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:

Borough of Petersburg

Borough of Petersburg Wastewater Treatment Plant

Public Comment Start Date: August 8, 2024

Public Comment Expiration Date: September 23, 2024

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EPA Proposes to Reissue the NPDES Permit

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

This Fact Sheet (FS) includes:

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

ADEC Issues Notice of Application for and Proposes to Issue the Clean Water Act 401 Certification

In accordance with Section 401 of the Clean Water Act (CWA), any applicant for a federal license or permit to conduct an activity that might result in a discharge into navigable waters must apply for and obtain certification from ADEC that the discharge will comply with the CWA, the Alaska Water Quality Standards, and other applicable State laws. On June 6, 2024, EPA requested final Clean Water Act (CWA) 401 certification from ADEC during the public comment period.

ADEC is accepting comment on the draft CWA 401 certification in Appendix G and Appendix H. The public notice for the notice of application for and draft Clean Water Act 401 Certification can also be found by visiting the Region 10 website at: https://www.epa.gov/npdes-permits/about-region-10s-npdes-permit-program.

For technical questions regarding the draft 401 certification, contact Marie Klingman at (907) 451-2101 or marie.klingman@alaska.gov.

To comment or request a public hearing on the notice of application or the proposed CWA 401 certification, submit comments electronically to Marie Klingman at marie.klingman@alaska.gov on or before the public notice expiration date listed above.

Clean Water Act 401(a)(2) Review

Section 401(a)(2) of the CWA requires that, upon receipt of an application and state certification pursuant to Section 401(a)(1), EPA as the permitting authority, shall notify a neighboring State or Tribe with Treatment as a State (TAS) when EPA determines that the discharge may affect the quality of the neighboring State/tribe's waters (33 U.S.C. 1341(a)(2)). As stated above, ADEC is the certifying authority and is accepting comment on the draft CWA 401 certification. After EPA receives final certification from ADEC, EPA will determine whether the discharge may affect the quality of a neighboring jurisdiction's water (33 U.S.C. 1341(a)(2)).

PUBLIC COMMENT

EPA requests that all comments on EPA's draft permit and tentative 301(h) decision or requests for a public hearing be submitted via email to Abigail Conner (conner.abigail@epa.gov). If you are unable to submit comments via email, please call 206-553-6358.

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

After the Public Notice expires, and all comments on the draft permit and tentative 301(h) decision have been considered, EPA Region 10 will make a final decision regarding 301(h) eligibility and permit issuance. If no substantive comments are received, the tentative conditions in the draft permit will become final, the tentative 301(h) decision will be finalized, and the permit will become effective upon issuance. If substantive comments are received, EPA will address the comments prior to taking final action on the 301(h) decision and 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

NPDES PERMIT

The draft permit, this Fact Sheet, the 301(h) Tentative Decision Document (301(h) TDD), and the Public Notice can also be found by visiting the Region 10 website at

https://www.epa.gov/npdes-permits/about-region-10s-npdes-permit-program.

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

For technical questions regarding the draft permit, this Fact Sheet, or the 301(h) TDD, contact Abigail Conner at (206) 553-6358 or conner.abigail@epa.gov. Services can be made available to persons with disabilities by contacting Audrey Washington at (206) 553-0523.

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Acronyms

1Q10	1 day, 10-year low flow
7Q10	7-day, 10-year low flow
30B3	Biologically based design flow intended to ensure an excursion frequency of less than once every three years, for a 30-day average flow.
ADEC	Alaska Department of Environmental Conservation
AML	Average Monthly Limit
AWL	Average Weekly Limit
BE	Biological Evaluation
BOD_5	Biochemical oxygen demand, five-day
BMP	Best Management Practices
$CBOD_5$	Carbonaceous Biochemical Oxygen Demand
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
gpd	Gallons per day
ICIS	Integrated Compliance Information System
LA	Load Allocation
Lbs/day	Pounds per day
LTA	Long Term Average
LTCP	Long Term Control Plan
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
MLLW	Mean Lower Low Water

MPN	Most Probable Number
NOAA	National Oceanic and Atmospheric Administration
NOEC	No Observable Effect Concentration
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Unit
POTW	Publicly owned treatment works
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
SS	Suspended Solids
SSO	Sanitary Sewer Overflow
s.u.	Standard Units
TDD	301(h) Technical Decision Document
TMDL	Total Maximum Daily Load
TRC	Total Residual Chlorine
TRE/TIE	Toxicity Reduction and Identification Evaluation
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
TSS	Total suspended solids
TU_a	Toxic Units, Acute
TU_c	Toxic Units, Chronic
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UV	Ultraviolet
WD	Water Division
WET	Whole Effluent Toxicity
WLA	Wasteload allocation
WQBEL	Water quality-based effluent limit
WQS	Water Quality Standards
WWTP	Wastewater treatment plant

I. BACKGROUND INFORMATION

A. GENERAL INFORMATION

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

Table 1. General Facility Information

NPDES Permit #	AK0021458
Applicant	Borough of Petersburg Borough of Petersburg Wastewater Treatment Plant
Type of Ownership	Publicly Owned Treatment Works
Physical Address	1404 14th Street Petersburg, AK 99833
Mailing Address	P.O. Box 329 Petersburg, AK 99833
Facility Contact	Justin Haley Wastewater Department Supervisor jhaley@petersburgak.gov 907-772-3787
Facility Location	Latitude: 56.817100, Longitude: -132.932939
Receiving Water	Frederick Sound
Facility Outfall	Latitude: 56.819594, Longitude: -132.923494 (midpoint of diffuser)

B. MODIFICATION OF SECONDARY TREATMENT REQUIREMENTS

The Borough of Petersburg (Petersburg, the applicant, or the permittee) has requested a modification, under Section 301(h) of the CWA of the secondary treatment requirements contained in Section 301(b)(1)(B) of the CWA to discharge wastewater receiving less than secondary treatment from the Borough of Petersburg Wastewater Treatment Plant (WWTP) into Frederick Sound. The effluent quality attainable by secondary treatment is defined in the regulations at 40 CFR Part 133 in terms of biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. Petersburg has requested a 301(h) modification of the secondary treatment requirements for BOD_5, TSS, but not for pH.

Upon review of the application materials and available data, EPA has tentatively determined that the Petersburg WWTP meets the nine statutory requirements of Section 301(h) of the CWA and the implementing regulations at 40 CFR Part 125, Subpart G, and is proposing to reissue a 301(h)-modified NPDES permit to the facility. EPA has prepared a tentative decision (301(h) TDD) which presents the findings and

conclusions of the Region as to whether the applicant's proposed discharge complies with the criteria set forth in Section 301(h) of the CWA, as implemented by regulations at 40 CFR Part 125, Subpart G.

C. PERMIT HISTORY

The Borough of Petersburg submitted its original application for a CWA section 301(h) variance on September 13, 1979, and submitted additional information on November 23, 1982. The original application was based on the discharge of effluent through four outfalls, with one to Frederick Sound and three to Wrangell Narrows as well as construction of a new primary treatment facility to replace the existing, non-functioning secondary treatment facility.

EPA issued a tentative decision to deny the variance from secondary treatment requirements on January 16, 1984. The basis for the denial was the applicant's failure to provide a determination from the State of Alaska that the proposed discharge would comply with applicable provisions of state law, including appliable water quality standards. ADEC conducted a fecal coliform bacteria survey in Wrangell Narrows adjacent to the City of Petersburg in July 1983. The high levels of bacteria found in some of the samples indicated excursions above the State's fecal coliform water quality standards occur in Wrangell Narrows, and ADEC could not certify that the three proposed outfalls into Wrangell Narrows would comply with applicable water quality standards. ADEC did however certify the fourth outfall to Frederick Sound would comply with water quality standards.

Petersburg notified EPA on February 15, 1984, of their intent to revise their 301(h) application. The revised application, submitted on January 13, 1985, with additional information submitted on February 25, 1985, stated discharge would only be to Frederick Sound. A permit was issued to the facility and became effective on April 29, 1986.

The most recent NPDES permit for the Petersburg WWTP was issued on November 20, 2001, became effective on December 24, 2001, and expired on December 26, 2006 (hereafter referred to as the 2001 permit). The 2001 permit is a 301(h)-modified NPDES permit which includes a modification of secondary treatment requirements, as approved by EPA. A timely and complete NPDES application was submitted by the permittee on March 20, 2006. Pursuant to 40 CFR 122.6, the permit has been administratively continued and remains fully effective and enforceable.

D. TRIBAL CONSULTATION

EPA consults on a government-to-government basis with federally recognized tribal governments when EPA actions and decisions may affect tribal interests. Meaningful tribal consultation is an integral component of the federal government's general trust relationship with federally recognized tribes. The federal government recognizes the right of each tribe to self-government, with sovereign powers over their members and their territory. Executive Order 13175 (November 2000) entitled "Consultation and Coordination with Indian Tribal Governments" requires federal agencies to have an

accountable process to assure meaningful and timely input by tribal officials in the development of regulatory policies on matters that have tribal implications and to strengthen the government-to-government relationship with Indian tribes. In May 2011, EPA issued the "EPA Policy on Consultation and Coordination with Indian Tribes" which established national guidelines and institutional controls for consultation.

The Petersburg WWTP is located within the traditional and historical territory of the Petersburg Indian Association, a federally recognized tribe. EPA notified the Petersburg Indian Association of its work on this draft permit in August 2020 and January 2021. EPA also held an informational webinar for the Petersburg Indian Association and other tribes on April 14 and 25, 2022. EPA shared the preliminary draft permit, draft fact sheet, and draft 301(h) TDD with the Petersburg Indian Association on March 29, 2024. EPA sent a letter of invitation to the Petersburg Indian Association to participate in formal government-to-government consultation on the draft 301(h) TDD and permitting decisions on June 6, 2024.

II. FACILITY INFORMATION

A. TREATMENT PLANT DESCRIPTION

Service Area

The Borough of Petersburg owns and operates the WWTP located in Petersburg, Alaska. The collection system is not a combined system. The facility serves a resident population of approximately 3,000 people. There is one industrial user that discharges to the treatment plant, a solid waste bailing facility.

Treatment Process

The max monthly design flow of the facility is 1.2 million gallons per day (mgd). The reported actual flows from the facility range from 0.28 mgd to 0.64 mgd (average monthly flow). The facility provides primary treatment to all wastewater prior to discharge. Influent to the facility enters through two primary screens and then proceeds to the grit separator where gravitational and centrifugal forces remove grit. The influent is then routed to two primary clarifiers, and chlorine is intermittently added. Primary sludge and skimmings from the clarifier are moved to the sludge storage tank. The final effluent from the primary clarifiers flow over v-notch weirs at the outlet end of the tanks and is collected in effluent launders where it then flows to the outfall pipe in Frederick Sound.

Separated solids removed from the primary screens are used as a bulking agent in the facility's composting operation. Sludge and scum are discharged to the sludge storage tank, which acts as an aerobic digester. Sludge from the storage tank is then routed to a belt filter for dewatering, through a variable speed progressive cavity pump with an added polymer, and then into a sludge mixing tank. The mixture then flows through the belt filter press and the dewatered solids are composed on site using either an aerated static or aerated turned pile method. The finished compost meets Class A biosolids requirements. Because the design flow is greater than 1 mgd, the

facility is considered a major facility. A schematic of the wastewater treatment process and a map showing the location of the treatment facility and discharge are included in Appendix A of the 301(h) TDD**.**

B. OUTFALL DESCRIPTION

The facility outfall is an 18-inch pipe which extends 1200 feet from shore at approximately 60 feet (18.3 meters) below mean lower low water (MLLW). The pipe ends in a five-port diffuser. Only two of the five ports on the diffuser remain open and used. The diffuser is 45.9 feet (14 meters) in length and the diameter of each port is 4 inches.

C. EFFLUENT CHARACTERIZATION

To characterize the effluent, EPA evaluated discharge monitoring report (DMR) data from 2018 through 2023 and the results of a 2002 and 2005 priority pollutant scan. The effluent quality is summarized in Table 2. Data are provided in B of this fact sheet and Appendix C of the 301(h) TDD.

Table 2. Effluent Characterization

Parameter	Minimum	Maximum
Flow (monthly avg), mgd	0.28	0.64
Flow (max daily), mgd	0.36	1.92
BOD (monthly avg), mg/L	42	125
BOD (monthly avg), lbs/day	156	414
BOD (daily max), mg/L	42	147
BOD (daily max), lbs/day	159	602
BOD (monthly avg % removal), %	36	59
TSS (monthly avg), mg/L	22	73
TSS (monthly avg), lbs/day	75	407
TSS (daily max), mg/L	25	85
TSS (daily max), lbs/day	79	680
TSS (monthly avg % removal), %	52	86
Fecal coliform (monthly geo mean), #/100 mL	90,000	995,834
Fecal coliform (daily max), #/100 mL	110,000	1,183,333
Dissolved oxygen (daily min), mg/L	2.6	9.2
Dissolved oxygen (daily max), mg/L	3.1	11.6
pH (min), standard units	6.6	7.3
pH (max), standard units	6.8	7.9
Temperature (monthly avg), ^{o}C	3.6	15.1
Parameter	**Avg Daily**	**Max Daily**
Arsenic[2], µg/L	100.0	100.0
Bis 2-ethylhexyl phthalate[2], µg/L	83.0	150.0
Chloroform[2], µg/L	3.8	3.4
Copper[2], µg/L	33.0	30.0
Cyanide[2], µg/L	0.01	0.01

Lead[2], µg/L	25.0	25.0
Phenol[2], µg/L	17.0	15.0
Selenium[2], µg/L	100.0	100.0
Thallium[2], µg/L	100.0	100.0
Zinc[2], µg/L	110.0	78.0
(1) Discharge monthly reports (DMR) from 6/30/2018 – 5/31/2023 (2) Priority Pollutant Scan, 2002 and 2005, 2 samples collected for each pollutant		

D. COMPLIANCE HISTORY

The facility did not have any effluent violations between 2018 and 2023. Additional compliance information for this facility, including compliance with other environmental statutes, is available on Enforcement and Compliance History Online (ECHO). The ECHO web address for this facility is: https://echo.epa.gov/detailed-facility-report?fid=110000760917.

EPA conducted an on-site inspection of the facility in 2017 and a desk audit in 2020. The inspection encompassed the wastewater treatment process, records review, operation and maintenance, and the collection system. The inspection did not note any significant concerns at the facility.

III. RECEIVING WATER

In drafting permit conditions, EPA must analyze the effect of the facility's discharge on the receiving water. The details of that analysis are provided in the 301(h) TDD and in the Water Quality-Based Effluent Limits (WQBEL) section of this Fact Sheet. This section summarizes characteristics of the receiving water that impact that analysis.

This facility discharges to Frederick Sound in Petersburg, AK. Frederick Sound is connected to the Pacific Ocean via Chatham Strait to the northwest and Dry Strait/Sumner Strait to the southeast. For a detailed description of the receiving waters please refer to Section 6 of the 301(h) TDD.

A. WATER QUALITY STANDARDS (WQS)

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

body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

Waterbodies in Alaska are designated for all uses unless the water has been reclassified under 18 Alaska Administrative Code (AAC) 70.230 as listed under 18 AAC 70.230(e). Some waterbodies in Alaska can also have site-specific water quality criterion per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b). The receiving water for this discharge, Frederick Sound, has not been reclassified, nor have site-specific water quality criteria been established. Therefore, Frederick Sound must be protected for all marine use classes as per 18 AAC 70.020(a)(2) and 18 AAC 70.050. The designated use classes for marine water include (A) water supply (aquaculture, seafood processing, and industrial), (B) water recreation (contact and secondary), (C) growth and propagation of fish, shellfish, other aquatic life, and wildlife, and (D) harvesting for consumption of raw mollusks or other raw aquatic life.

B. RECEIVING WATER QUALITY

The water quality of Frederick Sound is summarized in Table 3, below, and in Section 6 of the 301(h) TDD. The Petersburg WWTP collected water quality data in Frederick Sound in accordance with 2001 permit requirements for the following parameters: temperature, pH, dissolved oxygen, turbidity, and salinity.

From April through August 2021, the Aquatic Restoration and Research Institute (ARRI) conducted a survey for the Alaska Department of Environmental Conservation (ADEC) on water quality data in the vicinity of the Petersburg WWTP for temperature, salinity, pH, fecal coliform, enterococcus, ammonia, copper, nickel, and zinc. The water quality data in Frederick Sound from the 2021 ARRI report and the permittee are summarized below in Table 3 and Appendix B.

Table 3. Receiving Water Quality Data

Parameter	Units	Percentile	Value
Temperature[1]	°C	95th	9.3
pH[1]	Standard units	5th – 95th	7.1 - 8.4
Dissolved Oxygen[1]	mg/L	Minimum	5.6
Turbidity[1]	NTU	Average	8.7
Salinity[1]	ppt	5th – 95th	25.7 – 45.8
Fecal Coliform[2]	CFU/100 mL	Max Geometric Mean	283
Enterococcus[2]	MPN/100 mL	Maximum	16.4
Ammonia (N)[2]	mg/L	Maximum	0.048
Copper, Total Recoverable[2]	µg/L	Maximum	0.46
Nickel, Total Recoverable[2]	µg/L	Maximum	0.42
Zinc, Total Recoverable[2]	µg/L	Maximum	1.04
(1) Data collected by permittee 2002 - 2005 (2) ARRI, 2022. Water Quality Measures in Alaska's Ports and Shipping Lanes, 2021 Annual Report			

1. General Characteristics

Frederick Sound is located within the ocean waters east of Mitkof Island in southeast Alaska. The discharge is to an area of high currents with some freshwater influence from the Stikine River in the discharge area. The currents in Frederick Sound are generally reported to flow northwestward with southwestward flows during large tides.

2. Water Quality Limited Waters

The State of Alaska's 2022 Integrated Report Section 5 (CWA 303(d)) does not list Frederick Sound as impaired for any parameters (ADEC, 2022).

IV. EFFLUENT LIMITATIONS AND MONITORING

The draft permit includes several changes to the effluent limitations. The changes are summarized in Table 4 below:

Table 4. Summary of Proposed Changes to Effluent Limits

Parameter	Effluent Limit Change	Basis
TBELs		
BOD_5	More stringent average monthly limit	EPA is proposing a more stringent average monthly effluent limit for Oct 1 – April 30 that reflects facility performance. The proposed limit is at a level of performance which the facility can consistently achieve.
TSS	More stringent limits	EPA is proposing more stringent effluent limits that reflect facility performance. The proposed limits are at the level of performance which the facility can consistently achieve.
BOD_5[1]	Removing maximum daily limit/including average weekly limit	The regulations at 40 CFR 122.45(d)(2) require effluent limitations for continuous discharges from POTWs be expressed as average weekly and average monthly discharge limitations, unless impracticable. The 2001 permit contained average monthly and maximum daily effluent limits for BOD_5. The draft permit proposes to remove the maximum daily effluent limit and implement an average weekly limit. The inclusion of a maximum daily limit instead of an average weekly limit meets an exception to the prohibition on backsliding as described in Section IV.A.2.b.
BOD_5	Decreased averaging period for BOD percent removal	EPA is proposing to revise the averaging period for BOD_5 percent removal from quarterly to monthly. Facility DMR monitoring facility can meet the monthly averaging period and therefore does not qualify for quarterly averaging.

Parameter	Effluent Limit Change	Basis
TSS[1]	Removing maximum daily limit/including average weekly limit	The regulations at 40 CFR 122.45(d)(2) require effluent limitations for continuous discharges from POTWs be expressed as average weekly and average monthly discharge limitations, unless impracticable. The 2001 permit contained average monthly and maximum daily effluent limits for TSS. The draft permit proposes to remove the maximum daily effluent limit and implement an average weekly limit. The change in limits meets an exception to prohibition on backsliding as described in Section IV.A.2.b.
WQBELs		
Ammonia	New effluent limits	EPA is proposing new ammonia limits based on limits EPA expects ADEC to include in the CWA Section 401 certification.
Enterococcus	New effluent limits	Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet WQS. Section 301(h)(9) and 40 CFR 125.62 require 301(h)-modified discharges to meet all applicable state water quality standards and federal CWA Section 304(a) criteria at the boundary of the ZID. When the 2001 permit was issued, there were no WQS in effect for enterococcus. In 2017, EPA approved Alaska's WQS for enterococcus. EPA has determined the modified discharge has reasonable potential to cause or contribute to an excursion above the WQS for enterococcus. The draft permit contains WQBELs for enterococcus developed using the chronic mixing zone that will ensure Alaska's most protective WQS are met at the boundary of the ZID.

Parameter	Effluent Limit Change	Basis
Fecal Coliform	More stringent maximum daily and average monthly limits	Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet WQS. Section 301(h)(9) of the CWA and 40 CFR 125.62 require 301(h) discharges to meet state WQS and federal CWA 304(a) criteria at the boundary of the zone of initial dilution (ZID). The draft permit contains fecal coliform limits that EPA anticipates the state of Alaska will include as a condition of the 401 certification. These limits will ensure Alaska's most protective WQS are met at the boundary of the chronic mixing zone.
(1) Concentration/mass-loading limits only; compliance with 30% removal is still determined on monthly averaging basis.		

Table 5 below presents the existing effluent limits and monitoring requirements in the 2001 Permit. Table 6 below presents the effluent limits and monitoring requirements proposed in the draft permit.

Table 5. Existing 2001 Permit - Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly Limit	Average Weekly Limit	Max Daily Limit	Sample Location	Sample Frequency	Sample Type
Total Flow	MGD	1.2	--	3.6	Influent or Effluent	Continuous	Recorded
BOD_5, May 1 – Sept. 30	mg/L	175	--	200	Influent and Effluent	2/month	24-hour composite
	lbs/day	1750	--	2000			
BOD_5, Oct. 1 – April 30	mg/L	140	--	200	Influent and Effluent	2/month	24-hour composite
	lbs/day	1400	--	2000			
BOD_5,% removal[1]	%	30% (minimum)	--	--	Influent and Effluent	--	Calculation
Total Suspended Solids (TSS)	mg/L	140	--	200	Influent and Effluent	2/month	24-hour composite
	lbs/day	1400	--	2000			

TSS, % removal[1]	%	30% (minimum)	--	--	Influent and Effluent	--	Calculation
Total Ammonia as N	Mg/L	--			Effluent	mg/L	24-hour composite
Dissolved Oxygen	mg/L	Between 2.0 mg/L – 17 mg/L			Effluent	1/week	Grab
Fecal Coliform	# FC/100 mL	1.0×10^6	--	1.5×10^6	Effluent	2/month	Grab
pH	s.u.	Between 6.5 s.u.– 8.5 s.u.			Effluent	1/week	Grab
Settleable Solids	mg/L	--			Effluent	1/week	Grab
Temperature	°C	--			Effluent	1/week	Grab
Whole Effluent Toxicity (WET)[2], TU_c	TU_c	--			Effluent	1/permit term[3]	24-hour composite
Toxic Pollutants and Pesticides[4]	--	--			Effluent	2/permit term[5]	24-hour composite

(1) Percent removal requirements for BOD_5 are as follows: for BOD_5 for any quarter, the quarterly average effluent loading shall not exceed 70 percent of the quarterly average influent loading; for TSS for any month, the monthly average effluent loading shall not exceed 70 percent of the monthly average influent loading.

(2) See Permit Part I.C (2001 Permit)

(3) Whole Effluent Toxicity monitoring shall be conducted once per year in the first and fourth years of the permit term.

(4) "Toxic pollutants are defined as the 126 priority pollutants listed at 40 CFR 401.15. Pesticides are defined at 40 CFR 125.58(m).

(5) The permittee shall conduct analyses of the effluent for toxic pollutants and pesticides during the first and fourth years of the permit term. The analysis shall be performed on one 24-hr sample (dry weather). Dry weather is defined as the time period between 02/01 - 8/31. Samples shall be grab samples. Sampling and analysis shall be conducted according to methods approved in 40 CFR Part 136. Results of the analysis shall be submitted to EPA with the permittee's application for reissuance.

Table 6. Draft Permit - Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly Limit	Average Weekly Limit	Max Daily Limit	Sample Location	Sample Frequency	Sample Type
Total Flow	MGD	1.2	--	3.6	Influent or Effluent	Continuous	Recorded
BOD_5, May 1 – September 30	mg/L	175	340	--	Influent and Effluent	2/month	24-hour composite
	lbs/day	1751	3398	--			Calculation[1]
BOD_5, Oct 1 – April 30	mg/L	127	206	--	Influent and Effluent	2/month	24-hour composite
	lbs/day	1271	2062	--			Calculation[1]
BOD_5, % removal	%	30 (minimum)			Influent and Effluent	1/month	Calculation[2]
Total Suspended Solids (TSS)	mg/L	53	78	--	Influent and Effluent	2/month	24-hour composite
	lbs/day	530	781	--			Calculation[1]
TSS, % removal	%	30 (minimum)			Influent and Effluent	1/month	Calculation[2]
Total Ammonia (as N)	mg/L	22	--	39	Effluent	1/week	24-hour composite
	lbs/day	220	--	390			Calculation[1]
Dissolved Oxygen	mg/L	Between 2.0 – 17.0			Effluent	1/week	Grab
Enterococcus (Interim Limit)	#/100 mL	Report	--	Report	Effluent	2/month[3]	Grab
Enterero-coccus[4,5] (Final Limit)	#/100 mL	1,960[6] (geomean)	--	7,280 (instant. max)	Effluent	2/month[3]	Grab
Fecal Coliform[4] (Interim Limit)	# FC/100 mL	925,000[6,7] (geomean)	--	1,063,000[7] (instant. max)	Effluent	2/month[3]	Grab

Fecal Coliform[4,5] (Final Limit)	# FC/100 mL	200[6]	400	800	Effluent	2/month[3]	Grab
pH	s.u.	Between 6.5 – 8.5			Effluent	1/week	Grab
Monitoring Only							
Temperature	°C	--	Report	Report	Effluent	1/week	Grab
Arsenic, Total Recoverable	µg/L	Report	--	Report	Effluent	1/quarter	24-hour composite
	lbs/day	Report	--	Report			Calculation[1]
Total Residual Chlorine	µg/L	Report	--	Report	Effluent	1/week[8]	Grab
	lbs/day	Report	--	Report			Calculation[1]
Copper, Total Recoverable	µg/L	Report	--	Report	Effluent	1/quarter	24-hour composite
	lbs/day	Report	--	Report			Calculation[1]
Cyanide	µg/L	Report	--	Report	Effluent	1/quarter	24-hour composite
	lbs/day	Report	--	Report			Calculation[1]
Zinc, Total Recoverable	µg/L	Report	--	Report	Effluent	1/quarter	24-hour composite
	lbs/day	Report	--	Report			Calculation[1]
Whole Effluent Toxicity (WET)[9]	TU_c	See Permit Part I.C.			Effluent	1/quarter[10]	24-hour composite
Per-and Polyfluoroalkyl Substances (PFAS)[11]	ng/L	Report	--	Report	Influent, Effluent	2/year[12]	24-hour composite
	mg/kg dry weight	--	--	Report	Sludge	2/year[12]	Grab
Toxic Pollutant Scan[13]	See Permit Part I.C.				Effluent	2/5-years[14]	24-hour composite

(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) Between May and August of each year, fecal coliform and enterococcus sampling shall coincide with receiving water sampling in Permit Part I.D.

(4) Reporting is required within 24 hours of a maximum daily limit or instantaneous maximum limit violation. See Permit Parts I.B.3 and III.G.

(5) Final fecal coliform and enterococcus limits. See Permit Part II.C. for compliance schedule information.

(6) If more than one bacteria sample is collected within the reporting period, the average result must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the product of the quantities. For example, the geometric mean of 100, 200, and 300 is (100 X 200 X 300)1/3 = 181.7.

(7) Interim average monthly limit and maximum daily limits are based on the 95th percentile of fecal coliform data between 2018 - 2023. See Permit Part II.C for compliance schedule information.

(8) Monitoring for total residual chlorine is only required when chlorine is used in the treatment process.

(9) Chronic WET testing – See Permit Part I.C.

(10) Toxicity testing must be conducted quarterly, except as provided in Permit Parts I.C.

(11) See Permit Part I.B.9 and I.B.10.

(12) Monitoring for PFAS chemicals is required twice a year. One of the samples should occur between May through August, and the other between September through April, with at least two months between samples.

(13) Effluent Testing Data – See NPDES Permit Application Form 2A Table B, Table C, and Permit Part I.B.8 for the list of pollutants to be included in this testing. The Permittee must use sufficiently sensitive analytical methods in accordance with Permit Part I.B.5.

(14) Testing must occur twice every five years, once during the wet weather season and once during the dry weather season, with one instance of testing occurring during the 2nd year after the effective date of the permit and another instance during the 4th year after 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 effluent limits (TBELs) or WQBELs. TBELs are set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the WQS applicable to a waterbody are being met and may be more stringent than TBELs.

1. Pollutants of Concern

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

- Have a TBEL
- Have an assigned wasteload allocation (WLA) from a Total Maximum Daily Load (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

The wastewater treatment process for this facility includes primary treatment. Pollutants expected in the discharge from a facility with this type of treatment, include but are not limited to: BOD_5, TSS, fecal coliform and enterococcus bacteria, pH, ammonia, temperature, and dissolved oxygen (DO).

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

- BOD_5
- TSS
- pH
- Bacteria (fecal coliform, enterococcus)
- Ammonia
- Arsenic
- Chlorine
- Copper
- Cyanide
- DO
- Temperature
- Zinc
- Other Toxics (bis 2-ethylhexyl phthalate, chloroform, lead, phenol, selenium, 1,2-dichlorobenzene, and 1,3-dichlorobenzene)

2. Technology-Based Effluent Limits (TBELs)

a. Federal Primary 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. EPA has developed and promulgated "secondary treatment" effluent limitations, which are found in 40 CFR 133.102. These TBELs identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH.

Table 7. Secondary Treatment Standards

Parameter	30-day average	7-day average
BOD_5	30 mg/L	45 mg/L (or 40 mg/L $CBOD_5$)
TSS	30 mg/L	45 mg/L
BOD_5 and TSS removal	not less than 85%	--
pH	within the limits of 6.0–9.0	

Section 301(h) of the CWA provides for a waiver from secondary treatment if the permittee meets several specific criteria, including a requirement to achieve primary treatment. Primary treatment is defined in Section 301(h) of the CWA as 30 percent removal of BOD_5 and TSS from the influent. The current permit requires 30 percent removal of BOD_5 and TSS on a monthly basis and the applicant has requested to maintain these limits.

Unlike secondary treatment standards, which require POTWs to meet monthly average and weekly average concentration limits for BOD_5 and TSS, the primary treatment standards do not include concentration-based TBELs for BOD_5 and TSS. Instead, concentration-based limitations, and by extension mass-based limits, are established on a case-by-case basis using state WQS and the level of treatment performance the facility is consistently able to achieve. See Section IV.A.2.b for more information on concentration and mass limits.

EPA has tentatively determined that the Petersburg WWTP qualifies for a continuation of their waiver from the secondary treatment standards pursuant to Section 301(h) of the CWA. Therefore, the draft permit maintains the 30 percent minimum removal limits for TSS and BOD_5 on a monthly basis.

b. Concentration and Mass Based Limits

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

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

[1] 8.34 is a conversion factor with units (lb x L)(mg x gallon x 10^6). See Exhibit 5-7 in the NPDES Permit Writer's Manual.

In the 2001 permit, monthly average and maximum daily concentration-based limits for TSS and BOD_5 were specified by ADEC in their June 18, 2001, final Certificate of Reasonable Assurance issued pursuant to Section 401 of the CWA.

For this draft permit, EPA assessed influent and effluent data (2018-2023) for BOD_5 and TSS to establish concentration-based limits reflective of facility performance.

Instead of including maximum daily limits for BOD_5 and TSS, the draft permit imposes average weekly limits. This is consistent with 40 CFR 122.45(d)(2) which requires average weekly and average monthly discharge limitations for POTWs.

BOD_5

DMR data indicates the discharge is consistently achieving greater BOD_5 removal than the federal primary treatment standard of 30%. Average percent removal between 2018 and 2023 was 47%. The 2001 permit includes seasonal limits for BOD_5, based on the requirements in ADEC's 401 certification of the 2001 permit which cited greater loading during the summer months. The draft permit continues to have seasonal limits. Influent BOD_5 concentrations are higher during the summer months as shown in the facility DMR data between 2018-2023.

Average Monthly Limit (AML): EPA used the 95th percentile of influent data from 2018 to 2023 and an assumed 30% removal to calculate an AML of 176 mg/L (May 1 – Sept 30) and 127 mg/L (Oct 1 – April 30). The May 1 – Sept 30 calculated limit is less stringent than the current AML in the 2001 permit, which the permittee has demonstrated it can generally achieve. EPA is proposing to retain the current limit of 175 mg/L for May 1 – Sept 30 in draft permit. The Oct 1 – April 30 calculated limit is more stringent than the current AML in the 2001 permit. Since the federal primary treatment standard is 30% removal, EPA is proposing to implement the calculated limit of 127 mg/L for Oct 1 – April 30 in the draft permit. Based on the BOD_5 monitoring data, EPA expects the facility to be able to consistently meet this limit.

Average Weekly Limit (AWL): EPA used the multiplier from Table 5-3 of the Amended Technical Support Document for Water Quality-Based Toxics Control and the calculated AMLs to calculate AWLs of 340 mg/L (May 1 – Sept 30) and 206 mg/L (Oct 1 – Apr 30). EPA is proposing to include the calculated limits in the draft permit. EPA is removing the maximum daily limits that were in the 2001 permit. *See* Antibacksliding discussion, below.

Using these concentrations in the equation above, the mass-based limits for BOD_5 are as follows:

BOD_5 (May - September)

Average Monthly Limit = 175 mg/L × 1.2 mgd × 8.34 = 1,751 lbs/day

Average Weekly Limit = 339.5 mg/L × 1.2 mgd × 8.34 = 3,397 lbs/day

BOD_5 (October - April)

Average Monthly Limit = 127 mg/L × 1.2 mgd × 8.34 = 1,271 lbs/day

Average Weekly Limit = 206 mg/L × 1.2 mgd × 8.34 = 2,062 lbs/day

Table 8. Inputs for Calculation of BOD Limits

Parameter	May 1 – Sept 30	Oct 1 – April 30
95th Percentile of Influent Data (mg/L)	251	181
Final Effluent After 30% Removal (mg/L)	175.9	126.9
CV of Effluent Data	0.8	0.5
Samples per month	2	2
TSD Multiplier (99th/95th)	1.94	1.622

TSS

DMR data indicates the discharge is consistently achieving greater TSS removal than the federal primary treatment standard of 30%. Average percent removal between 2018 and 2023 was 72%. As discussed below, EPA proposes to establish TSS concentration limits that reflect facility performance.

Average Monthly Limit (AML): Using effluent data from 2018 to 2023, EPA conducted a statistical analysis to calculate an average monthly TSS effluent limitation based on facility performance. The performance-based AML was 53 mg/L. This is more stringent than the current AML of 140 mg/L and reflects facility performance for TSS removal. The draft permit contains an AML of 53 mg/L which is a level of performance the facility can consistently achieve.

Average Weekly Limit (AWL): Using effluent data from 2018 to 2023, EPA conducted a statistical analysis to calculate an AWL for TSS based on facility performance. The performance-based AWL was 78 mg/L, which reflects facility performance for TSS. The 2001 permit included maximum daily limit

(MDL) of 200 mg/L. The draft permit contains an AWL of 78 mg/L which is a level of performance the facility can consistently achieve.

Using these concentration limits in the equation above, the mass-based limits for TSS are as follows:

Average Monthly Limit = 53 mg/L × 1.2 mgd × 8.34 = 530 lbs/day

Average Weekly Limit = 78 mg/L × 1.2 mgd × 8.34 = 781 lbs/day

pH

The TBEL for pH at 40 CFR 133.102 is between 6.0 and 9.0 standard units (s.u). The facility has requested a 301(h) waiver for pH to be between 6.5 and 8.0. The requested pH is more stringent than the secondary treatment TBELs for pH and more stringent than the current pH limit of 6.5 to 8.5. Since the waiver is meant to provide a relief from a more stringent requirement, it appears that the facility requested this waiver in error. Therefore, EPA is maintaining the current pH limit.

Antibacksliding: TBELs

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

EPA is proposing to remove the maximum daily BOD_5 and TSS limits and establish average monthly and average weekly limits pursuant to 40 CFR 122.45(d)(2). 40 CFR 122.45(d)(2) requires that effluent limitations for continuous discharges from POTWs be expressed as average weekly and average monthly discharge limitations, unless impracticable.

40 CFR 122.44(l)(1) states that a permit can be made less stringent if "the circumstances on which the previous permit was based have materially and substantially changed since the time the permit was issued and would constitute cause for permit modification…under §122.62." Here, EPA is removing the maximum daily limits for BOD_5 and TSS. Since EPA is including both average monthly and average weekly limits, maximum daily limits are no longer necessary, and the permit is as stringent as it was previously. However, even assuming that removal of the maximum daily limits results in less stringent effluent limits, EPA can remove the limits. One of the causes for modification is to allow for the correction of technical mistakes. 40 CFR 122.62(a)(15). The 2001 BOD_5 average monthly and maximum daily effluent limits were specified in ADEC's 401 certification; it is unknown what

assumptions these limits were based on, and EPA is unable to determine how these limits were calculated. During preliminary discussions, ADEC has indicated they will not include maximum daily limits in their 401 certification. If this changes upon receipt of their final certification, EPA will include the effluent limits in the final permit. Therefore, EPA is correcting this technical mistake and an exception to antibacksliding applies.

3. Water Quality-Based Effluent Limits (WQBELs)

a. Statutory and Regulatory Basis

Section 301(b)(1)(C) of the CWA requires the development of limits in permits necessary to meet all applicable WQS. Discharges to state or tribal waters must also comply with conditions imposed by the state or tribe as part of the CWA 401 certification of the permit. See 33 U.S.C. 1341. 40 CFR 122.44(d)(1), which implements Section 301(b)(1)(C) of the CWA, requires that permits include limits for all pollutants or parameters that are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state or tribal WQS, including narrative criteria for water quality. Effluent limits must also meet the applicable water quality requirements of affected States other than the State in which the discharge originates, which may include downstream States. 40 CFR 122.4(d) and 122.44(d)(4), see also 33 U.S.C. 1341(a)(2). These requirements are applicable to all NPDES permits.

For 301(h)-modified dischargers, water quality-based effluent limits must consider the following separate regulatory provisions which overlap to some extent with the provisions discussed above.

Section 301(h)(9) of the CWA, and its implementing regulations at 40 CFR 125.62(a), require 301(h)-modified discharges to meet all applicable state WQS as well as water quality criteria established under Section 304(a)(1) of the CWA after initial mixing in the waters surrounding or adjacent to the discharge point. See 33 U.S.C. 1311(h)(9).

Section 301(h)(1) of the CWA, and its implementing regulations at 40 CFR 125.61, require that there must be a water quality standard applicable to each pollutant for which the 301(h) modification is requested (i.e., BOD_5 and TSS, or surrogates) and the applicant must demonstrate the proposed modified discharge will comply with these standards after initial mixing. 33 U.S.C. 1311(h)(1).

In addition, effluent limits must be stringent enough to ensure that WQS are met and must be consistent with any available wasteload allocation (WLA) for the discharge in an approved total maximum daily load (TMDL). 40 CFR 122.44. There are no approved TMDLs that specify WLAs for this discharge; therefore, all of the WQBELs are calculated directly from the applicable WQS.

Alaska's WQS can be found at 18 AAC 70 (ADEC 2023) and the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (ADEC 2022). As discussed in Section III.A of this Fact Sheet, Alaska's WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an antidegradation policy. The use classification system identifies the designated uses that each waterbody is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the designated use classification of each waterbody and are the values used in EPA's reasonable potential analysis.

b. Reasonable Potential Analysis and Need for WQBELs

EPA used Alaska WQS and the processes described in the Amended Section 301(h) Technical Support Document (301(h) TSD) and the 1991 *Technical Support Document for Water Quality-based Toxics Control* to determine reasonable potential. To determine if there is reasonable potential for the discharge to cause or contribute to an excursion above any state WQS for a given pollutant, EPA compares the maximum projected receiving water concentration to the water quality criteria for that pollutant. If the projected receiving water concentration exceeds the WQS, there is reasonable potential, and a WQBEL must be included in the permit. 40 CFR 125.62(a)(1)(iv) requires this evaluation be based upon conditions reflecting periods of maximum stratification and during other periods when discharge characteristics, water quality, biological seasons, or oceanographic conditions indicate more critical situations may exist. Such periods are commonly referred to as critical conditions.

In some cases, a dilution allowance or mixing zone is permitted within a receiving water. A mixing zone is a limited area or volume of water where dilution of a discharge takes place and within which certain WQS may be exceeded (EPA 2014). Under the 301(h) program, this mixing area is referred to as the zone of initial dilution, or ZID, and is defined at 40 CFR 125.58(dd) as, "*the region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser ports, provided that the ZID may not be larger than allowed by mixing zone restrictions in applicable water quality standards."* While the acute and chronic criteria may be exceeded within the ZID, the use and size of the ZID 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.

As discussed above, Section 301(h)(9) of the CWA and 40 CFR 125.62(a) require 301(h)-modified discharges to meet the water quality criteria established under Section 304(a)(1) of the CWA after initial mixing at the edge of the ZID, unless states have adopted more stringent criterion, in which case those must be met. Consistent with the recommendations in the

301(h) TSD for setting spatial boundaries for the ZID, EPA has established the spatial dimensions of the ZID to include the entire water column within a rectangle 183.7 ft (56 m) long (perpendicular to the shore) and 139.3 ft (42.5 m) wide, centered on the 45.9-foot diffuser.

The ZID for the applicant's outfall was calculated using a discharge depth of 60 ft (18.3 m) below MLLW, a mean tide level of 8.2 ft (2.5 m), and a port height above sea bottom of 0.7 ft (0.2m). Using the diffuser length of 45.9 ft (14.0 m), and a diameter of 18 in (1.5 ft; 0.46m), the ZID was calculated to be a rectangle of 183.7 ft (56 m) long (perpendicular to shore) and 139.3 ft (42.5 m) wide, centered on the diffuser and perpendicular to the shoreline. This is larger than the ZID spatial boundary in the 2001 permit of 167.3 ft long by 122.9 ft. The 2001 fact sheet described the calculation of the ZID using the same inputs as above but made a technical error in the calculation of the ZID dimensions. EPA is correcting the mistake in this draft permit.

The ZID dimension calculations are as follows:

Width (units in feet) = 1.5 + 2 x (60 + 8.2 + 0.7) = 139.3 ft
Length (units in feet) = 45.9 + 2 x (60 + 8.2 + 0.7) = 183.7 ft

18 AAC 70.240 provides Alaska's mixing zone policy for point source discharges. In preliminary discussions with EPA, ADEC proposes to authorize mixing zones within the spatial boundaries of the ZID. The mixing zones and their associated dilution factors that EPA has used in the draft permit are summarized below. All dilution factors are calculated with the effluent flow rate set equal to the design flow of 1.2 mgd.

Table 9. Mixing Zones for Petersburg WWTP

Criteria Type	Dilution Factor
Acute Aquatic Life	7.3
Chronic Aquatic Life	56
EPA 301(h) ZID	67

The reasonable potential analysis and WQBEL calculations were based on the dilution factors shown in Table 9 above. If ADEC revises the allowable mixing zone in its 401 certification of this permit, the reasonable potential analysis and WQBEL calculations will be revised accordingly.

As discussed in Part IV.A.1. Pollutants of Concern, the pollutants of concern in the discharge are BOD_5, DO, TSS, pH, temperature, fecal coliform, enterococci bacteria, chlorine, copper, ammonia and other toxics and metals as listed above. Each parameter is summarized in Part IV.A.3.c and the equations used to conduct the reasonable potential analysis and calculate the WQBELs are provided in Appendix D, *Reasonable Potential and WQBEL Formulae* and Section 8.C of the 301(h) TDD. The relevant WQS are shown

below. Since Frederick Sound is designated for all uses, the listed use is the one with the most protective criteria.

Table 10. Applicable Water Quality Standards

Pollutant	Designated Use	Marine Criteria	Basis
1,2-dichlorobenzene	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	17,000 µg/L (human health; organisms only)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)
1,3-dichlorobenzene	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	2,600 µg/L (human health; organisms only)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)
Ammonia (N)	Aquatic life	Temperature, pH, and salinity dependent 5,900 µg/L (acute) 880 µg/L (chronic)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)
Arsenic, dissolved	Aquatic life	69 µg/L (acute) 36 µg/L (chronic)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)
Bis 2-ethylhexyl phthalate	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	59 µg/L (human health; organisms only)	National Toxics Rule, 40 CFR 131.36
Chlorine	Aquatic life	13 µg/L (acute) 7.5 µg/L (chronic)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)

Chloroform	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	4700 µg/L (human health; organisms only)	National Toxics Rule, 40 CFR 131.36
Copper, Dissolved	Aquatic life	4.8 µg/L (acute) 3.1 µg/L (chronic)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)
Cyanide (as free cyanide, CN/I)	Aquatic Life	1.0 µg/L (acute) 1.0 µg/L (chronic)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)
	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	220,000 (human health; organisms only)	
Deleterious organic and inorganic substances	Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife	Narrative Criteria	18 AAC 70.020(b)(23)(C)
DO	Aquaculture	≥5 mg/L, ≤17 mg/L	18 AAC 70.020(b)(15)(A)(i)
Enterococcus	Primary contact recreation	35 CFU/100mL (acute) 130 CFU/100mL (chronic)	18 AAC 70.020(b)(14)(B)(i)
Fecal coliform	Harvesting for consumption of raw mollusks or other raw aquatic life	14 CFU/100mL (acute) 43 MPN/100mL (chronic)	18 AAC 70.020(b)(14)(D)
Lead, Dissolved	Aquatic life	210 µg/L (acute) 8.1 µg/L (chronic)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)

pH	Aquaculture	6.5—8.5 s.u.	18 AAC 70.020(b)(18)(A)(i)
Phenol	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	4,600,000 (human health; organisms only)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)
Residues	Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife	Narrative Criteria	18 AAC 70.020
Sediment	Contact recreation	No measurable increase in concentration of settleable solids above natural conditions, as measured by the volumetric Imhoff cone method.	18 AAC 70.020(21)(B)(i)
Selenium, Dissolved	Aquatic life	290 (acute) 71 (chronic)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)
Temperature	Seafood Processing, Aquaculture	May not exceed 15^{o}C and may not cause the weekly average temperature to increase more than 1^{o}C. The maximum rate of change may not exceed 0.5^{o}C per hour. Normal daily temperature cycles may not be altered in amplitude or frequency.	18 AAC 70.020(22)(A)(i))

Thallium	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	6.3 (human health; organisms only)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)
Total residual chlorine	Aquatic life	13 µg/L (acute) 7.5 µg/L (chronic)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)
Turbidity	Aquaculture Aquatic life	25 NTU (aquaculture) May not reduce the depth of the compensation point for photosynthetic activity by more than 10%. May not reduce the maximum secchi disk depth by more than 10%. (aquatic life)	18 AAC 70.020(b)(24)(A)(i) 18 AAC 70.020(b)(24)(C)
Whole Effluent Toxicity	Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife	1.0 TU_C	18 AAC 70.030
Zinc, Dissolved	Aquatic life	90 µg/L (acute) 81 µg/L (chronic)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2022)
	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	69,000 µg/L (human health; organisms only)	

c. Reasonable Potential and WQBELs

The reasonable potential and WQBELs for specific parameters are summarized below, in alphabetical order. The parameters included are ammonia, arsenic, chlorine, copper, cyanide, dissolved oxygen / BOD_5, enterococcus, fecal coliform, pH, residues, temperature, TSS / turbidity, and zinc. Other pollutants of concern that were evaluated for reasonable potential but were found to not have reasonable potential are also discussed at the end of the section. These other pollutants include bis 2-ethylhexyl phthalate, chloroform, lead, phenol, selenium, thallium, 1,2-dichlorobenzene, and 1,3-dichlorobenzene. The calculations are provided in Appendix E.

Ammonia

Marine ammonia criteria are based on a formula, which relies on the pH, temperature, and salinity of the receiving water, because the fraction of ammonia present as the toxic, un-ionized form increases with increasing pH and temperature and decreases with salinity. Therefore, the criteria become more stringent as pH and temperature increase and less stringent as salinity increases. Appendices F and G of the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* includes tables to determine acute and chronic criteria based upon these parameters.

EPA used temperature, salinity, and pH temperatures from the receiving water from the facility's permit application (2002-2005). To determine the ammonia criteria, EPA used data in the immediate vicinity of the discharge (Site 1) from summer 2003 and 2005. EPA used summer data, because this is the critical time period when temperatures are higher, and thus, ammonia is more toxic. EPA calculated the 95th percentile values of pH (8.4 s.u.), temperature (8.2 ^{o}C), salinity (30 g/kg) at mid-level depths, nearest to where the trapping depth occurs (GLEC, 2021). The facility collected data at mid-depth and the trapping depth occurs at 15 meters. EPA then applied pH, temperature, and salinity values in Appendices F and G of the *Alaska Water Quality Criteria Manual for Toxics (ADEC, 2022)* closest to the calculated 95th percentile mid-depth values to determine acute and chronic ammonia criteria. Since the values for temperature is between the table options of 5^{o}C and 10^{o}C, EPA used a linear interpolation between the criteria for each temperature value to determine the acute and chronic criteria at a temperature of 8.2^{o}C. Table 11 shows the input values and the ammonia criteria EPA used to determine the acute criteria of 5,900 µg/L and chronic criteria of 880 µg/L for ammonia.

Table 11. Ammonia Criteria Inputs

Temperature	Salinity (g/kg)	pH (s.u.)	Criteria (mg/L)
8.2	30	8.4	Acute: 5.9 Chronic: 0.88

EPA considered 60 effluent samples conducted by the facility between 06/30/2018 and 05/31/2023. Applying values for the maximum effluent concentration of 32.0 mg/L and a CV of 0.4 for the dataset, a reasonable potential calculation showed that the Petersburg WWTP discharge would have reasonable potential to cause or contribute to an excursion of the water quality standard for ammonia. See Appendix E for EPA's reasonable potential and effluent limit calculations for ammonia. EPA calculated effluent limits of 26 mg/L average monthly limit and 43 mg/L maximum daily limit for ammonia. However, ADEC has included in its draft certification ammonia limits of 22 mg/L an average monthly limit and 39 mg/L as a maximum daily limit for ammonia in the draft 401 certification conditions. Since ADEC's limits are more stringent, EPA has included these limits in the draft permit. See CWA section 401(d). If ADEC does not include these limits in the final 401 certification of this permit, EPA will include EPA's calculated ammonia limits in the permit. EPA is accepting comment on this approach.

Arsenic

Arsenic was detected in effluent during two priority pollutant scans conducted in 2002 and 2005 but not in a sample collected in December 2023. Since there are only three sampling events, with two conducted over 15 years ago, the concentration of arsenic in the current discharge is uncertain. This is reflected in the large reasonable potential multiplying factor of 5.6 used in the reasonable potential analysis (Table 3-1, 1991 TSD). If more effluent data were available for arsenic, the reasonable potential multiplying factor would be smaller, and a conclusion could be made regarding whether the discharge has the reasonable potential to cause or contribute to excursions above WQS. Due to the uncertainty in the effluent concentration of arsenic, EPA is proposing quarterly arsenic monitoring in the permit that can be used during the next permit issuance to determine reasonable potential.

Chlorine

Chlorine is often used to disinfect municipal wastewater prior to discharge. The Petersburg WWTP currently provides minor disinfection of its effluent intermittently, but will need to provide consistent, increased disinfection of its effluent to achieve the final bacteria limits in the draft permit. To achieve

disinfection, Petersburg WWTP will likely need to use either UV or chlorination.

The Petersburg WWTP uses chlorine intermittently but does not have sampling results of chlorine in the effluent. Due to the uncertainty in the effluent concentration of chlorine, EPA is proposing weekly chlorine monitoring when the facility is using chlorine intermittently in the treatment process. If the facility modifies the treatment process to regularly use chlorine in the treatment process, the facility must notify EPA of this change per Permit Part IV.I. and EPA will determine whether chlorine effluent limits are required at that time.

Copper

Copper was detected in the effluent during two priority pollutant scans conducted in 2002 and 2005 and in a sample collected in December 2023. Since there are only three data samples, with two conducted over 15 years ago, the concentration of copper in the current discharge is uncertain. This is reflected in the large reasonable potential multiplying factor of 5.6 used in the reasonable potential analysis (Table 3-1, 1991 TSD). If more effluent data were available for copper, the reasonable potential multiplying factor would be smaller, and a conclusion could be made regarding whether the discharge has the reasonable potential to cause or contribute to excursions above WQS. Due to the uncertainty in the effluent concentration of copper, EPA is proposing quarterly copper monitoring in the permit.

Cyanide

Cyanide was detected in the effluent during two priority pollutant scans conducted in 2002 and 2005. Since there are only two data samples conducted over 15 years ago, the concentration of cyanide in the current discharge is uncertain. This is reflected in the large reasonable potential multiplying factor of 7.4 used in the reasonable potential analysis (Table 3-1, 1991 TSD). If more effluent data were available for cyanide, the reasonable potential multiplying factor would be smaller, and a conclusion could be made regarding whether the discharge has the reasonable potential to cause or contribute to excursions above WQS. Due to the uncertainty in the effluent concentration of cyanide, EPA is proposing quarterly cyanide monitoring in the permit.

Dissolved Oxygen (DO) and BOD_5

Natural decomposition of organic material in wastewater effluent impacts DO 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.

Alaska does not have WQS for BOD_5 and instead uses DO. The standard applicable to marine waters provides that for estuarine water the concentration of DO shall not be less than 5.0 mg/L except where natural conditions cause this value to be depressed, and in no case can DO exceed 17.0 mg/L.

The reasonable potential to cause or contribute to excursions of the DO criteria of 5.0 mg/L at the edge of the ZID can be evaluated using equation B-5 in the 301(h) TSD, which calculates the DO depletion caused by the BOD_5 of the effluent. These equations were used to calculate the DO concentration at the completion of initial dilution and at the edge of the chronic mixing zone, using worst-case effluent and receiving water conditions as required by 40 CFR 125.62(a)(1)(iv) and the 301(h) TSD. This process was repeated for bottom, mid, and surface depths based on receiving water data. To assess the potential for far field impacts to DO, the final BOD_5 concentration after initial mixing was determined using the simplified procedures described in Appendix B of the 301(h) TSD.

The analysis indicates the effluent BOD_5 will result in a DO depletion of 2.0% at the boundary of the ZID and completion of initial mixing, with a final BOD_5 concentration of 2.72 mg/L after initial mixing. These results indicate that both near field and far field DO impacts meet Alaska WQS. For a complete analysis of DO please refer to Appendix E of the 301(h) TDD.

Based on the above analyses and that presented in the 301(h) TDD, the discharge will not contribute to an excursion of AK WQS for DO. The permit retains the DO limits from the 2001 permit to ensure the facility continues to meet Alaska WQS.

Enterococcus

Enterococci bacteria are indicator organisms of harmful pathogens recommended by the EPA to protect primary contact recreation for marine waters. The EPA Beaches Environmental Assessment and Coastal Health Act (BEACH Act) requires states and territories with coastal recreation waters to adopt enterococci bacteria criteria into their WQS. EPA approved Alaska's WQS for enterococcus in 2017. The WQS at 18 AAC 70.020(b)(14)(B)(i) for contact recreation specifies that the enterococci bacteria concentration shall not exceed 35 enterococci CFU/100mL, and not more than 10% of the samples may exceed a concentration of 130 enterococci CFU/100mL.

The 2001 permit does not contain effluent limitations for enterococcus bacteria because there was no applicable enterococcus standard in effect when the permit was issued in November 2001.

40 CFR 122.44(d)(1) requires EPA to account for existing controls on discharges when determining whether a discharge has the reasonable potential to cause or contribute to an excursion of state WQS. The WWTP

does not currently disinfect its effluent, resulting in the high bacterial loads observed in the available fecal coliform data. The 2001 permit did not require enterococcus monitoring, but high fecal coliform loads observed during the last permit cycle are indicative of high concentrations of other pathogens commonly found in WWTP effluents, including enterococcus. With the available fecal coliform data and lack of disinfection capacity at the facility, EPA has determined there is reasonable potential for the discharge to cause or contribute to an excursion above Alaska WQS for enterococcus at the edge of the chronic mixing zone. EPA calculated WQBELs using the same procedure used for fecal coliform. The enterococcus limits are expressed in terms of a geometric mean and instantaneous limit for the same reasons as explained in the fecal coliform section.

Monthly geometric mean limit = 35 CFU/100 mL x 56 = 1,960 CFU/100 mL

Instantaneous maximum limit = 130 CFU/100 mL x 56 = 7,280 CFU/100 mL

These WQBELs will be protective of Alaska WQS for enterococci at the boundary of the chronic mixing zone. The Petersburg WWTP does not currently have the disinfection technology necessary to meet these limits. ADEC has included a five-year compliance schedule for the Petersburg WWTP in its draft 401 Certification to meet the final enterococcus limits in the draft permit.

EPA has included the terms of the compliance schedule in the draft permit. Because this is a new effluent limit, no interim limits are being proposed.

Section V.C. of this Fact Sheet describes the compliance schedule for enterococcus. The WQBELs developed for enterococcus will be protective of Alaska WQS after initial mixing at the edge of the ZID and will satisfy the requirements of Section 301(h)(9) of the CWA and 40 CFR 125.63(a).

Fecal Coliform

Alaska's most restrictive marine criterion for fecal coliform bacteria concentrations are in areas protected for the harvesting and use of raw mollusks and other aquatic life. The criterion specifies that the geometric mean of samples shall not exceed 14 fecal coliform/100 mL, and that not more than 10 percent of the samples shall exceed 43 most probable number (MPN)/100 mL for a five-tube decimal dilution test. MPN is the statistic that represents the number of individuals most likely present in a given sample, based on test data. Because Frederick Sound is protected for raw aquatic life consumption, this standard must be met at the edge of the ZID.

40 CFR 122.45(d)(2) requires effluent limitations for continuous discharges from POTWs be expressed as average weekly and average monthly limitations, unless impracticable. Additionally, the terms “average weekly discharge limitation” and “average monthly discharge limitation” are defined

in 40 CFR 122.2 as being arithmetic (as opposed to geometric) averages. It is impracticable to properly implement a 30-day geometric mean criterion in a permit using monthly and weekly arithmetic average limits. The geometric mean of a given data set is equal to the arithmetic mean of that data set if and only if all of the values in that data set are equal. Otherwise, the geometric mean is always less than the arithmetic mean. In order to ensure that the effluent limits are "derived from and comply with" the geometric mean water quality criterion, as required by 40 CFR 122.44(d)(1)(vii)(A), it is necessary to express the effluent limits as a monthly geometric mean and an instantaneous maximum limit.

EPA derived WQBELs for fecal coliform by multiplying the dilution factor of 56:1 achieved at the edge of the chronic mixing zone by the criteria. The WQBEL calculations are shown below:

Monthly geometric mean limit = 14 CFU/100 mL x 56 = 784 CFU/100 mL

Instantaneous maximum limit = 43 CFU/100 mL x 56 = 2,408 CFU/100 mL

These WQBELs will be protective of Alaska WQS for fecal coliform at the boundary of the chronic mixing zone.

ADEC has included final fecal coliform limitations in the table below as a condition of their draft 401 Certification of the reissued permit (Appendix G). Since these limits are more stringent than the WQBELs developed above, EPA has included these limits in the draft permit. If ADEC includes these limits in the final 401 certification, then EPA must include them in the permit pursuant to CWA section 401(d). If ADEC does not include these limits in the final 401 certification of this permit, the fecal coliform effluent limits will be based on the WQBELs that EPA has calculated. EPA is accepting comment on the calculated WQBELs that will be imposed if ADEC does not include the fecal coliform limits as indicated in its 401 certification.

The limits set forth in Table 11 will become effective at the end of the compliance schedule authorized by ADEC in the draft certification.

Table 12. ADEC Proposed Final Fecal Coliform Limits

Average Monthly (FC/100 mL)	Average Weekly (FC/100 mL)	Maximum Daily (FC/100 mL)
200[1]	400[1]	800
(1) 18 AAC 72.990(21)		

The 2001 permit contains effluent limits for fecal coliform of a monthly average limit of 1,000,0000 FC/100mL and a maximum daily limit of 1,500,000 FC/100mL. The Petersburg WWTP does not currently have the

technology necessary to meet the more stringent limits for fecal coliform in the draft permit. ADEC has included a five-year compliance schedule for the facility in its 401 Certification to meet the final fecal coliform limits in the draft permit. EPA has included the terms of the compliance schedule in the draft permit.

The draft permit includes interim performance-based limits that apply until the end of the compliance schedule. The interim limits were derived by taking the 95th percentile of fecal coliform effluent data for the facility. The proposed interim fecal coliform limits are an average monthly limit of 925,000 CFU/100 mL and a maximum daily limit of 1,063,000 CFU/100 mL (See Appendix B for water quality data).

Section V.C. of this Fact Sheet describes the compliance schedule for fecal coliform. The limits developed for fecal coliform will be protective of Alaska WQS after mixing at the edge of the ZID and will satisfy the requirements of Section 301(h)(9) of the CWA and 40 CFR 125.63(a).

pH

The Alaska WQS for the protection of aquatic life require that ambient pH may not be less than 6.5 or greater than 8.5 standard units (s.u.) and may not vary more than 0.2 s.u. outside of the naturally occuring range. Mixing zones are generally not granted for pH, therefore the most stringent water quality criterion must be met before the effluent is discharged to the receiving water.

Effluent pH data were compared to the water quality criteria. Between 2018-2023, effluent pH ranged from 6.6 to 7.9 s.u. The draft permit retains the current pH limits of 6.5 to 8.5 s.u.

Residues

The Alaska WQS require that surface waters of the State be free from floating solids, visible foam, or oily wastes impairing designated beneficial uses. The draft permit contains a narrative limitation prohibiting the discharge of such materials.

Temperature

Alaska's WQS for water temperature provides that the discharge may not exceed 15^{o}C for marine uses. In addition, for waters protected for the aquaculture designated use, the discharge may not cause the weekly average temperature to increase more than 1^{o}C. The maximum rate of change may not exceed 0.5^{o}C per hour, and normal daily temperature cycles may not be altered in amplitude or frequency. EPA reviewed surface water and DMR data between 2018 and 2023 to assess whether the modified discharge will comply with the Alaska WQS for temperature.

The maximum ocean temperature recorded at the trapping depth of the discharge during receiving water monitoring from 2002 to 2005 was 8.2°C, and the maximum recorded effluent temperature between 2018 and 2023 was 15.1°C. EPA conducted a mass balance analysis using these values and calculated a final receiving water temperature of 8.3°C after initial dilution:

$$Cd = \frac{Ce + [\, Cu\, (\, Sa - 1\,)\,]}{Sa} \quad \text{where}$$

Cd = Resultant temperature at edge of mixing zone, °C

Ce = Maximum projected effluent temperature, (15.1 °C)

Cu = Background receiving water temperature, °C (8.2 °C)

Sa = ZID dilution factor (67)

Cd = 8.3°C

The temperature of the receiving water after initial dilution is 0.1°C greater than the ambient ocean temperature.

Based upon the above analysis, the proposed discharge is expected to comply with Alaska WQS for temperature after initial mixing at the edge of the ZID. Therefore, the permit does not contain a temperature effluent limit.

Total Suspended Solids and Turbidity

Alaska does not have WQS for TSS but uses turbidity as a surrogate. Alaska WQS applicable to the estuarine waters of Frederick Sound provide that turbidity shall not exceed 25 nephelometric turbidity units (NTU) and shall not reduce the depth of the compensation point for photosynthetic activity by more than 10%. In addition, the turbidity shall not reduce the maximum Secchi disc depth by more than 10%. The permittee collected ambient receiving water data for turbidity and Secchi data at the outfall and reference sites in January 2002, August 2003, January 2004, and August 2005. The permittee also monitored settleable solids in the effluent monthly during the permit term. The data are presented in Part 8.B of the 301(h) TDD.

NTU Monitoring Data

The turbidity results from 2002-2005 indicate that there are no clear patterns in turbidity between the depth of measurement and time of year. NTU sampling of Site 3 in August 2005 resulted in the only measurements taken by the permittee that exceed the Alaska WQS of 25 NTU, with results of 27 NTU at the surface, 26 NTU at mid-depth, and 130 NTU at the bottom. Since Site 3 is a reference site outside of the mixing zone, the high values are likely due to natural turbidity in the water and not the discharge. All other turbidity samples resulted in a maximum turbidity result of 9.7 NTU. Therefore, the

facility's TSS discharge is not expected to cause or contribute to an excursion of Alaska's water quality criteria for turbidity.

Secchi Monitoring Data

The applicant collected ambient Secchi data in the receiving water between 2002 and 2005. The data collected at reference and outfall sites is presented in Table 3 of the 301(h) TDD.

The change in suspended solids in the water column is indirectly related to turbidity measurements. The increase in receiving water suspended solids concentration following initial dilution can be calculated from formula B-32 in the 301(h) TSD:

$SS = SS_e/S_a$ where,

SS = change in suspended solids concentration following initial dilution

SS_e = effluent suspended solids concentration (78 mg/L)

S_a = ZID initial dilution (67:1)

Solving the above equation using the maximum allowable TSS concentration results in a 1.2 mg/L increase in suspended solids after initial dilution, or 1.5%. The 301(h) guidance states that a TSS increase of less than 10% after initial dilution is not expected to have a substantial impact on water quality.

Settleable Solids

The facility monitored settleable solids in the effluent data as required in the 2001 permit. Of the 60 samples taken between 06/2018 and 05/2023, all results were reported as 0.1 mL/L, except the sample reported for 06/2018, at 0.2 mL/L. Since EPA has determined that the discharge is not expected to have a substantial impact on water quality, and the permittee will continue to monitor NTU and Secchi in the receiving water, EPA has removed the settleable solids monitoring requirement from the draft permit.

Summary

Based on the above analyses and that presented in Appendix E of the 301(h) TDD, the discharge will not cause or contribute to an excursion of AK WQS for turbidity.

Zinc

Zinc was detected in the effluent during two priority pollutant scans conducted in 2005. Since there are only two data samples conducted over 15 years ago, the concentration of zinc in the current discharge is uncertain. This is reflected in the large reasonable potential multiplying factor of 7.4 used in the reasonable potential analysis (Table 3-1, 1991 TSD). If more effluent data were available for zinc, the reasonable potential multiplying factor would be smaller, and a conclusion could be made regarding whether the discharge

has the reasonable potential to cause or contribute to excursions above WQS. Due to the uncertainty in the effluent concentration of zinc, EPA is proposing quarterly zinc monitoring in the permit.

Other Pollutants of Concern

EPA also evaluated reasonable potential for other pollutants the facility detected during required monitoring of priority pollutants. In addition to those pollutants discussed above, EPA evaluated reasonable potential for the following pollutants detected in priority pollutant scans: Bis 2-ethylhexyl phthalate, chloroform, lead, phenol, selenium, thallium, 1,2-dichlorobenzene, and 1,3-dichlorobenzene.

EPA did not find reasonable potential to exceed the water quality criteria for any of these pollutants and effluent limits are therefore not included in the draft permit. Reasonable potential calculations can be found in Appendix E**.**

d. Antibacksliding: WQBELs

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

According to the U.S. EPA NPDES Permit Writers' Manual (EPA-833-K-10-001), backsliding is allowed if it is consistent with the provisions of CWA section 303(d)(4) or if one of the exceptions in CWA section 402(o)(2) is met (except for Sections 402(o)(2)(B)(ii) and 402(o)(2)(D)). Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the level necessary to support the water body's designated uses, WQBELs may be revised as long as the revision is consistent with the State's antidegradation policy. EPA is not proposing any WQBELs with limits that are less stringent than the current permit; therefore, an anti-backsliding analysis for WQBELs is not necessary.

B. Monitoring Requirements

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

The draft permit 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 draft permit also requires the permittee to perform effluent monitoring required by Tables A, B, and C of the NPDES Form 2A application, so that these data will be

available when the permittee applies for a renewal of its NPDES permit and EPA can assess compliance with Section 301(h) of the CWA.

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

1. Effluent Monitoring

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

a. Effluent Monitoring Changes from the Previous Permit

The draft permit maintains the effluent monitoring schedule from the 2001 permit except for the following proposed changes:

Table 13. Monitoring Changes in Permit

Parameter	Monitoring Change	Basis
Ammonia	Increased effluent monitoring frequency, weekly	The prior permit required monthly monitoring for ammonia. EPA determined the permittee has reasonable potential to exceed the WQS for ammonia and is proposing new ammonia effluent limits to meet Alaska WQS. EPA is increasing the effluent monitoring requirement to support the new limits.
Arsenic	New effluent monitoring	Arsenic is a pollutant of concern at the Petersburg WWTP and was detected in the effluent in two samples taken in 2005 but not in one from 2023. Quarterly monitoring will provide data for the next permit cycle for evaluating compliance with Alaska WQS.
Chlorine	New effluent monitoring	Chlorine is a pollutant of concern at the Petersburg WWTP and is used intermittently at the facility. Weekly monitoring while chlorine will provide data to evaluate compliance with Alaska WQS.
Copper	New effluent monitoring,	Copper is a pollutant of concern at the Petersburg WWTP and was detected in

		the effluent in two samples taken in 2005 and one in 2023. Quarterly monitoring will provide data for the next permit cycle for evaluating compliance with Alaska WQS.
Cyanide	New effluent monitoring	Cyanide is a pollutant of concern at the Petersburg WWTP and was detected in the effluent in two samples taken in 2005. Quarterly monitoring will provide data for the next permit cycle for evaluating compliance with Alaska WQS.
Enterococcus	New effluent monitoring requirement, twice per month	The draft permit contains a new effluent limit for enterococcus that the permittee will be working to achieve in accordance with the compliance schedule outlined Section II.C of the draft permit. Monitoring twice per month is necessary to ensure compliance with the limit and protection of Alaska WQS.
Fecal Coliform	Increase in effluent monitoring frequency from once per month to twice per month.	The draft permit contains new, more stringent, fecal coliform limits which the permittee will be working to achieve in accordance with the compliance schedule outlined Section II.C of the draft permit. Monitoring twice per month is more appropriate and representative than monthly monitoring and required to ensure compliance with the fecal coliform limits and protection of Alaska WQS.
PFAS	New effluent monitoring requirements	PFAS are widespread and persistent in the environment. The draft permit requires monitoring to determine if the effluent contains PFAS. See Section IV.B.1.b, below.
Settleable Solids	Removal of monitoring	The draft permit requires monitoring of turbidity in the receiving water to ensure the effluent meets Alaska WQS. Monitoring for settleable solids is not necessary.

Whole Effluent Toxicity	Increase in monitoring	Petersburg is classified as a major facility and requires more frequency toxicity monitoring. Increased monitoring will also help to better characterize WET for the next permit cycle.
Zinc	New effluent monitoring	Zinc is a pollutant of concern at the Petersburg WWTP and was detected in the effluent in two samples taken in 2005. Quarterly monitoring will provide data for the next permit cycle for evaluating compliance with Alaska WQS.
(1) Concentration/mass-loading limits only; compliance with 30% removal is still determined on monthly averaging basis.		

b. PFAS Monitoring

Per- and polyfluoroalkyl substances (PFAS) are a group of synthetic chemicals that have been in use since the 1940s. PFAS are found in a wide array of consumer and industrial products. Due to their widespread use and persistence in the environment, most people in the United States have been exposed to PFAS. Discharges of PFAS above certain levels may cause adverse effects to human health or aquatic life.

The Petersburg WWTP has a connection to the Petersburg Baler Facility, which is a suspected source of PFAS. Therefore, the draft permit requires that the permittee conduct twice yearly influent, effluent, and sludge sampling for PFAS chemicals. This will result in 10 samples being collected over the 5-year permit term. 10 results are the minimum sample size necessary to calculate the standard deviation and mean of the data with sufficient confidence (USEPA, 1991).

The draft permit also requires that the permittee inventory the industrial users (IUs) of the treatment works, to identify IUs of the POTW that may discharge PFAS chemicals to the collection system. Industry sectors known or suspected to discharge PFAS include, but are not limited to, organic chemicals, plastics & synthetic fibers (OCPSF); metal finishing; electroplating; electric and electronic components; landfills; pulp, paper & paperboard; leather tanning & finishing; plastics molding & forming; textile mills; paint formulating, and airports.[2] EPA's website has public databases such as Enforcement and Compliance History Online (ECHO) (https://echo.epa.gov/)

[2] A spreadsheet listing industries that may discharge PFAS, including Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS) codes, and a spreadsheet listing Superfund sites with PFAS detections, are available on EPA's website at: https://echo.epa.gov/tools/data-downloads/national-pfas-datasets#about.

and Envirofacts (https://enviro.epa.gov/) which may be useful in identifying such industrial users.

If PFAS chemicals are detected in the influent, effluent, or sludge in the first year of sampling, then the permittee must sample any IUs identified as potential PFAS sources at least once during the following calendar year. These requirements are in addition to the pretreatment program requirements set forth in Part II.D.2 of the permit.

The purpose of these monitoring and reporting requirements is to better understand potential discharges of PFAS from this facility and to inform future permitting decisions, including the potential development of water quality-based effluent limits. EPA is authorized to require this monitoring and reporting by CWA section 308(a). The permit conditions reflect EPA's commitments in the PFAS Strategic Roadmap, which directs the Office of Water to leverage NPDES permits to reduce PFAS discharges to waterways "at the source and obtain more comprehensive information through monitoring on the sources of PFAS and quantity of PFAS discharged by these sources."

There is currently no analytical method approved in 40 CFR Part 136 for PFAS. As stated in 40 CFR 122.44(i)(1)(iv)(B), in the case of pollutants or pollutant parameters for which there are no approved methods under 40 CFR Part 136 or methods are not otherwise required under 40 CFR chapter I, subchapter N or O, monitoring shall be conducted according to a test procedure specified in the permit for such pollutants or pollutant parameters. Therefore, the Permit specifies that until there is an analytical method approved in 40 CFR Part 136 for PFAS, monitoring shall be conducted using Draft Method 1633.

2. Receiving Water Monitoring

In general, receiving water monitoring may be required for pollutants of concern to assess the assimilative capacity of the receiving water for the pollutant. In addition, receiving water monitoring may be required for pollutants for which the water quality criteria are dependent and to collect data for TMDL development if the facility discharges to an impaired water body. Pursuant to Section 301(h)(3) of the CWA and 40 CFR 125.63(c), facilities operating under 301(h)-modified permits are required to establish and implement a water quality monitoring program to provide adequate data for evaluating compliance with WQS or federal water quality criteria and measure the presence of toxic pollutants that have been identified or reasonably may be expected to be present in the discharge.

EPA is retaining most of the receiving water monitoring program from the 2001 permit in the draft permit. Changes to the receiving water monitoring program include the addition of enterococcus to the suite of parameters analyzed and the addition of sampling at the center of the ZID, and at each side of the boundary of

the ZID. These additional sampling points will provide more complete information on dilution at the boundary of the ZID.

A detailed description of the receiving water monitoring program in the draft permit can be found in Section 8.G.2 of the 301(h) TDD, Part I.D. of the draft permit, and Table 14 below. Locations of the receiving water monitoring for each parameter can be found in Permit Part I.D.2, and maps of the monitoring locations can be found Permit Appendix A.

Table 14. Receiving Water Monitoring Requirements

Parameter	Units	Sample Type	Sample Depth	Frequency	Location
Temperature	°C	Grab	Surface, every 5m to bottom	Annually (August or September)	ZID Station, ZID Boundary, Reference Sites[1]
Salinity	ppt	Grab	Surface, every 5m to bottom	Annually (August or September)	ZID Station, ZID Boundary, Reference Sites[1]
Dissolved Oxygen	mg/L	Grab	Surface, every 5m to bottom	Annually (August or September)	ZID Station, ZID Boundary, Reference Sites[1]
pH	Standard units	Grab	Surface, every 5m to bottom	Annually (August or September)	ZID Station, ZID Boundary, Reference Sites[1]
Secchi Disk Depth	Feet	Visual	Per Method	Annually (August or September)	ZID Station, ZID Boundary, Reference Sites[1]
Turbidity	NTU	Grab	Surface, every 5m to bottom	Annually (August or September)	ZID Station, ZID Boundary, Reference Sites[1]
Fecal Coliform	#/100 mL	Grab	Surface (or just below)	Monthly[3,4] (May to August)	ZID Station, ZID Boundary, Reference Sites, Near Shore Sites[2]
Enterococcus	#/100mL	Grab	Surface (or just below)	Monthly[3] (May to August)	ZID Station, ZID Boundary, Reference Sites, Near Shore Sites[2]

Biological Monitoring for Benthic Infauna and Sediment Analysis	Per method	Grab	Per method	Once every 5 years[4,5]	ZID Station, ZID Boundary, Reference Sites[1]

(1) Monitoring is required at the following: ZID Station, ZID Boundary Sites and Reference Sites as described in Permit Part I.D.2.a,b,c.

(2) Monitoring is required at the following: ZID Station, ZID Boundary Sites and Reference Sites as described in Permit Part I.D.2.a,b,c,d.

(3) Monitoring is required once a month in May, June, July, and August. Fecal Coliform and enterococcus sampling shall coincide with effluent sampling in Permit Part I.B.

(4) Receiving water monitoring for fecal coliform can be discontinued if the permittee achieves 12 consecutive months of compliance with the final fecal coliform limits. In the event of any violation of the final fecal coliform limits, the permittee must restart the receiving water monitoring for fecal coliform until 12 consecutive months of compliance is achieved.

(5) Biological monitoring shall be conducted in August of the fourth year of the permit and every five years thereafter.

3. Whole Effluent Toxicity (WET) Testing Requirements

EPA and individual states implement three approaches to protect water quality. These approaches include chemical-specific control, toxicity testing control (i.e., whole effluent toxicity testing), and biological criteria/bioassessments (EPA 1991).

WET requirements in NPDES permits protect aquatic life from the aggregate toxic effect of a mixture of pollutants in the effluent using standardized testing protocols and surrogate species. WET tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent. The end point and results of WET tests are typically reported in acute and chronic toxic units, TUa and TUc, respectively. TUa = 100/LC50; the Lethal Concentration, 50 Percent (LC50) is the toxic or effluent concentration that would cause death in 50 percent of the test organisms over a specified period of time. TUc = 100/NOEC for the survival endpoint and $100/IC_{25}$ for non-quantal endpoints such as growth. The No Observed Effect Concentration (NOEC) is the highest concentration of toxicant to which organisms are exposed in a short-term chronic test that causes no observable adverse effects on the test organisms. The Inhibition Concentration, 25%, (IC_{25}) is a point estimate of the toxic or effluent concentration that would cause a 25-percent reduction in a non-lethal biological measurement. TUa and TUc test results are treated the same as other reported permit parameters and used in the same manner in the TSD calculations for determining reasonable potential and establishing WQBELs for WET.

Alaska WQS at 18 AAC 70.030 require that an effluent discharged to a waterbody may not impart chronic toxicity to aquatic organisms, expressed as 1.0 TUc, at the point of discharge, or if the Department authorizes a mixing zone in a permit, approval, or certification, at or beyond the mixing zone boundary, based on the minimum effluent dilution achieved in the mixing zone. 18 AAC 83.435 requires that a permit contain limitations on WET when a discharge has reasonable potential to cause or contribute to an exceedance of a WQS.

The Petersburg WWTP conducted WET tests in 2002 and 2005 pursuant to the terms of the 2001 permit. The reported values are 20 TU_c (2002) and 50 TU_c (2005). With only two data points collected over 20 years ago, the toxicity of the current discharge is highly uncertain. To characterize the toxicity of the effluent for the protection of Alaska WQS, the permit increases WET monitoring to quarterly while the permit remains in effect. If eight consecutive quarterly WET tests conducted over a 24-month period do not exceed 56 TU_c, the monitoring frequency may be reduced to annually.

A WET trigger of 56 TUc has been established; if exceeded, the Permittee is required to implement the toxicity identification evaluation (TIE) and toxicity reduction evaluation (TRE) procedures specified in Part I.C. of the draft permit. Testing must be conducted during different quarters on a rotating schedule to assess and monitor for any seasonal variation in results.

4. Biological Monitoring for Benthic Infauna and Sediment Analyses

Facilities operating under 301(h)-modified NPDES permits are required by 40 CFR 125.63(b) to have a biological monitoring program in place that provides adequate data to evaluate the impact of the discharge on marine biota. The draft permit requires biological monitoring, consisting of a benthic survey and sediment analysis for total volatile solids (TVS) within the ZID, at a reference location, and within 5 m beyond the ZID boundary.

The 2001 Permit required one biological monitoring survey, including a benthic survey, sediment analysis for TVS, and kelp bed monitoring, completed in 2006. The results of the survey do not indicate that the sewer outfall discharge is causing significant changes in the benthic community structure, sediment, or kelp beds.

The permittee conducted kelp bed monitoring as required in the 2001 permit, with two aerial surveys of the coastline near the wastewater treatment plant with the permittee taking photographs for documentation of the survey. EPA reviewed the photographs from the surveys, and did not identify any significant changes in the kelp beds. However, the photographs did not allow EPA to do a detailed analysis of the kelp beds in the vicinity of the discharge, and EPA is revising the required methods for the kelp bed monitoring program in the draft permit. The draft permit requires diver surveys and underwater photographs of the area near the discharge in place of the aerial kelp survey.

To continue to monitor the effect of the discharge on the surrounding benthic community, the biological monitoring program from the 2001 permit is being retained in the draft permit, with revisions to the kelp bed monitoring. The draft permit requires biological monitoring during the fourth year of the permit and every five years thereafter. See Permit Part I.E.

5. 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.

Further information about NetDMR, including upcoming trainings and contacts, is provided on the following website: https://npdes-ereporting.epa.gov/net-netdmr.

Permit Part III.B.3 requires that the Permittee submit a copy of the DMR to ADEC. The permittee may submit a copy by adding the email address for to the electronic submittal through NetDMR.

C. Sludge (Biosolids) Requirements

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

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

V. Other Permit Conditions

A. TOXICS CONTROL PROGRAM

1. Chemical Analysis and Source Identification

The 301(h) regulations at 40 CFR 125.66(a) require applicants to submit at the time of application an analysis of their effluent for the toxic substances and pesticides identified in 40 CFR 401.15. The draft permit requires monitoring of toxic substances and pesticides as detailed in the NPDES Application Form 2A, Table B, C, and Permit Part I.B.8 which includes those in 40 CFR 401.15. Pursuant to 40 CFR 125.66(b), facilities must also provide an analysis of the known or suspected sources of any detected parameters. The draft permit includes these requirements in Part II.D.1.

2. Industrial Pretreatment Requirements

The 301(h) regulations at 40 CFR 125.66(c) require applicants with known or suspected industrial sources of toxic pollutants to develop and implement an approved pretreatment program in accordance with 40 CFR Part 403. The objectives of the pretreatment program are listed under 40 CFR 403.2:

a) To prevent the introduction of pollutants into POTWs which will interfere with the operation of a POTW, including interference with its use or disposal of municipal sludge;

b) To prevent the introduction of pollutants into POTWs which will pass through the treatment works or otherwise be incompatible with such works, and

c) To improve opportunities to recycle and reclaim municipal and industrial wastewaters and sludges.

The 301(h) regulations at 40 CFR 125.58(j) define an industrial discharger or industrial source as any source of nondomestic pollutants regulated under Section 307(b) or (c) of the CWA which discharges into a POTW. Section 307(b) and (c) of the CWA establish pretreatment standards for existing and new sources of pollution discharging to POTWs at 40 CFR Part 403 and 40 CFR Chapter I, Subchapter N. 40 CFR Part 403 sets forth the general pretreatment regulations for existing and new sources of pollutants and contains general prohibitions and standards applicable to all nondomestic sources discharging to POTWs, as well as categorical standards for specific industrial categories which are found at 40 CFR Chapter I, Subchapter N.

The Petersburg Baler Facility is an active solid waste transfer facility that discharges to the Petersburg WWTP. The facility collects, bales, and ships solid waste to the Roosevelt Landfill in Washington State. The facility collects municipal solid waste, excluding wood and metal products. The Baler Facility is an industrial user regulated under Section 307(b) and (c) of the CWA through implementing regulations at 40 CFR Part 403, which contains general pretreatment standards and requirements. The Petersburg Baler Facility meets the definition of an industrial source under 40 CFR 125.58(j).

Therefore, the draft permit requires the Borough to develop a pretreatment program in accordance with 40 CFR 403.8 and 40 CFR 403.9. A draft program submittal must be submitted to EPA for approval within 12 months of the effective date of the permit, pursuant to 40 CFR 403.8(b). At a minimum, the pretreatment program submittal must include a local limits evaluation for pollutants of concern, a proposed local sewer use ordinance (SUO), certification by the Borough's attorney that the Borough has the legal authorities to conduct the pretreatment program, and implementation policies and procedures (e.g. enforcement, compliance monitoring, permit administration, and data management), including funding and staffing levels to manage the pretreatment program.

The pretreatment program requires the Borough to conduct a technical evaluation on whether local limits are needed to implement pretreatment requirements. If local limits are needed, the local limits may be numeric or BMP-based effluent limits.

The Borough must submit, among other documents, the technical evaluation and local limits to EPA for review and approval with the pretreatment program submittal. The additional documents that are required to be submitted are set forth in Permit Part II.D.2 and are required pursuant to 40 CFR 403.9.

Upon receipt of the pretreatment program submittal, EPA shall initiate its review of the program submittal for completeness, legal authority, implementation procedures and resources necessary to implement an effective pretreatment program in accordance with 40 CFR 403.11. In addition, EPA will conduct public notice of the program submittal and its decision to approve or disapprove the program submittal. After public notice of the program submittal, EPA will incorporate the pretreatment program into the NPDES permit through a minor modification pursuant to 40 CFR 122.63(g).

3. Non-Industrial Source Control Program

The 301(h) regulations at 40 CFR 125.66(d) require the permittee to implement a public education program designed to minimize the entrance of nonindustrial toxic pollutants and pesticides into its POTW. The draft permit requires the permittee to continue to implement a public education and outreach program designed to minimize the introduction of nonindustrial sources of toxics into the treatment plant.

B. INTERIM BEACH ADVISORY

The draft permit retains the requirement for a beach advisory sign placed on the nearshore area around the outfall advising against bathing or the consumption of raw shellfish from the area. The sign must remain in place until the final WQBELs for fecal coliform and enterococcus are achieved.

C. COMPLIANCE SCHEDULES

Compliance schedules are authorized by federal NPDES regulations at 40 CFR 122.47 and Alaska WQS at 18 AAC 70.910. Compliance schedules allow a discharger to phase in, over time, compliance with WQBELs when limitations are in the permit for the first time.

The draft permit proposes a compliance schedule for fecal coliform and enterococcus because the discharge cannot immediately comply with the new effluent limits on the effective date of the permit. The draft permit proposes the following:

- Interim performance-based limits for fecal coliform, based on fecal coliform effluent data from 2016-2021, effective until the end of the compliance schedule when final limits for fecal coliform become effective;

- Monitoring for enterococcus and final limits for enterococcus, which become effective at the end of the compliance schedule;
- A compliance schedule that allows 5 years for the facility to comply with the new effluent limits and includes interim milestones as set forth in Permit Part II.C.

ADEC authorizes compliance schedules in its 401 certification. EPA will amend the compliance schedule, if needed, after receiving final 401 certification from ADEC. For more information on the details of the compliance schedule refer to the 401-certification and Part II.C of the draft permit.

D. QUALITY ASSURANCE PLAN

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

E. OPERATION AND MAINTENANCE PLAN

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

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

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

The following specific permit conditions apply:

Immediate Reporting – The permittee is required to notify EPA of an SSO within 24 hours of the time the permittee becomes aware of the overflow. (See 40 CFR122.41(l)(6))

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

Third Party Notice – The permit requires that the permittee establish a process to notify specified third parties of SSOs that may endanger health due to a likelihood of human exposure; or unanticipated bypass and upset that exceeds any effluent limitation in the permit or that may endanger health due to a likelihood of human exposure. The permittee is required to develop, in consultation with appropriate authorities at the local, county, tribal and/or state level, a plan that describes how, under various overflow (and unanticipated bypass and upset) scenarios, the public, as well as other entities, would be notified of overflows that may endanger health. The plan should identify all overflows that would be reported and to whom, and the specific information that would be reported. The plan should include a description of lines of communication and the identities of responsible officials. (See 40 CFR122.41(l)(6)).

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

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

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

G. ENVIRONMENTAL JUSTICE

As part of the permit development process, EPA Region 10 conducted a screening analysis to determine whether this permit action could affect overburdened communities. "Overburdened" communities can include minority, low-income, tribal, and indigenous populations or communities that potentially experience disproportionate environmental harms and risks. EPA used a nationally consistent geospatial tool 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 Petersburg WWTP is not located within or near a Census block group that is potentially overburdened. The draft permit does not include any additional conditions to address environmental justice.

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

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

H. STANDARD PERMIT PROVISIONS

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

VI. OTHER LEGAL REQUIREMENTS

A. ENDANGERED SPECIES ACT

The Endangered Species Act (ESA) requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and/or the U.S. Fish and Wildlife Service (USFWS) if their actions could beneficially or adversely affect any threatened or endangered species. EPA has prepared a biological evaluation and determined the discharge is not likely to adversely affect the endangered western distinct population segment of Steller sea lion, the Mexican distinct population segment of humpback whales, or their respective critical habitats. Pursuant to Section 7 of the ESA, EPA will consult with NOAA Fisheries prior to taking final action on the permit. EPA has not identified any USFWS threatened or endangered species or critical habitats that will be affected by the discharge.

B. ESSENTIAL FISH HABITAT

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

The EFH regulations define an adverse effect as any impact that 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.

EPA has prepared a EFH assessment to assess the impacts of the discharge on EFH. Based upon the analysis and conclusions of the EFH assessment, the reissuance of the 301(h)-modified NPDES permit to Petersburg will not adversely affect EFH.

C. CWA SECTION 401 CERTIFICATION

Section 401 of the CWA requires the state in which the discharge originates to certify that the discharge complies with the appropriate sections of the CWA, as well as any appropriate requirements of state law. See 33 U.S.C. 1341(d). As a result of the certification, the state may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with WQS, or treatment standards established pursuant to any state law or regulation.

EPA had preliminary discussions with ADEC regarding its CWA Section 401 Certification during development of the draft permit. On February 17, 2023, EPA sent ADEC a pre-filing certification meeting request. EPA will request final 401 certification from ADEC with the public notice of this draft permit. EPA cannot issue the permit until ADEC has granted or waived certification. If ADEC denies certification, EPA cannot issue the permit.

D. ANTIDEGRADATION

ADEC will conduct an antidegradation analysis of the discharge following its antidegradation policy and implementation methods outlined in 18 AAC 70.015 and 18 AAC 70.016, respectively. The antidegradation review will be included in the CWA section 401 Certification for this permit. Questions regarding the CWA section 401 Certification or antidegradation review can be submitted to ADEC as set forth above (see State Certification on Page 1 of this Fact Sheet).

E. PERMIT EXPIRATION

The permit will expire five years from the effective date.

VII. REFERENCES

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EPA, 2022.*"Addressing PFAS Discharges in NPDES Permits and Through the Pretreatment Program and Monitoring Programs."* https://www.epa.gov/system/files/documents/2022-12/NPDES_PFAS_State%20Memo_December_2022.pdf

Executive Order 13175, 2000. Consultation and Coordination with Indian Tribal Government, November 2000.

Great Lakes Environmental Center, Inc, 2021. *Mixing Zone Dilution Modeling for Six Alaska POTWs.* Prepared for EPA Region 10. August 2021.

Appendix A. Facility Information

Figure 1. Facility Location Satellite

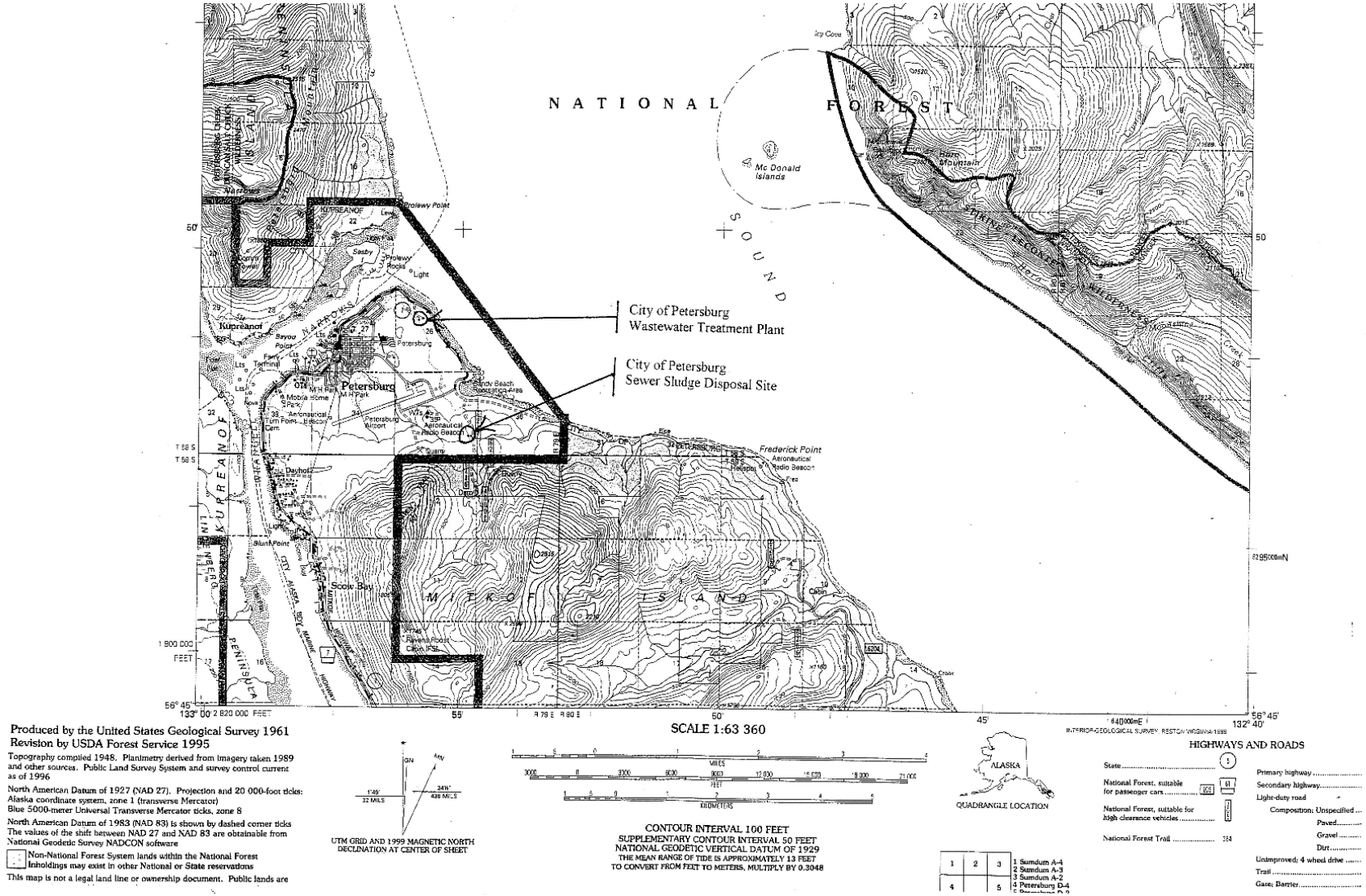

Figure 2. Facility Location Small Scale

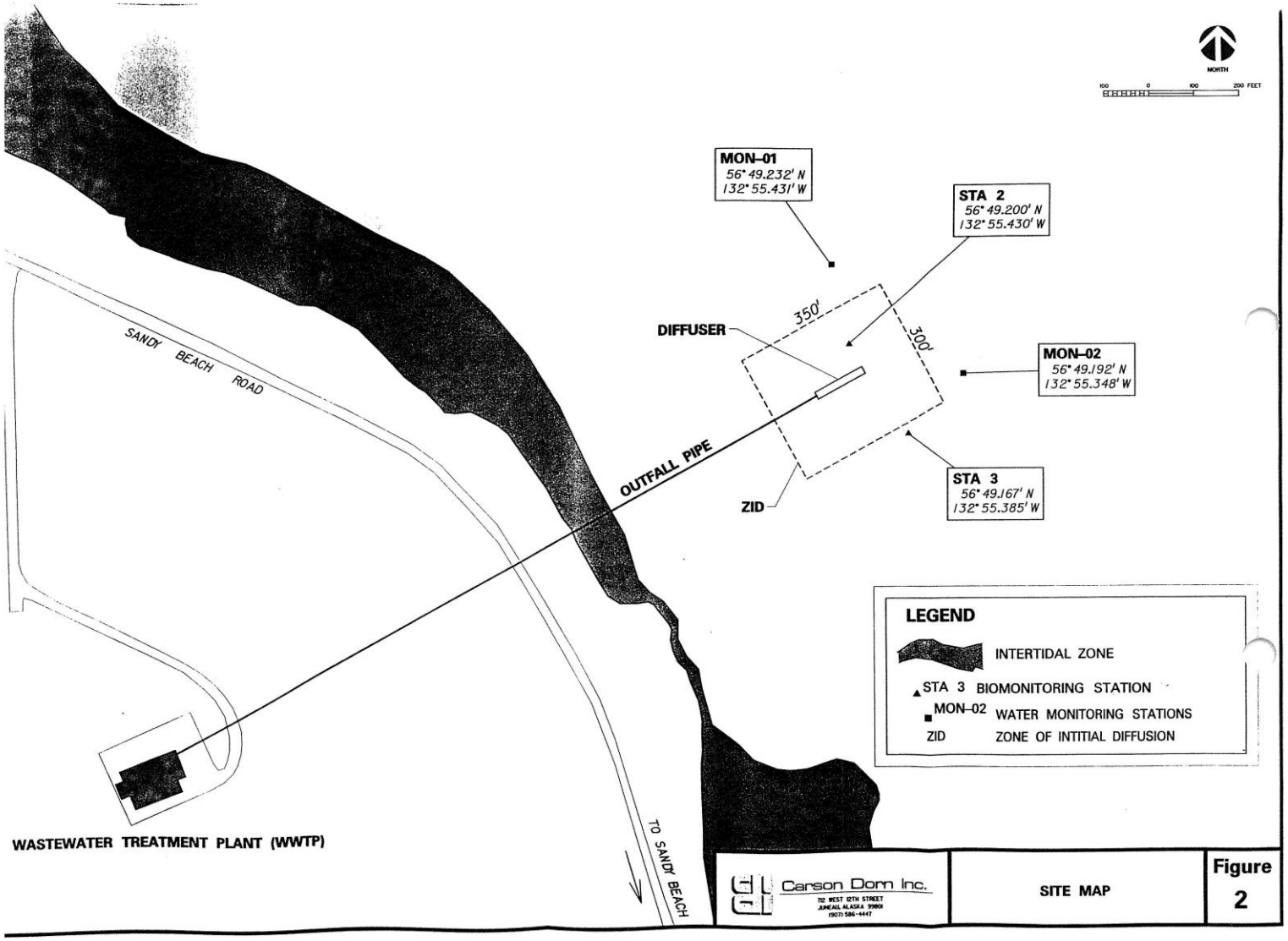

Figure 3. Petersburg WWTP Map

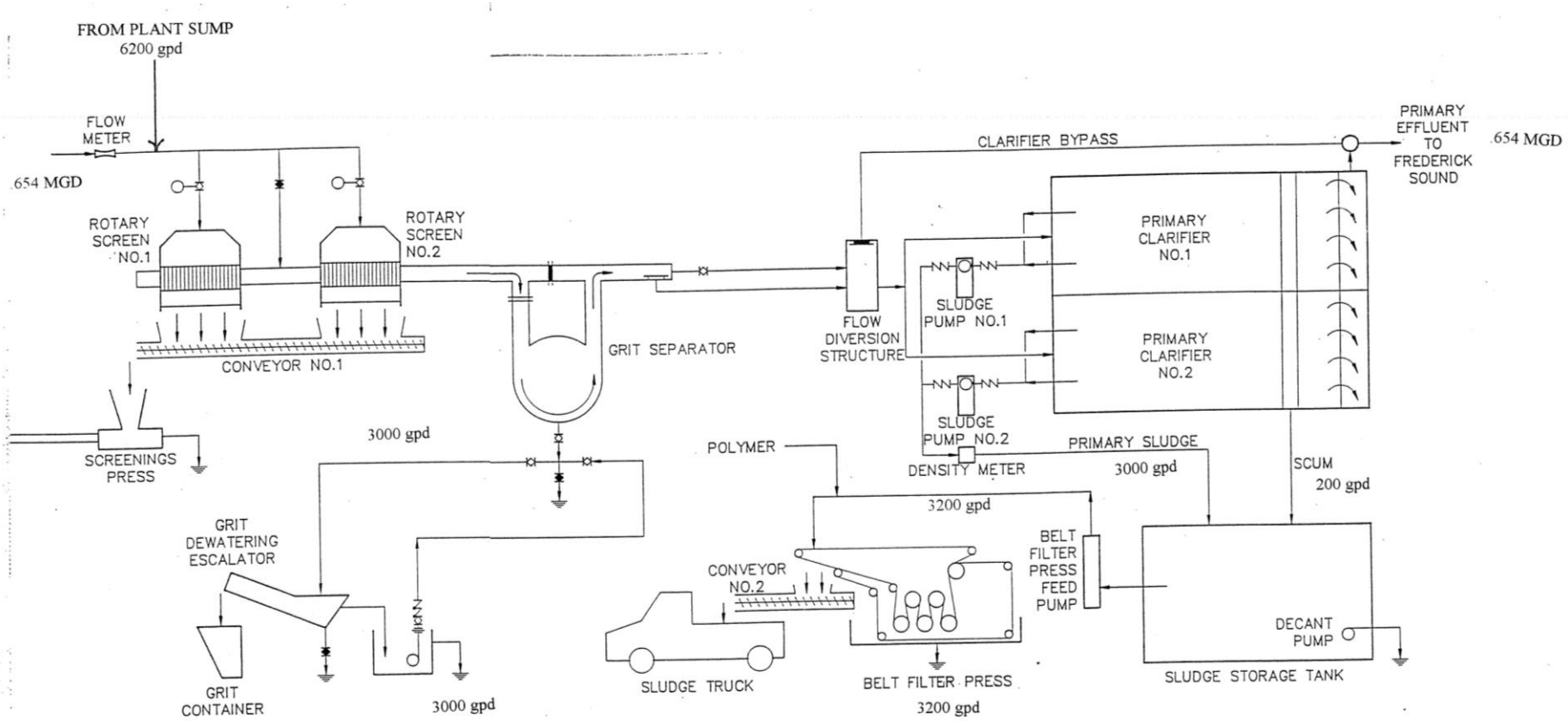

Figure 4. Process Schematic

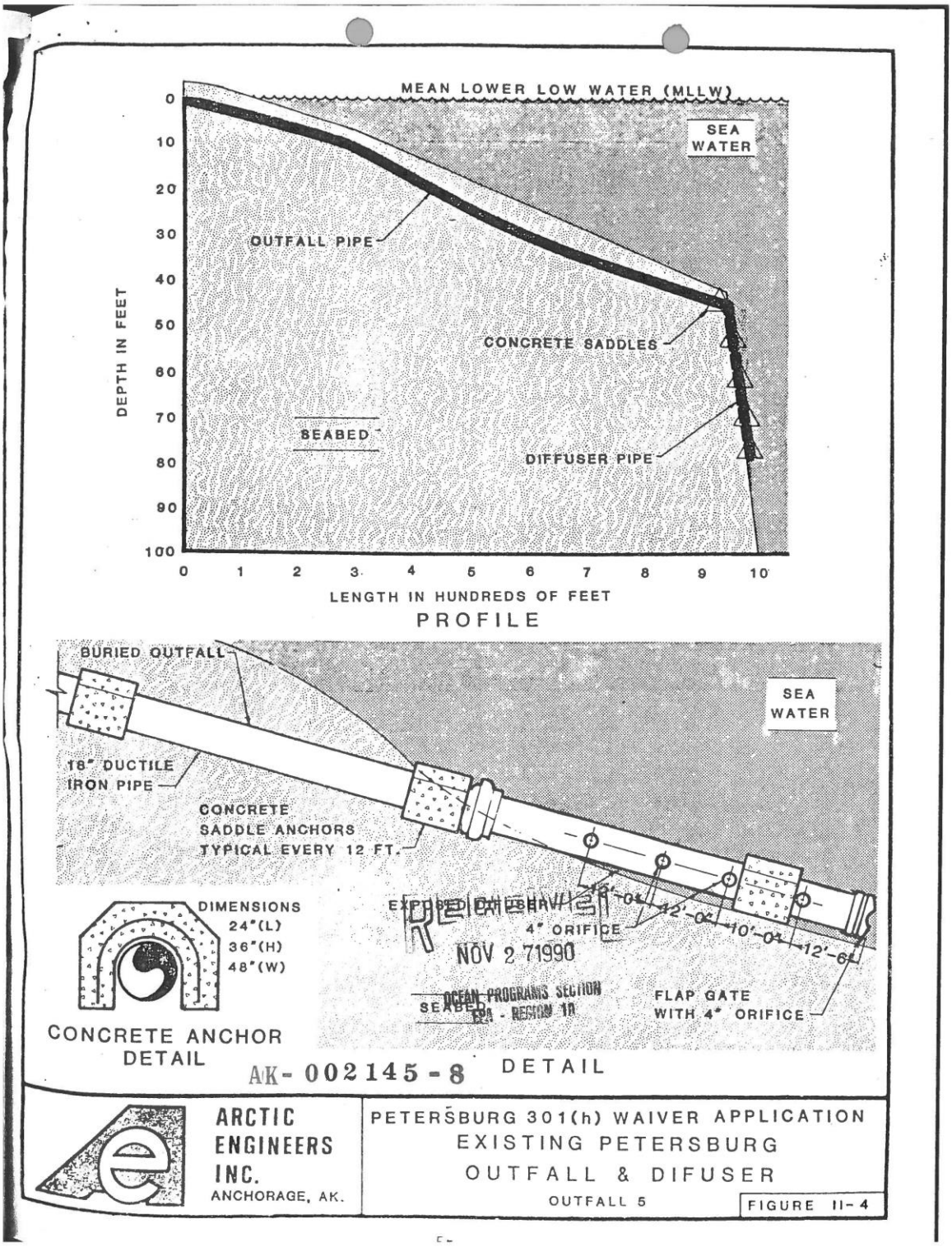

Figure 5. Petersburg Borough Sewer Outfall Plan View and Cross Section

Appendix B. Water Quality Data

Appendix A.1. Treatment Plant Effluent Data

Table 15. Facility DMR Data, 2018 - 2023

Parameter	Effluent Flow		BOD, 5-day, 20 deg. C, Influent		BOD, 5-day, 20 deg. C, Effluent					Total Suspended Solids, Influent		Total Suspended Solids, Effluent				
Row Labels	DAILY MX (MGD)	MO AVG (MGD)	MO AVG (mg/L)	MO AVG (lbs/day)	DAILY MX (mg/L)	MO AVG (mg/L)	DAILY MX (lbs/day)	MO AVG (lbs/day)	% Removal	MO AVG (mg/L)	MO AVG (lbs/day)	DAILY MX (mg/L)	MO AVG (mg/L)	DAILY MX (lbs/day)	MO AVG (lbs/day)	% Removal
06/30/2018	0.504	0.328	198.0	495.2	117.3	91.7	255.3	228.9	54.7	157.3	430.5	53.0	43.4	130.0	116.7	72.9
07/31/2018	0.639	0.329	212.0	513.6	112.0	105.5	267.1	254.9		245.4	595.0	77.7	61.2	185.3	147.5	75.2
08/31/2018	0.705	0.359	187.0	627.3	132.7	111.4	529.2	404.0		161.0	527.3	54.7	53.0	321.6	214.7	59.3
09/30/2018	0.824	0.379	183.0	633.2	114.7	96.4	363.0	316.2	45.2	317.7	1266.0	65.0	58.7	302.5	214.1	83.1
10/31/2018	1.136	0.476	175.5	925.6	92.0	84.3	602.3	413.5		161.7	704.9	55.0	48.2	276.2	205.3	70.9
11/30/2018	0.865	0.506	148.5	695.1	83.0	74.5	346.8	334.0		179.0	856.5	52.0	46.5	273.2	215.9	74.8
12/31/2018	1.091	0.452	139.5	406.9	70.5	68.8	244.2	204.4	52.3	94.4	335.8	37.3	34.7	233.0	160.0	52.3
01/31/2019	1.294	0.484	121.5	375.5	76.5	76.0	237.4	234.8		104.7	326.0	55.7	45.4	175.1	140.7	56.8
02/28/2019	0.355	0.279	178.0	378.8	110.5	100.3	244.2	214.8		156.7	333.5	58.0	51.2	128.2	109.7	67.1
03/31/2019	1.074	0.400	140.5	452.0	122.5	90.5	344.9	297.1	38.3	134.3	488.2	56.7	47.2	222.3	168.8	65.4
04/30/2019	0.810	0.431	122.0	524.9	57.3	54.7	325.0	239.9		155.0	607.4	40.0	37.4	226.8	150.6	75.2
05/31/2019	0.516	0.323	155.7	394.1	91.6	85.3	219.3	215.0		133.0	344.4	42.0	37.5	122.6	100.8	70.7
06/30/2019	1.075	0.396	219.4	696.0	90.1	79.7	260.1	243.5	54.9	249.3	794.1	45.3	38.2	116.3	115.2	85.5
07/31/2019	0.417	0.299	198.9	464.1	125.7	116.9	284.6	272.3		209.4	446.0	57.0	55.2	117.9	117.2	73.7
08/31/2019	1.114	0.434	252.0	628.9	129.9	125.3	326.2	310.4		250.4	629.2	67.0	59.4	152.0	145.8	76.8
09/30/2019	1.611	0.537	195.8	602.2	78.1	75.5	241.0	231.9	51.2	177.0	544.3	44.0	36.5	135.8	109.2	79.9
10/31/2019	1.270	0.501	155.5	468.0	67.3	66.0	203.2	198.4		166.0	499.5	47.7	37.7	142.8	113.2	77.3
11/30/2019	1.111	0.615	149.0	977.5	62.7	49.4	359.2	346.4		173.7	1145.0	36.7	31.0	234.4	222.3	80.6
12/31/2019	0.861	0.490	125.9	464.8	61.4	58.2	231.5	215.0	58.6	129.4	477.5	29.0	25.5	109.3	94.4	80.2
01/31/2020	1.005	0.476	157.5	446.2	76.0	66.0	187.3	180.5		173.0	500.9	33.3	32.0	111.4	90.8	81.9
02/29/2020	1.009	0.542	125.0	545.9	52.0	50.5	219.8	219.2		127.4	557.2	27.7	25.7	116.4	111.5	80.0
03/31/2020	0.802	0.430	130.1	536.2	62.4	56.3	288.3	226.7	59.0	130.0	537.9	33.3	29.5	153.9	119.3	77.8
04/30/2020	0.844	0.422	168.5	414.7	110.0	87.0	257.8	211.1		177.4	438.4	49.7	39.2	116.5	95.1	78.3
05/31/2020	0.561	0.329	165.2	423.3	114.9	109.1	311.9	285.3		151.9	386.1	50.0	45.7	124.7	118.6	69.3
06/30/2020	0.784	0.450	126.9	556.3	78.7	74.7	396.4	327.6	40.9	123.5	530.4	35.3	35.0	174.8	152.0	71.3
07/31/2020	0.951	0.432	135.2	783.2	77.9	69.8	488.6	392.1		231.0	1248.8	85.0	73.4	674.2	407.1	68.3
08/31/2020	0.924	0.557	123.8	578.3	85.3	73.1	368.6	335.1		141.7	664.3	48.7	45.7	295.3	223.1	66.4
09/30/2020	1.090	0.395	155.1	459.2	117.5	91.2	288.1	264.2	44.8	167.7	521.7	47.0	45.0	159.2	137.2	73.7
10/31/2020	1.061	0.437	96.6	350.9	53.7	50.8	224.4	188.3		87.0	314.5	24.7	21.9	79.4	79.0	74.9
11/30/2020	1.923	0.528	95.5	397.5	66.3	58.3	255.8	239.6		183.4	155.7	38.0	37.0	183.4	155.7	64.1
12/31/2020	1.817	0.582	111.6	491.3	89.5	74.3	370.0	327.6	39.8	99.5	449.2	44.0	39.2	215.1	177.6	60.5
01/31/2021	1.049	0.473								122.2	623.0	42.7	41.5	264.2	216.0	65.3
02/28/2021	0.758	0.352	191.0	427.3	118.2	106.7	241.5	238.1		166.7	369.3	58.0	49.5	118.5	109.9	70.3
03/31/2021	0.770	0.488	124.5	486.0	81.5	72.5	298.2	272.8	44.1	93.7	351.3	39.3	38.5	177.3	148.3	57.8
04/30/2021	0.783	0.414	89.8	405.7	58.9	58.3	268.5	263.2		84.5	383.0	35.0	34.2	162.9	154.3	59.7
05/31/2021	0.530	0.351	108.6	351.3	74.2	67.6	254.5	224.4		103.5	331.6	31.7	31.4	129.5	106.3	68.0
06/30/2021	0.871	0.400	116.0	398.0	97.4	72.4	264.8	249.2	36.2	85.8	300.7	37.0	29.3	107.0	103.8	65.5
07/31/2021	0.500	0.302	205.5	467.6	110.9	109.0	258.0	248.3		197.0	448.6	35.0	32.9	81.4	74.9	83.3
08/31/2021	1.047	0.430	249.5	737.6	118.6	105.8	363.0	312.8		244.4	715.8	57.3	56.0	175.4	165.0	76.9
09/30/2021	1.202	0.604	142.3	1038.6	50.7	47.6	361.9	350.9	56.9	270.7	1957.5	58.7	42.2	419.1	307.9	84.3
10/31/2021	1.538	0.526	94.7	625.6	57.9	49.8	533.6	354.0		127.7	891.3	53.0	43.9	679.8	392.1	56.0
11/30/2021	0.984	0.438	140.5	526.6	63.6	55.8	216.9	216.7		204.5	747.5	49.7	39.2	169.1	149.5	80.0
12/31/2021	0.631	0.339	122.4	393.9	88.3	73.0	284.3	234.8	47.6	114.0	367.0	42.7	40.7	137.5	131.0	64.3
01/31/2022	1.527	0.623	86.0	342.2	64.0	56.9	257.8	226.1		93.5	385.7	42.7	41.2	221.5	171.0	55.7
02/28/2022	1.031	0.551	110.8	642.3	71.2	59.3	489.3	339.3		148.7	911.9	67.7	47.2	465.2	286.1	68.6
03/31/2022	0.699	0.424	138.7	342.7	82.0	75.0	210.0	186.2	46.4	154.7	381.6	48.0	39.9	122.9	99.4	74.0
04/30/2022	0.499	0.301	133.6	348.4	98.2	80.9	240.3	221.7		124.7	326.1	42.0	38.9	134.9	110.9	66.0
05/31/2022	0.715	0.327	138.5	338.6	86.1	81.4	204.7	200.4		153.5	374.9	49.7	46.2	132.6	114.9	69.3
06/30/2022	0.515	0.302	180.6	366.4	112.6	105.4	222.5	215.0	39.5	205.7	417.7	52.3	44.8	96.4	90.5	78.3
07/31/2022	0.697	0.356	208.3	532.3	146.7	121.5	351.1	310.5		211.7	540.4	54.0	46.7	129.3	119.7	77.9
08/31/2022	1.016	0.422	182.3	483.4	107.6	104.0	294.4	275.6		188.0	496.7	67.0	51.9	159.8	133.8	73.1
09/30/2022	0.968	0.467	114.5	422.8	75.7	58.4	233.0	219.0	44.3	165.7	530.4	33.0	32.9	106.9	104.2	80.3
10/31/2022	1.196	0.635	109.6	349.7	81.3	60.1	197.3	192.3		152.7	479.0	46.0	37.7	141.0	126.3	73.6
11/30/2022	1.313	0.464	130.0	379.1	71.5	63.3	219.3	194.3		174.2	483.6	37.7	37.4	150.3	119.0	75.4
12/31/2022	0.642	0.338	123.3	377.0	82.2	66.3	209.1	202.5	46.7	118.9	371.9	40.3	33.5	103.8	103.1	72.3
01/31/2023	0.987	0.473	84.6	278.6	56.0	47.4	159.1	155.7		121.8	310.7	34.7	34.7	94.3	88.8	71.4
02/28/2023	0.793	0.460	64.8	329.5	42.0	41.6	216.8	211.7		76.0	386.5	31.0	30.2	160.0	153.4	60.3
03/31/2023	0.657	0.345	135.4	312.0	107.6	89.3	260.2	207.1	37.8	140.3	322.7	60.7	48.5	146.8	112.8	65.1
04/30/2023	0.723	0.424	105.6	443.9	58.7	52.2	275.0	215.8		124.2	536.4	39.3	30.5	130.8	117.9	78.0
05/31/2023	0.622	0.318	165.2	385.9	108.8	87.5	236.8	204.5		166.5	398.2	47.7	40.9	103.8	96.2	75.3
Count	**60**	**60**	**59**	**59**	**59**	**59**	**59**	**59**	**20**	**60**	**60**	**60**	**60**	**60**	**60**	**60**
Average	**0.922**	**0.432**	**146.5**	**495.6**	**87.3**	**77.0**	**290.9**	**256.2**	**47.0**	**158.1**	**546.6**	**47.1**	**41.3**	**187.2**	**148.9**	**71.5**
Min	**0.355**	**0.279**	**64.8**	**278.6**	**42.0**	**41.6**	**159.1**	**155.7**	**36.2**	**76.0**	**155.7**	**24.7**	**21.9**	**79.4**	**74.9**	**52.3**
Max	**1.923**	**0.635**	**252.0**	**1038.6**	**146.7**	**125.3**	**602.3**	**413.5**	**59.0**	**317.7**	**1957.5**	**85.0**	**73.4**	**679.8**	**407.1**	**85.5**
5th percentile	**0.499**	**0.301**	**86.0**	**329.5**	**52.0**	**47.6**	**197.3**	**186.2**	**36.3**	**85.9**	**310.9**	**29.1**	**25.9**	**94.4**	**88.9**	**56.0**
95th percentile	**1.607**	**0.614**	**219.4**	**925.6**	**129.9**	**116.9**	**529.2**	**392.1**	**59.0**	**250.3**	**1243.6**	**67.7**	**59.4**	**462.9**	**306.8**	**83.3**

Parameter	pH, Eff. (s.u.)		Fecal Coliform, Eff., CFU/100 mL		Ammonia-N, Eff. (mg/L)	DO, Eff.(mg/L)		Settleable Solids, Eff. (mg/L)	Temp, Eff., (deg C)
Row Labels	Max	Min	DAILY MX	MO GEO	DAILY MX	Max	Min	MO AVG	MO AVG
06/30/2018	7.0	6.9	983333	672778	15.0	4.7	3.5	0.2	11.1
07/31/2018	7.0	7.0	1183333	927778	24.0	4.6	3.2	0.1	13.5
08/31/2018	7.1	7.0	1133333	872222	30.0	7.6	3.1	0.1	12.8
09/30/2018	7.2	7.0	911111	702222	18.0	4.5	3.4	0.1	12.0
10/31/2018	7.0	7.0	816667	709445	15.0	8.2	3.6	0.1	9.4
11/30/2018	7.1	7.0	529167	354945	13.0	7.8	4.8	0.1	8.4
12/31/2018	7.1	7.0	225000	157500	18.0	9.6	4.8	0.1	7.5
01/31/2019	7.3	7.0	557778	505139	14.0	8.4	5.9	0.1	6.6
02/28/2019	7.2	7.0	883333	747000	19.0	6.9	4.2	0.1	6.4
03/31/2019	7.0	7.0	575000	343500	22.0	9.6	4.0	0.1	5.5
04/30/2019	7.3	7.0	711111	500556	25.0	9.9	4.4	0.1	6.2
05/31/2019	7.1	7.0	650000	587500	21.0	4.2	3.0	0.1	10.8
06/30/2019	7.1	7.0	638889	511945	20.0	5.2	3.1	0.1	12.4
07/31/2019	7.1	6.9	966667	963889	26.0	3.5	3.0	0.1	14.3
08/31/2019	7.0	6.9	1066667	995834	23.0	8.0	2.8	0.1	13.6
09/30/2019	7.2	7.0	766667	761112	17.0	7.4	3.5	0.1	12.0
10/31/2019	7.2	7.0	844444	631389	15.0	9.4	3.4	0.1	9.7
11/30/2019	7.1	6.9	430833	400000	10.0	9.7	3.3	0.1	6.0
12/31/2019	7.4	7.1	833333	610555	9.5	7.5	6.4	0.1	7.6
01/31/2020	7.4	7.1	1000000	835834	20.0	11.0	3.7	0.1	5.7
02/29/2020	7.4	7.1	783333	605417	5.6	11.2	9.2	0.1	5.2
03/31/2020	7.2	7.0	474167	447500	9.6	8.9	4.1	0.1	5.6
04/30/2020	7.2	7.0	877778	658056	16.8	9.9	2.6	0.1	6.0
05/31/2020	7.2	6.7	694444	611389	19.0	6.2	3.4	0.1	8.3
06/30/2020	7.1	7.0	426667	333334	10.0	7.9	5.1	0.1	10.3
07/31/2020	7.2	6.9	975000	808334	28.0	8.2	3.1	0.1	12.0
08/31/2020	7.1	6.8	783333	652917	10.0	7.3	5.2	0.1	13.4
09/30/2020	7.0	6.9	825000	776389	12.0	4.5	3.0	0.1	13.0
10/31/2020	7.0	6.8	210000	156000	12.0	6.3	4.5	0.1	11.0
11/30/2020	7.1	6.9	110000	90000	16.0	7.9	3.8	0.1	8.3
12/31/2020	7.1	6.9	465000	325500	7.8	10.1	4.9	0.1	6.6
01/31/2021	7.3	6.9	433333	336667	13.0	10.5	4.7	0.1	6.1
02/28/2021	7.2	7.1	550000	477084	23.6	8.2	4.3	0.1	6.6
03/31/2021	7.4	7.0	491667	423056	11.0	10.6	7.0	0.1	4.5
04/30/2021	7.1	6.8	512500	426250	9.8	9.3	3.1	0.1	6.2
05/31/2021	7.1	6.9	283111	187556	10.7	7.7	3.4	0.1	8.8
06/30/2021	7.0	6.9	794444	604306	0.3	8.1	3.1	0.1	11.2
07/31/2021	7.1	6.9	811111	689722	28.0	5.1	3.2	0.1	13.7
08/31/2021	7.0	6.8	325000	196500	19.1	4.2	2.8	0.1	14.9
09/30/2021	6.8	6.6	794445	573473	6.6	8.7	5.0	0.1	12.6
10/31/2021	7.0	6.6	240000	225000	4.4	9.7	5.2	0.1	9.9
11/30/2021	6.9	6.7	405000	305000	13.0	9.2	4.8	0.1	8.2
12/31/2021	6.9	6.6	413333	395000	12.0	6.6	3.1	0.1	6.2
01/31/2022	7.4	6.8	552000	426000	15.0	11.5	7.6	0.1	3.6
02/28/2022	7.4	7.3	716000	413000	13.0	11.6	5.6	0.1	4.3
03/31/2022	7.3	7.2	523333	450000	18.0	8.9	5.1	0.1	5.1
04/30/2022	7.2	7.0	788889	544445	13.0	7.1	3.3	0.1	6.8
05/31/2022	7.2	7.1	638889	543611	24.0	3.6	2.9	0.1	9.8
06/30/2022	7.2	7.0	950000	875000	22.0	3.1	2.9	0.1	12.5
07/31/2022	7.3	7.0	966667	630000	32.0	4.0	2.9	0.1	14.5
08/31/2022	7.5	7.1	537778	513889	25.0	4.5	2.9	0.1	15.1
09/30/2022	7.2	7.1	421667	361250	15.0	8.5	2.8	0.1	14.3
10/31/2022	7.1	6.9	383333	223667	17.0	8.5	3.2	0.1	12.8
11/30/2022	7.1	7.0	300000	205000	17.0	9.1	3.3	0.1	9.4
12/31/2022	7.0	6.9	417500	348750	19.0	5.6	3.4	0.1	7.4
01/31/2023	7.3	7.1	417500	346250	18.0	10.3	4.3	0.1	6.2
02/28/2023	7.1	6.9	240000	144250	9.3	9.6	5.2	0.1	5.6
03/31/2023	7.2	6.9	400000	374167	21.0	10.1	3.9	0.1	5.6
04/30/2023	7.5	7.0	363333	229667	8.4	9.5	4.7	0.1	5.7
05/31/2023	7.9	6.6	391667	381250	18.0	4.2	3.0	0.1	9.5
Count	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**
Average	**7.2**	**6.9**	**623231**	**501763**	**16.3**	**7.7**	**4.0**	**0.1**	**9.1**
Min	**6.8**	**6.6**	**110000**	**90000**	**0.3**	**3.1**	**2.6**	**0.1**	**3.6**
Max	**7.9**	**7.3**	**1183333**	**995834**	**32.0**	**11.6**	**9.2**	**0.2**	**15.1**
5th percentile	**6.9**	**6.6**	**225750**	**156075**	**5.7**	**3.6**	**2.8**	**0.1**	**4.5**
95th percentile	**7.5**	**7.1**	**1063334**	**925139**	**28.0**	**11.2**	**7.0**	**0.1**	**14.5**

Appendix A.2. Receiving Water Data

Table 16. Receiving Water Data Collected by Permittee, 2002-2005

Site	Depth (m)	Temp (C)	Salinity (ppt)	DO (mg/L)	pH (s.u.)	Turbidity (NTU)	Secchi Disc (ft)
January 2002							
Site 1	Surface	4.13	29.84	9.24	7.92	n/a	8.8
	Mid	4.99	30.94	8.85	7.91	n/a	
	Bottom	5.15	31.02	8.48	7.90	n/a	
Site 2	Surface	4.02	30.66	9.58	7.98	n/a	7.9
	Mid	4.90	30.86	8.98	7.94	n/a	
	Bottom	5.12	31.09	8.65	7.93	n/a	
Site 3	Surface	4.32	30.26	9.36	7.85	n/a	6.0
	Mid	4.31	30.82	9.00	7.89	n/a	
	Bottom	4.46	30.83	8.93	7.88	n/a	
Site 4	Surface	4.18	30.11	9.3	7.93	n/a	4.1
	Mid	4.83	30.79	8.74	7.93	n/a	
	Bottom	5.09	30.95	8.54	7.93	n/a	
August 2003							
Site 1	Surface	8.9	41	13.3	7.9	9.7	4.1
	Mid	7.9	45.5	9.2	7.9	3.1	
	Bottom	7.8	45.6	8.1	7.8	3.4	
Site 2	Surface	8.9	41.5	12	8.2	2	4.0
	Mid	7.9	45.5	9.2	7.9	3.3	
	Bottom	7.6	45.9	8.3	7.8	3.2	
Site 3	Surface	8.9	38.1	11.4	8.2	2	4.0
	Mid	8.9	41.4	10.6	8.2	2	
	Bottom	8.8	42.2	10.6	8.1	1.8	
Site 4	Surface	8.9	40.7	10.6	8.2	0.6	4.5
	Mid	8.5	44.1	9.9	8	2.4	
	Bottom	7.9	45.3	8.7	7.9	3.2	
	Mid	8.1	28.6	6.2	8.3	7.3	
	Bottom	7.5	30.7	5.6	8.3	4	

January 2004							
Site 1	Surface	8.9	30.3	13.5	7.3	3.4	6.8
	Mid	4.8	30.5	9.5	7.3	7.8	
	Bottom	4.8	30.5	8.9	7.3	6.6	
Site 2	Surface	4.2	30.4	9.8	7.3	4.5	5.1
	Mid	4.6	30.4	9.4	7.3	2.8	
	Bottom	4.9	30.5	9.2	7.3	2.9	
Site 3	Surface	4.2	31.7	12.5	6.7	5.4	5.0
	Mid	5	n/a	10.2	7	4.7	
	Bottom	5.2	n/a	9.3	7.3	1.2	
Site 4	Surface	3.5	30.2	12.5	7.4	2.4	5.0
	Mid	4.8	30.4	9.7	7.4	5	
	Bottom	4.9	30.6	8.8	7.4	6.8	
August 2005							
Site 1	Surface	9.5	25.8	7	8.3	8.3	7.0
	Mid	8.2	28.1	6.5	8.4	7.8	
	Bottom	7.3	30.9	5.7	8.4	3	
Site 2	Surface	9.1	25.7	7.2	8.4	1.5	6.9
	Mid	8.2	27.8	6.6	8.4	1.1	
	Bottom	7.5	30.2	6.2	8.3	2	
Site 3	Surface	8.7	26	7	8.3	27.3	5.0
	Mid	8.2	27.6	6.5	9.2	26.1	
	Bottom	7.5	30.6	5.6	8.3	130	
Site 4	Surface	9.7	25.2	7.1	8.3	4.8	8.4
	Mid	8.1	28.6	6.2	8.3	7.3	
	Bottom	7.5	30.7	5.6	8.3	4	

Table 17. Fecal Coliform and Enterococcus Data collected by Permittee

Sample date	Station	Reported Positive Values	MPN (#/100 mL)
1/29/2002	1	0-0-0	1
	2	0-0-0	1
	3	1-0-0	2
	4	0-0-0	1
	5	0-0-0	1
6/19/2002	1	0-0-0	1
	2	1-0-0	2
	3	0-0-0	1
	4	0-0-0	1
	5	0-0-0	1
1/28/2003	1	5-1-0	30
	2	5-1-0	30
	3	0-0-0	1
	4	1-0-0	2
	5	0-0-0	1
6/10/2003	1	0-0-0	1
	2	0-0-0	1
	3	0-0-0	1
	4	2-0-0	4
	5	0-0-0	1
1/29/2004	1	3-0-0	8
	2	1-0-0	2
	3	0-0-0	1
	4	0-0-0	1
	5	0-0-0	1
6/30/2004	1	5-1-0	30
	2	2-0-0	4
	3	4-0-0	13
	4	0-0-0	1
	5	0-0-0	1
1/12/2005	1	3-0-0	8
	2	5-0-0	23
	3	0-0-0	1
	4	0-0-0	1
	5	0-0-0	1
8/24/2005	1	3-1-0	11
	2	0-0-0	1
	3	3-2-0	14
	4	5-1-0	30
	5	0-0-0	1

1/11/2006	1	5-0-0	23
	2	4-0-1	17
	3	4-0-0	113
	4	3-0-0	8
	5	5-0-0	23

Table 18. Petersburg Sampling Results from 2021 ARRI Report

Site	PE01	PE02	PE03	PE04	PE05	PE06	Avg	Max
Ammonia-N (mg/L)	0.05	0.04	0.05	0.04	0.04	0.04	0.04	0.05
Cu, Total (ug/L)	0.41	0.38	0.38	0.40	0.40	0.46	0.41	0.46
Cu, Dissolved (ug/L)	0.45	0.45	0.37	0.36	0.36	0.49	0.41	0.49
Ni, Total (ug/L)	0.40	0.37	0.38	0.38	0.37	0.42	0.39	0.42
Ni, Dissolved (ug/L)	0.37	0.38	0.36	0.36	0.35	0.49	0.39	0.49
Zn, Total (ug/L)	0.83	0.37	0.40	0.39	0.42	1.04	0.58	1.04
Zn, Dissolved (ug/L)	1.59	0.63	0.46	0.42	0.40	2.09	0.93	2.09

Temperature (C)						
Depth (m)	**PE01**	**PE02**	**PE03**	**PE04**	**PE05**	**PE06**
1m	10.3	10.9	10.9	10.7	10.4	11.1
2n	10.2	10.7	10.5	10.4	10.3	10.2
3m	10.1	10.5	10.4	10.3	10.2	10.1
4m	10.1	10.6	10.4	10.3	10.2	10.2
Average	**10.2**	**10.7**	**10.6**	**10.4**	**10.3**	**10.4**

Salinity (ppt)						
Depth	**PE01**	**PE02**	**PE03**	**PE04**	**PE05**	**PE06**
1m	25.8	24.1	24.8	25	26.3	22.4
2n	26.1	25.3	26.3	26.3	26.4	25.4
3m	26.2	25.9	26.3	26.5	26.2	26.2
4m	26.3	25.7	26.3	26.5	26.6	26.1
Average	**26.1**	**25.3**	**25.9**	**26.1**	**26.4**	**25.0**

pH (s.u.)						
Depth (m)	**PE01**	**PE02**	**PE03**	**PE04**	**PE05**	**PE06**
1m	8.03	8.09	8.13	8.04	8.06	8.42
2n	8.06	8.10	8.10	8.05	8.07	8.16
3m	8.06	8.10	8.10	8.06	8.08	8.34
4m	7.98	8.12	8.09	8.15	8.36	8.31
Average	**8.03**	**8.10**	**8.11**	**8.08**	**8.14**	**8.31**

Dissolved Oxygen (mg/L)						
Depth (m)	**PE01**	**PE02**	**PE03**	**PE04**	**PE05**	**PE06**
1m	9.72	9.89	9.84	9.74	9.74	10.20
2n	9.80	9.98	9.90	9.77	26.40	10.15
3m	9.80	9.97	9.91	9.83	9.85	10.10
4m	9.79	9.77	9.94	9.84	9.88	10.23
Average	**9.78**	**9.90**	**9.90**	**9.80**	**13.97**	**10.17**

Appendix C. TSS TBEL Calculation

Table 19. Performance Based TSS Limit Calculations

INPUT	
LogNormal Transformed Mean:	3.6857
LogNormal Transformed Variance:	0.0820
Number of Samples per month for compliance monitoring:	4
Autocorrelation factor (n_e) (use 0 if unknown):	0
OUTPUT	
E(X) =	41.5403
V(X) =	147.431
VARn	0.0211
MEANn=	3.7161
VAR(Xn)=	36.858
RESULTS	
Maximum Daily Effluent Limit:	**77.6**
Average Monthly Effluent Limit:	**52.2**

Table 20. Facility TSS Data

Date	Influent TSS (mg/L)	Influent TSS (lbs/day)	Effluent TSS (mg/L)	Effluent TSS (lbs/day)
7/6/18	198.70	473.95	77.70	185.33
7/13/18	292.00	715.97	44.70	109.60
8/3/18	222.00	466.57	51.30	107.82
8/10/18	100.00	587.97	54.70	321.62
9/8/18	446.70	2078.82	65.00	302.49
9/14/18	188.70	453.24	52.30	125.62
10/5/18	177.30	433.25	55.00	134.40
10/12/18	146.00	976.55	41.30	276.24
11/2/18	121.30	469.40	41.0	158.7
11/9/18	236.70	1243.67	52.0	273.2
12/5/18	142.00	331.60	37.30	87.10
12/12/18	46.70	340.01	32.00	232.99
1/4/19	97.3	305.9	55.7	175.1
1/11/19	114.0	346.1	35.0	106.3
2/8/19	143.30	316.71	58.0	128.2
2/15/19	170.00	350.20	44.3	91.3
3/8/19	157.30	320.10	56.70	115.38
3/15/19	111.30	656.27	37.70	222.29
4/4/19	154.0	330.1	34.70	74.38
4/10/19	156.0	884.7	40.00	226.85
5/3/19	166.70	399.01	33.00	78.99
5/10/19	99.30	289.86	42.00	122.60
6/7/19	229.30	577.53	45.30	114.10
6/14/19	269.30	1010.68	31.00	116.34
7/6/19	222.70	486.62	53.30	116.46
7/13/19	196.00	405.39	57.00	117.89
8/2/19	282.70	763.90	51.70	139.70
8/10/19	218.00	494.53	67.00	151.99
9/6/19	202.70	625.49	44.00	135.78
9/13/19	151.30	463.10	27.00	82.64
10/4/19	130.00	389.23	47.70	142.82
10/11/19	202.00	609.85	27.70	83.63
11/9/19	262.70	1505.16	36.7	210.3
11/15/19	84.70	784.81	25.3	234.4
12/6/19	128.00	462.24	22.00	79.45
12/18/19	130.70	492.70	29.00	109.32
1/3/20	199.3	666.5	33.3	111.4
1/10/20	146.7	335.2	30.7	70.2
2/7/20	104.7	440.1	27.7	116.4

Date	Influent TSS (mg/L)	Influent TSS (lbs/day)	Effluent TSS (mg/L)	Effluent TSS (lbs/day)
2/14/20	150.0	674.3	23.7	106.5
3/6/20	165.30	763.75	33.30	153.86
3/13/20	94.70	311.97	25.70	84.66
4/3/20	202.0	518.9	28.70	73.72
4/8/20	152.7	357.9	49.70	116.47
5/6/20	115.00	347.19	41.30	124.69
5/13/20	188.70	424.91	50.00	112.59
6/3/20	113.70	572.75	34.70	174.80
6/10/20	133.30	488.05	35.30	129.24
7/8/20	193.30	438.50	61.70	139.97
7/16/20	268.70	2131.15	85.00	674.16
8/5/20	129.30	783.97	48.70	295.28
8/12/20	154.00	544.57	42.70	150.99
9/2/20	176.70	654.31	43.00	159.23
9/9/20	158.70	389.13	47.00	115.24
10/7/20	75.30	314.63	19.00	79.39
10/14/20	98.70	314.45	24.70	78.69
11/6/20	107.30	361.53	38.0	128.0
11/13/20	99.30	506.01	36.0	183.4
12/4/20	85.70	537.48	34.30	215.12
12/11/20	113.30	360.96	44.00	140.18
1/8/21	135.3	531.5	42.7	167.7
1/15/21	109.0	714.5	40.3	714.5
2/5/21	198.0	404.6	58.0	118.5
2/12/21	135.3	334.0	41.0	101.2
3/3/21	80.3	377.9	37.70	177.33
3/10/21	107.00	324.83	39.30	119.31
4/7/21	74.7	327.1	33.30	145.80
4/14/21	94.3	438.8	35.00	162.88
5/5/21	77.70	324.66	31.00	129.53
5/12/21	129.30	338.61	31.70	83.01
6/2/21	60.70	299.69	21.70	107.14
6/9/21	111.00	301.79	37.00	100.60
7/7/21	196.00	436.45	30.70	68.36
7/14/21	198.00	460.72	35.00	81.44
8/7/21	274.70	776.65	54.70	154.65
8/13/21	214.00	655.01	57.30	175.38
9/5/21	444.70	3174.73	58.70	419.06
9/11/21	96.70	740.35	25.70	196.76
10/2/21	103.30	1325.02	53.00	679.83
10/17/21	152.00	457.63	34.70	104.47
11/6/21	317.30	1079.68	49.7	169.1
11/17/21	91.70	415.27	28.7	130.0
12/3/21	74.70	240.48	38.70	124.58

Date	Influent TSS (mg/L)	Influent TSS (lbs/day)	Effluent TSS (mg/L)	Effluent TSS (lbs/day)
12/10/21	153.30	493.51	42.70	137.46
1/7/22	92.3	280.2	39.7	120.5
1/14/22	94.7	491.3	42.7	221.5
2/4/22	220.7	1516.7	67.7	465.2
2/11/22	76.7	307.0	26.7	106.9
3/4/22	137.3	351.5	48.00	122.90
3/10/22	172.00	411.70	31.70	75.88
4/2/22	79.7	301.1	35.70	134.88
4/15/22	169.7	351.0	42.00	86.87
5/7/22	129.70	346.14	49.70	132.64
5/13/22	177.30	403.68	42.70	97.22
6/3/22	229.30	422.63	52.30	96.40
6/10/22	182.00	412.86	37.30	84.61
7/8/22	258.00	617.54	54.00	129.25
7/15/22	165.30	463.21	39.30	110.13
8/5/22	175.30	514.62	36.70	107.74
8/12/22	200.70	478.72	67.00	159.81
9/2/22	215.30	703.88	32.70	106.91
9/9/22	116.00	356.99	33.00	101.56
10/6/22	214.30	520.09	46.00	111.64
10/13/22	91.00	437.91	29.30	141.00
11/4/22	87.70	349.62	37.7	150.3
11/10/22	260.70	617.48	37.0	87.6
12/2/22	134.00	340.86	40.30	102.51
12/9/22	103.70	403.02	26.70	103.77
1/6/23	114.3	310.8	34.7	94.3
1/13/23	129.3	310.6	34.7	83.3
2/3/23	74.3	383.6	31.0	160.0
2/10/23	77.7	389.5	29.3	146.9
3/3/23	147.3	356.3	60.70	146.81
3/10/23	133.30	289.05	36.30	78.71
4/7/23	122.0	735.6	21.70	130.85
4/15/23	126.3	337.1	39.30	104.88
5/5/23	125.70	327.08	34.00	88.47
5/12/23	207.30	451.24	47.70	103.83
6/2/23	136.70	523.30	55.70	213.22
6/9/23	178.70	408.36	47.00	107.40
7/7/23	357.30	792.65	46.70	103.60
7/14/23	230.70	467.54	48.30	97.89

Appendix D. Reasonable Potential and WQBEL Formulae

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

1. Mass Balance

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

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

where,

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

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

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

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

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

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

Where:

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

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

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

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

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

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

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

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

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

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

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

2. Maximum Projected Effluent Concentration

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

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

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

where,

p_n = the percentile represented by the highest reported concentration

n = the number of samples

confidence level = 99% = 0.99

and

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

Where,

σ^2 = $\ln(CV^2 + 1)$

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

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

CV = coefficient of variation (standard deviation ÷ mean)

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

$$C_e = (RPM)(MRC) \qquad \textit{Equation 10}$$

where MRC = Maximum Reported Concentration

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

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

4. Reasonable Potential

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

B. WQBEL Calculations

1. Calculate the Wasteload Allocations (WLAs)

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

$$C_e = WLA = D \times (C_d - C_u) + C_u \qquad \textit{Equation 11}$$

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

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

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

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

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

where,

σ^2 = $\ln(CV^2 + 1)$

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

CV = coefficient of variation (standard deviation ÷ mean)

σ_4^2 = $\ln(CV^2/4 + 1)$

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

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

where,

σ_{30}^2 = $\ln(CV^2/30 + 1)$

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

2. Derive the maximum daily and average monthly effluent limits

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

$$\mathrm{MDL} = \mathrm{LTA} \times \mathrm{e}^{\left(z_m \sigma - 0.5\sigma^2\right)} \qquad \textit{Equation 16}$$

$$\mathrm{AML} = \mathrm{LTA} \times \mathrm{e}^{\left(z_a \sigma_n - 0.5\sigma_n^2\right.} \qquad \textit{Equation 17}$$

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

σ_n^2 = $\ln(CV^2/n + 1$

z_a = 1.645 (z-score for the 95th percentile probability basis)

z_m = 2.326 (z-score for the 99th percentile probability basis)

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

Appendix E. Reasonable Potential and WQBEL Calculations

Table 21. Reasonable Potential Analysis for Toxic Pollutants in the Effluent

Pollutants of Concern			AMMONIA, default: cold water, fish early life stages present	ARSENIC - SEE Toxic BiOp	BIS(2-ETHYLHEXYL) PHTHALATE	CHLORINE (Total Residual)	CHLOROFORM	COPPER - SEE Toxic BiOp	CYANIDE (as WAD) - SEE Toxic BiOp	LEAD - SEE Toxic BiOp	PHENOL	SELENIUM	THALLIUM	ZINC - SEE Toxic BiOp	1,2 DICHLOROBENZENE	1,3 DICHLOROBENZENE
Effluent Data	Number of Samples in Data Set (n)		60	3	2	3	2	3	2	2	2	2	2	2	2	2
	Coefficient of Variation (CV) = Std. Dev./Mean (default CV = 0.6)		0.4023	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, µg/L (Max. or 95th Percentile) - (C_e)		32,000	100	150	750	3.8	33	10	25	17	100	100	110	5	5
	Calculated 50th % Effluent Conc. (when n>10), Human Health Only															
Receiving Water Data	90th Percentile Conc., µg/L - (C_u)															
	Geometric Mean, µg/L, Human Health Criteria Only															
Applicable Water Quality Criteria	Aquatic Life Criteria, µg/L	Acute	5,900.00	69.	--	13.	--	4.8	1.	210.	--	290.	--	90.	--	--
	Aquatic Life Criteria, µg/L	Chronic	880.00	36.	--	7.5	--	3.1	1.	8.1	--	71.		81.	--	--
	Acute:chronic ratio		6.70	1.92	--	1.73	--	1.55	1.00	25.93	--	4.08	--	1.11	--	--
	Human Health Water and Organism, µg/L		--	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Human Health, Organism Only, µg/L		--	--	59.	60.	4,700.	--	220,000.	Narrative	4,600,000.	11,000.	6.3	69,000.	17,000.	2,600.
	Metals Criteria Translator, decimal (or default use Conversion Factor)	Acute		1.	--	--	--	.83	--	.951	--	.998	--	.946	--	--
		Chronic		1.	--	--	--	.83	--	.951	--	.998	--	.946	--	--
	Carcinogen (Y/N), Human Health Criteria Only		--	--	Y	N	Y	N	N	N	N	--	N	N	N	N
Percent River Flow Default Value = 0%	Aquatic Life - Acute	1Q10	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Aquatic Life - Chronic	7Q10 or 4B3		0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		30B3 or 30Q10/30Q5	0%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Human Health - Non-Carcinogen	Harmonic Mean		0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Human Health - Carcinogen	Harmonic Mean		0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Calculated Dilution Factors (DF) (or enter Modeled DFs)	Aquatic Life - Acute	1Q10	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	Aquatic Life - Chronic	7Q10 or 4B3		56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0
	Aquatic Life - Chronic Ammonia	30B3 or 30Q10/30Q5	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0
	Human Health - Non-Carcinogen	Harmonic Mean		56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0
	Human Health - Carcinogen	Harmonic Mean		56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0
Aquatic Life Reasonable Potential Analysis																
σ	$\sigma^2=\ln(CV^2+1)$		0.387	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555
P_n	=(1-confidence level)$^{1/n}$, where confidence level =	99%	0.926	0.215	0.100	0.215	0.100	0.215	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
Multiplier (TSD p. 57)	$=\exp(z\sigma-0.5\sigma^2)/\exp[\text{normsinv}(P_n)\sigma-0.5\sigma^2]$, where	99%	1.4	5.6	7.4	5.6	7.4	5.6	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Statistically projected critical discharge concentration (C_e)			44976	562.24	1109.05	4216.83	28.10	185.54	73.94	184.84	125.69	739.37	739.37	813.31	36.97	36.97
Predicted max. conc.(ug/L) at Edge-of-Mixing Zone		Acute	6161	77.02	151.93	577.65	3.85	21.10	--	24.08	17.22	101.08	101.28	105.40	5.06	5.06
(note: for metals, concentration as dissolved using conversion factor as translator)		Chronic	803	10.04	19.80	75.30	0.50	2.75	--	3.14	2.24	13.18	13.20	13.74	0.66	0.66
Reasonable Potential to exceed Aquatic Life Criteria			YES	YES	NA	YES	NA	YES	YES	NO	NA	NO	--	YES	NA	NA
Aquatic Life Effluent Limit Calculations																
Number of Compliance Samples Expected per month (n)			4	4	4	4	4	4	4	4	4	4	4	4		
n used to calculate AML (if chronic is limiting then use min=4 or for ammonia min=30)			4	4	--	4	--	4	4	--	--	--	--	4	--	--
LTA Coeff. Var. (CV), decimal	(Use CV of data set or default = 0.6)		0.402	0.600	--	0.600	--	0.600	0.600	--	--	--	0.600	0.600	--	--
Permit Limit Coeff. Var. (CV), decimal	(Use CV from data set or default = 0.6)		0.402	0.600	--	0.600	--	0.600	0.600	--	--	--	0.600	0.600	--	--
Acute WLA, ug/L	$C_d = (\text{Acute Criteria} \times MZ_a) - C_u \times (MZ_a\text{-}1)$	Acute	43,070	503.7	--	94.9	--	35.0	7.3	--	--	--	--	657.0	--	--
Chronic WLA, ug/L	$C_d = (\text{Chronic Criteria} \times MZ_c) - C_u \times (MZ_c\text{-}1)$	Chronic	49,280	2,016.0	--	420.0	--	173.6	56.0	--	--	--	--	4,536.0	--	--
Long Term Ave (LTA), ug/L	WLAa x $\exp(0.5\sigma^2\text{-}z\sigma)$, Acute	99%	18,856	161.7	--	30.5	--	11.2	2.3	--	--	--	--	210.9	--	--
(99th % occurrence prob.)	WLAc x $\exp(0.5\sigma^2\text{-}z\sigma)$; ammonia n=30, Chronic	99%	41,661	1,063.2	--	221.5	--	91.6	29.5	--	--	--	--	2,392.2	--	--
Limiting LTA, ug/L	used as basis for limits calculation		18,856	161.7	--	30.5	--	11.2	2.3	--	--	--	--	210.9	--	--
Applicable Metals Criteria Translator (metals limits as total recoverable)				--	--	--	--	0.83	--	--	--	--	--	0.95	--	--
Average Monthly Limit (AML), ug/L , where % occurrence prob =		95%	**25,650.6030**	**251**	--	**47.2925**	--	**21**	--	--	--	--	--	**346**	--	--
Maximum Daily Limit (MDL), ug/L , where % occurrence prob =		99%	**43,070.0000**	**504**	--	**94.9000**	--	**42**	--	--	--	--	--	**695**	--	--
Average Monthly Limit (AML), mg/L			**25.65060**	**0.251**	--	**0.0473**	--	**0.021**	--	--	--	--	--	**0.346**	--	--
Maximum Daily Limit (MDL), mg/L			**43.07000**	**0.504**	--	**0.0949**	--	**0.042**	--	--	--	--	--	**0.695**	--	--
Average Monthly Limit (AML), lb/day			**256.71123**	**2.5**	--	**0.4733**	--	**0.211**	--	--	--	--	--	**3.5**	--	--
Maximum Daily Limit (MDL), lb/day			**431.04456**	**5.0**	--	**0.9498**	--	**0.423**	--	--	--	--	--	**7.0**	--	--
Human Health Reasonable Potential Analysis																
σ	$\sigma^2=\ln(CV^2+1)$			0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555
P_n	=(1-confidence level)$^{1/n}$ where confidence level =	95%		0.368	0.224	0.368	0.224	0.368	0.224	0.224	0.224	0.224	0.224	0.224	0.224	0.224
Multiplier	$=\exp(2.326\sigma-0.5\sigma^2)/\exp[\text{invnorm}(P_N)\sigma-0.5\sigma^2]$, prob. =	50%		1.205	1.524	1.205	1.524	1.205	1.524	1.524	1.524	1.524	1.524	1.524	1.524	1.524
Dilution Factor (for Human Health Criteria)				56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0	56.0
Max Conc. at edge of Chronic Zone, ug/L (C_d)				2.152	4.083	16.137	0.103	0.710	0.272	0.680	0.463	2.722	2.722	2.994	0.136	0.136
Reasonable Potential to exceed HH Water & Organism				**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Reasonable Potential to exceed HH Organism Only				**--**	**NO**	**NO**	**NO**	**--**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Appendix F. WET Test Results

The 2001 permit required the facility to conduct chronic whole effluent toxicity testing twice, during the 1st and 4th year of the permit term. The results of chronic WET testing in 2002 and 2005 using the *Dendraster excentricus* (sand dollar) test approach was 2 TUc and 5 TUc, respectively (see Table 22 below).

Table 22. Whole Effluent Toxicity Test Results

Test Date	Species and Test Type	NOEC (%)	IC25 (%)	TUc	TUa (Tc/10)
08-17-2002	Dendraster excentricus	5	15.3	20	2
08-27-2002	Dendraster excentricus	2	2.77	50	5

Appendix G. Draft CWA Section 401 Certification

STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DRAFT CERTIFICATE OF REASONABLE ASSURANCE

A Certificate of Reasonable Assurance, as required by Section 401 of the Clean Water Act, has been requested by the Environmental Protection Agency (EPA) for the marine water discharge of primary treated domestic wastewater from the Borough of Petersburg Wastewater Treatment Plant (WWTP).

The activity is located at 59.819594° north latitude, 132.923494° west longitude, near Petersburg, Alaska with discharges to Frederick Sound.

Water Quality Certification is required for the activity because the activity will be authorized by an EPA permit identified as National Pollutant Discharge Elimination Permit No. AK0021458 and because a discharge will result from the activity.

Public notice of the application for this certification is made in accordance with 18 Alaska Administrative Code (AAC) 15.180. Public notice of the Borough of Petersburg's Antidegradation Form 2G, included as an attachment to this certification, is made in accordance with 18 AAC 70.016. In accordance with 18 AAC 70.016, *Antidegradation implementation methods for discharges authorized under the federal Clean Water Act,* the Alaska Department of Environmental Conservation (DEC or Department) reviewed the Borough of Petersburg's Antidegradation Form 2G and determined that the information provided by the Borough of Petersburg complies with the requirements of 18 AAC 70.016. DEC will accept comments on these documents during the public notice period.

DEC has completed its review of EPA's Preliminary Draft National Pollutant Discharge Elimination Permit (NPDES) No. AK0021458 and associated documents and by means of this Draft Certificate of Reasonable Assurance conditionally certifies that there is reasonable assurance that the activity and the resulting proposed modified discharge from the Borough of Petersburg WWTP is compliant with the requirements of Section 401 of the Clean Water Act, 40 Code of Federal Regulations (CFR) 125.61, Alaska Statutes Title 46, and Alaska Water Quality Standards 18 AAC 70 provided that the proposed modified discharge adheres to the stipulations provided below in this certification. Furthermore, as per 40 CFR 125.64(b), the Department has determined that the proposed modified discharge will not result in an additional treatment pollution control or other requirement on any other point or nonpoint sources as Frederick Sound is not included on DEC's 2022 Integrated Water Quality Monitoring and Assessment Report as an impaired waterbody nor is the subject portion of Frederick Sound subject to a proposed or approved Total Maximum Daily Load.

A Final Certification of Reasonable Assurance is pending review of any public comments received and is contingent on the inclusion of the following stipulations in NPDES Permit No. AK0021458:

1. In accordance with 18 AAC 70.240, DEC authorizes mixing zones in Frederick Sound for total ammonia as Nitrogen (N), enterococcus bacteria, fecal coliform bacteria, total residual chlorine, dissolved oxygen, temperature, and whole effluent toxicity contained in the discharge from the Borough of Petersburg WWTP. The mixing zones are defined as follows:

   The chronic mixing zone has a dilution of 56:1 and is defined as a rectangular area with a length of 32 meters and width of 7.8 meters centered over the effective length of the diffuser with the length oriented parallel to the shoreline.

The acute mixing zone has a dilution of 7.3:1 and is defined as a rectangular area with a length of 7.6 meters and width of 3.6 meters centered over the effective length of the diffuser with the length oriented parallel to the shoreline.

Rationale: In accordance with State Regulations 18 AAC 70.240, the department has authority to designate mixing zones in permits or certifications. The designated mixing zones will ensure that the most stringent water quality criteria for total ammonia as N (chronic 0.8 milligrams per liter (mg/L), acute 5.4 mg/L), total residual chlorine (chronic 0.0075 mg/L, acute 0.013 mg/L with 0.1 mg/L compliance level), dissolved oxygen (6.0 mg/L daily minimum (surface for a depth of 1 meter, no less than 4 mg/L at any depth below the surface), 17 mg/L daily maximum), temperature (15° Celsius), and whole effluent toxicity (1.0 chronic toxic units) are met at all points outside of the mixing zone.

2. In order for the Borough of Petersburg WWTP to achieve compliance with the fecal coliform and enterococcus bacteria final effluent limits, DEC requires the establishment of a Compliance Schedule in the permit. Final effluent limits must be met as soon as possible, but no later than 5 years after the effective date of the permit. Interim requirements that will lead to compliance with the final effluent limits with dates for their achievement must be established in the permit. The following interim requirements shall be included in the Compliance Schedule:

   By one year after the effective date of the permit, the permittee shall develop a facility plan that evaluates alternatives to meet the final fecal coliform and enterococcus bacteria effluent limits and select their preferred alternative.

   By two years after the effective date of the permit, the permittee must complete the design of the preferred alternative and request approval to construct from DEC's Engineering Support and Plan Review (ESPR).

   By three years after the effective date of the permit, the permittee must secure funding and select a contractor to construct upgrades.

   By four years after the effective date of the permit, the permittee must commence construction.

   By five years after the effective date of the permit, the permittee must complete construction, complete optimization of facility upgrade operations, and achieve compliance with the final fecal coliform and enterococcus effluent limits. Final approval to operate must be requested from ESPR.

   The permittee must submit progress or compliance reports on interim and final requirements no later than 14 days following the scheduled date of each requirement.

   Rationale:
   In accordance with State Regulations 18 AAC 15.090, the Department may attach terms and reporting requirements, and the posting of a performance bond or other surety, that it considers necessary to ensure that conditions to a permit, variance, or approval, including operating, monitoring, inspection, sampling, access to records and all applicable criteria will be met.

   According to 18 AAC 83.560, the Department has authority to specify a schedule of compliance leading to compliance with 33 U.S.C. 1251-1387 (Clean Water Act). Any schedule of compliance must require compliance as soon as possible, but no later than the applicable statutory deadline under 33 U.S.C. 1251-1387 (Clean Water Act). 18 AAC 83.560(b) requires interim requirements and dates for their achievement if the schedule of compliance exceeds one year from the date of permit issuance. Time between interim

requirements must not exceed one year. Progress reports must be submitted no later than 14 days following each interim date and the final date of compliance.

According to 18 AAC 72.200, Application for department approval, (a) Except as otherwise provided in 18 AAC 72.035(d) and 18 AAC 72.200(b), a person must submit a plan to the department and obtain approval of that plan before constructing, installing, or modifying any part of a domestic wastewater collection, treatment, storage, or disposal system. To obtain approval, a person shall provide to the department the information required by 18 AAC 72.205. 18 AAC 72.240, states that the department will issue final approval to operate if the information required by 18 AAC 72.235 confirms that (A) the system was constructed as originally approved or (B) the system, or a designated phase of that system, otherwise meets the requirements of AS 46.03 and 18 AAC 72. DEC plan approval requirements will ensure that the most stringent water quality criteria for fecal coliform and enterococcus bacteria are met at all points outside the mixing zone.

3. DEC requires that the permit contain the following final fecal coliform effluent limits:

Monthly Average 200 fecal coliform per 100 mL (FC/100 mL)
Weekly Average 400 FC/100 mL
Daily Maximum 800 FC/100 mL.

Rationale:
In accordance with State Regulations 18 AAC 15.090, the Department may attach terms and reporting requirements, and the posting of a performance bond or other surety, that it considers necessary to ensure that conditions to a permit, variance, or approval, including operating, monitoring, inspection, sampling, access to records and all applicable criteria will be met.

18 AAC 72.050(a)(3), Minimum treatment, states that the Department may authorize a person to discharge domestic wastewater into or onto water or land if the discharge to surface water has received secondary treatment and has been disinfected. 18 AAC 72.050(c) states that the Department may allow or require treatment different from the minimum set out in this section as necessary to protect public health, public and private water systems, or the environment. In deciding to evaluate alternative minimum treatment requirements, the Department will consider other permit or plan approval requirements, and the receiving environment.

Under Section 301(h) of the Clean Water Act, EPA determined that the Borough of Petersburg WWTP qualifies for a continuation of their waiver from secondary treatment standards for 5-day biochemical oxygen demand (BOD_5) and total suspended solid (TSS). To qualify, the Borough of Petersburg must meet specific criteria including a requirement to achieve primary treatment. Therefore, DEC has determined that the Borough of Petersburg WWTP may treat to less than the minimum secondary treatment requirement at 18 AAC 72.050(a)(3); however, less than secondary treatment only applies to BOD_5 and TSS and does not include disinfection. Therefore, the discharge of domestic wastewater to surface water must be disinfected.

18 AAC 72.990(21) defines disinfect to treat by means of a chemical, physical, or other process such as chlorination, ozonation, application of ultraviolet light, or sterilization, designed to eliminate pathogenic organisms, and producing an effluent with a 30-day 200 FC/100 mL monthly average and a seven-day 400 FC/100 mL average. These limits are required as final fecal coliform limits. A daily maximum final effluent limit of 800 FC/100 mL limit is also required. Establishment of a daily maximum limit will help ensure compliance with water quality criteria. Since these limits are dependent on the use of specific technological processes, DEC applies these final fecal coliform bacteria effluent limits as technology-based limits. These

final fecal coliform bacteria effluent limits will ensure that the most stringent water quality criteria for fecal coliform bacteria are met at all points outside the mixing zone.

4. DEC requires that based on the chronic dilution of the driving parameter of the mixing zone (total ammonia as N, with a chronic dilution of 56:1), the permit contain the following final enterococcus bacteria limits:

   30-day Geometric Mean 1,960 colony forming units (CFU)/100 mL
   Daily Maximum 7,280 CFU/100 mL).

   Rationale:
   In accordance with State Regulations 18 AAC 15.090, the Department may attach terms and reporting requirements, and the posting of a performance bond or other surety, that it considers necessary to ensure that conditions to a permit, variance, or approval, including operating, monitoring, inspection, sampling, access to records and all applicable criteria will be met.

   Enterococcus bacteria has reasonable potential to exceed water quality criteria. Effluent limits based on the reasonable potential for enterococcus bacteria to exceed water quality criteria and the dilution required for the effluent to meet enterococcus water quality criteria water quality criteria were therefore developed using the chronic dilution of the driver of the mixing zone (total ammonia as N, 56:1). The final enterococcus bacteria limits will ensure that the most stringent water quality criteria for enterococcus bacteria are met at all points outside the mixing zone. DEC expects that after the implementation of disinfection, the Borough of Petersburg WWTP may achieve compliance with enterococcus water quality criteria (30-day geometric mean 35 CFU/100 mL with not more than 10% of the samples exceeding a statistical threshold value of 130 CFU/100 mL), therefore these final enterococcus bacteria limits may be revised in the next permit reissuance.

5. DEC requires the following total ammonia as N effluent limits:

   Average Monthly 22 mg/L
   Daily Maximum 39 mg/L

   Rationale:
   18 AAC 70.240(b)(2) requires the Department to consider the characteristics of the effluent after treatment of the wastewater. Additionally, 18 AAC 83.435(d) specifies that when the Department determines, using the procedures in 18 AAC 83.435(c), that a discharge causes, has the reasonable potential to cause, or contributes to an in-stream excursion above the allowable ambient concentration of a state numeric criteria within a state water quality standard for and individual permit, the permit must contain effluent limits for that pollutant.

   DEC used the process described in the Technical Support Document (TSD) for Water Quality-Based Toxics Control (Environmental Protection Agency, 1991) and DEC's guidance, Alaska Pollutant Discharge Elimination System Permits Reasonable Potential Analysis and Effluent Limits Development Guide (June 30, 2014) to determine the reasonable potential for total ammonia as N to exceed water quality criteria. The results of the reasonable potential analysis indicated that total ammonia as N, with a maximum expected concentration of 39 mg/L, has reasonable potential to exceed Alaska total ammonia as N marine water quality criteria (chronic 0.8 mg/L, acute 5.4 mg/L) which were calculated using the 85th percentile receiving water pH and temperature and the 15th percentile receiving water salinity. Effluent limits, using the available dilution for total ammonia as N were therefore developed (average monthly 22 mg/L, daily maximum 39 mg/L). These effluent limits will ensure that the most stringent total ammonia as N water quality criteria are met at all points outside the mixing zone.

DRAFT	DRAFT
Signature	Date
DRAFT	DRAFT

Appendix H. Antidegradation Form 2G

Antidegradation Form 2G

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC)
Wastewater Discharge Authorization Program
555 Cordova Street, AK 99501
907-269-6285

Form 2G must be completed by all applicants. The applicant shall submit sufficient information for the department to complete an antidegradation analysis and make findings under 18 AAC 70.016 (b), (c), and (d). DEC may request additional information as necessary.

Antidegradation analysis is tier-specific and the department findings for Tier 1 and Tier 2 are on a parameter-by-parameter basis. Analysis and department findings for Tier 3 water are on a basis of a designated water.

The antidegradation review procedure is based on:

- The level of protection (i.e. Tier 1, 2, or 3) assigned to the pollutants of concern within the receiving water,
- The type of receiving water,
- Existing water quality of the receiving water,
- The necessity of degradation, and
- The social and economic importance of the regulated activity.

All discharges that require a permit under 18 AAC 83 Alaska Pollutant Discharge Elimination System (APDES) or an application for state certification of a federal permit under Section 401 of the Clean Water Act (CWA) are subject to antidegradation regulatory requirements under 18 AAC 70.016. [18 AAC 70.016(a)(1)(A & B)]

Submit completed form to DEC Division of Water to the address above, or via email to either of the following email addresses depending on the type of permit:

- 401 Certification for 404 CWA, or other federal permits: DEC-401Cert@alaska.gov
- APDES Permits: DEC.Water.WQPermit@alaska.gov
- Or, via other means as coordinated with DEC Division of Water.

Section 1- Facility Information [18 AAC 70.016(a)(5)(A – G)]

Facility Name: The City of Petersburg Wastewater Treatment Facility **Permit Number**: AK-002145-8

1. Provide a list of Parameters of Concern in the discharge, the respective concentrations, persistence, and potential impacts to the receiving water.
2. Identify which Tier protection level should apply for each Parameter of Concern.

(For multiple parameters or if additional space is needed, attach separate sheet)

Receiving Waterbody or Wetland:

Frederick Sound

Parameter of Concern:	Respective Concentrations:	Tier* Protection Level: *(*Note, complete this entry after completing the rest of the form)*
ammonia and fecal coliform	30 mg/L-N and 1,183,333 CFU/100 mL	2

Persistence:
Ammonia has been tested at the Wastewater Treatment Facility (WWTF) on a monthly basis and has ranged from 0.3 mg/L-N to 30 mg/L-N with an average of 16.3 mg/L-N. Fecal coliform is discharged from the WWTF and is tested twice a month and concentrations range from 23,000 CFU/100 mL to 1,183,333 CFU/100 mL. The concentration ranges and averages are from data collected during 2017 to 2021.

Potential Impacts:

When ammonia is present in water at high enough concentrations, it can be difficult for aquatic organisms to sufficiently excrete ammonia, leading to a toxic buildup in internal tissues and blood, and potentially death. The maximum concentration tested in the effluent at the WWTF was 30 mg/L-N and is slightly above the AWQS if the average salinity, temperature, and pH of the receiving waterbody taken as part of the Water Quality Monitoring program in 2005. However, a mixing zone is currently in place and it is likely that the ammonia concentrations at the zone of initial dilution (ZID) likely meet the AWQS.

Fecal coliform, found in human and animal feces, is used to indicate the possible presence of disease-causing bacteria. Concentrations sampled at five stations as part of the fecal coliform monitoring program between 2017 and 2022 ranged from non-detect to 21 CFU/100 mL. The maximum concentration occurred during 2018. The concentrations from samples collected in the three most recent sampling events resulted in non-detect at all five stations. As described in the mixing zone Form 2-M and associated attachment, it is assumed that bacteria (fecal coliform, enterococcus) will be substantially reduced from current levels due to ADEC's determination that disinfection standards (18 AAC 72) will have to be met by the facility, which are 200 cfu/100 mL (average) applied at end of pipe. At these disinfection-reduced levels, bacteria will still need a mixing zone but the dilution and size needed will be controlled by other parameters.

If applicable, data is attached on the parameters that may alter the effects of the discharge to the receiving water. ☐ Yes, ☐ No, ☑ N/A

Section 2- Baseline Water Quality Provisions [18 AAC 70.016(a)(6)(A – C)]

If determined necessary and requested by the Department, submit sufficient and credible baseline water quality information for the receiving water which meets the requirements of 18 AAC 70.016(a)(6)(A – C).

Section 3- Tier 1 Protection Level and Analysis [18 AAC 70.016(b)]

1. Does a discharge of any parameter identified in Section 1 occur to a Category 4 [305(b)] or Category 5 [303(d)] waterbody listed in the current approved Alaska's Integrated Water Quality Monitoring and Assessment Report?

See http://dec.alaska.gov/water/water-quality/impaired-waters.aspx for the most recently approved integrated report and category listings.

☐ Yes ☑ No

a. If yes, list parameters from Section 1 that are present in the proposed discharge that will be included in the Tier 1 analysis in the following table.

Receiving Water and Wetlands Information (if additional space is needed, attach separate sheet):

a. Name of waterbodies or wetlands to which you discharge:	**Impaired Waters**					
	b. Is the proposed discharge(s) directly to any segment of a Category 4 or 5 waterbody?		If you answered yes to b, then answer the following three questions (c, d, and e).			
			c. What parameter(s) are causing the Category 4 or 5 water degradation?	**d**. Are the parameter(s) causing the degradation present in the proposed discharge?		**e**. Is the discharge consistent with the assumptions and requirements of applicable EPA approved or established Total Maximum Daily Load (TMDL)?
	Yes	No		Yes	No	Yes	No
	☐	☐		☐	☐	☐	☐
	☐	☐		☐	☐	☐	☐

Section 4- Tier 2 Protection Level and Analysis [18 AAC 70.016(c)]

If not identified as requiring only Tier 1 level of protection, Tier 2 is presumed for all water as the default protection level for all parameters [18 AAC 70.016(c)(1)].

1. Is the application for a *(Check all that apply)*:

☐ New Discharge* ☑ Existing Discharge ☐ Expanded Discharge*

*Note: "new or expanded," with respect to discharges means discharges that are regulated for the first time or discharges that are expanded such that they could result in an increase in permitted parameter load or concentration or other changes in discharge characteristics that could lower water quality or have other adverse environmental impacts.

2. Does a discharge of any parameter identified in Section 1 – Facility Information require Tier 2 analysis as defined under 18 AAC 70.016(c)(2)(A) – (E)?

☑ **Yes**, proceed to **Question 3**

☐ **No**, please **explain below** and proceed to **Section 5**

3. For each parameter requiring a Tier 2 analysis, provide a description per discharge (e.g., parameter specific per outfall) and analysis of a range of practicable alternatives that have the potential to prevent or lessen the degradation associated with the proposed discharge [18 AAC 70.016(c)(4)] (*if additional space is needed, attach separate sheet*). Include:

A. Identification of receiving water quality and accompanying environmental impacts on the receiving water for each of the practicable alternatives;

Please See Supplemental Attachment

B. Evaluation of the cost for each of the practicable alternatives, relative to the degree of water quality degradation;

Please See Supplemental Attachment

C. Identification of a proposed practicable alternative that prevents or lessens water quality degradation while also considering accompanying cross-media environmental impacts. (*If the applicant has selected a non-degrading alternative, the social or economic importance analysis in Question 4 is not required.*

Please See Supplemental Attachment

4. Social or Economic Importance [18 AAC 70.016(c)(5)]

Provide information that demonstrates the accommodation of important social or economic development. The applicant shall complete either a social OR economic importance analysis (or both) identifying each affected community in the area where the receiving water for the proposed discharge is located. *(if additional space is needed, attach separate sheet)*

(A) Social Importance Analysis: *(select one or more areas, and describe below)*	**(B) Economic Importance Analysis**: *(select one or more areas, and describe below)*:
☑ community services provided; ☑ public health or safety improvements; ☑ infrastructure improvements; ☑ education and training; ☐ cultural amenities; ☐ recreational opportunities	☑ employment, job availability, and salary impacts; ☐ tax base impacts; ☐ expanded leases and royalties; ☑ commercial activities; ☐ access to resources; ☐ access to a transportation network

Describe (checked items above or attach as separate document)

Please See Supplemental Attachment

Section 5- Tier 3 Protection Level and Analysis [18 AAC 70.016(d)]

1. Is the discharge to a designated Tier 3 water? ☐ Yes ☑ No

(Currently, the State of Alaska has not designated any Tier 3 waters).

See http://dec.alaska.gov/water/water-quality/standards/antidegradation.aspx for Tier 3 for further information.)

Section 6. Certification Information

An Alaska Pollutant Discharge Elimination System (APDES) permit application must be signed by an individual with the appropriate authority per 18 AAC 83.385 or for 401 certification of 404 permits or other federal permits per 18 AAC 15.030.

APDES Permits	
Corporate Executive Officer 18 AAC 83.385 (a)(1)(A)	For a corporation, a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation.
Corporate Operations Manager 18 AAC 83.385 (a)(1)(B)	For a corporation, the manager of one or more manufacturing, production, or operating facilities, if (i) the manager is authorized to make management decisions that govern the operation of the regulated facility, including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental statutes and regulations; (ii) the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and (iii) authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
Sole Proprietor or General Partner 18 AAC 83.385 (a)(2)	For a partnership or sole proprietorship, the general partner or the proprietor respectively.
Public Agency, Chief Executive Officer 18 AAC 83.385 (a)(3)(A)	For a municipality, state, or other public agency, the chief executive officer of the agency.
Public Agency, Senior Executive Officer 18 AAC 83.385 (a)(3)(B)	For a municipality, state, or other public agency, a senior executive officer having responsibility for the overall operations of a principal geographic unit or division of the agency.
401 Certifications	
Corporations 18 AAC 15.030(1)	In the case of corporations, by a principal executive officer of at least the level of vice president or his duly authorized representative, if the representative is responsible for the overall management of the project or operation.
Partnerships 18 AAC 15.030(2)	in the case of a partnership, by a general partner
Proprietorship 18 AAC 15.030(3)	in the case of a sole proprietorship, by the proprietor
Public Agency 18 AAC 15.030(4)	in the case of a municipal, state, federal or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Organization:	Name:	Title:
City of Petersburg	Karl Hagerman	Utility Director

Phone:	Fax (optional):	Email:
907-772-5421		khagerman@petersburgak.gov

Mailing Address:	Street (PO Box):		
	PO BOX 329		
	City:	State:	Zip:
	Petersburg	Alaska	99833

Signature/Responsible Official

January 20, 2023
Date

Section 7. Form 2G Preparer *(Complete if Form 2G was prepared by someone other than the certifier.)*

Organization:	Name:	Title:
HDR Engineering, Inc	Tom Dupuis	Senior Water Quality Engineer

Phone:	Fax (optional):	Email:
208-890-0464		thomas.dupuis@hdrinc.com

Mailing Address: ☐ Check if same as Certifiers Information	Street (PO Box):		
	582 E. 36th Avenue Suite 500		
	City:	State:	Zip:
	Anchorage	Alaska	99503

Form 2G Supplemental Attachment

Section 4-Tier 2 Protection Level and Analysis

It is the Petersburg Borough's (Borough) understanding that fecal coliform concentrations will be addressed by Alaska Department of Environmental Conservation (ADEC) as a technology based effluent limitation (TBEL) as described in 18 AAC 72. Review of effluent data indicates that ammonia is also a parameter of interest that would need a mixing zone to meet marine water quality standards. Additional treatment is the only potential practicable alternative for both ammonia and fecal coliform to further reduce concentrations in the effluent. The treatment alternatives include secondary treatment (nitrification) and disinfection at the WWTF.

Without additional treatment, concentrations of ammonia and fecal coliform in the effluent are expected to be similar to historical values and are unlikely to impact the existing water quality of Frederick Sound. The continued use of a multi-port diffuser will provide dilution sufficient to achieve water quality standards and avoid degradation of the receiving waterbody beyond the zone of initial dilution (ZID).

The Borough will need to complete an analysis to determine the type of disinfection and the process it will institute for determining the best treatment solution (i.e., ultraviolet disinfection or chlorine) in order to have the disinfection process meet the new permit limits (TBELs). The TBELs for fecal coliform will reduce fecal coliform concentrations from the current levels once disinfection is implemented at the WWTF.

It is the Borough's understanding that there will be a compliance schedule that will allow the WWTF the time needed to meet the new permit limits.

3A-Identification of Receiving Water Quality and Accompanying Environmental Impacts for Each Practicable Alternative

The Borough has conducted receiving waterbody monitoring as part of the 2006 discharge permit which has included water quality monitoring, fecal coliform testing, WET testing, kelp bed monitoring, and biological monitoring including sediment and benthic infauna sampling. Based on the results of this monitoring program the habitat of the receiving waterbody has not been impacted by the discharge of the effluent from the WWTF.

The practicable alternative of additional treatment for the WWTF would include secondary treatment (nitrification) and installation of ultraviolet disinfection or chlorination disinfection for fecal coliform. Impacts to Frederick Sound for this alternative would include a decrease in the concentrations of both ammonia and fecal coliform. If chlorine disinfection were chosen, there would likely be the introduction of some total residual chlorine from the disinfection process, but this would be monitored and likely have a permit limit at the WWTF.

3B. Evaluation of the cost for each of the practicable alternatives, relative to the degree of water quality degradation

The cost of installing and operating the various treatment systems at the WWTF include the cost of the building improvements and/or construction required, and additional mechanical equipment. piping and chemicals. The analysis and cost of treatment for each parameter as follows:

Cost for WWTF Improvements to Remove Ammonia

The existing Borough WWTF is currently a primary treatment facility utilizing a typical primary clarification process to meet the discharge requirements of their NPDES permit/301(h) waiver. The WWTF includes influent pumping, influent screening, grit removal and screenings/grit handling, primary clarifiers, aerobic solids digester, and solids dewatering and loading, and lab facilities/offices.

Influent wastewater is pumped via a force main to influent bar screens and grit removal. Screened wastewater then flows through two primary clarifiers. Primary solids from the clarifiers are pumped to an aerobic digester. The Borough dewaters the digested solids to separate much of the water from the solids, incorporates the dewatered sludge with wood chips and composts the biosolids via aerated static pile composting. Composted sludge meets EPA class "A" standards and is land applied at the Borough's Waste Soil Disposal site. Effluent from the primary clarifiers is discharged into Frederick Sound via the outfall pipe.

Potential ammonia limits that would be required without a mixing zone would be restrictive and the Borough facility would need to make significant changes to the treatment process in order to achieve adequate nitrification for ammonia removal. A new mechanical, secondary treatment facility utilizing a conventional activated sludge process requires regular maintenance, advanced training for operational staff, and would be more operationally difficult to maintain than the current primary facility. Upgrading the existing primary plant to a conventional activated sludge process (that can achieve nitrification) would generally require the addition of anoxic/aerobic reactors, secondary clarification, return activated sludge (RAS) pumping, aerobic digestion for sludge stabilization and dewatering. For the purposes of this planning analysis, a Membrane Bioreactor (MBR) alternative has been assumed for plant upgrades to meet the potential low effluent ammonia limits. This alternative would generally include upgraded influent fine screens and grit removal units, anoxic/aerobic reactors, membranes bioreactors, RAS and waste activated sludge (WAS) pumping, gravity belt thickeners, aerobic digestion and dewatering.

Table 1 provides a rough order of magnitude (ROM) opinion of probable cost for the development of ammonia removal processes at the WWTF. It is assumed that a separate building/structure would have to be constructed to house the treatment systems to have room on-site for the new facilities.

Table 1: Opinion of Probable Cost, WWTP Treatment Process to Remove Ammonia

Item	Quantity	Units	Unit Cost	Cost
New Equipment				
- Headworks improvements (screening, grit, etc.)	1	LS	$2,500,000	$2,500,000
- MBR (tanks, chemical systems, etc.)	1	LS	$3,400,000	$3,400,000
- Process pumps	1	LS	$150,000	$150,000
- Concrete basins	1	LS	$1,800,000	$1,800,000
- Process Piping	1	LS	$750,000	$750,000
- Solids Handling improvements	1	LS	$1,250,000	$1,250,000
- Ancillary equipment/systems	1	LS	$1,720,000	$1,720,000
New Building				
Additional Treatment Building (Structure and Mech)	5,200	SF	$800	$4,160,000
Misc Concrete and structures	1	LS	$860,000	$860,000
Site Work (excavation, grading, etc.)	1	LS	$2,150,000	$2,150,000
	Subtotal			**$18,740,000**
	Contingency (25%)			$4,685,000
	Electrical, Instrumentation, and Control (25%)			$4,685,000
	Engineering and Construction Management (20%)			$3,748,000
	Borough Administration and Legal (5%)			$937,000
	Operations (new FTEs in Utility Dept)			$380,000
	Total			**$33,175,000**

Cost for WWTF Disinfection Improvements

To meet the potential technology-based, end-of-pipe permit limits for fecal coliform and enterococcus (18-AAC-72 technology basis), a new disinfection system would be required at the Borough WWTF. If the Borough continues the use of primary clarification without secondary treatment (nitrification) for ammonia then ultraviolet (UV) disinfection system would not be a viable alternative based on the treated effluent from the existing primary clarifiers. If secondary treatment is provided, then ultraviolet disinfection should be compared to chlorine disinfection in a preliminary alternatives analysis and cost comparison.

For the purposes of this analysis, the use of sodium hypochlorite has been assumed for plant effluent disinfection. There are a number of potential alternatives to consider for a chlorine disinfection system including on-site generation versus storage, tote versus mini-bulk versus bulk storage of commercial hypochlorite, chemical transfer and metering pumping, chlorine contact basin versus pipeline for detention, etc. A detailed preliminary engineering evaluation should be performed, taking into account capital costs, as well as life cycle costs, chemical

delivery, facility footprint, and sensitivity to power costs and hypochlorite production costs before selecting the most viable alternative for the Borough WWTF. If it is determined that chlorination is the best alternative for the Borough then, as part of the evaluation, a dechlorination system (sodium bisulfite feed, control and monitoring) could also be designed based on the Borough's specific needs.

Table 2 provides a rough order of magnitude (ROM) opinion of probable cost for the development of chlorine disinfection and assumes on-site generation at the facility, associated ancillary equipment, and the construction of a concrete chlorine contact basin to achieve adequate detention time prior to discharge. It is assumed that a separate building/structure would have to be constructed to house the treatment systems and additional land would need to be purchased to have room on-site for the new facilities.

Table 2: Opinion of Probable Cost, WWTP Treatment Process for Disinfection

Item	Quantity	Units	Unit Cost	Cost
General Requirements (Contractor, Sales Tax, Mob/De-mob)	1	LS	$1,640,000	$1,640,000
Site Work (excavation, grading, etc.)	1	LS	$450,000	$450,000
Concrete (containment and diversion walls, bases, suspended walls, etc.)	1	LS	$343,000	$343,000
Miscellaneous Metals, Woods, and Plastics	1	LS	$100,000	$100,000
Painting and Protective Coatings	1	LS	$30,000	$30,000
New Equipment (Onsite Gen of Hypochlorite 0.8% System)	1	LS	$890,000	$890,000
-Hypochlorite Induction Unit				
-Hypochlorite Storage Tanks				
-Onsite Generation System				
-Sump Pumps				
Process Piping	1	LS	$400,000	$400,000
New Building				
Additional Treatment Building (Structure and Mech)	1,800	SF	$800	$1,440,000
Identification, Stenciling, and Tagging System, Package Scrubber, Emergency Eye Wash Stations	1	LS	$95,000	$95,000
Electrical	1	LS	$650,000	$650,000
	Subtotal			**$6,038,000**
	Contingency (30%)			$1,811,400
	Contractor or Owner change during Construction (10%)			$603,800
	Engineering and Construction Management (20%)			$1,207,600
	Borough Administration and Legal (5%)			$301,900
	Operations (new FTEs in Utility Dept)			$285,000
	Total			**$10,247,700**

The Class 5 (rough order of magnitude) opinions of probable cost (OPCC) for the development of treatment processes at the WWTF include estimated construction dollars, contingencies, administration, and engineering fees. Construction costs are based on conceptual alternatives. The costs have been estimated based on information from cost estimating guides and experience gained while designing similar facilities.

Preliminary cost estimates include the costs to construct the improvements as well as a number of additional factors, including an allowance for the contractor's overhead and profit and mobilization/demobilization costs. The OPCC includes capital costs of the conceptual level alternatives to provide a planning-level comparison and an indication of the significant capital expenditure that would be required to construct such facilities. The cost estimates do not provide a life-cycle cost analysis of long-term impacts to the Borough. On top of an overall increased operational complexity for more advanced treatment processes, long term costs for chemical addition, energy usage, and additional maintenance requirements would result in a significant annual O&M cost increase.

Before the Borough considers moving ahead with any of the options put forth in this memorandum, HDR suggests a comprehensive alternatives analysis and financial evaluation of the wastewater treatment methods/alternatives, coupled with a detailed determination of how final WWTP effluent permit requirements can be met.

Overall, the only alternative for the WWTP is to further treat ammonia and fecal coliform at a cost that would range from $40-$50 million dollars.

With an authorized mixing zone, there are still costs associated with disinfection in order to meet the ADEC TBEL fecal coliform permit limits which as shown above is approximately nine to ten million dollars.

3C. Identification of Proposed Practicable Alternative that Prevents or Lessens Water Quality Degradation

The most practicable alternative has been evaluated in the sections above. This is the only practicable alternative that can be considered for reducing ammonia and fecal coliform in the effluent at the Borough WWTP. Overall costs to treat for the two parameters listed would range between $40 to $50 million.

4. Social and Economic Importance

Wastewater treatment facilities are important in providing communities social and economic development growth opportunities. It has been well documented that wastewater infrastructure has been beneficial for the people within the community that they serve, the environment, and the economies in both the short and long term. Wastewater infrastructure investment is crucial in achieving public health, improve the environment, and enhance the quality of life. Wastewater

collection and treatment is essential to preventing disease and protecting human health. The Borough has provided these services at the WWTF since 1988 which has allowed for population and economic growth in the area.

The existing WWTF is currently permitted for a monthly average flow of 1.2 MGD and a daily maximum flow of 3.6 MGD. The average influent flows to the WWTF from 2017-2021 have been approximately 0.45 MGD with the highest maximum daily flow at 1.92 MGD. This shows that the Borough can continue to operate under the existing permitted flow rates or expand the WWTF to accommodate additional growth/flow. Based on the receiving water monitoring that has been conducted as part of the City's discharge permit the existing primary treatment being conducted at the WWTF does not adversely impact aquatic life or the overall health of Frederick Sound.

The WWTF currently employs 2 full time employees and shares one full time employee with the water department and a full-time administrative assistant with other departments. In a small community these positions help provide economic stability to a number of residents. The WWTF also provides community services and associated infrastructure improvement for 1,250 residential customers and 61 commercial customers. The Borough provides education and training to staff as well as internship opportunities to high school students. The WWTF also has provided public tours of the facilities.

The social and economic impacts of not authorizing a mixing zone should be considered. The capital and on-going operation and maintenance costs associated with additional treatment alternatives discussed in previous sections would have significant impact on the Borough and the customer base that fund the operation of the community utilities. Large increases in sewer rates to fund improvements and on-going operations could negatively impact the quality of life and make the region less attractive to individuals and companies looking to move or grow in the area.

If the WWTF were to be required to add additional treatment due to losing the mixing zone, not only would the costs of building in the additional treatment processes as discussed in previous sections be required, but also the Borough would incur long term operational and maintenance costs. For example, the Borough would need to hire additional operators with higher levels of operator certifications to operate the more complex facility. Small communities in Alaska have an extreme level of difficulty in finding and retaining qualified operators to run more complex treatment facilities.