pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0112747**
Facility Type	**Municipal**	APS ID	**1022693**
Major / Minor	**Minor**	Authorization ID	**1326021**

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Mahaffey Borough Municipal Authority**	Facility Name	**Mahaffey Borough Municipal Authority Wastewater Treatment Plant**
Applicant Address	PO Box 202 Mahaffey, PA 15757-0202	Facility Address	SR0. 219 Mahaffey, PA 15757
Applicant Contact	Edward Depp	Facility Contact	Roy Markle
Applicant Phone	(814) 277-6659	Facility Phone	(814) 591-3159
Client ID	72795	Site ID	1141
Ch 94 Load Status	Not Overloaded	Municipality	Mahaffey Borough
Connection Status	No Prohibitions	County	Clearfield
Date Application Received	September 1, 2020	EPA Waived?	Yes
Date Application Accepted	September 21, 2020	If No, Reason	
Purpose of Application	Renewal of an existing NPDES permit for the discharge of treated sewage.		

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		*Derek S. Garner* Derek S. Garner / Project Manager	January 25, 2021
X		*Nicholas W. Hartranft* Nicholas W. Hartranft, P.E. / Environmental Engineer Manager	January 26, 2021

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.07
Latitude	40º 52' 57.78"	Longitude	-78º 43' 55.65"
Quad Name	Mahaffey	Quad Code	
Wastewater Description:	Sewage		

Receiving Waters	West Branch Susquehanna River	Stream Code	18668
NHD Com ID	61833285	RMI	206.85
Drainage Area	299	Yield (cfs/mi^2)	0.141
Q_{7-10} Flow (cfs)	42.1	Q_{7-10} Basis	Streamgage No. 01541000
Elevation (ft)	1260	Slope (ft/ft)	0.0004
Watershed No	8-B	Chapter 93 Class.	WWF
Existing Use	n/a	Existing Use Qualifier	n/a
Exceptions to Use	n/a	Exceptions to Criteria	n/a
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment	n/a		
Source(s) of Impairment	n/a		
TMDL Status	Final, 07/09/2009	Name	West Branch Susquehanna

Nearest Downstream Public Water Supply Intake	Shawville Power LLC		
PWS Waters	West Branch Susquehanna River	Flow at Intake (cfs)	131
PWS RMI	163	Distance from Outfall (mi)	43.85

Treatment Facility Summary

The Mahaffey Borough Municipal Authority Wastewater Treatment Plant consists of one comminutor, one bar screen, three aerated lagoons (operated in series), and two chlorine contact tanks. Sonic wave transducers are used in two of three lagoons from Match to October to prevent algae blooms. The facility has an average annual flow and hydraulic capacity of 0.07 MGD and an organic design capacity of 123 lbs/day. The lagoon's sludge blankets are measured annually and pumped on an as-needed basis in accordance with the Authority's Standard Operation Procedure for Determination of Sludge Removal (March 2016). When necessary sludge will be hauled to another wastewater treatment plant for disposal.

The facility is operated under WQM Permit No. 1785403, issued on May 19, 1986. The permit was amended on August 12, 2009 to include use of the abovementioned sonic wave transducers. The permit was most recently amended again on December 30, 2020 to approve construction and operation of a mechanical bar screen, electromagnetic flow meter, and an ultraviolet light disinfection system. The existing chlorine disinfection system will be kept for redundancy during emergency purposes. As of the date of this fact sheet, a post-construction certification has not been received for these upgrades/modifications.

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.07
Latitude 40º 52' 57.78" **Longitude** -78º 43' 55.65"
Wastewater Description: Sewage

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

A "Reasonable Potential Analysis" (attached) was completed to assess the applicability of water quality-based effluent limits.

The parameters CBOD5, ammonia-n, and dissolved oxygen were assessed in WQM 7.0 v1.0b. The results are as follows:

Parameter	Monthly Avg	Maximum	Minimum
CBOD5	25	--	--
NH3-N	25	50	--
Dissolved Oxygen	--	--	3

As demonstrated by the above table, the existing effluent limitations and monitoring requirements for CBOD5, dissolved oxygen, and ammonia-n are protective of the receiving water.

The facility discharges to the West Branch Susquehanna River at river mile 206.85. This segment of the River is included in the West Branch Susquehanna River Watershed TMDL. The TMDL was developed to address the River's impairment caused by Total Iron, Total Aluminum, and Total Manganese. The Mahaffey Borough Municipal Authority WWTP is not assigned a load allocation in the TMDL; however, annual reporting for TMDL parameters (Al, Fe, Mn) were established in the previous renewal to characterize the effluent. The results are as follows:

Due Date	Parameter	Units	Value	Limit	SBC	Sample Frequency
1/28/2018	Aluminum, Total	mg/L	< 0.1	Monitor and Report	Daily Maximum	1/year
1/28/2019	Aluminum, Total	mg/L	< 0.0500	Monitor and Report	Daily Maximum	1/year
1/28/2020	Aluminum, Total	mg/L	1	Monitor and Report	Daily Maximum	1/year
1/28/2021	Aluminum, Total	mg/L	0.1	Monitor and Report	Daily Maximum	1/year

Due Date	Parameter	Units	Value	Limit	SBC	Sample Frequency
1/28/2018	Iron, Total	mg/L	0.155	Monitor and Report	Daily Maximum	1/year
1/28/2019	Iron, Total	mg/L	0.229	Monitor and Report	Daily Maximum	1/year
1/28/2020	Iron, Total	mg/L	2	Monitor and Report	Daily Maximum	1/year
1/28/2021	Iron, Total	mg/L	0.307	Monitor and Report	Daily Maximum	1/year

Due Date	Parameter	Units	Value	Limit	SBC	Sample Frequency
1/28/2018	Manganese, Total	mg/L	0.164	Monitor and Report	Daily Maximum	1/year
1/28/2019	Manganese, Total	mg/L	0.0791	Monitor and Report	Daily Maximum	1/year
1/28/2020	Manganese, Total	mg/L	0.0677	Monitor and Report	Daily Maximum	1/year
1/28/2021	Manganese, Total	mg/L	0.124	Monitor and Report	Daily Maximum	1/year

The maximum concentrations for each parameter were entered into the Toxics Management Spreadsheet v1.1 to assess the possibility of establishing effluent limits. The spreadsheet's recommendations are as follows:

Parameter	Governing WQBEL	Units	Comments
Total Aluminum	26,486	µg/l	Discharge Conc ≤ 10% WQBEL
Total Iron	585,474	µg/l	Discharge Conc ≤ 10% WQBEL
Total Manganese	375.756	µg/l	Discharge Conc ≤ 10% WQBEL

As demonstrated by the above table, the spreadsheet does not recommend any further monitoring or establishing effluent limits for the TMDL parameters because there does not appear to be any reasonable potential to exceed water quality criteria. Accordingly, DEP has proposed to remove the monitoring requirements for Al, Fe, and Mn.

An analysis of the existing total residual chlorine limits in the TRC_CALC spreadsheet indicates that they are protective of the West Branch Susquehanna River. No changes are proposed.

Best Professional Judgment (BPJ) Limitations

The existing reporting requirements for dissolved oxygen and ammonia-n are proposed to remain in the permit to continue to help characterize the effluent.

As stated in the Treatment Summary section above, the facility's WQM permit was recently amended to approve construction and operation of a UV light disinfection system while maintaining the existing TRC disinfection system for emergency purposes. A letter from JHA Companies on behalf of the Mahaffey Borough Municipal Authority, dated January 6, 2021, indicates the UV system will be operational by October 1, 2021 and will report intensity. Accordingly, DEP proposes that UV intensity reporting begin on October 1, 2021. Additionally, since TRC will only be for emergency purposes only, on October 1, 2021, TRC will only need reported when the system in use.

Additional Considerations

Existing influent monitoring requirements for BOD5 and TSS are proposed to remain in the permit to help with Chapter 94 reporting.

Chesapeake Bay

The permittee previously completed 48 months of sampling from January 2007 to December 2010 and the results were summarized in the previous fact sheet developed in 2015. Nothing further is required from the permittee to satisfy Pennsylvania's Chesapeake Bay Watershed Implementation Plan.

Compliance History

The following effluent violations occurred during the existing permit's term:

Non-compliance Date	Non-compliance Type	Non-compliance Category	Parameter	Sample Value	Violation Condition	Permit Value	Units	SBC
4/11/2017	Violation of permit condition	Conc. 2 Effluent Violation	TSS	32	>	30	mg/L	Avg Mo

No chronic exceedances have been documented. The compliance history should not impact the development of effluent limitations for the facility.

There are no open violations associated with the permittee.

The facility was last inspected by DEP on January 13, 2020. The inspection report concludes that the facility is operating normally, there is no visible impact below Outfall 001, and eDMRs are be submitted on time.

Existing Effluent Limitations and Monitoring Requirements

The existing effluent limits are monitoring requirements are as follows:

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report	XXX	XXX	XXX	XXX	Continuous	Metered
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	14	23 Wkly Avg	XXX	25	40	50	2/month	8-Hr Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/month	Grab
Total Suspended Solids Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/month	Grab
Total Suspended Solids	17	26 Wkly Avg	XXX	30	45	60	2/month	8-Hr Composite
Fecal Coliform (CFU/100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1,000	2/month	Grab
Fecal Coliform (CFU/100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2,000 Geo Mean	XXX	10,000	2/month	Grab
Ammonia-Nitrogen	Report	Report Wkly Avg	XXX	Report	Report	XXX	2/month	8-Hr Composite
Total Aluminum	XXX	Report	XXX	XXX	Report Daily Max	XXX	1/year	8-Hr Composite
Total Iron	XXX	Report	XXX	XXX	Report Daily Max	XXX	1/year	8-Hr Composite
Total Manganese	XXX	Report	XXX	XXX	Report Daily Max	XXX	1/year	8-Hr Composite
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/month	8-Hr Composite
TSS Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/month	8-Hr Composite

Compliance Sampling Location: Outfall 001

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 September 30, 2021.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Metered
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	Report Inst Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
CBOD5	14	23	XXX	25.0	40.0	50	2/month	8-Hr Composite
TSS	17	26	XXX	30.0	45.0	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
Ammonia	Report	Report	XXX	Report	Report	XXX	2/month	8-Hr Composite

Compliance Sampling Location: Outfall 001

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: October 1, 2021 through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Instantaneous Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Metered
pH (S.U.)	XXX	XXX	6.0	XXX	XXX	9.0	1/day	Grab
DO	XXX	XXX	Report	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.6	See Permit (1)	Grab
CBOD5	14	23	XXX	25.0	40.0	50	2/month	8-Hr Composite
TSS	17	26	XXX	30.0	45.0	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
UV Intensity (mW/cm²)	XXX	XXX	Report	XXX	XXX	XXX	1/day	Metered
Ammonia	Report	Report	XXX	Report	Report	XXX	2/month	8-Hr Composite

(1) Total Residual Chlorine shall be sampled daily when the system is in use.

Compliance Sampling Location: Outfall 001

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)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Daily Maximum	Minimum	Average Monthly	Maximum	Instant. Maximum		
BOD5 Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/month	8-Hr Composite
TSS Raw Sewage Influent	Report	Report	XXX	Report	XXX	XXX	2/month	8-Hr Composite

Compliance Sampling Location: Outfall 001

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DFLOW Results

All available data from Apr 1, 1989 through Mar 31, 2019 are included in analysis.

Gage	Period	Days in Record	Zero/Missing	1B3	Percentile	Excur per 3 yr	1Q10	Percentile	Excur per 3 yr	1Qy Type	xQy	Percentile	Harmonic	Percentile
01541000 - West Branch Susquehanna River at Bower, PA	1988/04/01 - 2019/04/01	11,322	0/0	41.6	0.09%	0.97	41.7	0.10%	0.77	1Q11	25.5	0.00%	2.11E+02	33.27%
Gage	**Period**	**Days in Record**	**Zero/Missing**	**1B3**	**Percentile**	**Excur per 3 yr**	**7Q10**	**Percentile**	**Excur per 3 yr**	**7Qy Type**	**xQy**	**Percentile**	**Harmonic**	**Percentile**
01541000 - West Branch Susquehanna River at Bower, PA	1988/04/01 - 2019/04/01	11,322	0/0	41.6	0.09%	0.97	44.4	0.35%	1.84	7Q11	28.2	0.00%	2.11E+02	33.27%
Gage	**Period**	**Days in Record**	**Zero/Missing**	**1B3**	**Percentile**	**Excur per 3 yr**	**30Q10**	**Percentile**	**Excur per 3 yr**	**30Qy Type**	**xQy**	**Percentile**	**Harmonic**	**Percentile**
01541000 - West Branch Susquehanna River at Bower, PA	1988/04/01 - 2019/04/01	11,322	0/0	41.6	0.09%	0.97	53.9	1.85%	3.97	30Q11	35.7	0.00%	2.11E+02	33.27%

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
10D	18668	WEST BRANCH SUSQUEHANNA RI	**206.850**	1260.00	299.00	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	0.141	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
MahaffeyBoroMA	PA0112747	0.0700	0.0700	0.0700	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
10D	18668	WEST BRANCH SUSQUEHANNA RI	**206.400**	1259.00	300.00	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	0.141	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	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

SWP Basin	Stream Code	Stream Name
10D	18668	WEST BRANCH SUSQUEHANNA RIVER

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												
206.850	42.16	0.00	42.16	.1083	0.00042	.991	107.37	108.37	0.40	0.069	25.00	7.00
Q1-10 Flow												
206.850	39.63	0.00	39.63	.1083	0.00042	NA	NA	NA	0.38	0.072	25.00	7.00
Q30-10 Flow												
206.850	51.01	0.00	51.01	.1083	0.00042	NA	NA	NA	0.44	0.062	25.00	7.00

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	0.94	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.21	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
10D	18668	WEST BRANCH SUSQUEHANNA RIVER

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
206.850	MahaffeyBoroMA	6.76	50	6.76	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
206.850	MahaffeyBoroMA	1.34	25	1.34	25	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)		
206.85	MahaffeyBoroMA	25	25	25	25	3	3	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
10D	18668	WEST BRANCH SUSQUEHANNA RIVER

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
206.850	0.070	25.000	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
107.374	0.991	108.371	0.397
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.06	0.044	0.06	1.029
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.230	0.878	Tsivoglou	5
Reach Travel Time (days)			
0.069			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.007	2.06	0.06	7.54
0.014	2.06	0.06	7.54
0.021	2.06	0.06	7.54
0.028	2.06	0.06	7.54
0.035	2.06	0.06	7.54
0.042	2.05	0.06	7.54
0.048	2.05	0.06	7.54
0.055	2.05	0.06	7.54
0.062	2.05	0.06	7.54
0.069	2.05	0.06	7.54

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
10D	18668	WEST BRANCH SUSQUEHANNA RIVER

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)
206.850	MahaffeyBoroMA	PA0112747	0.070	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			3

Discharge Information

Instructions | Discharge | Stream

Facility: **Mahaffey Borough Municipal Authority WWTP** NPDES Permit No.: **PA0112747** Outfall No.: **001**

Evaluation Type **Major Sewage / Industrial Waste** Wastewater Description: **Sewage**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.07	100	7						

					0 if left blank		*0.5 if left blank*		*0 if left blank*			*1 if left blank*	
	Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Group 1	Total Dissolved Solids (PWS)	mg/L											
	Chloride (PWS)	mg/L											
	Bromide	mg/L											
	Sulfate (PWS)	mg/L											
	Fluoride (PWS)	mg/L											
Group 2	Total Aluminum	µg/L		1000									
	Total Antimony	µg/L											
	Total Arsenic	µg/L											
	Total Barium	µg/L											
	Total Beryllium	µg/L											
	Total Boron	µg/L											
	Total Cadmium	µg/L											
	Total Chromium (III)	µg/L											
	Hexavalent Chromium	µg/L											
	Total Cobalt	µg/L											
	Total Copper	µg/L											
	Free Cyanide	µg/L											
	Total Cyanide	µg/L											
	Dissolved Iron	µg/L											
	Total Iron	µg/L		2000									
	Total Lead	µg/L											
	Total Manganese	µg/L		164									
	Total Mercury	µg/L											
	Total Nickel	µg/L											
	Total Phenols (Phenolics) (PWS)	µg/L											
	Total Selenium	µg/L											
	Total Silver	µg/L											
	Total Thallium	µg/L											
	Total Zinc	µg/L											
	Total Molybdenum	µg/L											
	Acrolein	µg/L	<										
	Acrylamide	µg/L	<										
	Acrylonitrile	µg/L	<										
	Benzene	µg/L	<										
	Bromoform	µg/L	<										

Group 3	Carbon Tetrachloride	µg/L	<										
	Chlorobenzene	µg/L											
	Chlorodibromomethane	µg/L	<										
	Chloroethane	µg/L	<										
	2-Chloroethyl Vinyl Ether	µg/L	<										
	Chloroform	µg/L	<										
	Dichlorobromomethane	µg/L	<										
	1,1-Dichloroethane	µg/L	<										
	1,2-Dichloroethane	µg/L	<										
	1,1-Dichloroethylene	µg/L	<										
	1,2-Dichloropropane	µg/L	<										
	1,3-Dichloropropylene	µg/L	<										
	1,4-Dioxane	µg/L	<										
	Ethylbenzene	µg/L	<										
	Methyl Bromide	µg/L	<										
	Methyl Chloride	µg/L	<										
	Methylene Chloride	µg/L	<										
	1,1,2,2-Tetrachloroethane	µg/L	<										
	Tetrachloroethylene	µg/L	<										
	Toluene	µg/L	<										
	1,2-trans-Dichloroethylene	µg/L	<										
	1,1,1-Trichloroethane	µg/L	<										
	1,1,2-Trichloroethane	µg/L	<										
	Trichloroethylene	µg/L	<										
	Vinyl Chloride	µg/L	<										
Group 4	2-Chlorophenol	µg/L	<										
	2,4-Dichlorophenol	µg/L	<										
	2,4-Dimethylphenol	µg/L	<										
	4,6-Dinitro-o-Cresol	µg/L	<										
	2,4-Dinitrophenol	µg/L	<										
	2-Nitrophenol	µg/L	<										
	4-Nitrophenol	µg/L	<										
	p-Chloro-m-Cresol	µg/L	<										
	Pentachlorophenol	µg/L	<										
	Phenol	µg/L	<										
	2,4,6-Trichlorophenol	µg/L	<										
Group 5	Acenaphthene	µg/L	<										
	Acenaphthylene	µg/L	<										
	Anthracene	µg/L	<										
	Benzidine	µg/L	<										
	Benzo(a)Anthracene	µg/L	<										
	Benzo(a)Pyrene	µg/L	<										
	3,4-Benzofluoranthene	µg/L	<										
	Benzo(ghi)Perylene	µg/L	<										
	Benzo(k)Fluoranthene	µg/L	<										
	Bis(2-Chloroethoxy)Methane	µg/L	<										
	Bis(2-Chloroethyl)Ether	µg/L	<										
	Bis(2-Chloroisopropyl)Ether	µg/L	<										
	Bis(2-Ethylhexyl)Phthalate	µg/L	<										
	4-Bromophenyl Phenyl Ether	µg/L	<										
	Butyl Benzyl Phthalate	µg/L	<										
	2-Chloronaphthalene	µg/L	<										
	4-Chlorophenyl Phenyl Ether	µg/L	<										
	Chrysene	µg/L	<										
	Dibenzo(a,h)Anthrancene	µg/L	<										
	1,2-Dichlorobenzene	µg/L	<										
	1,3-Dichlorobenzene	µg/L	<										
	1,4-Dichlorobenzene	µg/L	<										
	3,3-Dichlorobenzidine	µg/L	<										
	Diethyl Phthalate	µg/L	<										
	Dimethyl Phthalate	µg/L	<										
	Di-n-Butyl Phthalate	µg/L	<										
	2,4-Dinitrotoluene	µg/L	<										

	2,6-Dinitrotoluene	µg/L	<										
	Di-n-Octyl Phthalate	µg/L	<										
	1,2-Diphenylhydrazine	µg/L	<										
	Fluoranthene	µg/L	<										
	Fluorene	µg/L	<										
	Hexachlorobenzene	µg/L	<										
	Hexachlorobutadiene	µg/L	<										
	Hexachlorocyclopentadiene	µg/L	<										
	Hexachloroethane	µg/L	<										
	Indeno(1,2,3-cd)Pyrene	µg/L	<										
	Isophorone	µg/L	<										
	Naphthalene	µg/L	<										
	Nitrobenzene	µg/L	<										
	n-Nitrosodimethylamine	µg/L	<										
	n-Nitrosodi-n-Propylamine	µg/L	<										
	n-Nitrosodiphenylamine	µg/L	<										
	Phenanthrene	µg/L	<										
	Pyrene	µg/L	<										
	1,2,4-Trichlorobenzene	µg/L	<										
Group 6	Aldrin	µg/L	<										
	alpha-BHC	µg/L	<										
	beta-BHC	µg/L	<										
	gamma-BHC	µg/L	<										
	delta BHC	µg/L	<										
	Chlordane	µg/L	<										
	4,4-DDT	µg/L	<										
	4,4-DDE	µg/L	<										
	4,4-DDD	µg/L	<										
	Dieldrin	µg/L	<										
	alpha-Endosulfan	µg/L	<										
	beta-Endosulfan	µg/L	<										
	Endosulfan Sulfate	µg/L	<										
	Endrin	µg/L	<										
	Endrin Aldehyde	µg/L	<										
	Heptachlor	µg/L	<										
	Heptachlor Epoxide	µg/L	<										
	PCB-1016	µg/L	<										
	PCB-1221	µg/L	<										
	PCB-1232	µg/L	<										
	PCB-1242	µg/L	<										
	PCB-1248	µg/L	<										
	PCB-1254	µg/L	<										
	PCB-1260	µg/L	<										
	PCBs, Total	µg/L	<										
	Toxaphene	µg/L	<										
	2,3,7,8-TCDD	ng/L	<										
Group 7	Gross Alpha	pCi/L											
	Total Beta	pCi/L	<										
	Radium 226/228	pCi/L	<										
	Total Strontium	µg/L	<										
	Total Uranium	µg/L	<										
	Osmotic Pressure	mOs/kg											

Stream / Surface Water Information

Mahaffey Borough Municipal Authority WWTP, NPDES Permit No. PA0112747, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **West Branch Susquehanna river**

No. Reaches to Model: **1**

- (●) Statewide Criteria
- ( ) Great Lakes Criteria
- ( ) ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	018668	206.85	1260	299			Yes
End of Reach 1	018668	206.4	1259	300			Yes

Q ***7-10***

Location	RMI	LFY (cfs/mi²)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	206.85	0.141										100	7		
End of Reach 1	206.4	0.141													

Q ***h***

Location	RMI	LFY (cfs/mi²)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	206.85														
End of Reach 1	206.4														

Model Results

Mahaffey Borough Municipal Authority WWTP, NPDES Permit No. PA0112747, Outfall 001

Instructions | Results | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All | ○ Inputs | ○ Results | ○ Limits

☐ ***Hydrodynamics***

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 15 PMF: 0.139 Analysis Hardness (mg/l): 100 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	750	750	41,319	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	

☑ ***CFC*** CCT (min): 720 PMF: 0.963 Analysis Hardness (mg/l): 100 Analysis pH: 7.00

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	1,500	1,500	585,474	WQC = 30 day average; PMF = 1
Total Manganese	0	0		0	N/A	N/A	N/A	

☑ ***THH*** CCT (min): 720 PMF: 0.963 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	N/A	N/A	N/A	
Total Iron	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	1,000	1,000	375,756	

☑ ***CRL*** CCT (min): ###### PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Aluminum	0	0		0	N/A	N/A	N/A	

Total Iron	0	0		0	N/A	N/A	N/A	
Total Manganese	0	0		0	N/A	N/A	N/A	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments

☑ ***Other Pollutants without Limits or Monitoring***

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., <= Target QL).

Pollutants	Governing WQBEL	Units	Comments
Total Aluminum	26,483	µg/L	Discharge Conc ≤ 10% WQBEL
Total Iron	585,474	µg/L	Discharge Conc ≤ 10% WQBEL
Total Manganese	375,756	µg/L	Discharge Conc ≤ 10% WQBEL

TRC EVALUATION

Input appropriate values in B4:B8 and E4:E7

42.1	= Q stream (cfs)	0.5	= CV Daily
0.07	= Q discharge (MGD)	0.5	= CV Hourly
30	= no. samples	0.139	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	0.963	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
0	= % Factor of Safety (FOS)	0	=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 17.257	1.3.2.iii	WLA cfc = 116.445
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 6.431	5.1d	LTA_cfc = 67.696

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500	BAT/BPJ
		INST MAX LIMIT (mg/l) = 1.635	

WLA afc	(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))... ...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)
LTAMULT afc	EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)
LTA_afc	wla_afc*LTAMULT_afc
WLA_cfc	(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc))... ...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)
LTAMULT_cfc	EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5)
LTA_cfc	wla_cfc*LTAMULT_cfc
AML MULT	EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1))
AVG MON LIMIT	MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT)
INST MAX LIMIT	1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)