pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0041581**
Facility Type	**Municipal**	APS ID	**274666**
Major / Minor	**Minor**	Authorization ID	**1420318**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Liverpool Municipal Authority Perry County**	Facility Name	**Liverpool STP**
Applicant Address	PO Box 357	Facility Address	1461 Susquehanna Trail
	Liverpool, PA 17045-0357		Liverpool, PA 17045
Applicant Contact	Jonathan Marks	Facility Contact	Steve Sauers
Applicant Phone	(717) 444-3521	Facility Phone	(717) 444-3521
Client ID	39413	Site ID	248322
Ch 94 Load Status	Not Overloaded	Municipality	Liverpool Borough
Connection Status	No Limitations	County	Perry
Date Application Received	December 2, 2022	EPA Waived?	Yes
Date Application Accepted	December 16, 2022	If No, Reason	

Purpose of Application: This is an application for NPDES renewal.

Approve	Deny	Signatures	Date
X		Nicholas Hong, P.E. / Environmental Engineer Nick Hong (via electronic signature)	December 21, 2022
x		Daniel W. Martin, P.E. / Environmental Engineer Manager Maria D. Bebenek for Daniel W. Martin	January 25, 2023
x		Maria D. Bebenek, P.E. / Environmental Program Manager Maria D. Bebenek	January 25, 2023

Summary of Review

The application submitted by the applicant requests a NPDES renewal permit for the Liverpool Wastewater Treatment Plant located at 1461 Susquehanna Trail, Liverpool, PA 17045 in Perry County, municipality of Liverpool. The existing permit became effective on May 1, 2018 and expires(d) on April 30, 2023. The application for renewal was received by DEP Southcentral Regional Office (SCRO) on December 2, 2022.

The purpose of this Fact Sheet is to present the basis of information used for establishing the proposed NPDES permit effluent limitations. The Fact Sheet includes a description of the facility, a description of the facility's receiving waters, a description of the facility's receiving waters attainment/non-attainment assessment status, and a description of any changes to the proposed monitoring/sampling frequency. Section 6 provides the justification for the proposed NPDES effluent limits derived from technology based effluent limits (TBEL), water quality based effluent limits (WQBEL), total maximum daily loading (TMDL), antidegradation, anti-backsliding, and/or whole effluent toxicity (WET). A brief summary of the outlined descriptions has been included in the Summary of Review section.

The subject facility is a 0.175 MGD average annual design flow treatment facility. The hydraulic capacity is 0.4375 MGD. The applicant does not anticipate any proposed upgrades to the treatment facility in the next five years. The NPDES application has been processed as a Minor Sewage Facility (Level 2) due to the type of sewage and the design flow rate for the facility. The applicant disclosed the Act 14 requirement to Perry County Commissioners and Liverpool Borough Council and the notice was received by the parties in October 2022. A planning approval letter was not necessary as the facility is neither new or expanding.

Utilizing the DEP's web-based Emap-PA information system, the receiving waters has been determined to be the Susquehanna River. The sequence of receiving streams that the Susquehanna River drains into the Chesapeake Bay. The subject site is subject to the Chesapeake Bay implementation requirements. The receiving water has protected water usage for warm water fishes (WWF) and migratory fishes (MF). No Class A Wild Trout fisheries are impacted by this discharge. The absence of high quality and/or exceptional value surface waters removes the need for an additional evaluation of anti-degradation requirements.

The Susquehanna River is a Category 2 stream listed in the 2022 Integrated List of All Waters (formerly 303d Listed Streams). This stream is an attaining stream that supports recreational uses. The Susquehanna River is impaired for fish consumption due to PCBs from an unknown source. The receiving waters is not subject to a total maximum daily load (TMDL) plan to improve water quality in the subject facility's watershed.

The existing permit and proposed permit differ as follows:

- **Due to the EPA Triennial review, monitoring for E. Coli shall be required.**

Sludge use and disposal description and location(s): Sewage Sludge Biosolids disposed at Keystone Renewable Waste at Middleburg in Snyder County

The proposed permit will expire five (5) years from the effective date.

Based on the review in this report, it is recommended that the permit be drafted. DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the *Pennsylvania Bulletin* in accordance with 25 Pa. Code § 92a.82. Upon publication in the *Pennsylvania Bulletin*, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a hearing. If a hearing is held, notice of the hearing will be published in the *Pennsylvania Bulletin* at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge.

Any additional information or public review of documents associated with the discharge or facility may be available at PA DEP Southcentral Regional Office (SCRO), 909 Elmerton Avenue, Harrisburg, PA 17110. To make an appointment for file review, contact the SCRO File Review Coordinator at 717.705.4700.

1.0 Applicant

1.1 General Information

This fact sheet summarizes PA Department of Environmental Protection's review for the NPDES renewal for the following subject facility.

Facility Name:	Liverpool Wastewater Treatment Plant
NPDES Permit #	PA0041581
Physical Address:	1461 Susquehanna Trail Liverpool, PA 17045
Mailing Address:	PO Box 357 Liverpool, PA 17045
Contact:	Jonathan Marks Authority President
Consultant:	Taylor Lebo HRG, Inc. (717) 564-1121 tlebo@hrg-inc.com

1.2 Permit History

Permit submittal included the following information.

- NPDES Application

2.0 Treatment Facility Summary

2.1.1 Site location

The physical address for the facility is 1461 Susquehanna Trail, Liverpool, PA 17045. A topographical and an aerial photograph of the facility are depicted as Figure 1 and Figure 2.

Figure 1: Topographical map of the subject facility

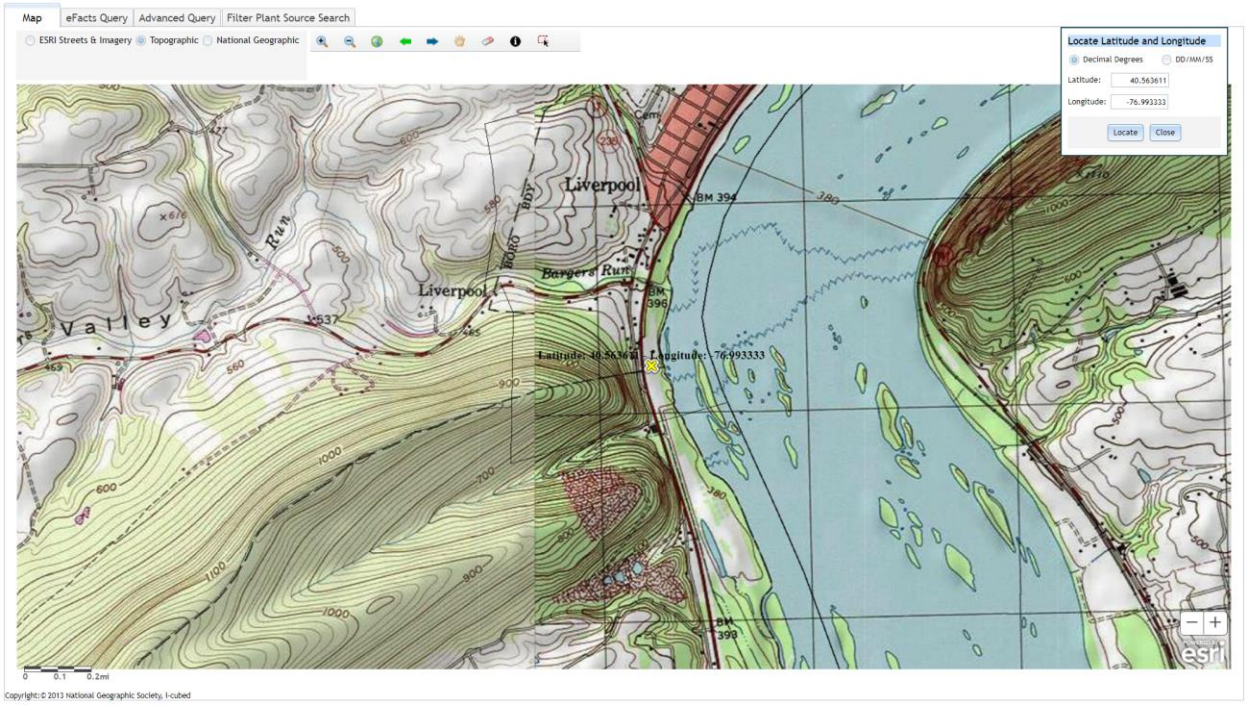
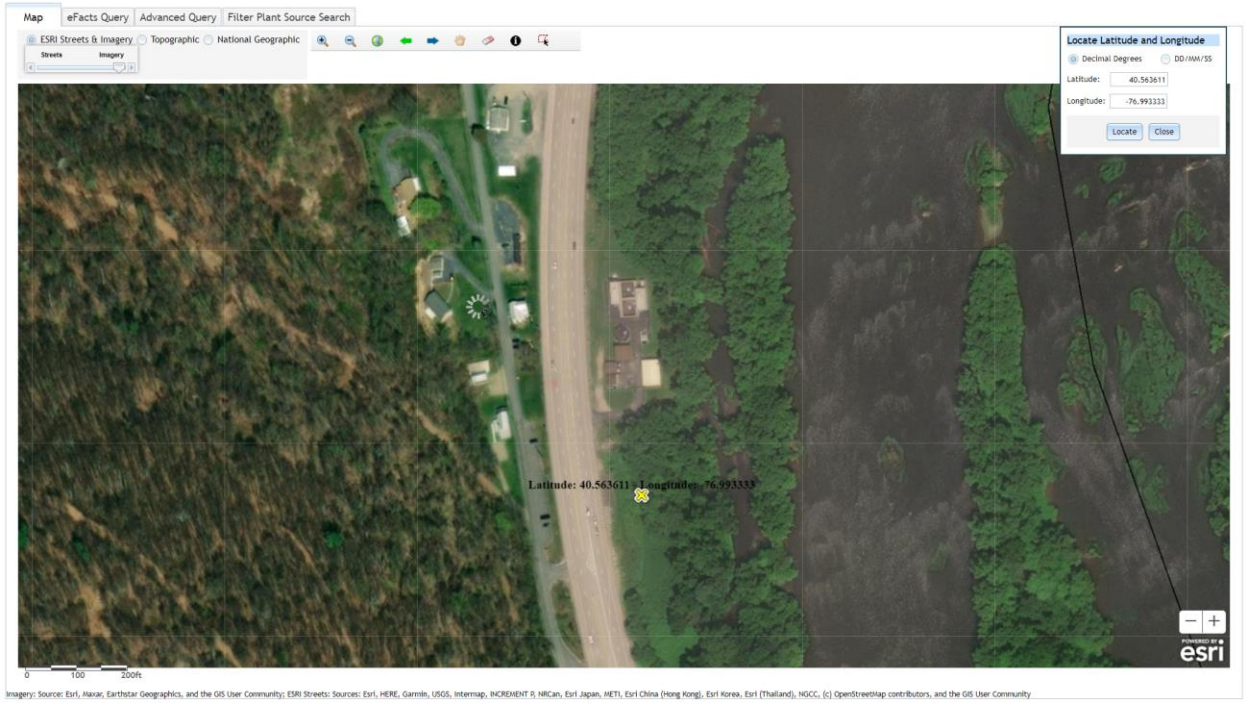


Figure 2: Aerial Photograph of the subject facility



2.1.2 Sources of Wastewater/Stormwater

The wastewater treatment plant receives 100% of the wastewater from Liverpool Borough.

The facility does not have wastewater contributions from industrial/commercial users.

The facility does not have hauled-in wastes.

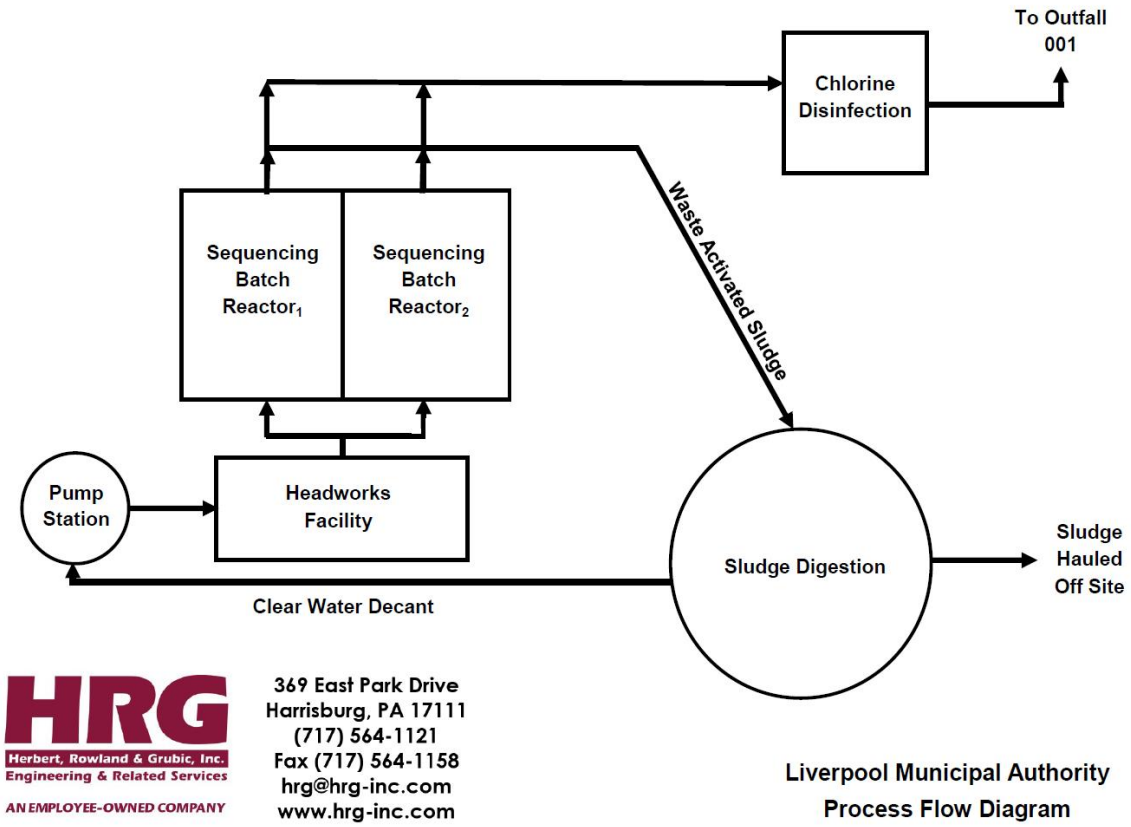
2.2 Description of Wastewater Treatment Process

The subject facility is a 0.175 MGD average annual design flow facility. The subject facility treats wastewater using sequencing batch reactor and chlorine disinfection prior to discharge through the outfall. Waste activated sludge is treated through sludge digestion prior to the sludge being hauled off site. The facility is being evaluated for flow, pH, dissolved oxygen, TRC, CBOD5, TSS, fecal coliform, nitrogen species, and phosphorus. The existing permits limits for the facility is summarized in Section 2.4.

The treatment process is summarized in the table.

Treatment Facility Summary				
Treatment Facility Name: Liverpool STP				
Waste Type	**Degree of Treatment**	**Process Type**	**Disinfection**	**Avg Annual Flow (MGD)**
Sewage	Secondary	Sequencing Batch Reactor	Hypochlorite	0.175
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
0.4375	321	Not Overloaded	Aerobic Digestion	Combination of methods

A schematic of the process is depicted.



2.3 Facility Outfall Information

The facility has the following outfall information for wastewater.

Outfall No.	001	**Design Flow (MGD)**	.175
Latitude	40º 33' 51.99"	**Longitude**	-76º 59' 34.37"
Wastewater Description:	Sewage Effluent		

2.3.1 Operational Considerations- Chemical Additives

Chemical additives are chemical products introduced into a waste stream that is used for cleaning, disinfecting, or maintenance and which may be detected in effluent discharged to waters of the Commonwealth. Chemicals excluded are those used for neutralization of waste streams, the production of goods, and treatment of wastewater.

The subject facility utilizes the following chemicals as part of their treatment process.

- Polymer (C-915) for solids settling in digester
- Sodium hypochlorite for disinfection

2.4 Existing NPDES Permits Limits

The existing NPDES permit limits are summarized in the table.

PART A - EFFLUENT LIMITATIONS, MONITORING, RECORDKEEPING AND REPORTING REQUIREMENTS

I. A. For Outfall 001 , **Latitude** 40º 33' 51.99" , **Longitude** 76º 59' 34.37" , **River Mile Index** 100 , **Stream Code** 06685

Receiving Waters: Susquehanna River

Type of Effluent: Sewage Effluent

1. The permittee is authorized to discharge during the period from **May 1, 2018** through **April 30, 2023**.
2. Based on the anticipated wastewater characteristics and flows described in the permit application and its supporting documents and/or amendments, the following effluent limitations and monitoring requirements apply (see also Additional Requirements and Footnotes).

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
Dissolved Oxygen	XXX	XXX	5.0 Daily Min	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	36	58	XXX	25	40	50	1/week	24-Hr Composite
Biochemical Oxygen Demand (BOD5) Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Total Suspended Solids	44	66	XXX	30	45	60	1/week	24-Hr Composite
Total Suspended Solids Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2,000 Geo Mean	XXX	10,000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
Nitrate-Nitrite as N	XXX	XXX	XXX	Report SEMI AVG	XXX	XXX	1/6 months	24-Hr Composite

Outfall 001 , Continued (from May 1, 2018 through April 30, 2023)

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Total Nitrogen	XXX	XXX	XXX	Report SEMI AVG	XXX	XXX	1/6 months	Calculation
Ammonia-Nitrogen	XXX	XXX	XXX	Report SEMI AVG	XXX	XXX	1/6 months	24-Hr Composite
Total Kjeldahl Nitrogen	XXX	XXX	XXX	Report SEMI AVG	XXX	XXX	1/6 months	24-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report SEMI AVG	XXX	XXX	1/6 months	24-Hr Composite

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

at Outfall 001

3.0 Facility NPDES Compliance History

3.1 Summary of Inspections

A summary of the most recent inspections during the existing permit review cycle is as follows.

The DEP inspector noted the following during the inspection.

11/19/2020:

- An administrative inspection was conducted by telephone and email communications. The purpose of the inspection was to follow-up on the facility during the COVID-19 related restrictions. Mr. Sauers requested guidance on how to report an apparent mix up between influent and effluent samples that were collected on 10-29-2020.

11/19/2021:

- Several holes were present in the bottom of the dumpster. The lower left seam is rusted through the entire length of the seam. Solids/rags were observed hanging from a hole in the bottom of the dumpster. An accumulation of solids and liquid was present beneath the dumpster and around the drain. The potential for an overflow exists if the drain would become obstructed by the accumulation of solids. The screening collection dumpster was documented as being in similar state of disrepair during a compliance evaluation inspection conducted by the Pennsylvania Department of Environmental Protection (Department) on 6/17/2019.
- Mr. Sauers stated that the sewage treatment plant has a waste removal contract with Cocolamus Creek Disposal Service (CCD). Representatives from CCD stated that the facility is required by the Department to utilize plastic dumpsters to collect influent screenings. After the inspection, email communications between the Department's Clean Water Program and Bureau of Waste Management concluded that the sewage treatment plant is not required to utilize a plastic dumpster to collect influent screenings

3.2 Summary of DMR Data

A review of approximately 1-year of DMR data shows that the monthly average flow data for the facility below the design capacity of the treatment system. The maximum average flow data for the DMR reviewed was 0.143 MGD in May 2022. The hydraulic design capacity of the treatment system is 0.4375 MGD.

The off-site laboratory used for the analysis of the parameters was ALS Environmental, 301 Fulling Mill Road, Middletown, PA 17057.

DMR Data for Outfall 001 (from November 1, 2021 to October 31, 2022)

Parameter	OCT-22	SEP-22	AUG-22	JUL-22	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22	DEC-21	NOV-21
Flow (MGD) Average Monthly	0.062	0.059	0.06	0.066	0.084	0.143	0.115	0.117	0.129	0.087	0.076	0.111
Flow (MGD) Daily Maximum	0.098	0.102	0.07	0.09	0.142	0.452	0.205	0.154	0.273	0.111	0.091	0.198
pH (S.U.) Daily Minimum	6.79	6.9	7.09	6.99	6.83	6.59	6.76	6.88	6.83	7.05	7.05	6.95
pH (S.U.) Daily Maximum	8.36	7.54	8.67	8.35	7.55	7.2	7.33	7.39	7.65	7.78	7.75	7.58
DO (mg/L) Daily Minimum	5.71	5.23	5.4	5.18	5.59	5.83	6.51	7.36	6.86	7.03	6.85	7.06
TRC (mg/L) Average Monthly	0.4	0.3	0.1	0.2	0.2	0.3	0.2	0.3	0.4	0.3	0.3	0.3
TRC (mg/L) Instantaneous Maximum	0.96	0.95	0.38	0.92	0.9	0.97	0.46	0.72	0.91	0.96	0.94	0.71
CBOD5 (lbs/day) Average Monthly	1	3.0	3	3	4	4	5	5	4	0.2	< 2	3
CBOD5 (lbs/day) Weekly Average	2	4.0	4	4	6	6	9	8	6	0.3	3	4
CBOD5 (mg/L) Average Monthly	3	6.0	6	5	5	4	5	6	3	11	< 3	4
CBOD5 (mg/L) Weekly Average	3	9.0	7	7	8	5	6	9	6	34	4	6
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	59	48	62	107	102	138	145	125	272	111	118	160
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	89	60	118	138	211	234	236	151	631	171	150	202
BOD5 (mg/L) Raw Sewage Influent Average Monthly	107	113	121	189	131	142	150	128	173	154	186	170
TSS (lbs/day) Average Monthly	< 3	8.0	7	< 7	5	10	10	11	20	11	7	< 6

TSS (lbs/day) Raw Sewage Influent Average Monthly	79	43	43	186	85	118	155	105	228	138	129	186
TSS (lbs/day) Raw Sewage Influent Daily Maximum	214	77	88	349	222	197	263	161	560	155	170	240
TSS (lbs/day) Weekly Average	< 4	9.0	14	10	8	14	19	16	30	11	8	7
TSS (mg/L) Average Monthly	< 5	18.0	15	< 12	< 7	10	10	11	15	16	11	< 6
TSS (mg/L) Raw Sewage Influent Average Monthly	129	99	84	337	103	114	158	108	140	195	204	199
TSS (mg/L) Weekly Average	< 5	19.0	24	19	10	12	13	17	19	17	13	9
Fecal Coliform (No./100 ml) Geometric Mean	2	< 2.0	< 3	< 2	< 1	< 8	< 4	< 1	< 4	< 1	< 1	< 20
Fecal Coliform (No./100 ml) Instantaneous Maximum	12	9.0	86	26	< 1	91	43	2	152	< 1	1	613
Nitrate-Nitrite (mg/L) Semi-Annual Average					3.48						2.12	
Total Nitrogen (mg/L) Semi-Annual Average					5.68						3.22	
Ammonia (mg/L) Semi-Annual Average					0.817						< 0.1	
TKN (mg/L) Semi-Annual Average					2.2						1.1	
Total Phosphorus (mg/L) Semi-Annual Average					1.2						0.85	

3.3 Non-Compliance

3.3.1 Non-Compliance- NPDES Effluent

A summary of the non-compliance to the permit limits for the existing permit cycle is as follows.

From the DMR data beginning in May 1, 2018 to December 19, 2022, the following were observed effluent non-compliances.

NON_COMPLIANCE_DATE	NON_COMPL_TYPE_DESC	NON_COMPL_CATEGORY_DESC	PARAMETER	SAMPLE_VALUE	VIOLATION_CONDITION	PERMIT_VALUE	UNIT_OF_MEASURE	STAT_BASE_CODE
7/12/2018	Sample collection less frequent than required	Other Violations	Dissolved Oxygen					
7/12/2018	Violation of permit condition	Effluent	Fecal Coliform	4400	>	1000	No./100 ml	Instantaneous Maximum
7/12/2018	Violation of permit condition	Other Violations						
8/24/2018	Violation of permit condition	Other Violations						
9/10/2020	Violation of permit condition	Effluent	Fecal Coliform	10400	>	1000	No./100 ml	Instantaneous Maximum
11/20/2020	Violation of permit condition	Effluent	Carbonaceous Biochemical Oxygen Demand (CBOD5)	266	>	40	mg/L	Weekly Average
11/20/2020	Violation of permit condition	Effluent	Carbonaceous Biochemical Oxygen Demand (CBOD5)	415	>	58	lbs/day	Weekly Average
11/20/2020	Violation of permit condition	Effluent	Carbonaceous Biochemical Oxygen Demand (CBOD5)	57	>	25	mg/L	Average Monthly
11/20/2020	Violation of permit condition	Effluent	Carbonaceous Biochemical Oxygen Demand (CBOD5)	85	>	36	lbs/day	Average Monthly
11/20/2020	Violation of permit condition	Effluent	Total Suspended Solids	114	>	66	lbs/day	Weekly Average
11/20/2020	Violation of permit condition	Effluent	Total Suspended Solids	73	>	45	mg/L	Weekly Average
1/12/2021	Other	Other Violations						
1/12/2021	Violation of permit condition	Effluent	Carbonaceous Biochemical Oxygen Demand (CBOD5)	41	>	40	mg/L	Weekly Average
11/30/2022	Late DMR Submission	Other Violations						

3.3.2 Non-Compliance- Enforcement Actions

A summary of the non-compliance enforcement actions for the current permit cycle is as follows:

Beginning in May 1, 2018 to December 18, 2022, the following were observed enforcement actions.

Summary of Enforcement Actions
Beginning May 1, 2018 and ending December 18, 2022

ENF ID	ENF TYPE	ENF TYPE DESC	DATE	EXECUTED DATE	INITIATED DATE	VIOLATIONS
410106	NOV	Notice of	12/07/2022	12/07/2022	12/01/2022	92A.75(A)

3.4 Summary of Biosolids Disposal

A summary of the biosolids disposed of from the facility is as follows.

2022			
Sewage Sludge / Biosolids Production Information			
Hauled Off-Site			
2022	Gallons	% Solids	Dry Tons
January	10,400	1.77	0.768
February	10,400	1.56	0.677
March	10,100	1.66	0.699
April	10,100	1.66	0.699
May	10,400	1.24	0.538
June	10,400	1.24	0.538
July	10,400	1.34	0.581
August			
September	31,200	1.265	1.67
October			
Notes:			
Sewage Sludge Biosolids disposed at Keystone Renewable Waste at Middleburg in Snyder County			

3.5 Open Violations

No open violations existed as of December 2022.

4.0 Receiving Waters and Water Supply Information Detail Summary

4.1 Receiving Waters

The receiving waters has been determined to be the Susquehanna River. The Susquehanna River drains into the Chesapeake Bay.

4.2 Public Water Supply (PWS) Intake

The closest PWS to the subject facility is Suez Water (PWS ID # 7220015) located approximately 23 miles downstream of the subject facility on the Susquehanna River. Based upon the distance and the flow rate of the facility, the PWS should not be impacted.

4.3 Class A Wild Trout Streams

Class A Wild Trout Streams are waters that support a population of naturally produced trout of sufficient size and abundance to support long-term and rewarding sport fishery. DEP classifies these waters as high-quality coldwater fisheries.

The information obtained from EMAP suggests that no Class A Wild Trout Fishery will be impacted by this discharge.

4.4 2022 Integrated List of All Waters (303d Listed Streams)

Section 303(d) of the Clean Water Act requires States to list all impaired surface waters not supporting uses even after appropriate and required water pollution control technologies have been applied. The 303(d) list includes the reason for impairment which may be one or more point sources (i.e. industrial or sewage discharges) or non-point sources (i.e.

abandoned mine lands or agricultural runoff and the pollutant causing the impairment such as metals, pH, mercury or siltation).

States or the U.S. Environmental Protection Agency (EPA) must determine the conditions that would return the water to a condition that meets water quality standards. As a follow-up to listing, the state or EPA must develop a Total Maximum Daily Load (TMDL) for each waterbody on the list. A TMDL identifies allowable pollutant loads to a waterbody from both point and non-point sources that will prevent a violation of water quality standards. A TMDL also includes a margin of safety to ensure protection of the water.

The water quality status of Pennsylvania's waters uses a five-part categorization (lists) of waters per their attainment use status. The categories represent varying levels of attainment, ranging from Category 1, where all designated water uses are met to Category 5 where impairment by pollutants requires a TMDL for water quality protection.

The receiving waters is listed in the 2022 Pennsylvania Integrated Water Quality Monitoring and Assessment Report as a Category 2 waterbody. The surface waters is an attaining stream that supports recreational uses. The Susquehanna River is impaired for fish consumption due to PCBs from an unknown source. The designated use has been classified as protected waters for warm water fishes (WWF) and migratory fishes (MF).

4.5 Low Flow Stream Conditions

Water quality modeling estimates are based upon conservative data inputs. The data are typically estimated using either a stream gauge or through USGS web based StreamStats program. The NPDES effluent limits are based upon the combined flows from both the stream and the facility discharge.

A conservative approach to estimate the impact of the facility discharge using values which minimize the total combined volume of the stream and the facility discharge. The volumetric flow rate for the stream is based upon the seven-day, 10-year low flow (Q710) which is the lowest estimated flow rate of the stream during a 7 consecutive day period that occurs once in 10 -year time period. The facility discharge is based upon a known design capacity of the subject facility.

The closest WQN station to the subject facility is the Susquehanna River @ Harrisburg, PA (WQN202). This WQN station is located approximately 29 miles downstream of the subject facility.

The closest gauge station to the subject facility is the Susquehanna River @ Harrisburg, PA (USGS station number 1570500). This gauge station is located approximately 29 miles downstream of the subject facility.

For WQM modeling, pH and stream water temperature data from the water quality network station was used. pH was estimated to be 8.25 and the stream water temperature was estimated to be 23.75 C.

The hardness of the stream was estimated from the water quality network to be 109 mg/l $CaCO_3$.

The low flow yield and the Q710 for the subject facility was estimated as shown below.

Gauge Station Data			
USGS Station Number	1570500		
Station Name	Susquehanna River @ Harrisburg, PA		
Q710	3,200	ft^3/sec	
Drainage Area (DA)	24,100	mi^2	
Calculations			
The low flow yield of the gauge station is:			
Low Flow Yield (LFY) = Q710 / DA			
LFY =	(3,200 ft^3/sec / 24,100 mi^2)		
LFY =	0.1328	$ft^3/sec/mi^2$	
The low flow at the subject site is based upon the DA of		19,500	mi^2
Q710 = (LFY@gauge station)(DA@Subject Site)			
Q710 = (0.1328 $ft^3/sec/mi^2$)(19,500 mi^2)			
Q710 =	2589.212	ft^3/sec	

4.6 Summary of Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	.175
Latitude	40º 33' 52.09"	Longitude	-76º 59' 33.78"
Quad Name		Quad Code	
Wastewater Description:	Sewage Effluent		
Receiving Waters	Susquehanna River (WWF)	Stream Code	6685
NHD Com ID	54973601	RMI	100
Drainage Area	19,500	Yield (cfs/mi^2)	0.1328
Q_{7-10} Flow (cfs)	2589	Q_{7-10} Basis	StreamStats
Elevation (ft)	374	Slope (ft/ft)	
Watershed No.	6-C	Chapter 93 Class.	WWF, MF
Existing Use	Same as Chapter 93 class.	Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining for recreational uses; Impaired for fish consumption		
Cause(s) of Impairment	PCBs		
Source(s) of Impairment	Unknown Source		
TMDL Status	Not applicable	Name	

Background/Ambient Data		Data Source
pH (SU)	8.25	WQN202; median July to Oct
Temperature (°C)	23.75	WQN202; median July to Oct
Hardness (mg/L)	109	WQN202; Median Historical
Other:		

Nearest Downstream Public Water Supply Intake		Suez Water	
PWS Waters	Susquehanna River	Flow at Intake (cfs)	
PWS RMI	75	Distance from Outfall (mi)	23

5.0: Overview of Presiding Water Quality Standards

5.1 General

There are at least six (6) different policies which determines the effluent performance limits for the NPDES permit. The policies are technology based effluent limits (TBEL), water quality based effluent limits (WQBEL), antidegradation, total maximum daily loading (TMDL), anti-backsliding, and whole effluent toxicity (WET) The effluent performance limitations enforced are the selected permit limits that is most protective to the designated use of the receiving waters. An overview of each of the policies that are applicable to the subject facility has been presented in Section 6.

5.2.1 Technology-Based Limitations

TBEL treatment requirements under section 301(b) of the Act represent the minimum level of control that must be imposed in a permit issued under section 402 of the Act (40 CFR 125.3). Available TBEL requirements for the state of Pennsylvania are itemized in PA Code 25, Chapter 92a.47.

The presiding sources for the basis for the effluent limitations are governed by either federal or state regulation. The reference sources for each of the parameters is itemized in the tables. The following technology-based limitations apply, subject to water quality analysis and best professional judgement (BPJ) where applicable:

Parameter	Limit (mg/l)	SBC	Federal Regulation	State Regulation
$CBOD_5$	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(2)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)

5.2.2 Mass Based Limits

For publicly owned treatment works (POTW), mass loadings are calculated based upon design flow rate of the facility and the permit limit concentration. The generalized calculation for mass loadings is shown below:

$$Quantity\ \left(\frac{lb}{day}\right) = (MGD)(Concentration)(8.34)$$

5.3 Water Quality-Based Limitations

WQBEL are based on the need to attain or maintain the water quality criteria and to assure protection of designated and existing uses (PA Code 25, Chapter 92a.2). The subject facility that is typically enforced is the more stringent limit of either the TBEL or the WQBEL.

Determination of WQBEL is calculated by spreadsheet analysis or by a computer modeling program developed by DEP. DEP permit engineers utilize the following computing programs for WQBEL permit limitations: (1) MS Excel worksheet for Total Residual Chorine (TRC); (2) WQM 7.0 for Windows Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen Version 1.1 (WQM Model) and (3) Toxics using DEP Toxics Management Spreadsheet for Toxics pollutants.

The modeling point nodes utilized for this facility are summarized below.

General Data	***(Modeling Point #1)***	***(Modeling Point #2)***	***Units***
Stream Code	6685	6685	
River Mile Index	100	98.9	miles
Elevation	374	372	feet
Latitude	40.563611	40.55348	
Longitude	-76.993333	-76.97925	
Drainage Area	19,500	19, 501	sq miles
Reach Slope	Default	Default	ft/ft
Low Flow Yield	0.1328	0.132780083	cfs/sq mile
Potable Water Supply Withdrawal	Default	Default	mgd

5.3.1 Water Quality Modeling 7.0

The WQM Model is a computer model that is used to determine NPDES discharge effluent limitations for Carbonaceous BOD (CBOD5), Ammonia Nitrogen (NH3-N), and Dissolved Oxygen (DO) for single and multiple point source discharges scenarios. WQM Model is a complete-mix model which means that the discharge flow and the stream flow are assumed to instantly and completely mixed at the discharge node.

WQM recommends effluent limits for DO, CBOD5, and NH_3-N in mg/l for the discharge(s) in the simulation.

Four types of limits may be recommended. The limits are

(a) a *minimum concentration for DO in the discharge as 30-day average;*
(b) a 30-day average concentration for CBOD5 in the discharge;
(c) a 30-day average concentration for the NH_3-N in the discharge;
(d) *24-hour average concentration for NH_3-N in the discharge*.

The WQM Model requires several input values for calculating output values. The source of data originates from either EMAP, the National Map, or Stream Stats. Data for stream gauge information, if any, was abstracted from USGS Low-Flow, Base-Flow, and Mean-Flow Regression Equations for Pennsylvania Streams authored by Marla H. Stuckey (Scientific Investigations Report 2006-5130).

The applicable WQM Effluent Limit Type are discussed in Section 6 under the corresponding parameter which is either DO, CBOD, or ammonia-nitrogen.

5.3.2 Toxics Modeling

The Toxics Management Spreadsheet model is a computer model that is used to determine effluent limitations for toxics (and other substances) for single discharge wasteload allocations. This computer model uses a mass-balance water quality analysis that includes consideration for mixing, first-order decay, and other factors used to determine recommended water quality-based effluent limits. Toxics Management Spreadsheet does not assume that all discharges completely mix with the stream. The point of compliance with water quality criteria are established using criteria compliance times (CCTs). The available CCTs are either acute fish criterion (AFC), chronic fish criterion (CFC), or human health criteria (THH & CRL).

Acute Fish Criterion (AFC) measures the criteria compliance time as either the maximum criteria compliance time (i.e.15 minutes travel time downstream of the current discharge) or the complete mix time whichever comes first. AFC is evaluated at Q710 conditions.

Chronic Fish Criterion (CFC) measures the criteria compliance time as either the maximum criteria compliance time (i.e. 12 hours travel time downstream of the current discharge) or the complete mix time whichever comes first. CFC is evaluated at Q710 conditions.

Threshold Human Health (THH) measures the criteria compliance time as either the maximum criteria compliance time (i.e. 12 hours travel time downstream of the current discharge) or the estimated travel time downstream to the nearest potable water supply intake whichever comes first. THH is evaluated at Q710 conditions.

Cancer Risk Level (CRL) measures the criteria compliance time as either the maximum criteria compliance time (i.e. 12 hours travel time downstream of the current discharge) or the complete mix time whichever comes first. CRL is evaluated at Qh (harmonic mean or normal flow) conditions.

The Toxics Model requires several input values for calculating output values. The source of data originates from either EMAP, the National Map, or Stream Stats. Data for stream gauge information, if any, was abstracted from USGS Low-Flow, Base-Flow, and Mean-Flow Regression Equations for Pennsylvania Streams authored by Marla H. Stuckey (Scientific Investigations Report 2006-5130).

5.3.2.1 Determining if NPDES Permit Will Require Monitoring/Limits in the Proposed Permit for Toxic Pollutants

To determine if Toxics modeling is necessary, DEP has developed a Toxics Management Spreadsheet to identify toxics of concern. Toxic pollutants whose maximum concentrations as reported in the permit application or on DMRs are greater than the most stringent applicable water quality criterion are pollutants of concern. A Reasonable Potential Analysis was utilized to determine (a) if the toxic parameters modeled would require monitoring or (b) if permit limitations would be

required for the parameters. The toxics reviewed for reasonable potential were the following pollutants: TDS, chloride, bromide, sulfate, total copper, total lead, and total zinc.

Based upon the SOP- Establishing Water Quality-Based Effluent Limitations (WQBELs) and Permit Conditions for Toxic Pollutants (Revised January 10, 2019), monitoring and/or limits will be established as follows.

(a) When reasonable potential is demonstrated, establish limits where the maximum reported concentration equals or exceeds 50% of the WQBEL.
(b) For non-conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 25% - 50% of the WQBEL.
(c) For conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 10% - 50% of the WQBEL.

Applicable monitoring or permit limits for toxics are summarized in Section 6.

The Toxics Management Spreadsheet output has been included in Attachment B.

5.3.3 Whole Effluent Toxicity (WET)

The facility is not subject to WET.

5.4 Total Maximum Daily Loading (TMDL)

5.4.1 TMDL

The goal of the Clean Water Act (CWA), which governs water pollution, is to ensure that all of the Nation's waters are clean and healthy enough to support aquatic life and recreation. To achieve this goal, the CWA created programs designed to regulate and reduce the amount of pollution entering United States waters. Section 303(d) of the CWA requires states to assess their waterbodies to identify those not meeting water quality standards. If a waterbody is not meeting standards, it is listed as impaired and reported to the U.S. Environmental Protection Agency. The state then develops a plan to clean up the impaired waterbody. This plan includes the development of a Total Maximum Daily Load (TMDL) for the pollutant(s) that were found to be the cause of the water quality violations. A Total Maximum Daily Load (TMDL) calculates the maximum amount of a specific pollutant that a waterbody can receive and still meet water quality standards.

A TMDL for a given pollutant and waterbody is composed of the sum of individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the TMDL must include an implicit or explicit margin of safety (MOS) to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. The TMDL components are illustrated using the following equation:

$$TMDL = \Sigma WLAs + \Sigma LAs + MOS$$

Pennsylvania has committed to restoring all impaired waters by developing TMDLs and TMDL alternatives for all impaired waterbodies. The TMDL serves as the starting point or planning tool for restoring water quality.

5.4.1.1 Local TMDL

The subject facility does not discharge into a local TMDL.

5.4.1.2 Chesapeake Bay TMDL Requirement

The Chesapeake Bay Watershed is a large ecosystem that encompasses approximately 64,000 square miles in Maryland, Delaware, Virginia, West Virginia, Pennsylvania, New York and the District of Columbia. An ecosystem is composed of interrelated parts that interact with each other to form a whole. All of the plants and animals in an ecosystem depend on each other in some way. Every living thing needs a healthy ecosystem to survive. Human activities affect the Chesapeake Bay ecosystem by adding pollution, using resources and changing the character of the land.

Most of the Chesapeake Bay and many of its tidal tributaries have been listed as impaired under Section 303(d) of the federal Water Pollution Control Act ("Clean Water Act"), 33 U.S.C. § 1313(d). While the Chesapeake Bay is outside the

boundaries of Pennsylvania, more than half of the State lies within the watershed. Two major rivers in Pennsylvania are part of the Chesapeake Bay Watershed. They are (a) the Susquehanna River and (b) the Potomac River. These two rivers total 40 percent of the entire Chesapeake Bay watershed.

The overall management approach needed for reducing nitrogen, phosphorus and sediment are provided in the Bay TMDL document and the Phase I, II, and III WIPs which is described in the Bay TMDL document and Executive Order 13508.

The Bay TMDL is a comprehensive pollution reduction effort in the Chesapeake Bay watershed identifying the necessary pollution reductions of nitrogen, phosphorus and sediment across the seven Bay watershed jurisdictions of Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia and the District of Columbia to meet applicable water quality standards in the Bay and its tidal waters.

The Watershed Implementation Plans (WIPs) provides objectives for how the jurisdictions in partnership with federal and local governments will achieve the Bay TMDL's nutrient and sediment allocations.

Phase 3 WIP provides an update on Chesapeake Bay TMDL implementation activities for point sources and DEP's current implementation strategy for wastewater. The latest revision of the supplement was September 13, 2021.

The Chesapeake Bay TMDL (Appendix Q) categorizes point sources into four sectors:

- Sector A- significant sewage dischargers;
- Sector B- significant industrial waste (IW) dischargers;
- Sector C- non-significant dischargers (both sewage and IW facilities); and
- Sector D- combined sewer overflows (CSOs).

All sectors contain a listing of individual facilities with NPDES permits that were believed to be discharging at the time the TMDL was published (2010). All sectors with the exception of the non-significant dischargers have individual wasteload allocations (WLAs) for TN and TP assigned to specific facilities. Non-significant dischargers have a bulk or aggregate allocation for TN and TP based on the facilities in that sector that were believed to be discharging at that time and their estimated nutrient loads.

Cap Loads will be established in permits as Net Annual TN and TP loads (lbs/yr) that apply during the period of October 1 – September 30. For facilities that have received Cap Loads in any other form, the Cap Loads will be modified accordingly when the permits are renewed.

Offsets have been incorporated into Cap Loads in several permits issued to date. From this point forward, permits will be issued with the WLAs as Cap Loads and will identify Offsets separately to facilitate nutrient trading activities and compliance with the TMDL.

Based upon the supplement the subject facility has been categorized as a Sector C discharger. The supplement defines Sector C as a as a non-significant dischargers include sewage facilities (Phase 4 facilities: ≥ 0.2 MGD and < 0.4 MGD and Phase 5 facilities: > 0.002 MGD and < 0.2 MGD), small flow/single residence sewage treatment facilities (≤ 0.002 MGD), and non-significant IW facilities, all of which may be covered by statewide General Permits or may have individual NPDES permits.

At this time, there are approximately 850 Phase 4 and 5 sewage facilities, approximately 715 small flow sewage treatment facilities covered by a statewide General Permit, and approximately 300 non-significant IW facilities.

For Phase 5 sewage facilities with individual permits (average annual design flow on August 29, 2005 > 0.002 MGD and < 0.2 MGD), DEP will issue individual permits with monitoring and reporting for TN and TP throughout the permit term at a frequency no less than annually, unless 1) the facility has already conducted at least two years of nutrient monitoring and 2) a summary of the monitoring results are included in the next permit's fact sheet. If, however, Phase 5 facilities choose to expand, the renewed or amended permits will contain Cap Loads based on the lesser of a) existing TN/TP concentrations at current design average annual flow or b) 7,306 lbs/yr TN and 974 lbs/yr TP.

If no data are available to determine existing concentrations for expanding Phase 4 or 5 facilities, default concentrations of 25 mg/l TN and 4 mg/l TP may be used (these are the average estimated concentrations of all non-significant sewage facilities).

DEP will not issue permits to existing Phase 4 and 5 facilities containing Cap Loads unless it is done on a broad scale or unless the facilities are expanding.

For new Phase 4 and 5 sewage discharges, in general DEP will issue new permits containing Cap Loads of "0" and new facilities will be expected to purchase credits and/or apply offsets to achieve compliance, with the exception of small flow and single residence facilities.

This facility is subject to Sector C monitoring requirements. Monitoring for nitrogen species and phosphorus shall be 2x/yr.

5.5 Anti-Degradation Requirement

Chapter 93.4a of the PA regulations requires that surface water of the Commonwealth of Pennsylvania may not be degraded below levels that protect the existing uses. The regulations specifically state that *Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected*. Antidegradation requirements are implemented through DEP's guidance manual entitled Water Quality Antidegradation Implementation Guidance (Document #391-0300-02).

The policy requires DEP to protect the existing uses of all surface waters and the existing quality of High Quality (HQ) and Exceptional Value (EV) Waters. Existing uses are protected when DEP makes a final decision on any permit or approval for an activity that may affect a protected use. Existing uses are protected based upon DEP's evaluation of the best available information (which satisfies DEP protocols and Quality Assurance/Quality Control (QA/QC) procedures) that indicates the protected use of the waterbody.

For a new, additional, or increased point source discharge to an HQ or EV water, the person proposing the discharge is required to utilize a nondischarge alternative that is cost-effective and environmentally sound when compared with the cost of the proposed discharge. If a nondischarge alternative is not cost-effective and environmentally sound, the person must use the best available combination of treatment, pollution prevention, and wastewater reuse technologies and assure that any discharge is nondegrading. In the case of HQ waters, DEP may find that after satisfaction of intergovernmental coordination and public participation requirements lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In addition, DEP will assure that cost-effective and reasonable best management practices for nonpoint source control in HQ and EV waters are achieved.

The subject facility's discharge will be to a non-special protection waters and the permit conditions are imposed to protect existing instream water quality and uses. Neither HQ waters or EV waters is impacted by this discharge.

5.6 Anti-Backsliding

Anti-backsliding is a federal regulation which prohibits a permit from being renewed, reissued, or modified containing effluent limitations which are less stringent than the comparable effluent limitations in the previous permit (40 CFR 122.l.1 and 40 CFR 122.l.2). A review of the existing permit limitations with the proposed permit limitations confirm that the facility is consistent with anti-backsliding requirements. The facility has proposed effluent limitations that are as stringent as the existing permit.

6.0 NPDES Parameter Details

The basis for the proposed sampling and their monitoring frequency that will appear in the permit for each individual parameter are itemized in this Section. The final limits are the more stringent of technology based effluent treatment (TBEL) requirements, water quality based (WQBEL) limits, TMDL, antidegradation, anti-degradation, or WET.

The reader will find in this section:

a) a justification of recommended permit monitoring requirements and limitations for each parameter in the proposed NPDES permit;
b) a summary of changes from the existing NPDES permit to the proposed permit; and
c) a summary of the proposed NPDES effluent limits.

6.1 Recommended Monitoring Requirements and Effluent Limitations

A summary of the recommended monitoring requirements and effluent limitations are itemized in the tables. The tables are categorized by (a) Conventional Pollutants and Disinfection and (b) Nitrogen Species and Phosphorus

6.1.1 Conventional Pollutants and Disinfection

Summary of Proposed NPDES Parameter Details for Conventional Pollutants and Disinfection
Liverpool WWTP, PA0041581

Parameter	Permit Limitation Required by[1]:	Recommendation	
pH (S.U.)	TBEL	Monitoring:	The monitoring frequency shall be daily as a grab sample (Table 6-3).
		Effluent Limit:	Effluent limits may range from pH = 6.0 to 9.0
		Rationale:	The monitoring frequency has been assigned in accordance with Table 6-3 and the effluent limits assigned by Chapter 95.2(1).
Dissolved Oxygen	BPJ	Monitoring:	The monitoring frequency shall be daily as a grab sample (Table 6-3).
		Effluent Limit:	Effluent limits shall be greater than 5.0 mg/l.
		Rationale:	The monitoring frequency has been assigned in accordance with Table 6-3 and the effluent limits assigned by best professional judgement.
CBOD	TBEL	Monitoring:	The monitoring frequency shall be 1x/wk as an 24-hr composite sample (Table 6-3).
		Effluent Limit:	Effluent limits shall not exceed 36 lbs/day and 25 mg/l as an average monthly.
		Rationale:	The monitoring frequency has been assigned in accordance with Table 6-3 and the effluent limits assigned by Chapter 92a.47(a)(1). WQM modeling indicates that the TBEL is more stringent than the WQBEL. Thus, the permit limit is confined to TBEL.
TSS	TBEL	Monitoring:	The monitoring frequency shall be 1/wk as a 24-hr composite sample (Table 6-3).
		Effluent Limit:	Effluent limits shall not exceed 44 lbs/day and 30 mg/l as an average monthly.
		Rationale:	The monitoring frequency has been assigned in accordance with Table 6-3 and the effluent limits assigned by Chapter 92a.47(a)(1). While there is no WQM modeling for this parameter, the permit limit for TSS is generally assigned similar effluent limits as CBOD or BOD.
TRC	TBEL	Monitoring:	The monitoring frequency shall be on a daily basis as a grab sample (Table 6-3).
		Effluent Limit:	The average monthly limit should not exceed 0.5 mg/l and/or 1.6 mg/l as an instantaneous maximum.
		Rationale: Chlorine in both combined (chloramine) and free form is extremely toxic to freshwater fish and other forms of aquatic life (Implementation Guidance Total Residual Chlorine 1). The TRC effluent limitations to be imposed on a discharger shall be the more stringent of either the WQBEL or TBEL requirements and shall be expressed in the NPDES permit as an average monthly and instantaneous maximum effluent concentration (Implementation Guidance Total Residual Chlorine 4). Based on the stream flow rate (lowest 7-day flow rate in 10 years) and the design flow rate of the subject facility calculated by the TRC Evaluation worksheet, the TBEL is more stringent than the WQBEL. The monitoring frequency has been assigned in accordance with Table 6-3 and the effluent limits assigned by Chapter 92a.48(b)(2)	
Fecal Coliform	TBEL	Monitoring:	The monitoring frequency shall be 1x/wk as a grab sample (Table 6-3).
		Effluent Limit:	Summer effluent limits shall not exceed 200 No./100 mL as a geometric mean. Winter effluent limits shall not exceed 2000 No./100 mL as a geometric mean.
		Rationale:	The monitoring frequency has been assigned in accordance with Table 6-3 and the effluent limits assigned by Chapter 92a.47(a)(4) and 92a.47(a)(5).
E. Coli	SOP; Chapter 92a.61	Monitoring:	The monitoring frequency shall be 1x/quarter as a grab sample (SOP).
		Effluent Limit:	No effluent requirements.
		Rationale:	Consistent with the SOP- Establishing Effluent Limitations for Individual Sewage Permits (Revised March 22, 2019) and under the authority of Chapter 92a.61, the facility will be required to monitor for E.Coli.

Notes:

1 The NPDES permit was limited by (a) anti-Backsliding, (b) Anti-Degradation, (c) SOP, (d) TBEL, (e) TMDL, (f) WQBEL, (g) WET, or (h) Other

2 Monitoring frequency based on flow rate of 0.175 MGD.

3 Table 6-3 (Self Monitoring Requirements for Sewage Discharges) in Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits) (Document # 362-0400-001) Revised 10/97

4 Water Quality Antidegradation Implementaton Guidance (Document # 391-0300-002)

5 Chesapeake Bay Phase 3 Watershed Implementation Plan Wastewater Supplement, Revised September 13, 2021

6.1.2 Nitrogen Species and Phosphorus

Summary of Proposed NPDES Parameter Details for Nitrogen Species and Phosphorus

Liverpool WWTP, PA0041581

Parameter	Permit Limitation Required by[1]:	Recommendation	
Ammonia-Nitrogen	Chesapeake Bay TMDL	Monitoring:	The monitoring frequency shall be 2x/yr as a 24-hr composite sample
		Effluent Limit:	No effluent requirements.
		Rationale:	Due to the Chesapeake Bay Implementation Plan, the facility is required to be monitored on a frequency at least 2x/yr.
Nitrate-Nitrite as N	Chesapeake Bay TMDL	Monitoring:	The monitoring frequency shall be 2x/yr as a 24-hr composite sample
		Effluent Limit:	No effluent requirements.
		Rationale:	Due to the Chesapeake Bay Implementation Plan, the facility is required to be monitored on a frequency at least 2x/yr.
Total Nitrogen	Chesapeake Bay TMDL	Monitoring:	The monitoring frequency shall be 2x/yr as a 24-hr composite sample
		Effluent Limit:	No effluent requirements.
		Rationale:	Due to the Chesapeake Bay Implementation Plan, the facility is required to be monitored on a frequency at least 2x/yr.
TKN	Chesapeake Bay TMDL	Monitoring:	The monitoring frequency shall be 2x/yr as a 24-hr composite sample
		Effluent Limit:	No effluent requirements.
		Rationale:	Due to the Chesapeake Bay Implementation Plan, the facility is required to be monitored on a frequency at least 2x/yr.
Total Phosphorus	Chesapeake Bay TMDL	Monitoring:	The monitoring frequency shall be 2x/yr as a 24-hr composite sample
		Effluent Limit:	No effluent requirements.
		Rationale:	Due to the Chesapeake Bay Implementation Plan, the facility is required to be monitored on a frequency at least 2x/yr.
Notes:			

1 The NPDES permit was limited by (a) anti-Backsliding, (b) Anti-Degradation, (c) SOP, (d) TBEL, (e) TMDL, (f) WQBEL, (g) WET, or (h) Other

2 Monitoring frequency based on flow rate of 0.175 MGD.

3 Table 6-3 (Self Monitoring Requirements for Sewage Discharges) in Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits) (Document # 362-0400-001) Revised 10/97

4 Water Quality Antidegradation Implementaton Guidance (Document # 391-0300-002)

5 Chesapeake Bay Phase 3 Watershed Implementation Plan Wastewater Supplement, Revised September 13, 2021

6.1.3.1 Implementation of Regulation- Chapter 92a.61

Chapter 92a.61 provides provisions to DEP to monitor for pollutants that may have an impact on the quality of waters of the Commonwealth. Based upon DEP policy directives issued on March 22, 2021 and in conjunction with EPA's 2017 Triennial Review, monitoring for E. Coli shall be required.

6.2 Summary of Changes From Existing Permit to Proposed Permit

A summary of how the proposed NPDES permit differs from the existing NPDES permit is summarized as follows.

- **Due to the EPA Triennial review, monitoring for E. Coli shall be required.**

6.3.1 Summary of Proposed NPDES Effluent Limits

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (362-0400-001), SOPs and/or BPJ.

The proposed NPDES effluent limitations are summarized in the table below.

PART A - EFFLUENT LIMITATIONS, MONITORING, RECORDKEEPING AND REPORTING REQUIREMENTS

I. A. For Outfall 001 , **Latitude** 40° 33' 51.99" , **Longitude** 76° 59' 34.37" , **River Mile Index** 100 , **Stream Code** 6685

Receiving Waters: Susquehanna River (WWF)

Type of Effluent: Sewage Effluent

1. The permittee is authorized to discharge during the period from **Permit Effective Date** through **Permit Expiration Date**.
2. Based on the anticipated wastewater characteristics and flows described in the permit application and its supporting documents and/or amendments, the following effluent limitations and monitoring requirements apply (see also Additional Requirements and Footnotes).

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
Dissolved Oxygen	XXX	XXX	5.0 Daily Min	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	36	58	XXX	25	40	50	1/week	24-Hr Composite
Biochemical Oxygen Demand (BOD5) Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Total Suspended Solids Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Total Suspended Solids	44	66	XXX	30	45	60	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab

Outfall 001, Continued (from Permit Effective Date through Permit Expiration Date)

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2)	Required
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum	Measurement Frequency	Sample Type
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/quarter	Grab
Nitrate-Nitrite as N	XXX	XXX	XXX	Report SEMI AVG	XXX	XXX	1/6 months	24-Hr Composite
Total Nitrogen	XXX	XXX	XXX	Report SEMI AVG	XXX	XXX	1/6 months	Calculation
Ammonia-Nitrogen	XXX	XXX	XXX	Report SEMI AVG	XXX	XXX	1/6 months	24-Hr Composite
Total Kjeldahl Nitrogen	XXX	XXX	XXX	Report SEMI AVG	XXX	XXX	1/6 months	24-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report SEMI AVG	XXX	XXX	1/6 months	24-Hr Composite

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

at Outfall 001

6.3.2 Summary of Proposed Permit Part C Conditions

The subject facility has the following Part C conditions.

- Chlorine Minimization
- SBR Batch Discharge Condition
- Hauled-in Waste Restrictions
- Chesapeake Bay Nutrient Definitions
- Solids Management for Non-Lagoon Treatment Systems

Tools and References Used to Develop Permit	
☒	WQM for Windows Model (see Attachment)
☒	Toxics Management Spreadsheet (see Attachment)
☐	TRC Model Spreadsheet (see Attachment)
☐	Temperature Model Spreadsheet (see Attachment)
☐	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☐	Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98.
☐	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97.
☐	Pennsylvania CSO Policy, 385-2000-011, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97.
☐	Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97.
☐	Implementation Guidance Design Conditions, 391-2000-006, 9/97.
☐	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 391-2000-007, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004.
☐	Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008.
☐	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09.
☐	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 10/97.
☐	Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 391-2000-019, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 3/99.
☐	Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 391-2000-022, 3/1999.
☐	Design Stream Flows, 391-2000-023, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 391-2000-024, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97.
☐	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☒	SOP: New and Reissuance Sewage Individual NPDES Permit Applications, rev 2/3/2022
☐	Other:

Attachment A

Stream Stats/Gauge Data

Table 1. List of U.S. Geological Survey streamgage locations in and near Pennsylvania with updated streamflow statistics.—Continued

[Latitude and Longitude in decimal degrees; mi², square miles]

Streamgage number	Streamgage name	Latitude	Longitude	Drainage area (mi²)	Regulated[1]
01561000	Brush Creek at Gapsville, Pa.	39.956	-78.254	36.8	N
01562000	Raystown Branch Juniata River at Saxton, Pa.	40.216	-78.265	756	N
01562500	Great Trough Creek near Marklesburg, Pa.	40.350	-78.130	84.6	N
01563200	Raystown Branch Juniata River below Rays Dam nr Huntingdon, Pa.	40.429	-77.991	960	Y
01563500	Juniata River at Mapleton Depot, Pa.	40.392	-77.935	2,030	Y
01564500	Aughwick Creek near Three Springs, Pa.	40.213	-77.925	205	N
01565000	Kishacoquillas Creek at Reedsville, Pa.	40.655	-77.583	164	N
01565700	Little Lost Creek at Oakland Mills, Pa.	40.605	-77.311	6.52	N
01566000	Tuscarora Creek near Port Royal, Pa.	40.515	-77.419	214	N
01566500	Cocolamus Creek near Millerstown, Pa.	40.566	-77.118	57.2	N
01567000	Juniata River at Newport, Pa.	40.478	-77.129	3,354	Y
01567500	Bixler Run near Loysville, Pa.	40.371	-77.402	15.0	N
01568000	Sherman Creek at Shermans Dale, Pa.	40.323	-77.169	207	N
01568500	Clark Creek near Carsonville, Pa.	40.460	-76.751	22.5	LF
01569000	Stony Creek nr Dauphin, Pa.	40.380	-76.907	33.2	N
01569800	Letort Spring Run near Carlisle, Pa.	40.235	-77.139	21.6	N
01570000	Conodoguinet Creek near Hogestown, Pa.	40.252	-77.021	470	LF
01570500	Susquehanna River at Harrisburg, Pa.	40.255	-76.886	24,100	Y
01571000	Paxton Creek near Penbrook, Pa.	40.308	-76.850	11.2	N
01571500	Yellow Breeches Creek near Camp Hill, Pa.	40.225	-76.898	213	N
01572000	Lower Little Swatara Creek at Pine Grove, Pa.	40.538	-76.377	34.3	N
01572025	Swatara Creek near Pine Grove, Pa.	40.533	-76.402	116	N
01572190	Swatara Creek near Inwood, Pa.	40.479	-76.531	167	N
01573000	Swatara Creek at Harper Tavern, Pa.	40.403	-76.577	337	N
01573086	Beck Creek near Cleona, Pa.	40.323	-76.483	7.87	N
01573160	Quittapahilla Creek near Bellegrove, Pa.	40.343	-76.562	74.2	N
01573500	Manada Creek at Manada Gap, Pa.	40.397	-76.709	13.5	N
01573560	Swatara Creek near Hershey, Pa.	40.298	-76.668	483	N
01574000	West Conewago Creek near Manchester, Pa.	40.082	-76.720	510	N
01574500	Codorus Creek at Spring Grove, Pa.	39.879	-76.853	75.5	Y
01575000	South Branch Codorus Creek near York, Pa.	39.921	-76.749	117	Y
01575500	Codorus Creek near York, Pa.	39.946	-76.755	222	Y
01576000	Susquehanna River at Marietta, Pa.	40.055	-76.531	25,990	Y
01576085	Little Conestoga Creek near Churchtown, Pa.	40.145	-75.989	5.82	N
01576500	Conestoga River at Lancaster, Pa.	40.050	-76.277	324	N
01576754	Conestoga River at Conestoga, Pa.	39.946	-76.368	470	N
01578310	Susquehanna River at Conowingo, Md.	39.658	-76.174	27,100	Y
01578400	Bowery Run near Quarryville, Pa.	39.895	-76.114	5.98	N
01580000	Deer Creek at Rocks, Md.	39.630	-76.403	94.4	N
01581500	Bynum Run at Bel Air, Md.	39.541	-76.330	8.52	N
01581700	Winters Run near Benson, Md.	39.520	-76.373	34.8	N
01582000	Little Falls at Blue Mount, Md.	39.604	-76.620	52.9	N
01582500	Gunpowder Falls at Glencoe, Md.	39.550	-76.636	160	Y
01583000	Slade Run near Glyndon, Md.	39.495	-76.795	2.09	N
01583100	Piney Run at Dover, Md.	39.521	-76.767	12.3	N

Table 2. Selected low-flow statistics for streamgage locations in and near Pennsylvania.—Continued

[ft^3/s; cubic feet per second; —, statistic not computed; <, less than]

Streamgage number	Period of record used in analysis[1]	Number of years used in analysis	1-day, 10-year (ft^3/s)	7-day, 10-year (ft^3/s)	7-day, 2-year (ft^3/s)	30-day, 10-year (ft^3/s)	30-day, 2-year (ft^3/s)	90-day, 10-year (ft^3/s)
01565000	1941–2008	37	17.6	18.6	28.6	20.3	32.4	24.4
01565700	1965–1981	17	.4	.4	.9	.5	1.1	.8
01566000	1913–2008	52	4.3	7.9	18.8	12.4	25.6	19.2
01566500	1932–1958	27	1.7	2.4	4.0	3.2	5.7	4.9
01567000	[2]1974–2008	35	504	534	725	589	857	727
01567000	[3]1901–1972	72	311	367	571	439	704	547
01567500	1955–2008	54	2.0	2.2	3.3	2.6	3.8	3.1
01568000	1931–2008	78	12.7	15.5	25.5	19.2	32.0	26.0
01568500	[2]1943–1997	55	1.8	2.3	4.3	2.7	5.0	3.1
01569000	1939–1974	14	2.6	4.0	7.4	5.1	9.4	7.8
01569800	1978–2008	31	15.9	17.0	24.4	18.4	26.1	20.3
01570000	[3]1913–1969	35	—	63.1	110	76.1	124	95.3
01570000	[2]1971–2008	38	63.1	69.3	109	78.3	125	97.8
01570500	[3]1901–1972	72	2,310	2,440	4,000	2,830	4,950	3,850
01570500	[2]1974–2008	35	3,020	3,200	5,180	3,690	6,490	4,960
01571000	1941–1995	16	.1	.2	.6	.3	1.2	.8
01571500	1911–2008	62	81.6	86.8	115	94.0	124	105
01572000	1921–1984	14	2.1	2.3	4.8	3.0	6.5	4.5
01572025	1990–2008	17	15.2	16.4	26.7	18.5	34.6	27.7
01572190	1990–2008	17	19.1	20.5	36.2	23.9	45.8	35.3
01573000	1920–2008	89	18.0	22.0	52.0	30.8	69.2	50.9
01573086	1965–1981	17	.5	.6	2.6	.8	3.3	1.1
01573160	1977–1994	18	26.9	29.6	46.4	33.6	51.9	39.5
01573500	1939–1958	20	1.3	1.4	2.5	1.8	3.2	2.6
01573560	1977–2008	30	50.3	62.0	104	76.9	131	108
01574000	1930–2008	79	8.0	11.1	32.0	17.7	47.0	33.9
01574500	[2]1968–2008	41	14.2	24.0	35.9	29.4	42.0	33.3
01574500	[3]1930–1966	34	2.3	7.1	11.5	9.3	14.8	12.7
01575000	[2]1973–1995	23	.7	1.4	6.7	3.2	12.0	9.3
01575000	[3]1929–1971	43	.1	.6	10.3	2.3	15.0	6.1
01575500	[2]1948–1996	49	12.1	18.7	41.3	23.9	50.0	33.8
01576000	[3]1933–1972	40	2,100	2,420	4,160	2,960	5,130	4,100
01576000	[2]1974–2008	35	2,990	3,270	5,680	3,980	7,180	5,540
01576085	1984–1995	12	.4	.5	.8	.7	1.2	1.2
01576500	1931–2008	78	27.2	38.6	79.4	49.1	97.3	66.1
01576754	1986–2008	23	74.2	84.9	151	106	189	147
[4]01578310	1969–2008	40	549	2,820	5,650	4,190	7,380	6,140
01578400	1964–1981	18	1.4	1.5	2.7	1.9	3.2	2.5
[4]01580000	1928–2008	81	19.7	22.8	48.1	28.1	51.8	35.4
[4]01581500	1946–2008	28	.2	.3	1.2	.8	1.7	1.5
[4]01581700	1969–2008	40	4.7	5.5	17.5	8.1	18.3	12.0
[4]01582000	1946–2008	63	11.3	12.5	25.0	15.5	28.0	20.3
[4]01582500	1979–2008	27	41.2	43.9	78.8	53.8	90.6	74.1
[4]01583000	1949–1981	33	.3	.3	.7	.3	1.0	.6
[4]01583100	1984–2008	15	2.1	2.4	5.5	3.2	6.0	4.2

StreamStats Report

Region ID: PA
Workspace ID: PA20221219151749506000
Clicked Point (Latitude, Longitude): 40.56402, -76.98436
Time: 2022-12-19 10:18:18 -0500

Liverpool STP PA0041581 Modeling Point #1 December 2022

Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CARBON	Percentage of area of carbonate rock	2.97	percent
DRNAREA	Area that drains to a point on a stream	19500	square miles
ELEV	Mean Basin Elevation	1447	feet
FOREST	Percentage of area covered by forest	71.9006	percent

Parameter Code	Parameter Description	Value	Unit
GLACIATED	Percentage of basin area that was historically covered by glaciers	60.626	percent
PRECIP	Mean Annual Precipitation	39	inches
ROCKDEP	Depth to rock	4.5	feet
STRDEN	Stream Density -- total length of streams divided by drainage area	1.73	miles per square mile

Low-Flow Statistics

Low-Flow Statistics Parameters [28.5 Percent (5550 square miles) Low Flow Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	19500	square miles	4.93	1280
PRECIP	Mean Annual Precipitation	39	inches	35	50.4
STRDEN	Stream Density	1.73	miles per square mile	0.51	3.1
ROCKDEP	Depth to Rock	4.5	feet	3.32	5.65
CARBON	Percent Carbonate	2.97	percent	0	99

Low-Flow Statistics Parameters [8.3 Percent (1610 square miles) Low Flow Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	19500	square miles	2.33	1720
ELEV	Mean Basin Elevation	1447	feet	898	2700
PRECIP	Mean Annual Precipitation	39	inches	38.7	47.9

Low-Flow Statistics Parameters [63.0 Percent (12300 square miles) Low Flow Region 5]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	19500	square miles	4.84	982
PRECIP	Mean Annual Precipitation	39	inches	33.1	47.1
GLACIATED	Percent of Glaciation	60.626	percent	0	100
FOREST	Percent Forest	71.9006	percent	41	100

Low-Flow Statistics Disclaimers [28.5 Percent (5550 square miles) Low Flow Region 2]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Low-Flow Statistics Flow Report [28.5 Percent (5550 square miles) Low Flow Region 2]

Statistic	Value	Unit
7 Day 2 Year Low Flow	3820	ft^3/s
30 Day 2 Year Low Flow	4590	ft^3/s
7 Day 10 Year Low Flow	2770	ft^3/s
30 Day 10 Year Low Flow	3310	ft^3/s
90 Day 10 Year Low Flow	4280	ft^3/s

Low-Flow Statistics Disclaimers [8.3 Percent (1610 square miles) Low Flow Region 3]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Low-Flow Statistics Flow Report [8.3 Percent (1610 square miles) Low Flow Region 3]

Statistic	Value	Unit

Statistic	Value	Unit
7 Day 2 Year Low Flow	1810	ft^3/s
30 Day 2 Year Low Flow	2210	ft^3/s
7 Day 10 Year Low Flow	1040	ft^3/s
30 Day 10 Year Low Flow	1290	ft^3/s
90 Day 10 Year Low Flow	1790	ft^3/s

Low-Flow Statistics Disclaimers [63.0 Percent (12300 square miles) Low Flow Region 5]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Low-Flow Statistics Flow Report [63.0 Percent (12300 square miles) Low Flow Region 5]

Statistic	Value	Unit
7 Day 2 Year Low Flow	2770	ft^3/s
30 Day 2 Year Low Flow	3440	ft^3/s
7 Day 10 Year Low Flow	1820	ft^3/s
30 Day 10 Year Low Flow	2260	ft^3/s
90 Day 10 Year Low Flow	2930	ft^3/s

Low-Flow Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
7 Day 2 Year Low Flow	2980	ft^3/s
30 Day 2 Year Low Flow	3660	ft^3/s
7 Day 10 Year Low Flow	2020	ft^3/s
30 Day 10 Year Low Flow	2470	ft^3/s
90 Day 10 Year Low Flow	3210	ft^3/s

Low-Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

USGS Software Disclaimer: This software has been approved for release by the U.S. Geological Survey (USGS). Although the software has been subjected to rigorous review, the USGS reserves the right to update the software as needed pursuant to further analysis and review. No warranty, expressed or implied, is made by the USGS or the U.S. Government as to the functionality of the software and related material nor shall the fact of release constitute any such warranty. Furthermore, the software is released on condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from its authorized or unauthorized use.

USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.11.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

StreamStats Report

Region ID: PA
Workspace ID: PA20221219162711713000
Clicked Point (Latitude, Longitude): 40.55348, -76.97925
Time: 2022-12-19 11:27:39 -0500

LIverpool WWTP PA0041581 Modeling Point #2 December 2022

Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CARBON	Percentage of area of carbonate rock	2.97	percent
DRNAREA	Area that drains to a point on a stream	19500	square miles
ELEV	Mean Basin Elevation	1447	feet
FOREST	Percentage of area covered by forest	71.8835	percent

Parameter Code	Parameter Description	Value	Unit
GLACIATED	Percentage of basin area that was historically covered by glaciers	60.5822	percent
PRECIP	Mean Annual Precipitation	39	inches
ROCKDEP	Depth to rock	4.5	feet
STRDEN	Stream Density -- total length of streams divided by drainage area	1.73	miles per square mile

Low-Flow Statistics

Low-Flow Statistics Parameters [28.5 Percent (5560 square miles) Low Flow Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	19500	square miles	4.93	1280
PRECIP	Mean Annual Precipitation	39	inches	35	50.4
STRDEN	Stream Density	1.73	miles per square mile	0.51	3.1
ROCKDEP	Depth to Rock	4.5	feet	3.32	5.65
CARBON	Percent Carbonate	2.97	percent	0	99

Low-Flow Statistics Parameters [8.3 Percent (1610 square miles) Low Flow Region 3]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	19500	square miles	2.33	1720
ELEV	Mean Basin Elevation	1447	feet	898	2700
PRECIP	Mean Annual Precipitation	39	inches	38.7	47.9

Low-Flow Statistics Parameters [63.0 Percent (12300 square miles) Low Flow Region 5]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	19500	square miles	4.84	982
PRECIP	Mean Annual Precipitation	39	inches	33.1	47.1
GLACIATED	Percent of Glaciation	60.5822	percent	0	100
FOREST	Percent Forest	71.8835	percent	41	100

Low-Flow Statistics Disclaimers [28.5 Percent (5560 square miles) Low Flow Region 2]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Low-Flow Statistics Flow Report [28.5 Percent (5560 square miles) Low Flow Region 2]

Statistic	Value	Unit
7 Day 2 Year Low Flow	3820	ft^3/s
30 Day 2 Year Low Flow	4590	ft^3/s
7 Day 10 Year Low Flow	2770	ft^3/s
30 Day 10 Year Low Flow	3310	ft^3/s
90 Day 10 Year Low Flow	4280	ft^3/s

Low-Flow Statistics Disclaimers [8.3 Percent (1610 square miles) Low Flow Region 3]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Low-Flow Statistics Flow Report [8.3 Percent (1610 square miles) Low Flow Region 3]

Statistic	Value	Unit

Statistic	Value	Unit
7 Day 2 Year Low Flow	1810	ft^3/s
30 Day 2 Year Low Flow	2210	ft^3/s
7 Day 10 Year Low Flow	1040	ft^3/s
30 Day 10 Year Low Flow	1290	ft^3/s
90 Day 10 Year Low Flow	1790	ft^3/s

Low-Flow Statistics Disclaimers [63.0 Percent (12300 square miles) Low Flow Region 5]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Low-Flow Statistics Flow Report [63.0 Percent (12300 square miles) Low Flow Region 5]

Statistic	Value	Unit
7 Day 2 Year Low Flow	2770	ft^3/s
30 Day 2 Year Low Flow	3440	ft^3/s
7 Day 10 Year Low Flow	1820	ft^3/s
30 Day 10 Year Low Flow	2250	ft^3/s
90 Day 10 Year Low Flow	2930	ft^3/s

Low-Flow Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
7 Day 2 Year Low Flow	2980	ft^3/s
30 Day 2 Year Low Flow	3660	ft^3/s
7 Day 10 Year Low Flow	2020	ft^3/s
30 Day 10 Year Low Flow	2470	ft^3/s
90 Day 10 Year Low Flow	3210	ft^3/s

Low-Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)

Application Version: 4.11.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

Attachment B

WQM 7.0 Modeling Output Values
Toxics Management Spreadsheet Output Values

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
07K	6685	SUSQUEHANNA RIVER

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
100.000	Liverpool WWTP	PA0041581	0.175	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			5

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
07K	6685	SUSQUEHANNA RIVER

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
100.000	Liverpool WWTP	1.77	50	1.77	50	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
100.000	Liverpool WWTP	.41	25	.41	25	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
100.00	Liverpool WWTP	25	25	25	25	5	5	0	0

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
07K	6685	SUSQUEHANNA RIVER	**100.000**	374.00	19500.00	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.133	0.00	0.00	0.000	0.000	0.0	0.00	0.00	23.75	8.25	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Liverpool WWTP	PA0041581	0.1750	0.1750	0.1750	0.000	25.00	7.33

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	5.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
07K	6685	SUSQUEHANNA RIVER	**98.900**	372.00	19501.00	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.133	0.00	0.00	0.000	0.000	0.0	0.00	0.00	23.75	8.25	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
07K	6685	SUSQUEHANNA RIVER

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
100.000	0.175	23.750	8.250
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
1638.962	0.823	1990.835	1.919
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.00	0.002	0.00	0.934
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.243	3.370	Tsivoglou	5
Reach Travel Time (days)			
0.035			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.004	2.00	0.00	7.70
0.007	2.00	0.00	7.70
0.011	2.00	0.00	7.70
0.014	2.00	0.00	7.70
0.018	2.00	0.00	7.70
0.021	2.00	0.00	7.70
0.025	2.00	0.00	7.70
0.028	2.00	0.00	7.70
0.032	2.00	0.00	7.70
0.035	2.00	0.00	7.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
07K	6685	SUSQUEHANNA RIVER

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
100.000	2589.60	0.00	2589.60	.2707	0.00034	.823	1638.96	1990.83	1.92	0.035	23.75	8.25
Q1-10 Flow												
100.000	2434.22	0.00	2434.22	.2707	0.00034	NA	NA	NA	1.85	0.036	23.75	8.25
Q30-10 Flow												
100.000	2978.04	0.00	2978.04	.2707	0.00034	NA	NA	NA	2.08	0.032	23.75	8.25

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☐
WLA Method	EMPR	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.94	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.15	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: **Liverpool WWTP** NPDES Permit No.: **PA0041581** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Sewage effluent**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.175	100	7.33						

					0 if left blank		*0.5 if left blank*		*0 if left blank*			*1 if left blank*	
	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L		298									
	Chloride (PWS)	mg/L		65.9									
	Bromide	mg/L		1.6									
	Sulfate (PWS)	mg/L		23.8									
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L											
	Total Antimony	µg/L											
	Total Arsenic	µg/L											
	Total Barium	µg/L											
	Total Beryllium	µg/L											
	Total Boron	µg/L											
	Total Cadmium	µg/L											
	Total Chromium (III)	µg/L											
	Hexavalent Chromium	µg/L											
	Total Cobalt	µg/L											
	Total Copper	µg/L		11									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L											
	Total Iron	µg/L											
	Total Lead	µg/L	<	1									
	Total Manganese	µg/L											
	Total Mercury	µg/L											
	Total Nickel	µg/L											
	Total Phenols (Phenolics) (PWS)	µg/L											
	Total Selenium	µg/L											
	Total Silver	µg/L											
	Total Thallium	µg/L											
	Total Zinc	µg/L		54									
	Total Molybdenum	µg/L											
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										
	Carbon Tetrachloride	µg/L	<										
	Chlorobenzene	µg/L											
	Chlorodibromomethane	µg/L	<										
	Chloroethane	µg/L	<										
	2-Chloroethyl Vinyl Ether	µg/L	<										

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Stream / Surface Water Information

Liverpool WWTP, NPDES Permit No. PA0041581, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Susquehanna River**

No. Reaches to Model: **1**

- (●) Statewide Criteria
- ( ) Great Lakes Criteria
- ( ) ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi^2)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	006685	100	374	19500			Yes
End of Reach 1	006685	98.9	372	19501			Yes

Q_{7-10}

Location	RMI	LFY (cfs/mi^2)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	100	0.1328										109	8.25		
End of Reach 1	98.9	0.1328										109	8.25		

Q_h

Location	RMI	LFY (cfs/mi^2)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	100														
End of Reach 1	98.9														

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Model Results

Liverpool WWTP, NPDES Permit No. PA0041581, Outfall 001

Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All ○ Inputs ○ Results ○ Limits

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.008 Analysis Hardness (mg/l): 108.88 Analysis pH: 8.21

Pollutants	Stream Conc	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	14.560	15.2	1,106	Chem Translator of 0.96 applied
Total Lead	0	0		0	70.838	91.0	6,631	Chem Translator of 0.779 applied
Total Zinc	0	0		0	125.936	129	9,386	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): 720 PMF: 0.052 Analysis Hardness (mg/l): 108.98 Analysis pH: 8.24

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	9.639	10.0	5,011	Chem Translator of 0.96 applied
Total Lead	0	0		0	2.763	3.55	1,772	Chem Translator of 0.778 applied
Total Zinc	0	0		0	127.070	129	64,316	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 720 PMF: 0.052 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 720 PMF: 0.073 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

Pollutants	*Mass Limits* AML (lbs/day)	*Mass Limits* MDL (lbs/day)	*Concentration Limits* AML	*Concentration Limits* MDL	*Concentration Limits* IMAX	*Concentration Limits* Units	Governing WQBEL	WQBEL Basis	Comments

☑ ***Other Pollutants without Limits or Monitoring***

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., <= Target QL).

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Total Copper	709	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	N/A	N/A	Discharge Conc < TQL
Total Zinc	6,016	µg/L	Discharge Conc ≤ 10% WQBEL

Attachment C

TRC Evaluation

Liverpool WWTP December 2022
PA0041581

1A	B	C	D	E	F	G
2	**TRC EVALUATION**					
3	Input appropriate values in B4:B8 and E4:E7					
4	2589	= Q stream (cfs)		0.5	= CV Daily	
5	0.175	= Q discharge (MGD)		0.5	= CV Hourly	
6	30	= no. samples		1	= AFC_Partial Mix Factor	
7	0.3	= Chlorine Demand of Stream		1	= CFC_Partial Mix Factor	
8	0	= Chlorine Demand of Discharge		15	= AFC_Criteria Compliance Time (min)	
9	0.5	= BAT/BPJ Value		720	= CFC_Criteria Compliance Time (min)	
	0	= % Factor of Safety (FOS)		0	=Decay Coefficient (K)	
10	Source	Reference	AFC Calculations		Reference	CFC Calculations
11	TRC	1.3.2.iii	WLA afc = #######		1.3.2.iii	WLA cfc = 2974.169
12	PENTOXSD TRG	5.1a	LTAMULT afc = 0.373		5.1c	LTAMULT cfc = 0.581
13	PENTOXSD TRG	5.1b	LTA_afc= #######		5.1d	LTA_cfc = 1729.042
14						
15	Source		Effluent Limit Calculations			
16	PENTOXSD TRG	5.1f	AML MULT = 1.231			
17	PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500		BAT/BPJ	
18			INST MAX LIMIT (mg/l) = 1.635			

WLA afc	**(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))...** **...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)**
LTAMULT afc	EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)
LTA_afc	wla_afc*LTAMULT_afc
WLA_cfc	**(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc))...** **...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)**
LTAMULT_cfc	EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5)
LTA_cfc	wla_cfc*LTAMULT_cfc
AML MULT	EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1))
AVG MON LIMIT	MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT)
INST MAX LIMIT	**1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)**