pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

| | | | |
|---|---|---|---|
| Application Type | **Renewal** | Application No. | **PA0272795** |
| Facility Type | **Non-Municipal** | APS ID | **1002065** |
| Major / Minor | **Minor** | Authorization ID | **1289003** |

# NPDES PERMIT FACT SHEET
# INDIVIDUAL SEWAGE

## Applicant and Facility Information

| | | | |
|---|---|---|---|
| Applicant Name | **Matthew R. Hinkle** | Facility Name | **Majors MHP** |
| Applicant Address | 5137 Clayton Circle | Facility Address | 5137 Clayton Circle |
| | New Castle, PA 16101 | | New Castle, PA 16101 |
| Applicant Contact | Matthew R. Hinkle | Facility Contact | Matthew R. Hinkle |
| Applicant Phone | (724) 944-8075 | Facility Phone | (724) 944-8075 |
| Client ID | 298847 | Site ID | 448796 |
| Ch 94 Load Status | Not Overloaded | Municipality | Slippery Rock Township |
| Connection Status | No Limitations | County | Lawrence County |
| Date Application Received | August 30, 2019 | EPA Waived? | Yes |
| Date Application Accepted | September 20, 2019 | If No, Reason | - |

Purpose of Application: Renewal of an NPDES Permit for an existing discharge of treated sanitary wastewater.

## 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. Dry Streams

SPECIAL CONDITIONS:
- II. Solids Management
- III. Requirements for Total Residual Chlorine (TRC)

There are no open violations in efacts associated with the subject Client ID (298847) as of 10/15/2021.

| Approve | Deny | Signatures | Date |
|---|---|---|---|
| X | | Stephen A. McCauley<br>Stephen A. McCauley, E.I.T. / Environmental Engineering Specialist | 10/15/2021 |
| X | | Justin C. Dickey<br>Justin C. Dickey, P.E. / Environmental Engineer Manager | 10/18/2021 |

| Discharge, Receiving Waters and Water Supply Information | | | |
|---|---|---|---|
| Outfall No. | 001 | Design Flow (MGD) | 0.00735 |
| Latitude | 40° 58’ 39.60” | Longitude | 80° 12’ 52.70” |
| Quad Name | Portersville | Quad Code | 1104 |
| Wastewater Description: | treated sanitary wastewater | | |
| Receiving Waters | Unnamed Tributary to the Brush Run (CWF) | Stream Code | N/A (34172) |
| NHD Com ID | 126216622 | RMI | N/A |
| Drainage Area | 0.06 | Yield (cfs/mi$^2$) | 0.03 |
| $Q_{7-10}$ Flow (cfs) | 0.0018 | $Q_{7-10}$ Basis | calculated |
| Elevation (ft) | 1200 | Slope (ft/ft) | 0.01683 |
| Watershed No. | 20-C | Chapter 93 Class. | 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 | Pennsylvania American Water Company - Ellwood City | | |
| PWS Waters | Connoquenessing Creek | Flow at Intake (cfs) | 27.6 |
| PWS RMI | 0.20 | Distance from Outfall (mi) | 21.5 |

Sludge use and disposal description and location(s): 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 0.00735 MGD of treated sewage from an existing MHP in Slippery Rock Township, Lawrence County.

Treatment permitted under WQM permit 3776402 consists of: A 1,000 gallon septic tank followed by an effluent pump tank, two 1,000 gallon septic tanks in series, a 6,000 gallon septic tank followed by an effluent pump tank discharging to a 13,500 gallon septic tank, a 500 gallon tank with a Zabel effluent filter, a 3,000 gallon dual siphon dosing tank, an intermittent 4,352 square foot (64' x 68') surface sand filter, a second 3,000 gallon dual siphon dosing tank, a second intermittent 4,352 square foot (64' x 68') surface sand filter (sand filters operating in series), and dual tablet chlorinators with a 2,853 gallon chlorine contact tank.

**1. Streamflow:**

Muddy Creek near Portersville, PA - USGS Gage 03106300 (1971-1993):

| | | | |
|---|---|---|---|
| $Q_{7-10}$: | 1.75 | cfs | from StreamStats |
| Drainage Area: | 51.2 | sq. mi. | from StreamStats |
| Yieldrate: | 0.03 | cfsm | calculated |

Unnamed Tributary to the Brush Run at Outfall 001:

| | | | |
|---|---|---|---|
| Yieldrate: | 0.03 | cfsm | calculated above |
| Drainage Area: | 0.06 | sq. mi. | from StreamStats |
| % of stream allocated: | 100% | Basis: | no nearby discharges |
| $Q_{7-10}$: | 0.0018 | cfs | calculated |

**2. Wasteflow:** Outfall 001:

Maximum discharge: 0.00735 MGD = 0.0113 cfs

Runoff flow period: 24 hours Basis: Runoff flow for septic tank/sand filter systems

The calculated stream flow (Q7-10) is less than 3 times the permitted discharge flow. In accordance with the SOP, since this is an existing discharge, the treatment requirements in document number 391-2000-014, titled, "Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers", dated April 12, 2008, were evaluated for this facility. Based on eDMR data, the treatment requirements are not attainable with the treatment technology in place so the requirements will not be implemented in this NPDES Permit renewal.

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, Phosphorus, $NH_3$-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 was previously set to 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), which will be retained.

b. Total Suspended Solids

Limits are 30 mg/l as a monthly average and 60 as a daily maximum.

Basis: Application of Chapter 92a47 technology-based limits.

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 between 0.002 MGD and 0.05 MGD.

e. Total 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

Monitoring for Total Nitrogen will be retained with this renewal in accordance with the SOP, based on Chapter 92a.61.

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

Median discharge pH to be used: 7.2 Standard Units (S.U.)

Basis: Average pH value from DMR summary

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 CWF modeling)

Background $NH_3$-N concentration: 0.1 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 summer limits above (see Attachment 1), which are less stringent than the previous NPDES Permit. The winter limits are calculated as 3 times the summer limits per the SOP. Since the previous more restrictive limits are being attained, they will be retained with this renewal.

h. $CBOD_5$

Median discharge pH to be used: 7.2 Standard Units (S.U.)

Basis: Average pH value from DMR summary

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 CWF modeling)

Background $CBOD_5$ concentration: 2.0 mg/l

Basis: Default value

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

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

Result: WQ modeling resulted in the above summer limits (see Attachment 1), which are the same as the previous permit. Since the summer limits are technology-based, the winter limits will also be technology-based. Since the summer and winter limits are technology-based, per the SOP, the previous year-round sampling for $CBOD_5$ will be retained.

i. Dissolved Oxygen (DO)

- ☒ 4.0 mg/l - minimum desired in effluent to protect all aquatic life.
- ☐ 5.0 mg/l - required in effluent for CWF, WWF, or TSF based on WQ Model.
- ☐ 6.0 mg/l - minimum required due to discharge going to a drainage swale or ditch.
- ☐ 8.0 mg/l - required due to discharge going to a naturally reproducing salmonid stream

Discussion: A Dissolved Oxygen technology-based minimum of 3.0 mg/l was calculated by the WQ Model (see Attachment 1). Based on the SOP, Chapter 93.7, and under the authority of Chapter 92a.61, the minimum of 4.0 mg/l will be retained from the previous permit.

The measurement frequency was previously set to 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), which will be retained.

j. Total Residual Chlorine (TRC)

- ☐ No limit necessary

☒ TRC limits: 0.26 mg/l (monthly average)
0.86 mg/l (instantaneous maximum)

Basis: The TRC limits above were calculated using the Department's TRC Calculation Spreadsheet (see Attachment 2) at the point of first use. The limits are more restrictive than in the previous NPDES Permit due largely to changes to the chlorine demand defaults in the spreadsheet. The new limits will be added with a compliance schedule to provide time for the permittee to meet them.

The measurement frequency was previously set to 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), which will be retained.

k. 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.

**4. Reasonable Potential Analysis:**

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):**

Limits for parameters that are based on PWS criteria (TDS, Chloride, Bromide, and Sulfate) are not calculated by the Toxics Management Spreadsheet. However, since no data was provided, mass-balance calculations were not able to be performed.

Nearest Downstream potable water supply (PWS): Pennsylvania American Water Company - Ellwood City
Distance downstream from the point of discharge: 21.5 miles (approximate)

☒ No limits necessary
☐ Limits needed

Basis: Significant dilution available.

**6. Attachment List:**

Attachment 1 - WQ Modeling Printouts
Attachment 2 - TRC_Calc Spreadsheet

## Compliance History

**DMR Data for Outfall 001 (from September 1, 2020 to August 31, 2021)**

| Parameter | AUG-21 | JUL-21 | JUN-21 | MAY-21 | APR-21 | MAR-21 | FEB-21 | JAN-21 | DEC-20 | NOV-20 | OCT-20 | SEP-20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow (MGD) Average Monthly | 0.0029 | 0.0029 | 0.0031 | 0.0032 | 0.0029 | 0.0030 | 0.0034 | 0.0030 | 0.0027 | 0.0024 | 0.0022 | 0.0028 |
| Flow (MGD) Daily Maximum | 0.0032 | 0.003 | 0.0036 | 0.0035 | 0.0032 | 0.0042 | 0.0041 | 0.0041 | 0.0031 | 0.0031 | 0.0028 | 0.0035 |
| pH (S.U.) Minimum | 7.2 | 7.2 | 7.2 | 7.3 | 7.0 | 7.0 | 7.0 | 7.1 | 7.1 | 7.2 | 7.1 | 7.2 |
| pH (S.U.) Maximum | 7.4 | 7.4 | 7.4 | 7.4 | 7.3 | 7.2 | 7.2 | 7.3 | 7.3 | 7.4 | 7.3 | 7.4 |
| DO (mg/L) Minimum | 7.7 | 7.6 | 7.8 | 8.8 | 10.0 | 11.0 | 13.0 | 12.3 | 12.3 | 10.9 | 9.3 | 8.6 |
| TRC (mg/L) Average Monthly | 0.37 | 0.38 | 0.34 | 0.3 | 0.31 | 0.28 | 0.35 | 0.29 | 0.286 | 0.388 | 0.34 | 0.37 |
| TRC (mg/L) Instantaneous Maximum | 0.45 | 0.48 | 0.49 | 0.48 | 0.41 | 0.35 | 0.40 | 0.31 | 0.47 | 0.48 | 0.49 | 0.49 |
| CBOD5 (mg/L) Average Monthly | < 2 | < 5.27 | < 6.96 | < 2 | < 2.89 | < 4 | < 8.33 | < 3 | < 3.0 | < 7.5 | < 3.67 | < 3 |
| CBOD5 (mg/L) Instantaneous Maximum | < 2 | < 6 | 7.91 | < 2 | 3.77 | < 6 | < 12 | < 3 | < 3.0 | < 12 | 4.33 | < 3 |
| TSS (mg/L) Average Monthly | < 5 | < 5 | < 5.0 | < 5 | < 5.0 | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 | < 14.5 |
| TSS (mg/L) Instantaneous Maximum | < 5 | < 5 | < 5.0 | < 5 | < 5.0 | < 5 | < 5 | < 5 | < 5 | < 5 | < 5 | 24 |
| Fecal Coliform (CFU/100 ml) Geometric Mean | < 1 | < 1 | < 2 | < 1 | < 1 | < 1 | 3 | < 1 | < 1 | < 1 | < 2 | < 1 |
| Fecal Coliform (CFU/100 ml) Instantaneous Maximum | < 1 | < 1 | 5 | < 1 | < 1 | 1 | 6 | < 1 | 1 | 1 | 3 | < 1 |
| Total Nitrogen (mg/L) Average Monthly | 0.625 | 0.625 | 25.7 | 17.7 | 36.1 | 30.0 | 20.41 | 13.6 | 18.83 | 20.0 | 30.8 | 15.43 |
| Ammonia (mg/L) Average Monthly | < 0.8 | < 0.8 | < 3.51 | < 0.8 | < 0.8 | < 0.800 | < 0.815 | < 0.800 | < 0.80 | < 0.800 | < 0.80 | < 0.800 |
| Ammonia (mg/L) Instantaneous Maximum | < 0.8 | < 0.8 | 6.22 | < 0.8 | < 0.8 | < 0.800 | 0.830 | < 0.800 | < 0.80 | < 0.800 | < 0.80 | < 0.800 |
| Total Phosphorus (mg/L) Average Monthly | 1.1 | 1.5 | 1.3 | 1 | 1.1 | 0.87 | 0.90 | 0.77 | 0.79 | 1.1 | 0.86 | 0.92 |

## 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 December 31, 2024**.

| 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 | 25.0 | XXX | 50.0 | 2/month | Grab |
| TSS | XXX | XXX | XXX | 30.0 | XXX | 60.0 | 2/month | Grab |
| Fecal Coliform (No./100 ml) Oct 1 - Apr 30 | XXX | XXX | XXX | 2000 Geo Mean | XXX | 10000 | 2/month | Grab |
| Fecal Coliform (No./100 ml) May 1 - Sep 30 | XXX | XXX | XXX | 200 Geo Mean | XXX | 1000 | 2/month | Grab |
| E. Coli (No./100 ml) | XXX | XXX | XXX | XXX | XXX | Report | 1/year | Grab |
| Total Nitrogen | XXX | XXX | XXX | Report | XXX | XXX | 1/month | Grab |
| Ammonia-Nitrogen Nov 1 - Apr 30 | XXX | XXX | XXX | 25.0 | XXX | 50.0 | 2/month | Grab |
| Ammonia-Nitrogen May 1 - Oct 31 | XXX | XXX | XXX | 16.6 | XXX | 33.2 | 2/month | Grab |
| Total Phosphorus | XXX | XXX | XXX | Report | XXX | XXX | 1/month | Grab |

Compliance Sampling Location: at Outfall 001, after disinfection.

Flow is monitor only based on Chapter 92a.61. The limits for pH and DO are technology-based on Chapter 93.7. The Total Residual Chlorine (TRC) limits are technology-based on Chapter 92a.47. The limits for $CBOD_5$, Total Suspended Solids, and Fecal Coliform are technology based on Chapter 92a.47. The limits for Ammonia-Nitrogen are water quality-based on Chapter 93.7. Monitoring for E. Coli, Total Nitrogen, and Total Phosphorus is based on Chapter 92a.61.

## 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: January 1, 2025 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 | 0.26 | XXX | 0.86 | 1/day | Grab |
| CBOD5 | XXX | XXX | XXX | 25.0 | XXX | 50.0 | 2/month | Grab |
| TSS | XXX | XXX | XXX | 30.0 | XXX | 60.0 | 2/month | Grab |
| Fecal Coliform (No./100 ml) Oct 1 - Apr 30 | XXX | XXX | XXX | 2000 Geo Mean | XXX | 10000 | 2/month | Grab |
| Fecal Coliform (No./100 ml) May 1 - Sep 30 | XXX | XXX | XXX | 200 Geo Mean | XXX | 1000 | 2/month | Grab |
| E. Coli (No./100 ml) | XXX | XXX | XXX | XXX | XXX | Report | 1/year | Grab |
| Total Nitrogen | XXX | XXX | XXX | Report | XXX | XXX | 1/month | Grab |
| Ammonia-Nitrogen Nov 1 - Apr 30 | XXX | XXX | XXX | 25.0 | XXX | 50.0 | 2/month | Grab |
| Ammonia-Nitrogen May 1 - Oct 31 | XXX | XXX | XXX | 16.6 | XXX | 33.2 | 2/month | Grab |
| Total Phosphorus | XXX | XXX | XXX | Report | XXX | XXX | 1/month | Grab |

Compliance Sampling Location: at Outfall 001, after disinfection.

Flow is monitor only based on Chapter 92a.61. The limits for pH and DO are technology-based on Chapter 93.7. The Total Residual Chlorine (TRC) limit is water quality-based on Chapter 93.7. The limits for $CBOD_5$, Total Suspended Solids, and Fecal Coliform are technology based on Chapter 92a.47. The limits for Ammonia-Nitrogen are water quality-based on Chapter 93.7. Monitoring for E. Coli, Total Nitrogen, and Total Phosphorus is based on Chapter 92a.61.

Attachment 1

## WQM 7.0 Effluent Limits (Perrenial Reach Model)

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 20C | 34172 | BRUSH RUN |

| RMI | Name | Permit Number | Disc Flow (mgd) | Parameter | Effl. Limit 30-day Ave. (mg/L) | Effl. Limit Maximum (mg/L) | Effl. Limit Minimum (mg/L) |
|---|---|---|---|---|---|---|---|
| 0.500 | Perennial | PA0272795p | 0.007 | CBOD5 | 2 | | |
| | | | | NH3-N | 5.29 | 10.58 | |
| | | | | Dissolved Oxygen | | | 3 |

Since the Perennial Reach Model limits for CBOD5 and NH3-N are the same as the limits from the Dry Reach Model, the inputs from the Dry Reach Model below are protective

CBOD5 = 25.0 mg/l

NH3-N = 25.0 mg/l

Since the Perennial Reach Model limit for DO is not the same as the limits from the Dry Reach Model, the DO limit will need to be a minimum of 3.0 mg/l to be protective.

DO = 3.0 mg/l

# WQM 7.0 D.O.Simulation

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 20C | 34172 | BRUSH RUN |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 0.500 | 0.007 | 21.824 | 7.063 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 3.632 | 0.322 | 11.274 | 0.027 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 2.00 | 0.000 | 1.93 | 0.805 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 6.330 | 16.238 | Owens | 6 |
| **Reach Travel Time (days)** | | | |
| 1.147 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.115 | 2.00 | 1.76 | 7.97 |
| 0.229 | 2.00 | 1.60 | 7.97 |
| 0.344 | 2.00 | 1.46 | 7.97 |
| 0.459 | 2.00 | 1.33 | 7.97 |
| 0.573 | 2.00 | 1.22 | 7.97 |
| 0.688 | 2.00 | 1.11 | 7.97 |
| 0.803 | 2.00 | 1.01 | 7.97 |
| 0.917 | 2.00 | 0.92 | 7.97 |
| 1.032 | 2.00 | 0.84 | 7.97 |
| 1.147 | 2.00 | 0.77 | 7.97 |

## 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 |
|---|---|---|---|---|---|---|---|---|
| 20C | 34172 | BRUSH RUN | **0.500** | 1120.00 | 0.66 | 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** | 0.030 | 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 |
|---|---|---|---|---|---|---|---|
| Perennial | PA0272795p | 0.0074 | 0.0000 | 0.0000 | 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 | 2.00 | 2.00 | 0.00 | 1.50 |
| Dissolved Oxygen | 2.00 | 8.24 | 0.00 | 0.00 |
| NH3-N | 5.29 | 0.00 | 0.00 | 0.70 |

(Values from Dry Reach Model)

## 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 |
|---|---|---|---|---|---|---|---|---|
| 20C | 34172 | BRUSH RUN | **0.000** | 1119.00 | 0.90 | 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** | 0.030 | 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 Wasteload Allocations

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 20C | 34172 | BRUSH RUN |

## NH3-N Acute Allocations

| RMI | Discharge Name | Baseline Criterion (mg/L) | Baseline WLA (mg/L) | Multiple Criterion (mg/L) | Multiple WLA (mg/L) | Critical Reach | Percent Reduction |
|---|---|---|---|---|---|---|---|
| 0.500 | Perennial | 12.75 | 10.58 | 12.75 | 10.58 | 0 | 0 |

## NH3-N Chronic Allocations

| RMI | Discharge Name | Baseline Criterion (mg/L) | Baseline WLA (mg/L) | Multiple Criterion (mg/L) | Multiple WLA (mg/L) | Critical Reach | Percent Reduction |
|---|---|---|---|---|---|---|---|
| 0.500 | Perennial | 1.68 | 5.29 | 1.68 | 5.29 | 0 | 0 |

## Dissolved Oxygen Allocations

| RMI | Discharge Name | CBOD5 | | NH3-N | | Dissolved Oxygen | | Critical Reach | Percent Reduction |
|---|---|---|---|---|---|---|---|---|---|
| | | Baseline (mg/L) | Multiple (mg/L) | Baseline (mg/L) | Multiple (mg/L) | Baseline (mg/L) | Multiple (mg/L) | | |
| 0.50 | Perennial | 2 | 2 | 5.29 | 5.29 | 3 | 3 | 0 | 0 |

# WQM 7.0 Hydrodynamic Outputs

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 20C | 34172 | BRUSH RUN |

| RMI | Stream Flow (cfs) | PWS With (cfs) | Net Stream Flow (cfs) | Disc Analysis Flow (cfs) | Reach Slope (ft/ft) | Depth (ft) | Width (ft) | W/D Ratio | Velocity (fps) | Reach Trav Time (days) | Analysis Temp (°C) | Analysis pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Q7-10 Flow** | | | | | | | | | | | | |
| 0.500 | 0.02 | 0.00 | 0.02 | .0114 | 0.00038 | .322 | 3.63 | 11.27 | 0.03 | 1.147 | 21.82 | 7.06 |
| **Q1-10 Flow** | | | | | | | | | | | | |
| 0.500 | 0.01 | 0.00 | 0.01 | .0114 | 0.00038 | NA | NA | NA | 0.02 | 1.326 | 22.36 | 7.08 |
| **Q30-10 Flow** | | | | | | | | | | | | |
| 0.500 | 0.03 | 0.00 | 0.03 | .0114 | 0.00038 | NA | NA | NA | 0.03 | 1.022 | 21.48 | 7.05 |

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

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 20C | 34172 | BRUSH RUN |

| RMI | Total Discharge Flow (mgd) | Analysis Temperature (°C) | Analysis pH |
|---|---|---|---|
| 1.400 | 0.007 | 24.317 | 7.000 |
| **Reach Width (ft)** | **Reach Depth (ft)** | **Reach WDRatio** | **Reach Velocity (fps)** |
| 1.253 | 0.275 | 4.555 | 0.038 |
| **Reach CBOD5 (mg/L)** | **Reach Kc (1/days)** | **Reach NH3-N (mg/L)** | **Reach Kn (1/days)** |
| 21.86 | 1.362 | 21.58 | 0.976 |
| **Reach DO (mg/L)** | **Reach Kr (1/days)** | **Kr Equation** | **Reach DO Goal (mg/L)** |
| 3.727 | 29.353 | Owens | 2 |
| **Reach Travel Time (days)** | | | |
| 1.440 | | | |

**Subreach Results**

| TravTime (days) | CBOD5 (mg/L) | NH3-N (mg/L) | D.O. (mg/L) |
|---|---|---|---|
| 0.144 | 17.21 | 18.75 | 2.00 |
| 0.288 | 13.55 | 16.29 | 2.00 |
| 0.432 | 10.67 | 14.16 | 2.00 |
| 0.576 | 8.40 | 12.30 | 2.00 |
| 0.720 | 6.61 | 10.69 | 2.00 |
| 0.864 | 5.21 | 9.29 | 2.00 |
| 1.008 | 4.10 | 8.07 | 2.00 |
| 1.152 | 3.23 | 7.01 | 2.00 |
| 1.296 | 2.54 | 6.09 | 2.00 |
| 1.440 | 2.00 | 5.29 | 2.00 |

(use values above as inputs into the 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 |
|---|---|---|---|---|---|---|---|---|
| 20C | 34172 | BRUSH RUN | **1.400** | 1200.00 | 0.06 | 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** | 0.030 | 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 Stream | PA0272795 | 0.0074 | 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 | 4.00 | 2.00 | 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 |
|---|---|---|---|---|---|---|---|---|
| 20C | 34172 | BRUSH RUN | **0.500** | 1120.00 | 0.66 | 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** | 0.030 | 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 |
|---|---|---|---|---|---|---|---|
| Perennial | PA0272795p | 0.0110 | 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 | 2.75 | 2.00 | 0.00 | 1.50 |
| Dissolved Oxygen | 2.00 | 8.24 | 0.00 | 0.00 |
| NH3-N | 7.02 | 0.00 | 0.00 | 0.70 |

# WQM 7.0 Hydrodynamic Outputs

| SWP Basin | Stream Code | Stream Name |
|---|---|---|
| 20C | 34172 | BRUSH RUN |

| RMI | Stream Flow (cfs) | PWS With (cfs) | Net Stream Flow (cfs) | Disc Analysis Flow (cfs) | Reach Slope (ft/ft) | Depth (ft) | Width (ft) | W/D Ratio | Velocity (fps) | Reach Trav Time (days) | Analysis Temp (°C) | Analysis pH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Q7-10 Flow** | | | | | | | | | | | | |
| 1.400 | 0.00 | 0.00 | 0.00 | NA | 0.01684 | .275 | 1.25 | 4.56 | 0.04 | 1.440 | 24.32 | 7.00 |
| **Q1-10 Flow** | | | | | | | | | | | | |
| 1.400 | 0.00 | 0.00 | 0.00 | NA | 0.01684 | NA | NA | NA | 0.00 | 0.000 | 0.00 | 0.00 |
| **Q30-10 Flow** | | | | | | | | | | | | |
| 1.400 | 0.00 | 0.00 | 0.00 | NA | 0.01684 | NA | NA | NA | 0.00 | 0.000 | 0.00 | 0.00 |

Attachment 2

## TRC EVALUATION

Input appropriate values in B4:B8 and E4:E7

| | | | |
|---|---|---|---|
| 0.0198 | = Q stream (cfs) | 0.5 | = CV Daily |
| 0.00735 | = Q discharge (MGD) | 0.5 | = CV Hourly |
| 30 | = no. samples | 1 | = AFC_Partial Mix Factor |
| 0.3 | = Chlorine Demand of Stream | 1 | = CFC_Partial Mix Factor |
| 0 | = Chlorine Demand of Discharge | 15 | = AFC_Criteria Compliance Time (min) |
| 0.5 | = BAT/BPJ Value | 720 | = CFC_Criteria Compliance Time (min) |
| 0 | = % Factor of Safety (FOS) | | =Decay Coefficient (K) |

| Source | Reference | AFC Calculations | | Reference | CFC Calculations | |
|---|---|---|---|---|---|---|
| TRC | 1.3.2.iii | WLA afc = | 0.574 | 1.3.2.iii | WLA cfc = | 0.553 |
| PENTOXSD TRG | 5.1a | LTAMULT afc = | 0.373 | 5.1c | LTAMULT cfc = | 0.581 |
| PENTOXSD TRG | 5.1b | LTA_afc= | 0.214 | 5.1d | LTA_cfc = | 0.321 |

| Source | | Effluent Limit Calculations | | |
|---|---|---|---|---|
| PENTOXSD TRG | 5.1f | AML MULT = | 1.231 | |
| PENTOXSD TRG | 5.1g | AVG MON LIMIT (mg/l) = | 0.263 | AFC |
| | | INST MAX LIMIT (mg/l) = | 0.862 | |

| | |
|---|---|
| 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)** |