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:

Suquamish Wastewater Treatment Plant
Kitsap County Public Works
18000 Suquamish Way NE
Suquamish, Washington 98392

Public Comment Start Date: September 19, 2019
Public Comment Expiration Date: October 21, 2019

Technical Contact: Kai Shum
(206) 553-0060
800-424-4372, ext. 0060 (within Alaska, Idaho, Oregon and Washington)
shum.kai@epa.gov

The EPA Proposes to Reissue NPDES Permit
The 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 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

State Certification
The EPA is requesting that the Washington State Department of Ecology certify the permit under Section 401 of the Clean Water Act. Ecology will public notice the EPA's request for certification pursuant to Section 401 of the Clean Water Act at:

https://ecology.wa.gov/Regulations-Permits/Permits-certifications/401-Water-quality-certification/non-hydropower-401-certifications/401-and-CZM-public-notices

Comments regarding the 401 certification should be directed to:

Department of Ecology
SEA Program Federal Project Coordinator
PO Box 47600
Olympia, WA 98504

or by email to ECYREFEDPERMITS@ecy.wa.gov.

All comments regarding the Section 401 of the Clean Water Act certification should include the permit applicant name, project name, your name, address and phone number.

Public Comment

Persons wishing to provide comment on, or request a Public Hearing for the facility's draft permit, must 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, email 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, the EPA's regional Director for the Water Division will make a final decision regarding permit issuance. If no substantive comments are received, the conditions in the draft permit will be issued as the final permit and the permit will become effective upon issuance. If substantive comments are received, the EPA will address the comments prior to issuing 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 permits, fact sheet and related documents are available online at the EPA Region 10 NPDES webpage at: https://www.epa.gov/npdes-permits/about-region-10s-npdes-permit-program.

In addition, the draft permit, fact sheet and related documents are available by visiting or contacting the EPA's Regional Office in Seattle between 8:30 a.m. and 4:00 p.m., Monday through Friday at the address below.

U.S. EPA Region 10
M/S: WD-19-C04
1200 Sixth Avenue, Suite 155
Seattle, Washington 98101-3188
(206) 553-0523 or
Toll Free 1-800-424-4372 (within Alaska, Idaho, Oregon and Washington)

Table of Contents

Acronyms

I. Background Information 7

A. General Information 7
B. Permit History 7
C. Tribal Coordination 8

II. Facility Information 8

A. Treatment Plant Description 8

III. Receiving Water 10

A. Receiving Water 10
B. Water Quality Standards 10
C. Receiving Water Quality 11
D. Water Quality Limited Waters 12

IV. Effluent Limitations and Monitoring 12

A. Basis for Effluent Limits 15
B. Pollutants of Concern 15
C. Technology-Based Effluent Limits 16
D. Water Quality-Based Effluent Limits 17
E. Antibacksliding 25

V. Monitoring Requirements 26

A. Basis for Effluent and Surface Water Monitoring 26
B. Effluent Monitoring 26
C. Outfall 001 Evaluation Report 26
D. Electronic Submission of Discharge Monitoring Reports 26

VI. Sludge (Biosolids) Requirements 26

VII. Other Permit Conditions 27

A. Quality Assurance Plan 27
B. Operation and Maintenance Plan 27
C. Sanitary Sewer Overflows and Proper Operation and Maintenance of the Collection System 27
D. Environmental Justice 28
E. Design Criteria 29
F. Pretreatment Requirements 29
G. Standard Permit Provisions 29

VIII. Other Legal Requirements 29

A. Endangered Species Act 29
B. Essential Fish Habitat 30

C. Antidegradation 30
D. Permit Expiration 30

IX. References 30

Appendix A. Facility Information 31

Appendix B. Water Quality Data 34

A. Summary of DMR Data 34
B. Receiving Water Data 41

Appendix C. Reasonable Potential and Dilution Factors Calculations 43

A. Reasonable Potential Analysis 43
B. Output of Visual Plumes Modeling 45

Appendix D. Reasonable Potential Calculations 47

A. Reasonable Potential Calculation for Ammonia 47
B. Reasonable Potential Calculation for pH 48
C. Reasonable Potential Calculation for Temperature 49
D. Reasonable Potential Calculation for Fecal Coliform Bacteria 50
E. Antidegradation Analysis 51

List of Tables

Table 1. General Facility Information 7
Table 2. Effluent Characterization 10
Table 3. Receiving Water 11
Table 4. Existing Permit - Effluent Limits and Monitoring Requirements 13
Table 5. Draft Permit - Effluent Limits and Monitoring Requirements 14
Table 6. Secondary Treatment Effluent Limits 16
Table 7. Marine Un-ionized Ammonia 22

Acronyms

ACR	Acute-to-Chronic Ratio
AML	Average Monthly Limit
ASR	Alternative State Requirement
AWL	Average Weekly Limit
BA	Biological Assessment
BAT	Best Available Technology economically achievable
BCT	Best Conventional pollutant control Technology
BOD_5	Biochemical oxygen demand, five-day
BOD_{5u}	Biochemical oxygen demand, ultimate
BMP	Best Management Practices
BPT	Best Practicable
°C	Degrees Celsius
C BOD_5	Carbonaceous Biochemical Oxygen Demand
CFR	Code of Federal Regulations
CFS	Cubic Feet per Second
COD	Chemical Oxygen Demand
CSO	Combined Sewer Overflow
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EA	Environmental Assessment
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
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
N	Nitrogen
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
WD	Water Division
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan
PMR	Port Madison Reservation
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
SS	Suspended Solids
SSO	Sanitary Sewer Overflow
s.u.	Standard Units
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UV	Ultraviolet
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 No.	WA0023256
Applicant:	Suquamish Wastewater Treatment Plant (WWTP) Kitsap County Public Works
Type of Ownership	Publicly-Owned Treatment Works (POTW)
Physical Address:	18000 Suquamish Way NE Suquamish, WA 98392
Mailing Address:	12351 Brownsville Highway NE Poulsbo, Washington 98370
Facility Contacts:	Stella Vakarcs Senior Program Manager svakarcs@co.kitsap.wa.us 360-337-5777 Matt Pickering Utility Analyst Lead MPickering@co.kitsap.wa.us 360-337-5695 Ken Young Plant Operator Supervisor kyoung@co.kitsap.wa.us 360-337-5658 360- 979-9481
Operator Name:	Kitsap County Public Works
Facility Location:	47.7256 N, 122.5469 W
Receiving Water:	Port Madison Bay of Puget Sound
Facility Outfall:	47.726 N, 122.547 W

B. Permit History

The most recent NPDES permit for the Suquamish WWTP was issued on May 8, 2008 (2008 Permit), became effective on June 1, 2008, and expired on May 31, 2013. The NPDES application for permit reissuance was submitted by the permittee on November 23, 2012. In a letter dated December 5, 2012, the EPA determined that the application was timely and

complete. Therefore, pursuant to 40 CFR 122.6, the permit was administratively continued and remains fully effective and enforceable.

C. Tribal Coordination

The 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, the EPA issued the "EPA Policy on Consultation and Coordination with Indian Tribes" which established national guidelines and institutional controls for consultation.

The Suquamish WWTP is located on the Port Madison Reservation of the Suquamish Tribe ("Reservation"). Consistent with the Executive Order and the EPA tribal consultation policies, the EPA coordinated with the Suquamish Tribe during development of the draft permit and is inviting the Suquamish Tribe to enter into formal tribal consultation.

II. Facility Information

A. Treatment Plant Description

Service Area

Kitsap County owns and operates the Suquamish WWTP ("the facility") located in the Reservation in Suquamish, Washington. The collection system has no combined sewers. According to the permit application, the facility serves a residential population of 2,770 and receives approximately 81,500 gallons per day (gpd) of wastewater from the Suquamish Clearwater Casino Resort. There are no major industries discharging to the facility.

Treatment Process

The Suquamish WWTP originally consisted of an activated sludge process followed by chlorination. This older system had a design flow rate of 0.20 mgd and was built in the 1970s.

In 1998, Kitsap County replaced the old plant with the current Sequencing Batch Reactor (SBR) Plant at the same location. The equalization tank and the solids holding tank were constructed from parts of the old plant. The generator and office space are housed in the old operations building. All other structures were built in 1998.

The new plant consists of two SBRs with an equalization tank and an ultraviolet (UV) disinfection system. Wastewater flows into the plant through a ¼-inch rotary bar screen and then flows to a grit chamber for grit removal. After primary treatment, the wastewater enters one of two SBR basins, is aerated, mixed, and the solids are allowed to settle. The

supernatant from the settled reactor is decanted to the equalization basin. A flow valve downstream of the equalization basin regulates flow to the UV channel. The disinfected effluent is discharged through an outfall into Port Madison Bay in Puget Sound (refer to Location Map in Appendix A, Figure A-1).

The facility completed a survey report, entitled, "*Kitsap County Public Works Suquamish Wastewater Facilities I&I Analysis, June 2012*", to reduce Infiltration and Inflow (I/I) from the facility's collection system. In 2014, the facility completed Phase I activities as identified in the 2012 survey report, which included replacing affected piping and manhole covers. This activity resulted the elimination of an estimated of 255 gallons per minute of I/I into the collection system during storm events.

In 2017, the facility was upgraded by replacing the thickening equipment with Rotary Drum Thickener (RDT), adding a dedicated Thickened Sludge Storage Tank (TSST) to eliminate recuperative thickening, and upgrading the facility's programmable logic controller (PLC) system. The facility also performed a list of minor equipment replacements and/or upgrades pertaining to its operation and maintenance. The facility's process Flow Schematic is shown in Appendix A, Figure A-2. As a result of the 2017 upgrades, the facility reduced its generation of biosolids from 471,100 gallons in 2016, to 308,900 gallons in 2018. Biosolids generated are currently transported to Natural Selection Farms in Sunnyside, Washington.

After the 2017 upgrades, the facility's design flow remains at 0.40 mgd, unchanged from the last permit cycle. The reported actual flow from the facility ranges between 0.15 to 0.48 mgd on an average monthly basis for the period from July 2008 to November 2018.

Because the design flow is less than 1 mgd, the facility type is designated as a minor POTW.

Outfall Description

The outfall was constructed in the mid-1970s. The WWTP discharges into Port Madison Bay in Puget Sound at the approximate location: latitude: 47º 43' 35.2" N; and longitude: 122º 32' 49.2" W; or in decimals: 47.726 N, 122.547 W. The outfall is equipped with a diffuser, has approximately 2,285 feet of marine piping, and is approximately 43.4 feet below the water surface (MLLW). The diffuser consists of a 12-inch diameter ductile iron pipe with four diffuser ports. Construction drawings show two of these ports are 6-inch diameter, one is 4-inch diameter, and a partially circular port at the end of the pipe. The 6-inch diameter ports are opposite each other and discharge horizontally. The 4-inch diameter port is at the top of the pipe and approximately 9 feet past the other ports. The diffuser ends with another port at the end of the pipe. A diagram of the diffuser is shown in Appendix A, Figure A-3. An outfall inspection was required by the 2008 Permit. The outfall and diffuser were inspected in February 2010 during which the structures were observed to be intact and functioning without any problems noted.

Effluent Characterization

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

Table 2. Effluent Characterization

Parameter	Maximum	Minimum
BOD_5 - Monthly Average (mg/l)	13.3	2.3
BOD_5 - Weekly Average (mg/l)	22.3	2.9
TSS - Monthly Average (mg/l)	9.8	1.7
TSS – Weekly Average (mg/l)	18.0	2.5
pH – Daily Max and Min (s.u.)	7.6	6.5
Fecal Coliform – Monthly Average of Geometric Mean (#/100 mL)	19	1
Fecal Coliform – Weekly Average of Geometric Mean (#/100 mL)	113	1
Flow - Monthly Average (mgd)	0.48	0.15
Alkalinity - Daily Max (mg/l)	199	82
Temperature – Daily Max (°C)	23	12
Ammonia as N – Daily Max (mg/l)	34.10	0.23

Source: DMR data from July 2008 to November 2018.

Compliance History

The EPA reviewed the facility DMRs from June 1, 2008 to November 2018. The facility has been in compliance with the permit discharge limits, with no violations.

On January 12, 2009, the EPA completed an NPDES inspection of the facility operations. There were no violations identified. The inspection identified minor changes to plant operations that should be updated in the facility's Operation and Maintenance Plan and details of its ammonia monitoring procedures that should be described in its Quality Assurance Plan.

On September 14, 2017, the EPA conducted an inspection of the facility. An area of concern described in the December 26, 2017 Inspection Report was that 24-hour composite samples are required by the permit are to be collected on a flow proportional basis. In 2018, the permittee replaced the sampling equipment and is collecting 24-hour composite samples as required.

The EPA's Enforcement and Compliance History Online (ECHO) report is available here: (https://echo.epa.gov/effluent-charts#WA0023256).

III. Receiving Water

In drafting permit conditions, the EPA must analyze the effect of the facility's discharge on the receiving water. The details of that analysis are provided later in this Fact Sheet. This section summarizes characteristics of the receiving water that impact that analysis.

A. Receiving Water

This facility discharges to a marine outfall into Port Madison.

B. Water Quality Standards

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet Water Quality Standards (WQS) by July 1, 1977. Federal regulations at 40 CFR 122.4(d) require that the conditions in NPDES permits ensure compliance with the

WQS of all affected States. A State's WQS are composed of beneficial use designations, numeric and/or narrative water quality criteria, and an anti-degradation policy. The WQS designates the beneficial uses (such as drinking water supply, contact recreation, and aquatic life) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the State to support the beneficial use designations of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

Designated Beneficial Uses

The Washington WQS describes the receiving water as: Puget Sound through Admiralty Inlet and South Puget Sound, south and west to longitude 122° 52' 30" W (Brisco Point) and longitude 122° 51W (northern tip of Hartstene Island).

The receiving water has the following Use Designations: [1]

- Aquatic Life Use: Extraordinary
- Recreational Use: Primary
- Harvest Use: All
- Miscellaneous Uses: Aesthetics, boating, commerce/navigation, and wildlife habitat.

The Extraordinary Aquatic Life Use designation has a General Description in WAC 173-201A-610, as follows: *"Extraordinary quality salmonid and other fish migration, rearing, and spawning; clam, oyster, and mussel rearing and spawning; crustaceans and other shellfish (crabs, shrimp, crayfish, scallops, etc.) rearing and spawning."*

C. Receiving Water Quality

Data summarized from Ecology's monitoring station near Port Madison ("Agate Pass North End"; Location ID: KCHD-AG01[2]) is shown below; detailed data of this summary is found in Appendix B, Part B, Receiving Water Data.

Table 3. Receiving Water

Parameter	Units	Maximum	Minimum	95th Percentile
DO	mg/L	12.0	6.3	11.7
Fecal Coliform	MPN/100mL	17	1	2
pH[1]	s.u.	8.2	7.3	8.1[1]
Temperature[2]	°C	15.6	8.2	15.0[2]
Ammonia as N[3]	µg/l	--	--	34[3]

Footnote:
1. pH and temperature values are 90th percentile.
2. Temperature data rounded from 14.95°C to 15.0°C.
3. Ammonia, 90th percentile from Ecology ambient monitoring stations: ADM003, PTWELLS1, KCHD-PS13 based on NPDES Fact Sheet Kingston WWTP, 2015.

[1] *See* WAC 173-201A-612 Table 612

[2] https://apps.ecology.wa.gov/eim/search/Eim/EIMSearchResults.aspx?ResultType=ResultList&EIMSearchResultsFirstPageVisit=false&LocationCounties=KITSAP&LocationUserIds=KCHD-AG01&LocationUserIdSearchType=Equals&LocationUserIDAliasSearchFlag=True

Antidegradation

The proposed issuance of an NPDES permit triggers the need to ensure that the conditions in the permit ensure that Tier I, II, and III of the State's antidegradation policy are met. An anti-degradation analysis was conducted by the EPA, which concluded that the permit would not result in degradation of water quality (see Appendix D).

D. Water Quality Limited Waters

Any waterbody for which the water quality does not, and/or is not expected to meet, applicable WQS is defined as a "water quality limited segment." Section 303(d) of the CWA requires states 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 WQS. 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 applicable TMDL allocations.

The area where the WWTP discharges is categorized by Ecology at Water Resource Inventory Area 15 (WRIA 15). The EPA checked Ecology's website, which contains a map of impaired waterbodies in Washington. Based on Ecology's mapping tool on February 28, 2019, the EPA concluded that there is one 303(d) listing near Port Madison in Puget Sound, located approximately 1.4 miles north of the facility's discharge.[3] This listing is for Dissolved Oxygen (Category 5; Listing #: 38714; Assessment Unit: 47122H5F5).

This listing will be addressed through the Puget Sound Nutrient Source Reduction Project. The Puget Sound Nutrient Source Reduction Project is a collaborative effort with Puget Sound stakeholders to find solutions for reducing human sources of excess nutrients. This work focuses on using the latest science to find the right solutions for regional investments to reduce nutrient sources. The objective is to improve Puget Sound water quality to support salmon and orca recovery and increase resiliency to climate impacts.

IV. Effluent Limitations and Monitoring

Table 4 below presents the existing effluent limits and monitoring requirements in the 2008 Permit. Table 5, below, presents the proposed effluent limits and monitoring requirements in the draft permit.

[3] Washington State Water Quality Atlas, https://fortress.wa.gov/ecy/waterqualityatlas/map.aspx?CustomMap=y&RT=1&Layers=30&Filters=n,y,n,n&F2.1=0&F2.2=0&BBox=-14338616,5395963,-12562831,6503994.

Table 4. Existing Permit - Effluent Limits and Monitoring Requirements

Parameter	Effluent Limitations				Monitoring Requirements		
	Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Percent Removal[3]	Sample Location	Sample Frequency	Sample Type
Flow, mgd	Report	---	Report Max. Daily Value	---	Effluent	Continuous	Recording
Biochemical Oxygen Demand (BOD_5)	30 mg/l	45 mg/l	---	85% (Min.)[3]	Influent and Effluent	1/week	24-hour composite
	100 lb/day	150 lb/day	---				Calculation[2]
Total Suspended Solids (TSS)	30 mg/l	45 mg/l	---	85% (Min.)[3]	Influent and Effluent	1/week	24-hour composite
	100 lb/day	150 lb/day	---				Calculation[2]
Fecal Coliform Bacteria[1]	200/100 mL	400/100 mL	---	---	Effluent	3/week	Grab
pH	Within the range of 6.0 to 9.0				Effluent	5/week	Grab
Total Ammonia as N, mg/l[5]	Report[5]	---	Report Max. Daily Value[5]	---	Effluent	1/quarter	24-hour composite
Alkalinity, mg/l as $CaCO_3$	Report	---	Report Max. Daily Value	---	Effluent	1/year	Grab
Temperature, degrees C	Report	---	Report Max. Daily Value	---	Effluent	2/week[6]	Grab
NPDES Application Form 2A Effluent Testing Data[4]	See Part I.B. 9 of the existing permit				Effluent	3/5 years	See Footnote 4

Footnotes

1. The Average Monthly Limit and the Average Weekly Limit for Fecal Coliform are based on the Geometric Mean in organisms/100mL. If any value used to calculate the geometric mean is less than 1, the permittee must round that value up to 1 for purposes of calculating the geometric mean.

2. Loading is calculated by multiplying the concentration in mg/L by the average daily flow for the day of sampling in mgd and a conversion factor of 8.34. If the concentration is measured in µg/L, the conversion factor is 0.00834. For more information on calculating, averaging, and reporting loads and concentrations see the NPDES Self-Monitoring System User Guide (EPA 833-B-85-100, March 1985).

3. Percent removal is calculated using the following equation: ((influent - effluent) / influent) x 100

4. For Effluent Testing Data, in accordance with instructions in NPDES Application Form 2A, Part B.6 and where each test is conducted in a separate permit year during the permitted discharge period, specifically for each of the first three years of the permit

5. The maximum ML for Total Ammonia is 0.05 mg/l.

6. Preferably temperature to be measured during the warmest period of the day.

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
Parameters with Effluent Limits							
Biochemical Oxygen Demand (BOD_5) [1]	mg/L	30	45	--	Influent and Effluent	1/week	24-hour composite
	lbs/day	100	150	--			Calculation[1]
BOD_5 Percent Removal [2]	%	85 (minimum)	--	--	--	1/month	Calculation[2]
Total Suspended Solids (TSS) [1]	mg/L	30	45	--	Influent and Effluent	1/week	24-hour composite
	lbs/day	100	150	--			Calculation[1]
TSS Percent Removal [2]	%	85 (minimum)	--	--	--	1/month	Calculation[2]
Fecal Coliform [3] Bacteria	CFU/ 100 mL	200	400	--	Effluent	3/week	Grab
pH	std units	Between 6.0 – 9.0			Effluent	5/week	Grab
		Report Parameters					
Flow	mgd	Report	--	Report	Influent and Effluent	continuous	Meter
Total Ammonia	mg /L as N	Report	--	Report	Effluent	1/month	24-hour composite
Enterococci Bacteria	CFU or MPN per 100 mL	Report	---	Report	Effluent	3/week	Grab
Nitrate + Nitrite	mg/L as N	Report	--	Report	Effluent	1/month	24-hour composite
Total Kjeldahl Nitrogen	mg/L as N	Report	--	Report	Effluent	1/month	24-hour composite
Temperature[4]	ºC	Report	--	Report	Effluent	2/week	Grab
Alkalinity	mg/L as $CaCO_3$	Report	--	Report	Effluent	1/year	Grab
Dissolved Oxygen	mg/L	Report		Report	Effluent	1/month	Grab
Effluent Testing for Permit Renewal							
Permit Application Effluent Testing Data[5]	--				Effluent	1/year	--
Notes (refer to sections in the permit)							

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type

1. Loading (in lbs/day) is calculated by multiplying the concentration (in mg/L) by the corresponding flow (in mgd) for the day of sampling and a conversion factor of 8.34. For more information on calculating, averaging, and reporting loads and concentrations see the *NPDES Self-Monitoring System User Guide* (EPA 833-B-85-100, March 1985).
2. Percent Removal. 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 using the following equation: (average monthly influent concentration – average monthly effluent concentration) ÷ average monthly influent concentration x 100. Influent and effluent samples must be taken over approximately the same time period.
3. The average monthly Fecal Coliform bacteria counts must not exceed a geometric mean of 200/100 mL (Average Weekly Limit), and 400/100mL (Average Monthly Limit) based on a minimum of five samples taken every 3 - 7 days within a calendar month. See Part VI of this permit for a definition of geometric mean. The Department of Ecology provides directions to calculate the monthly and weekly geometric mean in publication No. 04-10-020, Information Manual for Treatment Plant Operators available at: https://fortress.wa.gov/ecy/publications/documents/0410020.pdf.
4. Temperature to be measured during the warmest period of the day.
5. Effluent Testing Data - See NPDES Permit Application Form 2A, Tables A and B for the list of pollutants to be included in this testing. The Permittee must use sufficiently sensitive analytical methods in accordance with Part I.B.4 of the permit. Monitoring results shall be reported in the January DMR of the following year.

Differences Between the Existing and Proposed Permit Limits

The Draft Permit proposes the same effluent limits as the existing permit.

Differences Between the Existing and Proposed Monitoring Requirements

To evaluate nutrient data for the next permit cycle:

- 3 new parameters added: Nitrate plus Nitrite (1/month), Total Kjeldahl Nitrogen (1/month), Dissolved Oxygen (1/month).
- Revised monitoring schedule: Ammonia (from 1/quarter to 1/month).

To evaluate hydraulic needs:

- Influent flow rate added (continuous metering).

Enterococci Bacteria monitoring:

- Monitoring for Enterococci Bacteria added (3/week) beginning upon the effective date of the permit.

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 limits or water quality-based limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the WQS applicable to a waterbody are being met and may be more stringent than technology-based effluent limits.

B. Pollutants of Concern

Pollutants of concern are those that either have technology-based limits or may need water quality-based limits. The EPA identifies pollutants of concern for the discharge based on those which:

- Have a technology-based limit
- Have an assigned wasteload allocation (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 and DMR and any special studies
- Are expected to be in the discharge based on the nature of the discharge

Pollutants expected in the discharge from a facility with this type of treatment, include but are not limited to: five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS), fecal coliform bacteria, pH, ammonia, temperature, and dissolved oxygen (DO).

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

- BOD_5
- DO
- TSS
- Fecal Coliform bacteria
- Enterococci bacteria
- pH
- Temperature
- Ammonia
- Nitrate plus Nitrite and TKN

C. Technology-Based Effluent Limits

Federal Secondary Treatment Effluent Limits

The CWA requires POTWs to meet performance-based requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," which POTWs were required to meet by July 1, 1977. The EPA has developed and promulgated "secondary treatment" effluent limitations, which are found in 40 CFR 133.102. These technology-based effluent limits 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		

Mass-Based Limits

The federal regulation at 40 CFR 122.45(f) requires that effluent limits be expressed in terms of mass, except under certain conditions. The regulation at 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 (lb/day) = concentration limit (mg/L) × design flow (mgd) × 8.34[4]

Since the design flow for this facility is 0.40 mgd, the technology-based mass limits for BOD_5 and TSS are calculated as follows:

Average Monthly Limit = 30 mg/L × 0.40 mgd × 8.34 = 100 lbs/day

Average Weekly Limit = 45 mg/L × 0.40 mgd × 8.34 = 150 lbs/day

Ecology's TBEL for Fecal Coliform

Ecology's regulations at WAC 173-221-040, Domestic Wastewater Discharge Standards, provided the following technology-based treatment standards for fecal coliform: Fecal coliform limits shall not exceed a monthly geometric mean of 200 organisms per 100mL and a weekly mean of 400 organisms per 100mL.

Washington State General Criteria for Recreation

Ecology's regulations at WAC 173-201A-216(3)(a) describes narrative general criteria for the protection of recreational uses, referencing WAC173-201A-260(2)(a) and (b) concerning toxic, radioactive, and deleterious materials, and for aesthetic values. To comply with this criteria, the Draft Permit requires that the permittee must not discharge floating, suspended, or submerged matter of any kind in concentrations causing nuisance or objectionable conditions or that may impair designated beneficial uses. The EPA normally would also require the permittee to perform visual monitoring to ensure compliance with this criteria. However, due to the location of the submerged outfall at 43.4 feet below MLLW, and at a long distance from shore, that regular visual monitoring of the outfall is impractical and is therefore not required in the Draft Permit.

D. Water Quality-Based Effluent Limits

Statutory and Regulatory Basis

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet WQS. Discharges to State or Tribal waters must also comply with limitations imposed by the State or Tribe as part of its certification of NPDES permits under section 401 of the CWA. The NPDES regulation 40 CFR 122.44(d)(1) implementing Section 301(b)(1)(C) of the CWA 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 water quality standard, 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

[4] 8.34 is a conversion factor with units (lb ×L)/(mg × gallon×10^6)

originates, which may include downstream States (40 CFR 122.4(d), 122.44(d)(4), see also CWA Section 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 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 WQS are met and must be consistent with any available wasteload allocation for the discharge in an approved TMDL. In this case because there are no approved TMDLs that specify wasteload allocations for this discharge.

Reasonable Potential Analysis and Need for Water Quality-Based Effluent Limits

The 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, the 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 water quality-based effluent limit must be included in the permit.

Mixing Zone/Dilution Analysis

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.

Washington State Regulations

The receiving water body is considered "estuarine" for purposes of determining the size of a mixing zone. This position is supported by Washington State regulations, WAC 173-201A-400(7)(b)(ii), which states that the Puget Sound proper is considered to be entirely estuarine.

WAC 173-201A-240(b) states that in estuarine waters, a zone where acute criteria may be exceeded shall not extend beyond ten percent of the distance established in subsection (7)(b) of this section as measured independently from the discharge port(s).

For the Chronic Criteria, pertaining to the estuarine designation, in WAC 173-201A-240(7)(b)(i), the mixing zone shall, "Not extend in any horizontal direction from the discharge port(s) for a distance greater than two hundred feet plus the depth of water over the discharge port(s) as measured during mean lower low water".

The facility's permit application indicates that the depth of water is 44 feet. The 2008 Fact Sheet clarified that the water depth was 43.4 feet below MLLW. Given that the depth to the sea-floor is approximately 44 feet, the depth of the diffuser port would be approximately 43.4 feet, which would account for the outfall pipe's thickness (to the mid-point of the 12-inch pipe and thickness of fastening ties). Therefore, the depth of the discharge is approximated at 43.4 feet.

WAC 173-201A-400(7)(b)(i) defines the chronic mixing zone for estuarine receiving waters. The mixing zone is determined by adding 200 feet to the depth of water over the discharge port as measured during Mean Lower Low Water (MLLW). Accordingly, it is determined that the size of the mixing zone is 243.4 feet for the Chronic Criteria. Pertaining to WAC 173-201A-240(b), for the acute criteria, the size of the mixing zone is 10%, which calculates to 24.3 feet. The EPA used these site specific parameters to determine dilution ratios, and reasonable potential calculations as shown in the appendices.

In developing the 2008 Permit conditions, the EPA modeled the mixing zones using Visual Plumes. Because the facility's design flow and marine outfall are unchanged, and, Washington's mixing zone criteria are also unchanged, EPA has retained the Visual Plumes analysis as it is still applicable to determine the acute and chronic dilution factors.

The mixing zone analysis predicted the following dilution factors:
Acute Mixing Zone dilution factor: 102
Chronic Mixing Zone dilution factor: 290

The mixing zone water quality standard requires the State to authorize mixing zones. The EPA used Washington's mixing zone water quality standard to determine the size of the mixing zone; however, the EPA does not have the authority to use a mixing zone if Ecology does not provide for the mixing zone in its CWA 401 Certification. Therefore, if Ecology does not provide a mixing zone or provides different dilution factors in the CWA 401 Certification of this permit, the EPA will recalculate reasonable potential analysis and water quality based effluent limits accordingly based on the dilution provided in the CWA 401 certification.

The 2008 Visual Plumes analysis is as follows:

The EPA modeled the dilution at the edges of the acute and chronic mixing zones using site-specific conditions using a Visual Plumes model. Visual Plumes (4th Edition) uses a series of dilution equations based on characteristics of the wastewater effluent and ambient receiving water to determine the physical dispersion of pollutants. For the purpose of the Suquamish WWTP NPDES permit, the UM3 (Three-Dimensional Updated Merge) model version of Visual Plumes was used. UM3 uses a Lagrangian approach which incorporates the presence of ambient current into the model. Effluent parameters for the model include design flow rate, temperature, salinity, and information on the diffuser, including the depth of the diffuser and the number of ports and their sizes, spacing, and angle-orientation. The ambient receiving water characteristics required by the model include temperature, current speed and current direction. The model enables users to model site-specific circumstances, and calculate the acute and chronic mixing zone dilution ratios.

A Brooks Farfield model approach was included in the estimation because the plume had reached the surface water before the chronic distance could be reached.

In 2008, Ecology evaluated the National Oceanic and Atmospheric Administration (NOAA) bathymetry shape file which indicated that the depths towards Port Madison are in the order of 120 feet just past the diffuser, while the depth of Agate Passage is in the order of 20 feet. By comparison, the diffuser is located is at 43.4 feet below surface. In an e-mail to NOAA on

October 15, 2007, the EPA asked NOAA for clarification on current speeds. On October 16, 2006, William Watson of NOAA responded with the following response in an e-mail to the EPA: "At this location it appears that the water column is too erratic with minimum speed passing through all points and indefinite to detect. To place a value in speed and direction will be suspect." Given the information, and the need to use a numeric value for modeling purposes, the EPA determined that a 2 cm/s current speed would be considered weak, and the assumed general direction would be towards the main water-body of Puget Sound away from Port Madison Bay. The EPA believes that this interpretation of a small current speed is consistent with NOAA's qualitative description and the assumed numerical small current speed of 2 cm/s may predict very conservative dilution calculations for purposes of evaluating reasonable potential to exceed WQS.

The diffuser at the WWTP has 4 ports, in 3 different sizes, and where there are 2 grouping of 2 ports per group. The EPA understands from the Washington Department of Health's letter to Washington Department of Ecology (June 17, 1993) that the total port area is 94 square inches. Due to the orientation of the ports, for the purposes of modeling the plume from the diffuser, conservative assumptions were applied to simplify the model. The actual diffuser has two groups of two ports each. For the model, two ports were assumed to be each 7.74 inches in diameter which had a total port area of 94 square inches. Because 2 larger ports were assumed in the model rather than 4 smaller ports, it is expected that the result would yield a slightly smaller dilution ratio, which is considered conservative for purposes of calculating reasonable potential to exceed water quality criteria. For the model, assumptions made for at various depths of the water column were taken from Washington Department of Ecology's actual field data collected in August 8, 1995 and August 4, 1992. The values used in the model were averaged from actual values. Also assumed was the distance between ports is 10 feet. Current speed was assumed to be 2 cm/s for both near field and far field scenarios, and the effluent temperature used was 18 degrees C, which was then the average daily value in summer as reported in the permit application.

In 2008, Ecology recommended that separate models be computed for the acute scenario and for the chronic scenario. Ecology recommended using the flow rate of 0.6 mgd for modeling the acute scenario, which was the maximum daily flow rate reported in the permit application. Ecology currently uses the value representing the maximum average monthly flow for modeling the chronic and human health criteria. The maximum average monthly flow was 0.4836 mgd from July 2008 to November 2018. Since it is more conservative to use the higher value of 0.6 mgd than the lower value of 0.4836 mgd, the EPA is reusing the 2008 model with a flow rate of 0.6 mgd to model the acute scenario.

Ecology believed that it was acceptable to model the chronic scenario using 0.4 mgd which is the sustainable design flow rate of the plant. Using the UM3 model and the 4/3 Power Law, the model predicted the following dilution factors in Tables C-1 and C-2.

Acute Mixing Zone dilution factor:	102
Chronic Mixing Zone dilution factor:	290

The analyses and computations of the above acute and chronic dilution factors were reviewed by Ecology for the 2008 permit, and the EPA believes the predicted dilution factors are conservative for determining if there is reasonable potential to exceed Washington WQS.

The equations used to conduct the reasonable potential analysis and calculate the water quality-based effluent limits are provided in Appendix D. Ecology intends on including the same mixing zones as the previous permit which would result in the same acute and chronic dilution factors. If Ecology's policy changes, the EPA would have to determine if those changes would result in different effluent limits.

Reasonable Potential and Water Quality-Based Effluent Limits

The reasonable potential and water quality-based effluent limit for specific parameters are summarized below. The calculations are provided in Appendix D.

Ammonia

Analysis of the ammonia effluent ammonia data were based on 126 samples, and with the maximum daily discharge of 34.1 mg/L reported in May 2010. A reasonable potential analysis was conducted and determined that ammonia had no reasonable potential to exceed Washington State's WQS.

In Washington State's WQS, the criteria concentrations based on total ammonia for marine water can be found in EPA guidance, Ambient Water Quality Criteria for Ammonia (Saltwater)5 – 1989, EPA440/5-88-004. April, 1989.

The calculated values from the spreadsheet, Table B-4, are: acute criteria of 6.77 mg/l, and chronic criteria of 1.02 mg/l. These criteria values were used to determine reasonable potential to exceed Washington State WQS. For ambient ammonia level, the EPA used the 90^{th} percentile concentration of the ambient receiving water of 34 ug/l, consistent with the background concentration that Ecology had used in its 2015 NPDES Permit for the nearby Kingston Wastewater Treatment Plant which also discharges into Puget Sound.

Using the EPA modified spreadsheet from Ecology that accounts for 99% confidence level and 99% probability basis, there is no reasonable potential to exceed water quality criteria. The calculation for the ammonia criteria is shown below.

[5] http://www.epa.gov/waterscience/pc/ambientwqc/ammoniasalt1989.pdf

Table 7. Marine Un-ionized Ammonia

Marine Un-ionized Ammonia Criteria Calculation

Calculation of seawater fraction of un-ionized ammonia from Hampson (1977). Un-ionized ammonia criteria for salt water are from EPA 440/5-88-004. Revised 19-Oct-

INPUT	
1. Receiving Water Temperature, deg C (90th percentile):	15.0
2. Receiving Water pH, (90th percentile):	8.1
3. Receiving Water Salinity, g/kg (10th percentile):	29.9
4. Pressure, atm (EPA criteria assumes 1 atm):	1.0
5. Unionized ammonia criteria (mg un-ionized NH_3 per liter) from EPA 440/5-88-004:	
Acute:	0.233
Chronic:	0.035
OUTPUT	
Using mixed temp and pH at mixing zone boundaries?	No
1. Molal Ionic Strength (not valid if >0.85):	0.614
2. pKa8 at 25 deg C (Whitfield model "B"):	9.316
3. Percent of Total Ammonia Present as Unionized:	2.8%
4. Total Ammonia Criteria (mg/L as NH_3):	
Acute:	8.23
Chronic:	1.24
RESULTS	
Total Ammonia Criteria (mg/L as N)	
Acute:	**6.77**
Chronic:	**1.02**

Data source: Agate Pass North End, Location ID: KCHD-AG01

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. Since there are no reasonable potential for ammonia to exceed the WQS, effluent limits are not required. Monitoring for ammonia is proposed to generate data for evaluation with the next permit cycle.

pH

The Washington water quality criterion for Extraordinary quality marine water specifies a pH range of 7.0 to 8.5 standard units, with human-caused variation within the above range of less than 0.2 units (WAC 173-201A-210(1)(f)). In the previous permit, the technology-based limit allowed the range of pH from 6.0 s.u. to 9.0 s.u. The DMRs from the last permit cycle, the facility reported the effluent having a pH range from 6.5 s.u. (minimum) to 7.6 s.u. (maximum).

The EPA conducted reasonable potential analysis that demonstrated that compliance with the technology-based limits of 6.0 to 9.0 standard units will assure compliance with the WQS of surface waters because of the high buffering capacity of marine water. The impact of effluent pH on the receiving water was modeled and confirms compliance with the WQS using

calculations developed by Lewis and Wallace, 1988, and the chronic dilution factor tabulated below. As shown in Appendix D, there is no reasonable potential to exceed WQS, accordingly, the permit retains technology-based pH limits.

Temperature

In WAC 173-201A-210(1)(c), the Washington water quality criteria limit the ambient water temperature to 13.0ºC (1-day Maximum) for Extraordinary Quality marine water; when natural conditions exceed 13.0°C , no temperature increases will be allowed which will raise the receiving water temperature by greater than 0.3°C.

The highest ambient temperature of water in Port Madison Bay from Ecology's monitoring station on August 8, 1995 is 15°C. The highest temperature of the effluent as reported in the DMRs is 23°C.

As shown in Appendix D, EPA conducted a reasonable potential to exceed Ecology's WQS. Since the ambient temperature increase in the receiving water is predicted to be 0.03°C, which is significantly less than 0.3°C, there is no potential to violate Washington State's WQS for temperature; therefore, no effluent limit for temperature is warranted. Effluent temperature monitoring is proposed for the draft permit for comparison with past effluent, and to obtain data for potential future effluent modeling purposes.

BOD_5 and Dissolved Oxygen (DO)

The facility met its permit limits for BOD_5 during the last permit cycle. Based on the Federal Secondary Treatment Standards, the facility is required to meet an Average Monthly Limit of 30 mg/l, and an Average Weekly Limit of 45 mg/l. During the last permit cycle, the facility had the highest Average Monthly limit of 13.3 mg/l, and the highest Average Weekly Limit of 22.3 mg/l, which are both well under the permitted limits. The Federal Secondary Treatment Standards for BOD_5 are proposed to be retained for the next permit cycle.

Natural decomposition of organic material in wastewater effluent impacts dissolved oxygen in the receiving water at distances far outside of the regulated mixing zone. The BOD_5 of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water.

Nitrate plus Nitrite Nitrogen, and TKN

To better understand any possible impacts from the WWTP, the draft permit requires monthly monitoring for these nitrogen compounds: Nitrate plus Nitrite Nitrogen, and TKN. The data generated will be used to determine during the next permit cycle if permit limits are necessary to reduce nutrients from this WWTP for the next permit. In addition, the data will be used to inform the Puget Sound Nutrient Source Reduction Project.

Fecal Coliform (Shellfish Harvesting)

In WAC 173-201A-210-(2)(b) the Washington water quality criteria for Shellfish Harvesting requires that the fecal coliform levels shall not exceed both a geometric mean of 14 colonies/100mL and not have more than 10 percent of all samples obtained for calculating

the geometric mean value exceeding 43 colonies/100mL. These criteria are to be met at the edges of the mixing zone.

Based on the facility's DMRs for fecal coliform (from July 2008 to November 2018), the effluent's 95th percentile of the monthly average was 6 colonies/100mL (see Appendix B).

The EPA conducted a simple mixing analysis to predict fecal coliform levels at the edge of the mixing zone under critical conditions while discharging at the technology-based limit of 400 colonies per 100 mL. The predicted fecal coliform count at the edge of the Chronic mixing zone is 3 organisms/100mL, which is below the fecal WQS for Shellfish Harvesting of 14 organisms/100mL. (see Appendix D). In sum, under critical conditions, modeling predicts no violation of the water quality criterion for fecal coliform. Therefore, the proposed permit retains Ecology's technology-based effluent limit[6] for fecal coliform bacteria. Accordingly, fecal coliform limits shall not exceed a monthly geometric mean of 200 organisms/100mL and a weekly geometric mean of 400 organisms/100mL.

In addition to the Fecal Coliform effluent limits described above, the Draft Permit also includes reporting for the Shellfish Program in the event of unauthorized discharges such as collection system overflows, plant bypasses, or failure of disinfection system. These conditions would require immediate reporting by telephone to EPA's NPDES Compliance Hotline at (206) 553-1846, to the Washington State Department of Ecology, to the Kitsap Public Health District at (360)728-22235, and to the Washington State Department of Health, Shellfish Program. The Department of Ecology's Northwest Regional Office 24-hour number is (425) 649-7000, and the Department of Health's Shellfish Program office number is (360)236-3330 during normal working hours and (360) 789-8962 outside normal working hours.

Enterococci Bacteria and Fecal Coliform (Primary Contact Recreation)

On January 23, 2019, Ecology adopted amendments to Chapter 173-201A WAC to update fresh and marine WQS for the protection of water contact recreational uses in state waters. This included new bacterial indicators and numeric criteria based on enterococci bacteria instead of fecal coliform for marine waters. The EPA approved the new numeric standards on April 30, 2019.

The WQS update includes a transition period to phase out the fecal coliform criteria, which will expire December 31, 2020. Accordingly, the use of fecal coliform levels to determine compliance will expire December 31, 2020, and from January 1, 2021 onwards, only the new Enterococci bacteria WQS will apply. The criteria to protect primary contact recreation in marine waters are provided below[7].

Bacterial Indicator	Criteria
Fecal coliform Expires 12/31/2020	Fecal coliform organism levels must not exceed a geometric mean value of 14 colonies/100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 43 colonies per 100 mL

[6] WAC 173-221-040, Domestic Wastewater Facility Discharge Standards
[7] WAC 173-201A-210 (3), Recreational Uses in Marine Waters, and Table 210(3)(b)

Enterococci	Enterococci organism levels within an averaging period must not exceed a geometric mean value of 30 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample values exist) obtained within the averaging period exceeding 110 CFU or MPN per 100 mL

Ecology did not revise the technology-based effluent limits for fecal coliform with the recreational WQS update. The technology-based effluent limits state that fecal coliform limits shall not exceed a monthly geometric mean of 200 organisms/100 milliliters (mL), and a weekly geometric mean of 400 organisms per 100 mL. [8]

The EPA evaluated the WWTP effluent concentration with respect to the existing and updated bacteria criteria. The EPA modeled the fecal coliform levels in the effluent using a simple mixing analysis under critical conditions, with the facility discharging at the fecal coliform technology-based limit of 400 organisms per 100 ml with a dilution factor of 290. Under critical conditions, modeling predicts no violation of the water quality criterion for fecal coliform, see Appendix D. In the draft permit, the EPA is proposing to retain the existing technology-based effluent limit for fecal coliform bacteria.

The permit requires monitoring for both fecal coliform and enterococci. Effluent limits are not proposed for enterococci at this time. In retaining the existing technology-based effluent limits for fecal coliform, the treatment train includes disinfection and as a result there should be no reasonable potential to exceed water quality criteria for either indicator bacteria at the edge of the mixing zone. The effective date of the proposed permit will start before the sunset date (12/31/2020) of the existing fecal coliform recreational standard. Thus, it is appropriate for the EPA to determine reasonable potential to exceed the fecal coliform criteria. In addition, there are no monitoring data for the facility for enterococci, thus it is not possible to develop a correlation between fecal coliform levels and enterococci levels. Dual indicator monitoring will be a part of this permit so that a site-specific correlation can be developed during the permit cycle. The EPA will use this data to assess the reasonable potential to exceed the applicable water quality criterion in the next iteration of this permit.

E. Antibacksliding

Section 402(o) of the Clean Water Act and federal regulations at 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 antibacksliding exceptions refer to Chapter 7 of the Permit Writers Manual *Final Effluent Limitations and Anti-backsliding.*

An anti-backsliding analysis was done for the draft permit. Since all the proposed effluent limits are as stringent as the previous permit, the draft permit complies with the antibacksliding provisions.

[8] WAC 173-221-040, Domestic Wastewater Facility Discharge Standards

V. Monitoring Requirements

A. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 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 the NPDES Form 2A application, so that these data will be available when the permittee applies for a renewal of its NPDES permit.

The permit also requires the permittee to perform effluent monitoring required by Tables A and B of 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 the EPA.

B. 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 the EPA-approved test methods (generally found in 40 CFR 136) or as specified in the permit.

C. Outfall 001 Evaluation Report

The draft permit requires the facility shall inspect the submerged portion of the outfall pipe and diffuser to document its integrity and continued function, to confirm and verify the outfall coordinates and provide an inspection video. The inspection shall evaluate the structural condition of the submarine portion of the outfall, determine whether portions of the outfall are covered by sediments, and determine whether all diffuser ports are flowing freely. The facility must also perform a dye test to determine the structural integrity of the submarine outfall pipe. Photographic verification shall be included in the report. A brief report of this inspection shall be submitted to the EPA, together with next permit application.

D. 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.

VI. Sludge (Biosolids) Requirements

The EPA Region 10 separates wastewater and sludge permitting. The EPA has authority under the CWA to issue separate sludge-only permits for the purposes of regulating biosolids. The 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.

VII. Other Permit Conditions

A. Quality Assurance Plan

The facility is required to review and update the Quality Assurance Plan as needed within 180 days of the effective date of the final permit. The Quality Assurance Plan must include 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 be made available to the EPA or the PMR upon request.

B. Operation and Maintenance Plan

The permit requires the facility 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 review and update as needed the operation and maintenance plan for their facility within 180 days of the effective date of the final permit. The plan must be retained on site and made available to the EPA or the PMR 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 the 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 the 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 the 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 the 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, the 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. The EPA used a nationally consistent geospatial tool 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 WWTP is not located within or near a Census block group that is potentially overburdened. Accordingly, the draft permit does not include any additional conditions to address environmental justice.

Regardless of whether a WWTP is located near a potentially overburdened community, the 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. This provision requires the permittee to compare influent flow to the facility's design flow 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 three consecutive months.

F. Pretreatment Requirements

The permittee does not have an approved state pretreatment program per 40 CFR 403.10, thus, the EPA is the Approval Authority for this WWTP. Since the Suquamish Wastewater Treatment Plant does not have an approved POTW pretreatment program per 40 CFR 403.8, the EPA is also the Control Authority of industrial users that might introduce pollutants into the Suquamish Wastewater Treatment Plant.

Special Condition in Part II.E. of the permit reminds the Permittee that it cannot authorize discharges which may violate the national specific prohibitions of the General Pretreatment Program.

The Permittee must develop the legal authority enforceable in Federal, State or local courts which authorizes or enables the POTW to apply and to enforce the requirement of sections 307 (b) and (c) and 402(b)(8) of the Clean Water Act, 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. The 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. The legal authority must be adopted and enforced by the POTW. The 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).

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

G. Standard Permit Provisions

Sections III, IV and V of the draft permit 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.

VIII. Other Legal Requirements

A. Endangered Species Act

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and the U.S. Fish and Wildlife Service (USFWS) (i.e. the Services) if their actions could beneficially or adversely affect any threatened or endangered species. As documented in the Biological Evaluation (BE), a review of the threatened and endangered species located in the vicinity of the discharge finds

that the permit is **Not Likely To Adversely Affect** ESA species. The EPA is seeking concurrence from the Services on this 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 the EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect EFH (i.e., reduce quality and/or quantity of EFH). A review of the Essential Fish Habitat documents shows that the draft permit would **Not Likely To Adversely Affect** 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.

C. Antidegradation

The EPA has completed an antidegradation analysis and finds that it is consistent with the State's WQS and the State's antidegradation implementation procedures.

D. Permit Expiration

The permit will expire five years from the effective date.

IX. References

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control.* US Environmental Protection Agency, Office of Water, EPA/505/2-90-001.

https://www3.epa.gov/npdes/pubs/owm0264.pdf

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

EPA. 2010. *NPDES Permit Writers' Manual.* Environmental Protection Agency, Office of Wastewater Management, EPA-833-K-10-001. September 2010. https://www3.epa.gov/npdes/pubs/pwm_2010.pdf

EPA, 2007. *EPA Model Pretreatment Ordinance*, Office of Wastewater Management/Permits Division, January 2007.

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

EPA. 2014. Water Quality Standards Handbook Chapter 5: General Policies. Environmental Protection Agency. Office of Water. EPA 820-B-14-004. September 2014. https://www.epa.gov/sites/production/files/2014-09/documents/handbook-chapter5.pdf

Washington State Department of Ecology, 2015. Final *Fact Sheet for NPDES Permit WA0032077, Kingston Wastewater Treatment Plant, September 30, 2015.* https://apps.ecology.wa.gov/paris/PermitDocumentSearch.aspx?PermitNumber=WA0032077

Appendix A. Facility Information

Figure A-1: Location Map - Suquamish Wastewater Treatment Plant

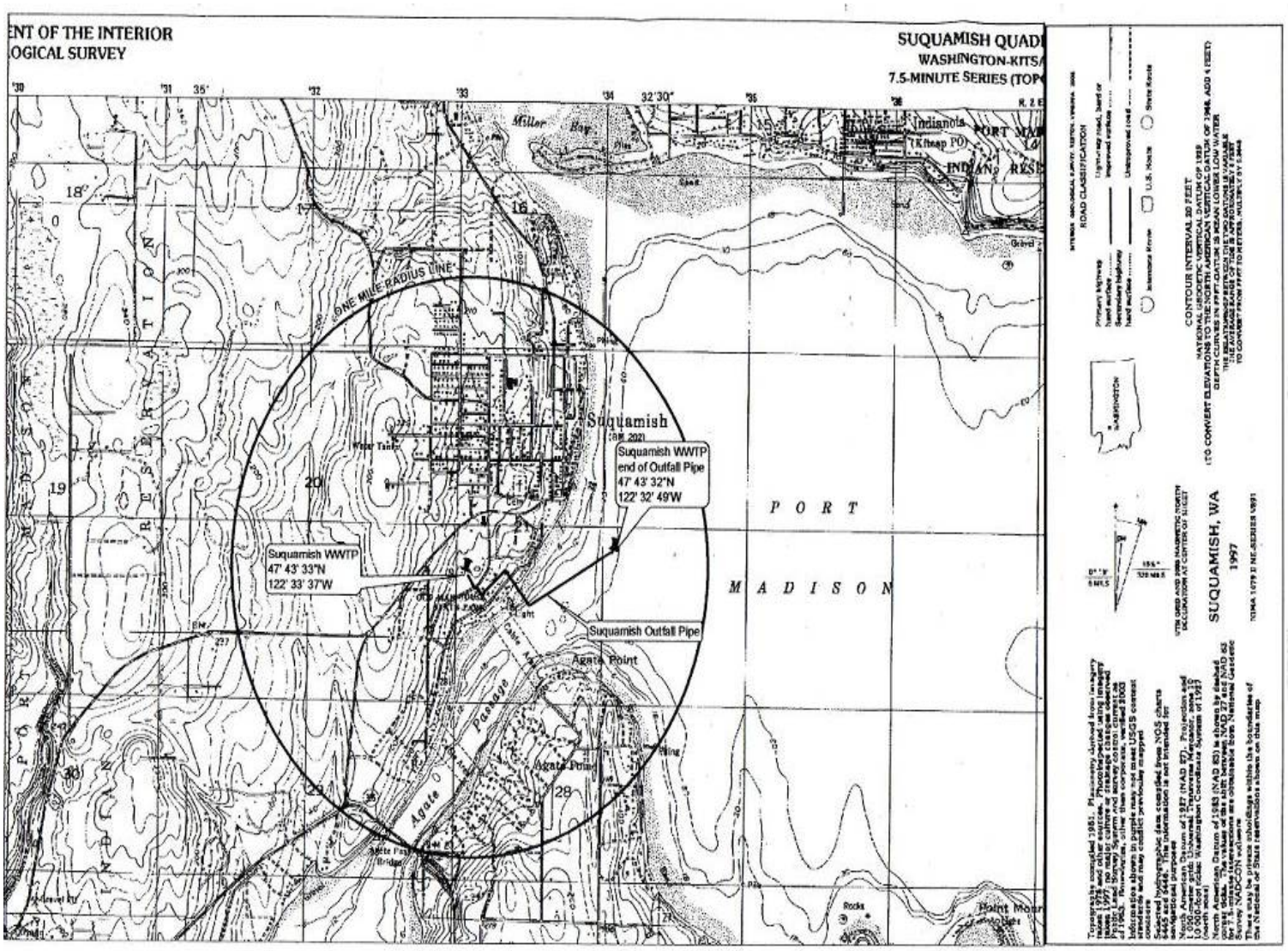


Figure A-2: Suquamish Wastewater Treatment Plant - Flow Schematic Diagram

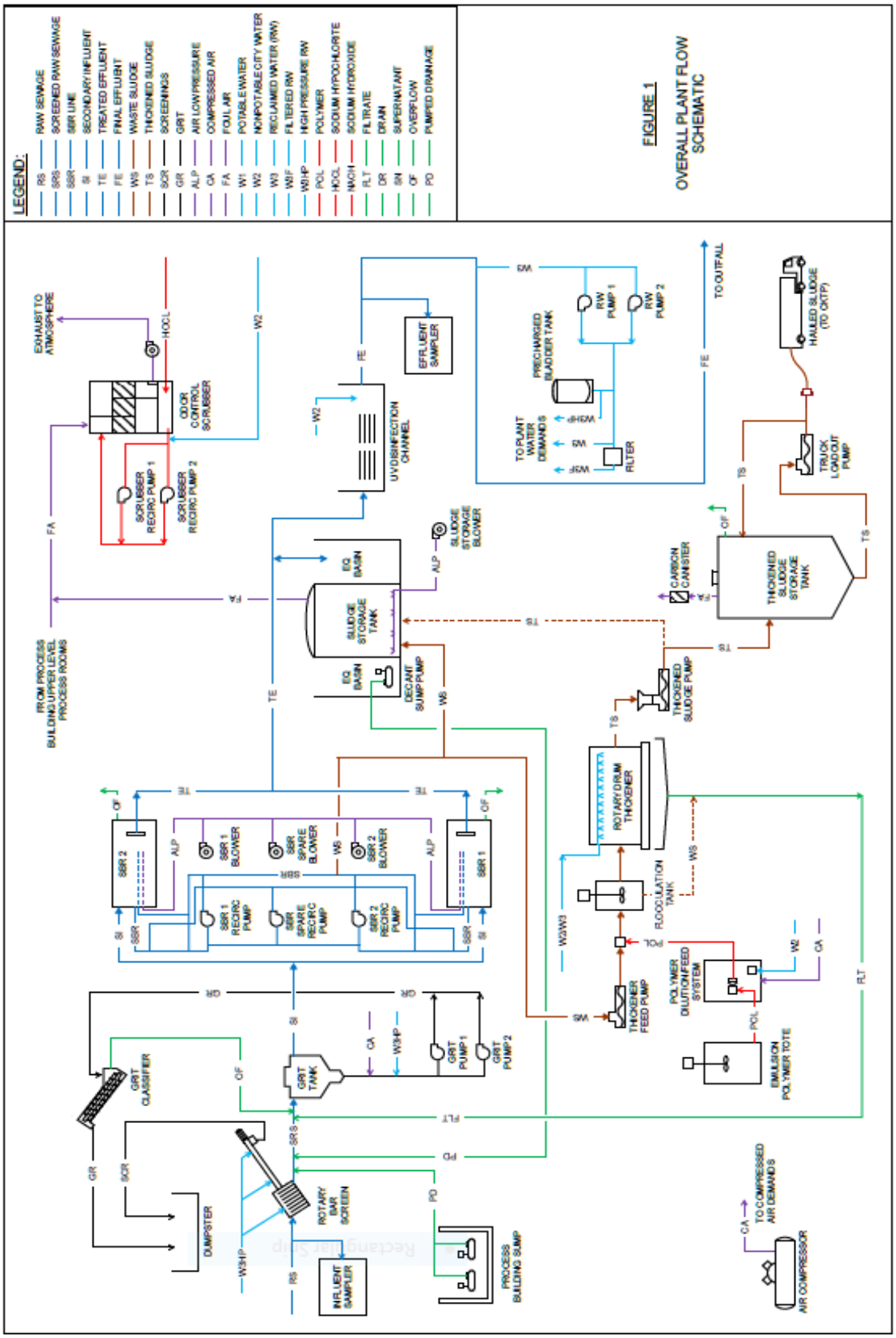
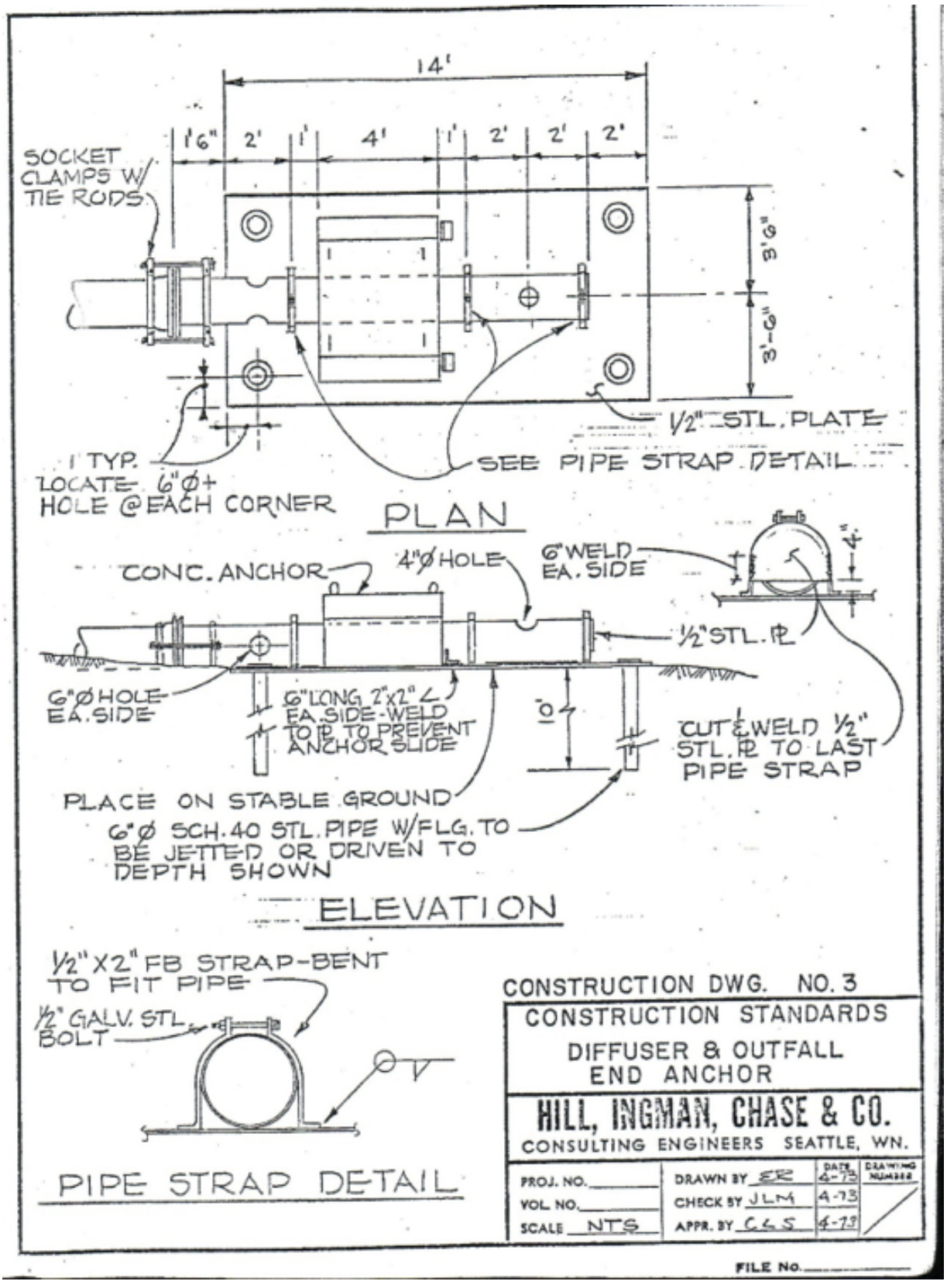


Figure A-3: Diagram of the Outfall Diffuser



Appendix B. Water Quality Data

A. Summary of DMR Data

Date	Effluent Gross Flow, in conduit or thru treatment plant Million Gallons per Day DAILY MX	Effluent Gross Flow, in conduit or thru treatment plant Million Gallons per Day MO AVG	Effluent Gross BOD, 5-day, 20 deg. C Milligrams per Liter MO AVG	Effluent Gross BOD, 5-day, 20 deg. C Milligrams per Liter WKLY AVG	Effluent Gross BOD, 5-day, 20 deg. C Pounds per Day MO AVG	Effluent Gross BOD, 5-day, 20 deg. C Pounds per Day WKLY AVG	Percent Removal BOD, 5-day, percent removal Percent MN % RMV	Effluent Gross pH Standard Units DAILY MN	Effluent Gross pH Standard Units DAILY MX
6/1/2008	0.2201	0.1727	10	13.4	13.8	17.5	94.6	7.2	7.4
7/1/2008	0.1973	0.1655	4.2	5	5.5	6.8	98.5	7.1	7.3
8/1/2008	0.2196	0.1606	9.8	16.9	12	20.2	96.4	7.3	7.4
9/1/2008	0.2049	0.1583	6.2	7.8	7.8	9.8	97.8	7.3	7.4
10/1/2008	0.1917	0.15393	4.6	5.4	5.9	7	98.4	7.2	7.5
11/1/2008	0.2752	0.1939	5.9	7.6	9	11.6	97.7	7.2	7.6
12/1/2008	0.3269	0.186	5.6	7.3	8.7	15.6	98	7.1	7.4
1/1/2009	0.4294	0.2463	8.8	13.2	16.4	24.3	96	7.1	7.4
2/1/2009	0.2435	0.1992	8.3	12.9	12.8	19	96.3	7.2	7.3
3/1/2009	0.3054	0.2388	3.6	4.3	7.1	8.7	98.1	7.1	7.3
4/1/2009	0.3602	0.2541	4.1	4.5	8.2	8.9	97.7	7.1	7.3
5/1/2009	0.3442	0.2339	5	7.1	10.1	12.7	97.2	7.1	7.3
6/1/2009	0.2133	0.16	6.7	7.4	8.9	10.1	97.6	7.2	7.3
7/1/2009	0.2372	0.1688	6.2	7.1	8.1	9.6	97.7	7.2	7.4
8/1/2009	0.2293	0.1592	4.8	5.8	6	8.2	98.3	7.1	7.4
9/1/2009	0.1881	0.1537	4.3	5.8	5.2	6.8	98.4	7	7.2
10/1/2009	0.3191	0.1765	3.1	4	4.2	5.5	98.7	6.9	7.1
11/1/2009	0.6425	0.3614	2.7	3.5	8.6	13.7	97.8	6.8	7.1
12/1/2009	0.4332	0.2948	4.3	10.3	10.1	22.7	97.2	7	7.3
1/1/2010	0.7088	0.43	4.4	6.3	16.5	22.7	95.5	7	7.4
2/1/2010	0.4864	0.3289	3.5	4.8	9	11.2	97.9	7	7.3
3/1/2010	0.4447	0.2769	3.6	5.9	7.9	12	98.1	7.1	7.3
4/1/2010	0.4224	0.2655	3.6	5.9	7.5	12.1	98.1	7.1	7.4
5/1/2010	0.2894	0.2121	4.9	6	7.8	8.8	97.8	7.2	7.4
6/1/2010	0.3166	0.2247	13.3	22.3	23.1	37	93.8	7.2	7.5
7/1/2010	0.3219	0.1723	11.4	22.2	16.8	34.8	95.9	7.1	7.4
8/1/2010	0.2309	0.1641	4.8	7.5	6.5	10.5	98.3	7.2	7.5
9/1/2010	0.2001	0.1616	5.7	7.9	6.8	10.5	98	7.2	7.6
10/1/2010	0.2271	0.1755	4.3	4.6	6	6.6	98.3	7.1	7.3
11/1/2010	0.3095	0.2252	3.7	3.8	7	6.6		7.1	7.3
12/1/2010	0.7702	0.4263	5.4	6.6	19.9	31.7	94.6	7	7.3
1/1/2011	0.5498	0.3196	5.6	10.7	14	25.5	96.5	7.1	7.4
2/1/2011	0.4588	0.2854	3.5	5.1	8.8	12.9	97.9	7.2	7.4
3/1/2011	0.8149	0.4284	6.1	10.6	21.6	47.6	94.2	6.9	7.3
4/1/2011	0.4	0.2774	4	5.2	9	10.5	97.5	7.2	7.4
5/1/2011	0.3383	0.2355	4	5.5	7.5	10.9	97.8	7.1	7.4
6/1/2011	0.2341	0.1834	4.1	5.2	5.9	7.6	98.1	7.3	7.4
7/1/2011	0.2004	0.1662	3.7	6.7	4.9	9.1	98.6	7.3	7.5
8/1/2011	0.1935	0.1559	5	9.2	6.2	11	98	7	7.2
9/1/2011	0.1938	0.1524	3	3.5	3.6	4.1	98.9	7	7.2
10/1/2011	0.2002	0.1563	5.6	8.1	7.1	9.8	98.1	7	7.3
11/1/2011	0.6351	0.2276	4.1	5.4	7.3	13.2	98.2	7.1	7.3
12/1/2011	0.2683	0.2082	5	7.8	8.2	11.7	97.8	6.9	7.3
1/1/2012	0.6229	0.3112	5.1	7.7	13	27.7		6.8	7.3
2/1/2012	0.3515	0.2534	4.3	5	8.7	10.4	97.8	7.1	7.3
3/1/2012	0.5525	0.3199	4.2	6.1	10.3	17.9	97.1	7	7.3
4/1/2012	0.4028	0.2656	2.3	3.2	5.1	6.4	98.6	7	7.3
5/1/2012	0.2786	0.2032	5.2	5.9	8.4	11.3	97.7	6.9	7.3
6/1/2012	0.2347	0.1877	5.8	7.5	8.8	11.5	97.6	6.9	7.3
7/1/2012	0.2318	0.1741	3.6	5.5	4.7	7.7	98.7	6.9	7.4
8/1/2012	0.1971	0.1665	3.9	4.5	5	5.5	98.5	7	7.3
9/1/2012	0.2069	0.1594	3.7	4.5	4.5	5.3	98.7	7	7.3
10/1/2012	0.3791	0.165	3.6	5.3	4.9	9	98.7	7	7.3
11/1/2012	0.7975	0.3178	4.4	6.8	9.9	15.7	97.4	6.8	7.2
12/1/2012	0.8084	0.4836	4.8	10.9	19.2	44.2	94.8	6.7	7.1
1/1/2013	0.5749	0.3182	3	3.6	7.4	9.8	98.4	6.8	7.3
2/1/2013	0.3535	0.2502	4	4.4	8	8.6	97.7	6.8	7.1
3/1/2013	0.3117	0.2372	5.5	7	10	13.6	97.1	6.8	7.1
4/1/2013	0.32	0.2498	3.3	5.2	6.6	10.6	98	6.8	7.2
5/1/2013	0.2204	0.1894	7.4	11.4	11.1	16.5	97.7	7	7.2
6/1/2013	0.2198	0.175	4.8	6.5	6.8	8.3	98.1	6.9	7.2
7/1/2013	0.1986	0.167	4.3	5.7	5.5	7	98.6	6.9	7.2
8/1/2013	0.1869	0.1592	2.9	3.5	3.7	4.3	99	7	7.3
9/1/2013	0.2412	0.1635	4.1	4.4	5.4	7	98.5	7.1	7.3
10/1/2013	0.2096	0.1658			4.1	5.7	99	6.9	7.2
11/1/2013	0.2042	0.1738	2.9	3.5	4.2	4.9	98.8	6.9	7.2
12/1/2013	0.2126	0.1697	2.7	3	3.6	3.9	99.1	6.9	7.2

Date	Effluent Gross Flow, in conduit or thru treatment plant Million Gallons per Day DAILY MX	Effluent Gross Flow, in conduit or thru treatment plant Million Gallons per Day MO AVG	Effluent Gross BOD, 5-day, 20 deg. C Milligrams per Liter MO AVG	Effluent Gross BOD, 5-day, 20 deg. C Milligrams per Liter WKLY AVG	Effluent Gross BOD, 5-day, 20 deg. C Pounds per Day MO AVG	Effluent Gross BOD, 5-day, 20 deg. C Pounds per Day WKLY AVG	Percent Removal BOD, 5-day, percent removal Percent MN % RMV	Effluent Gross pH Standard Units DAILY MN	Effluent Gross pH Standard Units DAILY MX
1/1/2014	0.3846	0.2005	3.7	5.5	5.5	7	98.5	6.9	7.1
2/1/2014	0.5893	0.3127	3.4	4.6	8.7	13.8	97.9	6.8	7.1
3/1/2014	0.7536	0.4319	7.1	13.8	23.1	34.1	95	6.8	7.2
4/1/2014	0.3668	0.2639	4.5	8.1	9.5	15.8	97.4	6.9	7.2
5/1/2014	0.2949	0.2141	4.7	8.1	7.9	11.8	98.2	6.7	7.1
6/1/2014	0.221	0.1815	3.7	4.1	5.5	6.1	98.8	6.9	7.1
7/1/2014	0.2026	0.1714	4.2	6	5.8	8.2	98.6	6.9	7.5
8/1/2014	0.2069	0.1695	3.3	4.5	4.3	5.2	99	6.9	7.2
9/1/2014	0.2711	0.162	3.7	3.9	4.8	5.4	98.9	6.9	7.3
10/1/2014	0.3984	0.1889	3.2	3.9	5	7.4	99	6.9	7.2
11/1/2014	0.39	0.2434	4	4.6	7.3	9.3	98.4	6.8	7.1
12/1/2014	0.5674	0.3672	2.4	2.9	7	10.6	98.6	6.7	7.3
1/1/2015	0.4981	0.2869	5.5	7.6	12.1	16.4	97.1	6.8	7.2
2/1/2015	0.6566	0.3303	3.8	4.8	9	9.8	97.9	6.8	7
3/1/2015	0.5206	0.2857	3.4	4.8	7.8	9.1	98.4	6.8	7
4/1/2015	0.2741	0.2214	4	4.6	7.3	8.7	98.5	6.8	7.3
5/1/2015	0.2186	0.2011	4.7	5.9	7.9	10.7	98.3	6.8	7.3
6/1/2015	0.2069	0.1938	3.2	4.1	5.1	7.1	98.8	6.7	7.2
7/1/2015	0.2169	0.1917	3.2	4.4	4.8	6.8	98.8	6.9	7.3
8/1/2015	0.2165	0.1912	2.8	3.2	4.3	5.1	99.1	6.5	7.2
9/1/2015	0.218	0.1932	4	7.9	6.6	13.6	98.6	6.7	7.2
10/1/2015	0.2273	0.1876	4.2	4.7	6.8	8.5	98.4	6.9	7.2
11/1/2015	0.452	0.2295	3	4.3	5.6	7.8	98.9	6.9	7.1
12/1/2015	0.7182	0.4199	6.8	12.4	27.5	74.3	93.9	6.5	7.2
1/1/2016	0.9551	0.4498	3	4.2	9	10.9	98	6.9	7.3
2/1/2016	0.4408	0.3629	2.7	3.5	8	11.1	98.5	6.9	7.2
3/1/2016	0.779	0.4363	2.6	3.4	8.7	9.9	98.4	6.6	7.1
4/1/2016	0.2904	0.234	3.8	4	7.2	7.6	98.6	6.9	7.1
5/1/2016	0.2261	0.2031	5	5.7	8	8.9	98.4	6.9	7.2
6/1/2016	0.2179	0.1964	5.6	8.3	9.1	13.9	98.4	7	7.2
7/1/2016	0.2138	0.195	5.6	6.7	9.3	11.6	98.2	7	7.3
8/1/2016	0.2112	0.1951	3.3	4.5	5.3	7.5	99	7.2	7.4
9/1/2016	0.2172	0.1911	3.8	5.3	6	9.1	98.9	7	7.6
10/1/2016	0.3341	0.2393	2.9	3.1	4.9	5.7	99.1	6.8	7.4
11/1/2016	0.6857	0.3842	3.4	4.1	9.9	14.3	98	6.8	7.3
12/1/2016	0.4278	0.3195	4.4	6	12.1	16.9	97.6	6.9	7.3
1/1/2017	0.6374	0.3278	6	8.5	15.2	22.2	96.8	6.9	7.3
2/1/2017	0.7692	0.4356	5.5	11.4	17.5	34.5	96.1	6.9	7.2
3/1/2017	0.699	0.4227	5.1	5.6	18.3	23.7	96.6	6.9	7.1
4/1/2017	0.4228	0.3494	7.4	8.8	20.4	24	95.5	7	7.4
5/1/2017	0.381	0.2916	5.4	7.6	12.2	17	97.5	7	7.3
6/1/2017	0.2392	0.2076	4.6	5.6	8.3	9.9	98.3	7.1	7.3
7/1/2017	0.2188	0.1847	4.5	5	7.4	8	98.7	7.2	7.5
8/1/2017	0.2107	0.1782	7	10.2	11	16.3	98.2	7.2	7.4
9/1/2017	0.1933	0.1685	5.4	6.6	8.5	10.7	98.7	7.2	7.4
10/1/2017	0.2223	0.1702	10.7	21.7	15.9	31.7	97	7.1	7.4
11/1/2017	0.5108	0.2646	3.1	4.6	7	9.5	98.5	6.8	7.3
12/1/2017	0.4702	0.286	3.8	5.6	9.9	14.1	97.7	6.9	7.3
1/1/2018	0.6894	0.4228	3	4.2	9.7	12	97.5	6.7	7.2
2/1/2018	0.4566	0.3005	3.8	4.4	8.7	10.3	97.8	6.7	7.2
3/1/2018	0.3188	0.2512	3.6	3.9	7.1	8.1	98.2	7	7.2
4/1/2018	0.5592	0.2943	3.7	4.2	8.7	11.5	98.2	6.7	7.2
5/1/2018	0.2314	0.2022	5.1	6.4	8.3	10.3	98	6.8	7.2
6/1/2018	0.208	0.1821	6.1	6.9	8.7	10.1	98.3	7	7.3
7/1/2018	0.1959	0.1757	8.1	15.7	11.4	22	97.6	7.2	7.4
8/1/2018	0.1827	0.1673	5.5	6.9	7.4	9.4	98.4	7.1	7.4
9/1/2018	0.1924	0.1659	6.6	8	9.3	11.5	98.1	7.2	7.5
10/1/2018	0.1929	0.1621	4.9	7	6.2	9.1	98.4	7	7.4
11/1/2018	0.2592	0.1812	5.4	7.3	8.1	10.6	98.2	7	7.3
12/1/2018	0.3943	0.2626	4.4	5.1	10.1	13.6	98.2	6.8	7.3
1/1/2019	0.3979	0.2924	5.1	7	11.5	15.8	97.5	6.8	7.1
2/1/2019	0.4257	0.2901	5.4	9	12.2	21.2	97.2	6.8	7.4
Count	**129.00**	**129.00**	**128.00**	**128.00**	**129.00**	**129.00**	**127.00**	**129.00**	**129.00**
Min	**0.183**	**0.152**	**2.300**	**2.900**	**3.600**	**3.900**	**93.800**	**6.500**	**7.000**
Max	**0.955**	**0.484**	**13.300**	**22.300**	**27.500**	**74.300**	**99.100**	**7.300**	**7.600**
Ave	**0.363**	**0.240**	**4.751**	**6.734**	**9.007**	**13.388**	**97.820**	**6.966**	**7.288**
Std. Dev.	**0.18**	**0.08**	**1.81**	**3.56**	**4.39**	**9.61**	**1.11**	**0.17**	**0.12**
Coef Vari	**0.50**	**0.34**	**0.38**	**0.53**	**0.49**	**0.72**	**0.01**	**0.02**	**0.02**

Date	Effluent Gross Solids, total suspended Milligrams per Liter MO AVG	Effluent Gross Solids, total suspended Milligrams per Liter WKLY AVG	Effluent Gross Solids, total suspended Pounds per Day MO AVG	Effluent Gross Solids, total suspended Pounds per Day WKLY AVG	Percent Removal Solids, suspended percent removal Percent MN % RMV	Effluent Gross Coliform, fecal MF, MFC broth, 44.5 C Number per 100 Milliliters MO GEO	Effluent Gross Coliform, fecal MF, MFC broth, 44.5 C Number per 100 Milliliters WKLY GEO	Effluent Gross Nitrogen, ammonia total [as N] Milligrams per Liter DAILY MX	Effluent Gross Nitrogen, ammonia total [as N] Milligrams per Liter MO AVG
6/1/2008	7.01	9.88	9.65	12.9	95.9	3	28	28.2	24.8
7/1/2008	4	5	5.2	6.7	98.3	2	4	22.8	19.1
8/1/2008	6.07	10.1	7.48	12.1	95.8	5	18	28.1	21.2
9/1/2008	4.7	5.3	5.9	7	98	1	2	27.8	27.8
10/1/2008	3.2	5.1	4.1	6.7	98.7	3	6	29.5	29.4
11/1/2008	5.5	7	8.5	11.8	97.5	18	85	22.4	19.5
12/1/2008	6.4	8.3	9.9	17.7	97.7	2	5	25.2	24.3
1/1/2009	9.8	12.5	18.4	23	94.4	2	14	23.4	21.9
2/1/2009	9	14.7	14	21.6	95.8	1	2	26.2	26
3/1/2009	3.7	4.2	7.3	8.8	97.9	1	1	21.3	20.9
4/1/2009	3.7	3.9	7.5	8.8	97.3	1	1	20	19.4
5/1/2009	5	6.9	10.2	12.5	97	2	9	21	20.6
6/1/2009	6.4	7.8	8.5	9.9	97.1	3	64	28.6	27.2
7/1/2009	6.8	7.6	8.9	10.1	96.6	2	9	29.2	28.9
8/1/2009	5.4	7	6.8	10	97.5	2	41	30.5	19.5
9/1/2009	3.9	5.1	4.8	6.4	98.1	1	3	5.9	5.5
10/1/2009	2.9	3.1	4	4.4	98.5	4	113	3.37	3.24
11/1/2009	3.7	5.1	11.7	19.2	96.8	2	4	3.37	2.22
12/1/2009	4.5	8.5	10.8	18.7	96.9	1	3	13.9	10.5
1/1/2010	5.2	5.9	20.8	31.5	94.7	1	2	11	9.72
2/1/2010	4.5	5.2	11.3	13	97.1	1	1	17	14.2
3/1/2010	4.4	6.6	9.8	13.5	97.6	1	4	16.8	15.6
4/1/2010	4.8	6.5	10.1	13.4	97.3	1	1	20.8	18.1
5/1/2010	5.5	6.5	8.8	9.9	97.5	1	1	34.1	30
6/1/2010	6.4	8.3	11.5	17.4	96.7	3	71	23.1	22.6
7/1/2010	5.9	8.3	8.5	13	97.7	1	4	29.5	27
8/1/2010	3.3	4.4	4.4	6.2	98.8	1	1	26.3	26.3
9/1/2010	5.3	7	6.4	9.3	98	1	2	26.2	23.8
10/1/2010	4.3	4.8	5.9	6.4	98.2	10	33	15.6	14.3
11/1/2010	4.4	4.4	8.3	7.3	97.5	1	2	13.9	11.9
12/1/2010	5.2	6.9	19.6	29.4	94.6	3	10	5.81	3.78
1/1/2011	5.2	8	13.4	19	96.3	1	4	14.2	12.4
2/1/2011	3.1	3.6	7.7	12.2	98.1	1	1	18.3	15.1
3/1/2011	6.1	11.2	24.1	68.6	92.7	1	2	17.4	12.4
4/1/2011	3.9	4.9	8.8	9.9	97.7	2	5	17.6	16.9
5/1/2011	4.7	5.9	8.9	10.4	97.6	2	5	21.2	19.4
6/1/2011	4.6	5.2	6.6	7.8	98.1	2	3	28.1	27.1
7/1/2011	4.1	6.4	5.3	8.7		1	2	30	29.9
8/1/2011	4.3	6.2	5.3	7.5	98.3	1	1	10	9.12
9/1/2011	3.1	3.8	3.7	4.5	98.9	1	1	1.14	1.11
10/1/2011	3.3	3.9	4.2	4.8	98.8	1	2	9.26	5.65
11/1/2011	3.2	4.6	6.6	16.1	98.5	1	1	15.1	13.4
12/1/2011	5	7.2	8.2	10.9	97.4	2	3	7.71	7.69
1/1/2012	7.1	15.2	19.3	54.2	94.7	2	4	1.94	1.55
2/1/2012	4.1	4.8	8.2	9.9	97.8	1	3	14.5	13
3/1/2012	5.6	10.1	14.1	29.7	95.9	1	2	13.6	11.8
4/1/2012	3.4	4.6	7.8	13.5	97.9	1	1	10.1	9
5/1/2012	5.8	7.9	9.5	12.7	97.5	1	2	10.6	9.2
6/1/2012	4.5	5.1	6.9	7.9	98.2	1	1	5.8	3.7
7/1/2012	3.9	5.9	5.1	8.2	98.5	1	5	4.59	2.78
8/1/2012	4	5.3	5.2	6.9	98.5	1	2	10.6	9.8
9/1/2012	2.9	3.9	3.5	4.5	98.8	2	4	6.6	4.9
10/1/2012	3.6	5.1	4.6	6.3	98.7	2	6	6.5	4.3
11/1/2012	2.8	3.6	8	18.1	97.7	1	2	9.3	8.4
12/1/2012	7	18	28.3	73	92.2	1	1	4.77	2.68
1/1/2013	3.5	4.9	8.9	13.2	98	1	3	11.4	10.7
2/1/2013	3.7	4.4	7.3	8.5	97.9	5	109	5.41	3.54
3/1/2013	7.4	9.1	13.5	15.9	96.1	1	3	1.38	1.38
4/1/2013	2.9	4.2	5.9	9.7	98.2	1	3	8.98	4.68
5/1/2013	5.3	7.1	8	10.9	98.2	4	33	8.08	7.14
6/1/2013	3.6	4.2	5.1	5.7	98.6	2	3	3.48	3.02
7/1/2013	2.7	3.3	3.5	4.4	99.1	1	2	5.92	3.63
8/1/2013	3.2	4.2	4.1	5.2	98.9	3	33	7.77	4.61
9/1/2013	3.6	4.6	4.8	7.3	98.8	2	8	12.9	12.8
10/1/2013	2.4	2.8	3.1	4.3	99.3	1	2	4.33	3.12
11/1/2013	2.4	3	3.5	4.2	99	1	3	1.96	1.45
12/1/2013	2.6	2.7	3.5	3.7	99.2	1	2	0.34	0.33

Date	Effluent Gross Solids, total suspended Milligrams per Liter MO AVG	Effluent Gross Solids, total suspended Milligrams per Liter WKLY AVG	Effluent Gross Solids, total suspended Pounds per Day MO AVG	Effluent Gross Solids, total suspended Pounds per Day WKLY AVG	Percent Removal Solids, suspended percent removal Percent MN % RMV	Effluent Gross Coliform, fecal MF, MFC broth, 44.5 C Number per 100 Milliliters MO GEO	Effluent Gross Coliform, fecal MF, MFC broth, 44.5 C Number per 100 Milliliters WKLY GEO	Effluent Gross Nitrogen, ammonia total [as N] Milligrams per Liter DAILY MX	Effluent Gross Nitrogen, ammonia total [as N] Milligrams per Liter MO AVG
1/1/2014	3.8	5.7	5.6	7.3	98.7	1	2	0.6	0.5
2/1/2014	4	5	10.5	18.4	97.7	1	2	0.4	0.3
3/1/2014	3.5	4.6	11.9	14	97.5	1	1	6.2	4.4
4/1/2014	3.7	6.3	8.1	12.3	98	2	7	7.7	6.9
5/1/2014	4.7	6.2	8.2	9	98.3	2	10	5.2	4.8
6/1/2014	2.5	2.9	3.6	4.3	99.2	2	8	5.1	2.9
7/1/2014	4.5	6.9	6.2	9.9	98.8	2	14	1.8	1.8
8/1/2014	3.6	4.8	4.6	6.2	98.9	2	3	4.6	2.6
9/1/2014	2.7	3.4	3.5	4.6	99.3	2	3	4.3	2.6
10/1/2014	2.5	3.5	4	7	99.2	2	8	1.8	1.5
11/1/2014	3	3.4	5.5	6.8	98.9	7	70	1.7	1.2
12/1/2014	1.7	2.5	5.2	9	98.8	2	6	4.4	2.6
1/1/2015	3.3	3.9	7.7	11.4	98.3	3	16	9.6	6
2/1/2015	2.7	3.4	6.5	8.8	98.7	5	34	4.42	4.42
3/1/2015	3.5	3.8	8.1	9	98.3	1	2	24.4	19.5
4/1/2015	5.2	7.3	9.5	13.9	98.2	1	2	15.1	7.9
5/1/2015	5.1	6.2	8.6	10.8	98.2	5	7	16.2	9
6/1/2015	4	5.6	6.4	9.6	98.6	2	5	2.2	1.3
7/1/2015	3.2	4.4	5	6.7	98.8	2	2	6.5	6.1
8/1/2015	3.1	3.8	4.7	6	99.1	2	3	1.9	1.3
9/1/2015	5.4	10.7	8.9	18.6	98	1	4	0.5	0.5
10/1/2015	3.9	4.6	6.3	7.9	98.3	1	2	10.6	7.9
11/1/2015	3.7	4.4	7.1	10.9	98.4	1	1	0.23	0.15
12/1/2015	7.7	14.6	31.7	87.6	92.4	4	43	7.59	4.07
1/1/2016	2.5	2.9	7.8	11	98.2	8	13	17.9	13.1
2/1/2016	1.9	2.8	6.8	8.8	98.8	1	3	10.2	9.3
3/1/2016	3.2	3.8	10.6	12.6	98.1	2	2	17.1	14.1
4/1/2016	3.3	3.6	6.2	7	98.9	2	2	7.1	6
5/1/2016	4.5	4.9	7.1	7.7	98.8	3	6	12.5	9.7
6/1/2016	4.8	8.2	7.8	13.7	98.8	1	4	14.6	14.4
7/1/2016	5.2	8.4	8.8	15	98.2	2	8	24.9	19.2
8/1/2016	3.5	5.4	5.6	9.1	99	3	12	22.9	22.5
9/1/2016	4.3	4.7	6.6	7.8	98.9	2	3	22.6	21.4
10/1/2016	3.3	4.2	5.5	6.5	99	2	2	15.6	11.5
11/1/2016	5.5	7	16.4	24.8	96.9	2	4	10.3	7.1
12/1/2016	7.8	10.1	21.1	26.2	96.5	2	3	8.7	5.4
1/1/2017	7.5	8.9	18.8	23.4	96	4	11	17.9	15.6
2/1/2017	7.4	11.5	23.3	34.8	95	5	65	15.4	11.9
3/1/2017	6.9	7.6	25.1	32.6	95.7	1	4	8.9	8.3
4/1/2017	6.8	7.5	18.5	21.7	95.9	4	8	12.4	11.6
5/1/2017	5.2	7.1	11.9	15.9	97.3	3	4	11.9	10.9
6/1/2017	3.4	4.2	6.1	7.4	98.6	2	3	24.1	22.7
7/1/2017	3.2	3.7	5.2	5.9	99	2	1	29.8	29.6
8/1/2017	5.7	8	8.9	12.8	98.5	3	18	31	31
9/1/2017	5.2	6.6	8.1	10.4	98.7	2	22	24.7	24.7
10/1/2017	5.6	8.5	8.4	12.5	98.2	8	52	23.7	23.7
11/1/2017	3.3	4.6	7.7	9.9	98.5	1	1	20.1	20.1
12/1/2017	5.9	6.9	15.7	27.2	96.6	6	13	16.7	16.7
1/1/2018	4.4	5.4	14	15.5	96.5	4	15	14.4	14.4
2/1/2018	4.3	5	9.7	11.4	97.7	2	7	6.82	6.82
3/1/2018	2.8	3.1	5.5	6.6	98.8	1	4	11.9	11.9
4/1/2018	3.2	3.6	7.7	11.7	98.3	1	1	14.8	14.8
5/1/2018	3.3	4.3	5.4	6.5	98.5	1	1	9.7	9.7
6/1/2018	4.5	4.9	6.5	7.1	98.5	6	101	9.1	9.1
7/1/2018	5.1	6.8	7.2	9.6	98.4	19	108	31.3	31.3
8/1/2018	4.6	5.8	6.2	7.9	98.7	2	8	27.8	27.8
9/1/2018	7.3	8.3	10.3	12.3	98	2	23	32	32
10/1/2018	6	6.9	7.6	10.3	98	1	12	26.4	26.4
11/1/2018	9.3	10.8	13.9	17.7	96.8	1	6	19.4	19.4
12/1/2018	8.3	10.2	18.9	25.6	96.7	1	4	17.2	17.2
1/1/2019	6.7	11.7	15.3	26.4	97.2	1	3	14.4	14.4
2/1/2019	4.6	6.5	10.5	15.2	97.6	2	7	9.6	9.6
129.00	**129.00**	**129.00**	**129.00**	**129.00**	**128.00**	**129.00**	**129.00**	**129.00**	**129.00**
39600.000	**1.700**	**2.500**	**3.100**	**3.700**	**92.200**	**1.000**	**1.000**	**0.230**	**0.150**
43497.000	**9.800**	**18.000**	**31.700**	**87.600**	**99.300**	**19.000**	**113.000**	**34.100**	**32.000**
41547.907	**4.580**	**6.194**	**9.129**	**13.763**	**97.719**	**2.357**	**12.636**	**14.113**	**12.578**
1133.42	**1.59**	**2.77**	**5.31**	**12.29**	**1.36**	**2.58**	**22.94**	**9.13**	**8.98**
0.03	**0.35**	**0.45**	**0.58**	**0.89**	**0.01**	**1.10**	**1.82**	**0.65**	**0.71**

Date	Effluent Gross Alkalinity, total [as CaCO3] Milligrams per Liter DAILY MX	Effluent Gross Alkalinity, total [as CaCO3] Milligrams per Liter MO AVG	Effluent Gross Temperature, water deg. centigrade Degrees Centigrade DAILY MX	Effluent Gross Temperature, water deg. centigrade Degrees Centigrade MO AVG	Raw Sewage Influent BOD, 5-day, 20 deg. C Milligrams per Liter MO AVG	Raw Sewage Influent BOD, 5-day, 20 deg. C Pounds per Day MO AVG	Raw Sewage Influent Solids, total suspended Milligrams per Liter MO AVG	Raw Sewage Influent Solids, total suspended Pounds per Day MO AVG
6/1/2008			18	17	261	357	227	312
7/1/2008			20	19	277	365	242	318
8/1/2008			20	20	266	338	227	289
9/1/2008			20	20	297	348	239	297
10/1/2008			19	18	296	378	248	318
11/1/2008	170	170	17	16	255	384	222	336
12/1/2008			15	14	280	434	277	438
1/1/2009			13	12	213	404	173	332
2/1/2009			13	12	223	349	212	331
3/1/2009			13	12	191	378	178	352
4/1/2009			14	13	177	355	141	282
5/1/2009			16	15	176	358	167	343
6/1/2009			18	18	284	380	259	349
7/1/2009			22	19	272	355	219	284
8/1/2009			21	21	274	340	213	268
9/1/2009			21	21	269	329	206	252
10/1/2009			20	18	228	307	194	261
11/1/2009			17	15	151	369	141	363
12/1/2009	170	170	14	13	150	354	143	339
1/1/2010			13	12	97	357	105	391
2/1/2010			13	12	174	433	156	390
3/1/2010			14	13	182	410	189	424
4/1/2010			15	14	183	386	177	376
5/1/2010	199	199	16	15	222	353	222	355
6/1/2010			18	17	215	375	201	352
7/1/2010			20	19	273	381	255	356
8/1/2010			21	20	282	373	270	358
9/1/2010			20	19	291	342	260	309
10/1/2010			20	18	256	355	231	321
11/1/2010			17	16	178	318	182	326
12/1/2010			14	13	115	374	114	366
1/1/2011			13	12	155	400	141	364
2/1/2011			13	12	170	411	178	415
3/1/2011			12	11	132	387	120	351
4/1/2011			14	13	160	364	174	395
5/1/2011			16	14	168	324	189	366
6/1/2011			18	17	224	321	237	341
7/1/2011			19	18	254	331	250	326
8/1/2011			20	20	249	310	250	313
9/1/2011	134	134	21	20	288	345	305	366
10/1/2011			20	18	289	366	268	340
11/1/2011			18	16	233	407	230	407
12/1/2011			15	14	229	376	198	327
1/1/2012			14	12	163	373	170	380
2/1/2012			13	12	196	392	188	377
3/1/2012			13	12	156	361	151	348
4/1/2012			15	14	170	369	169	368
5/1/2012			17	16	225	363	233	376
6/1/2012			19	17	243	366	257	387
7/1/2012	123	123	20	19	272	351	263	339
8/1/2012			21	20	266	342	262	338
9/1/2012			20	20	282	335	257	305
10/1/2012			20	19	284	364	271	348
11/1/2012			17	16	187	387	171	348
12/1/2012			14	13	101	386	97.1	365
1/1/2013			13	12	195	484	175	434
2/1/2013			13	13	179	352	172	340
3/1/2013			14	13	192	350	192	350
4/1/2013			15	14	174	333	171	327
5/1/2013			17	15.9	315	476	296	449
6/1/2013			19	18	256	366	247	355
7/1/2013			20	20	306	395	337	432
8/1/2013			21	20	281	361	281	361
9/1/2013			21	20	286	368	316	401
10/1/2013			19	18	334	429	375	482
11/1/2013			17	16	239	343	239	342
12/1/2013			15	14	314	423	370	498

Date	Effluent Gross Alkalinity, total [as CaCO3] Milligrams per Liter DAILY MX	Effluent Gross Alkalinity, total [as CaCO3] Milligrams per Liter MO AVG	Effluent Gross Temperature, water deg. centigrade Degrees Centigrade DAILY MX	Effluent Gross Temperature, water deg. centigrade Degrees Centigrade MO AVG	Raw Sewage Influent BOD, 5-day, 20 deg. C Milligrams per Liter MO AVG	Raw Sewage Influent BOD, 5-day, 20 deg. C Pounds per Day MO AVG	Raw Sewage Influent Solids, total suspended Milligrams per Liter MO AVG	Raw Sewage Influent Solids, total suspended Pounds per Day MO AVG
1/1/2014			14	14	259	392	320	488
2/1/2014			14	12	169	398	194	450
3/1/2014			13	11.9	143	464	146	500
4/1/2014			15	14.1	178	380	188	407
5/1/2014			18	17	247	433	289	500
6/1/2014			20	19	312	460	360	533
7/1/2014			21	20	315	430	420	573
8/1/2014			22	21	318	415	333	438
9/1/2014			22	21	331	430	370	481
10/1/2014			21	19	360	532	395	583
11/1/2014			18	16	252	467	269	503
12/1/2014	82	82	15	14	199	541	198	528
1/1/2015			15	14	187	422	216	477
2/1/2015			15	14	185	429	213	496
3/1/2015			15	14	222	497	229	510
4/1/2015			17	16	297	531	383	676
5/1/2015			19	18	273	456	6.2	5.1
6/1/2015			22	20	280	443	297	469
7/1/2015			23	22	425	279	295	448
8/1/2015			23	22	305	463	366	554
9/1/2015			22	21	287	463	294	472
10/1/2015			21	20	273	437	232	372
11/1/2015			20	18	274	500	232	428
12/1/2015			16	14	160	460	131	388
1/1/2016			14	13	154	465	147	444
2/1/2016			14	13	183	540	181	532
3/1/2016			14	13.1	171	546	185	589
4/1/2016			17	16	274	518	297	561
5/1/2016			20	18	326	524	374	605
6/1/2016			21	20	357	576	398	645
7/1/2016			22	21	308	512	298	495
8/1/2016			23	22	324	519	364	584
9/1/2016			23	21	360	554	402	616
10/1/2016			21	19	320	533	346	574
11/1/2016			18	17	172	497	176	516
12/1/2016	131	131	15	14	184	503	222	595
1/1/2017			14	12	191	484	195	492
2/1/2017			13	12	138	429	157	485
3/1/2017			13	12	161	568	177	629
4/1/2017			14	13	170	462	186	510
5/1/2017			17	15	221	496	197	442
6/1/2017			20	18	272	490	239	429
7/1/2017			21	21	338	548	319	518
8/1/2017			22	21	378	595	378	594
9/1/2017	1180	1180	22	21	411	637	395	613
10/1/2017			21	19	333	506	302	460
11/1/2017			18	16	237	494	234	509
12/1/2017			15	14	126	425	185	453
1/1/2018			14	12	121	386	127	410
2/1/2018			13	12	177	399	191	426
3/1/2018			14	12	209	406	241	465
4/1/2018			15	14	212	499	186	433
5/1/2018			18	17	257	422	242	398
6/1/2018			20	19	350	502	306	439
7/1/2018			22	20	338	477	334	472
8/1/2018			22	21	360	483	366	490
9/1/2018			20	20	354	501	376	531
10/1/2018			21	19	301	379	302	384
11/1/2018	170	170	19	17	309	449	315	462
12/1/2018			16	14	250	564	276	635
1/1/2019			15	13	218	487	252	560
2/1/2019			13	12	186	427	189	437
129.00	**9.00**	**9.00**	**129.00**	**129.00**	**129.00**	**129.00**	**129.00**	**129.00**
39600.000	**82.000**	**82.000**	**12.000**	**11.000**	**97.000**	**279.000**	**6.200**	**5.100**
43497.000	**1180.000**	**1180.000**	**23.000**	**22.000**	**425.000**	**637.000**	**420.000**	**676.000**
41547.907	**262.111**	**262.111**	**17.465**	**16.318**	**241.682**	**420.729**	**239.716**	**422.171**
1133.42	**326.15**	**326.15**	**3.19**	**3.21**	**69.05**	**72.50**	**77.58**	**102.12**
0.03	**1.24**	**1.24**	**0.18**	**0.20**	**0.29**	**0.17**	**0.32**	**0.24**

Alkalinity

Effluent Gross	DAILY MX	170.	mg/L	11/30/2008
Effluent Gross	DAILY MX	170.	mg/L	12/31/2009
Effluent Gross	DAILY MX	199.	mg/L	05/31/2010
Effluent Gross	DAILY MX	134.	mg/L	09/30/2011
Effluent Gross	DAILY MX	123.	mg/L	07/31/2012
Effluent Gross	DAILY MX	82.	mg/L	12/31/2014
Effluent Gross	DAILY MX	131.	mg/L	12/31/2016
Effluent Gross	DAILY MX	1180* outlier	mg/L	09/30/2017
Effluent Gross	DAILY MX	170.	mg/L	11/30/2018
	Max	**199.**	**mg/L**	
	Min	**82.**	**mg/L**	
	Ave	**147**	**mg/L**	**Equal to 2.94 meg/l**

Outlier Results

This calculator performed Grubbs' test, also called the ESD method (extreme studentized deviate), to determine whether the most extreme value in the list you entered is a signficant outlier from the rest. Unlike some other outlier tests, Grubbs' test only asks whether that one value is an outlier. It is not appropriate to then remove that outlier, and run the test again. Learn more about the principles of outlier detection and exactly how this test is calculated.

Descriptive Statistics

Mean: 262.11
SD: 345.93
# of values: 9
Outlier detected? Yes
Significance level: 0.05 (two-sided)
Critical value of Z: 2.2150045583

Your data

Row	Value	Z	Significant Outlier?
1	170.	0.27	
2	170.	0.27	
3	199.	0.18	
4	134.	0.37	
5	123.	0.40	
6	82.	0.52	
7	131.	0.38	
8	1180.	2.65	Significant outlier. P < 0.05
9	170.	0.27	

B. Receiving Water Data

Receiving water data from Ecology's "Agate Pass North End" monitoring station, Location ID: KCHD-AG01.

Dissolved Oxygen	1/8/2003	D		7.4	mg/L
Dissolved Oxygen	2/4/2003	D		8.5	mg/L
Dissolved Oxygen	2/9/2005	D		8	mg/L
Dissolved Oxygen	3/19/2003	D		8.6	mg/L
Dissolved Oxygen	4/5/2005	D		8.5	mg/L
Dissolved Oxygen	4/8/2003	D		9.7	mg/L
Dissolved Oxygen	5/13/2003	D		11.7	mg/L
Dissolved Oxygen	6/1/2005	D		8.5	mg/L
Dissolved Oxygen	7/8/2003	D		12	mg/L
Dissolved Oxygen	8/5/2003	D		10.7	mg/L
Dissolved Oxygen	8/18/2004	D		9.5	mg/L
Dissolved Oxygen	8/24/2005	D		7.9	mg/L
Dissolved Oxygen	10/21/2003	D		7.5	mg/L
Dissolved Oxygen	10/24/2002	D		6.3	mg/L
Dissolved Oxygen	10/27/2004	D		8.1	mg/L
Dissolved Oxygen	11/14/2002	D		7.1	mg/L
Dissolved Oxygen	12/5/2002	D		6.8	mg/L
Dissolved Oxygen	12/9/2003	D		7.8	mg/L
Dissolved Oxygen	12/28/2004	D		7.5	mg/L
			Max	**12**	**mg/L**
			Min	**6.3**	**mg/L**
			95th Percentile	**11.73**	**mg/L**

Fecal Coliform	1/9/2003	D		1	MPN/100mL
Fecal Coliform	2/5/2003	D		1	MPN/100mL
Fecal Coliform	2/10/2005	D		1	MPN/100mL
Fecal Coliform	3/20/2003	D		1	MPN/100mL
Fecal Coliform	4/6/2005	D		1	MPN/100mL
Fecal Coliform	4/9/2003	D		2	MPN/100mL
Fecal Coliform	4/29/2004	D		1	MPN/100mL
Fecal Coliform	5/14/2003	D		1	MPN/100mL
Fecal Coliform	6/2/2005	D		1	MPN/100mL
Fecal Coliform	6/25/2004	D		1	MPN/100mL
Fecal Coliform	7/9/2003	D		1	MPN/100mL
Fecal Coliform	8/6/2003	D		2	MPN/100mL
Fecal Coliform	8/19/2004	D		1	MPN/100mL
Fecal Coliform	8/25/2005	D		1	MPN/100mL
Fecal Coliform	9/4/2003	D		1	MPN/100mL
Fecal Coliform	10/22/2003	D		17	MPN/100mL
Fecal Coliform	10/25/2002	D		1	MPN/100mL
Fecal Coliform	10/28/2004	D		1	MPN/100mL
Fecal Coliform	11/15/2002	D		1	MPN/100mL
Fecal Coliform	12/6/2002	D		1	MPN/100mL
Fecal Coliform	12/10/2003	D		1	MPN/100mL
Fecal Coliform	12/29/2004	D		1	MPN/100mL
			Max	**17**	**MPN/100mL**
			Min	**1**	**MPN/100mL**
			95th Percentile	**2**	**MPN/100mL**

pH		1/8/2003	D		7.3	s.u.
pH		2/4/2003	D		7.7	s.u.
pH		2/9/2005	D		7.9	s.u.
pH		3/19/2003	D		7.9	s.u.
pH		4/5/2005	D		7.8	s.u.
pH		4/8/2003	D		8.2	s.u.
pH		5/13/2003	D		8.2	s.u.
pH		6/1/2005	D		7.9	s.u.
pH		7/8/2003	D		7.3	s.u.
pH		8/5/2003	D		8.1	s.u.
pH		8/18/2004	D		8	s.u.
pH		8/24/2005	D		8	s.u.
pH		9/3/2003	D		8.1	s.u.
pH		10/21/2003	D		8.1	s.u.
pH		10/24/2002	D		7.7	s.u.
pH		10/27/2004	D		7.8	s.u.
pH		11/14/2002	D		7.9	s.u.
pH		12/5/2002	D		8.1	s.u.
pH		12/28/2004	D		7.6	s.u.
				Max	**8.2**	**s.u.**
				Min	**7.3**	**s.u.**
				90th percentile	**8.12**	**s.u.**

Temperature, water		2/4/2003	D		8.8	deg C
Temperature, water		2/9/2005	D		8.2	deg C
Temperature, water		3/19/2003	D		9.1	deg C
Temperature, water		4/5/2005	D		9	deg C
Temperature, water		4/8/2003	D		9.6	deg C
Temperature, water		5/13/2003	D		11.5	deg C
Temperature, water		6/1/2005	D		11.7	deg C
Temperature, water		7/8/2003	D		14.9	deg C
Temperature, water		8/5/2003	D		15.6	deg C
Temperature, water		8/18/2004	D		15.4	deg C
Temperature, water		8/24/2005	D		14.5	deg C
Temperature, water		9/3/2003	D		14.4	deg C
Temperature, water		10/21/2003	D		13.2	deg C
Temperature, water		10/24/2002	D		12	deg C
Temperature, water		10/27/2004	D		11.9	deg C
Temperature, water		11/14/2002	D		10.7	deg C
Temperature, water		12/5/2002	D		9.9	deg C
Temperature, water		12/9/2003	D		9.7	deg C
Temperature, water		12/28/2004	D		9.2	deg C
				Max	**15.6**	**deg C**
				Min	**8.2**	**deg C**
				90th Percentile	**15.0**	**deg C**

Appendix C. Reasonable Potential and Dilution Factors Calculations

Part A of this appendix explains the process the EPA used to determine if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to a violation of Washington's federally approved WQS. Part B demonstrates how the dilution factors are calculated using Visual Plumes.

A. Reasonable Potential Analysis

The 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, the 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 this case, EPA completed reasonable potential analysis for Ammonia. EPA determined that Ammonia would not exceed Washington WQS based on reasonable potential analysis. The analysis incorporated Ecology's mixing zone policy, as discussed in Appendix C, and, authorization of the mixing zone is subject to Ecology's approval.

Maximum Projected Effluent Concentration

When determining the projected receiving water concentration downstream of the effluent discharge, the 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. To determine the maximum projected effluent concentration (Ce) the 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.

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

where,
p_n = the percentile represented by the highest reported concentration
n = the number of samples
confidence level = 99% = 0.99

and

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

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 cumulative 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:

$$C_e = (\text{RPM})(\text{MRC})$$

where MRC = Maximum Reported Concentration

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.

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.

For this permit, Ammonia is the only parameter of concern applicable for a reasonable potential analysis because this parameter is present in the waste stream, and has a WQ-based standard. Using a spreadsheet shown below, EPA analyzed if reasonable potential existed to exceed Washington State WQS for Ammonia.

For Ammonia, EPA assumed the 90th percentile concentration of the ambient receiving water as 34 ug/l. This is consistent with the background concentration that Ecology had used in its 2015 NPDES Permit for the Kingston Wastewater Treatment Plant which discharges into Puget Sound.

Results of the reasonable potential analyses for Ammonia is shown in Appendix D based on the Visual Plumes modeling to determine the dilution factors as shown below.

B. Output of Visual Plumes Modeling

The output Visual Plumes modeling to determine the dilution factors are shown below.

Table C-1: Visual Plumes Output For Acute Scenario

```
/ Windows UM3. 2/28/2008 11:49:22 AM
Case 1; ambient file F:\KSHUM\Suquamish\suq.2PortsAcutePeakFlow.001.db; Diffuser table record 1: ---------------------------------
      Depth    Amb-cur    Amb-dir    Amb-sal    Amb-tem    Amb-pol      Decay    Far-spd    Far-dir    Disprsn
          m        m/s        deg        psu          C      kg/kg        s-1        m/s        deg   m0.67/s2
        0.0       0.02       90.0      29.75      14.74        0.0        0.0       0.02       90.0     0.0003
        2.0       0.02       90.0      29.81       14.4        0.0        0.0       0.02       90.0     0.0003
        5.0       0.02       90.0      29.83       14.2        0.0        0.0       0.02       90.0     0.0003
       10.0       0.02       90.0      29.89       13.6        0.0        0.0       0.02       90.0     0.0003
       13.0       0.02       90.0      29.92       13.4        0.0        0.0       0.02       90.0     0.0003
      13.23       0.02       90.0      29.92       13.4        0.0        0.0       0.02       90.0     0.0003
   P-dia  P-elev V-angle H-angle   Ports Spacing AcuteMZ ChrncMZ P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)    (in)   (deg)   (deg)      ()    (ft)    (ft)    (ft)    (ft)   (MGD)   (psu)     (C)   (ppm)
    7.74    12.0    90.0     0.0     2.0    10.0    24.3   243.4    42.4     0.6     0.0    18.0   100.0
Froude number:      3.751
        Depth  Amb-cur    P-dia  Polutnt  4/3Eddy   Dilutn   x-posn   y-posn
Step     (ft)   (cm/s)     (in)    (ppm)    (ppm)       ()     (ft)     (ft)
   0      42.4      2.0    6.045    100.0    100.0      1.0      0.0      0.0;
 100      36.5      2.0    26.23     13.8     13.8    7.099      0.0    0.244;
 200     15.42      2.0    89.36    1.905    1.905    51.29      0.0    2.264; axial vel    0.02
 223     5.923      2.0    120.9    1.208    1.208    80.88      0.0    3.499; merging,
 232      0.67      2.0    141.1    1.011    1.011    96.65      0.0    4.267; axial vel   0.579 surface,
4/3 Power Law.  Farfield dispersion based on wastefield width of       4.63 m
    conc  dilutn   width distnce    time
   (ppm)             (m)     (m)    (hrs) (kg/kg)   (s-1)  (cm/s)(m0.67/s2)
 0.10012   101.9   6.571     7.4  0.0847     0.0     0.0     2.0 3.00E-4  (Shows the Acute Dilution Factor is 102)
 2.14E-2   119.4   9.217    14.8   0.187     0.0     0.0     2.0 3.00E-4
 1.00E-2   136.7   12.15    22.2    0.29     0.0     0.0     2.0 3.00E-4
 6.03E-3   152.5   15.33    29.6   0.393     0.0     0.0     2.0 3.00E-4
 4.07E-3   166.9   18.76    37.0   0.496     0.0     0.0     2.0 3.00E-4
 2.95E-3   180.2   22.41    44.4   0.599     0.0     0.0     2.0 3.00E-4
 2.25E-3   192.7   26.27    51.8   0.701     0.0     0.0     2.0 3.00E-4
 1.77E-3   204.5   30.32    59.2   0.804     0.0     0.0     2.0 3.00E-4
 1.43E-3   215.6   34.57    66.6   0.907     0.0     0.0     2.0 3.00E-4
 1.18E-3   226.2    39.0    74.0    1.01     0.0     0.0     2.0 3.00E-4
 9.98E-4   236.3    43.6    81.4   1.112     0.0     0.0     2.0 3.00E-4
count: 11
 ;
11:49:23 AM. amb fills: 2
```

Table C-2: Visual Plumes Output for Chronic Scenario

```
/ Windows UM3. 2/28/2008 12:19:35 PM
Case 1; ambient file F:\KSHUM\Suquamish\suq.2PortsChronic.001.db; Diffuser table record 1: ---------------------------------
      Depth    Amb-cur    Amb-dir    Amb-sal    Amb-tem    Amb-pol      Decay    Far-spd    Far-dir    Disprsn
          m        m/s        deg        psu          C      kg/kg        s-1        m/s        deg   m0.67/s2
        0.0       0.02       90.0      29.75      14.74        0.0        0.0       0.02       90.0     0.0003
        2.0       0.02       90.0      29.81       14.4        0.0        0.0       0.02       90.0     0.0003
        5.0       0.02       90.0      29.83       14.2        0.0        0.0       0.02       90.0     0.0003
       10.0       0.02       90.0      29.89       13.6        0.0        0.0       0.02       90.0     0.0003
       13.0       0.02       90.0      29.92       13.4        0.0        0.0       0.02       90.0     0.0003
      13.23       0.02       90.0      29.92       13.4        0.0        0.0       0.02       90.0     0.0003
   P-dia  P-elev V-angle H-angle   Ports Spacing AcuteMZ ChrncMZ P-depth Ttl-flo Eff-sal    Temp Polutnt
    (in)    (in)   (deg)   (deg)      ()    (ft)    (ft)    (ft)    (ft)   (MGD)   (psu)     (C)   (ppm)
    7.74    12.0    90.0     0.0     2.0    10.0    24.3   243.4    42.4     0.4     0.0    18.0   100.0
Froude number:        2.5
        Depth  Amb-cur    P-dia  Polutnt  4/3Eddy   Dilutn   x-posn   y-posn
Step     (ft)   (cm/s)     (in)    (ppm)    (ppm)       ()     (ft)     (ft)
   0      42.4      2.0    6.045    100.0    100.0      1.0      0.0      0.0;
 100     37.12      2.0    22.52     13.8     13.8    7.099      0.0    0.248;
 200     19.31      2.0    75.74    1.905    1.905    51.29      0.0    2.097; axial vel  0.0126
 235     6.429      2.0    120.9    0.953    0.953    102.6      0.0    4.001; merging,
 245     0.879      2.0    145.6    0.782    0.782    125.0      0.0    4.982; axial vel   0.374 surface,
4/3 Power Law.  Farfield dispersion based on wastefield width of       4.74 m
    conc  dilutn   width distnce    time
   (ppm)            (m)     (m)    (hrs) (kg/kg)   (s-1)  (cm/s)(m0.67/s2)
 6.91E-2   131.0   6.626     7.4  0.0817     0.0     0.0     2.0 3.00E-4
 1.35E-2   153.1    9.28    14.8   0.184     0.0     0.0     2.0 3.00E-4
 6.30E-3   175.2   12.22    22.2   0.287     0.0     0.0     2.0 3.00E-4
 3.76E-3   195.4   15.41    29.6    0.39     0.0     0.0     2.0 3.00E-4
 2.53E-3   214.0   18.84    37.0   0.493     0.0     0.0     2.0 3.00E-4
 1.83E-3   231.1   22.49    44.4   0.596     0.0     0.0     2.0 3.00E-4
 1.39E-3   247.1   26.35    51.8   0.698     0.0     0.0     2.0 3.00E-4
 1.09E-3   262.2   30.42    59.2   0.801     0.0     0.0     2.0 3.00E-4
 8.87E-4   276.5   34.67    66.6   0.904     0.0     0.0     2.0 3.00E-4
 7.33E-4   290.0    39.1    74.0   1.007     0.0     0.0     2.0 3.00E-4 (Shows the Chronic Dilution Factor is 290)
 6.17E-4   303.0   43.71    81.4   1.109     0.0     0.0     2.0 3.00E-4
count: 11
 ;
12:19:36 PM. amb fills: 2
```

Appendix D. Reasonable Potential Calculations

A. Reasonable Potential Calculation for Ammonia

The analysis below shows no reasonable potential to violate WQS for Ammonia.

Dilution Factors	Acute	Chronic
Aquatic Life	102.0	290.0
Human Health Carcinogenic		290.0
Human Health Non-Carcinogenic		290.0

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3
Effluent Data	# of Samples (n)		126
	Coeff of Variation (Cv)		0.66
	Effluent Concentration, ug/L (Max. or 95th Percentile)		34,100
	Calculated 50th percentile Effluent Conc. (when n>10)		
Receiving Water Data	90th Percentile Conc., ug/L		34
	Geo Mean, ug/L		
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	6,768
		Chronic	1,017
	WQ Criteria for Protection of Human Health, ug/L		-
	Metal Criteria Translator, decimal	Acute	-
		Chronic	-
	Carcinogen?		N

Aquatic Life Reasonable Potential

Effluent percentile value			0.990
s	$s^2=\ln(CV^2+1)$		0.601
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.964
Multiplier			1.00
Max concentration (ug/L) at edge of...		Acute	368
		Chronic	151
Reasonable Potential? Limit Required?			**NO**

B. Reasonable Potential Calculation for pH

The analysis shows no reasonable potential to violate WQS for pH.

The Washington water quality criterion for Extraordinary quality marine water specifies a pH range of 7.0 to 8.5 standard units, with human-caused variation within the above range of less than 0.2 units (WAC 173-201A-210(1)(f)).

(i) Using the maximum permitted pH of 9.0 s.u., and the maximum ambient pH of 8.2 s.u., the calculation shows that Washington WQS would be met at the edge of the mixing zone at 8.20 s.u., with no predicted variation with ambient pH.

Calculation of pH of a Mixture in Marine Water

Based on the CO2SYS program (Lewis and Wallace, 1998)
http://cdiac.esd.ornl.gov/oceans/co2rpt.html

INPUT	
1. MIXING ZONE BOUNDARY CHARACTERISTICS	
Dilution factor at mixing zone boundary	290.0
Depth at plume trapping level (m)	13.700
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	14.95
pH:	8.20
Salinity (psu):	29.90
Total alkalinity (meq/L)	2.32
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	23.00
pH:	9.00
Salinity (psu)	12.00
Total alkalinity (meq/L):	2.94
4. CLICK THE "Calculate" BUTTON TO UPDATE OUTPUT RESULTS -->	Calculat
OUTPUT	
CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	14.98
Salinity (psu)	29.84
Density (kg/m^3)	1022
Alkalinity (mmol/kg-SW):	2.27
Total Inorganic Carbon (mmol/kg-SW):	2
pH at Mixing Zone Boundary:	**8.204**

(ii) Using the minimum permitted pH of 6.0, and the lowest background pH of 7.3, the calculation below shows that Washington WQS would be met at the edge of the mixing zone at a pH of 7.27 s.u., with a 0.03 s.u. predicted variation with ambient pH.

Calculation of pH of a Mixture in Marine Water

Based on the CO2SYS program (Lewis and Wallace, 1998).
http://cdiac.esd.ornl.gov/oceans/co2rprt.html

INPUT	
1. MIXING ZONE BOUNDARY CHARACTERISTICS	
	290.0
Depth at plume trapping level (m)	13.700
2. BACKGROUND RECEIVING WATER CHARACTERISTICS	
Temperature (deg C):	14.95
pH:	7.30
Salinity (psu):	29.90
Total alkalinity (meq/L)	2.32
3. EFFLUENT CHARACTERISTICS	
Temperature (deg C):	23.00
pH:	6.00
Salinity (psu)	12.00
Total alkalinity (meq/L):	2.94
4. CLICK THE 'Calculate" BUTTON TO UPDATE OUTPUT RESULTS -->	Calculat
OUTPUT	
CONDITIONS AT THE MIXING ZONE BOUNDARY	
Temperature (deg C):	14.98
Salinity (psu)	29.84
Density (kg/m^3)	1022
Alkalinity (mmol/kg-SW):	2.27
Total Inorganic Carbon (mmol/kg-SW):	2
pH at Mixing Zone Boundary:	**7.271**

C. Reasonable Potential Calculation for Temperature

The analysis shows no reasonable potential to violate WQS for temperature.

In WAC 173-201A-210(1)(c), the Washington water quality criteria limit the ambient water temperature to 13.0ºC (1-day Maximum) for Extraordinary Quality marine water; when

natural conditions exceed 13.0 ºC, no temperature increases will be allowed which will raise the receiving water temperature by greater than 0.3º C.

The reasonable potential calculation below shows that incremental temperature increase is 0.03°C, which is less than the allowable WQS of 0.3°C. Therefore, the discharge has no reasonable potential to violate WQS for temperature, and no effluent limit for temperature is required.

Marine Temperature Reasonable Potential and Limit Calculation

Based on WAC 173-201A-200(1)(c)(i)--(ii) and Water Quality Program Guidance. All Data inputs must meet WQ guidelines. The Water Quality temperature guidance document may be found at: http://www.ecy.wa.gov/biblio/0610100.html

INPUT	Annual
1. Chronic Dilution Factor at Mixing Zone Boundary	290.0
2. Annual max 1DADMax Ambient Temperature (Background 90th percentile)	15.0 °C
3. 1DADMax Effluent Temperature (95th percentile)	23.0 °C
4. Aquatic Life Temperature WQ Criterion	13.0 °C
OUTPUT	
5. Temperature at Chronic Mixing Zone Boundary:	15.03 °C
6. Incremental Temperature Increase or decrease:	0.03 °C
7. Incremental Temperature Increase 12/(T-2) if T≤ crit:	---
8. Maximum Allowable Temperature at Mixing Zone Boundary:	15.30 °C
A. If ambient temp is warmer than WQ criterion	
9. Does temp fall within this warmer temp range?	YES
10. Temp increase allowed at mixing zone boundary, if required:	NO LIMIT

D. Reasonable Potential Calculation for Fecal Coliform Bacteria

The analysis shows no reasonable potential to violate WQS for fecal coliform bacteria.

EPA modeled the numbers of fecal coliform by simple mixing analysis using the technology-based limit of 400 organisms per 100 mL and a dilution factor of 290. The predicted fecal coliform count at the edge of the Chronic mixing zone is 3 organisms/100mL, which is below the WQS for Shellfish Harvesting of 14 organisms/100mL, therefore, Ecology's TBEL is appropriate, and would not violate Ecology's WQS for Shellfish Harvesting.

Calculation of Fecal Coliform at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	290.0
Receiving Water Fecal Coliform, #/100 ml	2
Effluent Fecal Coliform - worst case, #/100 ml	400
Surface Water Criteria, #/100 ml	*14*
OUTPUT	
Fecal Coliform at Mixing Zone Boundary, #/100 ml	**3**
Difference between mixed and ambient, #/100 ml	1

Conclusion: At design flow, the discharge has no reasonable potential to violate water quality standards for fecal coliform.

E. Antidegradation Analysis

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply all known, available, and reasonable methods of prevention, control, and treatment.
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions. Tier II ensures that waters of a higher quality than the criteria assigned are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.
A Tier II analysis is necessary when all three of the following conditions are met:

- The facility is planning a new or expanded action.
- Ecology regulates or authorizes the action.
- The action has the potential to cause measurable degradation to existing water quality at the edge of a chronic mixing zone.

Facility Specific Requirements--This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- For waters that do not meet assigned criteria, or protect existing or designated uses, Ecology will take appropriate and definitive steps to bring the water quality back into compliance with the WQS.

All the effluent limits in the Draft Permit are as stringent as the previous permit, and beneficial uses will not be impaired by the facility. The facility meets Tier I, and the facility does not meet the conditions that requires a further Tier II analysis. The analysis described demonstrates that the

proposed permit conditions will protect existing and designated uses of the receiving water. Therefore the Draft Permit meets Ecology's Antidegration policy.