

Application Type Renewal
 Facility Type Non-Municipal
 Major / Minor Minor

**NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE**

Application No. PA0032760
 APS ID 1011249
 Authorization ID 1305365

Applicant and Facility Information

Applicant Name	<u>PA DOT Maintenance & Operations Bureau</u>	Facility Name	<u>PA DOT Rest Area 17</u>
Applicant Address	<u>400 North Street Floor 6 Harrisburg, PA 17120</u>	Facility Address	<u>Interstate 79 Hadley, PA 16130</u>
Applicant Contact	<u>Nick Sahd</u>	Facility Contact	<u>Roderick J. Donghia – Operator</u>
Applicant Phone	<u>(717) 951-8685</u>	Facility Phone	<u>(724) 813-8838</u>
Client ID	<u>189304</u>	Site ID	<u>263093</u>
Ch 94 Load Status	<u></u>	Municipality	<u>Deer Creek Township</u>
Connection Status	<u></u>	County	<u>Mercer</u>
Date Application Received	<u>January 31, 2020</u>	EPA Waived?	<u>Yes</u>
Date Application Accepted	<u>February 25, 2020</u>	If No, Reason	<u>-</u>
Purpose of Application	<u>Renewal of an NPDES Permit for an existing discharge of treated sanitary wastewater</u>		

Summary of Review

This application is for a renewal of an NPDES permit, for an existing Minor discharge of treated sewage from a Non-Municipal STP.

The previous permit renewal was granted a phase-in period with relaxed monitoring for pH, Dissolved Oxygen, and TRC of 4/week. These three parameters will require daily sampling on the current permit renewal in order to be in compliance with the Department's SOP entitled "Establishing Effluent Limitations for Discharges of Sewage", which states, pH, TRC, and D.O. should be sampled daily for facilities with flows over 0.002 MGD.

Act 14 – Proof of Notification was submitted and received.

Sludge use and disposal description and location(s): Septage must be pumped and hauled off-site by a septage hauler for land application under a general permit authorized by DEP or disposal at an STP.

There are no open violations regarding sewage treatment facilities for subject client ID (189304) as of 3/30/2021. There are however, multiple violations regarding storage tanks in SCRO and NERO.

A part 2 WQM permit is not required at this time.

Treatment consist of (WQM Permit No. 4317401): The treatment train will consist of a comminutor w/ a bypass bar screen, equalization tank, (2) extended aeration tanks, final clarifier, aerated sludge holding tank, chlorine contact tank w/ chlor/dechlor, post-aeration and an effluent pump station. The design organic load is 17.5 lb BOD/day. The treated sewage then discharges into Unnamed Tributary 58648 to Sandy Creek (WWF).

Approve	Deny	Signatures	Date
X		Jon F. Bucha Jonathan F. Bucha / Civil Engineer Trainee	March 30, 2021
X		Justin C. Dickey Justin C. Dickey, P.E. / Environmental Engineer Manager	April 30, 2021

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	<u>001</u>	Design Flow (MGD)	<u>.0087</u>
Latitude	<u>41° 27' 11.24"</u>	Longitude	<u>-80° 9' 36.52"</u>
Quad Name	<u>Hadley</u>	Quad Code	<u>0704</u>
Wastewater Description: <u>Sewage Effluent</u>			
Receiving Waters	<u>Unnamed Tributary to Sandy Creek (WWF)</u>	Stream Code	<u>58648</u>
NHD Com ID	<u>100476847</u>	RMI	<u>0.81</u>
Drainage Area	<u>0.01 mi²</u>	Yield (cfs/mi ²)	<u>0.0527</u>
Q ₇₋₁₀ Flow (cfs)	<u>0</u>	Q ₇₋₁₀ Basis	<u>USGS# 03102500</u>
Elevation (ft)	<u>1357</u>	Slope (ft/ft)	<u>-</u>
Watershed No.	<u>16-G</u>	Chapter 93 Class.	<u>WWF</u>
Existing Use	<u></u>	Existing Use Qualifier	<u></u>
Exceptions to Use	<u></u>	Exceptions to Criteria	<u></u>
Assessment Status	<u>Attaining Use(s)</u>		
Cause(s) of Impairment	<u></u>		
Source(s) of Impairment	<u></u>		
TMDL Status	<u></u>	Name	<u></u>
Background/Ambient Data		Data Source	
pH (SU)	<u>7.0</u>	Default	<u></u>
Temperature (°C)	<u>25</u>	Default	<u></u>
Hardness (mg/L)	<u>-</u>	-	<u></u>
Other: NH ₃ -N	<u>0.1</u>	Default	<u></u>
Nearest Downstream Public Water Supply Intake	<u>Aqua Pennsylvania, Inc. – Emlenton</u>		
PWS Waters	<u>Allegheny River</u>	Flow at Intake (cfs)	<u>1376</u>
PWS RMI	<u>90.0</u>	Distance from Outfall (mi)	<u>40</u>

Changes Since Last Permit Issuance: There have been no changes to the discharge, receiving waters, and PWS intake.

Other Comments: Lake Wilhelm was determined to have algae growth and eutrophication concerns by Department Biologists during the 2010 permit renewal.

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.

Treatment Facility Summary				
Treatment Facility Name: PA DOT - Rest Area 17 - I-79 Rest North				
WQM Permit No.		Issuance Date		
4317401		May 18, 2017		
Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Tertiary	Extended Aeration	Chlorine	0.0087
Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.0087	17.5		Aerated Sludge Holding Tank	Other WWTP

Changes Since Last Permit Issuance: The treatment facility was replaced with an all new facility in 2017. WQM permit #4372410, for the old facilities, was cancelled after construction of the new plant was completed. No planning approval was required since this was an in-kind replacement of the existing facility.

Other Comments: Chemical feedbox allows for Phosphorus removal.

Compliance History	
Summary of DMRs:	Review of the past 3 years of DMR reports indicates no effluent violations. Supplemental reports are being submitted as required and there have been no non-compliance issues since installation of the new treatment plant.
Summary of Inspections:	An inspection occurred on 12/20/2019, where no violations were noted, and the plant is being properly maintained with a routine maintenance schedule.

Compliance History

DMR Data for Outfall 001 (from February 1, 2020 to January 31, 2021)

Parameter	JAN-21	DEC-20	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20	JUN-20	MAY-20	APR-20	MAR-20	FEB-20
Flow (MGD) Average Monthly	0.0005	0.0009	0.0009	0.0009	0.0010	0.0011	0.0012	0.0012	0.0009	0.0004	0.0009	0.0014
Flow (MGD) Daily Maximum	0.0006	0.0010	0.0011	0.0011	0.0011	0.0012	0.0019	0.0013	0.0010	0.0005	0.0015	0.0016
pH (S.U.) Minimum	7.1	7.0	6.9	7.0	7.0	7.0	6.9	7.0	7.0	7.0	7.0	7.1
pH (S.U.) Maximum	7.5	7.4	7.4	7.4	7.5	7.5	7.4	7.4	7.4	7.5	7.4	7.4
DO (mg/L) Minimum	6.9	7.0	7.1	7.1	7.0	7.1	7.0	7.0	7.0	7.0	6.4	7.1
TRC (mg/L) Average Monthly	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TRC (mg/L) Instantaneous Maximum	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
CBOD5 (mg/L) Average Monthly	3	4	4	4	5	4	5	4	4	4	5	4
TSS (mg/L) Average Monthly	9	8	12	11	11	7	9	8	11	8	7	10
Fecal Coliform (CFU/100 ml) Geometric Mean	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Fecal Coliform (CFU/100 ml) Instantaneous Maximum	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Total Nitrogen (mg/L) Average Monthly	26.0	25.2	25.5	26	25.3	22.6	26.4	25.3	26.0	24.7	25.4	23.9
Ammonia (mg/L) Average Monthly	15	15	15	15	14	13	14	14	15	14	15	13
Total Phosphorus (mg/L) Average Monthly	0.800	0.800	0.900	0.800	0.800	0.700	0.800	0.8	0.7	0.37	0.8	0.5

Development of Effluent Limitations

Outfall No. <u>001</u>	Design Flow (MGD) <u>.0087</u>
Latitude <u>41° 27' 11.24"</u>	Longitude <u>-80° 9' 36.52"</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 (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

The following limitations were determined through water quality modeling (Attachment E & Attachment F):

Parameter	Limit (mg/l)	SBC	Model
Ammonia Nitrogen	16.0	Average Monthly	WQM 7.0

Comments: An Ammonia Nitrogen limit of 16.0 mg/L is to be applied in the summertime. A winter limit of 25 mg/L will remain for Ammonia Nitrogen. The previous permit renewal had a 23 mg/L Ammonia Nitrogen summertime limit.

Ammonia Nitrogen Calculation: $C_o = C_i * e^{kt} = 7.64 \text{ mg/L} * e^{(0.7)(1.06)} = 16.045 \text{ mg/L}$

Best Professional Judgment (BPJ) Limitations

Comments: Monitoring for total nitrogen and a dissolved oxygen limit of a minimum of 4.0 mg/l were added in accordance with the Department’s SOP entitled “Establishing Effluent Limitations for Individual Sewage Permits.”

A total phosphorus limit of 1.0 mg/l as a monthly average will remain in the renewed permit due to Lake Wilhelm being determined to have algae growth and eutrophication concerns that was determined by Department Biologists during the 2010 permit renewal.

Additional Considerations

E. Coli monitoring of 1/year has been added based on Ch. 92a.61(11)(12).

Anti-Backsliding

Anti-Backsliding considerations do not apply since the effluent limitations have not been relaxed from the previous permit renewal.

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	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	1/week	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	4.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.4	1/day	Grab
CBOD5	XXX	XXX	XXX	25.0	XXX	50.0	2/month	Grab
TSS	XXX	XXX	XXX	30.0	XXX	60.0	2/month	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000	XXX	10000	2/month	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200	XXX	1000	2/month	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/year	Grab
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	2/month	Grab
Ammonia Nov 1 - Apr 30	XXX	XXX	XXX	25.0	XXX	50.0	2/month	Grab
Ammonia May 1 - Oct 31	XXX	XXX	XXX	16.0	XXX	32.0	2/month	Grab
Total Phosphorus	XXX	XXX	XXX	1.0	XXX	2.0	2/month	Grab

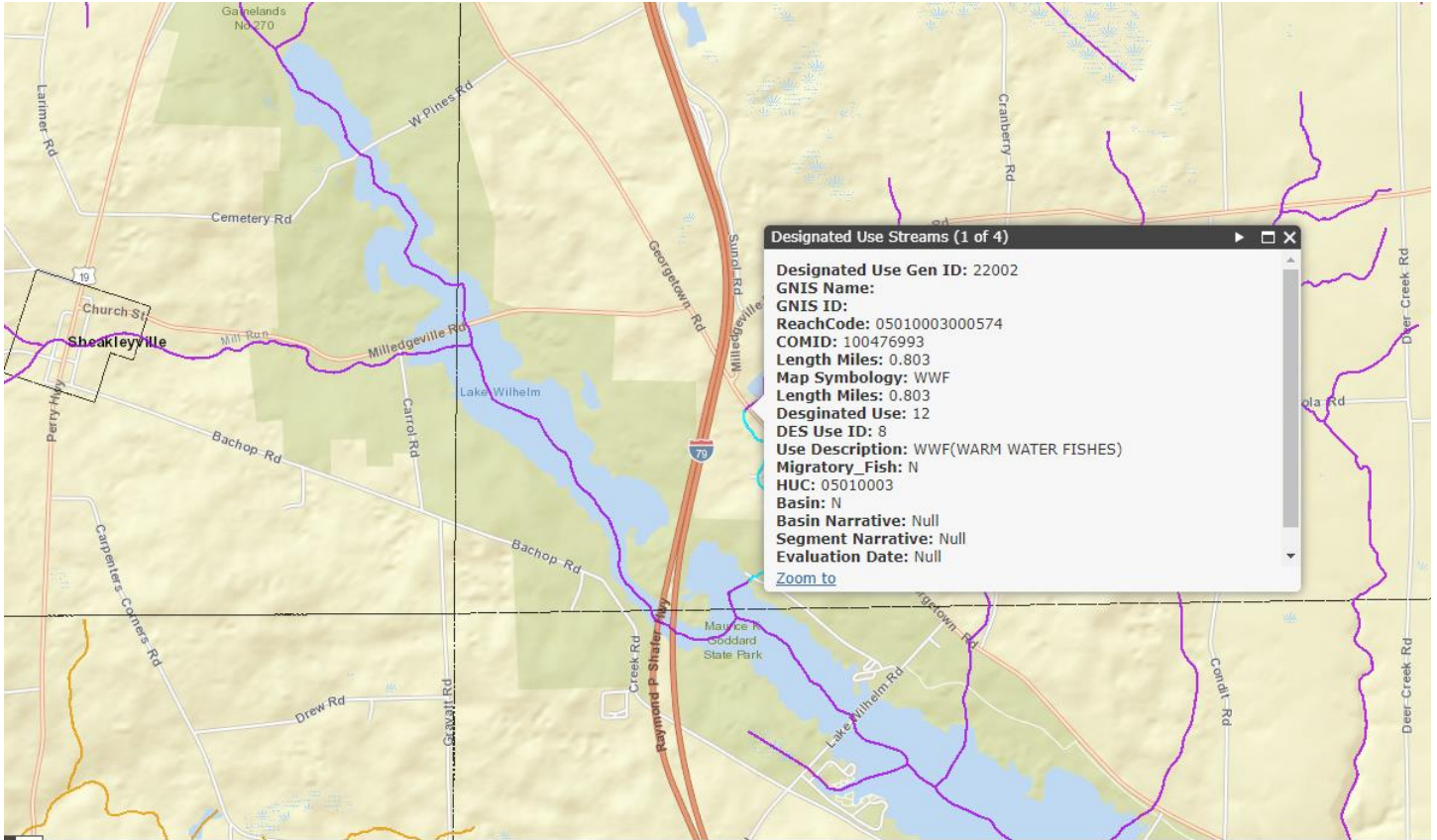
Compliance Sampling Location: Outfall 001 after disinfection.

Other Comments: N/A

Tools and References Used to Develop Permit	
<input checked="" type="checkbox"/>	WQM for Windows Model (see Attachment E and Attachment F)
<input checked="" type="checkbox"/>	TRC Model Spreadsheet (see Attachment G)
<input checked="" type="checkbox"/>	Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97.
<input checked="" type="checkbox"/>	Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97.
<input checked="" 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 checked="" type="checkbox"/>	SOP: Establishing Effluent Limitations for Individual Sewage Permits (SOP No. BPNPSM-PMT-033) dated November 9, 2012, Revised August 23, 2013).

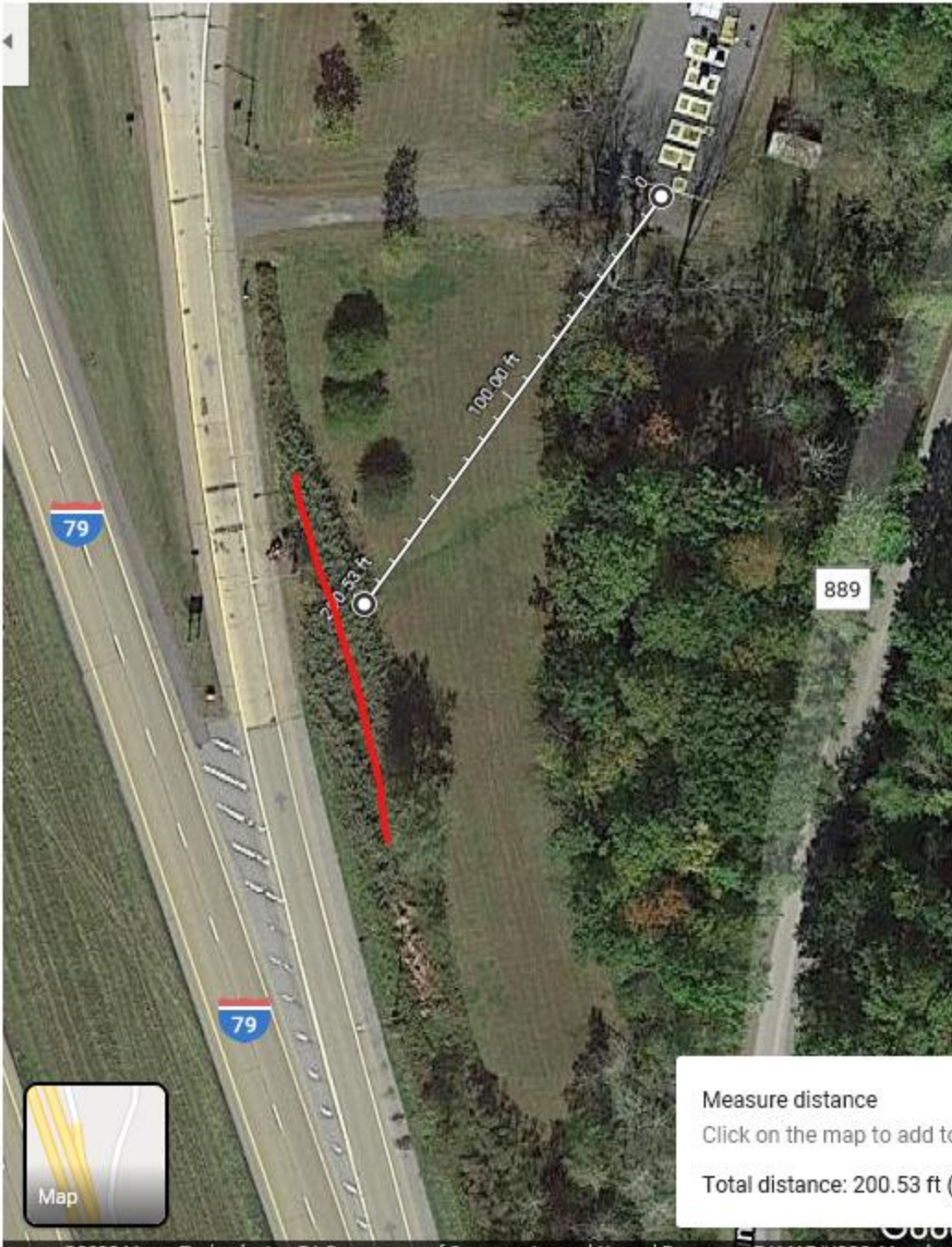
ATTACHMENT A

EMAP – STREAM DESIGNATION



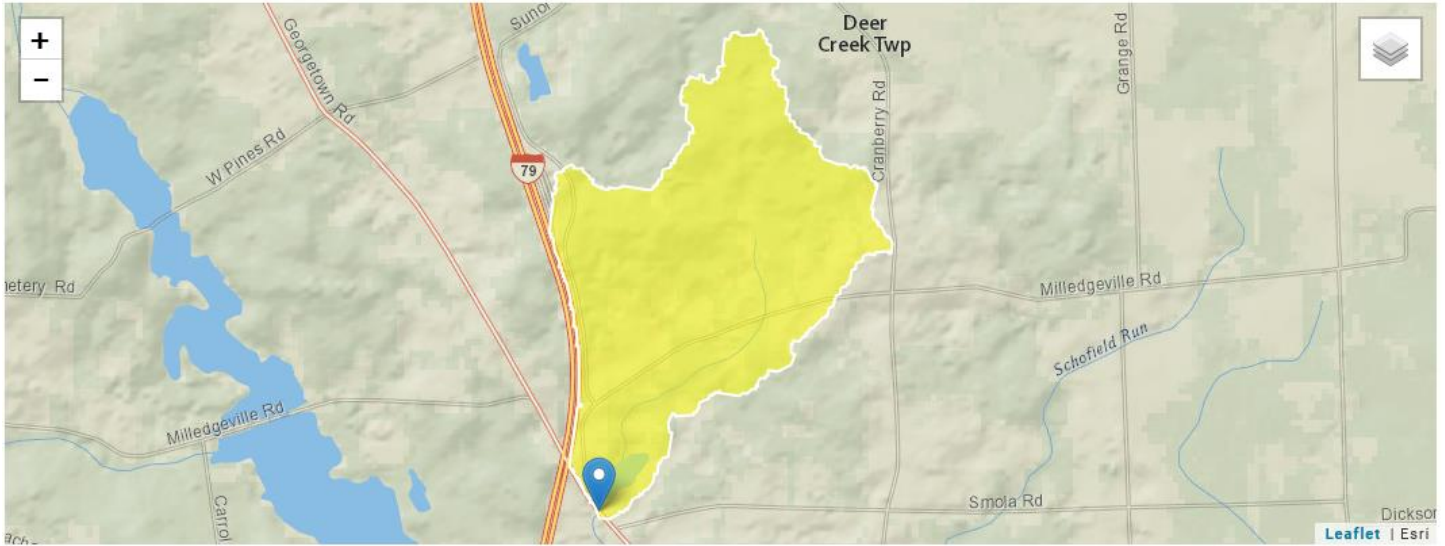
ATTACHMENT B

GOOGLE MAPS – DISCHARGE LOCATION ALONG DRAINAGE DITCH



ATTACHMENT C

STREAMSTATS REPORT – RMI 0.81 ON UNNAMED TRIBUTARY TO SANDY CREEK



Basin Characteristics			
Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.9	square miles
ELEV	Mean Basin Elevation	1387	feet
PRECIP	Mean Annual Precipitation	43	inches

Permit No. PA0032760

ATTACHMENT D

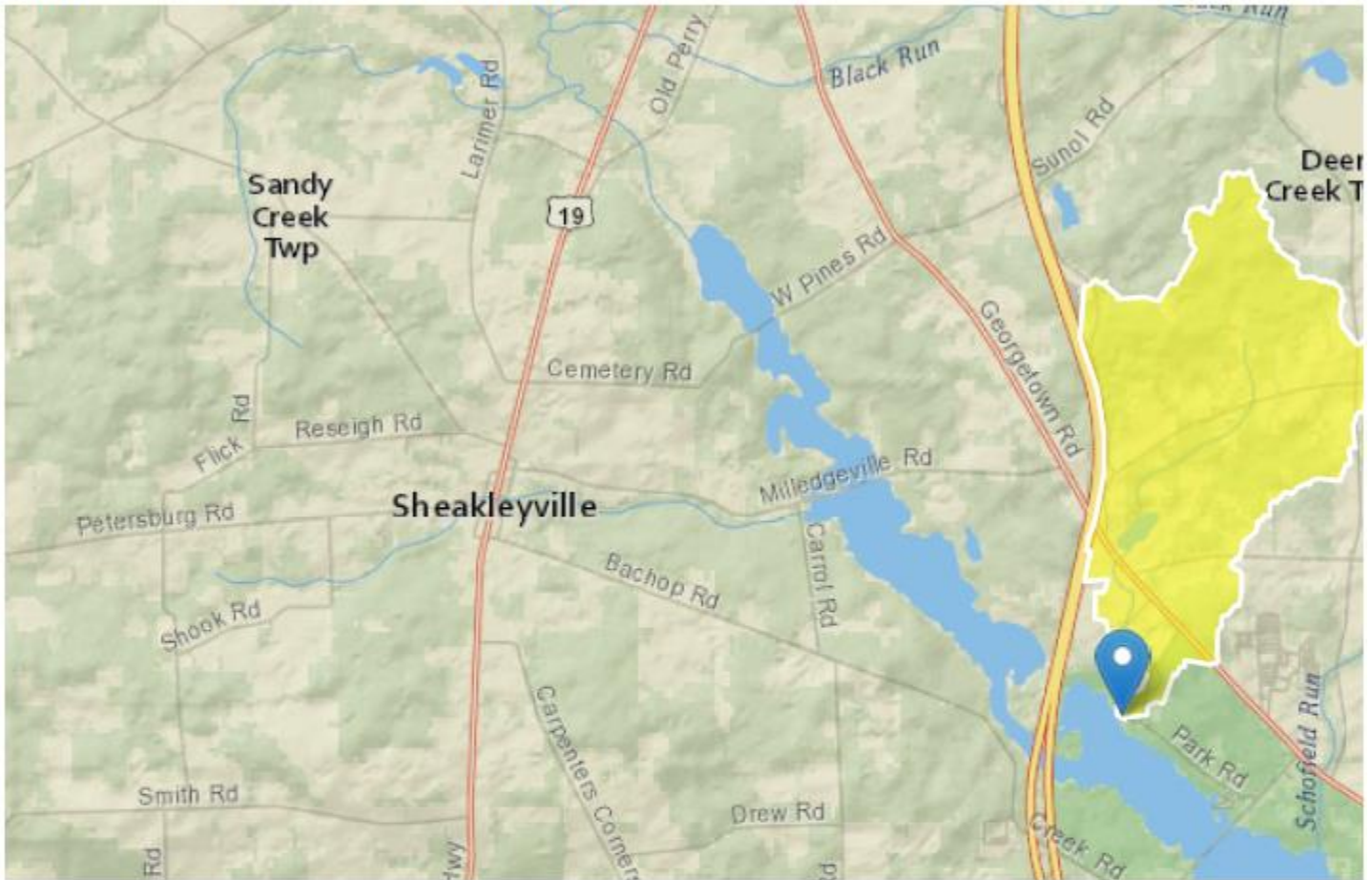
STREAMSTATS REPORT – RMI 0.01 ON UNNAMED TRIB TO SANDY CREEK

Region ID: PA

Workspace ID: PA20210330192323941000

Clicked Point (Latitude, Longitude): 41.43101, -80.15852

Time: 2021-03-30 15:23:40 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	1.45	square miles
ELEV	Mean Basin Elevation	1369	feet
PRECIP	Mean Annual Precipitation	43	inches

Permit No. PA0032760

ATTACHMENT E

WQM 7.0 MODEL OUTPUT FILE (DRY STREAM REACH)

WQM 7.0 Effluent Limits

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>					
16G	58648	Trib 58648 to Sandy Creek					
RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
1.800	58648	PA0032760	0.009	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			4

WQM 7.0 D.O. Simulation

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>			
16G	58648	Trib 58648 to Sandy Creek			
<u>RMI</u>	<u>Total Discharge Flow (mgd)</u>	<u>Analysis Temperature (°C)</u>		<u>Analysis pH</u>	
1.800	0.009	20.000		7.200	
<u>Reach Width (ft)</u>	<u>Reach Depth (ft)</u>	<u>Reach WDRatio</u>		<u>Reach Velocity (fps)</u>	
0.699	0.338	2.071		0.057	
<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>	
24.98	1.500	24.98		0.700	
<u>Reach DO (mg/L)</u>	<u>Reach Kr (1/days)</u>	<u>Kr Equation</u>		<u>Reach DO Goal (mg/L)</u>	
4.003	23.759	Owens		NA	
<u>Reach Travel Time (days)</u>	<u>Subreach Results</u>				
1.060	<u>TravTime (days)</u>	<u>CBOD5 (mg/L)</u>	<u>NH3-N (mg/L)</u>	<u>D.O. (mg/L)</u>	
	0.106	21.31	23.20	3.85	
	0.212	18.18	21.54	4.34	
	0.318	15.51	20.00	4.82	
	0.424	13.23	18.57	5.25	
	0.530	11.28	17.24	5.63	
	0.636	9.62	16.01	5.97	
	0.742	8.21	14.86	6.27	
	0.848	7.00	13.80	6.54	
	0.954	5.97	12.81	6.78	
	1.060	5.10	11.90	6.99	

Permit No. PA0032760

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
16G	58648	Trib 58648 to Sandy Creek	1.800	1357.00	0.01	0.00000	0.00	<input type="checkbox"/>

Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time	Rch Velocity	WD Ratio	Rch Width	Rch Depth	Tributary Temp	Tributary pH	Stream Temp	Stream pH
	(cfsm)	(cfs)	(cfs)	(days)	(fps)		(ft)	(ft)	(°C)		(°C)	
Q7-10	0.001	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.20	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
58648	PA0032760	0.0087	0.0000	0.0000	0.000	20.00	7.20

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	0.00	0.00	1.50
Dissolved Oxygen	4.00	7.54	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Permit No. PA0032760

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
16G	58648	Trib 58648 to Sandy Creek	0.810	1274.00	0.90	0.00000	0.00	<input checked="" type="checkbox"/>

Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time	Rch Velocity	WD Ratio	Rch Width	Rch Depth	Tributary Temp	Tributary pH	Stream Temp	Stream pH
	(cfsm)	(cfs)	(cfs)	(days)	(fps)		(ft)	(ft)	(°C)		(°C)	
Q7-10	0.001	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.20	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

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

Parameter Data

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

Permit No. PA0032760

WQM 7.0 Hydrodynamic Outputs

<u>SWP Basin</u>		<u>Stream Code</u>				<u>Stream Name</u>						
16G		58648				Trib 58648 to Sandy Creek						
RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
1.800	0.00	0.00	0.00	.0135	0.01588	.338	.7	2.07	0.06	1.060	20.00	7.20
Q1-10 Flow												
1.800	0.00	0.00	0.00	.0135	0.01588	NA	NA	NA	0.06	1.060	20.00	7.20
Q30-10 Flow												
1.800	0.00	0.00	0.00	.0135	0.01588	NA	NA	NA	0.06	1.060	20.00	7.20

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	1.36	Temperature Adjust Kr	<input checked="" type="checkbox"/>
D.O. Saturation	90.00%	Use Balanced Technology	<input checked="" type="checkbox"/>
D.O. Goal	2		

Permit No. PA0032760

WQM 7.0 Wasteload Allocations

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>
16G	58648	Trib 58648 to Sandy 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
1.800	58648	NA	50	8.24	50	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
1.800	58648	NA	25	1.7	25	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)		
1.80	58648	25	25	25	25	4	4	0	0

Permit No. PA0032760

ATTACHMENT F WQM 7.0 MODEL OUTPUT FILE (PERENIAL REACH)

WQM 7.0 Effluent Limits

<u>SWP Basin</u>		<u>Stream Code</u>		<u>Stream Name</u>			
16G		58648		Trib 58648 to Sandy Creek			
RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
0.810	58648	PA0032760	0.009	CBOD5	5.1		
				NH3-N	7.64	15.28	
				Dissolved Oxygen			6.99

WQM 7.0 D.O. Simulation

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>			
16G	58648	Trib 58648 to Sandy Creek			
<u>RMI</u>	<u>Total Discharge Flow (mgd)</u>	<u>Analysis Temperature (°C)</u>		<u>Analysis pH</u>	
0.810	0.009	23.895		7.037	
<u>Reach Width (ft)</u>	<u>Reach Depth (ft)</u>	<u>Reach WDRatio</u>		<u>Reach Velocity (fps)</u>	
3.765	0.322	11.677		0.050	
<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>	
2.69	0.253	1.77		0.945	
<u>Reach DO (mg/L)</u>	<u>Reach Kr (1/days)</u>	<u>Kr Equation</u>		<u>Reach DO Goal (mg/L)</u>	
7.418	26.007	Owens		5	
<u>Reach Travel Time (days)</u>	<u>Subreach Results</u>				
0.975	TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)	
	0.097	2.61	1.61	7.54	
	0.195	2.53	1.47	7.54	
	0.292	2.46	1.34	7.54	
	0.390	2.39	1.22	7.54	
	0.487	2.32	1.11	7.54	
	0.585	2.25	1.02	7.54	
	0.682	2.18	0.93	7.54	
	0.780	2.12	0.85	7.54	
	0.877	2.06	0.77	7.54	
	0.975	2.00	0.70	7.54	

Permit No. PA0032760

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
16G	58648	Trib 58648 to Sandy Creek	0.810	1274.00	0.90	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	0.053	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	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
58648	PA0032760	0.0087	0.0000	0.0000	0.000	20.00	7.20

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	5.10	2.00	0.00	1.50
Dissolved Oxygen	6.99	7.54	0.00	0.00
NH3-N	11.90	0.10	0.00	0.70

Permit No. PA0032760

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
16G	58648	Trib 58648 to Sandy Creek	0.010	1193.00	1.45	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 Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
	Q7-10	0.053	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	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>								
16G		58648		Trib 58648 to Sandy Creek								
RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
0.810	0.05	0.00	0.05	.0135	0.01918	.322	3.77	11.68	0.05	0.975	23.89	7.04
Q1-10 Flow												
0.810	0.03	0.00	0.03	.0135	0.01918	NA	NA	NA	0.04	1.172	23.46	7.05
Q30-10 Flow												
0.810	0.06	0.00	0.06	.0135	0.01918	NA	NA	NA	0.06	0.849	24.14	7.03

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	1.36	Temperature Adjust Kr	<input checked="" type="checkbox"/>
D.O. Saturation	90.00%	Use Balanced Technology	<input checked="" type="checkbox"/>
D.O. Goal	5		

Permit No. PA0032760

WQM 7.0 Wasteload Allocations

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>
16G	58648	Trib 58648 to Sandy 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
0.810	58648	7.27	23.43	7.27	23.43	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
0.810	58648	1.4	7.64	1.4	7.64	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)		
0.81	58648	5.1	5.1	7.64	7.64	6.99	6.99	0	0

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ATTACHMENT G

TRC SPREADSHEET

TRC EVALUATION					
Input appropriate values in A3:A9 and D3:D9					
0.05	= Q stream (cfs)	0.5	= CV Daily		
0.0087	= 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 = 1.204		1.3.2.iii	WLA_cfc = 1.166
PENTOXSD TRG	5.1a	LTAMULT_afc = 0.373		5.1c	LTAMULT_cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc = 0.449		5.1d	LTA_cfc = 0.678
Source	Effluent Limit Calculations				
PENTOXSD TRG	5.1f	AML_MULT = 1.231			
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500		BAT/BPJ	
		INST MAX LIMIT (mg/l) = 1.635			
WLA_afc	$(.019/e^{-k \cdot AFC_tc}) + [(AFC_Yc \cdot Qs \cdot .019 / Qd \cdot e^{-k \cdot AFC_tc}) \dots + Xd + (AFC_Yc \cdot Qs \cdot Xs / Qd)] \cdot (1 - FOS / 100)$				
LTAMULT_afc	$EXP((0.5 \cdot LN(cvh^2 + 1)) - 2.326 \cdot LN(cvh^2 + 1)^{0.5})$				
LTA_afc	$wla_afc \cdot LTAMULT_afc$				
WLA_cfc	$(.011/e^{-k \cdot CFC_tc}) + [(CFC_Yc \cdot Qs \cdot .011 / Qd \cdot e^{-k \cdot CFC_tc}) \dots + Xd + (CFC_Yc \cdot Qs \cdot Xs / Qd)] \cdot (1 - FOS / 100)$				
LTAMULT_cfc	$EXP((0.5 \cdot LN(cvd^2 / no_samples + 1)) - 2.326 \cdot LN(cvd^2 / no_samples + 1)^{0.5})$				
LTA_cfc	$wla_cfc \cdot LTAMULT_cfc$				
AML_MULT	$EXP(2.326 \cdot LN((cvd^2 / no_samples + 1)^{0.5}) - 0.5 \cdot LN(cvd^2 / no_samples + 1))$				
AVG MON LIMIT	$MIN(BAT_BPJ, MIN(LTA_afc, LTA_cfc) \cdot AML_MULT)$				
INST MAX LIMIT	$1.5 \cdot ((av_mon_limit / AML_MULT) / LTAMULT_afc)$				
	$(0.011 / EXP(-K \cdot CFC_tc / 1440)) + (((CFC_Yc \cdot Qs \cdot 0.011) / (1.547 \cdot Qd)) \dots$ $\dots \cdot EXP(-K \cdot CFC_tc / 1440)) + Xd + (CFC_Yc \cdot Qs \cdot Xs / 1.547 \cdot Qd) \cdot (1 - FOS / 100)$				

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ATTACHMENT H DISCHARGE PH

A	B	C	D	E	F	G	H
PA DOT Rest Area 17							
Deer Creek Township, Mercer County							
PA0032760		Discharge pH					
<u>Date</u>	<u>pH min</u>	<u>pH max</u>		<u>10⁻ -pH min</u>	<u>10⁻ -pH max</u>	<u>& pH max</u>	<u>-Log (Ave pH)</u>
Jul-17	6.8	7.4		1.5849E-07	3.9811E-08	9.915E-08	7.0
Aug-17	7.1	7.5		7.9433E-08	3.1623E-08	5.5528E-08	7.3
Sep-17	7	7.5		0.0000001	3.1623E-08	6.5811E-08	7.2
Jul-18	7	7.5		0.0000001	3.1623E-08	6.5811E-08	7.2
Aug-18	7	7.5		0.0000001	3.1623E-08	6.5811E-08	7.2
Sep-18	7	7.5		0.0000001	3.1623E-08	6.5811E-08	7.2
Jul-19	7	7.5		0.0000001	3.1623E-08	6.5811E-08	7.2
Aug-19	6.9	7.4		1.2589E-07	3.9811E-08	8.2852E-08	7.1
Sep-19	7	7.3		0.0000001	5.0119E-08	7.5059E-08	7.1
Jul-20	6.9	7.4		1.2589E-07	3.9811E-08	8.2852E-08	7.1
						Median:	7.2