pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northwest Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0220736**
Facility Type	**Non-Municipal**	APS ID	**1021164**
Major / Minor	**Minor**	Authorization ID	**1322861**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Flying W Ranch, Inc.**	Facility Name	**Flying W Ranch**
Applicant Address	685 Flying W Ranch Road	Facility Address	685 Flying W Ranch Road
	Tionesta, PA 16353		Tionesta, PA 16353
Applicant Contact	R. Dale Weller	Facility Contact	R. Dale Weller
Applicant Phone	(814) 463-7663	Facility Phone	(814) 463-7663
Client ID	24117	Site ID	237046
Ch 94 Load Status	Not Overloaded	Municipality	Kingsley Township
Connection Status	No Limitations	County	Forest County
Date Application Received	July 31, 2020	EPA Waived?	Yes
Date Application Accepted	August 11, 2020	If No, Reason	-
Purpose of Application	Renewal of an existing NPDES Permit for an existing discharge of treated sanitary wastewater from an STP serving a horse ranch.		

Summary of Review

Act 14 - Proof of Notification was submitted and received.

A Part II Water Quality Management permit is not required at this time.

The applicant should be able to meet the limits of this permit, which will protect the uses of the receiving stream.

I. OTHER REQUIREMENTS:
- A. Stormwater into sewers
- B. Right of way
- C. Solids handling
- D. Public sewerage availability
- E. Effluent Chlorine Optimization and Minimization

SPECIAL CONDITIONS:
- II. Solids Management

There are no open violations in efacts associated with the subject Client ID (24117) as of 7/6/2021.

Approve	Deny	Signatures	Date
X		Stephen A. McCauley Stephen A. McCauley, E.I.T. / Environmental Engineering Specialist	7/6/2021
X		Justin C. Dickey Justin C. Dickey, P.E. / Environmental Engineer Manager	7/8/2021

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	001	Design Flow (MGD)	0.01
Latitude	41° 32’ 53.36”	Longitude	79° 16’ 42.58”
Quad Name	Kellettville	Quad Code	0611
Wastewater Description:	treated sanitary wastewater		
Receiving Waters	Unnamed Tributary to the Church Run	Stream Code	N/A
NHD Com ID	100473691	RMI	N/A
Drainage Area	0.09	Yield (cfs/mi^2)	0.07
Q_{7-10} Flow (cfs)	0.0063	Q_{7-10} Basis	calculated
Elevation (ft)	1440	Slope (ft/ft)	0.10416
Watershed No.	16-F	Chapter 93 Class.	CWF
Existing Use	-	Existing Use Qualifier	-
Exceptions to Use	-	Exceptions to Criteria	-
Assessment Status	Attaining Use(s)		
Cause(s) of Impairment	-		
Source(s) of Impairment	-		
TMDL Status	-	Name	-

Background/Ambient Data		Data Source
pH (SU)	-	-
Temperature (°F)	-	-
Hardness (mg/L)	-	-
Other:	-	-

Nearest Downstream Public Water Supply Intake		Aqua Pennsylvania, Inc. - Emlenton	
PWS Waters	Allegheny River	Flow at Intake (cfs)	1,376
PWS RMI	90.0	Distance from Outfall (mi)	78.5

Sludge use and disposal description and location(s): Sludge is not used, it is disposed of at an approved landfill.

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.

Narrative: This Fact Sheet details the determination of draft NPDES permit limits for an existing discharge of 0.01 MGD of treated sewage from an existing horse ranch in Kingsley Township, Forest County.

Treatment permitted under WQM Permit 2793401 consists of the following: An 8,000 gallon septic tank and a 1,000 gallon septic tank in series, a 2,000 gallon dosing tank with two 74 gpm alternating submersible pumps, two 5,041 square foot (71' x 71') sand filter beds, and tablet chlorine disinfection with two 345 gallon contact tanks.

1. Streamflow:

The yieldrate was calculated from the drainage area and the Q_{7-10} low flow of the nearest stream with a gage station:

Tionesta Creek at Lynch, PA - USGS gage number 03017500 (1940-1979):

Drainage Area:	233	sq. mi.	(USGS StreamStats)
Q_{7-10}:	16.4	cfs	(USGS StreamStats)
Yieldrate:	0.07	cfsm	(calculated)

Unnamed Tributary to the Church Road at the discharge point:

Yieldrate:	0.07	cfsm	(calculated above)
Drainage Area:	0.09	sq. mi.	(USGS StreamStats)
% of stream allocated:	100%	Basis:	no nearby discharges
Q_{7-10}:	0.0063	cfs	(calculated)

2. Wasteflow:

Outfall 001:

Maximum discharge: 0.01 MGD = 0.015 cfs

Runoff flow period: 24 hours Basis: Runoff flow for a septic tank-based STP

Flow will be required to be monitored as authorized under Chapter 92a.61, and as recommended in the SOP.

3. Parameters:

The following parameters were evaluated: pH, Total Suspended Solids, Fecal Coliform, Phosphorus, NH_3-N, $CBOD_5$, Dissolved Oxygen, and Total Residual Chlorine.

a. pH

Between 6.0 and 9.0 at all times

Basis: Application of Chapter 93.7 technology-based limits. The measurement frequency is set as daily to comply with the suggestion of the SOP to adhere to the frequencies outlined in Table 6-3 of the Technical Guidance for the Development and Specification of Effluent Limitations (362-0400-001).

b. Total Suspended Solids

Limits are 30 mg/l as a monthly average and 60 as a daily maximum.

Basis: Application of Chapter 92a47 technology-based limits

c. Fecal Coliform

05/01 - 09/30: 200/100ml (monthly average geometric mean)

1,000/100ml (instantaneous maximum)

10/01 - 04/30: 2,000/100ml (monthly average geometric mean)
10,000/100ml (instantaneous maximum)

Basis: Application of Chapter 92a47 technology-based limits

d. E. Coli

Monitoring was added for E. Coli at a frequency of 1/year.

Basis: Application of Chapter 92a.61 as recommended by the SOP.

e. Phosphorus

☐ Limit necessary due to:

☐ Discharge to lake, pond, or impoundment
☐ Discharge to stream

☒ Limit not necessary

Basis: Chapter 96.5 does not apply. However, the Total Phosphorus monitoring requirement will be retained as recommended by the SOP to provide data for review during the next renewal application to ensure the discharge is not high in nutrients.

f. Total Nitrogen

The previous monitoring for Total Nitrogen will be retained in accordance with the SOP, based on Chapter 92a.61.

g. NO_2-NO_3, Fluoride, Phenolics, Sulfates, and Chlorides

Nearest Downstream potable water supply Aqua Pennsylvania, Inc. - Emlenton

Distance downstream from the point of 78.5 miles (approximate)

☒ No limits necessary
☐ Limits needed

Basis Significant dilution available.

h. Ammonia-Nitrogen (NH_3-N)

Median discharge pH to be used: 7.1 Standard Units (S.U.)

Basis: Average pH value from DMR summary (1 year)

Discharge temperature: 25°C (assumptive value used for modeling purposes)

Median stream pH to be used: 7.0 Standard Units (S.U.)

Basis: (assumptive value used for modeling purposes)

Stream Temperature: 20˚C (assumptive value used for CWF modeling purposes)

Background NH_3-N N/A mg/l

Basis: No background data available for NH_3-N.

NH_3-N Summer limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

NH_3-N Winter limits: 25.0 mg/l (monthly average)
50.0 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the summer limits above (see Attachment 1), which are less restrictive than the previous NPDES Permit limits. Since the existing limits are being met, they will be retained with this renewal.

i. $CBOD_5$

Median discharge pH to be used: 7.1 Standard Units (S.U.)

Basis: Average pH value from DMR summary (1 year)

Discharge temperature: 25°C (assumptive value used for modeling purposes)

Median stream pH to be used: 7.0 Standard Units (S.U.)

Basis: (assumptive value used for modeling purposes)

Stream Temperature: 20˚C (assumptive value used for CWF modeling purposes)

Background $CBOD_5$ concentration: 2.0 mg/l

Basis: Default value

$CBOD_5$ summer limits: 25 mg/l (monthly average)
50 mg/l (instantaneous maximum)

$CBOD_5$ winter limits: 25 mg/l (monthly average)
50 mg/l (instantaneous maximum)

Result: WQ modeling resulted in the summer limits above (see Attachment 1), which are less restrictive than the previous NPDES Permit limits. Since the existing limits are being met, they will be retained with this renewal.

j. Dissolved Oxygen (DO)

- ☐ 3.0 mg/l - minimum required due to discharge going to a drainage swale or ditch.
- ☒ 4.0 mg/l - minimum desired in effluent to protect all aquatic life.
- ☐ 5.0 mg/l - desired in effluent for Warm Water / Trout-Stocked Fisheries.
- ☐ 6.0 mg/l - desired in effluent for Cold Water Fisheries.
- ☐ 7.0 mg/l - required due to discharge going to a High Quality / Exceptional Value stream
- ☐ 8.0 mg/l - required due to discharge going to a naturally reproducing salmonid stream

Discussion: The Dissolved Oxygen minimum of 4.0 mg/l will be retained with this renewal. The technology-based minimum of 4.0 mg/l is recommended by the WQ Model (see Attachment 1) and the SOP based on Chapter 93.7, under the authority of Chapter 92a.61. The measurement frequency is set as daily to comply with the suggestion of the SOP to adhere to the frequencies outlined in Table 6-3 of the Technical Guidance for the Development and Specification of Effluent Limitations (362-0400-001).

k. Total Residual Chlorine (TRC)

☐ No limit necessary
☒ TRC limits: 0.5 mg/l (monthly average)
1.6 mg/l (instantaneous maximum)

Basis: The TRC limits are technology-based using the TRC_Calc Spreadsheet (see Attachment 2). The TRC is calculated at the first point of aquatic life use downstream of the discharge. The resulting limits are the same as in the previous NPDES Permit and will be retained. The measurement frequency is set as daily to comply with the suggestion of the SOP to adhere to the frequencies outlined in Table 6-3 of the Technical Guidance for the Development and Specification of Effluent Limitations (362-0400-001).

4. Anti-Backsliding

Since all the permit limits in this renewal are the same or more restrictive than the previous NPDES Permit, anti-backsliding is not applicable.

5. Attachment Details:

Attachment 1 - WQ Modeling Printouts

Attachment 2 - TRC_Calc Spreadsheet

(The Attachments above can be found at the end of this document)

Compliance History

DMR Data for Outfall 001 (from June 1, 2020 to May 31, 2021)

Parameter	MAY-21	APR-21	MAR-21	FEB-21	JAN-21	DEC-20	NOV-20	OCT-20	SEP-20	AUG-20	JUL-20	JUN-20
Flow (MGD) Average Monthly	0.00044	0.00044					0.00044	0.00044	0.00044	0.00044	0.00044	0.00044
Flow (MGD) Daily Maximum	0.00044	0.00044					0.00044	0.00044	0.00044	0.00044	0.00044	0.00044
pH (S.U.) Minimum	7.3	7.4					7.2	7.2	7.0	6.8	6.7	6.0
pH (S.U.) Maximum	7.6	7.8					7.4	7.7	7.4	7.5	7.2	7.2
DO (mg/L) Minimum	6.80	7.42					6.43	6.40	5.50	6.08	5.80	5.08
TRC (mg/L) Average Monthly	0.06	0.09					0.13	0.10	0.10	0.12	0.09	0.12
TRC (mg/L) Instantaneous Maximum	0.09	0.10					0.16	0.14	0.18	0.19	0.14	0.17
CBOD5 (mg/L) Average Monthly	< 3.0	< 3.0					< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0
TSS (mg/L) Average Monthly	< 3	< 3					4	8.5	3	< 3.5	< 3.0	< 3.0
Fecal Coliform (CFU/100 ml) Geometric Mean	< 1	1					8.30	< 1	3.87	3.46	2.45	3.74
Fecal Coliform (CFU/100 ml) Instantaneous Maximum	< 1	1					68	< 1	12	12	6	13
Total Nitrogen (mg/L) Average Monthly	7.05	5.10					54.5	83.75	75.05	59.1	35.95	11.3
Ammonia (mg/L) Average Monthly	< 0.10	< 0.10					< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.19
Total Phosphorus (mg/L) Average Monthly	0.28	0.31					0.19	0.28	0.24	0.250	0.260	0.320

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/week	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
DO	XXX	XXX	4.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
CBOD5	XXX	XXX	XXX	10.0	XXX	20	2/month	8-Hr Composite
TSS	XXX	XXX	XXX	20.0	XXX	40	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-Nitrogen Nov 1 - Apr 30	XXX	XXX	XXX	15.0	XXX	30	2/month	8-Hr Composite
Ammonia-Nitrogen May 1 - Oct 31	XXX	XXX	XXX	5.0	XXX	10	2/month	8-Hr Composite
Total Phosphorus	XXX	XXX	XXX	Report	XXX	XXX	2/month	8-Hr Composite

Compliance Sampling Location: at Outfall 001, after disinfection.

Flow is monitor only based on Chapter 92a.61. The limits for pH and Dissolved Oxygen are technology-based on Chapter 93.7. The Total Residual Chlorine (TRC) limits are technology-based on Chapter 92a.48. The limits for $CBOD_5$, Total Suspended Solids, and Fecal Coliforms are technology-based on Chapter 92a.47. The limits for Ammonia-Nitrogen are water quality-based on Chapter 93.7. Monitoring for E. Coli, Total Nitrogen, and Total Phosphorus is based on Chapter 92a.61.

Attachment 1

WQM 7.0 Effluent Limits (Perennial Model)

SWP Basin	Stream Code	Stream Name
16F	55041	CHURCH 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)
0.350	Flying W Ranch	PA0220736p	0.010	CBOD5	8.44		
				NH3-N	11.62	23.24	
				Dissolved Oxygen			6.04

Since the resulting limits are equal to the inputs, which came from the Dry Model, then the Dry Model inputs are protective. The resulting limits are:

CBOD5 = 25 mg/l

NH3-N = 25 mg/l

DO = 4 mg/l

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
16F	55041	CHURCH RUN

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
0.350	0.010	20.818	7.015
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
3.812	0.373	10.223	0.067
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
3.05	0.588	1.90	0.745
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.883	22.329	Owens	6
Reach Travel Time (days)			
0.321			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.032	2.99	1.86	8.12
0.064	2.94	1.81	8.12
0.096	2.88	1.77	8.12
0.129	2.82	1.73	8.12
0.161	2.77	1.69	8.12
0.193	2.71	1.65	8.12
0.225	2.66	1.61	8.12
0.257	2.61	1.57	8.12
0.289	2.56	1.53	8.12
0.321	2.51	1.50	8.12

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	6		

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
16F	55041	CHURCH RUN	**0.350**	1220.00	1.13	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	0.070	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Flying W Ranch	PA0220736p	0.0100	0.0000	0.0000	0.000	25.00	7.10

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	8.44	2.00	0.00	1.50
Dissolved Oxygen	6.04	8.24	0.00	0.00
NH3-N	11.62	0.00	0.00	0.70

(From Dry Model)

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
16F	55041	CHURCH RUN	**0.000**	1120.00	1.28	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	0.070	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

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

SWP Basin	Stream Code	Stream Name
16F	55041	CHURCH 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
0.350	Flying W Ranch	14.92	23.24	14.92	23.24	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
0.350	Flying W Ranch	1.8	11.62	1.8	11.62	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)		
0.35	Flying W Ranch	8.44	8.44	11.62	11.62	6.04	6.04	0	0

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
16F	55041	CHURCH 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												
0.350	0.08	0.00	0.08	.0155	0.05411	.373	3.81	10.22	0.07	0.321	20.82	7.01
Q1-10 Flow												
0.350	0.05	0.00	0.05	.0155	0.05411	NA	NA	NA	0.05	0.393	21.17	7.02
Q30-10 Flow												
0.350	0.11	0.00	0.11	.0155	0.05411	NA	NA	NA	0.08	0.277	20.63	7.01

WQM 7.0 D.O.Simulation (Dry Model)

SWP Basin	Stream Code	Stream Name
16F	55041	CHURCH RUN

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
0.400	0.010	23.553	7.069
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
1.323	0.311	4.260	0.053
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
18.34	1.428	17.77	0.920
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
5.228	28.669	Owens	2
Reach Travel Time (days)			
0.462			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.046	16.97	17.03	4.70
0.092	15.71	16.32	4.72
0.138	14.53	15.64	4.88
0.185	13.45	14.99	5.07
0.231	12.44	14.37	5.25
0.277	11.51	13.77	5.43
0.323	10.65	13.20	5.59
0.369	9.86	12.65	5.75
0.415	9.12	12.12	5.90
0.462	8.44	11.62	6.04

(Use as inputs in Perennial Model)

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
16F	55041	CHURCH RUN	**0.400**	1400.00	0.09	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	0.070	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
Flying W Ranch	PA0220736	0.0100	0.0000	0.0000	0.000	25.00	7.10

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	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
16F	55041	CHURCH RUN	**0.000**	1220.00	0.21	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	0.070	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (°C)	Disc pH
		0.0000	0.0000	0.0000	0.000	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	D.O.	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	Simulation	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	2		

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
16F	55041	CHURCH 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												
0.400	0.01	0.00	0.01	NA	0.08523	.311	1.32	4.26	0.05	0.462	23.55	7.07
Q1-10 Flow												
0.400	0.00	0.00	0.00	NA	0.08523	NA	NA	NA	0.00	0.000	0.00	0.00
Q30-10 Flow												
0.400	0.01	0.00	0.00	NA	0.08523	NA	NA	NA	0.00	0.000	0.00	0.00

Attachment 2

TRC EVALUATION

Input appropriate values in A3:A9 and D3:D9

0.0791	= Q stream (cfs)	0.5	= CV Daily
0.01	= 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)	0	=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 1.650	1.3.2.iii	WLA cfc = 1.601
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.615	5.1d	LTA_cfc = 0.931

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)**