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 Struthers Water Pollution Control Facility

Public Notice No.: 189488
Public Notice Date: September 21, 2023
Comment Period Ends: October 20, 2023

Ohio EPA Permit No.: **3PD00026*ND**
Application No.: **OH0027600**

Name and Address of Applicant:

City of Struthers
6 Elm Street
Struthers, Ohio 44471

Name and Address of Facility Where Discharge Occurs:

Struthers Water Pollution Control Facility (WPCF)
530 Lowellville Rd
Struthers, Ohio 44471
Mahoning County

Receiving Water: **Mahoning River**

Subsequent Stream Network: **Beaver River, Ohio River**

INTRODUCTION

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

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

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 (WQBELs) 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 wasteload allocation (WLA) placed free cyanide, hexavalent chromium, and mercury, in Group 5. Based on this placement, the existing mercury effluent limits will be continued. New final effluent limits, and an associated 36-month compliance schedule, are recommended for free cyanide. Monthly monitoring and a tracking requirement, in lieu of effluent limits, are recommended for hexavalent chromium.

The cadmium PEQ falls within 75 percent of the WLA. Based on this placement, a tracking requirement has been included in the permit.

Annual acute toxicity monitoring is recommended to continue. This satisfies the minimum testing requirements in Ohio Administrative Code (OAC) 3754-33-07(B)(11).

A schedule of compliance to address collection system sanitary sewer overflows has been included in the permit.

The *E. coli* monitoring requirements for the upstream and downstream stations have been revised from 1/month (Summer) to bi-weekly (June - August).

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; dissolved metal translator study; priority pollutant testing for future NPDES permit renewal; outfall signage; septage; method detection levels; and sludge monitoring.

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 Joseph Trocchio at 330-963-1193 or Joseph.Trocchio@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 Struthers Water Pollution Control Facility (Struthers WPCF) discharges to the Mahoning River at River Mile 14.32. Figure 1 shows the approximate location of the facility.

This segment of the Mahoning River is described by Ohio EPA River Code 18-001, Watershed Assessment Unit (WAU) Code: 05030103-08-09, County: Mahoning County, Ecoregion: Erie/Ontario Lake Plain. The Mahoning River is designated for the following uses under Ohio's WQS (OAC 3745-1-25): Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, Primary Contact Recreation, Public Water Supply.

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

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

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

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

FACILITY DESCRIPTION

The Struthers WPCF was constructed in 1961 and last upgraded in 2011. The average design flow is 6.0 million gallons per day (MGD) with a peak hydraulic capacity of 9.5 MGD. Struthers WPCF serves a population of approximately 34,500 people in the City of Struthers, Village of Poland, and neighboring parts of the City of Youngstown, Poland Township, and Boardman Township in Mahoning County.

As depicted in Figure 2, the Struthers WPCF consists of two parallel treatment systems referred to as the "West End" and "East End." All flow enters one common headworks consisting of bar screens and grit removal. Domestic septage is initially processed via a septage receiving station.

The West End consists of additional bar screens, conventional activated sludge biological treatment, final clarification, chlorine disinfection, and effluent flow monitoring (Parshall flume). The East End consists of influent flow monitoring (magmeter), primary clarification, secondary treatment through two trickling filters (plastic media), final clarification, chlorine disinfection, and effluent flow monitoring (ultrasonic). Effluent from both systems enters a common manhole where sodium bisulfite is dosed for dechlorination prior to discharging to the Mahoning River at Outfall 3PD00026001.

The City of Struthers has 100% separate sewers and includes five (5) lift stations. The City maintains a 4.5-million-gallon flow equalization (EQ) tank located at the Bridge Street Pump Station. In addition to the EQ tank, the City has identified multiple sanitary sewer overflow (SSO) locations in the collection system. Like other point source discharges from municipal sanitary sewer systems, SSOs are prohibited unless authorized by an NPDES permit. The City has been working collaboratively with Mahoning County to address the SSOs and water in basement (WIB) issues.

Struthers WPCF utilizes the following sewage sludge treatment processes: disc-thickener, aerated sludge holding tank, anaerobic digesters, and belt filter press. The dewatered sludge is disposed in a licensed municipal solid waste landfill. Table 1 shows the last five years of sludge removed from the Struthers WPCF.

Based on the NPDES application, the City of Struthers has two (2) identified categorical industrial users (CIUs) that discharge approximately 0.016 MGD of flow. Astro Shapes, LLC (Permit No. 3DP00002) and Spectrum Metal Finishing Incorporated (Permit No. 3DP00032) currently hold indirect discharge permits issued by Ohio EPA. Pursuant to the Director's discretion, the City has not been required to develop and implement an industrial pretreatment program. However, the City is required to maintain technically-justified industrial user limits. Additionally, provisions are included that stipulate that the permit may be modified, or revoked and reissued, if necessary, to require the City to develop and submit for approval the required elements of an industrial pretreatment program.

The City of Struthers's potable water is provided by Aqua Ohio; the surface water sources are Lake Hamilton and Lake McKelvey.

DESCRIPTION OF EXISTING DISCHARGE

The Struthers WPCF had several effluent violations which are shown in Table 2. These violations were not caused by a known process error or upset condition.

The average annual effluent flow rate for Struthers WPCF for the previous five years is presented in Table 3. The Struthers WPCF does not have provisions for treatment plant bypasses.

Struthers WPCF reports SSOs at Station 3PD00026300. The number of SSOs and dates recorded is presented in Table 4.

The seasonal phosphorus discharge from Outfall 3PD00026001 is presented in Table 5.

Table 6 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period January 2017 to July 2022. The current permit limits are provided for comparison.

Table 7 summarizes the chemical specific data for Outfall 3PD00026001 by presenting the average and maximum PEQ values.

Table 8 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

The lower Mahoning River watershed assessment unit, which includes the Mahoning River in the vicinity of Struthers WPCF, is listed as impaired for human health, recreation, and aquatic life on Ohio's 303(d) list of the *2022 Ohio Integrated Water Quality Monitoring and Assessment Report* (Integrated Report). The Integrated Report is available through the Ohio EPA, Division of Surface Water website at:

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

An assessment of the impact of a permitted point source on the immediate receiving waters includes an evaluation of the available chemical/physical, biological, and habitat data which have been collected by Ohio EPA pursuant to the Five-Year Basin Approach for Monitoring and NPDES Reissuance. Other data may be used provided it was collected in accordance with Ohio EPA methods and protocols as specified by the Ohio WQS and Ohio EPA guidance documents. Other information which may be evaluated includes, but is not limited to: NPDES permittee self-monitoring data; effluent and mixing zone bioassays conducted by Ohio EPA, the permittee, or U.S. EPA.

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

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

Three attainment status results are possible at each sampling location -full, partial, or non-attainment. Full attainment means that all of the applicable indices meet the biocriteria. Partial attainment means that one or more of the applicable indices fails meet the biocriteria. Nonattainment means that either none of the applicable indices meet the biocriteria or one of the organism groups indicates poor or very poor performance. An aquatic life use attainment table (see Table 9) is constructed based on the sampling results and is arranged from upstream to downstream and includes the sampling locations indicated by river mile, the applicable biological indices, the use attainment status (i.e., full, partial, or non), the Qualitative Habitat Evaluation Index, and comments and observations for each sampling location.

The Total Maximum Daily Load (TMDL) program, established under Section 303(d) of the Clean Water Act, focuses on identifying and restoring polluted rivers, streams, lakes and other surface water bodies. TMDLs are prepared for waters identified as impaired on the 303(d) list in the Integrated Report. 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 2018 *Biological and Water Quality Study of the Lower Mahoning River and Select Tributaries, 2011 and 2013,* indicates that Mahoning River is in full attainment for aquatic life use in the vicinity of Struthers WPCF. The river is in non-attainment further downstream, with a cause labelled “other.” This designation is used to describe a variety of impairments, none of which are significantly more severe than any other and none of which can be attributed to a specific source. These various causes include metal contamination in sediments, habitat alteration, flow alteration, sedimentation/siltation, and organic enrichment biological indicators. These impairments accumulated as they traveled downstream, culminating in the area downstream of Struthers and resulting in non-attainment with a source of “upstream sources”. Further downstream, below the former Lowellville Dam, the river returns to full attainment. The final report is available via the following link:

https://epa.ohio.gov/static/Portals/35/tmdl/TSD/Lower%20Mahoning%202013/2013-LMAHO-2_Mahoning%20TSD_FINAL.pdf

The "*Mahoning River Total Maximum Daily Load (TMDL) for Fecal Coliform Bacteria*" report was developed by US EPA in September 2004. The report identified impairment at various locations along the Mahoning River, including the segment upstream and downstream of the Struthers WPCF, with respect to the recreational use bacteria standards. The report identified the sources of the fecal coliform and *Escherichia (E.) coli* bacteria to include "unsewered areas, combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), livestock, stormwater runoff, and permitted discharges." With respect to the permitted dischargers, the TMDL noted that:

> *"No reductions to the permitted loads for the wastewater treatment plants and industrial facilities are being recommended as part of this TMDL, because within the NPDES program all permits are written to meet water quality standards set at the design flows for WWTPs or other facilities. Therefore, the WLA is the current loading."*

The TMDL is available through the Ohio EPA, Division of Surface Water website at:

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

DEVELOPMENT OF WATER-QUALITY-BASED EFFLUENT LIMITS

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

As in past modeling studies, all facilities discharging to the Mahoning River mainstem between the Leavittsburg dam and the Ohio-Pennsylvania border (Figure 3) are considered interactive and are included in the wasteload allocation (WLA). A river schematic (Figure 4) shows the interactive segment with locations of important dischargers, tributaries, and other relevant features. The segment contains a total of 11 outfalls from the 6 municipal WWTPs and 4 industrial facilities, as follows:

Municipal WWTPs	**Industrial Facilities**
City of Youngstown WWTP	Thomas Steel Strip Corporation
City of Warren WWTP	Cleveland Cliffs - Warren (formerly ArcelorMittal)
City of Niles WWTP	RMI Titanium Company - Niles
Mahoning County Campbell WWTP	McDonald Steel Corporation
City of Struthers WWTP	
Village of Lowellville WWTP	

Four major dischargers located on tributaries are allocated separately from the mainstem discharges: Meander Creek WWTP (Meander Creek), Girard WWTP (Little Squaw Creek), Mosquito Creek WWTP (Mosquito Creek), and Boardman WWTP (Mill Creek). Travel time to and distance from the Mahoning River are considered large enough that, for modeling purposes, the effluents from the respective treatment plants are considered non-interactive with the direct dischargers to the Mahoning. Effluents from these four treatment plants were allocated to meet water quality standards for the conditions, habitat, and use designation for their particular receiving waters. Monitoring was conducted downstream of these dischargers or at the mouths of these tributaries, however, for inputs into the Mahoning River mainstem model.

Parameter Selection

Effluent data for the Struthers WPCF were used to determine what parameters should undergo wasteload allocation. The sources of effluent data are as follows:

Self-monitoring data (DMRs)	January 2017 through July 2022
Priority Pollutant Scan Data	2021

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

- Chromium - 97.24 µg/L on 6/5/19; high outlier, excluded for better data fit.

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. The average and maximum PEQ values are presented Table 7.

The PEQ values are used according to Ohio rules to compare to applicable WQS and allowable WLA values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no WLA is done for that parameter. If either PEQ_{avg} or PEQ_{max} is greater than 25 percent of the applicable WQS, a WLA is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required (see Table 10 and Table 12).

Flows in the Mahoning River

Flows in the Mahoning River are contributed to by a series of reservoirs in the headwaters and on Mosquito Creek, controlled and mostly owned by the U.S. Army Corps of Engineers. Constructed several decades ago to provide adequate flow for the steel industry of the Mahoning River valley, the reservoirs are operated on a schedule to maintain specific seasonal flows at Leavittsburg and Youngstown. The operation of the reservoir system is discussed at length in earlier USEPA Mahoning River studies (Amendola et al., 1977; Schregardus and Amendola, 1984).

Modeling Approach and Wasteload Allocations

Appropriate effluent concentrations for dischargers to the Mahoning River were determined using two models: a Monte Carlo model for the six commonly allocated metals cadmium, chromium (total), copper, lead, nickel, zinc, selenium, and total dissolved solids (total filterable residue). The conventional Ohio EPA conservative parameter model (CONSWLA) was used for all other parameters. 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 models and their applications are discussed in the sections that follow and model inputs are presented.

Dissolved Metals Translators

A DMT is the factor used to convert a dissolved metal aquatic life criterion to an effective total recoverable aquatic life criterion with which a total recoverable aquatic life allocation can be calculated as required by NPDES permit rules [OAC 3745-33-05(C)(2)]. Currently, a DMT is based on site- or area-specific field data; each field data sample consists of a total recoverable measurement paired with a dissolved metal measurement.

In 2017, Ohio EPA stated that the DMTs used in previous modeling efforts for the lower Mahoning River would not be used again, as the DMTs were based on sample data collected in 1998 and are considered to be

unrepresentative of current conditions. No data to support updated DMTs were submitted and, therefore, these reasonable potential analyses do not include DMTs. For DMTs to be considered in future wasteload allocations, a new DMT analysis must be completed prior to the next permit renewal and submitted with the renewal application. See paragraphs F and G in rule 3745-2-04 of the Ohio Administrative Code for requirements in developing a DMT study.

2.1 The Monte Carlo Model

The Monte Carlo method was applied to selenium, TDS ("total filterable residue") and the six commonly allocated metals (cadmium, chromium (total), copper, lead, nickel, and zinc). Previous allocations for the metals, using the conventional Ohio EPA conservative parameter model, resulted in stringent limits for these parameters that have been difficult for dischargers to attain. As a result, the Ohio EPA was asked to consider other methods for determining effluent limits that would adequately protect the river while allowing the dischargers some relief. The Monte Carlo method addresses these concerns but does not guarantee more favorable discharge limits. This is the sixth permit cycle where a Monte Carlo method was used to determine the wasteload allocations for the six metals. (In the most recent permit cycle, TDS and selenium were added for reasons similar to the above.)

Conventional water quality modeling methods project the receiving water pollutant concentration which will occur under critical low-flow conditions. The Monte Carlo probabilistic method, as applied to water quality modeling, projects the year-round probability distribution for the pollutant. This allows a more accurate determination of the frequency at which water quality criteria are violated or maintained. Conventional modeling methods, when applied to systems with numerous dischargers, may be overly conservative because they model all dischargers at their maximum permitted concentration. The more dischargers modeled, the more unlikely it is that all will discharge at their maximum level at the same time and at critical low-flow conditions. The Monte Carlo method accounts for the independent variability of discharges as well as other model inputs.

The Monte Carlo model for the Mahoning River was originally developed by Limno-Tech, Inc., for their 1993 study to determine alternative copper limits for Thomas Steel Strip. The model combines the Monte Carlo statistical method with a multi-discharge mass-balance model and allows upstream flow to be input from a historical gaging station flow record, in order to account for unusual flow fluctuations caused by the numerous upstream dams and reservoirs. Ohio EPA approved the alternative limits developed using this model and received permission to modify and apply the model in the future. The original model was written in 1992-1993 in Borland Pascal. The model has since been modified by the Ohio EPA and re-written in the 'C' programming language.

When allocating multiple sources in a stream segment, the Director may distribute the loading among the discharges using any appropriate method, based on site-specific considerations [OAC 3745-2-05(A)(8)]. During the modeling process, Ohio EPA determined that allocating wasteloads for TDS that differed among the interactive dischargers was appropriate. Several permittees discharge relatively small loads of TDS, while others discharge large loads associated with industrial activity in the area. Wasteloads were allocated such that 1) no facility demonstrated reasonable potential to exceed their WLA and 2) water quality standards were protected throughout this reach of the Mahoning River.

River Hardness and Water Quality Criteria

Water quality criteria for the six metals depends on instream hardness. Thus, hardness is a key element in determining effluent limits for these parameters. A detailed analysis of the available hardness and flow data was conducted. This analysis revises and updates the Ohio EPA analysis previously performed in 2016. Stream hardness data was taken from the two main EA3 stations on the Mahoning River main stem, at Leavittsburg, Ohio (RM 45.51) and at Lowellville, Ohio (RM 12.42). The hardness data for the two stations was analyzed for the period March 2010 to September 2021.

A linear correlation between the Leavittsburg USGS gaging station flow and instream hardness was determined for both EA3 stations. These correlations were then used to calculate hardness as a function of river mile at the Leavittsburg 1Q10 low flow of 129 cfs and 7Q10 low flow of 136 cfs.

Acute Criteria, at 1Q10
river hardness (mg/L) = (-0.642)(river mile) + 172.078

Chronic Criteria, at 7Q10
river hardness (mg/L) = (-0.642)(river mile) + 171.955

Discharger hardness was calculated with these equations. This relationship established local river hardness for calculating both inside-mixing-zone and outside-mixing-zone, hardness-dependent criteria in the Monte Carlo model.

This Monte Carlo method uses a seven-day averaging period with a ten-year return period for meeting chronic (average) water quality criteria. A one-day averaging period with a ten-year return period is used for meeting the acute (maximum) water quality criteria. Agriculture and human health criteria are effectively long-term averages, rather than ten-year recurrence values, and the long-term average instream concentrations calculated by the Monte Carlo model are protective of the agriculture and human health criteria as well.

Federal rules require that a downstream state's water quality criteria be considered when calculating effluent limits. The Mahoning River enters Pennsylvania at RM 11.43. Therefore, the Pennsylvania WQS must be applied if they are more stringent than Ohio WQS. Pennsylvania's standards are the same as Ohio's for total chromium and zinc. However, Pennsylvania's standards for TDS, cadmium, copper, lead and nickel are more stringent than Ohio's and had to be considered. Since Pennsylvania uses, in effect, a one hundred-day return period, Ohio's acute criteria for the two metals, in combination with a ten-year return period, still meet Pennsylvania's water quality criteria. However, the same is not true for the chronic criteria.

Table 10 contains the water quality criteria for the six metals, selenium, and TDS in the vicinity of the Struthers WPCF.

Data Analysis for the Monte Carlo Model

The Monte Carlo method accounts for individual system component variability by generating probability distributions that predict a range of possible input conditions. These distributions are derived from the mean and the coefficient of variation (standard deviation / mean) input by the user and based on field data for each of these components. Table 11 lists the calculated mean and coefficient of variation for such system characteristics as background/ambient concentrations and discharger and tributary flows.

The CONSWLA Model

The CONSWLA model was used to calculate wasteload allocations for all other conservative parameters not being allocated using the Monte Carlo model. This model has been used to calculate WLAs for the lower Mahoning River dischargers since the late 1980's.

The term CONSWLA is an acronym for the **CON**servative **S**ubstance **W**aste**L**oad **A**llocation Program. CONSWLA is a one-dimensional multiple-outfall, multiple-reach conservative dilution model that was developed by the Ohio EPA's Division of Surface Water. CONSWLA operates in reverse from most water quality models; it starts with target instream concentrations and directly back-calculates limits for multiple outfalls. The input data used in the CONSWLA model are listed in Table 12 and Table 13. Additional information regarding this model is available on request from Ohio EPA, Division of Surface Water.

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.

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 13, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The wasteload allocation results to maintain all applicable criteria are presented in Table 14.

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 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 Struthers WPCF, the WLA values for Outfall 3PD00026001 are 1.0 TUa and 30.6 TUc.

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

In accordance with OAC 3745-33-07(B)(11)(c), TUc criteria are generally applied to publicly-owned treatment works when the available mixing zone dilution is less than twenty to one. Struthers WPCF is not required to monitor for TUc because the available downstream dilution is more than twenty to one. The available dilution ratio provided by the Mahoning River is approximately 30.6 to 1:

$$Chronic\ Dilution\ Ratio = \frac{\left[[7Q10\ *\ \%\ as\ applicable\ per\ OAC\ 3745-2-05] + [Outfall\ flow\ rate]\right]}{[Outfall\ flow\ rate]}$$

$$= \frac{[(0.932)294.46 + 9.28]}{[9.28]} = 30.6$$

Where: Upstream Mahoning River 7Q10 flow = 294.46 cfs
Percent of 7Q10 applied to mixing zone per OAC 3745-2-05 = 93.2 percent

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. Based on the above, a value of 1.0 TUa is the lowest value that can be calculated using the equation. TUa values between 0.2 and 1.0 are based on an interpolation of toxic effects where an LC50 cannot be identified.

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 14. The average PEL (PEL_{avg}) is compared to the average PEQ (PEQ_{avg}) from Table 7, and the PEL_{max} is compared to the PEQ_{max}. Based on the calculated percentage of the allocated value [($PEQ_{avg} \div PEL_{avg}$) 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 Struthers WPCF outfall 3PD00026001 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 are available at the following webpage:

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

Temperature and Flow Rate

Monitoring for temperature and flow rate are proposed to continue to evaluate performance of the treatment plant.

Total Suspended Solids and 5-day Carbonaceous Biochemical Oxygen Demand

The limitations proposed for total suspended solids (TSS) and 5-day carbonaceous biochemical oxygen demand ($CBOD_5$) are a continuation of existing permit limitations. These limits are based on plant design criteria and are equivalent to the Secondary Treatment Standards in 40 CFR Part 133.

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 limit is applicable whenever chlorination is being used for disinfection.

The effluent limit for chlorine at Outfall 3PD00026001 is less than the quantification level of 0.050 mg/L. However, a pollutant minimization program is not required because the dosing rate of dechlorination chemicals ensures that the water quality based effluent limit is being met.

Dissolved Oxygen, Oil & Grease, pH, and *E. coli*

Limits proposed for dissolved oxygen, oil and grease, pH, and *E. coli* are based on WQS (OAC 3745-1-35 and 1-37). The effluent limits are a continuation of existing limits. Primary contact recreation *E. coli* standards apply to the Mahoning River.

Ammonia (as Nitrogen)

The existing permit for Struthers WPCF does not contain any limits for ammonia-N. The ammonia-N toxicity WLAs placed summer ammonia-N into group 4 and winter ammonia-N into group 2. This placement supports that ammonia-N does not have the reasonable potential to contribute to WQS exceedances, and effluent limits are not necessary to protect water quality.

Dissolved Hexavalent Chromium, Free Cyanide, and Mercury

The Ohio EPA risk assessment (Table 15) places mercury in group 5. This placement, as well as the data in Table 6, 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 recommended limits for mercury are a continuation of existing limits. A 36-month compliance schedule is recommended for the permittee to meet the new final effluent limits for free cyanide. Provisions are also provided that would allow the permittee to request a modification to remove the limits after the collection of data for a 24-month period. Details are in Part I, C of the permit.

In the case of hexavalent chromium, the "Method A" PEQ calculation appears to over-represent the level of the parameter in the discharge. The PEQ is based on a single reported analytical value of 30 µg/L; the remaining 12 analyses were reported below the analytical method detection level. Upon further analyses, it also appears that hexavalent chromium was incorrectly collected as a composite sample until September 2020. This period includes

the result of 30 µg/L. When these 6 sample results are excluded from the analyses, hexavalent chromium becomes a group 2 parameter and does not appear to have the reasonable potential to contribute to WQS exceedances. Quarterly monitoring is recommended to continue.

Cadmium, Chloroform, and Total Dissolved Solids (Total Filterable Residue)

The Ohio EPA risk assessment (Table 15) placed these parameters in group 4. This placement, as well as the data in Table 6, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC 3745-33-07(A)(2). Based on the PEQ value, a tracking requirement has been included for cadmium.

In the case of chloroform, the PEQ calculation is based on one detectable result from the NPDES application priority pollutant scan (PPS) data. Given the nature of the pollutant, chloroform would not be expected to generally be present at elevated levels in the effluent discharge. As such, no additional monitoring requirements beyond the PPS scans are recommended for this parameter.

Antimony, Arsenic, Beryllium, Chromium (Total), Copper, Dichlorobromomethane, Lead, Nickel, Selenium, Silver, Thallium, 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 6, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring at a reduced frequency (i.e. 1/quarter) is recommended to continue for chromium, copper, lead, nickel, and zinc. The purpose of the monitoring is to document that these pollutants continue to remain at low levels. No additional monitoring requirements beyond the PPS scans are recommended for antimony, arsenic, beryllium, dichlorobromomethane, selenium, silver, and thallium.

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

Monitoring requirements for nitrate + nitrite and TKN are proposed in accordance with Ohio EPA guidance. Organic enrichment is listed as a cause of use impairment in the Mahoning River and major municipal point sources are listed among the sources. The purpose of the monitoring is to provide data on nutrient loads discharged to the Mahoning River as part of the Ohio River system. Additionally, monitoring will ensure that a nutrient data set is maintained for use in future stream studies and/or development of a TMDL.

Dissolved Orthophosphate and Total Phosphorus

Monitoring for total phosphorus and dissolved orthophosphate (aka dissolved reactive phosphorus) is required by ORC 6111.03. Monitoring is proposed to further develop nutrient datasets 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 Reasonable Potential

Based on evaluating the WET data presented in Table 8 and other pertinent data under the provisions of OAC 3745-33-07(B), the Struthers WPCF is placed in Category 4 with respect to acute WET. While this indicates that the plant's effluent does not currently pose a toxicity problem, annual acute toxicity testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). The proposed monitoring will adequately characterize toxicity in the plant's effluent.

Additional Monitoring Requirements

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 3PD00026001.

Upstream (3PD00026801) and Downstream (3PD00026901) Monitoring

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

- Based on revisions to Ohio EPA monitoring guidance, 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. Additionally, new monitoring requirements for TKN have been added.

- Monitoring requirements for lead have been removed from Station 3PD00026901.

Sludge

Limits and monitoring requirements proposed for the disposal of sewage sludge by the following management practices are based on OAC 3745-40: disposal at an authorized solid waste landfill (Station 3PD00026586) and hauling to another NPDES permit holder (Station 3PD00026588).

OTHER REQUIREMENTS

Compliance Schedule

Free Cyanide Final Effluent Limit - A 36-month compliance schedule is proposed for the new effluent limit. Details are in Part I, C of the permit.

Sanitary Sewer Overflows (SSOs) - A compliance schedule is proposed for Struthers WPCF to develop an implementation strategy to control and/or eliminate SSOs in the collection system. 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.

Septage/Hauled Wastes

Requirements for tracking and analyzing septage and other hauled wastes have been included in Part II of the permit.

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 Struthers WPCF to have a Class III wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through Outfall 3PD00026001. These rules also require the permittee to designate one or more operator of record to oversee the technical operation of the "treatment works" and/or "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.

Dissolved Metal Translator Study

If the permittee chooses to develop a DMT or water-effect ratio for any of the total recoverable metal parameters at Outfall 3PD00026001, the permittee shall follow the schedule presented in Part II of the permit.

Method Detection Limit Reporting

The Method Detection Limit (MDL) represents the minimum concentration at which we can be confident that a pollutant is present, i.e. above zero, in a discharge. The Quantification Level (QL) is the minimum concentration at which we can be confident that the numerical result is accurate. Minimum Level (ML) and Practical Quantification Level (PQL) are specific ways to measure the QL. In general, Ohio law requires that Ohio EPA use PQL as the quantification level in NPDES permits, and sets PQL at 5 times the MDL for the most sensitive test method (ORC 6111.13). This statute also allows the director to set other PQLs and MDLs based on a national consensus standard or other generally accepted standard.

When submitting Discharge Monitoring Reports (DMRs), NPDES permit holders must report all detected concentration values above the MDL, even if that value is below the QL. A detection above the MDL indicates the presence of a pollutant, with strong confidence, which must be considered when performing a reasonable potential analyses.

For more information on MDLs, see Modeling Guidance #9 at the following webpage:
https://epa.ohio.gov/static/Portals/35/guidance/Permit%20Guidance%209%20-%20Limits%20Below%20Quantification%20Levels.pdf

Sufficiently Sensitive Method

Part II of the permit includes a condition requiring the permittee to use laboratory analytical methods with a sufficiently sensitive MDL. All detected concentration values above the MDL must be reported.

Outfall Signage

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

NPDES Application Supplemental Data Submittal Requirements

Part II of the permit includes a requirement for the permittee to sample and analyze for a list of 101 parameters, including hardness, metals, volatile organic compounds (VOCs), acid-extractable compounds, and base-neutral compounds, as part of its next NPDES permit renewal application. This requirement is contained in 40 CFR Section 122.21 and stipulates that the permittee must provide effluent data from a minimum of three samples taken within four and one-half years prior to the date of the permit renewal application. The complete list of parameters is contained in Table 2 of "Appendix J to Part 122 - NPDES Permit Testing Requirements for Publicly Owned Treatment Works (§122.21(j))." Existing effluent data may be used, if available, in lieu of sampling performed solely for the purpose of the renewal application.

Part III

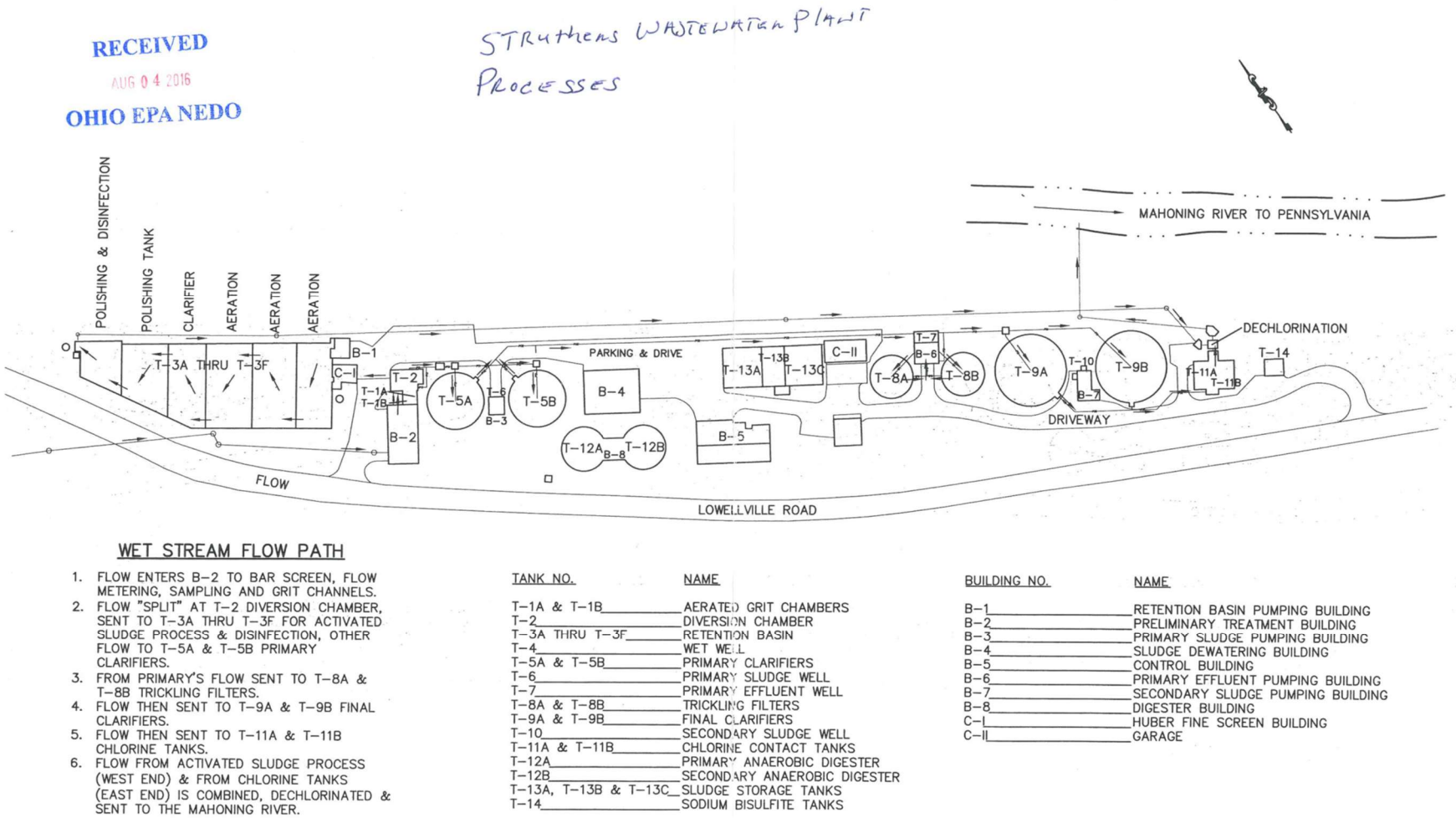
Part III of the permit details standard conditions that include monitoring, reporting requirements, compliance responsibilities, and general requirements.

Storm Water Compliance

Parts IV, V, and VI have been included with the draft permit to ensure that any storm water flows from the facility site are properly regulated and managed. As an alternative to complying with Parts IV, V, and VI, the facility may seek permit coverage under the general permit for industrial storm water (permit # OHR000007) or submit a "No Exposure Certification." Parts IV, V, and VI will be removed from the final permit if: 1) the facility submits a Notice of Intent (NOI) for coverage under the general permit for industrial storm water or submits a No Exposure Certification, 2) Ohio EPA determines that the facility is eligible for coverage under the general permit or meets the requirements for a No Exposure Certification, and 3) the determination by Ohio EPA can be made prior to the issuance of the final permit.

Figure 1. Location of Struthers WPCF

Figure 2. Diagram of processes at Struthers WPCF



WET STREAM FLOW PATH

1. FLOW ENTERS B–2 TO BAR SCREEN, FLOW METERING, SAMPLING AND GRIT CHANNELS.
2. FLOW "SPLIT" AT T–2 DIVERSION CHAMBER, SENT TO T–3A THRU T–3F FOR ACTIVATED SLUDGE PROCESS & DISINFECTION, OTHER FLOW TO T–5A & T–5B PRIMARY CLARIFIERS.
3. FROM PRIMARY'S FLOW SENT TO T–8A & T–8B TRICKLING FILTERS.
4. FLOW THEN SENT TO T–9A & T–9B FINAL CLARIFIERS.
5. FLOW THEN SENT TO T–11A & T–11B CHLORINE TANKS.
6. FLOW FROM ACTIVATED SLUDGE PROCESS (WEST END) & FROM CHLORINE TANKS (EAST END) IS COMBINED, DECHLORINATED & SENT TO THE MAHONING RIVER.

TANK NO.	NAME
T–1A & T–1B	AERATED GRIT CHAMBERS
T–2	DIVERSION CHAMBER
T–3A THRU T–3F	RETENTION BASIN
T–4	WET WELL
T–5A & T–5B	PRIMARY CLARIFIERS
T–6	PRIMARY SLUDGE WELL
T–7	PRIMARY EFFLUENT WELL
T–8A & T–8B	TRICKLING FILTERS
T–9A & T–9B	FINAL CLARIFIERS
T–10	SECONDARY SLUDGE WELL
T–11A & T–11B	CHLORINE CONTACT TANKS
T–12A	PRIMARY ANAEROBIC DIGESTER
T–12B	SECONDARY ANAEROBIC DIGESTER
T–13A, T–13B & T–13C	SLUDGE STORAGE TANKS
T–14	SODIUM BISULFITE TANKS

BUILDING NO.	NAME
B–1	RETENTION BASIN PUMPING BUILDING
B–2	PRELIMINARY TREATMENT BUILDING
B–3	PRIMARY SLUDGE PUMPING BUILDING
B–4	SLUDGE DEWATERING BUILDING
B–5	CONTROL BUILDING
B–6	PRIMARY EFFLUENT PUMPING BUILDING
B–7	SECONDARY SLUDGE PUMPING BUILDING
B–8	DIGESTER BUILDING
C–I	HUBER FINE SCREEN BUILDING
C–II	GARAGE

Figure 3. Mahoning River Study Area Map

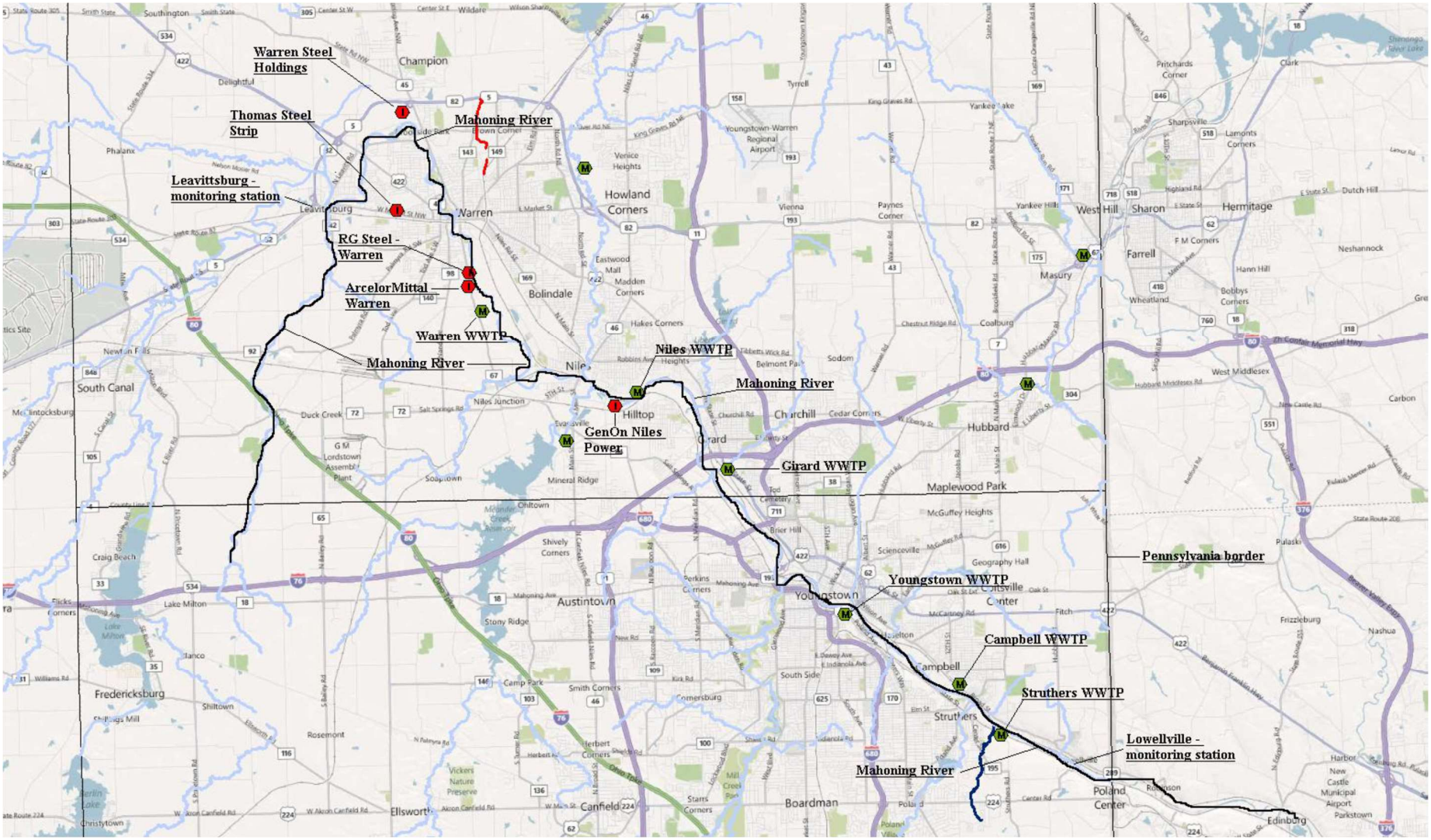


Figure 4. Mahoning River Study Area

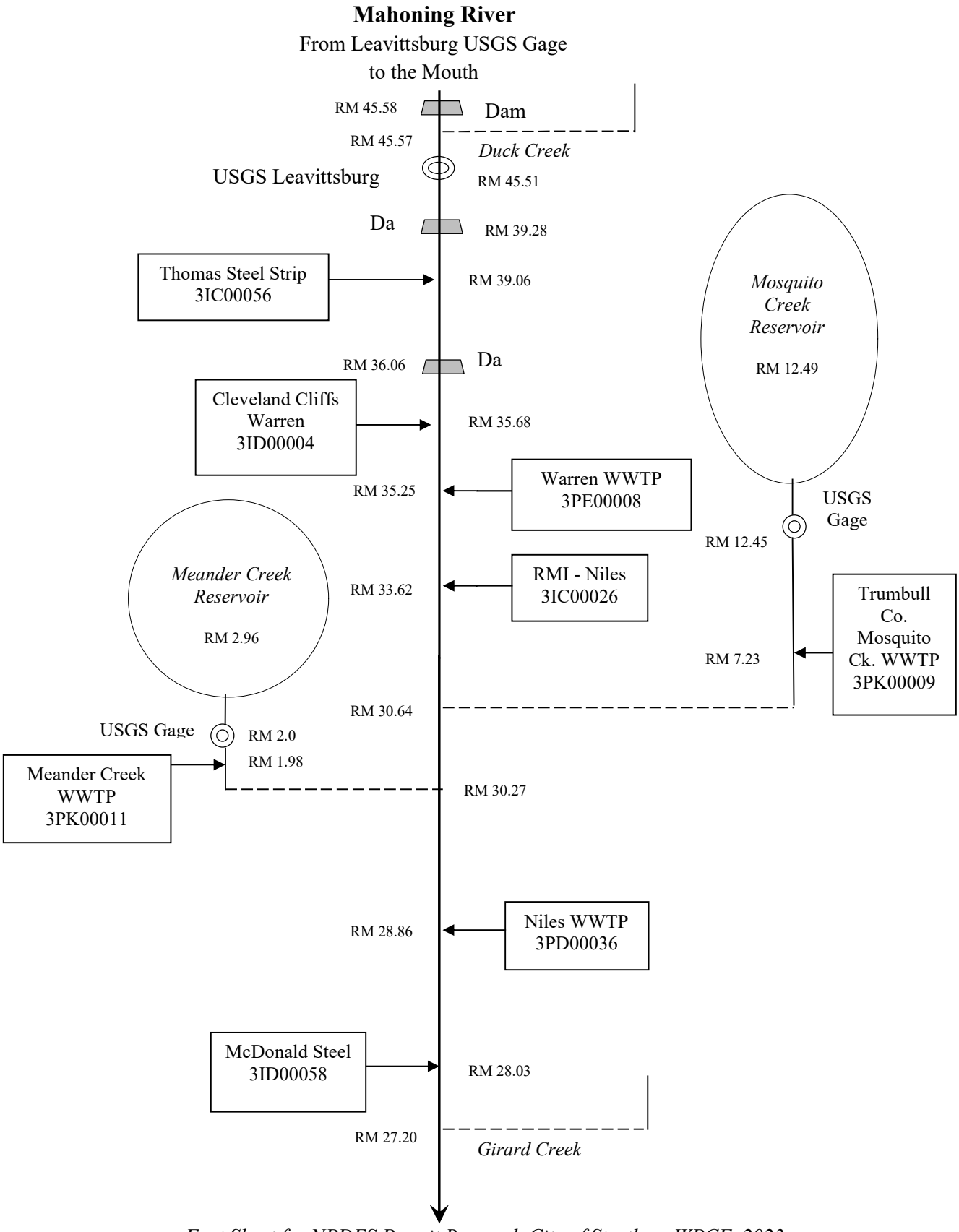


Figure 4. Mahoning River Study Area (continued)

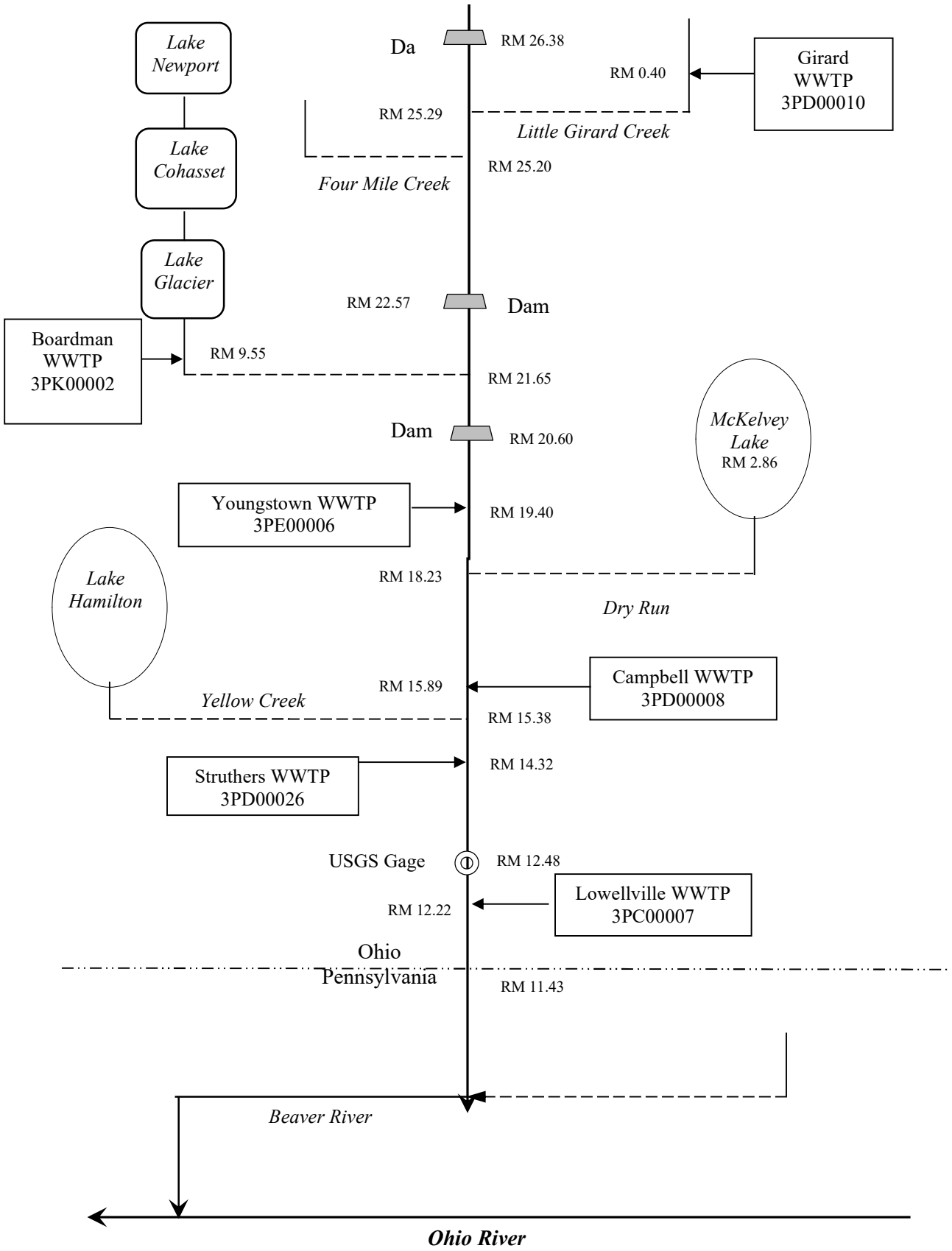


Table 1. Sewage Sludge Removal

Year	Dry Tons Removed for Landfill Disposal (Station No. 3PD00026586)
2017	902
2018	686
2019	567
2020	396
2021	408

Table 2. Effluent Violations for Outfall 3PD00026001 (1/2017 - 7/2022)

Parameter	2017	2018	2019	2020	2021	2022
Dissolved Oxygen	1	0	0	0	0	0
E. coli	2	0	0	0	0	0
Mercury, Total (Low Level)	4	5	5	5	0	0
Oil and Grease, Hexane	2	0	0	0	0	0
Total Suspended Solids	4	6	7	3	0	0
pH, Minimum	10	1	0	0	0	0
Total	**23**	**12**	**12**	**8**	**0**	**0**

Table 3. Annual Effluent Flow Rates (1/2017 - 7/2022)

Flow Rate (Million Gallons per Day)					
Year	**# Observations**	**Average**	**Median**	**95th Percentile**	**Maximum**
2017	365	5.73	5.38	9.61	12.47
2018	365	6.60	6.16	10.53	16.45
2019	365	6.25	5.91	10.16	14.39
2020	366	5.82	5.54	9.25	14.58
2021	365	5.24	4.79	7.82	11.85
2022	212	6.17	5.86	9.18	13.77

MGD = million gallons per day

Table 4. Sanitary Sewer Overflows (SSOs) Discharges (1/2017 - 7/2022)

Year	Number of SSOs
2017	31
2018	197
2019	206
2020	66
2021	47
2022	61

Table 5. Seasonal Effluent Phosphorus Discharge for Months, May - October

Year	Obs.	Median Phosphorus (mg/L)	Median Flow (MGD)	Median Loading (kg/day)
2017	24	2.81	4.08	44.8
2018	24	2.44	4.97	51.1
2019	24	2.70	5.31	53.3
2020	24	3.46	3.70	47.5
2021	24	3.19	4.83	57.2
2022	12	2.79	4.72	50.8

Table 6. Effluent Characterization using Self-Monitoring Data

Parameter	Unit	Current Limits		# Obs.	Percentiles		Data Range
		30 Day	Daily		50th	95th	
Water Temperature	°C	Monitor		2038	13.5	20.8	4.5 - 21.9
Dissolved Oxygen	mg/L	--	5.0[m]	2038	7.81	6.17*	4.7 - 11
Total Suspended Solids	kg/day	682	1030[w]	804	305	939	0 - 2020
Total Suspended Solids	mg/L	30	45[w]	804	15.1	28.8	0 - 85
Oil and Grease	mg/L	--	10.0	137	3.1	7.92	0 - 28.1
Nitrogen, Ammonia	mg/L	Monitor		805	.83	5.31	0 - 18.9
Nitrogen Kjeldahl, Total	mg/L	Monitor		67	2.6	6.68	1 - 10.4
Nitrite Plus Nitrate, Total	mg/L	Monitor		69	7.15	16.1	3.46 - 19.9
Orthophosphate, Total	mg/L	Monitor		57	1.67	3.3	.444 - 3.51
Phosphorus, Total	mg/L	Monitor		268	2.5	4.4	.34 - 6.24
Orthophosphate, Dissolved	mg/L	Monitor		7	1.69	3.19	1.03 - 3.8
Cyanide, Free	mg/L	Monitor		15	< .003	6.08	0 - 20.1
Nickel, TR	µg/L	Monitor		22	< 5	14.8	0 - 22.5
Zinc, TR	µg/L	Monitor		22	36.2	47.6	14.7 - 48
Cadmium, TR - All	kg/day	0.0591	0.523	10	--	--	< .00553
Cadmium, TR - All	µg/L	2.6	23	10	--	--	< .5
Cadmium, TR - Quarterly	µg/L	Monitor		19	< 1	2.1	0 - 3
Lead, TR	µg/L	Monitor		22	< 7	2.77	0 - 3.8
Chromium, TR	µg/L	Monitor		22	.975	9.79	0 - 97.2
Copper, TR	µg/L	Monitor		22	9.73	15	3.1 - 17
Chromium, Dissolved Hexavalent	µg/L	Monitor		13	< 5	12	0 - 30
E. coli	#/100 mL	126	284[w]	399	8.6	181	0 - 2420
Flow Rate	MGD	Monitor		2038	5.54	9.61	1.9 - 16.5
Chlorine, Total Residual - 2018-2022	mg/L	--	0.019	828	< .019	.019	0 - .019
Chlorine, Total Residual - 2017	mg/L	--	0.024	184	--	--	< .024
Mercury, Total - 2017-2022	kg/day	0.000273	0.0387	68	.000111	.000456	0 - .00145
Mercury, Total - 2017	kg/day	0.000705	0.0387	13	.000148	.000543	.00006 - .000705
Mercury, Total - 2017-2022	ng/L	12	1700	68	5.76	20.3	0 - 42.6
Mercury, Total - 2017	ng/L	31	1700	13	7.44	16.9	3.19 - 18.5

Cyanide, Free (Low-Level)	µg/L	Monitor		14	9.55	13.9	2.87 - 15.4
Acute Toxicity, Ceriodaphnia dubia	TUa	Monitor		5	--	--	< .2
Acute Toxicity, Pimephales promelas	TUa	Monitor		5	< .2	.16	0 - .2
pH, Maximum	S.U.	--	9.0	2038	7.17	7.55	6.38 - 8.41
pH, Minimum	S.U.	--	6.5[m]	2038	7.06	6.67*	6.09 - 7.83
Residue, Total Filterable	mg/L	Monitor		136	684	856	304 - 1060
CBOD 5 day	kg/day	568	909[w]	779	190	480	52.8 - 1120
CBOD 5 day	mg/L	25	40[w]	779	9	17.7	2.8 - 28.4

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

Table 7. Projected Effluent Quality

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Self-Monitoring (DMR) Data					
Ammonia (Summer)	mg/L	264	264	5.645	12.04
Ammonia (Winter)	mg/L	204	204	1.82	3.967
Cadmium – TR [A]	µg/L	32	3	2.628	3.6
Chlorine - Total Residual	mg/L	1012	0	--	--
Chromium - TR [A]	µg/L	24	13	6.188	10.57
Chromium, Dissolved Hexavalent	µg/L	13	1	35.04	48
Copper - TR [A]	µg/L	25	25	14.4	19.83
Cyanide - free	µg/L	27	19	16.94	27.87
Lead - TR [A]	µg/L	8	4	5.271	7.22
Mercury - TR (BCC)	ng/L	81	79	15.07	22.93
Nickel - TR [A]	µg/L	25	3	21.35	29.25
Nitrate-N + Nitrite-N	mg/L	69	69	12.02	16.12
Nitrogen Kjeldahl, Total	mg/L	67	67	5.649	8.283
Phosphorus	mg/L	268	268	3.655	4.844
Total Filterable Residue	mg/L	136	136	793	921
Zinc - TR [A]	µg/L	25	25	46.86	61.89
NPDES Application Priority Pollutant Scan Data					
Arsenic - TR	µg/L	3	0	--	--
Chloroform	µg/L	3	1	28.91	39.6
Dichlorobromomethane	µg/L	3	1	5.278	7.23
Selenium - TR	µg/L	3	0	--	--
Silver	µg/L	3	0	--	--

[A] = DMR data combined with priority pollutant scan data
BCC = Bioaccumulative Chemical of Concern
DMR = Discharge Monitoring Report
MDL = analytical laboratory method detection limit
PEQ = projected effluent quality
TR = Total Recoverable

Table 8. Summary of Acute and Chronic Toxicity Results

Date	*Ceriodaphnia Dubia*		*Pimephales Promelas*	
	Acute (Tu_a)	Chronic (Tu_c)	Acute (Tu_a)	Chronic (Tu_c)
10/19/2017	AA (0.2)	NR	AA (0.2)	NR
10/16/2018	AA (0.2)	NR	AA (0.2)	NR
10/17/2019	AA (0.2)	NR	AA (0.2)	NR
10/8/2020	AA (0.2)	NR	0.2	NR
10/11/2021	AA (0.2)	NR	AA (0.2)	NR

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
NR = testing not required

Table 9. Aquatic Life (AL) Use Attainment Table (Based on 2013 Data)

Location	River Mile	Use Designation	Attainment Status	Causes of Impairment	Sources of Impairment
Mahoning River at Girard, downstream Liberty St. Dam	26.36	WWH	FULL	--	--
Mahoning River at Youngstown @ Division St.	23.43	WWH	PARTIAL	Direct habitat alterations, Other flow regime alterations, Sedimentation/ siltation	Dam or Impoundment
Mahoning River at Youngstown, upstream Mill Creek	21.73	WWH	FULL	--	--
Mahoning River at Youngstown @ West Avenue	21.14	WWH	PARTIAL	Organic Enrichment, biological indicators	Combined sewer overflows
Mahoning River at Youngstown @ Marshall St.	20.45	WWH	FULL	--	--
Mahoning R downstream Youngstown WWTP	19.20	WWH	PARTIAL	Organic Enrichment, biological indicators	Combined sewer overflows, Municipal point source dischargers
Mahoning R at Campbell, near RR	17.63	WWH	PARTIAL	Organic Enrichment, biological indicators	Combined sewer overflows, Municipal point source dischargers
Mahoning River at Struthers @ Bridge St.	15.53	WWH	FULL	--	--
Mahoning River 100 yards upstream Struthers WWTP	14.38	WWH	FULL	--	--
Mahoning River 0.6 miles downstream Struthers WWTP	13.60	WWH	FULL	--	--
Mahoning River at Lowellville, upstream dam	12.70	WWH	NON	Other	Upstream sources
Mahoning River at Lowellville, @ First St.	12.42	WWH	PARTIAL	Other	Upstream sources
Mahoning River at Ohio/PA state line	11.43	WWH	PARTIAL	Other	Upstream sources

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

Table 10. Water Quality Criteria for Monte Carlo Model Parameters (Struthers WPCF)

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum [B]
		Average			Maximum Aquatic Life [B]	
		Human Health [A]	Agri-culture [A]	Aquatic Life [B]		
Cadmium	µg/L	--	50	0.39 [D]	7.8	16
Chromium	µg/L	--	100	130	2700	5400
Copper	µg/L	1300 [D]	500	14	22	44
Lead	µg/L	--	100	5.9 [D]	230	460
Nickel	µg/L	610 [D]	200	79	710	1400
Selenium	µg/L	4200	50	5	62	120
Total Filterable Residue	mg/L	--	--	500 [D]	--	--
Zinc	µg/L	26000	25000	180	180	360

[A] Long-term average instream concentrations generated by the Monte Carlo model met both the Agricultural Water Supply and Human Health criteria.
[B] Based on river hardness of 163 mg/L.
[D] Pennsylvania WQC at the state line.

Table 11. Monte Carlo Model Inputs

Parameter		Mean	Coefficient of Variation		Source
			Acute	Chronic	
Mahoning River at Leavittsburg					
	Flow (MGD)[A]	--	--	--	USGS
	Cadmium (µg/L)	0	0	0	EA3
	Chromium, total (µg/L)	0.94	2.677	1.012	EA3
	Copper (µg/L)	1.785	0.446	0.169	EA3
	Lead (µg/L)	1.007	0.682	0.258	EA3
	Nickel (µg/L)	3.291	0.379	0.143	EA3
	Selenium (µg/L)	0	0	0	EA3
	Total Filterable Residue (mg/L)	250.2	---	0.062	EA3
	Zinc (µg/L)	4.463	1.021	0.386	EA3
	(USGS station 03094000 and EA3 stations 602280, N03S64 and 200419)				
Mosquito Creek at mouth					
	Flow (MGD)	85.37	1.362	0.515	USGS/SWIMS
	Cadmium (µg/L)	0	0	0	EA3
	Chromium, total (µg/L)	0	0	0	EA3
	Copper (µg/L)	1.955	0.853	0.322	EA3
	Lead (µg/L)	1.888	2.261	0.855	EA3
	Nickel (µg/L)	1.082	1.018	0.385	EA3
	Selenium (µg/L)	0	0	0	EA3
	Total Filterable Residue (mg/L)	256.6	0.332	0.125	EA3
	Zinc (µg/L)	9.19	1.306	0.494	EA3
	(USGS station 03095500, Mosquito Ck WWTP flow and EA3 stations 602370, N03S21 and N03S48)				
Meander Creek at mouth					
	Flow (MGD)	3.866	0.323	0.122	SWIMS
	Cadmium (µg/L)	0	0	0	EA3
	Chromium, total (µg/L)	0.848	2.113	0.799	EA3
	Copper (µg/L)	6.997	0.855	0.323	EA3
	Lead (µg/L)	1.903	3.842	1.452	EA3
	Nickel (µg/L)	6.876	0.538	0.203	EA3
	Selenium (µg/L)	0	0	0	EA3
	Total Filterable Residue (mg/L)	509.7	0.258	0.098	EA3
	Zinc (µg/L)	27.3	0.695	0.263	EA3
	(Meander Ck WWTP flow and EA3 stations 602380, N03P05 and N03S68)				
Little Squaw Creek at mouth					
	Flow (MGD)	2.869	0.508	0.192	SWIMS
	Cadmium (µg/L)	0	0	0	SWIMS
	Chromium, total (µg/L)	0	0	0	SWIMS
	Copper (µg/L)	9.533	0.503	0.19	SWIMS
	Lead (µg/L)	0	0	0	SWIMS
	Nickel (µg/L)	3.539	0.652	0.246	SWIMS
	Selenium (µg/L)	1.689	1.307	0.494	SWIMS

Parameter		Mean	Coefficient of Variation		Source
			Acute	Chronic	
	Total Filterable Residue (mg/L)	603.3	0.136	0.0514	SWIMS
	Zinc (µg/L)	45.62	0.396	0.15	SWIMS
	(Girard WWTP flow and concentrations)				
Mill Creek at mouth					
	Flow (MGD)	44.52	2.23	0.843	USGS
	Cadmium (µg/L)	0	0	0	EA3
	Chromium, total (µg/L)	0.633	1.207	0.456	EA3
	Copper (µg/L)	2.959	0.291	0.11	EA3
	Lead (µg/L)	2.493	1.857	0.702	EA3
	Nickel (µg/L)	3.211	0.142	0.0537	EA3
	Selenium (µg/L)	0	0	0	EA3
	Total Filterable Residue (mg/L)	405.9	0.277	0.105	EA3
	Zinc (µg/L)	11.28	1.739	0.657	EA3
	(USGS station 03098500 and EA3 stations 602390, N03S02 and N03S03.)				
Discharger flows (MGD)					
	Thomas Steel Strip	0.4	0.491	0.186	SWIMS
	Cleveland Cliffs – Warren 014	2.592	0.275	0.104	SWIMS
	Cleveland Cliffs – Warren 213	6.559	0.375	0.142	SWIMS
	Warren WWTP	13.98	0.361	0.136	SWIMS
	RMI Niles	0.481	0.476	0.18	SWIMS
	Niles WWTP	5.038	0.482	0.182	SWIMS
	McDonald Steel	1.881	0.977	0.369	SWIMS
	Youngstown WWTP	30.35	0.332	0.125	SWIMS
	Campbell WWTP	1.492	0.633	0.239	SWIMS
	Struthers WWTP	5.86	0.36	0.136	SWIMS
	Lowellville WWTP	0.601	0.6	0.227	SWIMS

[A] Each iteration of the model sequentially selects an upstream flow from the historical flow record at this gage (April 1969 to March 2022).
EA3 = Ohio EPA Ecological Assessment and Analysis Application
SWIMS = Ohio EPA Surface Water Information and Management System
USGS = United States Geological Survey

Table 12. Water Quality Criteria in the Study Area (CONSWLA parameters)

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Ammonia (Summer)	mg/L	--	--	1.4	--	--
Ammonia (Winter)	mg/L	--	--	4.5	--	--
Antimony	µg/L	5.6 [B]	--	190	900	1800
Arsenic - TR	µg/L	10 [B]	100	150	340	680
Barium	µg/L	2400 [B]	--	930	4000	8000
Beryllium	µg/L	280	100	24	200	410
Bis(2-ethylhexyl) phthalate	µg/L	0.32 [B C]	--	8.4	1100	2100
Chlorine - Total Residual	mg/L	--	--	0.011	0.019	0.038
Chloroform	µg/L	5.7 [B C]	--	140	1300	2600
Chromium, Dissolved Hexavalent	µg/L	--	--	11	16	31
Cyanide - free	µg/L	4 [B]	--	5.2 [B]	22 [B]	92
Dichlorobromomethane	µg/L	0.95 [B C]	--	--	--	--
Mercury - TR [A]	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	20000	190000	370000
Nitrate-N + Nitrite-N	mg/L	--	100	--	--	--
Nitrogen Kjeldahl, Total	mg/L	--	--	--	--	--
Phosphorus	mg/L	--	--	--	--	--
Silver	µg/L	--	--	1.3	3.7	7.3
Thallium	µg/L	0.24 [B]	--	13 [B]	65 [B]	160

[A] = Bioaccumulative Chemical of Concern (BCC)
[B] = Pennsylvania Water Quality Criteria; applied if more stringent than Ohio criteria (Mahoning R dischargers only)
[C] = This criterion is based on a carcinogenic endpoint.
TR = Total Recoverable

Table 13. Instream Conditions and Discharger Flows

Parameter	Units		Value	Basis
Upstream Flows				
Mahoning River at Leavittsburg USGS gage				
7Q10	cfs	annual	136	USGS gage #03094000,1969-2021
1Q10	cfs	annual	129	USGS gage #03094000,1969-2021
30Q10	cfs	summer	189.6	USGS gage #03094000,1969-2021
30Q10	cfs	winter	196.5	USGS gage #03094000,1969-2021
Harmonic Mean Flow	cfs	annual	391	USGS gage #03094000,1969-2021
Mixing Assumption	%	average	100	Stream-to-discharge ratio
	%	max	100	Stream-to-discharge ratio
Mahoning River Discharger Flows				
Thomas Steel Strip - 001	cfs (MGD)	avg.	0.648 (0.42)	NPDES permit application
Cleveland Cliffs Warren - 014	cfs (MGD)	avg.	5.69 (3.68)	NPDES permit application
Cleveland Cliffs Warren - 213	cfs (MGD)	avg.	15.78 (10.2)	NPDES permit application
Warren WWTP	cfs (MGD)	design	24.8 (16.0)	NPDES permit application
RMI Niles - 001	cfs (MGD)	avg.	0.774 (0.5)	NPDES permit application
Niles WWTP	cfs (MGD)	design	9.59 (6.2)	NPDES permit application
McDonald Steel - 001	cfs (MGD)	avg.	4.87 (3.2)	NPDES permit application
Youngstown WWTP	cfs (MGD)	design	54.2 (35.0)	NPDES permit application
Campbell WWTP	cfs (MGD)	design	2.94 (1.9)	NPDES permit application
Struthers WWTP	cfs (MGD)	design	9.28 (6.0)	NPDES permit application
Lowellville WWTP	cfs (MGD)	design	0.792(0.512)	NPDES permit application
Significant Dischargers to Tributaries within the Interactive Segment				
Trumbull Co. Mosquito Creek WWTP (to Mosquito Creek)				
	cfs (MGD)	design	8.12 (5.25)	NPDES permit application
Meander Creek WWTP (to Meander Creek)				
	cfs (MGD)	design	12.38 (8.0)	NPDES permit application
Girard WWTP (to Little Squaw Creek)				
	cfs (MGD)	design	7.74 (5.0)	NPDES permit application
Boardman WWTP (to Mill Creek)				
	cfs (MGD)	design	7.74 (5.0)	NPDES permit application

NPDES = National Pollutant Discharge Elimination System
USGS = United States Geological Survey
cfs = cubic feet per second
MGD = Million Gallons per Day
WWTP = Wastewater Treatment Plant

Table 13. Instream Conditions and Discharger Flow (continued)

Parameter	Units		Value	Basis
Background Water Quality for the Mahoning River				
Ammonia	mg/L	summer	0.183	Youngstown WWWP Station 801; 21 values, 0<MDL, 2017-22
Ammonia	mg/L	winter	0.26	Youngstown WWWP Station 801; 17 values, 1<MDL, 2017-22
Arsenic - TR	µg/L	annual	2.3	EA3; 59 values, 17 <MDL, 2010-19
Barium	µg/L	annual	34.4	EA3; 59 values, 0 <MDL, 2010-19
Bis(2-ethylhexyl) phthalate	µg/L	annual	0	EA3; 3 values, 3 <MDL, 2013
Boron	µg/L	annual	0	No representative data available.
Cadmium - TR	µg/L	annual	0	EA3; 59 values; 59 <MDL, 2010-19
Chlorine - Total Residual	mg/L	annual	0	No representative data available.
Chloroform	µg/L	annual	0	EA3; 2 values, 2 <MDL, 2013
Chromium - TR	µg/L	annual	0.94	EA3; 59 values; 52 <MDL, 2010-19
Chromium, Dissolved Hexavalent	µg/L	annual	0	No representative data available.
Cobalt	µg/L	annual	0	No representative data available.
Copper - TR	µg/L	annual	1.79	EA3; 59 values; 35 <MDL, 2010-19
Cyanide - free	µg/L	annual	0	No representative data available.
Dichlorobromomethane	µg/L	annual	0	EA3; 2 values, 2 <MDL, 2013
Fluoride	mg/L	annual	0	No representative data available.
Iron - TR	µg/L	annual	900	EA3; 58 values, 0 <MDL, 2010-19
Lead - TR	µg/L	annual	1.01	EA3; 59 values; 54 <MDL, 2010-19
Molybdenum	µg/L	annual	0	No representative data available.
Naphthalene	µg/L	annual	0	EA3; 5 values, 5 <MDL, 2013
Nickel - TR	µg/L	annual	3.29	EA3; 58 values; 0 <MDL, 2010-19
Nitrate-N + Nitrite-N	µg/L	annual	0.72	EA3; 60 values, 0 <MDL, 2010-19
Peracetic Acid	µg/L	annual	0	No representative data available.
Selenium - TR	µg/L	annual	0	EA3; 59 values; 59 <MDL, 2010-19
Silver	µg/L	annual	0	No representative data available.
Total Filterable Residue	mg/L	annual	250	EA3; 60 values; 0 <MDL, 2010-19
Zinc - TR	µg/L	annual	4.46	EA3; 59 values; 53 <MDL, 2010-19

EA3 = Ohio EPA Ecological Assessment and Analysis Application
MDL = method detection limit
WWTP = wastewater treatment plant
TR = Total Recoverable

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	
		Human Health	Agri Supply	Aquatic Life		
Ammonia (Summer)	mg/L	--	--	6.72	--	--
Ammonia (Winter)	mg/L	--	--	23.61	--	--
Arsenic – TR [B]	µg/L	39 [F]	460	368	816 [A]	680
Barium [B]	µg/L	11121 [A B]	--	2423	10245 [A]	8000
Bis(2-ethylhexyl) phthalate [B]	µg/L	1.4 [B]	--	23 [B]	2924 [B]	2100
Cadmium - TR	µg/L	--	--	2.9 [F]	28.21 [A]	16
Chlorine - Total Residual	mg/L	--	--	0.031	0.052 [A]	0.038
Chloroform	µg/L	37 [F]	--	479	4327 [A]	2600
Chromium - TR [B]	µg/L	--	--	530	6127 [A]	5400
Chromium, Dissolved Hexavalent [B]	µg/L	--	--	29	40	31
Copper - TR	µg/L	--	--	59.21 [A]	66.67 [A]	44
Cyanide - free	µg/L	14 [F]	--	9.9 [F]	41 [F]	92
Dichlorobromomethane	µg/L	16 [F]	--	--	--	--
Lead - TR	µg/L	--	--	36.34 [F]	787 [A]	460
Mercury - TR [C]	ng/L	12	10000 [A]	910	1700	3400
Molybdenum [B]	µg/L	--	--	59918	554172 [A]	370000
Nickel - TR	µg/L	--	--	387	2846 [A]	1400
Selenium - TR [B]	µg/L	--	--	23.71	248 [A]	120
Silver [B]	µg/L	--	--	3	8.6 [A F]	7.3
Total Filterable Residue	mg/L	--	--	1222 [F]	--	--
Zinc - TR	µg/L	--	--	870 [A]	662 [A]	360

[A] Allocation must not exceed the Inside Mixing Zone Maximum
[B] Parameter would not require a WLA based on reasonable potential procedures, but allocation requested by Permits Group.
[C] Bioaccumulative Chemical of Concern (BCC), WQS must be met at end-of-pipe, unless the requirements for an exclusion are met as listed in 3745-2-05 (A)(2)(e)(ii).
[F] WLA based on Pennsylvania criteria.
TR = Total Recoverable

Table 15. Parameter Assessment

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

Nitrogen Kjeldahl, Total

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

Ammonia (Winter)	Antimony	Arsenic - TR
Beryllium	Chlorine - Total Residual	Chromium - TR
Nitrate-N + Nitrite-N	Selenium - TR	Silver
Thallium		

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

Dichlorobromomethane	Lead - TR	Nickel - TR
Zinc - TR	Copper - TR	

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

Ammonia (Summer)	Cadmium - TR [A]	Chloroform [A]
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
Chromium, Dissolved Hexavalent*	µg/L	Annual	29	31
Cyanide - free	µg/L	Annual	9.9	41
Mercury	ng/L	Annual	12	1700

[A] Requires a permit tracking requirement in accordance with OAC 3745-33-07(A)(2) since the PEQ is > or = 75 percent of the PEL.
* Chromium, Dissolved Hexavalent – see placement discussion in "Reasonable Potential/ Effluent Limits/Hazard Management Decisions".

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 3PD00026001

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	--	5.0 (Min.)	--	--	WQS
pH (Minimum/Maximum)	S.U.	1/day	6.5 - 9.0		--	--	WQS
Total Suspended Solids	mg/L	3/week	30	45[d]	682	1030[d]	PD
Oil & Grease	mg/L	1/ 2 weeks	--	10	--	--	WQS
Ammonia (as Nitrogen)	mg/L	3/week	- - - - - - - - - - - Monitor - - - - - - - - - - -				M[c]
Total Kjeldahl Nitrogen	mg/L	1/month	- - - - - - - - - - - Monitor - - - - - - - - - - -				M[c]
Nitrate+Nitrite (as Nitrogen)	mg/L	1/month	- - - - - - - - - - - Monitor - - - - - - - - - - -				M[c]
Phosphorus, Total	mg/L	1/week	- - - - - - - - - - - Monitor - - - - - - - - - - -				PMR
Orthophosphate, Dissolved (as P)	mg/L	1/month	- - - - - - - - - - - Monitor - - - - - - - - - - -				PMR
Free Cyanide [e]	µg/L	1/month	9.9	41	0.22	0.93	WLA
Nickel	µg/L	1/quarter	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Zinc	µg/L	1/quarter	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Cadmium	µg/L	1/month	- - - - - - - - - - - Monitor - - - - - - - - - - -				RP
Lead	µg/L	1/quarter	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Chromium, Total	µg/L	1/quarter	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
Copper	µg/L	1/quarter	- - - - - - - - - - - Monitor - - - - - - - - - - -				M
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]
Chlorine, Total Residual	mg/L	1/day	0.019	--	--	--	PD
Mercury	ng/L	1/month	12	1700	0.000273	0.0387	WLA
Acute Toxicity, *Ceriodaphnia dubia*	TUa	1/year	- - - - - - - - - - - Monitor - - - - - - - - - - -				WET
Acute Toxicity, *Pimephales promelas*	TUa	1/year	- - - - - - - - - - - Monitor - - - - - - - - - - -				WET
Total Filterable Residue	mg/L	1/ 2 weeks	- - - - - - - - - - - Monitor - - - - - - - - - - -				RP
cBOD5	mg/L	3/week	25	40[d]	568	909[d]	PD

[a] Effluent loadings based on average design discharge flow of 6.0 MGD.

[b] Definitions: cBOD5 = Carbonaceous Biochemical Oxygen Demand - 5 day
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 in Ohio Revised Code 6111.03
RP = Reasonable Potential for requiring 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.

[e] Compliance schedule recommended.

Addendum 1. Acronyms

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