Pennsylvania Department of Environmental Protection

Northwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0026379**
Facility Type	**Municipal**	APS ID	**1075146**
Major / Minor	**Major**	Authorization ID	**1416685**

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Bradford Sanitary Authority Mckean County**	Facility Name	**Bradford STP**
Applicant Address	28 Kennedy Street	Facility Address	410 Seaward Avenue
	Bradford, PA 16701-2006		Bradford, PA 16701-3112
Applicant Contact	Steve Disney	Facility Contact	Steve Disney
Applicant Phone	(814) 368-6254	Facility Phone	(814) 368-7105
Client ID	81373	Site ID	264727
Ch 94 Load Status	Not Overloaded	Municipality	Foster Township
Connection Status	No Limitations	County	McKean
Date Application Received	November 4, 2022	EPA Waived?	No
Date Application Accepted		If No, Reason	Major Facility, Pretreatment

Purpose of Application: This is an application to renew a Major POTW NPDES Permit that serves the city of Bradford, Bradford Township, Foster Township, Lafayette Township, and Lewis Run Borough.

Summary of Review

Upgrades to the plant since the last permit renewal include (2) new aerobic digestors, (6) new reed beds for sludge dewatering, new chlorine building and two new chlorinators, with controls, to disinfect the conventional activated sludge side of the treatment plant and a new diffused outfall in 2021; all permitted under WQM Permit No. 4217401. Additionally, there has also been the installation of a new JWC Environmental Auger Monster influent screening system with a maximum flow capacity of 500,000 gpd at the Lafayette Township Sewer Authorities Route 59 Pump Station.

Overall treatment at the facility consists of a diversion chamber, two mechanical bar screens, vortex grit removal, pumping stations, 4 SBR Tanks, 3 Primary Settling Tanks, 6 aeration tanks, 2 final clarifiers, and 2 chlorine contact tanks, UV disinfection for the SBR train at the facility, diffused outfall, and reed beds for sludge dewatering.

Additionally, the facilities plan for managing peak flows has changed since the last permit renewal. A new diversion chamber was constructed on the interceptor which controls flow into the new headworks facility which is equipped with a mechanical bar screen, vortex grit removal equipment, and raw sewage pumps. This new headworks facility No. 2 treats the normal flow from 0-10 MGD, once above 10 MGD the diversion chamber will allow the excess flow into the existing headworks facility, which will remain in operation as headworks facility No. 1 in reserve for wet weather events.

Regarding the request in the cover letter to reduce CBOD5 and TSS concentrations, it has been determined that the Department will not be able to honor these requests. The CBOD5 limitation is a WQBEL and has received more stringent water-quality based limits for this permit renewal. The TSS limitation was properly implemented in the last permit however the justification for including the limit was not correct. Since the facility increased its design discharge rate in the last permit renewal from 6.3 MGD to 8.8 MGD and the stream is effluent dominated (stream flow ($Q_{7\text{-}10}$) to Wastewater Flow (design flow) is less than 3:1 (7.1 MGD:8.8 MGD)) the proper justification should have been from the Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers which is intended for streams that have little or no assimilative capacity.

Approve	Deny	Signatures	Date
X		Dustin Hargenrater Dustin Hargenrater / Project Manager	October 22, 2025
X		Adam Olesnanik Adam Olesnanik, P.E. / Environmental Engineer Manager	October 29, 2025

Summary of Review
Sludge use and disposal description and location(s): Based on the 2022 application the facility disposed of 327.64 dry tons of sludge/biosolids. The facility has newly installed reed beds for sludge dewatering so the sludge/biosolids are disposed of on-site and the reed beds should provide a fair amount of time before the facility has to send the waste to a landfill. 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.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	8.8
Latitude	41º 59' 15.5"	Longitude	-78º 37' 31.8"
Quad Name	Bradford	Quad Code	41078H6
Wastewater Description:	Sewage Effluent		
Receiving Waters	Tunungwant Creek (WWF)	Stream Code	56932
NHD Com ID	112364695	RMI	0.88 (10.4 in Model due to DO still declining across state lines, Limestone WWTP RMI 6.81 - DO still declining, End model reach 0.01 RMI – DO recovering)
Drainage Area	136	Yield (cfs/mi^2)	0.131
Q_{7-10} Flow (cfs)	11	Q_{7-10} Basis	USGS - StreamStats
Elevation (ft)	1402	Slope (ft/ft)	---
Watershed No.	16-C	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	CAUSE UNKNOWN, CAUSE UNKNOWN, CAUSE UNKNOWN, MERCURY		
Source(s) of Impairment	CHANNELIZATION, INDUSTRIAL POINT SOURCE DISCHARGE, REMOVAL OF RIPARIAN VEGETATION, SOURCE UNKNOWN		
TMDL Status		Name	

Background/Ambient Data		Data Source
pH (SU)	8.1	Tunungwant Creek Continuous Water Quality Data Study (2017)
Temperature (°F)	20.8	Tunungwant Creek Continuous Water Quality Data Study (2017)
Hardness (mg/L)	77.6	Tunungwant Creek Continuous Water Quality Data Study (2017)
Other:		

Nearest Downstream Public Water Supply Intake		NY State Line	
PWS Waters	Tunungwant Creek	Flow at Intake (cfs)	--
PWS RMI	0	Distance from Outfall (mi)	0.88

Changes Since Last Permit Issuance: Completion of Phase 3 upgrades to the facility which included construction of a diffused outfall, construction of Headworks Facility No. 2 (SBR), and reed beds for sludge/biosolids management.

Discharge, Receiving Waters and Water Supply Information

Outfall No.	003	Design Flow (MGD)	0
Latitude	41º 59' 15.8"	Longitude	-78º 37' 31.8"
Outfall No.	004	Design Flow (MGD)	0
Latitude	41º 59' 11.4"	Longitude	-78º 37' 37.8"
Outfall No.	005	Design Flow (MGD)	0
Latitude	41º 59' 0.9"	Longitude	-78º 37' 31.8"
Outfall No.	006	Design Flow (MGD)	0
Latitude	41° 59’ 20”	Longitude	-78° 37’ 31”
Quad Name	Bradford	Quad Code	41078H6
Wastewater Description:	Stormwater		

Receiving Waters	Tunungwant Creek (WWF)	Stream Code	56932
NHD Com ID	112364695	RMI	--
Drainage Area	136	Yield (cfs/mi^2)	0.0809
Q_{7-10} Flow (cfs)	11	Q_{7-10} Basis	USGS - StreamStats
Elevation (ft)		Slope (ft/ft)	
Watershed No.	16-C	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	CAUSE UNKNOWN, CAUSE UNKNOWN, CAUSE UNKNOWN, MERCURY		
Source(s) of Impairment	CHANNELIZATION, INDUSTRIAL POINT SOURCE DISCHARGE, REMOVAL OF RIPARIAN VEGETATION, SOURCE UNKNOWN		
TMDL Status		Name	

Background/Ambient Data		Data Source
pH (SU)	8.1	Tunungwant Creek Continuous Water Quality Data Study (2017)
Temperature (°F)	20.8	Tunungwant Creek Continuous Water Quality Data Study (2017)
Hardness (mg/L)	77.6	Tunungwant Creek Continuous Water Quality Data Study (2017)
Other:		

Nearest Downstream Public Water Supply Intake	NY State Line		
PWS Waters	Tunungwant Creek	Flow at Intake (cfs)	--
PWS RMI	0	Distance from Outfall (mi)	0.88

Changes Since Last Permit Issuance: None

Treatment Facility Summary				
Treatment Facility Name: Bradford STP				
WQM Permit No.	**Issuance Date**			
4271401 A-2	August 9, 2017			
4202406 A-1	March 6, 2025			
Waste Type	**Degree of Treatment**	**Process Type**	**Disinfection**	**Avg Annual Flow (MGD)**
Sewage	Secondary	Activated Sludge	Gas Chlorine	6.3
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
8.8	9210	Not Overloaded	Combination	Landfill

Changes Since Last Permit Issuance:

4271401 A-2 (Bradford STP - 2017)
(2) new aerobic digesters, (6) new reed beds (for sludge dewatering) - converted rapid sand infiltration beds, new chlorine building and two new chlorinators, with controls, to disinfect the conventional activated sludge side of the treatment plant and a new diffused outfall.

- Install six, new primary settling tank influent weir gates.
- Install slide gates to isolate the CAS aeration tanks from the primaries.
- Various architectural, structural, electrical and mechanical system upgrades.
- Replace five boundary meters in the gravity sewer collection system.
- Demolition of existing sludge conditioning lime feed facilities and the two belt filter presses.

Design Hydraulic Capacity: **8.8** MGD
Design Organic Capacity: **9,512** lb BOD_5/day

4202406 A-1 (Lewis Run Pump Stations)
Installation of a new JWC Environmental Auger Moster (AGE1800-170) influent screening system that has a maximum flow capacity of 500,000 gpd at the Lafayette Township Sewer Authority's Route 59 Pump Station.

Chapter 94 Report Summary 2019 – 2024
No SSOs have occurred in the 5-year span being evaluated. There are currently 9 permitted industrial users that discharge to the BSA facility. The authority has on-going programs to implement repairs and maintenance of sewer extensions and repairs. Each of the areas served have on-going I/I identification programs which includes flushing, inspections, and maintenance to the system. The tributary sewer systems, while reportedly are well operated and maintained, contribute a proportionate share of wet weather flow to the WWTP. BSA monitors industries for toxic pollutants that may affect BSAs ability to meet future NPDES Permit limits and issues industrial user permits as needed. Beginning in 2020, sludge is being dewatered by the reed beds and will remain on site for several years before needing disposed of at a landfill. EPA has approved the pretreatment program, and it has been implemented, managed, and enforced by BSA throughout the service area under an interjurisdictional pretreatment agreement executed by all municipalities. BSA now owns the stormwater system assets within the city of Bradford and has amended their charter to allow such ownership and maintenance.

An entire OnBase summary has been completed dating back to 7/30/2020. Due to the length of this report the document will be added to the permit file for future reference.

Compliance History

DMR Data for Outfall 001 (from July 1, 2024 to June 30, 2025)

Parameter	JUN-25	MAY-25	APR-25	MAR-25	FEB-25	JAN-25	DEC-24	NOV-24	OCT-24	SEP-24	AUG-24	JUL-24
Flow (MGD) Average Monthly	4.8192	6.7267	5.7273	5.591	5.0773	3.9074	5.3908	3.5518	2.8893	3.1344	3.4325	3.1433
Flow (MGD) Weekly Average	6.0072	7.2804	7.7944	7.7368	7.3374	5.5779	7.8618	5.0576	3.7192	3.9486	3.8246	3.8724
pH (S.U.) Daily Minimum	6.6	6.5	6.7	6.7	6.3	6.7	6.7	6.7	6.7	6.8	6.8	6.3
pH (S.U.) Daily Maximum	7.5	7.1	7.6	6.9	7.1	7.0	7.3	7.2	7.2	7.2	7.2	7.1
DO (mg/L) Daily Minimum	5.0	5.7	6.2	6.1	5.7	6.1	6.4	7.4	7.4	7.0	7.0	5.2
TRC (mg/L) Geometric Mean	0.09	0.07	0.1	0.06	0.10	0.13	0.08	0.09	0.09	0.09	0.12	0.12
TRC (mg/L) Instantaneous Maximum	0.18	0.20	0.21	0.12	0.28	0.52	0.31	0.29	0.21	0.22	0.22	0.50
CBOD5 (lbs/day) Average Monthly	113	185	263	147	184	< 119	< 161	< 93	< 71	< 79	< 82	< 82
CBOD5 (lbs/day) Weekly Average	167	289	645	288	424	< 161	< 276	< 131	< 93	< 95	< 97	< 92
CBOD5 (mg/L) Average Monthly	2.7	3.1	5.3	2.7	3.5	< 3.7	< 3.2	< 3.0	< 3.1	< 3.0	< 3.0	< 3.0
CBOD5 (mg/L) Weekly Average	3.6	3.9	12.8	3.4	5.4	< 4.7	< 3.6	< 3.1	< 3.2	< 3.0	< 3.0	< 3.0
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	< 2734	< 2966	< 2685	< 2574	< 2665	< 1763	< 2359	< 1924	1723	1901	< 1550	< 1633
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	8757	7638	4708	6619	4998	3180	6278	3324	3115	5852	2503	3595
BOD5 (mg/L) Raw Sewage Influent Average Monthly	< 66.6	< 53.51	< 55.9	< 55.4	< 64	< 54.4	< 55.9	< 68.4	76.1	71.9	< 58.1	< 59.1
TSS (lbs/day) Average Monthly	172	230	208	265	491	182	535	137	77	83	101	87

TSS (lbs/day) Raw Sewage Influent Average Monthly	2981	2571	2803	2391	3056	2345	2243	2375	2151	2853	2100	2632
TSS (lbs/day) Raw Sewage Influent Daily Maximum	6386	6825	6216	8003	7377	3846	4069	4252	3119	9431	4202	5634
TSS (lbs/day) Weekly Average	266	354	289	528	987	270	1546	187	122	105	150	141
TSS (mg/L) Average Monthly	3.9	3.8	4.2	5.1	9.7	5.7	8.0	4.5	3.2	3.2	3.6	3.2
TSS (mg/L) Raw Sewage Influent Average Monthly	72	49	58	50	71	74	52	81	95	106	77	96
TSS (mg/L) Weekly Average	5.5	5.9	5.4	7.6	11.7	8.0	17.5	6.0	4.2	3.9	4.6	5.0
Fecal Coliform (No./100 ml) Geometric Mean	184	120	258	199	1282	354	158	211	111	93	175	134
Fecal Coliform (No./100 ml) Instantaneous Maximum	980.4	866.4	2419.6	2419.6	2419.6	2419.6	2419.6	2419.6	2419.6	866	613	980.4
Total Nitrogen (lbs/day) Average Quarterly	42			134			26			228		
Total Nitrogen (mg/L) Average Quarterly	0.83			2.505			1.13			10.7		
Ammonia (lbs/day) Average Monthly	20	< 34	< 42	< 26	44	< 25	< 23	< 5	< 5	< 5	< 18	< 23
Ammonia (mg/L) Average Monthly	0.5	< 0.5	< 0.9	< 0.5	1.1	< 0.8	< 0.3	< 0.2	< 0.2	< 0.2	< 0.6	< 0.8
Total Phosphorus (lbs/day) Average Quarterly	6			285			13			22		
Total Phosphorus (mg/L) Average Quarterly	0.12			0.46			0.57			1.05		
Total Copper (lbs/day) Average Monthly	< 0.3	< 0.4	< 0.3	< 0.3	0.3	< 0.3	< 0.5	< 0.3	< 0.2	< 0.2	< 0.3	< 0.3
Total Copper (mg/L) Average Monthly	< 0.007	< 0.005	< 0.006	< 0.005	0.009	< 0.008	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010

Compliance History

Effluent Violations for Outfall 001, from: August 1, 2024 To: June 30, 2025

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
TSS	12/31/24	Wkly Avg	1546	lbs/day	1100	lbs/day
TSS	12/31/24	Wkly Avg	17.5	mg/L	15.0	mg/L

Summary of Inspections: There have been 6 inspections at the facility within the last 4 years. There were 2 compliance evaluations, 3 Chapter 94 Report reviews, and 1 routine/partial inspection. No violations were noted with any of these inspections.

The effluent violations above are not considered significant violations and are the only violations of TSS since the final effluent limits became effective in June of 2023. The facility seems to be in good operating order as there are not consistent for significant violations occurring at the facility. The facilities average concentration since the final effluent limits took effect for monthly average TSS is 4.6 mg/l with a maximum of 9.7 mg/l and 6.97 mg/l with a maximum of 17.5 mg/l for weekly average.

Other Comments: There are no open violations in WMS for the subject Client ID (81373) as of 10/2/25.

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 8.8
Latitude 41º 59' 18.37" **Longitude** -78º 37' 31.20"
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: The CBOD5 and TSS limits will not follow the Technology-Based limits above as there is a Water-Quality based need for more stringent limits for CBOD5 and the exceptions to the anti-backsliding regulations are not applicable to TSS for this case.

The limitation for TSS in the last permit renewal was improperly justified as the argument that was being used was intended for use in discharges to large bodies of water. However, during the last permit term the facility increased its design discharge rate from 6.3 MGD to 8.8 MGD with the addition of a second treatment train. Based on the SOP for Establishing Effluent Limitations for Individual Sewage Permits application managers should determine the applicability of standards associated with dry streams which generally consider the stream flow to the design flow at the facility, new or expanding discharges within these effluent dominated streams, and for existing discharges if the more stringent treatment requirements cannot be met than the requirements may not be applied after it is determined whether or not the facility causes or contributes to an impairment. According to this section of the SOP a stream flow to wastewater flow should be greater than 3:1 to not be considered an effluent dominated stream, the ratio for stream flow to design flow for this case is 7.1 MGD (Stream Flow):8.8 MGD (Wastewater Flow) therefore the stream is considered effluent dominated and the DEP's Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers should be implemented.

Although the title of the Policy and Procedure document suggests this is strictly for discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers the main ideology of the Policy and Procedure has to do with streams that have little to no assimilative capacity which presents significant challenges to meeting surface water quality standards. Based on the Tunungwant Creek Continuous Water Quality Data study from the last permit term in 2017 "The water quality differences for the parameters measured were evident at the downstream CIM station when compared to the station upstream of the Bradford STP. The most notable difference was D.O. levels that frequently fell below Chapter 93 criteria at the downstream CIM station. This was observed despite a deployment period during a time of year less susceptible to low DO. The higher specific conductance measured at the downstream station is also likely to negatively effect macroinvertebrate communities." Although only D.O., pH, temperature, and specific conductance were tested the concerns that Chapter 93 criteria are or will be exceeded in the future are present and therefore the implementation of the limits found in the DEP's Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers for higher degree of treatment will be implemented. The limitations found in the guidance are as follows:

CBOD5 – 10 mg/L Monthly Average
TSS – 10 mg/L Monthly Average
Total N – 5 mg/L Monthly Average
Dissolved Oxygen – Minimum 6.0 mg/L at all times
Phosphorous – 0.5 mg/L Monthly Average

CBOD5
New WQBEL developed as part of this review are more stringent than the TBEL, so the WQBEL will be implemented. The WQBELs are discussed in more detail below in this Fact Sheet.

TSS
TSS limit of 10 mg/L monthly average will be retained from the previous permit along with the loading rates, weekly average, and IMAX limitations.

Total N
Total Nitrogen currently is a monitor only parameter on a quarterly basis for this facility. When looking at the facilities eDMR data to determine if a compliance schedule would be needed the facility is able to meet the proposed limit 87.5% of the time over the last 4 years. Due to the facility only testing quarterly the Department believes implementing a compliance schedule of 3 years would allow the permittee to optimize treatment and ensure they can meet the new limit. Interim period 1 will adjust the monitoring frequency for Total Nitrogen to 1/daily to conform to Table 6-3 Self-Monitoring Frequencies for Sewage Dischargers in the Permit Writers Manual.

Dissolved Oxygen
Since the TBEL found in the guidance document is more stringent than the proposed water quality-based limitation the more stringent limitation of 6 mg/L will be implemented into the permit. Based on eDMR data the facility meets the proposed limit 79% of the time already. Since this parameter is already tested on a daily basis the Department believes there is enough data to assume the facility is able to meet this limit already and a compliance schedule will not be implemented for Dissolved Oxygen.

Total Phosphorous
Total Phosphorous currently is monitor only on a quarterly basis for this facility. When looking at the facilities eDMR data to determine if a compliance schedule will be necessary the facility is able to meet the proposed limit 75% of the time over the last 4 years. Due to the facility only testing quarterly the Department believes implementing a compliance schedule of 3 years would allow the permittee to optimize treatment and ensure they can meet the limit. Interim period 1 will adjust the monitoring frequency for Total Phosphorous to 1/daily to conform to Table 6-3 Self-Monitoring Frequencies for Sewage Dischargers in the Permit Writers Manual.

Per- and Polyfluoroalkyl Substances (PFAS)
In February 2024, DEP implemented a new monitoring initiative for PFAS consistent with an EPA memorandum that provides guidance to states for addressing PFAS discharges. PFAS are a family of thousands of synthetic organic chemicals that contain a chain of strong carbon-fluorine bonds. Many PFAS are highly stable, water- and oil-resistant, and exhibit other properties that make them useful in a variety of consumer products and industrial processes. PFAS are resistant to biodegradation, photooxidation, direct photolysis, and hydrolysis and do not readily degrade naturally; thus, many PFAS accumulate over time. According to the United States Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR), the environmental persistence and mobility of some PFAS, combined with decades of widespread use, have resulted in their presence in surface water, groundwater, drinking water, rainwater, soil, sediment, ice caps, outdoor and indoor air, plants, animal tissue, and human blood serum across the globe. ATSDR also reported that exposure to certain PFAS can lead to adverse human health impacts Due to their durability, toxicity, persistence, and pervasiveness, PFAS have emerged as potentially significant pollutants of concern.

In accordance with Section II.I of DEP's "Standard Operating Procedure (SOP) for Clean Water Program – Establishing Effluent Limitations for Individual Industrial Permits" [SOP No. BCW-PMT-032] and under the authority of 25 Pa. Code § 92a.61(b), DEP has determined that monitoring for a subset of common/well-studied PFAS including Perfluorooctanoic acid (PFOA), Perfluorooctanesulfonic acid (PFOS), Perfluorobutanesulfonic acid (PFBS), and Hexafluoropropylene oxide dimer acid (HFPO-DA) is necessary to help understand the extent of environmental contamination by PFAS in the Commonwealth and the extent to which point source dischargers are contributors. SOP BCW-PMT-032 directs permit writers to consider special monitoring requirements for PFOA, PFOS, PFBS, and HFPO-DA in the following instances:

a. If sampling that is completed as part of the permit renewal application reveals a detection of PFOA, PFOS, HFPO-DA or PFBS (any of these compounds), the application manager will establish a quarterly monitoring requirement for PFOA, PFOS, HFPO-DA and PFBS (all of these compounds) in the permit.

b. If sampling that is completed as part of the permit renewal application demonstrates non-detect values at or below the Target QLs for PFOA, PFOS, HFPO-DA and PFBS (all of these compounds in a minimum of 3 samples), the application manager will establish an annual monitoring requirement for PFOA, PFOS, HFPO-DA and PFBS in the permit.

c. In all cases the application manager will include a condition in the permit that the permittee may cease monitoring for PFOA, PFOS, HFPO-DA and PFBS when the permittee reports non-detect values at or below the Target QL for four consecutive monitoring periods for each PFAS parameter that is analyzed. Use the following language: The permittee may discontinue monitoring for PFOA, PFOS, HFPO-DA, and PFBS if the non-detects at or below Quantitation Limits of 4.0 ng/L for PFOA, 3.7 ng/L for PFOS, 3.5 ng/L for PFBS and 6.4 ng/L for HFPO-DA. When monitoring is discontinued, permittees should enter a No Discharge Indicator (NODI) Code of “GG” on DMRs.

Bradford Sanitary Authority’s application was submitted before the NPDES permit application forms were updated to require sampling for PFOA, PFOS, PFBS, and HFPO-DA. Also, according to EPA’s guidance, Bradford Sanitary Authority does receive wastewaters from one of the industries EPA expects to be a source for PFAS (Metal Finishing). Therefore, quarterly reporting of PFOA, PFOS, PFBS, and HFPO-DA will be required consistent with Section II.I.b of SOP BCW-PMT-032. Even though Bradford Sanitary Authority did not report results for PFOA, PFOS, PFBS, and HFPO-DA on the permit application, the facility receives waste streams from industries suspected of containing PFAS parameters and the discharge will be subject to quarterly monitoring at the facility.

As stated in Section II.I.c of the SOP, if non-detect values at or below DEP’s Target QLs are reported for four consecutive monitoring periods (i.e., four consecutive quarterly results for Bradford Sanitary Authority’s case), then the monitoring may be discontinued.

E. Coli
To conform to the SOP for Establishing Effluent Limitations in Individual Sewage Permits, E.Coli monitoring is being imposed at a frequency of 1/month for facilities with design flows greater than 1 MGD. Monitoring for E.Coli is being proposed under the authority of 25 Pa. Code § 92a.61(b).

Water Quality-Based Limitations

The discharge was modeled using WQM 7.0 v 1.1, TRC_CALC, and the Toxics Management Spreadsheet. The WQM 7.0 model uses a mass balance equation using in-stream data for Q_{7-10}, Yield, Drainage Area, average concentration data for pH from the facility, and discharge rate of the facility. It then uses these values to calculate WQBELs for CBOD5, Ammonia-Nitrogen, and Dissolved Oxygen. The Toxics Management Spreadsheet uses a similar data set along with reported concentrations of toxic pollutants to calculate limits based on a mass balance approach for toxic pollutants. The TRC_CALC model takes into consideration the Q_{7-10} of the receiving stream and the discharge rate and uses a mass balance approach to calculate WQBELs for Total Residual Chlorine.

WQM 7.0 WQBELs

Modeling Procedure

No default values were used in the model for WQM 7.0. Values used in the model were determined using a stream study conducted in 2017 for the last permit renewal. Since the data is less than 10 years old it should still be relatively consistent with the receiving streams current conditions. Data pulled from this study are the same values used in the previous fact sheet as values used in the modeling. A pH of 7.8 S.U. was calculated as a 90th% value, a Temperature of 20.8^{o} C was calculated as a 90th% value, a Hardness of 77.6 mg/l median value was determined from the data set. The study will be attached to this document as Attachment 4.

Additionally, Limestone WWTP, which is 3.59 miles downstream of the discharge and across the state line in New York was once again added into the model. This is being implemented due to a request from New York States Department of Environmental Conservation to include this treatment plant in the modeling efforts to ensure the discharge is meeting in-

stream criteria at the state line as well as ensuring Bradford STP is not overloading the stream. The permitted discharge flow at the facility is 0.25 MGD according to public records for NYS DEC.

Modeling Results

The Water-Quality Based Effluent Limitations suggested by WQM 7.0 v 1.1 include a CBOD5 limit of 6.79 mg/l Average Monthly concentration, an Ammonia-Nitrogen limit of 2.04 mg/l Average Monthly and 4.08 mg/l Instantaneous Maximum, and a Dissolved Oxygen Concentration of 5 mg/l Instantaneous Minimum which was implemented in the previous permit and will be retained. The modeling results form WQM 7.0 v 1.1 will be included as Attachment 1.

CBOD5

Using the round-off guidelines in Table 6-3 of the Permit Writer's Manual the CBOD5 Monthly Average effluent limitation will be rounded down to 6.5 mg/l. Using the CBOD5 effluent limit for Monthly Average of 6.5 mg/l a Weekly Average concentration of 9.75 mg/l and an Instantaneous Maximum concentration of 13 mg/l were calculated based on a conversion factor of 1.5 for Weekly Average and 2.0 IMAX based on the Permit Writers' Manual. According to the SOP for New and Reissuance Individual Sewage NPDES Permits, for WQBELs and other TBELs in which the permittee has demonstrated it ability to comply by meeting the proposed limit at least 75% of the time considering existing performance data, no compliance schedule should be established in the draft permit. Based on the last 4 years of the facilities eDMRs, the facility already meets this limit at least 75% of the time so a compliance schedule will not be implemented into the permit. In the last 4 years of data there is only one exceedance of the proposed limit which occurred in the month of September in 2025.

Ammonia-Nitrogen

Using the round-off guidelines in Table 6-3 of the Permit Writers' Manual the Ammonia-Nitrogen limit will be rounded down to 2.0 mg/l Average Monthly and 4.0 mg/l Instantaneous Maximum. According to the SOP for New and Reissuance Individual Sewage NPDES Permits, for WQBELs and other TBELs in which the permittee has demonstrated its ability to comply by meeting the proposed limit at least 75% of the time considering existing performance data, no compliance schedule should be established in the draft permit. Based on the last 4 years of the facilities eDMRs, the facility meets the proposed limit at least 75% of the time so a compliance schedule will not be implemented into the permit. In the last 4 years of data evaluated the proposed limit was exceeded twice in January and February of 2024.

Dissolved Oxygen

The TBEL for Dissolved Oxygen from the DEP's Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers is more stringent than the limit the model produced so the TBEL will be imposed.

TRC_CALC Modeling Results

Modeling Procedure

The TRC_CALC model allows for inputs of $Q_{7\text{-}10}$ for the receiving stream, $Q_{Discharge}$ (MGD), Number of Samples being implemented per month, Chlorine Demand of Stream, Chlorine Demand of Discharge, BAT/BPJ Value, % Factor of Safety, CV Daily, CV Hourly, AFC Partial Mix Factor, CFC Partial Mix Factor, AFC Criteria Compliance Time, CFC Criteria Compliance Time, and a Decay Coefficient. Generally, permit writers input data for $Q_{7\text{-}10}$, $Q_{Discharge}$, and Number of Samples and the model calculates a limit based off of these values.

Modeling Results

The TRC_CALC model calculated limits of 0.127 mg/l Average Monthly and 0.415 mg/l for Instantaneous Maximum. Using the round-off guidelines in Table 6-3 of the Permit Writers' Manual the proposed limits for this permit term will be 0.12 mg/l Average Monthly and 0.41 mg/l Instantaneous Maximum. According to the SOP for New and Reissuance Individual Sewage NPDES Permits, for WQBELs and other TBELs in which the permittee has demonstrated its ability to comply by meeting the proposed limit at least 75% of the time considering existing performance data, no compliance schedule should be established in the draft permit. Based on the last 4 years of the facilities eDMRs, the facility meets the proposed limit at least 75% of the time, so a compliance schedule will not be implemented into the permit. There was one exceedance of the proposed Average Monthly limit in February of 2025, there were 4 exceedances of the proposed IMAX limit in January 2023, October 2023, August 2024, and February of 2024.

Toxics Management Spreadsheet Modeling

Modeling Procedure

The were no default values used in the model; values present in the model are identical to values used in the other two models. With the facility implementing a diffused outfall the Partial Mix Factor (PMF) is set to 1. Due to the state border being less than a mile down stream a Public Water Supply withdrawal of 100 GPD was added to ensure that criteria were met at the state line. 100 GPD was used as it had minimal impact on the modeling results while still taking into consideration that water quality criteria are being met at the state line.

Modeling Results

The model suggested monitoring for Total Dissolved Solids, Chloride, Total Copper, Dissolved Iron, Total Manganese, and Total Zinc. These were all suggested for monitoring since the discharge concentration is greater than 10% of the WQBEL meaning these parameters have no reasonable potential to exceed water quality criteria. The model suggested implementing limits for Free Cyanide, Total Phenols, and 2,6-Dinitrotoluene.

Free Cyanide

The limits suggested by the model for Free Cyanide are 8.76 µg/l Average Monthly Limit, 13.7 µg/l Maximum Daily Limit, 21.9 µg/l Instantaneous Maximum Limit. These limits were suggested based on the discharge concentration being greater than or equal to 50% of the WQBEL and does have reasonable potential to discharge at concentrations that may lead to an exceedance of the in-stream Water Quality Criteria. The limit will be implemented as a 24-hour composite with a frequency of once per week to conform to Table 6-3 Self-Monitoring Requirements for Sewage Discharges in the Permit Writers' Manual.

Total Phenols (Phenolics)

The limits suggested by the model for Total Phenols are 11.7 µg/l Average Monthly Limit, 18.2 µg/l Maximum Daily Limit, and 29.2 µg/l Instantaneous Maximum Limit. These limits were suggested based on the discharge concentration being greater than or equal to 50% of the WQBEL and does have reasonable potential to discharge at concentrations may lead to an exceedance of the in-stream Water Quality Criteria. The limit will be implemented as a 24-hour composite with a frequency of once per week to conform to Table 6-3 Self-Monitoring Requirements for Sewage Discharges in the Permit Writers' Manual. This limit is being suggested due to the PWS withdrawal being added into the model. This should ensure the that Total Phenols criteria (5.0 µg/l) is being met at the state line and following NYS DEC criteria of 5.0 µg/l

2,6-Dinitrotoluene

The limits suggested by the model for 2,6-Dinitrotoluene are 0.39 µg/l Average Monthly Limit, 0.61 µg/l Maximum Daily Limit, and 0.97 µg/l Instantaneous Maximum Limit. These limits were suggested based on the discharge concentration being greater than or equal to 50% of the WQBEL and does have reasonable potential to discharge at concentrations may lead to an exceedance of the in-stream Water Quality Criteria. The limit will be implemented as a 24-hour composite with a frequency of once per week to conform to Table 6-3 Self-Monitoring Requirements for Sewage Discharges in the Permit Writers' Manual. Due to the facility having a detection of this parameter during the application testing and the detection being above the daily maximum limit a 3-year compliance schedule will be implemented to ensure the facility can meet the proposed limits. A Part C Condition for WQBELs Below Quantitation Limits will be added into the permit since the WQBEL for 2,6-Dinitrotoluene is below the quantitation limit (5.0 µg/L) which can be found in 25 Pa. Code § 252.1, these quantitation limits are generally achievable by conventional analytical technology. For the purpose of compliance, a statistical value reported on the DMR that is less than the QL (i.e. "non-detect") will be considered to be in compliance.

Best Professional Judgment (BPJ) Limitations

No BPJ limits are being proposed at this time.

."

Anti-Backsliding

According to the Clean Water Act Section 402(o)(1) "In the case of effluent limitations established on the basis of subsection (a)(1)(B) of this section, a permit may not be renewed, reissued, or modified on the bases of effluent guidelines promulgated under section 1314(b) of this title subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit. In the case of effluent limitations established on the bases of section 1311(b)(1)(C) or section 1313(d) of this title, a permit may not be renewed, reissued, or modified to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit except in compliance with section 1313(d)(4) of this title

Limits Imposed in Previous Permit

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	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	9.0 Max	XXX	1/day	Grab
DO	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.20	XXX	0.65	1/day	Grab
CBOD5	730	1100	XXX	10.0	15.0	20	5/week	24-Hr Composite
TSS	730	1100	XXX	10.0	15.0	20	5/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	5/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	5/week	Grab
Ammonia Nov 1 - Apr 30	550	XXX	XXX	7.5	XXX	13	5/week	24-Hr Composite
Ammonia May 1 - Oct 31	180	XXX	XXX	2.5	XXX	5	5/week	24-Hr Composite
Total Copper	1.17	XXX	XXX	0.016	XXX	0.032	1/week	24-Hr Composite

Whole Effluent Toxicity (WET)

For Outfall 001, ☐ **Acute** ☒ **Chronic** WET Testing was completed:

☒ 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%, 78%, 55%, 28%, and 14%. The Target Instream Waste Concentration (TIWC) to be used for analysis of the results is: 55.

Summary of Four Most Recent Test Results

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
5/6/19	PASS	PASS	PASS	PASS
4/26/20	PASS	PASS	PASS	PASS
2/2/21	PASS	PASS	PASS	PASS
2/16/22	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:

Evaluation of Test Type, IWC and Dilution Series for Renewed Permit

Acute Partial Mix Factor (PMFa): **1** Chronic Partial Mix Factor (PMFc): **1**

1. Determine IWC – Acute (IWCa):

$(Q_d \times 1.547) / ((Q_{7\text{-}10} \times PMFa) + (Q_d \times 1.547))$

[(8.8 MGD x 1.547) / ((11 cfs x 1) + (8.8 MGD x 1.547))] x 100 = **55.3%**

Is IWCa < 1%? ☐ **YES** ☒ **NO**

Type of Test for Permit Renewal: **Chronic**

2a. Determine Target IWCa (If Acute Tests Required)

TIWCa = IWCa / 0.3 = **% - N/A**

2b. Determine Target IWCc (If Chronic Tests Required)

$(Q_d \times 1.547) / (Q_{7\text{-}10} \times PMFc) + (Q_d \times 1.547)$

[(8.8 MGD x 1.547) / ((11 cfs x 1) + (8.8 MGD x 1.547))] x 100 = **55.3%**

3. Determine Dilution Series

(NOTE – check Attachment C of WET SOP for dilution series based on TIWCa or TIWCc, whichever applies).

Dilution Series = 100%, 78%, 55%, 28%, and 14%.

WET Limits

Has reasonable potential been determined? ☐ YES ☒ NO

Will WET limits be established in the permit? ☐ YES ☒ NO

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

N/A

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

N/A

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" (386-0400-001), 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	Average Monthly	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	6.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.12	XXX	0.41	1/day	Grab
CBOD5	475	715	6.5	9.75 Wkly Avg	XXX	13	5/week	24-Hr Composite
Ultraviolet Light Intensity	XXX	XXX	XXX	Report Monthly Avg	XXX	XXX	1/day	Measured
BOD5 Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	5/week	24-Hr Composite
TSS	730	1100	10.0	15.0 Wkly Avg	XXX	20	5/week	24-Hr Composite
TSS Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	5/week	24-Hr Composite
Total Dissolved Solids	XXX	XXX	XXX	Report	Report	XXX	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	5/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	5/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/month	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	Average Monthly	Average Monthly	Daily Maximum	Instant. Maximum		
Ammonia Nov 1 - Apr 30	440	XXX	XXX	6.0	XXX	12	5/week	24-Hr Composite
Ammonia May 1 - Oct 31	145	XXX	XXX	2.0	XXX	4	5/week	24-Hr Composite
Total Copper (ug/L)	1.17	XXX	XXX	0.016	XXX	0.032	1/week	24-Hr Composite
Free Cyanide (ug/L)	XXX	XXX	XXX	8.76	13.7	XXX	1/week	24-Hr Composite
Dissolved Iron (ug/L)	XXX	XXX	XXX	Report	Report	XXX	1/week	24-Hr Composite
Total Manganese (ug/L)	XXX	XXX	XXX	Report	Report	XXX	1/week	24-Hr Composite
Chloride	XXX	XXX	XXX	Report	Report	XXX	1/week	24-Hr Composite
Total Phenolics (ug/L)	XXX	XXX	XXX	11.7	18.2	XXX	1/week	24-Hr Composite
PFOA (ng/L)	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/quarter	Grab
PFOS (ng/L)	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/quarter	Grab
PFBS (ng/L)	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/quarter	Grab
HFPO-DA (ng/L)	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/quarter	Grab

Compliance Sampling Location: Outfall 001, after disinfection.

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" (386-0400-001), SOPs and/or BPJ.

Outfall 001, Effective Period: Permit Effective Date through End of Interim Period 1.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/day	24-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report	XXX	XXX	1/day	24-Hr Composite
2,6-Dinitrotoluene (ug/L)	XXX	XXX	XXX	Report	Report Daily Max	XXX	1/day	24-Hr Composite

Compliance Sampling Location: Outfall 001, after disinfection.

Other Comments: Preliminary monitoring for Total Nitrogen, Total Phosphorous, and 2,6-Dinitrotoluene.

Outfall 001, Effective Period: End of Interim Period 1 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	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Total Nitrogen	XXX	XXX	XXX	5.0	XXX	10	1/day	24-Hr Composite
Total Phosphorus	XXX	XXX	XXX	0.5	XXX	1	1/day	24-Hr Composite
2,6-Dinitrotoluene (ug/L)	XXX	XXX	XXX	0.39	0.61	0.97	1/week	24-Hr Composite

Compliance Sampling Location: Outfall 001, after disinfection.

Other Comments: Final limits for Total Nitrogen, Total Phosphorous, and 2,6-Dinitrotoluene.

Attachment 1
WQM 7.0 Modeling

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
	16C	56932	TUNUNGWANT CREEK	**10.400**	1402.00	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	0.131	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.80	8.10	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
Bradford STP	PA0026379	8.8000	0.0000	0.0000	0.000	20.00	6.60

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	8.12	0.00	0.00
NH3-N	25.00	0.03	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
16C	56932	TUNUNGWANT CREEK	**6.810**	1393.00	147.00	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	0.131	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.80	8.10	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
Limestone NY WW	NY0029068	0.2500	0.0000	0.0000	0.000	20.00	7.50

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	8.12	0.00	0.00
NH3-N	25.00	0.03	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
16C	56932	TUNUNGWANT CREEK	**0.010**	1380.00	169.00	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	0.131	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.80	8.10	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

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
16C	56932	TUNUNGWANT 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												
10.400	17.82	0.00	17.82	13.6136	0.00047	.918	84.73	92.34	0.40	0.543	20.45	6.95
6.810	19.26	0.00	19.26	14.0004	0.00036	.935	88.66	94.8	0.40	1.036	20.46	6.97
Q1-10 Flow												
10.400	11.40	0.00	11.40	13.6136	0.00047	NA	NA	NA	0.36	0.617	20.36	6.85
6.810	12.32	0.00	12.32	14.0004	0.00036	NA	NA	NA	0.35	1.181	20.37	6.87
Q30-10 Flow												
10.400	24.23	0.00	24.23	13.6136	0.00047	NA	NA	NA	0.45	0.489	20.51	7.02
6.810	26.19	0.00	26.19	14.0004	0.00036	NA	NA	NA	0.45	0.932	20.52	7.04

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	5		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
16C	56932	TUNUNGWANT 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
10.400	Bradford STP	18.26	33.53	18.26	33.53	0	0
6.810	Limestone NY W	3.25	50	17.99	50	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
10.400	Bradford STP	1.81	4.98	1.81	4.98	0	0
6.810	Limestone NY W	.65	25	1.79	25	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
10.40	Bradford STP	7.92	6.79	2.38	2.04	5	5	2	14
6.81	Limestone NY WW	25	25	25	20.26	3	3	2	14

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
16C	56932	TUNUNGWANT CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
10.400	8.800	20.453	6.946
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
84.728	0.918	92.342	0.404
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
4.08	0.285	0.90	0.725
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.769	0.905	Tsivoglou	5
Reach Travel Time (days)			
0.543			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.054	4.01	0.86	6.63
0.109	3.95	0.83	6.51
0.163	3.89	0.80	6.40
0.217	3.83	0.77	6.30
0.271	3.77	0.74	6.21
0.326	3.71	0.71	6.14
0.380	3.65	0.68	6.07
0.434	3.59	0.66	6.02
0.488	3.54	0.63	5.97
0.543	3.48	0.61	5.93

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
6.810	9.050	20.463	6.967
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
88.660	0.935	94.798	0.401
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
3.67	0.304	0.81	0.725
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.988	0.685	Tsivoglou	5
Reach Travel Time (days)			
1.036			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.104	3.55	0.75	5.77
0.207	3.44	0.70	5.60
0.311	3.33	0.65	5.45
0.414	3.22	0.60	5.34
0.518	3.12	0.56	5.26
0.622	3.02	0.52	5.20
0.725	2.93	0.48	5.16
0.829	2.84	0.44	5.15
0.932	2.75	0.41	5.14
1.036	2.66	0.38	5.16

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
16C	56932	TUNUNGWANT 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)
10.400	Bradford STP	PA0026379	8.800	CBOD5	6.79		
				NH3-N	2.04	4.08	
				Dissolved Oxygen			5

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)
6.810	Limestone NY WW	NY0029068	0.250	CBOD5	25		
				NH3-N	20.26	40.52	
				Dissolved Oxygen			3

Attachment 2
TRC_CALC Modeling

TRC_CALC

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

11	= Q stream (cfs)	0.5	= CV Daily
8.8	= 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)	0	=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 0.277	1.3.2.iii	WLA cfc = 0.262
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.103	5.1d	LTA_cfc = 0.152

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.127	AFC
		INST MAX LIMIT (mg/l) = 0.415	

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 3
Toxics Management Spreadsheet Modeling

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Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: **Bradford STP** NPDES Permit No.: **PA0026379** Outfall No.: **001**

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

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
8.8	100	8.1	1	1	1	1		

					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		361									
	Chloride (PWS)	mg/L		131									
	Bromide	mg/L	<	0.2									
	Sulfate (PWS)	mg/L		16.1									
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L		43.5									
	Total Antimony	µg/L		0.348									
	Total Arsenic	µg/L		2									
	Total Barium	µg/L		55.9									
	Total Beryllium	µg/L		0.676									
	Total Boron	µg/L		0.12									
	Total Cadmium	µg/L	<	0.123									
	Total Chromium (III)	µg/L	<	0.199									
	Hexavalent Chromium	µg/L	<	0.25									
	Total Cobalt	µg/L		0.334									
	Total Copper	µg/L		7.8									
	Free Cyanide	µg/L		8									
	Total Cyanide	µg/L	<	10									
	Dissolved Iron	µg/L		210									
	Total Iron	µg/L		290									
	Total Lead	µg/L		0.505									
	Total Manganese	µg/L		240									
	Total Mercury	µg/L	<	0.104									
	Total Nickel	µg/L		5.29									
	Total Phenols (Phenolics) (PWS)	µg/L		7									
	Total Selenium	µg/L	<	1.67									
	Total Silver	µg/L	<	0.22									
	Total Thallium	µg/L	<	0.68									
	Total Zinc	µg/L		16.1									
	Total Molybdenum	µg/L		3.87									
	Acrolein	µg/L	<	1.95									
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<	0.51									
	Benzene	µg/L	<	0.43									
	Bromoform	µg/L	<	0.34									
	Carbon Tetrachloride	µg/L	<	0.51									
	Chlorobenzene	µg/L	<	0.21									
	Chlorodibromomethane	µg/L	<	0.39									
	Chloroethane	µg/L	<	0.42									
	2-Chloroethyl Vinyl Ether	µg/L	<	4									

Group 3	Chloroform	µg/L		1.44									
	Dichlorobromomethane	µg/L	<	0.32									
	1,1-Dichloroethane	µg/L	<	0.42									
	1,2-Dichloroethane	µg/L	<	0.39									
	1,1-Dichloroethylene	µg/L	<	0.33									
	1,2-Dichloropropane	µg/L	<	0.42									
	1,3-Dichloropropylene	µg/L	<	0.33									
	1,4-Dioxane	µg/L	<	0.34									
	Ethylbenzene	µg/L	<	0.27									
	Methyl Bromide	µg/L	<	0.46									
	Methyl Chloride	µg/L	<	0.36									
	Methylene Chloride	µg/L	<	0.45									
	1,1,2,2-Tetrachloroethane	µg/L	<	0.36									
	Tetrachloroethylene	µg/L	<	0.39									
	Toluene	µg/L		12.9									
	1,2-trans-Dichloroethylene	µg/L	<	0.39									
	1,1,1-Trichloroethane	µg/L	<	0.38									
	1,1,2-Trichloroethane	µg/L	<	0.24									
	Trichloroethylene	µg/L	<	0.46									
	Vinyl Chloride	µg/L	<	0.46									
Group 4	2-Chlorophenol	µg/L	<	0.13									
	2,4-Dichlorophenol	µg/L	<	0.25									
	2,4-Dimethylphenol	µg/L	<	0.26									
	4,6-Dinitro-o-Cresol	µg/L	<	0.9									
	2,4-Dinitrophenol	µg/L	<	0.86									
	2-Nitrophenol	µg/L	<	0.25									
	4-Nitrophenol	µg/L	<	0.19									
	p-Chloro-m-Cresol	µg/L	<	0.4									
	Pentachlorophenol	µg/L	<	0.97									
	Phenol	µg/L		0.3									
	2,4,6-Trichlorophenol	µg/L	<	0.24									
Group 5	Acenaphthene	µg/L	<	0.26									
	Acenaphthylene	µg/L	<	0.13									
	Anthracene	µg/L	<	0.22									
	Benzidine	µg/L	<	0.35									
	Benzo(a)Anthracene	µg/L	<	0.21									
	Benzo(a)Pyrene	µg/L	<	0.29									
	3,4-Benzofluoranthene	µg/L	<	0.31									
	Benzo(ghi)Perylene	µg/L	<	0.32									
	Benzo(k)Fluoranthene	µg/L	<	0.4									
	Bis(2-Chloroethoxy)Methane	µg/L	<	0.15									
	Bis(2-Chloroethyl)Ether	µg/L	<	0.25									
	Bis(2-Chloroisopropyl)Ether	µg/L	<	0.34									
	Bis(2-Ethylhexyl)Phthalate	µg/L	<	0.64									
	4-Bromophenyl Phenyl Ether	µg/L	<	0.19									
	Butyl Benzyl Phthalate	µg/L	<	0.38									
	2-Chloronaphthalene	µg/L	<	0.28									
	4-Chlorophenyl Phenyl Ether	µg/L	<	0.29									
	Chrysene	µg/L	<	0.45									
	Dibenzo(a,h)Anthrancene	µg/L	<	0.28									
	1,2-Dichlorobenzene	µg/L	<	0.32									
	1,3-Dichlorobenzene	µg/L	<	0.17									
	1,4-Dichlorobenzene	µg/L	<	0.15									
	3,3-Dichlorobenzidine	µg/L	<	0.13									
	Diethyl Phthalate	µg/L	<	0.27									
	Dimethyl Phthalate	µg/L	<	0.23									
	Di-n-Butyl Phthalate	µg/L	<	0.29									
	2,4-Dinitrotoluene	µg/L	<	0.77									
	2,6-Dinitrotoluene	µg/L		0.63									
	Di-n-Octyl Phthalate	µg/L	<	0.28									
	1,2-Diphenylhydrazine	µg/L	<	0.2									
	Fluoranthene	µg/L	<	0.35									
	Fluorene	µg/L	<	0.25									
	Hexachlorobenzene	µg/L	<	0.25									
	Hexachlorobutadiene	µg/L	<	0.27									
	Hexachlorocyclopentadiene	µg/L	<	0.22									
	Hexachloroethane	µg/L	<	0.26									
	Indeno(1,2,3-cd)Pyrene	µg/L	<	0.25									

	Isophorone	µg/L	<	0.23									
	Naphthalene	µg/L	<	0.25									
	Nitrobenzene	µg/L	<	0.26									
	n-Nitrosodimethylamine	µg/L	<	0.4									
	n-Nitrosodi-n-Propylamine	µg/L	<	0.31									
	n-Nitrosodiphenylamine	µg/L	<	0.27									
	Phenanthrene	µg/L	<	0.21									
	Pyrene	µg/L	<	0.16									
	1,2,4-Trichlorobenzene	µg/L	<	0.17									
Group 6	Aldrin	µg/L	<	0.01									
	alpha-BHC	µg/L	<	0.01									
	beta-BHC	µg/L	<	0.02									
	gamma-BHC	µg/L	<	0.01									
	delta BHC	µg/L	<	0.01									
	Chlordane	µg/L	<	0.5									
	4,4-DDT	µg/L	<	0.01									
	4,4-DDE	µg/L	<	0.01									
	4,4-DDD	µg/L	<	0.01									
	Dieldrin	µg/L	<	0.01									
	alpha-Endosulfan	µg/L	<	0.02									
	beta-Endosulfan	µg/L	<	0.01									
	Endosulfan Sulfate	µg/L	<	0.01									
	Endrin	µg/L	<	0.01									
	Endrin Aldehyde	µg/L	<	0.02									
	Heptachlor	µg/L	<	0.01									
	Heptachlor Epoxide	µg/L	<	0.01									
	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 1.4, May 2023

Stream / Surface Water Information

Bradford STP, NPDES Permit No. PA0026379, Outfall 001

Instructions | Discharge | Stream

Receiving Surface Water Name: **Tunungwant 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	056932	10.4	1402	136			Yes
End of Reach 1	056932	9.49	1401	139		0.0001	Yes

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

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	10.4	0.131										77.6	8.1		
End of Reach 1	9.49	0.131													

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	10.4														
End of Reach 1	9.49														

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Toxics Management Spreadsheet
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Model Results

Bradford STP, NPDES Permit No. PA0026379, Outfall 001

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

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 1 Analysis Hardness (mg/l): 87.302 Analysis pH: 8.10

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	1,732	
Total Antimony	0	0		0	1,100	1,100	2,540	
Total Arsenic	0	0		0	340	340	785	Chem Translator of 1 applied
Total Barium	0	0		0	21,000	21,000	48,483	
Total Boron	0	0		0	8,100	8,100	18,700	
Total Cadmium	0	0		0	1.765	1.86	4.29	Chem Translator of 0.95 applied
Total Chromium (III)	0	0		0	509.795	1,613	3,725	Chem Translator of 0.316 applied
Hexavalent Chromium	0	0		0	16	16.3	37.6	Chem Translator of 0.982 applied
Total Cobalt	0	0		0	95	95.0	219	
Total Copper	0	0		0	11.825	12.3	28.4	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	22	22.0	50.8	
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	55.688	68.7	159	Chem Translator of 0.811 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	1.400	1.65	3.8	Chem Translator of 0.85 applied
Total Nickel	0	0		0	417.420	418	966	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	2.547	3.0	6.92	Chem Translator of 0.85 applied
Total Thallium	0	0		0	65	65.0	150	
Total Zinc	0	0		0	104.445	107	247	Chem Translator of 0.978 applied
Acrolein	0	0		0	3	3.0	6.93	
Acrylonitrile	0	0		0	650	650	1,501	
Benzene	0	0		0	640	640	1,478	

Bromoform	0	0		0	1,800	1,800	4,156	
Carbon Tetrachloride	0	0		0	2,800	2,800	6,464	
Chlorobenzene	0	0		0	1,200	1,200	2,770	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	18,000	18,000	41,556	
Chloroform	0	0		0	1,900	1,900	4,387	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	15,000	15,000	34,630	
1,1-Dichloroethylene	0	0		0	7,500	7,500	17,315	
1,2-Dichloropropane	0	0		0	11,000	11,000	25,396	
1,3-Dichloropropylene	0	0		0	310	310	716	
Ethylbenzene	0	0		0	2,900	2,900	6,695	
Methyl Bromide	0	0		0	550	550	1,270	
Methyl Chloride	0	0		0	28,000	28,000	64,643	
Methylene Chloride	0	0		0	12,000	12,000	27,704	
1,1,2,2-Tetrachloroethane	0	0		0	1,000	1,000	2,309	
Tetrachloroethylene	0	0		0	700	700	1,616	
Toluene	0	0		0	1,700	1,700	3,925	
1,2-trans-Dichloroethylene	0	0		0	6,800	6,800	15,699	
1,1,1-Trichloroethane	0	0		0	3,000	3,000	6,926	
1,1,2-Trichloroethane	0	0		0	3,400	3,400	7,850	
Trichloroethylene	0	0		0	2,300	2,300	5,310	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	560	560	1,293	
2,4-Dichlorophenol	0	0		0	1,700	1,700	3,925	
2,4-Dimethylphenol	0	0		0	660	660	1,524	
4,6-Dinitro-o-Cresol	0	0		0	80	80.0	185	
2,4-Dinitrophenol	0	0		0	660	660	1,524	
2-Nitrophenol	0	0		0	8,000	8,000	18,470	
4-Nitrophenol	0	0		0	2,300	2,300	5,310	
p-Chloro-m-Cresol	0	0		0	160	160	369	
Pentachlorophenol	0	0		0	26.351	26.4	60.8	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	460	460	1,062	
Acenaphthene	0	0		0	83	83.0	192	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	300	300	693	
Benzo(a)Anthracene	0	0		0	0.5	0.5	1.15	
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	69,261	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	4,500	4,500	10,389	
4-Bromophenyl Phenyl Ether	0	0		0	270	270	623	
Butyl Benzyl Phthalate	0	0		0	140	140	323	
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	1,893	
1,3-Dichlorobenzene	0	0		0	350	350	808	
1,4-Dichlorobenzene	0	0		0	730	730	1,685	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	4,000	4,000	9,235	
Dimethyl Phthalate	0	0		0	2,500	2,500	5,772	
Di-n-Butyl Phthalate	0	0		0	110	110	254	
2,4-Dinitrotoluene	0	0		0	1,600	1,600	3,694	
2,6-Dinitrotoluene	0	0		0	990	990	2,286	
1,2-Diphenylhydrazine	0	0		0	15	15.0	34.6	
Fluoranthene	0	0		0	200	200	462	
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	23.1	
Hexachlorocyclopentadiene	0	0		0	5	5.0	11.5	
Hexachloroethane	0	0		0	60	60.0	139	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	10,000	10,000	23,087	
Naphthalene	0	0		0	140	140	323	
Nitrobenzene	0	0		0	4,000	4,000	9,235	
n-Nitrosodimethylamine	0	0		0	17,000	17,000	39,248	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	300	300	693	
Phenanthrene	0	0		0	5	5.0	11.5	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	130	130	300	
Aldrin	0	0		0	3	3.0	6.93	
alpha-BHC	0	0		0	N/A	N/A	N/A	
beta-BHC	0	0		0	N/A	N/A	N/A	
gamma-BHC	0	0		0	0.95	0.95	2.19	
Chlordane	0	0		0	2.4	2.4	5.54	
4,4-DDT	0	0		0	1.1	1.1	2.54	
4,4-DDE	0	0		0	1.1	1.1	2.54	
4,4-DDD	0	0		0	1.1	1.1	2.54	
Dieldrin	0	0		0	0.24	0.24	0.55	
alpha-Endosulfan	0	0		0	0.22	0.22	0.51	
beta-Endosulfan	0	0		0	0.22	0.22	0.51	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	0.086	0.086	0.2	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.52	0.52	1.2	
Heptachlor Epoxide	0	0		0	0.5	0.5	1.15	

☑ ***CFC*** CCT (min): ####### PMF: 1 Analysis Hardness (mg/l): 87.302 Analysis pH: 8.10

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	508	
Total Arsenic	0	0		0	150	150	346	Chem Translator of 1 applied
Total Barium	0	0		0	4,100	4,100	9,466	
Total Boron	0	0		0	1,600	1,600	3,694	
Total Cadmium	0	0		0	0.224	0.24	0.56	Chem Translator of 0.915 applied
Total Chromium (III)	0	0		0	66.314	77.1	178	Chem Translator of 0.86 applied
Hexavalent Chromium	0	0		0	10	10.4	24.0	Chem Translator of 0.962 applied
Total Cobalt	0	0		0	19	19.0	43.9	
Total Copper	0	0		0	7.975	8.31	19.2	Chem Translator of 0.96 applied
Free Cyanide	0	0		0	5.2	5.2	12.0	
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	3,463	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	2.170	2.68	6.18	Chem Translator of 0.811 applied
Total Manganese	0	0		0	N/A	N/A	N/A	
Total Mercury	0	0		0	0.770	0.91	2.09	Chem Translator of 0.85 applied
Total Nickel	0	0		0	46.362	46.5	107	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	11.5	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	30.0	
Total Zinc	0	0		0	105.299	107	247	Chem Translator of 0.986 applied
Acrolein	0	0		0	3	3.0	6.93	
Acrylonitrile	0	0		0	130	130	300	
Benzene	0	0		0	130	130	300	
Bromoform	0	0		0	370	370	854	
Carbon Tetrachloride	0	0		0	560	560	1,293	
Chlorobenzene	0	0		0	240	240	554	
Chlorodibromomethane	0	0		0	N/A	N/A	N/A	
2-Chloroethyl Vinyl Ether	0	0		0	3,500	3,500	8,080	
Chloroform	0	0		0	390	390	900	
Dichlorobromomethane	0	0		0	N/A	N/A	N/A	
1,2-Dichloroethane	0	0		0	3,100	3,100	7,157	
1,1-Dichloroethylene	0	0		0	1,500	1,500	3,463	
1,2-Dichloropropane	0	0		0	2,200	2,200	5,079	
1,3-Dichloropropylene	0	0		0	61	61.0	141	
Ethylbenzene	0	0		0	580	580	1,339	
Methyl Bromide	0	0		0	110	110	254	
Methyl Chloride	0	0		0	5,500	5,500	12,698	
Methylene Chloride	0	0		0	2,400	2,400	5,541	
1,1,2,2-Tetrachloroethane	0	0		0	210	210	485	
Tetrachloroethylene	0	0		0	140	140	323	
Toluene	0	0		0	330	330	762	
1,2-trans-Dichloroethylene	0	0		0	1,400	1,400	3,232	

1,1,1-Trichloroethane	0	0		0	610	610	1,408	
1,1,2-Trichloroethane	0	0		0	680	680	1,570	
Trichloroethylene	0	0		0	450	450	1,039	
Vinyl Chloride	0	0		0	N/A	N/A	N/A	
2-Chlorophenol	0	0		0	110	110	254	
2,4-Dichlorophenol	0	0		0	340	340	785	
2,4-Dimethylphenol	0	0		0	130	130	300	
4,6-Dinitro-o-Cresol	0	0		0	16	16.0	36.9	
2,4-Dinitrophenol	0	0		0	130	130	300	
2-Nitrophenol	0	0		0	1,600	1,600	3,694	
4-Nitrophenol	0	0		0	470	470	1,085	
p-Chloro-m-Cresol	0	0		0	500	500	1,154	
Pentachlorophenol	0	0		0	20.217	20.2	46.7	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	91	91.0	210	
Acenaphthene	0	0		0	17	17.0	39.2	
Anthracene	0	0		0	N/A	N/A	N/A	
Benzidine	0	0		0	59	59.0	136	
Benzo(a)Anthracene	0	0		0	0.1	0.1	0.23	
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	13,852	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	910	910	2,101	
4-Bromophenyl Phenyl Ether	0	0		0	54	54.0	125	
Butyl Benzyl Phthalate	0	0		0	35	35.0	80.8	
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	369	
1,3-Dichlorobenzene	0	0		0	69	69.0	159	
1,4-Dichlorobenzene	0	0		0	150	150	346	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	800	800	1,847	
Dimethyl Phthalate	0	0		0	500	500	1,154	
Di-n-Butyl Phthalate	0	0		0	21	21.0	48.5	
2,4-Dinitrotoluene	0	0		0	320	320	739	
2,6-Dinitrotoluene	0	0		0	200	200	462	
1,2-Diphenylhydrazine	0	0		0	3	3.0	6.93	
Fluoranthene	0	0		0	40	40.0	92.3	
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	4.62	
Hexachlorocyclopentadiene	0	0		0	1	1.0	2.31	
Hexachloroethane	0	0		0	12	12.0	27.7	
Indeno(1,2,3-cd)Pyrene	0	0		0	N/A	N/A	N/A	
Isophorone	0	0		0	2,100	2,100	4,848	
Naphthalene	0	0		0	43	43.0	99.3	

Nitrobenzene	0	0		0	810	810	1,870	
n-Nitrosodimethylamine	0	0		0	3,400	3,400	7,850	
n-Nitrosodi-n-Propylamine	0	0		0	N/A	N/A	N/A	
n-Nitrosodiphenylamine	0	0		0	59	59.0	136	
Phenanthrene	0	0		0	1	1.0	2.31	
Pyrene	0	0		0	N/A	N/A	N/A	
1,2,4-Trichlorobenzene	0	0		0	26	26.0	60.0	
Aldrin	0	0		0	0.1	0.1	0.23	
alpha-BHC	0	0		0	N/A	N/A	N/A	
beta-BHC	0	0		0	N/A	N/A	N/A	
gamma-BHC	0	0		0	N/A	N/A	N/A	
Chlordane	0	0		0	0.0043	0.004	0.01	
4,4-DDT	0	0		0	0.001	0.001	0.002	
4,4-DDE	0	0		0	0.001	0.001	0.002	
4,4-DDD	0	0		0	0.001	0.001	0.002	
Dieldrin	0	0		0	0.056	0.056	0.13	
alpha-Endosulfan	0	0		0	0.056	0.056	0.13	
beta-Endosulfan	0	0		0	0.056	0.056	0.13	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	0.036	0.036	0.083	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.0038	0.004	0.009	
Heptachlor Epoxide	0	0		0	0.0038	0.004	0.009	

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

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	1,168,780	WQC applied at RMI 9.49 with a design stream flow of 18.209 cfs
Chloride (PWS)	0	0		0	250,000	250,000	584,390	WQC applied at RMI 9.49 with a design stream flow of 18.209 cfs
Sulfate (PWS)	0	0		0	250,000	250,000	584,390	WQC applied at RMI 9.49 with a design stream flow of 18.209 cfs
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Antimony	0	0		0	5.6	5.6	12.3	
Total Arsenic	0	0		0	10	10.0	21.9	
Total Barium	0	0		0	2,400	2,400	5,259	
Total Boron	0	0		0	3,100	3,100	6,792	
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	8.76	
Dissolved Iron	0	0		0	300	300	657	
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	2,191	
Total Mercury	0	0		0	0.050	0.05	0.11	
Total Nickel	0	0		0	610	610	1,337	
Total Phenols (Phenolics) (PWS)	0	0		0	5	5.0	11.7	WQC applied at RMI 9.49 with a design stream flow of 18.209 cfs

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	0.53	
Total Zinc	0	0		0	N/A	N/A	N/A	
Acrolein	0	0		0	3	3.0	6.57	
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	219	
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	5.7	5.7	12.5	
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	72.3	
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	149	
Methyl Bromide	0	0		0	100	100.0	219	
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	125	
1,2-trans-Dichloroethylene	0	0		0	100	100.0	219	
1,1,1-Trichloroethane	0	0		0	10,000	10,000	21,911	
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	65.7	
2,4-Dichlorophenol	0	0		0	10	10.0	21.9	
2,4-Dimethylphenol	0	0		0	100	100.0	219	
4,6-Dinitro-o-Cresol	0	0		0	2	2.0	4.38	
2,4-Dinitrophenol	0	0		0	10	10.0	21.9	
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	8,765	
2,4,6-Trichlorophenol	0	0		0	N/A	N/A	N/A	
Acenaphthene	0	0		0	70	70.0	153	
Anthracene	0	0		0	300	300	657	
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	438	
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	0.22	
2-Chloronaphthalene	0	0		0	800	800	1,753	
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	2,191	
1,3-Dichlorobenzene	0	0		0	7	7.0	15.3	
1,4-Dichlorobenzene	0	0		0	300	300	657	
3,3-Dichlorobenzidine	0	0		0	N/A	N/A	N/A	
Diethyl Phthalate	0	0		0	600	600	1,315	
Dimethyl Phthalate	0	0		0	2,000	2,000	4,382	
Di-n-Butyl Phthalate	0	0		0	20	20.0	43.8	
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	43.8	
Fluorene	0	0		0	50	50.0	110	
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	8.76	
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	74.5	
Naphthalene	0	0		0	N/A	N/A	N/A	
Nitrobenzene	0	0		0	10	10.0	21.9	
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	43.8	
1,2,4-Trichlorobenzene	0	0		0	0.07	0.07	0.15	
Aldrin	0	0		0	N/A	N/A	N/A	
alpha-BHC	0	0		0	N/A	N/A	N/A	
beta-BHC	0	0		0	N/A	N/A	N/A	
gamma-BHC	0	0		0	4.2	4.2	9.2	
Chlordane	0	0		0	N/A	N/A	N/A	
4,4-DDT	0	0		0	N/A	N/A	N/A	
4,4-DDE	0	0		0	N/A	N/A	N/A	
4,4-DDD	0	0		0	N/A	N/A	N/A	
Dieldrin	0	0		0	N/A	N/A	N/A	
alpha-Endosulfan	0	0		0	20	20.0	43.8	
beta-Endosulfan	0	0		0	20	20.0	43.8	
Endosulfan Sulfate	0	0		0	20	20.0	43.8	
Endrin	0	0		0	0.03	0.03	0.066	
Endrin Aldehyde	0	0		0	1	1.0	2.19	
Heptachlor	0	0		0	N/A	N/A	N/A	
Heptachlor Epoxide	0	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): ####### 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	0.47	
Benzene	0	0		0	0.58	0.58	4.5	
Bromoform	0	0		0	7	7.0	54.4	
Carbon Tetrachloride	0	0		0	0.4	0.4	3.11	
Chlorobenzene	0	0		0	N/A	N/A	N/A	
Chlorodibromomethane	0	0		0	0.8	0.8	6.21	
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	0.95	0.95	7.38	
1,2-Dichloroethane	0	0		0	9.9	9.9	76.9	
1,1-Dichloroethylene	0	0		0	N/A	N/A	N/A	
1,2-Dichloropropane	0	0		0	0.9	0.9	6.99	
1,3-Dichloropropylene	0	0		0	0.27	0.27	2.1	
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	155	
1,1,2,2-Tetrachloroethane	0	0		0	0.2	0.2	1.55	

Tetrachloroethylene	0	0		0	10	10.0	77.6	
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	4.27	
Trichloroethylene	0	0		0	0.6	0.6	4.66	
Vinyl Chloride	0	0		0	0.02	0.02	0.16	
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	0.23	
Phenol	0	0		0	N/A	N/A	N/A	
2,4,6-Trichlorophenol	0	0		0	1.5	1.5	11.6	
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	0.0008	
Benzo(a)Anthracene	0	0		0	0.001	0.001	0.008	
Benzo(a)Pyrene	0	0		0	0.0001	0.0001	0.0008	
3,4-Benzofluoranthene	0	0		0	0.001	0.001	0.008	
Benzo(k)Fluoranthene	0	0		0	0.01	0.01	0.078	
Bis(2-Chloroethyl)Ether	0	0		0	0.03	0.03	0.23	
Bis(2-Chloroisopropyl)Ether	0	0		0	N/A	N/A	N/A	
Bis(2-Ethylhexyl)Phthalate	0	0		0	0.32	0.32	2.48	
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	0.93	
Dibenzo(a,h)Anthrancene	0	0		0	0.0001	0.0001	0.0008	
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	0.39	
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	0.39	
2,6-Dinitrotoluene	0	0		0	0.05	0.05	0.39	
1,2-Diphenylhydrazine	0	0		0	0.03	0.03	0.23	
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	0.0006	
Hexachlorobutadiene	0	0		0	0.01	0.01	0.078	
Hexachlorocyclopentadiene	0	0		0	N/A	N/A	N/A	
Hexachloroethane	0	0		0	0.1	0.1	0.78	

Indeno(1,2,3-cd)Pyrene	0	0		0	0.001	0.001	0.008	
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	0.005	
n-Nitrosodi-n-Propylamine	0	0		0	0.005	0.005	0.039	
n-Nitrosodiphenylamine	0	0		0	3.3	3.3	25.6	
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	
Aldrin	0	0		0	0.0000008	8.00E-07	0.000006	
alpha-BHC	0	0		0	0.0004	0.0004	0.003	
beta-BHC	0	0		0	0.008	0.008	0.062	
gamma-BHC	0	0		0	N/A	N/A	N/A	
Chlordane	0	0		0	0.0003	0.0003	0.002	
4,4-DDT	0	0		0	0.00003	0.00003	0.0002	
4,4-DDE	0	0		0	0.00002	0.00002	0.0002	
4,4-DDD	0	0		0	0.0001	0.0001	0.0008	
Dieldrin	0	0		0	0.000001	0.000001	0.000008	
alpha-Endosulfan	0	0		0	N/A	N/A	N/A	
beta-Endosulfan	0	0		0	N/A	N/A	N/A	
Endosulfan Sulfate	0	0		0	N/A	N/A	N/A	
Endrin	0	0		0	N/A	N/A	N/A	
Endrin Aldehyde	0	0		0	N/A	N/A	N/A	
Heptachlor	0	0		0	0.000006	0.000006	0.00005	
Heptachlor Epoxide	0	0		0	0.00003	0.00003	0.0002	

☑ ***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 Dissolved Solids (PWS)	Report	Report	Report	Report	Report	mg/L	1,169	THH-PWS	Discharge Conc > 10% WQBEL (no RP)
Chloride (PWS)	Report	Report	Report	Report	Report	mg/L	584	THH-PWS	Discharge Conc > 10% WQBEL (no RP)
Total Copper	Report	Report	Report	Report	Report	µg/L	18.2	AFC	Discharge Conc > 10% WQBEL (no RP)
Free Cyanide	0.64	1.0	8.76	13.7	21.9	µg/L	8.76	THH	Discharge Conc ≥ 50% WQBEL (RP)
Dissolved Iron	Report	Report	Report	Report	Report	µg/L	657	THH	Discharge Conc > 10% WQBEL (no RP)
Total Manganese	Report	Report	Report	Report	Report	µg/L	2,191	THH	Discharge Conc > 10% WQBEL (no RP)
Total Phenols (Phenolics) (PWS)	0.86	1.34	11.7	18.2	29.2	µg/L	11.7	THH-PWS	Discharge Conc ≥ 50% WQBEL (RP)
Total Zinc	Report	Report	Report	Report	Report	µg/L	158	AFC	Discharge Conc > 10% WQBEL (no RP)
2,6-Dinitrotoluene	0.028	0.044	0.39	0.61	0.97	µg/L	0.39	CRL	Discharge Conc ≥ 50% WQBEL (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
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	584	mg/L	Discharge Conc ≤ 10% WQBEL
Total Aluminum	1,110	µg/L	Discharge Conc ≤ 10% WQBEL
Total Antimony	12.3	µg/L	Discharge Conc ≤ 10% WQBEL
Total Arsenic	21.9	µg/L	Discharge Conc ≤ 10% WQBEL
Total Barium	5,259	µg/L	Discharge Conc ≤ 10% WQBEL
Total Beryllium	N/A	N/A	No WQS
Total Boron	3,694	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cadmium	0.56	µg/L	Discharge Conc < TQL
Total Chromium (III)	178	µg/L	Discharge Conc < TQL
Hexavalent Chromium	24.0	µg/L	Discharge Conc < TQL
Total Cobalt	43.9	µg/L	Discharge Conc ≤ 10% WQBEL
Total Cyanide	N/A	N/A	No WQS
Total Iron	3,463	µg/L	Discharge Conc ≤ 10% WQBEL
Total Lead	6.18	µg/L	Discharge Conc ≤ 10% WQBEL
Total Mercury	0.11	µg/L	Discharge Conc < TQL
Total Nickel	107	µg/L	Discharge Conc ≤ 10% WQBEL
Total Selenium	11.5	µg/L	Discharge Conc < TQL
Total Silver	4.43	µg/L	Discharge Conc < TQL
Total Thallium	0.53	µg/L	Discharge Conc < TQL
Total Molybdenum	N/A	N/A	No WQS
Acrolein	4.44	µg/L	Discharge Conc < TQL
Acrylonitrile	0.47	µg/L	Discharge Conc < TQL
Benzene	4.5	µg/L	Discharge Conc < TQL
Bromoform	54.4	µg/L	Discharge Conc < TQL
Carbon Tetrachloride	3.11	µg/L	Discharge Conc ≤ 25% WQBEL
Chlorobenzene	219	µg/L	Discharge Conc < TQL
Chlorodibromomethane	6.21	µg/L	Discharge Conc < TQL
Chloroethane	N/A	N/A	No WQS
2-Chloroethyl Vinyl Ether	8,080	µg/L	Discharge Conc < TQL
Chloroform	12.5	µg/L	Discharge Conc ≤ 25% WQBEL
Dichlorobromomethane	7.38	µg/L	Discharge Conc < TQL
1,1-Dichloroethane	N/A	N/A	No WQS
1,2-Dichloroethane	76.9	µg/L	Discharge Conc < TQL
1,1-Dichloroethylene	72.3	µg/L	Discharge Conc < TQL
1,2-Dichloropropane	6.99	µg/L	Discharge Conc < TQL
1,3-Dichloropropylene	2.1	µg/L	Discharge Conc < TQL
1,4-Dioxane	N/A	N/A	No WQS
Ethylbenzene	149	µg/L	Discharge Conc < TQL
Methyl Bromide	219	µg/L	Discharge Conc < TQL
Methyl Chloride	12,698	µg/L	Discharge Conc < TQL
Methylene Chloride	155	µg/L	Discharge Conc < TQL
1,1,2,2-Tetrachloroethane	1.55	µg/L	Discharge Conc < TQL
Tetrachloroethylene	77.6	µg/L	Discharge Conc < TQL

Toluene	125	µg/L	Discharge Conc ≤ 25% WQBEL
1,2-trans-Dichloroethylene	219	µg/L	Discharge Conc < TQL
1,1,1-Trichloroethane	1,408	µg/L	Discharge Conc < TQL
1,1,2-Trichloroethane	4.27	µg/L	Discharge Conc < TQL
Trichloroethylene	4.66	µg/L	Discharge Conc < TQL
Vinyl Chloride	0.16	µg/L	Discharge Conc < TQL
2-Chlorophenol	65.7	µg/L	Discharge Conc < TQL
2,4-Dichlorophenol	21.9	µg/L	Discharge Conc < TQL
2,4-Dimethylphenol	219	µg/L	Discharge Conc < TQL
4,6-Dinitro-o-Cresol	4.38	µg/L	Discharge Conc < TQL
2,4-Dinitrophenol	21.9	µg/L	Discharge Conc < TQL
2-Nitrophenol	3,694	µg/L	Discharge Conc < TQL
4-Nitrophenol	1,085	µg/L	Discharge Conc < TQL
p-Chloro-m-Cresol	237	µg/L	Discharge Conc < TQL
Pentachlorophenol	0.23	µg/L	Discharge Conc < TQL
Phenol	8,765	µg/L	Discharge Conc ≤ 25% WQBEL
2,4,6-Trichlorophenol	11.6	µg/L	Discharge Conc < TQL
Acenaphthene	39.2	µg/L	Discharge Conc < TQL
Acenaphthylene	N/A	N/A	No WQS
Anthracene	657	µg/L	Discharge Conc < TQL
Benzidine	0.0008	µg/L	Discharge Conc < TQL
Benzo(a)Anthracene	0.008	µg/L	Discharge Conc < TQL
Benzo(a)Pyrene	0.0008	µg/L	Discharge Conc < TQL
3,4-Benzofluoranthene	0.008	µg/L	Discharge Conc < TQL
Benzo(ghi)Perylene	N/A	N/A	No WQS
Benzo(k)Fluoranthene	0.078	µg/L	Discharge Conc < TQL
Bis(2-Chloroethoxy)Methane	N/A	N/A	No WQS
Bis(2-Chloroethyl)Ether	0.23	µg/L	Discharge Conc < TQL
Bis(2-Chloroisopropyl)Ether	438	µg/L	Discharge Conc < TQL
Bis(2-Ethylhexyl)Phthalate	2.48	µg/L	Discharge Conc < TQL
4-Bromophenyl Phenyl Ether	125	µg/L	Discharge Conc < TQL
Butyl Benzyl Phthalate	0.22	µg/L	Discharge Conc < TQL
2-Chloronaphthalene	1,753	µg/L	Discharge Conc < TQL
4-Chlorophenyl Phenyl Ether	N/A	N/A	No WQS
Chrysene	0.93	µg/L	Discharge Conc < TQL
Dibenzo(a,h)Anthrancene	0.0008	µg/L	Discharge Conc < TQL
1,2-Dichlorobenzene	369	µg/L	Discharge Conc < TQL
1,3-Dichlorobenzene	15.3	µg/L	Discharge Conc < TQL
1,4-Dichlorobenzene	346	µg/L	Discharge Conc < TQL
3,3-Dichlorobenzidine	0.39	µg/L	Discharge Conc < TQL
Diethyl Phthalate	1,315	µg/L	Discharge Conc < TQL
Dimethyl Phthalate	1,154	µg/L	Discharge Conc < TQL
Di-n-Butyl Phthalate	43.8	µg/L	Discharge Conc < TQL
2,4-Dinitrotoluene	0.39	µg/L	Discharge Conc < TQL
Di-n-Octyl Phthalate	N/A	N/A	No WQS
1,2-Diphenylhydrazine	0.23	µg/L	Discharge Conc < TQL
Fluoranthene	43.8	µg/L	Discharge Conc < TQL
Fluorene	110	µg/L	Discharge Conc < TQL
Hexachlorobenzene	0.0006	µg/L	Discharge Conc < TQL

Hexachlorobutadiene	0.078	µg/L	Discharge Conc < TQL
Hexachlorocyclopentadiene	2.31	µg/L	Discharge Conc < TQL
Hexachloroethane	0.78	µg/L	Discharge Conc < TQL
Indeno(1,2,3-cd)Pyrene	0.008	µg/L	Discharge Conc < TQL
Isophorone	74.5	µg/L	Discharge Conc < TQL
Naphthalene	99.3	µg/L	Discharge Conc < TQL
Nitrobenzene	21.9	µg/L	Discharge Conc < TQL
n-Nitrosodimethylamine	0.005	µg/L	Discharge Conc < TQL
n-Nitrosodi-n-Propylamine	0.039	µg/L	Discharge Conc < TQL
n-Nitrosodiphenylamine	25.6	µg/L	Discharge Conc < TQL
Phenanthrene	2.31	µg/L	Discharge Conc < TQL
Pyrene	43.8	µg/L	Discharge Conc < TQL
1,2,4-Trichlorobenzene	0.15	µg/L	Discharge Conc < TQL
Aldrin	0.000006	µg/L	Discharge Conc < TQL
alpha-BHC	0.003	µg/L	Discharge Conc < TQL
beta-BHC	0.062	µg/L	Discharge Conc < TQL
gamma-BHC	1.41	µg/L	Discharge Conc < TQL
delta BHC	N/A	N/A	No WQS
Chlordane	0.002	µg/L	Discharge Conc < TQL
4,4-DDT	0.0002	µg/L	Discharge Conc < TQL
4,4-DDE	0.0002	µg/L	Discharge Conc < TQL
4,4-DDD	0.0008	µg/L	Discharge Conc < TQL
Dieldrin	0.000008	µg/L	Discharge Conc < TQL
alpha-Endosulfan	0.13	µg/L	Discharge Conc < TQL
beta-Endosulfan	0.13	µg/L	Discharge Conc < TQL
Endosulfan Sulfate	43.8	µg/L	Discharge Conc < TQL
Endrin	0.066	µg/L	Discharge Conc < TQL
Endrin Aldehyde	2.19	µg/L	Discharge Conc < TQL
Heptachlor	0.00005	µg/L	Discharge Conc < TQL
Heptachlor Epoxide	0.0002	µg/L	Discharge Conc < TQL

Attachment 4
Tunungwant Creek Continuous Water Quality Data Study

Attachment B

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

MEMO

TO: Joe Brancato JCB
Water Pollution Biologist 3
Clean Water Management Program / Northwest Regional Office

FROM: Mark Hoger
Water Program Specialist MSH
Bureau of Clean Water / Division of Water Quality / Monitoring Section

DATE: December 1, 2017

SUBJECT: Tunungwant Creek Continuous Water Quality Data
Bradford, PA Sewage Treatment Plant

BACKGROUND

Continuous instream monitoring (CIM) stations were established upstream and downstream of the Bradford, PA sewage treatment plant (STP) to determine the effect on several water quality parameters (Figure 1). Sondes recorded temperature, specific conductance, pH, and dissolved oxygen (DO), following PA DEP CIM monitoring protocols (PA DEP 2013). The upstream sonde was deployed near the confluence of Foster Brook. To avoid influence from Foster Brook the sonde was placed 8 meters off the left descending bank (LDB). Within the short distance (1.3 km) between the STP outflow and the New York/Pennsylvania border, Tunungwant Creek is very uniformly wide and shallow resulting in little opportunity for mixing of the water. Near Latchaw Creek, about 500 meters downstream from the STP outflow, the influence in water quality from the STP can be seen across about half of Tunungwant Creek. The sonde was placed roughly half-way in this influence, about ¼ of the way across the creek or 8 meters off the LDB. The water quality measured by the downstream sonde therefore represents a partial mixing of the most-influenced waters along the LDB.

RESULTS

Water quality at the two stations had notable differences (Figures 2-5). Comparison of the two stations was focused on the first 12 days (Table 1), prior to several precipitation events. The heavy rain and the resulting shifting sediment on the bottom of the stream, led to significant fouling of the pH and DO sensors and resulted in data loss.

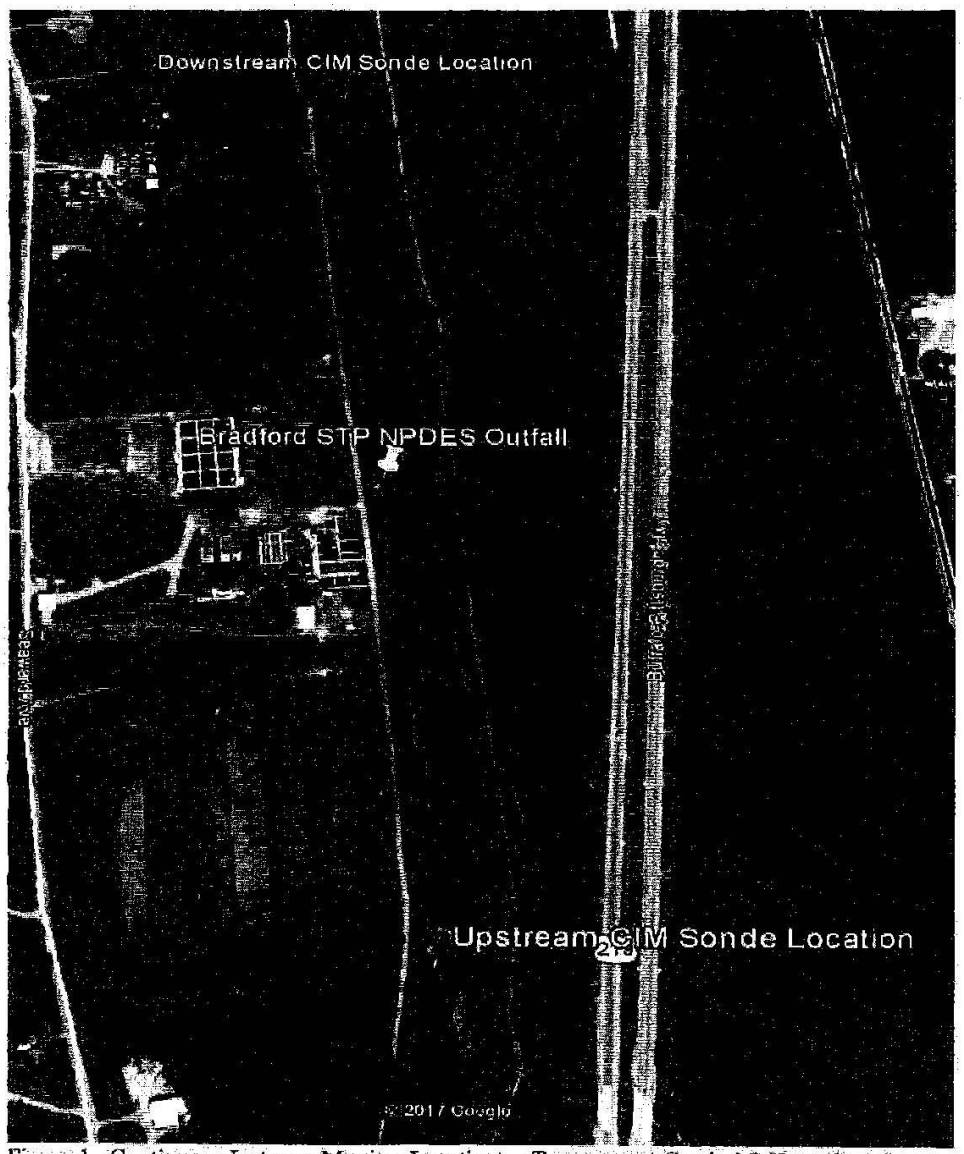

Figure 1. Continuous Instream Monitor Locations – Tunungwant Creek, McKean Co, PA (Google Earth Pro 2017).

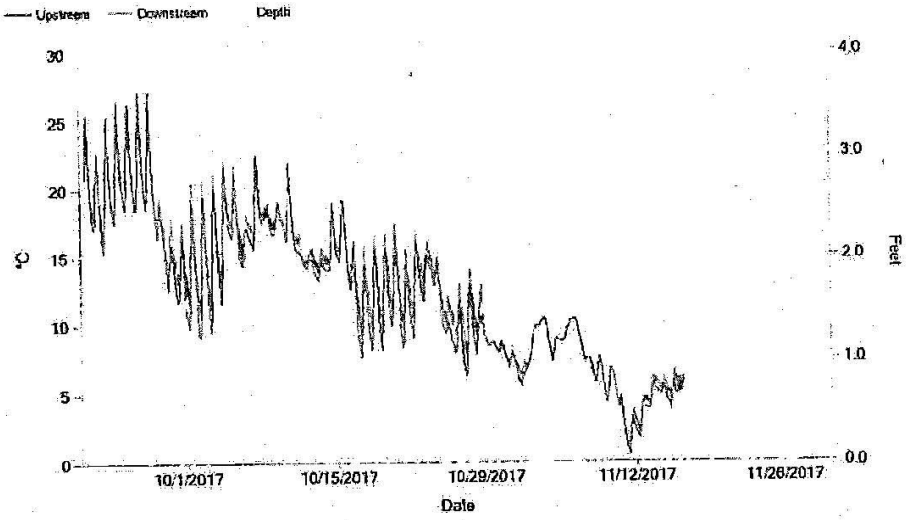

Figure 2. Continuous temperature data from the two PA DEP CIM stations on Tunungwant Creek and stage data from the USGS gage station.

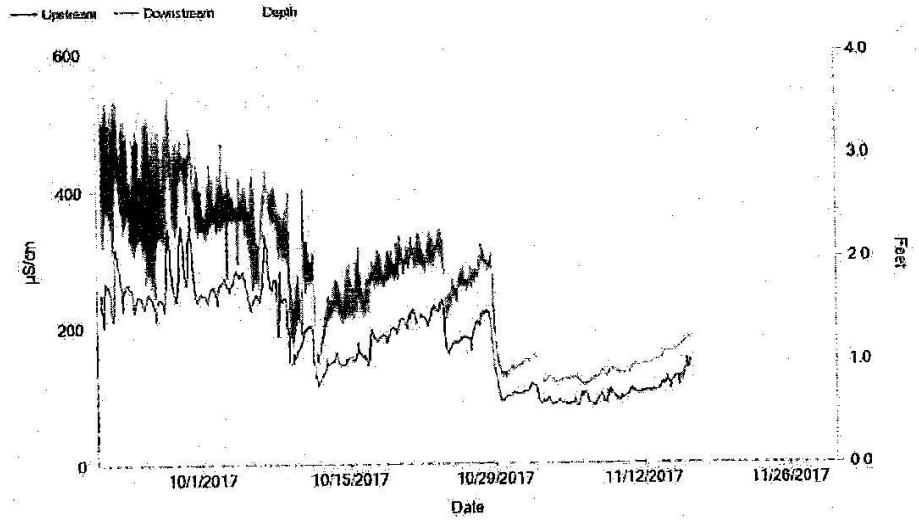

Figure 3. Continuous specific conductance data from the two PA DEP CIM stations on Tunungwant Creek and stage data from the USGS gage station.

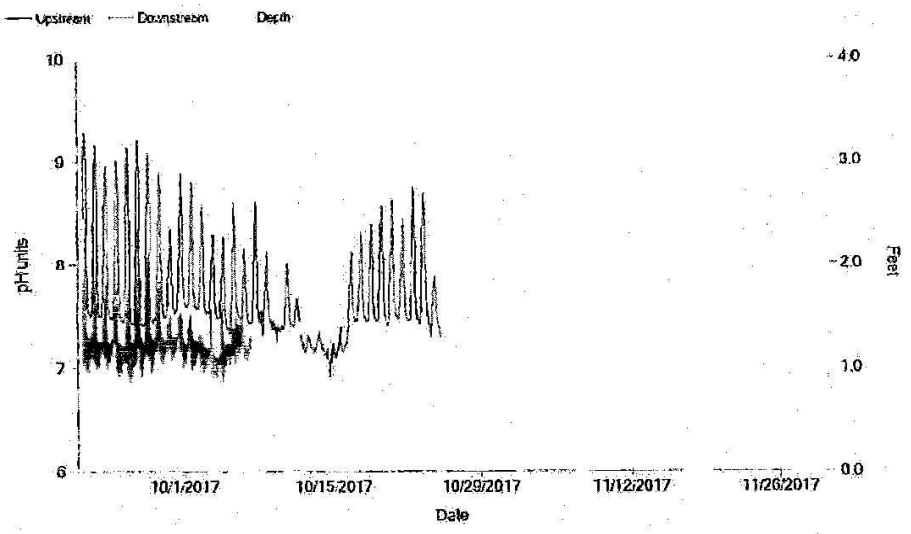

Figure 4. Continuous pH data from the two PA DEP CIM stations on Tununguant Creek and stage data from the USGS gage station.

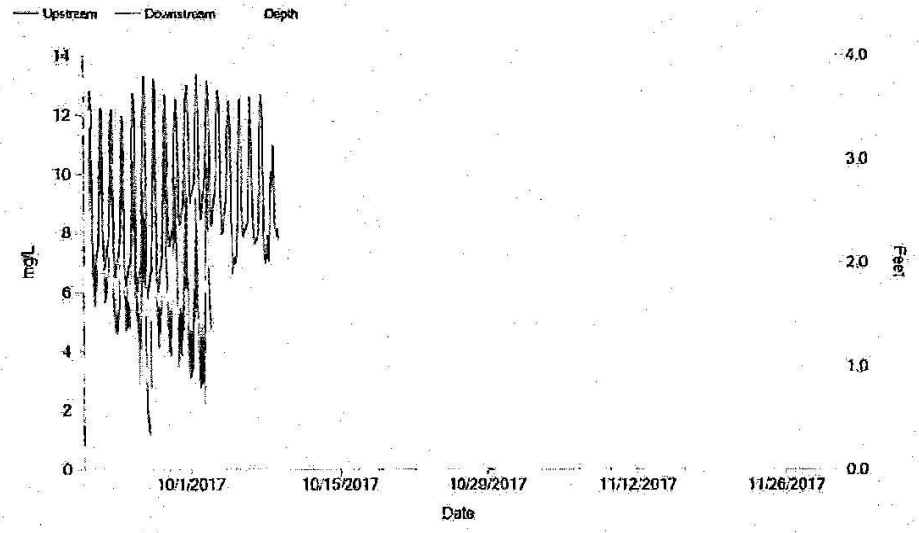

Figure 5. Continuous dissolved oxygen data from the two PA DEP CIM stations on Tununguant Creek and stage data from the USGS gage station.

Table 1. Comparison of CIM data from September 21 to October 2, 2017 at the two PA DEP CIM stations on Tunungwant Creek.

	Upstream	Downstream
Temp.		
Min	9.07	10.87
Mean	18.44	18.97
Max	27.22	28.33
Sp. Cond.		
Min	202.0	242.8
Mean	259.0	385.6
Max	365.2	545.9
pH.		
Min	7.41	6.76
Mean	7.98	7.30
Max	9.29	8.46
DO		
Min	5.81	1.16
Mean	9.30	6.35
Max	13.38	11.78

Higher diel swings of DO below the Bradford STP is evidence of increased production (Table 2). This increased production is likely driving the lower DO values observed at the beginning of the deployment. Numerous DO readings at the downstream station were below the Chapter 93 water quality standard of 5.0 mg/L (Table 3). No readings were below this criterion above the STP outflow.

Table 2. Diel DO swings at CIM locations upstream and downstream of the Bradford STP.

	Upstream	Downstream
9/21/2017	6.26	6.07
9/22/2017	5.47	5.67
9/23/2017	5.69	6.40
9/24/2017	5.78	5.81
9/25/2017	6.73	5.96
9/26/2017	7.51	7.82
9/27/2017	7.21	10.62
9/28/2017	6.40	7.16
9/29/2017	4.91	6.58
9/30/2017	4.67	6.73
10/1/2017	4.88	6.44
10/2/2017	4.85	8.66
Average	5.86	6.99

Table 3. Number of exceedances of Chapter 93 criteria, and the percent of a year that those exceedances represent, for pH and DO, upstream and downstream of the Bradford STP.

	pH		DO	
	#	%	#	%
Upstream	82	0.23%	0	0.00%
Downstream	0	0.00%	333	0.95%

SUMMARY

The water quality differences for the parameters measured were evident at the downstream CIM station when compared to the station upstream of the Bradford STP. The most notable difference was DO levels that frequently fell below Chapter 93 criteria at the downstream CIM station. This was observed despite a deployment period during a time of year less susceptible to low DO (lower temperature, less sunlight, etc.). The higher specific conductance measured at the downstream station is also likely to negatively affect macroinvertebrate communities (Cormier et al. 2011).

LITERATURE CITED

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