

Application Type Renewal
 Facility Type Non-Municipal
 Major / Minor Minor

**NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE**

Application No. PA0209694
 APS ID 1014514
 Authorization ID 1310843

Applicant and Facility Information

Applicant Name	<u>Sherwood James</u>	Facility Name	<u>Sherwood Retirement & Personal Care Home</u>
Applicant Address	<u>3995 Route 414</u> <u>Canton, PA 17724-7508</u>	Facility Address	<u>3995 Route 414</u> <u>Canton, PA 17724-7508</u>
Applicant Contact	<u>Karen Sherwood</u>	Facility Contact	<u>Karen Sherwood</u>
Applicant Phone	<u>(570) 673-8961</u>	Facility Phone	<u>(570) 673-8961</u>
Client ID	<u>118169</u>	Site ID	<u>490603</u>
Ch 94 Load Status	<u>Not Overloaded</u>	Municipality	<u>Canton Township</u>
Connection Status	<u>No Limitations</u>	County	<u>Bradford</u>
Date Application Received	<u>April 7, 2020</u>	EPA Waived?	<u>Yes</u>
Date Application Accepted	<u>April 20, 2020</u>	If No, Reason	<u></u>
Purpose of Application	<u>Application for individual NPDES permit for the discharge of treated sewage.</u>		

Summary of Review

DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the *Pennsylvania Bulletin* in accordance with 25 Pa. Code § 92a.82. Upon publication in the *Pennsylvania Bulletin*, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a hearing. If a hearing is held, notice of the hearing will be published in the *Pennsylvania Bulletin* at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge.

Approve	Deny	Signatures	Date
X		<i>Jonathan P. Peterman</i> Jonathan P. Peterman / Project Manager	January 12, 2021
X		<i>Nicholas W. Hartranft</i> Nicholas W. Hartranft, P.E. / Environmental Engineer Manager	January 13, 2021

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	<u>001</u>	Design Flow (MGD)	<u>0.003</u>
Latitude	<u>41° 39' 43.00"</u>	Longitude	<u>76° 49' 0.00"</u>
Quad Name	<u>Canton</u>	Quad Code	<u>0531</u>
Wastewater Description: <u>Sewage</u>			
Receiving Waters	<u>Alba Creek</u>	Stream Code	<u>30601</u>
NHD Com ID	<u>66407683</u>	RMI	<u>0.2</u>
Drainage Area	<u>12.81</u>	Yield (cfs/mi ²)	<u>0.013</u>
Q ₇₋₁₀ Flow (cfs)	<u>0.16</u>	Q ₇₋₁₀ Basis	<u>Gauge No. 01532000</u>
Elevation (ft)	<u>1109</u>	Slope (ft/ft)	<u>0.003</u>
Watershed No.	<u>4-C</u>	Chapter 93 Class.	<u>CWF</u>
Existing Use	<u>CWF</u>	Existing Use Qualifier	<u>N/A</u>
Exceptions to Use	<u>None.</u>	Exceptions to Criteria	<u>None.</u>
Assessment Status	<u>Attaining Use(s)</u>		
Cause(s) of Impairment	<u>N/A</u>		
Source(s) of Impairment	<u>N/A</u>		
TMDL Status	<u>N/A</u>	Name	<u>N/A</u>
Nearest Downstream Public Water Supply Intake	<u>Danville Municipal Water Authority</u>		
PWS Waters	<u>Susquehanna River</u>	Flow at Intake (cfs)	<u>1010</u>
PWS RMI	<u>138</u>	Distance from Outfall (mi)	<u>162</u>

Changes Since Last Permit Issuance: The updated Q₇₋₁₀ data was obtained from the updated stream gage information obtained from *Stuckey, M.H., and Roland, M.A., 2011, Selected Streamflow Statistics for Streamgage Locations In and Near Pennsylvania*. A Q₇₋₁₀ analysis was conducted using a downstream stream gage (01532000) as the reference stream gage. The Q₇₋₁₀ calculations, which are attached in Appendix A, indicate that the Q₇₋₁₀ is 0.16 cfs. No calculations were provided in these reviews for the determination of the Q₇₋₁₀. It is apparent that the Q₇₋₁₀ yield ratio for this watershed is significantly lower than default value of 0.1 cfs/mi² that is used as a baseline approximation of low flows. It is possible that underdeveloped headwaters may be the cause of this low yield ratio.

Given that fact that a downstream gage was used in the determination and the resulting Q₇₋₁₀ would only be considered conservative, the Q₇₋₁₀ utilized in the review is appropriate. Additionally, since there are no water quality-based effluent limits proposed, the Q₇₋₁₀ has little to no effect in the review.

Other Comments: None.

Treatment Facility Summary

Treatment Facility Name: Sherwood Retirement Sewer System

WQM Permit No.	Issuance Date	Comments
0898403	9/29/1998	Initial construction.

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Primary	Septic Tank	Hypochlorite	0.003
Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.003	---	Not Overloaded	---	Landfill

Treatment System Components for Outfall 001:

- One (1) Settling tank (Septic Tank).
- One (1) Zable Effluent Filter.
- Two (2) Aeration Tanks.
- Six (6) Filter Screens.
- One (1) Dosing Chamber.
- Three (3) Free Access Sand Filters.
- One (1) Tablet Erosion Chlorinator.
- Two (2) Chlorine Contact Tanks.
- One (1) Effluent Pump Tank.
- One (1) Outfall 001 to Alba Creek.

Changes Since Last Permit Issuance: None.
 Other Comments: None.

TMDL Impairment

The Departments Geographical Information System indicates that there are no associated TMDLs for this segment of Alba Creek. No further TMDL analysis is required.

Chesapeake Bay Requirements

Since this facility's design flow is 0.003 MGD, the permittee will be required to monitor and report TN and TP throughout the permit term at a frequency no less than annually in accordance with the Phase II WIP Chesapeake Bay Strategy for Phase V facilities (0.002 MGD to 0.2 MGD). Therefore, the proposed effluent limits were updated to contain the yearly monitoring requirements for nutrients.

Anti-Backsliding

In accordance with 40 CFR 122.44(l)(1) and (2), this permit does not contain effluent limitations, standards, or conditions that are less stringent than the previous permit.

Existing Effluent Limitations and Monitoring Requirements

Existing Limits – Outfall 001

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) ⁽¹⁾		Concentrations (mg/L)				Minimum ⁽²⁾ Measurement Frequency	Required Sample Type
	Annual Average	Total Annual	Minimum	Average Monthly		Instant. Maximum		
Flow (MGD)	Report Avg Mo	XXX	XXX	XXX	XXX	XXX	1/week	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	Report	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
CBOD5	XXX	XXX	XXX	25	XXX	50	2/month	Grab
Total Suspended Solids	XXX	XXX	XXX	30	XXX	60	2/month	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1,000	2/month	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2,000 Geo Mean	XXX	10,000	2/month	Grab
Ammonia-Nitrogen	XXX	XXX	XXX	Report	XXX	Report	1/6 months	Grab
Total Nitrogen	Report	Report	XXX	Report Annl Avg	XXX	XXX	1/year	Grab
Total Phosphorus	Report	Report	XXX	Report Annl Avg	XXX	XXX	1/year	Grab

*The existing effluent limits for Outfall 001 were based on a design flow of 0.003 MGD.

Development of Effluent Limitations

Outfall No. 001 Design Flow (MGD) 0.003
 Latitude 41° 39' 43.00" Longitude 76° 49' 0.00"
 Wastewater Description: Treated Sewage Effluent

Technology-Based Limitations

The following technology-based limitations apply, subject to water quality analysis and BPJ where applicable:

Pollutant	Limit (mg/l)	SBC	Federal Regulation	State Regulation
CBOD ₅	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(2)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform	1,000 / 100 ml	IMAX	-	92a.47(a)(4)

(5/1 – 9/30)				
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)

Water Quality-Based Limitations

To establish whether or not water-quality based effluent limitations (WQBELs) are required, the Department models in-stream conditions. In order to determine limitations for CBOD5, ammonia-N and dissolved oxygen, the Department utilizes the WQM 7.0 v1.0b model and in order to determine limitations for toxics, the Department utilizes the PENTOXSD v2.0d model.

WQM 7.0 for Windows, Version 1.0b, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen

The previous model was run using the latest information on Q7-10 stream flow, background water quality, average annual design flow, and other discharge characteristics. The existing technology based effluent limit for CBOD₅ (25 mg/l) and NH₃-N (25 mg/l) were used as inputs for the modeling. The DO minimum daily average criterion from §93.7 (5.0 mg/L for CWF) was used for the in-stream objective for the model. The summary of the output is as follows:

Parameter	Effluent Limit		
	30 Day Average	Maximum	Minimum
CBOD5	25	N/A	N/A
Ammonia-N	25	50	N/A
Dissolved Oxygen	N/A	N/A	3

The previous model did not recommend water-quality based effluent limitations with regards to CBOD5, ammonia-nitrogen, and dissolved oxygen. Refer to the Appendix for the WQM 7.0 inputs and results.

Comments: None.

Best Professional Judgment (BPJ) Limitations

See Dissolved Oxygen section below.

Comments: None.

Additional Considerations

None

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 the abovementioned 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) and/or BPJ.

Proposed Limits - 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
	Annual Average	Total Annual	Minimum	Average Monthly		Instant. Maximum		
Flow (MGD)	Report Avg Mo	XXX	XXX	XXX	XXX	XXX	1/week	Measured
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	Report	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
CBOD5	XXX	XXX	XXX	25	XXX	50	2/month	Grab
Total Suspended Solids	XXX	XXX	XXX	30	XXX	60	2/month	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1,000	2/month	Grab
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2,000 Geo Mean	XXX	10,000	2/month	Grab
Ammonia-Nitrogen	XXX	XXX	XXX	Report	XXX	Report	1/6 months	Grab
Total Nitrogen	Report	Report	XXX	Report Annl Avg	XXX	XXX	1/year	Grab
Total Phosphorus	Report	Report	XXX	Report Annl Avg	XXX	XXX	1/year	Grab

*The proposed effluent limits for Outfall 001 were based on a design flow of 0.003 MGD.

Effluent Limit Determination for Outfall 001

General Information

The associated mass-based limits (lbs/day) for all parameters were based on the formula: design flow (average annual) (MGD) x concentration limit (mg/L) at design flow x conversion factor (8.34). All effluent limits were then rounded down in accordance with the rounding rules established in the *Technical Guidance for the Development and Specification of Effluent Limitations* (362-0400-001), Chapter 5 - Specifying Effluent Limitations in NPDES Permits. The existing monitoring frequencies and sample types for these parameters generally correspond with the *Technical Guidance for the Development and Specification of Effluent Limitations* (362-0400-001) Table 6-3 and will remain.

Flow

Reporting of the average monthly is consistent with monitoring requirements for other treatment plants of this size and will remain.

Carbonaceous Biochemical Oxygen Demand (CBOD₅)

The results of the WQM 7.0 model show that the previously applied secondary treatment standards (25 PA Code §92a.47 (a) (1&2)) for CBOD₅ are protective of water quality and will remain.

Total Suspended Solids (TSS)

The previously applied technology based secondary treatment standards (25 PA Code §92a.47 (a) (1&2)) for TSS will remain as well.

pH

CFR Title 40 §133.102(c) and 25 PA Code §95.2(1) provide the basis of effluent limitations for pH. The existing limits will remain.

Total Residual Chlorine (TRC)

A TRC model evaluation was conducted by using the technology based effluent limitation as input. In accordance with 25 Pa. Code 92a.48(b)(2), a BAT value of 0.5 mg/l was used. The attached TRC model indicates that the technology based effluent limit of 0.5 mg/L (Average Monthly) and 1.6 mg/L (Instantaneous Maximum) are protective of water quality and will remain.

Fecal Coliforms

The existing fecal coliform limits with I-max limits were updated from the previous Chapter 92 code to correspond with what is specified in the updated 25 PA Code § 92a.47 (a)(4)&(5) and will remain.

Ammonia-Nitrogen (NH₃-N)

The results of the WQM 7.0 model show that water quality-based effluent limits for ammonia-nitrogen are not required. Based on BPJ, monitoring for NH₃-N will remain.

Dissolved Oxygen (DO)

Given results of the WQM 7.0 model, a discharge of effluent from this facility with a DO concentration of 3 mg/l would not result in an exceedance of water quality requirements for this stream. It is anticipated, based on similar technology, that the DO concentration in the effluent would be greater than 3.0 mg/l. Therefore, based on BPJ, only monitoring will be required for this facility. This will also provide historical data to establish baseline DO levels in the effluent for future reviews.

Compliance History

Summary of Inspections -The most recent Clean Water Program Compliance Inspection was conducted on 3/25/20. The report indicated no effluent violations.

WMS Query Summary - A WMS Query was run at *Reports - Violations & Enforcements – Open Violations for Client Report* to determine whether there are any unresolved violations associated with the client that will affect issuance of the permit (per CSL Section 609). This query revealed no open violations.

eDMRs Summary - Upon review of the eDMR's, the facility has generally been in compliance with the existing effluent limits.

Compliance History

DMR Data for Outfall 001 (from December 1, 2019 to November 30, 2020)

Parameter	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20	JUN-20	MAY-20	APR-20	MAR-20	FEB-20	JAN-20	DEC-19
Flow (MGD) Average Monthly	0.0013	0.0013	0.0012	0.0012	0.0012	0.0013	0.0012	0.0012	0.0011	0.0012	0.0011	0.0010
pH (S.U.) Minimum	7.1	7.1	7.2	7.2	7.2	7.1	7.2	7.1	7.2	7.2	7.2	7.3
pH (S.U.) Maximum	7.2	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.4	7.4	7.4	7.4
DO (mg/L) Minimum	5.12	4.85	4.59	4.52	4.21	4.19	5.17	5.10	5.12	5.04	4.52	4.78
TRC (mg/L) Average Monthly	0.28	0.30	0.29	0.32	0.27	0.28	0.29	0.33	0.29	0.29	0.26	0.26
TRC (mg/L) Instantaneous Maximum	0.44	0.46	0.46	0.46	0.45	0.43	0.44	0.46	0.44	0.42	0.41	0.42
CBOD5 (mg/L) Average Monthly	11.65	4.85	2.2	2.15	2.8	2.2	1.95	2	4.9	< 2.15	2.75	2.15
TSS (mg/L) Average Monthly	7	12.5	4	4.0	4	4.5	4.0	4	4	< 4	< 4.0	11.5
Fecal Coliform (No./100 ml) Geometric Mean	184.4	39.4	< 1	1.0	1	1	< 1	1.41	< 1	< 1	1	2.02
Fecal Coliform (No./100 ml) Instantaneous Maximum	290.9	1553.1	< 1	1.0	1	1	< 1	2	< 1	< 1	1	4.1
Total Nitrogen (lbs/day) Annual Average												0.19
Total Nitrogen (lbs/day) Total Annual												0.19
Total Nitrogen (mg/L) Annual Average												18.8
Ammonia (mg/L) Semi-Annual Average						4.1						17.4
Ammonia (mg/L) Instantaneous Maximum						4.1						17.4

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Total Phosphorus (lbs/day) Annual Average													0.04
Total Phosphorus (lbs/day) Total Annual													0.04
Total Phosphorus (mg/L) Annual Average													4.0

Tools and References Used to Develop Permit	
<input checked="" type="checkbox"/>	WQM for Windows Model (see Attachment B)
<input type="checkbox"/>	PENTOXSD for Windows Model (see Attachment [redacted])
<input checked="" type="checkbox"/>	TRC Model Spreadsheet (see Attachment C)
<input type="checkbox"/>	Temperature Model Spreadsheet (see Attachment [redacted])
<input type="checkbox"/>	Toxics Screening Analysis Spreadsheet (see Attachment [redacted])
<input type="checkbox"/>	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
<input checked="" type="checkbox"/>	Technical Guidance for the Development and Specification of Effluent Limitations, 362-0400-001, 10/97.
<input type="checkbox"/>	Policy for Permitting Surface Water Diversions, 362-2000-003, 3/98.
<input checked="" type="checkbox"/>	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 362-2000-008, 11/96.
<input type="checkbox"/>	Technology-Based Control Requirements for Water Treatment Plant Wastes, 362-2183-003, 10/97.
<input type="checkbox"/>	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 362-2183-004, 12/97.
<input type="checkbox"/>	Pennsylvania CSO Policy, 385-2000-011, 9/08.
<input type="checkbox"/>	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
<input type="checkbox"/>	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 391-2000-002, 4/97.
<input checked="" type="checkbox"/>	Determining Water Quality-Based Effluent Limits, 391-2000-003, 12/97.
<input type="checkbox"/>	Implementation Guidance Design Conditions, 391-2000-006, 9/97.
<input checked="" type="checkbox"/>	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.
<input type="checkbox"/>	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 391-2000-008, 10/1997.
<input type="checkbox"/>	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 391-2000-010, 3/99.
<input type="checkbox"/>	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 391-2000-011, 5/2004.
<input checked="" type="checkbox"/>	Implementation Guidance for Section 93.7 Ammonia Criteria, 391-2000-013, 11/97.
<input type="checkbox"/>	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 391-2000-014, 4/2008.
<input checked="" type="checkbox"/>	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 391-2000-015, 11/1994.
<input type="checkbox"/>	Implementation Guidance for Temperature Criteria, 391-2000-017, 4/09.
<input type="checkbox"/>	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 391-2000-018, 10/97.
<input type="checkbox"/>	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.
<input type="checkbox"/>	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 391-2000-021, 3/99.
<input type="checkbox"/>	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.
<input checked="" type="checkbox"/>	Design Stream Flows, 391-2000-023, 9/98.
<input type="checkbox"/>	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.
<input type="checkbox"/>	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 391-3200-013, 6/97.
<input checked="" type="checkbox"/>	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
<input type="checkbox"/>	SOP: [redacted]
<input type="checkbox"/>	Other: [redacted]

APPENDIX A

Q7-10 ANALYSIS AND STREAM DATA

Q₇₋₁₀ Analysis

Facility: Sherwood Retirement & PC Home
 Outfall: 001

NPDES Permit No.: PA0209694
 RMI at Outfall: 0.2 Elev. 1109

Reference Stream Gage Information

Stream Name	Towanda Creek
Reference Gage	1532000
Station Name	Towanda Creek near Monroeton, PA
Gage Drainage Area (sq. mi.)	215
Q ₇₋₁₀ at gage (cfs)	2.79
Yield Ratio (cfs/mi ²)	0.0130

Was Ecoflows Used?	No
Correlation From Ecoflows	

Check Dilution Ratio

Discharge at Outfall (wf) (mgd)	0.003	
	sf (cfs)	wf (cfs)
Dilution Ratio = sf/wf	0.1662	0.004641686
Dilution Ratio =	35.81286711 to 1	

Q₇₋₁₀ at Outfall

Drainage Area at site (sq. mi.)	12.81
Q ₇₋₁₀ at discharge site (cfs)	0.1662
Q ₇₋₁₀ at discharge site (mgd)	0.1074
Low Flow Yield Ratio of 0.1 cfs/mi ² (For Approx. Comparison Only)	
Q ₇₋₁₀ at discharge site (cfs)	1.2810
Q ₇₋₁₀ at discharge site (mgd)	0.8279

Q₇₋₁₀ at Downstream Reach #1

Drainage Area at Reach (sq. mi.)	40.41
RMI	0
Q ₇₋₁₀ at reach (cfs)	0.5244
Q ₇₋₁₀ at reach (mgd)	0.3389
	Elev. 1098

Q₇₋₁₀ at Downstream Reach #2

Drainage Area at Reach (sq. mi.)	[Drainage Area @ Reach #2]
RMI	[RMI @ Reach #2]
Q ₇₋₁₀ at reach (cfs)	#VALUE!
Q ₇₋₁₀ at reach (mgd)	#VALUE!

Q₇₋₁₀ at Downstream Reach #3

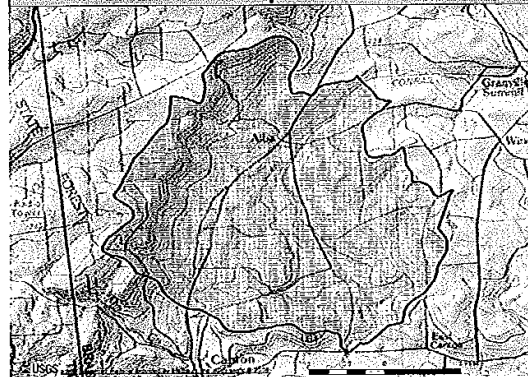
Drainage Area at Reach (sq. mi.)	[Drainage Area @ Reach #3]
RMI	[RMI @ Reach #3]
Q ₇₋₁₀ at reach (cfs)	#VALUE!
Q ₇₋₁₀ at reach (mgd)	#VALUE!

Basin Characteristics Report at [Site / Reach]

Date: Wed Jul 1 2015 11:38:02 Mountain Daylight Time
 NAD27 Latitude: 41.6616 (41 39 42)
 NAD27 Longitude: -76.8158 (-76 48 57)
 NAD83 Latitude: 41.6617 (41 39 42)
 NAD83 Longitude: -76.8155 (-76 48 56)

Parameter	Value
Area in square miles	12.81
Mean Basin Elevation in feet	1549.3
Unadjusted basin slope, in degrees	6.44
Adjusted basin slope, in degrees	6.2
Total stream length in miles	28.85
Stream density (miles/square mile)	2.25
Percent of area covered by lakes, ponds, reservoirs and wetlands	0
Percent of area covered by carbonate bedrock	0
Percent of area covered by glacial activity	100
Depth to rock in feet	4.6
Mean annual precipitation in inches	36
Maximum Daily Temperature in degrees F	54
Percent of area covered by forest	43
Percentage of impervious area determined from NLCD 2001 impervious dataset	0
Percent of area covered by urban land according to an enhanced version of NLCD 1992	0
Percentage of urban land cover determined from NLCD 2001 land cover dataset	4
Drainage quality Index from STATSGO	4.1
X coordinate of the centroid, in map projection, meters	97265.7
Y coordinate of the centroid, in map projection, meters	299613
X coordinate of the outlet, in map projection, meters	98645
Y coordinate of the outlet, in map projection, meters	296225
Longitude of the outlet, in decimal degrees	-76.81548

Basin Map at Outfall



12 Selected Streamflow Statistics for Streamgage Locations in and near Pennsylvania

Table 1. List of U.S. Geological Survey streamgage locations in and near Pennsylvania with updated streamflow statistics.—Continued

[Latitude and Longitude in decimal degrees; mi², square miles]

Streamgage number	Streamgage name	Latitude	Longitude	Drainage area (mi ²)	Regulated ¹
01508803	West Branch Tioughnioga River at Homer, N.Y.	42.638	-76.176	71.5	N
01509000	Tioughnioga River at Cortland, N.Y.	42.603	-76.159	292	N
01510000	Otselic River at Cincinnatus, N.Y.	42.541	-75.900	147	N
01512500	Chenango River near Chenango Forks, N.Y.	42.218	-75.848	1,483	N
01515000	Susquehanna River near Waverly, N.Y.	41.985	-76.501	4,773	N
01516350	Tioga River near Mansfield, Pa.	41.797	-77.080	153	N
01516500	Corey Creek near Mainesburg, Pa.	41.791	-77.015	12.2	N
01518000	Tioga River at Tioga, Pa.	41.908	-77.129	282	Y
01518700	Tioga River at Tioga Junction, Pa.	41.953	-77.115	446	Y
01518862	Cowanesque River at Westfield, Pa.	41.923	-77.532	90.6	N
01520000	Cowanesque River near Lawrenceville, Pa.	41.997	-77.140	298	Y
01520500	Tioga River at Lindley, N.Y.	42.029	-77.132	771	Y
01521500	Canisteo River at Arkport, N.Y.	42.396	-77.711	30.6	Y
01523500	Canacadea Creek near Hornell, N.Y.	42.335	-77.683	57.9	Y
01524500	Canisteo River below Canacadea Creek at Hornell, N.Y.	42.314	-77.651	158	Y
01526500	Tioga River near Erwins, N.Y.	42.121	-77.129	1,377	Y
01527000	Cohocton River at Cohocton, N.Y.	42.500	-77.500	52.2	N
01527500	Cohocton River at Avoca, N.Y.	42.398	-77.417	152	N
01528000	Fivemile Creek near Kanona, N.Y.	42.388	-77.358	66.8	N
01529000	Mud Creek near Savona, N.Y.	42.308	-77.197	76.6	Y
01529500	Cohocton River near Campbell, N.Y.	42.253	-77.217	470	N
01529950	Chemung River at Corning, N.Y.	42.146	-77.057	2,006	Y
01530332	Chemung River at Elmira, N.Y.	42.086	-76.801	2,162	Y
01530500	Newtown Creek at Elmira, N.Y.	42.105	-76.798	77.5	Y
01531000	Chemung River at Chemung, N.Y.	42.002	-76.635	2,506	Y
01531500	Susquehanna River at Towanda, Pa.	41.765	-76.441	7,797	Y
01532000	Towanda Creek near Monroeton, Pa.	41.707	-76.485	215	N
01532850	MB Wyalusing Creek near Birchardville, Pa.	41.863	-76.007	5.67	N
01533400	Susquehanna River at Meshoppen, Pa.	41.607	-76.050	8,720	Y
01533500	North Branch Mehoopany Creek near Lovelton, Pa.	41.531	-76.156	35.2	N
01533950	SB Tunkhannock Creek near Montdale, Pa.	41.575	-75.642	12.6	N
01534000	Tunkhannock Creek near Tunkhannock, Pa.	41.558	-75.895	383	N
01534300	Lackawanna River near Forest City, Pa.	41.680	-75.472	38.8	Y
01534500	Lackawanna River at Archbald, Pa.	41.505	-75.542	108	Y
01536000	Lackawanna River at Old Forge, Pa.	41.359	-75.744	332	Y
01536500	Susquehanna River at Wilkes-Barre, Pa.	41.251	-75.881	9,960	Y
01537000	Toby Creek at Luzerne, Pa.	41.281	-75.896	32.4	Y
01537500	Solomon Creek at Wilkes-Barre, Pa.	41.228	-75.904	15.7	N
01538000	Wapwallopen Creek near Wapwallopen, Pa.	41.059	-76.094	43.8	N
01539000	Fishing Creek near Bloomsburg, Pa.	41.078	-76.431	274	N
01539500	Little Fishing Creek at Byers Grove, Pa.	41.080	-76.511	56.5	N
01540200	Trexler Run near Ringtown, Pa.	40.853	-76.280	1.77	N
01540500	Susquehanna River at Danville, Pa.	40.958	-76.619	11,220	Y
01541000	West Branch Susquehanna River at Bower, Pa.	40.897	-78.677	315	N
01541200	West Branch Susquehanna River near Curwensville, Pa.	40.961	-78.519	367	Y

Table 2 25

Table 2. Selected low-flow statistics for streamgage locations in and near Pennsylvania.—Continued

[ft³/s; cubic feet per second; —, statistic not computed; <, less than]

Streamgage number	Period of record used in analysis ¹	Number of years used in analysis	1-day, 10-year (ft ³ /s)	7-day, 10-year (ft ³ /s)	7-day, 2-year (ft ³ /s)	30-day, 10-year (ft ³ /s)	30-day, 2-year (ft ³ /s)	90-day, 10-year (ft ³ /s)
01530500	1940–2008	69	5.0	6.1	11.0	7.6	13	9.0
01531000	² 1981–2008	28	138	147	237	169	296	203
01531000	³ 1905–1979	68	86.3	97.0	175	116	219	161
01531500	² 1981–2008	28	550	592	1,030	733	1,340	952
01531500	³ 1915–1979	65	539	571	990	675	1,230	928
01532000	1915–2008	94	2.2	2.8	9.7	4.6	14.4	9.4
01532850	1967–1979	13	.1	.2	.4	.3	.8	.7
01533400	² 1981–2008	28	602	648	1,110	790	1,430	1,060
01533500	1942–1958	17	.4	.6	1.5	.8	2.0	1.7
01533950	1962–1978	17	.2	.3	1.0	.6	1.4	1.0
01534000	1915–2008	94	15.2	17.3	35.9	24.2	51.0	38.7
01534300	1960–2008	49	1.1	1.7	5.1	2.8	7.6	4.8
01534500	² 1961–2008	48	16.7	18.8	29.2	21.9	35.8	27.6
01534500	³ 1941–1959	19	18.8	23.0	33.3	25.6	39.2	34.9
01536000	² 1961–2008	48	28.7	32.7	51.7	40.8	68.1	54.3
01536000	³ 1940–1959	20	77.8	93.9	119	105	138	124
01536500	² 1981–2008	28	828	872	1,450	1,030	1,830	1,350
01536500	³ 1901–1979	79	778	811	1,350	927	1,640	1,260
01537000	1943–1993	51	1.3	2.0	4.9	3.1	6.4	4.7
01537500	1941–1990	50	.2	.3	1.9	.5	3.1	1.6
01538000	1921–2008	88	3.1	3.6	7.1	5.0	9.3	7.5
01539000	1940–2008	69	15.4	16.8	36.8	21.1	51.1	36.8
01539500	1942–1958	17	.1	.3	1.4	1.0	3.3	2.3
01540200	1965–1981	17	0	0	.3	.1	.3	.1
01540500	² 1981–2008	28	1,080	1,120	1,870	1,320	2,330	1,690
01540500	³ 1906–1979	74	927	978	1,660	1,160	2,050	1,590
01541000	1915–2008	94	25.3	27.9	50.7	35.3	66.6	49.6
01541200	² 1967–2008	40	34.6	45.2	66.0	63.1	100	92.4
01541200	³ 1957–1965	9	22.9	24.7	44.7	27.7	58.2	36.4
01541303	1980–2008	29	53.4	58.5	94.0	74.4	123	102
01541308	1969–1979	11	1.3	1.3	1.9	1.6	2.4	2.1
01541500	² 1962–2008	47	39.0	41.9	66.5	51.9	86.3	70.6
01541500	³ 1915–1960	46	14.9	21.3	41.9	28.5	55.0	42.9
01542000	1942–1993	52	8.1	9.1	14.8	11.3	17.8	14.6
01542500	² 1967–2008	33	216	235	326	285	435	402
01542500	³ 1941–1965	20	—	131	189	152	243	221
01542810	1966–2008	43	.1	.1	.3	.2	.5	.3
01543000	1915–2008	94	2.9	4.2	16.0	9.6	27.4	19.2
01543500	1940–2008	69	10.7	14.5	44.9	26.6	74.9	50.5
01544000	² 1957–2008	52	3.3	6.9	19.0	11.2	31.1	19.0
01544500	1942–2008	67	4.2	4.9	12.5	7.5	17.4	11.7
01545000	² 1964–2008	45	6.8	8.2	21.2	12.0	32.7	20.7
01545500	² 1963–2008	46	217	238	446	306	629	428
01545500	³ 1909–1961	53	125	141	278	190	387	296
01545600	1966–2008	43	1.2	1.5	4.4	2.4	6.7	4.2

APPENDIX B

WQM 7.0 MODEL INPUT/OUTPUT

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
04C	30601	ALBA CREEK	0.200	1109.00	12.81	0.00000	0.00	<input checked="" type="checkbox"/>

Stream Data

Design Cond.	LFY	Trib Flow	Stream Flow	Rch Trav Time	Rch Velocity	WD Ratio	Rch Width	Rch Depth	Tributary Temp	Tributary pH	Stream Temp	Stream pH
	(cfsm)	(cfs)	(cfs)	(days)	(fps)		(ft)	(ft)	(°C)		(°C)	
Q7-10	0.100	0.00	0.16	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
Sherwood Retire	PA0209694	0.0000	0.0030	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

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
04C	30601	ALBA CREEK	0.000	1098.00	40.41	0.00000	0.00	<input checked="" type="checkbox"/>

Stream Data

Design Cond.	LFY (cfs)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary		Stream	
									Temp (°C)	pH	Temp (°C)	pH
Q7-10	0.100	0.00	0.52	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	0.00	7.00

Parameter Name	Parameter Data			
	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

<u>SWP Basin</u>		<u>Stream Code</u>		<u>Stream Name</u>								
04C		30601		ALBA CREEK								
RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (°C)	Analysis pH
Q7-10 Flow												
0.200	0.16	0.00	0.16	.0046	0.01042	.404	8.79	21.79	0.05	0.263	20.14	7.00
Q1-10 Flow												
0.200	0.15	0.00	0.15	.0046	0.01042	NA	NA	NA	0.04	0.277	20.15	7.00
Q30-10 Flow												
0.200	0.19	0.00	0.19	.0046	0.01042	NA	NA	NA	0.05	0.241	20.12	7.00

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	<input checked="" type="checkbox"/>
WLA Method	EMPR	Use Inputted W/D Ratio	<input type="checkbox"/>
Q1-10/Q7-10 Ratio	0.909	Use Inputted Reach Travel Times	<input type="checkbox"/>
Q30-10/Q7-10 Ratio	1.18	Temperature Adjust Kr	<input checked="" type="checkbox"/>
D.O. Saturation	90.00%	Use Balanced Technology	<input checked="" type="checkbox"/>
D.O. Goal	5		

WQM 7.0 Wasteload Allocations

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>
04C	30601	ALBA CREEK

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
0.200	Sherwood Retire	9.57	50	9.57	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
0.200	Sherwood Retire	1.9	25	1.9	25	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	<u>CBOD5</u>		<u>NH3-N</u>		<u>Dissolved Oxygen</u>		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
0.20	Sherwood Retire	25	25	25	25	3	3	0	0

WQM 7.0 D.O.Simulation

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>		
04C	30601	ALBA CREEK		
<u>RMI</u>	<u>Total Discharge Flow (mgd)</u>	<u>Analysis Temperature (°C)</u>		<u>Analysis pH</u>
0.200	0.003	20.141		7.000
<u>Reach Width (ft)</u>	<u>Reach Depth (ft)</u>	<u>Reach WDRatio</u>		<u>Reach Velocity (fps)</u>
8.794	0.404	21.794		0.046
<u>Reach CBOD5 (mg/L)</u>	<u>Reach Kc (1/days)</u>	<u>Reach NH3-N (mg/L)</u>		<u>Reach Kn (1/days)</u>
2.65	0.345	0.70		0.708
<u>Reach DO (mg/L)</u>	<u>Reach Kr (1/days)</u>	<u>Kr Equation</u>		<u>Reach DO Goal (mg/L)</u>
8.095	14.915	Owens		5
<u>Reach Travel Time (days)</u>	<u>Subreach Results</u>			
0.263	<u>TravTime (days)</u>	<u>CBOD5 (mg/L)</u>	<u>NH3-N (mg/L)</u>	<u>D.O. (mg/L)</u>
	0.026	2.62	0.69	8.22
	0.053	2.60	0.68	8.22
	0.079	2.58	0.67	8.22
	0.105	2.55	0.65	8.22
	0.132	2.53	0.64	8.22
	0.158	2.51	0.63	8.22
	0.184	2.48	0.62	8.22
	0.211	2.46	0.61	8.22
	0.237	2.44	0.60	8.22
	0.263	2.42	0.58	8.22

WQM 7.0 Effluent Limits

<u>SWP Basin</u>		<u>Stream Code</u>		<u>Stream Name</u>			
04C		30601		ALBA CREEK			
RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
0.200	Sherwood Retire	PA0209694	0.000	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			3

APPENDIX C

TRC ANALYSIS SPREADSHEET

1A	B	C	D	E	F	G
2	TRC EVALUATION Sherwood Retirement and PCH PA0209684					
3	Input appropriate values in B4:B8 and E4:E7					
4	0.16	= Q stream (cfs)		0.5	= CV Daily	
5	0.003	= Q discharge (MGD)		0.5	= CV Hourly	
6	30	= no. samples		1	= AFC_Partial Mix Factor	
7	0.3	= Chlorine Demand of Stream		1	= CFC_Partial Mix Factor	
8	0	= Chlorine Demand of Discharge		15	= AFC_Criteria Compliance Time (min)	
9	0.5	= BAT/BPJ Value		720	= CFC_Criteria Compliance Time (min)	
	0	= % Factor of Safety (FOS)		0	=Decay Coefficient (K)	
10	Source	Reference	AFC Calculations	Reference	CFC Calculations	
11	TRC	1.3.2.iii	WLA afc = 11.017	1.3.2.iii	WLA cfc = 10.733	
12	PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581	
13	PENTOXSD TRG	5.1b	LTA_afc = 4.105	5.1d	LTA_cfc = 6.240	
14	Source	Effluent Limit Calculations				
16	PENTOXSD TRG	5.1f	AML MULT = 1.231			
17	PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500		BAT/BPJ	
18			INST MAX LIMIT (mg/l) = 1.635			
	WLA afc	$(.019/e^{-k \cdot AFC_tc}) + [(AFC_Yc \cdot Qs \cdot 0.019 / Qd \cdot e^{-k \cdot AFC_tc}) \dots + Xd + (AFC_Yc \cdot Qs \cdot Xs / Qd)] \cdot (1 - FOS / 100)$				
	LTAMULT afc	$EXP((0.5 \cdot LN(cvh^2 + 1)) - 2.326 \cdot LN(cvh^2 + 1)^{0.5})$				
	LTA_afc	wla_afc * LTAMULT_afc				
	WLA_cfc	$(.011/e^{-k \cdot CFC_tc}) + [(CFC_Yc \cdot Qs \cdot 0.011 / Qd \cdot e^{-k \cdot CFC_tc}) \dots + Xd + (CFC_Yc \cdot Qs \cdot Xs / Qd)] \cdot (1 - FOS / 100)$				
	LTAMULT_cfc	$EXP((0.5 \cdot LN(cvd^2 / no_samples + 1)) - 2.326 \cdot LN(cvd^2 / no_samples + 1)^{0.5})$				
	LTA_cfc	wla_cfc * LTAMULT_cfc				
	AML MULT	$EXP(2.326 \cdot LN((cvd^2 / no_samples + 1)^{0.5}) - 0.5 \cdot LN(cvd^2 / no_samples + 1))$				
	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)				

APPENDIX D

FACILITY MAP AND SCHEMATIC

