pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0102822**
Facility Type	**Non-Municipal**	APS ID	**696763**
Major / Minor	**Minor**	Authorization ID	**1298717**

Applicant and Facility Information

Applicant Name	**Robert & Ronald Krenitsky d/b/a Rolling Valley Estates**	Facility Name	**Rolling Valley Estates**
Applicant Address	385 Eagle Mill Road Butler, PA 16001	Facility Address	369 Eagle Mill Road Butler, PA 16001
Applicant Contact	Robert Krenitsky	Facility Contact	Robert Krenitsky
Applicant Phone	(724) 789-7751	Facility Phone	(724) 789-7751
Client ID	29123	Site ID	244074
Ch 94 Load Status	Not Overloaded	Municipality	Connoquenessing Township
Connection Status	No Limitations	County	Butler County
Date Application Received	December 2, 2019	EPA Waived?	Yes
Date Application Accepted	December 12, 2019	If No, Reason	-

Purpose of Application: Renewal of an NPDES Permit for an existing discharge of treated sanitary wastewater.

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 continue to meet the limits of this permit, which will continue to protect the uses of the receiving stream.

I. OTHER REQUIREMENTS:

A. Stormwater into Sewers
B. Right of Way
C. Solids Handling
D. Public sewerage availability
E. Effluent Chlorine Optimization and Minimization
F. Little or No Assimilative Capacity or Dilution

SPECIAL CONDITIONS:

II. Solids Management

There are no open violations in efacts associated with the subject Client ID (29123) as of 11/6/2020.

Approve	Deny	Signatures	Date
X		Stephen A. McCauley Stephen A. McCauley, E.I.T. / Environmental Engineering Specialist	11/6/2020
X		Justin C. Dickey Justin C. Dickey, P.E. / Environmental Engineer Manager	November 9, 2020

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.025
Latitude	40º 51' 58.00"	Longitude	-79º 58' 41.00"
Quad Name	-	Quad Code	-
Wastewater Description:	Sewage Effluent		
Receiving Waters	Unnamed Tributary to the Little Connoquenessing Creek (CWF)	Stream Code	N/A
NHD Com ID	126217465	RMI	N/A
Drainage Area	11.54 (first point of perennial conditions)	Yield (cfs/mi^2)	0.047
Q_{7-10} Flow (cfs)	0.54	Q_{7-10} Basis	calculated
Elevation (ft)	1040	Slope (ft/ft)	0.002913
Watershed No.	20-C	Chapter 93 Class.	CWF
Existing Use	-	Existing Use Qualifier	-
Exceptions to Use	-	Exceptions to Criteria	-
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment	Aluminum, Iron, and Manganese		
Source(s) of Impairment	Abandoned Mine Drainage (AMD)		
TMDL Status	Final (4/9/2009)	Name	Little Connoquenessing Creek Watershed

Background/Ambient Data		Data Source
pH (SU)	7.4	5/2002 Connoquenessing Creek Watershed Alliance Growing Greener Watershed Assessment
Temperature (°F)	-	-
Hardness (mg/L)	-	-
Other:	-	-

Nearest Downstream Public Water Supply Intake	Harmony Borough Water Authority		
PWS Waters	Little Connoquenessing Creek	Flow at Intake (cfs)	2.0
PWS RMI	1.1	Distance from Outfall (mi)	7.0

* - 1/year monitoring was previously added, and will be retained, for Aluminum, Iron, and Manganese due to the Little Connoquenessing Creek Watershed TMDL that was made final on April 9, 2009, under the authority of Chapter 92a.61, and per the direction of the SOP for Establishing Effluent Limitations for Individual Sewage Permits.

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 0.025 MGD of treated sewage from a non-Municipal STP in Connoquenessing Borough, Butler County.

Treatment permitted under WQM Permit 1073410 consists of: Screening and comminution, alum for Phosphorus removal, two parallel 12,500 gallon aeration tanks, two parallel 2,000 gallon settling tanks, a 3,000 gallon aerated sludge storage tank, a dosing chamber with dual siphons, two 1,600 square foot (40' x 40') intermittent surface sand filters, and tablet chlorination with a 2,073 gallon contact tank.

1. Streamflow: Buffalo Creek at Freeport, PA (1976-1996) - used for most Connoquenessing Creek discharges:

Drainage Area:	137	sq. mi.	(USGS StreamStats)
Q_{7-10}:	6.37	cfs	(USGS StreamStats)
Yieldrate:	0.047	cfsm	(calculated)

Unnamed Tributary to the Connoquenessing Creek @ Outfall 001:

Drainage Area:	0.01	sq. mi.	(Dry/Intermittent stream)
Yieldrate:	0.047	cfsm	(from Connoquenessing Creek above)
Q_{7-10}:	0.00047	cfs	(calculated)

% of stream allocated: 100% Basis: No nearby discharges

2. Wasteflow:

Permitted discharge: 0.025 MGD = 0.038 cfs

Runoff flow period: 16 hours Basis: Runoff flow for a non-Municipal STP

24 hour flow: 0.025 MGD x 24/16 = 0.037 MGD = 0.057 cfs

There is less than 3 parts stream flow (Q7-10) to 1 part effluent (design flow). In accordance with the SOP, since this is an existing discharge, the treatment requirements in document number 391-2000-014, titled, "Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers", dated April 12, 2008, need to be evaluated for this facility. Based on eDMR data, the treatment requirements are not attainable with the treatment technology in place so the requirements will not be implemented in this NPDES Permit renewal.

3. Parameters:

The following parameters were evaluated: pH, Total Suspended Solids, Fecal Coliform, Phosphorus, Total Nitrogen, 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 will remain as 30 mg/l as a monthly average and 60 mg/l as an instantaneous maximum.

Basis: Application of Chapter 92a47 technology-based limits

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. Phosphorus

☒ Limit necessary due to:

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

Basis: The previous 2.0 mg/l limit based on Chapter 96.5 due to the discharge flowing to the Connoquenessing Creek, which is impaired for nutrients, will be retained.

☐ Limit not necessary

Basis: N/A

e. Total Nitrogen

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

f. Ammonia-Nitrogen (NH_3-N)

Median discharge pH to be used: 7.3 Standard Units (S.U.)

Basis: eDMR data

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

Median stream pH to be used: 7.4 Standard Units (S.U.)

Basis: 5/2002 Connoquenessing Creek Watershed Alliance Growing Greener Watershed Assessment

Stream Temperature: 20˚C (default value used for CWF modeling)

Background NH_3-N concentration: 0.0 mg/l

Basis: Default value.

Calculated NH_3-N Summer limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

Calculated NH_3-N 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). The winter limits are calculated as three times the summer limits, but since the technology-based limits are more protective, they will be used. As with the past renewal, the calculated limits are less restrictive than the limits that are set in the previous permit. The more restrictive limits set in the previous renewal are retained since, based on eDMR data, the limits are attainable.

g. $CBOD_5$

Median discharge pH to be used: 7.3 Standard Units (S.U.)

Basis: eDMR data

Discharge temperature:	25°C	(default value used in the absence of data)
Median stream pH to be used:	7.4	Standard Units (S.U.)
	Basis:	5/2002 Connoquenessing Creek Watershed Alliance Growing Greener Watershed Assessment
Stream Temperature:	20˚C	(default value used for CWF modeling)
Background $CBOD_5$ concentration:	2.0	mg/l
	Basis:	Default value
$CBOD_5$ Summer limits:	25.0	mg/l (monthly average)
	50.0	mg/l (instantaneous maximum)
$CBOD_5$ 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 the same as the previous NPDES Permit. The winter limits are calculated as three times the summer limits, but since the technology-based limits are more protective, they will be used.

h. Dissolved Oxygen (DO)

- ☒ 4.0 mg/l - minimum desired in effluent to protect all aquatic life
- ☐ 5.0 mg/l - desired in effluent for CWF, WWF, or TSF
- ☐ 6.0 mg/l - minimum required due to discharge falling under guidance document 391-2000-014
- ☐ 8.0 mg/l - required due to discharge going to a naturally reproducing salmonid stream

Discussion: The Dissolved Oxygen minimum of 4.0 mg/l will be retained with this renewal. The 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.

i. Total Residual Chlorine (TRC)

- ☐ No limit necessary
- ☒ TRC limits: 0.5 mg/l (monthly average)
  1.6 mg/l (instantaneous maximum)

Basis: The TRC limits above are technology-based using the TRC_Calc Spreadsheet (see Attachment 1).

j. 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.

Attachment List:

Attachment 1 - TRC_Calc Spreadsheet

Attachment 2 - WQ Modeling Printouts - Perennial Reach

Attachment 3 - WQ Modeling Printouts - Dry Reach

If viewing this electronically, please refer to the following PDF to view the above Attachments:

Adobe Acrobat Document

Compliance History

DMR Data for Outfall 001 (from October 1, 2019 to September 30, 2020)

Parameter	SEP-20	AUG-20	JUL-20	JUN-20	MAY-20	APR-20	MAR-20	FEB-20	JAN-20	DEC-19	NOV-19	OCT-19
Flow (MGD) Average Monthly	0.0079	0.0080	0.0093	0.0085	0.0087	0.0086	0.0096	0.0094	0.0848	0.00918	0.0097	0.0097
Flow (MGD) Daily Maximum	0.0095	0.0108	0.0127	0.0124	0.0128	0.0117	0.0110	0.0125	0.0104	0.0117	0.0133	0.0161
pH (S.U.) Minimum	7.0	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
pH (S.U.) Maximum	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
DO (mg/L) Minimum	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
TRC (mg/L) Average Monthly	0.33	0.48	0.39	0.46	0.44	0.43	0.43	0.34	< 0.44	0.45	0.43	0.42
TRC (mg/L) Instantaneous Maximum	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
CBOD5 (mg/L) Average Monthly	< 4.0	4.0	< 4.0	< 4.0	13	0.63	< 4.0	< 4.0	8.2	< 4.0	< 4.0	< 4.0
TSS (mg/L) Average Monthly	5.0	< 5.0	0.40	< 5.0	< 5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.25	< 5.0	< 5.0
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	0.01	0.01	0.01	0.01	0.1	0.01	0.01	1	0.01	0.001	0.01	0.01
Ammonia (mg/L) Average Monthly	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	0.45	< 0.30	< 0.30	< 0.30	< 0.34	< 0.30	< 0.30
Total Phosphorus (mg/L) Average Monthly	1.50	1.2	0.74	1.07	0.875	0.83	0.628	0.509	1.16	1.12	1.45	1.85
Total Aluminum (mg/L) Annual Average										0.200		
Total Iron (mg/L) Annual Average										0.200		
Total Manganese (mg/L) Annual Average										0.006		

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 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	4.0 Inst Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
CBOD5	XXX	XXX	XXX	20.0	XXX	40	2/month	8-Hr Composite
TSS	XXX	XXX	XXX	30.0	XXX	60	2/month	8-Hr Composite
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
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	2/month	8-Hr Composite
Ammonia-Nitrogen Nov 1 - Apr 30	XXX	XXX	XXX	12.0	XXX	36	2/month	8-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	XXX	XXX	XXX	4.0	XXX	12	2/month	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	2.0	XXX	4	2/month	8-Hr Composite
Total Aluminum	XXX	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	8-Hr Composite
Total Iron	XXX	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	8-Hr Composite

Outfall 001 , 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	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Total Manganese	XXX	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	8-Hr Composite

Compliance Sampling Location: at Outfall 001, after disinfection.

Flow and Total Nitrogen are monitor only based on Chapter 92a.61. The limits for pH and Dissolved Oxygen are technology-based on Chapter 93.7. The limits for Total Residual Chlorine (TRC), $CBOD_5$, Total Suspended Solids, and Fecal Coliform are technology based on Chapter 92a.47. The limits for Ammonia-Nitrogen are water quality-based on Chapter 93.7. The Total Phosphorus limits are technology-based on Chapter 96.5. Total Aluminum, Total Iron, and Total Manganese are monitor only based on Chapter 92a.61.

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

0.54	= Q stream (cfs)	0.5	= CV Daily
0.038	= Q discharge (MGD) (First point of perennial conditions)	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)	0	=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 2.949	1.3.2.iii	WLA cfc = 2.868
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 1.099	5.1d	LTA_cfc = 1.667

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*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))... ...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)
LTAMULT afc	EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)
LTA_afc	wla_afc*LTAMULT_afc
WLA_cfc	(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc))... ...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)
LTAMULT_cfc	EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5)
LTA_cfc	wla_cfc*LTAMULT_cfc
AML MULT	EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1))
AVG MON LIMIT	MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT)
INST MAX LIMIT	1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)

WQM 7.0 Effluent Limits (Perennial Reach)

SWP Basin	Stream Code	Stream Name
20C	34918	LITTLE CONNOQUENESSING 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)
13.300	Perennial Reach	PA0102822b	0.037	CBOD5	16.99		
				NH3-N	24.48	48.96	
				Dissolved Oxygen			2

Outputs equal inputs from the dry reach model for CBOD5 and DO, so the technology-based inputs are protective.

CBOD5 = 25.0 mg/l
DO = < 4.0 mg/l

For NH3-N, the equation of $c_t = c_o(e^{-kt})$ is used to back calculate,

where c_t = 24.48 mg/l
k = constant for NH3-N = 0.7 $days^{-1}$
t = dry reach model travel time = 0.205 days

$24.48 = c_o(e^{-0.7x0.205})$

NH3-N = 28.25 mg/l (technology-based limit of 25.0 mg/l will govern)

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
20C	34918	LITTLE CONNOQUENESSING CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
13.300	0.037	20.477	7.021
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
13.632	0.484	28.170	0.091
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
3.43	0.546	2.34	0.726
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.647	16.856	Owens	6
Reach Travel Time (days)			
0.598			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.060	3.32	2.24	8.16
0.120	3.21	2.14	8.17
0.180	3.10	2.05	8.17
0.239	3.00	1.96	8.17
0.299	2.90	1.88	8.17
0.359	2.81	1.80	8.17
0.419	2.72	1.72	8.17
0.479	2.63	1.65	8.17
0.539	2.54	1.58	8.17
0.598	2.46	1.51	8.17

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
20C	34918	LITTLE CONNOQUENESSING CREE	**13.300**	1040.00	11.54	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	0.047	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	20.00	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
Perennial Reach	PA0102822b	0.0370	0.0000	0.0000	0.000	25.00	7.30

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	16.99	2.00	0.00	1.50
Dissolved Oxygen	2.00	8.24	0.00	0.00
NH3-N	24.48	0.00	0.00	0.70

(from dry reach)

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
20C	34918	LITTLE CONNOQUENESSING CREE	**12.410**	1020.00	12.41	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)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.047	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	20.00	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 (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	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

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	6		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
20C	34918	LITTLE CONNOQUENESSING 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
13.300	Perennial Reach	8.99	48.96	8.99	48.96	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
13.300	Perennial Reach	1.85	24.48	1.85	24.48	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)		
13.30	Perennial Reach	16.99	16.99	24.48	24.48	2	2	0	0

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
20C	34918	LITTLE CONNOQUENESSING 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												
13.300	0.54	0.00	0.54	.0572	0.00426	.484	13.63	28.17	0.09	0.598	20.48	7.02
Q1-10 Flow												
13.300	0.35	0.00	0.35	.0572	0.00426	NA	NA	NA	0.07	0.746	20.71	7.03
Q30-10 Flow												
13.300	0.74	0.00	0.74	.0572	0.00426	NA	NA	NA	0.11	0.511	20.36	7.02

WQM 7.0 D.O.Simulation (Dry Reach)

SWP Basin	Stream Code	Stream Name
20C	34918	LITTLE CONNOQUENESSING CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
0.500	0.037	24.999	7.300
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
0.841	0.456	1.844	0.149
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
25.00	1.500	25.00	1.028
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
4.000	29.224	Owens	NA
Reach Travel Time (days)			
0.205			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)	
0.020	24.05	24.48	2.00	
0.041	23.14	23.97	2.00	
0.061	22.26	23.47	2.00	
0.082	21.42	22.98	2.00	
0.102	20.61	22.50	2.00	
0.123	19.83	22.03	2.00	
0.143	19.08	21.57	2.00	
0.164	18.35	21.12	2.00	
0.184	17.66	20.68	2.00	
0.205	16.99	20.25	2.00	<-- input into perennial reach

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
20C	34918	LITTLE CONNOQUENESSING CREE	**0.500**	1300.00	0.01	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	0.001	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	20.00	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
Dry Reach	PA0102822a	0.0370	0.0000	0.0000	0.000	25.00	7.30

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
20C	34918	LITTLE CONNOQUENESSING CREE	**0.000**	1040.00	0.02	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)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.001	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	20.00	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 (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	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

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		

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
20C	34918	LITTLE CONNOQUENESSING 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												
0.500	0.00	0.00	0.00	NA	0.09848	.456	.84	1.84	0.15	0.205	25.00	7.30
Q1-10 Flow												
0.500	0.00	0.00	0.00	NA	0.09848	NA	NA	NA	0.00	0.000	0.00	0.00
Q30-10 Flow												
0.500	0.00	0.00	0.00	NA	0.09848	NA	NA	NA	0.00	0.000	0.00	0.00