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:

City and Borough of Sitka

City and Borough of Sitka Wastewater Treatment Plant

The Alaska Department of Environmental Conservation (ADEC)

Announces Notice of EPA's Request for and Proposes to Issue a Clean Water Act (CWA) § 401 Certification for the:

NPDES Permit for the City and Borough of Sitka Wastewater Treatment Plant

Public Comment Start Date: June 7, 2023

Public Comment Expiration Date: July 24, 2023

Technical Contact (EPA, NPDES Permit):	Jennifer Wu 206-553-6328 800-424-4372, ext. 6328 (within Alaska, Idaho, Oregon and Washington) wu.jennifer@epa.gov
Technical Contact (ADEC, certification):	Marie Klingman 907-451-2101 marie.klingman@alaska.gov

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

Any applicant for a federal license or permit to conduct an activity that might result in a discharge into navigable waters, in accordance with Section 401 of the Clean Water Act (CWA) of 1977 (PL95-217), also 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. EPA is requesting final Clean Water Act (CWA) 401 certification from ADEC during the public comment period.

Notice is hereby given that EPA has requested a CWA §401 Water Quality Certification of the City and Borough of Sitka WWTP NPDES permit (AK0020010), as described in this Fact Sheet.

ADEC is proposing to issue the CWA § 401 certification in Appendix H and Appendix I.

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)). The are no neighboring states or tribes with TAS within 150 miles of the facility. Therefore, EPA has determined that no neighboring states or tribes will be impacted by the discharge from this facility.

Public Comment

NPDES Permit

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 Jennifer Wu (wu.jennifer@epa.gov). If you are unable to submit comments via email, please call 206-553-6328.

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.

CWA § 401 Certification

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.

DOCUMENTS ARE AVAILABLE FOR REVIEW

NPDES Permit

The draft permit, this Fact Sheet, the 301(h) Tentative Decision Document (301(h) TD), 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 Jennifer Wu.

For technical questions regarding the draft permit, this Fact Sheet, or the 301(h) TD, contact Jennifer Wu at (206) 553-6328 or wu.jennifer@epa.gov. Services can be made available to persons with disabilities by contacting Audrey Washington at (206) 553-0523.

CWA § 401 Certification

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.

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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.
	Clean Water Act
AML	Average Monthly Limit
AWL	Average Weekly Limit
BOD_5	Biochemical oxygen demand, five-day
°C	Degrees Celsius
$CBOD_5$	Carbonaceous Biochemical Oxygen Demand
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EC_{50}	Median Effective Concentration
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
GPD	Gallons per day
IC_{25}	25% Inhibition Concentration
ICIS	Integrated Compliance Information System
lbs/day	Pounds per day
LOEC	Lowest Observed Effect Concentration
mg/L	Milligrams per liter
mL	Milliliters
ML	Minimum Level
µg/L	Micrograms per liter
mgd	Million gallons per day
MLLW	Mean Lower Low Water
MPN	Most Probable Number
N	Nitrogen
NOAA	National Ocean and Atmospheric Administration
NOEC	No Observable Effect Concentration
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
O&M	Operations and maintenance
POTW	Publicly owned treatment works
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
SS	Suspended Solids

s.u.	Standard Units
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 Unit-Acute
TU_c	Toxic Unit-Chronic
USFWS	U.S. Fish and Wildlife Service
UV	Ultraviolet
WD	Water Division
WET	Whole Effluent Toxicity
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 #:	AK0021474
Applicant:	City and Borough of Sitka (CBS) Wastewater Treatment Plant
Type of Ownership	Publicly Owned Treatment Works
Physical Address:	100 Alice Loop Rd. Sitka, Alaska 99835
Mailing Address:	100 Alice Loop Rd. Sitka, Alaska 99835
Facility Contact:	Shilo Williams Environmental Superintendent 907-747-4071 Office shilo.williams@cityofsitka.org
Operator Name:	Shilo Williams. Wastewater Treatment Level II #22925, Wastewater Collection Operator Level III #22926.
Facility Location:	57.038776 º N, 135.345059º W
Receiving Water	Middle Channel of Sitka Sound
Facility Outfall	57.037748 º N, 135.344174º W

B. MODIFICATION OF SECONDARY TREATMENT REQUIREMENTS

The City and Borough of Sitka (CBS, the City, the applicant, Sitka, or the permittee) has requested a modification under Section 301(h) of the Clean Water Act (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 CBS wastewater treatment plant (WWTP) into Sitka Sound. The effluent quality attainable by secondary treatment is defined in regulations at 40 CFR Part 133 in terms of biochemical oxygen demand (BOD_5), total suspended solids (TSS), and pH. The City has requested a 301(h) modification of the secondary treatment requirements for BOD_5 and TSS, but not pH.

Upon review of the application materials and available data, EPA has tentatively determined that the CBS 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 document (301(h) TD), 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 40 CFR Part 125, Subpart G.

C. PERMIT HISTORY

EPA approved CBS' first request for modification of secondary treatment requirements and issued the first CWA Section 301(h)-modified NPDES permit on March 14, 1983. The most recent NPDES permit for the CBS WWTP was issued on November 27, 2001, became effective on December 31, 2001, and expired on January 2, 2007 (hereafter referred to as the 2001 permit). An NPDES application for permit issuance was submitted by the permittee on June 5, 2006. EPA determined that the application was timely and complete. Therefore, pursuant to 40 CFR 122.6, the 2001 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 CBS WWTP and outfall is located within the territory of the Sitka Tribe of Alaska (STA), a federally recognized tribal government with more than 4000 Tribal citizens who are primarily of Tlingit, Haida, Aleut, and Tsimpsian heritage in the Sheet'-Ka` area of southeastern Alaska. EPA notified STA of its work on this draft permit via electronic mail in August 2020 and January 2021, and held an informational webinar for STA and other tribes on April 14 and 18, 2022. EPA gave a presentation on the CBS WWTP NPDES permit to the STA Natural Resource Committee on April 20, 2023. On May 24, 2023, STA requested formal government-to-government consultation on the permit. On June 7, 2023, EPA accepted STA's request for consultation on the permit and will work with STA to address issues of concern prior to issuing the final permit in accordance with government-to-government consultation.

II. FACILITY INFORMATION

A. TREATMENT PLANT DESCRIPTION

The CBS WWTP is a primary treatment plant that began operation in 1984. The facility has a peak design flow of 5.3 million gallons per day (mgd) and an average daily design flow of 1.8 mgd. The existing outfall discharges to the Middle Channel of Sitka Sound at a depth of 85 feet below mean lower low water (MLLW). The outfall location is 57.037748 º N, 135.344174 º W, near the airport.

The treatment plant currently serves a population of approximately 8,500 and was designed for a population of 10,500. Sitka's population has held steady over the last several years, and the facility does not project a population increase during the term of

the proposed permit. The maximum daily flow rate in 2005 was 6.9 mgd, and the average of the monthly average flow rate from 2016-2021 was 1.6 mgd.

The collection system is a separate sanitary sewer system consisting of approximately 50 kilometers (31 miles) of mains and interceptors and 29 lift stations. Treatment consists of comminution of 90% of the sewage entering the treatment plant (Japonski, Alice, and Charcoal Island wastewater is injected into the force mains beyond the comminutor), fine screening (3 rotary screens), grit removal, and primary clarification (with scum skimming, sludge removal, and intermittent coagulant addition to increase BOD reduction). Sludge from the clarifiers is thickened and dewatered. Thickener supernatant is returned to the treatment system prior to the clarifiers. Sludge, scum, grit and screenings are incinerated.

The effluent is discharged through the existing 1,676 meter-long (5,500 ft) marine outfall which ends in a diffuser at a depth of 25.9 meters (85 ft) below MLLW.

B. OUTFALL DESCRIPTION

The existing marine outfall consists of 5,500 feet (ft) of 24-inch pipe and 197 ft of diffuser located at approximately 25.9 m (85 ft) below MLLW. The diffuser consists of 54 ft of 24-inch pipe, 65 ft of 20-inch pipe, 26 ft of 16-inch pipe, 26 feet of 14-inch pipe, and 24 ft of 10-inch pipe. There are sixteen round, 4-inch, bell-mouthed ports, located at 0° from the horizontal along the length of the diffuser. The ports are spaced alternately left and right of the pipe on 13 ft centers, 18 inches above the seabed. The average daily design flow rate for each port is 79.26 gallons per minute at 1.8 mgd. The approximate outfall location is shown below in Figure 1.

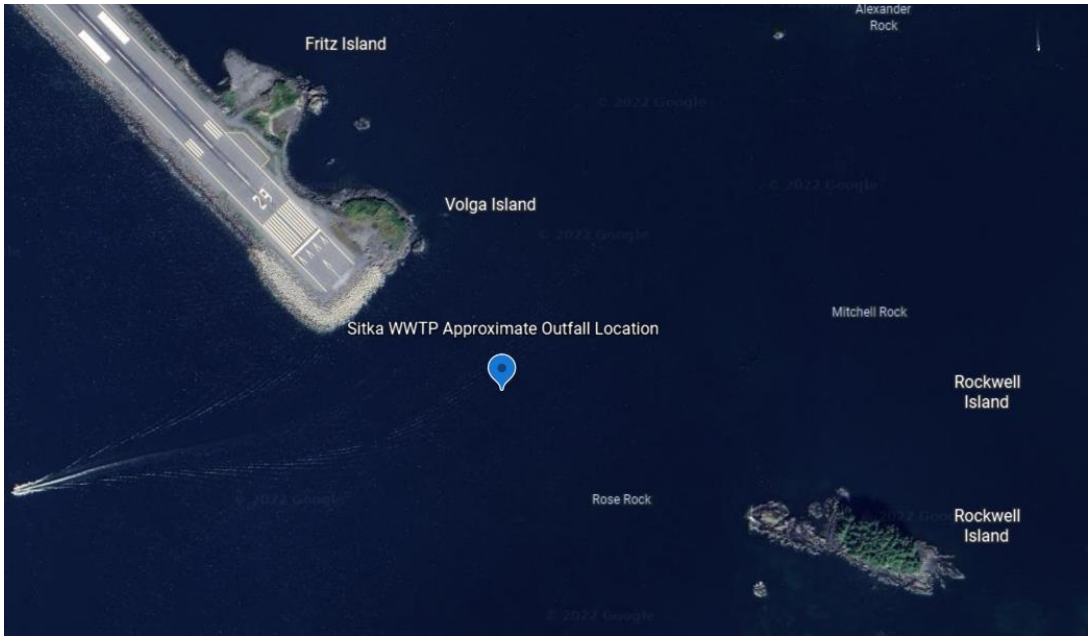

Figure 1. Approximate Location of CBS's Wastewater Discharge

C. EFFLUENT CHARACTERIZATION

To characterize the effluent, EPA evaluated the facility's application form, discharge monitoring report (DMR) data, and additional data provided by the City and Borough

of Sitka. The effluent quality is summarized in Table 2. Data are provided in Appendix B of this Fact Sheet and Appendix C of the 301(h) TD.

Table 2. Effluent Characterization

Parameter	Minimum	Maximum	Notes
5-day Biochemical Oxygen Demand (BOD_5), (monthly avg), mg/L BOD_5 (monthly avg), lbs/day	45 423	134 932	1
BOD_5 (daily max), mg/L BOD_5 (daily max), lbs/day	50 466	230 1554	1
BOD_5 (monthly avg percent removal), %	30	57	1
Total Suspended Solids (TSS), (monthly avg), mg/L TSS (monthly avg), lbs/day	21 129	60 665	1
TSS (daily max), mg/L TSS (daily max), lbs/day	24 148	87 1344	1
TSS (monthly avg percent removal), %	55	84	1
Fecal coliform (monthly avg), #/100/mL Fecal coliform (daily max), #/100/mL	9798 9798	998,303 2,009,778	1
Copper, Total Recoverable (daily max), µg/L	19.5	197	1
Flow (monthly avg), mgd	0.8	3.2	1
Ammonia (Total Ammonia as N), mg/L	7.5	29	1
Dissolved oxygen (daily min), mg/L	4.0	11.0	1
pH (min), standard units pH (max), standard units	6.4 7.0	7.4 7.9	1
Temperature (daily max), ^oC	7.0	15.0	1
Phenolics, Total mg/L	-	0.059	2
Arsenic µg/L	-	0.91	2
Cadmium µg/L	-	0.047	2
Copper µg/L	-	20.8	2
Iron µg/L	-	2990	2
Lead, µg/L	-	0.575	2
Manganese, µg/L	-	125	2
Nickel, µg/L	-	1.76	2
Selenium, µg/L	-	1.8	2
Zinc, µg/L	-	47.8	2
Chloroform, µg/L	-	1.8	2
Toluene µg/L	-	0.97	2
Tetrachloroethene (PCE) µg/L	-	9.8	2
Source: Discharge monthly reports (DMR) from 11/30/2016 - 09/30/21. 2 Based on single sample collected in Toxic Pollutant Scan 2020, submitted by permittee.			

D. COMPLIANCE HISTORY

A summary of effluent violations from November 2016 to September 2021 is provided in Table 3. Overall, the CBS WWTP has a consistent and reliable history of compliance with the 2001 permit limits. The facility does not have any consistent violations. The violations within the above period include failure to meet the daily maximum BOD_5 concentration twice, failure to meet the fecal coliform instantaneous maximum once, and failure to meet the pH minimum limit once. In each instance, CBS corrected the problem before the next reporting date.

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=110000759162

Table 3. Summary of Effluent Violations (November 2016-September 2021)

Parameter	Limit Type	Units	Number of Instances
BOD_5	Daily Maximum	mg/L	2
Fecal coliform	Instantaneous Maximum	#FC/100 mL	1
pH	Instantaneous Minimum	Standard Units	1
Information accessed in ICIS/ECHO on February 22, 2022.			

III. RECEIVING WATER

In drafting permit conditions, EPA must analyze the effect of the facility's discharge on the receiving water. The details of that analysis are provided in the 301(h) TD 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.

The facility discharges to the Middle Channel of Sitka Sound. In the 1989 Technical Decision Document, EPA determined that the receiving water is open ocean, in recognition of the absence of a salinity gradient during parts of the year and the physical characteristics of Sitka Sound in the vicinity of the outfall (EPA, 1989). For a detailed description of the receiving waters please refer to section 6 of the 301(h) TD.

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 has not been reclassified, nor have site-specific water quality criteria been established. Therefore, the vicinity of the discharge 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 CBS WWTP collected water quality data in Sitka Sound in accordance with 2001 permit requirements for the following parameters: temperature, pH, dissolved oxygen (DO), Secchi Disk Depth (a measure of turbidity) and salinity. Data were collected at various distances from the outfall and at different depths in August 2018 and August 2020. The sample results are shown in Appendix B.

From April through August 2021, the Aquatic Restoration and Research Institute (ARRI) conducted a study for ADEC on water quality data in the vicinity of the CBS WWTP outfall for temperature, salinity, pH, fecal coliform, enterococcus, ammonia, copper, nickel and zinc. Cruise ships were not operating in 2021. However, the 2021 values for temperature, salinity, pH and DO are similar to data collected by ARRI in 2020, when cruise ships were actively operating in the area (ARRI, 2022). Therefore, EPA concludes that the 2021 ARRI data are representative of Sitka Sound conditions. The water quality data in Sitka Sound from the 2021 ARRI report and from the permittee (2018-2020) are summarized below in Table 4 and Appendix A.

Table 4. Receiving Water Quality Data

Parameter	Units	Percentile	Value	Source
Temperature	°C	95th	12.0	1
pH	Standard units	5th – 95th	8.1 – 8.1	1
Dissolved Oxygen	mg/L	5th – 95th	9.6 – 12.3	1
Salinity	ppt	5th – 95th	31.6 – 43.1	1
Secchi Disk Depth	Feet	5th – 95th	18.4 – 25.6	1
Fecal Coliform	CFU/100 mL	Max Geometric Mean	4.6	2
Enterococcus	CFU/100 mL	Max Geometric Mean	8.2	2
Ammonia	mg/L	Maximum	0.031	2
Copper	µg/L	Maximum	3.98	2
Nickel	µg/L	Maximum	0.29	2
Zinc	µg/L	Maximum	4.88	2
Sources: 1. Data collected by permittee 2018-2020 2. ARRI, 2022. Water Quality Measures in Alaska's Ports and Shipping Lanes, 2021 Annual Report. https://dec.alaska.gov/media/24843/marine-water-quality-summary-report-2021-final-01-31-22.pdf				

1. General Characteristics

The facility discharges to the middle channel of Sitka Sound. Information indicates that the receiving water could be considered either open ocean or saline estuary, based on geographic and oceanographic characteristics (Tetra Tech, 1988). EPA believes this analysis remains applicable to the conditions in Sitka Sound. Therefore, EPA classifies the receiving water as open ocean, in recognition of the absence of a significant salinity gradient during the year and the physical characteristics of Sitka Sound in the vicinity of the outfall (EPA 1989 TD).

2. Water Quality Limited Waters

The State of Alaska's 2022 Integrated Report Section 5 (CWA 303(d)) does not list Sitka 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 the table below:

Table 5. Summary of Proposed Changes to Effluent Limits

Parameter	Effluent Limit Change	Basis
BOD_5	Less stringent limits	EPA is proposing less stringent effluent limits that reflect facility performance. The less stringent limits meets an exception to the prohibition on backsliding as described in Section IV.A.2.b.

TSS	More stringent limits	EPA is proposing more stringent effluent limits that reflect the 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 changing to average weekly limit	40 CFR 122.45(d)(2) requires 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 change in limits meets an exception to the prohibition on backsliding as described in Section IV.A.2.b.
TSS[1]	Removing maximum daily limit/including average weekly limit	40 CFR 122.45(d)(2) requires 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 the prohibition on backsliding as described in Section IV.A.2.b.
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 WQBELs for fecal coliform that will ensure Alaska's most protective WQS are met at the boundary of the ZID.

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, no WQS were 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 a violation of 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.
Copper	More stringent limits	EPA is proposing more stringent copper limits based on the draft CWA Section 401 certification from ADEC. See Section IV.A.3., subsection "Copper" of this Fact Sheet.
Ammonia	New effluent limits	EPA is proposing new ammonia limits based on the draft CWA Section 401 certification from ADEC. See Section IV.A.3., subsection "Ammonia" of this Fact Sheet.
1. Concentration/mass-loading limits only; compliance with 30% removal is still determined on monthly averaging basis.		

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
BOD_5	mg/L	140	--	200	Influent and Effluent	Weekly	24-hour composite
BOD_5	lbs/day	2100	--	3000	Influent and Effluent	Weekly	Calculation

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly Limit	Average Weekly Limit	Max Daily Limit	Sample Location	Sample Frequency	Sample Type
BOD_5, % removal[1]	%	Minimum 30% removal			Effluent	Weekly	Calculation
TSS	mg/L	140	--	200	Influent and Effluent	Weekly	24-hour composite
TSS	lbs/day	2100	--	3000	Influent and Effluent	Weekly	Calculation
TSS, % removal[1]	%	Minimum 30% removal			Effluent	Weekly	Calculation
Total flow	mgd	1.8	--	5.3	Influent or effluent	Continuous	Recorder
Fecal Coliform Bacteria	#/100 mL	1.0×10^6	--	1.5×10^6	Effluent	1/month	Grab
Total Ammonia as N	mg/L	--	--	--	Effluent	1/month	24-hour composite
Total Copper[1]	µg/L	243	--	354	Effluent	1/month	24-hour composite
Total Residual Chlorine*	mg/L	--	--	0.244	Effluent	1/week	Grab
pH	s.u.	Between 6.5 and 8.5			Effluent	1/week	Grab
Dissolved Oxygen	mg/L	No less than 2.0 mg/L			Effluent	1/week	Grab
Temperature	°C	--			Effluent	1/week	Grab
Toxic Pollutants and Pesticides[2]	--	--			Effluent	2/permit term[3]	Grab
Whole Effluent Toxicity (WET)[4]	TU_c	--			Effluent	2/permit term[5]	24-hour composite

1. Copper results will be reported as total recoverable copper.
2. "Toxic pollutants" are defined as the 126 priority pollutants listed in 40 CFR § 401.15.

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly Limit	Average Weekly Limit	Max Daily Limit	Sample Location	Sample Frequency	Sample Type
3. The permittee shall conduct analyses of the effluent for toxic pollutants and pesticides during the dry season (July through September) in the first and fourth years of the permit term. Samples shall be grab samples. Sampling and analysis shall be conducted according to methods approved in 40 CFR Part 136. 4. See Part I.C. of 2001 permit. 5. Whole Effluent Toxicity monitoring shall be conducted once per year in the first and fourth years of the permit term. *The total residual chlorine only applies if chlorination is added to the facility.							

Table 6. Draft Permit - Effluent Limits and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type
Parameters with Effluent Limits							
Total Flow	mgd	1.8	--	5.3	Influent and Effluent	Continuous	Recorded
Biochemical Oxygen Demand (BOD_5)	mg/L	151	196	--	Influent and Effluent	Weekly	24-hour composite
	lbs/day	2267	2947	--			Calculation[1]
BOD_5 Percent Removal	%	Minimum 30% removal			--	1/month	Calculation[2]
Total Suspended Solids (TSS)	mg/L	58	73	--	Influent and Effluent	Weekly	Calculation[1]
	lbs/day	871	1096	--			
TSS Percent Removal	%	Minimum 30% removal			--	1/month	Calculation[2]
Fecal coliform (interim limit)	CFU/ 100 ml	856,000[4,5,6]	--	1,110,000[3,4,5]	Effluent	1/week[7]	Grab
Fecal coliform (final limit)	CFU/ 100 ml	200[4,6,8] (geomean)	400[4,8]	800[3,4,8] (instant. max)	Effluent	1/week[7]	Grab
Enterococcus	CFU/ 100 ml	Report	--	Report	Effluent	1/week[7]	Grab

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly	Average Weekly	Maximum Daily	Sample Location	Sample Frequency	Sample Type
Enterococcus (final limit)	CFU/ 100 ml	2660[6,8] (geomean)	--	9880[3,8] (instant. max)	Effluent	1/week[7]	Grab
Total Copper (total recoverable copper)	mg/L	0.110	--	0.241[3]	Effluent	1/month	24-hour composite
Total Ammonia as N	mg/L	35	--	53	Effluent	1/month	Grab
pH	std units	Between 6.5 – 8.5			Effluent	1/week	Grab
DO	mg/L	Between 2.0 mg/L and 17.0 mg/L			Effluent	1/week	Grab
Total Residual Chlorine (TRC)	mg/L	--	--	0.244	Effluent	1/week[9]	Grab
	lbs/day	--	--	3.6			Calculation[1]
Report Parameters							
Temperature	°C	Report	--	Report	Effluent	1/week	Grab
Chronic Whole Effluent Toxicity (WET)[10]	Toxicity Units (TU)	Report	--	Report	Effluent	Quarterly[11]	24-hour composite
Toxic Pollutant Scan [12]	--	Report	--	Report	Effluent	Twice every 5 years[13]	Grab
Per- and polyfluoroalkyl substances (PFAS)[14]	ng/L	Report	--	Report	Influent and Effluent	2/year	24-hour composite
	mg/kg dry weight	--	--	Report	Sludge	2/year	Grab

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

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

2. Percent Removal. The monthly average percent removal must be calculated from the arithmetic mean of the influent values and the arithmetic mean of the effluent values for that month using the following equation:

(average monthly influent concentration – average monthly effluent concentration) ÷ average monthly influent concentration x 100. Influent and effluent samples must be taken over approximately the same time period.

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

4. A five-tube decimal dilution test is required. See 18 AAC 70.020(b)(14)(D).

5. Interim average monthly limit and maximum daily limits are based on the 95th percentile of fecal coliform data between 2016-2021. 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. Between May and August of each year, fecal coliform and enterococcus sampling shall coincide with receiving water sampling in Permit Part I.C.

8. Final fecal coliform and enterococcus limits. See Permit Part II.C. for compliance sampling information.

9. Monitoring for total residual chlorine is only required when chlorine is used in the treatment process for disinfection.

10. Chronic WET testing – See Permit Part I.C.

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

12. Effluent Testing Data - See NPDES Permit Application Form 2A Table B, Table C, and Permit Part I.B.10 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

13. Testing must occur in the 2nd year of the permit term and must be repeated every two years thereafter while the permit is in effect.

14. Monitoring for PFAS chemicals is required for 2 years (8 quarters), beginning at the start of the first complete quarter in the third year of the permit term.

A. BASIS FOR EFFLUENT LIMITS

In general, the CWA requires that the effluent limits for a particular pollutant be the more stringent of either TBELs or water quality based effluent limits (WQBELs). TBELs are set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the 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, as well as limited disinfection capacity with chlorination. Pollutants expected in the discharge from a facility with this type of treatment, include but are not limited to: BOD_5, TSS, bacteria, chlorine, pH, ammonia, temperature, and DO.

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

- BOD_5
- DO
- TSS
- pH
- Temperature
- Bacteria (Fecal coliform, Enterococcus)
- Chlorine
- Ammonia
- Metals (arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, selenium, zinc)
- Other Toxics (Chloroform, toluene, phenol, tetrachloroethylene)
- Per- and polyfluoroalkyl substances (PFAS)

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 limits, which are found at 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 6. 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% removal of BOD_5 and TSS from the influent. The 2001 permit requires 30% 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 limits, and by extension mass-based limits, are established case-by-case using state WQS and the level of treatment performance the facility is consistently able to achieve. See Section IV.A.2.a for more information on concentration and mass limits.

EPA has tentatively determined that the CBS WWTP qualifies for a continuation of their waiver from secondary treatment under Section 301(h) of the CWA for BOD_5 and TSS. Therefore, the draft permit maintains the 30% minimum percent 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 limits 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-based limit (mg/L) × design flow (mgd) × 8.34[1]

As discussed above, concentration limits for 301(h)-modified facilities are established on a case-by-case basis using state WQS and data on historical facility performance.

For this draft permit, EPA assessed influent and effluent data (2016-2021) for BOD_5 and TSS to establish concentration-based limits reflective of facility performance.

BOD_5

Average Monthly Limit (AML): EPA used the 95th percentile of influent data from 2016 to 2021 and an assumed 30% removal to calculate an average monthly limit of 151 mg/L. This is less stringent than the current average monthly limitation of 140 mg/L. EPA is proposing to include the calculated limits in the draft permit. See Antibacksliding discussion, below.

Average Weekly Limit (AWL): EPA used the multiplier from Table 5-3 of the Amended Technical Support Document for Water Quality-based Toxics Control (EPA 1991) and the calculated AML to calculate an AWL of 196 mg/L. 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 concentration limits in the equation above, the mass-based limits for BOD_5 are as follows:

Average Monthly Limit = 151 mg/L × 1.8 mgd × 8.34 = 2267 lbs/day

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

Average Weekly Limit = 196 mg/L × 1.8 mgd × 8.34 = 2947 lbs/day

Table 7. Inputs for Calculation of BOD_5 Limit

95th Percentile of Influent Data (mg/L)	216
Final Effluent After 30% Removal (mg/L)	151
CV of Effluent Data	0.3
Samples per month	2
TSD Multiplier (99th/95th)	1.3
Average Monthly Limit (mg/L)	151
Maximum Daily Limit (mg/L)	196
Average Monthly Limit (lbs/day)	2267
Maximum Daily Limit (lbs/day)	2947

TSS

DMR data indicates the discharge is achieving far greater TSS removal than the federal primary treatment standard of 30%. Average percent removal between 2016 and 2021 was 72%. As discussed below, EPA proposes to establish TSS concentration limits that reflect the historical performance of the facility.

Average Monthly Limit (AML): Using effluent data from 2016 to 2021, EPA conducted a statistical analysis to calculate an average monthly TSS limit based on facility performance. The performance-based AML was 58 mg/L. This is more stringent than the current AML of 140 mg/L and reflects the facility performance for TSS. The draft permit contains an AML for TSS of 58 mg/L, which is the level of performance the facility has demonstrated it can consistently achieve using available technology.

Average Weekly Limit (AWL): Using effluent data from 2016 to 2021, EPA conducted a statistical analysis to calculate a AWL for TSS based on facility performance. The performance-based AWL was 73 mg/L. The 2001 permit included an MDL of 200 mg/L. The draft permit contains an AWL of 73 mg/L, which is the level of performance the facility has demonstrated it can consistently achieve using available technology.

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

Average Monthly Limit = 58 mg/L × 1.8 mgd × 8.34 = 871 lbs/day

Maximum Daily Limit = 73 mg/L × 1.8 mgd × 8.34 = 1096 lbs/day

Antibacksliding

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 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 limits and average weekly limits pursuant to 40 CFR 122.45(d)(2). EPA is also proposing a less stringent average monthly limits for BOD_5.

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, daily maximum 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.

Regarding the proposed limits for BOD_5, EPA used effluent data from the facility to calculate new TBELs. This resulted in a less stringent average monthly limit for BOD5 and a more stringent average weekly limit.

The 2001 BOD_5 average monthly, average weekly, 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. One of the causes for modification is to allow for the correction of technical mistakes. 40 CFR 122.62(a)(15) and CWA Section 402(a)(1)(B). ADEC has not included maximum daily limits in their draft 401 certification (Appendix H). For the monthly average limit for BOD_5, EPA is proposing a limit based on facility effluent data. If this changes upon receipt of ADEC's final 401 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, WQBELs 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 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 WLA for the discharge in an approved TMDL. 40 CFR 122.44. There are no approved TMDLs that specify WLAs for this discharge; therefore, the WQBELs are calculated directly from the applicable WQS.

Alaska's WQS can be found at 18 AAC 70 (ADEC 2020) and the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (ADEC 2008). 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 the Alaska WQS and the processes described in the Amended Section 301(h) Technical Support Document (301(h) TSD) and the 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 WQS 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 initial 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 as a rectangle over the last 60m (197 feet) of the outfall of the pipe 117.8m (386.5 ft) long (perpendicular to shore) and 58.2m (190.9 ft) wide centered on the diffuser with an initial dilution of 87:1. This is the same ZID spatial boundary as the 2001 permit.

The ZID for the applicant's outfall was calculated using a discharge depth of 85ft (25.9 m) below MLLW, a mean tide level of 7.5ft (2.3 m), and a port height above sea bottom of 2.3ft (0.7 m). Using the diffuser length of 197ft (60m) and an average diameter of 15.7in (1.308ft; 0.4m), the ZID was calculated to be a rectangle of 386.5 ft (117.8 m) long (perpendicular to the shore) and 190.9 ft (58.2 m) wide, centered on the diffuser and perpendicular to the shoreline.

The ZID dimension calculations are as follows:

Width (units in feet) = 1.308 + 2 x (85 + 7.5 + 2.3) = 190.9 ft (58.2 m)

Length (units in feet) = 197 + 2 x (85 + 7.7 +2.3) = 386.5ft (117.8 m)

18 AAC 70.240 provides Alaska's mixing zone policy for point source discharges. ADEC proposes to authorize mixing zones and their associated dilution factors in its draft 401 certification (Appendix H), summarized in Table 8. All dilution factors are calculated using the peak design flow of 5.3 mgd to evaluate the worst case scenario for reasonable potential.

Table 7. Mixing Zones

Criteria Type	Dilution Factor
Mixing Zone (acute exposure)	46
Mixing Zone (chronic exposure)	76

The reasonable potential analysis and WQBEL calculations were based on the dilution factors shown in Table 8. If ADEC revises the allowable mixing zone in its final 401 certification of this permit, reasonable potential analysis and WQBEL calculations will be revised accordingly.

As discussed in Part IV.A.1, the pollutants of concern in the discharge are BOD_5, DO, TSS, pH, temperature, fecal coliform, enterococcus, chlorine, ammonia, metals: arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, selenium, zinc, and other toxics: chloroform, toluene, tetrachloroethylene, and PFAS. The reasonable potential analysis for each parameter is summarized in Table 8 below, and the equations used to conduct the reasonable potential analysis and calculate the WQBELs are provided in Appendix D and Appendix E. The relevant water quality standards evaluated to evaluate reasonable potential are shown in the table below. Since Sitka Sound is designated for all uses, the listed use is the one with the most protective criteria.

Table 8. Applicable Water Quality Standards

Pollutant	Designated Use	Criteria	Basis
Ammonia	Aquatic life	Temperature, pH and salinity dependent Sitka Sound: Acute: 7,900 µg/L Chronic 1,200 µg/L	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)
Arsenic, Dissolved	Aquatic life	Acute: 69 µg/L; Chronic: 36 µg/L	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)

Pollutant	Designated Use	Criteria	Basis
Cadmium	Aquatic life	Acute: 40 µg/L; Chronic: 8.8 µg/L	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)
Chlorine, Total Residual	Aquatic life	Acute: 13 µg/L; Chronic: 7.5 µg/L	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)
Chloroform	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	4,700 µg/L (human health; organisms only)	National Toxics Rule, 40 CFR 131.36
Chromium (Hex), Dissolved	Aquatic life	Acute: 1,100 µg/L; Chronic: 50 µg/L	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)
Copper, Dissolved	Aquatic life	Acute: 4.8 µg/L; Chronic: 3.1 µg/L	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)
Deleterious organic and inorganic substances	Growth and Propagation of Fish, Shellfish, Other Aquatic Life, and Wildlife	Narrative Criteria	18 AAC 70.020(23)(C)
DO	Aquaculture	≥5 mg/L, ≤17 mg/L	18 AAC 70.020(b)(15)(A)(i)
Enterococcus	Primary contact recreation	Acute: 35 CFU/100mL; Chronic: 130 CFU/100mL	18 AAC 70.020(b)(14)(b)(i)
Fecal coliform	Harvesting for consumption of raw mollusks or other raw aquatic life	Acute: 14 CFU/100mL; Chronic: 43 CRU/100mL	18 AAC 70.020(b)(14)(D)
Iron	Aquatic life	Chronic: 1,000 µg/L	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)

Pollutant	Designated Use	Criteria	Basis
Lead, Dissolved	Aquatic life	Acute: 210 µg/L; Chronic: 8.1 µg/L	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)
Manganese	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	100 µg/L (human health; organisms only)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)
Nickel, Dissolved	Aquatic life	Acute: 74 µg/L; Chronic: 8.2 µg/L	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)
	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	4,600 µg/L (human health; organisms only)	
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 µg/L (human health; organisms only)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)
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	Acute: 290 µg/L Chronic: 71 µg/L	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)
	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	11,000 µg/L (human health; organisms only)	

Pollutant	Designated Use	Criteria	Basis
Temperature	Seafood Processing, Aquaculture	May not exceed 15ºC and may not cause the weekly average temperature to increase more than 1ºC. The maximum rate of change may not exceed 0.5ºC per hour. Normal daily temperature cycles may not be altered in amplitude or frequency.	18 AAC 70.020(22)(A)(i))
Tetrachloro-ethylene	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	88.5 µg/L (human health; organisms only)	National Toxics Rule, 40 CFR § 131.36
Toluene	Growth and Propagation of Fish, Shellfish, other Aquatic Life and Wildlife	200,000 µg/L (human health; organisms only)	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)
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 TUC	18 AAC 70.030
Zinc, Dissolved	Aquatic life	Acute: 90 µg/L; Chronic: 81 µg/L	Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008)
	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 WQBEL for specific parameters are summarized below. 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 most recent receiving water monitoring conducted by CBS during August 2018 and August 2020 (see Table 15). To determine ammonia criteria, EPA used data in the immediate vicinity of Station C, as modeling concluded Site C is limiting in terms of mixing and dilution. Measurements were taken in the summer, since this is the critical time period when temperatures are higher, and thus, ammonia is more toxic. EPA calculated the 95th percentile values of pH, temperature, and salinity at mid-level depths, nearest to where the plume trapping depth occurs (GLEC, 2021). EPA used the calculated 95th percentile of temperature (12 ^{o}C, rounded to 10 ^{o}C), salinity (43.1 g/kg, rounded to 30 g/kg), and pH (8.1, rounded to 8.2) to identify the acute criteria of 7,900 µg/L and chronic criteria of 1,200 µg/L.

EPA considered 59 effluent samples conducted by CBS between 11/30/2016-9/30/2021. Applying values for the 95th percentile effluent concentration of 23.0 mg/L and CV of 0.3 for the dataset, a reasonable potential calculation showed that the CBS WWTP discharge would not 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.

ADEC has included in its draft 401 certification ammonia limits of 35 mg/L as an average monthly limit and 53 mg/L as a maximum daily limit (Appendix H). 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, EPA will not include ammonia limits in the permit. EPA is accepting comment on this approach.

pH

The Alaska WQS for the protection of aquatic life require that ambient pH may not be less than 6.5 to 8.5 standard units (s.u.) and may not vary more than 0.2 pH units outside of the naturally occurring 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.

EPA evaluated CBS WWTP effluent pH data from 2016-2021. The pH ranged from 6.4 to 7.9 s.u. A reasonable potential calculation shows that the CBS

WWTP discharge would not have reasonable potential to cause or contribute to an excursion of the water quality standard for pH at the edge of the ZID. See Appendix F for the reasonable potential calculation. The draft permit proposes to maintain the current pH limits of 6.5 to 8.5 s.u.

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 DO 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.

EPA evaluated data collected by CBS in Sitka Sound in 2018 and 2020 (Appendix B) and DMR data from 2016-2021. In accordance with the procedures outline in the 301(h) TSD Section B-II p.B-14, B-20, EPA conducted a near-field and far-field analysis to estimate the impacts on DO levels in the vicinity of the discharge.

For CBS, the following values were used for the near field DO analysis:

DO_a = 8.4 mg/L (worst case from station C, modeling indicated station C was limiting for DO and other parameters).

Do_e = 4 (min value effluent DO)

IDOD = 3 (from Table B-3 in TSD)

S_a = 87 (ZID dilution)

DO_f = 8.4 mg/L+((4 mg/L-3 mg/L-8.4 mg/L)/(87))= 8.3 mg/L

The near field DO reduction is approximately 0.1 mg/L under worst case conditions, therefore the Alaska WQS of no less than 5 mg/L and no greater than 17 mg/L are not violated.

EPA also evaluated the far-field effect of the effluent BOD_5. Using a simplified method from the 301(h) TSD, EPA calculated the BOD_5 at the edge of the ZID by multiplying the daily maximum limits for BOD_5 by 1.46 to calculate the ultimate CBOD and dividing ultimate CBOD by the initial dilution of 87. [2]

Using the BOD_5 maximum daily limit of 180 mg/L, the ultimate CBOD is 263 mg/L. The BOD_5 at the edge of the ZID is 3.0 mg/L in the summer. Natural background levels of BOD_5 typically range from 2-3 mg/L (Communication

[2] EPA assumes that all BOD_5 is CBOD. This is a conservative assumption since BOD includes oxygen-demanding materials from carbonaceous BOD and nitrogenous BOD.

Cope to Wu 2022). Therefore, BOD_5 levels at the edge of the ZID of 3.5 mg/L would be expected to have a negligible far-field effect on DO.

The draft permit retains a minimum effluent limit for DO of 2.0 mg/L and a maximum effluent limit of 17 mg/L as well as weekly sampling.

Total Suspended Solids and Turbidity

Alaska does not have WQS for TSS but uses turbidity as a surrogate. Alaska water quality standards applicable to the estuarine waters of Sitka 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 which included Secchi disc measurements. The most recent Secchi disc measurements are shown in Table 9 below.

Table 9. Secchi Disk Depth (ft) in Sitka Sound

	2018	Percent Difference 2018	2020	Percent Difference 2020	Average
Station A-western edge of the ZID	24 ft	11.1%	17 ft	5.6 %	8.4 %
Station C-reference station west of discharge	26 ft		18 ft		
Station B-eastern edge of ZID reference stations	26 ft	3.8%	19 ft	5.0 %	4.4 %
Station D- reference station east of discharge	25 ft		20 ft		
Source: 7/2018 & -7/2020 CBS receiving water monitoring					

EPA evaluated Secchi disk data from July 2018 and July 2020 and found that while there was one percent difference exceeding 10%, the overall trend is well below the state standard of not reducing Secchi disk depth more than 10%. In addition, the facility consistently reduced TSS in influent well above the required 30% reduction. Based on these indicators, EPA concludes the facility is not causing or contributing to an excursion of the WQS for TSS and turbidity.

The 2001 permit did not require receiving water turbidity measurements. EPA has added this requirement to the proposed permit to assist with evaluation during the next permit cycle.

Residues

The Alaska WQS require that surface waters of the State be free from floating, suspended or submerged matter of any kind in concentrations 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 temperatures may not exceed 15°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 1ºC. The maximum rate of change may not exceed 0.5ºC per hour, and normal daily temperature cycles may not be altered in amplitude or frequency. EPA reviewed data from Sitka Sound in 2018 and 2020 as well as DMR data (2016-2021) to assess whether the discharge will comply with Alaska WQS for temperature.

The maximum temperature in Sitka Sound was 12.2°C, and the maximum recorded effluent temperature between 2016 and 2021 was 15°C. EPA conducted a mass balance analysis using these values and calculated a final receiving water temperature of 12.1°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 °C)

Cu = Background receiving water temperature, °C (12.2 °C)

Sa = dilution factor (87)

Cd = 12.1°C

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.

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 Sitka 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 76:1 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 76 = 1064 CFU/100 mL

Instantaneous maximum limit = 43 CFU/100 mL x 76 = 3268 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 H). 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 draft 401 certification.

These limits would become effective at the end of the compliance schedule.

Table 10. 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 1,000,000 FC/100mL and a maximum daily limit of 1,500,00 FC/100mL. The draft permit proposes more stringent limits shown in Table 10.

The CBS WWTP does not currently have the technology necessary to meet

the WQBEL for fecal coliform in the draft permit. ADEC has included a five-year schedule of compliance for Sitka 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 856,000 cfu/100 mL and a maximum daily limit of 1,110,000 CFU/100 mL. (See Appendix B for water quality data.)

Section V.C, *Compliance Schedules,* of this Fact Sheet describes the compliance schedule for fecal coliform. The WQBELs developed for fecal coliform 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).

Enterococcus

Enterococci bacteria are indicator organisms of harmful pathogens recommended by 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 an 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 it reasons that the high fecal coliform loads observed are also indicative of high loads of other pathogens commonly found in WWTP effluent, 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 a violation of Alaska WQS for enterococcus. 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 above in the fecal coliform section.

Monthly geometric mean limit = 35 CFU/100 mL x 76 = 2660 CFU/100 mL

Instantaneous maximum limit = 130 CFU/100 mL x 76 = 9880 CFU/100 mL

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

ADEC has included final enterococcus limitations in Table 11 below as a condition of their draft 401 Certification of the reissued permit (Appendix H). These limits are the same as the WQBELs developed above, EPA has included these limits in the draft permit.

These limits would become effective at the end of the compliance schedule.

Table 11. ADEC Proposed Final Enterococcus Limits

Average Monthly (cfu/100 mL)	Maximum Daily (cfu/100 mL)
2660	9880
1. Based on chronic mixing zone dilution factor of 76:1 multiplied by the enterococcus WQS	

The CBS WWTP does not currently have the technology necessary to meet the WQBEL for enterococcus in the draft permit. ADEC has included a five-year compliance schedule in its draft 401 Certification to meet the final enterococcus limits in the draft permit (Appendix H).

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. However, EPA is requiring weekly monitoring of enterococcus to characterize enterococcus concentrations.

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 301(h)(9) and 40 CFR 125.63(a).

Chlorine

Chlorine is often used to disinfect municipal wastewater prior to discharge. The 2001 permit includes a total residual chlorine limit for when Sitka chlorinates its effluent. CBS WWTP uses low concentrations of chlorine in its treatment process and monitors chlorine concentration in its effluent.

Alaska WQS establish an acute criterion of 13 µg/L, and a chronic criteria of 7.5 µg/L for the protection of aquatic life (ADEC, 2008).

CBS WWTP monitors monthly chlorine concentration in the effluent. EPA has determined that the CBS WWTP has reasonable potential to exceed the water quality standard for chlorine. The calculated chlorine limits are less stringent than the 2001 chlorine limits. Due to the prohibition on backsliding, the draft permit retains the current maximum daily chlorine limit of 0.244 mg/L (3.6 lbs/day).

Copper

The Alaska WQS for the protection of aquatic life are an acute criterion of 4.8 µg/L and a chronic criterion of 3.1 µg/L for dissolved copper. The 2001 permit includes copper limits, and EPA evaluated DMR data from 2016 through 2021. EPA applied its reasonable potential analysis methodology and used the 95th percentile copper effluent concentration (129 µg/L), Alaska WQS, and the mixing zone ADEC has proposed. EPA determined that the CBS WWTP discharge does not have reasonable potential to cause or contribute to excursions above WQS for copper.

ADEC has included copper effluent limits in its draft 401 Certification of 0.110 mg/L as an average monthly limit and 0.241 mg/L as a maximum daily limit (Appendix H). If ADEC includes these limits in the final 401 certification, then EPA must include them in the permit pursuant to CWA section 401(d). ADEC will accept comment on their proposed limits during public notice of the 401 certification. If ADEC does not include these limits in the final 401 certification of this permit, EPA will not include copper limits. EPA is accepting comment on this approach.

Other Pollutants of Concern

EPA also evaluated reasonable potential for other pollutants the facility detected during required monitoring of priority pollutants. The other pollutants detected during a 2020 priority pollutant scan include arsenic, cadmium, chloroform, chromium, iron, lead, manganese, nickel, phenol, selenium, tetrachloroethylene, toluene, and zinc, as shown in Table 2. The applicable water quality standards for these pollutants are included in Table 8.

EPA did not find reasonable potential to exceed the water quality criteria for any of these pollutants and therefore there are not effluent limits for these pollutants in the draft permit. See Appendix E for reasonable potential calculations for these parameters.

PFAS

Alaska does not currently have a WQS for PFAS, nor is there a national WQS. However, EPA is in the process of developing Effluent Limitation Guidelines (ELGs) and water quality criteria for PFAS. EPA has released a series of guidances on PFAS and most recently issued a memo on December 5, 2022, "Addressing PFAS Discharges in NPDES Permits and Through the Pretreatment Program and Monitoring Programs."
EPA's recommendation is to obtain more comprehensive information through monitoring potential sources of PFAS, including at POTWs, and taking actions to reduce potential discharges of PFAS. To be consistent with EPA's recommendations, the permit is requiring the facility to monitor PFAS once per quarter in its effluent. This information will be used to inform the reasonable potential in the next permit cycle. Per EPA's December 5, 2022 memo, the permittee must use draft analytical method 1633 (see 40 CFR

122.21(e)(3)(ii) and 40 CFR 122.44(i)(1)(iv)(B)) and analyze each of the 40 PFAS parameters detectable by draft method 1633. The draft Adsorbable Organic Fluorine CWA wastewater method 1621 may also be used in conjunction with draft method 1633, if appropriate. EPA will assess in its next permit cycle whether pollution prevention controls are necessary at the facility, based on effluent data collected during this permit cycle.

4. Anti-backsliding

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*. All WQBELs in the proposed permit are at least as stringent as the effluent limits in the 2001 permit.

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

The 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

Table 12 includes the draft permit's proposed monitoring changes.

Table 12. Monitoring Changes from 2001 Permit

Parameter	Monitoring Change	Basis
Fecal Coliform	Increase in effluent monitoring frequency from 1/month to 1/week.	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. Weekly monitoring is more appropriate and representative than monthly monitoring and required to ensure compliance with the limit and protection of Alaska WQS.
Enterococcus	New effluent monitoring requirement, 1/week	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 in Section II.C of the draft permit. Weekly monitoring is necessary to ensure compliance with the limit and protection of Alaska WQS.
WET	Increase in effluent monitoring frequency to 1/quarter[1]	CBS is classified as a major facility and requires more frequent toxicity monitoring. Increased monitoring will also help to better characterize WET for the next permit cycle.
PFAS Monitoring	New effluent monitoring requirements	The connection from landfill leachate to the collection system is likely to contain PFAS. The draft permit requires monitoring to determine if PFAS are passing through the WWTP. See Section IV.B.1.b.
Toxic Pollutants Monitoring	Clarified effluent monitoring requirements	The draft permit clarifies the required toxic pollutants to monitor in effluent to comply with regulations under 301(h) and for NPDES.

1. If WET tests in the first 2 years indicated compliance with Alaska WQS, CBS may switch to annual monitoring as described in Fact Sheet Part IV.B.3 and Permit Part I.C.

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[3,4].

CBS has a connection to landfill leachate, 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 is 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[5,6]. EPA's website has public databases such as Enforcement and Compliance History Online (ECHO) (https://echo.epa.gov/) 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 the 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 these monitoring and reporting requirements pursuant to 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."

[3] EPA, *EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan*, EPA 823R18004, February 2019. Available at: https://www.epa.gov/sites/production/files/2019-02/documents/pfas_action_plan_021319_508compliant_1.pdf

[4] EPA, *Fact Sheet: Draft 2022 Aquatic Life Ambient Water Quality Criteria for Perfluorooctanoic acid (PFOA) and Perfluorooctane Sulfonic Acid (PFOS).* Available at: https://www.epa.gov/system/files/documents/2022-04/pfoa-pfos-draft-factsheet-2022.pdf

[5] 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.

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

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 changes to the locations of the sampling sites along the boundary of the ZID and the reference stations.

A detailed description of the receiving water monitoring program in the draft permit can be found in Part 8.G.2.of the 301(h) TD, Part I.D. of the draft permit and Table 13 below. Locations of the receiving water monitoring for each parameter can be found in Appendix H and Permit Part I.D.

Table 13. Receiving Water Monitoring Requirements

Parameter	Sample Type	Sample Depth	Frequency	Location
Temperature (ºC), Salinity (ppt), Dissolved Oxygen (mg/L), pH (s.u.), Secchi Disk (feet), Turbidity (NTU)	Grab	Surface, every 5m to bottom	Annually (July or August)	Center of ZID, ZID Boundary Sites, and Reference Sites (See Permit Part I.D.5.)
Fecal Coliform[2] (#/100 mL)	Grab	Surface (or just below)	Monthly (May to September)	ZID Boundary Sites, Reference Sites, and Near Shore Sites (See Permit Part I.D.6.)
Enterococcus[2] (#/100mL)	Grab	Surface (or just below)	Monthly (May to September)	ZID Boundary Sites, Reference Sites, and Near Shore Sites (See Permit Part I.D.6.)
Biological Monitoring for Benthic Infauna and Sediment Analysis[1] (See Permit Part 1.D.7)	Grab	Per method	Once every 5 years	ZID Boundary Sites and Reference Sites (See Permit Part I.D.5.)
[1]Survey must occur in the fourth year of the permit and every 5 years thereafter.				
[2]Fecal coliform and enterococcus sampling shall coincide with effluent sampling in Part 1.B.				

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. 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, acute toxic unit (TUa) and chronic toxic unit (TUc), respectively. The 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 2001 permit required chronic WET testing during the first and fourth year of the permit and established a WET trigger of 122 TUc. EPA reviewed WET data collected during 2017, 2020, and 2022. The highest reported TUc was 125 TUc during 2017 testing. However, the dose-response curve for the 2017 test was interrupted, with a statistically significant response at 1.6% effluent but not at the next higher concentration 3.3% effluent. Further, while the 1.6% effluent concentration was statistically significantly different than the control, the level of effect was extremely minute and likely a result of the statistical power of the test and not reflective of toxicity in the discharge. The level of effect in 1.6% effluent compared to the control was a 0.5% difference in proportion normal fertilization. The West Coast Chronic WET Methods (EPA, 1995) specified for the 2017 test do not establish a lower bound percent minimum significant difference (PMSD)—the smallest percentage decrease in growth or reproduction from the control that could be determined as statistically significant in the test based upon the precision of the test—however the 2002 chronic methods establish lower bound PMDS values in the 10-15% range for most tests, well below the 0.5% difference observed in the 2017 test. Such a small level of effect combined with an interrupted dose response curve indicates the 2017 test result in inconclusive and it was not used in the reasonable potential analysis for WET. The 2020 and 2022 WET results did not indicate toxicity at the highest effluent concentration tested, with TUc values <30.3, well below the trigger of 125 TUc.

Based upon a review of the data, EPA has determined the discharge does not have the reasonable potential to cause or contribute to an excursion of Alaska WQS for WET at the edge of the chronic mixing zone.

EPA will require the Permittee to continue to monitor its discharge for WET in the reissued permit. The draft permit requires quarterly WET tests. A WET trigger of 76 TUc has been established which, if exceeded, will require the Permittee to implement the toxicity identification evaluation (TIE) and toxicity reduction evaluation (TRE) procedures specified in Part I.C. of the draft Permit. If the WET trigger is not exceeded after eight (8) consecutive WET tests conducted over the course of two years, the Permittee may reduce the frequency of WET testing to annually while the permit remains in effect. If any annual WET test exceeds the WET trigger the permittee must revert to quarterly testing.

In order to assess and monitor for any seasonal variation in results, annual testing must be conducted on a rotating quarterly schedule, so that each annual test is conducted during a different quarter than the previous year's test. An increase in the frequency of WET monitoring is necessary given the designation of the facility as a major facility discharging >1 MGD, the inconclusive results from the 2017

WET test, and the contribution of landfill leachate to the treatment system by the Kimsham Street Landfill, an industrial source of toxic pollutants.

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) at the center of the ZID, at the ZID boundaries, and at reference locations, as described in Permit Part I.D.5.

The 2001 permit required benthic observations during the second and fourth year of the permit. The permittee completed benthic observations in 2008, 2010, 2013, 2015, and 2018, and sampling in 2018. The results of the surveys do not indicate that the sewer outfall discharge is causing significant changes in the benthic community structure.

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. The draft permit requires sediment analyses for total volatile solids (TVS) and a benthic survey during the fourth year of the permit and every five years thereafter (see Permit Part I.D.7.)

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. The permittee may use NetDMR after requesting and receiving permission from EPA Region 10.

Permit Part III.B.3 requires that the Permittee submit a copy of the DMR to ADEC. Currently, the permittee may submit a copy to ADEC in one of three ways: 1) a paper copy may be mailed; 2) The email address for ADEC may be added to the electronic submittal through NetDMR; or 3) The permittee may provide ADEC viewing rights 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.10 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 pollution 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 Kimsham Street Landfill in Sitka is a closed Class II municipal landfill that served as the primary solid waste repository for CBS for approximately 50 years, closing in 2009. Landfill leachate—the liquid that drains from the landfill material—is collected in a pond and then discharged to the Sitka POTW via a lift station and force main that connect to the sewer collection system along Tilson Street. In 2021, the leachate discharges to the POTW ranged from 0.15 to 0.52 mgd, in July and October respectively. The landfill currently monitors the leachate

for metals and other toxics in accordance with a permit issued by the State of Alaska.

Landfills are an industrial category regulated under Section 307(b) and (c) of the CWA through implementing regulations at 40 CFR Part 403 and 445, which contain general and categorical pretreatment requirements for landfill operations, respectively. The Kimsham Street Landfill meets the definition of an industrial source under 40 CFR 125.58(j).

Therefore, the draft permit requires the City to develop a pretreatment program in accordance with 40 CFR 403.8. 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 city's attorney that the City 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 City 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 City 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 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 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 bacteria 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 fecal coliform limits 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; and
- The compliance schedule 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 their 401 certification. EPA will amend the compliance schedule(s), if needed, after receiving final 401 certification from ADEC. For more information on the details of the compliance schedule, refer to the draft 401 certification (Appendix H) and Part II.C of the draft permit.

D. QUALITY ASSURANCE PLAN

The CBS 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 CBS WWTP to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to develop and implement an operation and maintenance plan for their facility within 180 days of the effective date of the permit. The plan must be retained on site and made available to EPA and 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 CFR 122.41(l)(6))

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

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

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

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

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

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 CBS 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. DESIGN CRITERIA

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

I. 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. A review of the threatened and endangered species located in Alaska finds the following listed species: The Western Distinct Population Segment Stellar Sea Lions, Fin Whale, Humpback Whale, North Pacific Right Whale, and Sperm Whale. EPA has prepared a biological evaluation and determined the discharge has the potential to affect at least one of the listed species. Pursuant to Section 7 of the ESA, EPA will consult with NOAA Fisheries prior to taking final action on the permit.

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 which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site specific, or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

EPA will prepared an EFH assessment to assess the impacts of the discharge on EFH. If the EFH assessment concludes there will be adverse impacts, EPA will consult with NOAA Fisheries prior to final permit action.

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.

On March 31, 2023, EPA sent ADEC a pre-filing certification meeting request. On June 1, 2023, ADEC sent EPA a draft 401 certification of the permit (Appendix H). On June 7, 2023, EPA requested final 401 certification from ADEC. EPA cannot reissue the permit until ADEC has granted or waived certification. If ADEC denies certification, EPA cannot issue the permit.

D. ANTIDEGRADATION

ADEC has completed 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 is included in the draft CWA section 401 Certification for this permit (Appendix H and Appendix I). Questions regarding the draft 401 Certification or antidegradation review can be submitted to ADEC as set forth above (see Pages 1-3 of this Fact Sheet).

E. PERMIT EXPIRATION

The permit will expire five years from the effective date.

VII. REFERENCES

ADEC, 2008. Alaska Water Quality Criteria Manual for Toxics and Other Deleterious Organic and Inorganic Substances. December 2008.

ADEC, 2020. Alaska Water Quality Standards.

ADEC, 2022. 2022 Integrated Water Quality Monitoring and Assessment Report. https://dec.alaska.gov/water/water-quality/integrated-report/.

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EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control.* US Environmental Protection Agency, Office of Water, EPA/505/2-90-001. https://www3.epa.gov/npdes/pubs/owm0264.pdf

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

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EPA, 2011b. EPA Policy on Consultation and Coordination with Indian Tribes. May 2011.

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

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.

Tetra Tech, 1988. Sitka 301(h) Questionnaire.

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

Appendix A. Facility Information

Figure 1. CBS WWTP Outfall and Diffuser Location

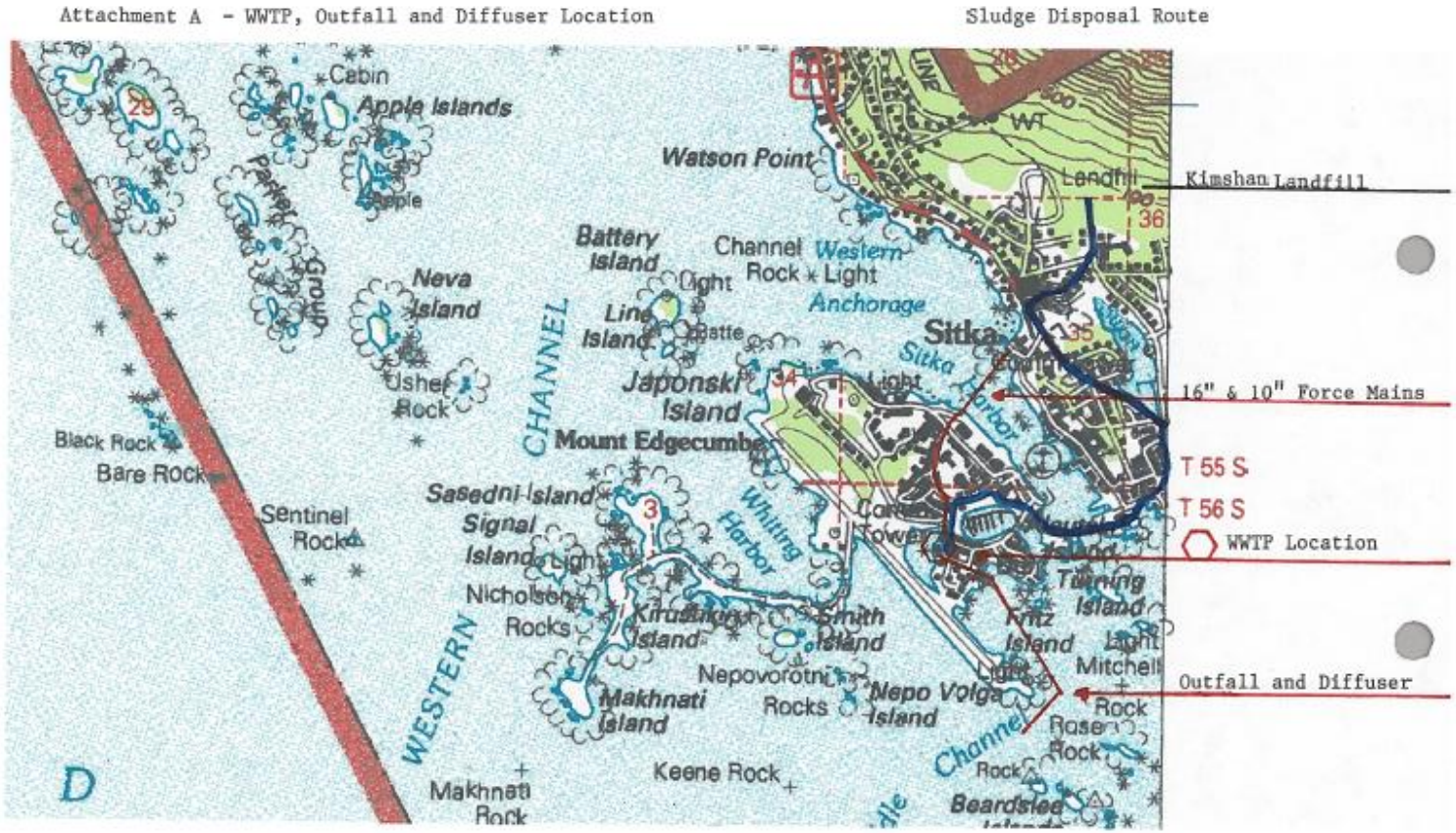
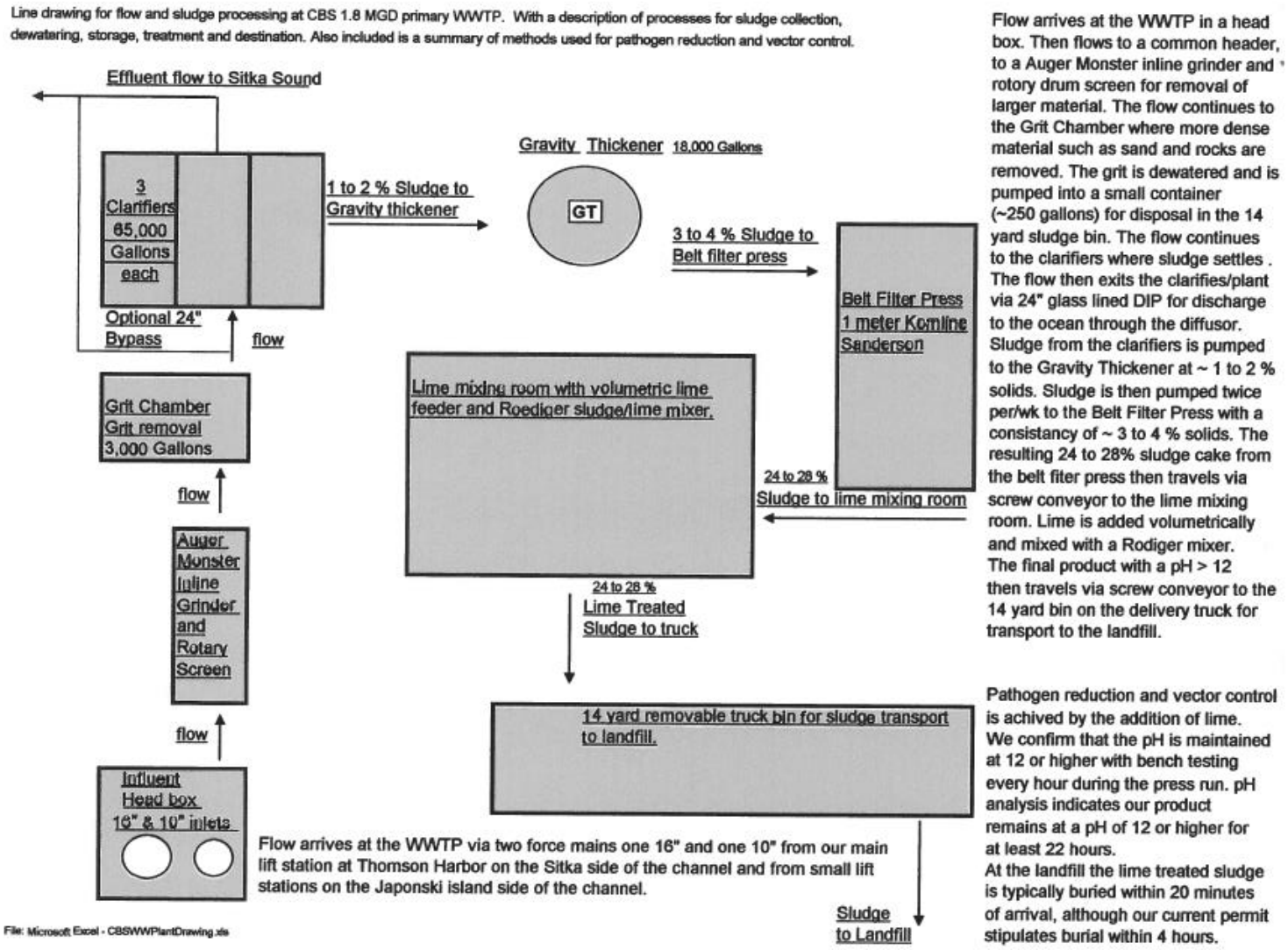


Figure 2. WWTP Schematic



Appendix B. Water Quality Data

The water quality data are from discharge monitoring reports (DMRs) from 2016 to 2021 from the City and Borough of Sitka.

Table 14. CBS WWTP DMR Data (2016-2021)

Parameter	Flow, in conduit or thru treatment plant	BOD, 5-day, 20 deg. C	BOD, 5-day, 20 deg. C	BOD, 5-day, 20 deg. C	Solids, total suspended	Solids, total suspended	Solids, total suspended	Solids, total suspended	Solids, total suspended	Solids, total suspended
Monitoring Location	Effluent Gross	Influent Gross	Effluent Gross	Percent Removal	Influent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Percent Removal
Statistical Base	MO AVE	MO AVG	MO AVG	MIN % RMV	MO AVG	MO AVG	MO AVG	DAILY MAX	DAILY MAX	MIN % RMV
Limit Units	MGD	mg/L	mg/L	%	mg/L	mg/L	lb/d	mg/L	lb/d	%
Current Limit	Report	Report	140	30	Report	140	2100	200	3000	30
11/30/2016	1.6	144	72	47	128	38	354	49	580	68
12/31/2016	1.9	146	75	45	147	35	329	43	402	74
01/31/2017	2.2	144	74	48	119	31	241	46	303	74
02/28/2017	2.7	118	67	44	104	34	243	45	304	67
03/31/2017	1.5	124	72	39	107	40	290	49	349	61
04/30/2017	1.5	198	104	44	183	47	273	63	315	71
05/31/2017	1.5	271	111	57	254	38	218	46	246	84
06/30/2017	1	206	132	36	189	47	258	51	276	74
07/31/2017	0.8	195	110	42	163	60	362	68	425	63
08/31/2017	1.8	162	104	35	146	50	377	65	451	65
09/30/2017	2.9	109	57	48	118	48	665	55	1344	56
10/31/2017	2.3	110	72	34	121	45	379	63	531	62
11/30/2017	1	207	113	44	178	39	269	45	315	75
12/31/2017	1.4	125	75	40	95	36	260	43	332	62
01/31/2018	1.4	125	87	30	110	39	229	51	291	64
02/28/2018	1.1	216	121	36	175	40	275	45	368	66
03/31/2018	1.1	138	82	40	121	40	257	73	457	68
04/30/2018	1.1	198	114	40	130	46	262	64	342	65
05/31/2018	1	148	89	39	124	40	265	51	336	68
06/30/2018	1	209	104	51	161	52	330	61	412	68
07/31/2018	1.2	207	134	37	159	52	364	69	466	67
08/31/2018	2	134	82	39	123	45	510	82	1135	64
09/30/2018	1.4	171	90	47	141	31	212	39	263	78
10/31/2018	1.6	136	73	47	111	31	272	36	432	72
11/30/2018	1.8	109	67	38	101	30	250	39	270	69
12/31/2018	1.5	118	71	39	95	29	225	40	275	69
01/31/2019	1.7	126	70	44	92	28	204	39	338	68
02/28/2019	1.2	135	75	44	110	30	186	43	240	73
03/31/2019	1.1	149	85	42	117	24	129	29	148	78
04/30/2019	0.9	141	83	41	115	30	180	35	202	73
05/31/2019	1.2	175	90	48	141	29	175	33	231	79
06/30/2019	1.2	223	98	55	188	38	224	44	252	80
07/31/2019	0.8	203	109	46	174	36	197	43	226	79
08/31/2019	0.9	209	110	45	162	31	174	34	198	80
09/30/2019	2.7	135	72	46	117	25	194	30	305	77
10/31/2019	1.7	111	55	49	100	23	207	29	301	75
11/30/2019	3.1	80	45	43	64	21	226	24	336	65
12/31/2019	1.5	113	58	48	95	27	229	36	258	72
01/31/2020	1.7	89	54	39	68	24	182	36	231	66
02/29/2020	2.6	78	45	36	56	23	279	37	349	55
03/31/2020	2.6	107	70	34	89	32	241	38	283	64
04/30/2020	1.9	112	68	39	97	27	205	38	282	73
05/31/2020	0.9	153	96	37	136	41	212	50	284	70
06/30/2020	0.9	187	98	48	190	50	247	87	399	75
07/31/2020	1.4	149	90	38	122	30	170	38	209	74
08/31/2020	1.3	179	93	45	151	44	281	69	426	68
09/30/2020	1.4	160	87	46	144	33	259	45	342	77
10/31/2020	3.2	117	68	41	85	22	180	26	280	72
11/30/2020	2.5	138	68	43	115	25	238	29	336	71
12/31/2020	3	178	75	48	106	24	263	31	295	73
01/31/2021	1.8	110	68	31	99	30	300	37	488	63
02/28/2021	2	133	76	43	110	33	275	46	430	70
03/31/2021	2	98	62	35	91	29	339	40	677	67
04/30/2021	1.4	142	89	37	105	33	256	53	389	69
05/31/2021	1.1	191	103	45	132	38	266	43	323	71
06/30/2021	2	190	98	46	173	45	380	57	628	74
07/31/2021	0.9	219	116	47	183	37	272	49	372	80
08/31/2021	1.9	168	92	43	162	33	306	37	382	77
09/30/2021	1.2	138	74	46	124	32	318	46	503	75
Average	**1.6**	**152.6**	**84.6**	**42.4**	**129.1**	**35.4**	**267.2**	**46.3**	**375.6**	**70.5**
Minimum	**0.8**	**78**	**45**	**30**	**56**	**21**	**129**	**24**	**148**	**55**
Maximum	**3.2**	**271**	**134**	**57**	**254**	**60**	**665**	**87**	**1344**	**84**
Count	**59**	**59**	**59**	**59**	**59**	**59**	**59**	**59**	**59**	**59**
Std Dev	**0.6**	**41.4**	**20.5**	**5.5**	**36.9**	**8.8**	**84.8**	**13.6**	**194.9**	**6.1**
CV	**0.4**	**0.3**	**0.2**	**0.1**	**0.3**	**0.2**	**0.3**	**0.3**	**0.5**	**0.1**
95th Percentile	**2.9**	**216.3**	**116.5**	**49.2**	**188.1**	**50.2**	**379.1**	**69.4**	**632.9**	**80.0**
5th Percentile	**0.9**	**97.1**	**54.9**	**34.0**	**83.3**	**23.0**	**174.9**	**29.0**	**208.3**	**61.9**
90th percentile	**2.6**	**207.4**	**111.4**	**48.0**	**179.0**	**47.2**	**362.4**	**65.6**	**508.6**	**78.2**

CBS WWTP DMR Data 2016 -2021 (continued)

Nitrogen, ammonia total [as N]	pH	pH	Fecal Coliform	Fecal Coliform	Temperature	Copper, Total Recoverable	Copper, Total Recoverable	Dissolved Oxygen
Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross	Effluent Gross
Monthly 24 HR Composite	INST MAX	INST MIN	INST MAX	MO GEO MN	MX DA AV	MO AVG	DAILY MAX	Minimum Daily Limit
mg/L	SU	SU	#/100mL	#/100mL	C	µg/L	µg/L	mg/L
Report	Report	Report	1,500,000	1,000,000	Report	243	354	2
15	7.2	6.8	151201	151201	11	48	48	4
13	7.3	6.9	247385	247385	9	44	44	9
16	7.3	6.9	268823	268823	8	47	47	7
18	7.3	6.8	705744	705744	8	34	34	9
23	7.3	7	898517	898517	7	42	42	6
14	7.4	7	252749	252749	8	47	47	7
21	7.1	7	445965	445965	10	44	44	7
22	7.2	6.8	276168	276168	12	56	56	6
18	7.1	6.9	233923	233923	13	62	62	8
29	7.1	6.7	287259	287259	14	73	73	6
13	7.3	6.7	44777	44777	14	108	108	8
13	7.2	6.8	114118	114118	12	96	96	8
16	7.3	7	196932	196932	12	57	57	8
14	7.3	6.8	261549	261549	10	45	45	9
12	7.2	6.9	203215	203215	8	32	32	9
19	7.3	6.7	655226	655226	7	127	127	8
12	7.4	6.7	185341	185341	8	36	36	8
20	7.2	6.5	226790	226790	10	52	52	7
17	7.4	6.8	449730	373684	11	56	56	8
21	7.2	7	287775	287775	13	54	54	4
17	7.3	6.8	143104	143104	14	55	55	4
14	7.1	6.6	9798	9798	15	189	189	6
22	7.3	6.9	112558	112558	14	58	58	5
12	7	6.6	98368	98368	12	29	29	8
12	7.3	6.5	377056	377056	11	34	34	6
18	7.1	6.6	594198	594198	9.7	46	46	8
14	7.2	6.6	689464	689464	9	147	147	5
12	7.4	6.8	151582	151582	7	46	46	7
18	7.3	6.5	406389	406389	8	197	197	9
19	7.3	7.1	624343	624343	9	107	107	7
19	7.5	6.8	764883	486089	11	43	43	7
23	7.3	6.7	751136	561985	12	55	55	5
25	7.2	6.6	2009778	552127	15	57	57	5
22	7	6.7	841461	664110	15	45	45	6
15	7.3	6.6	1099550	161971	14	43	43	7
14	7.5	6.6	794788	794788	13	27	27	7
11	7.4	6.5	446874	405929	11	25	25	10
10	7.4	6.7	585790	585790	10	28	28	7.2
12	7.4	6.4	569615	569615	9	38	38	8.4
7.5	7.4	7.1	851162	851162	7.2	31.4	31.4	11
10	7.5	6.8	1373452	836581	8	38	38	9
8.2	7.6	7.2	19797	19797	8.6	37.4	37.4	7.8
18	7.4	6.8	32761	32761	11	36	36	6
10	7.6	7.3	222253	222253	12	34	34	6.3
16	7.5	7.1	489011	489011	13	30.3	30.3	5.7
16	7.4	6.8	489011	489011	14	31	31	5.3
16	7.3	7.2	998303	998303	13	43	43	7.7
16	7.7	7	388697	388697	11	67	67	6.1
12	7.4	7.1	219856	219856	9	21	21	7.7
16	7.1	6.8	340799	340799	9	24	24	7
10	7.7	7.2	168862	168862	9	20	20	5.5
16	7.5	7	918331	918331	8	23	23	6.8
9	7.9	7.1	58733	58733	7	19.5	19.5	10.1
13	7.7	7.1	1196248	720188	9	24	24	6.3
19	7.6	7.1	850469	850469	10	50	50	8
23	7.6	7.4	570150	570150	12	34	34	5.2
23	7.8	7.4	638719	638719	13	34	34	6
23	7.6	7.3	126810	126810	14	44	44	6.9
18.6	7.7	7	167615	167615	13	36.1	36.1	8
16.2	**7.4**	**6.9**	**467541.7**	**396856.2**	**10.8**	**52.7**	**52.7**	**7.1**
7.5	**7**	**6.4**	**9798**	**9798**	**7**	**19.5**	**19.5**	**4**
29	**7.9**	**7.4**	**2009778**	**998303**	**15**	**197**	**197**	**11**
59	**59**	**59**	**59**	**59**	**59**	**59**	**59**	**59**
4.6	**0.2**	**0.2**	**381908.0**	**265446.0**	**2.4**	**36.4**	**36.4**	**1.5**
0.3	**0.0**	**0.0**	**0.8**	**0.7**	**0.2**	**0.7**	**0.7**	**0.2**
23.0	**7.7**	**7.3**	**1109219.8**	**855897.5**	**14.1**	**129.0**	**129.0**	**9.1**
9.9	**7.1**	**6.5**	**43575.4**	**43575.4**	**7.0**	**22.8**	**22.8**	**4.9**
23.0	**7.6**	**7.2**	**902479.8**	**803146.6**	**14.0**	**98.2**	**98.2**	**9.0**

Table 15. Receiving Water Data, Site C is limiting for ammonia (2018 and 2020)

(Source: CBS WWTP Receiving Water Quality Monitoring)

	Ambient pH	Ambient DO	Ambient Temperature	Ambient Salinity	Secchi Disk Depth
	Receiving Water	Receiving Water	Receiving Water	Receiving Water	Receiving Water
	Site C-Summer	Site C-Summer	Site C-Summer	Site C-Summer	Site C-Summer
	SU	mg/L	C	ppt	ft
8/14/2018	8.1	9.5	8.4	31	27
8/12/2020	8.1	12.4	12.2	43.7	18
Average	8.1	11.0	10.3	37.4	22.5
Minimum	8.1	9.5	8.4	31	18
Maximum	8.1	12.4	12.2	43.7	27
Count	2	2	2	2	2
Std Dev	0.0	2.1	2.7	9.0	6.4
CV	0.0	0.2	0.3	0.2	0.3
95th Percentile	8.1	12.3	12.0	43.1	26.6
5th Percentile	8.1	9.6	8.6	31.6	18.5

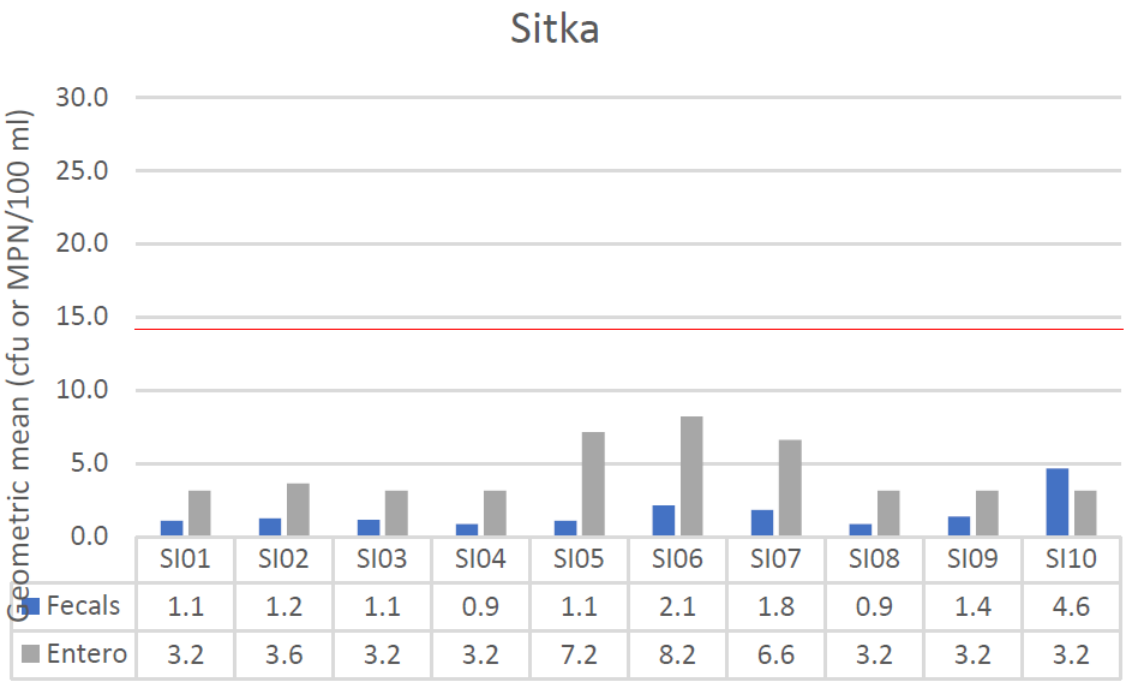


Figure 3. Receiving Water Quality Data Source (2021) ARRI, 2022

Table 16. Receiving Water Quality Data (2021) Source: AARI, 2022

Site	Ammonia-N (mg/L)	T-Cu (µg/L)	D-Cu (µg/L)	T-Ni (µg/L)	D-Ni (µg/L)	T-Zn (µg/L)	D-Zn (µg/L)
WQC	0.3	-	3.1	-	8.2	-	86
SI01	0.031	1.16	1.02	0.31	0.29	5.02	4.88
SI02	0.016	0.32	0.30	0.30	0.27	0.86	0.59
SI03	0.010	0.38	3.98	0.30	0.28	1.23	3.43
SI04	0.011	0.21	0.21	0.27	0.29	0.56	0.48
SI05	0.024	0.23	0.26	0.30	0.27	0.47	0.54
SI06	0.026	0.31	0.39	0.29	0.29	1.27	1.63
SI07	0.007	0.65	0.61	0.29	0.29	2.69	2.69
SI08	0.014	0.43	0.40	0.31	0.28	2.25	1.77
SI09	0.010	0.23	0.28	0.25	0.28	0.67	0.61
SI10	0.008	0.14	0.14	0.28	0.28	0.28	0.25
Average	0.016	0.41	0.76	0.29	0.28	1.53	1.69

Temp (C)	1m	2m	3m	4m
SI01	8.70	8.50	7.80	7.60
SI02	8.50	8.50	8.70	7.70
SI03	8.40	8.40	7.90	7.70
SI04	8.40	8.40	7.90	7.80
SI05	8.50	8.50	8.30	8.20
SI06	8.40	8.40	8.30	8.10
SI07	8.60	8.60	8.30	8.10
SI08	8.50	8.20	8.30	8.30
SI09	8.40	8.30	8.30	8.10
SI10	8.50	8.40	8.20	8.10
Average	8.49	8.42	8.20	7.97

pH	1m	2m	3m	4m
SI01	8.36	8.38	8.29	8.29
SI02	8.56	8.54	8.43	8.44
SI03	8.46	8.46	8.41	8.38
SI04	8.43	8.43	8.40	8.40
SI05	9.01	8.92	8.84	8.77
SI06	8.42	8.42	8.41	8.45
SI07	8.44	8.45	8.43	8.41
SI08	8.44	8.47	8.46	8.56
SI09	8.46	8.46	8.45	8.48
SI10	8.46	8.43	8.42	8.49
Average	8.50	8.50	8.45	8.47

Salinity (ppt)	1m	2m	3m	4m
SI01	24.58	24.85	30.76	31.20
SI02	25.12	25.46	30.04	30.83
SI03	24.67	25.96	30.40	30.89
SI04	25.40	27.61	30.58	30.85
SI05	25.54	27.88	29.36	29.59
SI06	25.44	27.85	28.99	29.85
SI07	26.83	27.19	28.34	29.98
SI08	25.80	28.83	29.10	29.29
SI09	29.70	29.80	29.89	30.19
SI10	28.10	29.30	29.85	29.90
Average	26.12	27.17	29.73	30.26

D.O. (mg/L)	1m	2m	3m	4m
SI01	11.44	11.82	11.70	11.98
SI02	11.85	11.92	11.74	12.59
SI03	11.39	11.75	12.16	12.51
SI04	10.85	11.94	12.55	12.96
SI05	11.96	12.07	12.29	12.56
SI06	11.91	11.82	12.10	12.36
SI07	12.15	12.22	12.34	12.57
SI08	12.10	11.97	12.19	12.35
SI09	13.14	13.14	13.22	13.14
SI10	13.30	13.13	13.13	13.33
Average	12.01	12.18	12.34	12.64

Weekly CBS WWTP TSS Effluent Data, 2016-2021

Date	Influent		Effluent			Date	Influent		Effluent	
	TSS mg/t	TSS lbs.	TSS mg/t	TSS lbs.			TSS mg/t	TSS lbs.	TSS mg/t	TSS lbs.
						2017-01-04	111	722	24	156
2016-08-03	140	1284	49	450		2017-01-11	144	949	46	303
2016-08-09	87	784	45	405		2017-01-18	121	1080	27	241
2016-08-16	95	856	33	297		2017-01-25	101	952	28	264
2016-08-17	113	961	37	315		2017-02-01	103	679	31	204
2016-08-24	126	1040	45	372		2017-02-08	113	763	45	304
2016-08-25	121	1100	37	336		2017-02-15	76	748	25	246
2016-08-31	116	977	40	337		2017-02-22	125	782	35	219
2016-09-07	101	1146	38	431		2017-03-01	144	913	49	311
2016-09-14	99	1726	23	401		2017-03-08	90	646	34	244
2016-09-20	108	955	31	274		2017-03-15	98	776	33	261
2016-09-28	161	1383	31	266		2017-03-22	120	821	42	287
2016-10-05	153	1136	43	319		2017-03-29	84	666	44	349
2016-10-12	149	1081	40	290		2017-04-05	114	865	29	220
2016-10-19	89	1447	32	520		2017-04-13	143	799	52	291
2016-10-25	134	1475	34	374		2017-04-18	168	841	63	315
2016-11-02	130	932	49	351		2017-04-26	305	1806	45	266
2016-11-08	86	889	27	279		2017-05-02	161	1007	37	231
2016-11-16	94	792	33	278		2017-05-09	198	1172	37	219
2016-11-22	206	1529	38	282		2017-05-17	299	1421	38	181
2016-11-29	125	1647	44	580		2017-05-24	344	2152	34	213
2016-12-06	155	1280	27	223		2017-05-31	268	1430	46	246
2016-12-13	128	1026	39	312		2017-06-07	150	801	45	240
2016-12-21	75	982	29	380		2017-06-14	274	1463	50	267
2016-12-28	231	2158	43	402		2017-06-21	135	777	43	247
						2017-06-27	198	1073	51	276
						2017-07-05	146	865	45	266
						2017-07-12	194	1197	68	420
						2017-07-19	145	859	57	338
						2017-07-26	165	1032	68	425
						2017-08-02	223	1451	65	423
						2017-08-09	150	838	51	285
						2017-08-16	123	903	43	316
						2017-08-22	113	1159	40	410
						2017-08-30	121	1050	52	451
						2017-09-06	73	1065	41	598
						2017-09-13	126	999	45	357
						2017-09-20	165	1197	50	363
						2017-09-26	106	2590	55	1344
						2017-10-04	105	1016	34	329
						2017-10-11	109	836	26	199
						2017-10-18	92	829	59	531
						2017-10-25	151	1096	63	457
						2017-10-31	146	1279	43	377
						2017-11-07	285	1997	45	315
						2017-11-15	200	1368	35	239
						2017-11-20	124	817	39	257
						2017-11-29	103	739	37	265
						2017-12-06	103	661	43	276
						2017-12-12	89	868	34	332
						2017-12-19	79	540	29	198
						2017-12-27	109	655	39	234

Weekly CBS WWTP TSS Effluent Data, 2016-2021

(continued)

Date	Influent		Effluent		Date	Influent		Effluent		Date	Influent		Effluent		Date	Influent		Effluent	
	TSS mg/t	TSS lbs.	TSS mg/t	TSS lbs.		TSS mg/t	TSS lbs.	TSS mg/t	TSS lbs.		TSS mg/t	TSS lbs.	TSS mg/t	TSS lbs.		TSS mg/t	TSS lbs.	TSS mg/t	TSS lbs.
2018-01-03	80	647	36	291	2019-01-05	65	564	39	338	2020-02-05	80	861	14	151	2021-01-06	205	1932	33	311
2018-01-10	115	643	34	190	2019-01-09	104	746	29	208	2020-02-12	41	633	21	324	2021-01-13	88	1160	37	488
2018-01-17	118	679	38	219	2019-01-16	103	636	24	148	2020-02-19	65	613	37	349	2021-01-20	47	498	23	244
2018-01-23	113	565	34	170	2019-01-23	108	712	28	184	2020-02-27	38	529	21	292	2021-01-25	47	384	23	188
2018-01-31	123	667	51	276	2019-01-30	80	634	18	143	2020-03-04	64	587	22	202	2021-01-27	107	901	32	270
2018-02-07	168	939	42	235	2019-02-06	87	646	28	208	2020-03-12	94	886	30	283	2021-03-03	63	788	24	300
2018-02-13	83	699	35	295	2019-02-13	145	810	43	240	2020-03-17	85	567	36	240	2021-03-10	130	1084	33	275
2018-02-21	371	2104	36	204	2019-02-20	95	658	22	152	2020-03-23	112	710	38	241	2021-03-17	96	865	25	225
2018-02-28	78	638	45	368	2019-02-27	113	603	27	144	2020-07-01	91	455	35	175	2021-03-24	86	839	22	215
2018-03-07	118	718	38	231	2019-03-06	139	707	29	148	2020-07-08	139	661	38	181	2021-03-31	80	1354	40	677
2018-03-14	103	730	24	170	2019-03-13	104	598	21	121	2020-07-15	128	726	16	91	2021-04-07	108	1000	25	231
2018-03-21	109	718	26	171	2019-03-20	78	462	25	148	2020-07-22	129	871	29	196	2021-04-14	108	874	26	210
2018-03-27	155	970	73	457	2019-03-27	145	665	22	101	2020-07-29	123	780	33	209	2021-04-21	100	684	28	191
2018-05-01	130	1063	39	319	2019-04-03	136	647	31	147	2020-09-02	158	1489	28	264	2021-04-28	105	771	53	389
2018-05-09	134	793	36	213	2019-04-11	105	534	35	178	2020-09-09	110	862	30	235	2021-05-05	104	781	43	323
2018-05-15	101	649	40	257	2019-04-18	123	954	26	202	2020-09-16	159	1074	33	223	2021-05-12	171	1112	40	260
2018-05-23	119	715	33	198	2019-04-23	96	633	29	191	2020-09-23	164	1245	45	342	2021-05-19	143	954	42	280
2018-05-30	135	889	51	336	2019-05-01	140	747	27	144	2020-09-30	131	1038	29	230	2021-05-25	109	845	26	201
2018-06-06	154	912	43	255	2019-05-08	119	983	28	231	2020-10-07	70	531	12	91	2021-06-02	141	1152	39	319
2018-06-14	145	980	61	412	2019-05-15	141	870	28	173	2020-10-14	104	789	22	167	2021-06-09	158	1146	53	385
2018-06-19	164	1067	56	364	2019-05-22	158	909	33	190	2020-10-21	116	813	26	182	2021-06-17	165	1128	40	274
2018-06-26	180	1126	46	288	2019-05-29	145	713	28	138	2020-10-28	50	538	26	280	2021-06-23	224	2466	57	628
2018-07-04	153	957	49	306	2019-06-05	173	923	44	235	2020-11-04	45	522	29	336	2021-06-30	179	1418	37	293
2018-07-11	163	1183	49	356	2019-06-12	200	1101	34	187	2020-11-11	88	881	14	140	2021-07-07	189	1403	36	267
2018-07-18	148	1137	42	323	2019-06-19	200	1485	34	252	2020-11-18	190	1442	28	213	2021-07-14	216	1639	49	372
2018-07-24	175	1211	53	367	2019-06-26	180	1006	40	224	2020-11-23	135	1227	29	264	2021-07-21	175	1343	37	284
2018-07-31	155	1047	69	466	2019-07-02	156	885	34	193	2020-12-02	37	710	14	269	2021-07-28	153	1021	25	167
2018-08-08	159	2201	82	1135	2019-07-10	170	936	35	193	2020-12-09	77	905	25	294	2021-08-04	169	1254	37	275
2018-08-15	108	982	34	309	2019-07-17	189	993	43	226	2020-12-16	93	861	23	213	2021-08-11	185	1527	33	272
2018-08-22	143	1157	36	291	2019-07-24	201	1023	37	188	2020-12-22	125	1188	31	295	2021-08-18	76	1001	29	382
2018-08-29	81	885	28	306	2019-07-31	153	880	32	184	2020-12-29	196	1651	29	244	2021-08-25	219	1900	34	295
2018-09-05	155	1047	39	263	2019-08-07	185	1065	30	173						2021-09-01	154	1361	31	274
2018-09-12	138	863	35	219	2019-08-14	176	954	30	163						2021-09-08	114	1284	38	428
2018-09-18	175	949	26	141	2019-08-21	158	857	30	163						2021-09-15	66	683	7	72.4
2018-09-26	96	945	23	226	2019-08-28	129	753	34	198						2021-09-22	130	1420	46	503
2018-10-02	161	926	36	207	2019-09-04	122	814	24	160						2021-09-29	158	1209	39	312
2018-10-10	108	1297	36	432	2019-09-11	151	756	30	150						2021-10-06	101	901	23	205
2018-10-16	89	1084	28	341	2019-09-18	131	951	22	160						2021-10-13	65	970	20	299
2018-10-24	91	797	18	158	2019-09-25	65	900	22	305						2021-10-20	141	1129	37	296
2018-10-31	108	685	35	222	2019-11-06	68	686	20	202						2021-10-27	108	1234	50	571
2018-11-07	141	917	39	254	2019-11-13	79	817	20	207						2021-11-03	136	1066	36	282
2018-11-14	82	793	24	232	2019-11-21	45	631	24	336						2021-11-10	130	932	38	273
2018-11-20	79	791	27	270	2019-11-26	63	531	19	160						2021-11-17	82	903	38	418
2018-11-28	100	784	31	243	2019-12-04	70	677	23	223						2021-11-23	77	713	32	296
2018-12-06	126	778	40	247	2019-12-11	115	825	36	258										
2018-12-12	71	651	30	275	2019-12-18	118	846	29	208										
2018-12-18	70	601	21	180	2019-12-26	76	963	18	228										
2018-12-26	113	924	24	196															

Appendix C. TSS TBEL Calculations

Instructions: Enter data on 'Input 1' tab and below with yellow fields. -- Click here for more details --		
Performance-based Effluent Limits		
INPUT		
LogNormal Transformed Mean:	3.5160	Use spreadsheet on right to calculate the log-normal transformed mean and variance.
LogNormal Transformed Variance:	0.1097	
Number of Samples per month for compliance monitoring:	1	
Autocorrelation factor (n_e) (use 0 if unknown):	0	
OUTPUT		
E(X) =	35.5472	
V(X) =	146.452	
VARn	0.1097	
MEANn=	3.5160	
VAR(Xn)=	146.452	
RESULTS		
Maximum Daily Effluent Limit:	**72.7**	
Average Monthly Effluent Limit:	**58.0**	
58.01925314	55.4545299	

Weekly TSS Data (2016-2022), log transformed

	Transformed Mean and Variance								
	Enter data in yellow								
Date	**Data**	**Ln()**		Date	**Data**	**Ln()**		Date	**Data**	**Ln()**
2016-08-03	49	3.892		2017-01-04	24	3.178		2018-01-03	36	3.584
2016-08-09	45	3.807		2017-01-11	46	3.829		2018-01-10	34	3.526
2016-08-16	33	3.497		2017-01-18	27	3.296		2018-01-17	38	3.638
2016-08-17	37	3.611		2017-01-25	28	3.332		2018-01-23	34	3.526
2016-08-24	45	3.807		2017-02-01	31	3.434		1018-01-31	51	3.932
2016-08-25	37	3.611		2017-02-08	45	3.807		2018-02-07	42	3.738
2016-08-31	40	3.689		2017-02-15	25	3.219		2018-02-13	35	3.555
2016-09-07	38	3.638		2017-02-22	35	3.555		1018-02-21	36	3.584
2016-09-14	23	3.135		2017-03-01	49	3.892		2018-02-28	45	3.807
2016-09-20	31	3.434		2017-03-08	34	3.526		2018-03-07	38	3.638
2016-09-28	31	3.434		2017-03-15	33	3.497		2018-03-14	24	3.178
2016-10-05	43	3.761		2017-03-22	42	3.738		2018-03-21	26	3.258
2016-10-12	40	3.689		2017-03-29	44	3.784		2018-03-27	73	4.290
2016-10-19	32	3.466		2017-04-05	29	3.367		2018-05-01	39	3.664
2016-10-25	34	3.526		2017-04-13	52	3.951		2018-05-09	36	3.584
2016-11-02	49	3.892		2017-04-18	63	4.143		2018-05-15	40	3.689
2016-11-08	27	3.296		2017-04-26	45	3.807		2018-05-23	33	3.497
2016-11-16	33	3.497		2017-05-02	37	3.611		2018-05-30	51	3.932
2016-11-22	38	3.638		2017-05-09	37	3.611		2018-06-06	43	3.761
2016-11-29	44	3.784		2017-05-17	38	3.638		2018-06-14	61	4.111
2016-12-06	27	3.296		2017-05-24	34	3.526		2018-06-19	56	4.025
2016-12-13	39	3.664		2017-05-31	46	3.829		2018-06-26	46	3.829
2016-12-21	29	3.367		2017-06-07	45	3.807		2018-07-04	49	3.892
2016-12-28	43	3.761		2017-06-14	50	3.912		2018-07-11	49	3.892
				2017-06-21	43	3.761		2018-07-18	42	3.738
				2017-06-27	51	3.932		2018-07-24	53	3.970
				2017-07-05	45	3.807		2018-07-31	69	4.234
				2017-07-12	68	4.220		2018-08-08	82	4.407
				2017-07-19	57	4.043		2018-08-15	34	3.526
				2017-07-26	68	4.220		2018-08-22	36	3.584
				2017-08-02	65	4.174		2018-08-29	28	3.332
				2017-08-09	51	3.932		2018-09-05	39	3.664
				2017-08-16	43	3.761		2018-09-12	35	3.555
				2017-08-22	40	3.689		2018-09-18	26	3.258
				2017-08-30	52	3.951		2018-09-26	23	3.135
				2017-09-06	41	3.714		2018-10-02	36	3.584
				2017-09-13	45	3.807		2018-10-10	36	3.584
				2017-09-20	50	3.912		2018-10-16	28	3.332
				2017-09-26	55	4.007		2018-10-24	18	2.890
				2017-10-04	34	3.526		2018-10-31	35	3.555
				2017-10-11	26	3.258		2018-11-07	39	3.664
				2017-10-18	59	4.078		2018-11-14	24	3.178
				2017-10-25	63	4.143		2018-11-20	27	3.296
				2017-10-31	43	3.761		2018-11-28	31	3.434
				2017-11-07	45	3.807		2018-12-06	40	3.689
				2017-11-15	35	3.555		2018-12-12	30	3.401
				2017-11-20	39	3.664		2018-12-18	21	3.045
				2017-11-29	37	3.611		2018-12-26	24	3.178
				2017-12-06	43	3.761				
				2017-12-12	34	3.526				
				2017-12-19	29	3.367				
				2017-12-27	39	3.664				

Weekly TSS Data (2016-2022), log transformed (continued)

Date	Data	Ln()	Date	Data	Ln()	Date	Data	Ln()
2019-01-05	39	3.664	2020-02-05	14	2.639	2021-01-06	33	3.497
2019-01-09	29	3.367	2020-02-12	21	3.045	2021-01-13	37	3.611
2019-01-16	24	3.178	2020-02-19	37	3.611	2021-01-20	23	3.135
2019-01-23	28	3.332	2020-02-27	21	3.045	2021-01-25	23	3.135
2019-01-30	18	2.890	2020-03-04	22	3.091	2021-01-27	32	3.466
2019-02-06	28	3.332	2020-03-12	30	3.401	2021-03-03	24	3.178
2019-02-13	43	3.761	2020-03-17	36	3.584	2021-03-10	33	3.497
2019-02-20	22	3.091	2020-03-23	38	3.638	2021-03-17	25	3.219
2019-02-27	27	3.296	2020-07-01	35	3.555	2021-03-24	22	3.091
2019-03-06	29	3.367	2020-07-08	38	3.638	2021-03-31	40	3.689
2019-03-13	21	3.045	2020-07-15	16	2.773	2021-04-07	25	3.219
2019-03-20	25	3.219	2020-07-22	29	3.367	2021-04-14	26	3.258
2019-03-27	22	3.091	2020-07-29	33	3.497	2021-04-21	28	3.332
2019-04-03	31	3.434	2020-09-02	28	3.332	2021-04-28	53	3.970
2019-04-11	35	3.555	2020-09-09	30	3.401	2021-05-05	43	3.761
2019-04-18	26	3.258	2020-09-16	33	3.497	2021-05-12	40	3.689
2019-04-23	29	3.367	2020-09-23	45	3.807	2021-05-19	42	3.738
2019-05-01	27	3.296	2020-09-30	29	3.367	2021-05-25	26	3.258
2019-05-08	28	3.332	2020-10-07	12	2.485	2021-06-02	39	3.664
2019-05-15	28	3.332	2020-10-14	22	3.091	2021-06-09	53	3.970
2019-05-22	33	3.497	2020-10-21	26	3.258	2021-06-17	40	3.689
2019-05-29	28	3.332	2020-10-28	26	3.258	2021-06-23	57	4.043
2019-06-05	44	3.784	2020-11-04	29	3.367	2021-06-30	37	3.611
2019-06-12	34	3.526	2020-11-11	14	2.639	2021-07-07	36	3.584
2019-06-19	34	3.526	2020-11-18	28	3.332	2021-07-14	49	3.892
2019-06-26	40	3.689	2020-11-23	29	3.367	2021-07-21	37	3.611
2019-07-02	34	3.526	2020-12-02	14	2.639	2021-07-28	25	3.219
2019-07-10	35	3.555	2020-12-09	25	3.219	2021-08-04	37	3.611
2019-07-17	43	3.761	2020-12-16	23	3.135	2021-08-11	33	3.497
2019-07-24	37	3.611	2020-12-22	31	3.434	2021-08-18	29	3.367
2019-07-31	32	3.466	2020-12-29	29	3.367	2021-08-25	34	3.526
2019-08-07	30	3.401				2021-09-01	31	3.434
2019-08-14	30	3.401				2021-09-08	38	3.638
2019-08-21	30	3.401				2021-09-15	7	1.946
2019-08-28	34	3.526				2021-09-22	46	3.829
2019-09-04	24	3.178				2021-09-29	39	3.664
2019-09-11	30	3.401				2021-10-06	23	3.135
2019-09-18	22	3.091				2021-10-13	20	2.996
2019-09-25	22	3.091				2021-10-20	37	3.611
2019-11-06	20	2.996				2021-10-27	50	3.912
2019-11-13	20	2.996				2021-11-03	36	3.584
2019-11-21	24	3.178				2021-11-10	38	3.638
2019-11-26	19	2.944				2021-11-17	38	3.638
2019-12-04	23	3.135				2021-11-23	32	3.466
2019-12-11	36	3.584					**Mean**	**3.59**
2019-12-18	29	3.367					**Variance**	**0.04**
2019-12-26	18	2.890						

Appendix D. Reasonable Potential and WQBEL Formulae

A. Reasonable Potential Analysis

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

1. Mass Balance

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

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

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:

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

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:

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

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,

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

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

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

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

$$C_d = \frac{C_e - C_u}{D} + C_u$$ 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:

$$C_d = \frac{CF \times C_e - C_u}{D} + C_u$$ 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.

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

where,

p_n = the percentile represented by the highest reported concentration

n = the number of samples

confidence level = 99% = 0.99

and

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

Where,

σ^2	=	$\ln(CV^2 + 1)$
Z_{99}	=	2.326 (z-score for the 99th percentile)
Z_{Pn}	=	z-score for the P_n percentile (inverse of the normal cumulative distribution function at a given percentile)
CV	=	coefficient of variation (standard deviation ÷ mean)

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

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

where MRC = Maximum Reported Concentration

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

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

4. Reasonable Potential

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

B. WQBEL Calculations

1. Calculate the Wasteload Allocations (WLAs)

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

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

   Idaho'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 __. As discussed in Appendix ___, the criteria translator (CT) is equal to the conversion factor, because site-specific translators are not available for this discharge.

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

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

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

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

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:

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

where,

σ_{30}^2 = $\ln(CV^2/30 + 1)$

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

2. Derive the maximum daily and average monthly effluent limits

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

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

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

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 Calculation

Reasonable Potential Analysis (RPA) and Water Quality Effluent Limit (WQBEL) Calculations

Facility Name	City and Borough of Sitka
Facility Flow (mgd)	5.30
Facility Flow (cfs)	8.20

			Annual	Annual	Annual		Annual	Annual	Annual	Annual
DF at defined percent of river flow allow	0%		46.0							
DF at defined percent of river flow allow	0%		76.0							
Receiving Water Data	Notes:		Annual							
Hardness, as mg/L $CaCO_3$		5th % at critical flows	Crit. Flows							
Temperature, °C	Temperature, °C	95th percentile	12							
pH, S.U.	pH, S.U.	95th percentile	8.1							

Pollutants of Concern			AMMONIA, default: cold water, fish early life stages present	ARSENIC (dissolved) - SEE Toxic BiOp	CADMIUM	CHLORINE (Total Residual)	CHLOROFORM	CHROMIUM (HEX)	COPPER - SEE Toxic BiOp	IRON
Effluent Data	**Number of Samples in Data Set (n)**		59	1	1	122	1	1	59	1
	Coefficient of Variation (CV) = Std. Dev./Mean (default CV = 0.6)		0.3	0.6	0.6	3.52	0.6	0.6	0.7	0.6
	Effluent Concentration, µg/L (Max. or 95th Percentile) - (C_e)		23,000	0.91	0.047	1.36	47.8	0.6	129	0.059
	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	7,900	69.	40.	13.	--	1,100.	4.8	--
	Aquatic Life Criteria, µg/L	Chronic	1,200	36.	8.8	7.5	--	50.	3.1	1,000.
	Acute:chronic ratio		6.58	1.92	4.55	1.73	--	22.00	1.55	0.00
	Human Health Water and Organism, µg/L		--	-	-	-	-	-	N/A	-
	Human Health, Organism Only, µg/L		--	-	-	-	4,700.	-	-	-
	Metals Criteria Translator, decimal (or default use Conversion Factor)	Acute		1.	.944	.944	--	.993	.83	--
		Chronic		1.	.944	.944	--	.993	.83	--
	Carcinogen (Y/N), Human Health Criteria Only		--	N	N	N	Y	N	N	N
Percent River Flow Default Value = 0%	**Aquatic Life - Acute**	**1Q10**	0%	0%	0%	0%	0%	0%	0%	0%
	Aquatic Life - Chronic	7Q10 or 4B3		0%	0%	0%	0%	0%	0%	0%
		30B3 or 30Q10/30Q5	0%	0%	0%	0%	0%	0%	0%	0%
	Human Health - Non-Carcinogen	Harmonic Mean		0%	0%	0%	0%	0%	0%	0%
	Human Health - Carcinogen	Harmonic Mean		0%	0%	0%	0%	0%	0%	0%
Calculated Dilution Factors (DF) (or enter Modeled DFs)	Aquatic Life - Acute	1Q10	46.0	46.0	46.0	--	46.0	46.0	46.0	46.0
	Aquatic Life - Chronic	7Q10 or 4B3	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0
	Aquatic Life - Chronic Ammonia	30B3 or 30Q10/30Q5	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0
	Human Health - Non-Carcinogen	Harmonic Mean	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0
	Human Health - Carcinogen	Harmonic Mean	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0

Aquatic Life Reasonable Potential Analysis

σ	$\sigma^2=\ln(CV^2+1)$		0.294	0.555	0.555	1.611	0.555	0.555	0.631	0.555
P_n	=(1-confidence level)$^{1/n}$, where confidence level =	**99%**	0.925	0.010	0.010	0.963	0.010	0.010	0.925	0.010
Multiplier (TSD p. 57)	$=\exp(z\sigma-0.5\sigma^2)/\exp[\text{normsinv}(P_n)\sigma-0.5\sigma^2]$, where	**99%**	1.3	13.2	13.2	2.4	13.2	13.2	1.8	13.2
Statistically projected critical discharge concentration (C_e)			29845	12.01	0.62	3.25	630.81	7.92	225.93	0.78
Predicted max. conc.(ug/L) at Edge-of-Mixing Zone		Acute	649	0.26	0.01	--	13.71	0.17	4.08	0.02
(note: for metals, concentration as dissolved using conversion factor as translator)		Chronic	393	0.16	0.01	0.04	8.30	0.10	2.47	0.01
Reasonable Potential to exceed Aquatic Life Criteria			**NO**	**NO**	**NO**	**YES**	**NA**	**NO**	**NO**	**NO**

Aquatic Life Effluent Limit Calculations

Number of Compliance Samples Expected per month (n)			1	4	4	5	4	4	4	4
n used to calculate AML (if chronic is limiting then use min=4 or for ammonia min=30)			--	--	--	5	--	--	--	--
LTA Coeff. Var. (CV), decimal	(Use CV of data set or default = 0.6)		--	--	--	3.520	--	--	--	--
Permit Limit Coeff. Var. (CV), decimal	(Use CV from data set or default = 0.6)		--	--	--	3.520	--	--	--	--
Acute WLA, ug/L	$C_a = (\text{Acute Criteria} \times MZ_a) - C_u \times (MZ_a-1)$	Acute	--	--	--	--	--	--	--	--
Chronic WLA, ug/L	$C_d = (\text{Chronic Criteria} \times MZ_c) - C_u \times (MZ_c-1)$	Chronic	--	--	--	570.0	--	--	--	--
Long Term Ave (LTA), ug/L	WLAa x $\exp(0.5\sigma^2-z\sigma)$, Acute	**99%**	--	--	--	--	--	--	--	--
(99th % occurrence prob.)	WLAc x $\exp(0.5\sigma^2-z\sigma)$; ammonia n=30, Chronic	**99%**	--	--	--	72.8	--	--	--	--
Limiting LTA, ug/L	used as basis for limits calculation		--	--	--	72.8	--	--	--	--
Applicable Metals Criteria Translator (metals limits as total recoverable)				--	--	0.94	--	--	--	--
Average Monthly Limit (AML), ug/L	, where % occurrence prob =	**95%**	**--**	**--**	**--**	**260**	**--**	**--**	**--**	**--**
Maximum Daily Limit (MDL), ug/L	, where % occurrence prob =	**99%**	**--**	**--**	**--**	**894**	**--**	**--**	**--**	**--**
Average Monthly Limit (AML), mg/L			**--**	**--**	**--**	**0.260**	**--**	**--**	**--**	**--**
Maximum Daily Limit (MDL), mg/L			**--**	**--**	**--**	**0.894**	**--**	**--**	**--**	**--**
Average Monthly Limit (AML), lb/day			**--**	**--**	**--**	**11.5**	**--**	**--**	**--**	**--**
Maximum Daily Limit (MDL), lb/day			**--**	**--**	**--**	**39.5**	**--**	**--**	**--**	**--**

Human Health Reasonable Potential Analysis

σ	$\sigma^2=\ln(CV^2+1)$		0.555	0.555	1.611	0.555	0.555	0.631	0.555
P_n	=(1-confidence level)$^{1/n}$ where confidence level =	**95%**	0.050	0.050	0.976	0.050	0.050	0.950	0.050
Multiplier	$=\exp(2.326\sigma-0.5\sigma^2)/\exp[\text{invnorm}(P_N)\sigma-0.5\sigma^2]$, prob. =	**50%**	2.490	2.490	0.042	2.490	2.490	0.353	2.490
Dilution Factor (for Human Health Criteria)			76.0	76.0	76.0	76.0	76.0	76.0	76.0
Max Conc. at edge of Chronic Zone, ug/L (C_d)			0.030	0.002	0.001	1.566	0.020	0.599	0.002
Reasonable Potential to exceed HH Water & Organism			**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Reasonable Potential to exceed HH Organism Only			**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

Reasonable Potential Analysis (RPA) and Water Quality Effluent Limit (WQBEL) Calculations

Facility Name	City and Borough of Sitka
Facility Flow (mgd)	5.30
Facility Flow (cfs)	8.20

			Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
DF at defined percent of river flow allow	0%		46.0								
DF at defined percent of river flow allow	0%		76.0								
Receiving Water Data	Notes:		Annual								
Hardness, as mg/L $CaCO_3$		5th % at critical flows	Crit. Flows								
Temperature, °C	Temperature, °C	95th percentile	12								
pH, S.U.	pH, S.U.	95th percentile	8.1								

Pollutants of Concern			AMMONIA, default: cold water, fish early life stages present	LEAD - SEE Toxic BiOp	MANGANESE	NICKEL - SEE Toxic BiOp	PHENOL	SELENIUM, Lentic	TETRACHLORO ETHYLENE	TOLUENE	ZINC - SEE Toxic BiOp
Effluent Data	**Number of Samples in Data Set (n)**		59	1	1	1	1	1	1	1	1
	Coefficient of Variation (CV) = Std. Dev./Mean (default CV = 0.6)		0.3	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)		23,000	0.575	125	1.76	59	1.8	9.8	0.97	47.8
	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	7,900	210.	--	74.	-	290.	--	--	90.
	Aquatic Life Criteria, µg/L	Chronic	1,200	8.1	--	8.2	-	71.	--	--	81.
	Acute:chronic ratio		6.58	25.93	--	9.02	--	4.08	--	--	1.11
	Human Health Water and Organism, µg/L		--	-		-	-	-	-	-	-
	Human Health, Organism Only, µg/L		--	-	100.	4,600.	4,600,000.	11,000.	88.5	200,000.	69,000.
	Metals Criteria Translator, decimal (or default use Conversion Factor)	Acute		.951	--	.99	1.	.998	--	--	.946
		Chronic		.951	--	.99	1.	.998	--	--	.946
	Carcinogen (Y/N), Human Health Criteria Only		--	N	N	N	N	N	Y	N	N
Percent River Flow Default Value = **0%**	**Aquatic Life - Acute**	**1Q10**	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Aquatic Life - Chronic	7Q10 or 4B3		0%	0%	0%	0%	0%	0%	0%	0%
		30B3 or 30Q10/30Q5	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Human Health - Non-Carcinogen	Harmonic Mean		0%	0%	0%	0%	0%	0%	0%	0%
	Human Health - Carcinogen	Harmonic Mean		0%	0%	0%	0%	0%	0%	0%	0%
Calculated Dilution Factors (DF) (or enter Modeled DFs)	Aquatic Life - Acute	1Q10	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0
	Aquatic Life - Chronic	7Q10 or 4B3	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0
	Aquatic Life - Chronic Ammonia	30B3 or 30Q10/30Q5	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0
	Human Health - Non-Carcinogen	Harmonic Mean	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0
	Human Health - Carcinogen	Harmonic Mean	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0	87.0

Aquatic Life Reasonable Potential Analysis

σ	$\sigma^2=\ln(CV^2+1)$		0.294	0.555	0.555	0.555	0.555	0.555	0.555	0.555	0.555
P_n	$=(1\text{-confidence level})^{1/n}$, where confidence level =	**99%**	0.925	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Multiplier (TSD p. 57)	$=\exp(z\sigma-0.5\sigma^2)/\exp[\text{normsinv}(P_n)\sigma-0.5\sigma^2]$, where	**99%**	1.3	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2
Statistically projected critical discharge concentration (C_e)			29845	7.59	1649.61	23.23	778.62	23.75	129.33	12.80	630.81
Predicted max. conc.(ug/L) at Edge-of-Mixing Zone		Acute	649	0.16	35.86	0.50	16.93	0.52	2.81	0.28	12.97
(note: for metals, concentration as dissolved using conversion factor as translator)		Chronic	393	0.09	21.71	0.30	10.24	0.31	1.70	0.17	7.85
Reasonable Potential to exceed Aquatic Life Criteria			**NO**	**NO**	**NA**	**NO**	**--**	**NO**	**NA**	**NA**	**NO**

Aquatic Life Effluent Limit Calculations

Number of Compliance Samples Expected per month (n)			1	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)			--	--	--	--	--	--	--	--	--
LTA Coeff. Var. (CV), decimal	(Use CV of data set or default = 0.6)		--	--	--	--	--	--	--	--	--
Permit Limit Coeff. Var. (CV), decimal	(Use CV from data set or default = 0.6)		--	--	--	--	--	--	--	--	--
Acute WLA, ug/L	$C_d = (\text{Acute Criteria x } MZ_a) - C_u \text{ x } (MZ_a\text{-}1)$	Acute	--	--	--	--	--	--	--	--	--
Chronic WLA, ug/L	$C_d = (\text{Chronic Criteria x } MZ_c) - C_{u\,x}\,(MZ_c\text{-}1)$	Chronic	--	--	--	--	--	--	--	--	--
Long Term Ave (LTA), ug/L	WLAa x $\exp(0.5\sigma^2\text{-}z\sigma)$, Acute	**99%**	--	--	--	--	--	--	--	--	--
(99th % occurrence prob.)	WLAc x $\exp(0.5\sigma^2\text{-}z\sigma)$; ammonia n=30, Chronic	**99%**	--	--	--	--	--	--	--	--	--
Limiting LTA, ug/L	used as basis for limits calculation		--	--	--	--	--	--	--	--	--
Applicable Metals Criteria Translator (metals limits as total recoverable)				--	--	--	--	--	--	--	--
Average Monthly Limit (AML), ug/L	, where % occurrence prob =	**95%**	--	--	--	--	--	--	--	--	--
Maximum Daily Limit (MDL), ug/L	, where % occurrence prob =	**99%**	--	--	--	--	--	--	--	--	--
Average Monthly Limit (AML), mg/L			--	--	--	--	--	--	--	--	--
Maximum Daily Limit (MDL), mg/L			--	--	--	--	--	--	--	--	--
Average Monthly Limit (AML), lb/day			--	--	--	--	--	--	--	--	--
Maximum Daily Limit (MDL), lb/day			--	--	--	--	--	--	--	--	--

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
P_n	$=(1\text{-confidence level})^{1/n}$ where confidence level =	**95%**	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Multiplier	$=\exp(2.326\sigma\text{-}0.5\sigma^2)/\exp[\text{invnorm}(P_N)\sigma\text{-}0.5\sigma^2]$, prob. =	**50%**	2.490	2.490	2.490	2.490	2.490	2.490	2.490	2.490
Dilution Factor (for Human Health Criteria)			76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0
Max Conc. at edge of Chronic Zone, ug/L (C_d)			0.019	4.095	0.058	1.933	0.059	0.321	0.032	1.566
Reasonable Potential to exceed HH Water & Organism			**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**
Reasonable Potential to exceed HH Organism Only			**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**

WET Test Results

Table 17. Whole Effluent Toxicity Test Results

Test Date	Species and Test Type	NOEC (%)	LOEC (%)	EC50 (%)	IC25 (%)	TUc	TUa (TUc/10)
12-3-2002	Sand dollar egg fertilization	68	>68	>68	>68	1.47	0.15
11-18-2005	Sand dollar egg fertilization	3.3	>3.3	>3.3	>3.3	30.30	<3.03
9-18-2007	Sand dollar egg fertilization	3.3	>3.3	>3.3	>3.3	30.30	<3.03
11-18-2010	Urchin sperm fertilization	3.3	>3.3	>3.3	>3.3	30.3	<3.03
11-29-2012	Urchin sperm fertilization	1.6	3.3	>3.3	>3.3	62.5	6.25
11-2-2017	Echinoderm sperm-fertilization test	3.3	>3.3	>3.3	>3.3	30.3	<3.03
11-19-2020	Bivalve Survival and Development	3.3	>3.3	>3.3	>3.3	30.3	<3.03
10-29-2022	Bivalve Survival and Development	3.3	>3.3	>3.3	>3.3	30.3	<3.03

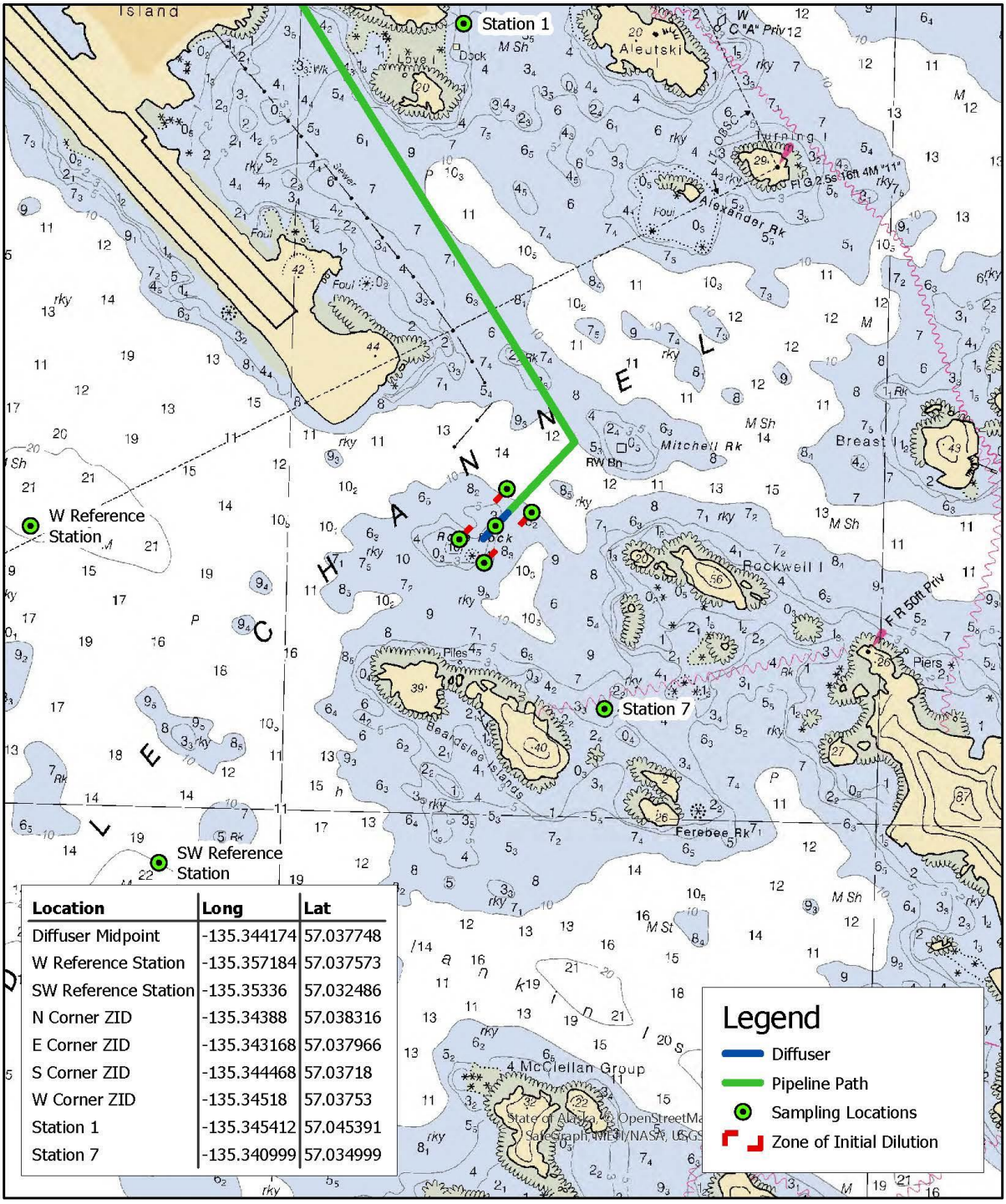
Appendix F. Effluent Limit Calculations for pH

Calculation of pH of a Mixture of Two Flows

Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Suppler

	Yr. Around Basis	
INPUT	**Min Limit**	**Max Limit**
1. Dilution Factor at Mixing Zone Boundary	**87.0**	**87.0**
2. Ambient/Upstream/Background Conditions		
Temperature (deg C):	8.40	12.00
pH:	8.10	8.10
Alkalinity (mg $CaCO_3$/L):	25.00	25.00
3. Effluent Characteristics		
Temperature (deg C):	22.00	5.00
pH:	**6.00**	**9.00**
Alkalinity (mg CaCO3/L):	25.00	25.00
4. Applicable Water Quality Standards	**6.50**	**8.50**
OUTPUT		
1. Ionization Constants		
Upstream/Background pKa:	6.48	6.45
Effluent pKa:	6.37	6.51
2. Ionization Fractions		
Upstream/Background Ionization Fraction:	0.98	0.98
Effluent Ionization Fraction:	0.30	1.00
3. Total Inorganic Carbon		
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	26	26
Effluent Total Inorganic Carbon (mg CaCO3/L):	83	25
4. Conditions at Mixing Zone Boundary		
Temperature (deg C):	8.56	11.92
Alkalinity (mg CaCO3/L):	25.00	25.00
Total Inorganic Carbon (mg CaCO3/L):	26.26	25.55
pKa:	6.48	6.45
RESULTS		
pH at Mixing Zone Boundary:	**7.77**	**8.10**
Reasonable Potential to contribute to excursion above	**NO**	**NO**

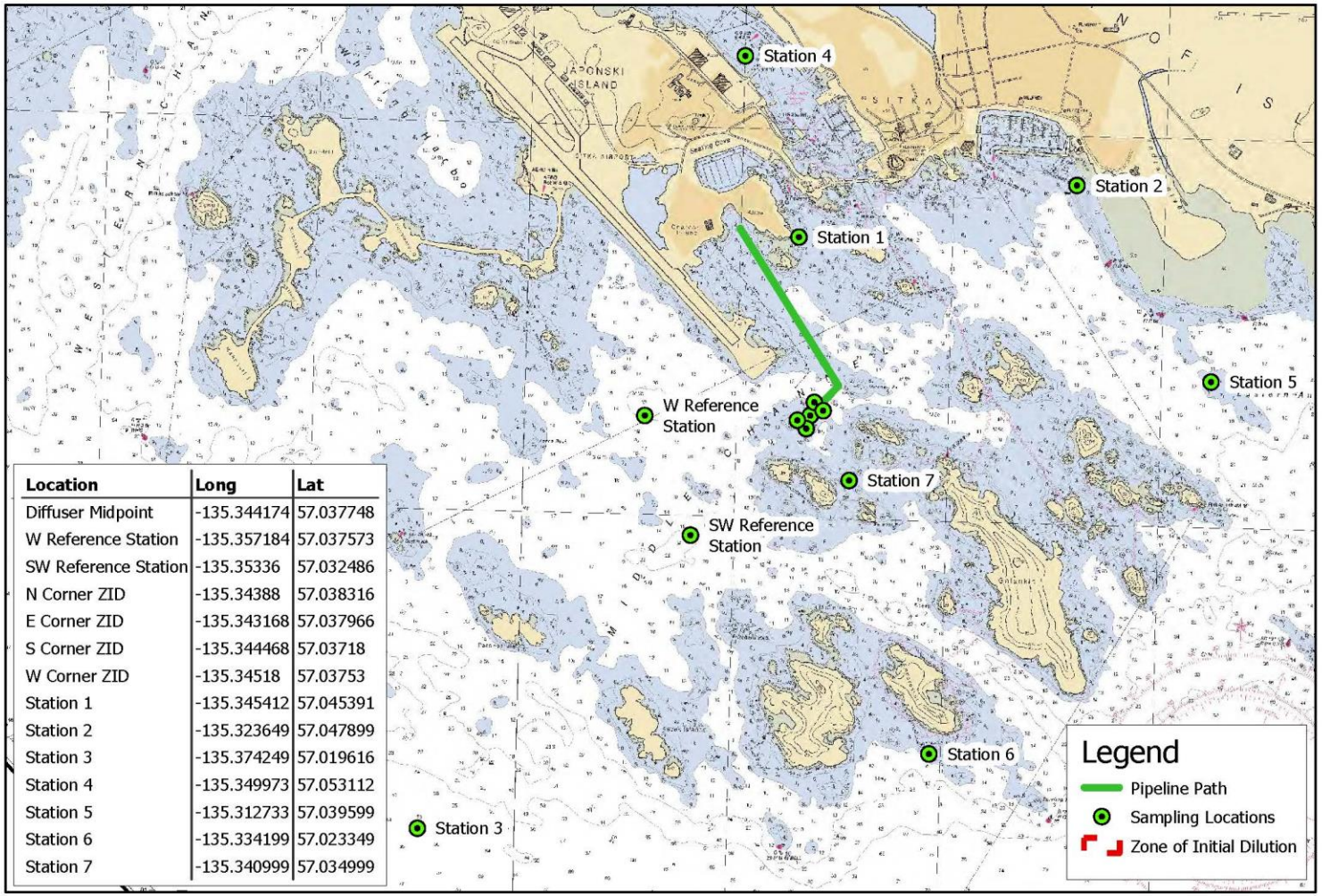
Appendix G. Receiving Water Sampling Locations



Location	Long	Lat
Diffuser Midpoint	-135.344174	57.037748
W Reference Station	-135.357184	57.037573
SW Reference Station	-135.35336	57.032486
N Corner ZID	-135.34388	57.038316
E Corner ZID	-135.343168	57.037966
S Corner ZID	-135.344468	57.03718
W Corner ZID	-135.34518	57.03753
Station 1	-135.345412	57.045391
Station 7	-135.340999	57.034999

Figure 1. Receiving Water Sampling Locations. City of Sitka Wastewater Treatment Plant. NPDES Permit No. AK0021474.

Figure 4. Outfall and Receiving Water Sampling Locations



Location	Long	Lat
Diffuser Midpoint	-135.344174	57.037748
W Reference Station	-135.357184	57.037573
SW Reference Station	-135.35336	57.032486
N Corner ZID	-135.34388	57.038316
E Corner ZID	-135.343168	57.037966
S Corner ZID	-135.344468	57.03718
W Corner ZID	-135.34518	57.03753
Station 1	-135.345412	57.045391
Station 2	-135.323649	57.047899
Station 3	-135.374249	57.019616
Station 4	-135.349973	57.053112
Station 5	-135.312733	57.039599
Station 6	-135.334199	57.023349
Station 7	-135.340999	57.034999

Figure 2. Receiving Water Sampling Locations. City of Sitka Wastewater Treatment Plant. NPDES Permit No. AK0021474.

Figure 5. Topographic Area Map of Receiving Water Sampling Locations

Appendix H.

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 City of Sitka Wastewater Treatment Facility (WWTF).

The activity is located at 57.038776º north latitude, 135.345059º west longitude, near Sitka, Alaska with discharges to Sitka 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. AK0021474 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 City of Sitka'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 City of Sitka's Antidegradation Form 2G and determined that the information provided by the City of Sitka 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. AK0021474 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 Sitka WWTF 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 Sitka 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 Sitka 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. AK0021474:

1. In accordance with 18 AAC 70.240, DEC authorizes mixing zones in Sitka Sound for copper, ammonia, dissolved oxygen, total residual chlorine, and whole effluent toxicity contained in the discharge from the Sitka WWTF. The mixing zones are defined as follows:

   The chronic mixing zone has a dilution of 76:1 and is defined as a rectangular area with a length of 63 meters and width of 25 meters centered over the diffuser with the length oriented perpendicular to the shoreline.

   The acute mixing zone has a dilution of 46:1 and is defined as a rectangular area with a length of 60 meters and width of 18 meters centered over the diffuser with the length oriented perpendicular 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 copper (acute 5.78 micrograms per liter (µg/L) total recoverable, chronic 3.73 µg/L total recoverable), ammonia (acute 4.0 milligrams per liter (mg/L), chronic 0.6 mg/L), 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), total residual chlorine (acute 0.013 mg/L, chronic 0.0075 mg/L with 0.1 mg/L compliance level), and whole effluent toxicity (1.0 chronic toxic units) are met at all points outside of the mixing zone.

2. In order for the Sitka WWTF 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 72.990(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 (copper, with a chronic dilution of 76:1), the permit contain the following final enterococcus bacteria limits:
   30-day Geometric Mean 2,660 colony forming unit (CFU)/100 mL
   Daily Maximum 9,880 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.

   These 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 Sitka WWTF 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 copper effluent limits:
   Average Monthly 110 µg/L (total recoverable)
   Daily Maximum 241 µg/L (total recoverable)

   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 copper to exceed water quality criteria. The results of the reasonable potential analysis indicated that copper with a maximum expected concentration of 239 µg/L total recoverable, has reasonable potential to exceed Alaska copper marine water quality criteria (chronic 3.7 µg/L total recoverable, acute 5.8 µg/L total recoverable). Effluent limits, using the dilution required to meet copper water quality criteria in the receiving water (chronic 46:1, acute 76:1) were therefore developed (average monthly 110 µg/L total recoverable, daily maximum 241 µg/L total recoverable). These effluent limits will ensure that the most stringent copper water quality criteria are met at all points outside the mixing zone.

6. DEC requires the following ammonia effluent limits:
   Average Monthly 35 mg/L
   Daily Maximum 53 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 ammonia to exceed water quality criteria. The results of the reasonable potential analysis indicated that ammonia with a maximum expected concentration of 33 mg/L, has reasonable potential to exceed Alaska ammonia marine water quality criteria (chronic 0.6 mg/L, acute 4.0 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 dilution required of the pollutant requiring the most dilution to meet water quality criteria in the receiving water (copper with dilutions of chronic 46:1, acute 76:1) were therefore developed (average monthly 35 mg/L, daily maximum 53 mg/L). These effluent limits will ensure that the most stringent ammonia water quality criteria are met at all points outside the mixing zone.

DRAFT	DRAFT
Signature	Date
DRAFT	DRAFT

Appendix I.

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: Sitka WW Treatment Facility **Permit Number**: AK0021474

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:

Middle Channel, Sitka Sound

Parameter of Concern:	Respective Concentrations:	Tier* Protection Level: *(*Note, complete this entry after completing the rest of the form)*
See Supplemental Attachment	See Supplemental Attachment	See Supplemental Attachment

Persistence:

See Supplemental Attachment

Potential Impacts:

See Supplemental Attachment

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
NA	☐	☐		☐	☐	☐	☐
	☐	☐		☐	☐	☐	☐

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**

   NA

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;

   See supplemental attachment

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

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.*

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)

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 and Borough of Sitka, Wastewater Treatment Plant	Shilo Williams	Environmental Superintendent

Phone:	Fax (optional):	Email:
907-747-4060	907-966-2257	shilo.williams@cityofsitka.org

Mailing Address:	Street (PO Box):		
	100 Alice Loop Rd.		
	City:	State:	Zip:
	Sitka	AK	99835

Shilo Williams
Signature/Responsible Official

3-29-2022
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	Sr. Engineer

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

Mailing Address: ☐ Check if same as Certifiers Information	Street (PO Box):		
	2525 C Street, Suite 500		
	City:	State:	Zip:
	Anchorage	AK	99503

Supplemental Attachment

Section 1-Facility Information

2. Parameters of Concern (POCs)

The POCs were determined through comparison of the maximum concentrations documented in Form 2A that was submitted in 2006 and concentrations found in the monthly DMRs from 2015 to 2021. Parameters that had maximum concentrations over the Alaska Water Quality Standards (AWQS) automatically were placed on the list as a POC. For parameters that were close to the AWQS but not over, they were placed in the ADEC's RPA tool to determine if the MEC would require a mixing zone. As described in the mixing zone Form 2-M and associated attachment, it is assumed that bacteria (fecal coliforms, enterococcus) will be substantially reduced from current levels due to ADEC's determination that its disinfection standards (18 AAC 72) will have to be met by the facility, which would be fecal coliform of 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.

The following are the POCs determined for the anti-degradation analysis:

Parameter: Ammonia
Respective Concentrations: 29 mg/L
Tier Protection Level: Tier 2
Persistence: Ammonia is a parameter typically found in domestic wastewater discharge and has been measured on a monthly basis as part of the current permit. The concentrations measured range from 2 mg/L to 29 mg/L.
Potential Impacts: The concentrations of ammonia that have been discharged to Sitka Sound have not been high concentrations that would cause concern for toxicity to aquatic life. No impacts have been linked to ammonia in the biological monitoring program that was last documented in 2018.

Parameter: Copper
Respective Concentrations: 122 µg/L
Tier Protection Level: Tier 2
Persistence: Copper concentrations are tested in the WWTP effluent on a monthly basis and has a wide range including concentrations over the AWQS. Detectable concentrations have been consistently found in the WWTP effluent during monthly sampling event. The 2015 toxic pollutant and pesticide testing measured copper at 38.3 µg/L and again in 2017 at 67.3 µg/L.
Potential Impacts: High copper concentrations can have impacts on aquatic organisms depending on the hardness of the waterbody. The higher the hardness, the higher the copper concentrations that aquatic organisms can withstand. Based on the 2015 and 2018 Biological Monitoring Reports there are no observations of impacts to aquatic organisms that could be related to higher copper concentrations.

Parameter: Silver
Respective Concentrations: 3.06 µg/L
Tier Protection Level: Tier 2

Persistence: Silver is not a required analyte to be sampled in the current permit. However, samples have been collected for permit renewal and silver concentrations were found. It is unknown if this is total or dissolved fraction. In the toxic pollutant and pesticide testing that occurred in 2015, silver was detected at 0.072 µg/L. The AWQS is for the dissolved fraction of silver and is hardness dependent.
Potential Impacts: Silver toxicity can occur in small aquatic invertebrates, most notably in the embryonic and larval stages. However, the toxicity is decreased with the presence of dissolve organic carbon and competing ions. Based on the 2015 and 2018 Biological Monitoring Reports there are no indications that there is an impact to marine aquatic life.

Parameter: Zinc
Respective Concentrations: 73.2 µg/L
Tier Protection Level: Tier 2
Persistence: Zinc is not typically sampled as part of the current permit. However, during the expanded effluent testing a maximum concentration of 73.2 mg/L occurred. During toxic pollutant and pesticide testing that occurred in 2015 zinc was 43.4 µg/L and at 65.2 µg/L in 2017.
Potential Impacts: Zinc toxicity to aquatic organisms is dependent on hardness concentrations. The higher the hardness the less toxic zinc concentrations will be. Based on the 2015 and 2018 Biological Monitoring Reports there are no known indications that there is currently an impact to aquatic life.

Parameter: Bacteria: Fecal Coliform and Enterococcus
Respective Concentrations: 998,303 cfu/100 mL fecal coliform (effluent data are not available for enterococcus)
Tier Protection Level:
Persistence: Fecal coliform is consistently being discharged from the WWTP with geometric means ranging from 9798 cfu/100 mL to 998,303 cfu/100 mL since 2015.
Potential Impacts: Fecal coliform is an indicator bacterium as it is commonly found in human and animal feces and is used to indicate the possible presence of disease-causing bacteria. Based on sampling conducted each year at the zone of initial dilution (ZID) fecal coliform concentrations are low and in many cases non-detected at the sampling locations. During the biological monitoring that occurred in 2015 and 2018, there were no indications of aquatic organisms that may potentially be impacted by bacteria.

Section 4-Tier 2 Protection Level and Analysis

It is the City and Borough of Sitka (CBS)'s understanding that fecal coliform concentrations will be addressed by Alaska Department of Environmental Conservation (ADEC) as a technology based effluent limitation (TBEL) through the use of disinfection as described in 18 AAC 72. The CBS will need to complete an analysis to determine the type of disinfection and the process it will institute for acquiring the necessary materials and chemicals in order to have the disinfection process meet the new permit limits (TBELs). It is the CBS's understanding that there will be a compliance schedule that will allow the WWTP to meet the new permit limits.

Ammonia, copper, silver, zinc and bacteria are parameters of concern. The only potential practicable alternative to further reduce POC concentrations in the effluent is treatment. The treatment alternatives

include corrosion control chemical addition, metals treatment, ammonia treatment, and disinfection at the WWTP.

Without further treatment, concentrations of ammonia, copper, silver, and zinc in the effluent are expected to be similar to historical values and are unlikely to impact the existing water quality of Sitka Sound. The continued us of a multi-port diffuser that will provide sufficient dilution to achieve water quality standards and avoid degradation beyond the mixing zone in the area. The TBELs for bacteria will reduce bacteria levels compared to current levels after implementation of disinfection, and the diffuser will provide that water quality standards for bacteria are met beyond the mixing zone.

3A. Identification of receiving water quality and accompanying environmental impacts on the receiving water for each of the practicable alternatives

A Receiving Waterbody Monitoring Program was instituted in 1983 with the first issuance of the Sitka WWTP discharge permit No. AK 0021474 which includes water quality analysis, mixing zone fecal coliform testing, WET testing, and Toxic Pollutants testing. Since 2015 water quality analysis has been conducted three times in 2015, 2018, and 2020. The mixing zone fecal coliform testing has been conducted from 2015-2019. Biological Monitoring has also occurred in 2015 and 2018. WET testing occurred in 2015 and 2017 along with toxic pollutant testing. Based on the monitoring program results, species diversity is similar across all observed stations from 1987 through 2018 and variations in habitat are unlikely occurring at least in part due to the operation of the diffuser.

The practicable alternative of additional treatment for the wastewater facility would include the addition of corrosion control chemical, metals treatment that includes enhanced clarification/filtration, ammonia treatment, and installation of chlorination equipment for disinfection. Impacts to the receiving waterbody for this alternative would include a decrease in the concentrations of ammonia, copper, silver, zinc, and fecal coliform entering the receiving waterbody. There may be the introduction of some total residual chlorine from the disinfection process, but this would be monitored and likely have a permit limit that the WWTP will need to meet.

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 WWTP include the cost of the chemicals, building improvements and/or construction required, land acquisition, and additional mechanical equipment and piping. The analysis and cost of treatment for each parameter is as follows:

Metals (Copper, Zinc, and Silver)

The City and Borough of Sitka (CBS) has limited background data on copper (or zinc or silver) in the drinking water and sanitary sewer systems. Reported copper concentrations in the distribution system come from the CBS's required lead and copper sampling (currently sample every three years). This data is the best available information but the limited nature of the sampling makes it difficult to develop strong correlations between detected copper concentrations leaving the distribution system and the

copper concentrations entering the wastewater. Corrosion of drinking water systems and plumbing has been established as one of the major contributors of metals to wastewater (Isaac et. al, 1997). In the case of Sitka, corrosion of copper, brass, bronze, and galvanized metals is likely to be the single largest contributor of metals as CBS lacks smelting, semiconductor, electroplating, paint manufacturing, large volume color printing, or wood preservative operations - industries that typically release large quantities of heavy metals into municipal sewer systems.

Results of the required water system lead and copper sampling from 2016 through 2020 indicate an average copper concentration in the water system ("at the tap") of approximately 400 µg/L. CBS does not currently sample for metals entering the wastewater treatment plant (WWTP). Effluent sampling as part of their current NPDES permit indicates effluent copper concentrations of approximately 53.2 µg/L in the WWTP effluent. Typically, a portion of influent copper, and other metals, is bound to solids and removed as sludge in the treatment process.

Cost for Corrosion Control in Drinking Water System

Prior to 2001, 35 of 40 Sitka households tested for the lead and copper sampling exceeded at least one action level of the lead and copper monitoring program. To reduce the corrosive nature of the drinking water, a sodium carbonate (soda ash) solution has been added since January 2001. Soda ash is added to the drinking water at the Corrosion Control Facility (CCF) located at 103 Jarvis Street. Soda ash slightly increases the pH and alkalinity of the treated water thereby reducing the leaching of lead and copper from private plumbing systems. This addition has been successful in reducing the number of lead and copper samples that exceed the action levels of these contaminants.

While soda ash addition is successful in keeping lead and copper levels below federal action levels for the Lead and Copper Rule, one potential additional 'treatment' option that may be employed on the drinking water system is the inclusion of corrosion control chemicals to minimize corrosion in the drinking water distribution system. The use of orthophosphates alone or blending with polyphosphates has been recommended by the United States Environmental Protection Agency (USEPA) for reducing lead and copper corrosion in plumbing systems for compliance with the federal Lead and Copper Rule.

For the purposes of this analysis, it is assumed the CBS could add a 100 percent orthophosphate solution, such as phosphoric acid, to assist in corrosion control in the water distribution system. However, to counteract the acid's pH depression, soda ash would likely need to be added to maintain the current water pH. It is likely that chemical addition for corrosion control would not provide enough reduction in metals alone to meet potential WWTP effluent limits and would need to be incorporated in conjunction with WWTP metals treatment processes to meet potential limits. Chemical addition for corrosion control is included as one potential approach if a multifaceted metals removal program should be required.

Table 1 provides a rough (conceptual level) order of magnitude opinion of probable cost for the development of corrosion control chemical feed systems at the WTP. It is assumed that a building addition or a separate building/structure would have to be constructed to house the treatment systems.

Table 1: Opinion of Probable Cost, Corrosion Control Chemical Addition

Item	Quantity	Units	Unit Cost	Cost
Chemical Addition Systems (Orthophosphate)	1	LS	$500,000	$500,000
WTP Building Improvements (Structure and Mech)	1,500	SF	$400	$600,000
Process Piping	1	LS	$150,000	$150,000
Ancillary Equipment	1	LS	$310,000	$310,000
Site Work (excavation, grading, etc.)	1	LS	$125,000	$125,000
	Subtotal			**$1,685,000**
	Contingency (25%)			$421,250
	Electrical, Instrumentation, and Control (20%)			$337,000
	Engineering and Construction Management (25%)			$421,250
	CBS Administration and Legal (5%)			$84,250
	Total			**$2,948,750**

Based on the current metals levels in the water distribution system, it is not known if corrosion control alone would reduce copper to a point where the CBS would meet potential marine criteria at end of pipe. Decreasing metals contributions from the drinking water system into the wastewater system could be part of a comprehensive approach to meeting the WWTP discharge permit requirements.

Cost for WWTP Improvements to Remove the Copper/Silver/Zinc

Another alternative considered for removing copper, silver, and zinc would be to add unit processes at the WWTP to target the removal of metals. The process for removing metals to the required level would likely involve chemical precipitation and removal of the particles with enhanced clarification or filtration.

Table 2 provides a rough order of magnitude (ROM) opinion of probable cost for the development of metals removal processes at the WWTP. 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. Currently the CBS is spending upwards of $1M to expand the permitted biosolids cell to accommodate future use. A further expansion of the cell would also have to be completed to house the increased volume of solids being produced due to metals treatment. **Note:** this conceptual cost analysis assumes that land adjacent to the existing WWTP could be acquired by the CBS to expand the existing facility. It is likely, however, that acquiring land in this area would be extremely costly, if available at all. The adjacent land is owned by the Alaska Department of Transportation for the Sitka Airport and may not be available for long term purchase. In the event that CBS would need to expand their WWTP facilities beyond their existing site, they would likely need to consider temporary treatment facilities while large scale modifications were made within the existing footprint of the WWTP or look to construct a new WWTP on a new property. Additionally, the increased

volume of solids would also have to either be shipped to the lower 48 due to the lack of the ability to store them on site or an even costlier more unreasonable disposal option (e.g., incineration). Either alternative would involve a complex permitting, design, and construction effort and would result in project costs well beyond the conceptual cost provided here. Additionally, the CBS recently completed approximately $10M in WWTP upgrades (electrical, mechanical, structural) that would potentially be sunk costs and would need to be considered in a more in-depth economic evaluation of alternatives if new facilities were required.

Table 2: Opinion of Probable Cost, WWTP Treatment Process to Remove Metals

Item	Quantity	Units	Unit Cost	Cost
WWTP Treatment Process (enhanced clarification/filtration)	1	LS	$3,500,000	$3,500,000
Additional Treatment Building (Structure and Mech)	1,800	SF	$400	$720,000
Land Acquisition	1	LS	$750,000	$750,000
Process Piping	1	LS	$300,000	$300,000
Ancillary Equipment	1	LS	$1,054,000	$1,054,000
Site Work (excavation, grading, etc.)	1	LS	$1,581,000	$1,581,000
	Subtotal			**$7,905,000**
	Contingency (25%)			$1,976,250
	Electrical, Instrumentation, and Control (20%)			$1,581,000
	Engineering and Construction Management (25%)			$1,976,250
	CBS Administration and Legal (5%)			$395,250
	Operations (new FTE in Utility Dept)			$190,000
	Total			**$14,024,000**

Cost for WWTP Improvements to Remove Ammonia

The existing Sitka WWTP is a primary treatment facility utilizing a typical primary clarification process to meet the discharge requirements of their NPDES permit/301h waiver. The plant generally includes influent pumping, influent screening, grit removal and screenings/grit handling, primary clarifiers, aerobic solids thickening, and solids dewatering and loading, and lab facilities/offices. In general, influent wastewater is pumped from an influent wetwell to influent bar screens and grit removal. From the screens the wastewater flows through three primary clarifiers. Solids from the clarifiers are pumped into an aerobic sludge thickener then into a dewatering press for disposal. Effluent from the primary clarifiers is discharged into Sitka Sound. The plant currently has a small on-site chlorine generation unit that is used periodically for odor control or to reduce the fecal coliform numbers slightly but it is not sized to fully disinfect the wastewater on a continual basis.

Potential ammonia limits that would be required without a mixing zone would be restrictive and the Sitka 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) facilities to recycle sludge from the clarifiers back to the reactor basins, and aerobic digestion for sludge stabilization. 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, gravity belt thickeners, and aerobic digestion. Additionally, further expansion of the permitted biosolid cell would have to be completed to house the increased volume of the biosolids be produced from the treatment process.

Table 3 provides a rough order of magnitude (ROM) opinion of probable cost for the development of ammonia removal processes at the WWTP. 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 and the expansion of the biosolid cell. Note the discussion above on the assumptions regarding land acquisition and expanded facilities and implications to the project cost and complexity.

Table 3: 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	$400	$2,080,000
Land Acquisition	1	LS	$1,000,000	$1,000,000
Misc Concrete and structures	1	LS	$860,000	$860,000
Site Work (excavation, grading, etc.)	1	LS	$2,150,000	$2,150,000
	Subtotal			**$17,660,000**
	Contingency (25%)			$4,415,000
	Electrical, Instrumentation, and Control (20%)			$3,532,000
	Engineering and Construction Management (25%)			$4,415,000

CBS Administration and Legal (5%)	$883,000
Operations (new FTEs in Utility Dept)	$380,000
Total	**$31,285,000**

Cost for WWTP Improvements to Disinfect

As previously stated, the existing Sitka WWTP has a small on-site chlorine generation unit that is used periodically for odor control or to reduce the fecal coliform numbers slightly but it is not sized to fully disinfect the wastewater on a continual basis. 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 Sitka WWTP. It is assumed that an ultraviolet (UV) disinfection system would not be a viable alternative based on the treated effluent from the existing primary clarifiers. 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 Sitka WWTP. Table 4 provides a rough order of magnitude (ROM) opinion of probable cost for the development of chlorine disinfection systems and assumes mini-bulk storage of hypochlorite at the facility (2 – 3,000 gallon chlorine tanks) and 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. Note the discussion above on the assumptions regarding land acquisition and expanded facilities and implications to the project cost and complexity.

Table 4: Opinion of Probable Cost, WWTP Treatment Process for Disinfection

Item	Quantity	Units	Unit Cost	Cost
New Equipment (Hypochlorite System)	1	LS	$1,100,000	$1,100,000
- Mini-bulk storage (2 - 3,000 gal tanks)				
- Hypochlorite Metering Pumps				
- Hypochlorite Transfer Pumps				
Process Piping	1	LS	$400,000	$400,000
New Building				
Additional Treatment Building (Structure and Mech)	1,800	SF	$400	$720,000
Land Acquisition	1	LS	$750,000	$750,000
Ancillary equipment/systems	1	LS	$300,000	$300,000
Misc Concrete (Chlorine Contact Basin)	1	LS	$600,000	$600,000
Site Work (excavation, grading, etc.)	1	LS	$450,000	$450,000
	Subtotal			**$4,320,000**
	Contingency (25%)			$1,080,000
	Electrical, Instrumentation, and Control (20%)			$864,000
	Engineering and Construction Management (25%)			$1,080,000
	CBS Administration and Legal (5%)			$216,000
	Operations (new FTEs in Utility Dept)			$285,000
	Total			**$7,560,000**

The rough order of magnitude opinions of probable cost for the development of treatment processes at the WWTP and development of corrosion control chemical feed systems for the water distribution system 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 ROM costs include capital costs of the conceptual 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 CBS. 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.

Overall, the only alternative for the WWTP is to further treat ammonia, zinc, copper, silver, and fecal coliform at a cost that would range from $50-$60 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 $7,570,000.

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

The one practicable alternative has been evaluated in the sections above. This is the only practicable alternative that can be considered for reducing ammonia, copper, silver, zinc, and fecal coliform in the effluent at the CBS WWTP. Overall costs to treat for the five parameters listed would range between $50 to $60 million. Adding the advanced treatment for metals would be very costly for CBS and would not be cost-effective alternative given that the CBS will continue to discharge metals concentrations that are comparable to historical values and continue to discharge via a multi-port diffuser. Cross-media or ancillary effects would include a likely increase in chemical (phosphorus, total residual chlorine, iron or aluminum-based precipitant) discharge from the WWTP and other effects associated with chemical manufacturing and shipping and an increase in energy consumption for heat and electrical needs in the facility.

4. Social and Economic Importance

Adequate wastewater treatment facilities are important factors in providing communities social and economic development growth opportunities. It is well understood that wastewater projects have paid dividends for people, the environment, and economies in the short and long-term. Investing in wastewater and other sanitation infrastructure is crucial to achieve public health and safety benefits, improve the environment, and enhance quality of life. Wastewater collection and treatment services are an essential part of preventing disease and protecting human health. While many communities in Alaska are awaiting first service water and sewer projects, the CBS has been providing wastewater treatment service at their existing WWTP since 1984 which has allowed for population and economic growth in the area.

The existing WWTP is permitted for a monthly average flow of 1.8 MGD and a daily maximum flow of 5.3 MGD. Over the period of 2015-2021, the average influent flows to the plant have been approximately 1 MGD and the max daily flow has been approximately 4 MGD. This suggests that the CBS will be able to operate under the existing permit without needing to request additional flow limits or expand the existing facility to accommodate additional growth/flow for a number of years. Also, as discussed in previous sections and based on the monitoring that has been performed in the receiving waters over the years of operation, the existing primary treatment facility has not adversely impacted aquatic life or the overall health of Sitka Sound.

A direct, positive impact of the WWTP includes employment of workers. The WWTP provides community services and associated infrastructure improvement for a number of residential units and commercial/industrial customers. Sitka also provides education and training to its staff and public tours of the treatment facilities. Together, these services foster cultural and recreational facilities on land and in the receiving waters.

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

In addition to the on-going expenses of operating a secondary or tertiary treatment facility, if the plant lost it's mixing zone the CBS would need hire additional operators with a higher certification level to operate the facility. As seen across the state, it can be extremely challenging for small communities to find and retain highly qualified operators to run more complex treatment facilities.