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:

United States Department of the Navy

Naval Radio Station Jim Creek

Public Comment Start Date: September 30, 2025

Public Comment Expiration Date: October 30, 2025

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THE EPA PROPOSES TO REISSUE THE NPDES PERMIT

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

This Fact Sheet (FS) includes:

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

CWA § 401 Certification

The EPA is requesting that the Washington State Department of Ecology (Ecology) provide a CWA Certification of the permit for this facility under CWA § 401. Comments regarding Ecology's intent to certify the permit should be directed to Amanda Gillen at amgi461@ecy.wa.gov.

Clean Water Act §401(a)(2) Review

CWA Section 401(a)(2) requires that, upon receipt of an application and 401 certification, the EPA must notify a neighboring State or Tribe with Treatment as a State when the EPA determines that the discharge may affect the quality of the neighboring jurisdiction's waters.

As stated above, Ecology is the certifying authority and is accepting comment regarding the intent to certify this permit. After the EPA receives final certification from Ecology, the EPA will determine whether the discharge may affect the quality of a neighboring jurisdiction's waters (33 U.S.C. § 1341(a)(2)).

Public Comment

Persons wishing to comment on, or request a Public Hearing for, the draft permit 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 below.

By the expiration date of the public comment period, all written comments and requests must be submitted to piscitelli.cody@epa.gov.

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

Documents are Available for Review

The draft NPDES permit, fact sheet and other information can be downloaded from the internet at https://www.epa.gov/npdes-permits/about-region-10s-npdes-permit-program.

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

For technical questions regarding the Fact Sheet, contact Cody Piscitelli at (206) 553-1169 or piscitelli.cody@epa.gov.

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ACRONYMS

1Q10	1 day, 10 year low flow
7Q10	7 day, 10 year low flow
7-DAD Max	Seven-Day Average of the Daily Maximum
°C	Degrees Celsius
CFR	Code of Federal Regulations
CV	Coefficient of Variation
CWA	Clean Water Act
DMR	Discharge Monitoring Report
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FR	Federal Register
Gpd	Gallons per day
HUC	Hydrologic Unit Code
ICIS	Integrated Compliance Information System
mg/L	Milligrams per liter
mL	Milliliters
µg/L	Micrograms per liter
mgd	Million gallons per day
MDL	Maximum Daily Limit or Method Detection Limit
NAVFAC	Naval Facilities Systems Engineering Command
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
QAP	Quality assurance plan
RP	Reasonable Potential
RPM	Reasonable Potential Multiplier
RWC	Receiving Water Concentration
s.u.	Standard Units
TMDL	Total Maximum Daily Load
TSD	Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001)
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WD	Water Division
WLA	Wasteload allocation

WQBEL	Water quality-based effluent limit
WQS	Water Quality Standards

I. Background Information

A. GENERAL INFORMATION

This fact sheet provides information on the draft National Pollutant Discharge Elimination System (NPDES) permit for the following entity:

Table 1. General Facility Information

NPDES Permit #:	WA0026573
Applicant:	United States Department of the Navy Naval Radio Station Jim Creek
Type of Ownership	Federal
Physical Address:	21027 Jim Creek Rd. Arlington, WA 98223
Mailing Address:	2000 W. Marine Drive Everett, WA 98207
Facility Contact:	Kaytee Villafranca Environmental Engineer kaytee.s.villafranca.civ@us.navy.mil (425) 304-3277
Facility Location:	48.203620°N, 121.916831°W
Receiving Water	Jim Creek
Facility Outfall	48.206266°N, 121.921519°W

B. PERMIT HISTORY

The most recent NPDES permit for the Naval Radio Station Jim Creek was issued on April 9, 2015, became effective on June 1, 2015, and expired on May 31, 2020. An NPDES permit application was submitted by the permittee on November 4, 2019. The EPA determined that the application was timely and complete. Therefore, pursuant to Title 40 Code of Federal Regulations (CFR) 122.6, the permit has been administratively continued and remains fully effective and enforceable. Since the State of Washington does not have authority to issue permits to federal facilities, the EPA is the permitting authority for this facility.

II. Facility Information

A. TREATMENT PLANT DESCRIPTION

1. General Facility Information

The Department of the Navy owns and operates the Naval Radio Station Jim Creek, which is permitted to discharge once-through non-contact cooling water from the radio station transmitter. Raw water from East Creek, West Creek, and an unnamed third creek is diverted to a settling basin before being stored in a 150,000-gallon above-ground storage tank. Cooling water flows from this tank by gravity to two heat exchangers within the transmitter building. Once inside the building, automatic valves regulate flow rate based on temperature inputs. Flow from the transmitter building continues to an infiltration pond built in 2016. Since the completion of this infiltration pond, the facility has not discharged via the outfall to waters of the United States. A project, scheduled to begin in 2030, will replace the current radio tubes system with solid-state electronics. Once this replacement is complete, the facility will no longer need cooling water from the creek and, thus, will no longer discharge effluent. Since the facility has not discharged since 2016, the EPA will consider terminating the permit pursuant to 40 CFR 122.64(a)(4) if the facility does not discharge during this next permit cycle.

B. OUTFALL DESCRIPTION

Non-contact cooling water with a waste heat component is discharged to the west of the Transmitter Building and is combined with any stormwater from roof and area drains and with the Transmitter Building footing drains. Flow is to a 480-foot concrete 18-inch pipe then to a rip-rap lined infiltration channel followed by a natural bioswale. The discharge then continues to the Flats Road Area for infiltration. Small springs from the hillside combine with the wastewater before any water that does not infiltrate is discharged through Outfall 067 to Jim Creek (See Appendix A, Site Map). As previously stated, the facility has not discharged through Outfall 067 since 2016 when construction of the infiltration basin was completed.

C. COOLING WATER INTAKE STRUCTURES

The intake cooling water used by the facility comes from streams on Blue Mountain which flow into three catchment basins. The 2-inch diameter intake pipes from the catchment basins contain screens to mitigate impingement and entrapment of fish and other animals. These pipes then flow cooling water into a 150,000-gallon aboveground storage tank. The flow rate into the storage tank is approximately 300 gallons per minute (0.432 mgd).

D. EFFLUENT CHARACTERIZATION

Because the facility has not discharged since the construction of the infiltration pond in 2016, there are no discharge monitoring report (DMR) data. The facility did discharge out of Outfall 067 on one occasion after the issuance of the current permit, which included a single effluent temperature sample of 10.9℃ on February 29, 2016. However, the most representative available effluent data are from the 2019 permit application. The effluent quality is summarized in Table 2.

Table 2. Effluent Characterization

Parameter	Number of Samples	Maximum Daily Discharge		Average Daily Discharge	
		Mass	Concentration	Mass	Concentration
Biochemical Oxygen Demand (BOD_5)	1	N/A	2.2 mg/L	0.003 lbs/day	2.2 mg/L
Total Suspended Solids (TSS)	1	N/A	< 1 mg/L	N/A	< 1 mg/L
Oil and Grease	1	N/A	< 5 mg/L	N/A	<5 mg/L
Ammonia (as N)	1	N/A	< 0.04 mg/L	N/A	< 0.04 mg/L
Discharge Flow	5	0.000376 mgd			
pH (range)	3	7.57 – 7.94 S.U.			
Temperature (winter)	5	11.0 ℃			
Chemical Oxygen Demand (COD)	1	N/A	< 10 mg/L	N/A	< 10 mg/L
Total Organic Carbon	1	N/A	1.43 mg/L	0.002 lbs/day	1.43 mg/L
Source: Reapplication Forms 1 and 2E submitted on November 4, 2019. Analyses completed by Analytical Resources, Incorporated on March 29, 2019.					

E. COMPLIANCE HISTORY

Overall, the facility has had a good compliance record. The EPA conducted an inspection of the facility on September 20, 2016. The inspection was done prior to the construction of the infiltration basin and noted two areas of concern. The first area of concern included an unpermitted, unmonitored discharge from another outfall not covered by the permit. This was described as trickling and has since been addressed by the infiltration basin. The other concern identified in the inspection report was missing continuous temperature monitoring for the month of March 2016. This was attributed to the monitoring equipment being sensitive to sunlight and radio waves, which may have corrupted the data download in the field. The inspection report noted that the permittee now downloads the data in a shaded area. The facility has not discharged since the infiltration basin was constructed 2016, and therefore has had no compliance issues since the infiltration basin became operational.

III. RECEIVING WATER

In drafting permit conditions, the EPA must analyze the effect of the facility’s discharge on the receiving water. The details of that analysis are provided in the Water Quality-Based Effluent Limits (WQBEL) section in IV.A.3. This section summarizes characteristics of the receiving water that impact that analysis.

This facility discharges to Jim Creek, a tributary of the Stillaguamish River. The outfall is located upstream of the City of Arlington, Washington.

A. WATER QUALITY STANDARDS

CWA § 301(b)(1)(C) requires the development of limitations in permits necessary to meet Water Quality Standards (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.

WAC 173-201A-602 (Table 602) describes designated uses for surface waters of the State of Washington and establishes designated uses for Jim Creek within the area above its confluence with Little Jim Creek but does not establish specific uses within the Naval boundaries below the confluence. In accordance with WAC 173-201A-600(1), all surface waters of the State not named in Table 602 are to be protected for salmonid spawning, rearing, and migration; primary contact recreation; domestic, industrial, and agricultural supply; stock watering; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values.

B. RECEIVING WATER QUALITY

Water quality data for the receiving water are largely unavailable. Because the facility was not required to monitor the receiving water, a receiving water monitoring report does not exist. Ecology operated a stream monitoring station (station #05G070) that sampled daily for temperature and flow on Jim Creek between 2004 and 2013, however, this station is approximately 10 miles downstream, with approximately 13 stream confluences between it and the facility's outfall, making these data non-representative.

1. Water Quality Limited Waters

The State of Washington's 2018 Integrated Report Section 5 (CWA § 303(d)) lists the section of Jim Creek near the facility's outfall as impaired for temperature.

In March 2004, Ecology published the Stillaguamish River Watershed Temperature Total Maximum Daily Load which includes Jim Creek. It was approved by the EPA in July 2006.

See Section IV.A for discussion of the previous temperature effluent limit.

2. Low Flow Conditions

Because representative receiving water data are not available, actual low flow statistics could not be calculated. However, using the United States Geological Survey's StreamStats tool, a 7-day 10-year low flow in Jim Creek is estimated to be 5.57 ft^3/s or 3.60 mgd.

IV. Effluent Limitations and Monitoring

1. Changes Relative to Prior Permit

- The replacement of the temperature WQBEL of 18.3℃ with a technology-based effluent limit (TBEL) of 16.0℃. See Section IV.A.2.

Table 3. Existing Permit - Effluent Limits and Monitoring Requirements

Table 3, below, presents the existing effluent limits and monitoring requirements in the current permit.

Parameter	Units	Effluent Limitations	Monitoring Requirements		
		7-DAD Max	Sample Location	Sample Frequency	Sample Type
Temperature	℃	18.3	Effluent	Continuous	Recording
Flow	GPD	--	Effluent	Continuous	Recording

Table 4. Draft Permit - Effluent Limits and Monitoring Requirements

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

Parameter	Units	Effluent Limitations	Monitoring Requirements		
		7-DAD Max	Sample Location	Sample Frequency	Sample Type
Temperature	℃	16.0	Effluent	Continuous	Recording
Flow	GPD	--	Effluent	Continuous	Recording

A. BASIS FOR EFFLUENT LIMITS AND MONITORING REQUIREMENTS

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

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

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.

1. Pollutants of Concern

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

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

The facility's effluent discharges to an infiltration pond in the Flats Road area. Once the effluent reaches the infiltration pond, it infiltrates to ground. Effluent that remains is naturally cooled to background temperatures; however, as previously stated, the facility has not discharged since the infiltration pond was constructed. This treatment system is described in Part II.A.1 and in Appendix A.

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

- Temperature

2. Technology-Based Effluent Limits (TBELs)

a. Federal Secondary Treatment Effluent Limits

Because the Jim Creek Naval Radio Station does not fit into an industrial category for which the EPA has developed technology-based effluent limitation guidelines (ELGs), the EPA may use best professional judgment (BPJ) to establish technology-based effluent limits, pursuant to CWA sections 301(b)(2) and 402(a)(1)(B), and in accordance with requirements established at 40 CFR Part 125.

During the previous permit issuance, the EPA noted that the facility had completed an All Known, Available, and Reasonable Methods of Prevention, Control and Treatment (AKART) study which was required by the 2009 permit. As explained in the 2015 fact sheet, the conclusion of the AKART study was that it appeared that 16°C is achievable. At that time, the EPA decided not to establish 16°C as a technology-based effluent because the facility had just installed the infiltration basin and it was unclear how much infiltration would occur. The EPA did state that during permit reissuance it would reconsider whether to establish a technology-based effluent limit of 16°C. As stated above, since the installation of the infiltration basin, the facility has not discharged and it does not appear that discharge will occur in the future. As discussed below, the EPA is using BPJ to establish a 16℃ technology-based limit in this permit.

Under 40 CFR § 125.3(c), technology-based treatment requirements may be imposed on a case-by-case basis where the EPA has not promulgated ELGs for the specific pollutant. The permit writer must apply the factors set forth in 40 CFR § 125.3(d)(3) which includes the consideration of appropriate technology for the category or class of point sources that the applicant is a member, based upon all available information, and any unique factors relating to the applicant. In setting best professional judgement (BPJ) case-by-case limitations based on best available technology (BAT) pursuant to § 125.3(c), the EPA considered the following factors:

(i) The age of equipment and facilities involved;

(ii) The process employed;

(iii) The engineering aspects of various types of control techniques;

(iv) Process changes;

(v) The cost of achieving such effluent reduction; and

(vi) Non-water quality environmental impact (including energy requirements).

A discussion of each of the factors is presented below.

The age of equipment and facilities

The EPA conducted site visits and inspections, as well as gathered additional information from the Navy regarding the age of equipment and facilities. See Part II.A for more information. The EPA concluded the age of equipment and facilities are not a barrier to achieving a 16℃ effluent limit.

The process employed

The process used to reduce temperature prior to discharge, described in Part II.A.1, includes a system that nearly eliminates any process water from reaching the outfall. Any water that does not percolate to groundwater prior to the outfall will almost entirely reach background temperatures due to slow flow through surface channels and basins. Because this treatment system does not need modification to reach this limit, the process employed is not a barrier.

The engineering aspects of various types of control techniques

Since the AKART study, three of the twelve technologies identified have been implemented. These include the construction of the infiltration basin in fall 2016, increase contact cooling capacity and upgrades to Catchment 93 (using more cooling water to reduce temperatures), and ground surface discharge to the Flats Road area. Since the implementation of these control techniques, the facility has not discharged and is not expected to discharge in the future. As stated above, due to the slow flow through surface channels and basins, it is expected that the facility will be able to achieve the 16°C effluent limit. Therefore, no further engineering changes are required to meet this limit.

Process Changes

Because the technologies required to achieve the 16°C effluent limit have already been implemented, no process changes are required. However, the facility currently plans on installing a new electronics system around the year 2030 which will eliminate the need for external cooling water. As such, it is expected that any potential for discharge will be eliminated with that project.

The cost of achieving such effluent reduction

As previously stated, the facility can already meet the 16°C effluent limit. Thus, no further costs associated with achieving this limit will be incurred.

Non-water quality environmental impact, including energy requirements

The EPA does not anticipate any significant non-water quality environmental related impacts given that the treatment needed to meet this effluent limit has already been installed at the facility.

3. Water Quality-Based Effluent Limits (WQBELs)

a. Statutory and Regulatory Basis

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

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that WQS are met and must be consistent with any available wasteload allocation for the discharge in an approved TMDL. If there are no approved TMDLs that specify wasteload allocations for this discharge; all of the WQBELs are calculated directly from the applicable WQS.

b. Reasonable Potential Analysis and Need for WQBELs

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

As discussed in Part IV.A.1, the pollutant of concern in the discharge is temperature. This parameter is summarized in Part IV.A.3.b and the equations used to conduct the reasonable potential analysis and calculate the WQBELs are provided in Appendix D. The relevant water quality standards are shown in Table 5, below.

Table 5. Applicable Water Quality Standards

Pollutant	Designated Use	Criteria
Temperature	Core summer salmonid habitat	16℃ Seven-Day Average of the Daily Maximum (7-DADMax) WAC 173-201A-200 (1) (c)

Temperature

As previously stated, the Jim Creek Naval Radio Station facility was never assigned a WLA in the TMDL. Thus, per Ecology's interpretation, the 2015 permit established a temperature WQBEL of 18.3℃ which was based on the Stillaguamish River TMDL's WLA for the Indian Ridge Corrections Facility that discharges to the Stillaguamish River. Since the proposed TBEL of 16.0℃ is more stringent than the existing WQBEL, the EPA has replaced the WQBEL with the proposed TBEL. As previously stated, if the facility does not discharge over the next permit cycle, the EPA will determine whether it is appropriate to terminate the permit pursuant to 40 CFR § 122.64(a)(4).

BOD, TSS, ammonia, and pH

In the 2019 application, the permittee included sampling data for BOD, TSS, ammonia, and pH, which are summarized in Table 2. Because the facility only discharges non-contact cooling water, these are not pollutants of concern and are therefore not assessed as such. No limits or monitoring is proposed for these parameters.

c. Antibacksliding

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

There is no backsliding in this permit.

4. Monitoring Requirements for Renewal

The permit also requires the permittee to perform effluent monitoring required by the NPDES Forms 1 and 2E application, so that these data will be available when the permittee applies for a renewal of its NPDES permit.

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

5. Cooling Water Intake Structures (CWIS) and CWA 316(b) Compliance

Section 316(b) of the CWA requires that facilities with CWIS ensure that the location, design, construction, and capacity of the structure reflect the best technology available (BTA) to minimize adverse impacts on the environment from impingement and entrainment of fish and other aquatic organisms. The 2014 Section 316(b) existing facilities rule states that the substantive provisions of the rule apply to any facility that is 1) a point source 2) with a cooling water intake structure with a design intake flow greater than 2 mgd, 3) using 25 percent of the withdrawn water for cooling. 40 C.F.R. § 125.91(a). The CWIS at the facility do not have a design intake flow greater than 2 mgd, thus, the substantive provisions of the existing facilities rule does not apply to this facility. However, 40 CFR § 125.90(b) states that CWIS not subject to the existing facilities rule must "meet requirements under section 316(b) of the CWA established by [the EPA] on a case-by-base, best professional judgment…basis." Since the facility plans to install new technologies by the year 2030 that will not require the use of the CWIS, the EPA has determined that additional BPJ-based requirements are not necessary at this time. If the facility does not install the new technology as anticipated and the CWIS continues to be utilized at the time of the next permit issuance, the EPA will re-evaluate whether additional BPJ-based requirements are necessary for the CWIS.

B. 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.

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

V. OTHER PERMIT CONDITIONS

A. QUALITY ASSURANCE PLAN

The Department of the Navy 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 the EPA and the Ecology upon request.

B. OPERATION AND MAINTENANCE PLAN

The permit requires the Department of the Navy 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 of the effective date of the permit. The plan must be retained on site and made available to the EPA and Ecology upon request.

C. STANDARD PERMIT PROVISIONS

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

VI. OTHER LEGAL REQUIREMENTS

A. ENDANGERED SPECIES ACT

The Endangered Species Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and 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 Washington finds that the gray wolf, yellow-billed cuckoo, marbled murrelet, steelhead, chinook salmon, and bull trout are threatened species found within the area. According to USFWS's Information for Planning and Conservation and the NOAA Essential Fish Habitat Mapper tools, the area of and immediately downstream of the discharge from Outfall 67 is a designated critical habitat for bull trout. A complete review of species and effect determinations is listed in Appendix D, Part 1.

B. ESSENTIAL FISH HABITAT

Essential fish habitat (EFH) is the waters and substrate (sediments, etc.) necessary for fish to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires the EPA to consult with NOAA Fisheries when a proposed discharge has the potential to adversely affect EFH (i.e., reduce quality and/or quantity of EFH). A review of the Essential Fish Habitat documents shows that Jim Creek is an EFH for fall-run chinook and coho salmon.

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. The EPA has prepared an EFH assessment which appears in Appendix D.

The EPA has determined that issuance of this permit will have no effect on the EFH in the vicinity of the discharge.

C. CWA § 401 CERTIFICATION

CWA § 401 requires the EPA to seek certification before issuing a final permit. As a result of the certification, Ecology 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.

D. PERMIT EXPIRATION

The permit will expire five years from the effective date.

VII. References

Alabaster, J. S. (1988). The dissolved oxygen requirements of upstream migrant chinook salmon, Oncorhynchus tshawytscha, in the lower Willamette River, Oregon. *Journal of Fish Biology*, *32*(4), 635-636.

Brett, J. R. (1952). Temperature tolerance in young Pacific salmon, genus Oncorhynchus. *Journal of the Fisheries Board of Canada*, *9*(6), 265-323.

Burrows, R. E. (1972). Salmonid husbandry techniques. *Fish nutrition*, 375-402.

Ebel, W. J. (1971). *Dissolved nitrogen concentrations in the Columbia and Snake rivers in 1970 and their effect on Chinook salmon and steelhead trout* (Vol. 646). National Marine Fisheries Service.

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.

EPA. 2003. *EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards*. U.S. Environmental Protection Agency Region 10, Office of Water.
https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P1004IUI.TXT

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

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

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

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

Fujioka, J. T. (1970). *Possible effects of low dissolved oxygen content in the Duwamish River estuary on migrating adult chinook salmon* (Doctoral dissertation, University of Washington).

Jeffres, C. A., J. J. Opperman, and P. B. Moyle. 2008. *Ephemeral floodplain habitats provide best growth conditions for juvenile Chinook salmon in a California river*. Environmental Biology of Fish. 83(4):449-458

NAVFAC. May 2011, *All Known, Available, and Reasonable Methods of Prevention, Control, and Treatment Study, Naval Radio Station Jim Creek Arlington, Washington,* Naval Facilities Engineering Command

NAVFAC, September 2011, *Cooling Water Infiltration Water, Naval Radio Station Jim Creek Arlington, Washington,* Naval Facilities Engineering Command

National Marine Fisheries Service (NMFS). 2017. *2016 5-Year Review : Summary & Evaluation of Puget Sound Chinook Salmon Hood Canal Summer-run Chum Salmon Puget Sound Steelhead.* West Coast Regional Office, National Marine Fisheries Service, National Oceanic and Atmospheric Administration

National Marine Fisheries Service (NMFS). December 2019, *ESA Recovery Plan for the Puget Sound Steelhead Distinct Population Segment (Oncorhynchus mykiss),* West Coast Regional Office, National Marine Fisheries Service, National Oceanic and Atmospheric Administration https://www.fisheries.noaa.gov/resource/document/esa-recovery-plan-puget-sound-steelhead-distinct-population-segment-oncorhynchus

NWIFC (Northwest Indian Fisheries Commission). 2016. State of Our Watersheds – A Report by the Treaty Tribes in Western Washington. http://nwifc.org/publications/state-of-our-watersheds/

Reiser, D. W., & Bjornn, T. C. (1979). Influence of forest and rangeland management on anadromous fish habitat in Western North America: habitat requirements of anadromous salmonids. *Gen. Tech. Rep. PNW-GTR-096. Portland, OR: US Department of Agriculture, Forest Service, Pacific Northwest Research Station: 1-54*, *96*.

U.S. Fish and Wildlife Service (USFWS). 2010. *Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for Bull Trout in the Coterminous United States*. January 14, 2010. 75 FR 2270 https://www.federalregister.gov/documents/2010/01/14/2010-176/endangered-and-threatened-wildlife-and-plants-revised-designation-of-critical-habitat-for-bull-trout

U.S. Fish and Wildlife Service (USFWS). 2019(a). *Fish Species Presence and Distribution Surveys at Naval Radio Station (T) Jim Creek*. U.S. Fish & Wildlife Service Western Washington Fish & Wildlife Conservation Office, Lacey, Washington https://pacific.navfac.navy.mil/Portals/72/Northwest/Documents/FINAL%20USFWS%20Jim%20Creek%20%20Fish%20Surveys%2010-16-19.pdf

U.S. Fish and Wildlife Service (USFWS). 2019(b). *NMFS 4(d) Rule Determination for WDFW and Tulalip Tribes Salmon Hatchery Operations in the Snohomish River*

Watershed. U.S. Fish and Wildlife Service Washington Fish and Wildlife Office Lacey, Washington https://wdfw.wa.gov/sites/default/files/hgmp-esa-documents/ESA%20Requirements/Snohomish%20River/Snohomish%20River%20USFWS%20Biological%20Opinion.pdf

U.S. Fish and Wildlife Service (USFWS). 2021. *Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Western Distinct Population Segment of the Yellow- Billed Cuckoo*. April 21, 2021. 86 FR 20798 21005. https://www.govinfo.gov/link/fr/86/20798?link-type=pdf

U.S. Fish and Wildlife Service (USFWS). 2023(a). *Species Status Assessment for the Gray Wolf (Canis lupus) in the Western United States.* Version 1.2. Lakewood, Colorado. 362 pp. https://ecos.fws.gov/ServCat/DownloadFile/245127

U.S. Fish and Wildlife Service (USFWS). 2023(b*). Recovery Outline for the Contiguous United States Distinct Population Segment of the North American Wolverine (Gulo gulo luscus).* Portland, Oregon. 12 pp. https://ecos.fws.gov/docs/recovery_plan/NA_Wolverine_Recovery_Outline_Wolverine_20231221_signed.pdf

U.S. Fish and Wildlife Service (USFWS). 2024(a). Bull Trout (Salvelinus confluentus) 5 Year Status Review: Summary and Evaluation. https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/19548.pdf

U.S. Fish and Wildlife Service (USFWS). 2024(b). *Marbled Murrelet (Brachyramphus marmoratus) 5-Year Review.* U.S. Fish and Wildlife Service Washington Fish and Wildlife Office Lacey, WA https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/18327.pdf

Whitmore, C. M., Warren, C. E., & Doudoroff, P. (1960). Avoidance reactions of salmonid and centrarchid fishes to low oxygen concentrations. *Transactions of the American Fisheries Society*, *89*(1), 17-26.

Appendix A. Facility Information

Figure 1. The Jim Creek Naval Radio Station transmitter building and outfall location in relation to Jim Creek.

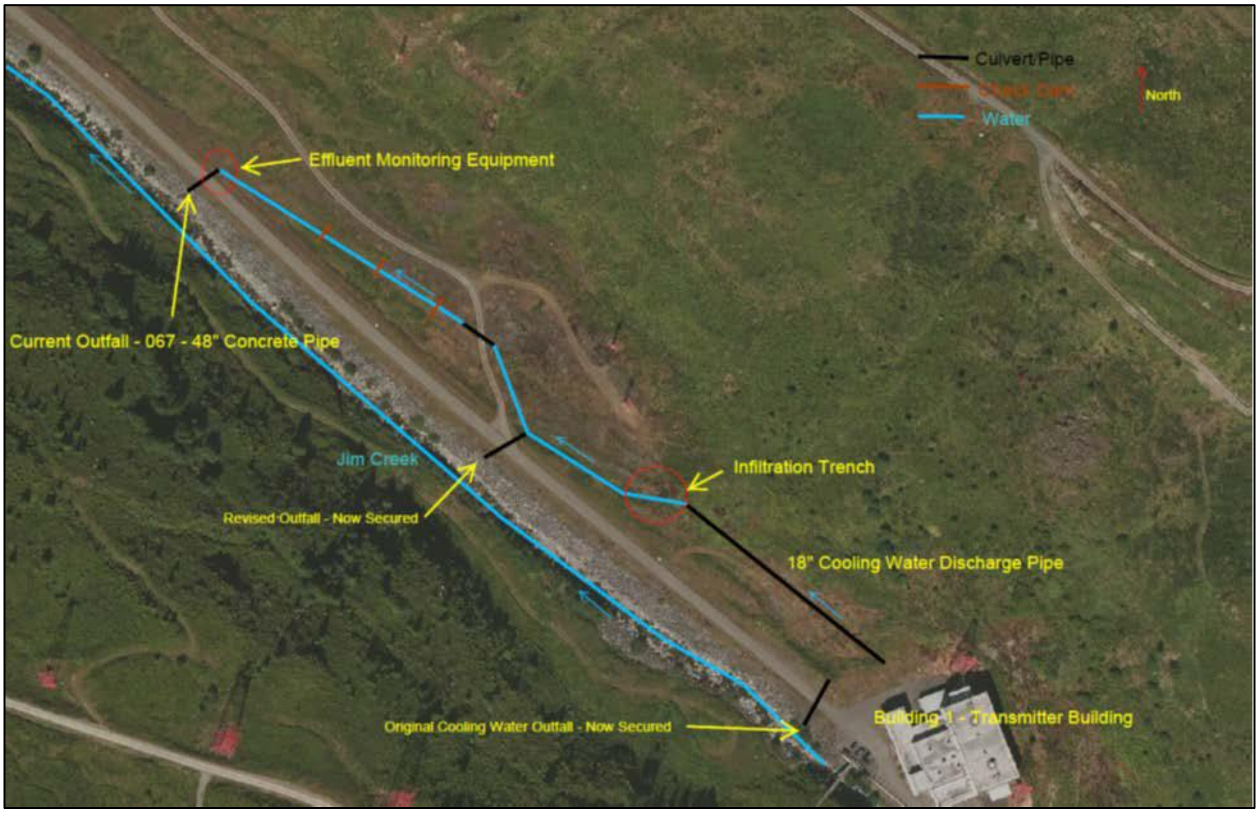

Figure 2. The water flow process through the non-contact transmitter cooling system upstream of the infiltration trench, basin, and outfall.

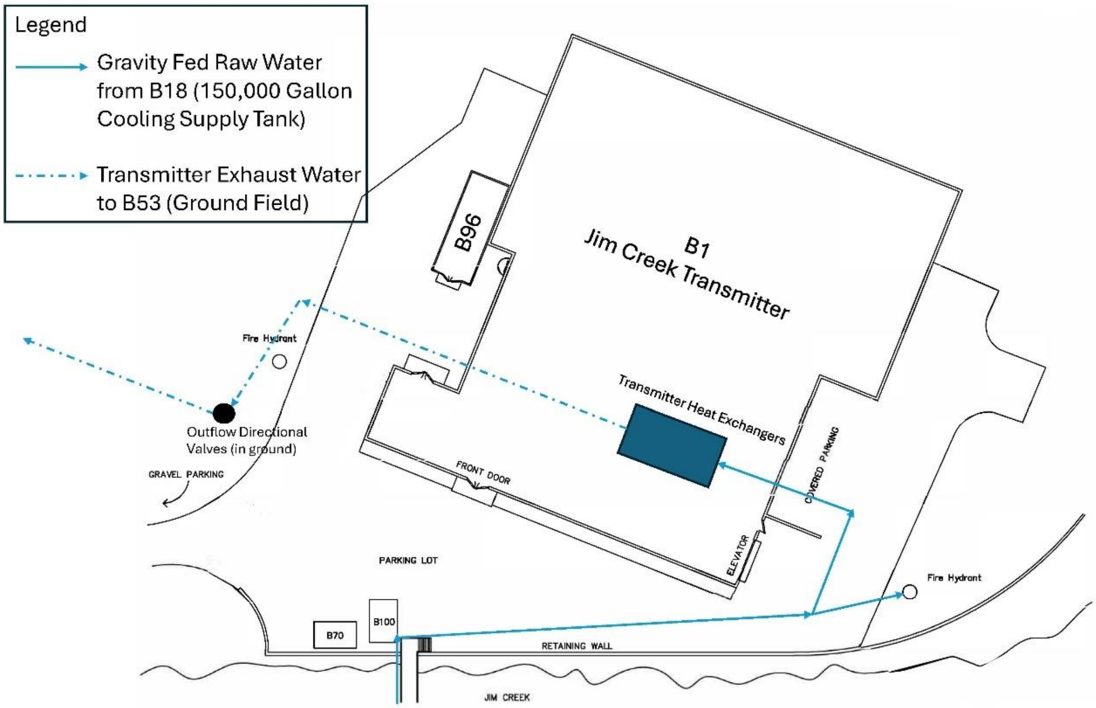

Figure 3. Southeasterly view of the new infiltration pond installed upstream of Outfall 067.

Appendix B. Water Quality Data

Treatment Plant Effluent and Receiving Water Data

As stated in Section II.D, there was only one instance of discharge since the issuance of the 2015 permit. Because the facility has not discharged since the 2016 construction of the infiltration basin, no effluent or receiving water data are available

Appendix C. Reasonable Potential and WQBEL Formulae

A. Reasonable Potential Analysis

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

1. Mass Balance

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

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

where,

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

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

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

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

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

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

Where:

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

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

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

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

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

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

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

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

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

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

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

2. Maximum Projected Effluent Concentration

When determining the projected receiving water concentration downstream of the effluent discharge, the EPA's Technical Support Document for Water Quality-based Toxics Control (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 cumul distribution function at a given percentile)

CV = coefficient of variation (standard deviation ÷ mean)

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

$$C_e = (RPM)(MRC)$$ *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:

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

Washington'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, the 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. The criteria translator (CT) is equal to the conversion factor, because site-specific translators are not available for this discharge.

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

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

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

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

where,

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

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

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

where,

$$\sigma_{30}^2 = \ln(CV^2/30 + 1)$$

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:

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

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

where σ, and σ^2 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 D. Endangered Species Act

1. Endangered Species Act

The Endangered Species Act (ESA) requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and 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 Idaho finds that bull trout (*Salvelinus confluentus*), Steelhead (*Oncorhynchus mykiss*), Chinook salmon (*Oncorhynchus tshawytscha*), the gray wolf (*Canis lupis*), the Yellow-billed Cuckoo (*Coccyzus americanus*) and the Marbled Murrelet (*Brachyramphus marmoratus*) are threatened and have the potential to be impacted by the discharge of the facility.

<u>Bull Trout (*Salvelinus confluentus*) (threatened)</u>

Background and Species Description

Bull trout are a char species of fish, a subgroup within the salmonid family. They are found native throughout the Pacific Northwest, Alaska, and Canada in waters with the following habitat conditions: cold, clean, complex, and connected. Due to these habitat requirements, bull trout are commonly found in high mountainous areas where the water is fed via snowmelt or glacial runoff. Within water systems, they will mainly be found inhabiting deep pools of large and cold rivers or lakes, where riparian habitats are intact, migration corridors are accessible, and conditions allow for both adult spawning and juvenile rearing. (USFWS 2024(a))

Compared to other salmonids, bull trout have more specific habitat requirements that appear to influence their distribution and abundance. They need cold water to survive, so they are seldom found in waters where temperatures exceed 59 to 64 degrees (F) (15 to 17.8 ℃). They also require stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors. Bull trout may be distinguished from brook trout (Salvelinus fontinalis) by several characteristics: spots never appear on the dorsal (back) fin, and the spots that rest on the fish's olive green to bronze back are pale yellow, orange or salmon colored. The bull trout's tail is not deeply forked as is the case with lake trout (Salvelinus namaycush). (USFWS 2024(a))

ESA Status

Bull trout are a threatened species and are likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Geographic Range and Spatial Distribution

Bull trout exhibit two forms: resident and migratory. Resident bull trout spend their entire lives in the same stream/creek. Migratory bull trout move to larger bodies of water to overwinter and then migrate back to smaller waters to reproduce. An anadromous form of bull trout also exists in the Coastal-Puget Sound population, which spawns in rivers and streams but rears young in the ocean. Resident and juvenile bull trout prey on invertebrates and small fish. Adult migratory bull trout primarily eat fish. Resident bull trout range up to 10 inches long and migratory forms may range up to 35 inches and up to 32 pounds. While not directly observed in Jim Creek during the 2019 USFWS study *Fish Species Presence and Distribution Surveys at Naval Radio Station (T) Jim Creek*, bull trout have been documented downstream in the Stillaguamish River.

Critical Habitat

Jim Creek is exempted from bull trout critical habitat designation (due to an existing Integrated Natural Resource Management Plan) and no information on spawning adults exists.

Population Trends and Risks

The decline of bull trout, a cold-water species, is primarily due to habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, impoundments, dams, water diversions, and the introduction of nonnative species (USFWS, 2019b).

Analysis of Potential Impacts to Bull Trout

In consideration of all factors pertaining to the bull trout and the discharge from the facility, the EPA has determined that there will be no impact to bull trout populations. The discharge does not contribute to the factors responsible for the bull trout's decline as described above. Because the non-contact cooling water flows through approximately 1500 feet of surface infiltration ponds and channels, the temperature in the discharge rapidly diminishes and reaches background conditions before nearing the outfall. The effects of temperature are unlike the effects of chemical pollutants, which may remain unaltered in the water column and/or accumulate in sediments and aquatic organisms. (EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards, April 2003). Temperature is the only pollutant of concern as there are no chemical pollutants in the wastewater. It is also unlikely that any water will reach Outfall 067 as this has not occurred since the construction of the infiltration basin in 2016 and no discharge is expected by the facility. In the event of a discharge, the permittee is required to conduct continuous effluent temperature monitoring at the time of any discharge, which will be used to assess any future temperature assessments in the next permit cycle.

Bull trout generally avoid waters that lack cover and vegetation. They are a cold-water highly mobile species requiring complex stream channel structures and subsurface cover for protection, as well as protection from direct sunlight. Because the area within one mile of the transmitter building is cleared of all vegetation and riparian cover, it is unlikely that bull trout will be within the area of the outfall or immediately downstream.

Juvenile bull trout and other smaller fishes are also predicted to not be affected by the facility's actions due to the protections from impingement and entrapment on the cooling water intake structures, as described in section II.C. These include the use of small 2-inch pipes with screens to mitigate the uptake of fishes and other small aquatic animals.

Effects Determination

For the above reasons, the EPA has determined that issuance of this permit will have no effect on bull trout populations.

<u>Puget Sound Steelhead (*Oncorhynchus mykiss*) (threatened)</u>

Background and Species Description

Steelhead trout (Oncorhynchus mykiss) belong to the family Salmonidae which includes all salmon, trout, and chars. Steelhead are similar to some Pacific salmon in their life cycle and ecological requirements. They are born in freshwater streams, where they spend their first 1-3 years of life. They then emigrate to the ocean where most of their growth occurs. After spending between one to four growing seasons in the ocean, steelhead return to their native freshwater stream to spawn. Unlike Pacific salmonids, steelhead do not necessarily die after spawning and are able to spawn more than once.

ESA Status

The Puget Sound steelhead was listed as a threatened species on May 11, 2007.

Geographic Range and Spatial Distribution

The Puget Sound steelhead, a distinct population segment, includes naturally spawned anadromous steelhead originating below natural and manmade impassable barriers from rivers flowing into Puget Sound from the Elwha River eastward, including rivers in Hood Canal, South Sound, North Sound and the Strait of Georgia. In the 2019 Jim Creek salmonids report by the USFWS, steelhead have been documented spawning and rearing within the boundaries of the Naval Radio Station Jim Creek (USFWS 2019a)

Critical Habitat

The area surrounding the discharge is not listed as critical habitat for steelhead populations.

Population Trends and Risks

The 2019 NMFS *ESA Recovery Plan for Puget Sound Steelhead* noted ten factors contributing to the decline of steelhead. The main factors noted were impaired or altered passages, surface pollution runoff, timber management activities, ecological and genetic interactions between hatchery and natural-origin fish, harvest pressures, juvenile mortality in the Puget Sound, and climate change (NMFS 2019).

Analysis of Potential Impacts to Steelhead

Any potential discharge from the facility is predicted to have no impact on Puget Sound steelhead or any other steelhead populations. Similar to bull trout, steelhead are highly mobile and cold-water species that generally avoid areas lacking cover, meaning it is unlikely that steelhead will be within the vegetation-free area surrounding the outfall. It is also unlikely that any water that does reach the outfall will be of temperature significantly above ambient temperatures as the wastestream flows through surface infiltration channels and basins before reaching the outfall. Moreover, there are no chemical pollutants in the wastewater, and therefore will have no effect on steelhead.

Effect Determination

For the above reasons, the EPA has determined that issuance of this permit will have no effect on steelhead populations.

<u>Chinook salmon (*Oncorhynchus tshawytscha)* (threatened)</u>

Background and Species Description

Chinook salmon are easily distinguished from other Oncorhynchus species by their large size. Adults weighing over 120 pounds have been caught in North American waters. Chinook salmon are very similar to coho salmon in appearance while at sea (blue-green back with silver flanks), except for their large size, small black spots on both lobes of the tail, and black pigment along the base of the teeth. Chinook salmon are anadromous and semelparous. This means that as adults, they migrate from a marine environment into the freshwater streams and rivers of their birth (anadromous) where they spawn and die (semelparous). Adult female Chinook will prepare a spawning bed, called a redd, in a stream area with suitable gravel composition, water depth and velocity. Redds will vary widely in size and in location within the stream or river. The adult female Chinook may deposit eggs in four to five "nesting pockets" within a single redd. After laying eggs in a redd, adult Chinook will guard the redd from four to 25 days before dying. Chinook salmon eggs will hatch, depending upon water temperatures, between 90 to 150 days after deposition. Stream flow, gravel quality, and silt load all significantly influence the survival of developing Chinook salmon eggs. Juvenile Chinook may spend from three months to two years in freshwater after emergence and before migrating to estuarine areas as smolts, and then into the ocean to feed and mature.

Chinook salmon are notably sensitive to changes and extremes in temperature, salinity, and dissolved oxygen. The preferred temperature range for Chinook salmon has been variously described as 12.2-13.9 ℃ (Brett 1952), 10-15.6 ℃ (Burrows 1963), or 13-18 ℃ (Theurer et al. 1985). Temperatures for optimal egg incubation are 5.0-14.4 ℃ (Bell 1986). The upper lethal temperature limit is 25.1 ℃ (Brett 1952) but may be lower depending on other water quality factors (Ebel et al. 1971). Variability in temperature tolerance between populations is likely due to selection for local conditions; however, there is little information on the genetic basis of this trait.

Dissolved oxygen concentrations of 5.0 mg/L or greater are needed for successful egg development in redds for water temperatures between 4-14 degrees C (Reiser and Bjornn 1979). Freshwater juveniles avoid water with dissolved oxygen concentrations below 4.5 mg/L at 20 degrees C (Whitmore et al. 1960). Migrating adults will pass through water with dissolved oxygen levels as low as 3.5-4.0 mg/L (Fujioka 1970; Alabaster 1988).

ESA Status

Puget Sound Chinook salmon were listed as an ESA threatened species on March 24, 1999 in 64 FR 14308.

Geographic Range and Spatial Distribution

Puget Sound Chinook salmon include naturally spawned Chinook salmon originating from rivers flowing into Puget Sound from the Elwha River (inclusive) eastward, including rivers in Hood Canal, South Sound, North Sound and the Strait of Georgia. In the 2019 Jim Creek fish population study (USFWS 2019(a)), no Chinook salmon were observed within the study area; though it was noted that this may have been due to the timing of the study being between the peak migration seasons.

Critical Habitat

The area surrounding the discharge is not listed as critical habitat for Chinook salmon populations.

Population Trends and Risks

The 2016 NMFS 5-Year Review of Puget Sound Chinook salmon, Hood Canal summer-run Chum salmon, and Puget Sound Steelhead noted several factors for the decline in Chinook salmon species, including: overfishing, loss of freshwater and estuarine habitat, hydropower development, poor ocean conditions, and hatchery practices. The specific water quality concerns noted untreated stormwater runoff as the main cause, identifying metals, organic compounds, personal care products, pharmaceuticals, and hydrocarbons as the primary pollutants.

The habitat loss described in the NMFS review was notably concerned with three areas – nearshore habitat, floodplain habitat, and instream habitat. Nearshore habitat loss primarily consists of development related to shoreline armoring, or the practice of constructing bulkheads, seawalls, and rock revetments, which disrupts natural erosion processes that transport sand and gravel to Puget Sound beaches and other native spawning grounds. Instream habitat loss primarily blamed the construction of low permeable or impermeable stream systems which exacerbates flood events and can wash away early-stage salmonids. Other forms of instream habitat loss include the overall restructuring of natural streams, reducing protections and creating migration barriers. The last category, floodplain habitat loss, is also described by anthropogenic activities such as land development, which reduces species connectivity and access to migration corridors.

One of the most noted hinderances to Puget Sound Chinook salmon is the loss of fish passages through dams and other manmade barriers. The NMFS 5-year review listed the Middle Fork Nooksack Diversion Dam, at the Howard Hanson Dam on the Green River, and the Buckley Diversion Dam on the White River as main examples.

Riparian forest cover in the Stillaguamish River floodplain remained at 23% in 2016, unchanged since 2006. This is less than a third of the 80% riparian forest cover that is considered a long-term Properly Functioning Condition in the Salmon Recovery Plan

(NWIFC 2016). Spring-run Chinook salmon, in particular, have long freshwater residency and are documented to have increased growth and survival rates when they can access functional floodplain habitat during their rearing period (Jeffres et al. 2008). Few populations of spring-run Chinook salmon remain in the Puget Sound region with essential populations occurring in the Nooksack (Whatcom County), Skagit, Dungeness, Elwha, and White rivers (Pierce County).

Analysis of Potential Impacts to the Chinook Salmon

In consideration of all factors pertaining to the Chinook salmon and the lack of discharge from the facility, it is predicted that there will be no impact to the Chinook Salmon. If the facility were to discharge within the permitted limitations, this discharge does not contribute to the factors responsible for the Chinook salmon's decline as described above. The characteristics of the discharge and permit conditions will not cause any harmful or beneficial effects to the Chinook salmon. Because any discharge that reaches the outfall will likely have reached ambient temperatures due to the flow passing through surface infiltration basins and channels, that the facility does not discharge chemical pollutants, the effluent meets State Water Quality Standards, and that Chinook salmon are a highly mobile species, no measurable impacts are predicted.

Effect Determination

For the above reasons, the EPA has determined that issuance of this permit will have no effect on Chinook salmon populations.

<u>Gray Wolf (*Canis lupis*) (endangered)</u>

Gray wolves are typically high-elevation territorial animals that avoid the presence of human civilization and seek geographic isolation from anthropogenic stressors (USFWS, 2023(a); USFWS, 2023(b)). According to the USFWS Environmental Conservation Online System, gray wolves in Washington are typically found in eastern Washington and not known to inhabit Snohomish County and other developed counties on the western slope of the Cascade Mountain Range. Because of this aversion to the area, the EPA has determined that issuance of this permit will have no effect on Gray Wolf populations.

<u>Yellow-billed Cuckoo (*Coccyzus americanus*) (threatened)</u>

The primary cause of decline of yellow-billed cuckoo is the loss and degradation of riparian breeding habitat, which typically entails wooded riparian zones with dense cover (USFWS, 2021). The area in the immediate vicinity of the discharge has been cleared of all vegetation for the efficiency of the radio transmitter. Because the facility is permitted to discharge non-contact cooling water and temperature is the only pollutant of concern, and that the discharge flows approximately 0.7 miles before reaching any vegetation cover, it is understood that by the time water from the discharge reaches any yellow-billed cuckoo habitat, it would be cooled to ambient temperatures. The EPA has determined that issuance of this permit will have no effect on yellow-billed cuckoo populations.

Marbled Murrelet (*Brachyramphus marmoratus)* (threatened)

The marbled murrelet, a small seabird, requires habitat comprised of large coniferous trees, large diameter platforms covered in moss and other detritus, overhead cover, and access routes, provides for the establishment of nests and the successful rearing of nestlings (USFWS, 2024). Similar to the yellow-billed cuckoo habitat, it is understood that no marbled murrelet habitat is present in the immediate vicinity of the discharge, where temperature from the effluent is of concern, and therefore, the EPA has determined that issuance of this permit will have no effect on marbled murrelet populations.

Appendix E. Antidegradation Analysis

The purpose of Washington's Antidegradation Policy is to:

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

    1. Tier I is used to ensure existing and designated uses are maintained and protected and applies to all waters and all sources of pollution.

    2. Tier II is used to ensure that waters of a higher quality than the criteria assigned in this chapter are not degraded unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities.

    3. Tier III is used to prevent the degradation of waters formally listed in this chapter as "outstanding resource waters," and applies to all sources of pollution.

The EPA utilized Washington's WQS downstream from the discharge in Jim Creek to establish discharge limits in the permit and accordingly, the antidegradation analysis was completed for the Stillaguamish River downstream of the discharge. The discharge proposed in this permit should not cause a loss of beneficial uses because there have not been any changes in the process of the existing facility, and there is no change in the design flow. Therefore, the EPA concludes that the discharge does not trigger the need for any further antidegradation analysis beyond Tier I Protection.

Tier I Protection – Protection and maintenance of existing and designated uses

According to Washington's antidegradation policy, WAC 172-210A-310, this facility must meet Tier I requirements. Existing and designated uses must be maintained and protected. No degradation may be allowed that would interfere with, or become injurious to, existing or designated uses, except as provided for in WAC 173-201A612. The waters of Jim Creek in

Washington downstream of the point of discharge are protected for the following designated beneficial uses:

- Aquatic Life Uses: Salmonoid Spawning, Rearing, and Migration Wildlife Habitat;
- Recreational Uses: Primary Contact
- Water Supply Uses: Domestic Water; Industrial Water; Agricultural Water; Stock Water; wildlife habitat; harvesting; commerce and navigation; boating
- Aesthetic Values.

The effluent limits in the permit ensure compliance with applicable numeric and narrative water quality criteria. The numeric and narrative water quality criteria are set at levels that ensure protection of the designated uses. As there is no information indicating the presence of existing beneficial uses other than those that are designated, the draft permit ensures a level of water quality necessary to protect the designated uses and, in compliance with WAC 173-201A-310 and 40 CFR § 131.12(a)(1), also ensures that the level of water quality necessary to protect existing uses is maintained and protected. If the EPA receives information during the public comment period demonstrating that there are existing uses for which Toppenish Drain is not designated, the EPA will consider this information before issuing a final permit and will establish additional or more stringent permit conditions if necessary to ensure protection of existing uses.

Tier II Protection – Protection of waters of higher quality than the standards

The EPA determined that analysis for a Tier II Protection is not necessary because the facility is not a new or expanded action that has the potential to cause measurable degradation to existing water quality. According to WAC 173-210A-320(2), a facility must prepare a Tier II analysis when the facility is planning a new or expanded action that has the potential to cause measurable degradation to the physical, chemical, or biological quality of the water body.

Tier III Protection – Protection of Outstanding Resource Waters

The EPA determined that a Tier III antidegradation analysis is not necessary because the receiving water does not meet the conditions as an Outstanding Resource Water pertaining to WAC 173-201A-330(1).