pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0021822**
Facility Type	**Municipal**	APS ID	**712428**
Major / Minor	**Minor**	Authorization ID	**1383111**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**The Municipal Authority of Borough of Berlin**	Facility Name	**Berlin Borough STP**
Applicant Address	700 North Street	Facility Address	Valley Road
	Berlin, PA 15530-1125		Berlin, PA 15530
Applicant Contact	Kerry Claycomb	Facility Contact	Chet Cyga
Applicant Phone		Facility Phone	814-255-7820
Client ID	76982	Site ID	243785
Ch 94 Load Status	Not Overloaded	Municipality	Berlin Borough
Connection Status	No Limitations	County	Somerset
Date Application Received	January 28, 2022	EPA Waived?	Yes
Date Application Accepted		If No, Reason	
Purpose of Application	NPDES permit renewal application.		

Summary of Review

The PA Department of Environmental Protection (PADEP/Department) received an NPDES permit renewal application from The Municipal Authority of Borough of Berlin (permittee) on January 28, 2022 for permittee's Berlin Borough STP (facility). The facility is a minor STP with an average annual design flow of 0.8 MGD. The treated effluent is discharged into an UNT to Buffalo Creek (CWF) through Outfall 001 in state watershed 19-F. The existing permit was expired on July 31, 2022. The terms and conditions are automatically extended since the renewal application was received at least 180 days of permit expiration date. Renewal NPDES permit applications under Clean Water program are not covered by PADEP's PDG per 021-2100-001.

This fact sheet is developed in accordance with 40 CFR §124.56.

Changes in this renewal: Quarterly E. Coli and Total Zinc monitoring added, compliance schedule for Total Copper added, annual AMD TMDL parameters monitoring added.

Sludge use and disposal description and location(s): Belt filter pressed biosolids are landfilled

Public Participation

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.

Approve	Deny	Signatures	Date
√		Reza H. Chowdhury, E.I.T. / Project Manager	November 8, 2022
X		Pravin Patel Pravin C. Patel, P.E. / Environmental Engineer Manager	11/10/2022

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	001	Design Flow (MGD)	0.8
Latitude	39º 53' 56.97"	Longitude	-78º 57' 21.68"
Quad Name	Berlin	Quad Code	1914
Wastewater Description:	Sewage Effluent		
Receiving Waters	Buffalo Creek (CWF)	Stream Code	39075
NHD Com ID	69918847	RMI	8.42
Drainage Area	9.2 mi^2	Yield (cfs/mi^2)	0.1
Q_{7-10} Flow (cfs)	0.92	Q_{7-10} Basis	Please see below
Elevation (ft)	2053.81	Slope (ft/ft)	
Watershed No.	19-F	Chapter 93 Class.	CWF
Existing Use	**CWF**	Existing Use Qualifier	Ch. 93
Exceptions to Use	None	Exceptions to Criteria	N/A
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status	Final (April 8, 2009)	Name	Buffalo Creek Somerset County

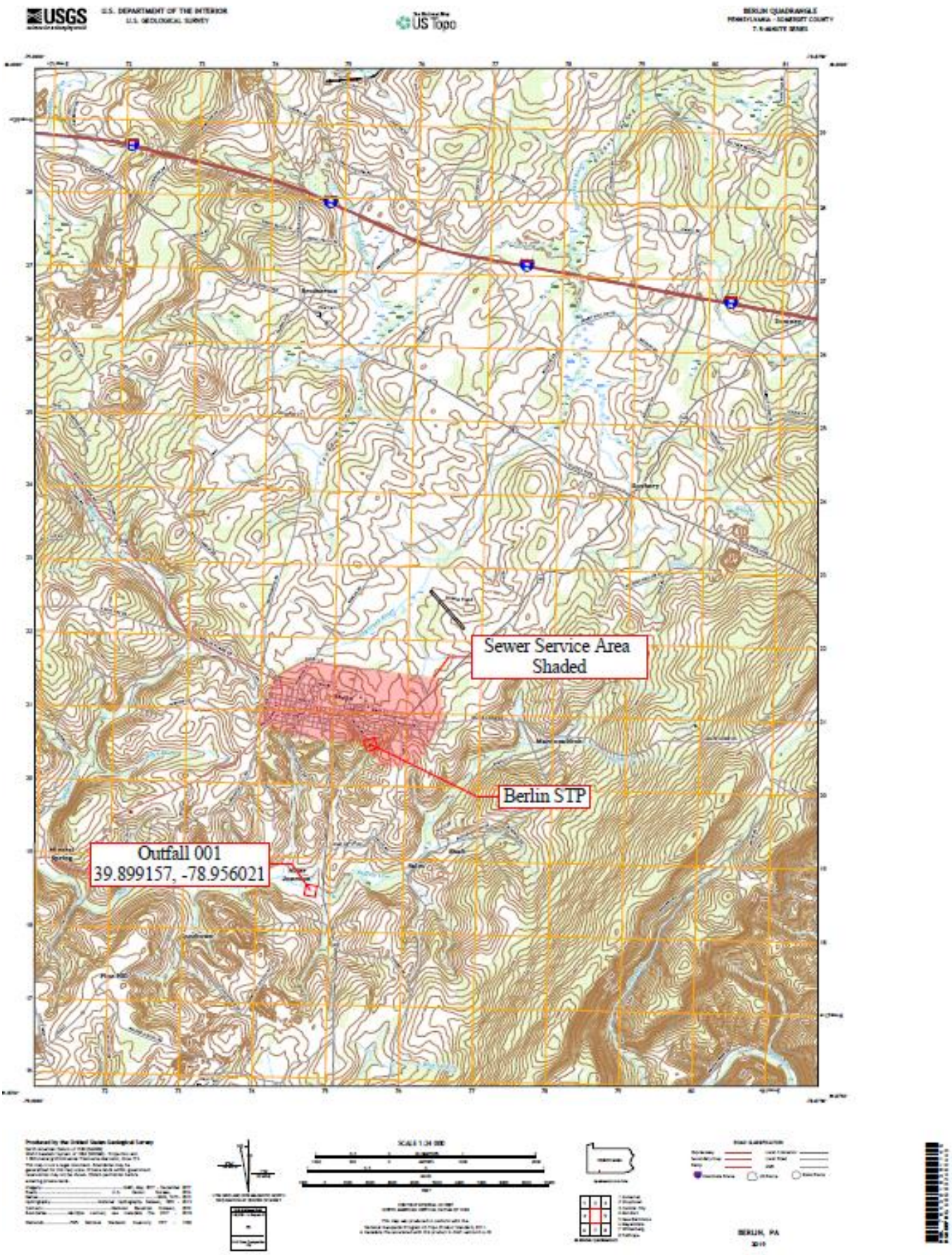
Background/Ambient Data		Data Source
pH (SU)	7.0	Default per 391-2000-013
Temperature (°C)	20	Default per 391-2000-007
Hardness (mg/L)	100	Default
Other:		

Nearest Downstream Public Water Supply Intake		Indian Creek Valley Water Authority in Saltlick TWP, Fayette County	
PWS Waters	Ohiopyle Yough River (Youghiogheny River)	Flow at Intake (GPD)	259,200
PWS RMI	62.88	Distance from Outfall (mi)	49.29

Changes Since Last Permit Issuance: None

Other Comments:
There is no nearby WQN Station or Streamgage from the discharge point. Therefore, USGS's web based watershed delineation tool StreamStats (accessible at https://streamstats.usgs.gov/ss/, accessed on October 4, 2022) was utilized to determine the drainage area and low flow statistics of the receiving stream at discharge point. The StreamStats delineation report shows a drainage area at the Outfall 001 to be 9.2 mi^2. A default yield of 0.1 cfs/mi^2, Q_{1-10}:Q_{7-10} ratio of 0.64, and Q_{30-10}:Q_{7-10} ratio of 1.36 will be used for modeling, if needed.

The calculated Q_{7-10} is 9.2 mi^2X0.1 cfs/mi^2 or 0.92 cfs. The treatment plant is near the sewer service area, but the treated effluent is piped approximately 1.5 miles downstream near the confluence of UNT 39120 to Buffalo Creek with Buffalo Creek. The consultant went to the outfall location on October 4, 2022 and verified the Outfall 001 location. Therefore, the modeling efforts will be at the Buffalo Creek at Lat/Long 39.899157, -78.956021. The below map depicts the locations.


USGS
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
US Topo
BERLIN QUADRANGLE
PENNSYLVANIA - SOMERSET COUNTY
Sewer Service Area
Shaded
Berlin STP
Outfall 001
39.899157, -78.956021
BERLIN, PA

PWS Intake:
The nearby downstream PWS intake is Indian Creek Valley Water Authority in Saltlick Township, Fayette County on Youghiogheny Creek at approximate RMI of 62.88. This intake is approximately 43.29 miles downstream of Outfall 001. Because of the distance, dilution at Casselman and Yough river, and effluent limitations, it is expected that the discharge from this facility won't affect the PWS intake.

RMI at Outfall 001 on Buffalo Creek ---------- +8.42 mile
RMI at confluence of Buffalo Creek and Casselman River ---------- +29.95 mile
RMI at confluence of Casselman River and Youghiogheny River ---------- +73.8 mile
RMI at PWS intake on Youghiogheny River ---------- -62.88 mile

Total: 49.29 mile

Wastewater Characteristics:
A pH of 7.0 (median July- September 2021-2022), default temperature of 20^0C (Default per 391-2000-007), and default Hardness value of 100 mg/l will be used for modeling, if needed.

Background data:
There is no nearby WQN station from the discharge point. In absence of site-specific data, a default pH of 7.0 S.U., default stream temperature of 20°C, and default hardness of 100 mg/l will be used, as appropriate.

Buffalo Creek Watershed TMDL:
The discharge in into an impaired watershed that has an approved TMDL, named Buffalo Creek Watershed TMDL (EPA approved April 8, 2009). The West Branch Susquehanna River Watershed TMDL was prepared on December 3, 2011. The TMDL was prepared to address the impairments noted on the 1996 PA Section 303(d) list of impaired waters, required under the CWA, and covers one segment on that list and additional segments on later lists/reports. The stream segment is listed as impaired for metals. All impairments resulted from drainage of abandoned coal mines. The TMDL addresses the three primary metals associated with abandoned mine drainage (iron, aluminum, and manganese) and pH. There are approved WLAs for some mining operations and for some future industries. This facility doesn't have WLA. However, per BCW-PMT-037 (revised May 20, 2021), TMDL parameters are to be monitored. Therefore, it is recommended to include annual monitoring for Total Iron, Total Aluminum, and Total Manganese to determine RP in next renewal.

Antidegradation (93.4):
The effluent limits for this discharge have been developed to ensure that existing in-stream water uses and the level of water quality necessary to protect the existing uses are maintained and protected. The receiving streams are designated as Cold-Water Fishes (CWF). No High-Quality stream or Exceptional Value water is impacted by this discharge; therefore, no Antidegradation Analysis is performed for the discharge.

Class A Wild Trout Fisheries:
No Class A Wild Trout Fisheries are impacted by this discharge.

Treatment Facility Summary

Treatment Facility Name: Berlin Borough STP

WQM Permit No.	Issuance Date
5689412 A-1	12/17/2010
5689412	5/14/1990

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary With Ammonia And Phosphorus	Activated Sludge	Gas Chlorine	0.8

Hydraulic Capacity (MGD)	Organic Capacity (lbs./day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.8		Not Overloaded	Belt filtration	Landfill

Changes Since Last Permit Issuance: None

Treatment Plant Description

Berlin Borough STP is a 0.8 MGD minor sewage facility located in Berlin Borough, Somerset County which discharges treated sewage through Outfall 001 into Buffalo Creek in state watershed 19-F. This is an extended aeration activated sludge treatment system with chlorine disinfection. The application indicated the following treatment train: Influent → Bar screen & inline muffin monster → four aeration basins in parallel → three clarifiers in parallel → chlorine contact tank → effluent meter → discharge through Outfall 001.

Return activated sludge is sent from clarifier to head of aeration basins. Settled sludge from clarifiers are sent to primary and secondary digestors to belt filter press. Biosolids are sent to Mostoller Landfill for ultimate disposal.

The facility receives 99% of its flow from Borough of Berlin and 1% from Brothersvalley Township. The sewer system is 100% separated. The facility also receives flows from some industrial or commercial facilities, notably Snyder of Berlin which Significant Industrial User (SIU) and contributes approximately 69,132 Gallons per day.

Summary of Inspection:
April 26, 2022: NOV issued for effluent violations for the period March 2021-February 2022.

April 19, 2022: CEI conducted. eDMR violations noted.

December 1, 2021: CACP entered in between the Department and the permittee.

April 22, 2021: NOV issued for effluent violations for the period of August 2019-February 2021.

April 1, 2021: CEI conducted. eDMR violations noted.

September 25, 2019: CEI conducted. No violation noted during the inspection.

February 27, 2018: RTPT conducted. No violation noted during the inspection.

February 13, 2018: CEI conducted. No violations noted during inspection.

Compliance History

DMR Data for Outfall 001 (from July 1, 2021 to June 30, 2022)

Parameter	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22	DEC-21	NOV-21	OCT-21	SEP-21	AUG-21	JUL-21
Flow (MGD) Average Monthly	0.251	0.419	0.483	0.380	0.630	0.452	0.390	0.280	0.345	0.570	0.260	0.200
Flow (MGD) Daily Maximum	0.655	1.843	0.865	0.550	1.602	1.413	0.733	0.362	0.990	1.533	0.969	0.555
pH (S.U.) Minimum	6.6	6.3	6.4	6.4	6.3	6.1	6.4	6.3	6.4	6.4	7.0	7.3
pH (S.U.) Maximum	7.5	7.1	7.1	7.0	7.5	7.0	7.1	7.3	8.7	7.9	7.9	7.6
DO (mg/L) Minimum	3.5	4.3	6.8	7.5	8.5	8.5	7.0	6.8	6.0	6.0	6.0	7.5
TRC (mg/L) Average Monthly	0.1	0.09	0.09	0.09	0.07	0.09	0.07	0.06	0.08	0.07	0.08	0.04
TRC (mg/L) IMAX	0.1	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.20	0.08
CBOD5 (lbs/day) Average Monthly	76.1	75.4	43.3	11.5	14.1	24.0		16.7	20.2	15.5	10.3	12.0
CBOD5 (lbs/day) Weekly Average	198.8	110.3	73.2	18.3	26.3	64.3		33.3	51.8	21.7	32.3	23.1
CBOD5 (mg/L) Average Monthly	36	22.4	11.2	3.6	4.0	5.0		7.0	5.0	3.0	3.0	7.0
CBOD5 (mg/L) Weekly Average	81.9	34.1	17.9	4.0	7.0	12.0		14.0	10.0	3.0	4.0	15.0
BOD5 (mg/L) Raw Sewage Influent Daily Maximum	762	741	281	198	120	189	251	420.0	176	265	389	291
TSS (lbs/day) Average Monthly	127.2	168.7	110.5	43.1	47.4	44.7	110.3	55.3	76.7	55.2	40.8	51.5
TSS (lbs/day) Weekly Average	334.9	378.6	178.2	85.5	75.1	61.3	149.2	68.9	191.6	72.4	129.3	69.4
TSS (mg/L) Average Monthly	57	51.5	27.6	14.0	14.0	11.0	40.0	24.0	18.0	10.0	13.0	32.0
TSS (mg/L) Raw Sewage Influent Daily Maximum	1110	390	340	375	166	218	405	212.0	398	312	520	397
TSS (mg/L) Weekly Average	138	117.0	44.7	28.0	20.0	19.0	52.0	31.0	37.0	10.0	17.0	53.0
Fecal Coliform (No./100 ml) Geometric Mean	< 491	98.4	6.6	1.7	20.5	1.6	34.0	16.4	2.6	144.7	161.7	262.4
Fecal Coliform (No./100 ml) Instantaneous Maximum	48392	9678.4	12.4	3.1	1918.9	6.3	24810.0	24810.0	22.6	120330.0	12021.5	9312.0

Total Nitrogen (mg/L) Daily Maximum							6.2					
Ammonia (lbs/day) Average Monthly	31.2	18.65	1.01	1.11	1.65	0.43	1.29	1.42	3.17	0.49	0.69	0.63
Ammonia (lbs/day) Weekly Average	42.9	45.37	1.99	4.4	4.7	1.0	2.60	2.4	9.17	0.72	6.5	4.95
Ammonia (mg/L) Average Monthly	14.5	5.77	0.25	0.29	0.45	0.12	0.58	0.67	0.96	0.11	0.32	0.60
Ammonia (mg/L) Weekly Average	23.6	14.02	0.50	0.95	1.25	0.18	0.98	1.17	1.85	0.15	0.80	3.98
Total Phosphorus (mg/L) Daily Maximum							1.06					

Compliance History

Effluent Violations for Outfall 001, from: August 1, 2021 To: June 30, 2022

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
DO	06/30/22	Min	3.5	mg/L	6.0	mg/L
DO	05/31/22	Min	4.3	mg/L	6.0	mg/L
CBOD5	06/30/22	Wkly Avg	198.8	lbs/day	150.0	lbs/day
CBOD5	05/31/22	Avg Mo	22.4	mg/L	15	mg/L
CBOD5	06/30/22	Avg Mo	36	mg/L	15	mg/L
CBOD5	06/30/22	Wkly Avg	81.9	mg/L	22.5	mg/L
CBOD5	05/31/22	Wkly Avg	34.1	mg/L	22.5	mg/L
TSS	06/30/22	Wkly Avg	334.9	lbs/day	300.0	lbs/day
TSS	05/31/22	Wkly Avg	378.6	lbs/day	300.0	lbs/day
TSS	12/31/21	Avg Mo	40.0	mg/L	30	mg/L
TSS	06/30/22	Avg Mo	57	mg/L	30	mg/L
TSS	05/31/22	Avg Mo	51.5	mg/L	30	mg/L
TSS	06/30/22	Wkly Avg	138	mg/L	45	mg/L

TSS	12/31/21	Wkly Avg	52.0	mg/L	45	mg/L
TSS	05/31/22	Wkly Avg	117.0	mg/L	45	mg/L
Fecal Coliform	06/30/22	Geo Mean	< 491	No./100 ml	200	No./100 ml
Fecal Coliform	05/31/22	IMAX	9678.4	No./100 ml	1000	No./100 ml
Fecal Coliform	09/30/21	IMAX	120330.0	No./100 ml	1000	No./100 ml
Fecal Coliform	11/30/21	IMAX	24810.0	No./100 ml	10000	No./100 ml
Fecal Coliform	09/30/21	IMAX	120330.0	No./100 ml	1000	No./100 ml
Fecal Coliform	12/31/21	IMAX	24810.0	No./100 ml	10000	No./100 ml
Fecal Coliform	08/31/21	IMAX	12021.5	No./100 ml	1000	No./100 ml
Fecal Coliform	06/30/22	IMAX	48392	No./100 ml	1000	No./100 ml
Ammonia	06/30/22	Avg Mo	31.2	lbs/day	20.0	lbs/day
Ammonia	06/30/22	Wkly Avg	42.9	lbs/day	30.0	lbs/day
Ammonia	05/31/22	Wkly Avg	45.37	lbs/day	30.0	lbs/day
Ammonia	05/31/22	Avg Mo	5.77	mg/L	3.0	mg/L
Ammonia	06/30/22	Avg Mo	14.5	mg/L	3.0	mg/L
Ammonia	05/31/22	Wkly Avg	14.02	mg/L	4.5	mg/L
Ammonia	06/30/22	Wkly Avg	23.6	mg/L	4.5	mg/L

Summary of Inspections: There are chronic effluent violations observed for years. The facility stated that the violations were due to discharge from Utz-Snyder industrial waste facility. Steps taken to achieve compliance include monitoring of Utz-Snyder effluent, coordination with plant personnel, and update STP plant sample collection protocol. The final NPDES permit may not be issued if there are any unresolved violations.

Other Comments: none

Existing Effluent Limitations and Monitoring Requirements

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum 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	Recorded
pH (S.U.)	XXX	XXX	6.0	XXX	9.0 Max	XXX	1/day	Grab
Dissolved Oxygen	XXX	XXX	6.0	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.1	XXX	0.3	1/day	Grab
CBOD5 Jan 1 - Apr 30, Nov 1 - 30	167.0	250.0	XXX	25.0	37.5	50	1/week	8-Hr Composite
CBOD5 May 1 - Oct 31	100.0	150.0	XXX	15	22.5	30	1/week	8-Hr Composite
BOD5 Raw Sewage Influent	XXX	XXX	XXX	Report Daily Max	XXX	XXX	1/week	8-Hr Composite
TSS Raw Sewage Influent	XXX	XXX	XXX	Report Daily Max	XXX	XXX	1/week	8-Hr Composite
TSS	200.0	300.0	XXX	30	45	60	1/week	8-Hr Composite
Fecal Coliform (No/100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No/100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
Total Nitrogen	XXX	XXX	XXX	Report Daily Max	XXX	XXX	1/year	8-Hr Composite
Ammonia-Nitrogen Nov 1 - Apr 30	50.0	75.0	XXX	7.5	11.3	15	1/week	8-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	20.0	30.0	XXX	3.0	4.5	6	1/week	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report Daily Max	XXX	XXX	1/year	8-Hr Composite

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.8
Latitude 39º 54' 17.90" **Longitude** -78º 57' 11.9"
Wastewater Description: Sewage Effluent

Technology-Based Limitations

The following technology-based limitations apply, subject to water quality analysis and BPJ where applicable:

Pollutant	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)

Comments: None

Water Quality-Based Limitations

WQM 7.0:

WQM 7.0 version 1.0b is a water quality model designed to assist DEP to determine appropriate effluent limits for $CBOD_5$, NH_3-N and DO. The model simulates two basic processes. In the NH_3-N module, the model simulates the mixing and degradation of NH_3-N in the stream and compares calculated instream NH_3-N concentrations to NH_3-N water quality criteria. In the D.O. module, the model simulates the mixing and consumption of D.O. in the stream due to the degradation of $CBOD_5$ and NH_3N and compares calculated instream D.O. concentrations to D.O. water quality criteria. The model was utilized for this permit renewal by using updated Q_{7-10} and historic background water quality levels of the river. The following data were used in the attached computer model of the stream:

- Discharge pH 7.0 (median Jul-Sep, 2021-2022, eDMR data)
- Discharge Temperature 20°C (Default)
- Discharge Hardness 100 mg/l (Default)
- Stream pH 7.0 (Default)
- Stream Temperature 20°C (Default)
- Stream Hardness 100 mg/l (Default)

The following nodes were considered in modeling:

Node 1: Outfall 001 at Outfall 001 on Buffalo Creek (39075)
Elevation: 2053.81 ft (USGS National Map viewer, 10/04/2022)
Drainage Area: 9.2 mi^2 (StreamStat Version 3.0, 010/04/2022)
River Mile Index: 8.42 (PA DEP eMapPA)
Low Flow Yield: 0.1 cfs/mi^2
Discharge Flow: 0.8 MGD

Node 2: At confluence with Millers Run (39098)
Elevation: 1997.77 ft (USGS National Map viewer, 10/05/2022)
Drainage Area: 22.2 mi^2 (StreamStat Version 3.0, 10/05/2022)
River Mile Index: 5.49 (PA DEP eMapPA)

Low Flow Yield: 0.1 cfs/mi^2
Discharge Flow: 0.0 MGD

NH_3-N:
WQM 7.0 suggested the existing limits are still protective. Existing limits will be carried over.

$CBOD_5$:
The WQM 7.0 model confirms the existing limits are still protective. Existing limits will be carried over.

Dissolved Oxygen (DO):
The existing permit has a minimum DO of 6.0 mg/l which is supported by WQM output as protective and will be carried over.

Toxics:
Based on the available data, PADEP utilizes Toxics Management Spreadsheet (TMS) to (1) evaluate reasonable potential for toxic pollutants to cause or contribute to an excursion above the water quality standards and (2) develop WQBELs for those such toxic pollutants (i.e., 40 CFR § 122.44(d)(1)(i)). It is noteworthy that some of these pollutants that may be reported as "non-detect", but still exceeded the criteria, were determined to be candidates for modeling because the method detection levels used to analyze those pollutants were higher than target QLs and/or the most stringent Chapter 93 criteria. The model then recommended the appropriate action for the Pollutants of Concerns based on the following logic:

1. In general, establish limits in the draft permit where the effluent concentration determined in B.1 or B.2 equals or exceeds 50% of the WQBEL (i.e., RP is demonstrated). Use the average monthly, maximum daily and instantaneous maximum (IMAX) limits for the permit as recommended by the TMS (or, if appropriate, use a multiplier of 2 times the average monthly limit for the maximum daily limit and 2.5 times the average monthly limit for IMAX).

2. For non-conservative pollutants, in general, establish monitoring requirements where the effluent concentration determined in B.1 or B.2 is between 25% - 50% of the WQBEL.

3. For conservative pollutants, in general, establish monitoring requirements where the effluent concentration determined in B.1 or B.2 is between 10% - 50% of the WQBEL.

NOTE 4 – If the effluent concentration determined in B.1 or B.2 is "non-detect" at or below the target quantitation limit (TQL) for the pollutant as specified in the TMS and permit application, the pollutant may be eliminated as a candidate for WQBELs or monitoring requirements unless 1) a more sensitive analytical method is available for the pollutant under 40 CFR Part 136 where the quantitation limit for the method is less than the applicable water quality criterion and 2) a detection at the more sensitive method may lead to a determination that an effluent limitation is necessary, considering available dilution at design conditions.

NOTE 5 – If the effluent concentration determined in B.1 or B.2 is a detection below the TQL but above or equal to the applicable water quality criterion, WQBELs or monitoring may be established for the pollutant.

4. Application managers may, on a site- and pollutant-specific basis, deviate from these guidelines where there is specific rationale that is documented in the fact sheet.

Output from the model is provided below:

☑ ***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	0.1	0.16	15.6	24.4	39.1	µg/L	15.6	AFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Zinc	Report	Report	Report	Report	Report	µg/L	134	AFC	Discharge Conc > 10% WQBEL (no RP)

Each of the parameters are discussed below:

Total Copper: TMS suggests AML of 15.6 ug/l and Daily max and IMAX 39.1 ug/l based on the sample result provided in the application. This is a new parameter without limit/monitoring requirement in the past. This parameter was included in the pre-draft survey. A response against the survey wasn't returned. PADEP, therefore, will provide a schedule with monitoring for the first three years and limits will be effective from 4th year. In addition, a Site-Specific data collection and TRE requirement will be added.

Total Zinc: TMS suggested monitoring for Total Zinc. A quarterly monitoring will be added in this renewal.

TDS and its constituents:
TMS suggests no RP for TDS and its constituents. Therefore, no monitoring or limits requirement will be placed in the permit.

Additional Considerations

Fecal Coliform:
The recent coliform guidance in 25 Pa. code § 92a.47.(a)(4) requires a summer technology limit of 200/100 ml as a geometric mean and an instantaneous maximum not greater than 1,000/100ml and § 92a.47.(a)(5) requires a winter limit of 2,000/100ml as a geometric mean and an instantaneous maximum not greater than 10,000/100ml. These are existing limits that will be carried over.

E. Coli:
DEP's SOP titled "Establishing Effluent Limitations for Individual Sewage Permits (BCW-PMT-033, revised March 24, 2021) recommends quarterly E. Coli monitoring for all sewage dischargers with design flows ≥ 0.05 MGD and < 1.0 MGD. This requirement will be applied from this permit term.

pH:
The TBEL for pH is above 6.0 and below 9.0 S.U. (40 CFR §133.102(c) and Pa Code 25 § 95.2(1)) which are existing limits and will be carried over.

Total Suspended Solids (TSS):
There is no water quality criterion for TSS. The existing limits of 30 mg/L average monthly, 45 mg/l average weekly, and 60 mg/L instantaneous maximum will remain in the permit based on the minimum level of effluent quality attainable by secondary treatment, 25 Pa. Code § 92a.47 and 40CFR 133.102(b). The mass based average monthly and weekly average limits are calculated to be 200 lbs./day and 300 lbs./day respectively. These are all existing limits that will be carried over.

Total Residual Chlorine (TRC):
The attached computer printout utilizes the equation and calculations as presented in the Department's 2003 Implementation Guidance for Total Residual Chlorine (TRC) (ID#391-2000-015) for developing chlorine limitations. The attached printout indicates that the existing limits are still protective and will be carried over.

Flow and Influent BOD_5 and TSS Monitoring Requirement:
The requirement to monitor the volume of effluent will remain in the draft permit per 40 CFR § 122.44(i)(1)(ii). Influent BOD_5 and TSS monitoring requirements are established in the permit per the requirements set in Pa Code 25 Chapter 94.

Best Professional Judgement (BPJ):

Total Phosphorus:
PADEP's SOP BCW-PMT-033 suggests monitoring requirement, at a minimum, for facilities with design flow greater than 2,000 GPD. This requirement is applied for all facilities meeting the flow criteria. This is an existing parameter with monitoring requirement that will be carried over.

Total Nitrogen:
PADEP's SOP BCW-PMT-033 suggests monitoring requirement, at a minimum, for facilities with design flow greater than 2,000 GPD. This requirement is applied for all facilities meeting the flow criteria. This is an existing parameter with monitoring requirement that will be carried over.

Monitoring Frequency and Sample Types:
Otherwise specified above, the monitoring frequency and sample type of compliance monitoring for existing parameters are recommended by DEP's SOP and Permit Writers Manual and/or on a case-by-case basis using best professional judgment (BPJ).

Anti-Backsliding
The proposed limits are at least as stringent as are in existing permit, unless otherwise stated; therefore, anti-backsliding is not applicable.

Proposed Effluent Limitations and Monitoring Requirements

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.

Outfall 001, Effective Period: 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		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Recorded
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	6.0 Daily Min	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.1	XXX	0.3	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5) Jan 1 - Apr 30, Nov 1 - 30	167.0	250.0	XXX	25.0	37.5	50	1/week	8-Hr Composite
Carbonaceous Biochemical Oxygen Demand (CBOD5) May 1 - Oct 31	100.0	150.0	XXX	15	22.5	30	1/week	8-Hr Composite
Biochemical Oxygen Demand (BOD5) Raw Sewage Influent	XXX	XXX	XXX	Report Daily Max	XXX	XXX	1/week	8-Hr Composite
Total Suspended Solids	200.0	300.0	XXX	30	45	60	1/week	8-Hr Composite
Total Suspended Solids Raw Sewage Influent	XXX	XXX	XXX	Report Daily Max	XXX	XXX	1/week	8-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
Total Nitrogen	XXX	XXX	XXX	Report Daily Max	XXX	XXX	1/year	8-Hr Composite

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		
Ammonia-Nitrogen Nov 1 - Apr 30	50.0	75.0	XXX	7.5	11.3	15	1/week	8-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	20.0	30.0	XXX	3.0	4.5	6	1/week	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report Daily Max	XXX	XXX	1/year	8-Hr Composite
Copper, Total (interim)	XXX	XXX	XXX	Report Avg Qrtly	Report Daily Max	XXX	1/quarter	8-Hr Composite
Copper, Total (final)	XXX	XXX	XXX	0.0156 Avg Qrtly	XXX	0.0391	1/quarter	8-Hr Composite
Zinc, Total	XXX	XXX	XXX	Report Avg Qrtly	Report Daily Max	XXX	1/quarter	8-Hr Composite
Aluminum, Total	XXX	XXX	XXX	Report Annl Avg	Report Daily Max	XXX	1/year	8-Hr Composite
Iron, Total	XXX	XXX	XXX	Report Annl Avg	Report Daily Max	XXX	1/year	8-Hr Composite
Manganese, Total	XXX	XXX	XXX	Report Annl Avg	Report Daily Max	XXX	1/year	8-Hr Composite

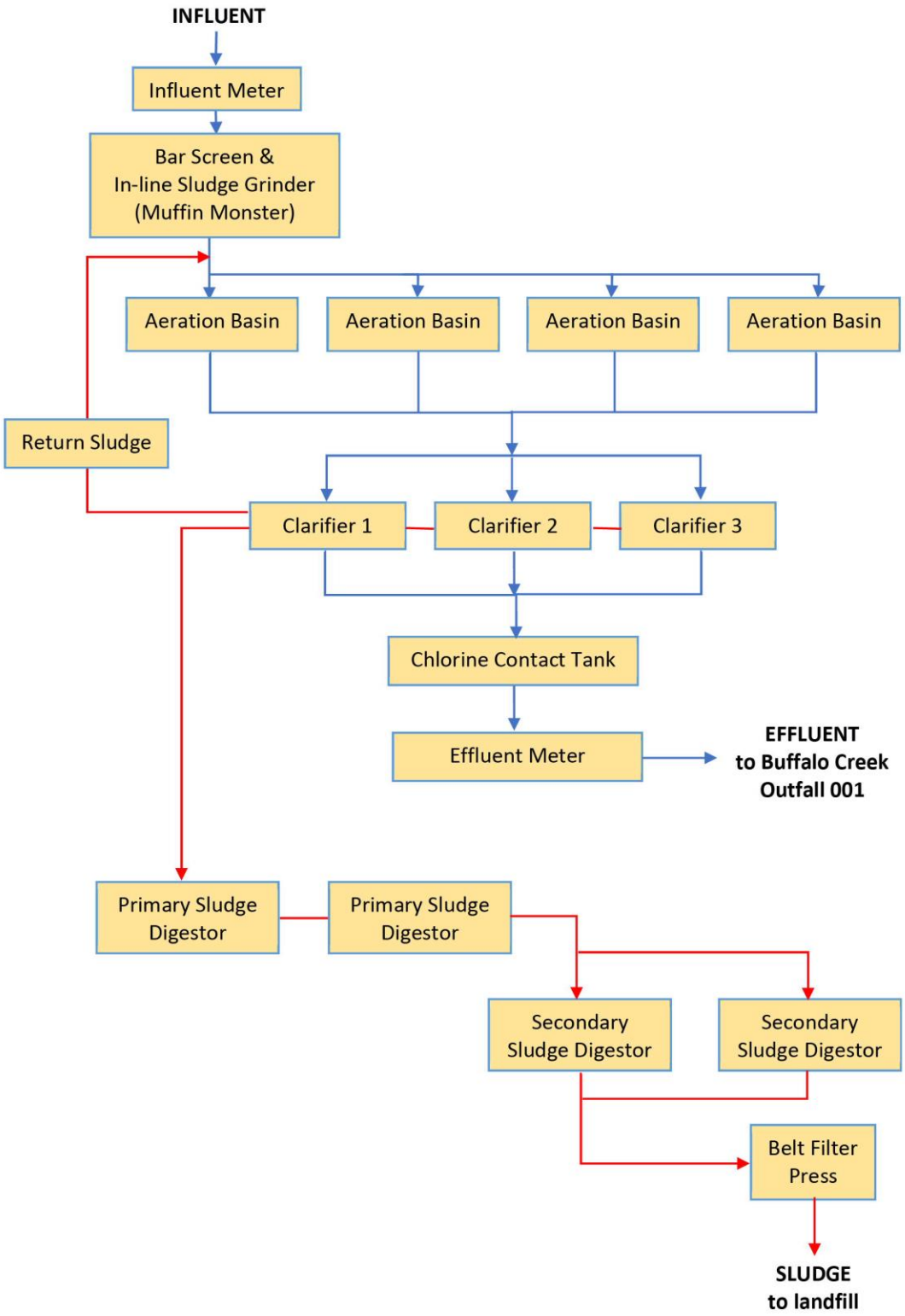
Compliance Sampling Location: At Outfall 001

Other Comments:

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

Permit No. PA0021822

Berlin Sewerage Treatment Plant
Process Flow Diagram



Permit No. PA0021822

PA0021822 at 001

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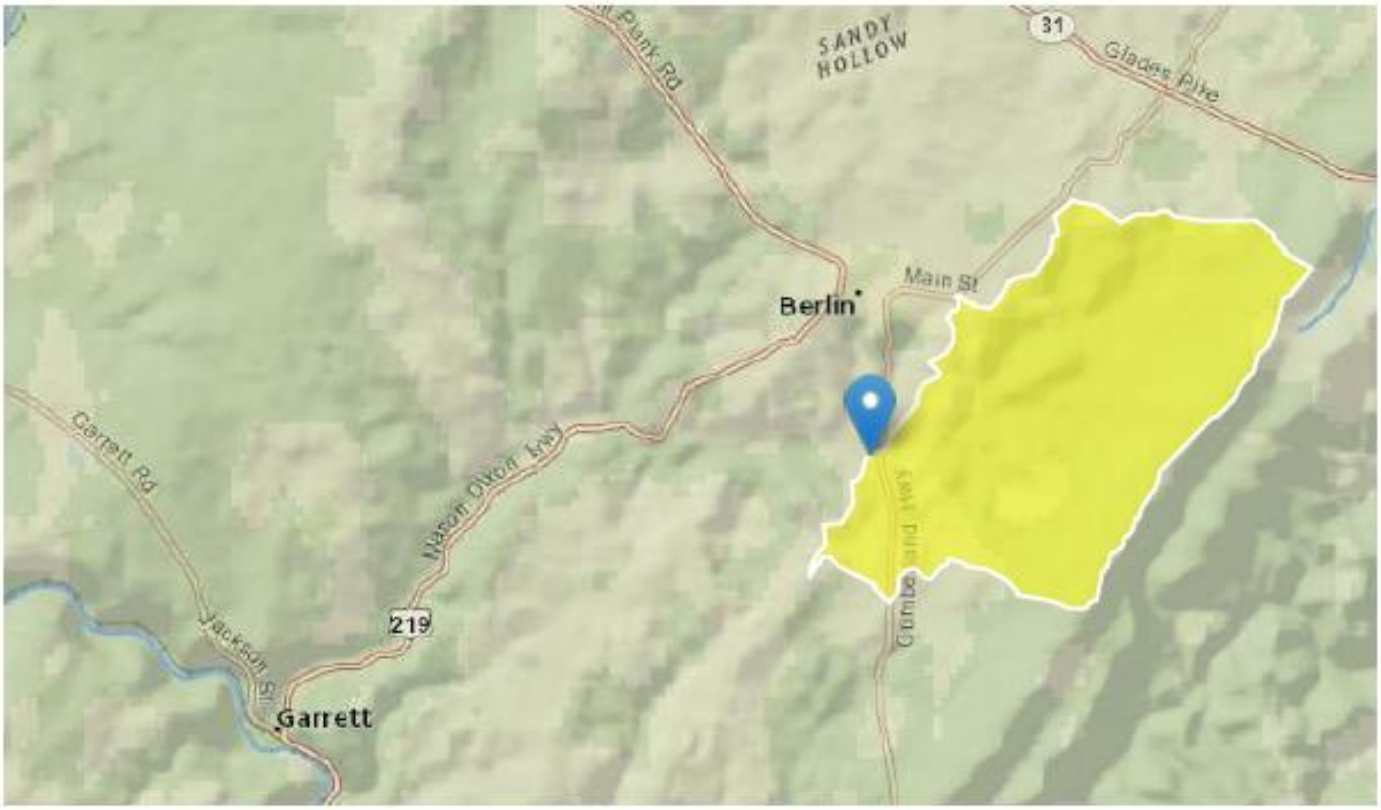

Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	9.02	square miles
ELEV	Mean Basin Elevation	2398	feet

Low-Flow Statistics

Permit No. PA0021822

Low-Flow Statistics Parameters [99.9 Percent (9.01 square miles) Low Flow Region 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	9.02	square miles	2.26	1400
ELEV	Mean Basin Elevation	2398	feet	1050	2580

Low-Flow Statistics Flow Report [99.9 Percent (9.01 square miles) Low Flow Region 4]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
7 Day 2 Year Low Flow	0.613	ft^3/s	43	43
30 Day 2 Year Low Flow	1.11	ft^3/s	38	38
7 Day 10 Year Low Flow	0.183	ft^3/s	66	66
30 Day 10 Year Low Flow	0.354	ft^3/s	54	54
90 Day 10 Year Low Flow	0.76	ft^3/s	41	41

Low-Flow Statistics Citations

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

Permit No. PA0021822

PA0021822 at node 2

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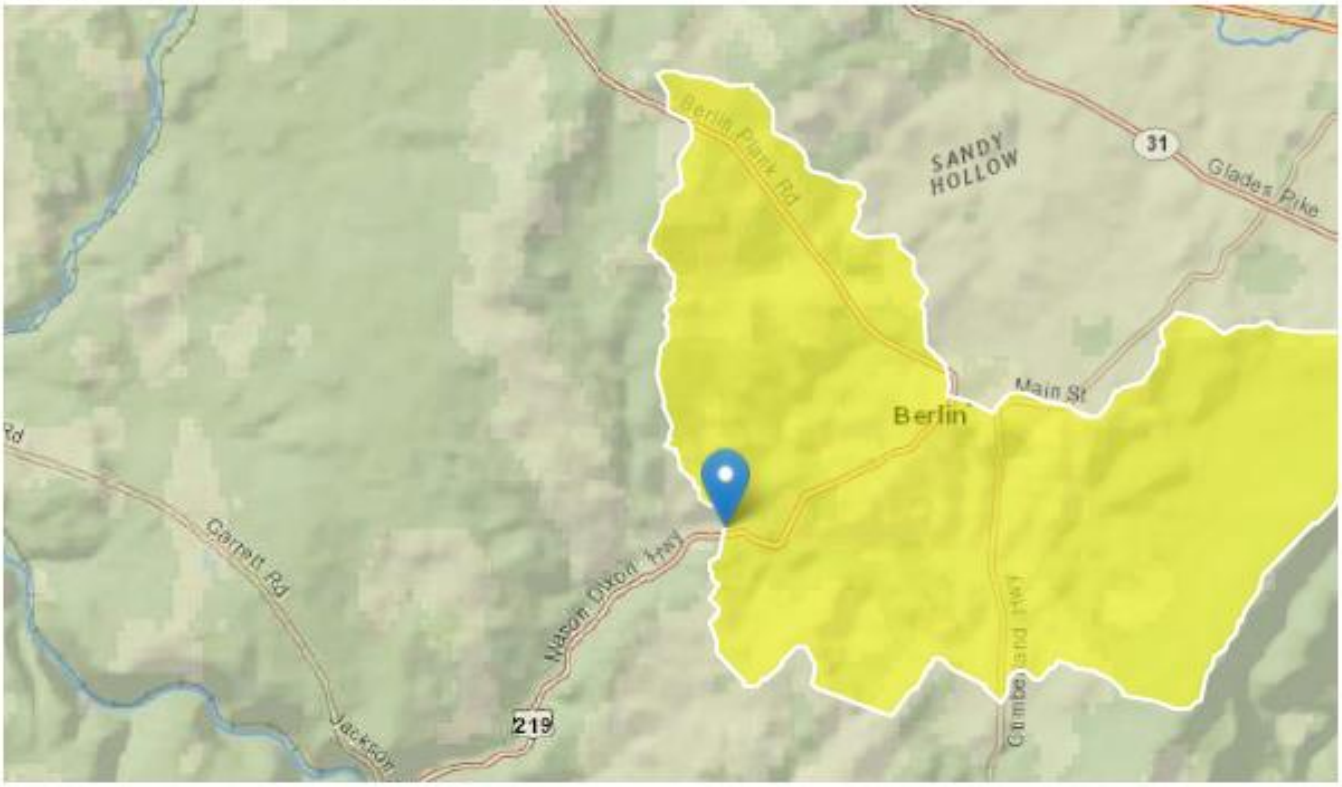

Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	22.2	square miles
ELEV	Mean Basin Elevation	2329	feet

Low-Flow Statistics

Permit No. PA0021822

Low-Flow Statistics Parameters [99.9 Percent (22.2 square miles) Low Flow Region 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	22.2	square miles	2.26	1400
ELEV	Mean Basin Elevation	2329	feet	1050	2580

Low-Flow Statistics Flow Report [99.9 Percent (22.2 square miles) Low Flow Region 4]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
7 Day 2 Year Low Flow	1.67	ft^3/s	43	43
30 Day 2 Year Low Flow	2.9	ft^3/s	38	38
7 Day 10 Year Low Flow	0.546	ft^3/s	66	66
30 Day 10 Year Low Flow	0.985	ft^3/s	54	54
90 Day 10 Year Low Flow	2.01	ft^3/s	41	41

Low-Flow Statistics Citations

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

Permit No. PA0021822

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
19F	39075	BUFFALO CREEK	8.420	2053.81	9.02	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	0.100	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	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
Berlin Boro STP	PA0021822	0.8000	0.8000	0.8000	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	15.00	2.00	0.00	1.50
Dissolved Oxygen	6.00	8.24	0.00	0.00
NH3-N	3.00	0.00	0.00	0.70

Permit No. PA0021822

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
19F	39075	BUFFALO CREEK	5.490	1997.77	22.20	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	0.100	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

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

Parameter Data

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

Permit No. PA0021822

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
19F	39075	BUFFALO 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												
8.420	0.90	0.00	0.90	1.2376	0.00362	.572	19.39	33.92	0.19	0.928	20.00	7.00
Q1-10 Flow												
8.420	0.58	0.00	0.58	1.2376	0.00362	NA	NA	NA	0.18	1.017	20.00	7.00
Q30-10 Flow												
8.420	1.23	0.00	1.23	1.2376	0.00362	NA	NA	NA	0.21	0.857	20.00	7.00

Permit No. PA0021822

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	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	6		

Permit No. PA0021822

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
19F	39075	BUFFALO 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
8.420	Berlin Boro STP	9.67	6	9.67	6	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
8.420	Berlin Boro STP	1.92	3	1.92	3	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
8.42	Berlin Boro STP	15	15	3	3	6	6	0	0

Permit No. PA0021822

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
19F	39075	BUFFALO CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
8.420	0.800	20.000	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
19.391	0.572	33.923	0.193
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
9.52	1.244	1.74	0.700
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.946	6.644	Tsivoglou	6
Reach Travel Time (days)			
0.928			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.093	8.48	1.63	6.44
0.186	7.56	1.52	6.31
0.278	6.73	1.43	6.38
0.371	6.00	1.34	6.54
0.464	5.35	1.25	6.73
0.557	4.76	1.18	6.93
0.649	4.24	1.10	7.13
0.742	3.78	1.03	7.31
0.835	3.37	0.97	7.48
0.928	3.00	0.91	7.64

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WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
19F	39075	BUFFALO CREEK

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
8.420	Berlin Boro STP	PA0021822	0.800	CBOD5	15		
				NH3-N	3	6	
				Dissolved Oxygen			6

Permit No. PA0021822

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Toxics Management Spreadsheet
Version 1.3, March 2021

Discharge Information

Instructions | Discharge | Stream

Facility: **Berlin Boro STP** NPDES Permit No.: **PA0021822** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Treated sewage**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.8	100	7						

					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		330									
	Chloride (PWS)	mg/L		60.9									
	Bromide	mg/L	<	0.2									
	Sulfate (PWS)	mg/L		35.6									
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L											
	Total Antimony	µg/L											
	Total Arsenic	µg/L											
	Total Barium	µg/L											
	Total Beryllium	µg/L											
	Total Boron	µg/L											
	Total Cadmium	µg/L											
	Total Chromium (III)	µg/L											
	Hexavalent Chromium	µg/L											
	Total Cobalt	µg/L											
	Total Copper	µg/L		33									
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L											
	Total Iron	µg/L											
	Total Lead	µg/L	<	1									
	Total Manganese	µg/L											
	Total Mercury	µg/L											
	Total Nickel	µg/L											
	Total Phenols (Phenolics) (PWS)	µg/L											
	Total Selenium	µg/L											
	Total Silver	µg/L											
	Total Thallium	µg/L											
	Total Zinc	µg/L		41									
	Total Molybdenum	µg/L											
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										

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Group 3	Carbon Tetrachloride	µg/L	<											
	Chlorobenzene	µg/L												
	Chlorodibromomethane	µg/L	<											
	Chloroethane	µg/L	<											
	2-Chloroethyl Vinyl Ether	µg/L	<											
	Chloroform	µg/L	<											
	Dichlorobromomethane	µg/L	<											
	1,1-Dichloroethane	µg/L	<											
	1,2-Dichloroethane	µg/L	<											
	1,1-Dichloroethylene	µg/L	<											
	1,2-Dichloropropane	µg/L	<											
	1,3-Dichloropropylene	µg/L	<											
	1,4-Dioxane	µg/L	<											
	Ethylbenzene	µg/L	<											
	Methyl Bromide	µg/L	<											
	Methyl Chloride	µg/L	<											
	Methylene Chloride	µg/L	<											
	1,1,2,2-Tetrachloroethane	µg/L	<											
	Tetrachloroethylene	µg/L	<											
	Toluene	µg/L	<											
	1,2-trans-Dichloroethylene	µg/L	<											
	1,1,1-Trichloroethane	µg/L	<											
	1,1,2-Trichloroethane	µg/L	<											
	Trichloroethylene	µg/L	<											
	Vinyl Chloride	µg/L	<											
Group 4	2-Chlorophenol	µg/L	<											
	2,4-Dichlorophenol	µg/L	<											
	2,4-Dimethylphenol	µg/L	<											
	4,6-Dinitro-o-Cresol	µg/L	<											
	2,4-Dinitrophenol	µg/L	<											
	2-Nitrophenol	µg/L	<											
	4-Nitrophenol	µg/L	<											
	p-Chloro-m-Cresol	µg/L	<											
	Pentachlorophenol	µg/L	<											
	Phenol	µg/L	<											
	2,4,6-Trichlorophenol	µg/L	<											
Group 5	Acenaphthene	µg/L	<											
	Acenaphthylene	µg/L	<											
	Anthracene	µg/L	<											
	Benzidine	µg/L	<											
	Benzo(a)Anthracene	µg/L	<											
	Benzo(a)Pyrene	µg/L	<											
	3,4-Benzofluoranthene	µg/L	<											
	Benzo(ghi)Perylene	µg/L	<											
	Benzo(k)Fluoranthene	µg/L	<											
	Bis(2-Chloroethoxy)Methane	µg/L	<											
	Bis(2-Chloroethyl)Ether	µg/L	<											
	Bis(2-Chloroisopropyl)Ether	µg/L	<											
	Bis(2-Ethylhexyl)Phthalate	µg/L	<											
	4-Bromophenyl Phenyl Ether	µg/L	<											
	Butyl Benzyl Phthalate	µg/L	<											
	2-Chloronaphthalene	µg/L	<											
	4-Chlorophenyl Phenyl Ether	µg/L	<											
	Chrysene	µg/L	<											
	Dibenzo(a,h)Anthrancene	µg/L	<											
	1,2-Dichlorobenzene	µg/L	<											
	1,3-Dichlorobenzene	µg/L	<											
	1,4-Dichlorobenzene	µg/L	<											
	3,3-Dichlorobenzidine	µg/L	<											
	Diethyl Phthalate	µg/L	<											
	Dimethyl Phthalate	µg/L	<											
	Di-n-Butyl Phthalate	µg/L	<											
	2,4-Dinitrotoluene	µg/L	<											

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	2,6-Dinitrotoluene	µg/L	<										
	Di-n-Octyl Phthalate	µg/L	<										
	1,2-Diphenylhydrazine	µg/L	<										
	Fluoranthene	µg/L	<										
	Fluorene	µg/L	<										
	Hexachlorobenzene	µg/L	<										
	Hexachlorobutadiene	µg/L	<										
	Hexachlorocyclopentadiene	µg/L	<										
	Hexachloroethane	µg/L	<										
	Indeno(1,2,3-cd)Pyrene	µg/L	<										
	Isophorone	µg/L	<										
	Naphthalene	µg/L	<										
	Nitrobenzene	µg/L	<										
	n-Nitrosodimethylamine	µg/L	<										
	n-Nitrosodi-n-Propylamine	µg/L	<										
	n-Nitrosodiphenylamine	µg/L	<										
	Phenanthrene	µg/L	<										
	Pyrene	µg/L	<										
	1,2,4-Trichlorobenzene	µg/L	<										
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
Version 1.3, March 2021

Stream / Surface Water Information

Berlin Boro STP, NPDES Permit No. PA0021822, Outfall 001

Instructions | Discharge | Stream

Receiving Surface Water Name: _____ No. Reaches to Model: 1

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

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	039075	8.42	2053.81	9.2			Yes
End of Reach 1	039075	5.49	1997.77	22.2			Yes

$Q_{7\text{-}10}$

Location	RMI	LFY (cfs/mi²)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	8.42	0.1										100	7		
End of Reach 1	5.49	0.1													

Q_h

Location	RMI	LFY (cfs/mi²)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	8.42														
End of Reach 1	5.49														

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Toxics Management Spreadsheet
Version 1.3, March 2021

Model Results

Berlin Boro STP, NPDES Permit No. PA0021822, Outfall 001

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

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 3.640 PMF: 1 Analysis Hardness (mg/l): 100 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	13.439	14.0	24.4	Chem Translator of 0.96 applied
Total Lead	0	0		0	64.581	81.6	142	Chem Translator of 0.791 applied
Total Zinc	0	0		0	117.180	120	209	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): 3.640 PMF: 1 Analysis Hardness (mg/l): 100 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	8.956	9.33	16.3	Chem Translator of 0.96 applied
Total Lead	0	0		0	2.517	3.18	5.55	Chem Translator of 0.791 applied
Total Zinc	0	0		0	118.139	120	209	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 3.640 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

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

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Total Copper	0	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Zinc	0	0		0	N/A	N/A	N/A	

☑ *CRL* CCT (min): 5.992 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

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

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

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Copper	0.1	0.16	15.6	24.4	39.1	µg/L	15.6	AFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Zinc	Report	Report	Report	Report	Report	µg/L	134	AFC	Discharge Conc > 10% WQBEL (no RP)

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

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

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Total Lead	N/A	N/A	Discharge Conc < TQL

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TRC_CALC

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

0.92	= Q stream (cfs)	0.5	= CV Daily
0.8	= Q discharge (MGD)	0.5	= CV Hourly
30	= no. samples	1	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
0	= % Factor of Safety (FOS)		=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 0.256	1.3.2.iii	WLA cfc = 0.242
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.095	5.1d	LTA_cfc = 0.141

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.117	AFC
		INST MAX LIMIT (mg/l) = 0.384	

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)