pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

**Southcentral Regional Office**
**CLEAN WATER PROGRAM**

# NPDES PERMIT FACT SHEET
# INDIVIDUAL SEWAGE

| | | | |
|---|---|---|---|
| Application Type | **Renewal** | Application No. | **PA0083151** |
| Facility Type | **Non-Municipal** | APS ID | **12857** |
| Major / Minor | **Minor** | Authorization ID | **1263020** |

## Applicant and Facility Information

| | | | |
|---|---|---|---|
| Applicant Name | **Penn Manor School District** | Facility Name | **Marticville Middle School WWTP** |
| Applicant Address | PO Box 1001 | Facility Address | 356 Frogtown Road |
| | Millersville PA 17551 | | Pequea PA 17565-9742 |
| Applicant Contact | Carl Mathias | Facility Contact | Brian Norris |
| Applicant Phone | (717) 872-9500 | Facility Phone | (610) 593-5710 |
| Client ID | 62059 | Site ID | 239200 |
| Ch 94 Load Status | Not Overloaded | Municipality | Martic Township |
| Connection Status | No Limitations | County | Lancaster |
| Date Application Received | January 30, 2019 | EPA Waived? | Yes |
| Date Application Accepted | March 1, 2019 | If No, Reason | |

Purpose of Application: NPDES Renewal.

## Summary of Review

Penn Manor School District has applied to the Pennsylvania Department of Environmental Protection (DEP) for reissuance of its National Pollutant Discharge Elimination System (NPDES) permit. The permit was issued on July 3, 2014 and became effective on August 1, 2014, authorizing discharge of treated sewage from the existing wastewater treatment plant (WWTP) located in Martic Township, Lancaster County into Pequea Creek. The existing permit expiration date was July 31, 2019, and the permit has been administratively extended since that time. Per the previous fact sheet, the design capacity of the aeration tank is 11,940 gallons, but the WWTP is limited by the chlorine contact tank at the design sewage flow of 0.00945 million gallons per day (mgd).

Changes in this renewal: A monitoring requirement for ammonia-nitrogen was added to the permit.

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.

Supplemental information is attached to this fact sheet.

| Approve | Deny | Signatures | Date |
|---|---|---|---|
| | | Benjamin R. Lockwood / Environmental Engineering Specialist | April 1, 2020 |
| | | Daniel W. Martin, P.E. / Environmental Engineer Manager | |
| | | Maria D. Bebenek, P.E. / Program Manager | |

**Discharge, Receiving Waters and Water Supply Information**

| | | | |
|---|---|---|---|
| Outfall No. | 001 | Design Flow (MGD) | .00945 |
| Latitude | 39º 55' 12.6" | Longitude | 76º 19' 9.7" |
| Quad Name | Conestoga | Quad Code | 1935 |
| Wastewater Description: | Sewage Effluent | | |
| Receiving Waters | Pequea Creek | Stream Code | 07450 |
| NHD Com ID | 57467891 | RMI | 5.55 |
| Drainage Area | 140 $mi^2$ | Yield ($cfs/mi^2$) | 0.158 |
| $Q_{7-10}$ Flow (cfs) | 22.1 | $Q_{7-10}$ Basis | USGS PA StreamStats |
| Elevation (ft) | 222 | Slope (ft/ft) | |
| Watershed No. | 7-K | Chapter 93 Class. | WWF, MF |
| Existing Use | N/A | Existing Use Qualifier | N/A |
| Exceptions to Use | N/A | Exceptions to Criteria | N/A |
| Assessment Status | Impaired | | |
| Cause(s) of Impairment | Pathogens, Habitat Alterations, Siltation | | |
| Source(s) of Impairment | Source Unknown, Habitat Modification – Other than Hydromodification, Agriculture | | |
| TMDL Status | Final, 04/09/2001 | Name | Pequea Creek TMDL |
| Nearest Downstream Public Water Supply Intake | Holtwood Power Plant | | |
| PWS Waters | Susquehanna River | Flow at Intake (cfs) | |
| PWS RMI | | Distance from Outfall (mi) | 10.5 |

Changes Since Last Permit Issuance: USGS PA StreamStats is showing a drainage area of 140 $mi^2$ and a $Q_{7-10}$ flow of 22.1 cfs.

Other Comments: None

| Treatment Facility Summary | | | | |
|---|---|---|---|---|
| **Waste Type** | **Degree of Treatment** | **Process Type** | **Disinfection** | **Avg Annual Flow (MGD)** |
| Sewage | Secondary | Activated Sludge | Hypochlorite | 0.00945 |
| | | | | |
| **Hydraulic Capacity (MGD)** | **Organic Capacity (lbs/day)** | **Load Status** | **Biosolids Treatment** | **Biosolids Use/Disposal** |
| 0.00945 | | Not Overloaded | | |

Changes Since Last Permit Issuance: None

Other Comments: The WWTP process is as follows: Comminutor/Bar Screen – Aeration Tank – Settling Tank – Chlorine Contact Tank - Dechlorination – Aerated Sludge Holding – Outfall 001 to Pequea Creek.

| Compliance History | |
|---|---|
| | |
| **Summary of DMRs:** | A summary of the past 12-month DMR effluent data is presented on the next page of this fact sheet |
| **Summary of Inspections:** | 9/12/2018: A routine inspection was conducted by Tracy Tomtishen and Heather Dock. A walkthrough of the treatment plant was performed. The grates above the aeration tank appeared to have a significant amount of rust and weathering. It was recommended they be replaced due to safety concerns. The clarifier opening sometimes becomes blocked with debris, which was removed and left on the ground near the aeration tank. It was recommended to collect the debris and dispose of it in a dumpster. The clarifier appeared slightly green with some ashing, and the trough had some rust accumulation. The weirs had a small accumulation of debris/algae. The clarifier effluent weir was not functioning properly. Effluent was flowing underneath rather than over the top. Effluent from the chlorine contact tank was clear with some surface scum and a small amount of suspended solids. Field results collected were within permit limits. |

Other Comments: There are no open violations associated with the permittee or facility.

## Compliance History

**DMR Data for Outfall 001 (from March 1, 2019 to February 29, 2020)**

| Parameter | FEB-20 | JAN-20 | DEC-19 | NOV-19 | OCT-19 | SEP-19 | AUG-19 | JUL-19 | JUN-19 | MAY-19 | APR-19 | MAR-19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow (MGD) Average Monthly | 0.000944 | 0.001211 | 0.001179 | 0.001109 | 0.000916 | 0.000794 | 0.000655 | 0.000726 | 0.000203 | 0.000598 | 0.000922 | 0.001046 |
| Flow (MGD) Daily Maximum | 0.0034 | 0.0026 | 0.00320 | 0.00240 | 0.00350 | 0.00250 | 0.00260 | 0.00220 | 0.00130 | 0.00150 | 0.00320 | 0.00280 |
| pH (S.U.) Minimum | 7.01 | 6.99 | 6.72 | 6.75 | 6.84 | 6.75 | 7.42 | 7.60 | 6.80 | 6.80 | 6.90 | 6.81 |
| pH (S.U.) Maximum | 8.01 | 7.54 | 7.20 | 7.36 | 8.06 | 7.92 | 8.29 | 8.60 | 8.65 | 7.24 | 7.55 | 7.29 |
| DO (mg/L) Minimum | 8.0 | 6.9 | 7.6 | 7.7 | 7.4 | 7.4 | 7.3 | 7.6 | 7.0 | 7.3 | 7.0 | 7.7 |
| TRC (mg/L) Average Monthly | 0.305 | 0.443 | 0.357 | 0.326 | 0.281 | 0.311 | 0.252 | 0.192 | 0.268 | 0.280 | 0.238 | 0.265 |
| TRC (mg/L) Instantaneous Maximum | 0.96 | 1.4 | 0.49 | 0.51 | 0.39 | 0.41 | 0.41 | 0.38 | 0.47 | 0.45 | 0.40 | 0.42 |
| CBOD5 (mg/L) Average Monthly | < 4.65 | 4.3 | 11.15 | < 2 | < 2.65 | 2.95 | < 3.75 | < 2.3 | < 2.25 | < 2 | 2.15 | < 2.95 |
| TSS (mg/L) Average Monthly | 21.5 | 21.5 | 21 | 15 | < 12 | 17.5 | 25 | 22.5 | 17.5 | < 6 | 9.5 | 16 |
| Fecal Coliform (CFU/100 ml) Geometric Mean | < 16.7 | 14.4 | < 1.4 | < 1 | < 1.4 | < 2.8 | < 1 | < 1 | < 1.4 | 15.4 | < 12.6 | < 1 |
| Fecal Coliform (CFU/100 ml) Instantaneous Maximum | 280 | 16 | 2 | < 1 | 2 | 8 | < 1 | < 1 | 2 | 118 | 160 | < 1 |
| Nitrate-Nitrite (mg/L) Annual Average | | | | | | 78.0 | | | | | | |
| Nitrate-Nitrite (lbs) Total Annual | | | | | | 11.1 | | | | | | |
| Total Nitrogen (mg/L) Annual Average | | | | | | < 79.0 | | | | | | |
| Total Nitrogen (lbs) Total Annual | | | | | | < 11.3 | | | | | | |
| TKN (mg/L) Annual Average | | | | | | < 1.0 | | | | | | |
| TKN (lbs) Total Annual | | | | | | < 0.14 | | | | | | |
| Total Phosphorus (mg/L) Annual Average | | | | | | 11.2 | | | | | | |
| Total Phosphorus (lbs) Total Annual | | | | | | 1.60 | | | | | | |

## Existing Effluent Limitations and Monitoring Requirements

The tables below summarize the effluent limits and monitoring requirements implemented in the existing NPDES permit.

**Outfall 001**

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) | | Concentrations (mg/L) | | | | Minimum Measurement Frequency | Required Sample Type |
| | Average Monthly | Total Annual | Minimum | Average Monthly | Maximum | Instant. Maximum | | |
| Flow (MGD) | Report | Report Daily Max | XXX | XXX | XXX | XXX | 1/week | Measured |
| pH (S.U.) | XXX | XXX | 6.0 Inst Min | XXX | XXX | 9.0 | 1/day | Grab |
| DO | XXX | XXX | 5.0 Inst Min | XXX | XXX | XXX | 1/day | Grab |
| TRC | XXX | XXX | XXX | 0.50 | XXX | 1.6 | 1/day | Grab |
| CBOD5 | XXX | XXX | XXX | 25 | XXX | 50 | 2/month | 8-Hr Composite |
| TSS | XXX | XXX | XXX | 30 | XXX | 60 | 2/month | 8-Hr Composite |
| Fecal Coliform (No./100 ml) Oct 1 - Apr 30 | XXX | XXX | XXX | 2,000 Geo Mean | XXX | 10,000 | 2/month | Grab |
| Fecal Coliform (No./100 ml) May 1 - Sep 30 | XXX | XXX | XXX | 200 Geo Mean | XXX | 1,000 | 2/month | Grab |
| TKN (lbs/year) | XXX | Report | XXX | Report Annl Avg | XXX | XXX | 1/year | 8-Hr Composite |
| Nitrate-Nitrite (lbs/year) | XXX | Report | XXX | Report Annl Avg | XXX | XXX | 1/year | 8-Hr Composite |
| Total Nitrogen (lbs/year) | XXX | Report | XXX | Report Annl Avg | XXX | XXX | 1/year | Calculation |
| Total Phosphorus (lbs/year) | XXX | Report | XXX | Report Annl Avg | XXX | XXX | 1/year | 8-Hr Composite |

Compliance Sampling Location: Outfall 001

## Development of Effluent Limitations

**Outfall No.** 001 **Design Flow (MGD)** .00945
**Latitude** 39º 55' 12.6" **Longitude** 76º 19' 9.7"
**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) |

### Water Quality-Based Limitations

Pursuant to 40 CFR § 122.44(d)(1)(i), more stringent requirements should be considered when pollutants are discharged at the levels which have the reasonable potential to cause or contribute to excursions above water quality standards.

WQM 7.0 ver. 1.0b is a water quality model designed to assist DEP in determining appropriate water quality based effluent limits (WQBELs) for carbonaceous biochemical oxygen demand ($CBOD_5$), ammonia ($NH_3$-N), and dissolved oxygen (D.O.). The model simulates two basic processes: In the $NH_3$-N module, the model simulates the mixing and degradation of $NH_3$-N in the stream and compares calculated instream $NH_3$-N concentrations to $NH_3$-N water quality criteria. In the D.O. module, the model simulates the mixing and consumption of D.O. in the stream due to the degradation of $CBOD_5$ and $NH_3$-N and compares calculated instream D.O. concentrations to D.O. water quality criteria. The model then determines the highest pollutant loadings that the stream can assimilate while still meeting water quality criteria under design conditions. DEP's Technical Guidance No. 391-2000-007 provides the technical methods contained in WQM 7.0 for determining wasteload allocations and for determining recommended NPDES effluent limits for point source discharges.

The model was utilized for this permit application. The flow data used to run the model was acquired from USGS PA StreamStats and is included in an attachment. Default stream pH and temperature inputs were used for this model run. The model output indicated a $CBOD_5$ average monthly limit of 25 mg/l, an $NH_3$-N average monthly limit of 25 mg/l, and a D.O. minimum limit of 5.0 mg/l were protective of water quality. The $CBOD_5$ limit is the same as the existing limit, which will remain in the permit. Per DEP's SOP No. BCW-PMT-033, for existing discharges, if WQM modeling results indicate that an average monthly limit of 25 mg/l is acceptable, a year-round monitoring requirement for ammonia-nitrogen should be established at a minimum. Therefore, a monitoring requirement for $NH_3$-N has been added to the permit.

There are no industrial/commercial users contributing industrial wastewater to the system and Penn Manor School District does not currently have an EPA-approved pretreatment program. Accordingly, evaluating reasonable potential of toxic pollutants is not necessary as effluent levels of toxic pollutants are expected to be insignificant.

## Best Professional Judgement (BPJ) Limitations

Dissolved Oxygen (D.O.)

A minimum D.O. limit of 5.0 mg/L is a D.O. water quality criterion found in 25 Pa. Code § 93.7(a). This limit is included in the existing NPDES permit. This limit will remain in the permit to ensure that the facility continues to achieve compliance with DEP water quality standards.

Total Residual Chlorine

The attached computer printout utilizes the equations and calculations as presented in the Department's May 1, 2003 Implementation Guidance for Total Residual Chlorine (TRC) (ID No. 391-2000-015) for developing chlorine limitations. The Guidance references Chapter 92, Section 92.2d (3) which establishes a standard BAT limit of 0.5 mg/l unless a facility-specific BAT has been developed. The attached printout indicates that a water quality limit of 0.5 mg/l would be needed to prevent toxicity concerns. It is recommended that a TRC limit of 0.5 mg/l monthly average and 1.6 mg/l instantaneous maximum be applied this permit cycle, the same as the existing limit.

## Additional Considerations

Chesapeake Bay Total Maximum Daily Load (TMDL)

DEP developed a strategy to comply with the EPA and Chesapeake Bay Foundation requirements by reducing point source loadings of Total Nitrogen (TN) and Total Phosphorus (TP). This strategy can be located in the *Pennsylvania Chesapeake Watershed Implementation Plan* (WIP), dated January 11, 2011. Subsequently, an update to the WIP was published as the Phase 2 WIP. As part of the Phase 2 WIP, a *Phase 2 Watershed Implementation Plan Wastewater Supplement* (Phase 2 Supplement) was developed, providing an update on TMDL implementation for point sources and DEP's current implementation strategy for wastewater. A new update to the WIP was published as the Phase 3 WIP in August 2019. As part of the Phase 3 WIP, a *Phase 3 Watershed Implementation Plan Wastewater Supplement* (Phase 3 Supplement) was developed, and was most recently revised on December 17, 2019, and is the basis for the development of any Chesapeake Bay related permit parameters. Sewage discharges have been prioritized based on their design flow to the Bay. The highest priority (Phases 1, 2, and 3) dischargers will receive annual Cap Loads based on their design flow on August 29, 2005 and concentrations of 6 mg/l TN and 0.8 mg/l TP. These limits may be achieved through a combination of treatment technology, credits, or offsets. For Phase 4 and 5 facilities, Cap Loads are not currently being implemented for renewed or amended permits for facilities that do not increase design flow.

This facility is considered a Phase 5 non-significant discharger with a design flow less than 0.2 MGD but greater than 0.002 MGD. According to DEP's latest-revised Phase 3 Supplement, issuance of permits with monitoring and reporting for TN and TP is recommended for any Phase 5 non-significant sewage facilities (i.e., facilities with average annual design flows on August 29, 2005 less than 0.2 MGD but greater than 0.002 MGD). Furthermore, DEP's SOP No. BCW-PMT-033 states that in general, at a minimum, monitoring for TN and TP should be included in new and reissued permits for sewage discharges with design flows > 2,000 gpd. Therefore, TN and TP monitoring will be included in the renewed permit, which is consistent with the existing permit.

Pequea Creek TMDL

A TMDL exists for Pequea Creek for phosphorus and sediment. The TMDL was completed and approved on April 9, 2001 and was revised in 2006. The TMDL does not include any wasteload allocations for this facility. After a review of the Pequea Creek TMDL, the Marticville Middle School WWTP is located outside of the area of the Pequea Creek Watershed targeted for TMDL development. This was determined by referencing Figure 2 of the TMDL, which documents the boundary of the Watershed. Therefore, it is not necessary for the permit to include any TMDL requirements. This is consistent with the existing permit. A copy of Figure 2 from the TMDL is attached.

Anti-Degradation (93.4)

The effluent limits for this discharge have been developed to ensure that existing instream water uses and the level of water quality necessary to protect the existing uses are maintained and protected. No High Quality Waters are impacted by this discharge. No Exceptional Value Waters are impacted by this discharge.

303d Listed Streams

The discharge is located on a stream segment that is designated on the 303(d) list as impaired. There is a recreational impairment for pathogens due to an unknown source. There is an aquatic life impairment for habitat modification – other than hydromodification due to habitat alterations, and for agriculture due to siltation. The permit includes a limit for fecal coliform, and will not contribute to the other impairments.

Class A Wild Trout Fisheries

No Class A Wild Trout Fisheries are impacted by this discharge.

Anti-Backsliding

Pursuant to 40 CFR § 122.44(l)(1), all proposed permit requirements addressed in this fact sheet are at least as stringent as the requirements implemented in the existing NPDES permit unless any exceptions addressed by DEP in this fact sheet.

## 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) | | Concentrations (mg/L) | | | | Minimum Measurement Frequency | Required Sample Type |
| | Average Monthly | Total Annual | Minimum | Average Monthly | Maximum | Instant. Maximum | | |
| Flow (MGD) | Report | Report Daily Max | XXX | XXX | XXX | XXX | 1/week | Measured |
| pH (S.U.) | XXX | XXX | 6.0 Inst Min | XXX | XXX | 9.0 | 1/day | Grab |
| DO | XXX | XXX | 5.0 Inst Min | XXX | XXX | XXX | 1/day | Grab |
| TRC | XXX | XXX | XXX | 0.50 | XXX | 1.6 | 1/day | Grab |
| CBOD5 | XXX | XXX | XXX | 25 | XXX | 50 | 2/month | 8-Hr Composite |
| TSS | XXX | XXX | XXX | 30 | XXX | 60 | 2/month | 8-Hr Composite |
| Fecal Coliform (No./100 ml) Oct 1 - Apr 30 | XXX | XXX | XXX | 2,000 Geo Mean | XXX | 10,000 | 2/month | Grab |
| Fecal Coliform (No./100 ml) May 1 - Sep 30 | XXX | XXX | XXX | 200 Geo Mean | XXX | 1,000 | 2/month | Grab |
| Ammonia-N | XXX | XXX | XXX | Report | XXX | XXX | 2/month | 8-Hr Composite |
| TKN (lbs/year) | XXX | Report | XXX | Report Annl Avg | XXX | XXX | 1/year | 8-Hr Composite |
| Nitrate-Nitrite (lbs/year) | XXX | Report | XXX | Report Annl Avg | XXX | XXX | 1/year | 8-Hr Composite |
| Total Nitrogen (lbs/year) | XXX | Report | XXX | Report Annl Avg | XXX | XXX | 1/year | Calculation |
| Total Phosphorus (lbs/year) | XXX | Report | XXX | Report Annl Avg | XXX | XXX | 1/year | 8-Hr Composite |

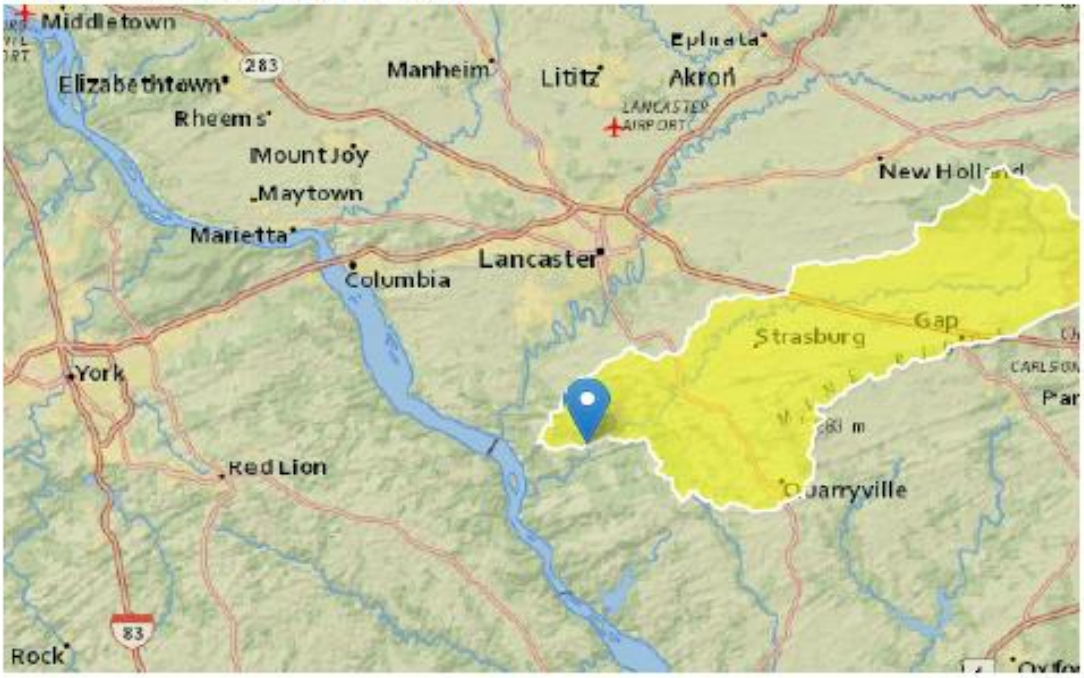
Compliance Sampling Location: Outfall 001

Other Comments: None

| Tools and References Used to Develop Permit | |
|---|---|
| | |
| ☒ | WQM for Windows Model (see Attachment ) |
| ☐ | PENTOXSD for Windows Model (see Attachment ) |
| ☒ | TRC Model Spreadsheet (see Attachment ) |
| ☐ | Temperature Model Spreadsheet (see Attachment ) |
| ☐ | Toxics Screening Analysis 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: |

# Marticville Middle School PA0083151 Outfall 001

**Region ID:** PA
**Workspace ID:** PA20200319122147590000
**Clicked Point (Latitude, Longitude):** 39.91976, -76.31922
**Time:** 2020-03-19 08:22:07 -0400




Basin Characteristics

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| DRNAREA | Area that drains to a point on a stream | 140 | square miles |
| BSLOPD | Mean basin slope measured in degrees | 4 | degrees |
| ROCKDEP | Depth to rock | 5.3 | feet |

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| URBAN | Percentage of basin with urban development | 3 | percent |

Low-Flow Statistics Parameters[Low Flow Region 1]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|---|---|---|---|---|---|
| DRNAREA | Drainage Area | 140 | square miles | 4.78 | 1150 |
| BSLOPD | Mean Basin Slope degrees | 4 | degrees | 1.7 | 6.4 |
| ROCKDEP | Depth to Rock | 5.3 | feet | 4.13 | 5.21 |
| URBAN | Percent Urban | 3 | percent | 0 | 89 |

Low-Flow Statistics Disclaimers[Low Flow Region 1]

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 1]

| Statistic | Value | Unit |
|---|---|---|
| 7 Day 2 Year Low Flow | 39.6 | ft^3/s |
| 30 Day 2 Year Low Flow | 48.6 | ft^3/s |
| 7 Day 10 Year Low Flow | 22.1 | ft^3/s |
| 30 Day 10 Year Low Flow | 26.8 | ft^3/s |
| 90 Day 10 Year Low Flow | 39.4 | ft^3/s |

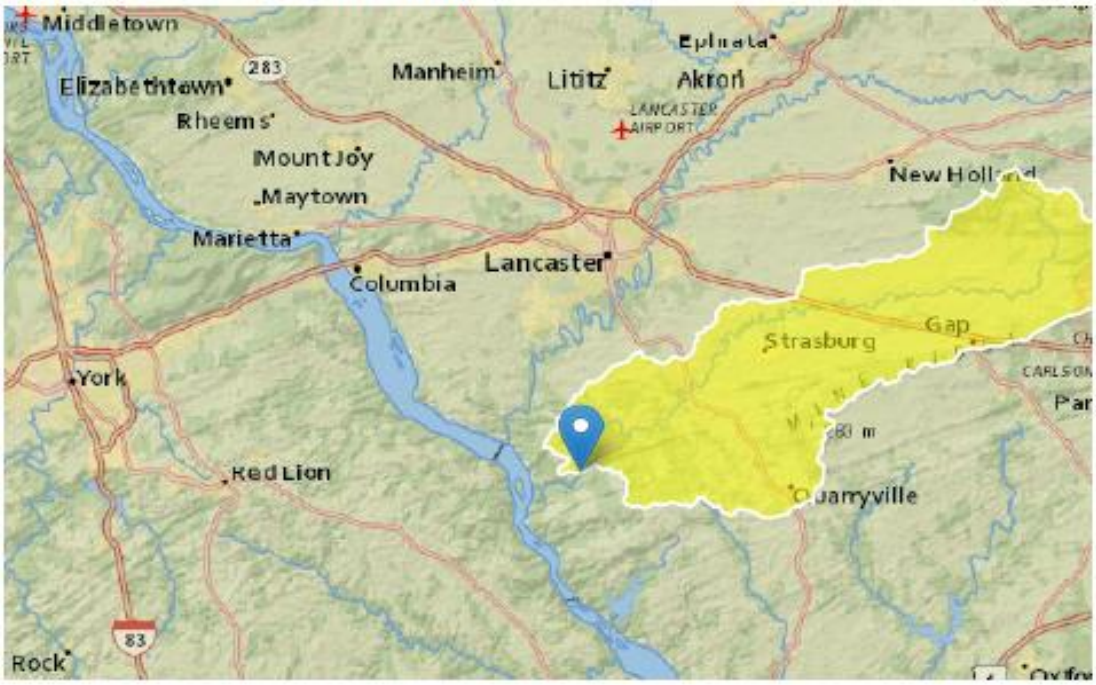
*Low-Flow Statistics Citations*

**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/)**

Application Version: 4.3.11

# Marticville Middle School PA0083151 Downstream Pt.

**Region ID:** PA
**Workspace ID:** PA20200319122515514000
**Clicked Point (Latitude, Longitude):** 39.90588, -76.32824
**Time:** 2020-03-19 08:25:34 -0400




Basin Characteristics

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| DRNAREA | Area that drains to a point on a stream | 148 | square miles |
| BSLOPD | Mean basin slope measured in degrees | 4.2 | degrees |
| ROCKDEP | Depth to rock | 5.3 | feet |

| Parameter Code | Parameter Description | Value | Unit |
|---|---|---|---|
| URBAN | Percentage of basin with urban development | 3 | percent |

Low-Flow Statistics Parameters[Low Flow Region 1]

| Parameter Code | Parameter Name | Value | Units | Min Limit | Max Limit |
|---|---|---|---|---|---|
| DRNAREA | Drainage Area | 148 | square miles | 4.78 | 1150 |
| BSLOPD | Mean Basin Slope degrees | 4.2 | degrees | 1.7 | 6.4 |
| ROCKDEP | Depth to Rock | 5.3 | feet | 4.13 | 5.21 |
| URBAN | Percent Urban | 3 | percent | 0 | 89 |

Low-Flow Statistics Disclaimers[Low Flow Region 1]

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 1]

| Statistic | Value | Unit |
|---|---|---|
| 7 Day 2 Year Low Flow | 44.5 | ft^3/s |
| 30 Day 2 Year Low Flow | 54.1 | ft^3/s |
| 7 Day 10 Year Low Flow | 25.3 | ft^3/s |
| 30 Day 10 Year Low Flow | 30.4 | ft^3/s |
| 90 Day 10 Year Low Flow | 43.5 | ft^3/s |

*Low-Flow Statistics Citations*

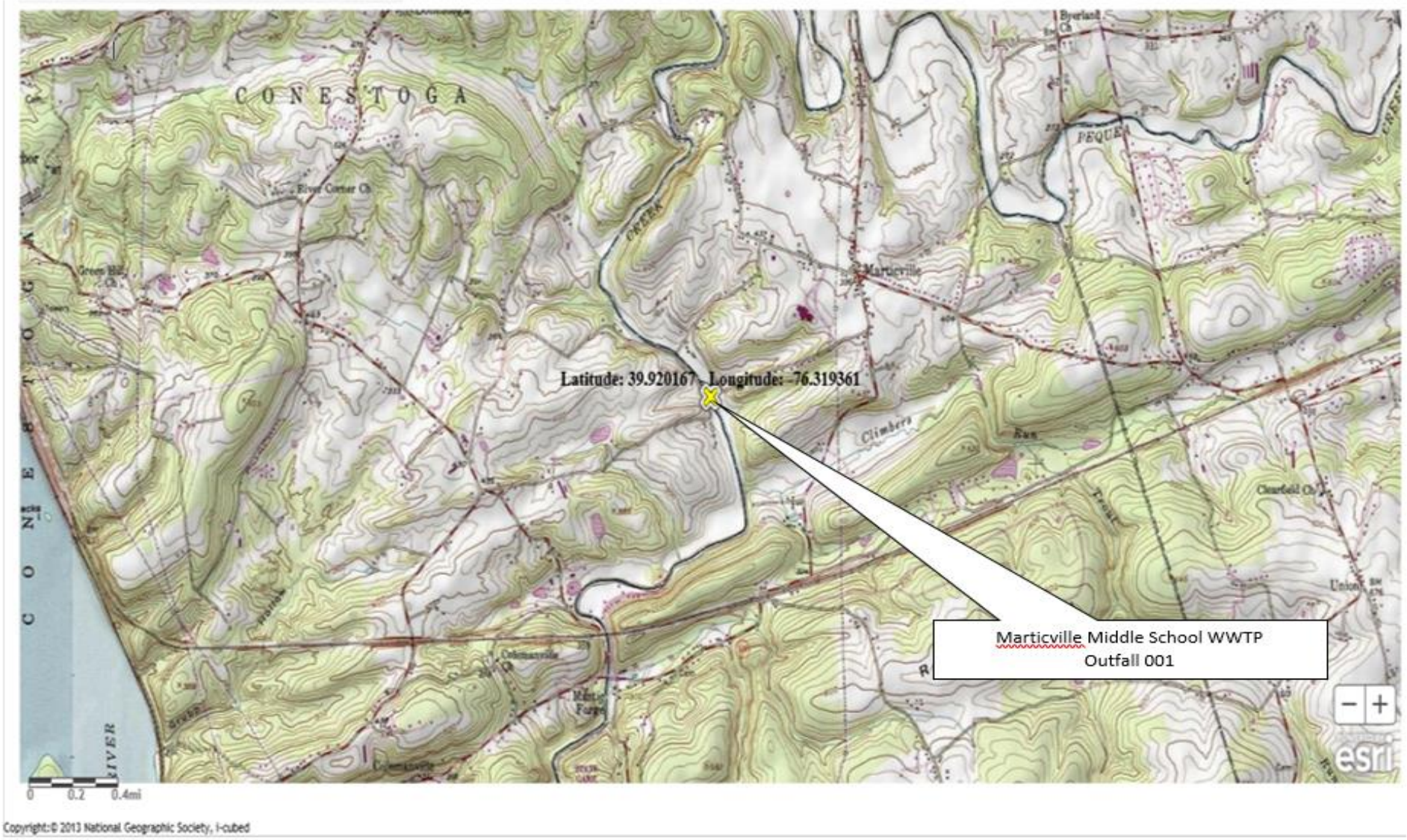
**Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)**

**Permit No. PA0083151**





Application Version: 4.3.11


CONESTOGA
Latitude: 39.920167, Longitude: -76.319361
Marticville Middle School WWTP
Outfall 001
esri
0 0.2 0.4mi
Copyright:© 2013 National Geographic Society, i-cubed

## 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 |
|---|---|---|---|---|---|---|---|---|
| 07K | 7450 | PEQUEA CREEK | 5.550 | 222.00 | 140.00 | 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 | 0.100 | 0.00 | 22.10 | 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 |
|---|---|---|---|---|---|---|---|
| Marticville MS | PA0083151 | 0.0094 | 0.0094 | 0.0094 | 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 | 5.00 | 8.24 | 0.00 | 0.00 |
| NH3-N | 25.00 | 0.00 | 0.00 | 0.70 |

**Permit No. PA0083151**

## 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 |
|---|---|---|---|---|---|---|---|---|
| 07K | 7450 | PEQUEA CREEK | 3.770 | 212.00 | 148.00 | 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 | 0.100 | 0.00 | 25.30 | 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 | 0.00 | 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. PA0083151**

## WQM 7.0 Hydrodynamic Outputs

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07K | 7450 | PEQUEA 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** | | | | | | | | | | | | |
| 5.550 | 22.10 | 0.00 | 22.10 | .0146 | 0.00106 | .869 | 72.15 | 83.04 | 0.35 | 0.308 | 20.00 | 7.00 |
| **Q1-10 Flow** | | | | | | | | | | | | |
| 5.550 | 14.14 | 0.00 | 14.14 | .0146 | 0.00106 | NA | NA | NA | 0.27 | 0.396 | 20.01 | 7.00 |
| **Q30-10 Flow** | | | | | | | | | | | | |
| 5.550 | 30.06 | 0.00 | 30.06 | .0146 | 0.00106 | NA | NA | NA | 0.42 | 0.260 | 20.00 | 7.00 |

Wednesday, April 1, 2020 Version 1.0b Page 1 of 1

**Permit No. PA0083151**

## 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 | | |

Wednesday, April 1, 2020 Version 1.0b Page 1 of 1

**Permit No. PA0083151**

# WQM 7.0 Wasteload Allocations

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07K | 7450 | PEQUEA 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 |
|---|---|---|---|---|---|---|---|
| 5.550 | Marticville MS | 9.67 | 50 | 9.67 | 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 |
|---|---|---|---|---|---|---|---|
| 5.550 | Marticville MS | 1.92 | 25 | 1.92 | 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) | | |
| 5.55 | Marticville MS | 25 | 25 | 25 | 25 | 5 | 5 | 0 | 0 |

**Permit No. PA0083151**

## WQM 7.0 D.O.Simulation

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07K | 7450 | PEQUEA CREEK |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 5.550 | 0.009 | 20.003 | 7.000 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 72.147 | 0.869 | 83.037 | 0.353 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 2.02 | 0.010 | 0.02 | 0.700 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 8.241 | 2.562 | Tsivoglou | 5 |
| **Reach Travel Time (days)** | | | |
| 0.308 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.031 | 2.01 | 0.02 | 8.24 |
| 0.062 | 2.01 | 0.02 | 8.24 |
| 0.093 | 2.01 | 0.02 | 8.24 |
| 0.123 | 2.01 | 0.02 | 8.24 |
| 0.154 | 2.01 | 0.01 | 8.24 |
| 0.185 | 2.01 | 0.01 | 8.24 |
| 0.216 | 2.01 | 0.01 | 8.24 |
| 0.247 | 2.01 | 0.01 | 8.24 |
| 0.278 | 2.01 | 0.01 | 8.24 |
| 0.308 | 2.01 | 0.01 | 8.24 |

**Permit No. PA0083151**

## WQM 7.0 Effluent Limits

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 07K | 7450 | PEQUEA CREEK |

| RMI | Name | Permit Number | Disc Flow (mgd) | Parameter | Eff. Limit 30-day Ave. (mg/L) | Eff. Limit Maximum (mg/L) | Eff. Limit Minimum (mg/L) |
|---|---|---|---|---|---|---|---|
| 5.550 | Marticville MS | PA0083151 | 0.009 | CBOD5 | 25 | | |
| | | | | NH3-N | 25 | 50 | |
| | | | | Dissolved Oxygen | | | 5 |

Wednesday, April 1, 2020 Version 1.0b Page 1 of 1

**Permit No. PA0083151**

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | **TRC EVALUATION** | | | | | | | |
| 2 | Input appropriate values in A3:A9 and D3:D9 | | | | | | | |
| 3 | 22.1 | = Q stream (cfs) | | 0.5 | = CV Daily | | | |
| 4 | 0.00945 | = Q discharge (MGD) | | 0.5 | = CV Hourly | | | |
| 5 | 30 | = no. samples | | 1 | = AFC_Partial Mix Factor | | | |
| 6 | 0.3 | = Chlorine Demand of Stream | | 1 | = CFC_Partial Mix Factor | | | |
| 7 | 0 | = Chlorine Demand of Discharg | | 15 | = AFC_Criteria Compliance Time (min) | | | |
| 8 | 0.5 | = BAT/BPJ Value | | 720 | = CFC_Criteria Compliance Time (min) | | | |
| 9 | 0 | = % Factor of Safety (FOS) | | | =Decay Coefficient (K) | | | |
| 10 | Source | Reference | AFC Calculations | | Reference | CFC Calculations | | |
| 11 | TRC | 1.3.2.iii | WLA afc = 482.256 | | 1.3.2.iii | WLA cfc = 470.155 | | |
| 12 | PENTOXSD TRG | 5.1a | LTAMULT afc = 0.373 | | 5.1c | LTAMULT cfc = 0.581 | | |
| 13 | PENTOXSD TRG | 5.1b | LTA_afc= 179.700 | | 5.1d | LTA_cfc = 273.326 | | |
| 14 | | | | | | | | |
| 15 | Source | | Effluent Limit Calculations | | | | | |
| 16 | PENTOXSD TRG | 5.1f | AML MULT = 1.231 | | | | | |
| 17 | PENTOXSD TRG | 5.1g | AVG MON LIMIT (mg/l) = 0.500 | | BAT/BPJ | | | |
| 18 | | | INST MAX LIMIT (mg/l) = 1.635 | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| 22 | WLA afc | | **(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))...** | | | | | |
| 23 | | | **...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)** | | | | | |
| 24 | LTAMULT afc | | EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5) | | | | | |
| 25 | LTA_afc | | wla_afc*LTAMULT_afc | | | | | |
| 26 | | | | | | | | |
| 27 | **WLA_cfc** | | **(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc) )...** | | | | | |
| 28 | | | **...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)** | | | | | |
| 29 | LTAMULT_cfc | | EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5) | | | | | |
| 30 | **LTA_cfc** | | wla_cfc*LTAMULT_cfc | | | | | |
| 31 | | | | | | | | |
| 32 | AML MULT | | EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1)) | | | | | |
| 33 | AVG MON LIMIT | | MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT) | | | | | |
| 34 | INST MAX LIMIT | | **1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)** | | | | | |
| 35 | | | | | | | | |
| 36 | | | | | | | | |
| 37 | | | | | | | | |
| 38 | | | | | | | | |
| 39 | | | | | | | | |
| 40 | | | | | | | | |
| 41 | **(0.011/EXP(-K*CFC_tc/1440))+(((CFC_Yc*Qs*0.011)/(1.547*Qd)....** | | | | | | | |
| 42 | **....*EXP(-K*CFC_tc/1440)))+Xd+(CFC_Yc*Qs*Xs/1.547*Qd))*(1-FOS/100)** | | | | | | | |
| 43 | | | | | | | | |
| 44 | | | | | | | | |
| 45 | | | | | | | | |
| 46 | | | | | | | | |
| 47 | | | | | | | | |