pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Southwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0033626**
Facility Type	**Non-Municipal**	APS ID	**1033988**
Major / Minor	**Minor**	Authorization ID	**1346068**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**West Greene School District**	Facility Name	**West Greene Middle School / High School STP**
Applicant Address	1367 Hargus Creek Road	Facility Address	1352 Hargus Creek Road
	Waynesburg, PA 15370-3815		Waynesburg, PA 15370-3814
Applicant Contact	Brian Jackson	Facility Contact	John McDermitt
Applicant Phone	(724) 499-5183	Facility Phone	(724) 705-4293
Client ID	62361	Site ID	249416
Ch 94 Load Status	Not Overloaded	Municipality	Center Township
Connection Status		County	Greene
Date Application Received	March 3, 2021	EPA Waived?	Yes
Date Application Accepted		If No, Reason	

Purpose of Application: NPDES permit renewal for treated sewage discharges from a non-municipal sewage treatment plant.

Summary of Review

On March 3, 2021, DEP received an application from the West Greene School District to renew the NPDES permit for discharges from the West Greene Middle School/High School Sewage Treatment Plant (West Greene STP). The permit currently in effect was issued on December 29, 2016 with a January 1, 2017 effective date and a December 31, 2021 expiration date. The renewal application was received at least 180 days before the permit expired (i.e., by July 4, 2021), so the terms and conditions of the 2017 permit were automatically continued and remain in effect.

Effluent limits and monitoring requirements in the renewed permit will be the same as those in the current permit except for the addition of an annual reporting requirement for *E. coli* and a change in the frequency of flow monitoring from 2/month to 1/week consistent with DEP's guidance.

Sludge use and disposal description and location(s): Sludge is hauled from the West Greene STP by C&M Waste Water to the Franklin Township Sewer Authority STP (NPDES PA0046426) in Franklin Township, Greene County.

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		*Ryan C. Decker* Ryan C. Decker, P.E. / Environmental Engineer	August 6, 2021
X		*Christopher Kriley* Christopher Kriley, P.E. / Program Manager	August 9, 2021

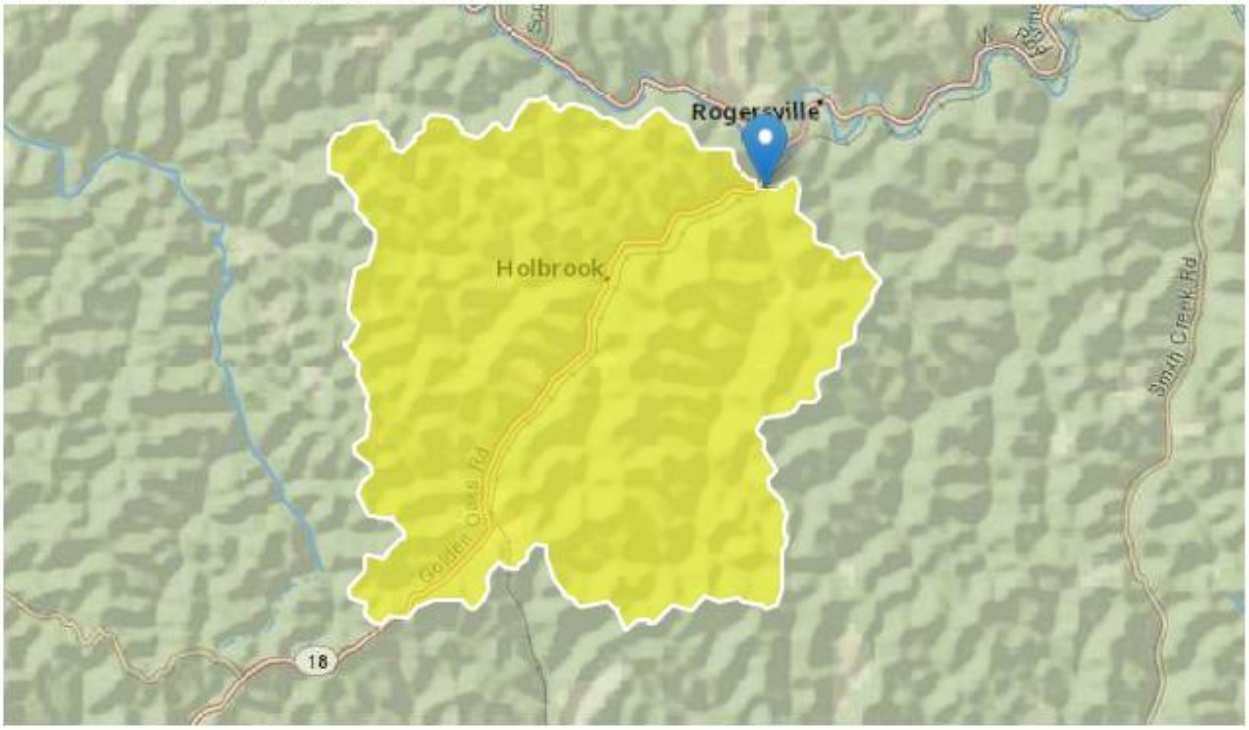
Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.012
Latitude	39° 52' 12"	Longitude	-80° 17' 2"
Quad Name	Holbrook	Quad Code	2003
Wastewater Description:	Treated sewage		
Receiving Waters	Hargus Creek (HQ-WWF)	Stream Code	40627
NHD Com ID	99417212	RMI	0.28
Drainage Area	21.5	Yield (cfs/mi^2)	0.017
Q_{7-10} Flow (cfs)	0.37	Q_{7-10} Basis	USGS StreamStats
Elevation (ft)	972	Slope (ft/ft)	0.0038
Watershed No.	19-B	Chapter 93 Class.	HQ-WWF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment			
Source(s) of Impairment			
TMDL Status		Name	
Nearest Downstream Public Water Supply Intake	Tri-County Joint Municipal Authority (PWS ID 5630045)		
PWS Waters	Monongahela River	Flow at Intake (cfs)	530
PWS RMI	64.78	Distance from Outfall (mi)	33.2

Changes Since Last Permit Issuance: None

StreamStats Report

Region ID: PA
Workspace ID: PA20210715223212988000
Clicked Point (Latitude, Longitude): 39.86882, -80.28379
Time: 2021-07-15 18:32:29 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	21.5	square miles
ELEV	Mean Basin Elevation	1251	feet

Low-Flow Statistics Parameters [Low Flow Region 4]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	21.5	square miles	2.26	1400

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
ELEV	Mean Basin Elevation	1251	feet	1050	2580

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

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SE	ASEp
7 Day 2 Year Low Flow	0.958	ft^3/s	43	43
30 Day 2 Year Low Flow	1.61	ft^3/s	38	38
7 Day 10 Year Low Flow	0.37	ft^3/s	66	66
30 Day 10 Year Low Flow	0.631	ft^3/s	54	54
90 Day 10 Year Low Flow	1.12	ft^3/s	41	41

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/)

Application Version: 4.6.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

Treatment Facility Summary		
Treatment Facility: West Greene Middle School/High School Sewage Treatment Plant		
WQM Permit No.	**Issuance Date**	**Purpose**
468S058	August 12, 1968	Permit issued to West Greene School District for a 0.00819 MGD sewage treatment plant consisting of two septic tanks, three dosing tanks, two siphons, six sand filters, a chlorinator, and a chlorine contact tank. By letter dated March 28, 1969, West Greene School District requested that this WQM permit be cancelled because the treatment facilities were not constructed. This permit was superseded by WQM 3069401.
3069401	March 27, 1969	Permit issued to the West Greene School District for a 0.00819 MGD sewage treatment plant consisting of a comminutor, two aeration tanks, a settling tank, a dosing chamber, two sand filter beds, and a chlorine contact tank with hypochlorite solution pump.
3080402	January 22, 1981	Permit issued to the West Greene School District for upgrades to the existing STP including a capacity increase to 0.0115 MGD, a 5,200-gallon aerated flow equalization tank with duplicate submersible grinder pumps, a 1,000-galllon aerated sludge holding tank, enlargement of the intermittent sand filters from 800 to 1000 square feet, and an increase in blower capacity.

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Tertiary	Extended Aeration	Tablet Chlorinator	0.004 to 0.006

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.0115	20.03	Not Overloaded	Sludge holding tank	No solids disposed in previous year

Changes Since Last Permit Issuance: None

Compliance History

DMR Data for Outfall 001 (from July 1, 2020 to June 30, 2021)

Parameter	JUN-21	MAY-21	APR-21	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20
Flow (MGD) Average Monthly	0.00331	0.00494	0.005	0.0049	0.0039	0.0028	0.00219	0.00241	0.004	0.004	0.002	0.002
pH (S.U.) Minimum	6.4	7.2	6.5	7.4	7.2	7.1	7.0	7.0	7.2	7.1	7.6	7.7
pH (S.U.) Maximum	7.2	7.0	6.8	7.1	7.7	7.0	7.0	7.3	7.3	7.3	7.7	7.8
DO (mg/L) Minimum	6.05	8.4	7.8	7.65	6.9	4.9	8.3	7.7	5.0	6.7	7.1	7.3
TRC (mg/L) Average Monthly	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.015	0.05	0.13	0.11	0.11	0.1
TRC (mg/L) Instantaneous Maximum	0.01	0.02	0.013	0.06	0.8	0.05	0.02	0.06	0.25	0.19	0.2	0.2
CBOD5 (mg/L) Average Monthly	3.7	2.45	4.8	8.1	8.6	2.2	2.65	< 2.0	2.0	2.1	3.6	2.0
CBOD5 (mg/L) Instantaneous Maximum	2.5	2.6	6.2	2.3	13.1	12.0	3.3	< 2.0	2.0	2.1	5.1	2.0
TSS (mg/L) Average Monthly	< 5.0	5.0	6.0	9.5	9.0	5.0	6.5	< 6.0	5.5	5.0	5.0	5.0
TSS (mg/L) Instantaneous Maximum	< 5.0	6.0	8.0	12.0	18.0	5.0	8.0	< 7.0	6.0	5.0	5.0	5.0
Fecal Coliform (No./100 ml) Geometric Mean	287	5.0	117	144	27	19200	419.4	151.4597	53.0	45.0	12.0	3.0
Fecal Coliform (No./100 ml) Instantaneous Maximum	1870	6.0	370	236	189	34779	3500	370	58.0	112.0	22.0	4.0
Total Nitrogen (mg/L) Daily Maximum							27.5					
Ammonia (mg/L) Average Monthly	0.5	0.3	1.45	23.4	9.0	3.7	0.4	0.5	0.3	0.4	0.2	0.4
Ammonia (mg/L) Instantaneous Maximum	1.0	0.3	2.3	16.0	11.1	44.3	0.7	0.9	0.5	0.4	0.2	0.4
Total Phosphorus (mg/L) Daily Maximum							3.5					

Compliance History

Effluent Violations for Outfall 001, from: July 1, 2020 To: June 30, 2021

Parameter	Date	SBC	DMR Value	Units	Limit Value	Units
DO	01/31/21	Min	4.9	mg/L	5.0	mg/L
Fecal Coliform	01/31/21	Geo Mean	19200	No./100 ml	2000	No./100 ml
Fecal Coliform	06/30/21	Geo Mean	287	No./100 ml	200	No./100 ml
Fecal Coliform	01/31/21	IMAX	34779	No./100 ml	10000	No./100 ml
Fecal Coliform	06/30/21	IMAX	1870	No./100 ml	1000	No./100 ml
Ammonia	02/28/21	Avg Mo	9.0	mg/L	4.5	mg/L
Ammonia	03/31/21	Avg Mo	23.4	mg/L	4.5	mg/L
Ammonia	01/31/21	IMAX	44.3	mg/L	9.0	mg/L
Ammonia	02/28/21	IMAX	11.1	mg/L	9.0	mg/L
Ammonia	03/31/21	IMAX	16.0	mg/L	9.0	mg/L

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.012
Latitude 39° 52' 12.0" **Longitude** -80° 17' 2.0"
Wastewater Description: Treated sewage

Technology-Based Effluent Limitations (TBELs)

25 Pa. Code § 92a.47 – Sewage Permits

Regulations at 25 Pa. Code § 92a.47 specify TBELs and effluent standards that apply to sewage discharges. Section 92a.47(a) requires that sewage be given a minimum of secondary treatment with significant biological treatment that achieves the following:

Table 1. Regulatory TBELs for Sanitary Wastewaters

Parameter	Average Monthly (mg/L)	Weekly Average (mg/L)	Instant. Max (mg/L)	Basis
CBOD5	25	40	50†	25 Pa. Code § 92a.47(a)(1), (a)(2) & 40 CFR § 133.102(a)(4)(i)
Total Suspended Solids	30	45	60†	25 Pa. Code § 92a.47(a)(1), (a)(2) & 40 CFR § 133.102(b)(1)
Fecal Coliform (No./100 mL) May 1 – September 30	200 (Geometric Mean)	N/A	1,000	25 Pa. Code § 92a.47(a)(4)
Fecal Coliform (No./100 mL) October 1 – April 30	2,000 (Geometric Mean)	N/A	10,000	25 Pa. Code § 92a.47(a)(5)
Total Residual Chlorine	0.5 (or facility-specific)	N/A	1.6 (or facility-specific)	25 Pa. Code § 92a.47(a)(8) & § 92a.48(b)(2)
pH (s.u.)	not less than 6.0 and not greater than 9.0			25 Pa. Code § 92a.47(a)(7) & § 95.2(1), & 40 CFR § 133.102(c)

†Value is calculated as two times the monthly average in accordance with Chapter 2 of DEP's "Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits" [Doc. No. 362-0400-001].

The $CBOD_5$, TSS, and pH limits are the same as those in EPA's secondary treatment regulation (40 CFR § 133.102).

In accordance with Section I of DEP's "Standard Operating Procedure for Clean Water Program Establishing Effluent Limitations for Individual Sewage Permits" [SOP No. BCW-PMT-033, Version 1.9, March 22, 2021] and under the authority of 25 Pa. Code § 92a.61(b), annual reporting for Total Nitrogen and Total Phosphorus is required for sewage discharges with design flows greater than 2,000 gpd to help evaluate treatment effectiveness and to monitor nutrient loading to the receiving watershed (this reporting was required by the previous permit and will be reimposed in the new permit). Pursuant to that same SOP, a minimum dissolved oxygen limit of 4.0 mg/L is imposed on sewage discharges and an annual reporting requirement for *E. coli* will be added to Outfall 001 under the authority of § 92a.61(b).

Antidegradation

The West Greene STP discharges treated sewage to Hargus Creek, which is designated for high quality warm-water fishes (HQ-WWF). In 1993, as part of the NPDES permit issued in 1994, DEP consulted a DEP guidance document for special protection waters dating to November 1992. Subsequent permit renewals through 2017 did not re-evaluate antidegradation requirements, but DEP has updated its guidance since 1992. The current antidegradation guidance is the "Water Quality Antidegradation Implementation Guidance" (Doc. No. 391-0300-002; November 29, 2003).

The 1993 Fact Sheet explained antidegradation requirements as follows:

> [When] this discharge was first permitted, Hargus Creek was not classified as a high quality-warm water fishery. High quality stream designations did not exist prior to 1979. The sewage treatment plant has been in existence since 1969.
>
> The Department recently issued new guidance for discharges to special protection waters (SPW). This implementation handbook was published and distributed in November of 1992. The handbook requires sewage dischargers to meet the more stringent of the following:

A. Water quality based effluent limitations required to meet current water quality criteria contained in Chapter 93 of the Department's Rules and Regulations.

B. Antidegradation BAT defined as follows: CBOD5 = 10 mg/L, Total Phosphorus = 1.0 mg/L, Total NH_3-N = 1.5 mg/L (May 1 – Oct. 31) and 4.5 mg/L (Nov 1 – Apr. 30), Suspended Solids = 10 mg/L, and Dissolved Oxygen = 5 or 6 mg/L.

C. Maintenance of existing water quality.

Since the WQ Jr-Sr HS STP existed prior to the stream's high quality designation, Paragraph C was eliminated from consideration for determining the new limitations.

As can be seen, the antidegradation BAT NH_3-N values mandated by the guidance are currently imposed in the existing permit, therefore, they will be reimposed. The existing BOD5 limit of 10 mg/L will be changed to a CBOD5 limit of 10 mg/L as current policy mandates. The existing DO limitation of 5.0 mg/L will also be reimposed.

A review of the DMRs reveals that the WQ Jr-Sr HS STP consistently achieves a 10 mg/L TSS average monthly limitation.

The exclusion of "maintenance of existing water quality" is referred to as "grandfathering". Page 46 of DEP's current antidegradation guidance explains:

> Discharges in existence prior to the HQ or EV designation are "grandfathered" and considered to be part of the existing quality of the waterbody. "Grandfathered" flows are not subject to "the non-discharge alternatives/use of best technologies analysis" or SEJ (for HQ waters)…[a]ll nonpoint source contributions and non-grandfathered point sources that occur after a waterbody is designated HQ or EV are subject to applicable provisions of the Antidegradation Program.

Based on current guidance, antidegradation BAT (currently referred to as Antidegradation Best Available Combination of Technologies or "ABACT") also would not apply to the STP. However, Section 402(a)(1) of the Clean Water Act and implementing regulations in 40 CFR § 125.3 (incorporated by reference in DEP's regulations at 25 Pa. Code § 92a.3(b)(4)) give DEP the authority to set case-by-case TBELs. Additionally, antibacksliding requirements in 40 CFR § 122.44(l)(1) (incorporated by reference in DEP's regulations at 25 Pa. Code § 92a.44) require that:

> Except as provided in paragraph (l)(2) of this section when a permit is renewed or reissued, interim effluent limitations, standards or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit (unless the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification or revocation and reissuance under §122.62.)

Since more stringent TBELs than those specified in 25 Pa. Code § 92a.47 (see Table 1) were previously imposed at Outfall 001 and there have been no material and substantial changes (excluding updated guidance like DEP's 2003 antidegradation guidance that is not considered as an allowance for backsliding per § 122.44(l)(2)(i)(B)(*1*)[1]) that warrant modification of those TBELs, the existing TBELs will be maintained in the renewed permit.

New, additional, and increased discharges are subject to antidegradation requirements, but West Greene School District has not reported any changes to its West Greene STP discharge such as an increased design flow or increased design organic/solids loading that would trigger an evaluation of those requirements for this permit renewal.

[1] (2) In the case of effluent limitations established on the basis of Section 402(a)(1)(B) of the CWA, a permit may not be renewed, reissued, or modified on the basis of effluent guidelines promulgated under section 304(b) subsequent to the original issuance of such permit, to contain effluent limitations which are less stringent than the comparable effluent limitations in the previous permit.
(i) Exceptions—A permit with respect to which paragraph (l)(2) of this section applies may be renewed, reissued, or modified to contain a less stringent effluent limitation applicable to a pollutant, if—
(B)(*1*) Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance; or

Table 2. TBELs for Outfall 001

Parameter	Average Monthly (mg/L)	Instant. Max (mg/L)	Basis
CBOD5	10.0	20.0†	25 Pa. Code § 92a.3(b)(4); 40 CFR § 125.3(d); & 40 CFR § 122.44(l)
Total Suspended Solids	10.0	20.0†	25 Pa. Code § 92a.3(b)(4); 40 CFR § 125.3(d); & 40 CFR § 122.44(l)
E. coli (No./100 mL)	—	Report (Daily Maximum)	25 Pa. Code § 92a.61(b)
Fecal Coliform (No./100 mL) May 1 – September 30	200 (Geometric Mean)	1,000	25 Pa. Code § 92a.47(a)(4); 40 CFR § 122.44(l)
Fecal Coliform (No./100 mL) October 1 – April 30	2,000 (Geometric Mean)	10,000	25 Pa. Code § 92a.47(a)(5); 40 CFR § 122.44(l)
Total Residual Chlorine	0.5	1.6	25 Pa. Code § 92a.47(a)(8) & § 92a.48(b)(2)
Dissolved Oxygen	5.0 (Minimum)	—	25 Pa. Code § 92a.3(b)(4); 40 CFR § 125.3(d); & 40 CFR § 122.44(l)
Ammonia-Nitrogen May 1 – October 31	1.5	3.0	25 Pa. Code § 92a.3(b)(4); 40 CFR § 125.3(d); & 40 CFR § 122.44(l)
Ammonia-Nitrogen November 1 – April 30	4.5	9.0	25 Pa. Code § 92a.3(b)(4); 40 CFR § 125.3(d); & 40 CFR § 122.44(l)
Nitrogen, Total	—	Report (Daily Maximum)	25 Pa. Code § 92a.61(b)
Phosphorus, Total	—	Report (Daily Maximum)	25 Pa. Code § 92a.61(b)
pH (s.u.)	not less than 6.0 and not greater than 9.0		25 Pa. Code § 92a.47(a)(7) & § 95.2(1), & 40 CFR § 133.102(c)

†Value is calculated as two times the monthly average in accordance with Chapter 2 of DEP's "Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits" [Doc. No. 362-0400-001].

Water Quality-Based Effluent Limitations (WQBELs)

Pursuant to EPA's approval of Pennsylvania's 2017 Triennial Review of Water Quality Standards and corresponding regulatory changes published in the *Pennsylvania Bulletin* on July 11, 2020, new water quality criteria for ammonia-nitrogen apply to waters of the Commonwealth. Therefore, WQBELs are re-evaluated even though there have been no changes to the STP.

WQM 7.0 Water Quality Modeling Program

WQM 7.0 is a water quality modeling program for Windows that determines Waste Load Allocations ("WLAs") and effluent limitations for carbonaceous biochemical oxygen demand ("CBOD5"), ammonia-nitrogen, and dissolved oxygen for single and multiple point-source discharge scenarios. To accomplish this, the model simulates two basic processes. In the ammonia-nitrogen module, the model simulates the mixing and degradation of ammonia-nitrogen in the stream and compares calculated instream ammonia-nitrogen concentrations to ammonia-nitrogen water quality criteria. In the dissolved oxygen module, the model simulates the mixing and consumption of dissolved oxygen in the stream due to the degradation of CBOD5 and ammonia-nitrogen and compares calculated instream dissolved oxygen concentrations to dissolved oxygen water quality criteria. WQM 7.0 then determines the highest pollutant loadings that the stream can assimilate while still meeting water quality criteria under design conditions.

Water Quality Modeling for Outfall 001 Using WQM 7.0

The WQM 7.0 model is run for Outfall 001 to determine whether WQBELs are necessary for $CBOD_5$, ammonia-nitrogen, and/or dissolved oxygen. Input values for the WQM 7.0 model are shown in Table 3.

DEP's modeling for sewage discharges is a two-step process. First, a discharge is modeled for the summer period (May through October) using warm temperatures for the discharge and the receiving stream. Modeling for the summer period is done first because allowable ammonia concentrations in a discharge are lower at higher temperatures (i.e., warm temperatures are more likely to result in critical loading conditions). Reduced dissolved oxygen levels also appear to increase ammonia toxicity and the maximum concentration of dissolved oxygen in water is lower at higher temperatures.

Table 3. Outfall 001 WQM 7.0 Inputs

Discharge Characteristics	
Parameter	**Value**
River Mile Index	0.28
Discharge Flow (MGD)	0.012
Discharge Temp. (°C) (Warm)	25.0
Discharge Temp. (°C) (Cold)	15.0
Basin/Stream Characteristics	
Parameter	**Value**
Area in Square Miles	21.5
Q_{7-10} (cfs)	0.37
Low-flow yield (cfs/mi^2)	0.017
Elevation (ft)	972
Slope	0.0038
Stream Temp. (°C) (Summer)	25.0
Stream Temp. (°C) (Winter)	5.0
Stream pH (s.u.)	7.0
D.O. Goal (mg/L)	5.0

The second step is to evaluate WQBELs for the winter period, but only if modeling shows that WQBELs are needed for the summer period. For the summer period, pursuant to DEP's "Implementation Guidance of Section 93.7 Ammonia Criteria" [Doc. No. 391-2000-013] (Ammonia Guidance) and in the absence of site-specific data, the discharge temperature is assumed to be 25°C and the design stream temperature and pH are assumed to be 20°C and 7.0 s.u., respectively, based on the recommendations for free stone warm water streams in DEP's Ammonia Guidance. The flow used for modeling is the average design flow (0.012 MGD).

The results of the WQM 7.0 modeling (see **Attachment A**) indicate that no WQBELs are needed for CBOD5, ammonia-nitrogen, or dissolved oxygen. Since WQBELs do not apply during summer months, no modeling is performed for winter months. The existing ammonia-nitrogen limits based on antidegradation BAT will control.

Total Residual Chlorine

The West Greene STP uses chlorine for disinfection. To determine if WQBELs are required for discharges containing total residual chlorine (TRC), a discharge evaluation is performed using a DEP program called TRC_CALC created with Microsoft Excel for Windows. TRC_CALC calculates TRC Waste Load Allocations (WLAs) through the application of a mass balance model which considers TRC losses due to stream and discharge chlorine demands and first-order chlorine decay. Input values for the program include flow rates and chlorine demands for the receiving stream and the discharge, the number of samples taken per month, coefficients of TRC variability, partial mix factors, and an optional factor of safety. The mass balance model calculates WLAs for acute and chronic criteria that are then converted to long term averages using calculated multipliers. The multipliers are functions of the number of samples taken per month and the TRC variability coefficients (normally kept at default values unless site-specific information is available). The most stringent limitation between the acute and chronic long-term averages is converted to an average monthly limit for comparison to the BAT average monthly limit of 0.5 mg/L from 25 Pa. Code § 92a.48(b)(2). The more stringent of these average monthly TRC limitations is imposed in the permit.

The results of the TRC modeling (see **Attachment B**) indicate that no WQBELs are necessary for TRC.

Based on TRC discharge evaluation, the TRC limits that apply to discharges at Outfall 001 are TBELs (0.5 mg/L average monthly and 1.6 mg/L instantaneous maximum). The IMAX limit is not consistent with DEP's policy for calculating IMAX limits from average monthly limits using a multiplier of 2.0 as described in Chapter 2, Section C of DEP's "Technical Guidance for the Development and Specification of Effluent Limitations and Other Permit Conditions in NPDES Permits" [Doc. No. 362-0400-001]. However, TRC_CALC recommends an IMAX limit of 1.6 mg/L and no water quality impacts have been noted in the receiving stream at that discharge level.

Effluent Limits and Monitoring Requirements

In accordance with 25 Pa. Code §§ 92a.12 and 92a.61, effluent limits applicable at Outfall 001 are the more stringent of TBELs, WQBELs, regulatory effluent standards, and monitoring requirements as summarized in the table on the following page.

Monitoring frequencies and sample types are established pursuant to DEP's "Technical Guidance for the Development and Specification of Effluent Limitations. and Other Permit Conditions in NPDES Permits" and DEP's "Standard Operating Procedure for Clean Water Program Establishing Effluent Limitations for Individual Sewage Permits". Dissolved oxygen, TRC, and pH must be sampled 1/day using grab sampling. CBOD5, TSS, and ammonia-nitrogen must be sampled 2/month using grab sampling. Fecal coliform must be sampled 2/month using grab sampling. *E.Coli* must be sampled 1/year using grab sampling. Total nitrogen and total phosphorus must be sampled 1/year using grab sampling. Flow must be measured 1/week.

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	Instant. Minimum	Average Monthly	Daily Maximum	Instant. Maximum		
Flow (MGD)	0.012	XXX	XXX	XXX	XXX	XXX	1/week	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	6.0	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.5	XXX	1.0	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	XXX	XXX	XXX	10.0	XXX	20.0	2/month	Grab
Total Suspended Solids (TSS)	XXX	XXX	XXX	10.0	XXX	20.0	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	Report	XXX	1/year	Grab
Total Nitrogen	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab
Ammonia Nov 1 - Apr 30	XXX	XXX	XXX	4.5	XXX	9.0	2/month	Grab
Ammonia May 1 - Oct 31	XXX	XXX	XXX	1.5	XXX	3.0	2/month	Grab
Total Phosphorus	XXX	XXX	XXX	XXX	Report	XXX	1/year	Grab

Compliance Sampling Location: at Outfall 001

Tools and References Used to Develop Permit	
☒	WQM for Windows Model (see Attachment A)
☐	Toxics Management Spreadsheet (see Attachment)
☒	TRC Model Spreadsheet (see Attachment B)
☐	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: Standard Operating Procedure for Clean Water Program Establishing Effluent Limitations for Individual Sewage Permits" [SOP No. BCW-PMT-033, Version 1.9, March 22, 2021]
☐	Other:

ATTACHMENT A

WQM 7.0 Modeling Results

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
19B	40627	HARGUS CREEK	0.280	972.00	21.50	0.00380	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	0.017	0.00	0.00	0.000	0.000	10.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Outfall 001	PA0033626	0.0120	0.0000	0.0000	0.000	20.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	10.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.38	0.00	0.00
NH3-N	1.50	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
19B	40627	HARGUS CREEK	0.050	971.00	21.60	0.00380	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	0.017	0.00	0.00	0.000	0.000	10.0	0.00	0.00	25.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		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	5		

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
19B	40627	HARGUS 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												
0.280	0.37	0.00	0.37	.0186	0.00380	.792	7.92	10	0.06	0.230	24.76	7.00
Q1-10 Flow												
0.280	0.23	0.00	0.23	.0186	0.00380	NA	NA	NA	0.05	0.291	24.63	7.00
Q30-10 Flow												
0.280	0.50	0.00	0.50	.0186	0.00380	NA	NA	NA	0.07	0.195	24.82	7.00

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
19B	40627	HARGUS 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
0.280	Outfall 001	11.42	3	11.42	3	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
0.280	Outfall 001	1.38	1.5	1.38	1.5	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)		
0.28	Outfall 001	10	10	1.5	1.5	3	3	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
19B	40627	HARGUS CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
0.280	0.012	24.758	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
7.923	0.792	10.000	0.061
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.39	0.256	0.07	1.010
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.120	5.136	Owens	5
Reach Travel Time (days)			
0.230			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.023	2.37	0.07	7.57
0.046	2.35	0.07	7.57
0.069	2.33	0.07	7.57
0.092	2.32	0.07	7.57
0.115	2.30	0.06	7.57
0.138	2.28	0.06	7.57
0.161	2.27	0.06	7.57
0.184	2.25	0.06	7.57
0.207	2.23	0.06	7.57
0.230	2.22	0.06	7.57

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
19B	40627	HARGUS 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)
0.280	Outfall 001	PA0033626	0.012	CBOD5	10		
				NH3-N	1.5	3	
				Dissolved Oxygen			3

ATTACHMENT B

TRC Modeling Results

TRC EVALUATION – Outfall 001

0.37	**= Q stream (cfs)**	**0.5**	**= CV Daily**
0.012	**= Q discharge (MGD)**	**0.5**	**= CV Hourly**
30	**= no. samples**	**0.776**	**= 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)**
	= % Factor of Safety (FOS)		**=Decay Coefficient (K)**

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	**1.3.2.iii**	WLA afc = 4.953	**1.3.2.iii**	WLA cfc = 6.210
PENTOXSD TRG	**5.1a**	LTAMULT afc = 0.373	**5.1c**	LTAMULT cfc = 0.581
PENTOXSD TRG	**5.1b**	LTA_afc= 1.846	**5.1d**	LTA_cfc = 3.610

Source	Reference	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)**