pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southwest Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0093203**
Facility Type	**Non-Municipal**	APS ID	**1054717**
Major / Minor	**Minor**	Authorization ID	**1381559**

Applicant and Facility Information

Applicant Name	**The Pennsylvania State University**	Facility Name	**New Kensington Campus WWTP**
Applicant Address	139J Physical Plant Building	Facility Address	3550 7th Street Road
	University Park, PA 16802-1118		New Kensington, PA 15068-1765
Applicant Contact	Dave Swisher	Facility Contact	Jason Bush
Applicant Phone	814-867-6123	Facility Phone	724-334-6022
Client ID	81628	Site ID	243194
Ch 94 Load Status	Not Overloaded	Municipality	Upper Burrell Township
Connection Status		County	Westmoreland
Date Application Received	January 6, 2022	EPA Waived?	Yes
Date Application Accepted		If No, Reason	
Purpose of Application	NPDES permit renewal.		

Summary of Review

The PA Department of Environmental Protection (PADEP/Department) received an NPDES permit renewal application from The Pennsylvania State University (PennState/permittee) for permittee's New Kensington Campus WWTP (facility) on January 6, 2022. The facility is a minor non-municipal WWTP with an average design flow of 0.015 mg/l. The treated effluent is discharged into a dry swale (UNT) to Pucketa Creek in state watershed 18-A, classified as TSF. The current permit will expire on August 31, 2022. The terms and conditions are automatically extended since the renewal application was received at least 180 days prior to the expiration date. Renewal NPDES permit applications under Clean Water program are not covered by PADEP's PDG per 021-2100-001.

This fact sheet is developed in accordance with 40 CFR §124.56.

Changes in this renewal: NH3-N and TRC limits recalculated and E. Coli monitoring requirement added.

Sludge use and disposal description and location(s): Liquid sludge is hauled off to Allegheny Valley Joint Sewer Authority for further treatment/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
√		Reza H. Chowdhury, E.I.T. / Project Manager	April 16, 2022
X		Pravin Patel Pravin C. Patel, P.E. / Environmental Engineer Manager/	04/18/2022

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.015
Latitude	40.549411	Longitude	-79.697904
Quad Name	New Kensington East	Quad Code	1408
Wastewater Description:	Sewage Effluent		
Receiving Waters	Unnamed Tributary to Pucketa Creek (TSF)	Stream Code	42410
NHD Com ID	123972473	RMI	1.96 (at POFU)
Drainage Area	0.05 mi^2 (at POFU)	Yield (cfs/mi^2)	0.0042
Q_{7-10} Flow (cfs)	0.000231	Q_{7-10} Basis	USGS StreamStats
Elevation (ft)	1122.69 (at POFU)	Slope (ft/ft)	
Watershed No.	18-A	Chapter 93 Class.	TSF
Existing Use	**TSF**	Existing Use Qualifier	
Exceptions to Use	None	Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status	**None**	Name	

Background/Ambient Data		Data Source
pH (SU)	7.0	Default per 391-2000-013
Temperature (°C)	20	Default per 391-2000-013
Hardness (mg/L)	100	Default per DEP TMS Instructions
Other:		

Nearest Downstream Public Water Supply Intake		Oakmont Water Authority	
PWS Waters	Allegheny River	Flow at Intake (cfs)	
PWS RMI	13.47	Distance from Outfall (mi)	11.09

Changes Since Last Permit Issuance: None

Other Comments:
Streamflow and Point of First Use Survey: USGS's web-based GIS application StreamStats (https://streamstats.usgs.gov/ss/) was accessed on March 2, 2022 to collect streamflow data. The drainage area at Outfall 001 was found to be nearly zero. The stream was determined to be a dry stream. Therefore, the permit writer requested the regional biologist to conduct a Point of First Use (POFU) Survey to determine the first point in the stream downstream of the discharge point that is capable to support aquatic life and must be protected, as defined in Pa Code 25 §93.9q. A POFU survey was conducted on March 28, 2022. The survey concluded that the POFU is at 200 meters downstream of Outfall 001, or at 40°32'53.3", -79°41'50.5". The survey also indicated the drainage area at this point is approximately 0.05 mi^2. The survey states *"Findings from this study suggests that the UNT 42410 to Pucketa Creek, approximately 200 meters downstream of the discharge location, is capable of supporting aquatic life (Lat: 40.547858; Long: -79.697253). Two long-lived taxa were identified in the macroinvertebrate sample, and the stream exhibited defined bed and bank and substrate".* Stream data at this point is collected from StreamStats. The data shows:

Drainage area: 0.05 mi^2
Q7-10: 0.00023 cfs
Q30-10: 0.000612 cfs
Calculated yield = 0.00023cfs/0.05 mi^2 or 0.0046 cfs/mi^2
Q30-10:Q7-10 = 0.000612 cfs/0.00023 cfs or 2.66. Default Q1-10:Q7-10 of 0.64 will be used in modeling.

The node 2 was determined at confluence with UNT to 42414 at 42410 RMI 1.5. Drainage area at this point was found to be 0.44 mi^2.

PWS Intake:
The nearby downstream PWS intake is Oakmont Water Authority, which is approximately 11.09 miles downstream of discharge point, on Allegheny River. Due to the distance, dilution of Allegheny River, and effluent limitations, it is expected that the discharge will not adversely impact the PWS intake.

Wastewater Characteristics:
A pH of 7.3 (median July- September 2021), default temperature of 20^0C (Default per 391-2000-007), and default Hardness value of 100 mg/l will be used for modeling, if needed.

Background data:
There is no nearby WQN station from the discharge point. In absence of site-specific data, a default pH of 7.0 S.U., default stream temperature of 20°C, and default hardness of 100 mg/l will be used, as appropriate.

Treatment Facility Summary

Treatment Facility Name: New Kensington Campus STP

WQM Permit No.	Issuance Date
465S118 A-2	8/6/2020
465S118 A-1	5/6/2019

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary	Activated Sludge	Gas Chlorine	0.015

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.015		Not Overloaded		

Changes Since Last Permit Issuance: None

Treatment Plant Description

Pennsylvania State University Kensington Campus WWTP is a minor, non-municipal WWTP located in Upper Burrell Township, Westmoreland County. It serves the Kensington Campus. The treated effluent is discharged through Outfall 001 into an UNT to Pucketa Creek. The WWTP is an oxigester package type extended aeration unit. It includes an aeration tank, followed by two settling tanks. Treated effluent flows through the effluent flow meter and is disinfected by chlorine. Flow is then conveyed through two chlorine contact tanks, followed by dechlorination and discharge through outfall. Solids are wasted to one aerobic digester.

Calcium hypochlorite is used for disinfection at 0.1 lbs. cl/day. Ascorbic acid is used to dechlorinate the effluent at a rate of 0.1 lbs./day.

The organic design capacity is 69 lbs. BOD5/day. The Annual average flow for previous 3 years is 0.00435 MGD (2018), 0.00386 MGD (2019), and 0.0036 MGD (2020). The highest monthly average flow for previous year is 0.008 MGD during the month of February.

Compliance History

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

Parameter	DEC-21	NOV-21	OCT-21	SEP-21	AUG-21	JUL-21	JUN-21	MAY-21	APR-21	MAR-21	FEB-21	JAN-21
Flow (MGD) Average Monthly	0.0073	0.004	0.005	0.00095	0.0045	0.002	0.001	0.0023	0.003	0.004	0.003	0.003
pH (S.U.) Minimum	6.8	6.4	6.7	6.9	6.9	7.1	7.0	6.5	6.7	6.7	7.0	7.6
pH (S.U.) Maximum	8.8	7.8	7.6	8.0	7.7	7.6	8.0	7.7	7.3	7.8	7.8	8.0
DO (mg/L) Minimum	8.60	8.22	8.0	5.6	6.60	8.3	8.0	7.80	8.8	9.0	10.0	14.00
TRC (mg/L) Average Monthly	0.38	0.03	0.04	0.18	0.21	0.07	0.20	0.18	0.14	0.16	0.27	0.13
TRC (mg/L) Instantaneous Maximum	0.98	0.06	0.09	0.29	0.90	0.20	0.48	0.49	0.36	1.59	0.49	0.30
CBOD5 (mg/L) Average Monthly	3.0	3.0	5.75	5.5	3.0	3.65	3.0	3.0	20.45	9.10	3.55	< 3.00
CBOD5 (mg/L) Instantaneous Maximum	3.0	3.0	8.50	5.9	3.0	4.3	3.0	3.0	34.9	15.2	4.10	< 3.00
TSS (mg/L) Average Monthly	5.0	14.0	8.0	9.0	3.0	3.0	6.0	10.0	5.0	11.0	5.0	6.0
TSS (mg/L) Instantaneous Maximum	7.0	17.0	13.0	10.0	3.0	3.0	7.0	14.0	7.0	18.0	6.0	7.0
Fecal Coliform (No./100 ml) Geometric Mean	2	1	2	48	3	1	2	2	1	7	2	< 1.0
Fecal Coliform (No./100 ml) IMAX	4	1	2	48	5	1	2	4	1	14	3	< 1.0
Ammonia (mg/L) Average Monthly	0.16	0.14	0.20	0.25	0.24	0.21	0.16	0.55	0.17	0.11	0.16	0.13
Ammonia (mg/L) IMAX	0.16	0.15	0.21	0.27	0.24	0.21	0.16	0.95	0.20	0.12	0.21	0.15

Compliance History

Effluent Violations for Outfall 001, from: February 1, 2021 To: December 31, 2021

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
DO	09/30/21	Min	5.6	mg/L	6.0	mg/L
CBOD5	04/30/21	Avg Mo	20.45	mg/L	15.0	mg/L
CBOD5	04/30/21	IMAX	34.9	mg/L	30.0	mg/L

Summary of Inspections:

02/04/2021: CEI conducted. No violation noted. The treatment plant appeared very well maintained with all components in good operable condition.

Existing Limits

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)	0.015	XXX	XXX	XXX	XXX	XXX	2/month	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	9.0	XXX	5/week	Grab
Dissolved Oxygen	XXX	XXX	6.0	XXX	XXX	XXX	5/week	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.5	XXX	1.6	5/week	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	XXX	XXX	XXX	15.0	XXX	30.0	2/month	Grab
Total Suspended Solids	XXX	XXX	XXX	25.0	XXX	50.0	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
Total Nitrogen	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab
Ammonia-Nitrogen Nov 1 - Apr 30	XXX	XXX	XXX	12.0	XXX	24.0	2/month	Grab
Ammonia-Nitrogen May 1 - Oct 31	XXX	XXX	XXX	4.0	XXX	8.0	2/month	Grab
Total Phosphorus	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.015
Latitude 40.549411 **Longitude** -79.697904
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)

Comments: The receiving stream is a dry stream, therefore, the requirements stated in *Policy and Procedures for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers (391-2000-014, revised April 12, 2008)* were considered. The dry stream limits are as following:

Parameter	Limit
CBOD5	10 mg/l as monthly average
TSS	10 mg/l as monthly average
Total Nitrogen	5 mg/l as monthly average
Dissolved Oxygen	Minimum 6 mg/l at all times
Phosphorus	0.5 mg/l as monthly average

However, the dry stream guidance states that if more stringent limits can't be met, the limits shouldn't be applied in permit renewal unless the receiving stream is impaired of any of the pollutants, and a compliance schedule may be provided to meet the final limits. A review of last 12 months eDMR data indicated that the facility was meeting (except one instance) the dry stream limits for CBOD5, TSS, and DO. The facility doesn't have numeric limit for TN and TP, rather has annual monitoring requirements. The receiving stream is attaining its designated use. As stated in page 2 of this fact sheet, the WQM model will be utilized at the POFU to calculate WQBELs for CBOD5, NH3-N, and DO, and will be compared with the existing limits. The most stringent limits will be applied.

Water Quality-Based Limitations

WQM 7.0:

WQM 7.0 is a water quality model designed to assist DEP to determine appropriate permit requirements for CBOD5, NH3-N and DO. DEP's guidance no. 391-2000-007 provides the technical methods contained in WQM 7.0 for conducting wasteload allocation and for determining recommended NPDES effluent limits for point source discharges. DEP recently updated this model (ver. 1.1) to include new ammonia criteria that has been approved by US EPA as part of the 2017 Triennial Review. The model was utilized for this permit renewal by using updated Q_{7-10} and historic background water quality levels of the river. The following data were used in the attached computer model of the stream:

- Discharge pH 7.4 (eDMR data)
- Discharge Temperature 20°C (Default per 391-2000-007)
- Discharge Hardness 100 mg/l (Default data)
- Stream pH 7.0 (Default per 391-2000-013)

- Stream Temperature 20°C (Default per 391-2000-013, WWF)
- Stream Hardness 100 mg/l (Application data)

The following nodes were considered in modeling:

Node 1: At POFU on UNT to Pucketa Creek (42410)
Elevation: 1122.69 ft (USGS National Map viewer, 04/16/2022)
Drainage Area: 0.05 mi^2 (StreamStat Version 3.0, 04/16/2022)
River Mile Index: 1.96 (PA DEP eMapPA)
Low Flow Yield: 0.0046 cfs/mi^2
Discharge Flow: 0.015 MGD

Node 2: At confluence with UNT to Pucketa Creek 42414
Elevation: 1014.24 ft (USGS National Map viewer, 04/16/2022)
Drainage Area: 0.44 mi^2 (StreamStat Version 3.0, 04/16/2022)
River Mile Index: 1.5 (PA DEP eMapPA)
Low Flow Yield: 0.0046 cfs/mi^2
Discharge Flow: 0.0 MGD

NH_3-N:
WQM 7.0 suggested NH_3-N limit of 1.57 mg/l as monthly average and 3.14 mg/l as IMAX limit during summer to protect water quality standards. Current permit has those limits as 4 mg/l and 8 mg/l, respectively. The existing permit had relaxed limit due to the fact that the model was utilized at much bigger stream compared to POFU location. Since a POFU was conducted at this renewal, the aquatic life must be protected at POFU. Therefore, new, more stringent limits will be applied. The current DMR shows the facility is consistently meeting the existing limit and will consistently meet the more stringent limit without the need of a schedule or any operational/treatment modification. Therefore, more stringent limits will be effective from effective date of this renewed permit. The winter limits are calculated as a multiplier of 3 of summer limits, and results in 4.71 mg/l as average monthly and 9.42 as IMAX.

$CBOD_5$:
The WQM 7.0 model suggests a monthly average $CBOD_5$ limit of 15 mg/l. This limit is the same as existing limit and will remain unchanged.

Dissolved Oxygen (DO):
The existing permit has a minimum DO of 6.0 mg/l which will be carried over in this renewal.

Toxics: Minor sewage facilities with design flow of less than 0.1 MGD are not required to sample and report toxics unless there is any industrial/commercial contributor to the WWTP. Since there is none, an RP analysis wasn't performed for toxics.

Additional Considerations

Fecal Coliform:
The recent coliform guidance in 25 Pa. code § 92a.47.(a)(4) requires a summer technology limit of 200/100 ml as a geometric mean and an instantaneous maximum not greater than 1,000/100ml and § 92a.47.(a)(5) requires a winter limit of 2,000/100ml as a geometric mean and an instantaneous maximum not greater than 10,000/100ml. These are the existing limits that will be carried over in this renewal.

E. Coli:
DEP's SOP titled "Establishing Effluent Limitations for Individual Sewage Permits (BCW-PMT-033, revised March 24, 2021) recommends annual E. Coli monitoring for sewage dischargers with a design flow of < 0.05 MGD. This is supported by Pa Code 25 § 92a.61. This requirement will be applied from this permit term.

pH:
The TBEL for pH is above 6.0 and below 9.0 S.U. (40 CFR §133.102(c) and Pa Code 25 § 95.2(1)) which are existing limits and will be carried over.

Total Suspended Solids (TSS):
There is no water quality criterion for TSS. The existing limits of 25 mg/L average monthly and 50 mg/L instantaneous maximum will remain in the permit based on the minimum level of effluent quality attainable by secondary treatment, 25 Pa. Code § 92a.47 and 40CFR 133.102(b).

Total Residual Chlorine (TRC):
The attached computer printout utilizes the equation and calculations as presented in the Department's 2003 Implementation Guidance for Total Residual Chlorine (TRC) (ID#391-2000-015) for developing chlorine limitations. The attached printout indicates that a water quality limit of 0.011 mg/l would be needed to prevent toxicity concerns at the POFU. The Instantaneous Maximum (IMAX) limit is calculated to be 0.033 mg/l. The existing permit has these limits as 0.5 mg/l and 1.6 mg/l, respectively. Since the recalculated value is less than Quantitation Limit of 0.02 mg/l, a special condition will be added in Part C to describe compliance. The permit will have 0.01 mg/l as limit, but values less than 0.02 mg/l will be considered as in compliance. A compliance schedule may be applied to meet the final WQBELs.

Flow and Influent BOD_5 and TSS Monitoring Requirement:
The requirement to monitor the volume of effluent will remain in the draft permit per 40 CFR § 122.44(i)(1)(ii). Influent BOD_5 and TSS monitoring requirements are established in the permit per the requirements set in Pa Code 25 Chapter 94.

Best Professional Judgement (BPJ):
Total Phosphorus:
Existing annual monitoring requirement will be carried over in this renewal, per BCW-PMT-033.

Total Nitrogen:
PADEP's SOP BCW-PMT-033 suggests monitoring requirement, at a minimum, for facilities with design flow greater than 2,000 GPD. This requirement is applied for all facilities meeting the flow criteria. This is an existing requirement which will be carried over.

Monitoring Frequency and Sample Types:
Otherwise specified above, the monitoring frequency and sample type of compliance monitoring for existing parameters are recommended by DEP's SOP and Permit Writers Manual and/or on a case-by-case basis using best professional judgment (BPJ).

Anti-Backsliding
The proposed limits are at least as stringent as are in existing permit, unless otherwise stated; therefore, anti-backsliding is not applicable.

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.

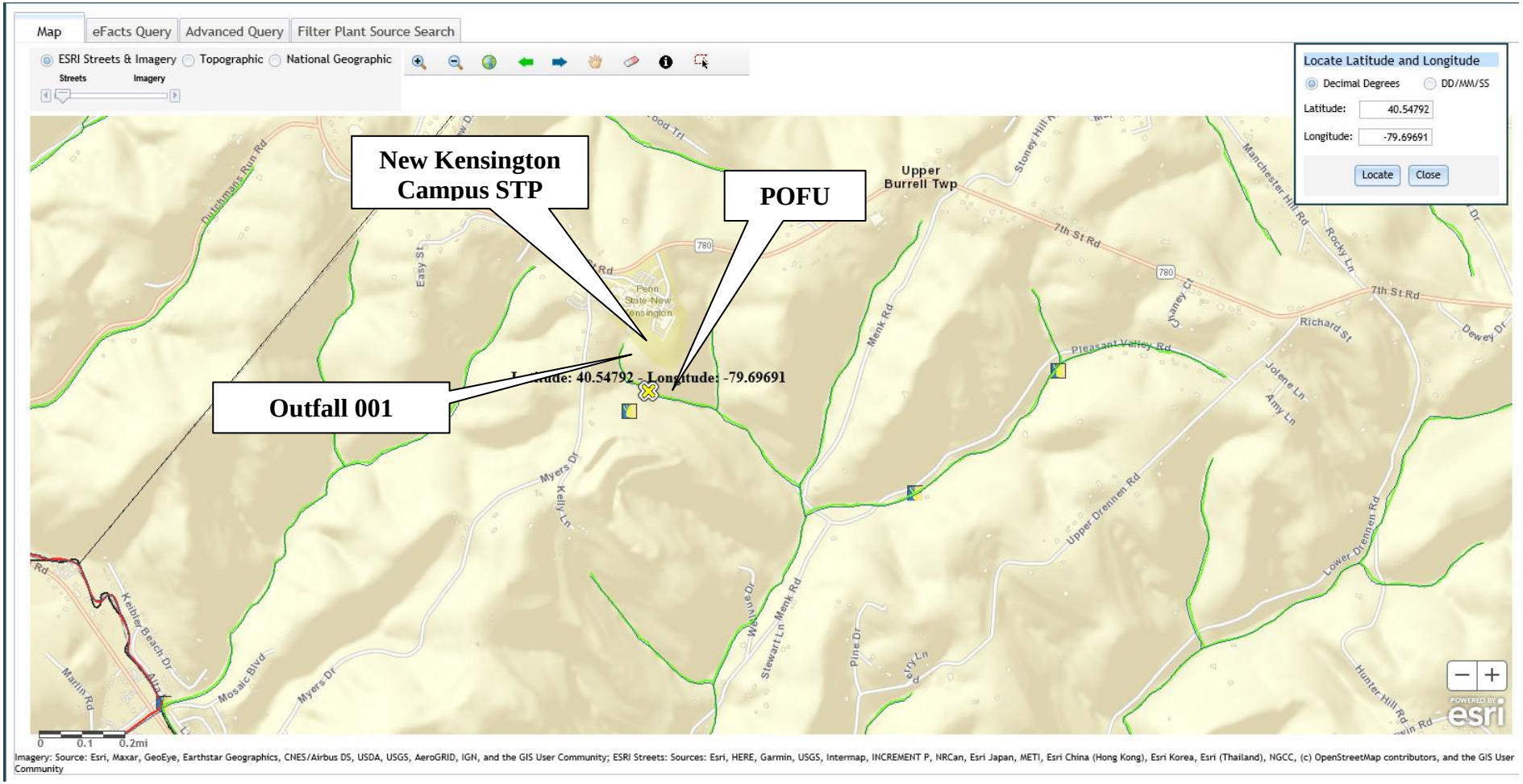
Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date.

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)	0.015	XXX	XXX	XXX	XXX	XXX	2/month	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	5/week	Grab
DO	XXX	XXX	6.0 Daily Min	XXX	XXX	XXX	5/week	Grab
TRC (interim)	XXX	XXX	XXX	0.5	XXX	1.6	5/week	Grab
TRC (final)	XXX	XXX	XXX	0.011	XXX	0.033	5/week	Grab
CBOD5	XXX	XXX	XXX	15.0	XXX	30.0	2/month	Grab
TSS	XXX	XXX	XXX	25.0	XXX	50.0	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/year	Grab
Total Nitrogen	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab
Ammonia Nov 1 - Apr 30	XXX	XXX	XXX	12.0	XXX	24.0	2/month	Grab
Ammonia May 1 - Oct 31	XXX	XXX	XXX	1.57	XXX	3.14	2/month	Grab
Total Phosphorus	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab

Compliance Sampling Location: At Outfall 001

Tools and References Used to Develop Permit	
☒	WQM for Windows Model (see Attachment)
☐	Toxics Management Spreadsheet (see Attachment)
☒	TRC Model Spreadsheet (see Attachment)
☐	Temperature Model Spreadsheet (see Attachment)
☐	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☐	Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98.
☐	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97.
☐	Pennsylvania CSO Policy, 385-2000-011, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97.
☐	Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97.
☐	Implementation Guidance Design Conditions, 391-2000-006, 9/97.
☐	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 391-2000-007, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004.
☐	Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97.
☒	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008.
☒	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09.
☐	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 10/97.
☐	Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 391-2000-019, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 3/99.
☐	Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 391-2000-022, 3/1999.
☐	Design Stream Flows, 391-2000-023, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 391-2000-024, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97.
☐	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☐	SOP:
☐	Other:

New Kensington Campus STP



pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

MEMO

TO	Reza Choudhury Project Manager Clean Water Program
FROM	Jamie Detweiler Aquatic Biologist 2 Clean Water Program
THROUGH	Richard Spear Aquatic Biologist 3 Clean Water Program
DATE	March 28, 2022
RE	Point of First Use Survey Unnamed Tributary 42410 to Pucketa Creek State Water Plan: 18A Hydrologic Unit Code: 05010009 Stream Code: 42410 Aquatic Use Designation: TSF The Pennsylvania State University, New Kensington Campus Property Upper Burrell Township, Westmoreland County

INTRODUCTION

On March 17, 2022, at the request of Reza Chowdhury of the Clean Water Program, a Point of First Surface Water Use (POFU) survey was conducted on the Unnamed Tributary 42410 to Pucketa Creek, located in Upper Burrell Township, Westmoreland County (Figures 1 and 2). The objective of the survey was to determine if the tributary was capable of supporting an Aquatic Life Use as defined in 25 Pennsylvania Code §93.9q in the vicinity of the discharge of the Sewage Treatment Plant (STP) on the New Kensington Campus of The Pennsylvania State University, located at approximately Latitude: 40.549411, Longitude: -79.697904.

The STP discharges into a channel that appears to be mostly fed by stormwater from the campus. The discharge point is located approximately 325 meters southeast of the intersection of west of the intersection of Myers Drive and 7th Street Road. Gradually, as the channel continues downslope, it appears to pick up groundwater flow. The closest, previously sampled point was an SSWAP site from 1999. The stream was also assessed, using this point in 1999 and was found to be attaining its aquatic use of Trout Stocking. Since the previous sample was taken over 22 years ago and it was 2000 meters downstream of the discharge location, we decided to perform a POFU study for the stream to assist with the permit renewal review for the STP.

Southwest Regional Office
400 Waterfront Drive | Pittsburgh, PA 16335 | 412.442.4000 | Fax. 412.442.4194 | www.dep.pa.gov

According to USGS StreamStats, the drainage area to the stream at the location of the POFU survey is 0.05 square miles. The drainage area is approximately 45% forest, 25% urban, and 30% old field/herbaceous. Unnamed Tributary 42410 to Pucketa Creek is in the Lower Allegheny, Allegheny River State Water Plan (18A), and the Lower Allegheny Hydrologic Unit (Hydrologic Unit Code 05010009). This stream is listed as attaining its designated Aquatic Life Use for Trout Stocking (TSF).

SAMPLING METHODOLOGY

The point of first aquatic life use is the location at which a body of water is capable of supporting aquatic life as defined in 25 Pennsylvania Code §93. Guidance for determining the point of first aquatic life use is in the Department's guidance document #391-2000-014, Policy and Procedures for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers (revised April 12, 2008). Specifically, Appendix B of the guidance document provides additional guidance when making a point of first use determination.

On March 17, 2022, basic water quality (Table 1) and macroinvertebrates (Table 2) were examined in the UNT 42410 to Pucketa Creek. The station was established approximately 200 meters downstream from the point where the STP discharge enters the stream channel (Figures 3, 4). Basic water quality parameters were examined using a field meter and macroinvertebrates were collected by examining the underside of rocks and according to the Department's Qualitative Benthic Macroinvertebrate Data Collection Protocol, found in the Water Quality Monitoring Protocols for Streams and Rivers 2021 (Monitoring Book), which can be found by following this link:
http://files.dep.state.pa.us/Water/Drinking%20Water%20and%20Facility%20Regulation/WaterQualityPortalFiles/Technical%20Documentation/MONITORING_BOOK.pdf

RESULTS

On the day of the survey, there was no water within the channel upslope of the STP discharge. In talking to the plant manager, the STP discharge pipe almost constantly discharges, but might slow to a trickle overnight. I could not take a meter reading in the channel directly downstream from the effluent because the water was not deep enough to submerge the probe. I walked downslope along the channel until it was obvious that groundwater was present within the channel. The water quality parameters were taken at the POFU. Specific conductivity was moderately high (751 umhos/cm). The pH was 6.74; dissolved oxygen was 10.88; and temperature was 10.2°C. The riparian area was forested, and the wetted width was approximately 1-2 feet. Seven aquatic invertebrate taxa were found and identified at this location. Of those taxa, there is one family and one genus that are considered to be long-lived (Hydropsychidae and *Tipula*).

DISCUSSION AND CONCLUSIONS

The objective of this study was to examine aquatic life in the UNT 42410 to Pucketa Creek to determine if and where the stream is capable of supporting an aquatic life use as defined in 25 Pennsylvania Code §93.9q, where water quality standards must be met.

Findings from this study suggest that the UNT 42410 to Pucketa Creek, approximately 200 meters downstream of the discharge location, is capable of supporting aquatic life (Lat: 40.547858; Long:-79.697253). Two long-

lived taxa were identified in the macroinvertebrate sample, and the stream exhibited defined bed and bank and substrate.

cc: Stream File – UNT 42410 to Pucketa Creek
Mahbuba Iasmin – SWRO, Environmental Group Manager
Christopher Kriley – SWRO, Environmental Program Manager
Michael (Josh) Lookenbill – CO, Environmental Group Manager

Permit No. PA0093203

PA0093203 at POFU

Region ID: PA
Workspace ID: PA20220406225749904000
Clicked Point (Latitude, Longitude): 40.54792, -79.69691
Time: 2022-04-06 18:58:09 -0400

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.0553	square miles
ELEV	Mean Basin Elevation	1188	feet

Low-Flow Statistics Parameters [Low Flow Region 4]

https://streamstats.usgs.gov/ss/ 4/6/2022

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.0553	square miles	2.26	1400
ELEV	Mean Basin Elevation	1188	feet	1050	2580

Low-Flow Statistics Disclaimers [Low Flow Region 4]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Low-Flow Statistics Flow Report [Low Flow Region 4]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.00103	ft^3/s
30 Day 2 Year Low Flow	0.00227	ft^3/s
7 Day 10 Year Low Flow	0.00023	ft^3/s
30 Day 10 Year Low Flow	0.000612	ft^3/s
90 Day 10 Year Low Flow	0.00144	ft^3/s

Low-Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)

Permit No. PA0093203

PA0090203 at Node 2

Region ID: PA
Workspace ID: PA20220303015516477000
Clicked Point (Latitude, Longitude): 40.54454, -79.69021
Time: 2022-03-02 20:55:35 -0500

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.44	square miles
ELEV	Mean Basin Elevation	1173	feet

Low-Flow Statistics Parameters [Low Flow Region 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.44	square miles	2.26	1400
ELEV	Mean Basin Elevation	1173	feet	1050	2580

Low-Flow Statistics Disclaimers [Low Flow Region 4]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Low-Flow Statistics Flow Report [Low Flow Region 4]

Statistic	Value	Unit
7 Day 2 Year Low Flow	0.0108	ft^3/s
30 Day 2 Year Low Flow	0.0216	ft^3/s
7 Day 10 Year Low Flow	0.00295	ft^3/s
30 Day 10 Year Low Flow	0.0067	ft^3/s
90 Day 10 Year Low Flow	0.0142	ft^3/s

Low-Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)

Permit No. PA0093203

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
18A	42410	Trib 42410 to Pucketa Creek	1.960	1122.69	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	0.005	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
PennState Kensi	PA0093203	0.0150	0.0150	0.0150	0.000	20.00	7.40

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	15.00	2.00	0.00	1.50
Dissolved Oxygen	6.00	8.24	0.00	0.00
NH3-N	4.00	0.00	0.00	0.70

Permit No. PA0093203

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
18A	42410	Trib 42410 to Pucketa Creek	1.500	1014.24	0.44	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	0.005	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

Permit No. PA0093203

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
18A	42410	Trib 42410 to Pucketa Creek

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
1.960	0.00	0.00	0.00	.0232	0.04465	.313	1.26	4.01	0.06	0.472	20.00	7.39
Q1-10 Flow												
1.960	0.00	0.00	0.00	.0232	0.04465	NA	NA	NA	0.06	0.473	20.00	7.40
Q30-10 Flow												
1.960	0.00	0.00	0.00	.0232	0.04465	NA	NA	NA	0.06	0.468	20.00	7.38

Permit No. PA0093203

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	2.66	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

Permit No. PA0093203

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
18A	42410	Trib 42410 to Pucketa Creek

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
1.960	PennState Kensi	6.68	6.72	6.68	6.72	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
1.960	PennState Kensi	1.53	1.57	1.53	1.57	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)		
1.96	PennState Kensi	15	15	1.57	1.57	6	6	0	0

Permit No. PA0093203

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
18A	42410	Trib 42410 to Pucketa Creek

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
1.960	0.015	20.000	7.394
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
1.257	0.313	4.011	0.060
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
14.87	1.497	1.56	0.700
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.022	28.050	Owens	5
Reach Travel Time (days)			
0.472			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.047	13.86	1.51	7.36
0.094	12.91	1.46	7.78
0.142	12.03	1.41	7.94
0.189	11.21	1.36	8.04
0.236	10.44	1.32	8.12
0.283	9.73	1.28	8.19
0.331	9.07	1.24	8.24
0.378	8.45	1.20	8.24
0.425	7.87	1.16	8.24
0.472	7.33	1.12	8.24

Permit No. PA0093203

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
18A	42410	Trib 42410 to Pucketa Creek

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
1.960	PennState Kensi	PA0093203	0.015	CBOD5	15		
				NH3-N	1.57	3.14	
				Dissolved Oxygen			6

Permit No. PA0093203

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

0.00023	= Q stream (cfs)	0.5	= CV Daily
0.015	= Q discharge (MGD)	0.5	= CV Hourly
30	= no. samples	1	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
0	= % Factor of Safety (FOS)		=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 0.022	1.3.2.iii	WLA cfc = 0.014
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.008	5.1d	LTA_cfc = 0.008

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.010	CFC
		INST MAX LIMIT (mg/l) = 0.033	

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)**