Fact Sheet

The U.S. Environmental Protection Agency (EPA)

Proposes to Reissue a National Pollutant Discharge Elimination System (NPDES) Permit to Discharge Pollutants Pursuant to the Provisions of the Clean Water Act (CWA) to:

Lummi Tribal Sewer and Water District

Kwina Road Membrane Bioreactor (MBR) Wastewater Treatment Plant

Public Comment Start Date:

Public Comment Expiration Date:

Technical Contact: Sally Goodman
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EPA PROPOSES TO REISSUE THE NPDES PERMIT

EPA proposes to reissue the NPDES permit for the facility referenced above. The draft permit places conditions on the discharge of pollutants from the wastewater treatment plant to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility.

This Fact Sheet (FS) includes:

- information on public comment, public hearing, and appeal procedures
- a listing of proposed effluent limitations and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the permit

CWA § 401 CERTIFICATION

EPA is requesting that Lummi Natural Resources Department (LNR) provide a CWA Certification of the permit for this facility under CWA § 401. Comments regarding the LNR intent to certify the permit should be directed to Kara Kuhlman, LNR Water Resources Manager (karak@lummi-nsn.gov).

Lummi Natural Resources Department
2665 Kwina Road
Bellingham, WA 98226

Clean Water Act §401(a)(2) Review

CWA Section 401(a)(2) requires that, upon receipt of an application and 401 certification, EPA as the permitting authority notify a neighboring State or Tribe with TAS when EPA determines that the discharge may affect the quality of the neighboring State/Tribe's waters. As stated above, LNR is the certifying authority and is accepting comment regarding the intent to certify this permit. After EPA receives final certification from LNR, EPA will determine whether the discharge may affect the quality of a neighboring jurisdiction's waters (33 U.S.C. § 1341(a)(2)).

Public Comment

We request that all comments on EPA's draft permit or requests for a public hearing be submitted via email to Sally Goodman (goodman.sally@epa.gov). If you are unable to submit comments via email, please call (206) 553-0782.

Persons wishing to comment on or request a Public Hearing for the draft permit for this facility may do so in writing by the expiration date of the Public Comment period. A request for a Public Hearing must state the nature of the issues to be raised as well as the requester's name, address and telephone number. All comments and requests for Public Hearings must be in writing and should be submitted to the EPA as described in the Public Comments Section of the attached Public Notice.

After the Public Notice expires, and all comments have been considered, EPA's regional Director for the Water Division will make a final decision regarding permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, and the permit will become effective upon issuance. If substantive comments are received, EPA will address the comments and issue the permit. The permit will become effective no less than 30 days after the issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days pursuant to 40 CFR 124.19.

Documents are Available for Review

The draft permit, this Fact Sheet and the Public Notice can also be found by visiting the Region 10 website at https://www.epa.gov/npdes-permits/about-region-10s-npdes-permit-program.

The draft Administrative Record for this action contains any documents listed in the References section. The Administrative Record or documents from it are available electronically upon request by contacting Sally Goodman.

For technical questions regarding the Fact Sheet, contact Sally Goodman at (206) 553-0782 or goodman.sally@epa.gov. Services can be made available to persons with disabilities by contacting Audrey Washington at (206) 553-0523.

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Acronyms

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
30Q10	30 day, 10 year low flow
AML	Average Monthly Limit
AWL	Average Weekly Limit
BA	Biological Assessment
BAT	Best Available Technology economically achievable
BCT	Best Conventional pollutant control Technology
BE	Biological Evaluation
BO or BiOp	Biological Opinion
BOD_5	Biochemical oxygen demand, five-day
BMP	Best Management Practices
BPT	Best Practicable Technology
°C	Degrees Celsius
$CBOD_5$	Carbonaceous Biochemical Oxygen Demand
CFR	Code of Federal Regulations
CSO	Combined Sewer Overflow
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
gpd	Gallons per day
HUC	Hydrologic Unit Code
ICIS	Integrated Compliance Information System
I/I	Infiltration and Inflow
LA	Load Allocation
lbs/day	Pounds per day
LTA	Long Term Average
mg/L	Milligrams per liter
mL	Milliliters
ML	Minimum Level
µg/L	Micrograms per liter

mgd	Million gallons per day
MDL	Maximum Daily Limit or Method Detection Limit
MF	Membrane Filtration
MPN	Most Probable Number
N	Nitrogen
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
SSO	Sanitary Sewer Overflow
s.u.	Standard Units
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRC	Total Residual Chlorine
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
TU_a	Toxic Units, Acute
TU_c	Toxic Units, Chronic
USFWS	U.S. Fish and Wildlife Service
UV	Ultraviolet
WD	Water Division
WET	Whole Effluent Toxicity
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WQS	Water Quality Standards
WWTP	Wastewater treatment plant

I. Background Information

A. GENERAL INFORMATION

This fact sheet provides information on the draft NPDES permit for the following entity:

Table 1. General Facility Information

NPDES Permit #:	WA0026727
Applicant:	Lummi Tribal Sewer and Water District Kwina Road MBR Wastewater Treatment Plant
Type of Ownership	POTW (tribal)
Physical Address:	4100 Lummi Shore Drive Bellingham, WA 98226
Mailing Address:	2156 Lummi View Drive Bellingham, WA 98226
Facility Contact:	Dale Andert District Manager dalea@lummi-nsn.gov (360) 758-7167
Operator Name:	Same
Facility Location:	48.7906° N 122.6136° W
Receiving Water	Wetland No. 2011-08
Facility Outfall	48.7908° N 122.6127° W

B. PERMIT HISTORY

The most recent NPDES permit for the Kwina Road MBR Wastewater Treatment Plant (WWTP) was issued on June 22, 2015, became effective on August 1, 2015, and expired on July 31, 2020. An NPDES application for permit issuance was submitted by the permittee on January 25, 2022. EPA determined that the application was complete.

C. TRIBAL CONSULTATION

EPA consults with federally recognized tribal governments on a government-to-government basis when EPA actions and decisions may affect tribal interests. Meaningful tribal consultation is an integral component of the federal government's general trust relationship with federally recognized tribes. The federal government recognizes the right of each tribe to self-government, with sovereign powers over their members and their territory. Executive Order 13175 (November 2000), entitled "Consultation and Coordination with Indian Tribal Governments", requires federal agencies to have an accountable process to assure meaningful and timely input by tribal officials in the development of regulatory policies on matters that have tribal implications and to strengthen the government-to-government relationship with Indian tribes. In May 2011, EPA issued the "EPA Policy on Consultation and Coordination Facility Information with Indian Tribes" which established national guidelines and institutional controls for consultation.

The Kwina Road MBR WWTP is located on the Lummi Reservation. Consistent with the Executive Order and EPA tribal consultation policies, EPA is coordinating with the Lummi Nation on this Permit Action and will invite formal tribal consultation.

II. Facility Information

A. TREATMENT PLANT DESCRIPTION

1. Service Area

Lummi Tribal Sewer and Water District (LTSWD) owns and operates the Kwina Road MBR WWTP located in Bellingham, WA. The collection system has no combined sewers. The facility serves a resident population of 500. There are no major industries discharging to the facility.

2. Treatment Process

The design flow of the facility is 0.107 mgd. The reported actual flows from the facility range from 0.05 to 0.15 mgd (average monthly flow). When inflows are too high, the facility is able to send sewage to the larger Lummi Gooseberry Point WWTP for treatment. The treatment process at the Kwina Road MBR WWTP consists of anoxic and pre-aeration basins for de-nitrification, before the influent is pumped through 900 membrane bioreactor cells to further filter and treat the wastewater. The facility uses an ultraviolet (UV) disinfection system. Sludge is sent to two aerobic digesters and the solids are applied to land at the Lummi Biosolids Application Site. A schematic of the wastewater treatment process and a map showing the location of the treatment facility are included in Appendix A. Because the design flow is less than 1 mgd, the facility is considered a minor facility.

The facility underwent several upgrades beginning shortly before the previous permit was issued and ending in 2017. They include: replacement of chlorine disinfection with UV, construction of two aerobic digesters, construction of a second pre-aeration treatment basin, replacement of the influent screens, mixers, generator, pumps, and membranes, and relocation of the outfall to its current location. The facility is planning to replace the membranes again during the summer of 2022 due to poor performance of the membranes installed during the upgrade [personal communication with facility employees during site visit on March 3, 2022].

B. OUTFALL DESCRIPTION

The Kwina Road MBR WWTP discharges directly to Wetland No. 2011-08, across Lummi Shore Road from the facility, through an underground 8" diameter PVC outfall pipe. The pipe starts from the non-potable water wet well on the facility property, travels approximately 20 feet north, turns ninety degrees, travels east for approximately 242 feet, passes under Lummi Shore Road, and terminates 23 feet east of Lummi Shore Road. The slope of the outfall pipe is approximately 3.5%.

The pipe discharges onto an energy dissipating rip rap apron that is 3 feet wide at the pipe outlet, 10 feet long, and 8 feet wide at the end. The maximum velocity at the pipe outlet for the design peak hour flow of 0.30 MGD is 4.6 feet per second, d/D = 0.33. The velocity for design peak day flow of 0.21 MGD is 4.2 feet per second. Discharge from the outfall flows briefly before it ultimately infiltrates into the ground (See Figure Figure A - 3). The outfall is located at 48.7908° N, 122.6127° W.

C. EFFLUENT CHARACTERIZATION

To characterize the effluent, EPA evaluated the facility's application form, discharge monitoring report (DMR) data, and additional data provided by the Kwina Road MBR WWTP. The effluent quality is summarized in Table 2. Data are provided in Appendix B.

Table 2. Effluent Characterization

Parameter		Units	Minimum	Maximum	95th Percentile	Number of Samples (n)
Flow	Monthly Average	MGD	0.05	0.97	0.13	60
	Daily Maximum	MGD	0.06	0.17	0.16	60
BOD_5	Monthly Average	mg/L	1.0	5	4	61
	Weekly Average	mg/L	1.0	8	6	61
	Percent Removal (Monthly Average Minimum)	%	98	100	100	61
TSS	Monthly Average	mg/L	0.61	4	2.5	61
	Weekly Average	mg/L	1	7	4	61
	Percent Removal (Monthly Average Minimum)	%	98	100	100	61
pH	Instantaneous Maximum	s.u.	7.07	8.5	8.18	61
	Instantaneous Minimum	s.u.	6.53	7.64	6.59 (5th percentile)	61
Dissolved Oxygen	Monthly Average	mg/L	4.74	13.03	4.94 (5th percentile)	60
	Instantaneous Minimum	mg/L	0.21	12.6	2.92 (5th percentile)	60
Fecal Coliform Bacteria	Monthly Average (Geomean)	cfu/100 mL	1.0	6.92	3.46	61
Enterococci Bacteria	Monthly Average (Geomean)	cfu/100 mL	1.0	5.62	2.62	61
	Instantaneous Maximum	cfu/100 mL	1.0	58.1	10.0	61

Total Ammonia (as N)	Monthly Average	mg/L	0.03	0.24	0.19	61
	Daily Maximum	mg/L	0.03	0.62	0.33	61
Nitrate + Nitrite (as N)	Quarterly Average	mg/L	0.11	14.5	11.36	18
Total Kjeldahl Nitrogen (as N)	Quarterly Average	mg/L	0.43	7.2	3.69	17
Total Phosphorus (as P)	Instantaneous Maximum (Quarterly)	mg/L	0.23	6.57	4.56	18
Temperature	Maximum 7-Day Average	°C	13.97	19.03	18.83	58
Source: DMR data February 2017 to February 2022						

D. COMPLIANCE HISTORY

Compliance information for this facility, including compliance with other environmental statutes, is available on Enforcement and Compliance History Online (ECHO). The ECHO web address for this facility is: https://echo.epa.gov/detailed-facility-report?fid=110038391406. There have been no effluent violations during the past five years (through February 2022).

III. RECEIVING WATER

In drafting permit conditions, EPA must analyze the effect of the facility's discharge on the receiving water. The details of that analysis are provided in the Water Quality-Based Effluent Limits (WQBEL) section below. This section summarizes characteristics of the receiving water that impact that analysis.

This facility discharges to Wetland No. 2011-08, due east of the facility location on Lummi Shore Road and just south of Marine Drive, on the Lummi Indian Reservation near the City of Bellingham, WA, at 48.7908° N latitude and 122.6127° W longitude. The wetland drains to Smuggler Slough, which runs through the wetland and heads generally north and west in the Nooksack River/Lummi River floodplain across the northern upland area of the Lummi Peninsula of the Lummi Indian Reservation before discharging through a series of culverts into Lummi Bay.

A. WATER QUALITY STANDARDS (WQS)

CWA § 301(b)(1)(C) requires the development of limitations in permits necessary to meet WQS. 40 CFR 122.4(d) requires that the conditions in NPDES permits ensure compliance with the WQS of all affected States. A State's WQS are composed of use classifications, numeric and/or narrative water quality criteria and an anti-degradation policy. The use classification system designates the beneficial uses that each water body is expected to achieve, such as drinking water supply, contact recreation, and aquatic life. The numeric and narrative water quality criteria are the criteria deemed necessary to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

The Lummi Nation has received treatment in a manner similar to a state (TAS) status for administering WQS over surface waters of the Lummi Indian Reservation. The Lummi WQS were adopted by the Lummi Indian Business Council in 2007 and approved by EPA in 2008.

1. Designated Beneficial Uses

This facility discharges to Wetland No. 2011-08, which is adjacent to and drains to Smuggler Slough. Smuggler Slough discharges into Lummi Bay near the northern extent of the Lummi Nation's Seapond Aquaculture Facility, which includes one of the tribe's salmon hatcheries and the tribal shellfish hatchery. The portion of Smuggler Slough north of Kwina Road, which is the portion adjacent to Wetland No. 2011-08, has been designated in the Tribe's WQS to be a Class AA freshwater [17 LAR 07.160]. The WQS also state that all unclassified surface waters of the Lummi Indian Reservation that are tributaries to Class AA waters are classified as Class AA [17 LAR 07.150]. 17 LAR 07.020 includes wetlands in the definition for *Surface waters of the Lummi Indian Reservation.* Accordingly, Wetland No. 2011-08 is classified as a Class AA water. Conversations with the Lummi Nation Natural Resources Department (LNR) confirmed that Smuggler Slough and Wetland 2011-08 are Class AA freshwaters for the purposes of this NPDES Permit. Smuggler Slough is located in the Nooksack River-Frontal Bellingham Bay Subbasin (HUC 171100040506).

The designated beneficial uses for Smuggler Slough, and therefore for Wetland 2011-08, are stated in the Lummi Nation WQS [17 LAR 07.030]. They include:

- Water supply
- Stock watering
- Fish and shellfish
    - Salmonid migration, juvenile rearing, spawning, egg incubation, fry emergence, and harvesting
    - Other fish migration, juvenile rearing, spawning, egg incubation, fry emergence, and harvesting
    - Clam, oyster, and mussel rearing, spawning, and harvesting
    - Crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, geoduck, etc.) rearing, spawning, and harvesting
- Wildlife habitat
- Recreation
- Commerce and navigation
- Cultural tribal uses.

The Class AA freshwater criteria applicable for the protection of Smuggler Slough for all of its designated beneficial uses, and thus also for the protection of Wetland 2011-08, are discussed below.

2. **Surface Water Quality Criteria**

The criteria applicable to Smuggler Slough and Wetland 2011-08 include:

- The narrative criteria applicable to all surface waters of the Lummi Nation are found at 17 LAR 07.030(e) (Narrative Water Quality Criteria);
- The numeric criteria for toxic substances for the protection of aquatic life and primary contact recreation are found at 17 LAR 07.040 and in Table 4 (Toxic Substance Criteria for Surface Waters of the Lummi Indian Reservation);
- Additional numeric criteria necessary for the protection of aquatic life and recreational/cultural/water supply uses can be found at 17 LAR 07.030 Class AA (General Water Use and Criteria Classes).

For the purposes of determining the reasonable potential for the Kwina Road MBR WWTP discharge to cause or contribute to a violation of the criteria, and therefore require limits on the concentrations of certain pollutants in the effluent discharge, EPA evaluated the Kwina Road MBR WWTP effluent water quality data against the following Lummi Nation water quality criteria for Class AA waters:

- Freshwater fecal coliform organism levels shall both not exceed a geometric mean density of 50 colonies/100 milliliters (mL) of water and not have more than 10 percent of the samples obtained for calculating the geometric mean density exceeding 100 colonies/100 mL.
- Freshwater enterococci densities shall both not exceed a geometric mean density of 33 colonies/100 mL and not exceed a single sample maximum allowable density of 61 colonies/100 mL.
- Freshwater dissolved oxygen – the seven-day mean minimum DO shall not be less than 11.0 mg/L.
- Temperature in freshwater shall not exceed a 7-day average daily maximum (DADM) temperature of 16 °C due to human or human related activities. When natural conditions exceed 16.0 °C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3 °C.
- pH shall be within the range of 6.5 – 8.5 standard units (s.u.) in freshwater.
- The one-hour average concentration of total ammonia nitrogen (in mg N/L) does not exceed, more than once every three years on the average, the CMC (acute criterion) calculated using the following equation where salmonid fish are present: $CMC = (0.275/(1 + 10^{7.204-pH})) + (39.0/(1 + 10^{pH-7.204}))$.
- The thirty-day average concentration of total ammonia nitrogen (in mg N/L) does not exceed, more than once every three years on the average, the CCC (chronic criterion) calculated using the following equation when fish early life stages are present: $CCC = ((0.0577/(1 + 10^{7.688-pH})) + (2.487/(1 + 10^{pH-7.688}))) \times MIN(2.85, 1.45 \cdot 10^{0.028 \cdot (25-T)})$.

- All surface waters of the Lummi Indian Reservation shall be free from substances attributable to point source discharges, nonpoint sources, vessels, or in-stream activities in accordance with:
    - No visible oils, scum, foam, grease, and/or other floating materials and suspended substances of a persistent nature resulting from anthropogenic causes.
    - No nutrients in concentrations producing objectionable algal densities or nuisance aquatic vegetation, or resulting in acute toxicity to any aquatic biota or wildlife, or otherwise causing nuisance conditions.

B. RECEIVING WATER QUALITY

There are no available water quality data for Wetland 2011-08. However there are several monitoring sites along Smuggler Slough. Water quality data for these sites were available from LNR. Table 3 summarizes water quality at LNR site SW015 in Smuggler Slough. Another monitoring site (SW072) closer to the inflow from Wetland No. 2011-08 has little data because Smuggler Slough is rarely flowing in that location. Thus, data from SW015 were used to evaluate the need for and to develop water quality based effluent limits. Photos of Smuggler Slough at SW015 and a map showing its location are included in Appendix B.

Table 3. Receiving Water Quality Data (Smuggler Slough at Monitoring Site SW015)

Parameter	Units	Percentile	Value	No. of Samples
Temperature	°C	95^{th}	16.41	29
pH	s.u.	5^{th} – 95^{th}	6.59 – 7.81	25
Biochemical Oxygen Demand	mg/L	95^{th}	4.11	7
Dissolved Oxygen	mg/L	5^{th}	1.87	29
Ammonia	mg/L	95^{th}	0.43	8
E. coli	cfu/100 mL	95^{th}	253	27
Enterococci	cfu/100 mL	95^{th}	738	27
Fecal coliform	cfu/100 mL	95^{th}	343	27
Nitrate + Nitrite (as N)	mg/L	95^{th}	0.31	8
Total Kjeldahl Nitrogen (as N)	mg/L	95^{th}	1.91	8
Total Organic Carbon	mg/L	95^{th}	19.25	8
Total Phosphorus	mg/L	95^{th}	0.57	8
Total Suspended Solids	mg/L	95^{th}	69.95	8
Salinity	ppt	95^{th}	0.78	30
Source: Lummi Nation Natural Resources Department, 2015-2021				

1. Water Quality Limited Waters

Section 303(d) of the CWA requires states or tribes to develop a Total Maximum Daily Load (TMDL) management plan for water bodies determined to be water quality limited segments. A TMDL is a detailed analysis of the water body to determine its assimilative capacity. The assimilative capacity is the loading of a pollutant that a water body can assimilate without causing or contributing to a violation of water quality standards. Once the assimilative capacity of the water body has been determined, the TMDL will allocate that capacity among point and non-point pollutant sources, taking into account natural background levels and a margin of safety. Allocations for non-point sources are known as "load allocations" (LAs). The allocations for point sources, known as "waste load allocations" (WLAs), are implemented through effluent limitations in NPDES permits. Effluent limitations for point sources must be consistent with the assumptions and requirements of the applicable TMDL WLAs.

Any waterbody for which the water quality does not, and/or is not expected to meet, applicable water quality standards is defined as a "water quality limited segment." The Lummi Nation LNR develops regular water quality assessment reports that are similar to a state's CWA Integrated Report (or "303(d) list"). The water quality assessments reports identifie waterbodies that do not meet the Tribe's WQS for specific pollutants. The latest Lummi Nation Water Quality Assessment Report can be found online at https://www.lummi-nsn.gov/userfiles/2018_2019_WaterQualityAssessmentReport_wAppendices.pdf.

The 2018-2019 Water Quality Assessment Report states that the surface waters flowing into Lummi Bay and the surface water of the Nooksack River continue to exhibit the poorest water quality on the Reservation. In particular, they are impaired for fecal coliform bacteria. Of additional concern for Reservation freshwaters are dissolved oxygen, temperature, pH, and enterococci bacteria. Several sites did not meet the Tribal WQS for one or more of those parameters. Specifically, Smuggler Slough sites fail to meet WQS for fecal coliform, enterococci, temperature, and dissolved oxygen regularly. The data summary in Table 3 shows that Smuggler Slough does not meet standards for all three parameters.

2. Low Flow Conditions

The Technical Support Document for Water Quality-Based Toxics Control (hereafter referred to as the TSD) (EPA, 1991) and the Lummi Nation WQS recommend the flow conditions for use in calculating water quality-based effluent limits (WQBELs) using steady-state modeling. The TSD and the Lummi Nation WQS state that WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years (7Q10) for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years (1Q10) for acute criteria. Because the Kwina Road MBR WWTP pipes effluent to discharge directly to Wetland No. 2011-08, and not to a flowing body of water, a mixing zone cannot be authorized and a dilution allowance cannot be afforded to the discharge. Therefore, all of the effluent limitations included in the permit are to be met at the end of the pipe at all times.

IV. Effluent Limitations and Monitoring

Table 4 below presents the existing effluent limits and monitoring requirements in the current permit. Table 5 presents the effluent limits and monitoring requirements proposed in the draft permit.

The draft permit includes several changes to the effluent limitations and monitoring requirements, which are as follows:

- Influent monitoring was added for ammonia, two times per month.
- Effluent monitoring requirements for nitrate plus nitrite and TKN were increased from quarterly to two times per month.
- Influent monitoring was added for nitrate plus nitrite and TKN, one time per month.
- Influent and effluent monitoring were added for carbonaceous biochemical oxygen demand ($CBOD_5$), two times per month.
- Effluent monitoring was added for total organic carbon (TOC), one time per quarter.
- Calculated TIN reporting was added, two times per month.
- Calculated monthly average TIN and annual TIN (to date) reporting were added.

Table 4. Existing Permit - Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type
Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	--	Influent and Effluent	2/month	24-hr composite
	lb/day	26	40	--			Calculation[1]
	% removal	≥85	--	--			Calculation[2]
Total Suspended Solids (TSS)	mg/L	30	45	--	Influent and Effluent	2/month	24-hr composite
	lb/day	26	40	--			Calculation[1]
	% removal	≥85	--	--			Calculation[2]
Fecal Coliform Bacteria	cfu/100 mL	50 (geometric mean)[3]	--	--	Effluent	1/week	Grab
Enterococci Bacteria	cfu/100 mL	33 (geometric mean)	--	61 (single sample maximum)[4]	Effluent	1/week	Grab

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type
Total Ammonia, as N	mg/L	2.6	--	10.1	Effluent	1/week	24-hr composite
	lb/day	2.3	--	9.0			Calculation[1]
pH	s.u.	Between 6.5 and 8.5 at all times			Effluent	2/week	Grab
Dissolved Oxygen (DO)	mg/L	Report Minimum and Average			Effluent	1/month	Grab
Nitrate + Nitrite, as N	mg/L	Report	--	Report	Effluent	1/quarter	24-hr composite
Total Kjeldahl Nitrogen (TKN), as N	mg/L	Report	--	Report	Effluent	1/quarter	24-hr composite
Total Phosphorus	mg/L	--	--	--	Effluent	1/quarter	24-hr composite
	lb/day						Calculation[1]
Total Dissolved Solids (TDS)[5]	mg/L	--	--	--	Effluent	1/year	24-hr composite
Temperature	°C	--	Report	Report Daily and Instantaneous Maximum	Effluent	Continuous	Recording
Flow	MGD	Report	--	Report	Effluent	Continuous	Recording

1. Loading is calculated by multiplying the concentration (in mg/L) by the flow (in mgd or million gallons per day) on the day sampling occurred and a conversion factor of 8.34.

2. The monthly average percent removal must be calculated from the arithmetic mean of the influent values and the arithmetic mean of the effluent values for that month, i.e., (average monthly influent – average monthly effluent) ÷ average monthly influent. Influent and effluent samples must be taken over approximately the same time period.

3. The average monthly fecal coliform counts must not exceed a geometric mean of 50/100 ml based on a minimum of five samples taken every 3 - 7 days within a calendar month. In addition, no more than 10 percent of the samples obtained for calculating the geometric mean density shall exceed 100 colonies/100 mL of water.

4. Reporting is required within 24 hours of a maximum daily limit or instantaneous maximum limit violation.

5. Effluent Testing Data - See NPDES Permit Application Form 2A, Part B.6 for the list of pollutants to be included in this testing.

Table 5. Draft Permit - Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type
Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	--	Influent and Effluent	2/month[1]	24-hr composite
	lb/day	26	40	--			Calculation[2]
	% removal	≥85	--	--			Calculation[3]
Total Suspended Solids (TSS)	mg/L	30	45	--	Influent and Effluent	2/month[1]	24-hr composite
	lb/day	26	40	--			Calculation[2]
	% removal	≥85	--	--			Calculation[3]
Fecal Coliform Bacteria	cfu/100 mL	50 (geometric mean)[4]	--	--	Effluent	1/week	Grab
Enterococci Bacteria	cfu/100 mL	33 (geometric mean)[4]	--	61 (single sample maximum)[5]	Effluent	1/week	Grab
Total Ammonia, as N	mg/L	Report	--	--	Influent	2/month[1]	24-hr composite
	mg/L	2.6	--	10.1[5]	Effluent	1/week	24-hr composite
	lb/day	2.3	--	9.0			Calculation[2]
pH	s.u.	Between 6.5 and 8.5 at all times			Effluent	2/week	Grab
Dissolved Oxygen (DO)	mg/L	Report	--	Report Instantaneous Minimum	Effluent	1/month	Grab
Nitrate + Nitrite, as N	mg/L	Report	--	--	Influent	1/month	24-hr composite
					Effluent	2/month[1]	24-hr composite
Total Kjeldahl Nitrogen (TKN), as N	mg/L	Report	--	--	Influent	1/month	24-hr composite
					Effluent	2/month[1]	24-hr composite

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type
Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	mg/L	Report	--	--	Influent and Effluent	2/month[1]	24-hr composite
Total Organic Carbon	mg/L	Report	--	--	Effluent	1/quarter	24-hr composite
Total Inorganic Nitrogen (TIN), as N	mg/L	Report	--	--	Effluent	2/month[1]	Calculation[6]
	lb/day	Report	--	--	Effluent	2/month[1]	Calculation[2]
Average Monthly TIN	lbs	Report	--	--	Effluent	1/month	Calculation[7]
Annual TIN (year to date)	lbs	Report Total Year to Date (Monthly)			Effluent	1/month	Calculation[8]
Total Dissolved Solids (TDS)[9]	mg/L	--			Effluent	1/year	24-hr composite
Temperature	°C	--	Report 7-Day Average Daily Maximum	Report Daily and Instantaneous Maximum	Effluent	Continuous	Recording
Flow	MGD	Report	--	Report	Effluent	Continuous	Recording

1. 2/month means two times during each month and on a rotational basis throughout the days of the week, except weekends and holidays.

2. Loading is calculated by multiplying the concentration (in mg/L) by the flow (in mgd or million gallons per day) on the day sampling occurred and a conversion factor of 8.34.

3. The monthly average percent removal must be calculated from the arithmetic mean of the influent values and the arithmetic mean of the effluent values for that month, i.e., (average monthly influent – average monthly effluent) ÷ average monthly influent. Influent and effluent samples must be taken over approximately the same time period.

4. The average monthly fecal coliform counts must not exceed a geometric mean of 50/100 ml based on a minimum of five samples taken every 3 - 7 days within a calendar month. In addition, no more than 10 percent of the samples obtained for calculating the geometric mean density shall exceed 100 colonies/100 mL of water.

5. Reporting is required within 24 hours of a maximum daily limit or instantaneous maximum limit violation. See Paragraph I.B.6 and Part III.G of this Permit.

6. TIN (mg/L N) = total ammonia (mg/L N) + nitrate plus nitrite (mg/L N).

7. Calculate the monthly average TIN load (lb as N) using the following equation: monthly average TIN load (lb as N) = ((Σ calculated TIN loads (lb/day N))/number of samples) X number of days in month.

8. Calculate the annual TIN, to date, using the following equation: annual TIN load (lb as N) = Σ (monthly average TIN loads, to date).

9. Required data for reapplication (see NPDES Permit Application Form 2A, Tables A and B for the list of pollutants to be included in this testing).

A. BASIS FOR EFFLUENT LIMITS

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBELs) or water quality-based effluent limits (WQBELs). TBELs are set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the WQSs applicable to a waterbody are being met and may be more stringent than TBELs.

1. Pollutants of Concern

Pollutants of concern are those that either have TBELs or may need WQBELs. EPA identifies pollutants of concern for the discharge based on those which:

- Have a TBEL
- Have an assigned WLA from a TMDL
- Had an effluent limit in the previous permit
- Are present in the effluent monitoring. Monitoring data are reported in the application, DMRs, and any special studies
- Are expected to be in the discharge based on the nature of the discharge

Based on this analysis, pollutants of concern are as follows:

- BOD_5
- $CBOD_5$
- DO
- Total suspended solids (TSS)
- Fecal coliform bacteria
- Enterococci bacteria
- pH
- Temperature
- Ammonia
- Nitrate + Nitrite
- TKN
- TOC
- Phosphorus

2. Technology-Based Effluent Limits (TBELs)

a. Federal Secondary Treatment Effluent Limits

The CWA requires publicly-owned treatment works (POTWs) to meet performance-based requirements based on available wastewater treatment technology. CWA § 301 established a required performance level, referred to as “secondary treatment,” which POTWs were required to meet by July 1, 1977. EPA has developed and promulgated “secondary treatment” effluent limitations, which are found in 40 CFR 133.102. These TBELs apply to certain municipal WWTPs and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. The federally promulgated secondary treatment effluent limits are listed in Table 6. For additional information and background refer to Part 5.1 *Technology Based Effluent Limits for POTWs* in the Permit Writers Manual.

Table 6. Secondary Treatment Effluent Limits

Parameter	30-day average	7-day average
BOD_5	30 mg/L	45 mg/L
TSS	30 mg/L	45 mg/L
Removal for BOD_5 and TSS (concentration)	85% (minimum)	--
pH	within the limits of 6.0 - 9.0 s.u.	
Source: 40 CFR 133.102		

b. *Mass-Based Limits*

40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, except under certain conditions. 40 CFR 122.45(b) requires that effluent limitations for POTWs be calculated based on the design flow of the facility. The mass based limits are expressed in pounds per day and are calculated as follows:

Mass based limit = concentration limit (mg/L) × design flow (mgd) × 8.34[1]

Since the design flow for this facility is 0.107 mgd, the technology-based mass limits for BOD_5 and TSS are calculated as follows:

Average Monthly Limit = 30 mg/L × 0.107 mgd × 8.34 = 26.8 lbs/day

Average Weekly Limit = 45 mg/L × 0.107 mgd × 8.34 = 40.2 lbs/day

3. Water Quality-Based Effluent Limits (WQBELs)

a. *Statutory and Regulatory Basis*

CWA § 301(b)(1)(C) requires the development of limitations in permits necessary to meet WQSs. Discharges to State or Tribal waters must also comply with conditions imposed by the State or Tribe as part of its certification of NPDES permits under CWA § 401. 40 CFR 122.44(d)(1) implementing CWA § 301(b)(1)(C) requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State or Tribal WQS, including narrative criteria for water quality. Effluent limits must also meet the applicable water quality requirements of affected States other than the State in which the discharge originates, which may include downstream States (40 CFR 122.4(d), 122.44(d)(4), see also CWA § 401(a)(2)).

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources

[1] 8.34 is a conversion factor with units (lb × L)/(mg × gallon × 10^6)

of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that WQSs are met and must be consistent with any available WLA for the discharge in an approved TMDL. If there are no approved TMDLs that specify WLAs for this discharge, all of the WQBELs are calculated directly from the applicable WQSs.

b. Reasonable Potential Analysis and Need for WQBELs

EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (*TSD*) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a WQBEL must be included in the permit.

In some cases, a dilution allowance or mixing zone is permitted. A mixing zone is a limited area or volume of water where initial dilution of a discharge takes place and within which certain water quality criteria may be exceeded (EPA, 2014). While the criteria may be exceeded within the mixing zone, the use and size of the mixing zone must be limited such that the waterbody as a whole will not be impaired, all designated uses are maintained and acutely toxic conditions are prevented. Since Wetland 2011-08 is not a flowing body of water, mixing zones are not authorized and the dilution factor (DF) is 1. The reasonable potential analysis and WQBEL calculations were based on this DF.

As discussed in Part IV.A.1, the pollutants of concern in the discharge are BOD_5, $CBOD_5$, DO, TSS, pH, temperature, fecal coliform, enterococci bacteria, ammonia, nitrate plus nitrite, TKN, TOC, and phosphorus. Since mixing zones are not authorized, several end-of-pipe WQBELs are equal to Lummi Nation water quality criteria. Each parameter is summarized below and the relevant water quality standards are shown in Table 7.

Table 7. Applicable Water Quality Standards

Parameter	Criteria
Fecal coliform	50 cfu / 100 mL (geometric mean), 100 cfu / 100 mL (no more than 10 percent of samples)
Enterococci	33 cfu / 100 mL (geometric mean), 61 cfu / 100 mL (single sample maximum)
Dissolved Oxygen	11.0 mg/L (seven-day mean minimum)
Temperature	16 °C (seven-day average daily maximum), or increase of 0.3 °C if natural conditions exceed 16 °C
pH	6.5 – 8.5 s.u.

Ammonia	(salmonids/fish early life stages present) $CMC = (0.275/(1 + 10^{7.204-pH})) + (39.0/(1 + 10^{pH-7.204}))$ $CCC = ((0.0577/(1 + 10^{7.688-pH})) + (2.487/(1 + 10^{pH-7.688}))) \times MIN(2.85, 1.45 \cdot 10^{0.028 \cdot (25-T)})$

<u>BOD_5 and $CBOD_5$</u>

There are no Tribal water quality criteria for BOD_5, so the draft permit proposes limits based on the TBELs. Based on the DMR data, the 95th percentile average monthly and average weekly effluent BOD_5 during the last permit cycle were 4 mg/L and 6 mg/L, respectively. Both of these values fall within the limits of 30 mg/L and 45 mg/L, respectively, so the TBELs are retained.

Washington Department of Ecology (Ecology) issued the Puget Sound Nutrient General Permit (PSNGP) on December 1, 2021. The PSNGP focuses on limiting discharges of excess nutrients, which have been a contributor to low oxygen levels in Puget Sound. It does not apply to facilities permitted by EPA or to facilities that do not discharge directly to Puget Sound. However, to better align with the goals of the PSNGP and to collect additional data to inform future permitting decisions, the draft permit proposes to include monitoring for the same parameters for which monitoring is required in the PSNGP, and with the same frequency.

$CBOD_5$ is a subset of BOD_5, and measures oxygen demand from only carbonaceous sources. There are no water quality criteria or TBELs for $CBOD_5$. Consistent with the PSNGP, twice monthly influent and effluent monitoring requirements are included in the proposed permit.

<u>DO</u>

The Lummi water quality criteria for Class AA freshwater establishes a seven-day minimum of 11.0 mg/L for DO. The existing permit required monthly DO monitoring. Based on DMR data, the 5^{th} percentile average monthly DO was 4.94 mg/L, and the 5^{th} percentile instantaneous minimum was 2.92 mg/L. Smuggler Slough is impaired for DO, with a mean concentration of 5.69 mg/L and 5^{th} percentile concentration of 1.86 mg/L. The proposed permit addresses DO concerns by imposing BOD limits which the facility can meet. EPA concludes that this will be effective at controlling DO impacts from the facility.

<u>TSS</u>

There are no Tribal water quality criteria for TSS, so the TBELs above are applied.

<u>pH</u>

The Lummi water quality criteria for Class AA freshwater specify that pH must be within the range of 6.5 to 8.5 standard units. Based on the DMR data, the effluent pH ranges from 6.59 (5th percentile) to 8.18 (95th percentile). The proposed permit includes end-of-pipe WQBELs that are equal to the criteria. These are the same limits that were included in the existing permit.

Temperature

The Lummi water quality criteria for Class AA freshwater limit temperature to 16 °C (seven-day average daily maximum). However, when natural conditions exceed 16 °C, the criteria state that no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3 °C.

EPA evaluated the impact of the effluent temperature using ambient water temperatures from Smuggler Slough at monitoring site SW015. EPA used this approach because of the challenges of determining temperature impacts from the facility on the wetland at the discharge point. At this location, the wetland is comprised primarily of muddy soils, making it challenging to collect water quality data because of the physical nature of the wetland. LNR does not collect ambient data in Wetland 2011-08.

EPA compared the 95th percentile effluent temperature to the maximim ambient temperatures to determine whether effluent temperatures would measurably increase ambient water temperatures. The 29 data points in Smuggler Slough at SW015 were collected from 2015 to 2021 and almost entirely between the months of October and April, with one temperature measurement taken in May and one in July. Due to the lack of continuous long-term temperature monitoring and insufficient data during the critical summer period, EPA used the maximum measured temperature. The maximum temperature in Smuggler Slough at SW015 is 19.21 °C. Based on the DMR data collected year-round, the 95th percentile maximum seven-day average effluent temperature is 18.83 °C. Therefore the effluent temperature is lower than the ambient temperature and would not increase the ambient temperature.

Further, the discharge is unlikely to increase temperatures that would harm aquatic life. The facility discharges into a wetland at a location where the flows are too small and the physical nature insufficient for salmon to reside. Salmon are present in Smuggler Slough adjacent to the wetland, but the heat from the facility is likely to dissipate after it discharges to the wetland and infiltrates into the ground, before reaching the slough. In addition, the discharge flow from the plant is minimal at 0.1 MGD. For these reasons, EPA has determined there is no reasonable potential and no temperature limit is required.

Fecal Coliform

The Lummi water quality criteria for Class AA freshwater require that fecal coliform must both not exceed a geometric mean density of 50 cfu/100 mL, and that no more than 10 percent of the samples obtained for calculating the geometric mean density exceed 100 cfu/100 mL. Based on the DMR data, the 95^{th} percentile monthly average (geomean) is 3.46 cfu/100 mL. The end-of-pipe WQBEL remains the same as in the existing permit and is equal to the criterion of 50 cfu/mL (monthly average) with no more than 10 percent of samples exceeding 100 cfu/100 mL.

Enterococci Bacteria

The Lummi water quality criteria for Class AA freshwater require that enterococci densities shall both not exceed a geometric mean density of 33 cfu/100 mL and not exceed a single sample maximum allowable density of 61 cfu/100 mL. Based on the DMR data, the 95^{th} percentile monthly average (geomean) is 2.62 cfu/100 mL and the 95^{th} percentile instantaneous maximum is 10 cfu/100 mL. The end-of-pipe WQBELs remain the same and are equal to the criteria of 33 cfu/100 mL (monthly average) and 61 cfu/100 mL (daily maximum).

Ammonia

A reasonable potential analysis was performed for ammonia as N. Ammonia criteria are based on a formula which relies on the pH and temperature of the receiving water, because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature. Therefore, the criteria become more stringent as pH and temperature increase. As with any natural water body the pH and temperature of the water will vary over time. Therefore, to protect water qality criteria it is important to develop the criteria based on pH and temperature values that will be protective of aquatic life at all times. EPA used the 90^{th} percentile of the pH and temperature data on Smuggler Slough at site SW015 in calculating the applicable ammonia criteria. Those values, used in the calculations below, were 7.7 s.u. and 12.2 °C, respectively. Figure 1 below details the equations used to determine water quality criteria for ammonia.

Figure 1. Calculation of Ammonia Criteria

Freshwater Un-ionized Ammonia Criteria Calculation

Based on 17 LAR 07.040 Table 4

	INPUT
1. Receiving Water Temperature (deg C):	12.2
2. Receiving Water pH:	7.7
3. Is salmonid habitat an existing or designated use?	Yes
4. Are non-salmonid early life stages present or absent?	Present
	OUTPUT
Using mixed temp and pH at mixing zone boundaries?	
Ratio	13.489
FT	1.714
FPH	1.201
pKa	9.657
Unionized Fraction	0.011
Unionized ammonia NH3 criteria (mg/L as NH_3)	
Acute:	0.128
Chronic:	0.029
	RESULTS
Total ammonia nitrogen criteria (mg/L as N):	
Acute:	9.644
Chronic:	3.524

Acute Criteria Equation: Salmonids Present

$$CMC = \frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH - 7.204}}$$

Acute Criteria Equation: Salmonids Absent

$$CMC = \frac{0.411}{1 + 10^{7.204 - pH}} + \frac{58.4}{1 + 10^{pH - 7.204}}$$

Chronic Criteria: Early Life Stages Present

$$CCC = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) \bullet MIN(2.85, 1.45 \cdot 10^{0.028(25-T)})$$

Chronic Criteria: Early Life Stages Absent

$$CCC = \left(\frac{0.0577}{1+10^{7.688-pH}} + \frac{2.487}{1+10^{pH-7.688}}\right) \bullet 1.45 \cdot 10^{0.028(25-T)})$$

Footnote ll to Table 4 of the Water Quality Standards For Surface Waters of the Lummi Indian Reservation states that the "salmonid fish are present" acute ammonia criterion is applicable unless reliable information demonstrates that salmonid fish are absent. Conversations with the Lummi LNR during the previous permit cycle indicated that currently the wetlands are heavily managed and engineered, and that there were no salmonids documented in the vicinity of the outfall (or in Wetland No. 2011-08) at that time [Jeremy

Freimund, Lummi LNR, personal conversation, May 2014]. However, salmon habitat restoration projects are ongoing in Smuggler Slough and surrounding wetlands downstream of the outfall. More recent reports from LNR fish biologist Don Kruse indicate that juvenile salmon (primarily Coho) are frequently observed in Smuggler Slough where it discharges to Lummi Bay, but that they tend to stay close to the mouth of the Slough. Juveniles may be found as far upstream as the Kwina Road crossing, but have not been observed beyond that point, where Wetland No. 2011-08 discharges [Kara Kuhlman, Lummi LNR, email conversation, February 2022]. Since available information does not demonstrate the absence of salmonid fish in Wetland No. 2011-08, and salmon are found in Smuggler Slough, EPA calculated the ammonia criteria using the specific acute criteria equation for when salmonids are present, as specified in the Lummi Nation WQS. EPA also calculated the chronic ammonia criterion assuming fish early life stages are present, in order to be as conservative as possible in the absence of other information [17 LAR 07.040 Table 4. Footnotes ll and mm]. The corresponding criteria that were used in determining the RP of the effluent to impact Smuggler Slough (and therefore, Wetland No. 2011-08) were calculated to be 9.644 mg/L for protection of aquatic life from acute impacts, and 3.524 mg/L for protection of aquatic life from chronic impacts.

After calculating the applicable criteria, EPA performed the RP calculations shown below (Figure 2) and determined that the Kwina Road MBR WWTP does not have RP to exceed the water quality criteria for ammonia. Therefore, WQBELs from the existing permit are retained in the proposed permit to comply with anti-backsliding rules (IV.A.3.c). The proposed WQBELs for ammonia as N are:

Average monthly limit (AML): 2.6 mg/L; 2.3 lb/day

Maximum daily limit (MDL): 10.1 mg/L; 9.0 lb/day

Weekly effluent monitoring for ammonia is retained in the proposed permit. In addition, to be consistent with the monitoring requirements in the PSNGP, twice monthly influent ammonia monitoring is proposed, as ammonia is a component of TIN.

Figure 2. Reasonable Potential Analysis for Ammonia

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3
Effluent Data	# of Samples (n)		61
	Coeff of Variation (Cv)		0.81
	Effluent Concentration, ug/L (Max. or 95th Percentile)		330
	Calculated 50th percentile Effluent Conc. (when n>10)		
Receiving Water Data	90th Percentile Conc., ug/L		331
	Geo Mean, ug/L		
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	9,644
		Chronic	3,524
	WQ Criteria for Protection of Human Health, ug/L		-
	Metal Criteria Translator, decimal	Acute	-
		Chronic	-
	Carcinogen?		N

Aquatic Life Reasonable Potential

Effluent percentile value			0.950
s	$s^2=\ln(CV^2+1)$		0.710
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.952
Multiplier			1.00
Max concentration (ug/L) at edge of...		Acute	330
		Chronic	330
Reasonable Potential? Limit Required?			**NO**

Nitrate plus Nitrite and Total Kjeldahl Nitrogen (TKN)

There are no Lummi water quality criteria for nitrogen. Quarterly monitoring is required for nitrate plus nitrite and TKN in the existing permit. To better align with the goals of the PSNGP and in order to have a more robust data set to determine whether nitrogen limits are needed in the future, the same monitoring requirements as are in the PSNGP are proposed. Monthly influent and twice monthly effluent monitoring are included in the proposed permit for both nitrate plus nitrite and TKN.

Total Organic Carbon (TOC)

There are no Lummi water quality criteria for TOC. Carbon is a secondary nutrient driving eutrophication in Puget Sound and the PSNGP requires quarterly TOC monitoring in order to refine the relationship between BOD and TOC. For the same purpose and to align with the PSNGP, the proposed permit requires quarterly effluent TOC monitoring.

Phosphorus

There are no Lummi water quality criteria for phosphorus. While phosphorus is the limiting nutrient in freshwater, nitrogen is of greatest concern in Puget Sound, where the discharge ultimately flows. Thus, phosphorus limits and monitoring are not included in the proposed permit.

c. Anti-backsliding

CWA § 402(o) and 40 CFR §122.44 (l) generally prohibit the renewal, reissuance or modification of an existing NPDES permit that contains effluent limits, permit conditions or standards that are less stringent than those established in the previous permit (i.e., anti-backsliding) but provides limited exceptions. For explanation of the anti-backsliding exceptions refer to Chapter 7 of the Permit Writers Manual *Final Effluent Limitations and Anti-backsliding*.

The proposed effluent limits in the draft permit are the same or more stringent than those in the 2015 Permit; therefore, the draft permit complies with the antibacksliding provisions and an antibacksliding analysis is not necessary.

B. MONITORING REQUIREMENTS

CWA § 308 and 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality.

The permit also requires the permittee to perform effluent monitoring required by Table B in the NPDES Form 2A application, so that these data will be available when the permittee applies for a renewal of its NPDES permit.

The permittee is responsible for conducting the monitoring and for reporting results on DMRs or on the application for renewal, as appropriate, to EPA.

1. Effluent Monitoring

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples must be used for averaging if they are conducted using EPA-approved test methods (generally found in 40 CFR 136) or as specified in the permit.

Monitoring Changes from the Previous Permit

The draft permit proposes monitoring increases for several nutrients. As described in Section IV.A.3, discharges of nutrients are contributing to low oxygen levels in Puget Sound and Ecology issued the PSNGP to control nutrient discharges from WWTPs to the Sound. The Kwina Road MBR WWTP does not discharge directly to Puget Sound, but the water from Smuggler Slough ultimately flows into it. EPA proposes monitoring for the parameters required for small loaders in the PSNGP.

2. Surface Water Monitoring

In general, surface water monitoring may be required in NPDES permits for the pollutants of concern in order to assess the assimilative capacity of the receiving water and/or the impact that the pollutant present in the WWTP effluent is having on the receiving water. In addition, surface water monitoring may be required for pollutants for which the water quality criteria are dependent and to collect data for TMDL development if the facility discharges to an impaired water body. In this case, since the facility is discharging to a wetland and not a flowing receiving water; and since the hydrology of the wetland changes over the seasons and daily during changes in tidal fluctuations; the effluent is expected to disperse and infiltrate underground before it reaches surface water (i.e., the outfall is to an upland area adjacent to the wetland); and because there is routine effluent monitoring required of the facility, there are no surface water monitoring requirements included in this Permit.

3. Electronic Submission of Discharge Monitoring Reports

The draft permit requires that the permittee submit DMR data electronically using NetDMR. NetDMR is a national web-based tool that allows DMR data to be submitted electronically via a secure Internet application.

EPA currently conducts free training on the use of NetDMR. Further information about NetDMR, including upcoming trainings and contacts, is provided on the following website: https://netdmr.epa.gov. The permittee may use NetDMR after requesting and receiving permission from EPA Region 10.

C. SLUDGE (BIOSOLIDS) REQUIREMENTS

EPA Region 10 separates wastewater and sludge permitting. EPA has authority under the CWA to issue separate sludge-only permits for the purposes of regulating biosolids. EPA may issue a sludge-only permit to each facility at a later date, as appropriate.

Until future issuance of a sludge-only permit, sludge management and disposal activities at each facility continue to be subject to the national sewage sludge standards at 40 CFR Part 503 and any requirements of the State's biosolids program. The Part 503 regulations are self-implementing, which means that facilities must comply with them whether or not a permit has been issued.

V. OTHER PERMIT CONDITIONS

A. QUALITY ASSURANCE PLAN

The LTSWD is required to update the Quality Assurance Plan (QAP) within 180 days of the effective date of the permit. The QAP must consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples, laboratory analysis, and data reporting. The plan must be retained on site and made available to EPA and LNR upon request.

B. OPERATION AND MAINTENANCE PLAN

The permit requires the LTSWD to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to develop and implement an operation and maintenance plan for their facility within 180 days of the effective date of the permit. The plan must be retained on site and made available to EPA and LNR upon request.

C. SANITARY SEWER OVERFLOWS AND PROPER OPERATION AND MAINTENANCE OF THE COLLECTION SYSTEM

SSOs are not authorized under this permit. The permit contains language to address SSO reporting and public notice and operation and maintenance of the collection system. The permit requires that the permittee identify SSO occurrences and their causes. In addition, the permit establishes reporting, record keeping and third party notification of SSOs. Finally, the permit requires proper operation and maintenance of the collection system.

The following specific permit conditions apply:

Immediate Reporting – The permittee is required to notify EPA of an SSO within 24 hours of the time the permittee becomes aware of the overflow. (See 40 CFR 122.41(l)(6))

Written Reports – The permittee is required to provide EPA a written report within five days of the time it became aware of any overflow that is subject to the immediate reporting provision. (See 40 CFR 122.41(l)(6)(i)).

Third Party Notice – The permit requires that the permittee establish a process to notify specified third parties of SSOs that may endanger health due to a likelihood of human exposure; or unanticipated bypass and upset that exceeds any effluent limitation in the permit or that may endanger health due to a likelihood of human exposure. The permittee is required to develop, in consultation with appropriate authorities at the local, county, tribal and/or state level, a plan that describes how, under various overflow (and unanticipated bypass and upset) scenarios, the public, as well as other entities, would be notified of overflows that may endanger health. The plan should identify all overflows that would be reported and to whom, and the specific information that would be reported. The plan should include a description of lines of communication and the identities of responsible officials. (See 40 CFR 122.41(l)(6)).

Record Keeping – The permittee is required to keep records of SSOs. The permittee must retain the reports submitted to EPA and other appropriate reports that could include work orders associated with investigation of system problems related to a SSO, that describes the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the SSO. (See 40 CFR 122.41(j)).

Proper Operation and Maintenance – The permit requires proper operation and maintenance of the collection system. (See 40 CFR 122.41(d) and (e)). SSOs may be indicative of improper operation and maintenance of the collection system. The permittee may consider the development and implementation of a capacity, management, operation and maintenance (CMOM) program.

The permittee may refer to the Guide for Evaluating Capacity, Management, Operation, and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems (EPA 305-B-05-002). This guide identifies some of the criteria used by EPA inspectors to evaluate a collection system's management, operation and maintenance program activities. Owners/operators can review their own systems against the checklist (Chapter 3) to reduce the occurrence of sewer overflows and improve or maintain compliance.

D. ENVIRONMENTAL JUSTICE

As part of the permit development process, EPA Region 10 conducted a screening analysis to determine whether this permit action could affect overburdened communities. "Overburdened" communities can include minority, low-income, tribal, and indigenous populations or communities that potentially experience disproportionate environmental harms and risks. EPA used a nationally consistent geospatial tool, called EJ Screen, that contains demographic and environmental data for the United States at the Census block group level. This tool is used to identify permits for which enhanced outreach may be warranted.

The Kwina Road MBR WWTP is located within the Lummi Reservation, which is home to the majority of members of the Lummi Nation. The Reservation is composed of two Census blocks; the block that contains the WWTP is potentially overburdened due to the high proportion of people of color and low income population. EPA is engaging with the tribe during the permit development process and invites government-to-government consultation. In addition, the service area for the WWTP includes the area of concern, so the permit action benefits the tribal community. Given the small size of the facility, there is no indication that reissuance of this permit would trigger any environmental justice concerns.

Regardless of whether a facility is located near a potentially overburdened community, EPA encourages permittees to review (and to consider adopting, where appropriate) Promising Practices for Permit Applicants Seeking EPA-Issued Permits: Ways To Engage Neighboring Communities (see https://www.federalregister.gov/d/2013-10945). Examples of promising practices include: thinking ahead about community's characteristics and the effects of the permit on the community, engaging the right community leaders, providing progress or status reports, inviting members of the community for tours of the facility, providing informational materials translated into different languages, setting up a hotline for community members to voice concerns or request information, follow up, etc.

For more information, please visit https://www.epa.gov/environmentaljustice and Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*.

E. DESIGN CRITERIA

The permit includes design criteria requirements (Permit Section II.C.1). This provision requires the permittee to compare influent flow and loading to the facility's design flow and loading and prepare a facility plan for maintaining compliance with NPDES permit effluent limits when the flow or loading exceeds 85% of the design criteria values for any two months in a twelve-month period.

F. PRETREATMENT REQUIREMENTS

The LTSWD does not have an approved POTW pretreatment program. Therefore, per 40 CFR 403.8, EPA is the Control Authority of industrial users that might introduce pollutants into the Kwina Road MBR WWTP.

Permit Part II.D reminds the Permittee that it cannot authorize discharges which may violate the national specific prohibitions of the General Pretreatment Program.

Although, not a permit requirement, the Permittee may wish to consider developing the legal authority enforceable in Federal, State or local courts which authorizes or enables the POTW to apply and to enforce the requirement of CWA §§ 307 (b) and (c) and 402(b)(8), as described in 40 CFR 403.8(f)(1). Where the POTW is a municipality, legal authority is typically through a sewer use ordinance, which is usually part of the city or county code. EPA has a Model Pretreatment Ordinance for use by municipalities operating POTWs that are required to develop pretreatment programs to regulate industrial discharges to their systems (EPA, 2007). The model ordinance should also be useful for communities with POTWs that are not required to implement a pretreatment program in drafting local ordinances to control nondomestic dischargers within their jurisdictions.

Background on the pretreatment program may be found at Introduction to the National Pretreatment Program (EPA, 2011).

G. STANDARD PERMIT PROVISIONS

Permit Parts III., IV. and V. contain standard regulatory language that must be included in all NPDES permits. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

VI. OTHER LEGAL REQUIREMENTS

A. ENDANGERED SPECIES ACT

The Endangered Species Act requires federal agencies to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS; together, the Services) if their actions could beneficially or adversely affect any threatened or endangered species. During the previous permit issuance, EPA found that there would be *no effect* to federally listed species or their critical habitat. No further ESA listed species or critical habitat have been added since the last permit issuance. There has been an increase in salmon – primarily Coho – found in Smuggler Slough as a result of habitat restoration. Coho in Puget Sound are not listed under ESA, and they have largely been found near the mouth of the Slough. Given this information, combined with the proposed end-of-pipe effluent limits and location of the discharge into a wetland, EPA continues to make a *no effect* finding.

B. ESSENTIAL FISH HABITAT

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires EPA to consult with NMFS when a proposed discharge has the potential to adversely affect EFH (i.e., reduce quality and/or quantity of EFH).

The EFH regulations define an adverse effect as any impact which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions. During the previous permit issuance, EPA found that there would be *no effect* to EFH. As was written in that finding, because this facility and the Zone of Potential Aquatic Impacts are located in an inland environment, the permitting of the Kwina Road MBR WWTP will not adversely affect EFH for federally managed groundfish and coastal pelagics. End-of-pipe limits, and infiltration of the discharge through the wetland before draining to Smuggler Slough will prevent any impacts to habitat in the restored Slough. Accordingly, EPA continues to make a *no effect* finding.

C. CWA § 401 CERTIFICATION

CWA § 401 requires EPA to seek certification before issuing a final permit. As a result of the certification, LNR may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with WQSs, or treatment standards established pursuant to any State law or regulation. Since this facility discharges to Lummi Nation Tribal waters and the Tribe has been approved for TAS from EPA for purposes of the CWA, LNR is the certifying authority.

EPA had preliminary discussions with LNR regarding the CWA § 401 Certification during development of the draft permit. EPA is sending a request for CWA § 401 Certification to LNR. Based upon the preliminary discussions with LNR, EPA does not anticipate conditions to be included in the CWA § 401 Certification.

D. PERMIT EXPIRATION

The permit will expire five years from the effective date.

VII. References

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EPA. 2011. *Introduction to the National Pretreatment Program*. Environmental Protection Agency, Office of Wastewater Management. EPA 833-B-11-011. June 2011.

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LIBC. 2007. *Water Quality Standards for Surface Waters of the Lummi Indian Reservation.* Lummi Indian Business Council, Natural Resources Department, Water Resources Division. 20 August 2007. https://www.lummi-nsn.gov/userfiles/1_17%20LAR%2007%20Water%20Quality%20Standards.pdf.

LNR. 2020. *2018-2019 Lummi Nation Water Quality Assessment Report.* Water Resources Division, Lummi Natural Resources Department. August 2020. https://www.lummi-nsn.gov/userfiles/2018_2019_WaterQualityAssessmentReport_wAppendices.pdf.

Water Pollution Control Federation. 1976. *Chlorination of Wastewater.* Water Pollution Control Federation, Subcommittee on Chlorination of Wastewater. Washington, D.C.

APPENDIX A. FACILITY INFORMATION

Figure A - 1. Facility Location

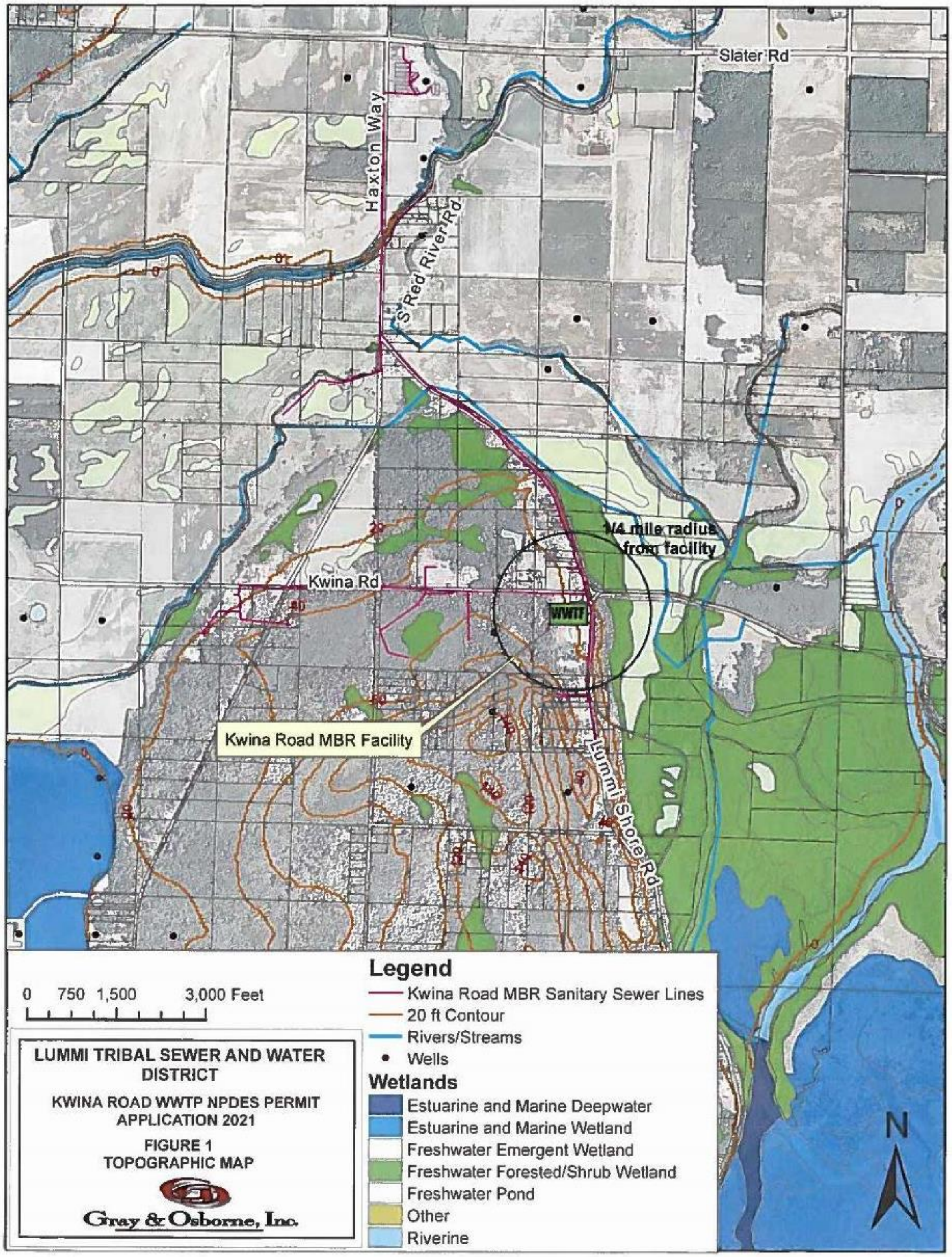

Figure A - 2. Process Flow Diagram

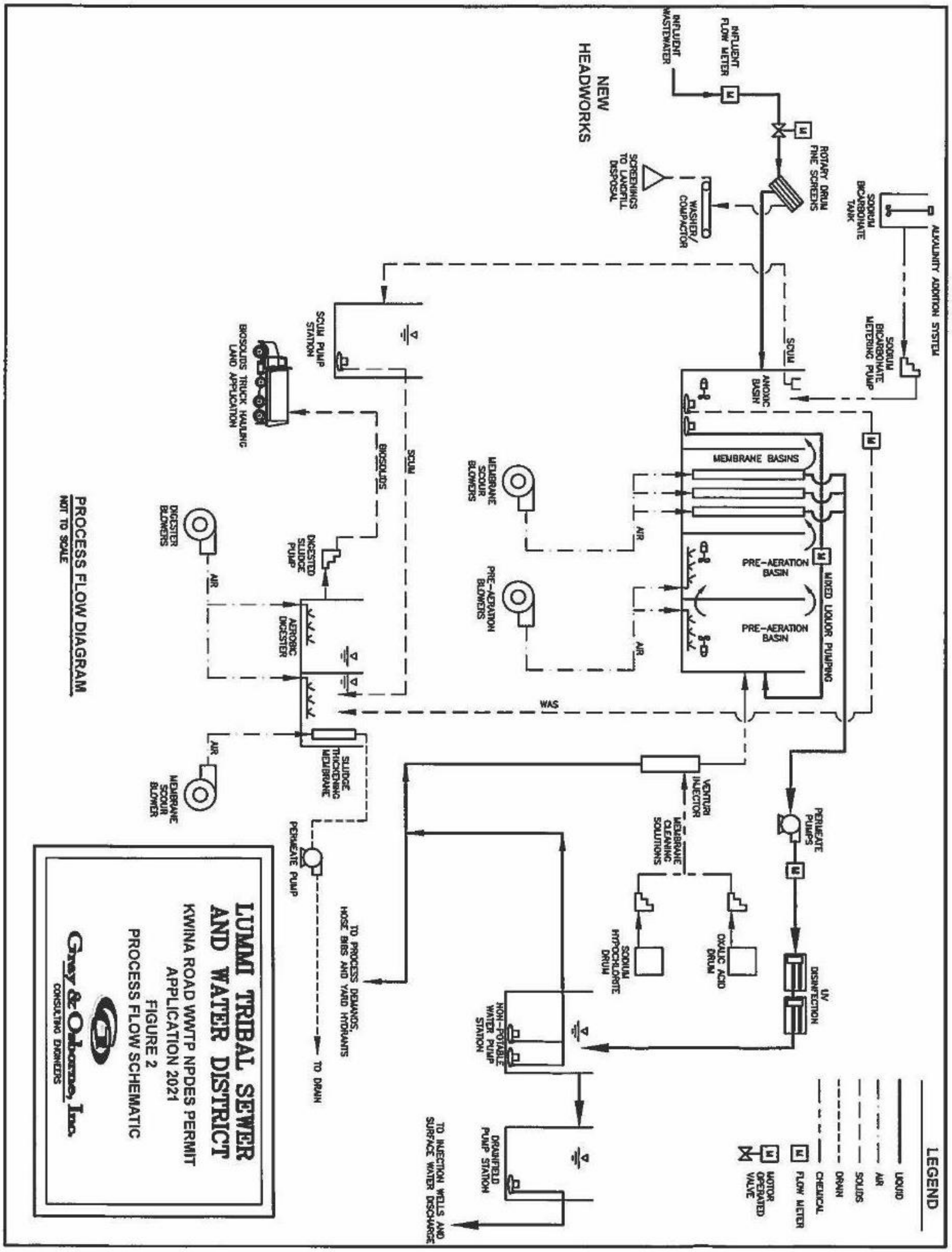

Figure A - 3. Outfall

APPENDIX B. WATER QUALITY DATA

Treatment Plant Effluent Data

Flow

	Monthly Average (mgd)	Daily Maximum (mgd)		Monthly Average (mgd)	Daily Maximum (mgd)
2/28/2017	0.113552	0.127582	11/30/2019	0.109445	0.158965
3/31/2017	0.122712	0.146791	12/31/2019	0.116556	0.135514
4/30/2017	0.10973	0.135209	1/31/2020	0.128096	0.148303
5/31/2017	0.10792	0.123742	2/29/2020	0.131893	0.161614
6/30/2017	0.104128	0.118358	3/31/2020	0.096736	0.14752
7/31/2017	0.105419	0.117078	4/30/2020	0.054895	0.063846
8/31/2017	0.087247	0.115221	5/31/2020	0.0628	0.083028
9/30/2017	0.099872	0.119785	6/30/2020	0.07764	0.088688
10/31/2017	0.099469	0.113475	7/31/2020		
11/30/2017	0.110715	0.143959	8/31/2020	0.129185	0.140978
12/31/2017	0.115722	0.155838	9/30/2020	0.12208	0.13
1/31/2018	0.115834	0.139104	10/31/2020	0.110094	0.127958
2/28/2018	0.124065	0.150098	11/30/2020	0.098337	0.146081
3/31/2018	0.111333	0.144029	12/31/2020	0.092211	0.138199
4/30/2018	0.126356	0.156092	1/31/2021	0.103822	0.139784
5/31/2018	0.096328	0.124597	2/28/2021	0.115163	0.144132
6/30/2018	0.103247	0.117097	3/31/2021	0.107914	0.124588
7/31/2018	0.110701	0.125703	4/30/2021	0.105498	0.12565
8/31/2018	0.097738	0.121876	5/31/2021	0.105921	0.119544
9/30/2018	0.099226	0.112941	6/30/2021	0.107743	0.130666
10/31/2018	0.099316	0.122018	7/31/2021	0.082421	0.092118
11/30/2018	0.107554	0.128978	8/31/2021	0.080806	0.09203
12/31/2018	0.15292	0.171186	9/30/2021	0.080721	0.103565
1/31/2019	0.106108	0.138745	10/31/2021	0.080312	0.103616
2/28/2019	0.109499	0.118995	11/30/2021	0.101855	0.133207
3/31/2019	0.102249	0.114431	12/31/2021	0.097907	0.125063
4/30/2019	0.109458	0.126322	1/31/2022	0.96526	0.118908
5/31/2019	0.106282	0.117213	2/28/2022	0.080537	0.101916
6/30/2019	0.109048	0.122291	**Mean**	**0.12**	**0.13**
7/31/2019	0.112118	0.120576	**Minimum**	**0.05**	**0.06**
8/31/2019	0.114785	0.141777	**Maximum**	**0.97**	**0.17**
9/30/2019	0.12281	0.101374	**95th Percentile**	**0.13**	**0.16**
10/31/2019	0.111668	0.129836	**5th Percentile**	**0.08**	**0.09**

BOD_5

	Monthly Average (mg/L)	Weekly Average (mg/L)	Percent Removal (Monthly Average Minimum)		Monthly Average (mg/L)	Weekly Average (mg/L)	Percent Removal (Monthly Average Minimum)
2/28/2017	4.01	7.84	98	11/30/2019	2	2	100
3/31/2017	2.75	4	99	12/31/2019	2	2	99
4/30/2017	5	6	98	1/31/2020	1.5	2	100
5/31/2017	3	3	99	2/29/2020	1.5	2	99
6/30/2017	3	4	99	3/31/2020	1	1	100
7/31/2017	1.5	2	100	4/30/2020	1.5	2	99
8/31/2017	2	2	99	5/31/2020	2.5	3	98
9/30/2017	2.5	3	100	6/30/2020	1.5	2	100
10/31/2017	2.5	3	100	7/31/2020	1.5	2	99
11/30/2017	2.5	3	99	8/31/2020	1.5	2	99
12/31/2017	2	3	99	9/30/2020	1	1	100
1/31/2018	2	2	100	10/31/2020	2	2	99
2/28/2018	4	4	99	11/30/2020	1.5	2	99
3/31/2018	3.54	4.07	99	12/31/2020	2	2	99
4/30/2018	3	3	99	1/31/2021	2.5	3	99
5/31/2018	1.5	2	100	2/28/2021	1.5	2	99
6/30/2018	2.5	3	99	3/31/2021	2	2	99
7/31/2018	1.5	2	100	4/30/2021	2	2	99
8/31/2018	2.5	3	100	5/31/2021	2	2	98
9/30/2018	2	3	100	6/30/2021	2	2	99
10/31/2018	2.5	3	99	7/31/2021	1.5	2	99
11/30/2018	1.5	2	100	8/31/2021	2	2	99
12/31/2018	2.5	3	99	9/30/2021	2.5	3	99
1/31/2019	3	3	99	10/31/2021	2	2	99
2/28/2019	4	5	99	11/30/2021	2	2	99
3/31/2019	2	3	99	12/31/2021	4	6	100
4/30/2019	2.5	3	99	1/31/2022	5	8	99
5/31/2019	2	2	100	2/28/2022	2	2	99
6/30/2019	3.5	6	99	**Mean**	**2.29**	**2.83**	**99.25**
7/31/2019	2	3	100	**Minimum**	**1**	**1**	**98**
8/31/2019	1.5	2	100	**Maximum**	**5**	**8**	**100**
9/30/2019	1	1	100	**95^{th} Percentile**	**4**	**6**	**100**
10/31/2019	2.5	3	99	**5^{th} Percentile**	**1.5**	**2**	**98**

TSS

	Monthly Average (mg/L)	Weekly Average (mg/L)	Percent Removal (Monthly Average Minimum)		Monthly Average (mg/L)	Weekly Average (mg/L)	Percent Removal (Monthly Average Minimum)
2/28/2017	0.61	1	100	11/30/2019	1	1	100
3/31/2017	1.15	1.7	100	12/31/2019	1.5	2	99
4/30/2017	1	1	100	1/31/2020	1	1	100
5/31/2017	1	1	100	2/29/2020	1	1	100
6/30/2017	0.65	1	100	3/31/2020	1	1	100
7/31/2017	0.65	1	100	4/30/2020	2	3	98
8/31/2017	1	1	99	5/31/2020	1	1	100
9/30/2017	1	1	100	6/30/2020	1.5	2	100
10/31/2017	1	1	100	7/31/2020	1	1	99
11/30/2017	0.65	1	100	8/31/2020	1	1	99
12/31/2017	1.5	2	99	9/30/2020	1	1	99
1/31/2018	1	1	100	10/31/2020	1	1	99
2/28/2018	1	1	100	11/30/2020	1	1	99
3/31/2018	1.15	1.3	100	12/31/2020	1	1	100
4/30/2018	1.17	1.33	100	1/31/2021	1.5	2	98
5/31/2018	4	4	99	2/28/2021	1	1	99
6/30/2018	1.5	2	99	3/31/2021	1	1	99
7/31/2018	2.5	4	99	4/30/2021	1	1	99
8/31/2018	1	1	100	5/31/2021	1	1	99
9/30/2018	1	1	98	6/30/2021	1.5	2	98
10/31/2018	1	1	100	7/31/2021	1	1	99
11/30/2018	1	1	100	8/31/2021	1	1	100
12/31/2018	1	1	100	9/30/2021	1	1	99
1/31/2019	1	1	99	10/31/2021	1.5	2	99
2/28/2019	1.5	2	99	11/30/2021	1	1	99
3/31/2019	2.5	4	99	12/31/2021	1	1	100
4/30/2019	1	1	100	1/31/2022	1.5	2	99
5/31/2019	1	1	100	2/28/2022	2	2	98
6/30/2019	1	1	100	**Mean**	**1.24**	**1.46**	**99.41**
7/31/2019	1	1	99	**Minimum**	**0.61**	**1**	**98**
8/31/2019	4	7	98	**Maximum**	**4**	**7**	**100**
9/30/2019	1	1	100	**95th Percentile**	**2.5**	**4**	**100**
10/31/2019	1	1	100	**5th Percentile**	**0.65**	**1**	**98**

pH

	Instantaneous Maximum	Instantaneous Minimum		Instantaneous Maximum	Instantaneous Minimum
2/28/2017	7.31	6.55	11/30/2019	7.6	7.13
3/31/2017	7.25	6.57	12/31/2019	7.52	7.02
4/30/2017	7.64	6.71	1/31/2020	7.41	7.09
5/31/2017	7.57	6.82	2/29/2020	7.78	7.64
6/30/2017	7.62	6.59	3/31/2020	7.43	7.23
7/31/2017	7.89	6.98	4/30/2020	8.08	7.14
8/31/2017	8	6.84	5/31/2020	7.14	6.73
9/30/2017	7.22	6.87	6/30/2020	7.54	6.93
10/31/2017	7.07	6.85	7/31/2020	8.18	6.63
11/30/2017	7.51	6.62	8/31/2020	8.2	7.09
12/31/2017	7.51	7.05	9/30/2020	7.63	7.22
1/31/2018	7.43	6.92	10/31/2020	7.81	7.44
2/28/2018	8.1	6.87	11/30/2020	7.95	7.48
3/31/2018	7.46	6.78	12/31/2020	8.12	7.25
4/30/2018	7.42	6.95	1/31/2021	7.49	7.31
5/31/2018	8.5	6.98	2/28/2021	7.65	7.29
6/30/2018	7.69	7.17	3/31/2021	7.45	7.26
7/31/2018	7.92	6.53	4/30/2021	7.88	7.31
8/31/2018	7.66	7.25	5/31/2021	8.16	7.28
9/30/2018	7.75	7.36	6/30/2021	8.39	7.23
10/31/2018	7.61	7.09	7/31/2021	7.5	6.95
11/30/2018	7.5	6.73	8/31/2021	7.51	7.04
12/31/2018	7.13	6.63	9/30/2021	7.79	6.93
1/31/2019	7.43	6.93	10/31/2021	7.85	7.16
2/28/2019	7.45	6.88	11/30/2021	7.54	7.38
3/31/2019	7.67	7.12	12/31/2021	7.84	7.53
4/30/2019	7.46	7.07	1/31/2022	7.84	6.96
5/31/2019	7.87	6.98	2/28/2022	7.86	6.95
6/30/2019	7.6	7.13	**Mean**	**7.66**	**7.03**
7/31/2019	7.54	7.28	**Minimum**	**7.07**	**6.53**
8/31/2019	7.55	7.02	**Maximum**	**8.5**	**7.64**
9/30/2019	7.52	7.21	**95th Percentile**	**8.18**	**7.44**
10/31/2019	7.52	6.98	**5th Percentile**	**7.22**	**6.59**

Dissolved Oxygen

	Monthly Average (mg/L)	Instantaneous Minimum (mg/L)		Instantaneous Minimum (mg/L)	Monthly Average (mg/L)
2/28/2017	6.88	5.39	11/30/2019	4.95	4.28
3/31/2017	5.22	3.68	12/31/2019	7.88	6.83
4/30/2017	7	5.87	1/31/2020	6.13	4.97
5/31/2017	6.16	3.9	2/29/2020	6.83	6.04
6/30/2017	6.23	5.24	3/31/2020	5.99	5.64
7/31/2017	5.49	2.48	4/30/2020	7.32	6.83
8/31/2017	5.29	0.21	5/31/2020	9.03	7.51
9/30/2017	5.76	4.55	6/30/2020	9.74	8.35
10/31/2017	5.91	4.69	7/31/2020	7.98	6.74
11/30/2017	6.05	4.59	8/31/2020	8.08	7.89
12/31/2017	6.9	6.19	9/30/2020	8.02	7.43
1/31/2018	6.32	4.74	10/31/2020	8.5	7.98
2/28/2018	5.92	4.7	11/30/2020	8.44	7.35
3/31/2018	6.81	5.25	12/31/2020	9.03	7.94
4/30/2018	6.6	4.17	1/31/2021	8.81	6.37
5/31/2018	5.09	2.93	2/28/2021	9.53	8.84
6/30/2018	5.4	2.73	3/31/2021	8.79	8.52
7/31/2018	5.62	3.39	4/30/2021	8.88	8.37
8/31/2018	5.49	3.68	5/31/2021	8.41	4.81
9/30/2018	6.22	4.99	6/30/2021	8.01	7.42
10/31/2018	6.62	4.45	7/31/2021	7.22	6.57
11/30/2018	7.19	6.73	8/31/2021	8.9	6.07
12/31/2018	7.14	6.33	9/30/2021	7.21	6.06
1/31/2019	6.55	5.62	10/31/2021	7.24	5.95
2/28/2019	6.43	4.53	11/30/2021	6.83	6.83
3/31/2019	5.74	4.74	12/31/2021		
4/30/2019	5.29	3.36	1/31/2022	9.68	8.89
5/31/2019	5.09	2.93	2/28/2022	13.03	12.6
6/30/2019	4.95	4.28	**Mean**	**6.96**	**5.60**
7/31/2019	4.74	3.83	**Minimum**	**4.74**	**0.21**
8/31/2019	4.79	3.7	**Maximum**	**13.03**	**12.6**
9/30/2019	4.76	3.22	**95th Percentile**	**9.54**	**8.54**
10/31/2019	7.23	6.05	**5th Percentile**	**4.94**	**2.92**

Fecal Coliform

	Monthly Geomean (cfu/100 mL)		Monthly Geomean (cfu/100 mL)
2/28/2017	1.19	11/30/2019	1
3/31/2017	1.52	12/31/2019	2.06
4/30/2017	1	1/31/2020	1
5/31/2017	1.15	2/29/2020	1
6/30/2017	1	3/31/2020	1
7/31/2017	1	4/30/2020	1.25
8/31/2017	1.38	5/31/2020	1.19
9/30/2017	1	6/30/2020	1.73
10/31/2017	1	7/31/2020	2.29
11/30/2017	1	8/31/2020	2.17
12/31/2017	1.19	9/30/2020	1
1/31/2018	1	10/31/2020	1
2/28/2018	1	11/30/2020	1.32
3/31/2018	1	12/31/2020	1
4/30/2018	1	1/31/2021	1
5/31/2018	1	2/28/2021	1
6/30/2018	1.19	3/31/2021	1.15
7/31/2018	1	4/30/2021	1
8/31/2018	1	5/31/2021	1
9/30/2018	1.41	6/30/2021	2.49
10/31/2018	1	7/31/2021	1.32
11/30/2018	1	8/31/2021	1.73
12/31/2018	1.41	9/30/2021	2.91
1/31/2019	1	10/31/2021	3.46
2/28/2019	1	11/30/2021	4.02
3/31/2019	1	12/31/2021	1.15
4/30/2019	1	1/31/2022	6.92
5/31/2019	2.61	2/28/2022	5.12
6/30/2019	1	**Mean**	**1.48**
7/31/2019	1	**Minimum**	**1**
8/31/2019	1	**Maximum**	**6.92**
9/30/2019	1	**95th Percentile**	**3.46**
10/31/2019	1	**5th Percentile**	**1**

Enterococci

	Monthly Geomean (cfu/100 mL)	Instantaneous Maximum (cfu/100 mL)		Monthly Geomean (cfu/100 mL)	Instantaneous Maximum (cfu/100 mL)
2/28/2017	1	1	11/30/2019	1	1
3/31/2017	1	1	12/31/2019	1	1
4/30/2017	2.76	58.1	1/31/2020	1	4.1
5/31/2017	1	1	2/29/2020	1	1
6/30/2017	1	1	3/31/2020	1	1
7/31/2017	1	1	4/30/2020	1	1
8/31/2017	1	1	5/31/2020	1	1
9/30/2017	1	1	6/30/2020	1.51	5.2
10/31/2017	1	1	7/31/2020	1	1
11/30/2017	1	1	8/31/2020	1.19	2
12/31/2017	1	1	9/30/2020	1	1
1/31/2018	1	1	10/31/2020	1	1
2/28/2018	1	1	11/30/2020	1	1
3/31/2018	1	1	12/31/2020	1	1
4/30/2018	1.19	2	1/31/2021	1.33	3.1
5/31/2018	1	1	2/28/2021	1.19	2
6/30/2018	1	1	3/31/2021	1	1
7/31/2018	1.78	10	4/30/2021	1	1
8/31/2018	1.58	10	5/31/2021	1	1
9/30/2018	1.78	10	6/30/2021	1	1
10/31/2018	1	1	7/31/2021	1.78	10
11/30/2018	1	1	8/31/2021	1	1
12/31/2018	1.19	2	9/30/2021	1	1
1/31/2019	1	1	10/31/2021	1	1
2/28/2019	1	1	11/30/2021	1.58	3.1
3/31/2019	1	1	12/31/2021	1.15	2
4/30/2019	1	1	1/31/2022	2.17	11
5/31/2019	1	1	2/28/2022	2.62	5.2
6/30/2019	5.62	10	**Mean**	**1.29**	**3.32**
7/31/2019	3.98	10	**Minimum**	**1**	**1**
8/31/2019	1	1	**Maximum**	**5.62**	**58.1**
9/30/2019	1	1	**95th Percentile**	**2.62**	**10**
10/31/2019	1	1	**5th Percentile**	**1**	**1**

Ammonia

	Monthly Average (mg/L as N)	Daily Maximum (mg/L as N)		Monthly Average (mg/L as N)	Daily Maximum (mg/L as N)
2/28/2017	0.17	0.5	11/30/2019	0.05	0.08
3/31/2017	0.05	0.05	12/31/2019	0.11	0.13
4/30/2017	0.09	0.1	1/31/2020	0.15	0.17
5/31/2017	0.17	0.62	2/29/2020	0.18	0.23
6/30/2017	0.06	0.07	3/31/2020	0.1	0.16
7/31/2017	0.04	0.07	4/30/2020	0.07	0.09
8/31/2017	0.03	0.06	5/31/2020	0.05	0.05
9/30/2017	0.03	0.05	6/30/2020	0.03	0.04
10/31/2017	0.03	0.06	7/31/2020	0.05	0.13
11/30/2017	0.09	0.11	8/31/2020	0.06	0.15
12/31/2017	0.06	0.14	9/30/2020	0.03	0.03
1/31/2018	0.14	0.19	10/31/2020	0.05	0.08
2/28/2018	0.19	0.21	11/30/2020	0.06	0.08
3/31/2018	0.2	0.24	12/31/2020	0.04	0.07
4/30/2018	0.22	0.27	1/31/2021	0.05	0.07
5/31/2018	0.17	0.29	2/28/2021	0.05	0.06
6/30/2018	0.14	0.2	3/31/2021	0.05	0.08
7/31/2018	0.05	0.07	4/30/2021	0.04	0.05
8/31/2018	0.04	0.11	5/31/2021	0.03	0.04
9/30/2018	0.09	0.25	6/30/2021	0.04	0.06
10/31/2018	0.04	0.05	7/31/2021	0.07	0.09
11/30/2018	0.12	0.17	8/31/2021	0.04	0.05
12/31/2018	0.11	0.14	9/30/2021	0.04	0.07
1/31/2019	0.24	0.33	10/31/2021	0.06	0.09
2/28/2019	0.15	0.19	11/30/2021	0.09	0.16
3/31/2019	0.16	0.2	12/31/2021	0.03	0.04
4/30/2019	0.14	0.21	1/31/2022	0.07	0.09
5/31/2019	0.07	0.09	2/28/2022	0.19	0.44
6/30/2019	0.11	0.15	**Mean**	**0.09**	**0.14**
7/31/2019	0.09	0.15	**Minimum**	**0.03**	**0.03**
8/31/2019	0.05	0.07	**Maximum**	**0.24**	**0.62**
9/30/2019	0.06	0.08	**95th Percentile**	**0.19**	**0.33**
10/31/2019	0.07	0.13	**5th Percentile**	**0.03**	**0.04**

Nitrate + Nitrite

	Instantaneous Maximum, Quarterly (mg/L as N)		Instantaneous Maximum, Quarterly (mg/L as N)
2/28/2017		11/30/2019	
3/31/2017	1.9	12/31/2019	5.5
4/30/2017		1/31/2020	
5/31/2017		2/29/2020	
6/30/2017	6.8	3/31/2020	3.67
7/31/2017		4/30/2020	
8/31/2017		5/31/2020	
9/30/2017	10.2	6/30/2020	6.72
10/31/2017		7/31/2020	
11/30/2017		8/31/2020	
12/31/2017	0.11	9/30/2020	4.24
1/31/2018		10/31/2020	
2/28/2018		11/30/2020	
3/31/2018	2.79	12/31/2020	14.5
4/30/2018		1/31/2021	
5/31/2018		2/28/2021	
6/30/2018	5.65	3/31/2021	10.8
7/31/2018		4/30/2021	
8/31/2018		5/31/2021	
9/30/2018		6/30/2021	4.5
10/31/2018		7/31/2021	
11/30/2018		8/31/2021	
12/31/2018	4.69	9/30/2021	7.73
1/31/2019		10/31/2021	
2/28/2019		11/30/2021	
3/31/2019	5.74	12/31/2021	
4/30/2019		1/31/2022	
5/31/2019		2/28/2022	
6/30/2019	8.11	**Mean**	**6.09**
7/31/2019		**Minimum**	**0.11**
8/31/2019		**Maximum**	**14.50**
9/30/2019	5.96	**95th Percentile**	**11.36**
10/31/2019		**5th Percentile**	**1.63**

Total Kjeldahl Nitrogen

	Instantaneous Maximum, Quarterly (mg/L as N)		**Instantaneous Maximum, Quarterly (mg/L as N)**
2/28/2017		11/30/2019	
3/31/2017	7.2	12/31/2019	1.38
4/30/2017		1/31/2020	
5/31/2017		2/29/2020	
6/30/2017	0.77	3/31/2020	0.96
7/31/2017		4/30/2020	
8/31/2017		5/31/2020	
9/30/2017	1.58	6/30/2020	
10/31/2017		7/31/2020	
11/30/2017		8/31/2020	
12/31/2017	1.19	9/30/2020	0.43
1/31/2018		10/31/2020	
2/28/2018		11/30/2020	
3/31/2018	1.22	12/31/2020	2.81
4/30/2018		1/31/2021	
5/31/2018		2/28/2021	
6/30/2018	1.38	3/31/2021	1.2
7/31/2018		4/30/2021	
8/31/2018		5/31/2021	
9/30/2018		6/30/2021	1.1
10/31/2018		7/31/2021	
11/30/2018		8/31/2021	
12/31/2018	1.19	9/30/2021	0.93
1/31/2019		10/31/2021	
2/28/2019		11/30/2021	
3/31/2019	1.48	12/31/2021	
4/30/2019		1/31/2022	
5/31/2019		2/28/2022	
6/30/2019	1.42	**Mean**	**1.59**
7/31/2019		**Minimum**	**0.43**
8/31/2019		**Maximum**	**7.20**
9/30/2019	0.87	**95th Percentile**	**3.69**
10/31/2019		**5th Percentile**	**0.70**

Total Phosphorus

	Instantaneous Maximum, Quarterly (mg/L as P)		Instantaneous Maximum, Quarterly (mg/L as P)
2/28/2017		11/30/2019	
3/31/2017	0.23	12/31/2019	0.678
4/30/2017		1/31/2020	
5/31/2017		2/29/2020	
6/30/2017	1	3/31/2020	2.99
7/31/2017		4/30/2020	
8/31/2017		5/31/2020	
9/30/2017	6.57	6/30/2020	1.89
10/31/2017		7/31/2020	
11/30/2017		8/31/2020	
12/31/2017	0.959	9/30/2020	2.55
1/31/2018		10/31/2020	
2/28/2018		11/30/2020	
3/31/2018	0.691	12/31/2020	1.81
4/30/2018		1/31/2021	
5/31/2018		2/28/2021	
6/30/2018	3.69	3/31/2021	2.09
7/31/2018		4/30/2021	
8/31/2018		5/31/2021	
9/30/2018		6/30/2021	2.89
10/31/2018		7/31/2021	
11/30/2018		8/31/2021	
12/31/2018	0.375	9/30/2021	4.21
1/31/2019		10/31/2021	
2/28/2019		11/30/2021	
3/31/2019	0.458	12/31/2021	
4/30/2019		1/31/2022	
5/31/2019		2/28/2022	
6/30/2019	4.21	**Mean**	**2.14**
7/31/2019		**Minimum**	**0.23**
8/31/2019		**Maximum**	**6.57**
9/30/2019	1.24	**95th Percentile**	**4.56**
10/31/2019		**5th Percentile**	**0.35**

Temperature

	Maximum 7-Day Average (°C)		Maximum 7-Day Average (°C)
2/28/2017	16.1	11/30/2019	16.92
3/31/2017	15.75	12/31/2019	15.94
4/30/2017	15.71	1/31/2020	15.56
5/31/2017	17.22	2/29/2020	16.15
6/30/2017	17.95	3/31/2020	15.98
7/31/2017	18.7	4/30/2020	15.37
8/31/2017	18.81	5/31/2020	16.12
9/30/2017	19.02	6/30/2020	16.84
10/31/2017	18.16	7/31/2020	17.12
11/30/2017	16.79	8/31/2020	17.48
12/31/2017	16.29	9/30/2020	17.42
1/31/2018	15.41	10/31/2020	16.76
2/28/2018	15.43	11/30/2020	15.98
3/31/2018	15.68	12/31/2020	14.96
4/30/2018	16.45	1/31/2021	14.48
5/31/2018	17.92	2/28/2021	13.97
6/30/2018	18.46	3/31/2021	14.34
7/31/2018	19.03	4/30/2021	15.27
8/31/2018	18.92	5/31/2021	15.97
9/30/2018	18.66	6/30/2021	17.45
10/31/2018	17.92	7/31/2021	18.28
11/30/2018	16.97	8/31/2021	18.43
12/31/2018	15.52	9/30/2021	18.03
1/31/2019	15.41	10/31/2021	16.74
2/28/2019		11/30/2021	16.15
3/31/2019		12/31/2021	15.26
4/30/2019	16	1/31/2022	14.45
5/31/2019	17.33	2/28/2022	
6/30/2019	17.95	**Mean**	**16.80**
7/31/2019	18.77	**Minimum**	**13.97**
8/31/2019	18.71	**Maximum**	**19.03**
9/30/2019	18.45	**95th Percentile**	**18.83**
10/31/2019	17.41	**5th Percentile**	**14.48**

Receiving Water Data

Receiving water data are from the LNR monitoring station SW015 on Smuggler Slough.

Figure B - 1. Locations of Smuggler Slough monitoring stations

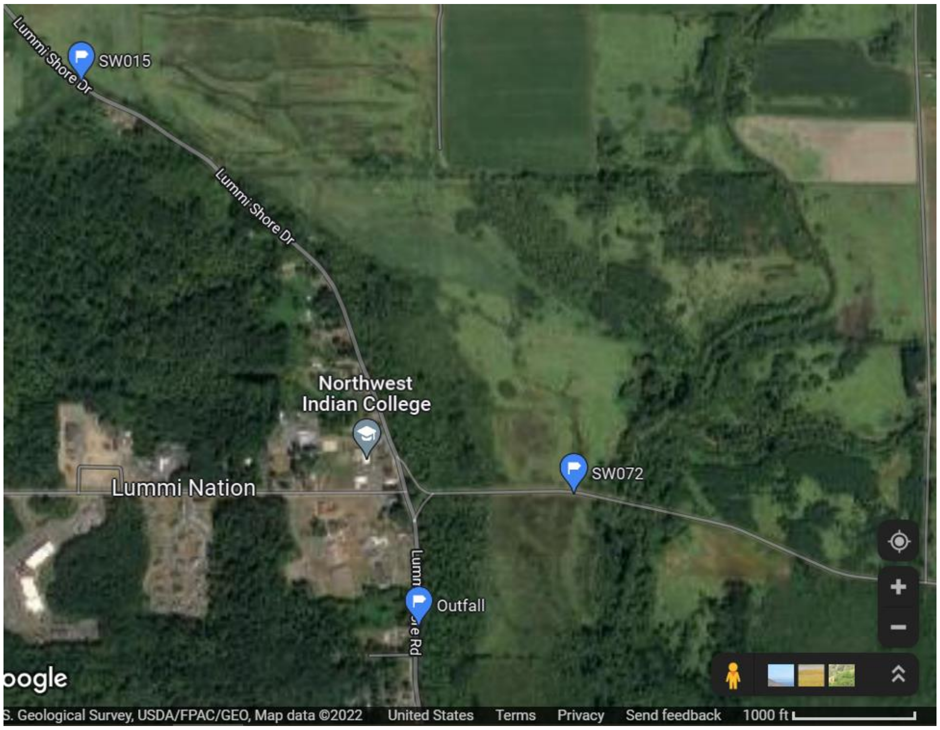

Figure B - 2. Smuggler Slough at SW015

	Water Temperature (°C)	pH	BOD_5 (mg/L)	Dissolved Oxygen (mg/L)	E. coli (cfu/100 mL)	Enterococci (cfu/100 mL)	Fecal Coliform (cfu/100 mL)
1/13/15	4.68	7.22		5.2	16	9	16
2/2/15	6.68	6.66	3.9	4.47	36	31	36
3/30/15	11.61	7.15		7.3	960	660	960
12/9/15	8.64	6.58		5.36	12	10	12
2/24/16							
2/25/16	7.89			7.34	190	1300	210
3/14/16	6.3	7.4		7.32	44	10	56
4/7/16	13.6	8.06		7.75	68	20	82
11/7/16	10.62	7.37	1.9	3.77	280	20	400
3/21/17	8.39		3	7.69	26	4	60
4/12/17	11.9	7.27		5.41	8	3	96
5/23/17	19.21		4.2	1.68	60	23	95
2/7/18	8.08			6.81	2	30	2
4/18/18	10.99	6.99		8.77	25	20	30
1/28/19	4.36	7.15		6.54	2	10	4
2/20/19	1.6	6.97	2	4.01	17	9	22
2/22/19	0.6	7.33		7.48	25	146	51
4/12/19	10.36	7.02			42	85	88
1/8/20	6.32	7.24		8.08	12	771	23
1/27/20	6.87	7.43		7.61	19	20	19
2/14/20	5.82	7.65		5.51			
2/19/20	4.23	7.1	3	6.22	4	10	4
3/11/20	6.2			5.56	9	9	14
10/23/20	6.9	7.37		2.15	120	605	200
11/19/20	7.4	7.14		4.78			
1/14/21		6.59		3.53	46	10	62
2/22/21	6.39	6.61	3	9.28	2	41	2
3/1/21	6.66	6.94		6.21	11	10	11
7/30/21	18.28	7.81		3.51			
10/26/21	10.63	7.09		1.56	150	86	200
12/14/21	4.25	7.79		4.24	8	41	16
Mean	**8.12**	**7.20**	**3**	**5.69**	**81.26**	**147.89**	**102.63**
5th Percentile	**2.65**	**6.59**	**1.93**	**1.87**	**2**	**5.5**	**2.6**
95th Percentile	**16.41**	**7.81**	**4.11**	**8.49**	**253**	**737.7**	**343**

	Nitrate + Nitrite, as N (mg/L)	Total Kjeldahl Nitrogen, as N (mg/L)	Total Organic Carbon (mg/L)	Total Phosphorus (mg/L)	Total Suspended Solids (mg/L)	Salinity (ppt)
1/13/15						0.13
2/2/15	67	1.6	13.1	0.52	42	0.18
3/30/15						0.2
12/9/15						0.56
2/24/16	0	1.41	11.5	0.169	21	
2/25/16						0.15
3/14/16						0.29
4/7/16						0.33
11/7/16	420	1	12	0.216	26	0.23
3/21/17	64	1.1	14.7	0.22	9.8	0.21
4/12/17						0.33
5/23/17	118	1.8	21.7	0.27	3.7	0.41
2/7/18						0.14
4/18/18						0.33
1/28/19						0.33
2/20/19	31	1.28	10.7	0.186	10	0.59
2/22/19						0.34
4/12/19						0.6
1/8/20						0.22
1/27/20						0.22
2/14/20						0.14
2/19/20	14	1.97	14.54	0.598	85	0.21
3/11/20						0.81
10/23/20						0.63
11/19/20						0.53
1/14/21						0.16
2/22/21	43	1.49	9.71	0.427	31	0.2
3/1/21						0.27
7/30/21						0.85
10/26/21						0.75
12/14/21						0.07
Mean	**94.63**	**1.46**	**13.49**	**0.33**	**28.56**	**0.35**
5th Percentile	**4.9**	**1.04**	**10.06**	**0.17**	**5.84**	**0.13**
95th Percentile	**314.3**	**1.91**	**19.25**	**0.57**	**69.95**	**0.78**

Appendix C. Reasonable Potential and WQBEL Formulae

A. Reasonable Potential Analysis

EPA uses the process described in the *Technical Support Document for Water Quality-based Toxics Control* (EPA, 1991) to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is reasonable potential, and a WQBEL must be included in the permit.

1. Mass Balance

For discharges to flowing water bodies, the maximum projected receiving water concentration is determined using the following mass balance equation:

$$C_d Q_d = C_e Q_e + C_u Q_u \qquad \textit{Equation 1}$$

where,

C_d	=	Receiving water concentration downstream of the effluent discharge (that is, the concentration at the edge of the mixing zone)
C_e	=	Maximum projected effluent concentration
C_u	=	95th percentile measured receiving water upstream concentration
Q_d	=	Receiving water flow rate downstream of the effluent discharge = Q_e+Q_u
Q_e	=	Effluent flow rate (set equal to the design flow of the WWTP)
Q_u	=	Receiving water low flow rate upstream of the discharge (1Q10, 7Q10 or 30B3)

When the mass balance equation is solved for C_d, it becomes:

$$C_d = \frac{C_e \times Q_e + C_u \times Q_u}{Q_e + Q_u} \qquad \textit{Equation 2}$$

The above form of the equation is based on the assumption that the discharge is rapidly and completely mixed with 100% of the receiving stream.

If the mixing zone is based on less than complete mixing with the receiving water, the equation becomes:

$$C_d = \frac{C_e \times Q_e + C_u \times (Q_u \times \%MZ)}{Q_e + (Q_u \times \%MZ)} \qquad \textit{Equation 3}$$

Where:

% MZ = the percentage of the receiving water flow available for mixing.

If a mixing zone is not allowed, dilution is not considered when projecting the receiving water concentration and,

$$C_d = C_e \qquad \textit{Equation 4}$$

A dilution factor (D) can be introduced to describe the allowable mixing. Where the dilution factor is expressed as:

$$D = \frac{Q_e + Q_u \times \%MZ}{Q_e} \qquad \textit{Equation 5}$$

After the dilution factor simplification, the mass balance equation becomes:

$$C_d = \frac{C_e - C_u}{D} + C_u \qquad \textit{Equation 6}$$

If the criterion is expressed as dissolved metal, the effluent concentrations are measured in total recoverable metal and must be converted to dissolved metal as follows:

$$C_d = \frac{CF \times C_e - C_u}{D} + C_u \qquad \textit{Equation 7}$$

Where C_e is expressed as total recoverable metal, C_u and C_d are expressed as dissolved metal, and CF is a conversion factor used to convert between dissolved and total recoverable metal.

The above equations for C_d are the forms of the mass balance equation which were used to determine reasonable potential and calculate wasteload allocations.

2. Maximum Projected Effluent Concentration

When determining the projected receiving water concentration downstream of the effluent discharge, EPA's Technical Support Document for Water Quality-based Toxics Controls (TSD, 1991) recommends using the maximum projected effluent concentration (Ce) in the mass balance calculation (see equation 3, page C-5). To determine the maximum projected effluent concentration (Ce) EPA has developed a statistical approach to better characterize the effects of effluent variability. The approach combines knowledge of effluent variability as estimated by a coefficient of variation (CV) with the uncertainty due to a limited number of data to project an estimated maximum concentration for the effluent. Once the CV for each pollutant parameter has been calculated, the reasonable potential multiplier (RPM) used to derive the maximum projected effluent concentration (Ce) can be calculated using the following equations:

First, the percentile represented by the highest reported concentration is calculated.

$$p_n = (1 - \text{confidence level})^{1/n} \qquad \textit{Equation 8}$$

where,

p_n = the percentile represented by the highest reported concentration

n = the number of samples

confidence level = 99% = 0.99

and

$$RPM = \frac{C_{99}}{C_{P_n}} = \frac{e^{Z_{99} \times \sigma - 0.5 \times \sigma^2}}{e^{Z_{P_n} \times \sigma - 0.5 \times \sigma^2}}$$ *Equation 9*

Where,

σ^2 = $\ln(CV^2 + 1)$

Z_{99} = 2.326 (z-score for the 99th percentile)

Z_{Pn} = z-score for the P_n percentile (inverse of the normal cumula distribution function at a given percentile)

CV = coefficient of variation (standard deviation ÷ mean)

The maximum projected effluent concentration is determined by simply multiplying the maximum reported effluent concentration by the RPM:

$$C_e = (RPM)(MRC)$$ *Equation 10*

where MRC = Maximum Reported Concentration

3. Maximum Projected Effluent Concentration at the Edge of the Mixing Zone

Once the maximum projected effluent concentration is calculated, the maximum projected effluent concentration at the edge of the acute and chronic mixing zones is calculated using the mass balance equations presented previously.

4. Reasonable Potential

The discharge has reasonable potential to cause or contribute to an exceedance of water quality criteria if the maximum projected concentration of the pollutant at the edge of the mixing zone exceeds the most stringent criterion for that pollutant.

B. WQBEL Calculations

1. Calculate the Wasteload Allocations (WLAs)

Wasteload allocations (WLAs) are calculated using the same mass balance equations used to calculate the concentration of the pollutant at the edge of the mixing zone in the reasonable potential analysis. To calculate the wasteload allocations, C_d is set equal to the acute or chronic criterion and the equation is solved for C_e. The calculated C_e is the acute or chronic WLA. Equation 6 is rearranged to solve for the WLA, becoming:

$$C_e = WLA = D \times (C_d - C_u) + C_u$$ *Equation 11*

Some water quality criteria for some metals are expressed as the dissolved fraction, but the Federal regulation at 40 CFR 122.45(c) requires that effluent limits be expressed as total recoverable metal. Therefore, EPA must calculate a wasteload allocation in total recoverable metal that will be protective of the dissolved criterion. This is accomplished by dividing the WLA expressed as dissolved by the criteria translator, as shown in equation 12. The criteria translator (CT) is equal to the conversion factor, because site-specific translators are not available for this discharge.

$$C_e = WLA = \frac{D \times (C_d - C_u) + C_u}{CT}$$ *Equation 12*

The next step is to compute the "long term average" concentrations which will be protective of the WLAs. This is done using the following equations from EPA's *Technical Support Document for Water Quality-based Toxics Control* (TSD):

$$LTA_a = WLA_a \times e^{(0.5\sigma^2 - z\,\sigma)}$$ *Equation 13*

$$LTA_c = WLA_c \times e^{(0.5\sigma_4^2 - z\sigma_4)}$$ *Equation 14*

where,

σ^2	=	$\ln(CV^2 + 1)$
Z_{99}	=	2.326 (z-score for the 99th percentile probability basis)
CV	=	coefficient of variation (standard deviation ÷ mean)
σ_4^2	=	$\ln(CV^2/4 + 1)$

For ammonia, because the chronic criterion is based on a 30-day averaging period, the Chronic Long Term Average (LTAc) is calculated as follows:

$$LTA_c = WLA_c \times e^{(0.5\sigma_{30}^2 - z\sigma_{30})}$$ *Equation 15*

where,

σ_{30}^2 = $\ln(CV^2/30 + 1)$

The LTAs are compared and the more stringent is used to develop the daily maximum and monthly average permit limits as shown below.

2. Derive the maximum daily and average monthly effluent limits

Using the TSD equations, the MDL and AML effluent limits are calculated as follows:

$$MDL = LTA \times e^{(z_m\sigma - 0.5\sigma^2)}$$ *Equation 16*

$$AML = LTA \times e^{(z_a\sigma_n - 0.5\sigma_n^2}$$ *Equation 17*

where σ, and σ² are defined as they are for the LTA equations above, and,

σ_n^2	=	$\ln(CV^2/n + 1$
z_a	=	1.645 (z-score for the 95th percentile probability basis)
z_m	=	2.326 (z-score for the 99th percentile probability basis)

n	=	number of sampling events required per month. With the exception of ammonia, if the AML is based on the LTA_c, i.e., $LTA_{minimum} = LTA_c$), the value of ''n'' should is set at a minimum of 4. For ammonia, In the case of ammonia, if the AML is based on the LTA_c, i.e., $LTA_{minimum} = LTA_c$), the value of ''n'' should is set at a minimum of 30.