pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0093033**
Facility Type	**Municipal**	APS ID	**1034413**
Major / Minor	**Minor**	Authorization ID	**1346735**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Eastern Armstrong County Municipal Authority**	Facility Name	**Elderton STP**
Applicant Address	PO Box 262 Elderton, PA 15736	Facility Address	Cemetary Road Elderton, PA 15736
Applicant Contact	William Ferrier	Facility Contact	William Ferrier
Applicant Phone	(724) 354-2540	Facility Phone	(724) 354-2540
Client ID	29012	Site ID	237617
Ch 94 Load Status	Not Overloaded	Municipality	Elderton Borough
Connection Status	No Limitations	County	Armstrong County
Date Application Received	February 25, 2021	EPA Waived?	Yes
Date Application Accepted	March 22, 2021	If No, Reason	-
Purpose of Application	Renewal of an existing NPDES Permit for an existing discharge of treated sanitary wastewater from a municipal sewer system.		

Summary of Review

Act 14 - Proof of Notification was submitted and received.

A Part II Water Quality Management permit is not required at this time.

The applicant should be able to meet the limits of this permit, which will protect the uses of the receiving stream.

I. OTHER REQUIREMENTS:

A. Stormwater into sewers
B. Right of way
C. Solids handling
D. Effluent Chlorine Optimization and Minimization

SPECIAL CONDITIONS:

II. Solids Management

There are 10 open violations in efacts associated with the subject Client ID (29012) as of 1/27/2022 (see Attachment 1).

Approve	Deny	Signatures	Date
X		Stephen A. McCauley Stephen A. McCauley, E.I.T. / Environmental Engineering Specialist	1/27/2022
X		Justin C. Dickey Justin C. Dickey, P.E. / Environmental Engineer Manager	1/28/2022

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.058
Latitude	40º 41' 25.00"	Longitude	-79º 20' 35.00"
Quad Name	-	Quad Code	-
Wastewater Description:	Sewage Effluent		
Receiving Waters	Unnamed Tributary to the Crooked Creek (WWF)	Stream Code	N/A (46216)
NHD Com ID	123858190	RMI	2.85
Drainage Area	0.05	Yield (cfs/mi^2)	0.1
Q_{7-10} Flow (cfs)	0.005	Q_{7-10} Basis	calculated
Elevation (ft)	1163	Slope (ft/ft)	0.00573
Watershed No.	17-E	Chapter 93 Class.	WWF
Existing Use	-	Existing Use Qualifier	-
Exceptions to Use	-	Exceptions to Criteria	-
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment	-		
Source(s) of Impairment	-		
TMDL Status	Final (March 2019)	Name	Crooked Creek Watershed

Background/Ambient Data		Data Source
pH (SU)	-	-
Temperature (°F)	-	-
Hardness (mg/L)	-	-
Other:	-	-

Nearest Downstream Public Water Supply Intake	New Kensington City Municipal Authority		
PWS Waters	Allegheny River	Flow at Intake (cfs)	2,300
PWS RMI	21.0	Distance from Outfall (mi)	54.0

* - The Crooked Creek Watershed has a TMDL for Total Suspended Solids (TSS) that was Final in March 2019.

The TMDL includes a WLA for Total Suspended Solids (TSS) of 8,828 lbs/day for the Elderton STP. At the full permitted flow of 0.058 MGD and the instantaneous maximum TSS concentration of 50.0 mg/l, the resulting mass loading would only be 24.2 lbs/day. Based on that information, the existing limits for TSS are more than 350 times more protective than the WLA in the TMDL.

Sludge use and disposal description and location(s): Sludge is disposed of at the Randall Smith Farm in Plumcreek Township under the beneficial use permit number PAG086110.

This facility accepts hauled in wastes from on-lot sewage systems.

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.

Narrative: This Fact Sheet details the determination of draft NPDES permit limits for an existing discharge of 0.058 MGD of treated sewage from an existing Publicly Owned Treatment Works (POTW) in Elderton Borough, Armstrong County.

Treatment permitted under WQM permit 0384404 consists of: A comminutor, equalization tank, two aeration tanks, holding tank/clarifier, charcoal filter, and ultraviolet (UV) light disinfection. Sludge is handled through two aerated digestors and two sludge drying beds.

1. Streamflow:

Crooked Creek at Idaho, PA - USGS Gage no. 03038000 (1970-2008):

Drainage Area:	191	sq. mi.	from StreamStats
Q_{7-10}:	19.9	cfs	from StreamStats
Yieldrate:	0.1	cfsm	calculated

Unnamed Tributary to the Crooked Creek at Outfall 001:

Yieldrate:	0.1	cfsm	calculated above
Drainage Area:	0.0455	sq. mi.	from StreamStats
% of stream allocated:	100%	Basis:	No nearby discharges
Q_{7-10}:	0.455	cfs	

2. Wasteflow: Outfall 001:

Maximum discharge: 0.058 MGD = 0.089 cfs

Runoff flow period: 24 hours Basis: Runoff flow for a Municipal STP

There is greater than 3 parts stream flow (Q7-10) to 1 part effluent (design flow). Therefore, the standards in DEP guidance (391-2000-014) will not be applied.

Flow will be required to be monitored as authorized under Chapter 92a.61, and as recommended in the SOP.

3. Parameters:

The following parameters were evaluated: pH, Total Suspended Solids, Fecal Coliform, Phosphorus, NH_3-N, $CBOD_5$, Dissolved Oxygen, and Total Residual Chlorine. NH_3-N, $CBOD_5$, and Dissolved Oxygen were evaluated using WQM 7.0 at the discharge point.

a. pH

Between 6.0 and 9.0 at all times

Basis: Application of Chapter 93.7 technology-based limits

b. Total Suspended Solids

Limits are 30.0 mg/l as a monthly average and 60.0 mg/l as an instantaneous maximum.

Basis: Application of Chapter 92a47 technology-based limits. However, the previous limits of 25.0 mg/l as a monthly average and 50.0 mg/l as an instantaneous maximum are attainable so they will be retained with this renewal. Based on the SOP, mass loading limits will be added with this renewal.

c. Fecal Coliform

05/01 - 09/30: 200/100ml (monthly average geometric mean)
1,000/100ml (instantaneous maximum)

10/01 - 04/30: 2,000/100ml (monthly average geometric mean)
10,000/100ml (instantaneous maximum)

Basis: Application of Chapter 92a47 technology-based limits

d. E. Coli

Monitoring was added for E. Coli at a frequency of 1/quarter.

Basis: Application of Chapter 92a.61 as recommended by the SOP for flows greater than 0.05 MGD and less than 1.0 MGD.

e. Total Phosphorus

☐ Limit necessary due to:

☐ Discharge to lake, pond, or impoundment
☐ Discharge to stream

☒ Limit not necessary

Basis: The previous monitoring for Total Phosphorus will be retained in accordance with the SOP, based on Chapter 92a.61.

f. Total Nitrogen

The previous monitoring for Total Nitrogen will be retained in accordance with the SOP, based on Chapter 92a.61.

g. Ammonia-Nitrogen (NH_3-N)

Median discharge pH to be used: 6.9 Standard Units (S.U.)

Basis: Average pH value from DMR summary

Discharge temperature: 25°C (default value used in the absence of data)

Median stream pH to be used: 7.0 Standard Units (S.U.)

Basis: default value used in the absence of data

Stream Temperature: 25˚C (default value used for WWF modeling)

Background NH_3-N concentration: 0.1 mg/l

Basis: Default value.

Calculated NH_3-N Summer limits: 2.9 mg/l (monthly average)
5.8 mg/l (instantaneous maximum)

Calculated NH_3-N Winter limits: 8.7 mg/l (monthly average)
17.4 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the calculated summer limits above (see Attachment 2). The previous permit limitations were 3.0 mg/l AML for summertime and 9.0 mg/l AML for wintertime. The existing limitations should still be protective and will be retained based on the calculated limitation of 2.94 mg/l. Based on the SOP, mass loading limits will be added with this renewal.

h. $CBOD_5$

Median discharge pH to be used: 6.9 Standard Units (S.U.)

Basis: Average pH value from DMR summary

Discharge temperature: 25°C (default value used in the absence of data)

Median stream pH to be used: 7.0 Standard Units (S.U.)

Basis: default value used in the absence of data

Stream Temperature: 25˚C (default value used for WWF modeling)

Background $CBOD_5$ concentration: 2.0 mg/l

Basis: Default value

Calculated $CBOD_5$ Summer limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

Calculated $CBOD_5$ Winter limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the calculated summer limits above (see Attachment 2), which are less restrictive than the previous NPDES Permit. Since the previous limits for CBOD5 are attainable, they will be retained with this renewal. Based on the SOP, mass loading limits will be added with this renewal.

i. Dissolved Oxygen (DO)

- ☒ 4.0 mg/l - minimum desired in effluent to protect all aquatic life.
- ☐ 5.0 mg/l - required in effluent for CWF, WWF, or TSF based on WQ Model.
- ☐ 6.0 mg/l - minimum required due to discharge going to a drainage swale or ditch.
- ☐ 8.0 mg/l - required due to discharge going to a naturally reproducing salmonid stream

Discussion: A Dissolved Oxygen technology-based minimum of 4.0 mg/l is recommended by the WQ Model (see Attachment 2), and the SOP, based on Chapter 93.7, under the authority of Chapter 92a.61. This is the same limit as in the previous permit and will be retained.

The measurement frequency was previously set to 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001), which will be retained.

j. Total Residual Chlorine (TRC)

☒ No limit necessary
☐ TRC limits: _____ mg/l (monthly average)
_____ mg/l (instantaneous maximum)

Basis: Since Ultraviolet (UV) light is used for disinfection, limits for TRC are not necessary. UV Transmittance (%) reporting will be retained with this renewal.

The measurement frequency will be increased from 1/week to 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001).

k. Influent Total Suspended Solids and BOD_5

These two parameters will be required to be monitored as recommended in the SOP for POTWs, as authorized under Chapter 92a.61.

l. Anti-Backsliding

Since all the permit limits in this renewal are the same or more restrictive than the previous NPDES Permit, anti-backsliding is not applicable.

4. Reasonable Potential Analysis:

A Reasonable Potential Analysis was not performed in accordance with State practices for Outfall 001 by the Department's Toxics Management Spreadsheet due to a lack of non-sewage data.

Result: No Reasonable potential was calculated for this renewal.

5. Reasonable Potential for Downstream Public Water Supply (PWS):

The Reasonable Potential Analysis performed above does not calculate limits for parameters that are based on PWS criteria (TDS, Chloride, Bromide, and Sulfate). However, since no non-sewage sample data was provided, no calculations were performed.

Nearest Downstream potable water supply (PWS): New Kensington City Municipal Authority
Distance downstream from the point of discharge: 54.0 miles (approximate)

☒ No limits necessary
☐ Limits needed

Basis: Significant dilution available.

6. Flow Information:

The Elderton STP receives 67% of its flow from the Elderton Borough and 33% from the Plumcreek Township.

The Elderton Borough and the Plumcreek Township are both 100% separate sewer systems.

7. Attachment List:

Attachment 1 - WMS Open Violations by Client
Attachment 2 - WQ Modeling Printouts

(The Attachments above can be found at the end of this document)

Compliance History

DMR Data for Outfall 001 (from December 1, 2020 to November 30, 2021)

Parameter	NOV-21	OCT-21	SEP-21	AUG-21	JUL-21	JUN-21	MAY-21	APR-21	MAR-21	FEB-21	JAN-21	DEC-20
Flow (MGD) Average Monthly	0.012	0.017	0.019	0.022	0.019	0.016	0.022	0.016	0.0016	0.013	0.010	0.036
pH (S.U.) Minimum	6.8	7.0	6.9	6.8	6.8	6.8	6.7	6.7	6.6	6.7	6.7	6.3
pH (S.U.) Maximum	7.5	7.4	7.4	7.2	7.3	7.3	7.5	7.3	7.5	7.5	7.7	7.2
DO (mg/L) Minimum	4.1	4.1	4.0	4.1	4.0	4.1	4.1	4.3	4.7	4.1	4.1	4.1
CBOD5 (mg/L) Average Monthly	3	3	3	2.8	2.27	2.14	2.40	2.40	2.72	2.1	2.1	2.1
CBOD5 (mg/L) Instantaneous Maximum	3	3	3	3.0	2.40	2.14	2.40	2.40	3	2.1	2.1	2.1
BOD5 (mg/L) Influent Average Monthly	375.5	213.5	172	209	178	284	218.5	353	146.5	266	229	307
TSS (mg/L) Average Monthly	1.2	1.60	0.9	2.03	2.50	2.50	2.50	2.50	5	2.5	2	4
TSS (mg/L) Influent Average Monthly	237	167	164	152	118	154	118	210	177	236	128	404
TSS (mg/L) Instantaneous Maximum	1.60	1.60	1	2.50	2.50	2.50	2.50	2.50	5	3	2	6
Fecal Coliform (CFU/100 ml) Geometric Mean	233.1	1	30.2	24.79	8.2	333.6	43.8	240	81	83	190	13
Fecal Coliform (CFU/100 ml) Instantaneous Maximum	288.2	1	178.9	37.900	22.300	980.40	55.600	1913.6	87.800	95.90	435.20	18.70
UV Transmittance (%) Average Monthly	0.50	0.9	1.06	1.3	1.4	0.26	0.42	0.6	0.3	0.2	0.2	0.2
Total Nitrogen (mg/L) Daily Maximum												12.9
Ammonia (mg/L) Average Monthly	0.1000	0.1000	0.1000	0.25	0.113	0.0151	0.1000	0.1625	0.43	0.11	0.125	0.61
Ammonia (mg/L) Instantaneous Maximum	0.1000	0.1000	0.1000	0.15	0.1260	0.3020	0.1000	0.2250	0.1000	0.13	0.14	1.10
Total Phosphorus (mg/L) Daily Maximum												4.14

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	XXX	XXX	XXX	XXX	XXX	1/week	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
DO	XXX	XXX	4.0 Daily Min	XXX	XXX	XXX	1/day	Grab
CBOD5	4.8	XXX	XXX	10.0	XXX	20.0	2/month	Grab
BOD5 Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	2/month	Grab
TSS	12.0	XXX	XXX	25.0	XXX	50.0	2/month	Grab
TSS Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	2/month	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	2/month	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	2/month	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
UV Transmittance (%)	XXX	XXX	XXX	Report	XXX	XXX	1/day	Measured
Total Nitrogen	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab
Ammonia-Nitrogen Nov 1 - Apr 30	4.2	XXX	XXX	9.0	XXX	18.0	2/month	Grab
Ammonia-Nitrogen May 1 - Oct 31	1.4	XXX	XXX	3.0	XXX	6.0	2/month	Grab
Total Phosphorus	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab

Compliance Sampling Location: at Outfall 001, after ultraviolet (UV) light disinfection.
Flow is monitor only based on Chapter 92a.61. The limits for pH and Dissolved Oxygen are technology-based on Chapter 93.7. The limits for $CBOD_5$, Total Suspended Solids, and Fecal Coliform are technology based on Chapter 92a.47. Monitoring for influent BOD5 and influent Total Suspended Solids is based on Chapter 92a.61. Monitoring for E. Coli, UV Transmittance, Total Nitrogen, and Total Phosphorus is based on Chapter 92a.61. The limits for Ammonia-Nitrogen are technology-based on a previous version of the Dry Streams Guidance.

Attachment 1

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

WATER MANAGEMENT SYSTEM
OPEN VIOLATIONS BY CLIENT

Client ID: 29012
Client: All

Open Violations: 10

	CLIENT ID	CLIENT	PF ID	FACILITY	PF KIND	PF STATUS	INSP PROGRAM	PROGRAM SPECIFIC ID
1	29012	EASTERN ARMSTRONG CNTY MUNI AUTH	257711	E ARMSTRONG CNTY MUNI AUTH	Community	Active	Safe Drinking Water	5030004
2	29012	EASTERN ARMSTRONG CNTY MUNI AUTH	257711	E ARMSTRONG CNTY MUNI AUTH	Community	Active	Safe Drinking Water	5030004
3	29012	EASTERN ARMSTRONG CNTY MUNI AUTH	257711	E ARMSTRONG CNTY MUNI AUTH	Community	Active	Safe Drinking Water	5030004
4	29012	EASTERN ARMSTRONG CNTY MUNI AUTH	257711	E ARMSTRONG CNTY MUNI AUTH	Community	Active	Safe Drinking Water	5030004
5	29012	EASTERN ARMSTRONG CNTY MUNI AUTH	257711	E ARMSTRONG CNTY MUNI AUTH	Community	Active	Safe Drinking Water	5030004
6	29012	EASTERN ARMSTRONG CNTY MUNI AUTH	257711	E ARMSTRONG CNTY MUNI AUTH	Community	Active	Safe Drinking Water	5030004
7	29012	EASTERN ARMSTRONG CNTY MUNI AUTH	257711	E ARMSTRONG CNTY MUNI AUTH	Community	Active	Safe Drinking Water	5030004
8	29012	EASTERN ARMSTRONG CNTY MUNI AUTH	257711	E ARMSTRONG CNTY MUNI AUTH	Community	Active	Safe Drinking Water	5030004
9	29012	EASTERN ARMSTRONG CNTY MUNI AUTH	257711	E ARMSTRONG CNTY MUNI AUTH	Community	Active	Safe Drinking Water	5030004
10	29012	EASTERN ARMSTRONG CNTY MUNI AUTH	257711	E ARMSTRONG CNTY MUNI AUTH	Community	Active	Safe Drinking Water	5030004

	INSP ID	VIOLATION ID	INSPECTION CATEGORY	VIOLATION DATE	VIOLATION CODE	VIOLATION	PF INSPECTOR	INSP REGION
1	3289500	938012	PF	12/01/2021	C1A	FAILURE TO MEET DESIGN AND CONSTRUCTION STANDARDS	WIVELL,SHANA	NWRO
2	3289500	938013	PF	12/01/2021	C1A	FAILURE TO MEET DESIGN AND CONSTRUCTION STANDARDS	WIVELL,SHANA	NWRO
3	3289500	938014	PF	12/01/2021	C1A	FAILURE TO MEET DESIGN AND CONSTRUCTION STANDARDS	WIVELL,SHANA	NWRO
4	3289500	938015	PF	12/01/2021	C1A	FAILURE TO MEET DESIGN AND CONSTRUCTION STANDARDS	WIVELL,SHANA	NWRO
5	3289500	938016	PF	12/01/2021	C1A	FAILURE TO MEET DESIGN AND CONSTRUCTION STANDARDS	WIVELL,SHANA	NWRO
6	3289500	938017	PF	12/01/2021	C1A	FAILURE TO MEET DESIGN AND CONSTRUCTION STANDARDS	WIVELL,SHANA	NWRO
7	3289500	938018	PF	12/01/2021	C1A	FAILURE TO MEET DESIGN AND CONSTRUCTION STANDARDS	WIVELL,SHANA	NWRO
8	3289500	938019	PF	12/01/2021	C1A	FAILURE TO MEET DESIGN AND CONSTRUCTION STANDARDS	WIVELL,SHANA	NWRO
9	3289500	938020	PF	12/01/2021	C4A	FAILURE TO OPERATE AND MAINTAIN THE WATER SYSTEM	WIVELL,SHANA	NWRO
10	3289500	938021	PF	12/01/2021	A1	CIRCUMSTANCES EXIST WHICH ADVERSELY AFFECT THE QUANTITY OR QUALITY OF WATER	WIVELL,SHANA	NWRO

Attachment 2

WQM 7.0 Effluent Limits (Perennial Reach)

SWP Basin	Stream Code	Stream Name
17E	46216	CROOKED 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)
2.380	Elderton STP	PA0093033p	0.058	CBOD5	15.74		
				NH3-N	2.52	5.04	
				Dissolved Oxygen			4

The results for CBOD5 and Dissolved Oxygen are the same as the inputs from the Dry Reach Model, so the Dry Reach Model inputs are protective.

For NH3-N, the limit can be back calculated using the equation: $Ct = (Co)e^{-(kt)}$, where Ct = 2.52 mg/l
k = 0.7 $days^{-1}$ = constant for NH3-N
t = 0.222 days = Dry Reach Model travel time

Therefore, 2.52 mg/l = $(Ct)e^{-(0.7\ days^{-1})(0.222\ days)}$

Ct = 2.94

NH3-N = 2.9 mg/l

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
17E	46216	CROOKED CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
2.380	0.058	25.000	6.935
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
4.436	0.375	11.842	0.086
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
10.64	1.279	1.58	1.029
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.576	29.005	Owens	5
Reach Travel Time (days)			
0.811			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.081	9.34	1.46	7.16
0.162	8.19	1.34	7.41
0.243	7.19	1.23	7.53
0.325	6.31	1.13	7.54
0.406	5.54	1.04	7.54
0.487	4.86	0.96	7.54
0.568	4.27	0.88	7.54
0.649	3.74	0.81	7.54
0.730	3.29	0.75	7.54
0.811	2.88	0.69	7.54

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	EMPR	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

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
17E	46216	CROOKED CREEK	**2.380**	1081.00	0.53	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.100	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	25.00	7.00
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
Elderton STP	PA0093033p	0.0580	0.0000	0.0000	0.000	25.00	6.90

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	15.74	2.00	0.00	1.50
Dissolved Oxygen	2.00	8.24	0.00	0.00
NH3-N	18.93	0.00	0.00	0.70

(Input from Dry Reach Model)

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
17E	46216	CROOKED CREEK	**1.240**	1022.00	0.99	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.100	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	25.00	7.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	0.00	7.00

Parameter Data

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

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
17E	46216	CROOKED 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												
2.380	0.05	0.00	0.05	.0897	0.00980	.375	4.44	11.84	0.09	0.811	25.00	6.93
Q1-10 Flow												
2.380	0.03	0.00	0.03	.0897	0.00980	NA	NA	NA	0.08	0.879	25.00	6.93
Q30-10 Flow												
2.380	0.07	0.00	0.07	.0897	0.00980	NA	NA	NA	0.09	0.756	25.00	6.94

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
17E	46216	CROOKED 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
2.380	Elderton STP	11.78	16.24	11.78	16.24	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
2.380	Elderton STP	1.4	2.52	1.4	2.52	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
2.38	Elderton STP	15.74	15.74	2.52	2.52	4	4	0	0

WQM 7.0 D.O.Simulation (Dry Reach)

SWP Basin	Stream Code	Stream Name
17E	46216	CROOKED CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
2.850	0.058	25.000	6.904
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
1.775	0.411	4.321	0.129
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
23.89	1.492	23.79	1.029
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
3.903	32.149	Owens	2
Reach Travel Time (days)			
0.222			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.022	22.91	23.26	2.00
0.044	21.98	22.73	2.00
0.067	21.08	22.22	2.00
0.089	20.22	21.71	2.00
0.111	19.39	21.22	2.00
0.133	18.60	20.74	2.00
0.156	17.84	20.28	2.00
0.178	17.11	19.82	2.00
0.200	16.41	19.37	2.00
0.222	15.74	18.93	2.00

(Input into Perennial Reach Model)

WQM 7.0 Modeling Specifications

Parameters	D.O.	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	Simulation	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.64	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.36	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	2		

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
17E	46216	CROOKED CREEK	**2.850**	1163.00	0.05	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.100	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	25.00	7.00
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
Eldreton STP	PA0093033	0.0580	0.0000	0.0000	0.000	25.00	6.90

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	4.00	2.00	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
17E	46216	CROOKED CREEK	**2.380**	1081.00	0.53	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.100	0.00	0.00	0.000	0.000	0.0	0.00	0.00	25.00	7.00	25.00	7.00
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

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
17E	46216	CROOKED 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												
2.850	0.00	0.00	0.00	NA	0.03304	.411	1.78	4.32	0.13	0.222	25.00	6.90
Q1-10 Flow												
2.850	0.00	0.00	0.00	NA	0.03304	NA	NA	NA	0.00	0.000	0.00	0.00
Q30-10 Flow												
2.850	0.01	0.00	0.00	NA	0.03304	NA	NA	NA	0.00	0.000	0.00	0.00