pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

| | | | |
|---|---|---|---|
| Application Type | **Renewal** | Application No. | **PA0038920** |
| Facility Type | **Municipal** | APS ID | **28391** |
| Major / Minor | **Minor** | Authorization ID | **1336587** |

# NPDES PERMIT FACT SHEET
# INDIVIDUAL SEWAGE

## Applicant and Facility Information

| | | | |
|---|---|---|---|
| Applicant Name | **Burnham Borough Authority** | Facility Name | **Burnham Borough STP** |
| Applicant Address | 200 1st Avenue | Facility Address | 80 Railroad Street |
| | Burnham, PA 17009-1640 | | Burnham, PA 17009 |
| Applicant Contact | Robert Knepp | Facility Contact | David Rheinholder |
| Applicant Phone | (717) 248-2692 | Facility Phone | (717) 248-6351 |
| Client ID | 62129 | Site ID | 251524 |
| Ch 94 Load Status | Not Overloaded | Municipality | Burnham Borough |
| Connection Status | No Limitations | County | Mifflin |
| Date Application Received | December 15, 2020 | EPA Waived? | No |
| Date Application Accepted | December 30, 2020 | If No, Reason | , DEP Discretion |

Purpose of Application: NPDES permit renewal for discharge of treated sewage

## Summary of Review

### 1.0 General Discussion

This factsheet supports the renewal of an existing NPDES permit for discharge of treated domestic wastewater from Burnham Borough Authority (Authority) wastewater treatment plant. The Authority owns, operates, and maintains the wastewater treatment plant located in Burnham Borough, Mifflin County. The facility receives flows from Burnham Borough and portion Derry Township There are 3 pump stations within the collection system located at Beech Street, Logan Boulevard and Orchard Grove Avenue. The last combined sewer overflow in the collection system was eliminated in 2014. The facility is sequential Batch Reactor with a design annual average flow of 0.64 MGD, hydraulic design of capacity of 0.90MGD and an organic design capacity of 1,140lbs/day. The facility discharges to Kishacoquillas Creek which is designated for High-Quality cold-water fishes and migratory fishes. The existing NPDES permit was issued on March 23, 2016 with an expiration date of March 30, 2021. The facility is currently operating under the terms and conditions in the existing permit pending Department action on the renewal application. A topographic map showing the discharge location is presented in attachment A.

### 1.1 Sludge use and disposal description and location(s):

Digested sludge is dewatered using reed beds. Reeds beds are cleaned periodically to removed solids to a landfill. Liquid sludge is hauled out as needed by license hauler.

### 1.2 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

| Approve | Deny | Signatures | Date |
|---|---|---|---|
| X | | *J. Pascal Kwedza*<br>J. Pascal Kwedza, P.E. / Environmental Engineer | January 4, 2022 |
| X | | Daniel W. Martin<br>Daniel W. Martin, P.E. / Environmental Engineer Manager | January 16, 2022 |

**Summary of Review**

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.

**1.3 Changes to Existing Permit**

Quarterly monitoring of E.Coli has been added to the permit

**1.4 Existing Limit and Monitoring Requirements**

| DISCHARGE LIMITATIONS | | | | | | | | MONITORING REQUIREMENTS | |
|---|---|---|---|---|---|---|---|---|---|
| | Mass Units lbs/day | | | Concentrations mg/l | | | | | |
| Discharge Parameter | Average Monthly | Average Weekly | Maximum Daily | Average Monthly | Average Weekly | Maximum Daily | Inst. Maximum | Monitoring Frequency | Sample Type |
| Flow (mgd) | Monitor & Report | XXX | Monitor & Report | XXX | XXX | XXX | XXX | continuous | measured |
| pH (S.U.) | XXX | XXX | XXX | From 6.0 to 9.0 inclusive | | | | 1/day | Grab |
| D.O. | XXX | XXX | XXX | Minimum of 5.0 mg/l at all times | | | | 1/day | Grab |
| TRC | XXX | XXX | XXX | 0.5 | XXX | XXX | 1.6 | 1/day | Grab |
| TSS | 160 | 240 | XXX | 30 | 45 | XXX | 60 | 1/week | 24-hour comp |
| $CBOD_5$ | 133 | 200 | XXX | 25 | 40 | XXX | 50 | 1/week | 24-hour comp |
| $NH_3$-N (5/1 to 10/31) | 70 | XXX | XXX | 14 | XXX | XXX | XXX | 1/week | 24-hour comp |
| $NH_3$-N (11/1 to 4/30) | Report | XXX | XXX | Report | XXX | XXX | XXX | 1/week | 24-hour comp |
| Total Phos. | Report | XXX | XXX | Report | XXX | XXX | 4.0 | 2/week | 24-hour comp |
| Fecal Col. (5/1 to 9/30) | XXX | XXX | XXX | 200 | XXX | 1000 | XXX | 1/week | Grab |
| Fecal Col. (10/1 to 4/30) | XXX | XXX | XXX | 2000 | XXX | 10000 | XXX | 1/week | Grab |

**Summary of Review**

**1.4.1 Chesapeake Bay Permit Requirements**

| Discharge Parameter | Effluent Limitations | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|
| | Mass Load(lbs) | | Concentrations (mg/l) | | | | |
| | Monthly | Annual | Minimum | Monthly Average | Maximum | Minimum Measurement Frequency | Required Sample Type |
| Ammonia---N | Report | Report | XXX | Report | XXX | 2/week | 24-hr Comp |
| Kjeldahl---N | Report | XXX | XXX | Report | XXX | 2/Week | 24-hr Comp |
| Nitrate-Nitrite as N | Report | XXX | XXX | Report | XXX | 2/Week | 24-hr Comp |
| Total Nitrogen | Report | Report | XXX | Report | XXX | 1/Month | Calculate |
| Total Phosphorus | Report | Report | XXX | Report | XXX | 2/week | 24-hr Comp |
| Net Total Nitrogen | Report | 11689 | XXX | XXX | XXX | 1/Month | Calculate |
| Net Total Phos. | Report | 1559 | XXX | XXX | XXX | 1/Month | Calculate |

## 1.5 Discharge, Receiving Waters and Water Supply Information

| | | | |
|---|---|---|---|
| Outfall No. | 001 | Design Flow (MGD) | .64 |
| Latitude | 40º 37' 46.39" | Longitude | -77º 33' 48.42" |
| Quad Name | | Quad Code | |
| Wastewater Description: | Sewage Effluent | | |
| Receiving Waters | Kishacoquillas Creek (HQ-CWF) | Stream Code | 12429 |
| NHD Com ID | 66204601 | RMI | 3.749 |
| Drainage Area | 174 | Yield (cfs/mi$^2$) | 0.113 |
| $Q_{7-10}$ Flow (cfs) | 19.66 | $Q_{7-10}$ Basis | USGS Gage Station |
| Elevation (ft) | 495 | Slope (ft/ft) | |
| Watershed No. | 12-A | Chapter 93 Class. | HQ-CWF |
| 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 | |

| Background/Ambient Data | | Data Source |
|---|---|---|
| pH (SU) | | |
| Temperature (°F) | | |
| Hardness (mg/L) | | |
| Other: | | |

| | | | |
|---|---|---|---|
| Nearest Downstream Public Water Supply Intake | Mifflintown Municipal Authority | | |
| PWS Waters | | Flow at Intake (cfs) | |
| PWS RMI | | Distance from Outfall (mi) | 13 |

Changes Since Last Permit Issuance: None

### 1.5.1 Water Supply Intake:

The nearest downstream public water supply intake is about 13 miles downstream by Mifflintown Municipal Authority on Juniata River in Mifflintown, Juniata County

| | | |
|---|---|---|
| Kishacoquillas Creek (12429) From Discharge to Juniata River | (RMI 3.749 – 0.00) | 3.749 mi |
| Juniata River (11414) Juniata River to intake | (RMI 46.56 – 37.26) | 9.30 mi |
| | | 13.53 mi |

Because of distance and dilution, the discharge is not expected to have an effect on the water supply.

**2.0 Treatment Facility Summary**

**Treatment Facility Name:** Burnham STP

| WQM Permit No. | Issuance Date |
|---|---|
| 4487402 12-1 | 11/13/2012 |
| 4487402 11-1 | 02/22/2012 |

| Waste Type | Degree of Treatment | Process Type | Disinfection | Avg Annual Flow (MGD) |
|---|---|---|---|---|
| Sewage | Secondary | Sequencing Batch Reactor | Chlorine | 0.64 |

| Hydraulic Capacity (MGD) | Organic Capacity (lbs/day) | Load Status | Biosolids Treatment | Biosolids Use/Disposal |
|---|---|---|---|---|
| 0.9 | 1,140 | Not Overloaded | Aerobic digestion | Reed bed/disposal offsite |

Changes Since Last Permit Issuance: None

## 2.1 Treatment Facility Description

The treatment facility consists of fine screen with comminutor bypass, influent pump chamber with 3 pumps, grit removal unit, 2 SBR units with 2 post Equalization tanks, 2 chlorine contact tanks for disinfection and 2 aerobic tanks for digestion with 3 reed beds.

## 2.2 Treatment Chemicals

- Sodium Hypochlorite for disinfection.
- Delpac.
- Soda ash for alkalinity or pH adjustment as needed

## 3.0 Compliance History

### 3.1 DMR Data for Outfall 001 (from November 1, 2020 to October 31, 2021)

| Parameter | OCT-21 | SEP-21 | AUG-21 | JUL-21 | JUN-21 | MAY-21 | APR-21 | MAR-21 | FEB-21 | JAN-21 | DEC-20 | NOV-20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow (MGD) Average Monthly | 0.381 | 0.945 | 0.393 | 0.381 | 0.301 | 0.313 | 0.296 | 0.425 | 0.409 | 0.347 | 0.436 | 0.276 |
| Flow (MGD) Daily Maximum | 0.793 | 3.336 | 1.470 | 0.973 | 0.778 | 0.626 | 0.526 | 1.185 | 1.508 | 0.786 | 2.268 | 0.0970 |
| pH (S.U.) Minimum | 7.3 | 6.9 | 7.4 | 7.2 | 7.5 | 7.6 | 7.1 | 7.2 | 7.4 | 7.5 | 7.0 | 7.0 |
| pH (S.U.) Maximum | 7.9 | 7.9 | 7.9 | 8.0 | 8.0 | 7.9 | 7.9 | 8.1 | 8.1 | 8.1 | 8.5 | 7.8 |
| DO (mg/L) Minimum | 8.2 | 5.8 | 7.8 | 7.3 | 8.6 | 9.0 | 8.9 | 7.8 | 10.9 | 8.9 | 9.3 | 9.1 |
| TRC (mg/L) Average Monthly | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.3 | 0.03 |
| TRC (mg/L) Instant. Maximum | 0.8 | 0.7 | 0.7 | 0.7 | 0.6 | 0.7 | 0.8 | 0.8 | 1.1 | 0.9 | 0.8 | 0.05 |
| CBOD5 (lbs/day) Average Monthly | < 8.3 | < 84.5 | < 15.3 | < 12.9 | 9.7 | < 11.9 | 13.4 | < 18.5 | 23.3 | < 20.4 | 40.3 | 46.4 |
| CBOD5 (lbs/day) Weekly Average | 9.8 | < 269.0 | 37.8 | 26.7 | 17.8 | 18.4 | 17.6 | 22.0 | 40.0 | 27.6 | 60.8 | 94.9 |
| CBOD5 (mg/L) Average Monthly | < 3.4 | < 5.4 | < 3.3 | < 4.7 | 4.5 | < 4.4 | 5.8 | < 6.2 | 7.5 | < 8.0 | 14.7 | 17.5 |
| CBOD5 (mg/L) Weekly Average | 4.8 | 9.7 | 4.0 | 9.5 | 8.1 | 6.9 | 6.9 | 9.9 | 10.3 | 12.7 | 25.4 | 41.1 |
| BOD5 (lbs/day) Raw Sewage Influent <br/> Ave. Monthly | 387.2 | 739 | < 960 | 405 | 547 | 365 | 421 | 423 | 462 | 430 | 673 | 447 |
| BOD5 (mg/L) Raw Sewage Influent <br/> Ave. Monthly | 147 | 72 | < 138 | 146 | 224 | 129 | 162 | 120 | 145 | 149 | 254 | 145 |
| TSS (lbs/day) Average Monthly | 7.1 | 308.2 | 45.0 | 10.5 | < 14.0 | 14.5 | < 16.2 | < 15.5 | 26.3 | 19.1 | 47.3 | 60.1 |
| TSS (lbs/day) Raw Sewage Influent <br/> Ave. Monthly | 327.7 | 757 | 1162 | 424 | 562 | 637 | 392 | 441 | 534 | 384 | 783 | 690 |
| TSS (lbs/day) Weekly Average | 8.7 | 1124.0 | 152.0 | 15.8 | 21.9 | 25.6 | 32.6 | 41.1 | 59.8 | 26.1 | 98.1 | 93.3 |
| TSS (mg/L) Average Monthly | 2.9 | 17.0 | 6.1 | 3.8 | < 6.6 | 6.2 | < 7.0 | < 5.1 | 10.4 | 7.5 | 18.9 | 20.0 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TSS (mg/L) Raw Sewage Influent <br/> Ave. Monthly | 122.8 | 70 | 167 | 147 | 231 | 209 | 146 | 128 | 151 | 132 | 276 | 146 |
| TSS (mg/L) Weekly Average | 3.2 | 40.4 | 12.4 | 5.6 | 10.8 | 12.4 | 12.8 | 14.4 | 29.5 | 10.4 | 49.2 | 40.4 |
| Fecal Coliform (CFU/100 ml) Geometric Mean | 31 | 45 | 29 | < 4 | 15 | 4 | 28 | 113 | 53 | 11 | 480 | 151 |
| Fecal Coliform (CFU/100 ml) Instant. Maximum | 641 | 1011 | 99 | 40 | 46 | 69 | 291 | 7945 | 1102 | 34 | 9678 | 295 |
| Nitrate-Nitrite (mg/L) Average Monthly | < 2.1 | < 3.0 | < 2.8 | 2.5 | 1.6 | 1.5 | 3.7 | 5.2 | 5.5 | 2.5 | 2.1 | 1.4 |
| Nitrate-Nitrite (lbs) Total Monthly | < 220.0 | < 1072.1 | < 327.3 | 235.2 | 108.8 | 142.6 | 297.1 | 500.5 | 418.8 | 210.7 | 203.9 | 139.5 |
| Total Nitrogen (mg/L) Average Monthly | < 3.0 | < 4.2 | < 3.8 | < 4.0 | 3.0 | < 3.1 | 6.9 | 10.0 | 9.7 | 4.1 | 8.7 | 5.8 |
| Total Nitrogen (lbs) Effluent Net <br/> Total Monthly | < 300 | < 1447 | < 429 | < 360 | 210 | < 261 | 524 | 972 | 775 | 347 | 764 | 492 |
| Total Nitrogen (lbs) Total Monthly | < 299.9 | < 1447.4 | < 429.2 | < 360.3 | 210.2 | < 261 | 524 | 972.2 | 775.2 | 346.5 | 763.5 | 491.6 |
| Total Nitrogen (lbs) Effluent Net <br/> Total Annual | | < 7014 | | | | | | | | | | |
| Total Nitrogen (lbs) Total Annual | | < 7014 | | | | | | | | | | |
| Ammonia (lbs/day) Average Monthly | < 1.3 | < 3.0 | 1.8 | 2.5 | 2.3 | < 2.7 | 6.8 | 13.1 | 11.2 | 11.2 | 3.3 | 3.4 |
| Ammonia (mg/L) Average Monthly | < 0.5 | < 0.4 | 0.6 | 0.9 | 1.0 | < 1.2 | 2.9 | 4.3 | 3.5 | 0.7 | 1.2 | 1.2 |
| Ammonia (lbs) Total Monthly | < 39.6 | < 90.3 | 56.6 | 76.3 | 69.0 | < 83.7 | 203.3 | 407.4 | 312.8 | 58.4 | 103.3 | 103.1 |
| Ammonia (lbs) Total Annual | | < 1658 | | | | | | | | | | |
| TKN (mg/L) Average Monthly | < 1.0 | 1.2 | < 1.0 | < 1.4 | 1.5 | < 1.7 | 3.2 | 4.8 | 4.1 | 1.7 | 6.6 | 4.4 |
| TKN (lbs) Total Monthly | < 79.9 | 375.3 | < 101.8 | < 123 | 101.3 | < 117.8 | 221.1 | 462.6 | 346.3 | 135.8 | 559.6 | 352.1 |
| Total Phosphorus (mg/L) Ave. Monthly | 0.5 | 0.8 | 1.1 | 1.0 | 0.8 | 0.8 | 1.2 | 1.9 | 2.1 | 1.8 | 1.7 | 1.2 |
| Total Phosphorus (lbs) Effluent Net <br/> Total Monthly | 47 | 238 | 109 | 85 | 52 | 61 | 84 | 245 | 158 | 139 | 134 | 95 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Phosphorus (lbs) Total Monthly | 46.9 | 237.8 | 108.6 | 84.5 | 52.4 | 60.9 | 84.3 | 244.7 | 157.9 | 138.8 | 133.6 | 95.2 |
| Total Phosphorus (lbs) Effluent Net <br/> Total Annual | | 1475 | | | | | | | | | | |
| Total Phosphorus (lbs) Total Annual | | 1475 | | | | | | | | | | |

**3.2 Effluent Violations for Outfall 001, from: December 1, 2020 To: October 31, 2021**

| Parameter | Date | SBC | DMR Value | Units | Limit Value | Units |
|---|---|---|---|---|---|---|
| TRC | 02/28/21 | Avg Mo | 0.6 | mg/L | 0.5 | mg/L |
| CBOD5 | 09/30/21 | Wkly Avg | < 269.0 | lbs/day | 200.0 | lbs/day |
| TSS | 09/30/21 | Avg Mo | 308.2 | lbs/day | 160.0 | lbs/day |
| TSS | 09/30/21 | Wkly Avg | 1124.0 | lbs/day | 240.0 | lbs/day |
| TSS | 12/31/20 | Wkly Avg | 49.2 | mg/L | 45.0 | mg/L |
| Fecal Coliform | 09/30/21 | IMAX | 1011 | CFU/100 ml | 1000 | CFU/100 ml |

**3.3 Summary of** Discharge Monitoring Reports (DMRs)**:**

DMRs review for the facility for the last 12 months of operation, presented on the table above in section 3.1 indicate permit limits have been met most of the time. TRC, CBOD5, Fecal Coliform and TSS effluent violations were noted on DMRs during the period reviewed and presented in section 3.2 above. The violations appear to be operation related. The violations recorded on 09/30/21 were attributed to extremely high flows to the facility from Hurricane Ida

**3.4 Summary of Inspections:**

The facility has been inspected a couple times during last permit cycle. A couple of operational violations were identified during plant inspections and recommendations were made to address them. No effluent violations were found during plant inspections. A notice of violation (NOV) was sent on 1/29/21 for a series of effluent violations in 2020. The response to the NOV attributed the violations to malfunctioning of SBR # 2 decanter. The decanter has since been repaired and functioning well.

## 4.0 Development of Effluent Limitations

**Outfall No.** 001 **Design Flow (MGD)** .64
**Latitude** 40º 37' 46.45" **Longitude** -77º 33' 48.23"
**Wastewater Description:** Sewage Effluent

### 4.1 Basis for Effluent Limitations

In general, the Clean Water Act(AWA) requires that the effluent limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards applicable to a waterbody are being met and may be more stringent than technology-based effluent limits.

### 4.2 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) |

### 4.3 Mass-Based Limits

The federal regulation at 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, if possible. The regulation at 40 CFR 122.45(b) requires that effluent limitations for POTWs be calculated based on the design flow of the facility. The mass based limits are expressed in pounds per day and are calculated as follows:
Mass based limit (lb/day) = concentration limit (mg/L) × design flow (mgd) × 8.34

### 4.4 Water Quality-Based Limitations

#### 4.4.1 Receiving Stream

The receiving stream is, Kishacoquillas Creek. According to 25 PA § 93.9n, from the Main Stem, Yeagertown/Burnham Railroad Bridge to SR 2005 (Mill Road) Bridge at Mount Rock the creek is protected for High-Quality Cold-Water Fishes (HQ-CWF) and Migratory Fishes (MF). It is located in Drainage List N and State Watershed 12-A. It has been assigned stream code 12429. The segment of the creek that receives discharge from this facility is attaining its designated uses.

#### 4.4.2 Stream flows

The Technical Support Document for Water Quality-Based Toxics Control (TSD) (EPA, 1991) and the Pennsylvania Water Quality Standards PA WQS) recommend the flow conditions for use in calculating water quality-based effluent limits (WQBELs) using steady-state modeling. The TSD and the PA WQS state that WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years ($Q_{7\text{-}10}$) for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years ($Q_{1\text{-}10}$) for acute criteria. However,

because the chronic criterion for ammonia is a 30-day average concentration not to be exceeded more than once every three years, EPA has used the $Q_{30-10}$ for the chronic ammonia criterion instead of the $Q_{7-10}$. The $Q_{30-10}$ is a biologically-based design flow intended to ensure an excursion frequency of once every three years for a 30-day average flow rate. These flows were determined by correlating with the yield of nearby USGS gauging station No 01565000 on Kishacoquillas Creek near Reedsville, PA. The $Q_{7-10}$ and drainage area of the gage 18.6cfs and 164 sq.mi respectively. The yield at the gage are:

- $Q_{7-10}$ =(18.6)/(164) = 0.113 cfs/sq.mi.
- $Q_{30-10}$ / $Q_{7-10}$ = 1.09
- $Q_{1-10}$ / $Q_{7-10}$ = 0.95

The drainage area at the discharge point was found from streamstats calculation to be 174sq.mi. The design streamflow ($Q_{7-10}$) at the discharge point is calculated as:

$Q_{7-10}$=(0.113)(174) = 19.66cfs

#### 4.4.3 $NH_3N$ Calculations

$NH_3N$ calculations will be based on the Department's Implementation Guidance of Section 93.7 Ammonia Criteria, dated 11/4/97 (ID No. 391-2000-013). The following data is necessary to determine the instream $NH_3N$ criteria used in the attached computer model of the stream:

- STP pH = 7.2 (DMR Median July-Sept)
- STP Temperature = 25 $^{o}$ C (default)
- Stream pH = 8.15 (Previous fact sheet)
- Stream Temperature = 19 $^{o}$ C (Previous factsheet)
- Background $NH_3$-N = 0.0 (default)

#### 4.4.4 $CBOD_5$

Brown Township STP and Burnham Borough STP discharges were modeled together due to their proximity to each other. The attached results of the WQM 7.0 stream model presented in attachment B indicates that for the and Burnham Borough STP discharge, a monthly average limit of 25 mg/l CBOD5 is required to protect the water quality of the stream. This is consistent with the existing permit and facility is meeting the limit. Therefore, an average monthly limit (AML) of 25 mg/l, average weekly limit (AWL) of 40mg/l and IMAX of 50mg/l will remain in the permit. Mass limits are calculated using the equation presented in section 4.3.

#### 4.4.5 $NH_3$-N

The attached results of the WQM 7.0 stream model (attachment B) also indicates a summer monthly average limit of 16.49 mg/l of NH3-N is necessary to protect the aquatic life from toxicity effects. However, the existing summer average monthly limit of 14 mg/l and monitoring for winter months will remain in the permit due to anti-backsliding restrictions. Mass limits are calculated using the equation presented in section 4.3.

#### 4.4.6 Dissolved Oxygen

The existing permit contains a limit of 5 mg/l for Dissolved Oxygen (DO). DEP's Technical Guidance for the Development and Specification of Effluent Limitations (362-0400-001, 10/97) suggests that either the adopted minimum stream D.O. criteria for the receiving stream or the effluent level determined through water quality modeling be used for the limit. Since the WQM 7.0 model was run using a minimum D.O. of 5.0 mg/l, this limit will be continued in the renewed permit with a daily monitoring requirement.

#### 4.4.7 Total Suspended Solids (TSS):

There is no water quality criterion for TSS. A limit of 30 mg/l AML in the existing permit which was based on the minimum level of effluent quality attainable by secondary treatment as defined in 40 CFR 133.102b(1) and 25 PA § 92a.47(a)(1) will remain in the permit. In addition, an AWL of 45mg/l per 40CFR 133.102(b)(2) and 25 PA § 92a.47(a)(2) is added to the permit. Mass-based limits are calculated based on the equation presented in section 4.3.

### 4.4.8 Phosphorus

The existing monitoring requirement and instantaneous maximum limit requirement to control phosphorus loading will be carried over in the renewed permit.

### 4.4.9 Chesapeake Bay Strategy:

The Department formulated a strategy in April 2007, to comply with the EPA and Chesapeake Bay Foundation requirements to reduce point source loadings of Total Nitrogen (TN) and Total Phosphorus (TP) to the Bay. In the Strategy, sewage dischargers have been prioritized by Central Office based on their delivered TN loadings to the Bay. The highest priority (Phases 1, 2, and 3) dischargers received annual loading caps based on their design flow on August 29, 2005 and concentrations of 6 mg/l TN and 0.8 mg/l TP. Phase 4 (0.2 -0.4mgd) and Phase 5(below 0.2mdg) are required to monitor and report TN and TP during permit renewal and any facility in Phases 4 and 5 that undergoes expansion is subjected to cap load right away. EPA published Chesapeake Bay TMDL in December of 2010. In order to address the TMDL, Pennsylvania developed Chesapeake Watershed Implementation Plan (WIP) Phase 1, Phase 2 and currently Phase 3 WIP and a supplement to the WIPs to be implemented with the original Chesapeake Bay Strategy.

As outlined in the current Phase 3 WIP and the current supplement to the WIP, re-issuing permits for significant dischargers would follow the same phased approach formulated in the original Bay strategy whilst Phase 4 and Phase 5 will be required to monitor and report TN and TP during permit renewals.

This facility falls in phase 3 of the strategy and is required to meet a total maximum annual Total Nitrogen Cap load of 11,689 lbs/year based on a design annual wasteflow of 0.64 MGD and 6 mg/l total nitrogen and a TP cap load of 1,559 lbs/year based on annual wasteflow of 0.64 MGD and 0.8 mg/l total phosphorus. The facility is in compliance with the bay cap load requirements.

### 4.4.10 Total Residual Chlorine

The attached results of TRC calculation presented in attachment C 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 92a, Section 92a.48 (b) which establishes a standard BAT limit of 0.5 mg/l unless a facility-specific BAT has been developed. The attached result indicates that a technology limit of 0.5 mg/l and 1.6mg/l IMAX would be needed to prevent toxicity concerns. This is consistent with the existing permit. The facility has no problem meeting the limits.

### 4.4.11 Toxics

The facility treats mainly domestic sewage, there are no parameters of concern associated with this discharge.

### 4.4.12 Influent BOD and TSS Monitoring

The permit will include influent BOD5 and TSS monitoring at the same frequency as is done for effluent in order to implement Chapter 94.12 and assess percent removal requirements.

### 4.4.13 Stormwater

There is no stormwater outfall associated with this facility.

### 4.4.14 Industrial Users

The wastewater treatment plant does not receive wastewater from any significant industrial users.

### 4.4.15 Pretreatment Requirements

The design annual average flow of the treatment plant is 0.64 MGD and the facility receives no flow from significant Industrial users. EPA does not require development of pretreatment program for facilities with design flow less than 5MGD. However, the permit contains standard conditions requiring the permittee to monitor and control industrial users if applicable.

### 4.4.16 Fecal Coliform and E. Coli

The existing Fecal Coliform limit is consistent with the technology limits recommended in 92a.47(a)(4) and (a)(5) and will remain in the permit. Quarterly monitoring of E. Coli is required in the permit following DEP recommendation of 1/quarter monitoring of E. Coli at a minimum for this type of facility.

## 5.0 Other Requirements

### 5.1 Anti-backsliding

Not applicable to this permit

### 5.2 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. The facility discharge to a stream segment designated as High-Quality Waters. The discharge is not expected to impact the stream negatively. No Exceptional Value Waters are impacted by this discharge.

### 5.3 Class A Wild Trout Fisheries

The discharge is into a stream segment which is identified as Class A Wild Trout Stream by PA Fish and Boat Commission. The discharge is not expected to the stream negatively.

### 5.4 303d Listed Streams

The discharge is not located on a 303d listed stream segment.

### 5.5 Special Permit Conditions

The permit contains the following special conditions:

- Stormwater Prohibition, Approval Contingencies, Solids Management, Restriction on receipt of hauled in waste under certain conditions, and chlorine minimization.

### 5.6 Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs).

### 5.7 Effluent Monitoring Frequency

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples can be used for averaging if they are conducted using EPA-approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits are less than the effluent limits. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

## 6.0 Proposed Effluent Limitations and Monitoring Requirements

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

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

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) (1) | | Concentrations (mg/L) | | | | Minimum (2) Measurement Frequency | Required Sample Type |
| | Average Monthly | Weekly Average | Minimum | Average Monthly | Weekly Average | Instant. Maximum | | |
| Flow (MGD) | Report | Report Daily Max | XXX | XXX | XXX | XXX | Continuous | Measured |
| pH (S.U.) | XXX | XXX | 6.0 Inst Min | XXX | XXX | 9.0 | 1/day | Grab |
| DO | XXX | XXX | 5.0 Daily Min | XXX | XXX | XXX | 1/day | Grab |
| TRC | XXX | XXX | XXX | 0.5 | XXX | 1.6 | 1/day | Grab |
| CBOD5 | 133.0 | 200.0 | XXX | 25.0 | 40.0 | 50 | 1/week | 24-Hr Composite |
| BOD5 Raw Sewage Influent | Report | XXX | XXX | Report | XXX | XXX | 1/week | 24-Hr Composite |
| TSS | 160.0 | 240.0 | XXX | 30.0 | 45.0 | 60 | 1/week | 24-Hr Composite |
| TSS Raw Sewage Influent | Report | XXX | XXX | Report | XXX | XXX | 1/week | 24-Hr Composite |
| Fecal Coliform (No./100 ml) Oct 1 - Apr 30 | XXX | XXX | XXX | 2000 Geo Mean | XXX | 10000 | 1/week | Grab |
| Fecal Coliform (No./100 ml) May 1 - Sep 30 | XXX | XXX | XXX | 200 Geo Mean | XXX | 1000 | 1/week | Grab |
| E. Coli (No./100 ml) | XXX | XXX | XXX | XXX | XXX | Report | 1/quarter | Grab |
| Nitrate-Nitrite | XXX | XXX | XXX | Report | XXX | XXX | 2/week | 24-Hr Composite |
| Nitrate-Nitrite (lbs) | Report Total Mo | XXX | XXX | XXX | XXX | XXX | 2/week | Calculation |

**Outfall 001 , Continued (from Permit Effective Date through Permit Expiration Date )**

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) (1) | | Concentrations (mg/L) | | | | Minimum (2) Measurement Frequency | Required Sample Type |
| | Average Monthly | Weekly Average | Minimum | Average Monthly | Weekly Average | Instant. Maximum | | |
| Total Nitrogen | XXX | XXX | XXX | Report | XXX | XXX | 1/month | Calculation |
| Total Nitrogen (lbs) | Report Total Mo | XXX | XXX | XXX | XXX | XXX | 1/month | Calculation |
| Ammonia Nov 1 - Apr 30 | Report | XXX | XXX | Report | XXX | XXX | 2/week | 24-Hr Composite |
| Ammonia May 1 - Oct 31 | 70.0 | XXX | XXX | 14.0 | XXX | 28.0 | 2/week | 24-Hr Composite |
| Ammonia (lbs) | Report Total Mo | XXX | XXX | XXX | XXX | XXX | 1/month | Calculation |
| TKN | XXX | XXX | XXX | Report | XXX | XXX | 2/week | 24-Hr Composite |
| TKN (lbs) | Report Total Mo | XXX | XXX | XXX | XXX | XXX | 2/week | Calculation |
| Total Phosphorus | XXX | XXX | XXX | Report | XXX | 4 | 2/week | 24-Hr Composite |
| Total Phosphorus (lbs) | Report Total Mo | XXX | XXX | XXX | XXX | XXX | 2/week | Calculation |

Compliance Sampling Location: Outfall 001

## 6.1 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**.

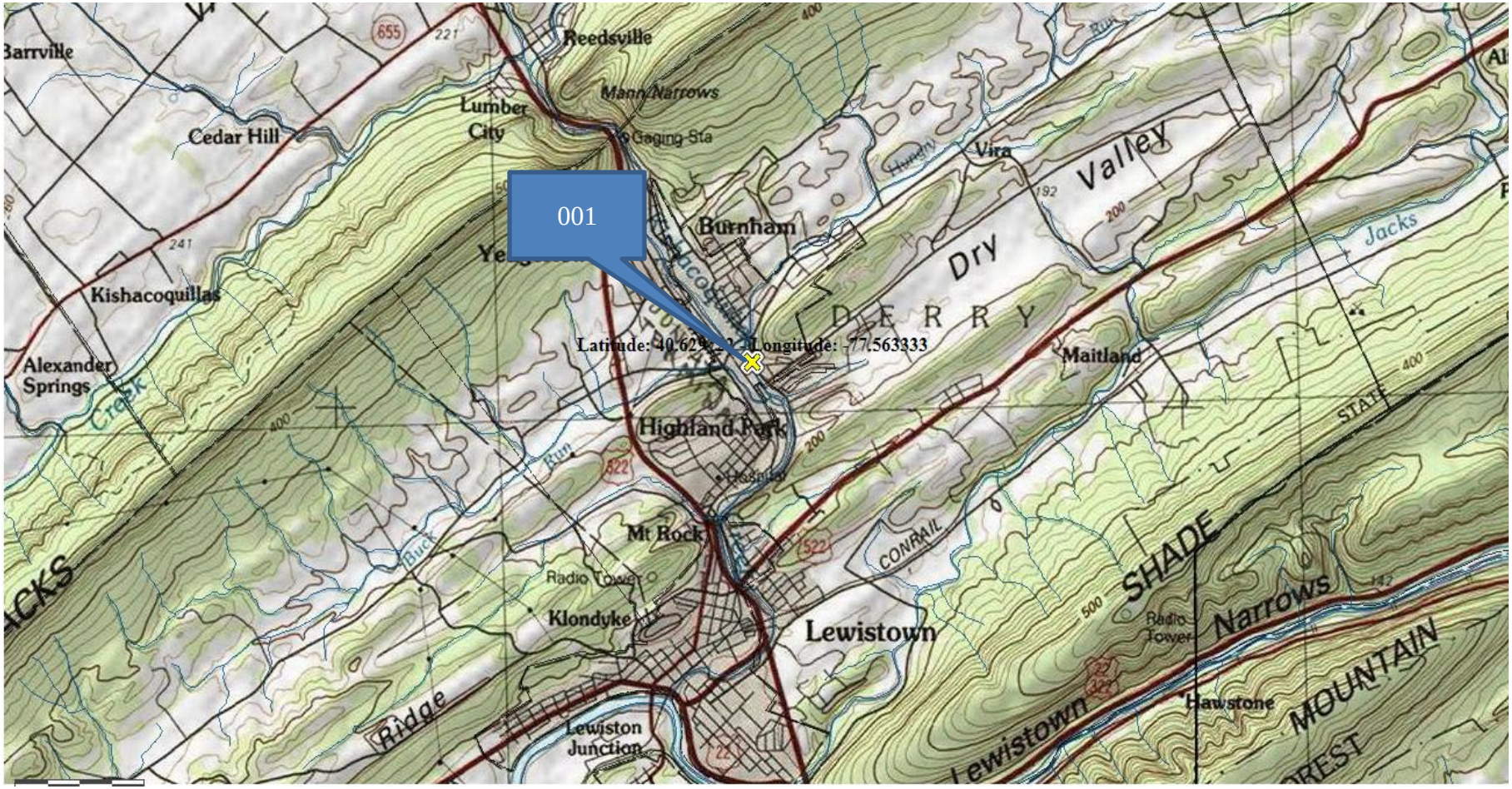
| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) (1) | | Concentrations (mg/L) | | | | Minimum (2) Measurement Frequency | Required Sample Type |
| | Monthly | Annual | Monthly | Monthly Average | Maximum | Instant. Maximum | | |
| Total Nitrogen (lbs) Effluent Net | XXX | 11689 Total Annual | XXX | XXX | XXX | XXX | 1/year | Calculation |
| Total Nitrogen (lbs) | XXX | Report Total Annual | XXX | XXX | XXX | XXX | 1/year | Calculation |
| Ammonia (lbs) | XXX | Report Total Annual | XXX | XXX | XXX | XXX | 1/year | Calculation |
| Total Phosphorus (lbs) Effluent Net | XXX | 1559 Total Annual | XXX | XXX | XXX | XXX | 1/year | Calculation |
| Total Phosphorus (lbs) | XXX | Report Total Annual | XXX | XXX | XXX | XXX | 1/year | Calculation |

Compliance Sampling Location: Outfall 001

| 7.0 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 limitation for individual sewage permit. |
| ☐ | Other: |

## 8.0 Attachments

### A. Topographical Map



B. WQM Model Results

## WQM 7.0 Effluent Limits

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 12A | 12429 | KISHACOQUILLAS 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) |
|---|---|---|---|---|---|---|---|
| 6.934 | Brown Twp | PA0026088 | 0.600 | CBOD5 | 25 | | |
| | | | | NH3-N | 9.82 | 19.64 | |
| | | | | Dissolved Oxygen | | | 5 |

| 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) |
|---|---|---|---|---|---|---|---|
| 3.749 | Burnham Boro | PA0038920 | 0.640 | CBOD5 | 25 | | |
| | | | | NH3-N | 16.49 | 32.98 | |
| | | | | Dissolved Oxygen | | | 5 |

Sunday, December 19, 2021 Version 1.1 Page 1 of 1

## 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 |
|---|---|---|---|---|---|---|---|---|
| 12A | 12429 | KISHACOQUILLAS CREEK | **6.934** | 577.00 | 68.53 | 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** | 0.113 | 0.00 | 0.00 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 19.00 | 8.15 | 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 |
|---|---|---|---|---|---|---|---|
| Brown Twp | PA0028088 | 0.6000 | 0.6000 | 0.6000 | 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 |

## 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 |
|---|---|---|---|---|---|---|---|---|
| 12A | 12429 | KISHACOQUILLAS CREEK | **3.749** | 495.00 | 174.00 | 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** | 0.113 | 0.00 | 0.00 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 19.00 | 8.15 | 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 |
|---|---|---|---|---|---|---|---|
| Burnham Boro | PA0038920 | 0.6400 | 0.6400 | 0.6400 | 0.000 | 25.00 | 7.20 |

### Parameter Data

| Parameter Name | Disc Conc (mg/L) | Trib Conc (mg/L) | Stream Conc (mg/L) | Fate Coef (1/days) |
|---|---|---|---|---|
| CBOD5 | 25.00 | 2.00 | 0.00 | 1.50 |
| Dissolved Oxygen | 5.00 | 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 |
|---|---|---|---|---|---|---|---|---|
| 12A | 12429 | KISHACOQUILLAS CREEK | 3.547 | 490.00 | 184.00 | 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 | 0.113 | 0.00 | 0.00 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 19.00 | 8.15 | 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 Wasteload Allocations

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 12A | 12429 | KISHACOQUILLAS 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 |
|---|---|---|---|---|---|---|---|
| 6.934 | Brown Twp | 6.24 | 50 | 6.24 | 50 | 0 | 0 |
| 3.749 | Burnham Boro | 4.1 | 50 | 5.3 | 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 |
|---|---|---|---|---|---|---|---|
| 6.934 | Brown Twp | 1.06 | 10.68 | 1.06 | 9.82 | 2 | 8 |
| 3.749 | Burnham Boro | .79 | 17.93 | .95 | 16.49 | 2 | 8 |

## 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) | | |
| 6.93 | Brown Twp | 25 | 25 | 9.82 | 9.82 | 5 | 5 | 0 | 0 |
| 3.75 | Burnham Boro | 25 | 25 | 16.49 | 16.49 | 5 | 5 | 0 | 0 |

Sunday, December 19, 2021 Version 1.1 Page 1 of 1

# WQM 7.0 D.O.Simulation

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 12A | 12429 | KISHACOQUILLAS CREEK |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 6.934 | 0.600 | 19.642 | 7.769 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 42.338 | 0.739 | 57.320 | 0.277 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 4.46 | 0.708 | 1.05 | 0.681 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 7.896 | 12.740 | Tsivoglou | 5 |
| **Reach Travel Time (days)** | | | |
| 0.702 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.070 | 4.25 | 1.00 | 8.24 |
| 0.140 | 4.05 | 0.96 | 8.24 |
| 0.211 | 3.85 | 0.91 | 8.24 |
| 0.281 | 3.67 | 0.87 | 8.24 |
| 0.351 | 3.49 | 0.83 | 8.24 |
| 0.421 | 3.33 | 0.79 | 8.24 |
| 0.491 | 3.17 | 0.75 | 8.24 |
| 0.562 | 3.02 | 0.72 | 8.24 |
| 0.632 | 2.87 | 0.68 | 8.24 |
| 0.702 | 2.74 | 0.65 | 8.24 |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 3.749 | 1.240 | 19.533 | 7.865 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 66.907 | 0.860 | 77.828 | 0.375 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 3.35 | 0.675 | 1.02 | 0.675 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 8.094 | 11.870 | Tsivoglou | 5 |
| **Reach Travel Time (days)** | | | |
| 0.033 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.003 | 3.34 | 1.02 | 8.12 |
| 0.007 | 3.34 | 1.01 | 8.14 |
| 0.010 | 3.33 | 1.01 | 8.16 |
| 0.013 | 3.32 | 1.01 | 8.18 |
| 0.016 | 3.31 | 1.01 | 8.20 |
| 0.020 | 3.31 | 1.00 | 8.22 |
| 0.023 | 3.30 | 1.00 | 8.24 |
| 0.026 | 3.29 | 1.00 | 8.24 |
| 0.030 | 3.29 | 1.00 | 8.24 |
| 0.033 | 3.28 | 1.00 | 8.24 |

Sunday, December 19, 2021 Version 1.1 Page 1 of 1

## 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 | 0.95 | Use Inputted Reach Travel Times | ☐ |
| Q30-10/Q7-10 Ratio | 1.09 | Temperature Adjust Kr | ☑ |
| D.O. Saturation | 90.00% | Use Balanced Technology | ☑ |
| D.O. Goal | 5 | | |

Sunday, December 19, 2021 Version 1.1 Page 1 of 1

# WQM 7.0 Hydrodynamic Outputs

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 12A | 12429 | KISHACOQUILLAS 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** | | | | | | | | | | | | |
| 6.934 | 7.74 | 0.00 | 7.74 | .9282 | 0.00488 | .739 | 42.34 | 57.32 | 0.28 | 0.702 | 19.64 | 7.77 |
| 3.749 | 19.66 | 0.00 | 19.66 | 1.9183 | 0.00469 | .88 | 66.91 | 77.83 | 0.38 | 0.033 | 19.53 | 7.86 |
| **Q1-10 Flow** | | | | | | | | | | | | |
| 6.934 | 7.36 | 0.00 | 7.36 | .9282 | 0.00488 | NA | NA | NA | 0.27 | 0.720 | 19.67 | 7.76 |
| 3.749 | 18.68 | 0.00 | 18.68 | 1.9183 | 0.00469 | NA | NA | NA | 0.37 | 0.034 | 19.56 | 7.86 |
| **Q30-10 Flow** | | | | | | | | | | | | |
| 6.934 | 8.44 | 0.00 | 8.44 | .9282 | 0.00488 | NA | NA | NA | 0.29 | 0.672 | 19.59 | 7.79 |
| 3.749 | 21.43 | 0.00 | 21.43 | 1.9183 | 0.00469 | NA | NA | NA | 0.39 | 0.031 | 19.49 | 7.88 |

Sunday, December 19, 2021 Version 1.1 Page 1 of 1

C. TRC Calculations

## TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

| | | | |
|---|---|---|---|
| 19.66 | = Q stream (cfs) | 0.5 | = CV Daily |
| 0.64 | = 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) | 0 | =Decay Coefficient (K) |

| Source | Reference | AFC Calculations | Reference | CFC Calculations |
|---|---|---|---|---|
| TRC | 1.3.2.iii | WLA afc = 6.353 | 1.3.2.iii | WLA cfc = 6.187 |
| PENTOXSD TRG | 5.1a | LTAMULT afc = 0.373 | 5.1c | LTAMULT cfc = 0.581 |
| PENTOXSD TRG | 5.1b | LTA_afc= 2.367 | 5.1d | LTA_cfc = 3.597 |

| 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)** |