pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northcentral Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0113093**
Facility Type	**Non-Municipal**	APS ID	**1056176**
Major / Minor	**Minor**	Authorization ID	**1384126**

Applicant and Facility Information

Applicant Name	**Christ Wesleyan Church**	Facility Name	**Christ Wesleyan Church Sewer System**
Applicant Address	363 Stamm Road Milton, PA 17847-7569	Facility Address	363 Stamm Road Milton, PA 17847-7569
Applicant Contact	Ken Paulhamus	Facility Contact	Keith Pfleegor
Applicant Phone	(570) 742-8987	Facility Phone	(570) 742-8987
Client ID	43867	Site ID	480713
Ch 94 Load Status	Not Overloaded	Municipality	Turbot Township
Connection Status	No Exceptions Allowed	County	Northumberland
Date Application Received	February 7, 2022	EPA Waived?	No
Date Application Accepted	February 10, 2022	If No, Reason	Chesapeake Bay Discharger, DEP Discretion
Purpose of Application	Renewal of a NPDES Permit		

Summary of Review

The subject facility is a sewage treatment plant serving the church, Meadowbrook Christian School, coffee shop, wellness gym, and other community facilities in Turbot Township, Northumberland County.

A map of the discharge location is attached.

Sludge use and disposal description and location(s): The facility's sludge is disposed at other WWTPs for further processing. Per the application, 0.55 dry tons were disposed in the previous year.

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		*Keith C. Allison* Keith C. Allison / Project Manager	August 11, 2022
X		*Nicholas W. Hartranft* Nicholas W. Hartranft, P.E. / Environmental Engineer Manager	August 12, 2022

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.0035
Latitude	41º 1' 25.25"	Longitude	-76º 49' 19.11"
Quad Name	Milton, PA	Quad Code	
Wastewater Description:	Sewage Effluent		
Receiving Waters	Unnamed Tributary to Limestone Run (WWF)	Stream Code	19095
NHD Com ID	66919589	RMI	0.85
Drainage Area	0.7	Yield (cfs/mi^2)	0.125
Q_{7-10} Flow (cfs)	0.088	Q_{7-10} Basis	USGS Gage 01555000 (Penns Creek, 1931-2008)
Elevation (ft)	500	Slope (ft/ft)	0.007
Watershed No.	10-D	Chapter 93 Class.	WWF
Existing Use	N/A	Existing Use Qualifier	N/A
Exceptions to Use	None	Exceptions to Criteria	N/A
Assessment Status	Impaired		
Cause(s) of Impairment	SILTATION		
Source(s) of Impairment	AGRICULTURE		
TMDL Status	Final	Name	Limestone Run TMDL
Nearest Downstream Public Water Supply Intake	PA American White Deer @ Milton, PA		
PWS Waters	West Branch Susquehanna River	Flow at Intake (cfs)	680
PWS RMI	10.66	Distance from Outfall (mi)	Approx. 3

Changes Since Last Permit Issuance: None. The above stream and drainage characteristics were determined for the previous review and remain adequate.

Other Comments: The facility has received no Wasteload Allocation (WLA) under the Limestone Run TMDL. The TMDL included a 1% bulk reserve allocation for TSS or 29,142 pounds of sediment per year. The discharge is typically below detection for TSS. Assuming an average concentration of 5 mg/L at the maximum annual average flow rate of 0.0035 MGD the facility would discharge 0.15 lbs/day or 53.3 lbs/yr TSS which is well within the sediment bulk reserve allocation.

No downstream water supply is expected to be affected by the discharge at this time with the limitations and monitoring proposed.

Treatment Facility Summary

Treatment Facility Name: Christ Wesleyan Church Sewer System

WQM Permit No.	Issuance Date	Permit Covered:
4986404	July 28, 1986	Original permitting for Cromaglass system
4986404 A-1	September 1990	Incorporation of anoxic cycles
4986404 A-3	June 20, 2018	Plant upgrade and expansion

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary	Activated Sludge	Hypochlorite	0.0035

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.005	45.9	Not Overloaded		Other WWTP

Changes Since Last Permit Issuance: Upgrades under WQM Permit No. 4986404 Amendment No. 3 were completed 2019.

Other Comments: The treatment consists of influent pump station, 5,000-gallon equalization tank, 15,000-gallon CromaFlow CF150 unit including aeration and sedimentation, NetaFim disc filters, tablet chlorinator, 750-gallon chlorine contact tank, 1,300-gallon sludge holding tank, and 3,000-gallon sludge holding tank.

Compliance History

DMR Data for Outfall 001 (from July 1, 2021 to June 30, 2022)

Parameter	JUN-22	MAY-22	APR-22	MAR-22	FEB-22	JAN-22	DEC-21	NOV-21	OCT-21	SEP-21	AUG-21	JUL-21
Flow (MGD) Average Monthly	0.001532	0.002524	0.002375	0.00243	0.002472	0.002158	0.001647	0.001882	0.002466	0.002561	0.001426	0.001109
Flow (MGD) Daily Maximum	0.001909	0.002774	0.002641	0.002819	0.002613	0.002506	0.002384	0.002433	0.002742	0.003062	0.001959	0.0011263
pH (S.U.) Minimum	6.3	6.2	6.4	6.3	6.3	6.1	6.3	6.3	6.1	6.2	6.2	6.3
pH (S.U.) Maximum	7.5	7.1	7.1	7.0	7.5	7.4	7.4	7.1	7.0	6.9	7.2	7.1
DO (mg/L) Minimum	4.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0
TRC (mg/L) Average Monthly	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
TRC (mg/L) Instantaneous Maximum	0.8	0.6	0.8	0.9	0.7	0.6	0.6	0.7	0.8	0.6	0.6	0.5
CBOD5 (mg/L) Average Monthly	< 2.0	< 2.0	< 2.0	3.0	6.0	3.0	3.0	< 2.0	< 2.0	< 3.0	< 2.0	< 2.0
TSS (mg/L) Average Monthly	6.0	< 4.0	< 8.0	5.0	7.0	< 4.0	< 5.0	< 4.0	< 4.0	< 6.0	< 8.0	< 5.0
Fecal Coliform (No./100 ml) Geometric Mean	< 1.0	< 1.0	< 1.0	< 7.0	2.0	< 11	< 1.0	< 2.0	< 1.0	< 6.0	< 1.0	< 1.0
Fecal Coliform (No./100 ml) Instantaneous Maximum	1.0	< 1.0	1.0	55.4	4.1	129.6	1.0	3.1	2.0	41.4	1.0	1.0
Nitrate-Nitrite (mg/L) Average Monthly	39.4	88.6	102.0	36.6	76.7	102.0	117.0	114	34.7	14.7	72.4	60.4
Nitrate-Nitrite (lbs) Total Monthly	13.9	63.5	67.4	21.3	45.7	38.3	35.6	69.4	20.4	7.6	26.0	15.4
Total Nitrogen (mg/L) Average Monthly	40.8	90.7	104.8	39.8	94.8	109.0	126.6	< 115	< 35.7	< 15.7	76.1	< 61.4
Total Nitrogen (lbs) Total Monthly	14.4	65.0	69.2	23.1	56.5	40.9	38.5	< 70	< 21	< 8.2	27.4	< 15.7
Total Nitrogen (lbs) Effluent Net Total Annual										151		

Total Nitrogen (lbs) Total Annual										< 268		
Ammonia (mg/L) Average Monthly	< 0.1	0.91	< 0.1	1.4	15.5	4.9	9.6	0.94	< 0.12	0.41	3.0	< 0.1
Ammonia (lbs) Total Monthly	< 0.04	0.7	< 0.07	0.8	9.2	1.8	2.9	0.6	< 0.1	0.2	1.1	< 0.03
Ammonia (lbs) Total Annual										< 4		
TKN (mg/L) Average Monthly	1.4	2.1	2.8	3.2	18.1	7.0	3.4	< 1.0	< 1.0	< 1.0	3.7	< 1.0
TKN (lbs) Total Monthly	0.5	1.5	1.9	1.9	10.8	2.6	1.0	< 0.6	< 0.6	< 0.5	1.3	< 0.03
Total Phosphorus (lbs/day) Average Monthly	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.1	0.1
Total Phosphorus (mg/L) Average Monthly	10.9	7.9	10.1	9.4	8.2	13.1	11.9	13.1	10.7	11.1	9.4	12.7
Total Phosphorus (lbs) Total Monthly	3.8	5.7	6.7	5.5	4.9	4.9	3.6	8	6.3	5.8	3.4	3.2
Total Phosphorus (lbs) Effluent Net Total Annual										< 22		
Total Phosphorus (lbs) Total Annual										55		

Compliance History, Cont'd	
Summary of Inspections:	The facility has been inspected annually over the past permit term. The most recent inspection on June 9, 2022 identified no violations at the time of inspection.
Other Comments:	A query in WMS found an open violation in eFACTS for Christ Wesleyan Church for effluent violations.

Existing Effluent Limitations and Monitoring Requirements – Outfall 001

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	Estimate
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	Report Inst Min	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	XXX	XXX	XXX	25.0	XXX	50	2/month	Grab
Total Suspended Solids	XXX	XXX	XXX	30.0	XXX	60	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
Ammonia-Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/month	Grab
Total Phosphorus	Report	XXX	XXX	Report	XXX	XXX	1/month	Grab

Existing Effluent Limitations and Monitoring Requirements – Chesapeake Bay								
Parameter	**Effluent Limitations**						**Monitoring Requirements**	
	Mass Units (lbs/day) (1)		**Concentrations (mg/L)**				**Minimum (2) Measurement Frequency**	**Required Sample Type**
	Monthly	**Annual**	**Monthly**	**Monthly Average**	**Maximum**	**Instant. Maximum**		
Ammonia--N	Report	Report	XXX	Report	XXX	XXX	1/month	Grab
Kjeldahl--N	Report	XXX	XXX	Report	XXX	XXX	1/month	Grab
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	XXX	1/month	Grab
Total Nitrogen	Report	Report	XXX	Report	XXX	XXX	1/month	Calculation
Total Phosphorus	Report	Report	XXX	Report	XXX	XXX	1/month	Grab
Net Total Nitrogen	XXX	152	XXX	XXX	XXX	XXX	1/year	Calculation
Net Total Phosphorus	XXX	24	XXX	XXX	XXX	XXX	1/year	Calculation

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.0035
Latitude 41º 1' 25.20" **Longitude** -76º 49' 19.10"
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 above limitations are applicable and included in the existing permit.

Water Quality-Based Limitations

DO, CBOD5 and NH3-N

The WQM7.0 model allows the Department to evaluate point source discharges of dissolved oxygen (DO), carbonaceous BOD ($CBOD_5$), and ammonia-nitrogen (NH_3-N) into free-flowing streams and rivers. To accomplish this, the model simulates two basic processes: the mixing and degradation of NH_3-N in the stream and the mixing and consumption of DO in the stream due to the degradation of $CBOD_5$ and NH_3-N. WQM7.0 modeling was performed showing the $CBOD_5$ technology-based limits noted above and no necessary NH_3-N limits are adequate to protect the receiving stream. The modeling run is attached (Attachment B).

Total Residual Chlorine

The Department uses a modeling spreadsheet to analyze the toxicity of a discharge's TRC in a receiving stream, accounting for available dilution. TRC modeling was performed showing that the existing BAT limit of 0.5 mg/L is adequate to protect the receiving stream. See Attachment C.

Toxics Management

No further "Reasonable Potential Analysis" was conducted to determine additional toxic pollutants as candidates for limitations for this minor treatment facility.

Chesapeake Bay/Nutrient Requirements

A portion of the Chesapeake Bay and many of its tidal tributaries have been listed as impaired under Section 303(d) of the Water Pollution Control Act, 33 U.S.C. §1313(d). Total Nitrogen and Total Phosphorus cap loads have been established for significant dischargers in Pennsylvania in order to reduce the total nutrient load to the Bay and meet State of Maryland Water Quality Standards. The Christ Wesleyan Church treatment facility is considered a Phase 5, Insignificant Chesapeake Bay discharger. Nutrient cap loadings were established in the previous review for this facility due to expansion.

The discharge's cap loadings as well as the Total Nitrogen and Total Phosphorus loadings for the past two cycle years are listed in the table below. The permittee has purchased credits for both Total Nitrogen and Total Phosphorus to meet cap loads.

Nutrient	Total Nitrogen	Total Phosphorus
Nutrient Cap Loads for PA0113093	152	24
10/1/19 – 9/30/20 Total Loadings	232	< 50
Credits Purchased	81	28
10/1/19 – 9/30/20 Net Loadings	151	< 22
10/1/20 – 9/30/21 Total Loadings	< 268	55
Credits Purchased	117	33
10/1/20 – 9/30/21 Net Loadings	< 151	22

Best Professional Judgment (BPJ) Limitations

Comments: No additional BPJ limitations are necessary at this time.

Anti-Backsliding

No limitations have been made less stringent consistent with the anti-backsliding requirements of the Clean Water Act and 40 CFR 122.44(l).

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	Estimate
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	Report Inst Min	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	XXX	XXX	XXX	25.0	XXX	50	2/month	Grab
Total Suspended Solids	XXX	XXX	XXX	30.0	XXX	60	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
Ammonia-Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	1/month	Grab
Total Phosphorus	Report	XXX	XXX	Report	XXX	XXX	1/month	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	Report Daily Max	XXX	1/year	Grab

Compliance Sampling Location: Outfall 001

Other Comments: E. Coli monitoring is new consistent with changes to Chapter 93 of the Department's regulations and Department policy.

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, to comply with Pennsylvania's Chesapeake Bay Tributary Strategy.

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
	Monthly	Annual	Monthly	Monthly Average	Maximum	Instant. Maximum		
Ammonia--N	Report	Report	XXX	Report	XXX	XXX	1/month	Grab
Kjeldahl--N	Report	XXX	XXX	Report	XXX	XXX	1/month	Grab
Nitrate-Nitrite as N	Report	XXX	XXX	Report	XXX	XXX	1/month	Grab
Total Nitrogen	Report	Report	XXX	Report	XXX	XXX	1/month	Calculation
Total Phosphorus	Report	Report	XXX	Report	XXX	XXX	1/month	Grab
Net Total Nitrogen	XXX	152	XXX	XXX	XXX	XXX	1/year	Calculation
Net Total Phosphorus	XXX	24	XXX	XXX	XXX	XXX	1/year	Calculation

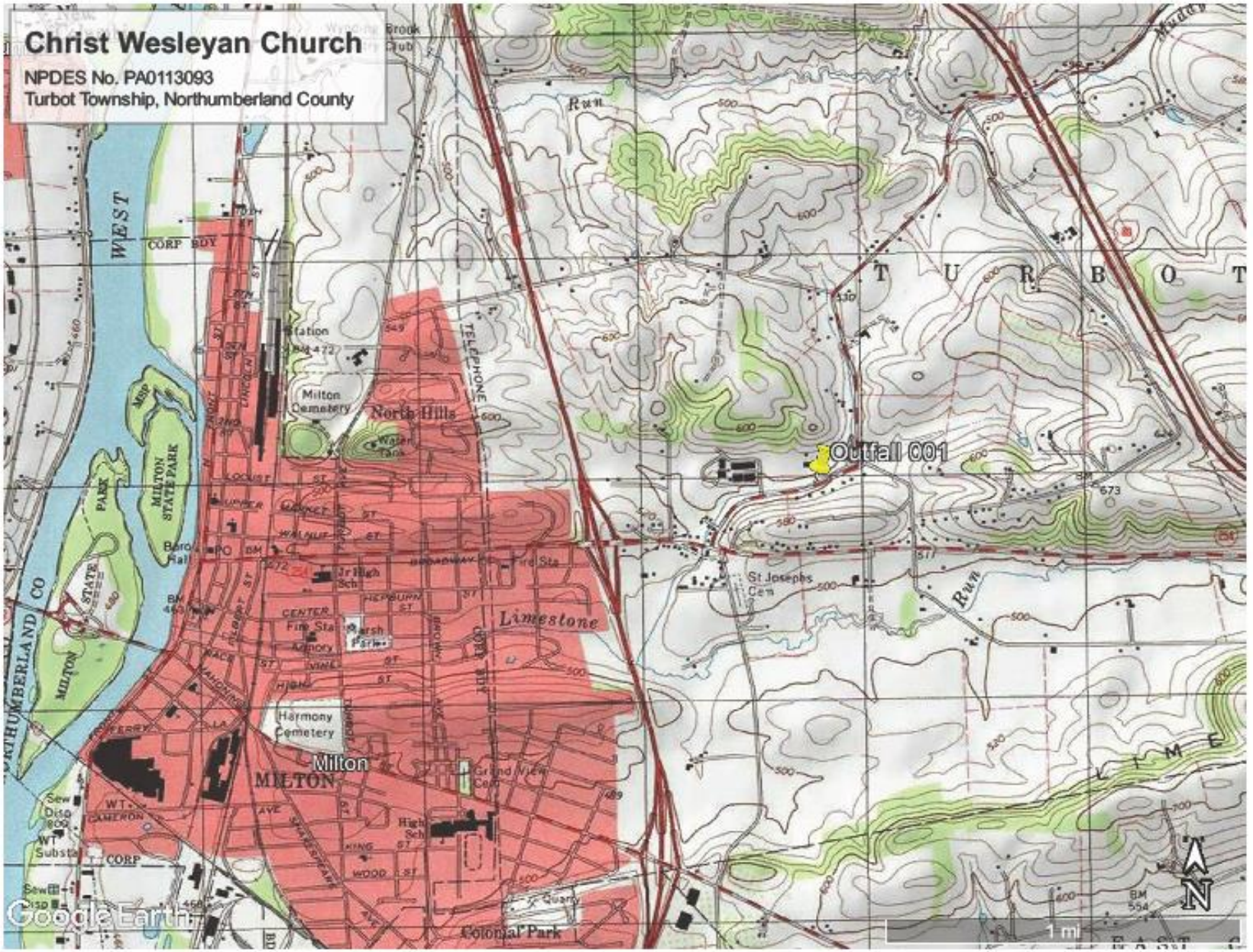
Compliance Sampling Location: Outfall 001

The above Chesapeake Bay limits and monitoring is unchanged.

Tools and References Used to Develop Permit	
☒	WQM for Windows Model (see Attachment **B**
☐	Toxics Management Spreadsheet (see Attachment)
☒	TRC Model Spreadsheet (see Attachment **C**)
☐	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: Establishing Effluent Limitations for Individual Sewage Permits, rev. 8/23/13;
☐	Other:

Attachments:

A. Discharge Location Map
B. WQM7.0 Model
C. TRC Model


Christ Wesleyan Church
NPDES No. PA0113093
Turbot Township, Northumberland County
Outfall 001
Milton
MILTON
North Hills
Milton Cemetery
Harmony Cemetery
Limestone
Run
TURBOT
WEST
Colonial Park
Google Earth
1 mi
N

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
10D	19094	LIMESTONE RUN	**0.850**	575.40	0.70	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	0.125	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
Christ Wesleyan	PA0113093	0.0035	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
10D	19094	LIMESTONE RUN	**0.000**	562.30	1.08	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	0.125	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

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 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
10D	19094	LIMESTONE RUN

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												
0.850	0.09	0.00	0.09	.0054	0.00292	.356	4.54	12.74	0.06	0.904	20.29	7.00
Q1-10 Flow												
0.850	0.06	0.00	0.06	.0054	0.00292	NA	NA	NA	0.05	1.140	20.44	7.00
Q30-10 Flow												
0.850	0.12	0.00	0.12	.0054	0.00292	NA	NA	NA	0.07	0.768	20.22	7.00

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
10D	19094	LIMESTONE RUN

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
0.850	0.004	20.291	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WD Ratio**	**Reach Velocity (fps)**
4.539	0.356	12.738	0.057
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
3.34	0.430	1.46	0.716
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.937	21.736	Owens	6
Reach Travel Time (days)			
0.904			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.090	3.21	1.37	8.20
0.181	3.09	1.28	8.20
0.271	2.97	1.20	8.20
0.362	2.85	1.12	8.20
0.452	2.74	1.05	8.20
0.543	2.64	0.99	8.20
0.633	2.53	0.93	8.20
0.723	2.44	0.87	8.20
0.814	2.34	0.81	8.20
0.904	2.25	0.76	8.20

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
10D	19094	LIMESTONE RUN

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
0.850	Christ Wesleyan	16.16	50	16.16	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
0.850	Christ Wesleyan	1.86	25	1.86	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)		
0.85	Christ Wesleyan	25	25	25	25	3	3	0	0

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
10D	19094	LIMESTONE RUN

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)
0.850	Christ Wesleyan	PA0113093	0.004	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			3

TRC_CALC

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

0.088	= Q stream (cfs)	0.5	= CV Daily
0.0035	= 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 = 5.204	1.3.2.iii	WLA cfc = 5.066
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 1.939	5.1d	LTA_cfc = 2.945

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)