pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

Application Type	Renewal	Application No.	**PA0032531**
Facility Type	Non-Municipal	APS ID	**975214**
Major / Minor	Minor	Authorization ID	**1240809**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**PA DCNR**	Facility Name	**Moraine State Park**
Applicant Address	225 Pleasant Valley Road	Facility Address	225 Pleasant Valley Road
	Portersville, PA 16051-9650		Portersville, PA 16051-2031
Applicant Contact	Dustin Drew, Park Manager	Facility Contact	Ashley Noland, Plant Operator
Applicant Phone	(724) 368-8811	Facility Phone	(724) 368-8121
Client ID	52524	Site ID	447025
Municipality	Muddycreek Township	County	Butler
Ch 94 Load Status	Not Overloaded	Connection Status	No Limitations
SIC Code	7999	SIC Code	4952
SIC Description	Services - Amusement & Recreation, NEC	SIC Description	Sewage conveyance and treatment
Application Received	August 15, 2018	EPA Waived?	Yes
Application Accepted	August 29, 2018	If No, Reason	
Application Purpose	NPDES permit renewal		

Summary of Review

This is a non-publicly owned treatment works (NPOTW) owned and operated by the Commonwealth of Pennsylvania with 40% of the waste originating in Prospect Borough.

Sanitary sewer overflows are reported and are being addressed through a Consent Order and Agreement with Prospect Borough, waste treatment facility expansion and pending collection system changes described in the Clean Water Permit application 1019403. The present treatment facility start-up was on February 28, 2018.

Recommended is sewage treatment facility headend and Prospect Borough collection system monitoring for Wasteload Management Reporting. The weekly requirements are POTW based and are continued from the previous NPDES permit.

Water supply source and treatment changes are anticipated. Wastewater treatment and discharge permit proposals are delayed by the water supply changes. The existing waste water treatment facilities are covered by WQM permit 1072204. No NPDES discharge permit information has been located and no effluent requirement changes are expected.

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		William H. Mentzer, P.E. Environmental Engineering Specialist	December 19, 2019
X		Justin C. Dickey, P.E. Environmental Engineer Manager	

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.4
Latitude NHD	40º 57' 46.66	Longitude NHD	-80º 7' 25.46"
Latitude DP	40º 57' 47.30"	Longitude DP	-80º 7' 25.90"
Quad Name	Prospect	Quad Code	1105
Wastewater:	Treated park and municipal sanitary wastes		

Receiving Waters	Muddy Creek	Stream Code	34081
NHD Com ID	126217202	RMI	4.39
Drainage Area	51	Yield (cfs/mi^2)	0.029297
Q_{7-10} Flow (cfs)	1.5	Q_{7-10} Basis	Conservation release
Elevation (ft)	1160.79	Slope (ft/ft)	0.00068
Watershed No.	20-C	Chapter 93 Class.	WWF
Existing Use	State wide	Existing Use Qualifier	none
Exceptions to Use	none	Exceptions to Criteria	none

Comments: The basin has five sewage discharges, one industrial waste discharge and a potable water intake. The potable water intake is in Lake Arthur at RMI 6.30 just above tributary 34100. Anticipated is replacement of the surface potable water intake with a groundwater source and revised treatment. The water supply changes will lead to waste treatment and discharge revisions. Industrial waste is presently discharged to Tributary 34100. At RMI 4.53 is the Lake Arthur Dam Gage Station #03106280. At RMI 4.5 is the Lake Arthur Dam. At RMI 4.39 and tailrace RMI 0.05 (1160.79-ft elev and 51.0-sq mi drainage) is the 0.4-MGD Moraine State Park STP discharge (PA0032531). At RMI 4.33 is the relocated Muddy Creek near Portersville USGS Stream gage station #0316300. At RMI 3.56 (11550.05-ft elev and 52.9-sq mi drainage) is tributary 63811 with a 0.014-MGD Heron Ridge discharge (PA0263583). At RMI 3.49 (1148.98-ft elev and 52.95-sq mi drainage) is a 0.05-MG D Pilot Travel discharge (PA0222290). At RMI 2.62 (1136.85-ft elev and 52.4-sq mi drainage is a Cooper Lake 0.003-MGD discharge. At RMI 2.34 (1134.24-ft elev and 54.30-sq mi drainage) is a 0.425-MGD Lake Arthur Estates discharge (PA009336). The stream mouth elev is 103454-ft with a 58.3-sq mi drainage.

Low Flow Reference: Muddy Creek near Portersville No 03106300 Period 1964 - 1972
Low Flow (cfs) 1.5 Drainage (Sq-mi) 51.2 Yield (cfs/sq-mi) 0.029
Comments: The critical low is the 1.5-cfs dam conservation (minimum) release flow.

Assessment Status	Attaining Use(s)
Cause(s) of Impairment	
Source(s) of Impairment	
TMDL Status	Name

Background/Ambient Data		Data Source
pH (SU)	7.2	Slippery Rock Creek on July 11, 1975 (tributaries)
pH (SU)	7.5	March 2016 Lake trophic Study (main stem)
Temperature (°C)	25	WWF default
Hardness (mg/L)	60	March 2016 Lake trophic Study
DO	7.54	WWF default
Ammonia:	0.02	March 2016 Lake trophic Study (Default is 0.1-mg/L)

Nearest Downstream Public Water Supply Intake		Pa American	
PWS Waters	Connoquenessing Creek	Flow at Intake (cfs)	NA
PWS RMI	0	Distance from Outfall (mi)	21

Changes Since Last Permit Issuance:

The Elwood City intake is to be replaced with a further downstream intake at the confluence of Connoquenessing Creek and Beaver River.

Other Comments: No water supply impairments are expected at either intake.

Treatment Facility Summary

Treatment Facility Name: Moraine State Park

WQM Permit No.	Issuance Date
367-S-045	March 26, 1968
1072418	February 23, 1973
1072411	October 12, 1972
1002404	June 10, 2002
1019403	pending

Waste Type	Degree of Treatment	Process Type	Disinfection	Avg Annual Flow (MGD)
Sewage	Secondary with Ammonia Reduction	Sequencing batch reactors	UV radiation	0.4

Hydraulic Capacity (MGD)	Organic Capacity (lbs/day)	Load Status	Biosolids Treatment	Biosolids Use/Disposal
0.4	475	Not Overloaded	Aerobic Digestion	offsite

Comments: The above loads are for permitted facilities in operation as of February 28, 2018.

Changes Since Last Permit Issuance:

The previous renewal included an expansion to 0.4-MGD from 0.225 MGD with sequencing batch reactor treatment.

SSO elimination is continuing.

Normally UV radiation disinfection is used. Emergency hypo-chlorination is proposed for manual application at the effluent equalization tank prior to filtration when the UV radiation disinfection system fails. The equalization tank is the former chlorine contact tank. This change is part of the Clean Water Permit operation description and should not require any permit change. A written summary has been requested for incorporation into the Clean Water Permit documentation.

Chlorine use can be reported as a DMR footnote or as a supplementary DMR report. The chlorine analysis frequency should be daily (the same as the UV radiation frequency).

FOR MORAINE STATE PARK

1019403

Pending for upgrading five pump stations (8, 10, 14, 15, and 16) to submersible pump stations using the existing wet wells, one Pump Station (9) will be abandoned, 22 manholes will be rehabilitated and/or replaced, approx. 9,600 LF of gravity sewer line will be abandoned, approx. 1,400 LF of 8 inch diameter sewer main will be lined and approx. 8,170 LF of force main will be replaced.

Pump Station	8	10	14	15	16
Capacity (gpm)	175	100	175	250	400

1014403 issued February 10, 2015 (treatment replacement and expansion)

Cylindrical fine screen with bypass bar screen, raw wastewater pump station, sequencing batch reactors, post sequencing batch reactor equalization, effluent pump station, sand filtration UV light disinfection, aerated sludge holding.

Design load 0.4-MG and 475-PPD.

Effluent equalization is to control flow to filtration and disinfection. Maximum equalization discharge flow is pump capacity limited to 450-gpm (0.648-MGD).

1013403 issued March 26, 2013

Pleasant Valley Sewers and Pump Station relocation.
Pump station capacity: 150-gpm.

Planning dated July 3, 2012

Planning approval for STP replacement with expansion to 0.4-MGD.

1002404 issued June 10, 2002

Sand filter replacement and chlorination enhancements.
Existing Treatment Process/Facilities and WQM permit are for comminutor with bypass bar screen, contact stabilization, settling, rapid sand filtration, aerobic sludge digestion, and chlorination disinfection.

Planning dated June 11, 2010

Pleasant Valley sewers and pump station planning approval.

1072411 issued October 12, 1972

STP modifications for 1973 Boy Scout Jamboree.
Facility expansion from 0.15 to 0.225-MGD. Deign population 45 670. (up from 42 926 and down from 46 000.)
Existing design was for 0.079-MGD, 124-PPD BOD and 175-PPD TSS
Proposed design: was for 0.225-MGD, 280-PPD BOD and 550-PPD TSS
Stated design was for 0.435-MGD (filtration limiting)

Included was four north side lift stations.

Lift station	1	2	3	8
Capacity (gpm)	175	250	320	320

Parts of this permit have been incorporated into later permits.

1072418 issued on February 23, 1972

Sewer and Northside Pump Stations

Lift station	1	12	13
Capacity (gpm)	100	100	100

Parts of this permit have been incorporated into later permits.

Order issued September 20, 1973

Change in effluent requirements: 20-mg/L BOD5, 25-mg/L TSS, 4-mg/L ammonia, and 0.5-mg/L phosphorus.

367-S-045 issued on March 26, 1968

This permit is for sewage treatment and ten pump stations surrounding Lake Arthur. In the north are Pump Stations 8, 9, and 10 with Pump Station 10 contributing to Pump Station 9 which in turn contributes to Pump Station 8. In the south are Pump Stations 1, 2, 3, 4, 5, 6, and 7. Furthest out is Pump Station 7 which contributes to Pump Station 6. Pump Station 6 contributes to Pump Station 3. A second node is formed by Pump Station 5 which contributes to Pump Station 4. Both Pump Stations 3 and 4 contributes to Pump Station 2. Pump station 2 contributes to Pump Station 1.
Design: Dated May 1965

	Visitors				BOD5	BOD5	TSS	TSS		Flow	Flow
	Initial	Design	factor	factor	ppcd	ppd	ppcd	ppd	factor	gpcd	MGD
Day use area		43 000	0.9	0.35	0.030	406	0.03				
	4060	1	5	21500							
Tent & Trailer		2 000		0.71	0.12	170	0.12	170	1	10	20000
Organized Camp Sites		1 000		0.71	0.12	85	0.12	85	1	10	10000
Total		46 000				661		661			245000
Application	19 523	42 926									250000

Complete treatment was required.
Waste flows are back calculated from application data using assumed per capita factors. Alternative flow is 0.215-MGD based on 42 960 visitors and 5-gpcd.

Conservation Release dated March 8, 1968

From WQM permit 367-S-045.
Forest and Waters provided a 1.5-cfs (0.969-MGD) minimum release flow at the Lake Arthur Dam.
Basin yield was 0.029297 cfs/square-mile based on a 51.2-square mile drainage area.

The conservation release is also reported as 1.0-MGD (1.547-cfs).

WLMR dated March 2019

Prospect Borough waste flow limited to 0.160-MGD.
Design Flow is 0.4-MGD
No additional flow is available for the Prospect Borough use.
10 SSO were reported of which 5 were mechanical failures.
High flows reported from Prospect Borough. Projected flow is 0.275-MGD with a 146-PPD load. Estimated equivalent concentration is 64-mg/L.
Prospect Borough has a CAP to eliminate overflows.
A Wilson Run Roan pump station upgrade is anticipated.

PROSPECT BOROUGH

1001401 A-2 issued July 10, 2013

Moraine State Park Equalization tank improvements (raw sewage pump and control replacement), electromagnetic flow meter, and standby generator.

1001404 issued February 5, 2001

Equalization tank and 2400-ft force main, flow diversion chamber, aeration, pumps, and McGowan Pump Station relocation. In line flow equalization above Pump station #7

1087414 issued February 5, 1988

For sewers, pump stations and an in-line retention basin.

Pump Station West at 65-gpm
East at 52-gpm
South at 64-gpm

The sanitary sewer collection system discharges to the Moraine state Park STP via a 135-foot long 8-feet diameter in-line retention basin with two 63-cfm blowers to Moraine state Park Pump Station 7-2.

Sewage Discharge
Application Data

			Influent							Effluent				
Month	year	MGD	Min PPD	Mean PPD	Max PPD	Min mg/L	Mean mg/L	Max mg/L	#	Min mg/L	Mean mg/L	Max mg/L	#	WQ mg/L
Annual Average Design		0.4												
Hydraulic Design Capacity		0.4												
Organic Design Capacity				475										
Annual Average Flow	2015	0.226												
	2016	0.146												
	2017	0.178												
Highest Monthly Average	April	0.287												
pH						6.4		8.0	204	6.78		8.1	560	6 to 9
DO										4.4	7.8	10.45	480	4.0 min
TRC										0.02	7.86	10.45	480	0.5
BOD			0.95	78	438	0.6	59	235	104	1.1	5.29	25	104	15
TSS			3	86	1042	5	59	326	104	5	9.92	41	104	30
Nitrogen			30.6		30.6	12.28		12.28	1	6.93		6.93	1	NA
Temperature										47.7	50	57.6	44	
Phosphorus			0.09	2.99	21.29	0.08	2.32	6.66	102	1		1	1	NA
Ammonia			0.33	17	216	0.33	15	263	102	0.02	2.52	30.59	104	4.0
TDS			991.8		99.1	398		398	1	458		458	1	370
Fecal Coliform										9	160	6 900	104	200
TKN										1.44		1.44	1	as N
Nitrite-Nitrate										5.75		5.75	1	as N
Chloride										156.2		156.2	1	661.2
Bromide										0.2		0.2	1	NA
Sulfate										37.4		37.4	1	622.8
Oil & Grease										5		5	1	NA
Copper										< 10		< 10	1	0.012
Lead										< 1		< 1	1	0.004
Zinc										68		68	1	0.146

Copper, lead and zinc were reported as mg/L. The expected reporting units are µg/L. As mg/L concentrations the values are high. As µg/L concentrations the values are within the expected range. The applicant has reported that the units should be µg/L.

The Connoquenessing Creek implementation plan has phosphorus requirements above Slippery Rock Creek. There are no phosphorus requirements listed for the Slippery rock Creek basin.

PentoxSD did not recommend any water quality-based requirements for TDS, chloride, sulfide, copper, lead and zinc. No known criteria exists for bromide. TKN is regulated through ammonia. Oil and grease is at the threshold detection level and should not be a concern. Phosphorus and nitrogen are being monitored for regulation development.

Chemicals used:

Sodium bicarbonate for pH control
Soda ash for pH control

Last year 5.21 dry tons sludge removed.

Sludge sent to Daltons Processing Center, Beaver Falls for landfill disposal.

Reported Prospect population: 1 185 people.

Compliance History

DMR Data for Outfall 001 (from September 1, 2018 to August 31, 2019)

Parameter	AUG-19	JUL-19	JUN-19	MAY-19	APR-19	MAR-19	FEB-19	JAN-19	DEC-18	NOV-18	OCT-18	SEP-18
Flow (MGD) Average Monthly	0.1285	0.2956	0.4009	0.2444	0.2715	0.1925	0.2773	0.2321	0.2719	0.3236	0.1582	0.2485
Flow (MGD) Weekly Average	0.1398	0.3635	0.5478	0.3779	0.3996	0.2552	0.3354	0.3387	0.3527	0.3966	0.2521	0.3569
pH (S.U.) Minimum	6.98	6.76	6.78	6.7	6.53	6.76	6.76	6.81	6.96	6.86	6.96	7.04
pH (S.U.) Maximum	7.21	7.06	7.04	7.02	7.07	6.93	7.09	7.2	7.27	7.13	7.37	7.36
TRC (mg/L) Average Monthly	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.0001	0.001	0.0001	0.001
TRC (mg/L) Inst. Maximum	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.0001	0.001	0.0001	< 0.001
CBOD5 (lbs/day) Average Monthly	9.0	15.0	19.0	9.5	10	9	11	29	16	18	11.0	45.0
CBOD5 (mg/L) Average Monthly	8	6	5	4	5	6	5	12	7	7	7	17
TSS (lbs/day) Average Monthly	6.0	16.2	24.9	17.8	12.3	13.8	14.4	15.0	20.0	23.0	15.0	14.0
TSS (mg/L) Average Monthly	6	6	7	9	6	8	6	8	10	8	8	6
Fecal Coliform (#/100 ml) Geometric Mean	10	12	10	< 10	11	10	10	11	< 10	< 8	27	10
Fecal Coliform (#/100 ml) Instant Maximum	10	25	10	10	20	10	10	20	10	< 10	130	6600
Ammonia (lbs/day) Average Monthly	1.1	0.4	0.3	0.7	0.3	0.2	0.1	0.1	0.2	< 0.3	0.1	0.2
Ammonia (mg/L) Average Monthly	1	0.182	0.085	0.3275	0.154	0.1	0.0575	0.06	0.1025	< 0.12	0.07	0.1225

The above data is for the new treatment facility that started operation in February 2108. TRC monitoring is no longer required
Summer median pH 7.05-SU

Compliance History

Nothing listed. New treatment facilities are in place to correct existing problems.

Inspections
February 4, 2014 by Bruce Leidy
Contact stabilization treatment with disinfection. (Treatment system replaced as of February 28, 2018)

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.4
Latitude 40º 57' 47.30" **Longitude** -80º 7' 25.90"
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)
DO	4.0			BPJ

Comments:

DO basis has changed from water quality to technology based. The weekly average requirements are for POTWs only.

Treatment design includes equalization after the sequencing batch reactors to limit the flow to filtration and disinfection. The effluent pump capacity is 480-gpm or 0.65-MGD. Without flow control the pump capacity effectively controls the discharge. Equalization is designed to limit the downstream flow to less than 1-MGD. Equalization design should be sufficient to equalize the 0.4-MGD design discharge over twenty-four hours.

Water Quality-Based Limitations

The reported parameters were placed into three groups for water quality review. Group 1 with CBOD-5, DO, and ammonia was evaluated with DODAG WQM7. Group 2 for TRC only was evaluated using the TRC spreadsheet. Group 3 with chloride, copper, lead, manganese, nitrogen sulfate, TDS, iron and zinc were evaluated with PENTOXSD. No distinction was made between nitrogen nitrite, nitrate and Kjeldahl nitrogen.

TRC review was for emergency operation. At the post equalization pumped discharge rate TRC is limited to 0.4-mg/L as a monthly average and 1.3-mg/L as a maximum.

The stream was evaluated at the reservoir 1-MGD (1.5-cfs) conservation (minimum) release rate.

The upstream dam is Lake Arthur Dam 55-feet high with an Army Corps 53-quare mile drainage. Base elevation is approximately 1149.5 feet, normal pool is at 1190.00-feet and maximum pool is at 1204.5-feet. Outlet inlet is at 1158.92-feet and the outlet exit is at 1157.29-feet. The dam discharge is used for downstream water augmentation.

Muddy Creek above the Lake Arthur dam is classified as a high-quality cold-water fishery. The reservoir is managed as a warm water (bass) fishery.

Because of reservoir stratification, intermittently reported local reservoir dead zone and 1158.92-foot drawdown level background pH was determined from an upper level subset of the Lake Trophic Study data. A bottom drawn down should lower the background pH due to stratification and the localized Lake Arthur bottom dead zone with its mine drainage impacts.

The Moraine State Park discharge materially controls ammonia assimilation above the Cooper Lake discharge. The Heron Ridge ammonia discharge is marginally reduced after its confluence with Muddy Creek and without the park discharge to Muddy Creek Pilot Travel may not require ammonia treatment.

Moraine State Park WQ limitations

Parameter			**Permitted Limitations**					**SBC**	**Model**		
		Monthly	Monthly	Daily	Daily	Monthly	Daily		Daily	Monthly	Daily
		Mean	Mean	Max	Min	Mean	Max		Min	Mean	Max
		(PPD)	**(PPD)**	**(PPD)**	**(mg/l)**	**(mg/l)**	**(mg/l)**		**(mg/l)**	**(mg/l)**	
CBOD	summer	**60.1**	**60.1**	**122.2**		18.0	36.0	NA		18.31	
CBOD	winter	85.0	83.5	166.9		25.0	50.0	NA		25.0	
TSS		100.0	100.1	200.3		30.0	60.0	NA			
Ammonia	summer	11.7	11.7	24.2		3.5	7.0	NA		3.62	7.24
	winter	35.0	35.0	70.1		10.5	21.0	NA		10.86	21.72
DO					4.0			NA	4.0		
TRC						0.5	1.6	NA		0.5	1.6

Comments:

Ammonia has been rounded down to the nearest 0.5-mg/L (3.5-mg/L). The current annual maximums are 17-mg/L for CBOD5 and 1.0-mg/L for ammonia. No interim rounding was done. Values over 65-ppd have been rounded to the nearest 5-pound.

TRC was reviewed because of previous permitting and anticipated emergency use when the UV radiation disinfection system fails. Manual hypochlorite application to the post equalization tank is planned. With effective equalization the 0.5-mg/L TRC BAT requirement is sufficient to maintain water quality compliance. At the maximum effluent pump rate and conservation release rate effluent TRC should not exceed 0.4-mg/L as a monthly average and 1.2-mg/l as a maximum. The chlorination contact time has not been reported. Only the emergency chlorine use reporting is necessary at the same monitoring frequency as for UV disinfection.

The review output files attached:

.**Best Professional Judgment (BPJ) Limitations**

Comments: A extended aeration sequencing batch reactor effluent 4.0-mg/L daily minimum DO limit is considered as BPJ

Anti-Backsliding

Backsliding consideration are reserved. Potentially CBOD5 may be a candidate if significant on-going effluent violations occur that cannot be abated. (one high value at 17-mg/L reported for September 2018)

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.

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 Wkly Avg	XXX	XXX	XXX	XXX	Continuous	Measured
DO (mg/L)	XXX	XXX	4.0	XXX	XXX	XXX	1/day	Grab
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
Ultraviolet Light Radiation Intensity	XXX	XXX	XXX	report	XXX	XXX	1/day	Grab
CBOD5 Nov 1 - Apr 30	85.0	XXX	XXX	25.0	XXX	5.00	1/week	24-Hr Composite
CBOD5 May 1 - Oct 31	60.1	XXX	XXX	18.0	XXX	36.0	1/week	24-Hr Composite
TSS	100.0	XXX	XXX	30.0	XXX	60.0	1/week	24-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	1/week	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	1/week	Grab
Total Nitrogen	XXX	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	24-Hr Composite
Ammonia Nov 1 - Apr 30	35.0	XXX	XXX	10.5	XXX	21.0	1/week	24-Hr Composite
Ammonia May 1 - Oct 31	11.7	XXX	XXX	3.5	XXX	7.0	1/week	24-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report Avg Qrtly	XXX	XXX	1/quarter	24-Hr Composite

Compliance Sampling Location: Outfall 001 after disinfection

APPENDIX A1

Stream Data

Basin The basin formerly had a stream gaging station upstream near Isle, Pa. The present stream Gaging station is below the Moraine State Park sewage discharge. This gage station has two earlier locations 1000 feet and 2000 feet downstream of its present location. A third one-time used gage station is reported near the Stream mouth. Dam gage station #03106280 is just above the Lake Arthur Dam at RMI 4.53. At RMI 4.50 is the Lake Arthur Dam. Below the dam at RMI 4.39 and tailrace RMU 0.05 is the 0.04-MGD Moraine State Park STP operating under NPDES permit PA0032531. At the STP outfall the basin elevation is 1160.79-feet with a 51.0 square mile drainage. Below the state park discharge at RMI 4.33 is the USGS Stream Gage Station Muddy Creek near Portersville #0316300. This gage was formerly located 1 000 and 2 000-feet further downstream. The Muddy Creek mouth elevation is 1034.54-feet above sea level with a 58.3-squatre mile drainage area.

Stream Gage Station	Muddy Creek at Isle		No	03106200	Period	1945 - 1958	
	Low Flow (cfs)	0.4	Drainage (Sq-mi)	29.3	Yield (cfs/sq-mi)	0.0136562	
	RMI	9.22	River Elevation (ft)	1178.01			
Dam Gage Station	Lake Arthur at Moraine St Park		No	03106280	Period	2006 -	
	Low Flow (cfs)	NA	Drainage (Sq-mi)	50.8	Yield (cfs/sq-mi)		
	RMI	4.53	River Elevation (ft)				
Stream Gage Station	Muddy Creek near Portersville		No	03106300	Period	1964 - 1972	
	Low Flow (cfs)	0.55	Drainage (Sq-mi)	51.2	Yield (cfs/sq-mi)	0.010742	
Stream Gage Station	Muddy Creek near Portersville		No	03106300	Period	1971 - 1993	
	Low Flow (cfs)	1.75	Drainage (Sq-mi)	53.0	Yield (cfs/sq-mi)	0.033019	
	RMI	4.33	River Elevation (ft)	1160.58			

The Department of Interior Stream Stats data supports the stream gage drainage areas but not the reported 53-square mile Lake Arthur drainage.

The controlling low flow is the March 8, 1968 Forests and Waters determined a 1.5-cfs (1-MGD) conservation release. Basin yield is 0.029297-cfs/square miles based on 1.5-cfs minimum stream release and a 51.2-squre mile drainage.

APPENDIX A2

Gage Station Data

Gage Name	No	Latitude	Longitude	Below Dam	RMI	Elevation	Ref	Drainage DoI	Drainage	Start	End	Low Flow StSts	Low Flow Pub	Yield
		DDMMSS	DDMMSS	feet		feet		Sq mile				cfs	cfs	cfs/sq-mi
Muddy Creek mouth		40°58’48”	-80°10’46”		0.00	1034.54		58.3	58.2			1.3		0.022298
Muddy Creek at Grant City	03106350	40°58’ 57”	-80°10’15”		0.70	1115.18			58.5	19460925	19460925			0.011966
Muddy Creek near Portersville	03106300			-3000	3.93			51.5			19630408	1.12		0.021748
Muddy Creek near Portersville	03106300			-2000	4.12	1155.21				19630502	19800930			
Muddy Creek near Portersville	03106300			-2000	4.12	1155.21			51.2	1964	1972		0.55	0.010742
Muddy Creek near Portersville	03106300	40°57’ 47”	-80°07’31”	-1000	4.37	1155.81	1929	51.0		1971	1993		1.75	0.034317
Muddy Creek near Portersville	03106300	40°57’ 47”	-80°07’31”	-1000	4.37	1155.81	1929		51.2	1971	1993		1.75	0.034180
Muddy Creek near Portersville	03106300	40°57’ 44”	-80°07’31”	-1000	4.37	1155.81	1929	51.0		196303	199309	1.1		0.021569
Muddy Creek near Portersville	03106300	40°57’ 44”	-80°07’31”	-1000	4.37	1155.81	1929		51.2	196303	199309	1.1		0.021484
Muddy Creek near Portersville	03106300	40°57’ 44”	-80°07’31”	-1000	4.37	1155.81	1929	51.0		196303	199309		1.3	0.025490
Lake Arthur Dam		40°57’ 45”	-80°07’17”		4.50	1156.28		50.9					1.5	0.029470
Lake Arthur Dam		40°57’ 45”	-80°07’17”		4.50	1156.28			51.2				1.5	0.029297
Lake Arthur Dam		40°57’ 45”	-80°07’17”		4.50	1156.28		50.9	51.2			1.1		0.021484
Lake Arthur					4.60				53.0				1.75	0.033019
Lake Arthur at Moraine State Park	03106280	40°57’ 45”	-80°07’18”		4.53	1156.39	1929		50.8	19690515				
Muddy Creek at Isle	03106200	40°56’ 55”	-80°02’25”		9.22	1173.09		29.5	29.3	19440920	19570828	0.37		0.013652
Muddy Creek at Isle	03106200	40°56’ 55”	-80°02’25”		9.22	1173.09	1927	29.5	29.3	19440920	19570828		0.4	0.013559

The expansion review used an 1.75-cfs 7-day 10-year low flow for the period 1971 - 1993.

Other low flows considered were a 1-MGD minimum release, and 1.1-cfs statistical derived low flow.

The basin yields varied because the dam drainage is reported as 51.8 and 53-square miles with only the 51.8-square miles drainage verified through the Dept of Interior’s Stream Stats.

The Stream Stats statistical low flows imply flows less than the conservation release are possible. The 1971 through 1993 data shows that the conservation release is providing an adequate low for the water quality evaluation.

APPENDIX A3

Moraine State Park Discharge Sensitivity Notes

Stream							Discharge						
Flow	Drainage	Yield	CBOD	Ammonia	pH	DO	Tech Flow	Tech CBOD	WQ CBOD	Tech Ammonia	WQ Ammonia	Tech pH	Tech DO
CFS	Sq Mi	CFS/Sq-Mi	mg/L	mg/L	SU	mg/L	MGD	mg/L	mg/L	mg/L	mg/L	SU	mg/L
1.10	51.5	0.021	2.0	0.02	7.5	7.54	0.40	25.0	14.70	25.0	3.00	7.05	4.0
1.10	51.5	0.021	2.0	0.02	6.8	7.54	0.40	25.0	12.32	25.0	3.70	7.05	4.0
1.10	51.2	0.021	2.0	0.02	6.8	7.54	0.65	25.0	10.74	25.0	3.06	7.05	4.0
1.10	51.2	0.021	2.0	0.02	6.8	7.54	0.40	25.0	12.32	25.0	3.70	7.05	4.0
1.10	51.2	0.021	2.0	0.02	7.5	7.54	0.40	25.0	14.70	25.0	3.00	7.05	4.0
1.10	51.2	0.021	2.0	0.02	7.2	7.54	0.40	25.0	13.33	25.0	3.18	7.05	4.0
1,30	51.2	0.025	2.0	0.02	7.5	7.54	0.40	25.0	17.13	25.0	3.22	7.05	4.0
1.30	51.2	0.025	2.0	0.02	6.8	7.54	0.40	25.0	14.49	25.0	4.38	7.05	4.0
1.50	**51.2**	**0.029**	**2.0**	**0.02**	**7.5**	**7.54**	**0.40**	**25.0**	**18.31**	**25.0**	**3.62**	**7.05**	**4.0**
1.55	51.2	0.030	2.0	0.02	6.8	7.54	0.40	25.0	16.67	25.0	5.32	7.05	4.0
1.55	51.2	0.030	2.0	0.02	7.2	7.54	0.40	25.0	17.88	25.0	4.39	7.05	4.0
1.55	51.2	0.030	2.0	0.02	7.5	7.54	0.40	25.0	19.81	25.0	3.73	7.05	4.0
1.75	51.2	0.034	2.0	0.02	7.2	7.54	0.40	25.0	19.28	25.0	4.96	7.05	4.0
1.75	**51.2**	**0.034**	**2.0**	**0.02**	**7.5**	**7.54**	**0.40**	**25.0**	**21.31**	**25.0**	**4.21**	**7.05**	**4.0**
1.75	51.2	0.034	2.0	0.02	6.8	7.54	0.40	25.0	18.1	25.0	6,03	7.05	4.0
1.75	51.2	0.034	2.0	0.02	7.5	7.54	0.65	25.0	17.17	25.0	3.16	7.05	4.0
1.75	51.2	0.034	2.0	0.02	6.8	7.54	0.65	25.0	14.70	25.0	4.56	7.05	4.0
1.75	**53.0**	**0.033**	**2.0**	**0.02**	**7.5**	**7.54**	**0.40**	**25.0**	**19.67**	**25.0**	**4.07**	**7.05**	**4.0**
1.75	53.0	0.033	2.0	0.02	6.8	7.54	0.40	25.0	17.88	25.0	5.92	7.05	4.0

Stream Stats provides the lowest stream flows.
The 1.5-cfs is a Forests and Waters conservation release flow.
1971 through 1993 stream data estimates a 1.75-cfs seven-day ten-year low flow.
Lower stream pH lowers the effluent CBOD5 requirements and raises the effluent ammonia requirements

APPENDIX B

Lake Arthur Trophic Report Summary

MUDDY CREEK BACKGROUND ABOVE MORAINE STATE PARK STP OUTFALL

The reservoir is classified as a high-quality-cold water fishery. The dam was built in 1968 with the reservoir filler for park start-up on 23 May 1970. The reservoir is operated as a warm water bass fishery. Muddy Creek below the reservoir is classified for warm water fish.

Generally, the local coal mines were classified as alkaline without a significant iron discharge. Also reported for one reservoir bay was a bottom mine drainage limited zone that did not materially impair reservoir operation.

Dam Tailrace
Summer Background

		mean	Comments
pH	SU	7.5	median lake pH above 5-foot depth near dam
Alkalinity	mg/L $CaCO_3$	24.2	24-mg/L
Total Hardness	mg/L $CaCO_3$	60	less than the 100-mg/L as calcium carbonate default
TSS	mg/L	< 5	No criteria
TDS	mg/L	110	Less than the water supply criteria
Chloride	mg/L	16.27	Less than the water supply criteria
Sulfates	mg/L	38.12	Less than the water supply criteria
Total Phosphorus	mg/L	0.026	0.03-mg/L
Diss Phosphorus	mg/L	< 0.01	0.01-mg/L
Total Nitrogen	mg/L	0.66	Less than the water supply criteria
Ammonia	mg/L	< 0.02	Default is 0.1-mg/L
Calcium	mg/L	15.9	15.9-mg/L
Total Magnesium	mg/L	4.953	5.0 with No promulgated criteria
Total Aluminum	mg/L	0.0280	0.03-mg/L
Total Copper	mg/L	< 0.004	0.004-mg/L – as expected for surface waters according to Hem
Total Iron	mg/L	0.0770	0.1-mg/L
Total Lead	mg/L	< 0.001	0.001-mg/L
Total Manganese	mg/L	0.0642	0.06-mg/L
Total Zinc	mg/L	< 0.005	0.005-mg/L

The reservoir is a reclaimed coal surface mine.

Bottom concentrations are assumed to be mine drainage affected.

Data is from the Lake Arthur Trophic Status Index Survey Report of March 1, 2016

LAKE ARTHUR TROPHIC STATUS INDEX SURVEY REPORT OF MARCH 1, 2016

Lake study does not address the park water supply and one area was previously reported as mine drainage impacted. The mine drainage impact was credited to mine drainage abatement failure during lake constriction.

Station 1 (near dam 405747.3N 800711.2W)
pH

Depth	Spring	Summer	Fall	median
0	7.69	8.28	6.4	6.69
1	7.61	8.15	6.89	7.61
2	7.70	7.68	7.25	7.68
3	7.71	7.23	7.53	7.53
4	7.51	6.89	7.67	7.51
5	7.35	6.71	7.61	7,35
6	7.22	6.5	7.48	7.22
7	7.07	6.35	7.36	7.07
8	6.92	6.27	7.29	6.92
9	6.82	6.14	7.28	6.82
Minimum	6.82	6.14	6.40	6.14
Maximum	7.51	8.28	6.67	8.28
Median	7.29	6.80	7.33	7.27

Other Parameters

	Spring		Summer		Fall			
	Surface	Bottom	Surface	Bottom	Surface	Bottom	average	median
pH	7.6	7.3	8.5	7.1	7.6	7.6	7.6	7.6
Alkalinity	16.0	16.4	24.2	34.2	30.0	29.6	25.1	26.9
Hardness	56	57	60	62	63	59	59.5	59.5
Secchi Depth	1.2		1		1.6		1.3	1.2
Sp Cond	182.9	185.2	187.7	199.7	198.5	196.3	191.7	192.0
TSS	6	< 5	< 5	< 5	10	< 5	< 8	< 8
TDS	112	120	110	140	96	130	118	116
Chloride	15.58	15.51	16.27	15.51	17.21	16.85	16.16	15.93
Sulfates	39.69	40.75	38.12	36.75	37.88	38.19	38.56	38.16
Phosphorus	0.016	0.018	0.026	0.015	0.020	0.022	0.020	0.019
Diss P	< 0.01	0.01	< 0.01	< 0.01	0.013	< 0.01	< 0.01	< 0.01
Nitrogen	0.56	0.39	0.66	0.52	0.56	0.52	0.54	0.54
Ammonia	0.03	0.05	< 0.02	0.23	0.03	0.04	< 0.08	< 0.04
Calcium	14.1	14.7	15.9	16.0	17.5	15.1	15.55	15.50
Magnesium	5.005	4.900	4.953	5.299	4.785	5.214	5.026	4.979
Aluminum	0.0390	0.0534	0.0280	0.0384	0.0183	0.0234	0.0334	0.0332
Copper	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Iron	0.115	0.199	0.077	0.481	0.103	0.113	0.181	0.114
Lead	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.001
Mn	0.184	0.571	0.0642	3.0976	0.0733	0.0739	0.677	0.129
Zinc	0.0115	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.012	0.012

pH basis is not clearly stated
Fall turnover indicated
Summer stratification indicated.

Station 2 (2 mile above dam. (Muddy Creek RMI 6.5) 405659.0N 800509.00W)
pH

Depth	Spring	Summer	Fall	median
0	7.71	7.99	7.44	7.71
1	7.64	7.96	7.44	7.64
2	7.55	7.76	7.43	7.55
3	7.51	7.69	7.42	7.51
4	7.44	7.07	7.40	7.40
5	7.37	6.72	7.39	7.37
6	6.09	6.49	7.35	7.49
Minimum	6.09	6.49	7.35	6.71
Maximum	7.71	7.99	7.446	7.98
Median	7.51	7.69	7.42	7.44

Other Parameters

	Spring		Summer		Fall			
	Surface	Bottom	Surface	Bottom	Surface	Bottom	average	median
pH	7.2	7.1	7.8	7.2	7.7	7.7	7.37	7.20
Alkalinity	16.2	15.8	25.0	36.0	29.4	28.6	19.00	16.20
Hardness	57	58	60	61	62	61	58.33	58.00
Secchi Depth	1.0		0.9		1.5		1.0	1.0
Sp Cond	180.4	181.1	191.2	198.47	193.8	193.7	184.23	181.10
TSS	6	8	6	< 5	< 5	< 5	< 6.67	< 6.0
TDS	102	110	136	78	132	136	116.00	110.00
Chloride	15.58	15.48	16.06	15.76	17.24	17.34	15.71	15.58
Sulfates	38.77	39.26	37.81	34.27	36.99	37.12	38.61	38.77
Phosphorus	0.012	0.022	0.030	0.033	0.025	0.023	0.02	0.02
Diss P	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nitrogen	0.36	0.39	0.67	0.64	0.50	0.52	0.47	0.39
Ammonia	< 0.02	< 0.02	< 0.02	0.21	< 0.02	< 0.02	< 0.02	< 0.02
Calcium	15.0	14.4	15.0	16.5	16.3	16.3	14.80	14.00
Magnesium	4.729	4.886	5.516	4.754	5.173	4.840	5.04	4.89
Aluminum	0.0332	0.0707	0.0363	0.0723	0.0325	0.0398	0.05	0.04
Copper	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Iron	0.097	0.145	0.108	0.331	0.131	0.117	0.12	0.11
Lead	< 0.001	< 0.001	< 0.001	0.0012	< 0.001	< 0.001	< 0.001	0.001
Mn	0.180	0.241	0.1203	2.8694	0.0791	0.0741	0.18	0.18
Zinc	<0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0218	< 0.005	< 0.005

pH basis is not clearly stated
Fall turnover indicated
Summer stratification indicated.

Station 3 (3.5 miles above dam. (Muddy Creek RMI 8.0) 405706.2N 800328.9W)
pH

Depth	Spring	Summer	Fall	median
0	7.81	7.98	7.46	7.81
1	7.69	7.97	7.43	7.69
2	7.65	7.56	7.41	7.56
3	7.58	7.46	7.36	7.46
4	7.42	7.01	7.35	7.35
5	6.71	6.72	7.33	6.72
6			7.28	7.28
Minimum	6.71	6.72	7.28	6.71
Maximum	7.81	7.98	7.46	7.98
Median	7.62	7.51	7.36	7.43

Other Parameters

	Spring		Summer		Fall			
	Surface	Bottom	Surface	Bottom	Surface	Bottom		
pH	7.6	7.5	8.0	7.6	7.7	7.7	7.70	7.60
Alkalinity	17,0	16.8	25.0	25.2	29.2	29.4	20.90	20.90
Hardness	55	55	61	61	59	60	57.00	55.00
Secchi Depth	1.5		0.7		1.4		1.1	1.1
Sp Cond	175.4	175.4	187.6	187.1	193.1	191.3	179.47	175.4
TSS	< 5	8	6	< 5	8	8	7.00	7.00
TDS	108	116	138	132	126	120	120.67	116.00
Chloride	15.12	14.91	16.19	16.19	17.04	16.97	15.41	15.12
Sulfates	36.95	39.63	37.12	37.19	36.73	36.59	37.90	37.12
Phosphorus	0.013	0.020	0.049	0.038	0.024	0.027	0.03	0.02
Diss P	< 0.01	< 0.01	< 0.01	< 0.01	0.018	< 0.01	< 0.01	< 0.01
Nitrogen	0.36	0.39	0.88	0.72	0.57	0.59	0.54	0.39
Ammonia	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Calcium	14.2	14.2	15.7	16.1	15.9	15.7	14.7	14.2
Magnesium	4.729	4.780	5.283	4.964	4.723	4.995	4.93	4.78
Aluminum	0.0360	0.0613	0.03723	0.0475	< 0.01	0.0531	0.04	0.04
Copper	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.004
Iron	0.113	0.181	0.174	0.208	0.154	0.187	0.16	0.27
Lead	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.01	< 0.01
Mn	0.145	0.159	0.1453	0.1556	0.0713	0.0712	0.15	0.15
Zinc	<0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0113	< 0.005	< 0.005

pH basis is not clearly stated
Fall turnover indicated
Summer stratification indicated.
Site is near the potable water intake.

APPENDIX C
Basin Tributary Discharges

Heron Ridge

January 8, 2018 NOV for not registering for eDMR.
December 10, 2015 NPDES PA0263583 issued with a December 31, 2020 expiration.
Required treatment is secondary with a 3.2-mg/l summer ammonia limit and nitrogen and phosphorus monitoring. Design flow is 0.014-MGD from a 34-home allotment
Outfall

		Units	Modelled	Revised Model
		RMI	0.43	0.43
Drainage		sq mile	1.15	1.15
Elevation		feet	1180	1169.09
Slope		ft/ft	0.0088	0.0038
Yield		cfs/sq-mile	0.34	0.0207
Stream Flow		cfs	0.039	0.0337
Limitations	CBOD	mg/L	25.9	25
	Ammonia	mg/L	3.28	2.5
	DO	mg/L	4.0	4.0
Stream quality:	CBOD	mg/L	5.20	5.24
	Ammonia	mg/L	0.85	0.74
	DO	mg/L	7.54	7.54
	pH	SU		7.22

Treatment
WQM permit 1009405 for a 0.015-MGD Cromaglass CA-1 Sequencing batch reactor with chlorination and a 16-hour run-off period.

The facility was inspected by Bruce Leidy on August 11, 2014. He reported nothing built.

Lake Arthur Estates
Outfall

		Units	Modelled	Revised Model
		RMI	0.63	0.63
Discharge			0.425	0.425
	24-hour Runoff		0.6375	0.6375
Stream	Drainage	sq mile	0.13	0.13
	Elevation	feet		1155.25
	Slope	ft/ft		0.00632
	Yield	cfs/sq-mile	0.33	0.29
	Flow	cfs	0.00429	0.0038
Limitations	CBOD	mg/L	25.0	25,0
	Ammonia	mg/L		1.01
	DO	mg/L		5.0
Stream quality:	CBOD	mg/L		20.04
	Ammonia	mg/L		0.90
	DO	mg/L		6.30
	pH	SU		7.498

Stream discharge modelled to determine stream quality at its confluence with Muddy Creek.

APPENDIX D
Water Supply Permitting

The water supply is covered under permits 368-W-003 and 1072503. Water Supply Permit 368-W-003 approved on April 19, 1968 is for wells and potable water treatment. This permit was issued prior to park start-up on May 23, 1970. Water Supply Permit 1072503 approved on September 29, 1972 was for a Lake Arthur in take potable water treatment.

Potable Water waste water treatment is under WQM permit 1072204 issued on July 19, 1972. The waste source is water filtration backwash and treatment is sedimentation in a plastic lined earthen basin. Discharge was to Lake Arthur tributary near the water treatment plant. No NPDES discharge permit has been located.

Permit operation status has not been verified. Water supply changes are anticipated and will determine waste treatment requirements.

Stream		34100	
Discharge	Latitude	405754.9	
	Longitude	-800524.6	
	RMI	0.89	
	MGD	0.007943	weekly average based (daily value)
	Elevation (ft)	1207.39	
	Drainage (sq-mi)	0.12	
	Slope (ft/ft)	0.045258	
Stream	Yield (cfs/sq-mi)	0.029297	
	Flow	intermittent	

WQ recommendations

Parameter	Technology			Background	Effluent	Maximum	WQBEL	Comments	
	Mean	Max	I Max						
	Mg/L	Mg/L	Mg/L	Mg/L	Mg/L	Mg/L	Mg/L	Control	Basis
Aluminum	4.0	8.0	10.0	0.040	0.611	0.953	0.611	AFC	AFC
Copper				< 0.004	0.004	0.004	0.006	input	CFC
Lead				< 0.001	0.001	0.001	0.002	input	CFC
Manganese	1.0	2.0	2.5	0.18	1.0	1.56	1.23	input	THH
N as Nitrite-Nitrate				0.39	0.39	0.39	16.9	input	THH
Sulfate				38.77	38.77	38.77	401.1	input	THH
Chloride				15.580	15.58	15.58	417.7	input	THH
TDS				110	110	110	779.0	input	THH
Iron	2.0	4.0	5.0	0.110	1.898	2.96	1.898	input	CFC
Zinc				< 0.005	0.005	0.005	0.061	input	AFC

Copper, lead and zinc were evaluated at their absolute values.

To generate water supply requirements a 0.000 001-MGD intake was placed at the stream mouth.

The receiving waters are marked as an intermittent stream on the USGS map. The above requirements assume perennial stream conditions at the discharge.

A similar discharge from treating well water was originally authorized prior to park start-up. After the park start-up a lake intake was authorized, and any industrial waste treatment and discharge facilities were relocated.

The high-quality stream designation date is unknown.

Background is from the 2016 Lake Trophic Report Station 2 and should be 0.3-mile above the park potable water intake.

For the intermittent stream discharge aluminum, copper, lead, manganese, nitrogen-nitrite, nitrogen-nitrate, sulfate, chloride, dissolved solids, total iron, and zinc could be background limited. Alternatively, aluminum could be AFC limited to 0.6-mg/L and iron limited to 1.9-mg/L.

For a discharge to the reservoir no water-quality requirements are recommended.