pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0087181**
Facility Type	**Municipal**	APS ID	**276674**
Major / Minor	**Major**	Authorization ID	**1241033**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Ephrata Borough Authority Lancaster County**	Facility Name	**Ephrata STP Plant #2**
Applicant Address	124 S State Street	Facility Address	43 Springhouse Road
	Ephrata, PA 17522-2411		Ephrata, PA 17522
Applicant Contact	Jay Snyder	Facility Contact	Jay Snyder
Applicant Phone	(717) 738-9282	Facility Phone	(717) 738-9282
Client ID	66907	Site ID	264277
Ch 94 Load Status	Not Overloaded	Municipality	Ephrata Township
Connection Status	No Limitations	County	Lancaster
Date Application Received	July 30, 2018	EPA Waived?	No
Date Application Accepted	August 29, 2018	If No, Reason	Major Facility, Significant CB Discharge

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)	June 3, 2021
x		Daniel W. Martin, P.E. / Environmental Engineer Manager Maria D. Bebenek for Daniel W. Martin	June 7, 2021
x		Maria Bebenek, P.E. / Environmental Program Manager Maria D. Bebenek	June 7, 2021

Summary of Review

The application submitted by the applicant requests a NPDES renewal permit for the Ephrata Borough Authority STP (Plant #2) located at 43 Springhouse Road, Ephrata, PA 17522 in Lancaster County, municipality of Ephrata Township. The existing permit became effective on February 1, 2014 and expired on January 31, 2019. The application for renewal was received by DEP Southcentral Regional Office (SCRO) on July 30, 2018.

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 2.3 MGD (annual average design flow) treatment facility. The hydraulic design capacity treatment of the facility is 3.5 MGD. The applicant anticipates the following proposed upgrades to the treatment facility in the next five years.

- Adjust aeration phases to enhance biological nutrient removal.

The NPDES application has been processed as a Major Sewage Facility due to the type of sewage and the design flow rate for the facility. The applicant disclosed the Act 14 requirement to Lancaster County and the Borough of Ephrata and the notice was received by the parties on June 29, 2018 and June 14, 2018. 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 Cocalico Creek. The sequence of receiving streams that Cocalico Creek discharges into are the Conestoga Creek and the Susquehanna River which eventually 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 Cocalico Creek is a Category 5 stream listed in the 2020 Integrated List of All Waters (formerly 303d Listed Streams).

This stream is a non-attaining stream that is impaired for aquatic life for the following reasons. Impaired for aquatic life from (a) crop related agriculture due to nutrients; (b) urban runoff/storm sewers due to an unknown cause; and (c) life grazing related agriculture due to siltation.

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 1x/month**
- **Monitoring for total copper and total zinc shall be 2x/month**
- **Monitoring and limits shall apply for free cyanide and bis(2-ethylhexyl) phthalate**

Sludge use and disposal description and location(s): Sewage Sludge were disposed at WWTP #2 farm fields, Memory Gardens farm fields, Cocalico Commons Farm Fields which were all located in Lancaster County.

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

Summary of Review
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:	Ephrata Borough Authority STP (Plant #2)
NPDES Permit #	PA0087181
Physical Address:	43 Springhouse Road Ephrata, PA 17522
Mailing Address:	124 South State Street Ephrata, PA 17522
Contact:	jsnyder@ephrataboro.org
Consultant:	There was not a consultant utilized for this NPDES renewal.

1.2 Permit History

Description of Facility

The NPDES permit covering the period from February 1, 2014 and expired on January 31, 2019 utilized two site specific studies to develop permit limits. *Travel Time Study Propane Gas Survey on Cocalico Creek for Ephrata Borough* recommended travel times and aeration rates for reaches on the receiving stream (last revised in 1995). *Borough of Ephrata Total Residual Chlorine Site-Specific Study* dated in 1997 recommended chlorine demand for the stream.

Permit submittal included the following information.

- NPDES Application
- Flow Diagrams
- Influent Sample Data
- Effluent Sample Data
- WET Testing Data

2.0 Treatment Facility Summary

2.1.1 Site location

The physical address for the facility is 43 Springhouse Road, Ephrata, PA 17522. 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

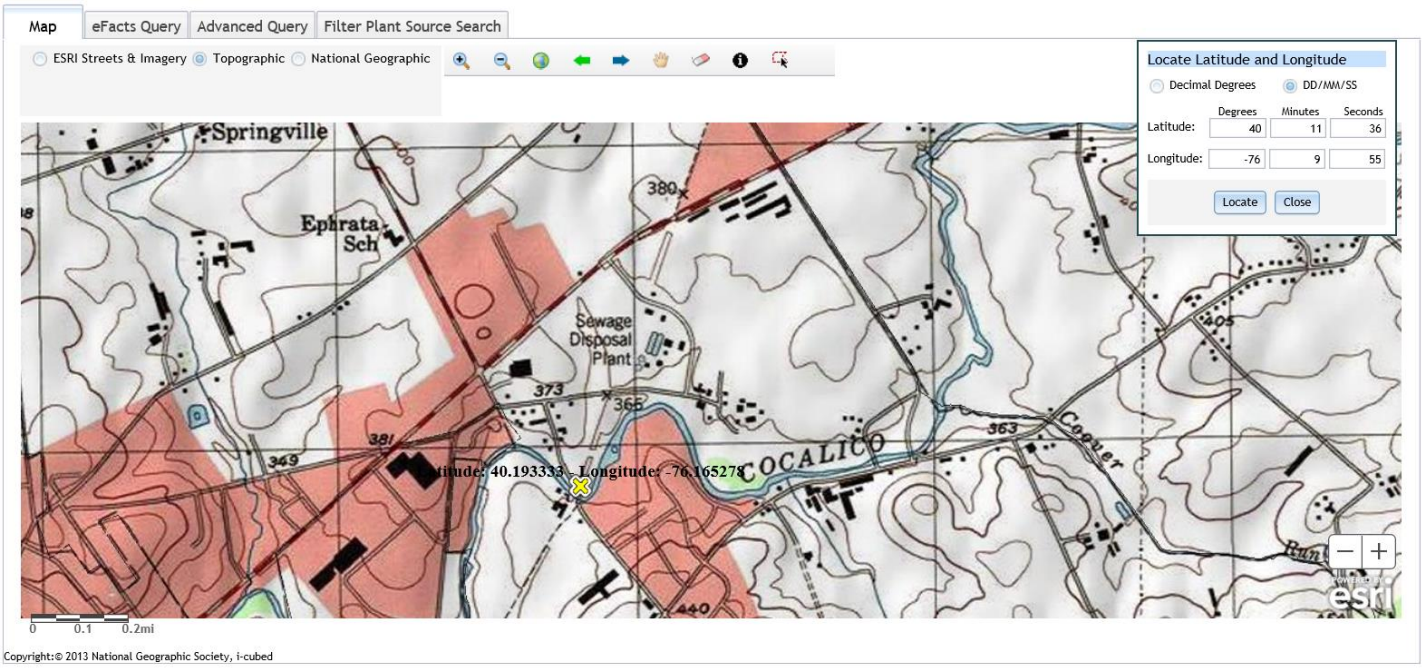
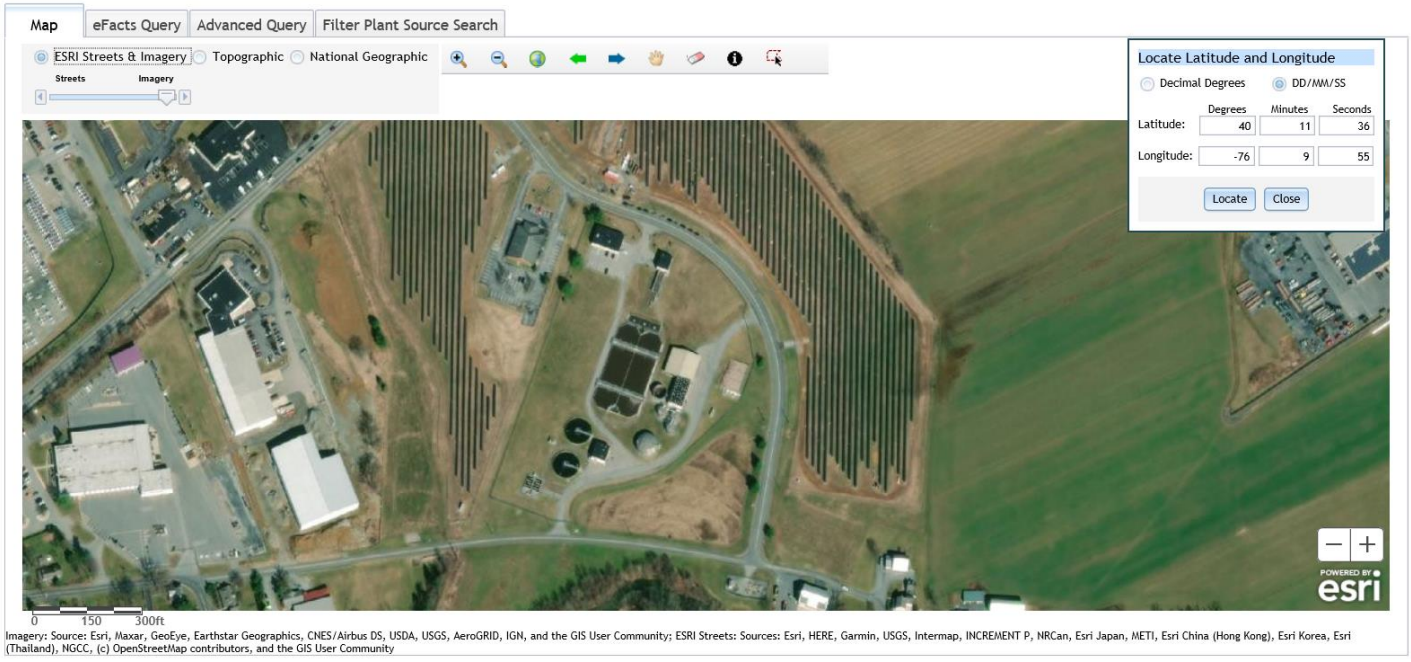


Figure 2: Aerial Photograph of the subject facility



2.1.2 Sources of Wastewater/Stormwater

The facility receives wastewater contributions from the following municipalities:

Denver Borough	29%
Ephrata Borough	1%
Ephrata Township	6%
East Cocalico Township	64%

The facility reported the following industrial users.

Industrial User Name	Address	Description of Industry	Wastewater Flow (GPD)
ACME	500 S. Muddy Creek Road, Denver, PA 17517	Receiving and Shipping Groceries	18,900
Pepperidge Farm	2195 N. Reading Road, Denver, PA 17517	Bakery of Bread, Cookies, Crackers, and Other Products	40,000

Ephrata initiated a pretreatment local administered program in 1983. On November 16, 2001, EPA approved the Ephrata pretreatment program. Modifications were made to the pretreatment programs on October 14, 2008. On February 12, 2014, both the Ephrata Borough Authority Plant #1 and #2 had their local limits re-evaluated. The facilities engaged in the pretreatment are summarized in the table.

Ephrata Area Wastewater- Industrial Waste 2017

Customer	Permit	
	Issue Date	Expire Date
F & M Hat Co.	Exempt	
Kalas Manufacturing Co.	6/16/2017	10/28/2021
Boose Aluminum Foundary Co.	10/28/2016	10/28/2021
Kyma Seafood Grill, Silk City Diner	10/28/2016	10/28/2021
Pepperidge Farm	10/28/2016	10/28/2021
Reamstown Athletic Association	10/28/2016	10/28/2021
Weaver Markets, Inc.	10/28/2016	10/28/2021
Park Place Diner	10/28/2016	10/28/2021
Supervalu Acme	10/28/2016	10/28/2021
Four Seasons Produce, Inc.	10/28/2016	10/28/2021
Union Barrol Works	1/10/2008	1/9/2012

Hauled-In Wastes

In the NPDES applications, the facility reported that they did not receive any hauled-in wastes in the last three years. The applicant does not anticipate any hauled in wastes the next five years.

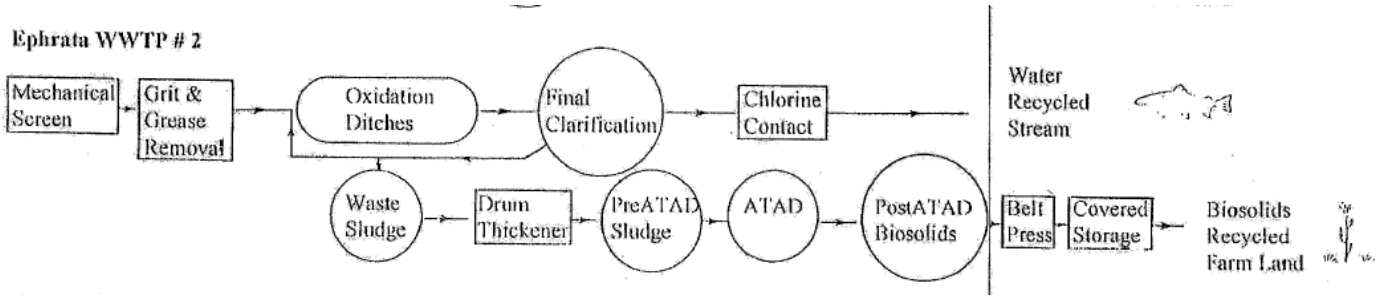
Stormwater Outfalls

The facility does not have any stormwater outfalls.

2.2 Description of Wastewater Treatment Process

The subject facility is a 2.3 MGD design flow facility. The subject facility treats wastewater using a bar screen, a three stage anaerobic selector and BioDenipho mode Phased isolation Ditch (PID) Technology, a clarifier(s), and a chlorine contact tank(s), and a chlorination/dechlorination system prior to discharge through the outfall.

A schematic of the process flow diagram is shown.



The plant is designed to remove BOD5, suspended solids, ammonia nitrogen, nitrite/nitrates, and phosphorus biologically. There is a backup phosphorus removal system which utilizes ferrous chloride.

The facility is being evaluated for flow, pH, dissolved oxygen, total residual chlorine, CBOD5, TSS, fecal coliform, nitrogen species, and total phosphorus. The existing permits limits for the facility is summarized in Section 2.4.

The treatment process is summarized in the table.

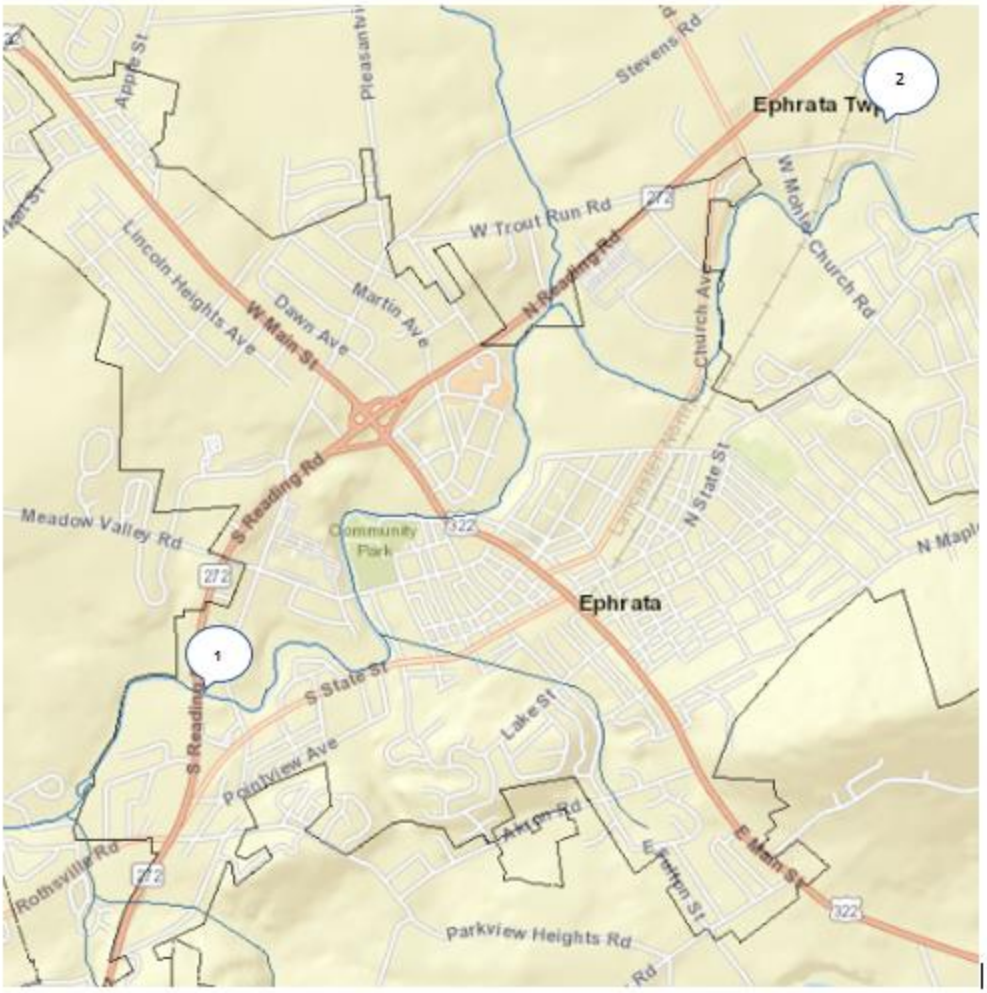
Treatment Facility Summary				
Treatment Facility Name: Ephrata Region STP Plant #2				
Waste Type	**Degree of Treatment**	**Process Type**	**Disinfection**	**Avg Annual Flow (MGD)**
Sewage	Secondary	Oxidation Ditch	Gas Chlorine	2.3
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
3.5	7300	Not Overloaded		

2.3 Facility Outfall Information

The facility has the following outfall information for wastewater.

Outfall No. 001 **Design Flow (MGD)** 2.3
Latitude 40º 11' 36.00" **Longitude** -76º 9' 55.00"
Wastewater Description: Sewage Effluent

The subject facility outfall is within the vicinity of another sewage/wastewater outfall. Ephrata Borough Authority Plant #1 (PA0027405) outfall is about 3.7 miles downstream from the subject facility. The map shows the location of the two Ephrata WWTPs.



Map Location #1:

Ephrata Borough Authority- Plant #1 (PA0027405)
405 South Reading Road
Ephrata, PA 17522

Map Location #2:

Ephrata Borough Authority- Plant #2 (PA0087181)
43 Springhouse Road
Ephrata, PA 17522

2.3.1.1 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.

- Chlorine for disinfection
- Ferrous chloride for phosphorus removal

2.3.1.1 Operational Considerations- Managing Peak Flows

In anticipation of managing peak flows, the facility has prepared a SOP. The SOP includes the following:

(a) Check vital equipment for operation readiness prior to and during the event
(b) Adjust RAS rates upward as needed to control final clarifier blanket level.

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** 40° 11' 39.9" , **Longitude** 76° 09' 51.5" , **River Mile Index** 11.90 , **Stream Code** 07656

Receiving Waters: Cocalico Creek

Type of Effluent: Sewage

1. The permittee is authorized to discharge during the period from February 1, 2014 through January 31, 2019.

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	Daily Maximum	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine	XXX	XXX	XXX	0.42	XXX	1.38	1/day	Grab
CBOD5	480	767 Wkly Avg	XXX	25	40	50	2/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Total Suspended Solids Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Total Suspended Solids	575	863 Wkly Avg	XXX	30	45	60	2/week	24-Hr Composite
Fecal Coliform (CFU/100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1,000	2/week	Grab
Fecal Coliform (CFU/100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2,000 Geo Mean	XXX	10,000	2/week	Grab

Outfall 001, Continued (from February 1, 2014 through January 31, 2019)

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Ammonia-Nitrogen May 1 - Oct 31	48	XXX	XXX	2.5	XXX	5.0	2/week	24-Hr Composite
Ammonia-Nitrogen Nov 1 - Apr 30	144	XXX	XXX	7.5	XXX	15	2/week	24-Hr Composite
Total Phosphorus	38	XXX	XXX	2.0	XXX	4.0	2/week	24-Hr Composite

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

at discharge from facility

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

I. B. For Outfall 001 , **Latitude** 40° 11' 39.9" , **Longitude** 76° 09' 51.5" , **River Mile Index** 11.90 , **Stream Code** 07656

Receiving Waters: Cocalico Creek

Type of Effluent: Sewage

1. The permittee is authorized to discharge during the period from February 1, 2014 through January 31, 2019.
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 [1]	Effluent Limitations					Monitoring Requirements	
	Mass Units (lbs)		Concentrations (mg/L)			Minimum [2] Measurement Frequency	Required Sample Type
	Monthly	Annual	Minimum	Monthly Average	Maximum		
Ammonia---N	Report	Report	XXX	Report	XXX	2/week	24-Hr Composite
Kjeldahl---N	Report	XXX	XXX	Report	XXX	2/week	24-Hr Composite
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	2/week	24-Hr Composite
Total Nitrogen	Report	Report	XXX	Report	XXX	1/month	Calculation
Total Phosphorus	Report	Report	XXX	Report	XXX	2/week	24-Hr Composite
Net Total Nitrogen	Report	54,550	XXX	XXX	XXX	1/month	Calculation
Net Total Phosphorus	Report	6,818	XXX	XXX	XXX	1/month	Calculation

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

Footnotes:
(1) See Part C for Chesapeake Bay Requirements.
(2) This is the minimum number of sampling events required. Permittees are encouraged, and it may be advantageous in demonstrating compliance, to perform more than the minimum number of sampling events required.
(3) The permittee is authorized to use 25 lbs/year as Total Nitrogen (TN) Offsets toward compliance with the Annual Net TN mass load limitations (Cap Loads), in accordance with Part C of this permit. These Offsets may be applied throughout the Compliance Year or during the Truing Period. The application of offsets must be reported to DEP as described in Part C. The Offsets are authorized for the following pollutant load reduction activities:
Connection of 1 on-lot sewage disposal system to the public sewer system after January 1, 2003, in which 25 lbs/year of TN offsets are granted per connection.

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.

07/14/2014: There was nothing significant to report.

08/05/2015: There was nothing significant to report.

09/20/2018:

- Grit/grease channel was offline due to yearly cleaning.
- The sampler refrigerator is no longer in use and samples were kept on ice during collection.
- The facility was utilizing only one of three ATAD digesters.

07/23/2019: There was nothing significant to report.

05/18/2020: An administrative inspection was conducted to determine the status of the operations.

- There was nothing significant to report

02/05/2021: A Chesapeake Bay Cap Load Compliance Evaluation was conducted.

- Monthly eDMR submission, supplemental reports, and annual Chesapeake Bay submissions were reviewed.
- The facility was advised to correct errors on the reporting.
- The facility was advised to us the most current Chesapeake Bay spreadsheet. No credits were purchased or sold during the year.

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 1.912 MGD in March 2021. The hydraulic design capacity of the treatment system is 3.5 MGD.

The off-site laboratory used for the analysis of the parameters was Suburban Testing Labs located at 1037 F MacArthur Road, Reading Road, Reading, PA.

The off-site laboratory used for the analysis of the whole effluent toxicity was American Aquatics located at 890 North Gram Street, Allentown, PA.

DMR Data for Outfall 001 (from April 1, 2020 to March 31, 2021)

Parameter	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20	JUN-20	MAY-20	APR-20
Flow (MGD) Average Monthly	1.912	1.583	1.380	1.692	1.183	0.966	0.903	1.409	1.066	1.006	1.353	1.782
Flow (MGD) Daily Maximum	4.834	4.221	2.713	5.224	2.052	1.616	2.262	4.035	1.925	1.730	3.008	4.902
pH (S.U.) Minimum	7.2	7.4	7.4	7.1	7.5	7.5	7.4	7.2	7.5	7.6	7.4	7.5
pH (S.U.) Maximum	7.7	7.8	7.9	8.2	7.9	7.9	7.9	7.9	8.0	8.0	7.9	7.8
DO (mg/L) Minimum	9.4	9.7	9.6	8.7	8.4	8.2	7.7	7.5	7.5	7.9	8.3	9.0
TRC (mg/L) Average Monthly	0.30	0.29	0.32	0.32	0.34	0.31	0.33	0.35	0.33	0.34	0.31	0.31
TRC (mg/L) Instantaneous Maximum	0.48	0.54	0.56	0.55	0.54	0.50	0.50	0.59	0.53	0.47	0.41	0.49
CBOD5 (lbs/day) Average Monthly	51	44	29	28	23	21	20	50	26	27	31	35
CBOD5 (lbs/day) Weekly Average	116	84	34	35	28	27	33	109	35	40	42	46
CBOD5 (mg/L) Average Monthly	2.9	3.0	2.6	2.1	2.4	2.8	2.4	3.2	2.8	3.3	3.1	2.7
CBOD5 (mg/L) Weekly Average	4.2	3.7	3.5	2.4	2.8	3.6	2.7	4.2	3.3	4.5	4.7	3.2
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	2166	1839	1891	1866	1784	1791	1868	2101	2400	2366	2334	2217
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	2896	2417	2493	2376	2196	2078	2994	3053	3042	3082	2502	2760
BOD5 (mg/L) Raw Sewage Influent Average Monthly	150	166	191	172	207	236	224	173	254	267	227	179
TSS (lbs/day) Average Monthly	45	36	11	31	13	9	9	17	8	12	17	43
TSS (lbs/day) Raw Sewage Influent Average Monthly	1712	1699	1553	1603	1390	1550	1476	1882	2547	2593	2197	1904

TSS (lbs/day) Raw Sewage Influent Daily Maximum	2804	2585	1816	2110	1926	2056	2118	3088	3596	3743	2627	2274
TSS (lbs/day) Weekly Average	116	90	19	62	23	16	19	44	14	15	25	76
TSS (mg/L) Average Monthly	2.4	2.2	1.0	2.2	1.3	1.2	1.1	1.0	0.9	1.5	1.7	2.6
TSS (mg/L) Raw Sewage Influent Average Monthly	122	151	156	149	160	206	178	149	270	292	214	140
TSS (mg/L) Weekly Average	4.0	3.8	1.8	4.0	2.4	2.2	1.6	1.6	1.4	2.0	2.0	4.8
Fecal Coliform (CFU/100 ml) Geometric Mean	3	2	1	1	2	1	2	2	1	2	1	2
Fecal Coliform (CFU/100 ml) Instantaneous Maximum	80	10	1	2	16	1	80	8	5	37	2	53
Nitrate-Nitrite (mg/L) Average Monthly	7.98	8.2	9.22	7.08	7.53	7.47	6.24	4.51	5.58	5.42	5.10	5.21
Nitrate-Nitrite (lbs) Total Monthly	3834	2990	3148	2793	2190	1783	1559	1955	1671	1316	1661	2343
Total Nitrogen (mg/L) Average Monthly	9.90	9.88	10.40	8.58	9.82	9.10	7.51	5.80	7.17	6.95	6.20	6.58
Total Nitrogen (lbs) Effluent Net Total Monthly	4711	3674	3565	3383	2870	2173	1899	2578	2142	1681	2005	2948
Total Nitrogen (lbs) Total Monthly	4711	3674	3565	3383	2870	2173	1899	2578	2142	1681	2005	2948
Total Nitrogen (lbs) Effluent Net Total Annual							28577					
Total Nitrogen (lbs) Total Annual							28577					
Ammonia (lbs/day) Average Monthly	16	15	6	7	2	3	3	6	4	3	3	9
Ammonia (mg/L) Average Monthly	1.02	0.95	0.56	0.54	0.21	0.37	0.36	0.31	0.42	0.32	0.27	0.60
Ammonia (lbs) Total Monthly	501	411	197	221	65	90	102	179	128	79	83	264
Ammonia (lbs) Total Annual							2021					

TKN (mg/L) Average Monthly	1.92	1.68	1.18	1.50	2.30	1.63	1.27	1.28	1.59	1.53	1.10	1.37
TKN (lbs) Total Monthly	877	684	417	590	679	390	340	624	470	365	344	605
Total Phosphorus (lbs/day) Average Monthly	22	14	13	11	7	6	5	10	9	10	11	15
Total Phosphorus (mg/L) Average Monthly	1.47	1.05	1.10	0.84	0.73	0.79	0.62	0.76	0.98	1.24	1.03	1.07
Total Phosphorus (lbs) Effluent Net Total Monthly	688	392	406	331	209	188	149	319	290	303	335	455
Total Phosphorus (lbs) Total Monthly	688	392	406	331	209	188	149	319	290	303	335	455
Total Phosphorus (lbs) Effluent Net Total Annual							3661					
Total Phosphorus (lbs) Total Annual							3661					

3.2.1 Additional Toxics Present

During the pollutant group sampling, the laboratory reported five (5) additional toxic pollutants. These toxic pollutants are not listed on the standard pollutant group list but were observed during the sampling and laboratory analysis.

The toxic pollutants were

- n-Hexadecanoic acid
- Octadecanoic acid
- Ethanol, 2-butoxy-, phosphate (3:1 (1)
- 2,3,3-Trimethyl-1-hexene 1
- Cyclohexane,1-methyl-2-propyl-1

3.2.2 Chesapeake Bay Truing Compliance

The table summarizes that the facility has been able to meet the Chesapeake Bay truing compliance permit limits.

Chesapeake Bay Annual Nutrient Summary
Ephrata Plant #2
PA0087181

Year for Truing Period (Oct 1 - Nov 28)	Net Effluent Limits		Compliant with Permit Limits (Yes/No)	
	Nitrogen (lbs)	Phosphorus (lbs)	Nitrogen	Phosphorus
	54,550	***6,818***		
2016	27,365	3,838	Yes	Yes
2017	29,854	3,777	Yes	Yes
2018	31,618	4,327	Yes	Yes
2019	34,832	4,563	Yes	Yes
2020	28,509	3,678	Yes	Yes

Based upon Chesapeake Bay reporting, there were differences in net effluent limits for nitrogen and phosphorus. This can be seen when comparing net effluent limits from Section 3.2 and 3.2.2. The differences were addressed in a revision by the facility for the Chesapeake Bay reporting.

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 February 1, 2014 to May 18, 2021, the table summarizes the effluent non-compliances.

Summary of Non-Compliance w NPDES Effluent Limits
Beginning 2/1/14 and ending 05/18/21

DATE	NON COMPLIANCE TYPE	PARAMETER	SAMPLE VALUE	CONDITION	PERMIT VALUE	MEASURE	STATISTICAL BASE CODE
08/17/2018	Violation of permit condition	Fecal Coliform	2100	>	1000	CFU/100 ml	Instantaneous
08/21/2019	Violation of permit condition	Fecal Coliform	5300	>	1000	CFU/100 ml	Instantaneous

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 February 1, 2014 to May 18, 2021, there were no observed enforcement actions.

3.4 Summary of Biosolids/Sewage Sludge Disposal

The sludge train consists of rotary drum thickening, an automated thermophyllic aerobic digestion system (ATAD) and a 2-meter belt press for dewatering. The exceptional quality biosolids are then applied to area farm fields.

Sewage sludge are managed under DEP permit number PAG-07-3508 which was issued March 20, 2018.

Sewage sludge was disposed at WWTP #2 farm fields, Memory Gardens farm fields, Cocalico Commons Farm Fields which were all located in Lancaster County.

A summary of the sewage sludge disposed of from the facility in 2020 is as follows.

2020			
Sewage Sludge / Biosolids Production Information			
Hauled Off-Site			
Date (YEAR)	Tons Dewatered	% Solids	Dry Tons
May	310.99	23.4	72.77
Notes:			
Sewage sludge disposed at U-7-7 East Cocalico Twp, Lancaster, PA under DEP Permit Number PAG07-3508			

3.5 Open Violations

No open violations existed as of May 2021.

4.0 Receiving Waters and Water Supply Information Detail Summary

4.1 Receiving Waters

The receiving waters has been determined to be Cocalico Creek. The sequence of receiving streams that Cocalico Creek discharges into are the Conestoga Creek and the Susquehanna River which eventually drains into the Chesapeake Bay.

4.2 Public Water Supply (PWS) Intake

The closest PWS to the subject facility is Ephrata Area Joint Authority (PWS ID # 7360045) located approximately 1.7 miles downstream of the subject facility on the Cocalico Creek. 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 2020 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 2020 Pennsylvania Integrated Water Quality Monitoring and Assessment Report as a Category 5 waterbody. The surface waters is a non-attaining stream that is impaired for aquatic life for the following reasons:

Impaired for aquatic life from (a) crop related agriculture due to nutrients; (b) urban runoff/storm sewers due to an unknown cause; and (c) grazing related agriculture due to siltation

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 August 26, 2013 Fact Sheet prepared by DEP included an extensive review comparing low flow stream rates from gauge station and Stream Stats. The Fact Sheet concluded that the gauge stations for the Conestoga and Little Conestoga were from an older set of data (1930 – 1995 and 1983 – 1993, respectively). Further the low flow yield from Stream Stats was slightly larger than the low flow yield from the nearby gauge stations. **The low flow yield from Stream Stats was utilized for the previous renewal and shall be used for the proposed NPDES renewal**.

The Q710 low flow value of 0.12 $ft^3/s/mi^2$ was used for the upstream Ephrata Plant #2. The downstream plant Ephrata Plant #1 shall have a Q710 of 0.103 $ft^3/s/mi^2$. This is slightly less than the Q710 for the Ephrata Plant #2 since it considers a water intake (Ephrata Area Joint Authority) (Abstracted from Fact Sheet dated for August 2013).

The closest WQN station to the subject facility is the Conestoga River station (WQN273). This WQN station is located approximately 43 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 8.2 and the stream water temperature was estimated to be 22.7 C.

The hardness of the stream was estimated by collecting a sample upstream of the facilities on July 10, 2018. For Ephrata Plant #1, the sample result was 198 mg/l. For Ephrata Plant #2, the sample result was 156 mg/l. Since the facilities are within a reasonable vicinity of each other, the sample results were averaged giving a result of 177 mg/l $CaCO_3$.

4.6 Summary of Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	2.3
Latitude	40Âº 12' 23.25"	Longitude	-76Âº 7' 57.54"
Quad Name		Quad Code	
Wastewater Description:	Sewage Effluent		

Receiving Waters	Cocalico Creek (WWF)	Stream Code	7656
NHD Com ID	57461655	RMI	11.59
Drainage Area	44.4	Yield (cfs/mi^2)	0.12
Q_{7-10} Flow (cfs)	5.63	Q_{7-10} Basis	Stream Stats
Elevation (ft)	344	Slope (ft/ft)	
Watershed No.	7-J	Chapter 93 Class.	WWF, MF
Existing Use	Same as Chapter 93 class.	Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired for aquatic life		
Cause(s) of Impairment	CAUSE UNKNOWN, NUTRIENTS, SILTATION		
Source(s) of Impairment	CROP PRODUCTION (CROP LAND OR DRY LAND), GRAZING IN RIPARIAN OR SHORELINE ZONES, URBAN RUNOFF/STORM SEWERS		
TMDL Status	Not applicable	Name	

Background/Ambient Data		Data Source
pH (SU)	8.2	WQN273; median July to Sept
Temperature (°C)	22.7	WQN273; median July to Sept
Hardness (mg/L)	177	Sample collection on July 10, 2018 for NPDES renewal app. Sample is average of Ephrata #1 and #2 samples.
Other:		

Nearest Downstream Public Water Supply Intake	Ephrata Area Joint Authority		
PWS Waters	Cocalico Creek	Flow at Intake (cfs)	
PWS RMI	9.9	Distance from Outfall (mi)	1.7

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) the Toxics Management Spreadsheet for Toxics pollutants.

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 input values utilized for the modeling are summarized in the table which can be found in Attachment B.

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).

The input values utilized for the modeling are summarized in the table which can be found in Attachment B.

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 pollutants in Groups 1 through 5.

An extensive group of pollutants were requested to be resampled for the following reasons: (1) The sample result exceeded the DEP recommended QL; and (2) The sample results had sufficient number of samples that had a positive hit result of the pollutant. A table summarizing the resample decision is shown.

Resample Decision Table
Ephrata Borough Authority- Plant #2; PA0087181

Pollutants	NPDES App Data ug/l			DEP Recommended QL (ug/l)	Resample Decision
Total Aluminum	<	100	3 Nondetect results out of 3	10	NPDES application data exceeds DEP Recommended QL
Total Cadmium	<	0.4	8 Nondetect results out of 8	0.2	NPDES application data exceeds DEP Recommended QL
Free Cyanide	<	5	3 Nondetect results out of 3	1	NPDES application data exceeds DEP Recommended QL
Total Mercury		0.1	4 Nondetect results out of 8	0.2	The samples results show 4 positive hit results out of eight samples. Collect additional samples to verify data
Acrolein		3.4	2 Nondetect results out of 3	2	The sample results show 1 postive hit result out of 3 samples. Collect additional samples to verify data
Dichlorobromomethane		1.4	2 Nondetect results out of 3	0.5	The sample results show 1 postive hit result out of 3 samples. Collect additional samples to verify data
Bis(2-Ethylhexyl)Phthalate		5.13	2 Nondetect results out of 3	5	The sample results show 1 postive hit result out of 3 samples. Collect additional samples to verify data
3,3-Dichlorobenzidine	<	10	3 Nondetect results out of 3	5	NPDES application data exceeds DEP Recommended QL
Hexachlorobutadiene	<	1	3 Nondetect results out of 3	0.5	NPDES application data exceeds DEP Recommended QL
Hexachloroethane	<	10	3 Nondetect results out of 3	5	NPDES application data exceeds DEP Recommended QL
1,2,4-Trichlorobenzene	<	1	3 Nondetect results out of 3	0.5	NPDES application data exceeds DEP Recommended QL

In the NPDES application submittal, total copper and total zinc reported each had eight positive hit results out of eight samples. DEP believes that a sufficient number of samples were collected to make a determination that these pollutants were a concern for the proposed NPDES permit. These parameters were not requested to be resampled.

The resample results are summarized in the table.

Resampling Laboratory Results

Pollutant	DEP Recommended QL (ug/l)	NPDES App		4/1/2021		4/7/2021		4/20/2021		Max	
		ug/l		ug/l		ug/l		ug/l		ug/l	
Total Aluminum	10	<	100		6		5		12		12
Total Cadmium	0.2	<	0.4	<	0.08	<	0.08	<	0.08	<	0.08
Total Copper	4		11						6		11
Free Cyanide	1	<	5		3	<	0.5	<	5	<	5
Total Mercury	0.2		0.1	<	0.04	<	0.04	<	0.04	<	0.04
Total Zinc	5		45						41		45
Acrolein	2		3.4	<	1	<	1	<	1	<	1
Dichlorobromomethane	0.5		1.4		0.5		0.6		0.6		0.6
Bis(2-Ethylhexyl)Phthalate	5		5.13	<	2.88	<	2.86		8.61		8.61
3,3-Dichlorobenzidine	5	<	10	<	0.134	<	0.132	<	0.132	<	0.134
Hexachlorobutadiene	0.5	<	1	<	0.0788	<	0.0781	<	0.0781	<	0.0788
Hexachloroethane	5	<	10	<	0.0663	<	0.0657	<	0.0657	<	0.0663
1,2,4-Trichlorobenzene	0.5	<	1	<	0.0894	<	0.0886	<	0.0886	<	0.0894

Notes:
- The NPDES application reported hits of copper and zinc on eight out of eight samples. These parameters were not resampled.

The Toxics Management Spreadsheet indicated modeling had concentrations measured in the effluent sample that were not within the normal range for safe water quality protection.

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)

Whole effluent toxicity is the aggregate toxic effect from a facility's wastewater discharge on aquatic organisms. WET measures the effect of wastewater effluent on an organisms' ability to survive, grow, and reproduce. WET testing is either acute or chronic. Acute testing measures lethality, the ability for an organism to survive after no more than 96 hours of exposure to an effluent. Chronic tests measures both lethality, immobility, and sublethal endpoints to exposures ranging longer than 96 hours and up to 8 days.

WET is required if the applicant satisfies any one of the following conditions.

(a) Major sewage facilities with an average annual design flow greater than or equal to 1.0 MGD (25 Pa. Code § 92a.27(a)(1)(i)).
(b) Sewage facilities with EPA-approved pretreatment programs or will be required in the permit to develop a program (25 Pa. Code § 92a.27(a)(1)(i)).
(c) Other facilities that are considered candidates for WET testing by one or more of the factors contained in 25 Pa. Code § 92a.27(a)(2).

5.3.3.1 WET Tests Review

WET analysis was analyzed by American Aquatics at 890 North Gram Street, Allentown, PA.

The in-stream waste concentration and dilution series was estimated using partial mixing factor factors from the Toxics Management Spreadsheet, the design flow rate for the facility, and the Q710.

The proposed NPDES permit shall utilize a chronic instream waste concentration of XX%. The complete dilution series will be 100%, 70%, 39%, 20%, and 10%.

The derivation is shown in the calculations.

Whole Effluent Toxicity (WET)

For Outfall 001, **Chronic** WET Testing was completed:

X	For the permit renewal application (4 tests).
	Quarterly throughout the permit term.
	Quarterly throughout the permit term and a TIE/TRE was conducted.
	Other:

The dilution series used for the tests was: 100%, 70%, 39%, 20%, and 10%. The Target Instream Waste Concentration (TIWC) to be used for analysis of the results is: 39%.

Summary of Four Most Recent Test Results

(NOTE – Enter results into one table, depending on which data analysis method was used).

TST Data Analysis

(NOTE – In lieu of recording information below, the application manager may attach the DEP WET Analysis Spreadsheet).

Test Date	*Ceriodaphnia* Results (Pass/Fail)		*Pimephales* Results (Pass/Fail)	
	Survival	Reproduction	Survival	Growth
10/10/2017	Pass	Pass	Pass	Pass
9/11/2018	Pass	Pass	Pass	Pass
9/9/2019	Pass	Pass	Pass	Pass
9/8/2020	Pass	Pass	Pass	Pass

***** *A "passing" result is that in which the replicate data for the TIWC is not statistically significant from the control condition. This is exhibited when the calculated t value ("T-Test Result") is greater than the critical t value. A "failing" result is exhibited when the calculated t value ("T-Test Result") is less than the critical t value.*

Is there reasonable potential for an excursion above water quality standards based on the results of these tests? (*NOTE – In general, reasonable potential is determined anytime there is at least one test failure in the previous four tests). YES/NO*

Comments:

No

Data

PMFa =	0.673	
PMFc =	1	
Qd =	2.3	MGD
Q710 =	5.63	cfs

Step 1: Determine IWC - Acute (IWCa)

IWCa = [(Qd x 1.547) / ((Q7-10 x PMFa) + (Qd x 1.547))] x 100

IWCa = 48.43

Is IWCA < 1% No (Yes- acute tests required; No- chronic test required)

If the discharge is to the tidal portion of the Delaware River, indicate how the type of test was determined.

Type of Test for Permit Renewal:

Chronic Tests required

Step 2a: Determine Target IWCa (If acute tests required)

TIWCa = IWCA / 0.3

TIWCa = 161.43

Step 2b: Determine Target IWCc (If chronic tests required)

ICCc = [(Qd x 1.547) / ((Q7-10 x PWFc) + (Design Flow MGD x 1.547))] x 100

ICCc = 38.73

Step 3: Determine Dilution Series

Dilution Series =	100%	70%	39%	20%	10%

WET Limits

Has reasonable potential been determined ? No

Will WET limits be established in the permit ? No

If WET limits wil be established, identify the species and the limit values for the permit (TU).

Not applicable

If WET limits will not be established, but reasonable potential was determined, indicate the rationale

Not applicable

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.

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 December 17, 2019.

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.

Based upon the supplement the subject facility has been categorized as a Sector A discharger. The supplement defines Sector A as a sewage facility that is considered significant if it has a design flow of at least 0.4 MGD. For rollout of its permitting strategy, DEP classified these facilities into three phases. Thirty IW facilities have individual WLAs in the TMDL.

Table 5 presents all NPDES permits for Significant Sewage dischargers with Cap Loads. The NPDES Permit No., phase, facility name, latest permit issuance date, expiration date, Cap Load compliance start date, TN and TP Cap Loads, and TN and TP Delivery Ratios are presented. In addition, if TN Offsets were incorporated into the TN Cap Loads when the permit was issued, the amount is shown; these Offsets will be removed from Cap Loads upon issuance of renewed permits to implement Section IV of the WIP document (i.e., a facility may use Offsets for compliance but may not register them as credits).

The total nitrogen (TN) and total phosphorus (TP) cap loads itemized by Table 5 for the subject facility are as follows:

TN Cap Load (lbs/yr)	54,550
TN Delivery Ratio	0.891
TP Cap Load (lbs/yr)	6,818
TP Delivery Ratio	0.436

Expansions by any Significant Sewage discharger will not result in any increase in Cap Loads. Where non-significant facilities expand to a design flow of 0.4 MGD or greater, the lesser of baseline Cap Loads of 7,306 lbs/yr TN and 974 lbs/yr TP or existing performance will be used for permits, and the load will be moved from the Non-Significant sector load to the Significant Sewage sector load. If considered necessary for environmental protection, DEP may decide to move load from the Point Source Reserve to the Significant Sewage sector in the future.

The minimum monitoring frequency for TN species and TP in new or renewed NPDES permits for Significant Sewage dischargers is 2/week.

This facility is subject to Sector A monitoring requirements. Monitoring shall be required at least 2x/wk.

Reporting

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.

An Annual DMR must be submitted by the end of the Truing Period, November 28. As attachments to the Annual DMR a facility must submit a completed Annual Chesapeake Bay Spreadsheet, available through DEP's Supplemental Reports website, which contains an Annual Nutrient Monitoring worksheet and an Annual Nutrient Budget worksheet. This Spreadsheet will be submitted once per Compliance Year only, and reflect all nutrient sample results (for the period October 1 – September 30), Credit transactions (including the Truing Period) and Offsets applied during the Compliance Year.

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.

Discussion on Reaeration Rates for CBOD/Ammonia-Nitrogen Effluent Limits

In 1995, a report was prepared by James D. Miller entitled *Travel Time Study / Propane Gas Survey on Cocalico Creek for Ephrata Borough* (Attached in Appendix). The purpose of the study was to conduct field studies to establish more accurate stream velocities and reaeration rates for the Ephrata Plant #2 NPDES (Springhouse Road) permit and the Ephrata Plant #1 (South Reading Road) NPDES permit.

Travel times/reaeration rate studies occurred in 1979, 1989, 1994, and 1995. The 1995 study utilized propane gas stream survey on Reaches #1, #2, and #3 to determine the stream reaeration rates in a more direct manner using propane gas as the compound for stream measurement. The reaeration rates from the study resulted in Reach #1 as 5.3/day, Reach #2 as 15.6/day, and Reach #3 as 3.5/day.

The Fact Sheet from August 2013 utilized these reaeration rates for WQM modeling.

The propane study was conducted in 1995 which is over 26 years ago (2021 – 1995 = 26 years). While the propane study may be considered outdated, the reaeration rates were utilized to recommend effluent limits for the proposed NPDES permit.

For the NPDES renewal in 2021, WQM was run with and without the reaeration rates for comparison purposes. **The permit limits that shall apply to the proposed permit shall utilize the reaeration rates from the 1995 study. CBOD and ammonia nitrogen limits shall continue at the same permit limits for the proposed permit.**

The CBOD and ammonia nitrogen limits are summarized in the Table called Summary of WQM Results for CBOD and Ammonia for both the Ephrata Borough Authority Plant 1 (PA0027405) and Plant #2 (PA0087181). The table summarizes three sets of data: Data Set #1 is for current limits using reaeration rates; Data Set #2 is for proposed limits with reaeration rates; Data Set #3 is for proposed limits in the Year 2026 without reaeration rates.

Summary of WQM results for CBOD/Ammonia-N

Facility / Parameter	*PA0027405 (Plant #1)*	PA0087181 (Plant #2)	*PA0027405 (Plant #1)*	PA0087181 (Plant #2)	*PA0027405 (Plant #1)*	PA0087181 (Plant #2)
	With Reaeration Rates[A]		With Reaeration Rates[A]		Without Reaeration Rates[C]	
	Current Limit (mg/l)		**Proposed (mg/l)**		**Proposed Alternate (mg/l)**	
CBOD	21	25	**21**	**25**	**7**	**11**
Ammonia-Nitrogen[B]	2	2.5	**3.5**	**4.0**	**2**	**3**

Notes:

[A] Travel Time Study / Propane Gas Survey on Cocalico Creek for Ephrata Borough by James D. Miller (last dated for Aug - Nov 1995)

[B] Data is output from WQM Model. Permit limit may be more stringent than output from WQM Model due to antibacksliding

- Data represents mathematically rounded data

[C] Projected data without reaeration rates

Differences in concentration for ammonia may be attributed to whether default values (i.e. pH, temperature) or WQN values were utilized when modeling. Additionally, the WQM model was revised consistent with the EPA Triennial review. Ammonia-Nitrogen appears to be less stringent for the proposed permit compared to the current permit. Based upon anti-backsliding, the more stringent limits shall apply.

The DMRs for CBOD for both plants are summarized in Table Summary of CBOD for Ephrata Authority Plant #1 and #2.

Summary of CBOD for Ephrata Authority Plant #1 and #2

Plant Location / Date	Parameter	21-Mar	21-Feb	21-Jan	20-Dec	20-Nov	20-Oct	20-Sep	20-Aug	20-Jul	20-Jun	20-May	20-Apr
Ephrata Plant #1; PA0027405	CBOD5 (mg/L)	4.6	4.8	3.8	3.5	4.2	5.1	3.2	4.2	3.2	3.4	2.6	3.0
Ephrata Plant #2; PA0087181	CBOD5 (mg/L)	2.9	3.0	2.6	2.1	2.4	2.8	2.4	3.2	2.8	3.3	3.1	2.7

Again, the propane study was conducted in 1995 which is over 26 years ago.

In future renewals, the facility may have two options:

- Option 1- Model CBOD and ammonia nitrogen without the reaeration rates. The projected limits would be reduced. The preliminary projected limits are summarized under Proposed Alternate. Based upon the DMR from the last 12 months, both facilities should be able to meet the reduced permit limits.
- Option 2- The facility should conduct a reaeration rate study in preparation for the next renewal which will occur 5 years from this renewal (i.e. at the expiration of this renewal). The reaeration results from the study will be utilized for WQM modeling. The permit limits using those reaeration rates from the study may differ from the current permit limits.

Discussion on TRC Site Specific Study

In February 1997, a report was prepared by Gannett Fleming entitled *Borough of Ephrata TRC Site-Specific Study* (Attached in Appendix). The purpose of the study was to conduct field studies to develop site-specific data to determine appropriate NPDES limits for TRC. The report stated that the site-specific study was not complete but had enough information to utilize data for the site specific study.

The raw data consisted of 26 different points collected from September 1995 to November 1996. The more stringent summertime fecal coliform limit is 200 cfu/100 mL. To attain the fecal coliform limit, a TRC residual must be maintained in the effluent. The summer chlorine demand ranged from 0.55 mg/l to 0.74 mg/l. The report concluded that a conservative chlorine demand would be 0.55 mg/l.

The Fact Sheet from August 2013 utilized the TRC site specific data.

The TRC study was conducted in 1996 which is over 25 years ago (2021 – 1996 = 25 years). **While the TRC study may be considered outdated, the use of the data for this TRC modeling was utilized to recommend TRC effluent limits for the proposed NPDES permit.** Using the site specific TRC data, both facilities should be able to meet the TRC effluent limit.

The TRC limits with and without the site specific TRC data is summarized in the Table called Comparison of Proposed TRC With and Without Site Specific Chlorine Demand.

Comparison of Proposed TRC with/without Site Specific Chlorine Demand

Facility	Without Site Specific Cl_2 Data	With Site Specific Cl_2 Data
	Average Monthly (mg/l)	Average Monthly (mg/l)
Plant #1	0.16	0.29
Plant #2	0.24	0.42

Notes:

The site specific data was abstracted from the Febraury 1997 report. The site specific summertime chlorine demand is 0.55 mg/l.

The reader should note that based upon the DMR data for both plants for the last 12 months, both Plants #1 and #2 would not be able to consistently meet the TRC limits without the site-specific TRC chlorine demand factor. The DMRs for TRC for both plants are summarized below.

Summary of TRC for Ephrata Authority Plant #1 and #2

Plant Location / Date	Parameter	21-Mar	21-Feb	21-Jan	20-Dec	20-Nov	20-Oct	20-Sep	20-Aug	20-Jul	20-Jun	20-May	20-Apr
Ephrata Plant #1; PA0027405	TRC (mg/L)	0.21	0.18	0.17	0.19	0.17	0.18	0.17	0.24	0.17	0.2	0.22	0.23
Ephrata Plant #2; PA0087181	TRC (mg/L)	0.30	0.29	0.32	0.32	0.34	0.31	0.33	0.35	0.33	0.34	0.31	0.31

The TRC study was conducted in 1996 which is over 25 years

In future renewals, the facility may have two options:

- Option A- Model TRC without the site specific TRC data. The facility may be required to upgrade the facility to meet the TRC effluent limits using dechlorination or uv dinfection.
- Option B- Conduct a TRC study in preparation for the next renewal which will occur 5 years from this renewal (i.e. at the expiration of this renewal). The TRC study results from the study will be utilized for a TRC evaluation. The permit limits using those TRC study results may differ from the current TRC permit 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, (b) Nitrogen Species and Phosphorus, and (c) Toxics.

6.1.1 Conventional Pollutants and Disinfection

Due to the EPA Triennial Review, E. Coli shall be monitored on a 1x/month basis.

Summary of Proposed NPDES Parameter Details for Conventional Pollutants and Disinfection Ephrata Borough Authority- Plant #2; PA0087181			
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 2x/wk as a 24-hr composite sample (Table 6-3).
		Effluent Limit:	Effluent limits shall not exceed 480 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 2x/wk as a 24-hr composite sample (Table 6-3).
		Effluent Limit:	Effluent limits shall not exceed 575 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. Since the TBEL is more stringent than TBEL, TBEL will apply.
TRC	WQBEL	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 0.42 mg/l and/or 1.38 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 WQBEL is more stringent than the TBEL. The monitoring frequency has been assigned in accordance with Table 6-3 and the effluent limits assigned by TRC Evaluation XLS	
Fecal Coliform	TBEL	Monitoring:	The monitoring frequency shall be 2x/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; EPA Triennial Directive	Monitoring:	The monitoring frequency shall be required on a 1x/mo basis as a grab sample (SOP).
		Effluent Limit:	No effluent requirements.
		Rationale:	Due to directive from EPA in the 2017 Triennial Review, monitoring for this parameter shall be required on a 1x/month basis..
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 2.3 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 Phase 2 Watershed Implementation Plan Wastewater Supplement, Revised September 6, 2017			

6.1.2 Nitrogen Species and Phosphorus

Summary of Proposed NPDES Parameter Details for Nitrogen Species and Phosphorus

Ephrata Borough Authority- Plant #2; PA0087181

Parameter	Permit Limitation Required by[1]:	Recommendation	
Ammonia-Nitrogen	Anti-backsliding	Monitoring:	The monitoring frequency shall be 2x/wk as a 24-hr composite sample
		Effluent Limit:	During the months of May 1 to Oct 31, the effluent limit shall be 48 lbs/day and 2.5 mg/l as an average monthly. During the months of Nov 1 to Apr 31, the effluent limit shall be 144 lbs/day and 7.5 mg/l as an average monthly.
		Rationale:	Due to anti-backsliding, the curent permit limits shall continue to the proposed permit.
Nitrate-Nitrite as N	Chesapeake Bay TMDL	Monitoring:	The monitoring frequency shall be 2x/wk 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/wk.
Total Nitrogen	Chesapeake Bay TMDL	Monitoring:	The monitoring frequency shall be 1x/mo.
		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 1x/mo.
TKN	Chesapeake Bay TMDL	Monitoring:	The monitoring frequency shall be 2x/wk 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/wk.
Total Phosphorus	Anti-backsliding	Monitoring:	The monitoring frequency shall be 2x/wk as a 24-hr composite sample
		Effluent Limit:	Effluent limits shall not exceed 38 lbs/day and 2.0 mg/l as an average monthly.
		Rationale:	Due to antibacksliding regulations, the current limit shall contnue to the proposed permit.
Net Total Nitrogen	Chesapeake Bay TMDL	Monitoring:	The monitoring frequency shall be 1x/mo as a 24-hr composite sample
		Effluent Limit:	Effluent limits shall not exceed 54,550 lbs annually.
		Rationale:	Due to the Chesapeake Bay Implementation Plan, the facility is required to be monitored on a frequency at least 1x/mo.
Net Total Phosphorus	Chesapeake Bay TMDL	Monitoring:	The monitoring frequency shall be 1x/mo as a 24-hr composite sample
		Effluent Limit:	Effluent limits shall not exceed 6,818 lbs annually.
		Rationale:	Due to the Chesapeake Bay Implementation Plan, the facility is required to be monitored on a frequency at least 1x/mo.

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 2.3 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 Phase 2 Watershed Implementation Plan Wastewater Supplement, Revised September 6, 2017

6.1.3 Toxics

Summary of Proposed NPDES Parameter Details for Toxics

Ephrata Borough Authority- Plant #2; PA0087181

Parameter	Permit Limitation Required by[1]:	Recommendation	
Total Copper	WQBEL	Monitoring:	The monitoring frequency shall be 2x/month as a 24-hr composite sample (Table 6-3).
		Effluent Limit:	No effluent requirements.
		Rationale:	The Toxics Management Spreadsheet recommends monitoring.
Free Cyanide	WQBEL	Monitoring:	The monitoring frequency shall be 2x/month as a grab sample (Table 6-3).
		Effluent Limit:	Effluent limits shall not exceed 0.19 lbs/day and 0.009 mg/l as an average monthly.
		Rationale:	The Toxics Management Spreadsheet recommends effluent limits.
Total Zinc	WQBEL	Monitoring:	The monitoring frequency shall be 2x/month as a 24-hr composite sample (Table 6-3).
		Effluent Limit:	No effluent requirements.
		Rationale:	The Toxics Management Spreadsheet recommends monitoring.
Bis(2-Ethylhexyl) Phthlate	WQBEL	Monitoring:	The monitoring frequency shall be 2x/month as a 24-hr composite sample (Table 6-3).
		Effluent Limit:	Effluent limits shall not exceed 0.06 lbs/day and 0.003 mg/l as an average monthly.
		Rationale:	The Toxics Management Spreadsheet recommends effluent limits.

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 2.3 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 Phase 2 Watershed Implementation Plan Wastewater Supplement, Revised September 6, 2017

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.

Changes in Permit Monitoring or Effluent Quality

Parameter	Existing Permit	Draft Permit
E. Coli	No monitoring or effluent limits.	Due to the EPA Triennial Review, monitoring shall be 1x/month.
Total Copper	No monitoring or effluent limits.	Toxics Management Spreadsheet recommends monitoring. Monitoring shall be 2x/month
Free Cyanide	No monitoring or effluent limits.	Toxics Management Spreadsheet recommends limits. Monitoring shall be 2x/month and the effluent limits shall not exceed 0.19 lbs/day and 0.009 mg/l as an average monthly.
Total Zinc	No monitoring or effluent limits.	Toxics Management Spreadsheet recommends monitoring. Monitoring shall be 2x/month
Bis(2-Ethylhexyl) Phthlate	No monitoring or effluent limits.	Toxics Management Spreadsheet recommends limits. Monitoring shall be 2x/month and the effluent limits shall not exceed 0.06 lbs/day and 0.003 mg/l as an average monthly.

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° 11' 38.00" , **Longitude** 76° 9' 55.00" , **River Mile Index** 11.59 , **Stream Code** 7656

Receiving Waters: Stony Run (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 Inst Min	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	5.0 Inst Min	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.42	XXX	1.38	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	480	767	XXX	25	40	50	2/week	24-Hr Composite
Biochemical Oxygen Demand (BOD5) Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Total Suspended Solids	575	863	XXX	30	45	60	2/week	24-Hr Composite
Total Suspended Solids Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	2/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	2/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	2/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] Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/month	Grab
Ammonia-Nitrogen Nov 1 - Apr 30	144	XXX	XXX	7.5	XXX	15	2/week	24-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	48	XXX	XXX	2.5	XXX	5	2/week	24-Hr Composite
Total Phosphorus	38	XXX	XXX	2.0	XXX	4	2/week	24-Hr Composite
Copper, Total	Report	XXX	XXX	Report	XXX	XXX	2/month	24-Hr Composite
Cyanide, Free	0.19	XXX	XXX	0.009	0.015 Daily Max	0.025	2/month	Grab
Zinc, Total	Report	XXX	XXX	Report	XXX	XXX	2/month	24-Hr Composite
Bis(2-Ethylhexyl)Phthalate	0.06	XXX	XXX	0.003	0.005 Daily Max	0.008	2/month	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.

- The travel times and reaeration rates used for this NPDES renewal were developed in 1995, which was more than 25 years ago. In order to use site specific reaeration rates in the next renewal, the permittee shall be required to conduct a comprehensive study providing current travel times and reaeration rates for the receiving waters. In anticipation for the expiration of this permit in 5 years, the facility should have the study completed 4 years from the effective date of this permit. The facility may choose to waive the study in which case DEP will utilize applicable modeling tools without site specific aeration rates.

- The TRC site specific study was used for this NPDES renewal originated in 1997 which was almost 25 years ago. In order to use site specific data in the next renewal, the permittee shall be required to conduct a comprehensive study with a current TRC site specific study for the next NDPES renewal. In anticipation for the expiration of this permit in 5 years, the facility should have the study completed 4 years from the effective date of this permit.

  The facility may choose to waive the study in which case DEP will utilize applicable models without the TRC site specific data. In developing the final WQBELs for TRC, DEP would assumed in-stream and discharge chlorine demands of 0.3 mg/l and 0 mg/l, respectively.

  Alternatively, other methods of disinfection or dechlorination to meet TRC effluent concentrations may be acceptable.
- Pretreatment Implementation
- Chlorine Minimization
- Peak Flow Management Plan
- Hauled-in Waste Restrictions
- Chesapeake Bay Nutrient Definitions
- Solids Management for Non-Lagoon Treatment Systems
- Whole Effluent Toxicity – No Permit Limits
- The Chesapeake Bay nutrient requirements for Total Nitrogen and Total Phosphorus may be exchanged on a pound per pound basis between the Ephrata Borough Plant #1 and Plant #2. The exchange would be considered as offsets used by the same entity and not a transfer by definition between owners, projects, or properties. A reserve requirement shall not be applied in this situation.

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)
☐	Toxics Screening Analysis 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, October 11, 2013.*
☐	Other:

Attachment A

Stream Stats/Gauge Data

Available Upon Request

Attachment B

WQM 7.0 Modeling Output Values
Toxic Management Spreadsheet

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
07J	7656	COCALICO CREEK

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Eff. Limit 30-day Ave. (mg/L)	Eff. Limit Maximum (mg/L)	Eff. Limit Minimum (mg/L)
11.590	Ephrata Plant 2	PA0087181	2.300	CBOD5	25		
				NH3-N	4.07	8.14	
				Dissolved Oxygen			5

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Eff. Limit 30-day Ave. (mg/L)	Eff. Limit Maximum (mg/L)	Eff. Limit Minimum (mg/L)
8.180	Ephrata Plant 1	PA0027405	3.800	CBOD5	21.44		
				NH3-N	3.77	7.54	
				Dissolved Oxygen			5

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
07J	7656	COCALICO CREEK

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
11.590	Ephrata Plant 2	11.37	22.27	11.37	22.27	0	0
9.720		NA	NA	10.37	NA	NA	NA
8.180	Ephrata Plant 1	11.91	21.54	13.25	21.54	0	0
7.580		NA	NA	13.18	NA	NA	NA
6.410		NA	NA	13.12	NA	NA	NA
5.190		NA	NA	12.1	NA	NA	NA

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
11.590	Ephrata Plant 2	1.26	4.29	1.26	4.07	3	5
9.720		NA	NA	1.17	NA	NA	NA
8.180	Ephrata Plant 1	1.32	3.98	1.45	3.77	3	5
7.580		NA	NA	1.44	NA	NA	NA
6.410		NA	NA	1.44	NA	NA	NA
5.190		NA	NA	1.34	NA	NA	NA

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)		
11.59	Ephrata Plant 2	25	25	4.07	4.07	5	5	0	0
9.72		NA	NA	NA	NA	NA	NA	NA	NA
8.18	Ephrata Plant 1	21.44	21.44	3.77	3.77	5	5	0	0
7.58		NA	NA	NA	NA	NA	NA	NA	NA
6.41		NA	NA	NA	NA	NA	NA	NA	NA
5.19		NA	NA	NA	NA	NA	NA	NA	NA

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
07J	7656	COCALICO CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
11.590	2.300	21.619	7.358
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
42.489	0.734	57.909	0.285
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
11.21	1.285	1.63	0.793
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.944	5.507	User Supplied	5
Reach Travel Time (days)			
0.401			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.040	10.60	1.58	6.31
0.080	10.03	1.53	5.85
0.120	9.49	1.48	5.53
0.160	8.98	1.43	5.31
0.200	8.49	1.39	5.19
0.241	8.04	1.35	5.13
0.281	7.60	1.30	5.12
0.321	7.19	1.26	5.15
0.361	6.80	1.22	5.20
0.401	6.44	1.18	5.28

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
9.720	2.300	21.807	7.428
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
48.680	0.769	63.299	0.287
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
5.66	1.067	0.98	0.804
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.799	5.532	User Supplied	5
Reach Travel Time (days)			
0.327			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.033	5.45	0.95	5.91
0.065	5.25	0.93	6.02
0.098	5.05	0.90	6.12
0.131	4.87	0.88	6.22
0.164	4.69	0.86	6.31
0.196	4.51	0.84	6.40
0.229	4.34	0.81	6.49
0.262	4.18	0.79	6.57
0.295	4.03	0.77	6.65
0.327	3.88	0.75	6.73

WQM 7.0 D.O. Simulation

SWP Basin	Stream Code	Stream Name
07J	7656	COCALICO CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
8.180	6.100	21.189	7.231
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
57.841	0.812	71.191	0.359
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
9.97	1.199	1.79	0.767
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.145	16.046	User Supplied	5
Reach Travel Time (days)			
0.102			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.010	9.85	1.78	6.33
0.020	9.72	1.76	6.50
0.031	9.59	1.75	6.64
0.041	9.47	1.74	6.76
0.051	9.35	1.72	6.87
0.061	9.23	1.71	6.96
0.072	9.11	1.70	7.04
0.082	8.99	1.68	7.12
0.092	8.88	1.67	7.18
0.102	8.76	1.66	7.24

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
7.580	6.100	21.206	7.236
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
63.240	0.871	72.639	0.310
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
8.69	1.166	1.64	0.768
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.247	3.602	User Supplied	5
Reach Travel Time (days)			
0.231			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.023	8.44	1.61	6.91
0.046	8.21	1.58	6.61
0.069	7.98	1.55	6.34
0.092	7.75	1.53	6.11
0.115	7.54	1.50	5.90
0.138	7.32	1.47	5.73
0.162	7.12	1.45	5.58
0.185	6.92	1.42	5.45
0.208	6.73	1.40	5.34
0.231	6.54	1.37	5.25

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
07J	7656	COCALICO CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
6.410	6.100	21.223	7.240
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
58.770	0.801	70.881	0.379
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
6.49	1.114	1.38	0.769
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.283	3.603	User Supplied	5
Reach Travel Time (days)			
0.196			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.020	6.34	1.34	5.23
0.039	6.19	1.32	5.19
0.059	6.05	1.30	5.15
0.079	5.91	1.28	5.12
0.098	5.78	1.26	5.11
0.118	5.64	1.24	5.09
0.138	5.52	1.22	5.09
0.157	5.39	1.20	5.09
0.177	5.27	1.18	5.10
0.196	5.15	1.17	5.11

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
5.190	6.100	21.465	7.308
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
68.267	0.860	79.404	0.351
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
4.63	0.955	0.98	0.784
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.620	3.624	User Supplied	5
Reach Travel Time (days)			
0.308			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.031	4.49	0.95	5.66
0.062	4.35	0.93	5.71
0.092	4.21	0.91	5.76
0.123	4.06	0.89	5.82
0.154	3.96	0.86	5.87
0.185	3.83	0.84	5.93
0.216	3.72	0.82	5.99
0.246	3.60	0.80	6.05
0.277	3.49	0.78	6.11
0.308	3.38	0.77	6.17

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	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.6	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
07J	7656	COCALICO CREEK

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												
11.590	5.33	0.00	5.33	3.5581	0.00182	.734	42.49	57.91	0.29	0.401	21.62	7.36
9.720	7.20	0.00	7.20	3.5581	0.00123	.769	48.68	63.3	0.29	0.327	21.81	7.43
8.180	7.43	0.00	7.43	9.4367	0.00095	.812	57.84	71.19	0.36	0.102	21.19	7.23
7.580	7.62	0.00	7.62	9.4367	0.00016	.871	63.24	72.64	0.31	0.231	21.21	7.24
6.410	7.82	0.00	7.82	9.4367	0.00186	.801	56.77	70.88	0.38	0.196	21.22	7.24
5.190	11.20	0.00	11.20	9.4367	0.00064	.86	68.29	79.4	0.35	0.308	21.47	7.31
Q1-10 Flow												
11.590	3.41	0.00	3.41	3.5581	0.00182	NA	NA	NA	0.25	0.459	21.32	7.27
9.720	4.61	0.00	4.61	3.5581	0.00123	NA	NA	NA	0.25	0.382	21.52	7.33
8.180	4.75	0.00	4.75	9.4367	0.00095	NA	NA	NA	0.33	0.113	20.90	7.16
7.580	4.88	0.00	4.88	9.4367	0.00016	NA	NA	NA	0.28	0.255	20.92	7.17
6.410	5.00	0.00	5.00	9.4367	0.00186	NA	NA	NA	0.34	0.217	20.94	7.17
5.190	7.17	0.00	7.17	9.4367	0.00064	NA	NA	NA	0.31	0.348	21.17	7.23
Q30-10 Flow												
11.590	8.52	0.00	8.52	3.5581	0.00182	NA	NA	NA	0.34	0.338	21.90	7.47
9.720	11.52	0.00	11.52	3.5581	0.00123	NA	NA	NA	0.35	0.271	22.06	7.55
8.180	11.88	0.00	11.88	9.4367	0.00095	NA	NA	NA	0.41	0.090	21.50	7.32
7.580	12.20	0.00	12.20	9.4367	0.00016	NA	NA	NA	0.35	0.202	21.52	7.33
6.410	12.51	0.00	12.51	9.4367	0.00186	NA	NA	NA	0.43	0.172	21.54	7.33
5.190	17.91	0.00	17.91	9.4367	0.00064	NA	NA	NA	0.41	0.263	21.77	7.41

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
07J	7656	COCALICO CREEK	**11.590**	344.00	44.40	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	0.120	0.00	0.00	0.000	0.000	0.0	0.00	0.00	22.70	8.20	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
Ephrata Plant 2	PA0087181	2.3000	2.3000	2.3000	0.000	20.00	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	5.00	8.24	0.00	5.30
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
07J	7656	COCALICO CREEK	**9.720**	326.00	60.00	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	0.120	0.00	0.00	0.000	0.000	0.0	0.00	0.00	22.70	8.20	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	0.00	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	5.00	8.24	0.00	5.30
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
07J	7656	COCALICO CREEK	**8.180**	316.00	62.20	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	0.103	0.00	0.00	0.000	0.000	0.0	0.00	0.00	22.70	8.20	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
Ephrata Plant 1	PA0027405	3.8000	3.8000	3.8000	0.000	20.00	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	5.00	8.24	0.00	15.60
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
07J	7656	COCALICO CREEK	**7.580**	313.00	64.10	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	0.103	0.00	0.00	0.000	0.000	0.0	0.00	0.00	22.70	8.20	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	0.00	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	5.00	8.24	0.00	3.50
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
07J	7656	COCALICO CREEK	**6.410**	312.00	66.00	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	0.103	0.00	0.00	0.000	0.000	0.0	0.00	0.00	22.70	8.20	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	0.00	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	5.00	8.24	0.00	3.50
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
07J	7656	COCALICO CREEK	**5.190**	300.00	98.80	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	0.103	0.00	0.00	0.000	0.000	0.0	0.00	0.00	22.70	8.20	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	0.00	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	5.00	8.24	0.00	3.50
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
07J	7656	COCALICO CREEK	3.420	294.00	136.00	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	0.103	0.00	0.00	0.000	0.000	0.0	0.00	0.00	22.70	8.20	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	0.00	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

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Toxics Management Spreadsheet
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Discharge Information

Instructions | Discharge | Stream

Facility: **Ephrata Borough Authority (Plant #2)** NPDES Permit No.: **PA0087181** 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
2.3	282	7.65						

					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		640									
	Chloride (PWS)	mg/L		159									
	Bromide	mg/L	<	1									
	Sulfate (PWS)	mg/L		56									
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L		12									
	Total Antimony	µg/L		0.6									
	Total Arsenic	µg/L		1									
	Total Barium	µg/L		37									
	Total Beryllium	µg/L	<	0.4									
	Total Boron	µg/L		207									
	Total Cadmium	µg/L	<	0.08									
	Total Chromium (III)	µg/L	<	1									
	Hexavalent Chromium	µg/L	<	0.1									
	Total Cobalt	µg/L	<	1									
	Total Copper	µg/L		11									
	Free Cyanide	µg/L	<	5									
	Total Cyanide	µg/L		14									
	Dissolved Iron	µg/L		56									
	Total Iron	µg/L	<	100									
	Total Lead	µg/L	<	1									
	Total Manganese	µg/L		44									
	Total Mercury	µg/L	<	0.04									
	Total Nickel	µg/L		2									
	Total Phenols (Phenolics) (PWS)	µg/L	<	5									
	Total Selenium	µg/L	<	2									
	Total Silver	µg/L	<	1									
	Total Thallium	µg/L	<	0.4									
	Total Zinc	µg/L		45									
	Total Molybdenum	µg/L		5									
	Acrolein	µg/L	<	1									
	Acrylamide	µg/L											
	Acrylonitrile	µg/L	<	0.5									
	Benzene	µg/L	<	0.5									
	Bromoform	µg/L	<	0.5									
	Carbon Tetrachloride	µg/L	<	0.5									
	Chlorobenzene	µg/L	<	0.5									
	Chlorodibromomethane	µg/L		0.5									
	Chloroethane	µg/L	<	0.5									
	2-Chloroethyl Vinyl Ether	µg/L	<	0.5									

Group 3	Chloroform	µg/L		1.5										
	Dichlorobromomethane	µg/L		0.6										
	1,1-Dichloroethane	µg/L	<	0.5										
	1,2-Dichloroethane	µg/L	<	0.5										
	1,1-Dichloroethylene	µg/L	<	0.5										
	1,2-Dichloropropane	µg/L	<	0.5										
	1,3-Dichloropropylene	µg/L	<	0.5										
	1,4-Dioxane	µg/L	<	0.5										
	Ethylbenzene	µg/L	<	0.5										
	Methyl Bromide	µg/L	<	0.5										
	Methyl Chloride	µg/L	<	0.5										
	Methylene Chloride	µg/L	<	0.5										
	1,1,2,2-Tetrachloroethane	µg/L	<	0.5										
	Tetrachloroethylene	µg/L	<	0.5										
	Toluene	µg/L		0.6										
	1,2-trans-Dichloroethylene	µg/L	<	0.5										
	1,1,1-Trichloroethane	µg/L	<	0.5										
	1,1,2-Trichloroethane	µg/L	<	0.5										
	Trichloroethylene	µg/L	<	0.5										
	Vinyl Chloride	µg/L	<	0.5										
Group 4	2-Chlorophenol	µg/L	<	1										
	2,4-Dichlorophenol	µg/L	<	1										
	2,4-Dimethylphenol	µg/L	<	1										
	4,6-Dinitro-o-Cresol	µg/L	<	1										
	2,4-Dinitrophenol	µg/L	<	3										
	2-Nitrophenol	µg/L	<	1										
	4-Nitrophenol	µg/L	<	5										
	p-Chloro-m-Cresol	µg/L	<	5										
	Pentachlorophenol	µg/L	<	1										
	Phenol	µg/L	<	5										
	2,4,6-Trichlorophenol	µg/L	<	1										
Group 5	Acenaphthene	µg/L	<	1										
	Acenaphthylene	µg/L	<	1										
	Anthracene	µg/L	<	1										
	Benzidine	µg/L	<	4.81										
	Benzo(a)Anthracene	µg/L	<	1										
	Benzo(a)Pyrene	µg/L	<	1										
	3,4-Benzofluoranthene	µg/L	<	1										
	Benzo(ghi)Perylene	µg/L	<	1										
	Benzo(k)Fluoranthene	µg/L	<	1										
	Bis(2-Chloroethoxy)Methane	µg/L	<	1										
	Bis(2-Chloroethyl)Ether	µg/L	<	1										
	Bis(2-Chloroisopropyl)Ether	µg/L	<	1										
	Bis(2-Ethylhexyl)Phthalate	µg/L	<	8.61										
	4-Bromophenyl Phenyl Ether	µg/L	<	1										
	Butyl Benzyl Phthalate	µg/L	<	1										
	2-Chloronaphthalene	µg/L	<	1										
	4-Chlorophenyl Phenyl Ether	µg/L	<	1										
	Chrysene	µg/L	<	1										
	Dibenzo(a,h)Anthrancene	µg/L	<	1										
	1,2-Dichlorobenzene	µg/L	<	0.5										
	1,3-Dichlorobenzene	µg/L	<	0.5										
	1,4-Dichlorobenzene	µg/L	<	0.5										
	3,3-Dichlorobenzidine	µg/L	<	0.134										
	Diethyl Phthalate	µg/L	<	1										
	Dimethyl Phthalate	µg/L	<	1										
	Di-n-Butyl Phthalate	µg/L		2.88										
	2,4-Dinitrotoluene	µg/L	<	3										
	2,6-Dinitrotoluene	µg/L	<	1										
	Di-n-Octyl Phthalate	µg/L	<	1										
	1,2-Diphenylhydrazine	µg/L	<	1										
	Fluoranthene	µg/L	<	1										
	Fluorene	µg/L	<	1										
	Hexachlorobenzene	µg/L	<	1										
	Hexachlorobutadiene	µg/L	<	0.0788										
	Hexachlorocyclopentadiene	µg/L	<	1										
	Hexachloroethane	µg/L	<	0.0663										
	Indeno(1,2,3-cd)Pyrene	µg/L	<	1										

	Isophorone	µg/L	<	1									
	Naphthalene	µg/L	<	1									
	Nitrobenzene	µg/L	<	1									
	n-Nitrosodimethylamine	µg/L	<	1									
	n-Nitrosodi-n-Propylamine	µg/L	<	1									
	n-Nitrosodiphenylamine	µg/L	<	1									
	Phenanthrene	µg/L	<	1									
	Pyrene	µg/L	<	1									
	1,2,4-Trichlorobenzene	µg/L	<	0.0894									
Group 6	Aldrin	µg/L	<										
	alpha-BHC	µg/L	<										
	beta-BHC	µg/L	<										
	gamma-BHC	µg/L	<										
	delta BHC	µg/L	<										
	Chlordane	µg/L	<										
	4,4-DDT	µg/L	<										
	4,4-DDE	µg/L	<										
	4,4-DDD	µg/L	<										
	Dieldrin	µg/L	<										
	alpha-Endosulfan	µg/L	<										
	beta-Endosulfan	µg/L	<										
	Endosulfan Sulfate	µg/L	<										
	Endrin	µg/L	<										
	Endrin Aldehyde	µg/L	<										
	Heptachlor	µg/L	<										
	Heptachlor Epoxide	µg/L	<										
	PCB-1016	µg/L	<										
	PCB-1221	µg/L	<										
	PCB-1232	µg/L	<										
	PCB-1242	µg/L	<										
	PCB-1248	µg/L	<										
	PCB-1254	µg/L	<										
	PCB-1260	µg/L	<										
	PCBs, Total	µg/L	<										
	Toxaphene	µg/L	<										
	2,3,7,8-TCDD	ng/L	<										
Group 7	Gross Alpha	pCi/L											
	Total Beta	pCi/L	<										
	Radium 226/228	pCi/L	<										
	Total Strontium	µg/L	<										
	Total Uranium	µg/L	<										
	Osmotic Pressure	mOs/kg											

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Toxics Management Spreadsheet
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Stream / Surface Water Information

Ephrata Borough Authority (Plant #2), NPDES Permit No. PA0087181, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: Cocalico Creek

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	007656	11.59	344	44.4			Yes
End of Reach 1	007656	9.72	326	60			Yes

Q_{7-10}

Location	RMI	LFY (cfs/mi^2)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	11.59	0.12										177	8.2		
End of Reach 1	9.72	0.12										177	8.2		

Q_h

Location	RMI	LFY (cfs/mi^2)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	11.59														
End of Reach 1	9.72														

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Model Results

Ephrata Borough Authority (Plant #2), NPDES Permit No. PA0087181, Outfall 001

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

☐ *Hydrodynamics*

☑ *Wasteload Allocations*

☑ *AFC* CCT (min): 15 PMF: 0.673 Analysis Hardness (mg/l): 229.31 Analysis pH: 7.84

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 Aluminum	0	0		0	750	750	1,505	
Total Antimony	0	0		0	1,100	1,100	2,208	
Total Arsenic	0	0		0	340	340	682	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	42,153	
Total Boron	0	0		0	8,100	8,100	16,259	
Total Cadmium	0	0		0	4.510	4.96	9.95	Chem Translator of 0.909 applied
Total Chromium (III)	0	0		0	1124.297	3,558	7,142	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	32.7	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	191	
Total Copper	0	0		0	29.374	30.6	61.4	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	22	22.0	44.2	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	157.352	235	471	Chem Translator of 0.67 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	3.31	Chem Translator of 0.85 applied
Total Nickel	0	0		0	944.893	947	1,900	Chem Translator of 0.998 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	Chem Translator of 0.922 applied
Total Silver	0	0		0	13.407	15.8	31.7	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	130	
Total Zinc	0	0		0	236.724	242	486	Chem Translator of 0.978 applied
Acrolein	0	0		0	3	3.0	6.02	
Acrylonitrile	0	0		0	650	650	1,305	
Benzene	0	0		0	640	640	1,285	

Bromoform	0	0		0	1,800	1,800	3,613	
Carbon Tetrachloride	0	0		0	2,800	2,800	5,620	
Chlorobenzene	0	0		0	1,200	1,200	2,409	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	18,000	18,000	36,131	
Chloroform	0	0		0	1,900	1,900	3,814	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	15,000	15,000	30,109	
1,1-Dichloroethylene	0	0		0	7,500	7,500	15,054	
1,2-Dichloropropane	0	0		0	11,000	11,000	22,080	
1,3-Dichloropropylene	0	0		0	310	310	622	
Ethylbenzene	0	0		0	2,900	2,900	5,821	
Methyl Bromide	0	0		0	550	550	1,104	
Methyl Chloride	0	0		0	28,000	28,000	56,203	
Methylene Chloride	0	0		0	12,000	12,000	24,087	
1,1,2,2-Tetrachloroethane	0	0		0	1,000	1,000	2,007	
Tetrachloroethylene	0	0		0	700	700	1,405	
Toluene	0	0		0	1,700	1,700	3,412	
1,2-trans-Dichloroethylene	0	0		0	6,800	6,800	13,649	
1,1,1-Trichloroethane	0	0		0	3,000	3,000	6,022	
1,1,2-Trichloroethane	0	0		0	3,400	3,400	6,825	
Trichloroethylene	0	0		0	2,300	2,300	4,617	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	560	560	1,124	
2,4-Dichlorophenol	0	0		0	1,700	1,700	3,412	
2,4-Dimethylphenol	0	0		0	660	660	1,325	
4,6-Dinitro-o-Cresol	0	0		0	80	80.0	161	
2,4-Dinitrophenol	0	0		0	660	660	1,325	
2-Nitrophenol	0	0		0	8,000	8,000	16,058	
4-Nitrophenol	0	0		0	2,300	2,300	4,617	
p-Chloro-m-Cresol	0	0		0	160	160	321	
Pentachlorophenol	0	0		0	20.375	20.4	40.9	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	460	460	923	
Acenaphthene	0	0		0	83	83.0	167	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	300	300	602	
Benzo(a)Anthracene	0	0		0	0.5	0.5	1.0	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	30,000	30,000	60,218	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	9,033	
4-Bromophenyl Phenyl Ether	0	0		0	270	270	542	
Butyl Benzyl Phthalate	0	0		0	140	140	281	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	

Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	820	820	1,646	
1,3-Dichlorobenzene	0	0		0	350	350	703	
1,4-Dichlorobenzene	0	0		0	730	730	1,465	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	4,000	4,000	8,029	
Dimethyl Phthalate	0	0		0	2,500	2,500	5,018	
Di-n-Butyl Phthalate	0	0		0	110	110	221	
2,4-Dinitrotoluene	0	0		0	1,600	1,600	3,212	
2,6-Dinitrotoluene	0	0		0	990	990	1,987	
1,2-Diphenylhydrazine	0	0		0	15	15.0	30.1	
Fluoranthene	0	0		0	200	200	401	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	10	10.0	20.1	
Hexachlorocyclopentadiene	0	0		0	5	5.0	10.0	
Hexachloroethane	0	0		0	60	60.0	120	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	10,000	10,000	20,073	
Naphthalene	0	0		0	140	140	281	
Nitrobenzene	0	0		0	4,000	4,000	8,029	
n-Nitrosodimethylamine	0	0		0	17,000	17,000	34,124	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	300	300	602	
Phenanthrene	0	0		0	5	5.0	10.0	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	130	130	261	

☑ *CFC* CCT (min): 33.151 PMF: 1 Analysis Hardness (mg/l): 219.04 Analysis pH: 7.89

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 Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	220	220	549	
Total Arsenic	0	0		0	150	150	375	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	10,239	
Total Boron	0	0		0	1,600	1,600	3,996	
Total Cadmium	0	0		0	0.424	0.48	1.21	Chem Translator of 0.876 applied
Total Chromium (III)	0	0		0	140.863	164	409	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	26.0	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	47.5	
Total Copper	0	0		0	17.502	18.2	45.5	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	5.2	5.2	13.0	
Dissolved Iron	0	0		0	N/A	N/A	N/A	

Total Iron	0	0		0	1,500	1,500	3,746	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	5.842	8.63	21.6	Chem Translator of 0.677 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	2.26	Chem Translator of 0.85 applied
Total Nickel	0	0		0	100.959	101	253	Chem Translator of 0.997 applied
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	4.600	4.99	12.5	Chem Translator of 0.922 applied
Total Silver	0	0		0	N/A	N/A	N/A	Chem Translator of 1 applied
Total Thallium	0	0		0	13	13.0	32.5	
Total Zinc	0	0		0	229.575	233	581	Chem Translator of 0.986 applied
Acrolein	0	0		0	3	3.0	7.49	
Acrylonitrile	0	0		0	130	130	325	
Benzene	0	0		0	130	130	325	
Bromoform	0	0		0	370	370	924	
Carbon Tetrachloride	0	0		0	560	560	1,399	
Chlorobenzene	0	0		0	240	240	599	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	3,500	3,500	8,741	
Chloroform	0	0		0	390	390	974	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	3,100	3,100	7,742	
1,1-Dichloroethylene	0	0		0	1,500	1,500	3,746	
1,2-Dichloropropane	0	0		0	2,200	2,200	5,494	
1,3-Dichloropropylene	0	0		0	61	61.0	152	
Ethylbenzene	0	0		0	580	580	1,449	
Methyl Bromide	0	0		0	110	110	275	
Methyl Chloride	0	0		0	5,500	5,500	13,736	
Methylene Chloride	0	0		0	2,400	2,400	5,994	
1,1,2,2-Tetrachloroethane	0	0		0	210	210	524	
Tetrachloroethylene	0	0		0	140	140	350	
Toluene	0	0		0	330	330	824	
1,2-trans-Dichloroethylene	0	0		0	1,400	1,400	3,496	
1,1,1-Trichloroethane	0	0		0	610	610	1,523	
1,1,2-Trichloroethane	0	0		0	680	680	1,698	
Trichloroethylene	0	0		0	450	450	1,124	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	110	110	275	
2,4-Dichlorophenol	0	0		0	340	340	849	
2,4-Dimethylphenol	0	0		0	130	130	325	
4,6-Dinitro-o-Cresol	0	0		0	16	16.0	40.0	
2,4-Dinitrophenol	0	0		0	130	130	325	
2-Nitrophenol	0	0		0	1,600	1,600	3,996	
4-Nitrophenol	0	0		0	470	470	1,174	
p-Chloro-m-Cresol	0	0		0	500	500	1,249	
Pentachlorophenol	0	0		0	15.632	15.6	39.0	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	91	91.0	227	
Acenaphthene	0	0		0	17	17.0	42.5	
Anthracene	0	0		0	N/A	N/A	N/A	

Benzidine	0	0		0	59	59.0	147	
Benzo(a)Anthracene	0	0		0	0.1	0.1	0.25	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	6,000	6,000	14,985	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	2,273	
4-Bromophenyl Phenyl Ether	0	0		0	54	54.0	135	
Butyl Benzyl Phthalate	0	0		0	35	35.0	87.4	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	160	160	400	
1,3-Dichlorobenzene	0	0		0	69	69.0	172	
1,4-Dichlorobenzene	0	0		0	150	150	375	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	800	800	1,998	
Dimethyl Phthalate	0	0		0	500	500	1,249	
Di-n-Butyl Phthalate	0	0		0	21	21.0	52.4	
2,4-Dinitrotoluene	0	0		0	320	320	799	
2,6-Dinitrotoluene	0	0		0	200	200	499	
1,2-Diphenylhydrazine	0	0		0	3	3.0	7.49	
Fluoranthene	0	0		0	40	40.0	99.9	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	2	2.0	4.99	
Hexachlorocyclopentadiene	0	0		0	1	1.0	2.5	
Hexachloroethane	0	0		0	12	12.0	30.0	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	2,100	2,100	5,245	
Naphthalene	0	0		0	43	43.0	107	
Nitrobenzene	0	0		0	810	810	2,023	
n-Nitrosodimethylamine	0	0		0	3,400	3,400	8,491	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	59	59.0	147	
Phenanthrene	0	0		0	1	1.0	2.5	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	26	26.0	64.9	

☑ ***THH*** CCT (min): 33.151 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

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	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 Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	14.0	

Total Arsenic	0	0		0	10	10.0	25.0	
Total Barium	0	0		0	2,400	2,400	5,994	
Total Boron	0	0		0	3,100	3,100	7,742	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Free Cyanide	0	0		0	4	4.0	9.99	
Dissolved Iron	0	0		0	300	300	749	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	1,000	1,000	2,497	
Total Mercury	0	0		0	0.050	0.05	0.12	
Total Nickel	0	0		0	610	610	1,523	
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	0.24	0.24	0.6	
Total Zinc	0	0		0	N/A	N/A	N/A	
Acrolein	0	0		0	3	3.0	7.49	
Acrylonitrile	0	0		0	N/A	N/A	N/A	
Benzene	0	0		0	N/A	N/A	N/A	
Bromoform	0	0		0	N/A	N/A	N/A	
Carbon Tetrachloride	0	0		0	N/A	N/A	N/A	
Chlorobenzene	0	0		0	100	100.0	250	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	N/A	N/A	N/A	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	N/A	N/A	N/A	
1,1-Dichloroethylene	0	0		0	33	33.0	82.4	
1,2-Dichloropropane	0	0		0	N/A	N/A	N/A	
1,3-Dichloropropylene	0	0		0	N/A	N/A	N/A	
Ethylbenzene	0	0		0	68	68.0	170	
Methyl Bromide	0	0		0	100	100.0	250	
Methyl Chloride	0	0		0	N/A	N/A	N/A	
Methylene Chloride	0	0		0	N/A	N/A	N/A	
1,1,2,2-Tetrachloroethane	0	0		0	N/A	N/A	N/A	
Tetrachloroethylene	0	0		0	N/A	N/A	N/A	
Toluene	0	0		0	57	57.0	142	
1,2-trans-Dichloroethylene	0	0		0	100	100.0	250	
1,1,1-Trichloroethane	0	0		0	10,000	10,000	24,974	
1,1,2-Trichloroethane	0	0		0	N/A	N/A	N/A	
Trichloroethylene	0	0		0	N/A	N/A	N/A	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	30	30.0	74.9	
2,4-Dichlorophenol	0	0		0	10	10.0	25.0	
2,4-Dimethylphenol	0	0		0	100	100.0	250	

4,6-Dinitro-o-Cresol	0	0		0	2	2.0	4.99	
2,4-Dinitrophenol	0	0		0	10	10.0	25.0	
2-Nitrophenol	0	0		0	N/A	N/A	N/A	
4-Nitrophenol	0	0		0	N/A	N/A	N/A	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Pentachlorophenol	0	0		0	N/A	N/A	N/A	
Phenol	0	0		0	4,000	4,000	9,990	
2,4,6-Trichlorophenol	0	0		0	N/A	N/A	N/A	
Acenaphthene	0	0		0	70	70.0	175	
Anthracene	0	0		0	300	300	749	
Benzidine	0	0		0	N/A	N/A	N/A	
Benzo(a)Anthracene	0	0		0	N/A	N/A	N/A	
Benzo(a)Pyrene	0	0		0	N/A	N/A	N/A	
3,4-Benzofluoranthene	0	0		0	N/A	N/A	N/A	
Benzo(k)Fluoranthene	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroethyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Chloroisopropyl)Ether	0	0		0	200	200	499	
Bis(2-Ethylhexyl)Phthalate	0	0		0	N/A	N/A	N/A	
4-Bromophenyl Phenyl Ether	0	0		0	N/A	N/A	N/A	
Butyl Benzyl Phthalate	0	0		0	0.1	0.1	0.25	
2-Chloronaphthalene	0	0		0	800	800	1,998	
Chrysene	0	0		0	N/A	N/A	N/A	
Dibenzo(a,h)Anthrancene	0	0		0	N/A	N/A	N/A	
1,2-Dichlorobenzene	0	0		0	1,000	1,000	2,497	
1,3-Dichlorobenzene	0	0		0	7	7.0	17.5	
1,4-Dichlorobenzene	0	0		0	300	300	749	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	600	600	1,498	
Dimethyl Phthalate	0	0		0	2,000	2,000	4,995	
Di-n-Butyl Phthalate	0	0		0	20	20.0	49.9	
2,4-Dinitrotoluene	0	0		0	N/A	N/A	N/A	
2,6-Dinitrotoluene	0	0		0	N/A	N/A	N/A	
1,2-Diphenylhydrazine	0	0		0	N/A	N/A	N/A	
Fluoranthene	0	0		0	20	20.0	49.9	
Fluorene	0	0		0	50	50.0	125	
Hexachlorobenzene	0	0		0	N/A	N/A	N/A	
Hexachlorobutadiene	0	0		0	N/A	N/A	N/A	
Hexachlorocyclopentadiene	0	0		0	4	4.0	9.99	
Hexachloroethane	0	0		0	N/A	N/A	N/A	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	34	34.0	84.9	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	10	10.0	25.0	
n-Nitrosodimethylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	N/A	N/A	N/A	
Phenanthrene	0	0		0	N/A	N/A	N/A	
Pyrene	0	0		0	20	20.0	49.9	
1,2,4-Trichlorobenzene	0	0		0	0.07	0.07	0.17	

☑ *CRL* CCT (min): 29.882 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

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 Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	N/A	N/A	N/A	
Total Arsenic	0	0		0	N/A	N/A	N/A	
Total Barium	0	0		0	N/A	N/A	N/A	
Total Boron	0	0		0	N/A	N/A	N/A	
Total Cadmium	0	0		0	N/A	N/A	N/A	
Total Chromium (III)	0	0		0	N/A	N/A	N/A	
Hexavalent Chromium	0	0		0	N/A	N/A	N/A	
Total Cobalt	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Free Cyanide	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	N/A	N/A	N/A	
Total Nickel	0	0		0	N/A	N/A	N/A	
Total Phenols (Phenolics) (PWS)	0	0		0	N/A	N/A	N/A	
Total Selenium	0	0		0	N/A	N/A	N/A	
Total Silver	0	0		0	N/A	N/A	N/A	
Total Thallium	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	
Acrolein	0	0		0	N/A	N/A	N/A	
Acrylonitrile	0	0		0	0.06	0.06	0.6	
Benzene	0	0		0	0.58	0.58	5.81	
Bromoform	0	0		0	7	7.0	70.1	
Carbon Tetrachloride	0	0		0	0.4	0.4	4.0	
Chlorobenzene	0	0		0	N/A	N/A	N/A	
Chlorodibromomethane	0	0		0	0.8	0.8	8.01	
2-Chloroethyl Vinyl Ether	0	0		0	N/A	N/A	N/A	
Chloroform	0	0		0	5.7	5.7	57.1	
Dichlorobromomethane	0	0		0	0.95	0.95	9.51	
1,2-Dichloroethane	0	0		0	9.9	9.9	99.1	
1,1-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,2-Dichloropropane	0	0		0	0.9	0.9	9.01	
1,3-Dichloropropylene	0	0		0	0.27	0.27	2.7	
Ethylbenzene	0	0		0	N/A	N/A	N/A	
Methyl Bromide	0	0		0	N/A	N/A	N/A	
Methyl Chloride	0	0		0	N/A	N/A	N/A	
Methylene Chloride	0	0		0	20	20.0	200	
1,1,2,2-Tetrachloroethane	0	0		0	0.2	0.2	2.0	

Tetrachloroethylene	0	0		0	10	10.0	100	
Toluene	0	0		0	N/A	N/A	N/A	
1,2-trans-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,1,1-Trichloroethane	0	0		0	N/A	N/A	N/A	
1,1,2-Trichloroethane	0	0		0	0.55	0.55	5.51	
Trichloroethylene	0	0		0	0.6	0.6	6.01	
Vinyl Chloride	0	0		0	0.02	0.02	0.2	
2-Chlorophenol	0	0		0	N/A	N/A	N/A	
2,4-Dichlorophenol	0	0		0	N/A	N/A	N/A	
2,4-Dimethylphenol	0	0		0	N/A	N/A	N/A	
4,6-Dinitro-o-Cresol	0	0		0	N/A	N/A	N/A	
2,4-Dinitrophenol	0	0		0	N/A	N/A	N/A	
2-Nitrophenol	0	0		0	N/A	N/A	N/A	
4-Nitrophenol	0	0		0	N/A	N/A	N/A	
p-Chloro-m-Cresol	0	0		0	N/A	N/A	N/A	
Pentachlorophenol	0	0		0	0.030	0.03	0.3	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	1.5	1.5	15.0	
Acenaphthene	0	0		0	N/A	N/A	N/A	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	0.0001	0.0001	0.001	
Benzo(a)Anthracene	0	0		0	0.001	0.001	0.01	
Benzo(a)Pyrene	0	0		0	0.0001	0.0001	0.001	
3,4-Benzofluoranthene	0	0		0	0.001	0.001	0.01	
Benzo(k)Fluoranthene	0	0		0	0.01	0.01	0.1	
Bis(2-Chloroethyl)Ether	0	0		0	0.03	0.03	0.3	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	0.32	0.32	3.2	
4-Bromophenyl Phenyl Ether	0	0		0	N/A	N/A	N/A	
Butyl Benzyl Phthalate	0	0		0	N/A	N/A	N/A	
2-Chloronaphthalene	0	0		0	N/A	N/A	N/A	
Chrysene	0	0		0	0.12	0.12	1.2	
Dibenzo(a,h)Anthrancene	0	0		0	0.0001	0.0001	0.001	
1,2-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
1,3-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
1,4-Dichlorobenzene	0	0		0	N/A	N/A	N/A	
3,3-Dichlorobenzidine	0	0		0	0.05	0.05	0.5	
Diethyl Phthalate	0	0		0	N/A	N/A	N/A	
Dimethyl Phthalate	0	0		0	N/A	N/A	N/A	
Di-n-Butyl Phthalate	0	0		0	N/A	N/A	N/A	
2,4-Dinitrotoluene	0	0		0	0.05	0.05	0.5	
2,6-Dinitrotoluene	0	0		0	0.05	0.05	0.5	
1,2-Diphenylhydrazine	0	0		0	0.03	0.03	0.3	
Fluoranthene	0	0		0	N/A	N/A	N/A	
Fluorene	0	0		0	N/A	N/A	N/A	
Hexachlorobenzene	0	0		0	0.00008	0.00008	0.0008	
Hexachlorobutadiene	0	0		0	0.01	0.01	0.1	
Hexachlorocyclopentadiene	0	0		0	N/A	N/A	N/A	
Hexachloroethane	0	0		0	0.1	0.1	1.0	

Indeno(1,2,3-cd)Pyrene	0	0		0	0.001	0.001	0.01	
Isophorone	0	0		0	N/A	N/A	N/A	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	N/A	N/A	N/A	
n-Nitrosodimethylamine	0	0		0	0.0007	0.0007	0.007	
n-Nitrosodi-n-Propylamine	0	0		0	0.005	0.005	0.05	
n-Nitrosodiphenylamine	0	0		0	3.3	3.3	33.0	
Phenanthrene	0	0		0	N/A	N/A	N/A	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	N/A	N/A	N/A	

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

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Copper	Report	Report	Report	Report	Report	µg/L	39.4	AFC	Discharge Conc > 10% WQBEL (no RP)
Free Cyanide	0.19	0.3	9.99	15.6	25.0	µg/L	9.99	THH	Discharge Conc ≥ 50% WQBEL (RP)
Total Zinc	Report	Report	Report	Report	Report	µg/L	311	AFC	Discharge Conc > 10% WQBEL (no RP)
Bis(2-Ethylhexyl)Phthalate	0.061	0.096	3.2	5.0	8.01	µg/L	3.2	CRL	Discharge Conc ≥ 50% WQBEL (RP)

☐ ***Other Pollutants without Limits or Monitoring***

Attachment C

TRC Evaluation

Ephrata Borough Plant #2 May 2021
PA0087181

1A	B	C	D	E	F	G
2	**TRC EVALUATION**					
3	Input appropriate values in B4:B8 and E4:E7					
4	5.63	**= Q stream (cfs)**		**0.5**	**= CV Daily**	
5	2.3	**= Q discharge (MGD)**		**0.5**	**= CV Hourly**	
6	30	**= no. samples**		**1**	**= AFC_Partial Mix Factor**	
7	0.55	**= 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 = 0.919		**1.3.2.iii**	WLA cfc = 0.899
12	PENTOXSD TRG	**5.1a**	LTAMULT afc = 0.373		**5.1c**	LTAMULT cfc = 0.581
13	PENTOXSD TRG	**5.1b**	LTA_afc= 0.343		**5.1d**	LTA_cfc = 0.522
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) = 0.422		AFC	
18			INST MAX LIMIT (mg/l) = 1.379			

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)**

Attachment D

WET Results

WET Results: 10/19/2017

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Pimephales
Endpoint	Survival
TIWC (decimal)	0.39
No. Per Replicate	10
TST b value	0.75
TST alpha value	0.25

Facility Name: Ephrata WWTP #1

Permit No.: PA0087181

Test Completion Date: 10/10/2017

Replicate No.	Control	TIWC
1	10	7
2	9	9
3	8	9
4	9	10
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	9.000	8.750
Std Dev.	0.816	1.258
# Replicates	4	4

T-Test Result: 2.8819
Deg. of Freedom: 5
Critical T Value: 0.7267
Pass or Fail: **PASS**

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Pimephales
Endpoint	Growth
TIWC (decimal)	0.39
No. Per Replicate	10
TST b value	0.75
TST alpha value	0.25

Facility Name: Ephrata WWTP #1

Permit No.: PA0087181

Test Completion Date: 10/10/2017

Replicate No.	Control	TIWC
1	0.259	0.248
2	0.247	0.263
3	0.236	0.294
4	0.339	0.274
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.270	0.270
Std Dev.	0.047	0.019
# Replicates	4	4

T-Test Result	3.3467
Deg. of Freedom	5
Critical T Value	0.7267
Pass or Fail	**PASS**

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Ceriodaphnia
Endpoint	Survival
TIWC (decimal)	0.39
No. Per Replicate	1
TST b value	0.75
TST alpha value	0.2

Facility Name: Ephrata WWTP #1

Permit No.: PA0087181

Test Completion Date: 10/9/2017

Replicate No.	Control	TIWC
1	1	1
2	1	1
3	1	1
4	1	1
5	1	1
6	1	1
7	1	1
8	1	1
9	1	1
10	1	1
11		
12		
13		
14		
15		
Mean	1.000	1.000
Std Dev.	0.000	0.000
# Replicates	10	10

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail **PASS**

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Ceriodaphnia
Endpoint	Reproduction
TIWC (decimal)	0.39
No. Per Replicate	1
TST b value	0.75
TST alpha value	0.2

Facility Name: Ephrata WWTP #1

Permit No.: PA0087181

Test Completion Date: 10/9/2017

Replicate No.	Control	TIWC
1	28	31
2	26	34
3	29	28
4	28	31
5	22	31
6	25	24
7	19	29
8	26	30
9	27	36
10	30	33
11		
12		
13		
14		
15		
Mean	26.000	30.700
Std Dev.	3.333	3.335
# Replicates	10	10

T-Test Result: 8.4975
Deg. of Freedom: 16
Critical T Value: 0.8647
Pass or Fail: **PASS**

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

WET Results: 09/11/2018

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Pimephales
Endpoint	Survival
TIWC (decimal)	0.39
No. Per Replicate	10
TST b value	0.75
TST alpha value	0.25

Facility Name: Ephrata WWTP #1

Permit No.: PA0087181

Test Completion Date: 8/21/2018

Replicate No.	Control	TIWC
1	10	10
2	9	9
3	10	10
4	10	10
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	9.750	9.750
Std Dev.	0.500	0.500
# Replicates	4	4

T-Test Result	6.7314
Deg. of Freedom	5
Critical T Value	0.7267
Pass or Fail	PASS

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Pimephales
Endpoint	Growth
TIWC (decimal)	0.39
No. Per Replicate	10
TST b value	0.75
TST alpha value	0.25

Facility Name: Ephrata WWTP #1

Permit No.: PA0087181

Test Completion Date: 8/21/2018

Replicate No.	Control	TIWC
1	0.447	0.549
2	0.502	0.527
3	0.508	0.568
4	0.506	0.593
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.491	0.557
Std Dev.	0.029	0.027
# Replicates	4	4

T-Test Result	10.7358
Deg. of Freedom	5
Critical T Value	0.7267
Pass or Fail	PASS

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Ceriodaphnia
Endpoint	Reproduction
TIWC (decimal)	0.39
No. Per Replicate	1
TST b value	0.75
TST alpha value	0.2

Facility Name: Ephrata WWTP #1

Permit No.: PA0087181

Test Completion Date: 8/21/2018

Replicate No.	Control	TIWC
1	40	38
2	47	37
3	40	37
4	39	38
5	38	31
6	38	34
7	40	43
8	34	35
9	30	39
10	41	41
11		
12		
13		
14		
15		
Mean	38.700	37.300
Std Dev.	4.448	3.433
# Replicates	10	10

T-Test Result	5.4659
Deg. of Freedom	17
Critical T Value	0.8633
Pass or Fail	PASS

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Ceriodaphnia
Endpoint	Survival
TIWC (decimal)	0.39
No. Per Replicate	1
TST b value	0.75
TST alpha value	0.2

Facility Name
Ephrata WWTP #1

Permit No.
PA0087181

Test Completion Date
8/21/2018

Replicate No.	Control	TIWC
1	1	1
2	1	1
3	1	1
4	1	1
5	1	1
6	1	1
7	1	1
8	1	1
9	1	1
10	1	1
11		
12		
13		
14		
15		
Mean	1.000	1.000
Std Dev.	0.000	0.000
# Replicates	10	10

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail PASS

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

WET Results: 09/09/2019

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Pimephales
Endpoint	Survival
TIWC (decimal)	0.39
No. Per Replicate	10
TST b value	0.75
TST alpha value	0.25

Facility Name

Ephrata WWTP #: 3

Permit No.

PA0087181

Test Completion Date 8/20/2019

Replicate No.	Control	TIWC
1	10	10
2	10	10
3	10	8
4	10	10
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	10.000	9.500
Std Dev.	0.000	1.000
# Replicates	4	4

T-Test Result 3.6316
Deg. of Freedom 3
Critical T Value 0.7649
Pass or Fail **PASS**

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Pimephales
Endpoint	Growth
TIWC (decimal)	0.39
No. Per Replicate	10
TST b value	0.75
TST alpha value	0.25

Facility Name

Ephrata WWTP #: 2

Permit No.

PA0087181

Test Completion Date 8/20/2019

Replicate No.	Control	TIWC
1	0.402	0.466
2	0.438	0.355
3	0.442	0.414
4	0.439	0.477
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.430	0.428
Std Dev.	0.019	0.056
# Replicates	4	4

T-Test Result	3.6530
Deg. of Freedom	4
Critical T Value	0.7407
Pass or Fail	PASS

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Ceriodaphnia
Endpoint	Survival
TIWC (decimal)	0.39
No. Per Replicate	1
TST b value	0.75
TST alpha value	0.2

Facility Name: Ephrata WWTP #2

Permit No.: PA0087181

Test Completion Date: 8/20/2019

Replicate No.	Control	TIWC
1	1	1
2	1	1
3	1	1
4	1	1
5	1	1
6	1	1
7	1	1
8	1	1
9	1	1
10	1	1
11		
12		
13		
14		
15		
Mean	1.000	1.000
Std Dev.	0.000	0.000
# Replicates	10	10

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail: **PASS**

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Ceriodaphnia
Endpoint	Reproduction
TIWC (decimal)	0.39
No. Per Replicate	1
TST b value	0.75
TST alpha value	0.2

Facility Name
Ephrata WWTP # 2

Permit No.
PA0087181

Test Completion Date
8/20/2019

Replicate No.	Control	TIWC
1	34	36
2	35	35
3	38	42
4	35	37
5	33	35
6	34	33
7	34	36
8	38	28
9	38	34
10	34	38
11		
12		
13		
14		
15		
Mean	35.300	35.400
Std Dev.	1.947	3.596
# Replicates	10	10

T-Test Result 7.2716
Deg. of Freedom 14
Critical T Value 0.8681
Pass or Fail **PASS**

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

WET Results: 09/21/2020

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Pimephales
Endpoint	Survival
TIWC (decimal)	0.39
No. Per Replicate	10
TST b value	0.75
TST alpha value	0.25

Facility Name: Ephrata WWTP #1

Permit No.: PA0087181

Test Completion Date: 9/8/2020

Replicate No.	Control	TIWC
1	10	10
2	10	10
3	10	10
4	10	10
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	10.000	10.000
Std Dev.	0.000	0.000
# Replicates	4	4
T-Test Result		
Deg. of Freedom		
Critical T Value		
Pass or Fail	PASS	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		
T-Test Result		
Deg. of Freedom		
Critical T Value		
Pass or Fail		

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		
T-Test Result		
Deg. of Freedom		
Critical T Value		
Pass or Fail		

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		
T-Test Result		
Deg. of Freedom		
Critical T Value		
Pass or Fail		

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Pimephales
Endpoint	Growth
TIWC (decimal)	0.39
No. Per Replicate	10
TST b value	0.75
TST alpha value	0.25

Facility Name: Ephrata WWTP #1

Permit No.: PA0087181

Test Completion Date: 9/8/2020

Replicate No.	Control	TIWC
1	0.316	0.388
2	0.348	0.356
3	0.383	0.377
4	0.316	0.359
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.341	0.370
Std Dev.	0.032	0.015
# Replicates	4	4

T-Test Result	8.0705
Deg. of Freedom	5
Critical T Value	0.7267
Pass or Fail	PASS

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Test Completion Date:

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Ceriodaphnia
Endpoint	Survival
TIWC (decimal)	0.39
No. Per Replicate	1
TST b value	0.75
TST alpha value	0.2

Facility Name: Ephrata WWTP #1

Permit No.: PA0087181

Test Completion Date: 9/7/2020

Replicate No.	Control	TIWC
1	1	1
2	1	1
3	1	1
4	1	1
5	1	1
6	1	1
7	1	1
8	1	1
9	1	1
10	1	1
11		
12		
13		
14		
15		
Mean	1.000	1.000
Std Dev.	0.000	0.000
# Replicates	10	10

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail: **PASS**

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

Test Completion Date

Replicate No.	Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result
Deg. of Freedom
Critical T Value
Pass or Fail

DEP Whole Effluent Toxicity (WET) Analysis Spreadsheet

Type of Test	Chronic
Species Tested	Ceriodaphnia
Endpoint	Reproduction
TIWC (decimal)	0.39
No. Per Replicate	1
TST b value	0.75
TST alpha value	0.2

Facility Name: Ephrata WWTP #1

Permit No.: PA0087181

Replicate No.	Test Completion Date: 9/7/2020 Control	TIWC
1	33	34
2	17	35
3	32	34
4	31	40
5	33	40
6	37	19
7	32	27
8	39	30
9	35	36
10	34	43
11		
12		
13		
14		
15		
Mean	32.300	33.800
Std Dev.	5.908	7.052
# Replicates	10	10

T-Test Result	3.6355
Deg. of Freedom	15
Critical T Value	0.8662
Pass or Fail	PASS

Replicate No.	Test Completion Date: Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean	0.000	0.000
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	

Replicate No.	Test Completion Date: Control	TIWC
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Mean		
Std Dev.		
# Replicates		

T-Test Result	
Deg. of Freedom	
Critical T Value	
Pass or Fail	