Application Type	**Renewal**	
Facility Type	**Municipal**	
Major / Minor	**Minor**	

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application No.	**PA0239861**
APS ID	**1069250**
Authorization ID	**1406270**

Applicant and Facility Information

Applicant Name	**Cochranton Borough Crawford County**	Facility Name	**Cochranton Borough STP**
Applicant Address	109 E Adams Street PO Box 66	Facility Address	109 E Adams Street
	Cochranton, PA 16314-8603		Cochranton, PA 16314-8603
Applicant Contact	Susan Armburger	Facility Contact	Frances Mcclain
Applicant Phone	(814) 425-3365	Facility Phone	(814) 425-3365
Client ID	72001	Site ID	672158
Ch 94 Load Status	Not Overloaded	Municipality	Cochranton Borough
Connection Status	No Limitations	County	Crawford
Date Application Received	August 4, 2022	EPA Waived?	Yes
Date Application Accepted		If No, Reason	

Purpose of Application	Application to renew an NPDES Permit for a Minor Individual Sewage Treatment Plant that is owned by the Cochranton Borough Municipality.

Summary of Review

A 2017 DEP study found no evidence that the STP effluent was impacting mussel populations, mussel habitat, or water quality. French Creek, downstream of the Cochranton Borough STP, continues to exhibit a diverse and abundant mussel population, including robust populations of state and federal listed species.

There have been no updates to the facility within the last permit term.

There are currently 2 open violations in WMS for the subject Client ID (72001) as of 6/27/25. Both violations are for Failure of a public water system to obtain a permit through the Safe Drinking Water program.

Sludge use and disposal description and location(s): 17.94 dry tons of sludge were removed in 2022 when the application was submitted, a disposal location was not specified but the sludge is pumped and hauled to a disposal location by Dalton Service, LLC.

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
X		Dustin Hargenrater Dustin Hargenrater / Project Manager	June 27, 2025
X		Adam Olesnanik Adam Olesnanik, P.E. / Environmental Engineer Manager	July 1, 2025

Discharge, Receiving Waters and Water Supply Information

Outfall No.   001
Latitude   41º 30' 12.35"
Quad Name   Cochranton
Wastewater Description: Effluent

Design Flow (MGD)   .175
Longitude   -80º 2' 19.50"
Quad Code   41080E1

Receiving Waters   French Creek (WWF)
NHD Com ID   127346469
Drainage Area   990
Q_{7-10} Flow (cfs)   69.1
Elevation (ft)   1,044
Watershed No.   16-D
Existing Use
Exceptions to Use
Assessment Status   Impaired
Cause(s) of Impairment   MERCURY
Source(s) of Impairment   SOURCE UNKNOWN
TMDL Status

Stream Code   51591
RMI   17.3
Yield (cfs/mi^2)   0.0698
Q_{7-10} Basis   USGS - StreamStats
Slope (ft/ft)   --
Chapter 93 Class.   WWF
Existing Use Qualifier
Exceptions to Criteria

Name

Background/Ambient Data
pH (SU)   7.0
Temperature (°F)   25
Hardness (mg/L)   100
Other:

Data Source
Default
Default – WWF
Default

Nearest Downstream Public Water Supply Intake   Aqua Pennsylvania Inc. - Emlenton
PWS Waters   Allegheny River
PWS RMI   90.0

Flow at Intake (cfs)   1,376
Distance from Outfall (mi)   53

Changes Since Last Permit Issuance: None

Other Comments: The Mussel survey conducted in 2017 is still expected to be accurate for the case of this permit renewal.

2

Treatment Facility Summary				
Treatment Facility Name: Cochranton Borough STP				

WQM Permit No.	Issuance Date
2006403	5/22/2007
2006403 A-1	5/9/2008

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary w/ phosphorous reduction	Activated Sludge	Ultraviolet	0.175

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.175	315	Not Overloaded	Aerobic Digestion	Other WWTP

Changes Since Last Permit Issuance: None

Other Comments: French Creek has known populations of federally listed endangered/threatened species of the Northern Riffleshell, Rabitsfoot, and Rayed Bean mussels. Due to this being a direct discharge to French Creek the PADEP Aquatic Biologists did a mussel survey prior to the last permit term in October of 2017. When discussing this study with the biologists they consider the study to still be an accurate representation of the stream reach and therefore information provided below will be based off of the 2017 study.

The USFWS has indicated in comment letters on other NPDES permits that in order to protect threatened and endangered mussel species, wastewater discharges containing ammonia-nitrogen (NH_3-N), chloride (Cl^-), copper, zinc and nickel, where mussels or their habitat exist, can be no more than 1.9 mg/l, 78 mg/l, 10.0 µg/l ,13.18 µg/l and 7.3 µg/l, respectively.

The Department completed an aquatic biological investigation in the discharge area in 2017. The 2017 DEP studies conclusion was that no evidence was found that the STP effluent was impacting mussel populations, mussel habitat, or water quality. French Creek, downstream of the Cochranton Borough STP continues to exhibit a diverse and abundant mussel population, including robust populations of state and federal listed species.

The Department utilized its Impact Evaluation spreadsheet to calculate the maximum potential impact area of the STP discharge under the worst-case theoretical scenario. The spreadsheet is included as an attachment to this Fact Sheet under Attachment 1. This yielded a maximum potential impact area of approximately 1.39 square meters (14.96 square feet) for ammonia-nitrogen. All other parameters resulted in an anticipated impact area of less than 1 square meter. The calculated 1.39 square meter impact area for ammonia-nitrogen is based on the discharge concentration of ammonia-nitrogen being at the proposed water quality based effluent limitation of 8 mg/l. The Department will retain monitoring for Chloride, Copper, Nickel, and Zinc for the next permit term, during the time of the last renewal Copper and Zinc were not known to be toxic to the mussel population and therefore those parameters were left out of the last renewal. Based on new data from the USFWS regarding the toxicity of metals to the mussel population, Total Copper and Total Zinc monitoring will be imposed on the next renewal.

Compliance History

DMR Data for Outfall 001 (from May 1, 2024 to April 30, 2025)

Parameter	APR-25	MAR-25	FEB-25	JAN-25	DEC-24	NOV-24	OCT-24	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24
Flow (MGD) Average Monthly	0.038	0.035	0.036	0.035	0.034	0.033	0.035	0.041	0.044	0.042	0.039	0.041
Flow (MGD) Daily Maximum	0.055	0.041	0.053	0.041	0.044	0.044	0.051	0.053	0.078	0.048	0.049	0.049
pH (S.U.) Daily Minimum	7.0	6.9	6.8	6.7	6.8	6.9	6.9	7.2	7.3	7.3	7.3	6.2
pH (S.U.) Daily Maximum	7.9	7.3	7.8	7.4	7.5	7.4	7.8	8.8	7.8	7.8	7.6	7.6
DO (mg/L) Daily Minimum	6.6	6.2	5.5	4.9	4.8	4.7	6.0	4.7	4.7	6.2	5.5	7.2
CBOD5 (lbs/day) Average Monthly	1	1	< 1	< 1	< 1	< 1	< 1	< 1	< 2	< 1	< 1	< 1
CBOD5 (lbs/day) Weekly Average	2	2	1	1	1	1	< 1	< 1	4	< 1	1	2
CBOD5 (mg/L) Average Monthly	3	4	< 3	< 2	< 2	< 2	< 2	< 2	< 5	< 2	< 2	< 3
CBOD5 (mg/L) Weekly Average	4	6	5	2	3	2	2	< 2	12	3	3	4
BOD5 (lbs/day) Raw Sewage Influent Average Monthly	66	65	70	72	54	65	82	86	109	71	76	99
BOD5 (lbs/day) Raw Sewage Influent Daily Maximum	93	87	88	81	78	86	98	126	211	88	92	131
BOD5 (mg/L) Raw Sewage Influent Average Monthly	214	211	241	243	189	241	281	253	246	214	245	281
TSS (lbs/day) Average Monthly	< 2	< 2	< 1	< 2	< 1	< 1	< 2	< 2	< 2	< 2	< 2	< 2
TSS (lbs/day) Raw Sewage Influent Average Monthly	63	48	57	69	58	62	72	81	111	63	69	83
TSS (lbs/day) Raw Sewage Influent Daily Maximum	71	64	69	90	70	95	81	148	276	72	91	102

TSS (lbs/day) Weekly Average	< 2	< 2	< 2	< 2	< 2	< 2	2	< 2	< 3	< 2	< 2	< 2
TSS (mg/L) Average Monthly	< 5	< 5	< 5	< 5	< 5	< 5	< 6	< 5	< 5	< 5	< 5	< 5
TSS (mg/L) Raw Sewage Influent Average Monthly	213	158	199	232	200	229	248	228	231	190	223	235
TSS (mg/L) Weekly Average	6	< 5	< 5	< 5	< 5	< 5	7	< 5	< 5	< 5	< 5	< 5
Fecal Coliform (No./100 ml) Geometric Mean	< 1	< 1	< 1	< 1	< 1	< 6	< 1	< 1	< 1	< 1	< 1	< 1
Fecal Coliform (No./100 ml) Instantaneous Maximum	< 1	< 1	< 1	< 1	< 1	961	< 1	< 1	< 1	< 1	1	< 1
UV Intensity (µw/cm²) Average Monthly	0.3	0.3	0.2	0.2	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.4
Total Nitrogen (lbs/day) Average Monthly	3	3	4	4	2	2	3	2	4	2	2	4
Total Nitrogen (mg/L) Average Monthly	10.9	9.76	14.6	12.6	7.65	8.05	8.36	5.5	6.37	6.52	7.01	10.2
Ammonia (lbs/day) 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
Ammonia (mg/L) Average Monthly	< 0.2	< 0.2	< 0.2	< 0.2	< 0.4	< 0.2	< 0.2	< 0.1	< 0.2	< 0.3	0.2	< 0.3
Total Phosphorus (lbs/day) Average Monthly	0.3	0.3	0.3	0.5	0.3	0.3	0.3	< 0.4	0.4	< 0.2	0.4	0.5
Total Phosphorus (mg/L) Average Monthly	1.0	1.1	0.9	1.6	0.9	1.2	1.0	1.3	1.0	< 0.6	1.3	1.3
Total Nickel (mg/L) Average Quarterly		< 0.005			< 0.005			< 0.005			< 0.005	
Chloride (mg/L) Average Monthly	83.6	88.6	118	99	75.3	78	77.2	93	83.7	85.3	91.3	82

Development of Effluent Limitations

Outfall No. 001   **Design Flow (MGD)** .175

Latitude 41º 30' 12.00"   **Longitude** -80º 2' 20.00"

Wastewater Description: Effluent

Technology-Based Limitations

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

Pollutant	Limit (mg/l)	SBC	Federal Regulation	State Regulation
CBOD$_5$	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(2)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)

Comments: UV disinfection is utilized at the facility so the Total Residual Chlorine limitation will not be implemented.

Water Quality-Based Limitations

Modeling was performed using WQM 7.0 v 1.1 per the SOP for Establishing Effluent Limitations in Individual Sewage Permits. The WQM 7.0 Model takes into consideration receiving stream flow, discharge flow rate, existing concentrations of parameters, and stream temperature to create a mass balance equation and produce WQBELs for CBOD5, Ammonia-Nitrogen, and Dissolved Oxygen.

The modeling results suggest limits of 25 mg/l average monthly and 50 mg/l Instantaneous Maximum for Ammonia-Nitrogen, a 25 mg/l average monthly limitation for CBOD5, and Dissolved Oxygen minimum limitation of 4.0. These limits are less stringent than the limits currently set forth in the permit. The limitations calculated by the WQM 7.0 model are less stringent than the limits currently set in the permit, therefore due to anti-backsliding provisions these limitations will not be implemented. Modeling output files are attached as Attachment 2 for the purpose of verifying the limits.

The following limitations were used in the previous renewal due to being more stringent than the WQM 7.0 model that was conducted during the last renewal.

Parameter	Limit (mg/l)	SBC	Model
CBOD$_5$	22	Average Monthly	WQM 7.0 Version 1.0a (Run 1/31/2007)
Ammonia Nitrogen May 1 - Oct 31	8	Average Monthly	WQM 7.0 Version 1.0a (Run 1/31/2007)
Ammonia Nitrogen Nov 1 - Apr 30	24	Average Monthly	WQM 7.0 Version 1.0a (Run 1/31/2007)
Total Phosphorus	2.0	Average Monthly	1993 SERA Survey (Ch 96.5)

The facility does not have a history of effluent violations for any of these parameters so due to anti-backsliding provisions and based on the SOP for Establishing Effluent Limitations in Individual Sewage Permits these limits will be retained.

Best Professional Judgment (BPJ) Limitations

Comments: The Dissolved Oxygen minimum daily limit of 4.0 mg/l will be retained for this permit renewal. UV Intensity and Total Nitrogen monitoring was implemented as a BPJ limit in the last permit term and will be retained. Per the SOP for Establishing Effluent Limitations in Individual Sewage Permits, E. Coli monitoring will be implemented with a monitoring frequency of 1/quarter for design flows >= 0.05 MGD and <1 MGD.

Anti-Backsliding

The limitations calculated in the 2007 permit for Ammonia-Nitrogen and CBOD5 are more stringent than the limits calculated in the updated WQM 7.0 v 1.1 model and there is currently no justification for backsliding the limitations with this permit renewal. The 8 mg/l established in the 2007 permit has been easily achieved by the facility based on reported data in the EDMRs.

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (386-0400-001), SOPs and/or BPJ.

Outfall 001, Effective Period: <u>Permit Effective Date</u> through <u>Permit Expiration Date</u>.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) [1]		Concentrations (mg/L)				Minimum [2]	
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum	Measurement Frequency	Required Sample Type
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	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	32	48	XXX	22.0	33.0	44	1/week	24-Hr Composite
BOD5 Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
TSS Raw Sewage Influent	Report	Report Daily Max	XXX	Report	XXX	XXX	1/week	24-Hr Composite
TSS	44	66	XXX	30.0	45.0	60	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
UV Intensity (µw/cm²)	XXX	XXX	XXX	Report	XXX	XXX	1/day	Measured
Total Nitrogen	Report	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Ammonia Nov 1 - Apr 30	35.0	XXX	XXX	24.0	XXX	48	1/week	24-Hr Composite
Ammonia May 1 - Oct 31	11.7	XXX	XXX	8.0	XXX	16	1/week	24-Hr Composite
Total Phosphorus	2.9	XXX	XXX	2.0	XXX	4	1/week	24-Hr Composite
Total Nickel	XXX	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	24-Hr Composite
Chloride	XXX	XXX	XXX	Report	XXX	XXX	1/month	24-Hr Composite
Total Copper	XXX	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	24-Hr Composite
Total Zinc	XXX	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	24-Hr Composite
E. Coli (No./100 ml)	XXX	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	Grab

Compliance Sampling Location: Outfall 001, after disinfection.

Attachment 1
Mussel Impact Evaluation Spreadsheet

Outfall 001

Facility:	Cochranton Boro STP		
Permit Number:	PA0239861	Effective:	Expiration:
Outfall No:	001		
Location:	Cochranton, Crawford County		
Discharge to:	French Creek		
Site Specific Mussel Survey Completed:	Mussel Study conducted in 2017.		

Discharge and Stream Characteristics			Comments
Q_S	Stream Flow	45 MGD / 69.1 cfs	
Q_D	Discharge Flow	0.175 MGD / 0.2708 cfs	
$C_{S(Cl^-)}$	Instream chloride Concentration	0 mg/L	
$C_{E(Cl^-)}$	Discharge chloride (existing)	105 mg/L	
$C_{P(Cl^-)}$	Discharge chloride (proposed)	105 mg/L	
$C_{S(Ni)}$	Instream nickel Concentration	0 µg/L	
$C_{E(Ni)}$	Discharge nickel (existing)	5 µg/L	
$C_{P(Ni)}$	Discharge nickel (proposed)	5 µg/L	
$C_{S(Zn)}$	Instream zinc Concentration	0 µg/L	
$C_{E(Zn)}$	Discharge zinc (existing)	µg/L	
$Zn_{P(Zn)}$	Discharge zinc (proposed)	µg/L	
$C_{S(Cu)}$	Instream copper Concentration	0 µg/L	
$C_{E(Cu)}$	Discharge copper (existing)	5 µg/L	
$Zn_{P(Cu)}$	Discharge copper (proposed)	5 µg/L	
$C_{S(NH3-N)}$	Instream NH³-N	0.2 mg/L	
$C_{E(NH3-N)}$	Discharge NH³-N (existing)	1.2 mg/L	
$C_{P(NH3-N)}$	Discharge NH³-N (proposed)	8 mg/L	
pH_S	Instream pH	7 S.U.	
T_S	Instream Temp.	25 °C	Default value for a WWF
$C_{C(NH3-N)}$	Ammonia criteria	1.367 mg/L	From ammonia criteria comparison spreadsheet -using instream pH and Temp
$C_{C(Cl^-)}$	Chloride criteria	78 mg/L	USFWS criteria
$C_{C(Ni)}$	Nickel criteria	7.3 µg/L	USFWS criteria
$C_{C(Zn)}$	Zinc criteria	13.18 µg/L	USFWS criteria
$C_{C(Cu)}$	Copper criteria	10 µg/L	USFWS criteria
W_S	Stream width	73 meters	Google Earth (Approximate)

Ammonia Criteria Calculations:

pH_S	7	S.U.	(Default value is 7.0)	
T_S	25	°C	(Default value is 20° for a CWF and 25° for a WWF)	

Acute Criteria

METHOD and UNITS	CRITERIA	Comments	
Old CMC (mg TAN/L) =	6.764		
EPA 2013 CMC (mg TAN/L) =	11.073	Oncorhynchus present	* formula on pg. 41 (plateaus at 15.7 C)
	11.073	Oncorhynchus absent	* formula on pg. 42 (plateaus at 10.2 C)

Chronic Criteria

	METHOD and UNITS	CRITERIA	COMMENTS
	Old CMC (mg TAN/L) =	1.341	
$C_{C(NH3-N)}$	EPA 2013 CMC (mg TAN/L) =	1.367	* formula on pg. 46 (plateaus at 7 C)

Endangered Mussel Species Impact Area Calculations:

Existing Area of Impact

☑ N/A - No Site Specific Mussel Survey Completed for this Discharger

Approximate Area of Impact Determined from Survey =	N/A m²	(Enter N/A if no site specific survey has been completed)
Existing Mussel Density within Area of Impact =		
Rabbitsfoot *(Quadrula cylindrical)*	per m²	
Northern Riffleshell *(Epioblasma torulosa rangiana)*	per m²	
Rayed Bean *(Villosa fabalis)*	per m²	
Clubshell *(Pleurobema clava)*	per m²	
Sheepnose *(Plethobasus cyphyus)*	per m²	
Snuffbox *(Epioblasma triquetra)*	per m²	
TOTAL	0 per m²	

Method 1 - Utilizing Site Specific Mussel Survey Information

☑ N/A - No Site Specific Mussel Survey Completed for this Discharger

This method utilizes a simple comparison of the size of the existing area of impact as determined from a site specific mussel survey and the chlorides in the existing discharge compared to the chlorides in the proposed discharge after the facility upgrades treatment technologies. This method is only applicable to where the stream impairment is caused by TDS and/or chlorides as the plume has been delineated through conductivity measurements.

A.	Area of Impact Determined from Survey:	N/A	m²
B.	Chlorides in Existing Discharge:		105 mg/L
C.	Chlorides in Proposed Discharge after Treatment Facility Upgrades:		105 mg/L
D.	Approximate Area of Impact after Treatment Facility Upgrades:		N/A m²

A/B = D/C   Therefore, D = (A*C)/B

6/30/2025

Outfall 001

Facility:	Cochranton Boro STP		
Permit Number:	PA0239861	Effective:	Expiration:
Outfall No:	001		
Location:	Cochranton, Crawford County		
Discharge to:	French Creek		
Site Specific Mussel Survey Completed:	Mussel Study conducted in 2017.		

Endangered Mussel Species Impact Area Calculations: (continued...)

Method 2 - Mass Balance Relationship of Loading and Assimilative Capacity of Stream

Chloride (Cl⁻)	$L_{S(Cl^-)}$ = Available Chloride Loading in Stream = $C_{C(Cl^-)}$ - $C_{S(Cl^-)}$ X Q_S(MGD) X 8.34 =	29,273 lbs/Day
	$L_{D-MAX(Cl^-)}$ = Current Maximum Discharge Chloride Loading exceeding criteria = $(C_{E(Cl^-)} - C_{E(Cl^-)})$ X Q_D(MGD) X 8.34 =	39 lbs/Day
	%$_{E(Cl^-)}$ = Percent of Stream Capacity for Current Loading = $L_{D-MAX(Cl^-)}$ / $L_{S(Cl^-)}$ =	0% of Current Capacity
	$L_{D(Cl^-)}$ = Proposed Discharge Cl⁻ Loading exceeding criteria after Treatment Facility Upgrades = $(C_{P(Cl^-)} - C_{P(Cl^-)})$ X Q_D(MGD) X 8.34 =	39.4065 lbs/Day
	%$_{P(Cl^-)}$ = Percent of Stream Capacity for Proposed Loading = $L_{D(Cl^-)}$ / $L_{S(Cl^-)}$ =	0.13% of Stream Capacity
	Proposed Area of Impact due to Chloride * = (%$_{P(Cl^-)}$ X W_s)² X 0.5 =	0.00 m²
	* assuming equal flow across transect and 90° spread at discharge	
Nickel (Ni)	$L_{S(Ni)}$ = Available Nickel Loading in Stream = $C_{C(Ni)}$ - $C_{S(Ni)}$ X Q_S(MGD) X 8.34 =	2,740 lbs/Day
	$L_{D-MAX(Ni)}$ = Current Maximum Discharge Nickel Loading exceeding criteria = $(C_{E(Ni)} - C_{E(Ni)})$ X Q_D(MGD) X 8.34 =	-3 lbs/Day
	%$_{E(Ni)}$ = Percent of Stream Capacity for Current Loading = $L_{D-MAX(Ni)}$ / $L_{S(Ni)}$ =	0% of Stream Capacity
	$L_{D(Ni)}$ = Proposed Discharge Ni Loading exceeding criteria after Treatment Facility Upgrades = $(C_{P(Ni)} - C_{P(Ni)})$ X Q_D(MGD) X 8.34 =	-3.35685 lbs/Day
	%$_{P(Ni)}$ = Percent of Stream Capacity for Proposed Loading = $L_{D(Ni)}$ / $L_{S(Ni)}$ =	-0.12% of Stream Capacity
	Proposed Area of Impact due to Nickel * = (%$_{P(Ni)}$ X W_s)² X 0.5 =	0.00 m²
	* assuming equal flow across transect and 90° spread at discharge	
Zinc (Zn)	$L_{S(Zn)}$ = Available Zinc Loading in Stream = $C_{C(Zn)}$ - $C_{S(Zn)}$ X Q_S(MGD) X 8.34 =	4,946 lbs/Day
	$L_{D-MAX(Zn)}$ = Current Maximum Discharge Zinc Loading exceeding criteria = $(C_{E(Zn)} - C_{E(Zn)})$ X Q_D(MGD) X 8.34 =	-19 lbs/Day
	%$_{E(Zn)}$ = Percent of Stream Capacity for Current Loading = $L_{D-MAX(Zn)}$ / $L_{S(Zn)}$ =	0% of Stream Capacity
	$L_{D(Zn)}$ = Proposed Discharge Zn Loading exceeding criteria after Treatment Facility Upgrades = $(C_{P(Zn)} - C_{P(Zn)})$ X Q_D(MGD) X 8.34 =	-19.23621 lbs/Day
	%$_{P(Zn)}$ = Percent of Stream Capacity for Proposed Loading = $L_{D(Zn)}$ / $L_{S(Zn)}$ =	-0.39% of Stream Capacity
	Proposed Area of Impact due to Zinc * = (%$_{P(Zn)}$ X W_s)² X 0.5 =	0.04 m²
	* assuming equal flow across transect and 90° spread at discharge	
Copper (Cu)	$L_{S(Cu)}$ = Available Copper Loading in Stream = $C_{C(Cu)}$ - $C_{S(Cu)}$ X Q_S(MGD) X 8.34 =	3,753 lbs/Day
	$L_{D-MAX(Cu)}$ = Current Maximum Discharge Copper Loading exceeding criteria = $(C_{E(Cu)} - C_{E(Cu)})$ X Q_D(MGD) X 8.34 =	-7 lbs/Day
	%$_{E(Cu)}$ = Percent of Stream Capacity for Current Loading = $L_{D-MAX(Cu)}$ / $L_{S(Cu)}$ =	0% of Stream Capacity
	$L_{D(Cu)}$ = Proposed Discharge Cu Loading exceeding criteria after Treatment Facility Upgrades = $(C_{P(Cu)} - C_{P(Cu)})$ X Q_D(MGD) X 8.34 =	-7.2975 lbs/Day
	%$_{P(Cu)}$ = Percent of Stream Capacity for Proposed Loading = $L_{D(Cu)}$ / $L_{S(Cu)}$ =	-0.19% of Stream Capacity
	Proposed Area of Impact due to Copper* = (%$_{P(Cu)}$ X W_s)² X 0.5 =	0.01 m²
	* assuming equal flow across transect and 90° spread at discharge	
Ammonia-Nitrogen (NH3-N)	$L_{S(NH3-N)}$ = Available NH3-N Loading in Stream = $C_{C(NH3-N)}$ - $C_{S(NH3-N)}$ X Q_S(MGD) X 8.34 =	438 lbs/Day
	$L_{D-MAX(NH3-N)}$ = Current Maximum Discharge NH3-N Loading = $C_{E(NH3-N)}$ X Q_D(MGD) X 8.34 =	2 lbs/Day
	%$_{E(NH3-N)}$ = Percent of Stream Capacity for Current Loading = $L_{D-MAX(NH3-N)}$ / $L_{S(NH3-N)}$ =	0% of Stream Capacity
	$L_{D(NH3-N)}$ = Proposed Discharge NH3-N Loading after Treatment Facility Upgrades = $C_{P(NH3-N)}$ - $C_{C(NH3-N)}$ X Q_D(MGD) X 8.34 =	10 lbs/Day
	%$_{P(NH3-N)}$ = Percent of Stream Capacity for Proposed Loading = $L_{D(NH3-N)}$ / $L_{S(NH3-N)}$ =	2.28% of Stream Capacity
	Proposed Area of Impact due to NH3-N * = (%$_{P(NH3-N)}$ X W_s)² X 0.5 =	1.39 m²
	* assuming equal flow across transect and 90° spread at discharge	

6/30/2025

Outfall 001

Facility:	Cochranton Boro STP		
Permit Number:	PA0239861	Effective:	Expiration:
Outfall No:	001		
Location:	Cochranton, Crawford County		
Discharge to:	French Creek		
Site Specific Mussel Survey Completed:	Mussel Study conducted in 2017.		

Endangered Mussel Species Impact Area Calculations: (continued...)

Method 3 - Mass Balance Relationship of Stream Flow, Proposed Effluent Quality, and Mussel Protection Criteria

Chloride (Cl⁻)	$Q_{A(Cl^-)}C_{S(Cl^-)} + Q_D C_{P(Cl^-)} = Q_T C_{C(Cl^-)}$	
	$Q_{A(Cl^-)}$ = Assimilative Stream Flow Required to Achieve Criteria (cfs)	
	$Q_T = Q_S + Q_D$ (cfs)	
	$Q_{A(Cl^-)}C_{S(Cl^-)} + Q_D C_{P(Cl^-)} = (Q_D + Q_S)C_{C(Cl^-)}$	
	SOLVING FOR $Q_{A(Cl^-)} = [(Q_D C_{P(Cl^-)} / C_{C(Cl^-)}) - Q_D] / (1 - C_{S(Cl^-)}/C_{C(Cl^-)}) =$	0.09373846 cfs
	$\%_{P(Cl^-)}$ = Percent of Stream Width Required to Assimilate Chlorides to Criteria Concentration = $Q_{A(Cl^-)} / Q_S$ (cfs) =	0.1357%
	$W_{I(Cl^-)}$ = Proposed Width of Stream required to Assimilate Chlorides to Criteria Concentration = W_S X $\%_{P(Cl^-)}$	0.099029 meters
	Proposed Area of Impact due to Chloride * = $(W_{I(Cl^-)})^2$ X 0.5 =	0.00 m²
	* assuming equal flow across transect and 90° spread at discharge	
Nickel (Ni)	$Q_{A(Ni)}C_{S(Ni)} + Q_D C_{P(Ni)} = Q_T C_{C(Ni)}$	
	$Q_{A(Ni)}$ = Assimilative Stream Flow Required to Achieve Criteria (cfs)	
	$Q_T = Q_S + Q_D$ (cfs)	
	$Q_{A(Ni)}C_{S(Ni)} + Q_D C_{P(Ni)} = (Q_D + Q_S)C_{C(Ni)}$	
	SOLVING FOR $Q_{A(Ni)} = [(Q_D C_{P(Ni)} / C_{C(Ni)}) - Q_D] / (1 - C_{S(Ni)}/C_{C(Ni)}) =$	-0.08532055 cfs
	$\%_{P(Cl^-)}$ = Percent of Stream Width Required to Assimilate Nickel to Criteria Concentration = $Q_{A(Ni)} / Q_S$ (cfs) =	-0.1235%
	$W_{I(Ni)}$ = Proposed Width of Stream required to Assimilate Nickel to Criteria Concentration = W_S X $\%_{P(Ni)}$	-0.090136 meters
	Proposed Area of Impact due to Nickel * = $(W_{I(Ni)})^2$ X 0.5 =	0.00 m²
	* assuming equal flow across transect and 90° spread at discharge	
Zinc (Zn)	$Q_{A(Zn)}C_{S(Zn)} + Q_D C_{P(Zn)} = Q_T C_{C(Zn)}$	
	$Q_{A(Zn)}$ = Assimilative Stream Flow Required to Achieve Criteria (cfs)	
	$Q_T = Q_S + Q_D$ (cfs)	
	$Q_{A(Zn)}C_{S(Zn)} + Q_D C_{P(Zn)} = (Q_D + Q_S)C_{C(Zn)}$	
	SOLVING FOR $Q_{A(Zn)} = [(Q_D C_{PZn} / C_{C(Zn)}) - Q_D] / (1 - C_{S(Zn)}/C_{C(Zn)}) =$	-0.2708 cfs
	$\%_{P(Cl^-)}$ = Percent of Stream Width Required to Assimilate Zinc to Criteria Concentration = $Q_{A(Zn)} / Q_S$ (cfs) =	-0.3919%
	$W_{I(Zn)}$ = Proposed Width of Stream required to Assimilate Zinc to Criteria Concentration = W_S X $\%_{PZn}$	-0.286084 meters
	Proposed Area of Impact due to Zinc * = $(W_{I(Zn)})^2$ X 0.5 =	0.04 m²
	* assuming equal flow across transect and 90° spread at discharge	
Copper (Cu)	$Q_{A(Cu)}C_{S(Cu)} + Q_D C_{P(Cu)} = Q_T C_{C(Cu)}$	
	$Q_{A(Cu)}$ = Assimilative Stream Flow Required to Achieve Criteria (cfs)	
	$Q_T = Q_S + Q_D$ (cfs)	
	$Q_{A(Cu)}C_{S(Cu)} + Q_D C_{P(Cu)} = (Q_D + Q_S)C_{C(Cu)}$	
	SOLVING FOR $Q_{A(Cu)} = [(Q_D C_{PCu} / C_{C(Cu)}) - Q_D] / (1 - C_{S(Cu)}/C_{C(Cu)}) =$	-0.1354 cfs
	$\%_{P(Cu)}$ = Percent of Stream Width Required to Assimilate Copper to Criteria Concentration = $Q_{A(Cu)} / Q_S$ (cfs) =	-0.1959%
	$W_{I(Cu)}$ = Proposed Width of Stream required to Assimilate Copper to Criteria Concentration = W_S X $\%_{PCu}$	-0.143042 meters
	Proposed Area of Impact due to Copper * = $(W_{I(Cu)})^2$ X 0.5 =	0.01 m²
	* assuming equal flow across transect and 90° spread at discharge	
Ammonia-Nitrogen (NH3-N)	$Q_{A(NH3-N)}C_{S(NH3-N)} + Q_D C_{P(NH3-N)} = Q_T C_{C(NH3-N)}$	
	$Q_{A(NH3-N)}$ = Assimilative Stream Flow Required to Achieve Criteria (cfs)	
	$Q_T = Q_S + Q_D$ (cfs)	
	$Q_{A(NH3-N)}C_{S(NH3-N)} + Q_D C_{P(NH3-N)} = (Q_D + Q_S)C_{C(NH3-N)}$	
	SOLVING FOR $Q_{A(NH3-N)} = [(Q_D C_{P(NH3-N)} / C_{C(NH3-N)}) - Q_D] / (1 - C_{S(NH3-N)}/C_{C(NH3-N)}) =$	1.539174 cfs
	$\%_{P(NH3-N)}$ = Percent of Stream Width Required to Assimilate NH3-N to Criteria Concentration = $Q_{A(NH3-N)} / Q_S$ (cfs) =	2.2275%
	$W_{I(NH3-N)}$ = Proposed Width of Stream required to Assimilate NH3-N to Criteria Concentration = W_S X $\%_{P(NH3-N)}$	1.626045 meters
	Proposed Area of Impact due to NH3-N * = $(W_{I(NH3-N)})^2$ X 0.5 =	1.32 m²
	* assuming equal flow across transect and 90° spread at discharge	

Attachment 2
WQM 7.0 Modeling Output Files

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
16D	51591 FRENCH CREEK		**17.300**	1044.00	990.00	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (°C)	pH	Stream Temp (°C)	pH
Q7-10	0.070	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
Cochranton STP	PA0239861	0.1750	0.1750	0.1750	0.000	25.00	7.25

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	8.24	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
16D	51591 FRENCH CREEK		16.500	1041.00	993.00	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	pH	Stream Temp (ºC)	pH
Q7-10	0.070	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 (ºC)	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	4.00	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
16D	51591	FRENCH 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												
17.300	69.10	0.00	69.10	.2707	0.00071	1.108	152.13	137.24	0.41	0.119	25.00	7.00
Q1-10 Flow												
17.300	44.23	0.00	44.23	.2707	0.00071	NA	NA	NA	0.32	0.152	25.00	7.00
Q30-10 Flow												
17.300	93.98	0.00	93.98	.2707	0.00071	NA	NA	NA	0.49	0.100	25.00	7.00

WQM 7.0 Modeling Specifications

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

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
16D	51591	FRENCH 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
17.300	Cochranton STP	11.06	50	11.06	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
17.300	Cochranton STP	1.37	25	1.37	25	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5 Baseline (mg/L)	CBOD5 Multiple (mg/L)	NH3-N Baseline (mg/L)	NH3-N Multiple (mg/L)	Dissolved Oxygen Baseline (mg/L)	Dissolved Oxygen Multiple (mg/L)	Critical Reach	Percent Reduction
17.30	Cochranton STP	25	25	25	25	4	4	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
16D	51591	FRENCH CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
17.300	0.175	25.000	7.001
Reach Width (ft)	Reach Depth (ft)	Reach WDRatio	Reach Velocity (fps)
152.129	1.108	137.243	0.411
Reach CBOD5 (mg/L)	Reach Kc (1/days)	Reach NH3-N (mg/L)	Reach Kn (1/days)
2.09	0.063	0.10	1.029
Reach DO (mg/L)	Reach Kr (1/days)	Kr Equation	Reach DO Goal (mg/L)
8.226	1.534	Tsivoglou	5
Reach Travel Time (days)			
0.119			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.012	2.09	0.10	7.54
0.024	2.09	0.10	7.54
0.036	2.08	0.09	7.54
0.048	2.08	0.09	7.54
0.059	2.08	0.09	7.54
0.071	2.08	0.09	7.54
0.083	2.08	0.09	7.54
0.095	2.07	0.09	7.54
0.107	2.07	0.09	7.54
0.119	2.07	0.09	7.54

<u>WQM 7.0 Effluent Limits</u>

<u>SWP Basin</u>	<u>Stream Code</u>			<u>Stream Name</u>			
16D	51591			**FRENCH 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)
17.300	Cochranton STP	PA0239861	0.175	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			4