pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

**Northwest Regional Office**
**CLEAN WATER PROGRAM**

# NPDES PERMIT FACT SHEET
# INDIVIDUAL SEWAGE

| | | | |
|---|---|---|---|
| Application Type | **Renewal** | Application No. | **PA0263834** |
| Facility Type | **Non-Municipal** | APS ID | **1066509** |
| Major / Minor | **Minor** | Authorization ID | **1405279** |

## Applicant and Facility Information

| | | | |
|---|---|---|---|
| Applicant Name | **Lake Lucy Sewage Authority** | Facility Name | **Lake Lucy STP** |
| Applicant Address | 1560 Lake Lucy Road | Facility Address | Behind 1543 Lake Lucy Road |
| | Tionesta, PA 16353 | | Tionesta, PA 16353 |
| Applicant Contact | Richard Harriett, Chairman lakelucysewageauthority@gmail.com | Facility Contact | Richard Harriett, Chairman lakelucysewageauthority@gmail.com |
| Applicant Phone | (814) 354-2648 | Facility Phone | (814) 354-2648 |
| Client ID | 370898 | Site ID | 545577 |
| Ch 94 Load Status | Not Overloaded | Municipality | Washington Township |
| Connection Status | No Limitations | County | Clarion County |
| Date Application Received | June 6, 2022 | EPA Waived? | Yes |
| Date Application Accepted | June 30, 2022 | If No, Reason | - |
| Purpose of Application | Renewal of an NPDES Permit for an existing discharge of treated sanitary wastewater. This application also transfers ownership from the Lake Lucy Sewage Association to the Lake Lucy Sewer Authority. | | |

## Summary of Review

Act 14 - Proof of Notification was submitted and received.

A Part II Water Quality Management permit is not required at this time.

The applicant should be able to meet the limits of this permit, which will protect the uses of the receiving stream.

I. OTHER REQUIREMENTS:

- A. Stormwater into Sewers
- B. Right of Way
- C. Solids Handling
- D. Public Sewerage Availability
- E. Effluent Chlorine Optimization and Minimization
- F. Little or No Assimilative Capacity

SPECIAL CONDITIONS:

II. Solids Management

There are no open violations in EFACTS associated with the subject Client ID (370898) as of 9/13/2022.

| Approve | Deny | Signatures | Date |
|---|---|---|---|
| X | | Stephen A. McCauley<br>Stephen A. McCauley, E.I.T. / Environmental Engineering Specialist | 9/13/2022 |
| X | | Adam J. Pesek (Lead Reviewer) for<br>*Vacant* / Environmental Engineer Manager | 9/23/2022 |

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

| | | | |
|---|---|---|---|
| Outfall No. | 001 | Design Flow (MGD) | 0.014 |
| Latitude | 41º 23' 53.00" | Longitude | -79º 23' 29.00" |
| Quad Name | - | Quad Code | - |
| Wastewater Description: | Sewage Effluent | | |
| Receiving Waters | East Branch Hemlock Creek (EV) | Stream Code | 54853 |
| NHD Com ID | 100476245 | RMI | 4.60 |
| Drainage Area | 0.54 | Yield (cfs/mi$^2$) | 0.11 |
| $Q_{7-10}$ Flow (cfs) | 0.059 | $Q_{7-10}$ Basis | calculated |
| Elevation (ft) | 1559 | Slope (ft/ft) | 0.005997 |
| Watershed No. | 16-E | Chapter 93 Class. | EV* |
| 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 | Aqua Pennsylvania, Inc. - Emlenton | | |
| PWS Waters | Allegheny River | Flow at Intake (cfs) | 1,376 |
| PWS RMI | 90.0 | Distance from Outfall (mi) | 54 |

* This facility has been permitted to discharge to the East Branch Hemlock Creek since 1979. The receiving stream was re-designated in 1995 as an Exceptional Value (EV) stream. This discharge is considered “grandfathered” at its previous NPDES Permit limits, which were set to prevent nuisance conditions due to dry stream conditions.

Sludge use and disposal description and location(s): All sludge is disposed of at an approved landfill.

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.

Narrative: This Fact Sheet details the determination of draft NPDES permit limits for an existing discharge of 0.014 MGD of treated sewage from a non-municipal STP in Washington Township, Clarion County.

Treatment permitted under Water Quality Management (WQM) Permit number 1679401 consists of: A bar screen, a 303,700 gallon waste stabilization lagoon, a second 350,800 gallon waste stabilization lagoon, one intermittent sand filter, and tablet chlorination with a 489 gallon contact tank.

**1. Streamflow:**

Patchel Run near Franklin, PA - USGS Reference Gage Number 03025200

| | | | |
|---|---|---|---|
| $Q_{7-10}$: | 0.63 | cfs | (USGS StreamStats) |
| Drainage Area: | 5.69 | sq. mi. | (USGS StreamStats) |
| Yieldrate: | 0.11 | cfsm | (calculated) |

East Branch Hemlock Creek at Outfall 001:

| | | | |
|---|---|---|---|
| Yieldrate: | 0.11 | cfsm | (calculated above) |
| Drainage Area: | 0.54 | sq. mi. | (USGS StreamStats) |
| % of stream allocated: | 100% | Basis: | No nearby discharges |
| $Q_{7-10}$: | 0.059 | cfs | (calculated) |

**2. Wasteflow:**

Maximum discharge: 0.014 MGD = 0.021 cfs

Runoff flow period: 24 hours Basis: Runoff flow for lagoon systems

The calculated stream flow (Q7-10) is greater than 3 times the permitted discharge flow. Therefore, the standards in DEP guidance (391-2000-014) will not be applied.

Flow will be required to be monitored as authorized under Chapter 92a.61, and as recommended in the SOP.

**3. Parameters:**

The following parameters were evaluated: pH, Total Suspended Solids, Fecal Coliform, E. Coli, Total Phosphorus, Total Nitrogen, $NH_3$-N, $CBOD_5$, Dissolved Oxygen, and Total Residual Chlorine.

a. pH

Between 6.0 and 9.0 at all times

Basis: Application of Chapter 93.7 technology-based limits.

The measurement frequency will remain as 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001).

b. Total Suspended Solids

Limits are 30.0 mg/l as a monthly average and 60.0 as an instantaneous maximum.

Basis: Application of Chapter 92a47 technology-based limits. Since the previous limits are more restrictive and are being attained, the previous limits that were based on the old dry streams guidance will be retained. Per DEP policy, the CBOD5 limits were changed from seasonal to year round.

c. Fecal Coliform

| | | |
|---|---|---|
| 05/01 - 09/30: | 200/100ml | (monthly average geometric mean) |
| | 1,000/100ml | (instantaneous maximum) |
| 10/01 - 04/30: | 2,000/100ml | (monthly average geometric mean) |
| | 10,000/100ml | (instantaneous maximum) |

Basis: Application of Chapter 92a47 technology-based limits

d. E. Coli

Monitoring was added for E. Coli at a frequency of 1/year.

Basis: Application of Chapter 92a.61 as recommended by the SOP for flows greater than 0.002 MGD and less than 0.05 MGD.

e. Phosphorus

☐ Limit necessary due to:

☐ Discharge to lake, pond, or impoundment
☐ Discharge to stream

Basis: N/A

☒ Limit not necessary

Basis: Chapter 96.5 does not apply. However, the previous monitoring for Total Phosphorus will be retained in accordance with the SOP, based on Chapter 92a.61.

f. Total Nitrogen

The previous monitoring for Total Nitrogen will be retained in accordance with the SOP, based on Chapter 92a.61.

g. Ammonia-Nitrogen ($NH_3$-N)

| | | |
|---|---|---|
| Median discharge pH to be used: | 6.7 | Standard Units (S.U.) |
| | | Basis: eDMR data from previous 12 months |
| Discharge temperature: | 25°C | (default value used in the absence of data) |
| Median stream pH to be used: | 7.0 | Standard Units (S.U.) |
| | | Basis: default value used in the absence of data |
| Stream Temperature: | 20˚C | (default value used for EV [CWF] modeling) |
| Background $NH_3$-N concentration: | 0.0 | mg/l |
| | | Basis: Default value |
| Calculated $NH_3$-N Summer limits: | 25.0 | mg/l (monthly average) |
| | 50.0 | mg/l (instantaneous maximum) |

Calculated $NH_3$-N Winter limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the calculated NH3-N limits above (see Attachment 1). The winter limits are calculated as three times the summer limits, but since the technology-based limits are more protective, they will be used. Since the previous limits are more restrictive and are being attained, the previous limits that were based on the old dry streams guidance will be retained.

h. $CBOD_5$

Median discharge pH to be used: 6.7 Standard Units (S.U.)

Basis: eDMR data from previous 12 months

Discharge temperature: 25°C (default value used in the absence of data)

Median stream pH to be used: 7.0 Standard Units (S.U.)

Basis: default value used in the absence of data

Stream Temperature: 20˚C (default value used for EV [CWF] modeling)

Background $CBOD_5$ concentration: 2.0 mg/l

Basis: Default value

Calculated $CBOD_5$ limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the calculated limits above (see Attachment 1). Since the previous limits are more restrictive and are being attained, the previous limits that were based on the old dry streams guidance will be retained. Per DEP policy, the CBOD5 limits were changed from seasonal to year round.

i. Dissolved Oxygen (DO)

The technology-based minimum of 4.0 mg/l is recommended by the WQ Model (see Attachment 1) and the SOP based on Chapter 93.7, under the authority of Chapter 92a.61.

The measurement frequency will remain as 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001).

j. Total Residual Chlorine (TRC)

☒ TRC limits: 0.5 mg/l (monthly average)
1.6 mg/l (instantaneous maximum)

Basis: The TRC limits above were calculated using the Department's TRC Calculation Spreadsheet (see Attachment 2). The limits are based on the first point of use, per the SOP. Since the calculated limits are the same as in the previous permit, and are attainable, they will be retained.

The measurement frequency will remain as 1/day as recommended in the SOP, based on Table 6-3 in the "Technical Guidance for the Development and Specification of Effluent Limitations" (362-0400-001).

**4. Reasonable Potential Analysis for Receiving Stream:**

A Reasonable Potential Analysis was not performed in accordance with State practices using the Department's Toxics Management Spreadsheet since no sampling other than sewage-related parameters was performed for this facility with the renewal application.

**5. Reasonable Potential for Downstream Public Water Supply (PWS):**

The Department's Toxics Management Spreadsheet does not calculate limits for parameters that are based on PWS criteria (TDS, Chloride, Bromide, and Sulfate). However, since no sample data was provided, mass-balance calculations were not performed.

Nearest Downstream potable water supply (PWS): Aqua Pennsylvania, Inc. - Emlenton

Distance downstream from the point of discharge: 54.0 miles (approximate)

☒ No limits necessary

☐ Limits needed

Basis: Significant dilution available

**6. Anti-Backsliding:**

Since all the permit limits in this renewal are the same or more restrictive than the previous NPDES Permit, anti-backsliding is not applicable.

**7. Attachment List:**

Attachment 1 - WQ Modeling Printouts - Perennial Reach

Attachment 2 - WQ Modeling Printouts - Dry Reach

Attachment 3 - TRC_Calc Spreadsheet

(The Attachments above can be found at the end of this document)

## Compliance History

**DMR Data for Outfall 001 (from August 1, 2021 to July 31, 2022)**

| Parameter | JUL-22 | JUN-22 | MAY-22 | APR-22 | MAR-22 | FEB-22 | JAN-22 | DEC-21 | NOV-21 | OCT-21 | SEP-21 | AUG-21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow (MGD) Average Monthly | 0.006 | 0.006 | 0.0098 | 0.013 | 0.018 | 0.014 | 0.013 | 0.0125 | 0.0012 | 0.0013 | 0.0012 | 0.0058 |
| Flow (MGD) Daily Maximum | 0.020 | 0.011 | 0.014 | 0.014 | 0.021 | 0.014 | 0.014 | 0.014 | 0.0014 | 0.0019 | 0.0014 | 0.013 |
| pH (S.U.) Minimum | 6.9 | 6.6 | 6.4 | 6.2 | 6.4 | 6.4 | 6.5 | 6.6 | 6.3 | 6.6 | 6.4 | 6.2 |
| pH (S.U.) Maximum | 7.9 | 7.6 | 7.3 | 6.9 | 7.1 | 7.1 | 7.1 | 7.1 | 7.1 | 7.1 | 7.1 | 7.1 |
| DO (mg/L) Minimum | 4.01 | 4.09 | 4.11 | 4.18 | 4.10 | 4.00 | 4.07 | 4.00 | 4.01 | 4.09 | 4.14 | 4.06 |
| TRC (mg/L) Average Monthly | 0.47 | 0.47 | 0.47 | 0.457 | 0.46 | 0.41 | 0.41 | 0.48 | 0.473 | 0.47 | 0.485 | 0.45 |
| TRC (mg/L) Instantaneous Maximum | 1.3 | 1.2 | 1.0 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.12 |
| CBOD5 (mg/L) Average Monthly | < 2.0 | < 2.0 | 2.05 | 2.65 | 6.35 | 11.0 | 4.25 | 3.3 | < 2.0 | < 2.0 | 2.0 | < 2.0 |
| TSS (mg/L) Average Monthly | 5.0 | 7.0 | 8.5 | 8.5 | 20.5 | 23 | 14.5 | 9.5 | 6.0 | 5.5 | 6.5 | 13.5 |
| Fecal Coliform (No./100 ml) Geometric Mean | < 10 | < 10 | < 10 | < 10 | < 10 | 728.0 | 501.9 | 34.9 | 20.15 | < 10 | 34.9 | < 10 |
| Fecal Coliform (No./100 ml) Instantaneous Maximum | < 10 | < 10 | < 10 | < 10 | < 10 | 53000 | 7000 | 122 | 29 | < 10 | 122 | < 10 |
| Total Nitrogen (mg/L) Average Monthly | 2.025 | 1.92 | 2.09 | 1.805 | 3.533 | 3.255 | 3.125 | 5.09 | 6.08 | 2.315 | 4.26 | 4.045 |
| Ammonia (mg/L) Average Monthly | 0.226 | 1.23 | 1.21 | 2.086 | 2.65 | < 0.10 | 6.51 | 3.44 | 3.87 | 1.915 | 1.655 | 3.63 |
| Total Phosphorus (mg/L) Average Monthly | < 0.10 | 0.14 | 0.22 | 0.455 | 1.13 | 1.17 | 0.665 | 1.14 | 0.205 | 0.135 | 0.22 | 0.34 |

## Proposed Effluent Limitations and Monitoring Requirements

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

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

| Parameter | Effluent Limitations | | | | | | Monitoring Requirements | |
|---|---|---|---|---|---|---|---|---|
| | Mass Units (lbs/day) (1) | | Concentrations (mg/L) | | | | Minimum (2) Measurement Frequency | Required Sample Type |
| | Average Monthly | Average Weekly | Minimum | Average Monthly | Maximum | Instant. Maximum | | |
| Flow (MGD) | Report | Report Daily Max | XXX | XXX | XXX | XXX | 1/week | Measured |
| pH (S.U.) | XXX | XXX | 6.0 Inst Min | XXX | XXX | 9.0 | 1/day | Grab |
| DO | XXX | XXX | 4.0 Inst Min | XXX | XXX | XXX | 1/day | Grab |
| TRC | XXX | XXX | XXX | 0.5 | XXX | 1.6 | 1/day | Grab |
| CBOD5 | XXX | XXX | XXX | 10.0 | XXX | 20 | 2/month | 8-Hr Composite |
| TSS | XXX | XXX | XXX | 10.0 | XXX | 20 | 2/month | 8-Hr Composite |
| 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 | Report Annl Avg | XXX | XXX | 1/year | Grab |
| Total Nitrogen | XXX | XXX | XXX | Report | XXX | XXX | 2/month | 8-Hr Composite |
| Ammonia Nov 1 - Apr 30 | XXX | XXX | XXX | 9.0 | XXX | 18 | 2/month | 8-Hr Composite |
| Ammonia May 1 - Oct 31 | XXX | XXX | XXX | 3.0 | XXX | 6 | 2/month | 8-Hr Composite |
| Total Phosphorus | XXX | XXX | XXX | Report | XXX | XXX | 2/month | 8-Hr Composite |

Compliance Sampling Location: at Outfall 001, after disinfection.

Flow is monitor only based on Chapter 92a.61. The limits for pH and Dissolved Oxygen are technology-based on Chapter 93.7. The Total Residual Chlorine (TRC) limits are technology-based on Chapter 92a.48. The limits for $CBOD_5$, Total Suspended Solids (TSS), and Ammonia-Nitrogen are technology-based on the old Dry Streams Guidance. The limits for Fecal Coliforms are technology-based on Chapter 92a.47. Monitoring for E. Coli, Total Nitrogen, and Total Phosphorus is based on Chapter 92a.61.

Attachment 1

## WQM 7.0 Effluent Limits (Perennial Reach)

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 16E | 54853 | EAST BRANCH HEMLOCK 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) |
|---|---|---|---|---|---|---|---|
| 3.400 | perenial reach | PA0263834 | 0.014 | CBOD5 | 3.33 | | |
| | | | | NH3-N | 8.34 | 16.68 | |
| | | | | Dissolved Oxygen | | | 6.24 |

Since the perennial reach outputs equal the dry reach inputs, the dry reach inputs are protective of the receiving stream.

# WQM 7.0 D.O.Simulation

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 16E | 54853 | EAST BRANCH HEMLOCK CREEK |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 3.400 | 0.014 | 20.371 | 6.969 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 7.676 | 0.414 | 18.544 | 0.092 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 2.10 | 0.051 | 0.62 | 0.720 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 8.094 | 22.602 | Owens | 6 |
| **Reach Travel Time (days)** | | | |
| 0.932 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.093 | 2.09 | 0.58 | 8.19 |
| 0.186 | 2.08 | 0.54 | 8.19 |
| 0.279 | 2.07 | 0.51 | 8.19 |
| 0.373 | 2.06 | 0.47 | 8.19 |
| 0.466 | 2.05 | 0.44 | 8.19 |
| 0.559 | 2.04 | 0.41 | 8.19 |
| 0.652 | 2.03 | 0.39 | 8.19 |
| 0.745 | 2.02 | 0.36 | 8.19 |
| 0.838 | 2.01 | 0.34 | 8.19 |
| 0.932 | 2.00 | 0.32 | 8.19 |

# WQM 7.0 Modeling Specifications

| | | | |
|---|---|---|---|
| Parameters | Both | Use Inputted Q1-10 and Q30-10 Flows | ☑ |
| WLA Method | EMPR | Use Inputted W/D Ratio | ☐ |
| Q1-10/Q7-10 Ratio | 0.64 | Use Inputted Reach Travel Times | ☐ |
| Q30-10/Q7-10 Ratio | 1.36 | Temperature Adjust Kr | ☑ |
| D.O. Saturation | 90.00% | Use Balanced Technology | ☑ |
| D.O. Goal | 6 | | |

## 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 |
|---|---|---|---|---|---|---|---|---|
| 16E | 54853 | EAST BRANCH HEMLOCK CREEK | **3.400** | 1521.00 | 2.46 | 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** | 0.110 | 0.00 | 0.00 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 20.00 | 7.00 | 0.00 | 0.00 |
| **Q1-10** | | 0.00 | 0.00 | 0.000 | 0.000 | | | | | | | |
| **Q30-10** | | 0.00 | 0.00 | 0.000 | 0.000 | | | | | | | |

### Discharge Data

| Name | Permit Number | Existing Disc Flow (mgd) | Permitted Disc Flow (mgd) | Design Disc Flow (mgd) | Reserve Factor | Disc Temp (°C) | Disc pH |
|---|---|---|---|---|---|---|---|
| perenial reach | PA0263834 | 0.0140 | 0.0000 | 0.0000 | 0.000 | 25.00 | 6.70 |

### Parameter Data

| Parameter Name | Disc Conc (mg/L) | Trib Conc (mg/L) | Stream Conc (mg/L) | Fate Coef (1/days) |
|---|---|---|---|---|
| CBOD5 | 3.33 | 2.00 | 0.00 | 1.50 |
| Dissolved Oxygen | 6.24 | 8.24 | 0.00 | 0.00 |
| NH3-N | 8.34 | 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 |
|---|---|---|---|---|---|---|---|---|
| 16E | 54853 | EAST BRANCH HEMLOCK CREEK | **2.000** | 1445.00 | 4.58 | 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** | 0.110 | 0.00 | 0.00 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 20.00 | 7.00 | 0.00 | 0.00 |
| **Q1-10** | | 0.00 | 0.00 | 0.000 | 0.000 | | | | | | | |
| **Q30-10** | | 0.00 | 0.00 | 0.000 | 0.000 | | | | | | | |

### Discharge Data

| Name | Permit Number | Existing Disc Flow (mgd) | Permitted Disc Flow (mgd) | Design Disc Flow (mgd) | Reserve Factor | Disc Temp (°C) | Disc pH |
|---|---|---|---|---|---|---|---|
| | | 0.0000 | 0.0000 | 0.0000 | 0.000 | 25.00 | 7.00 |

### Parameter Data

| Parameter Name | Disc Conc (mg/L) | Trib Conc (mg/L) | Stream Conc (mg/L) | Fate Coef (1/days) |
|---|---|---|---|---|
| CBOD5 | 25.00 | 2.00 | 0.00 | 1.50 |
| Dissolved Oxygen | 3.00 | 8.24 | 0.00 | 0.00 |
| NH3-N | 25.00 | 0.00 | 0.00 | 0.70 |

# WQM 7.0 Hydrodynamic Outputs

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 16E | 54853 | EAST BRANCH HEMLOCK 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** | | | | | | | | | | | | |
| 3.400 | 0.27 | 0.00 | 0.27 | .0217 | 0.01028 | .414 | 7.68 | 18.54 | 0.09 | 0.932 | 20.37 | 6.97 |
| **Q1-10 Flow** | | | | | | | | | | | | |
| 3.400 | 0.17 | 0.00 | 0.17 | .0217 | 0.01028 | NA | NA | NA | 0.07 | 1.169 | 20.56 | 6.95 |
| **Q30-10 Flow** | | | | | | | | | | | | |
| 3.400 | 0.37 | 0.00 | 0.37 | .0217 | 0.01028 | NA | NA | NA | 0.11 | 0.793 | 20.28 | 6.98 |

# WQM 7.0 Wasteload Allocations

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 16E | 54853 | EAST BRANCH HEMLOCK 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 |
|---|---|---|---|---|---|---|---|
| 3.400 | perenial reach | 16.64 | 16.68 | 16.64 | 16.68 | 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 |
|---|---|---|---|---|---|---|---|
| 3.400 | perenial reach | 1.87 | 8.34 | 1.87 | 8.34 | 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) | | |
| 3.40 | perenial reach | 3.33 | 3.33 | 8.34 | 8.34 | 6.24 | 6.24 | 0 | 0 |

Attachment 2

# WQM 7.0 D.O.Simulation (Dry Reach)

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 16E | 54853 | EAST BRANCH HEMLOCK CREEK |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 4.600 | 0.014 | 25.000 | 6.700 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 0.822 | 0.383 | 2.145 | 0.069 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 25.00 | 1.500 | 25.00 | 1.029 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 4.000 | 23.930 | Owens | 2 |
| **Reach Travel Time (days)** | | | |
| 1.068 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) | |
|---|---|---|---|---|
| 0.107 | 20.44 | 22.40 | 1.46 | |
| 0.214 | 16.71 | 20.07 | 2.14 | |
| 0.320 | 13.66 | 17.98 | 2.93 | |
| 0.427 | 11.17 | 16.11 | 3.64 | |
| 0.534 | 9.13 | 14.44 | 4.24 | |
| 0.641 | 7.46 | 12.94 | 4.76 | |
| 0.747 | 6.10 | 11.59 | 5.21 | |
| 0.854 | 4.99 | 10.39 | 5.60 | |
| 0.961 | 4.08 | 9.31 | 5.94 | |
| 1.068 | 3.33 | 8.34 | 6.24 | (Input into perennial reach model) |

# WQM 7.0 Modeling Specifications

| | | | |
|---|---|---|---|
| Parameters | D.O. | Use Inputted Q1-10 and Q30-10 Flows | ☑ |
| WLA Method | Simulation | 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 | 2 | | |

## 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 |
|---|---|---|---|---|---|---|---|---|
| 16E | 54853 | EAST BRANCH HEMLOCK CREEK | **4.600** | 1559.00 | 0.01 | 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** | 0.000 | 0.00 | 0.00 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 20.00 | 7.00 | 0.00 | 0.00 |
| **Q1-10** | | 0.00 | 0.00 | 0.000 | 0.000 | | | | | | | |
| **Q30-10** | | 0.00 | 0.00 | 0.000 | 0.000 | | | | | | | |

### Discharge Data

| Name | Permit Number | Existing Disc Flow (mgd) | Permitted Disc Flow (mgd) | Design Disc Flow (mgd) | Reserve Factor | Disc Temp (°C) | Disc pH |
|---|---|---|---|---|---|---|---|
| Dry Reach | PA0263834a | 0.0140 | 0.0000 | 0.0000 | 0.000 | 25.00 | 6.70 |

### Parameter Data

| Parameter Name | Disc Conc (mg/L) | Trib Conc (mg/L) | Stream Conc (mg/L) | Fate Coef (1/days) |
|---|---|---|---|---|
| CBOD5 | 25.00 | 0.00 | 0.00 | 1.50 |
| Dissolved Oxygen | 4.00 | 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 |
|---|---|---|---|---|---|---|---|---|
| 16E | 54853 | EAST BRANCH HEMLOCK CREEK | **3.400** | 1521.00 | 0.02 | 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** | 0.000 | 0.00 | 0.00 | 0.000 | 0.000 | 0.0 | 0.00 | 0.00 | 20.00 | 7.00 | 0.00 | 0.00 |
| **Q1-10** | | 0.00 | 0.00 | 0.000 | 0.000 | | | | | | | |
| **Q30-10** | | 0.00 | 0.00 | 0.000 | 0.000 | | | | | | | |

### Discharge Data

| Name | Permit Number | Existing Disc Flow (mgd) | Permitted Disc Flow (mgd) | Design Disc Flow (mgd) | Reserve Factor | Disc Temp (°C) | Disc pH |
|---|---|---|---|---|---|---|---|
| perenial reach | PA0263834 | 0.0140 | 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 Hydrodynamic Outputs

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 16E | 54853 | EAST BRANCH HEMLOCK 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** | | | | | | | | | | | | |
| 4.600 | 0.00 | 0.00 | 0.00 | NA | 0.00600 | .383 | .82 | 2.14 | 0.07 | 1.068 | 25.00 | 6.70 |
| **Q1-10 Flow** | | | | | | | | | | | | |
| 4.600 | 0.00 | 0.00 | 0.00 | NA | 0.00600 | NA | NA | NA | 0.00 | 0.000 | 0.00 | 0.00 |
| **Q30-10 Flow** | | | | | | | | | | | | |
| 4.600 | 0.00 | 0.00 | 0.00 | NA | 0.00600 | NA | NA | NA | 0.00 | 0.000 | 0.00 | 0.00 |

Attachment 3

## TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

| | | | |
|---|---|---|---|
| 0.2706 | = Q stream (cfs) (first point of use) | 0.5 | = CV Daily |
| 0.014 | = Q discharge (MGD) | 0.5 | = CV Hourly |
| 30 | = no. samples | 0.499 | = 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 = 2.008 | 1.3.2.iii | WLA cfc = 3.897 |
| PENTOXSD TRG | 5.1a | LTAMULT afc = 0.373 | 5.1c | LTAMULT cfc = 0.581 |
| PENTOXSD TRG | 5.1b | LTA_afc= 0.748 | 5.1d | LTA_cfc = 2.265 |

| 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)** |