pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0070424**
Facility Type	**Municipal**	APS ID	**3993**
Major / Minor	**Minor**	Authorization ID	**1412032**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Caernarvon Township Municipal Authority Berks County**	Facility Name	**Caernarvon Township STP**
Applicant Address	601 Hemlock Road, PO Box 291	Facility Address	224 Mill Road
	Morgantown, PA 19543-0291		Morgantown, PA 19543
Applicant Contact	Denise Stine	Facility Contact	Denise Stine
Applicant Phone	(610) 286-1017	Facility Phone	(610) 286-1017
Client ID	33388	Site ID	445462
Ch 94 Load Status	Not Overloaded	Municipality	Caernarvon Township
Connection Status	No Limitations	County	Berks
Date Application Received	September 30, 2022	EPA Waived?	No
Date Application Accepted	October 12, 2022	If No, Reason	Significant CB Discharge
Purpose of Application	NPDES permit Renewal.		

Summary of Review

Great Valley Consultants, on behalf of the Caernarvon Township Municipal Sewer Authority (Authority/Permittee), applied to the Pennsylvania Department of Environmental Protection (DEP) for issuance of the NPDES permit. The permit was reissued on March 23, 2018 and became effective on April 1, 2018. The permit expires on March 31, 2023 but the terms and conditions of the permit have been extended since that time.

The average annual design flow and hydraulic design capacity is 0.7 MGD and the organic loading capacity is 2,043 lbs BOD_5/day. The treated effluent is discharged to Conestoga River. This facility receives 90.0% of its flow from Caernarvon Township Berks County, 4.0% from Caernarvon Township Lancaster County, and 6.0% from Honey Brook Township Chester County.

The WQM No. 0603412 was issued on May 4, 2004. The WQM No. 0603412 A-1 amendment was issued on August 24, 2017. The WQM No. 0603412 A-2 amendment was issued on April 27, 2023 to replace the existing medium pressure inline UV disinfection system with three Proline WWIL 1000 UV installed in parallel.

Sludge use and disposal description and location(s): N/A because sludge is hauled by Republic Services.

Changes from the previous permit: The E. Coli. monitoring and report requirements will add to the proposed permit. The TRC limits of 0.22 mg/L as AML and 0.71 mg/L as IMAX for emergency use will be added to the proposed permit. The $CBOD_5$ limits of 20.0 mg/L as AML, 30.0 mg/L as AWL, & 40.0 mg/L as IMAX, and mass limits of 117.0 lbs/day as AML and 175.0 lbs/day as AWL for all year round are replaced in the proposed permit.

Based on the review outlined in this fact sheet, it is recommended that the permit be drafted. A public notice of the draft permit will be published in the *Pennsylvania Bulletin* for public comments for 30 days.

Approve	Deny	Signatures	Date
X		*Hilaryle* Hilary H. Le / Environmental Engineering Specialist	December 19, 2023
X		*Maria D. Bebenek for* Daniel W. Martin, P.E. / Environmental Engineer Manager	January 26, 2024

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	001	Design Flow (MGD)	0.7
Latitude	40º 8' 45.93"	Longitude	-75º 52' 57.71"
Quad Name	Morgantown	Quad Code	1738
Wastewater Description:	Sewage Effluent		
Receiving Waters	Conestoga River (WWF)	Stream Code	07548
NHD Com ID	57461789	RMI	58.05
Drainage Area	14.7 mi.^{2}	Yield (cfs/mi^2)	0.105
Q_{7-10} Flow (cfs)	1.54	Q_{7-10} Basis	USGS StreamStats
Elevation (ft)	498	Slope (ft/ft)	
Watershed No.	7-J	Chapter 93 Class.	WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Nutrients, Organic Enrichment		
Source(s) of Impairment	Agriculture, Source Unknown,		
TMDL Status	Final	Name	Conestoga Headwaters TMDL
Nearest Downstream Public Water Supply Intake	Lancaster Municipal Water Company		
PWS Waters	Conestoga River	Flow at Intake (cfs)	
PWS RMI	22.0	Distance from Outfall (mi)	Approximate 36.0

Changes Since Last Permit Issuance:

Drainage Area
The discharge is to Conestoga River at RMI 58.05. The drainage area upstream of the point of discharge is 14.7 sq.mi, according to USGS PA StreamStats (https://water.usgs.gov/osw/streamstats/pennsylvania.html).

Streamflow
The USGS gauging station No. 1576105 on the Conestoga River near Terre Hill, PA is located approximately 12 miles downstream from the point of discharge; however, the station recorded the flow during periods only between 1981-1983. The next downstream gauging station is on the Conestoga River at Lancaster, PA (station no. 1576500). While this station has the latest flow data, the station is located approximately 35 miles downstream from the point of discharge. Considering the distance, it is not reasonable to use this station to estimate the low flows at the point of discharge. DEP has therefore determined to simply use the low-flow statistics produced by the USGS PA StreamStats as DEP believes that this web-based application provides more accurate estimates on the site-specific flow basin characteristics. The Q_{7-10} of 1.54 cfs from USGS PA StreamStats is therefore used in DEP's in-stream water quality modeling.

Conestoga River
25 Pa Code §93.9o classifies Conestoga River as warm water fishes surface water. At the point of discharge, DEP's 2022 integrated report recognizes that Conestoga River is impaired for nutrients and siltation as a result of agricultural activity (crop & grazing related agriculture). Just upstream of the point of discharge, Conestoga river is also impaired for organic enrichment and low Dissolved Oxygen as a result of other unknown sources in addition to nutrients impairment from agricultural activities. The Total Maximum Daily Load (TMDL) was developed to address this impairment (just for the watershed upstream of the point of discharge). More details on the TMDL will be discussed later in this fact sheet.

Public Water Supply Intake
The nearest downstream public water supply intake is the Lancaster Municipal Water Company, located on the Conestoga River approximately 36.0 miles from the point of discharge. Considering the distance, the discharge is not expected to significantly affect the water supply intake.

Treatment Facility Summary

Treatment Facility Name: Caernarvon Township STP

WQM Permit No.	Issuance Date
0603412	05/04/2004
0603412 A-1	8/24/2017
0603412 A-2	4/27/2023

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Tertiary	Sequencing Batch Reactor W/Sol Removal	Ultraviolet	0.7

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.7	2043	Not Overloaded		

Changes Since Last Permit Issuance:

Other Comments:
The treatment process is including:

Influent Pumping Station → Bar Screen/Comminuter → Fine Screening Unit → Sequencing Batch Reactors (2) → Post Equalization Tank → Cloth Disk Filters (2) → UV Disinfections (2)/Chlorine disinfection for emergency → Outfall 001 to Conestoga River

Two (2) aerobic digesters are used followed by two (2) sludge holding tanks and belt press for solids handling prior to hauling off to a land fill for disposal.

Chemical used:
Aluminum Sulphate is used for phosphorus control at a rate of 100 gpd. Sodium Hypochlorite is used for Algae control in Post Eq Basin at a rate of 8 gpd. Caustic Soda 50% is used for pH control at a rate of 20 gpd. Polymer (Clarifloc NE-2290) is used for Sludge dewatering at a rate of 90 pounds. Silicon Based Defoamer is used for reducing effluent foaming of a rate of 3 gpd.

Biosolids:
The total sewage sludge/biosolids production within the facility for the previous year was 94.29 dry tons.

Compliance History	
Summary of DMRs:	A summary of the past 12-month DMR data is presented on the pages 6, 7 & 8.
Summary of Inspections:	02/18/2021: Tracy Tomtishen, DEP Water Quality Specialist, conducted Chesapeake Bay Cap Load compliance evaluation inspection. There were no violations noted during inspection. Recommendations: 1. Revisions to eDMR Annual CBAY submission should be addressed within 15 calendar days. 2. Please indicate "non-detect" results on Annual Chesapeake Bay Spreadsheet by using the less than (<) symbol to report any parameter value that is less than the quantitation limit. 3. For future annual submissions, please use the most updated version of the Chesapeake Bay Spreadsheet found on DEP's Chesapeake Bay Wastewater website. Permitted Cap Load and delivery ratios are reported correctly. 10/28/2019: Shawn Fassl, DEP WQ Environmental Trainee, conducted compliance evaluation inspection. The field sample test results were within permit limits. Effluent appeared clear. Recommendations: 1. Influent/effluent flow meter calibration due. 10/25/19. Calibrations should be performed before this date. 2. Update 24-hour Emergency Response. 3. Please revise May 2019 and June 2019 eDMR submission with corrected "Sewage Sludge/Biosolids Production and Disposal" supplemental report.
Other Comments:	There are currently no open violations associated with the permittee or the facility.

Other Comments:

The table below summarizes the influent/effluent testing results submitted along with the application.

Influent Testing Results

Parameter	Min/Max Value	Average Value
BOD_5 (mg/L)	788 mg/L	326.1 mg/L
BOD_5 (lbs/day)	1562 lbs/day	769.96 lbs/day
TSS (mg/L)	1522 mg/L	238.3 mg/L
TSS (lbs/day)	2361 lbs/day	546.12 lbs/day
TN (mg/L)	51.02 mg/L	51.02 mg/L
TN (lbs/day)	118 lbs/day	118 lbs/day
TP (mg/L)	18.4 mg/L	7.96 mg/L
TP (lbs/day)	43.73 lbs/day	19.06 lbs/day
NH_3-N (mg/L)	53.3 mg/L	32.2 mg/L
NH_3-N (lbs/day)	142.87 lbs/day	78.46 lbs/day
TDS (mg/L)	1070 mg/L	1070 mg/L
TDS (lbs/day)	2473 lbs/day	2473 lbs/day
Fecal Coliform	2900 No./100 ml	2900 No./100 ml
TKN	51.0 mg/L	51.0 mg/L
NO_2-N + NO_3-N	0.02 mg/L	0.02 mg/L

Effluent Testing Results

Parameter	Min/Max Value	Average Value
pH (minimum)	6.68 S.U.	
pH (maximum)	8.33 S.U.	
D.O (minimum)	6.28 mg/L	mg/L
TRC	mg/L	mg/L
Fecal Coliform	3100 No./100ml	3.11 No./100 ml
$CBOD_5$	8.1 mg/L	2.3 mg/L
TSS	7.0 mg/L	1.6 mg/L
NH_3-N	3.1 mg/L	0.22 mg/L
TN	10.32 mg/L	5.66 mg/L
TP	0.51 mg/L	0.16 mg/L
Temp	73 F	73 F
TKN	5.85 mg/L	1.01 mg/L
NO_2-N + NO_3-N	8.92 mg/L	4.65 mg/L
TDS	1310 mg/L	1310 mg/L
Chloride	553 mg/L	553 mg/L
Bromide	<1.00 mg/L	<1.00 mg/L
Sulfate	98.4 mg/L	98.4 mg/L
Oil and Grease	< 5.0 mg/L	< 5.0 mg/L
Total Copper	0.015 mg/L	0.015 mg/L
Total Lead	< 0.01 mg/L	< 0.01 mg/L
Total Zinc	0.022 mg/L	0.022 mg/L

Compliance History

DMR Data for Outfall 001 (from November 1, 2022 to October 31, 2023)

Parameter	OCT-23	SEP-23	AUG-23	JUL-23	JUN-23	MAY-23	APR-23	MAR-23	FEB-23	JAN-23	DEC-22	NOV-22
Flow (MGD) Average Monthly	0.253	0.270	0.247	0.255	0.242	0.271	0.283	0.298	0.293	0.298	0.300593	0.269442
Flow (MGD) Daily Maximum	0.343	0.513	0.512	0.695	0.388	0.649	0.454	0.480	0.480	0.498	0.509927	0.50899
pH (S.U.) Daily Minimum	7.5	7.41	7.41	7.34	7.59	7.51	7.21	7.44	7.49	7.2	7.11	7.3
pH (S.U.) Daily Maximum	8.04	7.99	8.0	7.99	8.32	8.18	8.06	7.93	7.97	7.8	7.85	7.93
DO (mg/L) Daily Minimum	8.02	7.61	6.9	7.86	8.01	8.11	6.14	8.51	8.85	8.66	8.79	8.44
CBOD5 (lbs/day) Average Monthly	< 4	< 5	< 4	< 4	< 4	< 5.0	< 5	< 12	< 5	< 5.0	< 8	< 4
CBOD5 (lbs/day) Weekly Average	5	7	< 4	< 4	5	< 6.0	6	28	< 5	< 6.0	12	6
CBOD5 (mg/L) Average Monthly	< 2.3	< 2.3	< 2.0	< 2.1	< 2.0	< 2.0	< 2.3	< 5.7	< 2.0	< 2.1	< 2.9	< 2.1
CBOD5 (mg/L) Weekly Average	2.9	3.1	< 2.0	2.3	2.1	< 2.0	3.0	14.0	< 2.0	2.3	4.0	2.0
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	738	1213	2008	690	961	687	1555	1186	1268	1527	1104	1240
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	8.51	1421	6538	1119	1382	869	4641	2409	2071	2455	1635	1448
BOD5 (mg/L) Raw Sewage Influent Average Monthly	385	600	642	354	462	318	763	480	509	596	384	530
TSS (lbs/day) Average Monthly	< 5.0	< 4	8	< 3	< 2	< 2.0	< 6	< 8	< 3	< 5.0	< 8	< 6
TSS (lbs/day) Raw Sewage Influent Average Monthly	392	958	3326	735	1077	582	3189	818	951	1979	682	593
TSS (lbs/day) Raw Sewage Influent Daily Maximum	653	1624	14100	735	2130	821	10538	935	1536	3469	1012	808
TSS (lbs/day) Weekly Average	9	9	13	4	2	< 3.0	10	26	5	9	20	17
TSS (mg/L) Average Monthly	< 2.5	< 1.8	4.2	< 1.5	< 1.0	< 1.0	< 2.8	< 3.8	< 1.3	< 1.8	< 2.8	< 2.6

TSS (mg/L) Raw Sewage Influent Average Monthly	204	472	839	369	520	268	1571	328	381	759	239	249
TSS (mg/L) Weekly Average	4.0	4.0	6.0	2.0	1.0	1.0	5.0	13.0	2.0	3.0	6.0	7.0
Fecal Coliform (No./100 ml) Geometric Mean	< 2	16	< 3	< 2	< 3	85	< 2	> 339	< 4	< 14	103	< 20
Fecal Coliform (No./100 ml) IMAX	3	60	5	< 2	7	3400	3	> 20000	20	233	320	310
Nitrate-Nitrite (mg/L) Average Monthly	4.99	5.64	4.43	3.72	4.15	5.69	8.0	4.18	4.42	2.93	3.74	3.47
Nitrate-Nitrite (lbs) Total Monthly	325	361	316	208	260	413	536	331	320	238	282	215
Total Nitrogen (mg/L) Average Monthly	< 5.67	6.52	< 5.27	4.84	5.13	< 6.52	9.15	< 5.4	5.3	6.53	< 4.41	< 4.38
Total Nitrogen (lbs) Effluent Net Total Monthly	< 367	417	< 372	272	322	< 476	609	< 425	384	554	331	< 271
Total Nitrogen (lbs) Total Monthly	< 367	417	< 372	272	322	< 476	609	< 425	384	554	< 331	< 271
Total Nitrogen (lbs) Effluent Net Total Annual		< 4786										
Total Nitrogen (lbs) Total Annual		< 4786										
Ammonia (lbs/day) Average Monthly	0.1	0.2	< 0.1	< 0.09	0.2	< 0.1	< 0.02	< 0.6	0.4	< 8	< 0.1	< 0.07
Ammonia (mg/L) Average Monthly	0.06	0.09	< 0.04	< 0.05	0.08	< 0.05	< 0.08	< 0.21	0.16	< 2.65	< 0.05	< 0.04
Ammonia (lbs) Total Monthly	4	6	< 3	< 3.0	5.0	< 4	< 5	< 17	11	< 237	< 4	< 2
Ammonia (lbs) Total Annual		< 274										
TKN (mg/L) Average Monthly	< 0.68	0.82	< 0.84	1.11	0.98	< 0.84	1.11	< 1.21	0.88	3.61	< 0.67	< 0.91
TKN (lbs) Total Monthly	< 43	52	< 56	64	62	< 63	73	< 94	64	316	< 49	< 56
Total Phosphorus (lbs/day) Average Monthly	2	2	2	2	1	0.9	0.7	1	0.7	0.7	2	2
Total Phosphorus (mg/L) Average Monthly	0.88	1.05	1.0	0.98	0.71	0.39	0.33	0.55	0.3	0.27	0.69	0.87

Total Phosphorus (lbs) Effluent Net Total Monthly	56	66	73	56	45	29	22	42	21	22	51	54
Total Phosphorus (lbs) Total Monthly	56	66	73	56	45	29	22	42	21	22	51	54
Total Phosphorus (lbs) Effluent Net Total Annual		549										
Total Phosphorus (lbs) Total Annual		549										

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.7
Latitude 40º 8' 45.93" **Longitude** -75º 52' 57.71"
Wastewater Description: Sewage Effluent

Technology-Based Limitations

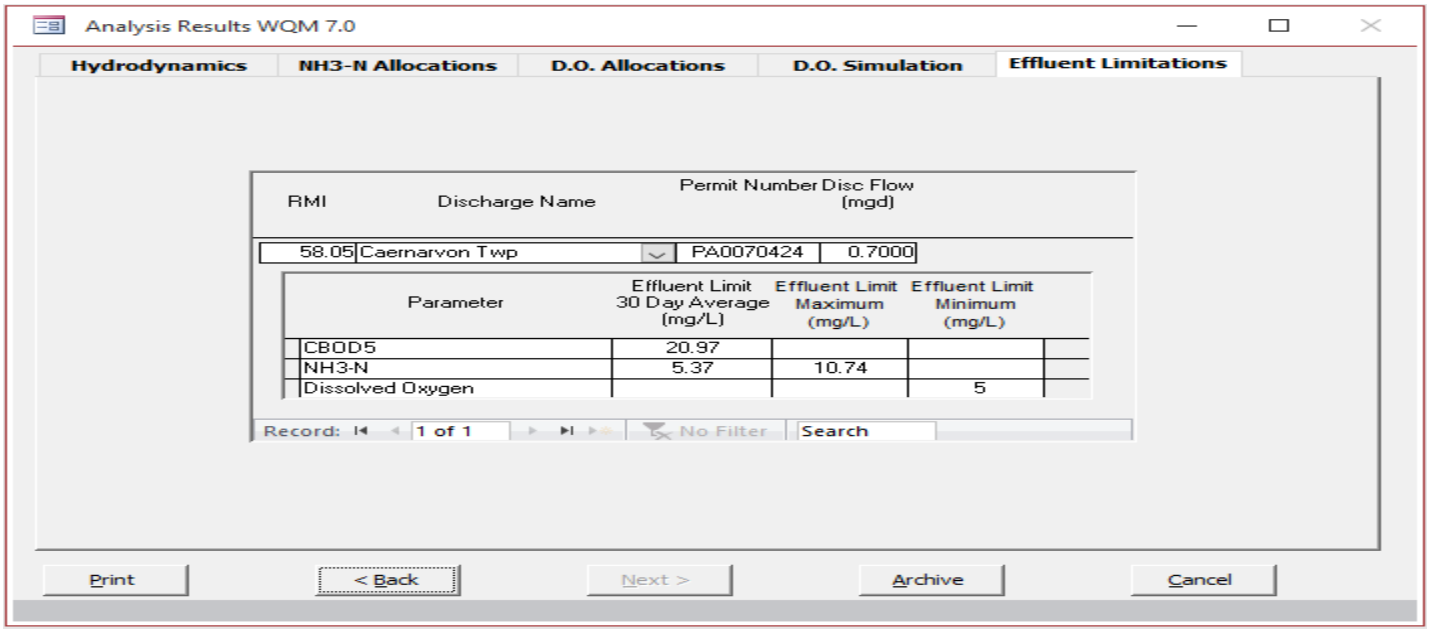
The following technology-based limitations apply, subject to water quality analysis and BPJ where applicable:

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)

Water Quality-Based Limitations

Ammonia (NH_3-N):
NH_3N calculations are based on the Department's Implementation Guidance of Section 93.7 Ammonia Criteria, dated 11/4/97 (ID No. 391-2000-013). The following data is necessary to determine the in-stream NH_3-N criteria used in the attached WQM 7.0 computer model of the stream:

*	Discharge pH	=	7.0	(Default)
*	Discharge Temperature	=	20°C	(Default)
*	Stream pH	=	7.0	(Default)
*	Stream Temperature	=	20ºC	(Default)
*	Background NH_3-N	=	0 mg/L	(Default)



Regarding NH_3-N limits, the attached computer printout of the WQM 7.0 stream model (version 1.1) indicates that a limit of 5.37 mg/L as a monthly average and 10.74 mg/L instantaneous maximum (IMAX) are necessary to protect the aquatic life from toxicity effects at the point of discharge. However, the existing summer limits of 4.5 mg/L monthly average & 9.0 mg/L IMAX are more stringent and will remain in the proposed permit. Per anti-backsliding policy, the existing winter average monthly limit of 13.5 mg/L & IMAX limit of 27.0 mg/L will remain in place. Recent DMRs and inspection reports show that the facility has been consistently achieving these limits. Mass limits are calculated as follows:

Summer average monthly mass limit: 4.5 mg/L x 0.7 MGD x 8.34 = 26.27 (26.0) lbs/day
Winter average monthly mass limit: 13.5 mg/L x 0.7 MGD x 8.34 = 78.8 (79.0) lbs/day

Carbonaceous Biochemical Oxygen Demand ($CBOD_5$):
The attached computer printout of the WQM 7.0 stream model (ver. 1.1) indicates that a monthly average limit of 20.97 (20.0) mg/L for summer and 25.0 mg/L for winter, or secondary treatment, is adequate to protect the water quality of the stream.

Since, recent DMRs and inspection reports show that the facility has typically been achieving concentrations below limit of 20.0 mg/L AML all year round. Therefore, the new permit limits of 20.0 mg/L as AML, 30.0 mg/L as weekly average limit (AWL), & 40.0 mg/L as IMAX for all year round are more stringent and will replace in the proposed permit. Mass limits are calculated as follows:

Average monthly mass limit: 20.0 mg/L x 0.7 MGD x 8.34 = 116.76 (117.0) lbs/day
Average weekly mass limit: 30.0 mg/L x 0.7 MGD x 8.34 = 175.14. (175.0) lbs/day

These values are rounded down to 117.0 lbs/day and 175.0 lbs/day, respectively. The minimum monitoring frequency will remain the same 1/week.

Dissolved Oxygen (D.O.):
The D.O. goal is 6.0 mg/L. However, a minimum D.O. of 5.0 mg/L is required per 25 Pa. Code § 93.7. It is recommended that this limit be maintained in the proposed permit to ensure the protection of water quality standards. This approach is consistent with DEP's current Standard Operating Procedure (SOP) No. BCW-PMT-033, version 1.9 revised March 22, 2021, and has been applied to other point source dischargers throughout the state.

pH:
The effluent discharge pH should remain above 6.0 and below 9.0 standard units according to 25 Pa. Code § 95.2(1).

Total Suspended Solids (TSS):
The existing technology-based limits of 30.0 mg/L average monthly, 45.0 mg/L weekly average, and 60.0 mg/L IMAX will remain in the proposed permit based on the minimum level of effluent quality attainable by secondary treatment based on 25 Pa. Code § 92a.47. Recent DMRs and inspection reports show that the facility has been consistently achieving these limits. Mass limits are calculated as follows:

Average monthly mass limit: 30.0 mg/L x 0.7 MGD x 8.34 = 175.14 (175.0) lbs/day
Average weekly mass limit: 45.0 mg/L x 0.7 MGD x 8.34 = 262.71 (263.0) lbs/day

The average monthly and weekly average mass loadings will be rounded down to 175.0 lbs/day and 263.0 lbs/day, respectively. The minimum monitoring frequency will remain the same 1/week.

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

E. Coli:
As recommended by DEP's SOP No. BCW-PMT-033, version 1.9 revised March 22, 2021, a routine monitoring for E. Coli will be included in the proposed permit under 25 Pa. Code § 92a.61. This requirement applies to all sewage dischargers greater than 0.002 MGD in their new and reissued permits. A monitoring frequency of 1/quarter will be included in the permit to be consistent with the recommendation from this SOP.

Raw Sewage Influent Monitoring:
As a result of negotiation with EPA, influent monitoring of TSS and BOD_5 are required for any POTWs; therefore, influent sampling of BOD_5 and TSS will be remain in the proposed permit. A 8-hr composite sample type will be required to be consistent with the proposed sampling frequency for TSS and BOD_5 in the effluent.

Flow Monitoring

The requirement to monitor the volume of effluent will remain in the draft permit per 40 CFR § 122.44(i)(1)(ii).

Ultraviolet Disinfection Monitoring

Since the UV is utilized in lieu of chlorine for disinfection, a routine monitoring of UV intensity output is recommended. This approach is consistent with DEP's SOP no. BPNPSM-PMT-033. Accordingly, the draft permit will contain daily monitoring of UV intensity output in mW/sq.cm.

Total Phosphorus

The existing permit average monthly TP concentration of 2.0 mg/L, and 4.0 mg/L IMAX will remain in the proposed permit. Mass average monthly of 11.676 (12.0) lbs/day is also in the proposed permit. It appears these limits were developed based on DEP's technical guidance no. 391-2000-018 in which DEP previously determined that the facility has the potential to contribute 0.25% or more of the total point source phosphorus loading. Conestoga River at the point of discharge is impaired for nutrients; therefore, existing limits will still remain in the proposed permit to ensure that the facility does not significantly contribute to this local impairment. Also, a relaxation of existing effluent limits is prohibited per 40 CFR §122.44(l)(1).

Total Residual Chlorine (TRC) for emergency use:

The attached computer printout utilizes the equation and calculations as presented in the Department's 2003 Implementation Guidance for Total Residual Chlorine (TRC) (ID#391-2000-015) for developing chlorine limitations. The average monthly limit of 0.217 (0.22) mg/L and IMAX limit of 0.709 (0.71) mg/L, which was indicated in DEP's approval letter dated 4/3/2023, will be added in the proposed permit.

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

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

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 0.473	1.3.2.iii	WLA cfc = 0.453
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.176	5.1d	LTA_cfc = 0.264

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.217	AFC
		INST MAX LIMIT (mg/l) = 0.709	

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)

Chesapeake Bay Strategy:

In the Phase 3 WIP Wastewater Supplement revised on July 29, 2022, Table 5, page 12, of this document shows that Caernarvon Township Sewer Authority has been allocated 12,785 lbs/year of TN and 1,705 lbs/year of TP. This approach is consistent with the Chesapeake Bay TMDL, it was based on the actual performance data previously evaluated by the Department. Since the permittee is easily capable of achieving compliance with these loads, the Department determines

that no "compliance schedule" for the requirements associated with the Chesapeake Bay Strategy is necessary. Accordingly, the Chesapeake Bay nutrient existing limitations and monitoring requirements will remain in the proposed permit.

Phase 3 WIP Wastewater Supplement
Revised, July 29, 2022

NPDES Permit No.	Phase	Facility	Latest Permit Issuance Date	Permit Expiration Date	Cap Load Compliance Start Date	TN Cap Load (lbs/yr)	TN Offsets Included in Cap Load (lbs/yr)	TP Cap Load (lbs/yr)	TN Delivery Ratio	TP Delivery Ratio
PA0043273	2	Hollidaysburg Regional Sewer Authority	2/10/2017	2/28/2022	10/1/2012	109,588	-	14,612	0.763	0.519
PA0043575	3	Lykens Borough	2/5/2018	2/28/2023	10/1/2012	7,488	-	998	0.803	0.447
PA0043681	3	Valley Joint Sewer Authority	10/18/2017	10/31/2022	10/1/2012	41,095	-	5,479	0.773	0.477
PA0043893	3	Western Clinton County Municipal Authority	7/21/2017	7/31/2022	10/1/2011	16,438	-	2,192	0.718	0.233
PA0044113	2	South Middleton Township Municipal Authority	4/27/2017	4/30/2022	10/1/2014	27,397	-	3,653	0.682	0.410
PA0044661	1	Lewisburg Area Joint Sanitary Authority	3/12/2019	3/31/2024	10/1/2012	44,200	-	5,893	0.805	0.464
PA0045985	1	Mountaintop Area Sewer Authority	6/1/2019	5/31/2024	10/1/2010	76,318	-	10,185	0.615	0.383
PA0046221	3	Newville Borough	5/21/2021	5/31/2026	10/1/2011	7,306	-	974	0.670	0.440
PA0046272	3	Porter-Tower Joint Municipal Authority	9/21/2017	9/30/2022	10/1/2013	9,922	-	1,321	0.764	0.447
PA0046388	3	Butler Township St. Johns	3/16/2022	3/31/2027	10/1/2009	40,182	-	5,357	0.675	0.374
PA0060046	3	Can-Do Inc	4/27/2020	4/30/2025	10/1/2012	18,265	-	2,435	0.637	0.466
PA0060135	3	Shickshinny Borough Sewer Authority	10/26/2017	10/31/2022	10/1/2013	8,219	-	1,096	0.766	0.403
PA0060518	3	Hallstead-Great Bend Joint Sewer Authority	11/19/2020	11/30/2025	10/1/2012	9,741	-	1,218	0.516	0.372
PA0060801	2	Montrose Municipal Authority	2/25/2011	2/29/2016	10/1/2013	14,977	-	1,997	0.724	0.380
PA0061034	3	Waverly Township	7/1/2011	7/31/2016	10/1/2013	9,132	-	1,218	0.438	0.386
PA0061590	3	Little Washington Wastewater Co.	5/1/2019	4/30/2024	10/1/2013	24,073	-	3,210	0.705	0.433
PA0062201	2	Schuylkill County Municipal Authority	8/19/2016	8/31/2021	10/1/2012	10,959	-	1,461	0.793	0.458
PA0062219	1	Frackville Area Municipal Authority	8/26/2021	8/31/2026	10/1/2010	25,570	-	3,409	0.691	0.458
PA0064025	2	KBM Regional Authority	3/24/2021	3/31/2026	10/1/2009	13,637	-	1,705	0.769	0.459
PA0070041	3	Mahanoy City	6/13/2012	6/30/2017	10/1/2012	25,205	-	3,361	0.793	0.458
PA0070386	3	Shenandoah Municipal Sewer Authority	10/6/2017	10/31/2022	10/1/2011	36,529	-	4,871	0.687	0.346
PA0070424	2	Carnarvon Township	3/23/2018	3/31/2023	10/1/2013	12,785	-	1,705	0.625	0.535

- 12 -

Total Dissolved Solids (TDS):
TDS and its associated solids including Bromide, Chloride, and Sulfate have become statewide pollutants of concern. The requirement to monitor these pollutants must be considered under the criteria specified in 25 Pa. Code § 95.10 and the following January 23, 2014 DEP Central Office Directive:

> *For point source discharges and upon issuance or reissuance of an individual NPDES permit:*
>
> *-Where the concentration of TDS in the discharge exceeds 1,000 mg/L, or the net TDS load from a discharge exceeds 20,000 lbs/day, and the discharge flow exceeds 0.1 MGD, Part A of the permit should include monitor and report for TDS, sulfate, chloride, and bromide. Discharges of 0.1 MGD or less should monitor and report for TDS, sulfate, chloride, and bromide if the concentration of TDS in the discharge exceeds 5,000 mg/L.*
>
> *- Where the concentration of bromide in a discharge exceeds 1 mg/L and the discharge flow exceeds 0.1 MGD, Part A of the permit should include monitor and report for bromide. Discharges of 0.1 MGD or less should monitor and report for bromide if the concentration of bromide in the discharge exceeds 10 mg/L.*
>
> *-Where the concentration of 1,4-dioxane (CAS 123-91-1) in a discharge exceeds 10 µg/L and the discharge flow exceeds 0.1 MGD, Part A of the permit should include monitor and report for 1,4-dioxane. Discharges of 0.1 MGD or less should monitor and report for 1,4-dioxane if the concentration of 1,4-dioxane in the discharge exceeds 100 µg/L.*

The sample result shows that effluent contains a maximum TDS concentration of 1310.0 mg/L and Bromide concentration of < 1.0 mg/l. Accordingly, the requirement to monitor these pollutants is not necessary.

Toxics:
The data was analyzed based on the guidelines found in DEP's Water Quality Toxics Management Strategy (Document No. 361-0100-003, version 1.4, revised 5/2023) and DEP's SOP No. BPNPSM-PMT-033. Spreadsheet results are attached to this fact sheet. The Toxics Management Spreadsheet uses the following logic:

a. Establish average monthly and IMAX limits in the draft permit where the maximum reported concentration exceeds 50% of the WQBEL.
b. For non-conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 25% - 50% of the WQBEL.
c. For conservative pollutants, establish monitoring requirements where the maximum reported concentration is between 10%-50% of the WQBEL.

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

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Copper	Report	Report	Report	Report	Report	mg/L	0.054	CFC	Discharge Conc > 10% WQBEL (no RP)

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

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

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Total Lead	28.7	µg/L	Discharge Conc ≤ 10% WQBEL
Total Zinc	0.44	mg/L	Discharge Conc ≤ 10% WQBEL

However, as the Copper & Zinc metals are hardness-based pollutants, DEP requested ten (10) composite samples of effluent hardness, three (3) samples of upstream hardness and three (3) samples of downstream hardness. The 90th percentile of effluent hardness data was determined to be 371 mg/L, upstream hardness of 196 mg/L, and downstream hardness of 225 mg/L (average of three data).

Therefore, the results are as follows.

- Total Copper pollutant has no reasonable potential (no-RP) discharge concentration greater than 10% WQBEL, per DEP's SOP No. BPNPSM-PMT-033, therefore, the monitoring and reporting requirements of this pollutant is not necessary.

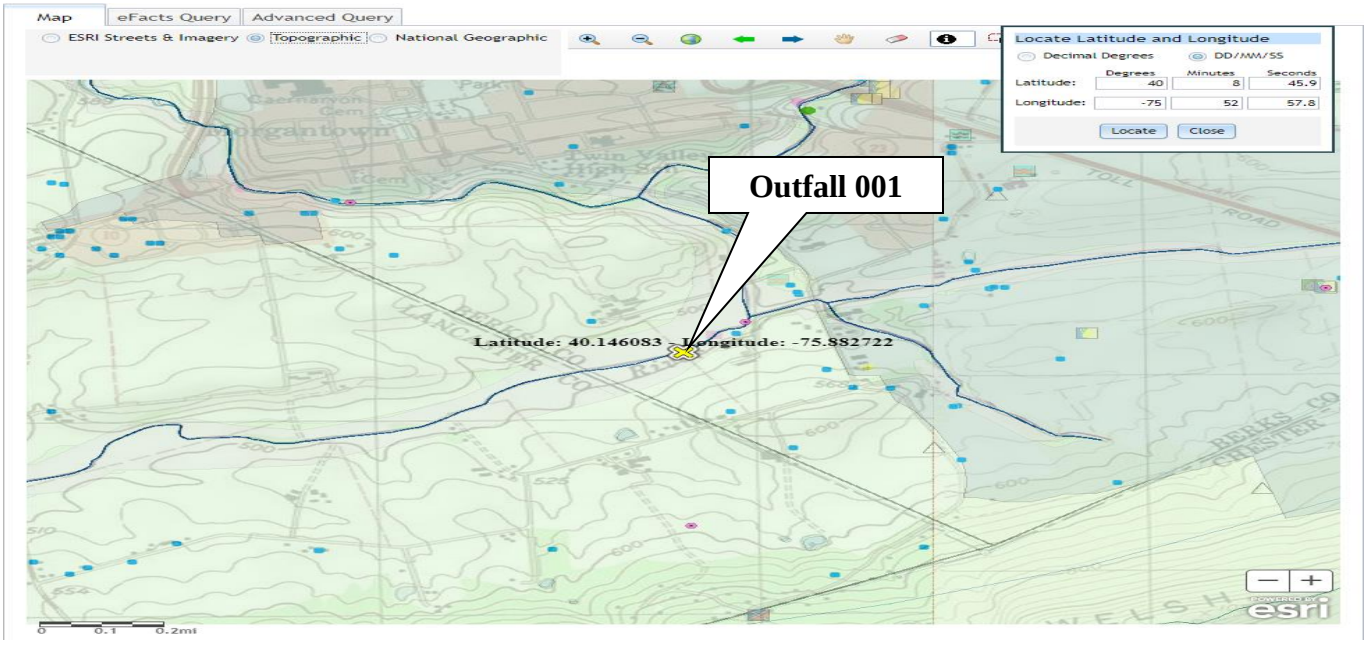
Stormwater:
There is no known stormwater outfall associated with this facility.

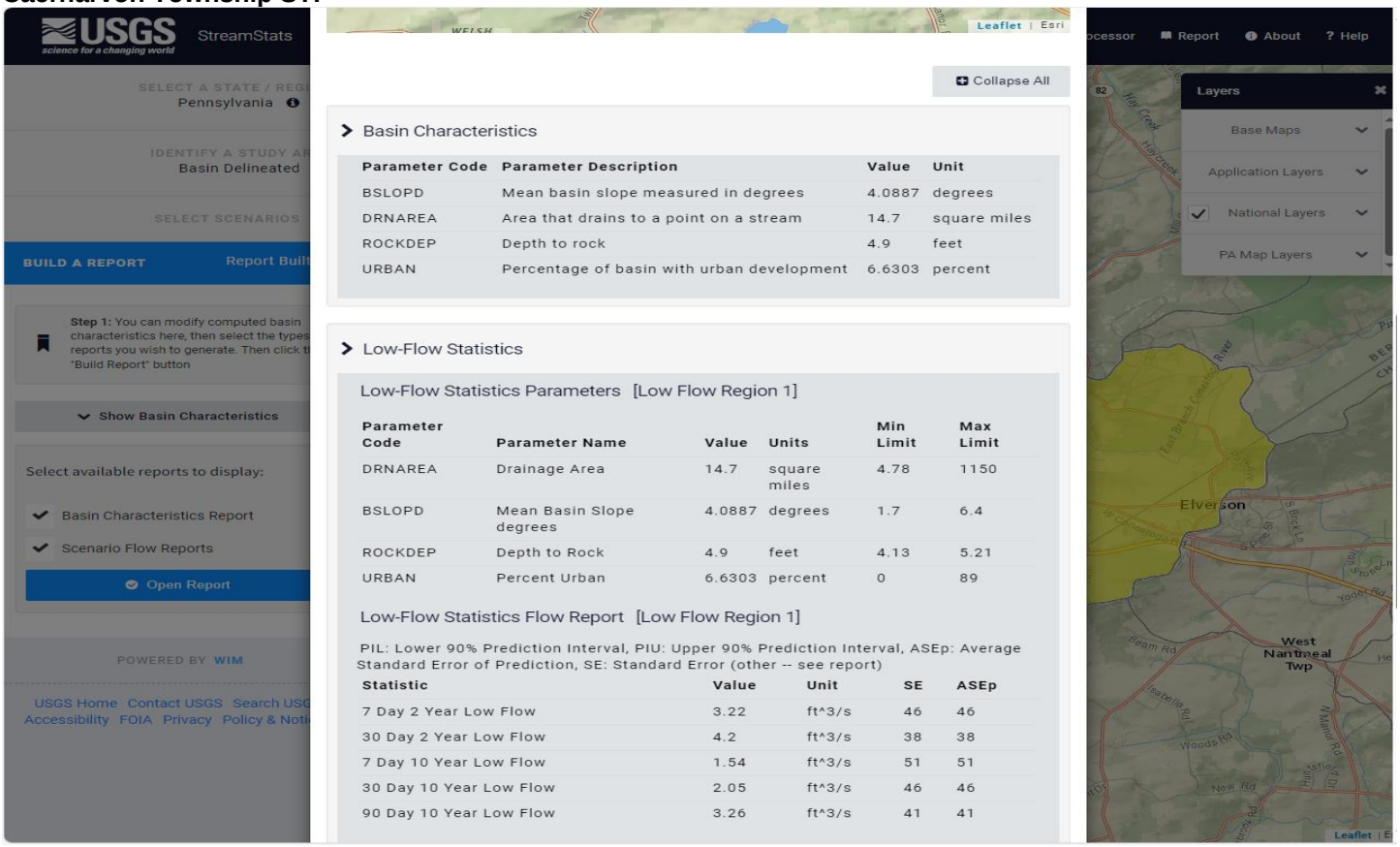
WETT:
Minor facilities and facilities without a formal EPA approved pretreatment program are exempted from WETT.

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

Antidegradation (93.4):
The effluent limits for this discharge have been developed to ensure that existing in-stream water uses and the level of water quality necessary to protect the existing uses are maintained and protected. No High-Quality Waters are impacted by this discharge. No Exceptional Value Waters are impacted by this discharge.

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




USGS
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StreamStats
Pennsylvania
Basin Delineated
BUILD A REPORT
Step 1: You can modify computed basin characteristics here, then select the types reports you wish to generate. Then click t "Build Report" button
Show Basin Characteristics
Select available reports to display:
Basin Characteristics Report
Scenario Flow Reports
Open Report
POWERED BY WIM
USGS Home Contact USGS Search USG
Accessibility FOIA Privacy Policy & Noti
Leaflet | Esri
Collapse All
Basin Characteristics
Parameter Code | Parameter Description | Value | Unit
BSLOPD | Mean basin slope measured in degrees | 4.0887 | degrees
DRNAREA | Area that drains to a point on a stream | 14.7 | square miles
ROCKDEP | Depth to rock | 4.9 | feet
URBAN | Percentage of basin with urban development | 6.6303 | percent
Low-Flow Statistics
Low-Flow Statistics Parameters [Low Flow Region 1]
Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit
DRNAREA | Drainage Area | 14.7 | square miles | 4.78 | 1150
BSLOPD | Mean Basin Slope degrees | 4.0887 | degrees | 1.7 | 6.4
ROCKDEP | Depth to Rock | 4.9 | feet | 4.13 | 5.21
URBAN | Percent Urban | 6.6303 | percent | 0 | 89
Low-Flow Statistics Flow Report [Low Flow Region 1]
PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)
Statistic | Value | Unit | SE | ASEp
7 Day 2 Year Low Flow | 3.22 | ft^3/s | 46 | 46
30 Day 2 Year Low Flow | 4.2 | ft^3/s | 38 | 38
7 Day 10 Year Low Flow | 1.54 | ft^3/s | 51 | 51
30 Day 10 Year Low Flow | 2.05 | ft^3/s | 46 | 46
90 Day 10 Year Low Flow | 3.26 | ft^3/s | 41 | 41
Report
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Layers
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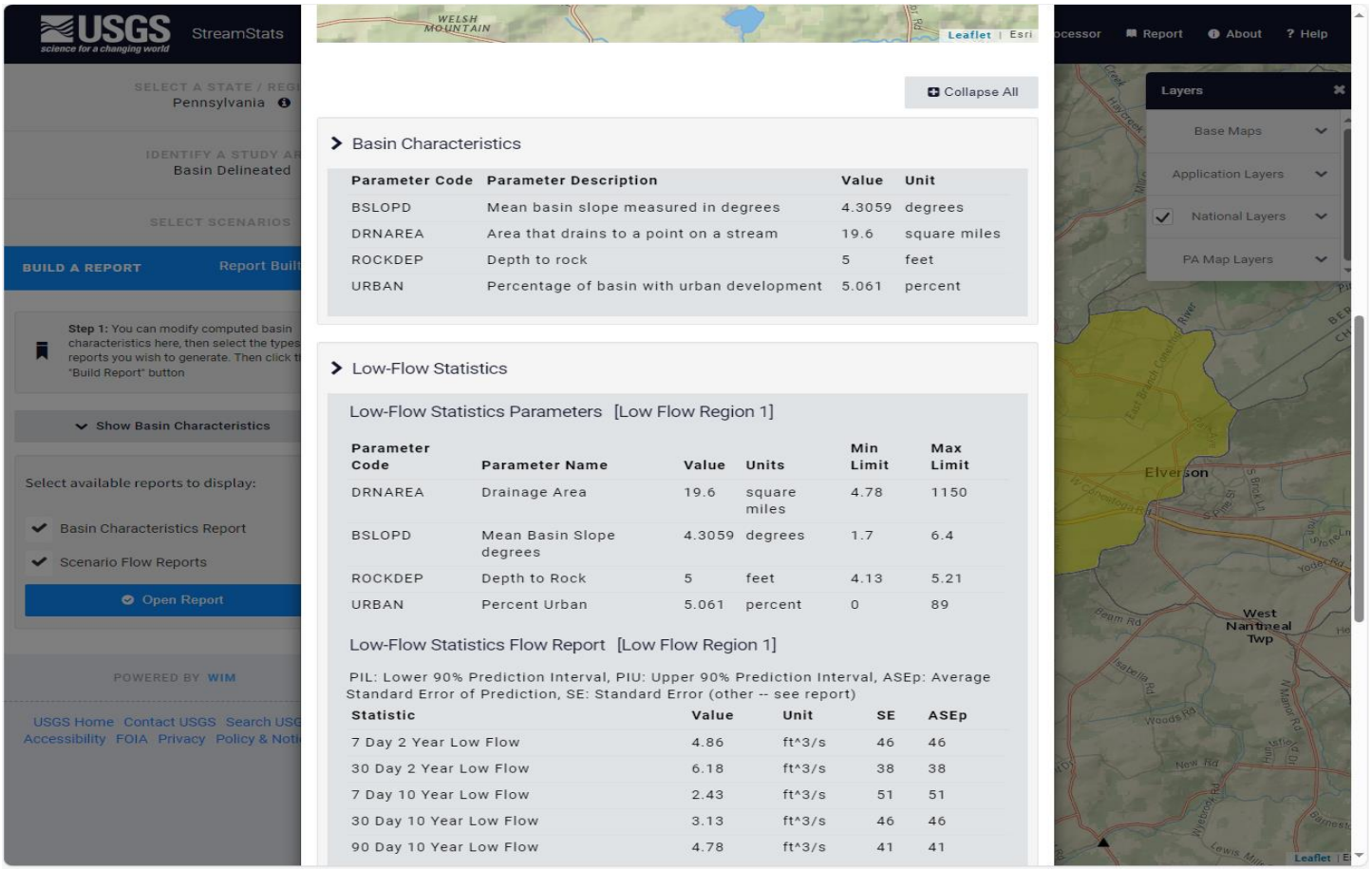
National Layers
PA Map Layers
Elverson
West Nantmeal Twp
Leaflet


USGS
science for a changing world
StreamStats
WELSH MOUNTAIN
Pennsylvania
Basin Delineated
BUILD A REPORT
Step 1: You can modify computed basin characteristics here, then select the types reports you wish to generate. Then click t "Build Report" button
Show Basin Characteristics
Select available reports to display:
Basin Characteristics Report
Scenario Flow Reports
Open Report
POWERED BY WIM
USGS Home Contact USGS Search USG
Accessibility FOIA Privacy Policy & Noti
Leaflet | Esri
Collapse All
Basin Characteristics
Parameter Code | Parameter Description | Value | Unit
BSLOPD | Mean basin slope measured in degrees | 4.3059 | degrees
DRNAREA | Area that drains to a point on a stream | 19.6 | square miles
ROCKDEP | Depth to rock | 5 | feet
URBAN | Percentage of basin with urban development | 5.061 | percent
Low-Flow Statistics
Low-Flow Statistics Parameters [Low Flow Region 1]
Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit
DRNAREA | Drainage Area | 19.6 | square miles | 4.78 | 1150
BSLOPD | Mean Basin Slope degrees | 4.3059 | degrees | 1.7 | 6.4
ROCKDEP | Depth to Rock | 5 | feet | 4.13 | 5.21
URBAN | Percent Urban | 5.061 | percent | 0 | 89
Low-Flow Statistics Flow Report [Low Flow Region 1]
PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)
Statistic | Value | Unit | SE | ASEp
7 Day 2 Year Low Flow | 4.86 | ft^3/s | 46 | 46
30 Day 2 Year Low Flow | 6.18 | ft^3/s | 38 | 38
7 Day 10 Year Low Flow | 2.43 | ft^3/s | 51 | 51
30 Day 10 Year Low Flow | 3.13 | ft^3/s | 46 | 46
90 Day 10 Year Low Flow | 4.78 | ft^3/s | 41 | 41
Report
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Layers
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Application Layers
National Layers
PA Map Layers
Elverson
West Nantmeal Twp
Leaflet

WQM 7.0: (Summer)
The following data were used in the attached computer model (WQM 7.0) of the stream:

*	Discharge pH	7.0	(Default)
*	Discharge Temperature	20°C	(Default per 391-2000-013)
*	Stream pH	7.0	(Default per 391-2000-013)
*	Stream Temperature	20°C	(Default per 391-2000-013)

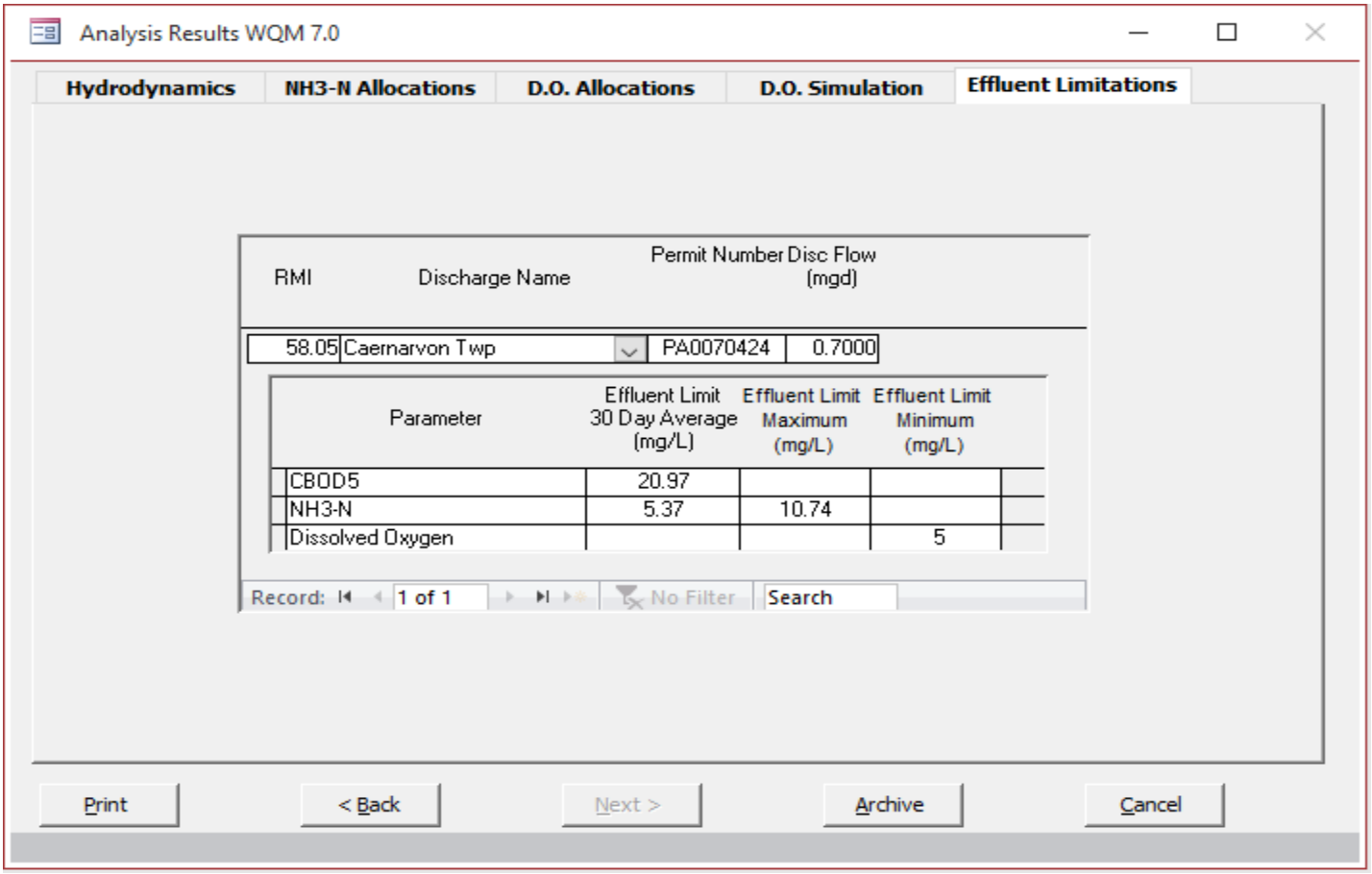
The following two nodes were used in modeling:

Node 1: Outfall 001 at Conestoga River (07548)

Elevation:	498.00 ft (USGS National Map)
Drainage Area:	14.7 mi^2 (USGS StreamStats)
River Mile Index:	58.05 (PA DEP eMapPA)
Low Flow Yield:	0.1 cfs/mi^2 (1.54 cfs/14.7$mi.^2$)
Discharge Flow:	0.7 MGD

Node 2: At the confluence UNT to 07809

Elevation:	458.00 ft (USGS National Map)
Drainage Area:	19.6 mi^2 (USGS StreamStats)
River Mile Index:	55.83 (PA DEP eMapPA)
Low Flow Yield:	0.1 cfs/mi^2
Discharge Flow:	0.00 MGD



rptEffLimits

WQM 7.0 Effluent Limits

SWP Basin: 07J | Stream Code: 7548 | Stream Name: CONESTOGA RIVER (formerly CREEK)

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Eff. Limit 30-day Ave. (mg/L)	Eff. Limit Maximum (mg/L)	Eff. Limit Minimum (mg/L)
56.050	Caernarvon Twp	PA0070424	0.700	CBOD5	20.97		
				NH3-N	5.37	10.74	
				Dissolved Oxygen			5

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rpt_WLA

WQM 7.0 Wasteload Allocations

SWP Basin: 07J | Stream Code: 7548 | Stream Name: CONESTOGA RIVER (formerly 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
56.050	Caernarvon Twp	16.76	31.32	16.76	31.32	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
56.050	Caernarvon Twp	1.89	5.37	1.89	5.37	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5 Baseline (mg/L)	CBOD5 Multiple (mg/L)	NH3-N Baseline (mg/L)	NH3-N Multiple (mg/L)	Dissolved Oxygen Baseline (mg/L)	Dissolved Oxygen Multiple (mg/L)	Critical Reach	Percent Reduction
56.05	Caernarvon Twp	20.97	20.97	5.37	5.37	5	5	0	0

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rptDOSim

WQM 7.0 D.O. Simulation

SWP Basin: 07J | Stream Code: 7548 | Stream Name: CONESTOGA RIVER (formerly CREEK)

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
56.050	0.700	20.000	7.000
Reach Width (ft)	Reach Depth (ft)	Reach WD Ratio	Reach Velocity (fps)
22.542	0.595	37.926	0.190
Reach CBOD5 (mg/L)	Reach Kr (1/days)	Reach NH3-N (mg/L)	Reach Kn (1/days)
1.003	1.042	2.28	0.700
Reach DO (mg/L)	Reach Kr (1/days)	Kr Equation	Reach DO Goal (mg/L)
6.287	8.175	Tsivoglou	6
Reach Travel Time (days)			
0.712			

Subreach Results

Travel time (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.071	9.33	2.17	6.40
0.142	8.88	2.06	6.19
0.214	8.04	1.86	6.13
0.285	7.48	1.87	6.16
0.356	6.93	1.78	6.24
0.427	6.43	1.69	6.36
0.499	5.97	1.61	6.50
0.570	5.55	1.53	6.64
0.641	5.15	1.45	6.78
0.712	4.78	1.38	6.92

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rptModelSpecs

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	EMPR	Use Inputted WD Ratio	☐
Q1-10/Q7-10 Ratio	0.84	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	6		

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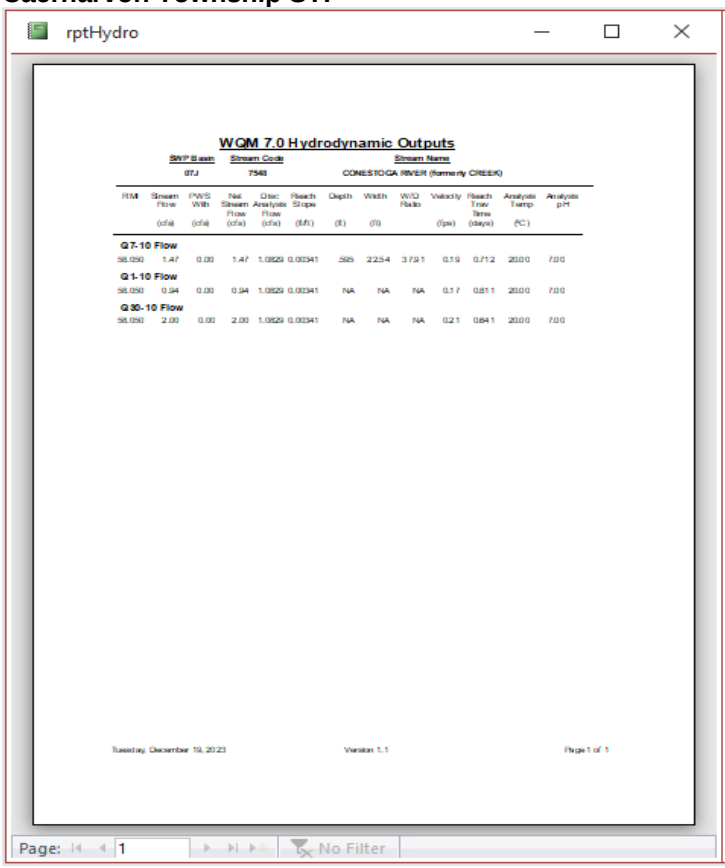
rptHydro
WQM 7.0 Hydrodynamic Outputs
SWP Basin
Stream Code
Stream Name
07J
7548
CONESTOGA RIVER (formerly CREEK)
RM
Stream Flow (cfs)
PWS With (cfs)
Net Stream Flow (cfs)
Disc Analysis Flow (cfs)
Reach Slope (ft/ft)
Depth (ft)
Width (ft)
W/D Ratio
Velocity (fps)
Reach Trav Time (days)
Analysis Temp (°C)
Analysis pH
Q7-10 Flow
58.050 1.47 0.00 1.47 1.0829 0.00341 .565 22.54 37.91 0.19 0.712 20.00 7.00
Q1-10 Flow
58.050 0.94 0.00 0.94 1.0829 0.00341 NA NA NA 0.17 0.851 20.00 7.00
Q30-10 Flow
58.050 2.00 0.00 2.00 1.0829 0.00341 NA NA NA 0.21 0.841 20.00 7.00
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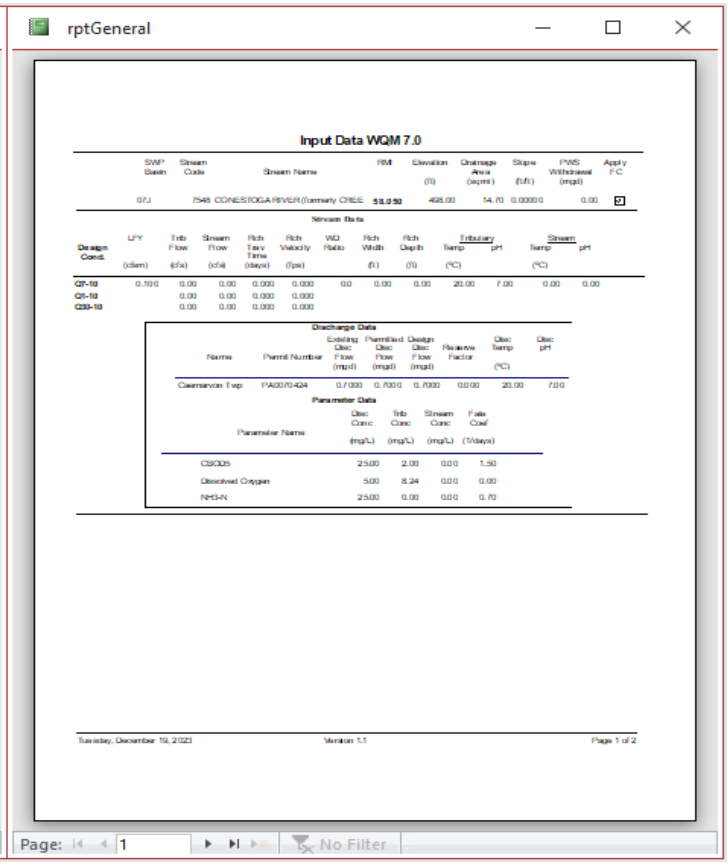
rptGeneral
Input Data WQM 7.0
SWP Basin
Stream Code
Stream Name
RM
Elevation (ft)
Drainage Area (sq mi)
Slope (ft/ft)
PWS Withdrawal (mgd)
Apply FC
07J
7548 CONESTOGA RIVER (formerly CREE
58.050
468.00
14.70
0.00000
0.00
Stream Data
Design Cond.
LFY (cfsm)
Trib Flow (cfs)
Stream Flow (cfs)
Rch Trav Time (days)
Rch Velocity (fps)
WD Ratio
Rch Width (ft)
Rch Depth (ft)
Tributary Temp (°C)
Tributary pH
Stream Temp (°C)
Stream pH
Q7-10
Q1-10
Q30-10
0.500
0.00
0.00
0.000
0.000
0.0
0.00
0.00
20.00
7.00
0.00
0.00
Discharge Data
Name
Permit Number
Existing Disc Flow (mgd)
Permitted Disc Flow (mgd)
Design Disc Flow (mgd)
Reserve Factor
Disc Temp (°C)
Disc pH
Caernarvon Twp
PA0070424
0.7000
0.7000
0.7000
0.000
20.00
7.00
Parameter Data
Parameter Name
Disc Conc (mg/L)
Trib Conc (mg/L)
Stream Conc (mg/L)
Fate Coef (1/days)
CBOD5
25.00
2.00
0.00
1.50
Dissolved Oxygen
5.00
8.24
0.00
0.00
NH3-N
25.00
0.00
0.00
0.70
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Version 1.1
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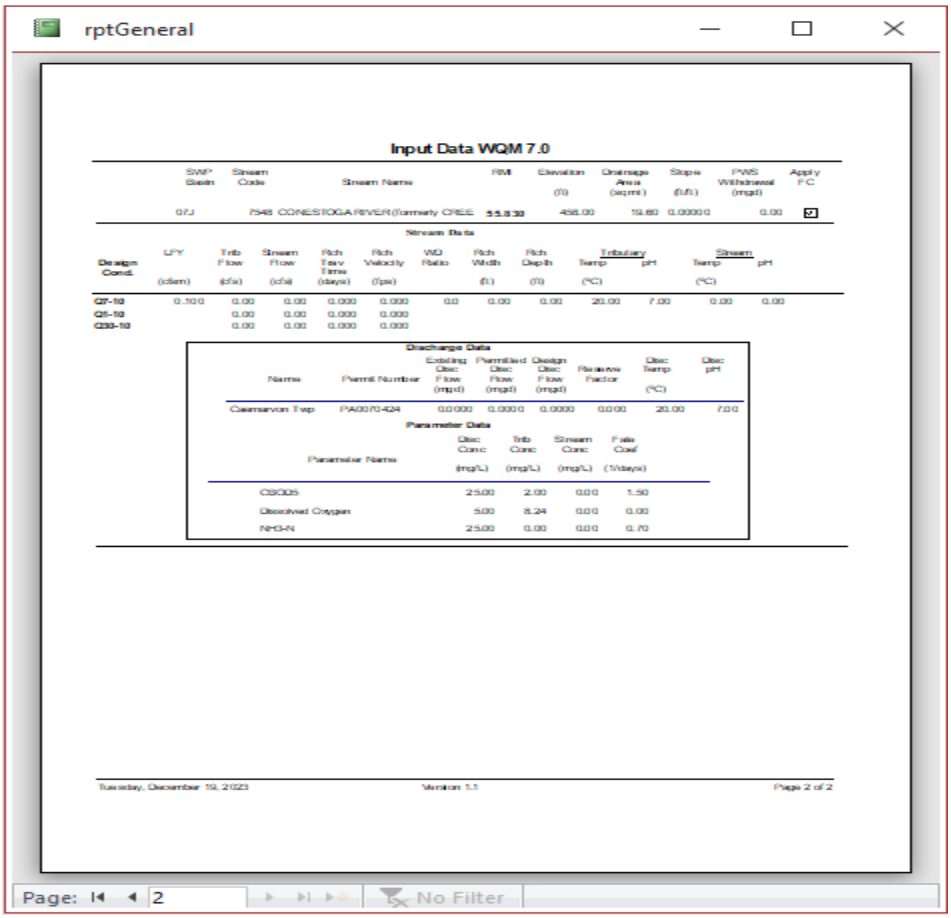
Page: 1
No Filter


rptGeneral
Input Data WQM 7.0
SWP Basin
Stream Code
Stream Name
RM
Elevation (ft)
Drainage Area (sq mi)
Slope (ft/ft)
PWS Withdrawal (mgd)
Apply FC
07J
7548 CONESTOGA RIVER (formerly CREE
55.830
458.00
19.60
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
Q1-10
Q30-10
0.500
0.00
0.00
0.000
0.000
0.0
0.00
0.00
20.00
7.00
0.00
0.00
Discharge Data
Name
Permit Number
Existing Disc Flow (mgd)
Permitted Disc Flow (mgd)
Design Disc Flow (mgd)
Reserve Factor
Disc Temp (°C)
Disc pH
Caernarvon Twp
PA0070424
0.0000
0.0000
0.0000
0.000
20.00
7.00
Parameter Data
Parameter Name
Disc Conc (mg/L)
Trib Conc (mg/L)
Stream Conc (mg/L)
Fate Coef (1/days)
CBOD5
25.00
2.00
0.00
1.50
Dissolved Oxygen
5.00
8.24
0.00
0.00
NH3-N
25.00
0.00
0.00
0.70
Tuesday, December 19, 2023
Version 1.1
Page 2 of 2
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No Filter

WQM 7.0: (Winter)

The following data were used in the attached computer model (WQM 7.0) of the stream:

*	Discharge pH	7.0	(Default)
*	Discharge Temperature	5°C	(Default per 391-2000-013)
*	Stream pH	7.0	(Default per 391-2000-013)
*	Stream Temperature	5°C	(Default per 391-2000-013)

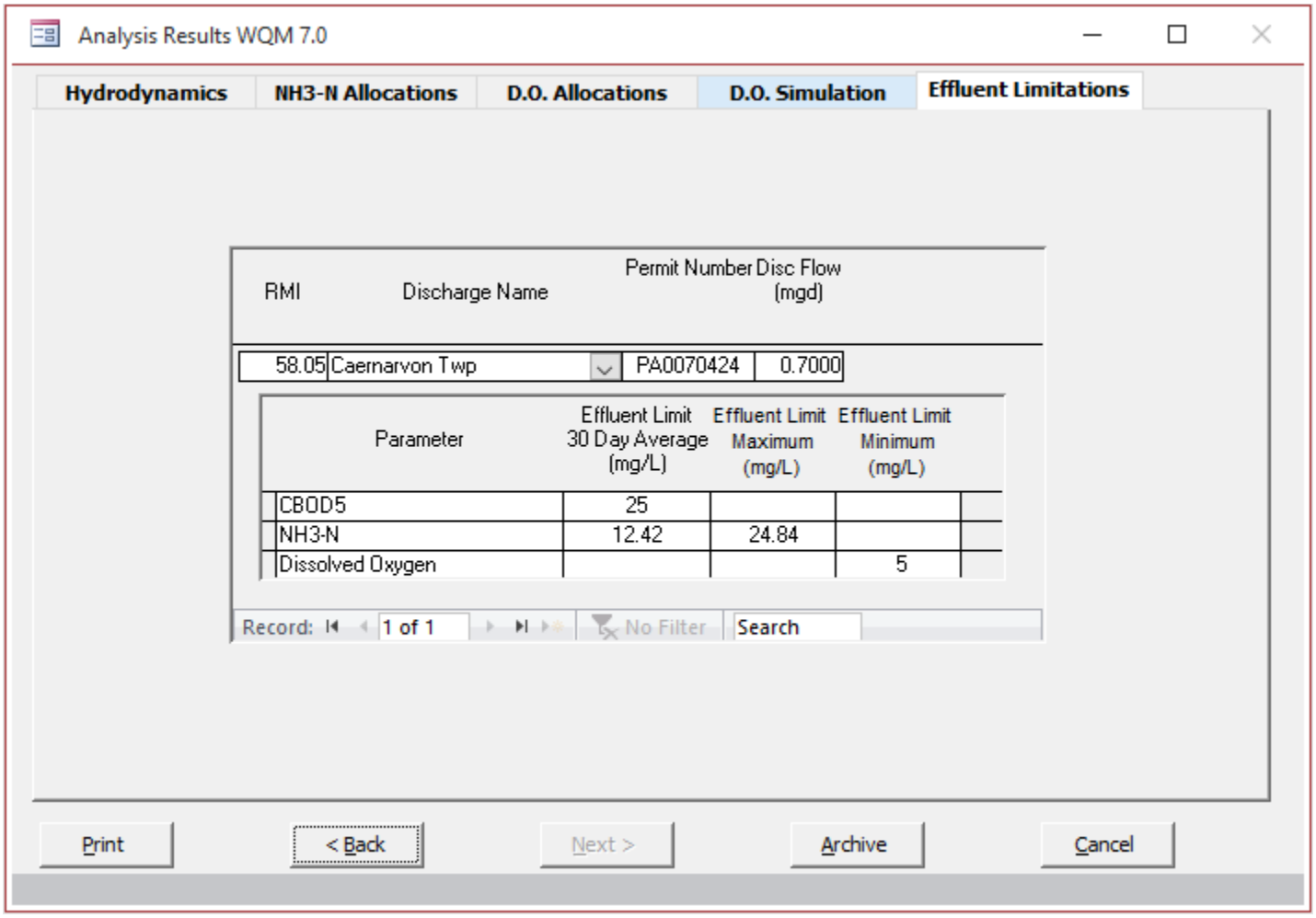
The following two nodes were used in modeling:

Node 1: Outfall 001 at Conestoga River (07548)

Elevation:	498.00 ft (USGS National Map)
Drainage Area:	14.7 mi^2 (USGS StreamStats)
River Mile Index:	58.05 (PA DEP eMapPA)
Low Flow Yield:	0.1 cfs/mi^2
Discharge Flow:	0.7 MGD

Node 2: At the confluence UNT to 07809

Elevation:	458.00 ft (USGS National Map)
Drainage Area:	19.6 mi^2 (USGS StreamStats)
River Mile Index:	55.83 (PA DEP eMapPA)
Low Flow Yield:	0.1 cfs/mi^2
Discharge Flow:	0.00 MGD



Toxics Data:

The following input data were used for Toxic Management Spreadsheet (TMS) Analysis:

* Discharge pH = 7.5 (Application) (average (6.68 + 8.33)/2 = 7.5)
* Stream pH = 7.0 (Default)
* Discharge Hardness = 371 mg/L
* Stream Hardness = 225 mg/L (downstream hardness)

Node 1: Outfall 001 at Conestoga River (07548)

Elevation:	498.00 ft (USGS National Map)
Drainage Area:	14.7 mi^2 (USGS StreamStats)
River Mile Index:	58.05 (PA DEP eMapPA)
Low Flow Yield:	0.1 cfs/mi^2
Discharge Flow:	0.7 MGD

Node 2: At the confluence UNT to 07809

Elevation:	458.00 ft (USGS National Map)
Drainage Area:	19.6 mi^2 (USGS StreamStats)
River Mile Index:	55.83 (PA DEP eMapPA)
Low Flow Yield:	0.1 cfs/mi^2
Discharge Flow:	0.00 MGD

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Toxics Management Spreadsheet
Version 1.4, May 2023

Discharge Information

Instructions | Discharge | Stream

Facility: Caernarvon Township Municipal Authority NPDES Permit No.: PA0070424 Outfall No.: 001

Evaluation Type: Custom / Additives Wastewater Description: Conestoga River

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.7	371	7.5						

Discharge Pollutant	Units	Max Discharge Conc		0 if left blank: Trib Conc	Stream Conc	0.5 if left blank: Daily CV	Hourly CV	0 if left blank: Stream CV	Fate Coeff	FOS	1 if left blank: Criteria Mod	Chem Transl
Total Dissolved Solids (PWS)	mg/L		1310									
Chloride (PWS)	mg/L		553									
Bromide	mg/L	<	1									
Sulfate (PWS)	mg/L		98.4									
Total Copper	mg/L		0.015									
Total Lead	mg/L	<	0.01									
Total Zinc	mg/L		0.022									

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Toxics Management Spreadsheet
Version 1.4, May 2023

Stream / Surface Water Information

Caernarvon Township Municipal Authority, NPDES Permit No. PA0070424, Outfall 001

Instructions | Discharge | Stream

Receiving Surface Water Name: Conestoga River No. Reaches to Model: 1

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

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	007548	58.05	498	14.7			Yes
End of Reach 1	007548	55.83	458	19.6			Yes

Q_{7-10}

Location	RMI	LFY (cfs/mi²)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness*	pH*	Hardness*	pH*	Hardness	pH
Point of Discharge	58.05	0.1										225	7		
End of Reach 1	55.83	0.1													

Q_h

Location	RMI	LFY (cfs/mi²)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	58.05														
End of Reach 1	55.83														

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Toxics Management Spreadsheet
Version 1.4, May 2023

Model Results

Caernarvon Township Municipal Authority, NPDES Permit No. PA0070424, Outfall 001

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

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ *AFC* CCT (min): 8.621 PMF: 1 Analysis Hardness (mg/l): 286.93 Analysis pH: 7.15

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	36.282	37.8	89.1	Chem Translator of 0.96 applied
Total Lead	0	0		0	199.113	312	736	Chem Translator of 0.637 applied
Total Zinc	0	0		0	286.240	293	690	Chem Translator of 0.978 applied

☑ *CFC* CCT (min): 8.621 PMF: 1 Analysis Hardness (mg/l): 286.93 Analysis pH: 7.15

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	22.043	23.0	54.1	Chem Translator of 0.96 applied
Total Lead	0	0		0	7.759	12.2	28.7	Chem Translator of 0.637 applied
Total Zinc	0	0		0	288.581	293	690	Chem Translator of 0.986 applied

☑ *THH* CCT (min): 8.621 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

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

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

☑ *CRL* CCT (min): 7.905 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

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

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

No. Samples/Month: 4

Pollutants	*Mass Limits* AML (lbs/day)	*Mass Limits* MDL (lbs/day)	*Concentration Limits* AML	*Concentration Limits* MDL	*Concentration Limits* IMAX	*Concentration Limits* Units	Governing WQBEL	WQBEL Basis	Comments
Total Copper	Report	Report	Report	Report	Report	mg/L	0.054	CFC	Discharge Conc > 10% WQBEL (no RP)

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

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

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable
Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Total Lead	28.7	µg/L	Discharge Conc ≤ 10% WQBEL
Total Zinc	0.44	mg/L	Discharge Conc ≤ 10% WQBEL

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April 3, 2023
VIA ELECTRONIC MAIL

Mr. John Good
Caernarvon Township Municipal Authority
601 Hemlock Road
P.O. Box 291
Morgantown, PA 19543-0291

Re: Emergency Approval - Disinfection
Caernarvon Township Sewage Treatment Plant
NPDES Permit No. PA0070424
Caernarvon Township, Berks County

Dear Mr. Good:

The Department of Environmental Protection (DEP) received a request for approval from Great Valley Consultants on your behalf for emergency use of sodium hypochlorite at the Caernarvon Township Sewage Plant. The failure of the UV disinfection equipment was realized on March 27, 2023 and reported to the DEP on the same day. A description of the emergency use of sodium hypochlorite was provided to DEP on March 30, 2023 by Great Valley Consultants.

DEP grants approval of the described sodium hypochlorite remedy until such time as the UV units are operational with the following conditions:

-the dosages must be maintained to prevent the discharge from exceeding 0.22 mg/l as a Monthly Average and 0.71 mg/l as a Daily Maximum for Total Residual Chlorine (TRC);

-the discharge must be monitored daily for TRC with the results attached to the facility's DMRs and submitted to DEP.

This emergency approval does not grant the right to exceed any of the existing NPDES permit limits. If it is desired to keep chlorine disinfection as a permanent design, an amendment to the pending WQM permit application for the UV disinfection upgrade (permit #0603412) should be submitted to DEP's Clean Water Program.

If you have questions, you may contact Bonnie Boylan of my staff at 717.705.4803 or bboylan@pa.gov.

Sincerely,

Maria D. Bebenek

Maria D. Bebenek, P.E.
Environmental Program Manager
Clean Water Program

cc: Eric McCracken, Great Valley Consultants (electronically)
Joseph Dalton, Caernarvon Township Municipal Sewage Authority (electronically)
Heather Dock, PADEP SCRO Clean Water Operations (electronically)

South Central Regional Office
909 Elmerton Avenue | Harrisburg, PA 17110-8200 | 717.705.4800 | Fax 717.705.4760
www.depweb.state.pa.us

Existing Effluent Limitations and Monitoring Requirements

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Daily Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	9.0 Daily Max	XXX	1/day	Grab
D.O.	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
UV Intensity (mW/cm²)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Recorded
CBOD5	146	234	XXX	25.0	40.0	50	1/week	8-Hr Composite
BOD5 Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	8-Hr Composite
TSS Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	8-Hr Composite
TSS	175	263	XXX	30.0	45.0	60	1/week	8-Hr Composite
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Ammonia May 1 - Oct 31	26	XXX	XXX	4.5	XXX	9	2/week	8-Hr Composite
Ammonia Nov 1 - Apr 30	79	XXX	XXX	13.5	XXX	27	2/week	8-Hr Composite
Total Phosphorus	12	XXX	XXX	2.0	XXX	4	2/week	8-Hr Composite

Existing Effluent Limitations and Monitoring Requirements

Chesapeake Bay Requirements

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Monthly	Annual	Monthly	Monthly Average	Maximum	Instant. Maximum		
Ammonia--N	Report	Report	XXX	Report	XXX	XXX	2/week	8-Hr Composite
Kjeldahl--N	Report	XXX	XXX	Report	XXX	XXX	2/week	8-Hr Composite
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	XXX	2/week	8-Hr Composite
Total Nitrogen	Report	Report	XXX	Report	XXX	XXX	1/month	Calculation
Total Phosphorus	Report	Report	XXX	Report	XXX	XXX	2/week	8-Hr Composite
Net Total Nitrogen	Report	12,785	XXX	XXX	XXX	XXX	1/month	Calculation
Net Total Phosphorus	Report	1,705	XXX	XXX	XXX	XXX	1/month	Calculation

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	Daily Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	9.0 Daily Max	XXX	1/day	Grab
D.O.	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
UV Intensity (mW/cm²)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Recorded
TRC (***for emergency use***)	XXX	XXX	XXX	0.22	XXX	0.71	Daily when Discharging	Grab
CBOD5	117.0	175.0	XXX	20.0	30.0	40.0	1/week	8-Hr Composite
BOD5 Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	8-Hr Composite
TSS Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	8-Hr Composite
TSS	175.0	263.0	XXX	30.0	45.0	60.0	1/week	8-Hr Composite
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1,000	1/week	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2,000 Geo Mean	XXX	10,000	1/week	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
Ammonia May 1 - Oct 31	26.0	XXX	XXX	4.5	XXX	9.0	2/week	8-Hr Composite
Ammonia Nov 1 - Apr 30	79.0	XXX	XXX	13.5	XXX	27.0	2/week	8-Hr Composite
Total Phosphorus	12.0	XXX	XXX	2.0	XXX	4.0	2/week	8-Hr Composite

Compliance Sampling Location:

Other Comments:

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
	Monthly	Annual	Monthly	Monthly Average	Maximum	Instant. Maximum		
Ammonia--N	Report	Report	XXX	Report	XXX	XXX	2/week	8-Hr Composite
Kjeldahl--N	Report	XXX	XXX	Report	XXX	XXX	2/week	8-Hr Composite
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	XXX	2/week	8-Hr Composite
Total Nitrogen	Report	Report	XXX	Report	XXX	XXX	1/month	Calculation
Total Phosphorus	Report	Report	XXX	Report	XXX	XXX	2/week	8-Hr Composite
Net Total Nitrogen	Report	12,785	XXX	XXX	XXX	XXX	1/month	Calculation
Net Total Phosphorus	Report	1,705	XXX	XXX	XXX	XXX	1/month	Calculation

Compliance Sampling Location:

Other Comments:

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment)
☒	Toxics Management Spreadsheet (see Attachment)
☒	TRC Model Spreadsheet (see Attachment)
☐	Temperature Model Spreadsheet (see Attachment)
☒	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☐	Technical Guidance for the Development and Specification of Effluent Limitations, 386-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 386-2000-019, 3/98.
☐	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 386-2000-018, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 386-2183-001, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 386-2183-002, 12/97.
☐	Pennsylvania CSO Policy, 386-2000-002, 9/08.
☒	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 386-2000-008, 4/97.
☐	Determining Water Quality-Based Effluent Limits, 386-2000-004, 12/97.
☐	Implementation Guidance Design Conditions, 386-2000-007, 9/97.
☒	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 386-2000-016, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 386-2000-012, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 386-2000-009, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 386-2000-015, 5/2004.
☒	Implementation Guidance for Section 93.7 Ammonia Criteria, 386-2000-022, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 386-2000-013, 4/2008.
☐	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 386-2000-011, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 386-2000-001, 4/09.
☒	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 386-2000-021, 10/97.
☐	Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 386-2000-020, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 386-2000-005, 3/99.
☐	Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 386-2000-010, 3/1999.
☐	Design Stream Flows, 386-2000-003, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 386-2000-006, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 386-3200-001, 6/97.
☒	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☒	SOP: SOP No. BCW-PMT-033
☐	Other: