

National Pollutant Discharge Elimination System (NPDES) Permit Program

FACT SHEET

Regarding an NPDES Permit to Discharge to Waters of the State of Ohio  
for Beavercreek Water Resource Reclamation Facility (Beavercreek WRRF)

Public Notice No.: 19-08-017  
Public Notice Date: August 13, 2019  
Comment Period Ends: September 13, 2019

Ohio EPA Permit No.: 1PK00003\*ND  
Application No.: OH0025381

Name and Address of Applicant:

Greene County Board of Commissioners  
667 Dayton-Xenia Road  
Xenia, OH 45385

Name and Address of Facility Where

Discharge Occurs:

Beavercreek Water Resource Reclamation Facility  
420 Factory Road  
Beavercreek, OH 45434  
Greene County

Receiving Water: Beaver Creek

Subsequent Stream Network: Little Miami River to Ohio River

**INTRODUCTION**

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

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

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**

New monitoring is proposed for selenium and bis(2-ethylhexyl) phthalate because their projected effluent quality (PEQ) was equivalent to or exceeded seventy-five percent of the preliminary effluent limit (PEL) and are thus considered Group 4 parameters.

Increased frequency of monitoring is proposed for cyanide and lindane because their projected effluent quality (PEQ) exceeded 100 percent of the preliminary effluent limit (PEL) and are thus considered Group 5 parameters. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), monitoring rather than limits is proposed for these parameters. Monitoring for lindane is to replace monitoring for gamma-bhc.

Annual chronic toxicity monitoring with the determination of acute endpoints is proposed for the life of the permit. This satisfies the minimum testing requirements of Ohio Administrative Code (OAC) 3754-33-07(B)(11) and will adequately characterize toxicity in the plant's effluent.

Water temperature, dissolved oxygen, and pH are being removed from upstream monitoring station 801 and Dissolved oxygen is being removed from downstream monitoring station 901 because of new internal Ohio EPA recommended monitoring frequency requirements.

This permit no longer authorizes the use of method 4500 CN-I from Standard Methods for free cyanide testing. As soon as possible, the permittee must begin using one of the approved methods for free cyanide listed in 40 CFR 136.

To ensure that data is obtained that allows Ohio EPA to make water quality-related decisions regarding cadmium, dissolved hexavalent chromium, copper, lead, gamma-hexachlorocyclohexane (lindane), and bis(2-ethylhexyl) phthalate, a special condition is proposed in Part II of the permit that provides guidance on the analytical method detection limits (MDLs) the permittee should use in analyzing for these contaminants.

In Part II of the permit, special conditions are included that address sanitary sewer overflow (SSO) reporting; operator certification, minimum staffing and operator of record; whole effluent toxicity (WET) testing; storm water compliance; tracking of group 4 and 5 parameters; dissolved metal translator (DMT) study; pretreatment program requirements; and outfall signage.

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## **PROCEDURES FOR PARTICIPATION IN THE FORMULATION OF FINAL DETERMINATIONS**

The draft action shall be issued as a final action unless the Director revises the draft after consideration of the record of a public meeting or written comments, or upon disapproval by the Administrator of the U.S. Environmental Protection Agency.

Within thirty days of the date of the Public Notice, any person may request or petition for a public meeting for presentation of evidence, statements or opinions. The purpose of the public meeting is to obtain additional evidence. Statements concerning the issues raised by the party requesting the meeting are invited. Evidence may be presented by the applicant, the state, and other parties, and following presentation of such evidence other interested persons may present testimony of facts or statements of opinion.

Requests for public meetings shall be in writing and shall state the action of the Director objected to, the questions to be considered, and the reasons the action is contested. Such requests should be addressed to:

**Legal Records Section  
Ohio Environmental Protection Agency  
P.O. Box 1049  
Columbus, Ohio 43216-1049**

Interested persons are invited to submit written comments upon the discharge permit. Comments should be submitted in person or by mail no later than 30 days after the date of this Public Notice. Deliver or mail all comments to:

**Ohio Environmental Protection Agency  
Attention: Division of Surface Water  
Permits Processing Unit  
P.O. Box 1049  
Columbus, Ohio 43216-1049**

The Ohio EPA permit number and Public Notice numbers should appear on each page of any submitted comments. All comments received no later than 30 days after the date of the Public Notice will be considered.

Citizens may conduct file reviews regarding specific companies or sites. Appointments are necessary to conduct file reviews, because requests to review files have increased dramatically in recent years. The first 250 pages copied are free. For requests to copy more than 250 pages, there is a five-cent charge for each page copied. Payment is required by check or money order, made payable to Treasurer State of Ohio.

For additional information about this fact sheet or the draft permit, contact Geoff Holmes, 937-285-6464, [Geoffrey.Holmes@epa.ohio.gov](mailto:Geoffrey.Holmes@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](http://epa.ohio.gov/portals/35/pretreatment/Pretreatment_Program_Priority_Pollutant_Detection_Limits.pdf).)

In accordance with ORC 6111.03(J)(3), the Director established these WQBELs after considering, to the extent consistent with the Federal Water Pollution Control Act, evidence relating to the technical feasibility and economic reasonableness of removing the polluting properties from those wastes and to evidence relating to conditions calculated to result from that action and their relation to benefits to the people of the state and to accomplishment of the purposes of this chapter. This determination was made based on data and information

available at the time the permit was drafted, which included the contents of the timely submitted NPDES permit renewal application, along with any and all pertinent information available to the Director.

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

**Ohio Environmental Protection Agency  
Attention: Division of Surface Water  
Permits Processing Unit  
P.O. Box 1049  
Columbus, Ohio 43216-1049**

Should the applicant need additional time to review, obtain or develop site-specific pertinent and factual information with respect to the technical feasibility and economic reasonableness of achieving compliance with these limitations, written notification 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

Beavercreek WRRF discharges to Beaver Creek at River Mile 0.35. Beaver Creek flows into the Little Miami River at River Mile 72.75. Figure 1 shows the approximate location of the facility.

This segment of the Beaver Creek is described by Ohio EPA River Code: 11-035, Hydrologic Unit Code: 05090202-02-05, County: Greene, Ecoregion: Eastern Corn Belt Plains. Beaver Creek is designated for the following uses under Ohio's WQS (OAC 3745-1-18): Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, and Primary Contact Recreation. Beaver Creek subsequently discharges to the Little Miami River in less than a half mile downstream. Although Beaver Creek is a stream previously designated as "Class B," the Beavercreek WRRF discharge dominates the stream it discharges to and the Little Miami River, which is designated "Class A" is less than one half of a mile downstream. Without a Class A designation to Beavercreek WRRF, TMDL goals for impaired streams could not be met at the Little Miami River and thus a "Class A" designation has been proposed for the Beavercreek WRRF discharge. The Little Miami River is designated for the following uses under Ohio's WQS (OAC 3745-1-18): Exceptional Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, and Primary Contact Recreation.

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

Beavercreek WRRF was constructed in 1963 and last upgraded in 2007. The average design flow is 8.5 million gallons per day (MGD) and the peak hydraulic capacity is 25 MGD. Beavercreek WRRF serves the City of Beavercreek and Beavercreek Township, approximately 46,937 persons. Beavercreek WRRF has the following treatment processes which are shown in Figure 2:

- Flow Equalization
- Bar Screens
- Influent Pumping
- Primary Clarifiers
- Activated Sludge – Extended Aeration

- Secondary Clarification
- Ultraviolet Disinfection

Beavercreek WRRF has no bypasses built into the treatment works. Beavercreek has 100% separated sewers in the collection system.

Greene County's pretreatment program was approved by Ohio EPA on October 5, 1984. Beavercreek WRRF has 3 categorical industrial users that discharge approximately 0.061 MGD of flow.

Beavercreek's potable water comes from Greene County and private well owners.

Beavercreek WRRF utilizes the following sewage sludge treatment processes (Figure 3):

- Aerobic Digestion
- Polymer Addition
- Centrifuges
- Off Site Treatment – OR – Landfill

Treated sludge is either transferred to another NPDES permit holder or to a landfill. Prior to September 2014, sludge was hauled away for disposal in a municipal landfill. Table 1 and **Figure 6** shows the last five years of sludge removed from the Beavercreek WRRF.

## **DESCRIPTION OF EXISTING DISCHARGE**

As shown in Table 2, Beavercreek WRRF had 8 effluent violations for 3 parameters in April 2013, July 2013, September 2014, July 2016, and April 2018. These violations have been addressed by modifying Beavercreek's Standard Operating Procedure (SOP).

Beavercreek WRRF has an estimated infiltration/inflow (I/I) rate of 1.1 MGD that does not cause known problems in the collection system, but does stress the treatment system. The average annual effluent flow rate for Beavercreek WRRF for the previous five years is presented in Table 3, Figure 8, and Figure 9. Beavercreek is currently at or near its design flow capacity. Beavercreek WRRF has hired a consulting engineering firm to perform a sanitary sewer collection system capacity study to identify areas of high I/I, hydraulic capacity issues, recommended I/I reduction measures, and needed collection system improvements. Ohio EPA requested the Beavercreek WRRF undergo a stress test to evaluate the upper bound of treatable daily flows and submit the results to Ohio EPA. Greene County has agreed to submit semi-annual updates to Ohio EPA by January 31 and July 31 of each year until Greene County submits the necessary PTI application for the treatment system expansion. These reports are to describe the actions being taken to upgrade the Beavercreek WRRF, I/I reduction projects completed, and the progress towards a PTI submittal for the Beavercreek WRRF.

Beavercreek WRRF reports SSOs at station 300. The number of SSOs and dates recorded is presented in Table 4 and Figure 10. Beavercreek uses cctv to identify root and grease problems and use root cutters and grease nozzles to clean spans of debris.

Beavercreek WRRF must maintain phosphorus loading limits as part of the Total Maximum Daily Loads for the Upper Little Miami River, approved by U.S. EPA in 2002. Beavercreek's annualized phosphorus loading limit is 16.1 kg/day. Compliance information is presented in Table 5 and Figure 11. Greene County has proposed to trade phosphorus credits from Beavercreek WRRF to its Sugarcreek WRRF. The Beavercreek WRRF baseline was determined to be 12.58 kg/day of phosphorus, based the median flows and phosphorus concentrations from 2013-2015. Under this proposal, the Beavercreek WRRF would be able to trade phosphorus credits to the



Sugarcreek WRRF when Beaver Creek's summer loading is less than 12.58 kg/day. This phosphorus trading proposal has not yet been granted, as Ohio EPA is awaiting comment responses from Greene County regarding the proposal.

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

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

Table 8 presents a summary of unaltered Discharge Monitoring Report (DMR). Data are presented for the period January 2013 to April 2018, and current permit limits are provided for comparison.

Table 9 summarizes the chemical specific data for outfall 001 by presenting the average and maximum PEQ values.

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

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

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.

## **ASSESSMENT OF IMPACT ON RECEIVING WATERS**

Pursuant to Section 303(d) of the Clean Water Act, each state is required to develop and submit a list to US EPA of its impaired and threatened waters (e.g. stream/river segments, lakes). For each water on the list, the state identifies the pollutant(s) causing the impairment, when known. The Beaver Creek watershed assessment unit, which includes the Beaver Creek in the vicinity of Beaver Creek WRRF, is listed as impaired for aquatic life and recreation on Ohio's 303(d) list. A summary of the results from this assessment for the interactive segment covered in this report can be found in Table 12. No waters in the Beaver Creek watershed assessment unit are utilized for water supply. The Total Maximum Daily Load (TMDL) program focuses on identifying and restoring polluted rivers, streams, lakes and other surface water bodies. A TMDL is a written, quantitative assessment of water quality problems in a water body and contributing sources of pollution. It specifies the amount a pollutant needs to be reduced to meet water quality standards (WQS), allocates pollutant load reductions, and provides the basis for taking actions needed to restore a water body.

A Total Daily Maximum Load (TMDL) report was approved for Beaver Creek in April 2002. The second cycle TMDL is under development. The attainment status of Beaver Creek is also reported in the final *Ohio 2018 Integrated Water Quality Monitoring and Assessment Report* ("Integrated Report"). The most recent data available for Beaver Creek is from 2011. The full Integrated Report is available through the Ohio EPA, Division of Surface Water website at: <http://www.epa.ohio.gov/dsw/tmdl/OhioIntegratedReport>. Both the TMDL report and the 2011 Biological and Water Quality Study of the Upper Little Miami River are available through the Ohio EPA, Division of Surface Water website at: <http://www.epa.ohio.gov/dsw/tmdl/LittleMiamiRiver>.

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

limited to: NPDES permittee self-monitoring data; effluent and mixing zone bioassays conducted by Ohio EPA, the permittee, or U.S. EPA.

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

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

Three attainment status results are possible at each sampling location -full, partial, or non-attainment. Full attainment means that all of the applicable indices meet the biocriteria. Partial attainment means that one or more of the applicable indices fails meet the biocriteria. Nonattainment means that either none of the applicable indices meet the biocriteria or one of the organism groups indicates poor or very poor performance. An aquatic life use attainment table (see Table 12) is constructed based on the sampling results and is arranged from upstream to downstream and includes the sampling locations indicated by river mile, the applicable biological indices, the use attainment status (i.e., full, partial, or non), the Qualitative Habitat Evaluation Index, and comments and observations for each sampling location.

Beaver Creek is impaired for aquatic life, recreation, and fish tissue due to the following: natural sources, urban runoff discharging through storm sewers, and municipal point source discharges. Most notably in the 2011 Technical Support Document, effluent discharges from the Montgomery County Eastern Regional Water Resource Reclamation Facility and Beavercreek WRRF were cited as causes for elevated nitrate-nitrate and phosphorus levels above the target stream levels. Additionally, high bacteria counts exceeding the PCR criteria were attributed to the following sources: urban runoff, Sanitary Sewer Overflows, wildlife, and Beavercreek WRRF effluent. This indicates that Beavercreek WRRF was contributing to the impairments in Beaver Creek due to high nutrient and bacteria discharges at the time of the survey in summer 2011.

## **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 Beavercreek WRRF were used to determine what parameters should undergo WLA. The parameters discharged are identified by the data available to Ohio EPA, DMR data submitted by the permittee, compliance sampling data collected by Ohio EPA, and any other data submitted by the permittee, such as priority pollutant scans required by the NPDES application or by pretreatment, or other special conditions in the NPDES permit. The sources of effluent data used in this evaluation are as follows:

Self-monitoring data (DMR)  
Pretreatment data  
Ohio EPA compliance sampling data

January 2013 through April 2018  
2014 through 2017  
2017

### Statistical Outliers and Other Non-representative Data

The data were examined and the following values were removed from the evaluation as non-representative data: NH<sub>3</sub>-N, winter – 9.53 mg/L on 7/25/13; Cadmium – 5.4 µg/L on 12/5/13; Copper – 6052 µg/L on 8/6/17; Silver, 13.3 µg/L on 6/2/15 and 201 µg/L on 6/10/14 (all extreme high values); Zinc 271 µg/L on 3/9/14 and 244 µg/L on 2/17/15 Cyanide-free – 20 µg/L (all extreme high values - (>5xMDL); and Barium – 0.57 µg/L on 5/5/16 (extreme low value).

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

The PEQ values are used according to Ohio rules to compare to applicable WQS and allowable WLA values for each pollutant evaluated. Initially, PEQ values are compared to the applicable average and maximum WQS. If both PEQ values are less than 25 percent of the applicable WQS, the pollutant does not have the reasonable potential to cause or contribute to exceedances of WQS, and no WLA is done for that parameter. If either PEQ<sub>avg</sub> or PEQ<sub>max</sub> is greater than 25 percent of the applicable WQS, a WLA is conducted to determine whether the parameter exhibits reasonable potential and needs to have a limit or if monitoring is required (see Table 13).

### Wasteload Allocation

For those parameters that require a WLA, the results are based on the uses assigned to the receiving waterbody in OAC 3745-1. Dischargers are allocated pollutant loadings/concentrations based on the Ohio WQS (OAC 3745-1). Most pollutants are allocated by a mass-balance method because they do not break down in the receiving water. For free flowing streams, WLAs using this method are done using the following general equation: Discharger WLA = (downstream flow x WQS) - (upstream flow x background concentration). Discharger WLAs are divided by the discharge flow so that the allocations are expressed as concentrations.

The following dischargers in the upper Little Miami River segment were considered interactive (see Figure 4 and Figure 5):

- Xenia-Ford Road WWTP
- Xenia-Glady Run WWTP
- Montgomery County Eastern Regional WRF
- Beaver Creek WRRF
- Sugar Creek WRRF

These facilities were allocated together for most parameters due to the size of the plant discharges, the flows of the upper Little Miami River study area and the relatively close proximity of the plants. The exception was the ammonia-N WLA, which was done separately for each facility because ammonia-N is 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). A mass balancing method is then used to allocate effluent concentrations that maintain WQS under these conditions. This technique is appropriate when

data bases are unavailable to generate statistical distributions for inputs and if the parameters modeled are conservative.

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

Aquatic life (Warmwater Habitat)	Toxics (metals, organics, etc.)	Average Maximum	Annual 7Q10 Annual 1Q10
	Ammonia	Average Average	Summer 30Q10 Winter 30Q10
Wildlife			Annual 90Q10
Agricultural Water Supply			Harmonic Mean Flow
Human Health (nondrinking)			Harmonic Mean Flow

Allocations are developed using a percentage of stream design flow as specified in Table 14, and allocations cannot exceed the Inside Mixing Zone Maximum (IMZM) criteria.

The data used in the WLA are listed in Table 13 and Table 14. The WLA results to maintain all applicable criteria are presented in Table 15.

#### Whole Effluent Toxicity Wasteload Allocation

WET is the total toxic effect of an effluent on aquatic life measured directly with a toxicity test. Acute WET measures short term effects of the effluent while chronic WET measures longer term and potentially more subtle effects of the effluent.

WQS for WET are expressed in Ohio's narrative "free from" WQS rule [OAC 3745-1-04(D)]. These "free froms" are translated into toxicity units (TUs) by the associated WQS Implementation Rule (OAC 3745-2-09). WLAs can then be calculated using TUs as if they were water quality criteria.

The WLA calculations for WET are similar to those for aquatic life criteria - using the chronic toxicity unit ( $TU_c$ ) and 7Q10 flow for the average and the acute toxicity unit ( $TU_a$ ) and 1Q10 flow for the maximum. These values are the levels of effluent toxicity that should not cause instream toxicity during critical low-flow conditions. For Beavercreek WRRF, the WLA values are 0.79  $TU_a$  and 2.66  $TU_c$ .

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

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

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations except when the following equation is more restrictive (*Ceriodaphnia dubia* only):

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

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

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

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations.

When the acute WLA is less than 1.0 TU<sub>a</sub>, it may be defined as:

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

$$\text{Dilution Ratio} = \frac{1Q_{10} + [\text{WWTP flow rate}]}{[\text{WWTP flow rate}]} = \frac{3.78 \text{ cfs} + 13.15 \text{ cfs}}{13.15 \text{ cfs}} = 1.29$$

The acute WLA for Beavercreek WRRF is 30 percent mortality in 100 percent effluent based on the dilution ratio of 1.29 to 1.

**REASONABLE POTENTIAL/EFFLUENT LIMITS/MANAGEMENT DECISIONS**

After appropriate effluent limits are calculated, the reasonable potential of the discharger to violate the WQS must be determined. Each parameter is examined and placed in a defined "group". Parameters that do not have a WQS or do not require a WLA based on the initial screening are assigned to either group 1 or 2. For the allocated parameters, the preliminary effluent limits (PEL) based on the most restrictive average and maximum WLAs are selected from Table 15. The average PEL (PEL<sub>avg</sub>) is compared to the average PEQ (PEQ<sub>avg</sub>) from Table 9, and the PEL<sub>max</sub> is compared to the PEQ<sub>max</sub>. Based on the calculated percentage of the allocated value [(PEQ<sub>avg</sub> ÷ PEL<sub>avg</sub>) X 100, or (PEQ<sub>max</sub> ÷ PEL<sub>max</sub>) X 100)], the parameters are assigned to group 3, 4, or 5. The groupings are listed in Table 16.

The final effluent limits are determined by evaluating the groupings in conjunction with other applicable rules and regulations. Table 17 presents the final effluent limits and monitoring requirements proposed for Beavercreek WRRF outfall 001 and the basis for their recommendation. Unless otherwise indicated, the monitoring frequencies proposed in the permit are continued from the existing permit.

**Dissolved Oxygen, Total Suspended Solids, Ammonia, and 5-Day CBOD**

The limits proposed for dissolved oxygen, total suspended solids, ammonia and 5-day carbonaceous biochemical oxygen demand are all based on plant design criteria. These limits are protective of WQS. The current ammonia limits have been evaluated using the WLA procedures and are protective of WQS for ammonia toxicity.

**Phosphorus**

Based on best technical judgment (BTJ), limits are recommended to be continued for phosphorus. The TMDL lists the Beaver Creek watershed as impaired for aquatic life. Nutrients and organic enrichment/dissolved oxygen are listed as “high magnitude” causes, and major municipal point sources are listed among the “high magnitude” sources. Considering this information and the fact that municipal WWTPs discharge a nutrient load to the river, there is reasonable potential for nutrients to adversely affect the receiving stream. Therefore, a thirty-day average concentration limit, a weekly average concentration limit, a thirty-day average loading limit, and a weekly loading limit for phosphorus are proposed. Based on the 2002 TMDL, a summer seasonal loading limit is proposed to continue.

### **Oil and Grease, pH, and *Escherichia coli***

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

New WQS for *E. coli* became effective in April 2016. Receiving waters formerly designated as “Class B” waters, such as Beaver Creek, must now meet the same *E. coli* standards as “Class A” PCR waters, such as the Little Miami River. *E. coli* numerical limits for the Beavercreek WRRF are unchanged from the previous permit.

### **Cyanide and Gamma-Hexachlorocyclohexane (Lindane)**

The Ohio EPA risk assessment (Table 16) places cyanide and gamma-hexachlorocyclohexane (lindane) in group 5, which recommends limits to protect water quality. Using the discretion allowed the Director under OAC 3745-33-07(A)(5), monitoring rather than limits is proposed for these parameters. The PEQ values calculated for cyanide and gamma-hexachlorocyclohexane (Table 9) may not be representative of their actual levels in the plant effluent since they were based on 3 and 4 data points, respectively. The purpose of the proposed monitoring is to collect additional data on the frequency of occurrence and variability of these pollutants in the plant’s effluent. An appropriate method detection level (MDL) of these parameters will help to determine the maximum PEQ for future permit renewals.

Considering the magnitude of the reported values compared to the WLA, a tracking provision is proposed in Part II of the permit that requires the Beavercreek WRRF to notify Ohio EPA if a sample result exceeds the preliminary effluent limit (Table 15). If certain conditions are met, the facility is required to take steps to reduce the discharge level of this pollutant.

### **Bis (2-ethylhexyl) Phthalate, Selenium, Silver, and Total Filterable Residue**

The Ohio EPA risk assessment (Table 16) places bis (2-ethylhexyl) phthalate, selenium, silver, and total filterable residue in group 4. This placement, as well as the data in Table 8 and Table 9, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring for Group 4 pollutants (where PEQ exceeds 50 percent of the WLA) is required by OAC 3745-33-07(A)(2). No limits are proposed for these parameters.

In addition, bis (2-ethylhexyl) phthalate’s effluent quality falls within 75 percent of the WLA. Under OAC 3745-33-07(A)(2), parameters in this range must have a tracking requirement in the permit that specifies reductions in pollutant concentrations if effluent concentrations exceed the WLA. The tracking/reduction requirements are included in Part II of the permit.

### **Barium, Copper, Ammonia (Summer & Winter), Cadmium, Chromium, Hexavalent Chromium (Dissolved), Lead, Mercury, Nickel, and Zinc**

The Ohio EPA risk assessment (Table 16) places barium, copper, ammonia (summer & winter), cadmium, chromium, hexavalent chromium (dissolved), lead, mercury, nickel, and zinc in groups 2 and 3. This placement, as well as the data in Table 8 and Table 9, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. Monitoring at a reduced frequency is proposed to document that these pollutants continue to remain at low levels.

### **Butyl Benzyl Phthalate, Manganese, Arsenic, Aldrin, 1,4-Dichlorobenzene, Diethyl phthalate, Iron, Molybdenum, Naphthalene, Phenol, Strontium, Toluene, and 1,2,4-Trichlorobenzene**

The Ohio EPA risk assessment (Table 16) places butyl benzyl phthalate, manganese, arsenic, aldrin, 1,4-dichlorobenzene, diethyl phthalate, iron, molybdenum, naphthalene, phenol, strontium, toluene, and 1,2,4-trichlorobenzene in groups 2 and 3. This placement, as well as the data in Table 8 and Table 9, support that these parameters do not have the reasonable potential to contribute to WQS exceedances, and limits are not necessary to protect water quality. No new monitoring is proposed.

### **Water Temperature and Flow Rate**

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

### **Nitrate+Nitrite, and Total Nitrogen Kjeldahl**

The 2018 *Ohio Integrated Water Quality Monitoring and Assessment Report* (Ohio EPA) lists the Beaver Creek watershed as impaired for aquatic life. Nutrients and organic enrichment/dissolved oxygen are listed as “high magnitude” causes, and major municipal point sources are listed among the “high magnitude” sources. Considering this information and the fact that municipal WWTPs discharge a nutrient load to the river, monthly monitoring for nitrate + nitrite and total Kjeldahl nitrogen is proposed based on best technical judgment. The purpose of the monitoring is to maintain a nutrient data set for use in the future total maximum daily loads (TMDL) study.

### **Dissolved Orthophosphate**

Monitoring for dissolved orthophosphate (as P) is required by ORC 6111.03. Monitoring 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 samples must be filtered within 15 minutes of collection using a 0.45-micron filter. The filtered sample must be analyzed within 48 hours.

### **Additive Carcinogens**

Bis(2-ethylhexyl) phthalate and gamma-hexachlorocyclohexane (lindane) are carcinogens, which require the evaluation of the additive effect of these pollutants. OAC 3745-33-07(A)(8) states that the additivity equation must be included in the permit and used to determine compliance unless certain conditions are met. One of the conditions in the rule referenced above states that a pollutant may be removed from the consideration of additivity if the PEL for the pollutant is less than the quantification level for that pollutant. For each of these pollutants, the average PELs are less than the respective quantification levels, so these parameters can be removed from the additivity equation. As a result, the compliance equation in Attachment 2 does not need to be included in the permit.

### **Whole Effluent Toxicity Reasonable Potential**

Based on evaluating the WET data presented in Table 10 and Table 11 and other pertinent data under the provisions of OAC 3745-33-07(B), the Beavercreek WRRF is placed in Category 4 with respect to WET. While this indicates that the plant's effluent does not currently pose a toxicity problem, annual toxicity testing is proposed consistent with the minimum monitoring requirements at OAC 3754-33-07(B)(11). Annual chronic toxicity monitoring with the determination of acute endpoints with annual acute toxicity monitoring is proposed for the life of the permit. The proposed monitoring will adequately characterize toxicity in the plant's effluent.

### **Additional Monitoring Requirements**

Monitoring for dissolved oxygen is proposed to be removed at both upstream and downstream monitoring stations 801 and 901 because monitoring for these parameters at these stations have been removed from Ohio EPA's guidance documents. Monitoring for water temperature and pH is proposed to be removed at the upstream monitoring station 801 for the same reason.

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

## **Sludge**

Limits and monitoring requirements proposed for the disposal of sewage sludge by the following management practices are based on OAC 3745-40: removal to sanitary landfill or transfer to another facility with an NPDES permit.

## **OTHER REQUIREMENTS**

### **Compliance Schedule**

***Pretreatment Local Limits Review*** - A 6-month compliance schedule is proposed for the County to submit a technical justification for either revising its local industrial user limits or retaining its existing local limits. If revisions to local limits are required, the County must also submit a pretreatment program modification request. Details are in Part I.C of the permit.

### **Sanitary Sewer Overflow Reporting**

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

### **Operator Certification and Operator of Record**

Operator certification requirements have been included in Part II of the permit in accordance with rules adopted in December 2006 (OAC 3745-7-02). These rules require the Beavercreek WRRF to have a Class IV wastewater treatment plant operator in charge of the sewage treatment plant operations discharging through outfall 001. These rules also require the permittee to designate one or more operator of record to oversee the technical operation of the treatment works.

In accordance with OAC 3745-7-04, the permittee has requested that Ohio EPA reduce the minimum staffing requirements from 40 hours to 20 hours. Ohio EPA has reviewed the request and determined that the reduced staffing plan should be granted. The criteria used to approve the reduced staffing plan include the automation and continuous monitoring of the plant with an electronic notification system that will activate if a problem at the WRRF occurs, and the certified operator can respond within 30 minutes. Any change in the criteria under which the reduced staffing plan was approved (such as enforcement status, history of compliance, or provisions included in the plan) will require that the treatment works immediately return to the minimum staffing requirements included in OAC 3745-7-04(C)(1). The permittee is also required to designate one or more operator of record to oversee the technical operation of the treatment works.

### **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.



New NPDES permits no longer authorize the use of method 4500 CN-I from Standard Methods for free cyanide testing. The new permits require permittees to begin using one of these approved methods as soon as possible. If a permittee must use method 4500 CN-I during the transition to an approved method, they are instructed to report the results on their DMR and enter “Method 4500 CN-I” in the remarks section.

#### **Method Detection Limit**

Part II of the permit includes a condition requiring the Beavercreek WRRF to use laboratory analytical methods with an appropriate MDL.

#### **Outfall Signage**

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

#### **Part III**

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

#### **Storm Water Compliance**

Parts IV, V, and VI have been included with the draft permit to ensure that any storm water flows from the facility site are properly regulated and managed. As an alternative to complying with Parts IV, V, and VI, the Beavercreek WRRF may seek permit coverage under the general permit for industrial storm water (permit # OHR000006) or submit a “No Exposure Certification.” Parts IV, V, and VI will be removed from the final permit if: 1) the Beavercreek WRRF 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 Beavercreek WRRF

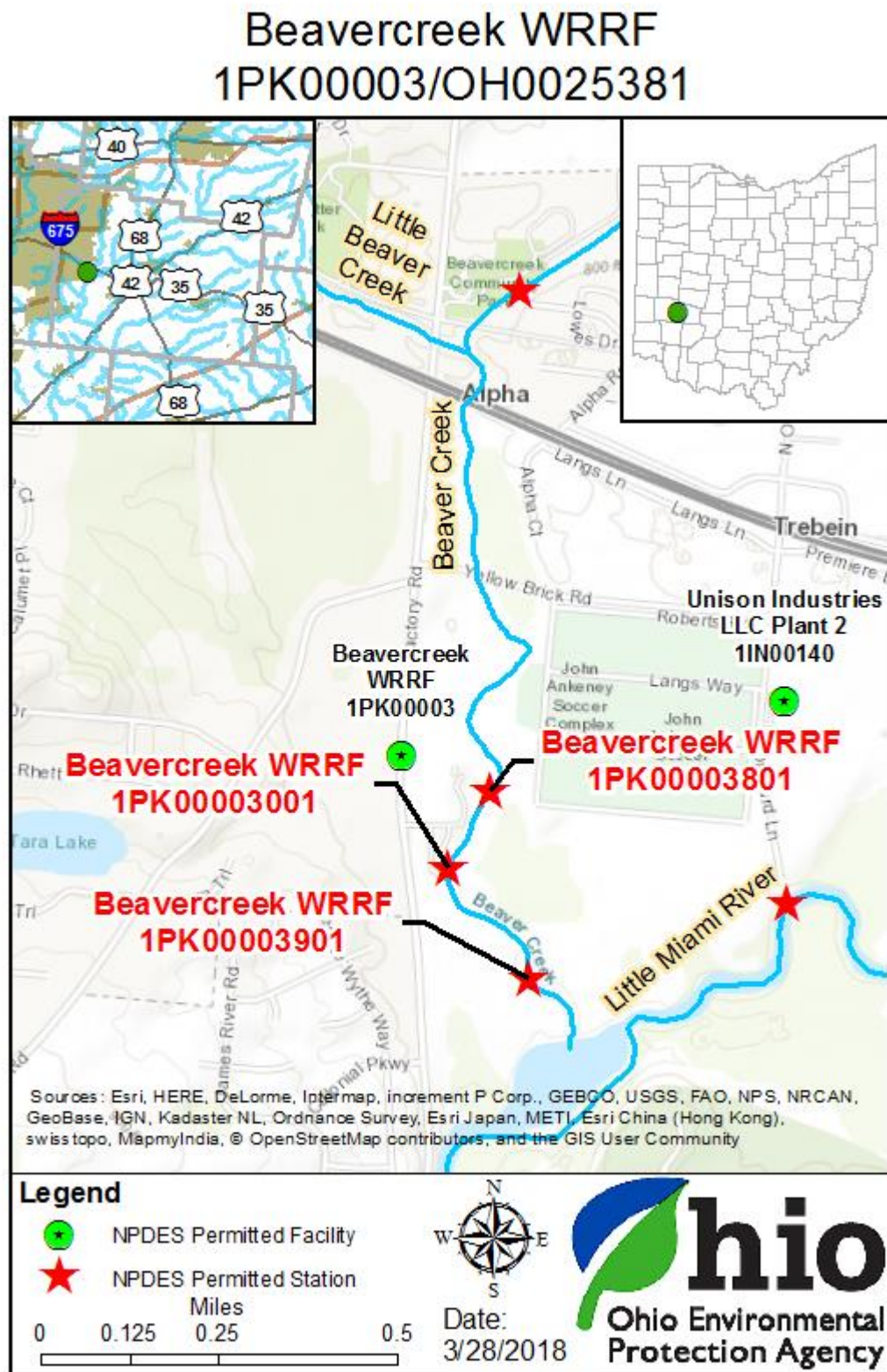


Figure 2. Diagram of Wastewater Treatment System

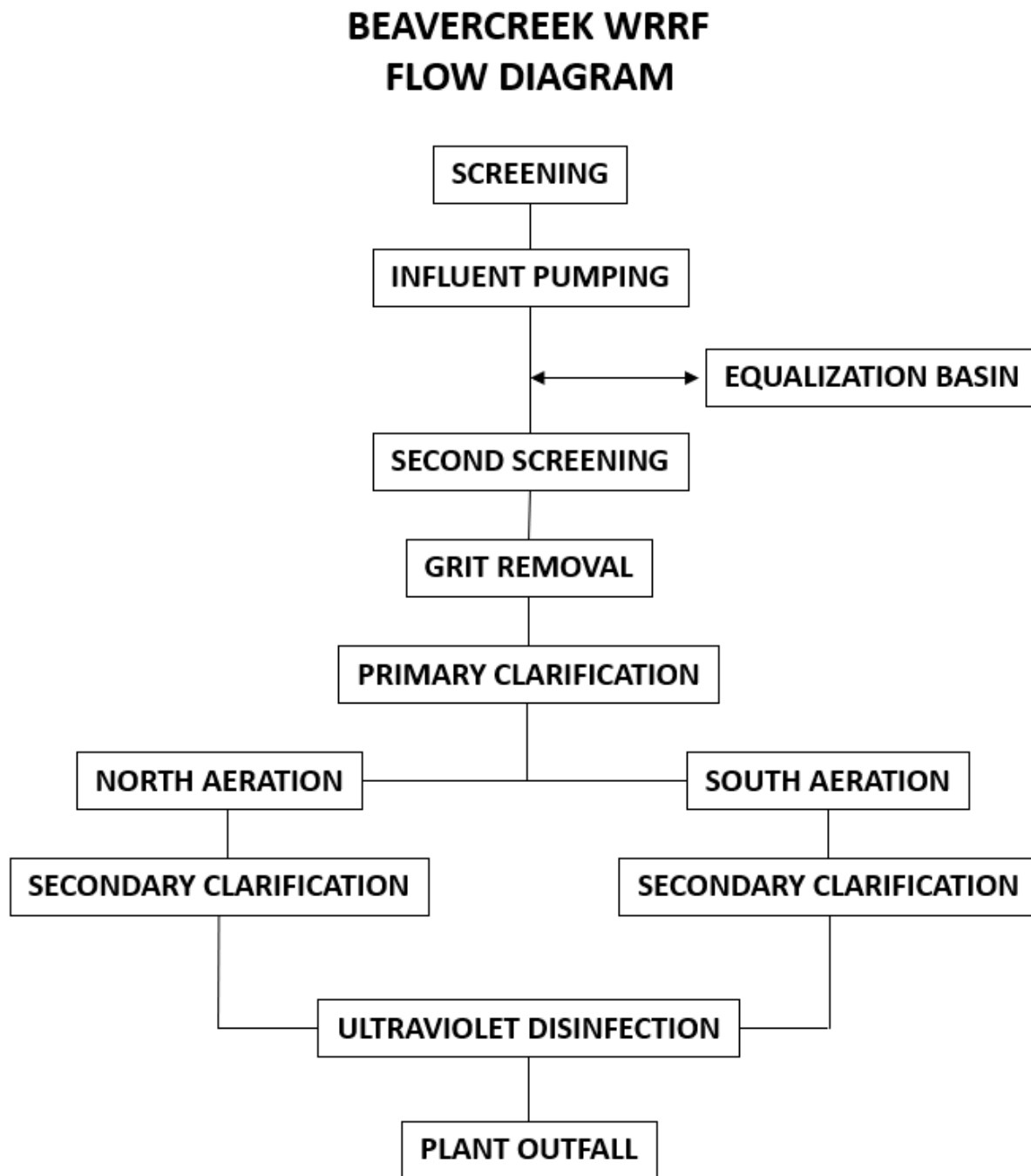


Figure 3. Sewage Sludge Treatment Process

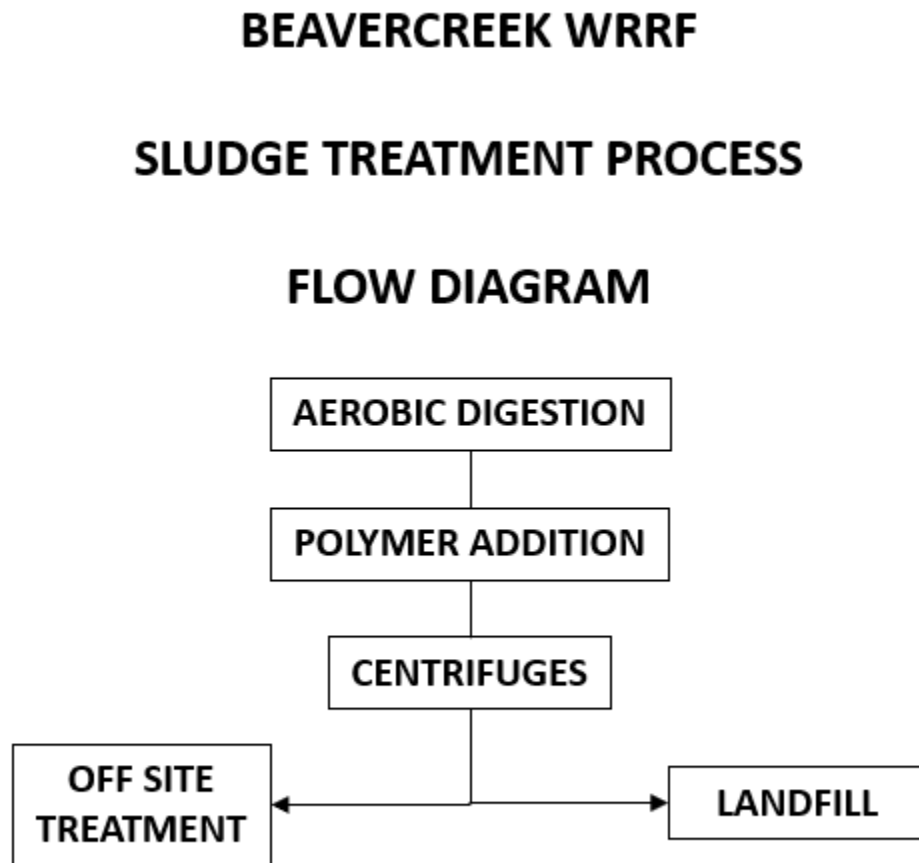
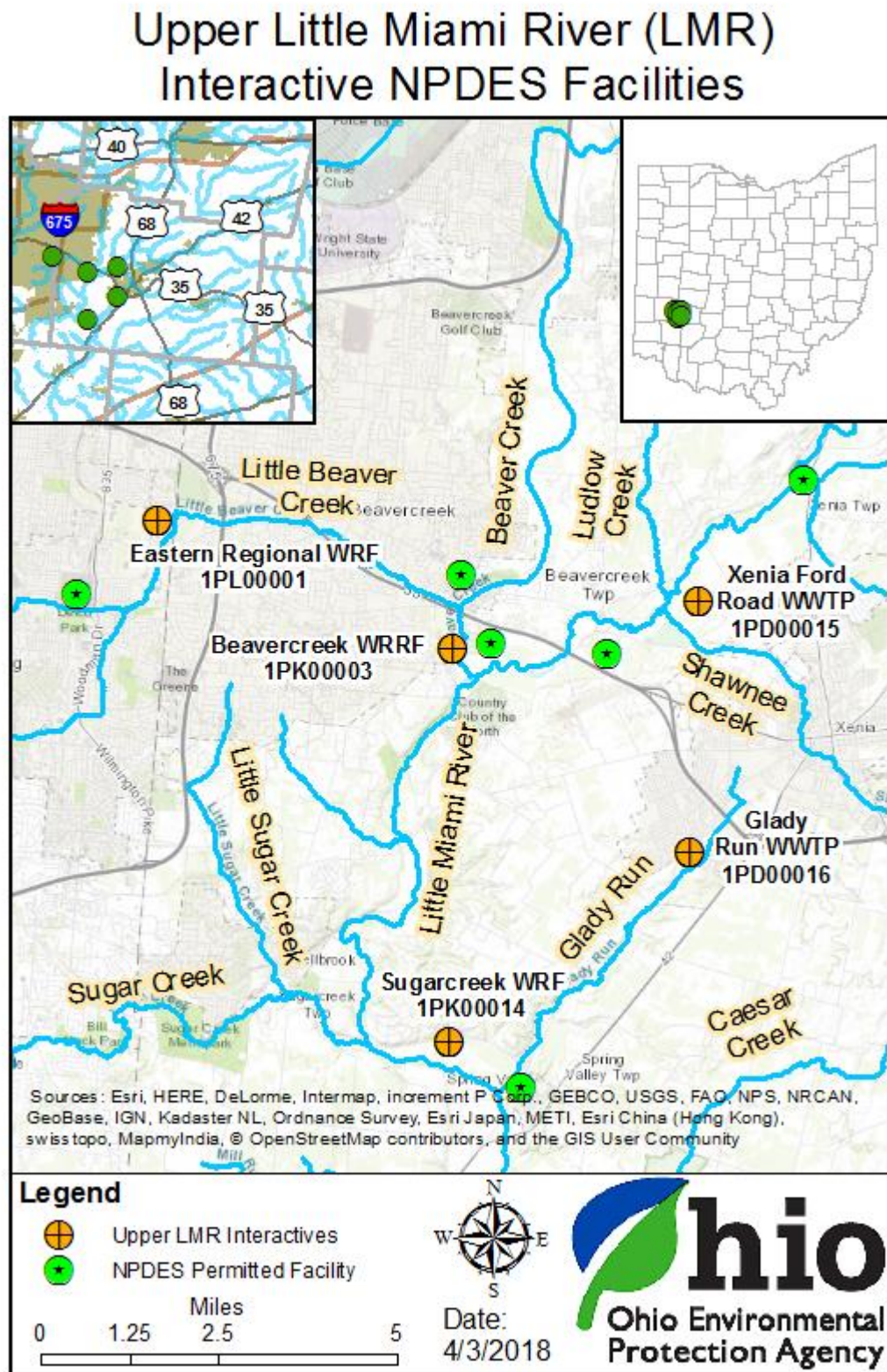
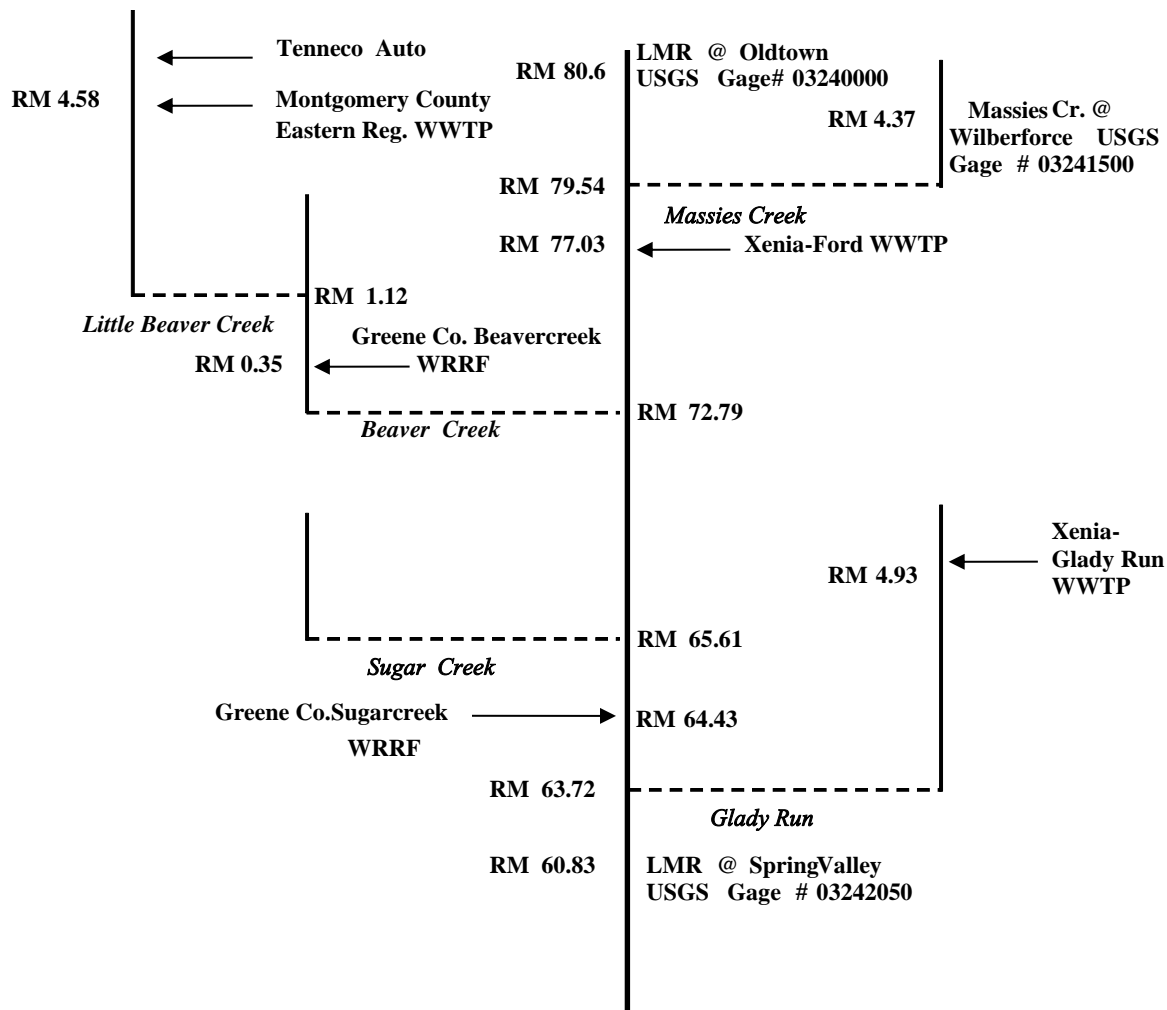


Figure 4. Upper Little Miami River Study Area



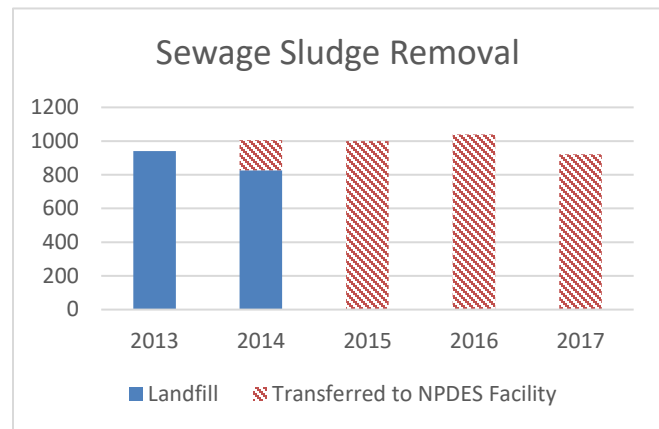
**Figure 5. Upper Little Miami River Study Area – River Network**





**Table 1. Sewage Sludge Removal**

Year	Dry Tons Removed		Total
	Landfill	Transferred	
2013	939.78	--	940
2014	826.52	178.26	1005
2015	--	999.09	999
2016	--	1038.91	1039
2017	--	920.71	921

**Figure 6. Sewage Sludge Removal****Table 2. Effluent Violations for Outfall 001**

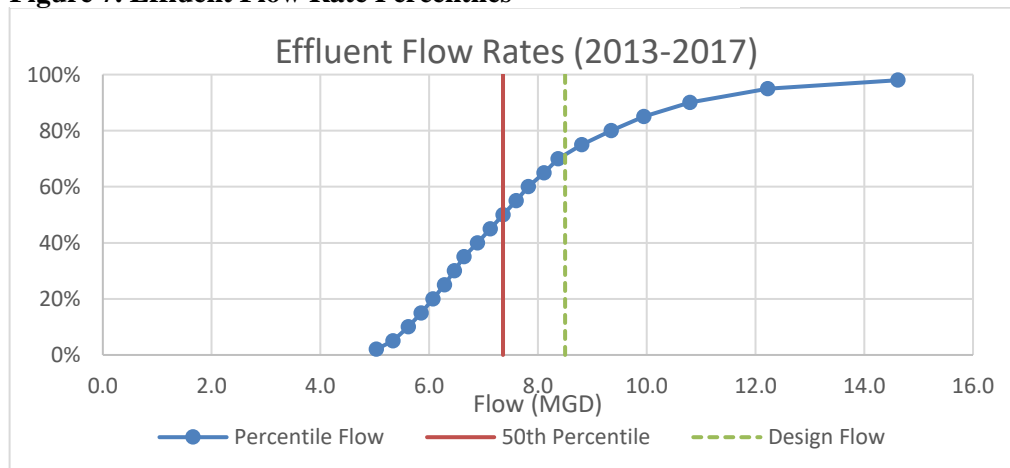
Parameter	2013	2014	2015	2016	2017	2018 <sup>A</sup>
Total Suspended Solids	2	0	0	0	0	1
Ammonia Nitrogen	2	2	0	0	0	0
Phosphorus	0	0	0	1	0	0
Total	4	2	0	1	0	1

<sup>A</sup>= Thru April 2018

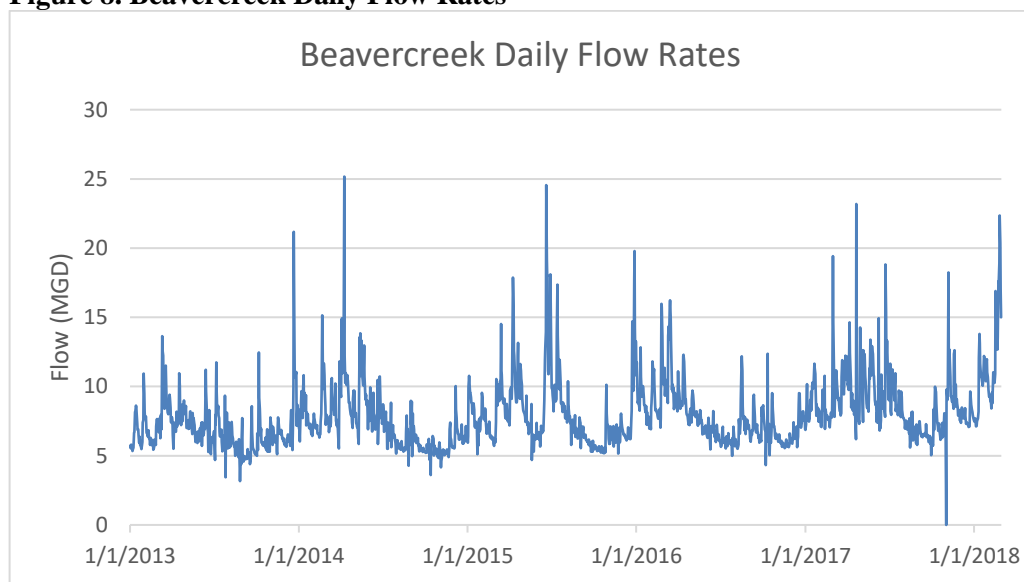
**Table 3. Average Annual Effluent Flow Rates**

Year	Annual Flow in MGD		
	50th Percentile	95th Percentile	Maximum
2013	6.55	9.69	21.18
2014	6.99	11.01	25.17
2015	7.34	13.64	24.56
2016	7.24	11.41	16.23
2017	8.25	12.51	23.19

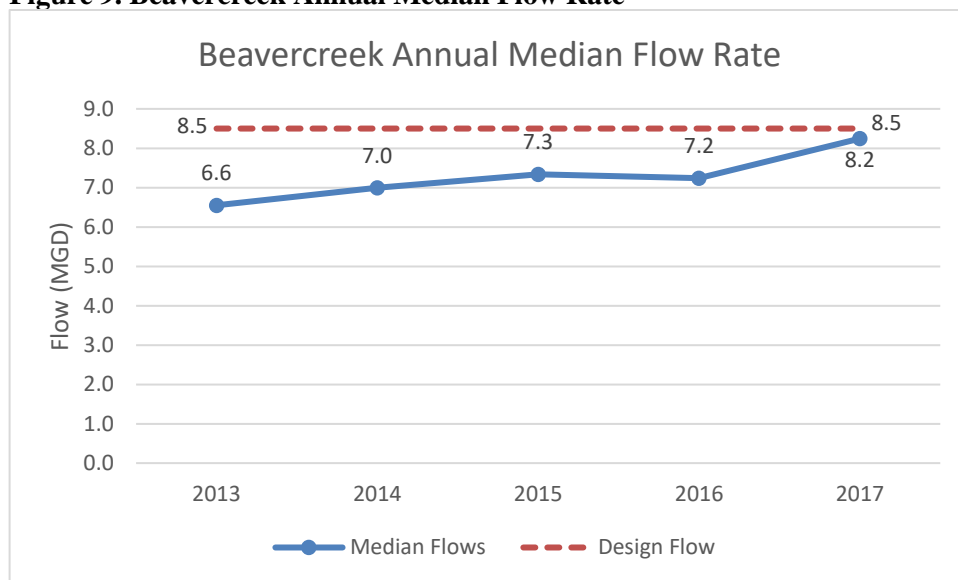
MGD = million gallons per day.

**Figure 7. Effluent Flow Rate Percentiles**

**Figure 8. Beavercreek Daily Flow Rates**



**Figure 9. Beavercreek Annual Median Flow Rate**



**Table 4. Sanitary Sewer Overflows Discharges**

Year	Number
2013	2
2014	2
2015	7
2016	1
2017	3

**Figure 10. Sanitary Sewer Overflow Discharges**

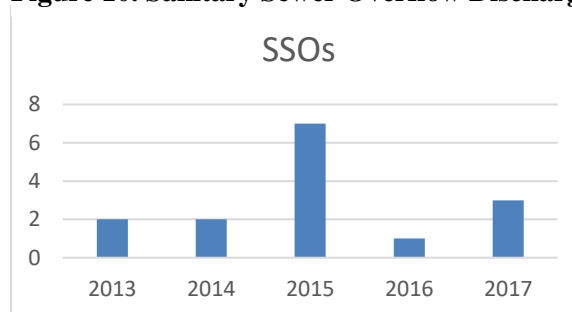


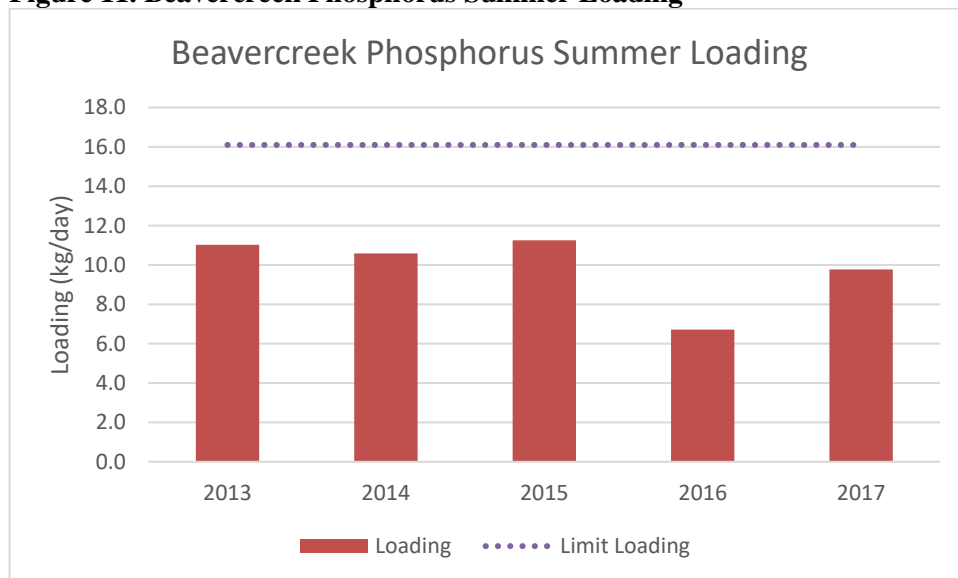


Table 5. Calculated Phosphorus Loadings from 2013 - 2017

Median Flows for May through October		Median Daily P Concentration for May through October		Calculated Loading	
Range	Flow (MGD)	Year	Phosphorus (mg/L)	Year	Loading (kg/day)
'08-'12	5.61	2013	0.52	2013	11.03
'09-'13	5.71	2014	0.49	2014	10.59
'10-'14	5.83	2015	0.51	2015	11.26
'11-'15	6.12	2016	0.29	2016	6.72
'12-'16	6.30	2017	0.41	2017	9.77

MGD = million gallons per day

Figure 11. Beavercreek Phosphorus Summer Loading



**Table 6. Effluent Characterization Using Pretreatment Data**

Parameter (µg/L)	8/11/2014	8/11/2015	8/9/2016	8/14/2017
Antimony	AA (5)	AA (5)	AA (5)	AA (5)
Arsenic	AA (5)	AA (5)	7.2	AA (5)
Beryllium	AA (0.5)	AA (0.5)	AA (0.5)	AA (0.5)
Cadmium	AA (2)	AA (2)	AA (2)	AA (2)
Chromium	8.95	AA (5)	AA (5)	AA (5)
Copper	AA (5)	AA (5)	AA (5)	AA (5)
Lead	AA (5)	AA (5)	AA (5)	AA (5)
Mercury	AA (0.2)	AA (0.2)	AA (0.2)	AA (0.2)
Molybdenum	AA (10)	AA (10)	10.5	10.5
Nickel	AA (5)	AA (5)	AA (5)	AA (5)
Selenium	AA (10)	AA (10)	AA (10)	AA (10)
Silver	AA (2.0)	AA (2.0)	AA (2.0)	AA (2.0)
Thallium	AA (1)	AA (1)	AA (1)	AA (1)
Zinc	18.5	24.6	24.2	23.2

AA = not-detected (analytical method detection limit)

**Table 7. Effluent Characterization Using Ohio EPA data**

Parameter	Units	10/18/2017
Aluminum	µg/L	142.3
Ammonia	mg/L	0.0774
Arsenic	µg/L	5.95
Barium	µg/L	73.5
Bromodichloromethane	µg/L	AA (0.5)
Cadmium	µg/L	AA (0.2)
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/L	4.07
Chemical Oxygen Demand	mg/L	39.8
Chloride	mg/L	316
Chloroform	µg/L	AA (0.118)
Chromium	µg/L	AA (0.2)
Copper	µg/L	5.38
Cyanide, Free	µg/L	3.92
Iron	µg/L	145
Lead	µg/L	1.08
Magnesium	mg/L	33.2
Manganese	µg/L	20.6
Nickel	µg/L	3.19
Nitrate+Nitrite	mg/L	10.7
Oil & Grease	mg/L	AA (2.15)
Phosphorus	mg/L	0.498
Selenium	µg/L	1.05
Strontium	µg/L	502
Total Filterable Residue	mg/L	988
Total Kjeldahl Nitrogen	mg/L	1.34
Total Suspended Solids	mg/L	5.00
Zinc	µg/L	15.9
Bis (2Ethylhexyl) Phthalate	µg/L	0.951
Butylbenzylphthalate	µg/L	1.45
Diethylphthalate	µg/L	0.225
1,2,3-Trichlorobenzene	µg/L	0.166
1,2,4-Trichlorobenzene	µg/L	0.16
1,4-Dichlorobenzene	µg/L	0.119
Chloromethane	µg/L	0.166
Naphthalene	µg/L	0.194
Toluene	µg/L	0.341

AA = not detected (analytical method detection limit)

**Table 8. Effluent Characterization Using Self-Monitoring Data**

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Outfall 001								
Water Temperature	Annual	°C	----- Monitor -----		1818	16	23	7-26
Dissolved Oxygen	Annual	mg/L	----- Monitor -----		1814	11.2	15.8	0.5-21.6
Total Suspended Solids	Annual	mg/L	20	30 <sup>a</sup>	1243	8	23	1-52
		kg/day	1666	2498 <sup>a</sup>	--	--	--	--
Oil and Grease	Annual	mg/L	----- Monitor -----		242	2.2	5.99	0-9
Ammonia (Summer)	Summer	mg/L	----- Monitor -----		636	12	17	2-20
Ammonia (Winter)	Winter	mg/L	----- Monitor -----		605	11	16	1-25
Total Kjeldahl Nitrogen	Annual	mg/L	----- Monitor -----		48	12.1	16.6	3.7-22.4
Nitrate + Nitrite	Annual	mg/L	----- Monitor -----		122	0.825	1.68	0.26-2.2
Phosphorus	Annual	mg/L	1.0	1.5 <sup>a</sup>	481	0.44	0.84	0.18-0.96
		kg/day	83	125 <sup>a</sup>	--	--	--	--
Cyanide, Free	Annual	mg/L	----- Monitor -----		32	0.006	0.018	0-0.02
Nickel	Annual	µg/L	----- Monitor -----		60	0	25	0-40
Silver	Annual	µg/L	----- Monitor -----		120	0	0	0-5
Zinc	Annual	µg/L	----- Monitor -----		60	28	40.5	10-84
Cadmium	Annual	µg/L	----- Monitor -----		60	0	0	0-0
Lead	Annual	µg/L	----- Monitor -----		60	0	0	0-0
Chromium	Annual	µg/L	----- Monitor -----		60	0	0	0-20
Copper	Annual	µg/L	----- Monitor -----		120	10	20	0-49
Hexavalent Chromium (Dissolved)	Annual	µg/L	----- Monitor -----		60	0	0	0-0
<i>E. coli</i>	Annual	#/100 ml	126	284 <sup>a</sup>	454	9	647	0-21000
Flow Rate	Annual	MGD	----- Monitor -----		1771	12.7	23.7	7.7-48.4
Gamma-BHC, Total (Lindane)	Annual	µg/L	----- Monitor -----		20	0.05	0.43	0-0.5

**Table 8. Effluent Characterization Using Self-Monitoring Data**

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Chlorine, Total Residual	Annual	mg/L	----- Monitor -----		638	0	0.01	0-0.137
Mercury	Annual	ng/L	9.9	1700	32	3.02	7.53	1.7-10.5
		kg/day	0.000825	0.142	--	--	--	--
Acute Toxicity, <i>Ceriodaphnia dubia</i>	Annual	TU <sub>a</sub>	----- Monitor -----		5	0	1.12	0-1.4
Acute Toxicity, <i>Pimephales promelas</i>	Annual	TU <sub>a</sub>	----- Monitor -----		5	0.8	1.18	0-1.22
pH, Maximum	Annual	S.U.	--	9.0	1816	6.9	7.3	6.3-8.2
pH, Minimum	Annual	S.U.	--	6.0	1816	6.8	7.1	6.1-7.5
Residue, Total Filterable	Annual	mg/L	----- Monitor -----		24	615	1040	489-1270
Carbonaceous	Annual	mg/L	15	23 <sup>a</sup>	1201	6	14	1-23
Biochemical Oxygen Demand (5 day)		kg/day	1249	1915 <sup>a</sup>	--	--	--	--
Bypass Monitoring Station 002								
Total Suspended Solids	Annual	mg/L	----- Monitor -----		370	54	229	7-358
<i>E. coli</i>	Annual	#/100 ml	----- Monitor -----		74	38.5	2560	1-15200
Flow Rate	Annual	MGD	----- Monitor -----		344	10.8	48.7	0.04-108
Chlorine, Total Residual	Annual	mg/L	----- Monitor -----		71	5	11.6	0-13.9
Carbonaceous Biochemical Oxygen Demand (5 day)	Annual	mg/L	----- Monitor -----		344	24	79.9	1-170
Bypass Occurrence, Number per month	Annual	No./Month	----- Monitor -----		237	1	1	1-2
Bypass Duration, Hours per month	Annual	Hr/Month	----- Monitor -----		374	7.5	24	0.25-24

**Table 8. Effluent Characterization Using Self-Monitoring Data**

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Combined Sewer Overflow Station 005								
Total Suspended Solids	Annual	mg/L	-----	Monitor -----	--	--	--	--
<i>E. coli</i>	Annual	#/100 ml	-----	Monitor -----	--	--	--	--
Overflow Occurrence	Annual	No./Month	-----	Monitor -----	31	1	1	1-1
		Million						
Overflow Volume	Annual	Gallons	-----	Monitor -----	20	0.0456	0.36	0.00082-1.7
Carbonaceous Biochemical Oxygen Demand (5 day)	Annual	mg/L	-----	Monitor -----	--	--	--	--
Combined Sewer Overflow Station 006								
Total Suspended Solids	Annual	mg/L	-----	Monitor -----	17	136	481	16-518
<i>E. coli</i>	Annual	#/100 ml	-----	Monitor -----	2	40500	70700	7000-74000
Overflow Occurrence	Annual	No./Month	-----	Monitor -----	191	1	1	1-2
		Million						
Overflow Volume	Annual	Gallons	-----	Monitor -----	151	0.0451	0.596	0.00011-3.19
Carbonaceous Biochemical Oxygen Demand (5 day)	Annual	mg/L	-----	Monitor -----	16	16.5	91	5-127
Combined Sewer Overflow Station 007								
Total Suspended Solids	Annual	mg/L	-----	Monitor -----	19	110	300	12-304
<i>E. coli</i>	Annual	#/100 ml	-----	Monitor -----	2	67000	76900	56000-78000
Overflow Occurrence	Annual	No./Month	-----	Monitor -----	182	1	1	1-2
		Million						
Overflow Volume	Annual	Gallons	-----	Monitor -----	151	0.0567	0.463	0.00006-2.15

**Table 8. Effluent Characterization Using Self-Monitoring Data**

Parameter	Season	Units	Current Permit Limits		# Obs.	Percentiles		Data Range
			30 day	Daily		50th	95th	
Carbonaceous Biochemical Oxygen Demand (5 day)								
	Annual	mg/L	----- Monitor -----		15	40	169	3-231
Sanitary Sewer Overflow Station 025								
<i>E. coli</i>	Annual	#/100 ml	----- Monitor -----		--	--	--	--
Overflow Occurrence	Annual	No./Month	----- Monitor -----		6	1	1	1-1
Sanitary Sewer Overflow Station 026								
<i>E. coli</i>	Annual	#/100 ml	----- Monitor -----		--	--	--	--
Overflow Occurrence	Annual	No./Month	----- Monitor -----		16	1	1	1-1
Sanitary Sewer Overflow Station 300								
Overflow Occurrence	Annual	No./Month	----- Monitor -----		58	2	12.5	0-19
Sludge Station 585								
Arsenic	Annual	mg/kg	----- Monitor -----		--	--	--	--
Beryllium	Annual	mg/kg	----- Monitor -----		--	--	--	--
Cadmium	Annual	mg/kg	----- Monitor -----		--	--	--	--
Chromium	Annual	mg/kg	----- Monitor -----		--	--	--	--
Lead	Annual	mg/kg	----- Monitor -----		--	--	--	--
Nickel	Annual	mg/kg	----- Monitor -----		--	--	--	--
Sludge Fee Weight	Annual	Dry Tons	----- Monitor -----		--	--	--	--
Mercury	Annual	mg/kg	----- Monitor -----		--	--	--	--
Sludge Station 586								
Sludge Fee Weight	Annual	Dry Tons	----- Monitor -----		5	2520	3350	2370-3390

**Table 8. Effluent Characterization Using Self-Monitoring Data**

Parameter	Season	Units	Current Permit Limits		#	Percentiles		Data Range
			30 day	Daily	Obs.	50th	95th	
Influent Monitoring Station 601								
Total Suspended Solids	Annual	mg/L	-----	Monitor -----	1240	136	244	24-474
Cyanide, Total	Annual	mg/L	-----	Monitor -----	60	0	0	0-0
Nickel	Annual	µg/L	-----	Monitor -----	60	0	45.3	0-55
Silver	Annual	µg/L	-----	Monitor -----	60	0	5	0-5
Zinc	Annual	µg/L	-----	Monitor -----	60	75	131	40-640
Cadmium	Annual	µg/L	-----	Monitor -----	60	0	0	0-0
Lead	Annual	µg/L	-----	Monitor -----	60	0	0	0-0
Chromium	Annual	µg/L	-----	Monitor -----	60	0	23.1	0-35
Copper	Annual	µg/L	-----	Monitor -----	60	40	70	10-100
Hexavalent Chromium (Dissolved)	Annual	µg/L	-----	Monitor -----	60	0	0	0-32
Mercury	Annual	ng/L	-----	Monitor -----	61	21	153	0-306
pH, Maximum	Annual	S.U.	-----	Monitor -----	1823	7.9	8.6	6.6-11.5
pH, Minimum	Annual	S.U.	-----	Monitor -----	1823	7.4	7.8	3.7-8.5
Carbonaceous Biochemical Oxygen Demand (5 day)	Summer	mg/L	-----	Monitor -----	620	111	161	23-214
	Winter	mg/L	-----	Monitor -----	583	97	149	23-210

\* = For minimum pH, 5th percentile shown in place of 50th percentile.

\*\* = For dissolved oxygen, 5th percentile shown in place of 95th percentile.

<sup>a</sup> = weekly average.



**Table 9. Projected Effluent Quality for Outfall 001**

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Self-Monitoring (DMR) Data					
Ammonia (Summer)	mg/L	244	244	0.220	0.474
Ammonia (Winter)	mg/L	192	191	0.480	0.962
Barium <sup>A</sup>	µg/L	31	31	122.2	146.9
Cadmium <sup>A</sup>	µg/L	23	11	0.447	0.761
Chromium <sup>A</sup>	µg/L	24	1	9.80	13.43
Copper <sup>A</sup>	µg/L	67	44	11.60	17.61
Cyanide - free	µg/L	32	4	8	11
Gamma-hexachlorocyclohexane (Lindane)	µg/L	20	4	0.548	0.75
Hexavalent Chromium, dissolved	µg/L	19	7	0.013	0.018
Lead <sup>A</sup>	µg/L	24	7	2.198	3.578
Mercury <sup>A</sup>	ng/L	66	29	1.321	2.060
Nickel <sup>A</sup>	µg/L	24	4	3.493	4.785
Nitrate-N + Nitrite-N <sup>A</sup>	mg/L	62	62	11.04	13.66
Phosphorus	mg/L	258	258	1.316	1.946
Silver <sup>A</sup>	µg/L	66	4	0.803	1.100
Total Filterable Residue <sup>A</sup>	mg/L	62	62	1060	1181
Nitrogen Total Kjeldahl	mg/L	61	61	1.818	2.744
Zinc <sup>A</sup>	µg/L	24	21	42.30	62.02

<sup>A</sup> = DMR data combined with Ohio EPA data and/or Pretreatment Program data.

<sup>B</sup> = Combined other data sources include Pretreatment Program data and Ohio EPA data.

DMR = Discharge Monitoring Report

MDL = analytical laboratory method detection limit

PEQ = projected effluent quality

Table 9: Projected Effluent Quality for outfall 001 - Continued

Parameter	Units	Number of Samples	Number > MDL	PEQ Average	PEQ Maximum
Combined Other Data <sup>B</sup>					
Arsenic	µg/L	6	2	11.04	15.12
Aluminum	µg/L	1	1	644.1	882.26
Bis(2-ethylhexyl) phthalate	µg/L	5	2	5.675	7.774
Butyl benzyl phthalate	µg/L	1	1	6.563	8.99
Chlorides	mg/L	1	1	1430	1959
Chloromethane	µg/L	1	1	0.751	1.029
1,4-Dichlorobenzene	µg/L	1	1	0.539	0.7378
Diethyl phthalate	µg/L	1	1	1.018	1.395
Iron	µg/L	1	1	656.3	899
Manganese	µg/L	1	1	93.24	127.7
Molybdenum	µg/L	4	2	19.93	27.30
Naphthalene	µg/L	1	1	0.878	1.203
Selenium	µg/L	5	1	1.763	2.415
Strontium	µg/L	1	1	2272	3112
Toluene	µg/L	1	1	1.543	2.114
1,2,3-Trichlorobenzene	µg/L	1	1	0.751	1.029
1,2,4-Trichlorobenzene	µg/L	1	1	0.724	0.992

<sup>A</sup> = DMR data combined with Ohio EPA data and/or Pretreatment Program data.

<sup>B</sup> = Combined other data sources include Pretreatment Program data and Ohio EPA data.

DMR = Discharge Monitoring Report

MDL = analytical laboratory method detection limit

PEQ = projected effluent quality

**Table 10. Summary of Acute and Chronic Toxicity Results**

Date	<i>Ceriodaphnia Dubia</i>		<i>Pimephales promelas</i>	
	TU <sub>a</sub>	TU <sub>c</sub>	TU <sub>a</sub>	TU <sub>c</sub>
9/15/2013	AA	2.08	AA	AA
8/12/2014	AA	4.02	AA	AA
11/11/2014	AA	1.1	--	--
2/17/2015	AA	AA	--	--
5/5/2015	AA	AA	--	--
8/14/2015	AA	1.1	AA	AA
11/3/2015	AA	AA	--	--
2/12/2016	AA	AA	--	--
5/3/2016	AA	AA	--	--
8/12/2016	AA	AA	AA	AA
8/29/2017	AA	AA	AA	AA

AA = non-detection; analytical method detection limit of 0.2 TU<sub>a</sub>, 1.0 TU<sub>c</sub>

TU<sub>a</sub> = acute toxicity unit

TU<sub>c</sub> = chronic toxicity unit

**Table 11. Ohio EPA Toxicity Screening Results for Outfall 001**

Date	Acutely Toxic (Y/N)	<i>Pimephales promelas</i>	<i>Ceriodaphnia dubia</i>
		%M	%M
10/19/2017	N	0	0

<sup>a</sup> = 24-hour composite sample

%M = percent mortality in 100% effluent

# Ohio River Basin Whole Effluent Toxicity

Reasonable Potential for Ohio EPA NPDES Permits

Reviewer:	Geoff Holmes
Date:	2018-03-28

Facility Name:	Beavercreek WRRF
Permit Number:	1PK00003
Date Range Searched	Feb. 2013 to Feb. 2018

Outfall #				
	Water flea (C. Dubia)		Fathead minnow (P. Promelas)	
	Acute	Chronic	Acute	Chronic
WLA	0.79	2.66	0.79	2.66
# of tests	11	11	5	5
Maximum value	AA (0.2)	4.02	AA (0.2)	AA (1.0)
Per cent of tests greater than WLA	0	1÷11 = 9.1%	0	0
Geometric mean	0.2	1.23	0.2	1.0
Geomean * Per cent of tests greater than WLA	0	9.1% * 1.23 = 0.112	0	0
(Geomean * Per cent of tests greater than WLA) / WLA	0	0.112 ÷ 2.66 = 4.2%	0	0
Factors to consider [ <a href="#">OAC 3745-33-07(B)(1)</a> ]				
(a) The magnitude, frequency and variability of toxicity discharged.		Included in Table 1.		
(b) The degree and type of near-field and far-field effects in the receiving water as measured by physical, chemical, toxicity or biological index measurements		Included in Table 1.		
(c) The quality and quantity of each type of data available.		Included in Table 1.		
(d) Other relevant factors.		N/A		
See Table 1 below				
Optional information if available Impacts Table 1(A)(4) and (A)(5)				
Is there near-field data available? – No		Complete Table 1(B)		
Is there far-field data available? – No		Complete Table 1(C)		
Results – Hazard Categorization				
	Water flea		Fathead minnow	
	Acute	Chronic	Acute	Chronic
Effluent Toxicity	4	3	4	4
Near-Field Impact	---		---	
Far-field Impact		---		---
Overall Categorization	3 – Possible Toxicity		4 – No Toxicity	

Attribute Evaluated	Hazard Category 1	Hazard Category 2	Hazard Category 3	Hazard Category 4
Degree of toxicity problem	Adequately Documented	Strongly Suspected	Possible	None
(A) Effluent toxicity				
.....(1) Minimum number of tests (Actual number 11)	3	1	0 or 1	0 or 1
.....(2) Per cent of tests greater than WLA (Actual per cent 9.1%)	greater than 30	20 to 30	10 to 20 $9\% \approx 10\%$	less than 10 $9\% \approx 10\%$
.....(3) Effluent geometric mean TU TUa (0.2) TUc (1.23)				
.....(4) Average exceedance <sup>1</sup> (Geometric Mean $TU_x$ * Per cent of tests greater than WLA)				
.....(a) Without paragraph (B) and (C) of this table available				
.....(i) Acute <sup>2</sup>	greater than 0.3	greater than or equal to 0.3	greater than or equal to 0.2	less than 0.2
.....(ii) Chronic	greater than 0.3 x WLA	greater than or equal to 0.3 x WLA	greater than or equal to 0.2 x WLA	less than 0.2 x WLA ( $0.2 \times 2.66$ ) $= 0.532 > 0.11$
.....(b) With paragraph (B) or (C) of this table available				
.....(i) Acute <sup>2</sup>	greater than 0.5	greater than or equal to 0.3	greater than or equal to 0.3	less than 0.3
.....(ii) Chronic	greater than 0.67 x WLA	greater than or equal to 0.5 x WLA	greater than or equal to 0.5 x WLA	less than 0.5 x WLA
.....(5) Maximum TU value TUa (0.2) TUc (4.02)				
.....(a) Without paragraph (B) and (C) of this table available	greater than or equal to 3 x WLA	greater than or equal to 1 x WLA $4.02 \div 2.66 = 1.51$		less than 1 x WLA
.....(b) With paragraph (B) or (C) of this table available and confirming toxic impact	greater than 1 x WLA	greater than or equal to 1 x WLA	greater than or equal to 0.5 x WLA	less than 0.5 x WLA
(B) Near-field impact				
.....(1) Mortality within mixing zone <sup>3</sup>	greater than or equal to 20%	less than or equal to 20%	less than to equal to 20%	less than 20%
.....(2) Stream community impact within mixing zone				
.....(a) Implied chemically <sup>4</sup>	greater than or equal to 3 x IMZM	greater than or equal to 1.5 x IMZM	greater than or equal to IMZM	less than or equal to 0.5 x IMZM

Attribute Evaluated	Hazard Category 1	Hazard Category 2	Hazard Category 3	Hazard Category 4
Degree of toxicity problem	Adequately Documented	Strongly Suspected	Possible	None
.....(b) Implied toxicologically <sup>4</sup>	greater than or equal to 1.0 TUa	greater than or equal to 1.0 TUa	greater than or equal to 1.0 TUa	less than 1.0 TUa
.....(c) Measured biologically	Toxic or severe unknown signature	Fair/poor community	Slight impact or unknown impact signature	None or non-toxic signature
(C) Far-field impact				
.....(1) Aquatic life use impairment (Ohio EPA biological criteria)	Yes <sup>5</sup>	Yes or partial <sup>5</sup>	Partial	None or non-toxic signature
.....(2) Stream community impact				
.....(a) Implied toxicologically <sup>3</sup>	Significant effect	Significant effect	Unknown or slight effect	None
.....(3) Other indicators	Stress indicated	Stress indicated	Stress indicated	No stress

<sup>1</sup> Compare (per cent exceedances x geometric mean TU) to table factor.

<sup>2</sup> Use 0.3 x WLA for situations where AIM exists.

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

<sup>4</sup> Based on effluent data. May not be appropriate for situations where AIM exists.

<sup>5</sup> Lack of attainment due to toxic, complex or unidentifiable type of impact.

**Table 12. Use Attainment Table**

Location	River Mile	Use Designation	Attainment Status	Causes of Impairment	Sources of Impairment
L. Beaver Ck upst Eastern Reg WWTP	4.76	WWH	B	Comment: Macroinvertebrates impacted by nutrient enrichment due to urban runoff.	
L. Beaver Ck upst Grange Hall Rd; dst Eastern Reg. WWTP	3.54	WWH	B	Nutrient enrichment biological indicators; Particle distribution (embeddedness); other flow regime alterations	Urban runoff/storm sewers; Municipal point source discharges; Municipal (urbanized high density area)
L. Beaver Ck at Valleywood	2.83	WWH	A	Nutrient enrichment biological indicators; Particle distribution (embeddedness); other flow regime alterations	Urban runoff/storm sewers; Municipal point source discharges; Municipal (urbanized high density area)
L. Beaver Ck at Factory Rd. near Alpha	0.05	WWH	Partial	Nutrient enrichment biological indicators; Particle distribution (embeddedness); other flow regime alterations	Urban runoff/storm sewers; Municipal point source discharges; Municipal (urbanized high density area)
Beaver Ck at Fairgrounds Rd	3.86	WWH	B	Comment: Macroinvertebrate community reflects wetland stream conditions (ie, slack flow, low D.O.)	
Beaver Ck at Dayton-Xenia Rd	1.57	WWH	Partial	Natural conditions (Flow or habitat)	Natural sources
Beaver Ck at US 35; dst L.Beaver Ck	1.04	WWH	Partial	Nutrient enrichment biological indicators	Urban runoff/Storm sewers; Municipal point source discharges
Beaver Ck at Adj Factory Rd; dst Beaver Creek WWTP	0.20	WWH	Full		

<sup>A</sup> Location not sampled.

<sup>B</sup> Only an ICI qualitative sample was available here; no attainment status assessment was made.

Ck = creek

Adj. = adjacent

Dst. = downstream

Upst. = upstream

WWH = warmwater habitat

WWTP = wastewater treatment plant

**Table 13. Water Quality Criteria in the Study Area**

Parameter	Units	Human Health	Agri-culture	Aquatic Life	Maximum Aquatic Life	Inside Mixing Zone Maximum
Aldrin	µg/L	0.0014 <sup>C</sup>	--	--	--	--
Aluminum	µg/L	--	--	--	--	--
Ammonia (Summer)	mg/L	--	--	0.9	--	--
Ammonia (Winter)	mg/L	--	--	2.8	--	--
Arsenic	µg/L	--	100	150	340	680
Barium	µg/L	--	--	220	2000	4000
Bis(2-ethylhexyl) phthalate	µg/L	59 <sup>C</sup>	--	8.4	1100	2100
Butyl benzyl phthalate	µg/L	5200	--	23	130	260
Cadmium	µg/L	--	50	6.5	18	36
Chlorides	mg/L	--	--	--	--	--
Chlorine, Total Residual	mg/L	--	--	0.011	0.019	0.038
Chloromethane	µg/L	--	--	--	--	--
Chromium	µg/L	--	100	240	4900	9800
Copper	µg/L	1300	500	27	44	89
Cyanide, free	µg/L	220000	--	12	46	92
1,4-Dichlorobenzene	µg/L	2600	--	9.4	57	110
Dieldrin <sup>D</sup>	µg/L	--	--	0.056	0.24	0.47
Diethyl phthalate	µg/L	120000	--	220	980	2000
Dimethyl phthalate	µg/L	2900000	--	1100	3200	6400
4,6-Dinitro-2-methylphenol <sup>D</sup>	µg/L	770	--	--	--	--
Gamma-Hexachloro-cyclohexane (Lindane) <sup>D</sup>	µg/L	0.63 <sup>C</sup>	--	0.057	0.95	1.9
Heptachlor <sup>D</sup>	µg/L	0.0021	--	--	--	--
Hexavalent Chromium, dissolved	µg/L	--	--	11	16	31
Iron	µg/L	--	5000	--	--	--
Lead	µg/L	--	100	31	580	1200
Manganese	µg/L	--	--	--	--	--
Mercury <sup>B</sup>	ng/L	12	10000	910	1700	3400
Molybdenum	µg/L	--	--	20000	190000	370000
Naphthalene	µg/L	--	--	21	170	340
Nickel	µg/L	4600	200	150	1300	2600
Nitrate-N + Nitrite-N	mg/L	--	100	--	--	--
Nitrogen Total Kjeldahl	mg/L	--	--	--	--	--
Phenol	µg/L	4600000	--	400	4700	9400
Phosphorus	mg/L	--	--	--	--	--
Selenium	µg/L	11000	50	5	--	--



Parameter	Units	Human Health	Agri-culture	Aquatic Life	Maximum Aquatic Life	Inside Mixing Zone Maximum
Silver	µg/L	--	--	1.3	13	26
Strontium	µg/L	--	--	21000	40000	81000
Total Filterable Residue	mg/L	--	--	1500	--	--
1,2,3-Trichlorobenzene	µg/L	--	--	--	--	--
1,2,4-Trichlorobenzene	µg/L	940	--	--	--	--
Toluene	µg/L	200000	--	62	560	1100
Zinc	µg/L	69000	25000	340	340	680

<sup>C</sup> Carcinogen

<sup>B</sup> Bioaccumulative Chemical of concern (BCC)

<sup>D</sup> This parameter was found in the effluent of another discharger in this interactive segment.

**Table 14. Instream Conditions and Discharger Flow**

Parameter	Units		Value	Basis
Upstream Flows				
Little Miami River (upstream of Xenia - Ford Rd. WWTP)				
1Q10	cfs	annual	8.65	USGS gage #03240000 & 03241500, 1952 - 1997 data.
7Q10	cfs	annual	10.63	
30Q10	cfs	summer	12.88	
		winter	29.09	“
Harmonic Mean Flow	cfs	annual	56.61	“
Mixing Assumption	%	average	100	Stream-to-discharge ratio
(GMR & Tribs.)	%	maximum	100	Stream-to-discharge ratio
Little Beaver Creek (upstream of Eastern Reg. WWTP and Tenneco)				
1Q10	cfs	annual	2.68	USGS gage #03241500, 1952-97 data
7Q10	cfs	annual	2.71	USGS gage #03241500, 1952-97 data
30Q10	cfs	summer	2.81	USGS gage #03241500, 1952-97 data
	cfs	winter	3.50	USGS gage #03241500, 1952-97 data
Harmonic Mean Flow	cfs	annual	4.33	USGS gage #03241500, 1952-97 data
Incremental flow for L. Beaver Creek between Eastern Reg. WWTP and mouth				
1Q10	cfs	annual	0.31	USGS gage #03241500, 1952-97 data
7Q10	cfs	annual	0.36	USGS gage #03241500, 1952-97 data
30Q10	cfs	summer	0.52	USGS gage #03241500, 1952-97 data
	cfs	winter	1.66	USGS gage #03241500, 1952-97 data
Harmonic Mean Flow	cfs	annual	3.01	USGS gage #03241500, 1952-97 data
Beaver Creek (upstream of L. Beaver Cr. confluence)				
1Q10	cfs	annual	0.79	USGS gage #03241500, 1952-97 data
7Q10	cfs	annual	0.86	USGS gage #03241500, 1952-97 data
30Q10	cfs	Summer	1.06	USGS gage #03241500, 1952-97 data
	cfs	winter	2.57	USGS gage #03241500, 1952-97 data
Harmonic Mean Flow	cfs	annual	4.36	USGS gage #03241500, 1952-97 data
Incremental Flow for Little Miami River between Xenia - Ford Rd. WWTP and Sugarcreek WRRF				
1Q10	cfs	annual	3.04	USGS gage #03241500, 1952-97 data
7Q10	cfs	annual	2.50	USGS gage #03241500, 1952-97 data
30Q10	cfs	summer	3.10	USGS gage #03241500, 1952-97 data
	cfs	winter	7.47	USGS gage #03241500, 1952-97 data
Harmonic Mean Flow	cfs	annual	12.63	USGS gage #03241500, 1952-97 data

Table 14. Instream Conditions and Discharger Flow - Continued

Parameter	Units		Value	Basis
Sugar Creek (@ mouth)				
1Q10	cfs	annual	0.64	USGS gage #03241500, 1952-97 data
7Q10	cfs	annual	0.75	USGS gage #03241500, 1952-97 data
30Q10	cfs	summer	1.07	USGS gage #03241500, 1952-97 data
	cfs	winter	3.42	USGS gage #03241500, 1952-97 data
Harmonic Mean Flow	cfs	annual	6.20	USGS gage #03241500, 1952-97 data
Glady Run (upstream of Glady Run WWTP)				
1Q10	cfs	annual	0.09	USGS gage #03241500, 1952-97 data
7Q10	cfs	annual	0.10	USGS gage #03241500, 1952-97 data
30Q10	cfs	summer	0.15	USGS gage #03241500, 1952-97 data
	cfs	winter	0.47	USGS gage #03241500, 1952-97 data
Harmonic Mean Flow	cfs	annual	0.84	USGS gage #03241500, 1952-97 data
Xenia- Ford Rd. WWTP				
Outfall 001 flow rate	cfs (MGD)	avg.	5.57 (3.6)	NPDES permit application
Mont. Co. East. Regional WWTP				
Outfall 001 flow rate	cfs (MGD)	avg.	20.11 (13)	NPDES permit application
Greene Co. Beaver Creek WRRF				
Outfall 001 flow rate	cfs (MGD)	avg.	13.15 (8.5)	NPDES permit application
Greene Co. Sugarcreek WRRF				
Outfall 001 flow rate	cfs (MGD)	avg.	15.32 (9.9)	NPDES permit application
Xenia- Glady Run WWTP				
Outfall 001 flow rate	cfs (MGD)	avg.	6.19 (4.0)	NPDES permit application
Mixing Assumption	% average		100	Stream-to-discharge ratio
	% maximum		100	Stream-to-discharge ratio
Instream Summer Temperature				
L. Miami River (RM 77.0)	°C		20	Xenia-Ford 901Station; 19 values, 2013-17
L. Miami River (RM 64.0)	°C		22	Sugarcreek 901 Station; 20 values, 2013-18
Beaver Creek	°C		22	Beavercreek 901Station; 20 values, 2013-18
L. Beaver Creek	°C		22	East.Reg. 901Station; 20 values, 2013-18
Glady Run	°C		19	Xenia-Glady 901Station; 19 values, 2013-18

Table 14. Instream Conditions and Discharger Flow - Continued

Parameter	Units	Value	Basis
Instream Winter Temperature			
L. Miami River (RM 77.0)	°C	6.6	Xenia-Ford 901Station; 9 values, 2013-17
L. Miami River (RM 64.0)	°C	7.3	Sugarcreek 901 Station; 17 values, 2013-18
Beaver Creek	°C	8.2	Beavercreek 901Station; 16 values, 2013-18
L. Beaver Creek	°C	9.3	East.Reg. 901Station; 17 values, 2013-18
Glady Run	°C	8.7	Xenia-Glady 901Station; 11 values, 2013-18
Instream Summer pH			
L. Miami River (RM 77.0)	S.U.	8.3	Xenia-Ford 901Station; 19 values, 2013-17
L. Miami River (RM 64.0)	S.U.	8.2	Sugarcreek 901 Station; 20 values, 2013-18
Beaver Creek	S.U.	8.1	Beavercreek 901Station; 20 values, 2013-18
L. Beaver Creek	S.U.	7.8	East.Reg. 901Station; 20 values, 2013-18
Glady Run	S.U.	8.2	Xenia-Glady 901Station; 19 values, 2013-18
Instream Winter pH			
L. Miami River (RM 77.0)	S.U.	8.4	Xenia-Ford 901Station; 9 values, 2013-17
L. Miami River (RM 64.0)	S.U.	8.4	Sugarcreek 901 Station; 17 values, 2013-18
Beaver Creek	S.U.	8.1	Beavercreek 901Station; 16 values, 2013-18
L. Beaver Creek	S.U.	7.9	East.Reg. 901Station; 17 values, 2013-18
Glady Run	S.U.	8.2	Xenia-Glady 901Station; 11 values, 2013-18
Instream Hardness			
L. Miami River dst Xenia-Ford Rd. WWTP	mg/L	349	Xenia-Ford 901Station; 42 values, 2013-17
L. Miami River dst Sugarcreek WWTP	mg/L	332	Sugarcreek 901 Station; 62 values, 2013-18
Beaver Creek	mg/L	341	Beavercreek 901Station; 61 values, 2013-18
L. Beaver Creek	mg/L	318	East.Reg. 901Station; 62 values, 2013-18
Glady Run	mg/L	365	Xenia-Glady 901Station; 51 values, 2013-18

USGS = United States Geological Survey

NPDES = National Pollutant Discharge Elimination System

Table 14. Instream Conditions and Discharger Flow - Continued

Parameter	Units		Value	Basis
Background Water Quality for the Little Miami River				
Aldrin	µg/L	annual	0	No representative data available.
Aluminum	µg/L	annual	251	STORET; 3 values, 1 <MDL, 2011
Ammonia, summer	mg/L	annual	0.08	DMR; 19 values, 8 <MDL, 2013-18
Ammonia, winter	mg/L	annual	0.035	DMR ½ MDL; 8 values, 5 <MDL, 2013-17
Arsenic	µg/L	annual	0	STORET; 3 values, 3 <MDL, 2011
Barium	µg/L	annual	93.7	STORET; 3 values, 0 <MDL, 2011
Bis(2-ethylhexyl) phthalate	µg/L	annual	0	No representative data available.
Butyl benzyl phthalate	µg/L	annual	0	No representative data available.
Cadmium	µg/L	annual	0	STORET; 3 values, 3 <MDL, 2011
Chlorine, Total Residual	µg/L	annual	0	No representative data available.
Chromium	µg/L	annual	0	STORET; 3 values, 3 <MDL, 2011
Copper	µg/L	annual	1.8	STORET; 3 values, 1 <MDL, 2011
Cyanide, Free	µg/L	annual	0	No representative data available.
1,4-Dichlorobenzene	µg/L	annual	0	No representative data available.
Dieldrin	µg/L	annual	0	No representative data available.
Diethyl phthalate	µg/L	annual	0	No representative data available.
Dimethyl phthalate	µg/L	annual	0	No representative data available.
4,6-Dinitro-2-methylphenol	µg/L	annual	0	No representative data available.
Gamma-Hexachlorocyclohexane (Lindane)	µg/L	annual	0	No representative data available.
Heptachlor	µg/L	annual	0	No representative data available.
Hexavalent Chromium, dissolved	µg/L	annual	0	No representative data available.
Iron	µg/L	annual	370	STORET; 3 values, 0 <MDL, 2011
Lead	µg/L	annual	0	STORET; 3 values, 3 <MDL, 2011
Manganese	µg/L	annual	26.67	STORET; 3 values, 0 <MDL, 2011
Mercury	ng/L	annual	0	No representative data available.
Molybdenum	µg/L	annual	0	No representative data available.
Naphthalene	µg/L	annual	0	No representative data available.
Nickel	µg/L	annual	3.4	STORET; 3 values, 0 <MDL, 2011
Nitrate-N + Nitrite-N	mg/L	annual	3.16	STORET; 6 values, 6 <MDL, 2011
Phenols	µg/L	annual	0	No representative data available.
Selenium	µg/L	annual	0	STORET; 3 values, 3 <MDL, 2011
Silver	µg/L	annual	0	No representative data available.
Strontium	µg/L	annual	681	STORET; 3 values, 0 <MDL, 2011
Total Filterable Residue	mg/L	annual	408	STORET; 6 values, 0 <MDL, 2011
Toluene	µg/L	annual	0	No representative data available.
1,2,4-Trichlorobenzene	µg/L	annual	0	No representative data available.
Zinc	µg/L	annual	16.3	STORET; 6 values, 0 <MDL, 2011

Table 14. Instream Conditions and Discharger Flow - Continued

Parameter	Units		Value	Basis
Background Water Quality for Beaver Creek				
Aldrin	µg/L	annual	0	STORET; 3 values, 3 <MDL, 2011
Aluminum	µg/L	annual	100	STORET; 11 values, 8 <MDL, 2011
Ammonia, summer	mg/L	annual	0.04	DMR; 20 values, 0 <MDL, 2013-18
Ammonia, winter	mg/L	annual	0.05	DMR; 16 values, 1 <MDL, 2013-18
Arsenic	µg/L	annual	0	STORET; 11 values, 11 <MDL, 2011-12
Barium	µg/L	annual	100	STORET; 11 values, 0 <MDL, 2011-12
Bis(2-ethylhexyl) phthalate	µg/L	annual	0	No representative data available.
Butyl benzyl phthalate	µg/L	annual	0	STORET; 1 values, 1 <MDL, 2011
Cadmium	µg/L	annual	0	STORET; 11 values, 11 <MDL, 2011-12
Chlorine, Total Residual	µg/L	annual	0	No representative data available.
Chromium	µg/L	annual	0	STORET; 11 values, 11 <MDL, 2011-12
Copper	µg/L	annual	1.0	STORET; 11 values, 10 <MDL, 2011-12
Cyanide, Free	µg/L	annual	0	No representative data available.
1,4-Dichlorobenzene	µg/L	annual	0	STORET; 2 values, 2 <MDL, 2011-12
Dieldrin	µg/L	annual	0	STORET; 3 values, 3 <MDL, 2011-12
Diethyl phthalate	µg/L	annual	0	STORET; 1 values, 1 <MDL, 2011
Dimethyl phthalate	µg/L	annual	0	STORET; 1 values, 1 <MDL, 2011
4,6-Dinitro-2-methylphenol	µg/L	annual	0	STORET; 1 values, 1 <MDL, 2011
Gamma-Hexachlorocyclohexane (Lindane)	µg/L	annual	0	No representative data available.
Heptachlor	µg/L	annual	0	STORET; 3 values, 3 <MDL, 2011-12
Hexavalent Chromium, dissolved	µg/L	annual	0	No representative data available.
Iron	µg/L	annual	438	STORET; 11 values, 0 <MDL, 2011-12
Lead	µg/L	annual	0	STORET; 11 values, 11 <MDL, 2011-12
Manganese	µg/L	annual	82	STORET; 11 values, 0 <MDL, 2011-12
Mercury	ng/L	annual	0	No representative data available.
Molybdenum	µg/L	annual	0	No representative data available.
Naphthalene	µg/L	annual	0	STORET; 2 values, 2 <MDL, 2011-12
Nickel	µg/L	annual	2.5	STORET; 11 values, 1 <MDL, 2011-12
Nitrate-N + Nitrite-N	mg/L	annual	0.855	STORET; 14 values, 0 <MDL, 2011-12
Phenol	µg/L	annual	0	STORET; 1 values, 1 <MDL, 2011
Selenium	µg/L	annual	0	STORET; 11 values, 11 <MDL, 2011-12
Silver	µg/L	annual	0	No representative data available.
Strontium	µg/L	annual	216	STORET; 11 values, 0 <MDL, 2011-12
Total Filterable Residue	mg/L	annual	455	STORET; 14 values, 0 <MDL, 2011-12
Toluene	µg/L	annual	0	STORET; 1 values, 1 <MDL, 2011
1,2,4-Trichlorobenzene	µg/L	annual	0	STORET; 1 values, 1 <MDL, 2011

Table 14. Instream Conditions and Discharger Flow - Continued

Parameter	Units		Value	Basis
Zinc	µg/L	annual	0	STORET; 11 values, 11<MDL, 2011-12
Background Water Quality for Little Beaver Creek				
Aldrin	µg/L	annual	0	No representative data available.
Aluminum	µg/L	annual	0	STORET; 5 values, 5 <MDL, 2011
Ammonia, summer	mg/L	annual	0	DMR; 20 values, 11<MDL, 2013-18
Ammonia, winter	mg/L	annual	0.03	DMR; 17 values, 8<MDL, 2013-18
Arsenic	µg/L	annual	0	STORET; 5 values, 5 <MDL, 2011
Barium	µg/L	annual	93	STORET; 5 values, 0 <MDL, 2011
Bis (2-ethylhexyl) phthalate	µg/L	annual	0	No representative data available.
Butyl benzyl phthalate	µg/L	annual	0	No representative data available.
Cadmium	µg/L	annual	0	STORET; 5 values, 5 <MDL, 2011
Chlorine, Total Residual	µg/L	annual	0	No representative data available.
Chromium	µg/L	annual	0	STORET; 5 values, 5 <MDL, 2011
Copper	µg/L	annual	1.6	STORET; 5 values; 2<MDL, 2011
Cyanide, Free	µg/L	annual	0	No representative data available.
1,4-Dichlorobenzene	µg/L	annual	0	No representative data available.
Dieldrin	µg/L	annual	0	No representative data available.
Diethyl phthalate	µg/L	annual	0	No representative data available.
Dimethyl phthalate	µg/L	annual	0	No representative data available.
4,6-Dinitro-2-methylphenol	µg/L	annual	0	No representative data available.
Gamma-Hexachloro-cyclohexane (Lindane)	µg/L	annual	0	No representative data available.
Total Filterable Residue	µg/L	annual	0	No representative data available.
Heptachlor	µg/L	annual	0	No representative data available.
Hexavalent Chromium, dissolved	µg/L	annual	0	No representative data available.
Iron	µg/L	annual	140	STORET; 5 values, 0 <MDL, 2011
Lead	µg/L	annual	0	STORET; 5 values, 5 <MDL, 2011
Manganese	µg/L	annual	32.2	STORET; 5 values, 0<MDL, 2011
Mercury	ng/L	annual	0	No representative data available.
Molybdenum	µg/L	annual	0	No representative data available.
Naphthalene	µg/L	annual	0	No representative data available.
Nickel	µg/L	annual	1.8	STORET; 5 values, 2<MDL, 2011
Nitrate-N + Nitrite-N	mg/L	annual	0.46	STORET; 10 values, 0<MDL, 2011
Phenols	µg/L	annual	0	No representative data available.
Selenium	µg/L	annual	0	STORET; 5 values, 5 <MDL, 2011
Silver	µg/L	annual	0	No representative data available.
Strontium	µg/L	annual	194.4	STORET; 5 values, 0<MDL, 2011
Total Filterable Residue	mg/L	annual	443	STORET; 10 values, 0<MDL, 2011
Toluene	µg/L	annual	0	No representative data available.

Table 14. Instream Conditions and Discharger Flow - Continued

Parameter	Units		Value	Basis
1,2,4-Trichlorobenzene	µg/L	annual	0	No representative data available.
Zinc	µg/L	annual	6.6	STORET; 5 values, 4<MDL, 2011

USGS = United States Geological Survey

MDL = analytical method detection limit

NPDES = National Pollutant Discharge Elimination System

WWTP = wastewater treatment plant

WRRF = Water resource reclamation facility

STORET = United States Environmental Protection Agency Storage and Retrieval Data Warehouse

DMR = Discharge Monitoring Report



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

Parameter	Units	Human Health	Agri-culture	Aquatic Life	Maximum Aquatic Life	Inside Mixing Zone Maximum
Aldrin <sup>D</sup>	µg/L	0.005	--	--	--	--
Aluminum <sup>E</sup>	µg/L	--	--	--	--	--
Ammonia, summer	mg/L	--	--	2.66	--	--
Ammonia, winter	mg/L	--	--	9.14	--	--
Arsenic <sup>B</sup>	µg/L	--	156	168	379	680
Barium	µg/L	--	--	416	4084 <sup>A</sup>	4000
Bis(2-ethylhexyl) phthalate <sup>D</sup>	µg/L	92	--	9.4	111	2100
Butyl benzyl phthalate	µg/L	17779 <sup>A</sup>	--	65	366 <sup>A</sup>	260
Cadmium <sup>B</sup>	µg/L	--	78	7.8	21	36
Chlorides <sup>E</sup>	mg/L	--	--	--	--	--
Chromium	µg/L	--	156	297	5657	9800
Copper	µg/L	2028 <sup>A</sup>	780 <sup>A</sup>	33	51	89
Cyanide, Free	µg/L	343000 <sup>A</sup>	--	13	51	92
1,4-Dichlorobenzene <sup>B</sup>	µg/L	8889 <sup>A</sup>	--	27	161 <sup>A</sup>	110
Diethyl phthalate <sup>B</sup>	µg/L	410281 <sup>A</sup>	--	622	9014 <sup>A</sup>	2000
Gamma-Hexachlorocyclohexane (Lindane) <sup>C D</sup>	µg/L	0.63	--	0.057	0.95	1.9
Hexavalent Chromium, dissolved <sup>B</sup>	µg/L	--	--	12	18	31
Iron <sup>B</sup>	µg/L	--	16486	--	--	--
Lead <sup>B</sup>	µg/L	--	156	39	715	1200
Manganese <sup>E</sup>	µg/L	--	--	--	--	--
Mercury <sup>B C</sup>	ng/L	12	10000 <sup>A</sup>	910	1700	3400
Molybdenum <sup>B</sup>	µg/L	--	--	22363	211594	370000
Naphthalene <sup>B</sup>	µg/L	--	--	59	479 <sup>A</sup>	340
Nickel	µg/L	7177 <sup>A</sup>	311	181	1582	2600
Nitrate-N + Nitrite-N <sup>B</sup>	mg/L	--	341	--	--	--
Phenol <sup>B</sup>	µg/L	15730000 <sup>A</sup>	--	1131	13239 <sup>A</sup>	9400
Selenium	µg/L	17165	78	5.6	--	--
Silver	µg/L	--	--	1.5	16	26
Strontium <sup>B</sup>	µg/L	--	--	44110	82322 <sup>A</sup>	81000
Total Filterable Residue	mg/L	--	--	1625	--	--
Toluene <sup>B</sup>	µg/L	312091 <sup>A</sup>	--	69	624	1100
1,2,4-Trichlorobenzene <sup>B</sup>	µg/L	3214	--	--	--	--
Zinc	µg/L	107670 <sup>A</sup>	39010 <sup>A</sup>	406	403	680

<sup>A</sup> Allocation must not exceed the Inside Mixing Zone Maximum.

<sup>B</sup> Parameter would not require a WLA based on reasonable potential procedures, but allocation requested by permit staff.

<sup>C</sup> Bioaccumulative Chemical of concern (BCC).

<sup>D</sup> Carcinogen

<sup>E</sup> No WLA required for this parameter.

**Table 16. Parameter Assessment**

Group 1:	Due to a lack of numeric criteria, the following parameters could not be evaluated at this time.			
	Aluminum	Chlorides	Manganese	Phosphorus
	Total Kjeldahl Nitrogen			
Group 2:	PEQ < 25 percent of WQS or all data below minimum detection limit. WLA not required. No limit recommended; monitoring optional.			
	Ammonia (summer)	Ammonia (winter)	Arsenic	Aldrin
	Cadmium	Chromium	1,4-Dichlorobenzene	Diethyl phthalate
	Hexavalent Chromium, dissolved	Iron - TR	Lead - TR	Mercury
	Molybdenum	Naphthalene	Nickel	Nitrate + Nitrite
	Phenol	Strontium	Toluene	1,2,4-Trichlorobenzene
	Zinc			
Group 3:	PEQ <sub>max</sub> < 50 percent of maximum PEL and PEQ <sub>avg</sub> < 50 percent of average PEL. No limit recommended; monitoring optional.			
	Barium	Butyl benzyl phthalate		Copper
Group 4:	PEQ <sub>max</sub> ≥ 50 percent, but < 100 percent of the maximum PEL or PEQ <sub>avg</sub> ≥ 50 percent, but < 100 percent of the average PEL. Monitoring is appropriate.			
	Bis(2-ethylhexyl) phthalate <sup>A</sup>		Selenium	Silver
	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.			
	<u>Limits to Protect Numeric Water Quality Criteria</u>			
	Parameter	Units	Period	Recommended Effluent Limits
				Average      Maximum
	Cyanide - free	µg/L	Annual	13      51
	Gamma-Hexachloro-cyclohexane (Lindane)	µg/L	Annual	0.057      0.95
	<sup>A</sup>			

Table 16. Parameter Assessment - Continued

PEL = preliminary effluent limit

PEQ = projected effluent quality

WLA = wasteload allocation

WQS = water quality standard

<sup>A</sup> Additivity of carcinogens. Following are the human health limits for the carcinogens:

Substance	Parameter	Limits for Human Health (µg/L)
A	Bis(2-ethylhexyl)phthalate	92
B	gamma-Hexachlorocyclohexane (Lindane)	0.057

The following equation will be used to calculate the additivity factor:

$$\frac{\text{MAC}_A}{92 \text{ µg/L}} + \frac{\text{MAC}_B}{0.057 \text{ µg/L}} \leq 1.0$$

where MAC = average concentration of all samples collected within the month.

**Table 17. Final Effluent Limits for Outfall 001**

Parameter	Season	Units	Concentration		Loading (kg/day) <sup>a</sup>		Basis <sup>b</sup>
			30 Day	Daily	30 Day	Daily	
			Average	Maximum	Average	Maximum	
Water Temperature	All	°C	----- Monitor -----				M <sup>c</sup>
Flow Rate	All	MGD	----- Monitor -----				M <sup>c</sup>
pH	All	SU	6.5 - 9.0		---	---	WQS
Dissolved Oxygen	All	mg/L	---	6.0 <sup>m</sup>	---	---	WQS
Total Suspended Solids	Summer	mg/L	11	16 <sup>d</sup>	354	515 <sup>d</sup>	PD
Total Suspended Solids	Winter	mg/L	16	24 <sup>d</sup>	515	773 <sup>d</sup>	PD
Oil & Grease	All	mg/L	---	10	---	---	WQS
Ammonia	Summer	mg/L	1.1	1.6 <sup>d</sup>	35.4	51.5 <sup>d</sup>	PD
Ammonia	Winter	mg/L	3.8	5.7 <sup>d</sup>	123	184 <sup>d</sup>	PD
Total Kjeldahl Nitrogen	All	mg/L	----- Monitor -----				M
Nitrate+Nitrite	All	mg/L	----- Monitor -----				M
Phosphorus	Summer	mg/L	1.0	1.5 <sup>d</sup>	32.2	48.3 <sup>d</sup>	TMDL
Phosphorus	Winter	mg/L	----- Monitor -----				M
Phosphorus	May-Oct	kg/day	----- 16.1 kg/day seasonal limit -----				TMDL
Orthophosphate, Dissolved (as P)	All	mg/L	----- Monitor -----				M
Free Cyanide	All	µg/L	----- Monitor -----				M
Barium	Quarterly	µg/L	----- Monitor -----				M
Nickel	Quarterly	µg/L	----- Monitor -----				M
Silver	All	µg/L	----- Monitor -----				M
Zinc	Quarterly	µg/L	----- Monitor -----				M
Cadmium	Quarterly	µg/L	----- Monitor -----				M
Lead	Quarterly	µg/L	----- Monitor -----				M
Chromium, Total Recoverable	Quarterly	µg/L	----- Monitor -----				M
Copper	All	µg/L	----- Monitor -----				M
Selenium	All	µg/L	----- Monitor -----				M
Hexavalent Chromium, Dissolved	Quarterly	µg/L	----- Monitor -----				M
<i>E. coli</i>	Summer	#/100ml	126	284 <sup>d</sup>	---	---	WQS
Bis (2-ethylhexyl) Phthalate	All	µg/L	----- Monitor -----				M
Gamma-Hexachlorocyclohexane (Lindane)	All	µg/L	----- Monitor -----				M
Mercury, Total (low-level)	All	ng/L	----- Monitor -----				M
Acute Toxicity, Ceriodaphnia dubia	August	TUa	----- Monitor -----				WET

Parameter	Season	Units	Concentration		Loading (kg/day) <sup>a</sup>		Basis <sup>b</sup>
			30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Chronic Toxicity, Ceriodaphnia dubia	August	TUc	----- Monitor -----				WET
Acute Toxicity, Pimephales promelas	August	TUa	----- Monitor -----				WET
Chronic Toxicity, Pimephales promelas	August	TUa	----- Monitor -----				WET
Total Filterable Residue	All	mg/L	----- Monitor -----				M
CBOD 5 day	Summer	mg/L	10	15 <sup>d</sup>	322	483 <sup>d</sup>	PD
CBOD 5 day	Winter	mg/L	25	40 <sup>d</sup>	805	1290 <sup>d</sup>	PD

<sup>a</sup> Effluent loadings based on average design discharge flow of 8.5 MGD.

<sup>b</sup> Definitions:

M = Division of Surface Water NPDES Permit Guidance 1: Monitoring frequency requirements for Sanitary Discharges

PD = Plant Design (OAC 3745-33-05(E))

TMDL = Total Maximum Daily Load

WET = Minimum testing requirements for whole effluent toxicity (OAC 3745-33-07(B)(11))

WQS = Ohio Water Quality Standards (OAC 3745-1)

<sup>c</sup> Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.

<sup>d</sup> 7 day average limit.

<sup>m</sup> Minimum

## **Addendum 1. Acronyms**

ABS	Anti-backsliding
BPJ	Best professional judgment
CFR	Code of Federal Regulations
CMOM	Capacity Management, Operation, and Maintenance
CCTV	Closed Circuit Television
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