmwater habitat (MWH), and Breakneck Creek is designated warmwater habitat (WWH) under Ohio's Water Quality Standards (OAC 3745-1-26). Wahoo Ditch and Breakneck Creek are designated for primary contact recreation (PCR) while Hommon Ditch is designated as secondary contact (SCR). All three streams are designated for agricultural water supply (AWS) and industrial water supply (IWS) uses.

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 (MWH) or Limited Resource Water (LRW) 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 (PCR) and wading only (Secondary Contact - 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 AWS and IWS.

FACILITY DESCRIPTION

The Ravenna WWTP was initially constructed in 1907. The most recent treatment plant modification was initiated in 2004. The plant serves the City of Ravenna and outlying parts of the unincorporated areas of Ravenna, Rootstown, and Shalersville townships in Portage County. The total population within the service area is approximately 18,771. The collection system is comprised of 100 percent separate sanitary sewers. Water supply for the service area is provided by the Ravenna Water Treatment Plant as well as private wells.

The tertiary treatment facility provides treatment to an average design flow of 2.8 million gallons per day (MGD) with a peak hydraulic capacity of 6.02 MGD. As depicted in Figure 2, the existing wet-stream treatment processes and/or equipment include:

- Screening
- Grit Removal

- Flow Equalization
- Primary Clarification
- Activated Sludge Biological Secondary Treatment Process
- Secondary Clarification
- Tertiary Disk Filtration
- Phosphorus Removal (Alum Addition)
- Ultraviolet Disinfection
- Cascade Post Aeration

When influent flows exceed the capacity of the treatment plant, wastewater can be diverted from primary treatment to two flow equalization (EQ) basins, each with a storage capacity of 1.4 million gallons. Diversion to the EQ basins generally occur when the influent flow reaches 5.5 to 6.0 MGD. The limiting design factor in the treatment process preventing higher amounts of wastewater being treated is the capacity of the disk filters. Once sent to the EQ basins, wastewater is re-introduced into the treatment process as the influent flow rate decreases or discharged from the EQ basin directly to the outfall sewer. Excess wet-weather overflow from the EQ basins (Internal Bypass Station 3PD00018602) combines with the treated effluent prior to the sampler at Outfall 3PD00018001.

In addition to the internal bypass, the plant is equipped with an emergency bypass (Outfall 3PD00018002) at the plant headworks. A manual gate can be opened to direct flow from the headworks directly to Hommon Ditch without treatment. This bypass has only been used once in the past 15 years.

Waste sludge from the treatment process is anaerobically digested for pathogen and vector control. The digested sludge is dewatered using a belt filter press, stored either in the sludge storage building or on sludge drying beds, and land applied for agronomic benefit. The dewatered Class B sludge is presently land applied under contract. Table 1 shows the quantities of sludge removed for the past 5 years.

The City of Ravenna continues to implement an Ohio EPA-approved industrial pretreatment program, initially approved on June 13, 1985. The pretreatment program is mandated under the Clean Water Act and regulates industrial facilities discharging process wastewater to publicly owned treatment works (POTWs). Because POTWs are not generally designed to treat for these substances, pretreatment programs are needed to ensure that potentially serious problems do not arise. Since local sewer control is best handled at the local level, Ohio EPA typically delegates the program responsibilities to the local control authority.

Based on information in the NPDES renewal application, there are there are 3 categorical and 6 non-categorical significant industrial users (SIUs) presently discharging to the Ravenna WWTP. The total flow from the SIUs is approximately 0.275 MGD.

DESCRIPTION OF EXISTING DISCHARGE

The annual effluent flow rates for Ravenna WWTP for the review period, January 2018 through March 2023, are presented in Table 2.

Effluent limitations violations reported for the review period, January 2018 through March 2023, are listed in Table 3.

Plant bypasses from the EQ basin are reported utilizing Bypass Station 3PD00018602. Bypass data for the review period, January 2018 through March 2023, are presented in Table 4.

Ravenna WWTP currently reports collection system sanitary sewer overflows (SSO) utilizing SSO Station 3PD00018300. SSO data for the review period, January 2018 through March 2023, are presented in Table 5.

The seasonal phosphorus discharges from Outfall 3PD00018001 are listed in Table 6

Table 7 presents a summary of unaltered Discharge Monitoring Report (DMR) data for the review period, January 2018 through March 2023. The current permit limits are provided for comparison.

Table 8 presents a select summary of effluent data from the facility's annual pretreatment reports for the period, 2018 to 2022. Under the provisions of 40 CFR 122.21(j), the Director has waived the requirement for submittal of expanded effluent testing data as part of the NPDES renewal application. Ohio EPA has access to substantially identical information through the submission of annual pretreatment program reports and/or from Ohio EPA effluent testing conducted.

Table 9 summarizes the chemical specific data for Outfall 3PD00018001 by presenting the average and maximum PEQ values.

Table 10 summarizes the results of acute Whole Effluent Toxicity (WET) tests of the final effluent using the water flea (*Ceriodaphnia dubia*) and fathead minnow (*Pimephales promelas*) as the test organisms.

ASSESSMENT OF IMPACT ON RECEIVING WATERS

An assessment of the impact of a permitted point source on the immediate receiving waters includes an evaluation of the available chemical/physical, biological, and habitat data which have been collected by Ohio EPA pursuant to the Five-Year Basin Approach for Monitoring and NPDES Reissuance. Other data may be used provided it was collected in accordance with Ohio EPA methods and protocols as specified by the Ohio WQS and Ohio EPA guidance documents. Other information which may be evaluated includes, but is not limited to: NPDES permittee self-monitoring data; effluent and mixing zone bioassays conducted by Ohio EPA, the permittee, or U.S. EPA. In evaluating this data, Ohio EPA attempts to link environmental stresses and measured pollutant exposure to the health and diversity of biological communities. Stresses can include pollutant discharges (permitted and unpermitted), land use effects, and habitat modifications. Indicators of exposure to these stresses include whole effluent toxicity tests, fish tissue chemical data, and fish health biomarkers (for example, fish blood tests).

Use attainment is a term which describes the degree to which environmental indicators are either above or below criteria specified by the Ohio WQS (OAC 3745-1). Assessing use attainment status for aquatic life uses primarily relies on the Ohio EPA biological criteria (OAC 3745-1-07; Table 7-15). These criteria apply to rivers and streams outside of mixing zones. Numerical biological criteria are based on measuring several characteristics of the fish and macroinvertebrate communities; these characteristics are combined into multimetric biological indices including the Index of Biotic Integrity (IBI) and modified Index of Well-Being (MIwb), which indicate the response of the fish community, and the Invertebrate Community Index (ICI), 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 11) 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 (QHEI), and comments and observations for each sampling location.

Pursuant to Section 303(d) of the Clean Water Act (CWA), 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. Ohio EPA's biennial "*Integrated Water Quality Monitoring and Assessment Report*" (Integrated Report) summarizes the general condition of Ohio's waters and identifies waters that are not meeting water quality goals. The report satisfies the CWA requirements for both Section 305(b) for biennial reports on the condition of the State's waters and Section 303(d) for a prioritized list of impaired waters. For each impaired water, Ohio EPA typically prepares a Total Maximum Daily Load (TMDL) analysis.

The 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. Ohio EPA typically focuses on watersheds in preparing TMDLs.

The attainment status of Breakneck Creek is reported in the final Ohio 2022 Integrated Report. The Feeder Canal-Breakneck Creek assessment unit, WAU 041100020202, which includes Hommon Road Ditch and Wahoo Ditch in the vicinity of the Ravenna WWTP, is listed as impaired for human health (historical), aquatic life (various causes), and recreation (*E. coli*) on Ohio's 303(d) list. The full Integrated Report can be found at this website:

https://epa.ohio.gov/static/Portals/35/tmdl/2022intreport/Full-2022-IR.pdf

A final Total Daily Maximum Load (TMDL) report was approved in March 2000 for the Middle Cuyahoga River. The TMDL report can be found at:

https://epa.ohio.gov/divisions-and-offices/surface-water/reports-data/cuyahoga-river-watershed.

Recommendations from the TMDL regarding total suspended solids, CBOD5, dissolved oxygen, ammonia-nitrogen and total phosphorus effluent limits were implemented through previous versions of the Ravenna WWTP NPDES permit. The recommendations of the TMDL are proposed to continue in this permit (see

Table 16).

The Cuyahoga River basin currently has three approved TMDL reports. In addition to the middle section, the upper section was approved in September 2004 and the lower section was approved in September 2003. As part of the TMDL implementation process, a comprehensive chemical, physical, and biological monitoring survey was conducted in the Cuyahoga River mainstem and 67 tributary streams, including Wahoo Ditch and Breakneck Creek, in 2017 and 2018. This assessment included sampling at sites in Breakneck Creek and Wahoo Ditch. No biological assessments were available for Hommon Ditch. A summary of the biological assessment results for the interactive segment can be found in Table 9. The complete details regarding the assessments in Breakneck Creek and Wahoo Ditch can be found in the following draft technical support document; "*Biological and Water Quality Study of the Cuyahoga River Watershed, 2017 and 2018*"; Ohio EPA, February, 2023:

https://epa.ohio.gov/static/Portals/35/tmdl/TSD/Cuyahoga/Cuyahoga-TSD.pdf

The report notes that:

> *"... Compared to historical survey results, fish index scores from the lower reaches of Breakneck Creek have markedly improved (Figure 43). This was especially evident around Wahoo Ditch and the Franklin Hills and Ravenna WWTPs, where previous surveys documented water quality issues that led to fish community impairment (Ohio EPA 1999)..."*

Additional information about Breakneck Creek can be found in the technical support document; "*Biological and Water Quality Study of the Cuyahoga River and Selected Tributaries*"; Ohio EPA, August, 1999.

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 Ravenna WWTP were used to determine what parameters should undergo a 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 March 2023
Pretreatment data	2018 to 2022

The data were examined and the following value was removed from the evaluation as non-representative data:

Parameter	Date	Value	Units	Comment
Mercury	7/17/2019	27.4	mg/L	Non-Representative High Value

The average and maximum projected effluent quality (PEQ) values are presented in Table 9.

For more information on PEQ calculations, see Modeling Guidance #1 at the following webpage:
https://epa.ohio.gov/static/Portals/35/guidance/model1.pdf

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. By rule, mixing zones are not authorized for pollutants, such as mercury, which have been designated as bioaccumulative chemicals of concern (BCCs). For BCCs, the WLA is set equal to the respective WQS value.

The methodology employed generally depends on whether the facility is considered a direct discharger to a (1) free-flowing receiving water/stream or (2) non-flowing receiving water/Lake.

For free flowing streams, WLAs for both average and maximum criteria are performed 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.

WLAs for direct discharges to lakes are performed using the following equation for average criteria:

Discharger WLA = (11 x WQS) – (10 x Background Concentration).

The following dischargers in the Breakneck Creek study area were considered interactive (see Figure 3):

- Ravenna WWTP
- Franklin Hills WWTP

These facilities were allocated together for most parameters due to the size of the plant discharges, the flows of the Breakneck Creek, Wahoo Ditch and Hommon Road Ditch, and the relatively close proximity of the two plants. The exception was the ammonia-N WLA, which was done separately for each facility because ammonia-N is considered to be a non-conservative parameter.

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) using available ambient stream data from upstream sampling stations. 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 the Ravenna WWTP effluent discharge and the associated stream design flows are as follows:

Aquatic life (Warmwater Habitat)		
Toxics (metals, organics, etc.)	Average	Annual 7Q10
	Maximum	Annual 1Q10
Ammonia-N	Average	Summer/winter 30Q10
Human Health (nondrinking)		Harmonic mean flow

Agricultural Water Supply	Harmonic mean flow
Wildlife Habitat	Annual 90Q10

Allocations are developed using a percentage of stream design flow, as specified in Table 13. WLA results cannot exceed the IMZM unless a mixing demonstration is completed in accordance with OAC 3745-2-08 that justifies an alternate value.

The data used in the WLA are listed in Table 12 and Table 13. The wasteload allocation results that would allow the Ravenna WWTP to maintain all applicable water quality criteria are presented in Table 14.

Whole Effluent Toxicity WLA

Whole effluent toxicity (WET) is the total toxic effect of an effluent on aquatic life measured directly with a toxicity test. Acute WET tests measure survival and mortality of the test organism over a short time period (48- or 96-hours). Chronic WET tests measure survival and mortality, as well as effects on growth and reproduction over a longer period of the test organism's life.

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) for use in NPDES permits by the associated WQS Implementation Rule (OAC 3745-2-09). The translation results in numeric values 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 3745-2-08, 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 the Ravenna WWTP, the wasteload allocation values are 0.30 TUa and 1.01 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 (IC_{25}):

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

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):

$$TUc = 100/\text{geometric mean of NOEC and LOEC}$$

Where NOEC is the No Observed Effect Concentration and LOEC is the 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 (LC_{50}) for the most sensitive test species:

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

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 LC_{50} cannot be identified.

When the acute wasteload allocation 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

$$Acute\ Dilution\ Ratio = \frac{\left[[1Q10] + [Outfall\ flow\ rate]\right]}{[Outfall\ flow\ rate]} = \frac{[0.037 + 2.32]}{[2.32]} = 1.02$$

The acute wasteload allocation for the Ravenna WWTP can be expressed as 30 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/HAZARD MANAGEMENT DECISIONS

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 14. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 9, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [($PEQ_{avg} \div PEL_{avg}$) X 100, or ($PEQ_{max} \div PEL_{max}$) X 100)], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 15.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations.

Table 16 presents the final effluent limits and monitoring requirements proposed for Ravenna WWTP Outfall 3PD00018001 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit. Additional information on permit guidance is available at the following webpage:

https://epa.ohio.gov/static/Portals/35/guidance/npdes_permit_guidance%201.pdf

Water Temperature and Flow Rate

Monitoring is proposed to continue for water temperature and flow rate in order to assist in the evaluation of effluent quality and treatment plant performance, and in accordance with Ohio EPA guidance.

Total Suspended Solids, Ammonia (as Nitrogen), Dissolved Oxygen, Total Phosphorus, and 5-Day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)

The proposed limits for total suspended solids (TSS), ammonia-nitrogen, 5-day carbonaceous biochemical oxygen demand (CBOD5), total phosphorus, and dissolved oxygen (DO) are all a continuation from the existing permit and are based on plant design criteria. They are consistent with the recommendations of the TMDL for the Middle Cuyahoga River. The concentration limits at the current design flow of 2.8 MGD represent an adjustment to the original TMDL design flow value of 2.3 MGD; these changes were originally incorporated in Permit No. 3PD00018*LD (January 2003). A ratio was applied to the limits at the time {(*KD version) 2.3 MGD/2.8 MGD = 0.82} and new limits included.

Oil and Grease and pH

Limits proposed for oil and grease and pH are based on Ohio WQS (OAC 3745-1-35 and -37).

Escherichia coli

Secondary contact recreation criteria in OAC 3745-1-37 apply to Hommon Ditch at the point of discharge from the Ravenna WWTP. However, Ohio rules require that water quality standards in downstream segments must also be protected. Because primary contact recreation (PCR) contact recreation *E. coli* standards apply to both Wahoo Ditch and Breakneck Creek, the monthly and weekly *E. coli* limits have been set at the PCR derived values of 126/100 ml and 284/100 ml, respectively.

Mercury

The Ohio EPA risk assessment (Table 15) places mercury in group 5. This placement, as well as the data in Table 7, Table 8, and Table 9, 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 and certain conditions exist that increase the risk to the environment. Pollutants that meet this requirement must have permit limits under OAC 3745-33-07(A)(1).

The NPDES permit for the Ravenna WWTP was originally modified pursuant to OAC 3745-33-07(D)(10)(a) in July 2007 to include a variance-based limit for mercury. The existing NPDES permit includes a revised variance-based limit of 3.7 ng/L for mercury. Based on available monitoring data and new application information, the permittee has determined that the Ravenna WWTP cannot meet the 30-day average water quality-based effluent limit (WQBEL) of 1.3 ng/L. However, the effluent data shows that the Ravenna WWTP can meet the mercury annual average value of 12 ng/L. The Pollutant Minimization Program (PMP) schedule developed from the original variance continues to be implemented, and further reductions in mercury may be possible.

Ravenna WWTP submitted information supporting the renewal of the variance. Ohio EPA has reviewed the mercury variance information and has determined that it meets the requirements of the OAC. The permittee's application has also demonstrated to the satisfaction of Ohio EPA that there is no readily apparent means of complying with the WQBEL without constructing prohibitively expensive end-of-pipe controls for mercury. Based upon these demonstrations, the Ravenna WWTP is eligible for renewal of the mercury variance under OAC 3745-1-38(H).

A condition in Part II of the NPDES permit lists the provisions of the mercury variance renewal, and includes the following requirements:

- A lower variance-based monthly average effluent limit of 2.3 ng/L, based on the review of the facility's monitoring data, i.e. PEQ data (See Table 9);
- A requirement that the permittee make reasonable progress to meet the WQBEL for mercury by implementing the plan of study, which has been developed as part of the PMP;
- Low-level mercury monitoring of the plant's influent and effluent;
- A requirement that the annual average mercury effluent concentration is less than or equal to 12 ng/L as specified in the plan of study;
- A requirement to submit an annual report on implementation of the PMP; and
- A requirement for submittal of a certification stating that all permit conditions related to implementing the plan of study and the PMP have been satisfied, but that compliance with the monthly average WQBEL for mercury has not been achieved.

Copper, Selenium, and Total Filterable Residue (aka Total Dissolved Solids or TDS)

The Ohio EPA risk assessment (Table 15) places these parameters in group 4. This placement, as well as the data in Table 7, Table 8, and Table 9, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Based on the current analysis, the existing copper limit is recommended to be removed. Continued monitoring is recommended to continue for both copper and TDS.

Based on a review of the selenium pretreatment dataset in Table 8, the "Method A" PEQ calculations appears to over-represent the level of this parameter in the discharge. The PEQs are based on two low-level detections (i.e. 0.5 and 1.0 µg/L selenium) within the small dataset. Both results are substantially less than the corresponding selenium WQS of 5.0 µg/L; the remaining 3 analyses were reported below the analytical method detection levels. Based on this additional analysis, selenium does not appear to have the reasonable potential to contribute to WQS exceedances. Using the discretion allowed the Director under OAC 3745-33-07(A)(6), no additional monitoring requirements beyond the annual Pretreatment Program priority pollutant scan (PPS) data is recommended for this parameter.

Cadmium, Chromium, Free Cyanide, Hexavalent Chromium (Dissolved), Lead, Nickel, and Zinc

The Ohio EPA risk assessment (Table 15) places these parameters in groups 2 and 3. This placement, as well as the data in Table 7, Table 8, and Table 9, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring at reduced frequencies, i.e. 1/Quarter, is recommended for these parameters.

Antimony, Arsenic, Beryllium, Molybdenum, Silver, and Thallium

The Ohio EPA risk assessment (Table 15) places these parameters in group 2. This placement, as well as the data in Table 7, Table 8, and Table 9, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No additional monitoring requirements beyond the pretreatment program PPS data are recommended for these parameters.

Total Kjeldahl Nitrogen (TKN) and Nitrate+Nitrite (as Nitrogen)

In accordance with Ohio EPA guidance, a new monitoring requirement has been added for TKN. The Ravenna WWTP discharges a nutrient load and monitoring for these nitrogen parameters will allow Ohio EPA to adequately characterize the influence of the treatment plant on the receiving stream. Additionally, monitoring will ensure that a nutrient data set is maintained for use in future stream studies and/or updates to the TMDL.

Dissolved Orthophosphate

Monthly monitoring is proposed for dissolved orthophosphate (as P). This monitoring is required by ORC 6111.03. Monitoring for orthophosphate is proposed to further develop nutrient datasets for dissolved reactive phosphorus and to assist in stream and watershed assessments and studies. Ohio EPA monitoring, as well as other in-stream monitoring, are generally performed via the collection of grab samples. Thus, orthophosphate is proposed to be collected by grab sample to maintain consistent data to support watershed and stream surveys. The grab sample must be filtered within 15 minutes of collection using a 0.45-micron filter. The filtered sample must be analyzed within 48 hours of sample collection.

Whole Effluent Toxicity (WET) Reasonable Potential

Evaluating the acute and chronic toxicity results for the test organisms in Table 10 and Attachment 1 under the provisions of 40 CFR Part 132, Appendix F, Procedure 6, gives an estimated chronic PEQ of 3.4 TUc for *C. dubia* and 6.58 TUc for *P. promelas*. Reasonable potential for toxicity for *C. dubia* and *P. promelas* is demonstrated, since these values exceed the WLA value of 1.01 TUc. Consistent with Procedure 6 and OAC 3745-33-07(B)(10), a monthly average limit of 1.0 TUc and a daily maximum limit of 1.0 TUa is recommended to continue. Quarterly chronic toxicity monitoring with the determination of acute endpoints is recommended. The proposed monitoring will adequately characterize toxicity in the plant's effluent.

Additional Monitoring Requirements

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

Influent Monitoring

Continued monitoring of the plant influent parameters are recommended. Frequencies are recommended to match the requirements for Outfall 3PD00018001.

Upstream (3PD00018801) and Downstream (3PD00018901) Monitoring

- Continued monitoring in the receiving stream are recommended for the following parameters: DO, pH, temperature, ammonia-N, nitrate-nitrite (as N), TKN, phosphorus, *E. coli*, acute toxicity (upstream only) and hardness (downstream only).

- The monitoring frequencies for *E. coli* have been changed from 1/month (Summer) to 1/ 2 weeks (June - August) at the upstream and downstream monitoring stations. The increased frequency over a shorter duration will facilitate impairment assessments.

Bypass Monitoring (3PD00018002 and 3PD00018602)

Monitoring of the bypass locations are recommended for the following parameters: bypass occurrences, bypass volume, bypass total hours, total suspended solids, and $CBOD_5$.

Sludge

Limits and monitoring requirements proposed for the disposal of sewage sludge by the following management practices are based on OAC 3745-40: Class B biosolids agronomic land application (Station 3PD00018581) and hauling to an authorized landfill (Station 3PD00018586).

OTHER REQUIREMENTS

Compliance Schedule(s)

Pretreatment Local Limits Review - A compliance schedule is proposed for the Ravenna WWTP to submit a technical justification for either revising its local industrial user limits or retaining its existing local limits. Details are in Part I.C of the permit.

Phosphorus Optimization - A compliance schedule is proposed for the facility to continue to implement treatment and/or control strategies aimed at reducing the discharge of phosphorus. Additionally, an evaluation report must be completed and submitted as part of the next NPDES renewal application. 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 discharge monitoring reports (DMRs); 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 OAC 3745-7. These rules require the Ravenna WWTP to have a Class III wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through Outfall 3PD00018001. These rules also require the permittee to designate one or more operator of record to oversee the technical operation of the treatment works.

Low-Level Free Cyanide Testing

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

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

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

Outfall Signage

Part II of the permit includes requirements for the permittee to place and maintain a sign at each outfall providing information about the discharge. Signage at outfalls is required pursuant to OAC 3745-33-08(A). Signs are not required at in-plant sampling stations or at outfalls that are not accessible to the public by land or by recreational use of the water body, e.g. submerged off-shore outfalls.

Part III

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

Stormwater Compliance

On August 1, 2022, the Ravenna WWTP was issued permit number 3GR01886*FG under Ohio EPA's Multi-Sector General Industrial Storm Water Permit (MSGP No. OHR000007). To demonstrate continuing compliance

with the storm water requirements, the Ravenna WWTP shall submit either a Notice of Intent (NOI) or a "No Exposure Certification" at the time of re-issuance of the MSGP. Alternatively, the Ravenna WWTP may seek to consolidate coverage under the individual permit via submission of NPDES Application Form 2F.

Figure 1. Location of Ravenna WWTP

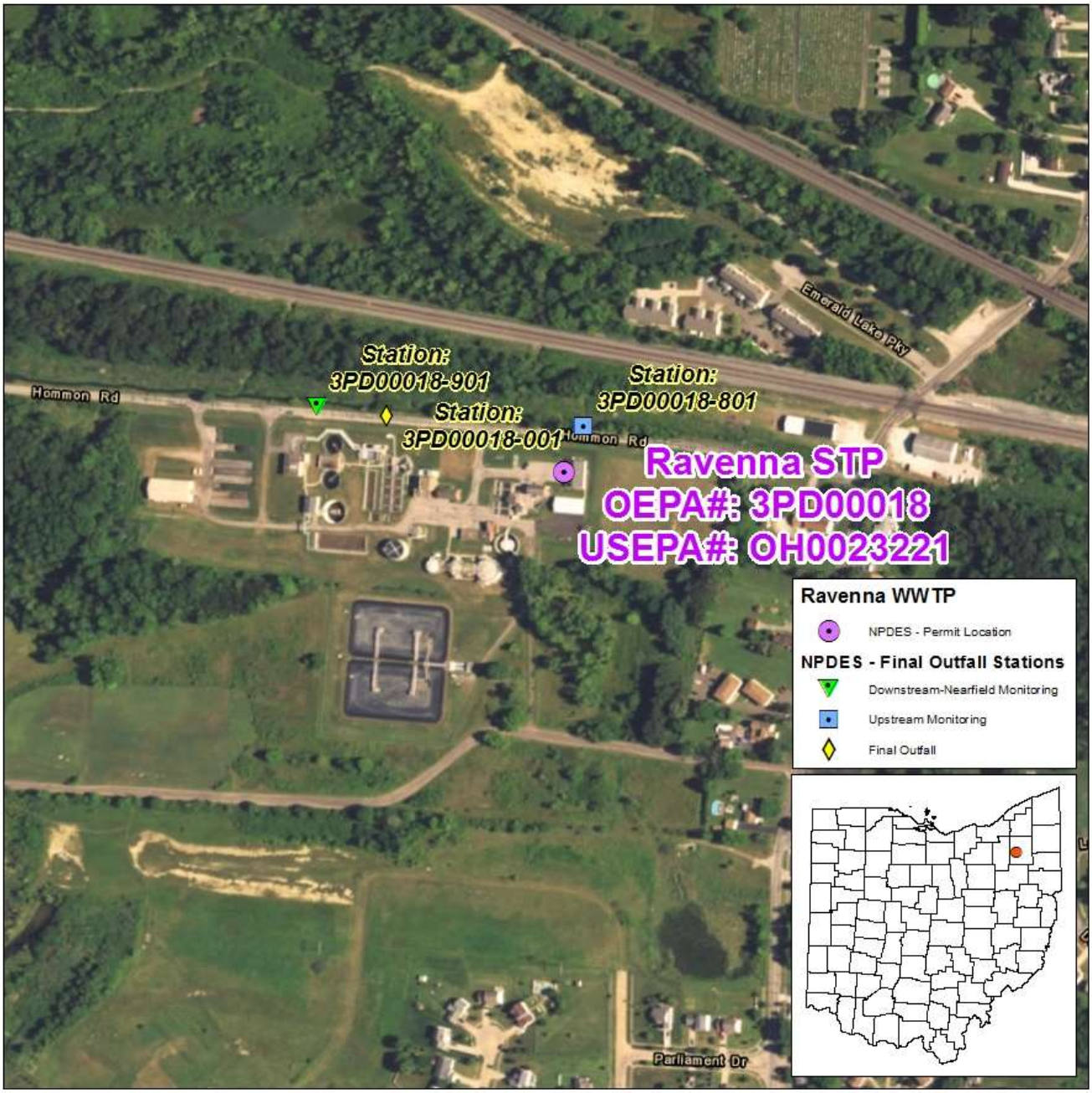


Figure 2. Diagram of Ravenna WWTP

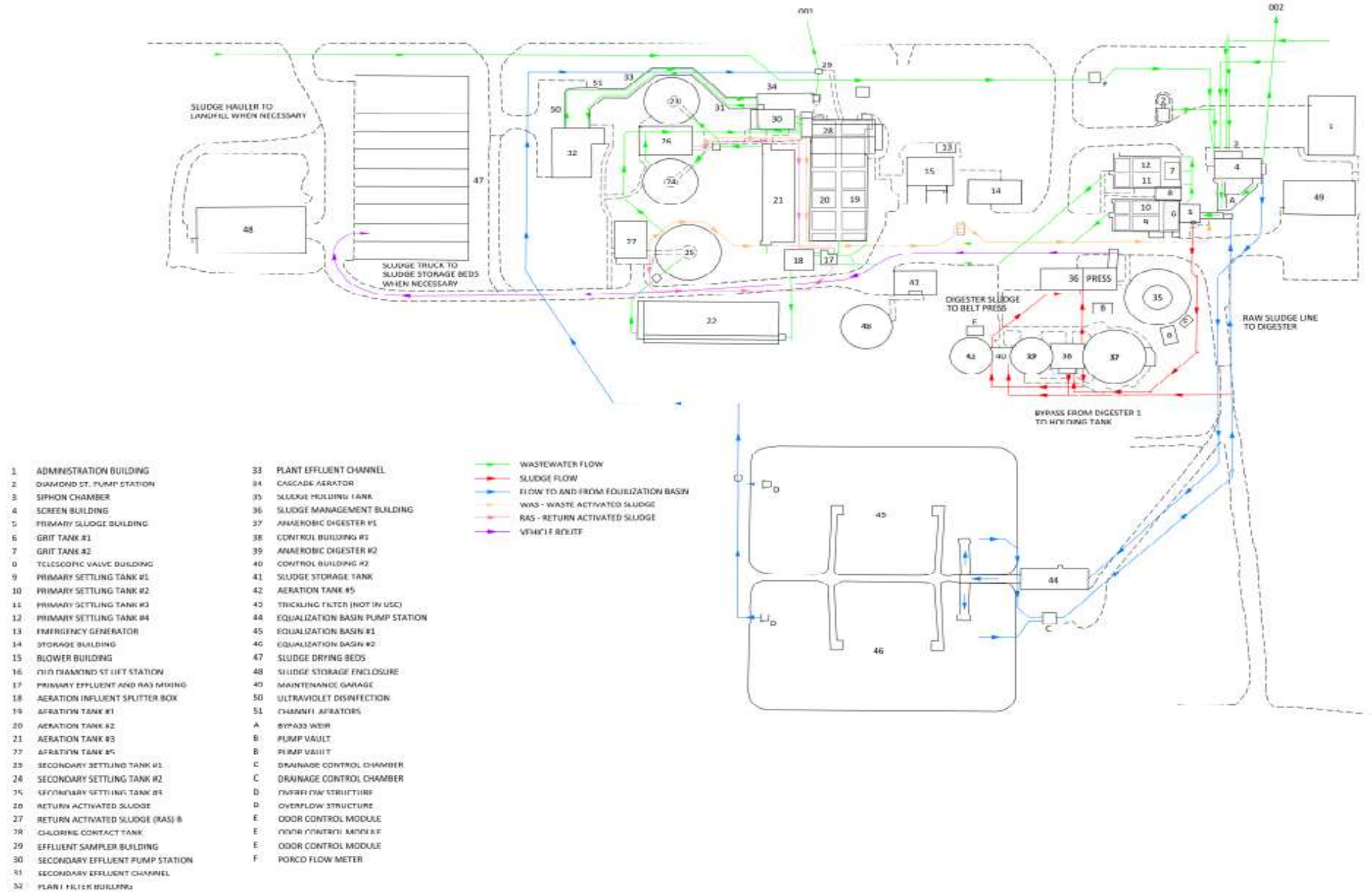
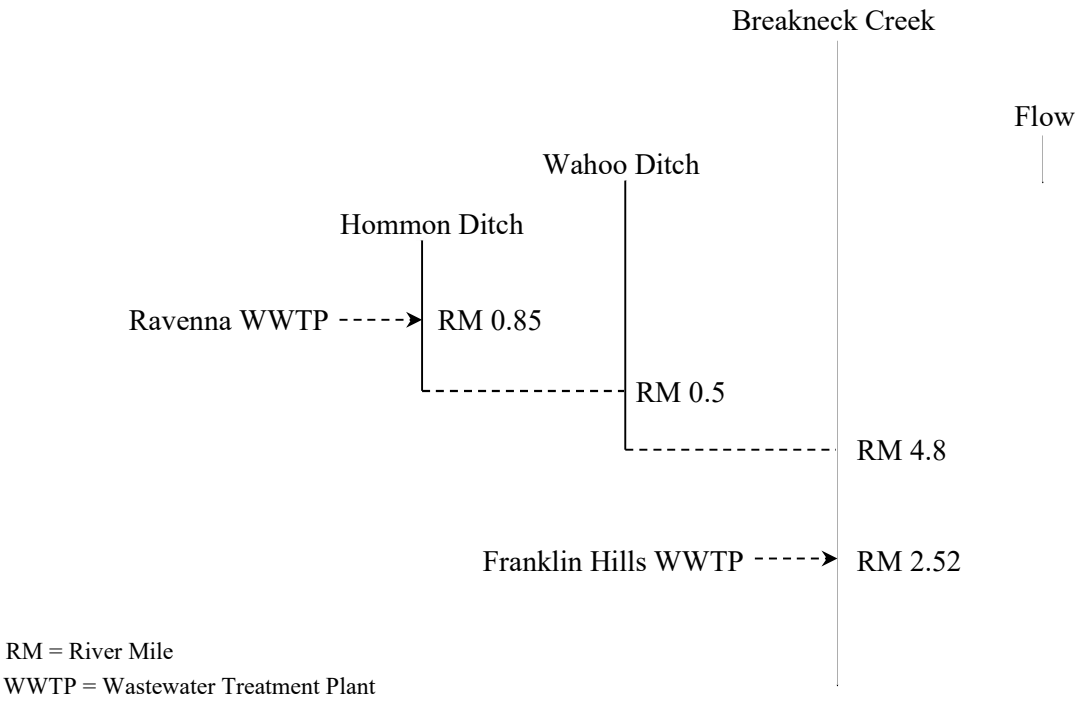


Figure 3. Breakneck Creek Study Area:



RM = River Mile
WWTP = Wastewater Treatment Plant

Table 1. Sewage Sludge Removal

Year	Station 3PD00018581 Class B Biosolids Land Application (Dry Tons)	Station 3PD00018586 Landfill Disposal (Dry Tons)
2018	216.9	--
2019	215.7	--
2020	278.49	--
2021	193.84	--
2022	191.08	--

Table 2. Average Annual Effluent Flow Rates

Year	Annual Flow in MGD				
	# Days	Average	Median	95th Percentile	Maximum
2018	365	1.61	1.36	3.04	3.83
2019	365	1.66	1.43	2.92	4.13
2020	366	1.57	1.45	2.51	3.59
2021	365	1.50	1.35	2.45	3.24
2022	365	1.62	1.47	2.78	3.64
2023	90	2.09	2.02	3.16	3.27

MGD = million gallons per day

Table 3. Effluent Limit Violations for Outfall 3PD00018001(1/2018 – 3/2023)

Parameter	2018	2019	2020	2021	2022	2023	Total
Chronic Toxicity, *Ceriodaphnia dubia*	0	0	1	0	0	0	**1**
Chronic Toxicity, *Pimephales promelas*	2	2	0	0	0	0	**4**
Dissolved Oxygen	0	0	0	0	1	0	**1**
Mercury, Total (Low Level)	0	0	0	0	1	2	**3**
pH, Maximum	0	0	0	1	0	0	**1**
pH, Minimum	0	0	1	0	0	0	**1**
Total	**2**	**2**	**2**	**1**	**2**	**2**	**11**

Table 4. Plant EQ Basin Overflow/Bypasses (1/2018 – 3/2023)

Year	Bypass Flow in MGD* (Station 3PD00018602)			
	No. of Events	Maximum	Median	Mean
2018	12	3.41	1.01	1.33
2019	10	2.93	0.86	1.02
2020	4	2.58	0.94	1.15
2021	6	1.07	0.51	0.57
2022	8	2.03	0.62	0.79
2023	3	1.50	0.50	0.71

MGD = million gallons per day

Table 5. Sanitary Sewer Overflow Discharges

Year	Number
2018	2
2019	3
2020	2
2021	3
2022	6

Table 6. Effluent Phosphorus Discharges for Outfall 3PD00018001 (2018 - 2022)

Year	Obs.	Median Phosphorus (mg/L)	Median Flow (MGD)	Median Loading (kg/day)
2018	30	0.71	1.08	3.28
2019	27	0.76	1.30	3.99
2020	24	0.60	1.16	2.60
2021	24	0.73	1.21	3.48
2022	25	0.69	1.24	3.32

Table 7. Effluent Characterization Using Self-Monitoring Data (1/2018 – 3/2023)

Parameter	Unit	Current Limits		# Obs.	Percentiles		Data Range
		30 Day	Daily		50th	95th	
Water Temperature	°C	Monitor		1916	15.6	23.3	7.7 - 36.6
Dissolved Oxygen	mg/L	--	7.5[m]	1916	10.7	9*	7.3 - 18.7
Total Suspended Solids	kg/day	106	159[w]	764	17.8	60.4	3.66 - 247
Total Suspended Solids	mg/L	10	15[w]	764	3	8	1 - 21
Oil and Grease	mg/L	--	10	126	--	--	< 5
Nitrogen, Ammonia - Summer	kg/day	10.6	15.9[w]	366	.246	.806	.026 - 4.85
Nitrogen, Ammonia - Summer	mg/L	1.0	1.5[w]	366	.048	.152	.004 - .989
Nitrogen, Ammonia - Winter	kg/day	82.7	124[w]	406	.322	14.2	.0324 - 41.8
Nitrogen, Ammonia - Winter	mg/L	7.8	11.7[w]	406	.054	1.4	.007 - 4.5
Nitrite Plus Nitrate, Total	mg/L	Monitor		63	20.3	27.7	9.21 - 28.5
Phosphorus, Total	kg/day	8.7	13.0[w]	269	3.78	7.72	.695 - 10.8
Phosphorus, Total	mg/L	0.82	1.23[w]	269	.7	1.05	.14 - 1.25
Dissolved Orthophosphate (as P)	mg/L	Monitor		65	.46	1.4	.01 - 2.1
Nickel, TR	µg/L	Monitor		21	--	--	< 10
Zinc, TR	µg/L	Monitor		21	27	51	16 - 55
Cadmium, TR	µg/L	Monitor		21	--	--	< .5
Lead, TR	µg/L	Monitor		21	< 2	7.9	0 - 8.4
Chromium, TR	µg/L	Monitor		21	--	--	< 10
Copper, TR	kg/day	0.201	0.318	65	< .0322	.0882	0 - .137
Copper, TR	µg/L	19	30	65	< 10	14	0 - 26
Chromium, Dissolved Hexavalent	µg/L	Monitor		21	--	--	< 4
E. coli	#/100 mL	126	284[w]	364	3	100	1 - 680
Flow Rate	MGD	Monitor		1916	1.43	2.85	.73 - 4.13
Mercury, Total	kg/day	0.00004	0.0181	63	.00000556	.0000259	0 - .000058
Mercury, Total	ng/L	3.7	1700	63	1.06	2.94	0 - 4.69
Cyanide, Free (Low-Level)	µg/L	Monitor		21	--	--	< .003
Acute Toxicity, *Ceriodaphnia dubia*	TUa	--	1.0	21	< 1	.2	0 - .4
Chronic Toxicity, *Ceriodaphnia dubia*	TUc	1.0	--	21	< 1	< 1	0 - 2.82
Acute Toxicity, *Pimephales promelas*	TUa	--	1.0	22	< 1	.19	0 - .3
Chronic Toxicity, *Pimephales promelas*	TUc	1.0	--	22	< 1	2.75	0 - 4.7
pH, Maximum	S.U.	--	9.0	1916	7.2	7.8	6.7 - 9.3
pH, Minimum	S.U.	--	6.5[m]	1916	7	6.7*	6.2 - 8.3
Residue, Total Filterable	mg/L	Monitor		126	698	889	110 - 1080
CBOD 5 day	kg/day	87	131[w]	762	9.84	34.2	2.81 - 96.7

Parameter	Unit	Current Limits		# Obs.	Percentiles		Data Range
		30 Day	Daily		50th	95th	
CBOD 5 day	mg/L	8.2	12.3[w]	762	2	4	1 - 10

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

Table 8. Effluent Characterization Using Pretreatment (PT) Data

Parameter (µg/L)	PT Sample Date				
	7/25/2018 (*)	7/17/2019 (*)	3/18/2020 (*)	8/18/2021	7/20/2022
Antimony	AA 5.0	AA 5.0	AA 5.0	AA 0.8	1.1
Arsenic	AA 5.0	AA 5.0	AA 5.0	1.1	1.2
Beryllium	AA 3.0	AA 3.0	AA 3.0	AA 2.0	AA 0.1
Cadmium	AA 3.0	AA 3.0	AA 3.0	AA 1.0	AA 0.1
Chromium	AA 7.0	AA 7.0	AA 7.0	AA 6.0	AA 1.5
Copper	9.0	AA 8.0	12	8	7.2
Lead	AA 10	AA 10	AA 10	AA 9.0	AA 0.2
Mercury (ng/L)	3.6	27.4	3.0	0.4	1.4
Molybdenum	AA 20	AA 20	AA 20	3.8	5.2
Nickel	AA 8.0	AA 8.0	AA 8.0	AA 4.0	3.1
Selenium	AA 4.0	AA 4.0	AA 4.0	0.5	1.0
Silver	AA 5.0	AA 5.0	AA 5.0	AA 2.0	AA 0.4
Thallium	AA 5.0	AA 5.0	AA 5.0	AA 0.1	AA 0.1
Zinc	36	27	32	31	14

(*) Reported "AA" values during specified periods represent analytical quantification levels (QLs), not method detection limits (MDLs).

Table 9. Projected Effluent Quality

Parameter	Units	Number of Samples	Number MDL	PEQ Average	PEQ Maximum
Self-Monitoring (DMR) Data					
Ammonia-N (summer)	mg/L	243	243	0.091	0.167
Ammonia-N (winter)	mg/L	208	208	0.31	0.67
Cadmium – TR [A]	µg/L	26	0	--	--
Chromium - TR [A]	µg/L	26	0	--	--
Chromium, Dissolved Hexavalent	µg/L	21	0	--	--
Copper - TR [A]	µg/L	70	23	12.27	17.64
Cyanide,free	µg/L	21	0	--	--
Lead - TR [A]	µg/L	22	4	7.972	10.92
Mercury - TR (BCC) [A]	ng/L	67	66	2.282	3.356
Nickel - TR [A]	µg/L	26	1	9.49	13
Nitrate-N + Nitrite-N	mg/L	63	63	25.75	32.32
Phosphorus	mg/L	269	269	0.95	1.211
Total Filterable Residue	mg/L	126	126	945	1266
Zinc - TR [A]	µg/L	26	26	43.82	59.66
Pretreatment Data					
Antimony	µg/L	2	1	3.051	4.18
Arsenic - TR	µg/L	2	2	3.329	4.56
Beryllium	µg/L	5	0	--	--
Molybdenum	µg/L	5	2	8.731	11.96
Selenium - TR	µg/L	5	2	1.679	2.3
Silver	µg/L	5	0	--	--
Thallium	µg/L	5	0	--	--

[A] DMR data combined with Pretreatment data and/or Ohio EPA Compliance data.
DMR = Discharge Monitoring Report
MDL = analytical laboratory method detection limit
PEQ = projected effluent quality
TR = total recoverable

Table 10. Summary of Acute and Chronic Toxicity Results

Date	*Ceriodaphnia Dubia* TUa	*Ceriodaphnia Dubia* TUc	*Pimephales promelas* TUa	*Pimephales promelas* TUc
2/4/2018	AA (1.0)	AA (1.0)	0.2	1.01
5/5/2018	AA (1.0)	AA (1.0)	AA (1.0)	AA (1.0)
8/6/2018	AA (1.0)	AA (1.0)	AA (1.0)	AA (1.0)
11/5/2018	AA (1.0)	AA (1.0)	AA (1.0)	4.7
2/3/2019	AA (1.0)	AA (1.0)	AA (1.0)	2.78
5/6/2019	AA (1.0)	AA (1.0)	0.3	2.16
5/26/2019	--	--	AA (1.0)	AA (1.0)
8/4/2019	AA (1.0)	AA (1.0)	AA (1.0)	AA (1.0)
11/3/2019	AA (1.0)	AA (1.0)	AA (1.0)	AA (1.0)
2/3/2020	--	--	AA (1.0)	AA (1.0)
2/9/2020	0.4	2.82	--	--
5/3/2020	AA (1.0)	AA (1.0)	AA (1.0)	AA (1.0)
8/3/2020	AA (1.0)	AA (1.0)	AA (1.0)	AA (1.0)
11/8/2020	AA (1.0)	AA (1.0)	AA (1.0)	AA (1.0)
2/7/2021	AA (1.0)	AA (1.0)	AA (1.0)	AA (1.0)
5/4/2021	0.2	AA (1.0)	AA (1.0)	AA (1.0)
8/2/2021	AA (0.2)	AA (1.0)	AA (1.0)	AA (1.0)
11/7/2021	AA (0.2)	AA (1.0)	AA (1.0)	AA (1.0)
2/6/2022	AA (0.2)	AA (1.0)	AA (1.0)	AA (1.0)
5/1/2022	AA (1.0)	AA (1.0)	AA (1.0)	AA (1.0)
8/7/2022	AA (1.0)	AA (1.0)	AA (1.0)	AA (1.0)
11/6/2022	AA (1.0)	AA (1.0)	AA (1.0)	AA (1.0)
2/14/2023	AA (1.0)	AA (1.0)	AA (1.0)	AA (1.0)

TUa = acute toxicity unit
TUc = chronic toxicity unit
AA = non-detection; analytical method detection limit of 0.2 TUa, and 1.0 TUc

Table 11. Use Attainment Status

Location	Year	River Mile	Use Designation	Attainment Status	Causes of Impairment	Sources of Impairment
Wahoo Ditch at Ravenna, upstream White Rubber	2009	2.6	MWH	NON	Dir. habitat alterations organic enrich/DO siltation unknown toxicity natural limits flow alteration	Flow reg. /mod. & minor municipal point source development, municipal point source and natural non-irrigated crop production, channelization
Wahoo Ditch at Ravenna, adjacent White Rubber	2009	2.5	MWH	NON	" "	" "
Wahoo Ditch at Ravenna, at Main St.	2018	1.22	MWH	FULL	--	--
Breakneck Creek upstream Wahoo Ditch	1996	5.2	WWH	FULL	--	--
Breakneck Creek upstream Franklin Hills WWTP at Powder Mill Rd.	2018	3.1	WWH	FULL	--	--
Breakneck Creek downstream Franklin Hills WWTP near mouth	2018	0.05	WWH	FULL	--	--

MWH = Modified Warmwater Habitat
WWH = Warmwater Habitat
WWTP = Wastewater Treatment Plant

Table 12. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria					Inside Mixing Zone Maximum
		Average				Maximum Aquatic Life	
		Wildlife	Human Health	Agri-culture	Aquatic Life		
Ammonia-N (summer)	mg/L	--	--	--	2.8 [F]	--	--
Ammonia-N (winter)	mg/L	--	--	--	6.9 [F]	--	--
Antimony	µg/L	--	780	--	190	900	1800
Arsenic - TR	µg/L	--	580	100	150	340	680
Beryllium	µg/L	--	130 [C]	100	38[B]	320 [B]	640 [B]
Cadmium - TR	µg/L	--	730	50	4.5	11	22
Chromium - TR	µg/L	--	14000	100	160	3400	6800
Chromium VI - Dissolved	µg/L	--	14000	--	11	16	31
Copper - TR	µg/L	--	64000	500	18	29	58
Cyanide - free	µg/L	--	48000	--	5.2	22	44
Lead - TR	µg/L	--	--	100	17	330	650
Mercury - TR [D]	ng/L	1.3	3.1	10000	910	1700	3400
Molybdenum	µg/L	--	10000	--	20000	190000	370000
Nickel - TR	µg/L	--	43000	200	100	900	1800
Nitrate-N + Nitrite-N	mg/L	--	--	100	--	--	--
Phosphorus	mg/L	--	--	--	--	--	--
Selenium - TR	µg/L	--	3100	50	5	62	120
Silver	µg/L	--	11000	--	1.3	5.3	12
Thallium	µg/L	--	--	--	17	79	160
Total Filterable Residue	mg/L	--	--	--	1500	--	--
Zinc - TR	µg/L	--	35000	25000	230	230	460

[A] Human Health and Aquatic Life Criteria are Tier I unless otherwise indicated.
[B] Tier II Values
[C] Carcinogen
[E] Bioaccumulative Chemical of Concern (BCC)
[F] MWH criteria for Wahoo Ditch (since Hommon Ditch is designated LRW, no average NH3-N criteria apply)
TR = total recoverable

Table 13. Instream Conditions and Discharger Flows

Parameter	Units	Season	Value	Basis
Upstream flows:				
Hommon Ditch above Ravenna WWTP				
1Q10	cfs	annual	0.037	USGS gage #4206000, 1940-2022 data
7Q10	cfs	annual	0.089	USGS gage #4206000, 1940-2022 data
30Q10	cfs	summer	0.138	USGS gage #4206000, 1940-2022 data
30Q10	cfs	winter	0.350	USGS gage #4206000, 1940-2022 data
90Q10	cfs	annual	0.184	USGS gage #4206000, 1940-2022 data
Harmonic Mean Flow	cfs	annual	0.715	USGS gage #4206000, 1940-2022 data
Wahoo Ditch above Hommon Ditch				
1Q10	cfs	annual	0.042	USGS gage #4206000, 1940-2022 data
7Q10	cfs	annual	0.102	USGS gage #4206000, 1940-2022 data
30Q10	cfs	summer	0.157	USGS gage #4206000, 1940-2022 data
30Q10	cfs	winter	0.399	USGS gage #4206000, 1940-2022 data
90Q10	cfs	annual	0.209	USGS gage #4206000, 1940-2022 data
Harmonic Mean Flow	cfs	annual	0.814	USGS gage #4206000, 1940-2022 data
Breakneck Creek above Wahoo Ditch				
1Q10	cfs	annual	0.281	USGS gage #4206000, 1940-2022 data
7Q10	cfs	annual	0.678	USGS gage #4206000, 1940-2022 data
30Q10	cfs	summer	1.05	USGS gage #4206000, 1940-2022 data
30Q10	cfs	winter	2.665	USGS gage #4206000, 1940-2022 data
90Q10	cfs	annual	1.396	USGS gage #4206000, 1940-2022 data
Harmonic Mean Flow	cfs	annual	5.432	USGS gage #4206000, 1940-2022 data
Mixing Assumption	%	average	25	Stream-to-discharge ratio
	%	maximum	100	Stream-to-discharge ratio
Ravenna WWTP				
Outfall 001 flow rate	cfs (MGD)	design	4.33 (2.8)	NPDES permit application
Franklin Hills WWTP				
Outfall 001 flow rate	cfs (MGD)	design	2.32 (1.5)	NPDES permit application

Parameter	Units	Season	Value	Basis
Instream Hardness	mg/L	annual	216	DMR (Ravenna 901); 63 values, 2018-2023
Background Water Quality for Hommon Ditch				
Ammonia	mg/L	summer	0.18	DMR 801; 20 values, 3<MDL, 2018-23
Ammonia	mg/L	winter	0.15	DMR 801; 17 values, 5<MDL, 2018-23
Arsenic	µg/L	annual	2.64	EA3; 7 values, 0<MDL, 2018
Antimony	µg/L	annual	0	No representative data available.
Cadmium	µg/L	annual	0	EA3; 7 values, 7<MDL, 2018
Chromium	µg/L	annual	0	EA3; 7 values, 7<MDL, 2018
Chromium VI - Dissolved	µg/L	annual	0	No representative data available.
Copper	µg/L	annual	2.55	EA3; 7 values, 1<MDL, 2018
Cyanide, free	µg/L	annual	0	No representative data available.
Lead	µg/L	annual	0	EA3; 7 values, 7<MDL, 2018
Mercury	µg/L	annual	0	No representative data available.
Molybdenum	µg/L	annual	0	No representative data available.
Nickel	µg/L	annual	2.63	EA3; 7 values, 0<MDL, 2018
Nitrate + Nitrite	mg/L	annual	0.6	DMR 801; 63 values, 21<MDL, 2018-23
Selenium	µg/L	annual	0	EA3; 7 values, 7<MDL, 2018
Silver	µg/L	annual	0	No representative data available.
Total Filterable Residue	mg/L	annual	636	EA3; 7 values, 0<MDL, 2018
Zinc	µg/L	annual	0	EA3; 7 values, 7<MDL, 2018

DMR = Discharge Monitoring Report
EA3 = Ohio EPA Ecological Assessment and Analysis Application
MDL = method detection limit
NPDES = National Pollutant Discharge Elimination System
TR = total recoverable
USGS = United States Geological Survey

Table 14. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria

Parameter	Units	Outside Mixing Zone Criteria					Inside Mixing Zone Maximum
		Average				Maximum Aquatic Life	
		Wildlife	Human Health	Agri-culture	Aquatic Life		
Ammonia-N (summer)	mg/L	--	--	--	2.88 [D]	--	--
Ammonia-N (winter)	mg/L	--	--	--	7.45 [D]	--	--
Arsenic – TR [B]	µg/L	--	604	104	152	343	680
Cadmium – TR [B]	µg/L	--	760 [A]	52 [A]	4.3	10	22
Chromium – TR [B]	µg/L	--	14579 [A]	104	158	3429	6800
Chromium, Dissolved Hexavalent [B]	µg/L	--	14579 [A]	--	11	16	31
Copper - TR	µg/L	--	66646 [A]	521 [A]	17	28	58
Cyanide - free	µg/L	--	48000	--	5.2	22	44
Lead - TR	µg/L	--	--	104	17	316	650
Mercury - TR [C]	ng/L	1.3	3.1	10000 [A]	910	1700	3400
Molybdenum [B]	µg/L	--	10413	--	20217	191624	370000
Nickel – TR [B]	µg/L	--	44777 [A]	208	97	885	1800
Nitrate-N + Nitrite-N	mg/L	--	--	104	--	--	--
Phosphorus	mg/L	--	--	--	--	--	--
Selenium - TR	µg/L	--	3228 [A]	52	5.1	63	120
Silver [B]	µg/L	--	11455 [A]	--	1.3	5.7	12
Total Filterable Residue	mg/L	--	--	--	1509	--	--
Zinc - TR	µg/L	--	36447 [A]	26033 [A]	227	232	460

[A] Allocation must not exceed the Inside Mixing Zone Maximum.
[B] Parameter would not require a WLA based on reasonable potential procedures, but allocation requested by permit staff.
[C] Bioaccumulative Chemical of concern (BCC).
[D] WLA to meet MWH criteria in Wahoo Ditch.
TR = total recoverable

Table 15. Parameter Assessment

Group 1:	Due to a lack of numeric criteria, the following parameters could not be evaluated at this time.		
	No parameters placed in the group.		
Group 2:	PEQ < 25% of WQS or all data below minimum detection limit; WLA not required. No limit recommended, monitoring optional		
	Ammonia-N (summer)	Ammonia-N (winter)	Antimony
	Arsenic	Beryllium	Cadmium - TR
	Chromium - TR	Chromium, Dissolved Hexavalent	Cyanide, free
	Molybdenum	Nickel	Silver
	Thallium		
Group 3:	PEQmax < 50% of maximum PEL and PEQavg < 50% of average PEL. No limit recommended, monitoring optional.		
	Lead	Nitrate-N + Nitrite-N	Zinc
Group 4:	PEQmax > 50% but <100% of the maximum PEL or PEQavg > 50% but < 100% of the average PEL. Monitoring is appropriate.		
	Copper - TR	Total Filterable Residue	Selenium - TR*
Group 5:	Maximum PEQ > 100% of the maximum PEL or average PEQ > 100% of the average PEL, or either the average or maximum PEQ is between 75 and 100% of the PEL and certain conditions that increase the risk to the environment are present. Limit recommended.		

Limits to Protect Numeric Water Quality Criteria

			Recommended Effluent Limits	
Parameter	**Units**	**Period**	**Average**	**Maximum**
Mercury [A]	ng/L	annual	1.3	1700

* Selenium - see placement discussion in "Reasonable Potential/ Effluent Limits/Hazard Management Decisions".

[A] Bioaccumulative Chemical of concern (BCC).
PEL = preliminary effluent limit
PEQ = projected effluent quality
TR = total recoverable
WLA = wasteload allocation
WQS = water quality standard

Table 16. Final Effluent Limits for Outfall 3PD00018001

Parameter	Units	Frequency	Concentration		Loading (kg/day)[a]		Basis[b]
			30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Water Temperature	°C	1/day	- - - - - - - - - - - Monitor - - - - - - - - - - -				M[c]
Dissolved Oxygen	mg/L	1/day	7.5 (Minimum)				PD/TMDL
Total Suspended Solids	mg/L	3/week	10	15[d]	106	159[d]	PD/TMDL
Oil & Grease	mg/L	1/ 2 weeks	--	10	--	--	WQS
Ammonia (as N) - Summer	mg/L	3/week	1.0	1.5 [d]	10.6	15.9 [d]	PD/TMDL
Ammonia (as N) - Winter	mg/L	3/week	7.8	11.7 [d]	82.7	124 [d]	PD/TMDL
Total Kjeldahl Nitrogen	mg/L	1/month	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Nitrate+Nitrite (as N)	mg/L	1/month	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Phosphorus, Total	mg/L	1/week	0.82	1.23 [d]	8.7	13.0 [d]	PD/TMDL
Orthophosphate, Dissolved (as P)	mg/L	1/month	- - - - - - - - - - - Monitor - - - - - - - - - - -				PMR
Cyanide, Free	µg/L	1/quarter	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Nickel	µg/L	1/quarter	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Zinc	µg/L	1/quarter	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Cadmium	µg/L	1/quarter	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Lead	µg/L	1/quarter	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Chromium	µg/L	1/quarter	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Copper	µg/L	1/month	- - - - - - - - - - - Monitor - - - - - - - - - - -				RP
Hexavalent Chromium, Dissolved	µg/L	1/quarter	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
E. coli	#/100 mL	3/week	126	284[d]	--	--	WQS
Flow Rate	MGD	1/day	- - - - - - - - - - - Monitor - - - - - - - - - - -				M[c]
Mercury	ng/L	1/month	2.3	1700	0.000024	0.018	VAR
Residue, Total Filterable	mg/L	1/ 2 weeks	- - - - - - - - - - - Monitor - - - - - - - - - - -				RP
Carbonaceous Biochemical Oxygen Demand (5 day), CBOD5	mg/L	3/week	8.2	12.3[d]	87	131[d]	PD/TMDL
pH	S.U.	1/day	6.5 (Min) - 9.0 (Max)		--	--	WQS
Acute Toxicity							
Ceriodaphnia dubia	TUa	1/quarter	--	1.0	--	--	WET/RP
Pimephales promelas	TUa	1/quarter	--	1.0	--	--	WET/RP
Chronic Toxicity							
Ceriodaphnia dubia	TUc	1/quarter	1.0	--	--	--	WET/RP
Pimephales promelas	TUc	1/quarter	1.0	--	--	--	WET/RP

[a] Effluent loadings based on average design discharge flow of 2.8 MGD.

[b] Definitions: 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)
PTS = Phosphorus Treatment Standards (OAC 3745-33-06 (C))
RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in permits (OAC 3745-33-07(A))
TMDL = "Total Maximum Daily Loads for the Middle Cuyahoga River", Ohio EPA Final Report, March 2000
VAR = Mercury variance renewal (OAC 3745-1-38(H))
WET = Whole Effluent Toxicity (40 CFR Part 132, Appendix F, Procedure 6 and/or 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.

Attachment 1. Whole Effluent Toxicity Reasonable Potential Analysis

	Water Flea (*Ceriodaphnia dubia*)		Fathead Minnow (*Pimephales promelas*)	
	Acute	**Chronic**	**Acute**	**Chronic**
WLA (TU)	0.3	1.0	0.3	1.0
Total # of Tests	21	21	22	22
Maximum Value (TU)	0.4	2.82	0.3	4.7
Coefficient of Variation[1] (standard deviation/mean) [Where # tests > 10]	0.2	0.4	0.1	0.7
Multiplying Factors[2]	1.1	1.2	1.1	1.4
PEQ (Maximum Value x Multiplying Factor)	0.44*	3.4	0.33*	6.58
Reasonable Potential Demonstrated? (Yes/No) (Yes if PEQ > WLA)	No*	Yes	No*	Yes

[1] 40 CFR Part 132, Appendix F, Paragraph D(3)
[2] 40 CFR Part 132, Appendix F, Table F6-1
* TUa values less than 1.0 are interpolations.

Addendum 1. Acronyms

ABS	Anti-backsliding
BPJ	Best professional judgment
CFR	Code of Federal Regulations
CMOM	Capacity Management, Operation, and Maintenance
CONSWLA	Conservative substance wasteload allocation
CSO	Combined sewer overflow
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DMT	Dissolved metal translator
IMZM	Inside mixing zone maximum
LTCP	Long-term Control Plan
MDL	Analytical method detection limit
MGD	Million gallons per day
NPDES	National Pollutant Discharge Elimination System
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
OMZM	Outside mixing zone maximum
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
WWTC	Wastewater Treatment Plant