pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0102717**
Facility Type	**Non-Municipal**	APS ID	**1037544**
Major / Minor	**Minor**	Authorization ID	**1352608**

Applicant and Facility Information

Applicant Name	**Jones Estates Sandy Hills LLC**	Facility Name	**Sandy Hill Estates MHP**
Applicant Address	230 Sandy Hill Road	Facility Address	Sandy Hill Road
	Valencia, PA 16059-3332		Valencia, PA 16059
Applicant Contact	Jason Freed	Facility Contact	Jason Freed
Applicant Phone	(917) 225-9614	Facility Phone	(917) 225-9614
Client ID	362598	Site ID	256458
Ch 94 Load Status	Not Overloaded	Municipality	Middlesex Township
Connection Status	No Limitations	County	Butler
Date Application Received	April 3, 2020	EPA Waived?	Yes
Date Application Accepted	April 20, 2020	If No, Reason	

Purpose of Application: Renewal & Transfer of NPDES permit.

Summary of Review

This permit application is for the renewal of the NPDES permit, as well as transferring the NPDES & WQM permit from Sandy Hill Estates Irrevocable Trust to Jones Estates Sandy Hills LLC.

Act 14 – Proof of notification were submitted and received.

There are no open violations for subject client no. 362598 as of 9/28/2021.

This facility is currently submitting eDMR reports.

There has been no change to the discharge or receiving stream since the last permit issuance.

Sludge use and disposal description and location(s): Septage must be pumped and hauled off-site by a septage hauler for land application under a general permit authorized by DEP or disposal at an STP.

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		Jon F. Bucha Jonathan F. Bucha / Civil Engineer General	September 28, 2021
X		Justin C. Dickey Justin C. Dickey, P.E. / Environmental Engineer Manager	October 1, 2021

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	.022
Latitude	40º 42' 59"	Longitude	-79º 54' 19"
Quad Name	Valencia	Quad Code	1306
Wastewater Description:	Sewage Effluent		
Receiving Waters	Glade Run (WWF)	Stream Code	35096
NHD Com ID	126222446	RMI	11.13
Drainage Area	1.12 mi^2	Yield (cfs/mi^2)	0.043 (USGS#03049000 '76 – 2011)
Q_{7-10} Flow (cfs)	0.048	Q_{7-10} Basis	Calculated
Elevation (ft)	1130 (Google Earth)	Slope (ft/ft)	-
Watershed No.	20-C	Chapter 93 Class.	WWF
Existing Use	-	Existing Use Qualifier	-
Exceptions to Use	-	Exceptions to Criteria	-
Assessment Status	Impaired		
Cause(s) of Impairment	NUTRIENTS, SILTATION		
Source(s) of Impairment	AGRICULTURE		
TMDL Status	-	Name	-

Background/Ambient Data		Data Source
pH (SU)	7.0	Default
Temperature (°F)	25 ºC	Default
Hardness (mg/L)	-	-
Other:	0.1 mg/L	Ammonia Nitrogen Default

Nearest Downstream Public Water Supply Intake		Beaver Falls Municipal Authority @ Eastvale	
PWS Waters	Beaver River	Flow at Intake (cfs)	561
PWS RMI	3.5	Distance from Outfall (mi)	36

Changes Since Last Permit Issuance: Drainage area at the discharge point was revised from 3.46 mi^2 to 1.12 mi^2 using Streamstats, which resulted in a more stringent TRC limit. E. Coli monitoring is new to this permit renewal based on Ch. 92a.61.

Other Comments: This treatment facility is capable of meeting the effluent limits.

Treatment Facility Summary

Treatment Facility Name: Sandy Hill Estates

WQM Permit No.	Issuance Date
1072419 T-2	12/1/2015

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary With Ammonia And Phosphorus	Extended Aeration	Hypochlorite	0.022

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.022	48	Not Overloaded	Sludge Holding Tank	Landfill

Changes Since Last Permit Issuance: N/A

Other Comments: Treatment consists of screening, comminution, extended aeration, chemical addition for phosphorus removal, final settling tank, (2) intermittent sand filters, sludge holding tank, and chlorination.

The WQM permit will be transferred concurrently with this NPDES permit.

Compliance History	
Summary of DMRs:	Review of the past 3 years of eDMR data showed 1 violation for ammonia nitrogen in May, 2019. The cause was low DO in the MLSS, and the issue was corrected by increasing air to the aeration tank.
Summary of Inspections:	An inspection occurred on 11/17/2020 where no violations were noted.

Other Comments: **N/A**

Compliance History

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

Parameter	JUL-21	JUN-21	MAY-21	APR-21	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20	SEP-20	AUG-20
Flow (MGD) Average Monthly	0.0158	0.0155	0.02	0.0133	0.0206	0.0184	0.0215	0.0263	0.0131	0.0117	0.0142	0.0166
Flow (MGD) Daily Maximum	0.0485	0.0407	0.0733	0.0292	0.0733	0.0554	0.0784	0.0731	0.023	0.037	0.0214	0.0751
pH (S.U.) Minimum	6.07	6.14	6.55	6.99	7.2	7.17	7.23	7.21	7.33	7.75	7.36	8.12
pH (S.U.) Maximum	7.31	7.45	8.52	8.46	7.65	7.67	7.83	7.91	8.38	8.39	8.19	8.40
DO (mg/L) Minimum	5.28	5.23	5.0	5.92	6.47	6.7	6.58	6.59	6.73	6.58	6.53	6.58
TRC (mg/L) Average Monthly	0.23	0.31	0.50	< 0.20	< 0.10	< 0.10	< 0.10	< 0.10	< 0.05	< 0.10	< 0.10	0.10
TRC (mg/L) Instantaneous Maximum	0.74	1.14	1.68	1.19	0.18	< 0.14	0.14	0.13	0.11	0.09	0.17	0.11
CBOD5 (mg/L) Average Monthly	< 2	< 2	< 2.0	2.0	< 2	< 2.0	< 2.0	< 2.0	< 2.0	< 2	< 2.0	< 2
TSS (mg/L) Average Monthly	< 7	< 5	< 6.0	< 7	< 5	< 5.0	< 5.0	< 10	< 5.0	< 5	< 5	< 5.0
Fecal Coliform (CFU/100 ml) Geometric Mean	< 10	< 10	< 10	< 10	34	< 12	< 10	< 10	< 10.0	< 10	< 10	< 10
Fecal Coliform (CFU/100 ml) Instantaneous Maximum	< 10	< 10	< 10	< 10	57	14	10	< 10	< 10	< 10	< 10	< 10
Total Nitrogen (mg/L) Average Monthly	< 26.16	< 26.11	28.51	24.46	28.12	< 36.66	< 25.76	< 25.62	< 29.8	< 38.43	48.9	< 59.6
Ammonia (mg/L) Average Monthly	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.45	< 0.1	< 0.1	< 0.1	< 0.1
Total Phosphorus (mg/L) Average Monthly	0.53	0.49	0.43	0.38	0.2	0.21	0.32	0.40	0.38	0.46	0.42	0.6

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** .022
Latitude 40º 42' 59.00" **Longitude** -79º 54' 19.00"
Wastewater Description: 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 (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

The following limitations were determined through water quality modeling (output files attached):

Parameter	Limit (mg/l)	SBC	Model
Total Residual Chlorine	0.22	Average Monthly	TRC_CALC Spreadsheet
Total Residual Chlorine	0.71	IMAX	TRC_CALC Spreadsheet
Ammonia Nitrogen (05/01 – 10/31)	2.0	Average Monthly	WQAM 6.3
Ammonia Nitrogen (11/01 – 04/30)	6.0	Average Monthly	WQAM 6.3

Comments: TRC limits are more stringent than the previous renewal due to using a revised drainage area from Streamstats, which resulted in a lower calculated $Q_{7\text{-}10}$ streamflow. The previous renewals TRC limits were 0.98 mg/L Avg Monthly and 3.2 mg/L imax. No compliance schedule is being proposed for the new TRC limits upon reviewing eDMR data. Ammonia Nitrogen limits are remaining the same as the previous renewal to ensure continued protection of the stream and considering anti-backsliding. Attachment D contains the latest WQM 7.0 modeling for the parameters Dissolved Oxygen, Ammonia Nitrogen, and $CBOD_5$.

Best Professional Judgment (BPJ) Limitations

Comments: A Total Phosphorus limit of 2.0 mg/l is applied basin-wide to protect against nutrient enrichment in Conn. Creek (above Slippery Rock Creek). The outfall discharge point on Glade Run is currently impaired for nutrients and siltation, therefore Total Nitrogen monitoring will remain at 2/month. A D.O. limit of a minimum of 4.0 mg/l as well as 1/year monitoring for E. Coli is in accordance with the Department's SOP entitled "Establishing Effluent Limitations for Discharges of Sewage.

Anti-Backsliding

Anti-backsliding is not applicable since the permit limits are not being relaxed.

Proposed Effluent Limitations and Monitoring Requirements

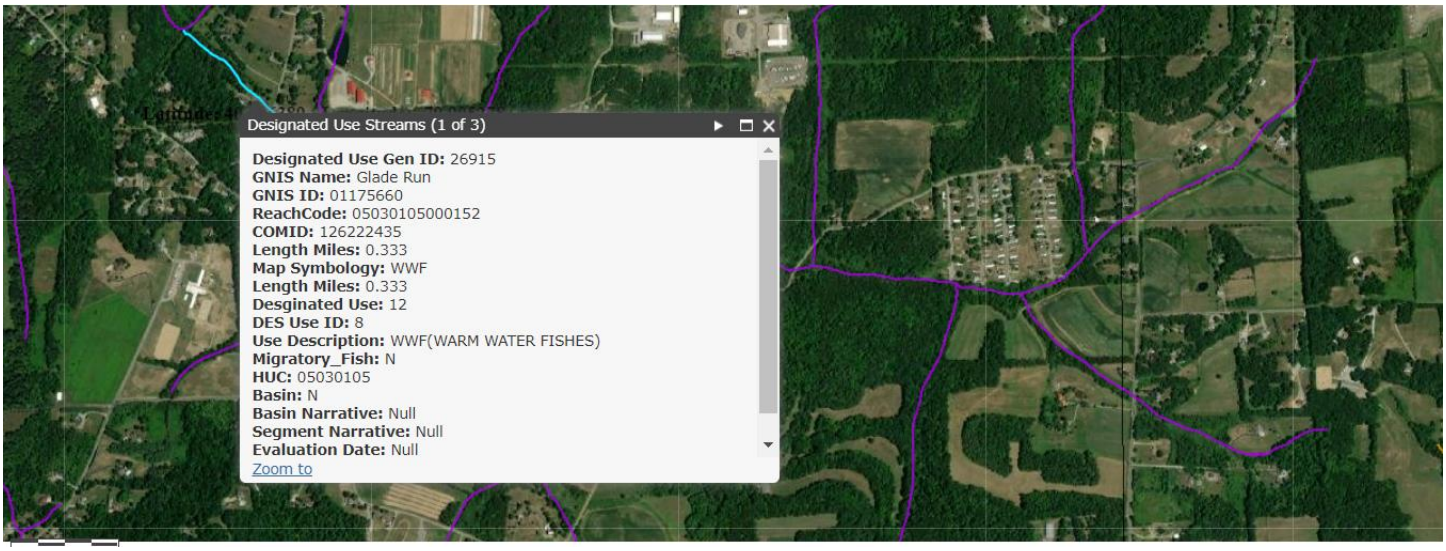
The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants).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

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

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	1/day	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	4.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.22	XXX	0.71	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
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/year	Grab
Total Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	2/month	8-Hr Composite
Ammonia Nov 1 - Apr 30	XXX	XXX	XXX	6.0	XXX	12	2/month	8-Hr Composite
Ammonia May 1 - Oct 31	XXX	XXX	XXX	2.0	XXX	4	2/month	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	2.0	XXX	4	2/month	8-Hr Composite

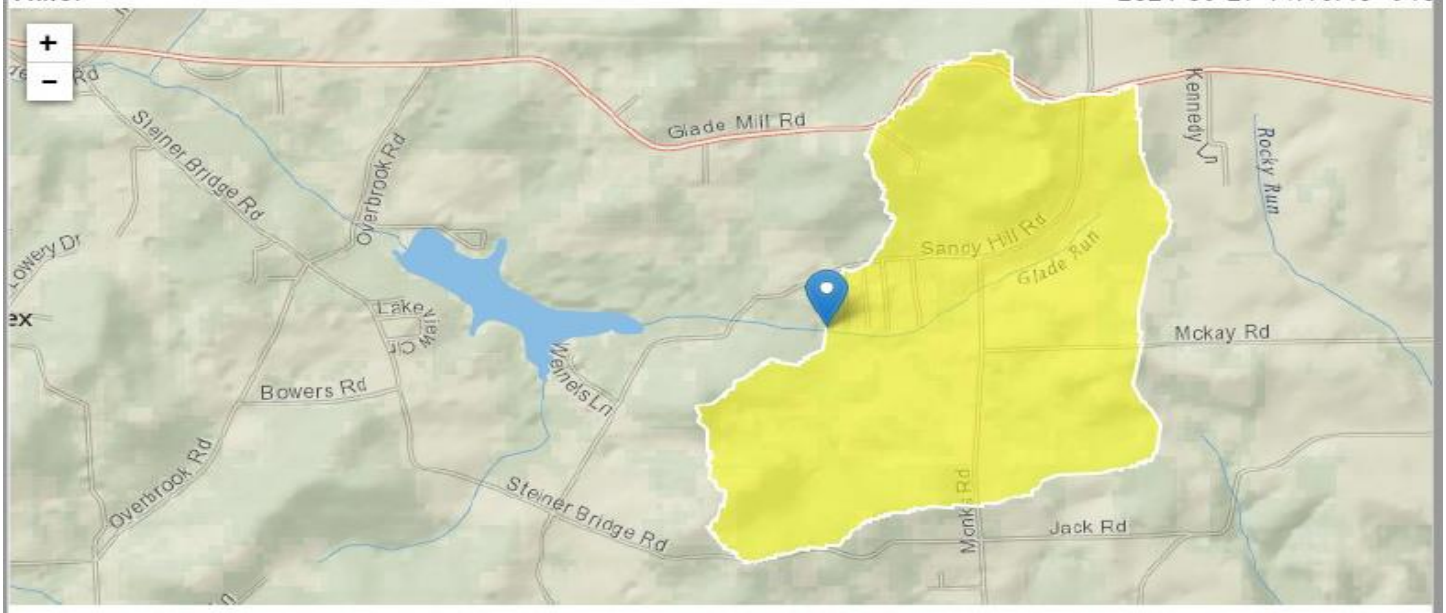
Compliance Sampling Location: Outfall 001 after disinfection.

Attachment A – eMAP Stream Designation



Attachment B – Streamstats Drainage Area (Discharge Point)

Region ID: PA
Workspace ID: PA20210927181525369O
Clicked Point (Latitude, Longitude): 40.71232, -79.88380
Time: 2021-09-27 14:15:45 -040

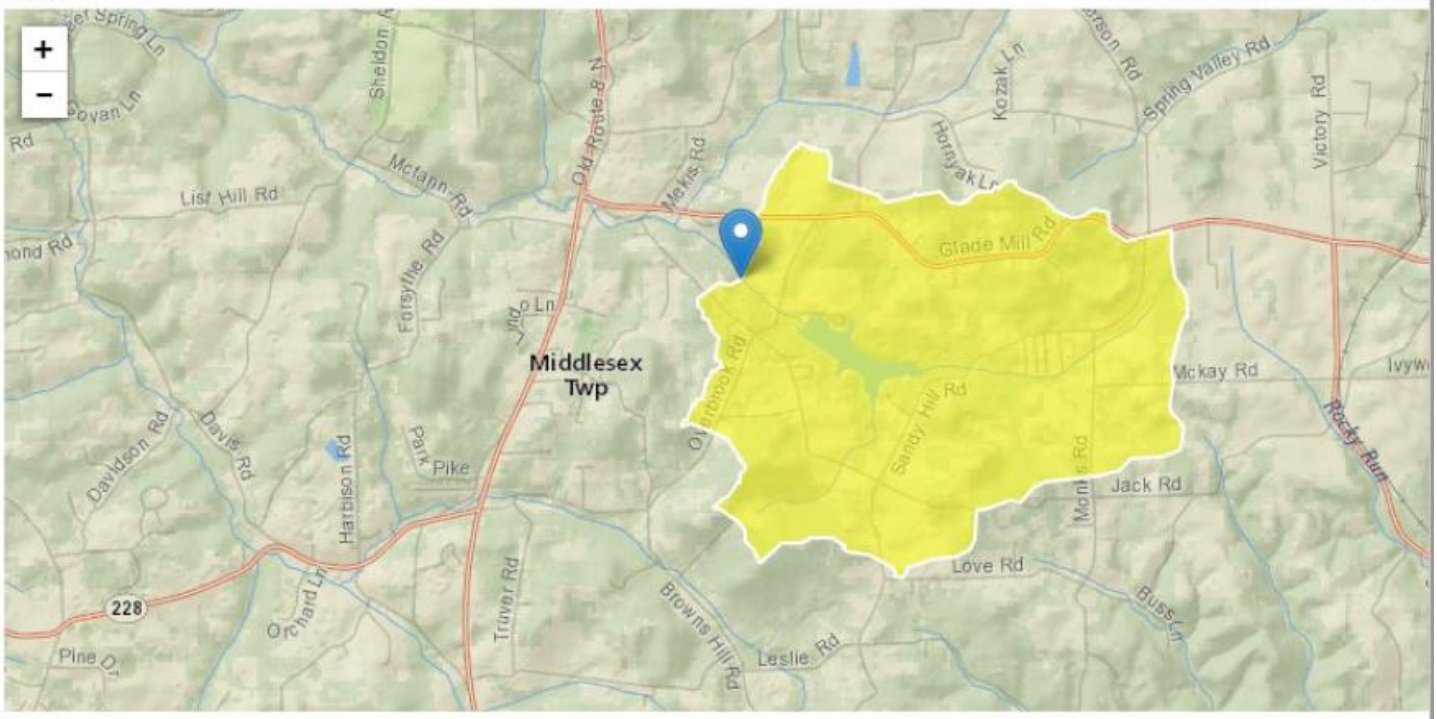


Basin Characteristics

Parameter Code	Parameter Description	Value
DRNAREA	Area that drains to a point on a stream	1.12
ELEV	Mean Basin Elevation	1216

Attachment C – Streamstats Drainage Area (End of Reach)

Region ID:	PA
Workspace ID:	PA20210927182254039O
Clicked Point (Latitude, Longitude):	40.71931, -79.91070
Time:	2021-09-27 14:23:15 -04(



Basin Characteristics

Parameter Code	Parameter Description	Value
DRNAREA	Area that drains to a point on a stream	3.81
ELEV	Mean Basin Elevation	1196

Attachment D – WQM 7.0 Modeling

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
20C	35096	GLADE 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)
11.130	Sandy Hill MHP	PA0102717	0.000	CBOD5	25		
				NH3-N	3.91	7.82	
				Dissolved Oxygen			4

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
20C	35096	GLADE RUN

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
11.130	0.022	22.930	7.161
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
4.761	0.342	13.930	0.051
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
11.52	0.917	1.68	0.877
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
6.074	22.941	Owens	5
Reach Travel Time (days)			
1.669			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.167	9.67	1.45	7.54
0.334	8.12	1.25	7.54
0.501	6.81	1.08	7.54
0.668	5.72	0.93	7.54
0.835	4.80	0.81	7.54
1.002	4.03	0.70	7.54
1.169	3.38	0.60	7.54
1.335	2.84	0.52	7.54
1.502	2.38	0.45	7.54
1.669	2.00	0.39	7.54

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	35096	GLADE RUN	11.130	1130.00	1.12	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	0.043	0.00	0.00	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
Sandy Hill MHP	PA0102717	0.0000	0.0000	0.0220	0.000	20.00	7.60

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	7.54	0.00	0.00
NH3-N	25.00	0.10	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	35096	GLADE RUN	9.750	1094.00	3.81	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	0.043	0.00	0.00	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	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 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	5		

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
20C	35096	GLADE 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												
11.130	0.05	0.00	0.05	.034	0.00494	.342	4.76	13.93	0.05	1.669	22.93	7.16
Q1-10 Flow												
11.130	0.03	0.00	0.03	.034	0.00494	NA	NA	NA	0.04	1.906	22.38	7.22
Q30-10 Flow												
11.130	0.07	0.00	0.07	.034	0.00494	NA	NA	NA	0.06	1.500	23.29	7.13

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
20C	35096	GLADE 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
11.130	Sandy Hill MHP	6.83	12.93	6.83	12.93	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
11.130	Sandy Hill MHP	1.4	3.91	1.4	3.91	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)		
11.13	Sandy Hill MHP	25	25	3.91	3.91	4	4	0	0

Attachment E – Discharge pH

Sandy Hill Estates MHP							
Middlesex Township, Butler County							
PA0102717			Discharge pH				
Date	pH min	pH max		10^ -pH min	10^ -pH max	& pH max)	-Log (Ave pH)
Jul-21	6.07	7.31		8.51138E-07	4.8978E-08	4.5006E-07	6.3
Jul-20	7.8	8.31		1.58489E-08	4.8978E-09	1.0373E-08	8.0
Aug-20	8.12	8.4		7.58578E-09	3.9811E-09	5.7834E-09	8.2
Sep-20	7.36	8.19		4.36516E-08	6.4565E-09	2.5054E-08	7.6
Jul-19	7.21	7.69		6.16595E-08	2.0417E-08	4.1038E-08	7.4
Aug-19	7.29	7.79		5.12861E-08	1.6218E-08	3.3752E-08	7.5
Sep-19	7.28	7.6		5.24807E-08	2.5119E-08	3.88E-08	7.4
Jul-18	7.38	8.41		4.16869E-08	3.8905E-09	2.2789E-08	7.6
Aug-18	7.4	8.41		3.98107E-08	3.8905E-09	2.1851E-08	7.7
Sep-18	7.3	8.41		5.01187E-08	3.8905E-09	2.7005E-08	7.6
						Median:	7.6

Attachment F – TRC CALC Spreadsheet

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

0.04816	= Q stream (cfs)	0.5	= CV Daily
0.022	= 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 = 0.470	1.3.2.iii	WLA cfc = 0.451
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.175	5.1d	LTA_cfc = 0.262

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.216	AFC
		INST MAX LIMIT (mg/l) = 0.706	

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