pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0239712**
Facility Type	**Municipal**	APS ID	**892018**
Major / Minor	**Minor**	Authorization ID	**1372302**

Applicant and Facility Information

Applicant Name	**Bear Creek Watershed Authority**	Facility Name	**Bruin STP**
Applicant Address	258 Argyle Street	Facility Address	Bruin STP Parker Street
	Petrolia, PA 16050		Bruin, PA 16022
Applicant Contact	Thomas McElravy, Chairman	Facility Contact	Chris Dunmyre, Operator
Applicant Phone	(724) 756-4600	Facility Phone	
Applicant E Mail	bearcreekwater@zoominternet.net	Facility E Mail	
Client ID	62798	Site ID	724614
Municipality	Fairview Township	Municipality	Parker Township
Ch 94 Load Status	Not Overloaded	Connection Status	No Limitations
Applicant Name	**Bear Creek Watershed Authority**	County	Butler
Received	October 12, 2021	EPA Waived?	Yes
Accepted	October 19, 2021	If No, Reason	

Purpose of Application: NPDES renewal

Summary of Review

No current violations reported. The facility serves Parker Township with a 632-person population for 9% of the total population served and Bruin Borough with a 524-person population for 91% of the total population served with 100% separate sanitary sewers.

Sludge is sent to the Petrolia STP for final treatment and disposal.

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		William H. Mentzer William H. Mentzer, P.E. Environmental Engineering Specialist	January 4, 2023
X		Justin C. Dickey Justin C. Dickey, P.E. Environmental Engineer Manager	January 11, 2023

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.0432
Latitude DP	41º 3' 50.77"	Longitude DP	-79º 43' 34.80"
Latitude NHD	41º 3' 50.72"	Longitude NHD	-79º 43' 34.47"
Quad Name	Parker	Quad Code	1008
Wastewater Description:	Municipal sanitary sewers		

Receiving Waters	Bear Creek	Stream Code	49116
NHD Com ID	123851477	RMI	3.87
Drainage Area	38.4	Yield (cfs/mi^2)	0.044*
Q_{7-10} Flow (cfs)	1.6	Q_{7-10} Basis	Stream Stats 4.0
Elevation (ft)	1010.65	Slope (ft/ft)	0.00912
Watershed No.	17-C	Chapter 93 Class.	CWF
Existing Use	**statewide**	Existing Use Qualifier	none
Exceptions to Use	none	Exceptions to Criteria	none
Comments	Node RMI 0.03 above tributary 49138. At the North Branch Drainage 62.0 sq mile Elevation 888.74 feet RMI 1.42. Mouth drainage 7730 sq mile Elevation 820.39 feet		

Assessment Status	Impaired		
Cause(s) of Impairment	unknown, nutrients, and siltation		
Source(s) of Impairment	municipal point source discharges, urban runoff/storm sewers and unknown other		
TMDL Status		Name	

Background/Ambient Data		Data Source
pH (SU)	7.94	June 14 2017 Bear Creek below South Branch study
Temperature (°C)	20	CWF default
Hardness (mg/L)	100	Default
Other:		

Nearest Downstream Public Water Supply Intake		Butler District Pennsylvania-American Water Company**	
PWS Waters	Allegheny River	Flow at Intake (cfs)	NA
PWS RMI	69.9	Distance from Outfall (mi)	16.2

Changes Since Last Permit Issuance: none

Other Comments:

*Previous evaluations used the Toms Run @ Cooksburg gage station data to develop a yield rate for this watershed (0.048 cfsm). Previous evaluations used the USGS Stream Stats Version 3T with 'Low Flow Statistics for PA Streams'. Beta Version 4 is now in place which uses Low-Flow, Base-Flow, and Mean-Flow Regression Equations for Pennsylvania Streams by Marla H. Stuckey to determine low flows.

**This is a supplemental water source that transfers water from the Allegheny River over to the Boydstown-Oneida & Thorn Run reservoirs in the headwaters of Connoquenessing Creek.

Treatment Facility Summary				
Treatment Facility Name: Bruin Borough Bear Creek Watershed Authority				
WQM Permit No.	**Issuance Date**			
1083402	25 August 1983			
1083402	1985			
Waste Type	**Degree of Treatment**	**Process Type**	**Disinfection**	**Avg Annual Flow (MGD)**
Sewage	Secondary	Extended Aeration	Hypochlorite	0.0432
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
0.0432	120	Not Overloaded	Holding	Other

Changes Since Last Permit Issuance: none

Other Comments: The 1985 design load is 115-PPD. Biosolids treatment is provided at the Petrolia Borough STP

Last Reviewed WLMR is for 2017

Sanitary sewer service for	775 EDU.	
Annual average flow is	0.0432-MGD	
Mean Flow	0.018-MGD	
Maximum monthly Flow	0.029-MGD	January 2017
Annual Average BOD5 Load	119.68-PPD	
Mean BOD5	25-PPD	
Maximum monthly BPD5	37-PPD	July 2017

Pump Stations
1 Parker Street
2 Bruin Park
4 Hook City Road
3 Linamen Grinder

Compliance History

DMR Data for Outfall 001 (from September 1, 2020 to August 31, 2021)

Parameter	AUG-21	JUL-21	JUN-21	MAY-21	APR-21	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20	SEP-20
Flow (MGD) Ave Mon	**0.0446**	0.0275	0.0217	**0.0467**	0.0314	0.0363	0.0330	0.0321	0.0369	0.0196	0.0281	0.0267
Flow (MGD) D Max	0.0498	0.0289	0.0321	0.1684	0.0343	0.0375	0.0351	0.0372	0.0373	0.0320	0.0977	0.0537
pH (S.U.) Minimum	7.54	7.48	7.48	7.44	7.49	7.42	7.41	7.39	7.38	7.29	7.25	7.39
pH (S.U.) Maximum	7.62	7.59	7.56	7.54	7.56	7.55	7.5	7.52	7.49	7.40	7.54	7.54
DO (mg/L) Daily Min	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
TRC (mg/L) Ave Mon	0.31	0.31	0.34	0.26	0.25	0.25	0.41	0.40	0.41	0.34	0.47	0.46
TRC (mg/L) Inst Max	0.62	0.50	0.55	0.60	0.56	0.38	1.19	0.66	0.69	0.6	1.04	0.90
CBOD5 (ppd) Ave Mon	2.3	0.7	0.9	3.1	2.6	1.73	1.5	1.10	1.9	1.03	0.96	1.22
CBOD5 (lbs/day) Weekly Average	3.6	0.8	1.7	3.8	3.1	2.03	2.2	2.23	2.8	1.07	1.31	1.31
CBOD5 (mg/L) Ave M	6.1	3.1	5.2	8.0	10.1	5.7	5.3	4.1	6.15	6.3	4.1	5.5
CBOD5 (mg/L) Wkly A	8.6	3.2	6.4	9.5	10.9	6.5	7.6	7.2	9.1	6.5	5.6	5.9
BOD5 (ppd) Influent Average Monthly	58.2	29.8	52.6	102.2	74.9	48.7	67	37.1	50.2	28.1	71.7	61.9
BOD5 (ppd) Influent Weekly Average	76.8	35.4	94.8	105.9	113.6	83.2	78.5	64.5	63.1	54.2	73.8	71.0
BOD5 (mg/L) Influent Average Monthly	56.5	130	290.5	262.5	286	161	242	138.7	163	171	306	278
BOD5 (mg/L) Influent Weekly Average	185	147	354.0	267	397	266	268	208.0	203	203	315	319
TSS (ppd) Ave Mon	1.7	0.6	0.6	2.1	1.8	0.41	1.3	0.37	1.0	2.0	1.36	0.45
TSS (ppd) Influent Average Monthly	31.2	21.3	21.7	69.3	63.9	29.5	38.5	31.6	42.7	29.6	89.9	0.45
TSS (ppd) Influent Weekly Average	39.0	27.0	48.2	95.3	74.4	46.9	46.3	48.4	52.3	42.7	112.0	0.45
TSS (ppd) Wkly Ave	3.7	0.9	1.5	2.7	2.4	0.47	1.9	0.87	1.2	2.4	2.24	0.45
TSS (mg/L) Ave Mon	4.5	2.6	3.5	5.4	6.85	1.35	4.6	1.4	3.25	12.0	5.8	2.0
TSS (mg/L) Influent Average Monthly	84.0	93.0	120.0	178	244	97.5	140	118	139	180	383	2.0
TSS (mg/L) Influent Weekly Average	94.0	112.0	180.0	240	260	150	158	156	168	260	478	2.0
TSS (mg/L) Wkly Ave	9.0	3.6	5.6	6.8	8.4	14.5	6.4	2.8	4.0	14.8	9.6	2.0
F Coliform (#/100 ml) Geometric Mean	170	141	120	64	515	353	1458	1329	253	721	407	88
T N (mg/L) Ave Mon	4.0	0.5	0.2	0.92	1.6	6.34	0.42	4.6	7.4	1.67	3.7	2.68
Amm (ppd) Ave Mon	1.2	0.24	0.1	0.02							0.44	1.58
Amm (mg/L) Ave Mon	3.2	1.03	0.7	0.1	0.7	4.2	0.4	0.65	4.0	1.09	1.87	7.11
T P (mg/L) Ave Mon	5.5	3.1	5.8	3.6	4.4	3.39	4.9	2.8	4.6	3.4	5.43	5.12

		INFLUENT						EFFLUENT			
		Mean	Mean	Min	Mean	Max	#	Min	Mean	Max	#
Month	Year	MGD	PPD								
Annual Average Design		0.0432									
Hydraulic Design		0.0432									
Annual Average Flow	2018	0.0270									
	2019	0.0280									
	2020	0.0290									
Highest Monthly Average	March	0.0390									
pH								**7.1**		**7.78**	**1460**
TRC									**0.29**	**1.29**	**73**
Fecal Coliform									**381**	**1000**	**48**
CBOD5									**7.32**	**19.6**	**48**
TSS									**7.20**	**25.6**	**48**
Amm									**3.76**	**18.51**	**48**
N									**4.32**	**14.12**	**48**
P									**3.61**	**6.91**	**48**

Chemicals used:
Calcium Oxide (lime) for pH adjustment
Calcium hypochlorite for disinfection

3.88 dry tons sludge was removed to the Dalton Processing Facility then to a landfill by Dalton Service Company after treatment at the Petrolia STP.

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** .0432
Latitude 41º 3' 50.77" **Longitude** -79º 43' 34.80"
Wastewater Description: Sewage 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)
DO	4.0	Daily Minimum		BPJ
E Coli	Report			BPJ

Comments: none

Water Quality-Based Limitations

A sewage based “Reasonable Potential Analysis” determined the following parameters were candidates for limitations: BOD5, CBOD5, TSS, ammonia-nitrogen, nitrogen, phosphorus, chlorine, UV light, DO and pH.

The following limitations were determined through water quality modeling (output files attached):

Parameter		Limit (mg/l)			SBC	Model		
CBOD5			25.0	50.0	NA		25.0	50.0
Ammonia N	summer		13.0	26.0	NA		13.0	26.0
Ammonia N	winter		Report	Report			39.0	78.0
DO		4.0				4.0		

Comments:
As the assumed winter ammonia nitrogen effluent concentration is less than the winter limits no winter concentration limit is necessary and monitoring is recommended.

Best Professional Judgment (BPJ) Limitations

Comments: Applies to DO.

Anti-Backsliding

With ammonia compliance the existing requirements are continued.

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
17C	49141	SOUTH BRANCH BEAR CREEK	**0.000**	855.00	63.20	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	0.044	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

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

Parameter Data

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

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
17C	49141	SOUTH BRANCH BEAR CREEK	**4.110**	1046.00	38.41	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 (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.044	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Bruin	PA0239712	0.0432	0.0432	0.0432	0.000	25.00	7.50

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	0.10	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
17C	49141	SOUTH BRANCH BEAR CREEK	**7.640**	1158.00	8.80	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	0.044	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Petrolia	PA0094200	0.0411	0.0411	0.0411	0.000	25.00	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	2.00	0.00	1.50
Dissolved Oxygen	4.00	8.24	0.00	0.00
NH3-N	25.00	0.10	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
17C	49141	SOUTH BRANCH BEAR CREEK	**9.790**	1195.00	4.54	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	0.044	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Karns City	PA0239739	0.0340	0.0340	0.0340	0.000	25.00	7.10

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	0.10	0.00	0.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
17C	49141	SOUTH BRANCH BEAR 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												
9.790	0.20	0.00	0.20	.0526	0.00326	.417	9	21.59	0.07	1.954	21.04	7.02
7.640	0.39	0.00	0.39	.1162	0.00601	.465	12.03	25.9	0.09	2.396	21.15	7.03
4.110	1.69	0.00	1.69	.183	0.00880	.598	22.34	37.35	0.14	1.791	20.49	7.02
Q1-10 Flow												
9.790	0.13	0.00	0.13	.0526	0.00326	NA	NA	NA	0.06	2.358	21.46	7.03
7.640	0.25	0.00	0.25	.1162	0.00601	NA	NA	NA	0.08	2.874	21.60	7.04
4.110	1.08	0.00	1.08	.183	0.00880	NA	NA	NA	0.11	2.232	20.72	7.03
Q30-10 Flow												
9.790	0.27	0.00	0.27	.0526	0.00326	NA	NA	NA	0.08	1.698	20.81	7.01
7.640	0.53	0.00	0.53	.1162	0.00601	NA	NA	NA	0.10	2.090	20.90	7.02
4.110	2.30	0.00	2.30	.183	0.00880	NA	NA	NA	0.16	1.530	20.37	7.01

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	95.00%	Use Balanced Technology	☑
D.O. Goal	5		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
17C	49141	SOUTH BRANCH BEAR 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
9.790	Karns City	14.5	49.51	14.5	49.51	0	0
7.640	Petrolia	14.94	50	14.13	50	0	0
4.110	Bruin	16.11	50	15.39	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
9.790	Karns City	1.78	10.46	1.78	9.66	2	8
7.640	Petrolia	1.81	15.97	1.76	14.75	2	8
4.110	Bruin	1.86	25	1.83	25	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)		
9.79	Karns City	25	25	9.66	9.66	4	4	0	0
7.64	Petrolia	25	25	14.75	14.75	4	4	0	0
4.11	Bruin	25	25	25	25	4	4	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
17C	49141	SOUTH BRANCH BEAR CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
9.790	0.034	21.042	7.019
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
9.002	0.417	21.587	0.067
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
6.79	0.596	2.09	0.758
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.359	18.384	Owens	5
Reach Travel Time (days)			
1.954			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.195	6.01	1.80	8.24
0.391	5.32	1.56	8.24
0.586	4.71	1.34	8.24
0.782	4.17	1.16	8.24
0.977	3.69	1.00	8.24
1.173	3.26	0.86	8.24
1.368	2.89	0.74	8.24
1.563	2.55	0.64	8.24
1.759	2.26	0.55	8.24
1.954	2.00	0.48	8.24

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
7.640	0.075	21.154	7.031
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
12.035	0.465	25.901	0.090
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
4.91	0.355	2.14	0.765
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.707	18.346	Owens	5
Reach Travel Time (days)			
2.396			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.240	4.48	1.78	8.24
0.479	4.10	1.48	8.24
0.719	3.75	1.23	8.24
0.959	3.43	1.03	8.24
1.198	3.13	0.85	8.24
1.438	2.86	0.71	8.24
1.678	2.62	0.59	8.24
1.917	2.39	0.49	8.24
2.157	2.19	0.41	8.24
2.396	2.00	0.34	8.24

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
17C	49141	SOUTH BRANCH BEAR 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)
9.790	Karns City	PA0239739	0.034	CBOD5	25		
				NH3-N	9.66	19.32	
				Dissolved Oxygen			4

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)
7.640	Petrolia	PA0094200	0.041	CBOD5	25		
				NH3-N	14.75	29.5	
				Dissolved Oxygen			4

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)
4.110	Bruin	PA0239712	0.043	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			4

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
17C	49141	SOUTH BRANCH BEAR CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
4.110	0.118	20.489	7.019
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
22.336	0.598	37.353	0.140
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.82	0.188	1.05	0.727
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.092	11.864	Tsivoglou	5
Reach Travel Time (days)			
1.791			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.179	2.73	0.92	8.24
0.358	2.63	0.81	8.24
0.537	2.54	0.71	8.24
0.716	2.46	0.63	8.24
0.896	2.38	0.55	8.24
1.075	2.29	0.48	8.24
1.254	2.22	0.42	8.24
1.433	2.14	0.37	8.24
1.612	2.07	0.33	8.24
1.791	2.00	0.29	8.24

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
17C	49141	SOUTH BRANCH BEAR 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)
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				NH3-N	9.66	19.32	
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				NH3-N	14.75	29.5	
				Dissolved Oxygen			4

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)
4.110	Bruin	PA0239712	0.043	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			4

	Discharger	Bruin Borough							Wednesday, December 15, 2021			
	Site	Bruin STP						Revised	Thursday, December 29, 2022			
	Municipality	Bruin Borough										
	County	Butler										
	NPDES Permit	PA0239712										
	0.5											
2					**TRC EVALUATION**							
3	Input appropriate values in B4:B8 and E4:E7											
4	0.1975	**= Q stream (cfs)**				**0.5**	**= CV Daily**					
5	0.0340	**= Q discharge (MGD)**				**0.5**	**= CV Hourly**					
6	30	**= no. samples**				**1**	**= AFC_Partial Mix Factor**					
7	0.4	**= Chlorine Demand of Stream**				**1**	**= CFC_Partial Mix Factor**					
8	0	**= Chlorine Demand of Discharge**				**15**	**= AFC_Criteria Compliance Time (min)**					
9		**= BAT/BPJ Value**				**720**	**= CFC_Criteria Compliance Time (min)**					
	0	**= % Factor of Safety (FOS)**					**=Decay Coefficient (K)**					
10	Source	Reference	AFC Calculations				Reference		CFC Calculations			
11	TRC	**1.3.2.iii**		WLA afc = 1.593			**1.3.2.iii**		WLA cfc = 1.555			
12	PENTOXSD TRG	**5.1a**		LTAMULT afc = 0.373			**5.1c**		LTAMULT cfc = 0.581			
13	PENTOXSD TRG	**5.1b**		LTA_afc= 0.593			**5.1d**		LTA_cfc = 0.904			
14												
15	Source					Effluent Limit Calculations						
16	PENTOXSD TRG	5.1f			AML MULT = 1.231							
17	PENTOXSD TRG	5.1g			LIMIT (mg/l) = 0.500			BAT/BPJ				
18					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)**

(0.011/EXP(-K*CFC_tc/1440))+(((CFC_Yc*Qs*0.011)/(1.547*Qd)....
....*EXP(-K*CFC_tc/1440)))+Xd+(CFC_Yc*Qs*Xs/1.547*Qd))*(1-FOS/100)

	Chlorine Required		=	perennial	Chlorine Demand	+	Chlorine Residual
Stream	Reach/Node		1	1			
Stream	Flow	Conditions		perennial			
Stream	Code			49141			
	Function						
Samples				30			
reach	outfall		RMI	9.79			
	Reach End		RMI	7.64			
reach			feet	11352			
drainage			sq miles	4.54			
TRC	limitation	average	mg/L	0.500			
		maximum	mg/L	1.600			
elevation		modelled	feet	1195			
elevation		modelled	feet	1158			
slope		modelled	foot/foot	0.003			
low flow			cfs/sq mi	0.044			
discharge			mgd	0.0340			
Runoff	Period		hours	24.000			
Multiple discharges							
stream	flow		cfs	0.19755			
stream	flow		MGD	0.127678			
stream	flow	total	MGD	0.161678			
stream	chlorine	demand	mg/L	0.4	0.3		
discharge	discharge	demand	mg/L				
stream	Total Stream/Waste		ratio	4.8			

PaGIS map and NHD place the discharge at RMI 0.34. This is approximately 1000 feet above tritbutary 62717 and perennial stream conditions.

permitted	TRC	mean	BAT	0.5
permitted	TRC	maximum	BAT	1.6

Proposed Effluent Limitations and Monitoring Requirements

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

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	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 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
CBOD5	9.0	14.4	XXX	25.0	40.0	50.0	2/month	8-Hr Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	Report	XXX	2/month	8-Hr Composite
TSS Raw Sewage Influent	Report	Report	XXX	Report	Report	XXX	2/month	8-Hr Composite
TSS	10.8	16.2	XXX	30.0	45.0	60.0	2/month	8-Hr Composite
E Coli	XXX	XXX	XXX	XXX	XXX	Report	1/year	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	XXX	2/month	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	XXX	2/month	Grab
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	2/month	8-Hr Composite
Ammonia Nov 1 - Apr 30	XXX	XXX	XXX	Report	XXX	XXX	2/month	8-Hr Composite
Ammonia May 1 - Oct 31	3.2	XXX	XXX	13.0	XXX	26.0	2/month	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report	XXX	XXX	2/month	8-Hr Composite

Compliance Sampling Location: Outfall 001 after disinfection