

Application Type

Renewal

Facility Type

Non-Municipal

Major / Minor

Minor

Application No.

PA0081825

APS ID

825092

Authorization ID

1464127

**NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE**

Applicant and Facility Information

Applicant Name	<u>UMH PA Rolling Hills Estates LLC</u>	Facility Name	<u>Rolling Hills Estates</u>
Applicant Address	<u>3499 Us Highway 9 Suite 3c</u>	Facility Address	<u>457 Burgner'S Road</u>
	<u>Freehold, NJ 07728-3277</u>		<u>Carlisle, PA 17015</u>
Applicant Contact	<u>Jeffrey Yorick</u>	Facility Contact	<u>Karen Herb</u>
Applicant Phone	<u>(304) 291-3380</u>	Facility Phone	<u>(717) 226-8446</u>
Client ID	<u>307794</u>	Site ID	<u>260826</u>
Ch 94 Load Status	<u>Not Overloaded</u>	Municipality	<u>Lower Frankford Township</u>
Connection Status	<u>No Limitations</u>	County	<u>Cumberland</u>
Date Application Received	<u>December 5, 2023</u>	EPA Waived?	<u>Yes</u>
Date Application Accepted	<u>December 27, 2023</u>	If No, Reason	
Purpose of Application	<u>NPDES Renewal.</u>		

Summary of Review

UMH PA Rolling Hills Estates LLC (Permittee) has applied to the Pennsylvania Department of Environmental Protection (DEP) for reissuance of the NPDES permit. The permit was last reissued on May 31, 2019 and became effective on June 1, 2019. The permit expired on May 31, 2024.

Based on the review, it is recommended that the permit be drafted.

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.

Approve	Deny	Signatures	Date
X		<i>Jinsu Kim</i> Jinsu Kim / Environmental Engineering Specialist	September 11, 2024
X		Maria D. Bebenek Daniel W. Martin, P.E. / Environmental Engineer Manager	September 17, 2024
X		Maria D. Bebenek Maria D. Bebenek, P.E. / Program Manager	September 17, 2024

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	001	Design Flow (MGD)	.023
Latitude	40° 12' 55.22"	Longitude	-77° 17' 54.02"
Quad Name	Plainfield	Quad Code	1727
Wastewater Description:	Sewage Effluent		
Receiving Waters	Conodoguinet Creek	Stream Code	10194
NHD Com ID	56406747	RMI	46.05
Drainage Area	340 sq.mi.	Yield (cfs/mi ²)	0.105
Q ₇₋₁₀ Flow (cfs)	35.8	Q ₇₋₁₀ Basis	USGS StreamStats
Elevation (ft)	470	Slope (ft/ft)	
Watershed No.	7-B	Chapter 93 Class.	WWF
Existing Use	None	Existing Use Qualifier	None
Exceptions to Use	None	Exceptions to Criteria	None
Assessment Status	Impaired		
Cause(s) of Impairment	Organic Enrichment		
Source(s) of Impairment	Source Unknown		
TMDL Status	Final	Name	Conodoguinet Creek Watershed
Nearest Downstream Public Water Supply Intake	Carlisle Borough		
PWS Waters	Conodoguinet Creek	Flow at Intake (cfs)	48
PWS RMI	35.95	Distance from Outfall (mi)	10.1

Drainage Area

The discharge is to Conodoguinet Creek at RMI 46.05. A drainage area upstream of the point of discharge is estimated to be 340 sq.mi., according to USGS StreamStats available at <https://streamstats.usgs.gov/ss/>.

Streamflow

USGS StreamStats produced a Q7-10 flow of 35.8 cfs at the point of discharge; resulting a low flow yield of 35.8 cfs / 340 sq.mi = 0.105 cfs/sq.mi.

Conodoguinet Creek

Under 25 Pa Code §93.9o, the Conodoguinet Creek basin from PA 997 at Roxbury to Mouth is designated as warm water fishes and supports migratory fishes. No special protection water is therefore impacted by this discharge. No Class A Wild Trout Fishery is impacted by this discharge. DEP's 2024 integrated water quality shows that the discharge is located in a stream segment listed impaired for organic enrichment due to unknown source(s). While a TMDL was developed in 2000 to address impairments identified in 18 sub-watersheds in the Conodoguinet Creek basin, no wasteload allocation has been considered for this discharge.

Public Water Supply Intake

The nearest downstream public water supply intake is Carlisle Borough, on the Conodoguinet Creek located approximately 10 miles from the discharge. Given the nature and distance, the discharge is not expected to significantly impact the water supply.

Treatment Facility Summary				
Treatment Facility Name: Rolling Hills Estates				
WQM Permit No.	Issuance Date			
2186430	12/29/1986			
2186430 04-1	11/8/2006			
Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Tertiary	Aerated Lagoon	Hypochlorite	0.023
Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.023	N/A	Not Overloaded	Aerobic Digestion	Other WWTP

The permittee owns and operates an on-site sanitary wastewater treatment facility serving wastewater generated from a manufactured home community in Carlisle, PA. The facility utilizes extended aeration treatment process with tertiary filtration. The process, according to the application, includes a three-cell aeration lagoon, lagoon effluent tank, clarifiers (2), chlorine contact tank, floc tank, Aqua-Aerobic Aqua mini disk cloth media filter, dechlorinator and outfall to Conodoguinet Creek.

Liquid chlorine (sodium hypochlorite) is used for disinfection and alum is used for phosphorous removal. The filter backwash is sent to the lagoon. There are two (2) sludge holding tanks available for sludge handling prior to hauling off site via a local septic hauler to another WWTP for ultimate treatment/disposal.

Compliance History	
Summary of DMRs:	A summary of past 12-month DMR data is presented on the next page.
Summary of Inspections:	<p>06/06/2024: DEP conducted a routine inspection and noted that the facility has failed to maintain records. Violations were noted at the time of inspection.</p> <p>04/23/2020: DEP conducted an administrative inspection due to covid-19 related restrictions. No violations were noted at the time of inspection.</p>
Other Comments:	DEP's database revealed that there are several open violations associated with this permittee or facility. A draft permit cover letter will indicate that the permit may not be finalized until all violations are resolved.

Effluent Data

DMR Data for Outfall 001 (from August 1, 2023 to July 31, 2024)

Parameter	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	OCT-23	SEP-23	AUG-23
Flow (MGD) Average Monthly	0.013	0.0178	0.01581	0.0182	0.0181	0.0186	0.0167	0.0157	0.0171	0.0169	0.016	0.0134
Flow (MGD) Daily Maximum	0.0202	0.0254	0.0221	0.0306	0.0243	0.0252	0.0196	0.0182	0.0209	0.02	0.0285	0.0186
pH (S.U.) Instantaneous Minimum	7.1	6.7	6.7	6.8	7.1	6.5	6.0	7.5	7.0	8.0	7.0	7.0
pH (S.U.) Instantaneous Maximum	7.3	7.1	7.7	7.0	8.0	8.5	7.9	8.4	8.2	8.4	8.5	7.5
DO (mg/L) Instantaneous Minimum	6.3	6.0	6.0	6.4	8.7	9.8	10.1	9.7	7.2	6.2	5.3	7.0
TRC (mg/L) Average Monthly	0.33	0.46	0.33	0.4	0.43	0.43	0.43	0.44	0.44	0.39	0.39	0.43
TRC (mg/L) Instantaneous Maximum	0.44	1.33	0.47	0.48	0.49	0.48	0.48	0.48	0.49	0.48	0.48	0.48
CBOD5 (mg/L) Average Monthly	< 2.9	< 3.6	< 2.4	< 3.2	< 2.4	4.4	< 2.4	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TSS (mg/L) Average Monthly	5.0	7.0	3.0	2.0	3.0	2.0	1.0	< 6.0	< 6.0	< 14.0	< 12.0	< 5.0
Fecal Coliform (No./100 ml) Geometric Mean	< 1	< 1	< 1	< 1	< 1	90	< 1	< 1	< 1	< 3	< 1	< 1
Fecal Coliform (No./100 ml) Instantaneous Maximum	< 1	< 1	< 1	< 1	1	104	< 1	< 1	< 1	10	< 1	< 1
Nitrate-Nitrite (mg/L) Annual Average								0.88				
Total Nitrogen (mg/L) Annual Average								5.02				
TKN (mg/L) Annual Average								4.1				
Total Phosphorus (mg/L) Average Monthly	0.59	0.43	0.34	0.6	0.13	< 0.13	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Existing Effluent Limitations and Monitoring Requirements

The table below summarizes effluent limits and monitoring requirements specified in the current permit.

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	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	5.0 Inst Min	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	XXX	XXX	XXX	25.0	XXX	50	2/month	8-Hr Composite
Total Suspended Solids	XXX	XXX	XXX	30.0	XXX	60	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
Nitrate-Nitrite as N	XXX	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	8-Hr Composite
Total Nitrogen	XXX	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	Calculation
Total Kjeldahl Nitrogen	XXX	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	2.0	XXX	XXX	2/month	8-Hr Composite

Development of Effluent Limitations and Monitoring Requirements

Outfall No. 001
Latitude 40° 12' 55.22"
Wastewater Description: Sewage Effluent

Design Flow (MGD) .023
Longitude -77° 17' 54.02"

Technology-Based Limitations

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

Pollutant	Limit (mg/l)	SBC	Federal Regulation	State Regulation
CBOD ₅	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(2)
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)

Water Quality-Based Limitations

CBOD5, NH3-N and Dissolved Oxygen (DO)

WQM 7.0 version 1.0b is a water quality model designed to assist DEP to determine appropriate permit requirements for CBOD5, NH3-N and DO. DEP's guidance no. 391-2000-007 provides the technical methods contained in WQM 7.0 for conducting wasteload allocation and for determining recommended NPDES effluent limits for point source discharges. The model output indicated that existing effluent limits are still adequate for water quality protection.

Total Residual Chlorine

Since chlorine is used for disinfection, Total Residual Chlorine (TRC) effluent levels must be regulated in accordance with 25 Pa Code §92a.48(b). DEP's TRC_CALC worksheet indicates that existing limits of 0.5 mg/L (average monthly) and 1.6 mg/L (IMAX) are still protective of water quality.

Toxics

DEP's NPDES permit application for minor sewages less than 0.1 MGD does not require sampling of toxics pollutants. As a result, no reasonable potential analysis for toxics pollutants has been performed for the upcoming permit renewal.

Additional Considerations

Flow Monitoring

The requirement to monitor the volume of effluent will remain in the draft permit per 40 CFR § 122.44(i)(1)(ii).

Dissolved Oxygen

The permit contains a minimum of 5.0 mg/L for DO which is a state water quality criterion set forth in 25 Pa Code §92.7(a). This effluent limit will still remain unchanged in the permit to ensure that the facility achieves compliance with DEP's water quality standards. This approach is also consistent with DEP's SOP has also been implemented to other major sewage facilities throughout the state.

E. Coli Monitoring Requirement

DEP's SOP no. BCW-PMT-033 recommends a routine monitoring for E. Coli in all new and reissued sewage permits. As a result, an annual monitoring requirement for E. Coli will be included in the permit given the facility's design flow is greater than 0.002 MGD and less than 0.05 MGD.

Total Phosphorus

The existing Total Phosphorus effluent limit of 2.0 mg/L (30-day average) was developed to protect the lower Susquehanna River as recommended by DEP's technical guidance no. 391-2000-018. There is no reason to relax or remove this effluent; as a result, the existing effluent limit will be maintained in the permit.

Chesapeake Bay TMDL

According to Pennsylvania's Chesapeake Bay Tributary Strategy, this treatment facility is classified as a Phase V facility, a facility with a design flow greater than 0.002 MGD and less than 0.2 MGD. DEP's current Supplement to Phase II WIP (Watershed Implementation Plan) requires all renewal individual permits for Phase V facilities will include monitoring and reporting for TN and TP throughout the permit term at a frequency no less than annually. Since the permittee has already monitored Total Phosphorus, no additional monitoring is necessary for Total Phosphorus. Also, the existing annual Total Nitrogen monitoring will continue to be included in the permit.

Monitoring Frequency and Sample Type

All monitoring frequencies and sample types will remain unchanged in the permit.

Antidegradation Requirements

All effluent limitations and monitoring requirements have been developed to ensure that existing instream water uses and the level of water quality necessary to protect the existing uses are maintained and protected.

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" (386-0400-001), 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)					
	Average Monthly	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum	Minimum ⁽²⁾ Measurement Frequency	Required Sample Type
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Measured
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	5.0 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	2/month	8-Hr Composite
TSS	XXX	XXX	XXX	30.0	XXX	60	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
Nitrate-Nitrite	XXX	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	8-Hr Composite
Total Nitrogen	XXX	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	Calculation
TKN	XXX	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	2.0	XXX	XXX	2/month	8-Hr Composite
E. Coli (No. / 100 mL)	XXX	XXX	XXX	XXX	XXX	Report	1/year	Grab

Tools and References Used to Develop Permit	
<input type="checkbox"/>	WQM for Windows Model (see Attachment [REDACTED])
<input type="checkbox"/>	Toxics Management Spreadsheet (see Attachment [REDACTED])
<input type="checkbox"/>	TRC Model Spreadsheet (see Attachment [REDACTED])
<input type="checkbox"/>	Temperature Model Spreadsheet (see Attachment [REDACTED])
<input type="checkbox"/>	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
<input type="checkbox"/>	Technical Guidance for the Development and Specification of Effluent Limitations, 386-0400-001, 10/97.
<input type="checkbox"/>	Policy for Permitting Surface Water Diversions, 386-2000-019, 3/98.
<input type="checkbox"/>	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 386-2000-018, 11/96.
<input type="checkbox"/>	Technology-Based Control Requirements for Water Treatment Plant Wastes, 386-2183-001, 10/97.
<input type="checkbox"/>	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 386-2183-002, 12/97.
<input type="checkbox"/>	Pennsylvania CSO Policy, 386-2000-002, 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, 386-2000-008, 4/97.
<input type="checkbox"/>	Determining Water Quality-Based Effluent Limits, 386-2000-004, 12/97.
<input type="checkbox"/>	Implementation Guidance Design Conditions, 386-2000-007, 9/97.
<input type="checkbox"/>	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 386-2000-016, 6/2004.
<input type="checkbox"/>	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 386-2000-012, 10/1997.
<input type="checkbox"/>	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 386-2000-009, 3/99.
<input type="checkbox"/>	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 386-2000-015, 5/2004.
<input type="checkbox"/>	Implementation Guidance for Section 93.7 Ammonia Criteria, 386-2000-022, 11/97.
<input type="checkbox"/>	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 386-2000-013, 4/2008.
<input type="checkbox"/>	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 386-2000-011, 11/1994.
<input type="checkbox"/>	Implementation Guidance for Temperature Criteria, 386-2000-001, 4/09.
<input type="checkbox"/>	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 386-2000-021, 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, 386-2000-020, 10/97.
<input type="checkbox"/>	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 386-2000-005, 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, 386-2000-010, 3/1999.
<input type="checkbox"/>	Design Stream Flows, 386-2000-003, 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, 386-2000-006, 10/98.
<input type="checkbox"/>	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 386-3200-001, 6/97.
<input 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]

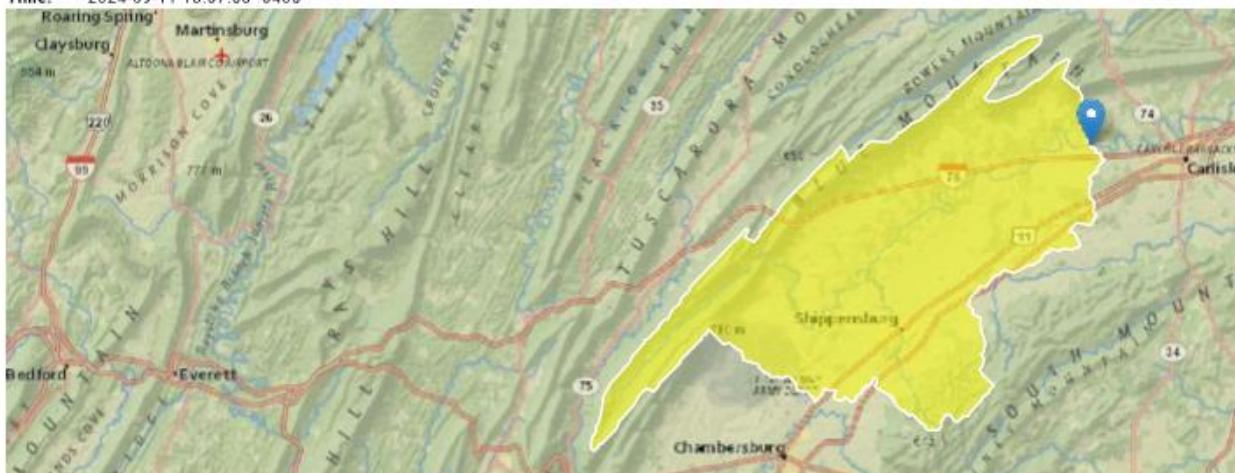
StreamStats Report

Region ID: PA

Workspace ID: PA20240911170644277000

Clicked Point (Latitude, Longitude): 40.21510, -77.29837

Time: 2024-09-11 13:07:08 -0400



[Collapse All](#)

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CARBON	Percentage of area of carbonate rock	31.96	percent
DRNAREA	Area that drains to a point on a stream	340	square miles
PRECIP	Mean Annual Precipitation	39	inches
ROCKDEP	Depth to rock	4.5	feet
STRDEN	Stream Density -- total length of streams divided by drainage area	1.87	miles per square mile

Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	340	square miles	4.93	1280
PRECIP	Mean Annual Precipitation	39	inches	35	50.4
STRDEN	Stream Density	1.87	miles per square mile	0.51	3.1
ROCKDEP	Depth to Rock	4.5	feet	3.32	5.65
CARBON	Percent Carbonate	31.96	percent	0	99

Low-Flow Statistics Flow Report [Low Flow Region 2]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct (other -- see report)

Statistic	Value	Unit	SE	ASEp
7 Day 2 Year Low Flow	58.5	ft ³ /s	38	38
30 Day 2 Year Low Flow	71.3	ft ³ /s	33	33

Statistic	Value	Unit	SE	ASEp
7 Day 10 Year Low Flow	35.6	ft ³ /s	51	51
30 Day 10 Year Low Flow	43.8	ft ³ /s	46	46
90 Day 10 Year Low Flow	56.8	ft ³ /s	36	36

Low-Flow Statistics Citations

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

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Application Version: 4.23.0

StreamStats Services Version: 1.2.22

NSS Services Version: 2.2.1

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name			RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC		
07B	10194 CONODOGUINET CREEK				46.050	470.00	340.00	0.00000	0.00	<input checked="" type="checkbox"/>		
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)	Stream pH		
Q7-10	0.100	0.00	35.80	0.000	0.000	0.0	0.00	0.00	23.40	8.40		
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				
	Rolling Hills	PA0081825	0.0230	0.0230	0.0230	0.000	25.00	7.00				
Parameter Data												
	Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)							
	CBOD5	25.00	2.00	0.00	1.50							
	Dissolved Oxygen	5.00	8.24	0.00	0.00							
	NH3-N	25.00	0.00	0.00	0.70							

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name		RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC				
07B		10194 CONODOGUINET CREEK		45.000	465.00	340.13	0.00000	0.00	<input checked="" type="checkbox"/>				
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)	Stream Temp (°C)	pH	Stream pH	
Q7-10	0.100	0.00	36.50	0.000	0.000	0.0	0.00	0.00	25.00	7.00	0.00	0.00	
Q1-10		0.00	0.00	0.000	0.000								
Q30-10		0.00	0.00	0.000	0.000								
Discharge Data													
Name		Permit Number		Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH				
				0.0000	0.0000	0.0000	0.000	0.00	7.00				
Parameter Data													
Parameter Name				Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)						
CBOD5				25.00	2.00	0.00	1.50						
Dissolved Oxygen				3.00	8.24	0.00	0.00						
NH3-N				25.00	0.00	0.00	0.70						

WQM 7.0 Hydrodynamic Outputs

<u>SWP Basin</u>			<u>Stream Code</u>		<u>Stream Name</u>								
07B			10194		CONODOGUINET CREEK								
RMI	Stream Flow	PWS With	Net Stream Flow	Disc Analysis Flow	Reach Slope	Depth	Width	W/D Ratio	Velocity	Reach Trav Time	Analysis Temp	Analysis pH	
	(cfs)	(cfs)	(cfs)	(cfs)	(ft/ft)	(ft)	(ft)		(fps)	(days)	(°C)		
	Q7-10 Flow												
46.050	35.80	0.00	35.80	.0356 0.00090	.963	99.15	102.91	0.38	0.171	23.40	8.39		
	Q1-10 Flow												
46.050	22.91	0.00	22.91	.0356 0.00090	NA	NA	NA	0.29	0.220	23.40	8.38		
	Q30-10 Flow												
46.050	48.69	0.00	48.69	.0356 0.00090	NA	NA	NA	0.45	0.144	23.40	8.39		

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	0.64	Use Inputted Reach Travel Times	<input type="checkbox"/>
Q30-10/Q7-10 Ratio	1.36	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>					
07B	10194	CONODOGUINET 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
	46.050 Rolling Hills	1.4	50	1.4	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
	46.050 Rolling Hills	.33	25	.33	25	0	0
Dissolved Oxygen Allocations							
RMI	Discharge Name	CBOD5 Baseline (mg/L)	CBOD5 Multiple (mg/L)	NH3-N Baseline (mg/L)	NH3-N Multiple (mg/L)	Dissolved Oxygen Baseline (mg/L)	Dissolved Oxygen Multiple (mg/L)
	46.05 Rolling Hills	25	25	25	25	5	5
						0	0

WQM 7.0 D.O.Simulation

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>		
07B	10194	CONODOGUINET CREEK		
<u>RMI</u> 46.050	<u>Total Discharge Flow (mgd)</u> 0.023	<u>Analysis Temperature (°C)</u> 23.402	<u>Analysis pH</u> 8.390	
<u>Reach Width (ft)</u> 99.153	<u>Reach Depth (ft)</u> 0.963	<u>Reach WDRatio</u> 102.912	<u>Reach Velocity (fps)</u> 0.375	
<u>Reach CBOD5 (mg/L)</u> 2.02	<u>Reach Kc (1/days)</u> 0.016	<u>Reach NH3-N (mg/L)</u> 0.02	<u>Reach Kn (1/days)</u> 0.909	
<u>Reach DO (mg/L)</u> 8.240	<u>Reach Kr (1/days)</u> 1.711	<u>Kr Equation</u> Tsivoglou	<u>Reach DO Goal (mg/L)</u> 5	
<u>Reach Travel Time (days)</u> 0.171	Subreach Results			
	TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
	0.017	2.02	0.02	7.75
	0.034	2.02	0.02	7.75
	0.051	2.02	0.02	7.75
	0.068	2.02	0.02	7.75
	0.086	2.02	0.02	7.75
	0.103	2.02	0.02	7.75
	0.120	2.02	0.02	7.75
	0.137	2.02	0.02	7.75
	0.154	2.02	0.02	7.75
	0.171	2.02	0.02	7.75

WQM 7.0 Effluent Limits

<u>SWP Basin</u>	<u>Stream Code</u>	<u>Stream Name</u>					
07B	10194	CONODOGUINET 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)
46.050	Rolling Hills	PA0081825	0.023	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			5

TRC_CALC

A	B	C	D	E	F	G
2 TRC EVALUATION						
3 Input appropriate values in B4:B8 and E4:E7						
4	35.8	= Q stream (cfs)		0.5	= CV Daily	
5	0.023	= 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)			= Decay Coefficient (K)	
10	Source	Reference	AFC Calculations	Reference	CFC Calculations	
11	TRC	1.3.2.iii	WLA_afc = 320.982	1.3.2.iii	WLA_cfc = 312.925	
12	PENTOXSD TRG	5.1a	LTAMULT_afc = 0.373	5.1c	LTAMULT_cfc = 0.581	
13	PENTOXSD TRG	5.1b	LTA_afc = 119.606	5.1d	LTA_cfc = 181.920	
14						
15	15 Source					
16	16 Effluent Limit Calculations					
17	PENTOXSD TRG	5.1f	AML MULT = 1.231			
18	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			$\text{EXP}((0.5*\text{LN}(cvh^2+1))-2.326*\text{LN}(cvh^2+1)^0.5)$			
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			$\text{EXP}((0.5*\text{LN}(cvd^2/no_samples+1))-2.326*\text{LN}(cvd^2/no_samples+1)^0.5)$			
LTA_cfc			$wla_cfc*LTAMULT_cfc$			
AML MULT			$\text{EXP}(2.326*\text{LN}((cvd^2/no_samples+1)^0.5)-0.5*\text{LN}(cvd^2/no_samples+1))$			
AVG MON LIMIT			$\text{MIN}(\text{BAT_BPJ},\text{MIN}(\text{LTA_afc},\text{LTA_cfc})*\text{AML_MULT})$			
INST MAX LIMIT			$1.5*(\text{av_mon_limit}/\text{AML_MULT})/\text{LTAMULT_afc}$			