

Application Type Renewal
Facility Type Municipal
Major / Minor Minor

**NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE**

Application No. PA0056413
APS ID 1008151
Authorization ID 1299608

Applicant and Facility Information

Applicant Name	<u>Lower Salford Township Authority</u>	Facility Name	<u>Lower Salford Township Mainland STP</u>
Applicant Address	<u>PO Box 243</u> <u>Harleysville, PA 19438-0243</u>	Facility Address	<u>57 Main Street</u> <u>Harleysville, PA 19438-2515</u>
Applicant Contact	<u>Connie Weimer</u>	Facility Contact	<u>Craig Forwood</u>
Applicant Phone	<u>(215) 256-8676</u>	Facility Phone	<u>(215) 256-6127</u>
Client ID	<u>61749</u>	Site ID	<u>457766</u>
Ch 94 Load Status	<u>Not Overloaded</u>	Municipality	<u>Lower Salford Township</u>
Connection Status	<u>No Limitations</u>	County	<u>Montgomery</u>
Date Application Received	<u>December 2, 2019</u>	EPA Waived?	<u>Yes</u>
Date Application Accepted	<u>February 4, 2021</u>	If No, Reason	<u></u>
Purpose of Application	<u>NPDES permit renewal.</u>		

Summary of Review

The PA Department of Environmental Protection (PADEP/Department) received an NPDES permit renewal application for Mainland STP (facility) from Lower Salford Township Authority (permittee) on December 2, 2019. The facility is in Lower Salford Township, Montgomery County. This is a minor facility with design flow of 0.9 MGD. The treated effluent discharges through Outfall 001 into a culvert to Skippack Creek, TSF/MF, at RMI 10.79. The existing permit expired on May 31, 2020. The terms and conditions were automatically extended since the renewal application was received at least 180 days prior to permit expiration date. Renewal NPDES permit applications under Clean Water program are not covered by PADEP's PDG per 021-2100-001.


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

Changes in the permit: Monitoring for Total Zinc and Lead, monitoring removed for Total and Dissolved Iron, Total Copper, and Total Aluminum. Mass limits recalculated for TSS. CBOD5 limits became more stringent, and mass limits for NH₃-N are recalculated.

Sludge use and disposal description and location(s): Other WWTP

Public Participation

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

Approve	Deny	Signatures	Date
√		Reza H. Chowdhury, E.I.T. / Project Manager 	February 9, 2021
X		Pravin Patel Pravin C. Patel, P.E. / Environmental Engineer Manager	02/09/2021

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	001	Design Flow (MGD)	0.9
Latitude	40° 15' 26"	Longitude	-75° 21' 21"
Quad Name	Telford	Quad Code	1643
Wastewater Description: Sewage Effluent			
Receiving Waters	Skippack Creek (TSF, MF)	Stream Code	01024
NHD Com ID	25998882	RMI	10.7900
Drainage Area	10.9 mi ²	Yield (cfs/mi ²)	0.02
Q ₇₋₁₀ Flow (cfs)	0.244	Q ₇₋₁₀ Basis	StreamStats
Elevation (ft)	194.37	Slope (ft/ft)	
Watershed No.	3-E	Chapter 93 Class.	TSF, MF
Existing Use	None	Existing Use Qualifier	N/A
Exceptions to Use	None	Exceptions to Criteria	N/A
Assessment Status	Impaired		
Cause(s) of Impairment	ALGAE, NUTRIENTS, SILTATION		
Source(s) of Impairment	RURAL (RESIDENTIAL AREAS)		
TMDL Status	Final 04/09/2005, withdrawn	Name	Skippack Creek Watershed TMDL
Background/Ambient Data		Data Source	
pH (SU)	7.0		Default per 391-2000-013
Temperature (°C)	20		Default per 391-2000-013 for TSF/CWF
Hardness (mg/L)	100		Default
Other:			
Nearest Downstream Public Water Supply Intake		Aqua PA Main Division at Perkiomen Cr & Green Ln Reservoir release	
PWS Waters	Perkiomen Creek	Flow at Intake (cfs)	
PWS RMI	0.934	Distance from Outfall (mi)	12.77

Changes Since Last Permit Issuance: None

Other Comments:

Streamflow:

There is no nearby upstream Stream Gage from Outfall 001. In absence of Stream Gage data, Streamflow will be correlated with the USGS's web-based GIS application (<https://streamstats.usgs.gov/ss/>) accessed on February 4, 2021. Q₇₋₁₀ and Q₃₀₋₁₀ values at discharge point are 0.244 cfs and 0.426 cfs, respectively. The drainage area was found to be 10.9 mi². Default Q₁₋₁₀: Q₇₋₁₀ ratio is 0.64.

$$Q_{7-10} \text{ runoff rate} = 0.244 \text{ cfs}/10.9 \text{ mi}^2 = 0.02 \text{ cfs}/\text{mi}^2$$

$$Q_{1-10} = 0.64 * 0.244 = 0.156 \text{ cfs}$$

$$Q_{30-10}/Q_{7-10} = 0.426 \text{ cfs}/0.244 \text{ cfs} = 1.75$$

PWS Intake:

The nearest downstream public water supply is Aqua PA Main Division at Perkiomen Creek and Green Reservoir release, located at Perkiomen Creek RMI 0.934. It is approximately 12.77 miles downstream of the discharge. Due to the distance, dilution, and effluent limits the discharge is not expected to impact the public water supply.

Wastewater Characteristics:

A median pH of 6.7 during July through September for the reporting years 2019-2020 from eDMR, a default temperature of 20°C, and discharge hardness of 182 mg/l from application data will be used for modeling.

Background data:

A default pH of 7.0, hardness of 100 mg/l, and temperature of 20°C will be used for modeling.

303d Listed Streams:

The discharge from this facility is to Skippack Creek which has Aquatic Life impairment due to Nutrients, Siltation, and Excessive Algal Growth due to small residential runoff. Skippack Creek Watershed TMDL was finalized

Skippack Creek Total Maximum Daily Load (TMDL):

Skippack Creek is a 15.2-mile stream located in sub-sub-basin 03E, Montgomery County, PA. It is a tributary to Perkiomen Creek whose drainage basin is composed of urban, suburban, agricultural, and rural components. Skippack Creek begins within Souderton Borough limits and flows generally southwest to its confluence with Perkiomen Creek at RMI 3.0. The Skippack Creek TMDL was finalized in April 9, 2005 for Sediments and Nutrients. There were 11 active NPDES permitted point source discharges in the watershed including 7 STPs, 1 meat packing plant, 1 dairy farm, and 2 manufacturers. No reduction for sediment load from point sources were proposed in the final TMDL. The nutrient portion of the TMDL was withdrawn in summer of 2007. No WLA was assigned to this treatment plant. The effluent limitations in the permit will be applied in a way that the discharge from this facility will not add to the existing impairment of the receiving stream.

Antidegradation (93.4):

The effluent limits for this discharge have been developed to ensure that existing in-stream water uses and the level of water quality necessary to protect the existing uses are maintained and protected. The receiving streams are designated as Trout Stocking (TSF) and Migratory Fishes (MF.)

Class A Wild Trout Fisheries:

No Class A Wild Trout Fisheries are impacted by this discharge. The receiving stream, Skippack Creek, is a stocked trout water. The existing permit has a minimum DO limit of 5.0 mg/l to protect the stocked trout. This requirement will be carried over during this renewal.

Treatment Facility Summary				
Treatment Facility Name: Mainland STP				
WQM Permit No.		Issuance Date		
4617401		04/19/2017		
Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Tertiary	Activated Sludge With Solids Removal	Ultraviolet	0.9
Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
1.976	2252	Not Overloaded	Aerobic digestion	Other WWTP

Changes Since Last Permit Issuance: WQM permit 4617401 authorized extension of an existing force main and allowed the construction of a new headworks building in 2017.

Treatment Plant Description

Lower Salford Mainland WWTP is a 0.9 MGD Minor Sewer Facility (MISF2) located in Lower Salford Township, Montgomery County which discharges treated sewage through outfall 001 into Skippack Creek in watershed 3-E.

The facility receives flows mostly from Towamencin Township and Upper Gwynedd Township and small contributions from few other townships as listed in the next page.

Municipalities served	Flow contribution (%)	Type of Sewer System		Population
		Separate (%)	Combined (%)	
Lower Salford Township	95	100	0	8,696
Franconia Township	5	100	0	445

Per the renewal application, there are several non-categorical and non-significant Industrial/Commercial Users contributing to the treatment plant. They are Alderfer Bolonga Co., Isabella's, and Almac. The facility doesn't have or required to have an EPA approved Pretreatment Program.

Per DEP's recent visit to the site on January 8, 2021, the treatment facility consists of the following units:

- Two influent screens
- One oxidation ditch
- Two secondary clarifiers
- One media filter
- Two UV disinfection chambers
- Two aerated digesters

Flow enters the plant via one of two force mains and into the Headworks Building, through a fine screen and vortex grit removal system, continues by gravity flow to a multi-channel oxidation ditch, directed to circular clarifiers and then to a travelling bridge filter prior to disinfection by ultraviolet irradiation.

The process flow diagram is attached in the appendix.

The facility uses Aluminum Chloride for Phosphorus removal at a rate of 108 gals/day.

Biosolids Management:

Aerobically digested biosolids are hauled off site to either Hatfield Township Municipal Authority or Towamencin Township Authority's WWTP for further treatment and disposal.

Compliance History

DMR Data for Outfall 001 (from January 1, 2020 to December 31, 2020)

Parameter	DEC-20	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20	JUN-20	MAY-20	APR-20	MAR-20	FEB-20	JAN-20
Flow (MGD) Average Monthly	1.183	0.874	0.626	0.560	0.740	0.681	0.603	0.702	0.994	0.977	0.974	0.885
Flow (MGD) Daily Maximum	3.105	3.162	1.457	0.833	2.916	1.688	0.842	1.139	3.680	1.992	2.010	2.753
pH (S.U.) Minimum	6.3	6.4	6.2	6.3	5.9	6.0	6.1	6.5	6.4	6.3	6.5	6.4
pH (S.U.) Maximum	8.4	7.4	7.3	7.2	7.0	6.9	7.3	7.5	7.5	7.3	7.0	7.6
DO (mg/L) Minimum	8.3	7.9	6.4	6.2	6.6	6.0	6.9	7.8	8.7	8.7	7.5	7.4
CBOD5 (lbs/day) Average Monthly	< 11.99	18.53	14.84	24.43	16.40	14.74	24.36	32.49	23.33	38.17	42.36	38.20
CBOD5 (lbs/day) Raw Sewage Influent Average Monthly	1722.64	1887.89	1936.93	1596.34	1660.16	1982.15	1985.20	1778.36	1586.70	2124.63	2473.50	1979.92
CBOD5 (lbs/day) Weekly Average	30.03	32.39	38.11	51.61	34.52	19.73	30.29	38.66	22.26	53.72	35.34	43.06
CBOD5 (mg/L) Average Monthly	< 2.00	2.54	2.84	5.23	2.66	2.60	4.85	5.55	2.81	4.69	5.22	5.18
CBOD5 (mg/L) Raw Sewage Influent Average Monthly	174.6	259.00	371.0	341.8	269	349.0	394.75	303.75	191.4	260.75	304.5	268.25
CBOD5 (mg/L) Weekly Average	3.51	3.45	4.82	7.43	3.36	4.24	6.36	8.22	3.84	6.58	5.68	6.47
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	1581.06	2140.58	1782.9	1325.46	1629.30	2091.2	2791.10	1496.85	1618.20	2065.56	2063.28	1845.23
BOD5 (mg/L) Raw Sewage Influent Average Monthly	160.25	293.66	341.5	283.8	264	368.2	555	255.66	195.2	253.5	254.0	250.0
TSS (lbs/day) Average Monthly	44.73	14.58	12.18	9.97	8.24	14.39	5.44	18.54	22.10	35.97	35.17	13.54
TSS (lbs/day) Raw Sewage Influent Average Monthly	980.70	1366.72	960.63	868.69	1026.03	1382.4	1562.76	1412.44	896.97	1472.78	1423.58	1452.19
TSS (lbs/day) Weekly Average	65.71	20.82	50.05	20.84	37.71	19.25	10.53	21.97	41.20	51.68	35.21	31.08

**NPDES Permit Fact Sheet
Lower Salford Township Mainland STP**

NPDES Permit No. PA0056413

TSS (mg/L) Average Monthly	4.53	2.00	2.33	2.13	1.34	2.53	1.08	3.17	2.67	4.42	4.33	1.84
TSS (mg/L) Raw Sewage Influent Average Monthly	99.4	187.5	184	186	166.25	243.4	310.75	241.25	108.2	180.75	175.25	196.75
TSS (mg/L) Weekly Average	8.00	2.67	6.33	3.00	3.67	4.00	2.33	4.67	5.00	6.33	5.66	4.67
Total Dissolved Solids (lbs/day) Average Monthly	2653.61	3056.70	2881.90	2792.25	3611.62	3228.19	2744.38	2341.87	3264.59	3472.18	2877.47	2878.55
Total Dissolved Solids (mg/L) Average Monthly	268.96	419.35	552.0	597.86	585.20	568.39	545.71	400.0	393.80	426.13	354.23	390
Fecal Coliform (CFU/100 ml) Geometric Mean	64.9	27.76	23.56	2.22	8.73	5.38	2.11	3.71	4.18	10.53	5.42	8.41
Fecal Coliform (CFU/100 ml) Instantaneous Maximum	550	900	200.0	5.5	17.5	10.0	14.0	9.5	17.0	70.0	15.5	33.5
UV Intensity (mW/cm ²) Minimum	1.0	0.9	0.6	0.6	0.4	1.1	0.0	0.4	0.8	0.9	1.0	0.8
Nitrate-Nitrite (lbs/day) Average Monthly	69.75	94.03	94.50	70.06	17.90	52.54	83.48	70.26	82.90	78.14	79.93	76.02
Nitrate-Nitrite (mg/L) Average Monthly	7.07	12.90	18.10	15.00	2.90	9.25	16.60	12.00	10.00	9.59	9.84	10.30
Total Nitrogen (lbs/day) Average Monthly	80.40	99.72	100.76	74.68	25.67	59.41	87.80	78.51	87.04	85.80	116.08	91.08
Total Nitrogen (mg/L) Average Monthly	8.15	13.68	19.30	15.99	4.16	10.46	17.46	13.41	10.50	10.53	14.29	12.34
Ammonia (lbs/day) Average Monthly	< 0.63	< 0.47	< 0.52	< 0.47	< 0.62	< 0.57	< 0.16	< 0.59	< 0.83	0.92	6.68	< 0.74
Ammonia (mg/L) Average Monthly	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.11	0.82	< 0.10
TKN (lbs/day) Average Monthly	10.65	5.69	6.27	4.62	7.78	6.87	4.32	8.26	4.14	7.66	36.15	15.06
TKN (mg/L) Average Monthly	1.08	0.78	1.20	0.99	1.26	1.21	0.86	1.41	0.50	0.94	4.45	2.04
Total Phosphorus (lbs/day) Average Monthly	4.59	7.34	1.08	3.08	0.91	0.65	0.83	1.81	3.45	2.77	1.60	1.07

**NPDES Permit Fact Sheet
Lower Salford Township Mainland STP**

NPDES Permit No. PA0056413

Total Phosphorus (mg/L) Average Monthly	0.47	1.01	0.21	0.66	0.15	0.11	0.17	0.31	0.42	0.34	0.20	0.15
Total Aluminum (mg/L) Average Monthly	0.121	0.101	0.133	< 0.100	0.169	< 0.100	0.215	0.261	0.257	0.143	0.115	0.112
Total Copper (mg/L) Average Monthly	< 0.100	0.006	0.008	0.008	0.004	< 0.002	0.006	0.004	0.004	0.007	0.007	0.007
Dissolved Iron (mg/L) Average Monthly	0.024	0.012	0.018	0.011	< 0.010	0.014	0.012	< 0.100	< 0.010	0.014	0.018	0.011
Total Iron (mg/L) Average Monthly	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100	< 0.010	< 0.100	< 0.100	< 0.100	< 0.100
Total Hardness (mg/L) Average Monthly	146.0	174	168	172	154.0	162	144	120	152.0	120	162.0	146.0

Compliance History

Effluent Violations for Outfall 001, from: February 1, 2020 To: December 31, 2020

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
pH	08/31/20	Min	5.9	S.U.	6.0	S.U.

Summary of Inspections:

01/08/2021: RTPT conducted. No violation noted. Final effluent appeared clear.

07/24/2020: RTPT conducted. No violation noted. The plant looked to be operating properly and well maintained. Final effluent looked clear.

03/06/2020: CEI conducted. No violation noted.

04/05/2019: INCDT inspection conducted. Unpermitted discharge of sewage (SSO) occurred on 4/4/2019. Solids may be discharged from sand filter and bypassed the UV channel and may be discharged into the stream. An NOV was issued on April 19, 2019 for this SSO.

Other Comments: None

Existing Effluent Limitations and Monitoring Requirements

The table below summarizes effluent limitations and monitoring requirements specified in the existing final NPDES permit that was in effect between June 1, 2015 to May 31, 2020.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Metered
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
CBOD5 Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
CBOD5 May 1 - Oct 31	75	113	XXX	10	15	20	1/week	24-Hr Composite
CBOD5 Nov 1 - Apr 30	150	225	XXX	20	30	40	1/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Suspended Solids Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Total Suspended Solids	225	340	XXX	30	45	60	1/week	24-Hr Composite
Total Dissolved Solids	Report	XXX	XXX	Report	XXX	XXX	1/month	Grab
Fecal Coliform (CFU/100 ml)	XXX	XXX	XXX	200 Geo Mean	XXX	1000 (*)	1/week	Grab
UV Intensity (mW/cm ²)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Measured
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Nitrogen	Report	XXX	XXX	Report	XXX	XXX	1/month	Calculation
Ammonia-Nitrogen May 1 - Oct 31	11	XXX	XXX	1.4	XXX	2.8	1/week	24-Hr Composite
Ammonia-Nitrogen Nov 1 - Apr 30	32	XXX	XXX	4.2	XXX	8.4	1/week	24-Hr Composite

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Total Kjeldahl Nitrogen	Report	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Phosphorus Apr 1 - Oct 31	7.5	XXX	XXX	1.0	XXX	2.0	1/week	24-Hr Composite
Total Phosphorus Nov 1 - Mar 31	15	XXX	XXX	2.0	XXX	4.0	1/week	24-Hr Composite
Total Aluminum	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Copper	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Dissolved Iron	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Iron	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Hardness, Total (as CaCO3)	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite

Development of Effluent Limitations

Outfall No. <u>001</u>	Design Flow (MGD) <u>.9</u>
Latitude <u>40° 15' 26.00"</u>	Longitude <u>-75° 21' 21.00"</u>
Wastewater Description: <u>Sewage Effluent</u>	

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	200 / 100 ml	Geo Mean	-	DRBC, 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)	1,000 / 100 ml	10% rule	-	DRBC
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)
Total Dissolved Solids	1,000	Average Monthly		DRBC

Comments: These standards apply, subject to Water Quality Analysis and BPJ where applicable.

Water Quality-Based Limitations

WQM 7.0:

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

- Discharge pH 6.7 (median July-Sep, 2019-2020, daily eDMR data)
- Discharge Temperature 20°C (Default per 391-2000-013)
- Discharge Hardness 182 mg/l (Application data)
- Stream pH 7.0 (Default)
- Stream Temperature 20°C (Default per 391-2000-007)
- Stream Hardness 100 mg/l (Default)

The following two nodes were used in modeling:

- Node 1: At Outfall 001 on Skippack Creek (01024) at RMI 10.79
 Elevation: 194.37 ft (USGS TNM 2.0 viewer, 02/04/2021)
 Drainage Area: 10.9 mi² (StreamStat Version 3.0, 02/04/2021)
 River Mile Index: 10.79 (PA DEP eMapPA)
 Low Flow Yield: 0.02 cfs/mi²
 Discharge Flow: 0.9 MGD
- Node 2: on Skippack Creek At confluence with West Branch Skippack Creek (01083)
 Elevation: 161.65 ft (USGS TNM 2.0 viewer, 02/04/2021)
 Drainage Area: 19.2 mi² (StreamStat Version 3.0, 02/04/2021)
 River Mile Index: 8.56 (PA DEP eMapPA)
 Low Flow Yield: 0.02 cfs/mi²
 Discharge Flow: 0.0 MGD

Ammonia (NH₃-N), Carbonaceous Biochemical Oxygen Demand (CBOD₅), & Dissolved Oxygen (DO):

WQM 7.0 version 1.0b is a water quality model designed to assist DEP to determine appropriate effluent limits for CBOD₅, NH₃-N and DO. The model simulates two basic processes. In the NH₃-N module, the model simulates the

mixing and degradation of NH₃-N in the stream and compares calculated instream NH₃-N concentrations to NH₃-N water quality criteria. In the D.O. module, the model simulates the mixing and consumption of D.O. in the stream due to the degradation of CBOD₅ and NH₃-N and compares calculated instream D.O. concentrations to D.O. water quality criteria. The model was utilized for this permit renewal by using Q₇₋₁₀ and current background water quality levels of the stream.

NH₃-N:

WQM 7.0 suggested NH₃-N limit of 1.4 mg/l as monthly average and 2.8 mg/l as IMAX limit during summer to protect water quality standards. These values are the same as existing permitted limits. Recent DMR data show that the plant is meeting the permit limits. The average monthly mass loading is calculated to be 10.5 lbs./day. The existing winter season limits of 4.2 mg/l as average monthly and 8.4 mg/l as IMAX limit will be carried over in this renewal. Winter average monthly mass limit was calculated as 31.5 lbs./day. The mass-based limits are a little stringent compared to existing limits. Recalculated mass-based limits will be applied in this renewal.

CBOD₅:

The WQM 7.0 model suggests a monthly average CBOD₅ limit of 9.29 mg/l, weekly average 13.94 mg/l, and IMAX 18.58 mg/l. The average monthly and average weekly mass loadings were calculated as 69.73 lbs/day and 104.6 lbs/day respectively. These values will be rounded down to 9.0 mg/l, 13.0 mg/l, 18.0 mg/l, 65 lbs./day, and 100 lbs./day, respectively, per PADEP's guidance 362-0400-001 Chapter 5 Page 9. The current permit has seasonal limit for CBOD₅ with a multiplier of 2.0 which will be carried over in this renewal. Seasonal limit for CBOD₅ is allowed in PADEP's guidance (per *Determining Water-Quality Based Effluent Limits*, 391-2000-003, December 9, 1997). The existing permit has summer season average monthly concentration-based limit of 10 mg/l, average weekly limit of 15 mg/l, and IMAX of 20 mg/l. The winter limits are calculated as: average monthly 18.58 mg/l, weekly average 27.87 mg/l, and IMAX of 37.16 mg/l. Winter season average monthly mass limit is 139.46 lbs./day and weekly average is 209.19 lbs./day. These values will be rounded down to 18.0 mg/l, 27.0 mg/l, 37.0 mg/l, 135 lbs./day, and 205 lbs./day, respectively.

Dissolved Oxygen (DO):

A minimum of 5.0 mg/L for D.O. is an existing effluent limit and is supported by the output from WQM 7.0 modeling. The existing limit will remain unchanged in the draft permit.

Toxics:

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

1. In general, establish limits in the draft permit where the effluent concentration determined in B.1 or B.2 equals or exceeds 50% of the WQBEL (i.e., RP is demonstrated). Use the average monthly, maximum daily and instantaneous maximum (IMAX) limits for the permit as recommended by the TMS (or, if appropriate, use a multiplier of 2 times the average monthly limit for the maximum daily limit and 2.5 times the average monthly limit for IMAX).
2. For non-conservative pollutants, in general, establish monitoring requirements where the effluent concentration determined in B.1 or B.2 is between 25% - 50% of the WQBEL.
3. For conservative pollutants, in general, establish monitoring requirements where the effluent concentration determined in B.1 or B.2 is between 10% - 50% of the WQBEL.

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

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

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

The table below summarizes the model recommendations:

Recommended WQBELs & Monitoring Requirements

No. Samples/Month: **4**

Pollutants	Mass Limits		Concentration Limits				Governing WQBEL	WQBEL Basis	Comments
	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units			
Total Aluminum	Report	6.51	Report	867	867	µg/L	750	AFC	Discharge Conc > 10% WQBEL (no RP)
Total Copper	Report	Report	Report	Report	Report	µg/L	17.1	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Lead	0.055	0.085	7.28	11.4	18.2	µg/L	7.28	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Zinc	1.42	1.64	189	218	218	µg/L	189	AFC	Discharge Conc ≥ 50% WQBEL (RP)

Each of the pollutants are discussed below:

Total Aluminum: The model suggests no RP was demonstrated for Total Aluminum based on the average discharge concentration out of 24 sample results. The existing permit has Monitoring requirement for Total Aluminum. It is recommended that existing monthly monitoring for Total Aluminum will be removed from this renewal.

Total Copper: The model suggests no RP was demonstrated for Total Copper based on the average discharge concentration out of 24 sample results. The existing permit has Monitoring requirement for Total Copper. It is recommended that the monitoring requirement for Total Copper be removed from this renewal.

Total Lead: The model recommends that a RP was demonstrated for Total Lead. The determination was based on one sample result. It is recommended that a quarterly monitoring requirement will be placed in this renewal to collect data for another RP determination in next renewal.

Total Zinc: The model recommends that a RP was demonstrated for Total Zinc. This determination was based on one sample result. It is recommended that a quarterly monitoring requirement will be placed in this renewal to collect data for another RP determination in next renewal.

Total and Dissolved Iron: No limits or monitoring was recommended by the model, nor an RP was demonstrated. The application indicated no use of ferric chloride to remove Phosphorus. Therefore, it is recommended that monitoring requirement for Total and Dissolved Iron be removed from this renewal. If the permittee decides to use ferric chloride or any iron salt for any treatment purpose, they must indicate so in the next renewal application.

Total Hardness: Existing monthly monitoring for Total Hardness will be carried over in this renewal with sampling frequency changed to quarterly. The data will refine the TMS model run for hardness-based parameters.

Additional Requirements:

Total Dissolved Solids: TMS didn't recommend monitoring for TDS. However, Skippack Creek has elevated concentration of TDS. Continuation of monitoring of TDS in this watershed is recommended to determine the contribution of Mainland STP to the Watershed.

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. Delaware River Basin Commission's (DRBC's) Water Quality Regulations at Section 4.30.4.A requires that during winter season from October through April, the instantaneous maximum concentration of fecal coliform organisms shall not be greater than 1,000 per 100 milliliters in more than 10 percent of the samples tested. Therefore, the summer limit is governed by DEP's regulation while winter limit is governed by DRBC's regulation. Existing requirements will be carried over.

pH:

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

Total Suspended Solids (TSS):

There is no water quality criterion for TSS. The existing limits of 30 mg/L average monthly, 45 mg/l average weekly, and 60 mg/L instantaneous maximum will remain in the permit based on the minimum level of effluent quality attainable by secondary treatment, 25 Pa. Code § 92a.47 and 40CFR 133.102(b). The mass based average monthly and weekly average limits are calculated to be 225.18 lbs./day and 337.77 lbs./day respectively, which are rounded down to 225 lbs./day and 335 lbs./day, respectively (362-0400-001). The existing average weekly mass limit is 340 lbs./day, which will be changed to 335 lbs./day.

Flow and Influent BOD₅, CBOD₅, and TSS Monitoring Requirement:

The requirement to monitor the volume of effluent will remain in the draft permit per 40 CFR § 122.44(i)(1)(ii). Influent BOD₅ and TSS monitoring requirements are established in the permit per the requirements set in Pa Code 25 Chapter 94. To show compliance with percentage removal efficiency of CBOD₅, reporting for influent CBOD₅ will remain in the permit.

UV monitoring: The existing permit has daily monitoring requirement for UV Intensity in mW/cm². This monitoring requirement will be carried over in this renewal.

Best Professional Judgment (BPJ) Limitations

Total Phosphorus: The existing permit has seasonal Total Phosphorus limits. The DMR data indicates the average mass loading for April-October is 1.69 lbs./day (<7.5 lbs./day permit limit) and concentration 0.29 mg/l (<1 mg/l permit limit). Average mass loading for November-March is 3.47 lbs./day (<15 lbs./day permit limit) and concentration 0.434 mg/l (<2 mg/l permit limit). It is evident that the permittee is meeting the existing limits comfortably. It is recommended that the existing limits be carried over in this renewal.

Total Nitrogen:

PADEP's SOP BCW-PMT-033 suggests monitoring requirement, at a minimum, for facilities with design flow greater than 2,000 GPD. This requirement is applied for all facilities meeting the flow criteria. The existing permit has monitoring requirements for Total Nitrogen, TKN, and Nitrate-Nitrite-N. These monitoring requirements will be carried over in this renewal since TKN and Nitrate-Nitrite-N are components of TN calculation.

Anti-Backsliding

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

Proposed Effluent Limitations and Monitoring Requirements

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

Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) ⁽¹⁾		Concentrations (mg/L)				Minimum ⁽²⁾ Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Daily Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Metered
pH (S.U.)	XXX	XXX	6.0	XXX	9.0 Daily Max	XXX	1/day	Grab
Dissolved Oxygen	XXX	XXX	5.0	XXX	XXX	XXX	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5) Nov 1 - Apr 30	135.0	205.0	XXX	18.0	27.0	37.0	1/week	24-Hr Composite
Carbonaceous Biochemical Oxygen Demand (CBOD5) May 1 - Oct 31	65.0	100.0	XXX	9.0	13.0	18.0	1/week	24-Hr Composite
Carbonaceous Biochemical Oxygen Demand (CBOD5) Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Biochemical Oxygen Demand (BOD5) Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Suspended Solids	225	335	XXX	30.0	45.0	60	1/week	24-Hr Composite
Total Suspended Solids Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/week	24-Hr Composite
Total Dissolved Solids	Report	XXX	XXX	Report	XXX	XXX	1/month	Grab
Fecal Coliform (No./100 ml)	XXX	XXX	XXX	200 Geo Mean	XXX	1000*	1/week	Grab

Outfall001 , 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	Daily Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Ultraviolet light intensity (mW/cm ²)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Measured
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Nitrogen	Report	XXX	XXX	Report	XXX	XXX	1/month	Calculation
Ammonia-Nitrogen Nov 1 - Apr 30	31.5	XXX	XXX	4.2	XXX	8.4	1/week	24-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	10.5	XXX	XXX	1.4	XXX	2.8	1/week	24-Hr Composite
Total Kjeldahl Nitrogen	Report	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Phosphorus Nov 1 - Mar 31	15	XXX	XXX	2.0	XXX	4	1/week	24-Hr Composite
Total Phosphorus Apr 1 - Oct 31	7.5	XXX	XXX	1.0	XXX	2	1/week	24-Hr Composite
Lead, Total	XXX	XXX	XXX	Report Avg. Qrtly	XXX	XXX	1/quarter	24-Hr Composite
Zinc, Total	XXX	XXX	XXX	Report Avg. Qrtly	XXX	XXX	1/quarter	24-Hr Composite
Hardness, Total (as CaCO ₃)	XXX	XXX	XXX	Report Avg. Qrtly	XXX	XXX	1/quarter	24-Hr Composite

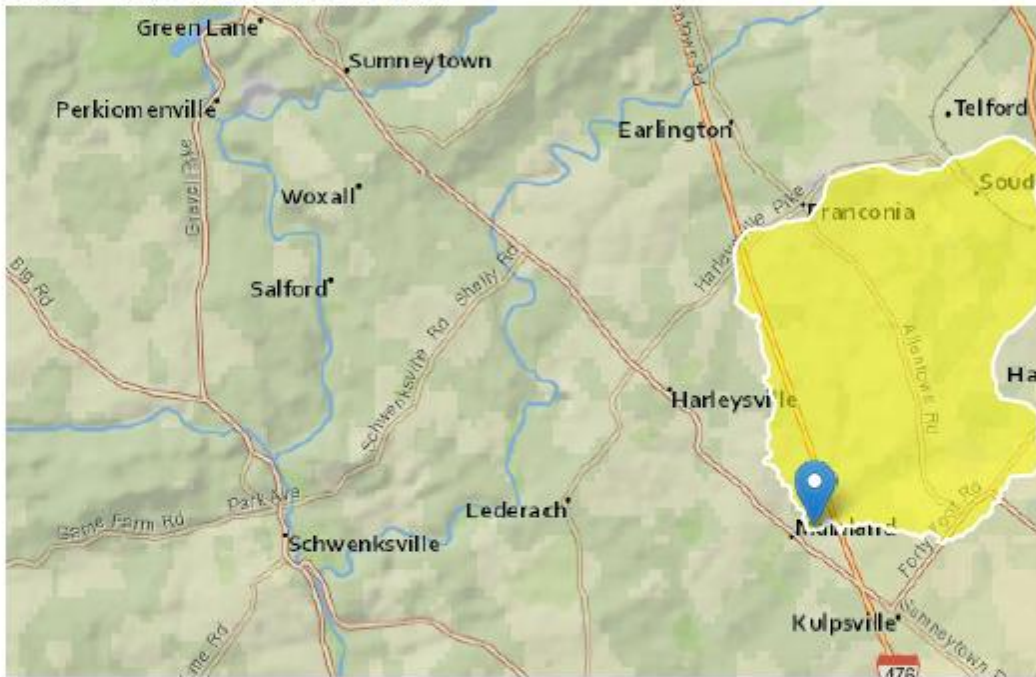
* See permit regarding October thru April reporting of maximum fecal coliform values
Compliance Sampling Location: At Outfall 001

Other Comments: None

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

PA0056413 At DP

Region ID: PA
Workspace ID: PA20210204195836004000
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Time: 2021-02-04 14:58:55 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	10.9	square miles
BSLOPD	Mean basin slope measured in degrees	2.155	degrees
ROCKDEP	Depth to rock	4.1	feet
URBAN	Percentage of basin with urban development	26.8645	percent

Low-Flow Statistics Parameters_(Low Flow Region 1)

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	10.9	square miles	4.78	1150
BSLOPD	Mean Basin Slope degrees	2.155	degrees	1.7	6.4
ROCKDEP	Depth to Rock	4.1	feet	4.13	5.21
URBAN	Percent Urban	26.8645	percent	0	89

Low-Flow Statistics Disclaimers_(Low Flow Region 1)

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

Low-Flow Statistics Flow Report_(Low Flow Region 1)

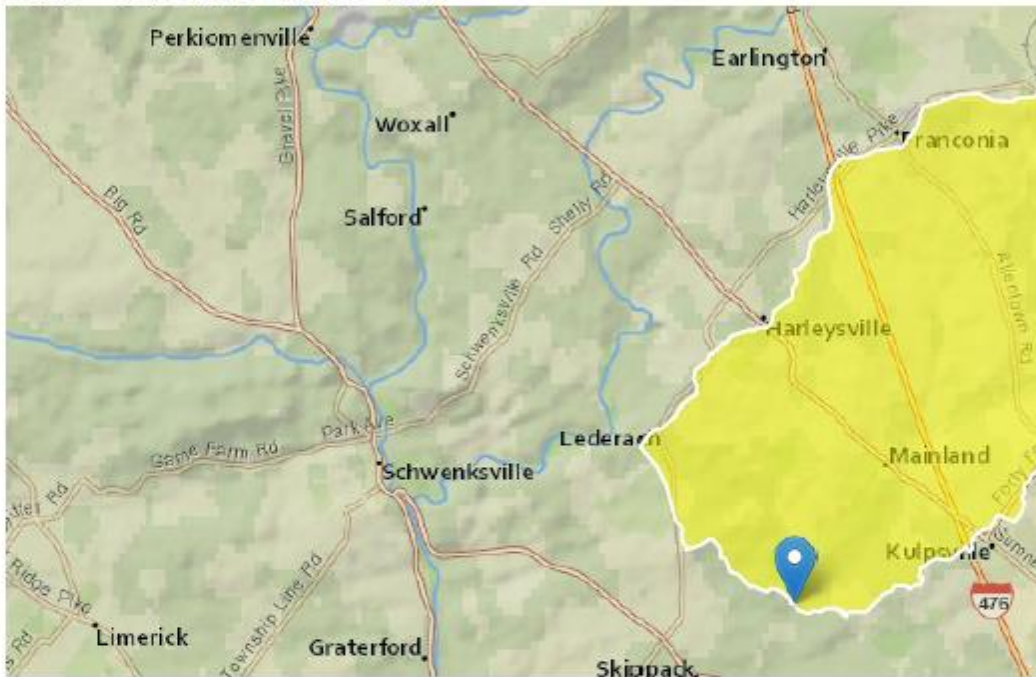
Statistic	Value	Unit
7 Day 2 Year Low Flow	0.701	ft ³ /s
30 Day 2 Year Low Flow	1.17	ft ³ /s
7 Day 10 Year Low Flow	0.244	ft ³ /s
30 Day 10 Year Low Flow	0.426	ft ³ /s
90 Day 10 Year Low Flow	1.03	ft ³ /s

Low-Flow Statistics Citations

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

PA0056413 at Node 2

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Workspace ID: PA20210204200456933000
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Time: 2021-02-04 15:05:14 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	19.2	square miles
BSLOPD	Mean basin slope measured in degrees	2.1721	degrees
ROCKDEP	Depth to rock	4.1	feet
URBAN	Percentage of basin with urban development	25.9259	percent

Low-Flow Statistics Parameters_(Low Flow Region 1)

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	19.2	square miles	4.78	1150
BSLOPD	Mean Basin Slope degrees	2.1721	degrees	1.7	6.4
ROCKDEP	Depth to Rock	4.1	feet	4.13	5.21
URBAN	Percent Urban	25.9259	percent	0	89

Low-Flow Statistics Disclaimers_(Low Flow Region 1)

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

Low-Flow Statistics Flow Report_(Low Flow Region 1)

Statistic	Value	Unit
7 Day 2 Year Low Flow	1.23	ft ³ /s
30 Day 2 Year Low Flow	2.05	ft ³ /s
7 Day 10 Year Low Flow	0.44	ft ³ /s
30 Day 10 Year Low Flow	0.759	ft ³ /s
90 Day 10 Year Low Flow	1.81	ft ³ /s

Low-Flow Statistics Citations

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



Discharge Information

Instructions Discharge Stream

Facility: **Mainland STP** NPDES Permit No.: **PA0056413** Outfall No.: **001**

Evaluation Type: **Major Sewage / Industrial Waste** Wastewater Description: **Treated 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
0.9	182	6.7						

Discharge Pollutant	Units	Max Discharge Conc	0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
			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	538									
Chloride (PWS)	mg/L	183									
Bromide	mg/L	< 1									
Sulfate (PWS)	mg/L	36.8									
Fluoride (PWS)	mg/L										
Group 2											
Total Aluminum	µg/L	< 170									
Total Antimony	µg/L										
Total Arsenic	µg/L										
Total Barium	µg/L										
Total Beryllium	µg/L										
Total Boron	µg/L										
Total Cadmium	µg/L										
Total Chromium (III)	µg/L										
Hexavalent Chromium	µg/L										
Total Cobalt	µg/L										
Total Copper	µg/L	8									
Free Cyanide	µg/L										
Total Cyanide	µg/L										
Dissolved Iron	µg/L	19									
Total Iron	µg/L	< 100									
Total Lead	µg/L	< 10									
Total Manganese	µg/L										
Total Mercury	µg/L										
Total Nickel	µg/L										
Total Phenols (Phenolics) (PWS)	µg/L										
Total Selenium	µg/L										
Total Silver	µg/L										
Total Thallium	µg/L										
Total Zinc	µg/L	< 100									
Total Molybdenum	µg/L										
Acrolein	µg/L	<									
Acrylamide	µg/L	<									
Acrylonitrile	µg/L	<									
Benzene	µg/L	<									
Bromoform	µg/L	<									



Stream / Surface Water Information

Mainland STP, NPDES Permit No. PA0056413, Outfall 001

Instructions Discharge **Stream**

Receiving Surface Water Name: Skippack 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	001024	10.79	194.37	10.9			Yes
End of Reach 1	001024	8.56	161.65	19.2			Yes

Q₇₋₁₀

Location	RMI	LFY (cfs/mi ²)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	10.79	0.02										100	7		
End of Reach 1	8.56	0.02													

Q_b

Location	RMI	LFY (cfs/mi ²)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	10.79														
End of Reach 1	8.56														

Permit No. PA0056413



Model Results

Mainland STP, NPDES Permit No. PA0056413, Outfall 001

Instructions

Results

RETURN TO INPUTS

SAVE AS PDF

PRINT

All Inputs Results Limits

Hydrodynamics

Wasteload Allocations

AFC

CCT (min):

PMF:

Analysis Hardness (mg/l):

Analysis pH:

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 Aluminum	0	0		0	750	750	867	
Total Copper	0	0		0	22.267	23.2	26.8	Chem Translator of 0.96 applied
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	115.145	162	187	Chem Translator of 0.713 applied
Total Zinc	0	0		0	184.525	189	218	Chem Translator of 0.978 applied

CFC

CCT (min):

PMF:

Analysis Hardness (mg/l):

Analysis pH:

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 Aluminum	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	14.157	14.7	17.1	Chem Translator of 0.96 applied
Dissolved Iron	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	1,735	WQC = 30 day average; PMF = 1
Total Lead	0	0		0	4.487	6.29	7.28	Chem Translator of 0.713 applied
Total Zinc	0	0		0	186.034	189	218	Chem Translator of 0.966 applied

THH

CCT (min):

PMF:

Analysis Hardness (mg/l):

Analysis pH:

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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 Aluminum	0	0		0	N/A	N/A	N/A	
Total Copper	0	0		0	N/A	N/A	N/A	
Dissolved Iron	0	0		0	300	300	347	
Total Iron	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): PMF: Analysis Hardness (mg/l): Analysis pH:

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 Aluminum	0	0		0	N/A	N/A	N/A	
Total Copper	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 Zinc	0	0		0	N/A	N/A	N/A	

Recommended WQBELs & Monitoring Requirements

No. Samples/Month:

Pollutants	Mass Limits		Concentration Limits				Governing WQBEL	WQBEL Basis	Comments
	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units			
Total Aluminum	Report	6.51	Report	867	867	µg/L	750	AFC	Discharge Conc > 10% WQBEL (no RP)
Total Copper	Report	Report	Report	Report	Report	µg/L	17.1	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Lead	0.055	0.085	7.28	11.4	18.2	µg/L	7.28	CFC	Discharge Conc ≥ 50% WQBEL (RP)
Total Zinc	1.42	1.64	189	218	218	µg/L	189	AFC	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

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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
Dissolved Iron	347	µg/L	Discharge Conc ≤ 10% WQBEL
Total Iron	1,735	µg/L	Discharge Conc ≤ 10% WQBEL

Permit No. PA0056413

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
03E	1024	SKIPPACK CREEK	10.790	194.37	10.90	0.00000	0.00	<input checked="" type="checkbox"/>

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		Stream	
									Temp (°C)	pH	Temp (°C)	pH
Q7-10	0.020	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data							
Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Mainland STP	PA0056413	0.9000	0.9000	0.9000	0.000	20.00	6.70

Parameter Data					
Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)	
CBOD5	10.00	2.00	0.00	1.50	
Dissolved Oxygen	5.00	8.24	0.00	0.00	
NH3-N	1.40	0.00	0.00	0.70	

Permit No. PA0056413

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
03E	1024	SKIPPACK CREEK	8.560	161.65	19.20	0.00000	0.00	<input checked="" type="checkbox"/>

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		Stream	
									Temp (°C)	pH	Temp (°C)	pH
Q7-10	0.020	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data							
Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	25.00	7.00
Parameter Data							
Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)			
CBOD5	25.00	2.00	0.00	1.50			
Dissolved Oxygen	3.00	8.24	0.00	0.00			
NH3-N	25.00	0.00	0.00	0.70			

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WQM 7.0 Hydrodynamic Outputs

<u>SWP Basin</u>		<u>Stream Code</u>			<u>Stream Name</u>							
03E		1024			SKIPPACK CREEK							
RMI	Stream Flow	PWS With	Net Stream Flow	Disc Analysis Flow	Reach Slope	Depth	Width	W/D Ratio	Velocity	Reach Trav Time	Analysis Temp	Analysis pH
	(cfs)	(cfs)	(cfs)	(cfs)	(ft/ft)	(ft)	(ft)		(fps)	(days)	(°C)	
Q7-10 Flow												
10.790	0.22	0.00	0.22	1.3923	0.00278	.557	18.72	33.62	0.15	0.882	20.00	6.73
Q1-10 Flow												
10.790	0.14	0.00	0.14	1.3923	0.00278	NA	NA	NA	0.15	0.907	20.00	6.72
Q30-10 Flow												
10.790	0.38	0.00	0.38	1.3923	0.00278	NA	NA	NA	0.16	0.836	20.00	6.75

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WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	<input checked="" type="checkbox"/>
WLA Method	EMPR	Use Inputted W/D Ratio	<input type="checkbox"/>
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	<input type="checkbox"/>
Q30-10/Q7-10 Ratio	1.75	Temperature Adjust Kr	<input checked="" type="checkbox"/>
D.O. Saturation	90.00%	Use Balanced Technology	<input checked="" type="checkbox"/>
D.O. Goal	5		

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WQM 7.0 Wasteload Allocations

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>
03E	1024	SKIPPACK 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
10.790	Mainland STP	11.2	2.8	11.2	2.8	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
10.790	Mainland STP	2.22	1.4	2.22	1.4	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	<u>CBOD5</u>		<u>NH3-N</u>		<u>Dissolved Oxygen</u>		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
10.79	Mainland STP	9.29	9.29	1.4	1.4	5	5	0	0

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WQM 7.0 D.O. Simulation

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>		
03E	1024	SKIPPACK CREEK		
<hr/>				
<u>RMI</u>	<u>Total Discharge Flow (mgd)</u>	<u>Analysis Temperature (°C)</u>		<u>Analysis pH</u>
10.790	0.900	20.000		6.730
<u>Reach Width (ft)</u>	<u>Reach Depth (ft)</u>	<u>Reach WDRatio</u>		<u>Reach Velocity (fps)</u>
18.721	0.557	33.624		0.154
<u>Reach CBOD5 (mg/L)</u>	<u>Reach Kc (1/days)</u>	<u>Reach NH3-N (mg/L)</u>		<u>Reach Kn (1/days)</u>
8.30	1.307	1.21		0.700
<u>Reach DO (mg/L)</u>	<u>Reach Kr (1/days)</u>	<u>Kr Equation</u>		<u>Reach DQ Goal (mg/L)</u>
5.439	4.079	Tsivoglou		5
<u>Reach Travel Time (days)</u>				
0.882				
	<u>Subreach Results</u>			
	<u>TravTime</u>	<u>CBOD5</u>	<u>NH3-N</u>	<u>D.O.</u>
	(days)	(mg/L)	(mg/L)	(mg/L)
	0.088	7.40	1.14	5.15
	0.176	6.59	1.07	5.09
	0.265	5.87	1.01	5.17
	0.353	5.23	0.95	5.34
	0.441	4.66	0.89	5.56
	0.529	4.16	0.84	5.81
	0.618	3.70	0.79	6.06
	0.706	3.30	0.74	6.31
	0.794	2.94	0.69	6.55
	0.882	2.62	0.65	6.78
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Permit No. PA0056413

WQM 7.0 Effluent Limits

<u>SWP Basin</u>		<u>Stream Code</u>		<u>Stream Name</u>			
03E		1024		SKIPPACK CREEK			
<u>RMI</u>	<u>Name</u>	<u>Permit Number</u>	<u>Disc Flow (mgd)</u>	<u>Parameter</u>	<u>Effl. Limit 30-day Ave. (mg/L)</u>	<u>Effl. Limit Maximum (mg/L)</u>	<u>Effl. Limit Minimum (mg/L)</u>
10.790	Mainland STP	PA0056413	0.900	CBOD5	9.29		
				NH3-N	1.4	2.8	
				Dissolved Oxygen			5