State of Oregon
Department of
Environmental
Quality

National Pollutant Discharge Elimination System
Permit Fact Sheet
City of Cascade Locks

Permittee	City of Cascade Locks Cascade Locks STP 105 Herman Creek Lane Cascade Locks, OR 97014-0308
Existing Permit Information	File Number: 108653 Permit Number: 101328 EPA Reference Number: OR0041271 Category: Domestic Class: Minor Expiration Date: 07-31-2024
Permittee Contact	Louie Hooks Facility Contact 541-386-2432 818 Riverside Dr. Hood River, OR 97031-1179
Receiving Water Information	Receiving stream/NHD name: Columbia River NHD Reach Code & % along reach: 17070105010058 – 57.01% USGS 12-digit HUC: 170701051204 OWRD Administrative Basin: Main Stem Columbia River ODEQ LLID & River Mile: 1240483462464 – 147.1 Integrated Report Assessment Unit ID: OR_LK_1707010512_88_100134
Proposed Action	Permit Renewal Application Number: 948173 Date Application Received: 02/02/2024
Permit Writer	Megan Poskaitis 503-847-6597 Date Prepared: (final date prior to PN)

NPDES Permit Fact Sheet
City of Cascade Locks

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1. Introduction

As required by Oregon Administrative Rule 340-045-0035, this fact sheet describes the basis and methodology used in developing the permit. The permit is divided into several sections:

Schedule A – Waste discharge limitations
Schedule B – Minimum monitoring and report requirements
Schedule C – Not Applicable
Schedule D – Special conditions
Schedule E – Not Applicable
Schedule F – General conditions

A summary of the major changes to the permit are listed below:

- Update of excess thermal load limit with new thermal load limit to be consistent with the Columbia and Lower Snake Rivers temperature TMDL
- Substitution of BOD_5 for $CBOD_5$ effluent limits
- Update of TSS and BOD_5 mass load limits due to new design flows following plant upgrades
- Inclusion of receiving stream (Main stem Columbia River) monitoring for pH, temperature, alkalinity, and ammonia – Table B4

2. Facility Description

2.1 Wastewater Facility

The original wastewater treatment plant was constructed at Marina Park and placed into operation in 1968. In June 1998, to accommodate future growth, a new sequencing batch reactor (SBR) wastewater treatment facility was constructed and placed into service at its current location at the NE end of Herman Creek Road. The original wastewater treatment facility was demolished.

The SBR facility consists of the headworks equipped with a mechanical fine screen, bar screen and grit removal system, two SBR basins, a flow equalization basin, two aerobic digesters, and an ultraviolet (UV) disinfection channel system.

During the previous permit cycle, improvements to the wastewater treatment facility and collections system recommended by Anderson Perry & Associates, Inc. were installed. The wastewater treatment plant improvements include addition of a grit removal system to the headworks, SBR renovations, digester improvements, plant lift station improvements, and upgrades to the UV disinfection system.

Previously, headworks treatment did not include grit removal. The new grit removal system consists of a grit vortex, grit cyclone/classifier, and grit slurry pump. The SBR aeration system, US Filter Jet-Tech, was removed and replaced with the Aqua-Aerobic system, in which aeration and mixing are independent. Additional SBR renovations include a new blower system, a removable fine bubble diffuser, replaced decanting mechanism, and new floating mixers. The plant lift station improvements include pump removal and replacement, UV drain installation into wet well, and valve replacement. The UV disinfection system was upgraded to Trojan UV3000Plus with new electrical and controls. The existing effluent weir, light banks, and magnetic flow meter were removed and replaced, and a new UV basin drain was installed that drains to the plant lift station.

Untreated wastewater from the city collection system enters the plant through a 24-inch interceptor to the headworks where it is screened and passed through a grit removal system prior to being channeled to one of the two SBR basins. The following treatment processes occur in each SBR basin: fill, mixing, aeration, settling, decanting, and anoxic mixing. Each SBR basin can be operated in sequence (e.g., while one basin is in treatment mode the other can be filled) or each SBR basin can be operated separately. Decanted wastewater from the SBRs flows to the equalization basin before flowing at a metered rate through the UV disinfection channel. After passing through two UV disinfection banks, the treated effluent is directed to the Columbia River outfall and discharged.

Treated effluent discharges to the Columbia River (Outfall 001) at river mile 147.1. The outfall pipe is 18 inches in diameter and extends approximately 1300 feet from the bank into the Columbia River at a depth of 10 feet. A five-nozzle multi-port diffuser is at the end of the outfall pipe. Waste digested sludge is hauled to Hood River Wastewater Treatment Plant for treatment and disposal.

The Marina Park lift station, also referred to as the main pump station, is located at the site of the original wastewater treatment facility. Marina Park lift station receives a majority of wastewater from the city. It pumps wastewater approximately three miles to the wastewater treatment facility. This lift station has an emergency back-up power generator. During the renovation, the existing station components were demolished and new submersible pumps, valve vault, and piping were installed, equipped with new electrical, control, and SCADA panels.

The industrial pump station located at the intersection of Forest Land and Industrial Park Way was idle at the time of the last permit renewal. The industrial way pump station has been restored during the improvements through installation of submersible pumps, valve vault and piping, wet well rehabilitation, new electrical, control and SCADA panels and connection for a portable back-up power generator.

Figure 2-1: Facility Location

Figure 2-2: Facility Process Schematic I

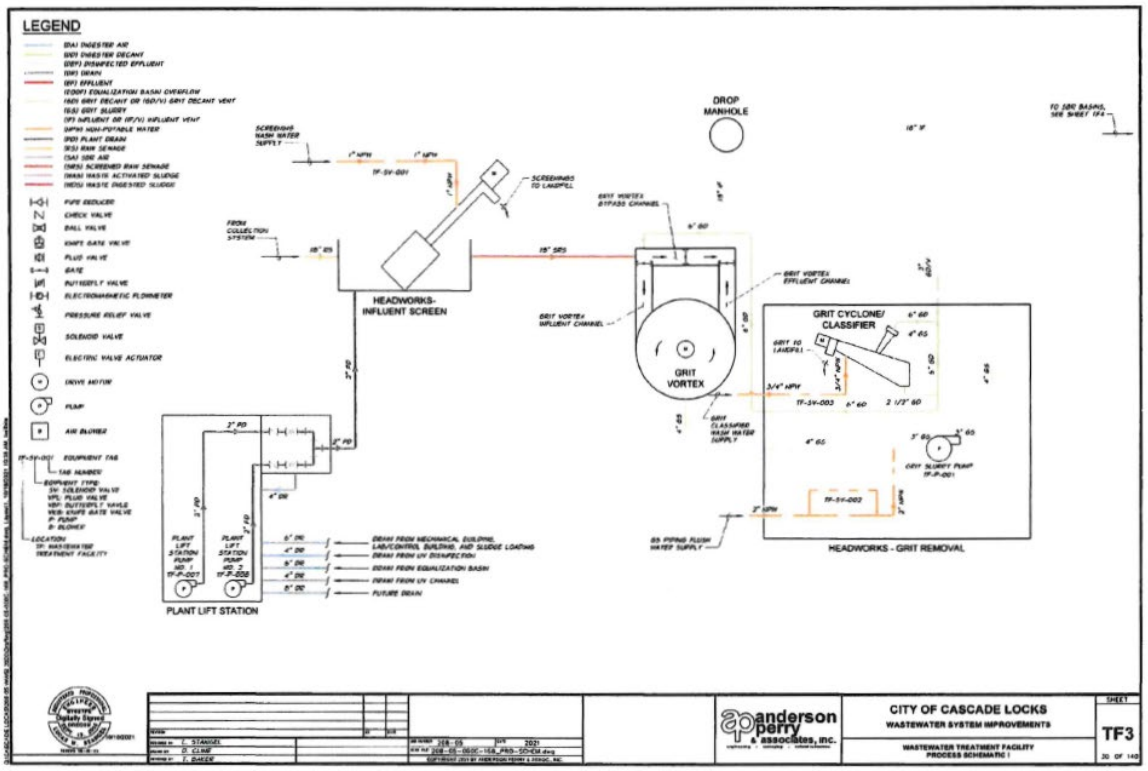

Figure 2-3: Facility Process Schematic II

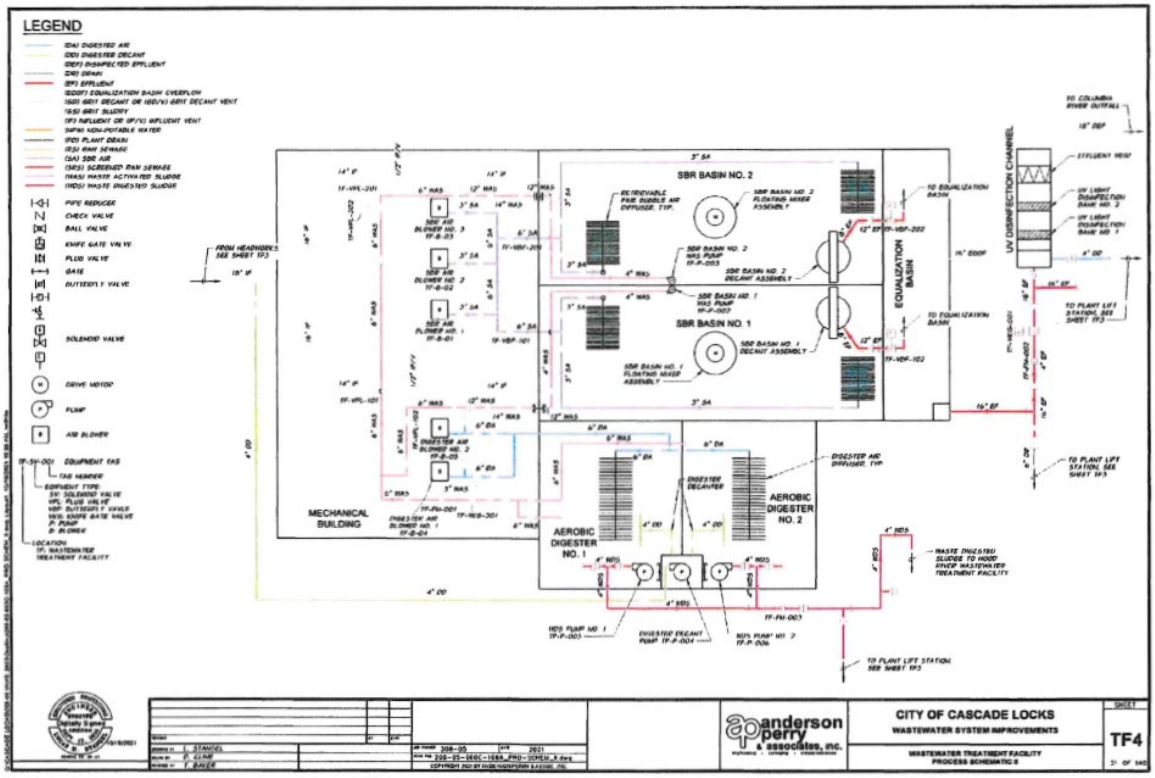

Table 2-1: List of Outfalls

Outfall Number	Type of Waste	Lat/Long	Design Flow[1] (mgd)	Existing Flow[2] (mgd)
001	Treated Wastewater	45.68575, -121.868167	0.111	0.110

1. Design Flow = design average dry weather flow
2. Existing Flow = existing average monthly dry weather flow

2.2 Stormwater

Stormwater is not addressed in this permit. General NPDES permits for stormwater are not required for facilities with a design flow of less than 1 MGD.

2.3 Industrial Pretreatment

The permittee does not have a DEQ-approved industrial pretreatment program. Based on current information, no industrial pretreatment program is needed. Schedule D of the proposed permit requires the permittee to perform an industrial user survey.

2.4 Wastewater Classification

OAR 340-049 requires all permitted municipal wastewater collection and treatment facilities receive a classification based on the size and complexity of the systems. DEQ evaluated the classifications for the treatment and collection system, which are publicly available at: https://www.deq.state.or.us/wq/opcert/Docs/OpcertReport.pdf.

3. Schedule A: Effluent Limit Development

Effluent limits serve as the primary mechanism in NPDES permits for controlling discharges of pollutants to receiving waters. Effluent limitations can be based on either the technology available to control the pollutants or limits that are protecting the water quality standards for the receiving water. DEQ refers to these two types of permit limits as technology-based effluent limitations (TBELs) and water quality-based effluent limits (WQBELs) respectively. When a TBEL is not restrictive enough to protect the receiving stream, DEQ must include a WQBEL in the permit.

3.1 Existing Effluent Limits

The table below shows the limits contained in the existing permit.

Table 3-1: Existing Effluent Limits

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum
$CBOD_5$ (November 1 - April 30)	mg/L	25	40	-
	lb/day	58	87	116
	% removal	85	-	-
$CBOD_5$ (May 1 – October 31)	mg/L	15	25	-
	lb/day	41	62	82
	% removal	85	-	-
TSS (November 1 – April 30)	mg/L	30	45	-
	lb/day	83	124	166
	% removal	85	-	-
TSS (May 1 – October 31)	mg/L	20	30	-
	lb/day	41	62	82
	% removal	85	-	-
pH	SU	Instantaneous limit between a daily minimum of 6.0 and a daily maximum of 8.5		
E. coli See note a.	#/100 mL	Monthly log mean (same as geometric mean) may not exceed 126 organisms per 100 mL. No single sample may exceed 406 organisms per 100 mL.		
Excess Thermal Load (ETL)	million kcal/day (Mkcal/day)	44 million kcals/day maximum 7 day rolling average ETL		

Notes:

a. No single *E. coli* sample may exceed 406 organisms per 100 mL; however, DEQ will not cite a violation of this limit if the permittee takes at least 5 consecutive re-samples at 4 hour intervals beginning as soon as practicable (preferably within 28 hours after the original sample was taken) and the geometric mean of the 5 re-samples is less than or equal to 126 *E. coli* organisms/100 mL.

3.2 Technology-Based Effluent Limit Development

40 CFR 122.44(a)(1) requires publicly owned treatment works (POTW) to meet technology-based effluent limits, for five-day biochemical oxygen demand (BOD_5), total suspended solids (TSS) and pH (i.e., federal secondary treatment standards). Substitution of 5-day carbonaceous

oxygen demand ($CBOD_5$) for BOD_5 is allowed. The numeric standards for these pollutants are contained in 40 CFR 133.102. In addition, DEQ has developed minimum design criteria for BOD_5 and TSS that apply to specific watershed basins in Oregon. These are listed in the basin-specific criteria sections under OAR 340-041-0101 to 0350. During the summer low flow months as defined by OAR, these design criteria are more stringent than the federal secondary treatment standards. The basin-specific criteria are not effluent limits, but are implemented as design criteria for new or expanded wastewater treatment plants. The table below shows a comparison of the federal secondary treatment standards and the basin-specific design criteria for the Main Stem Columbia River.

Table 3-2: Comparison of TBELs for Federal Secondary Treatment Standards and Oregon Basin-Specific Design Criteria

Parameter	Federal Secondary Treatment Standards		Main Stem Columbia River Basin-Specific Design Criteria (OAR 340-041-0104)
	30-Day Average	7-Day Average	Monthly Average
BOD_5 (mg/L)	30	45	20 (May 1 to October 31)
TSS (mg/L)	30	45	20 (May 1 to October 31)
pH (S.U.)	6.0 – 9.0. (instantaneous)		Not applicable
BOD_5 and TSS % Removal	85%	Not applicable	Not applicable

The limits for BOD_5 and TSS shown in the table above are concentration-based limits. Mass-based limits are required in addition to the concentration-based limits per OAR 340-041-0061(9). For any new facility or any facility that has expanded its dry weather treatment capacity after June 30, 1992, OAR 340-041-0061(9)(b) requires that the mass load limits be calculated based on the proposed treatment facility capabilities and the highest and best practicable treatment to minimize the discharge of pollutants. The permittee's facility has been engineered to achieve TSS monthly average concentrations of 20 mg/L during the dry weather season and 30 mg/L during the wet weather season. The permittee's facility has been engineered to achieve $CBOD_5$ monthly average concentrations of 15 mg/L during the dry weather season and 25 mg/L during the wet weather season.

The permittee has requested substitution of BOD_5 effluent limits in the proposed permit for $CBOD_5$ effluent limits in the current permit. DEQ permits this in accordance with EPA's 1984 promulgated rule revisions, allowing for the substitution of $CBOD_5$ for BOD_5 and vice versa when implementing federal secondary treatment standards. Following federal regulations and guidance, a monthly average concentration of 20 mg/L BOD_5 will substitute for 15 mg/L $CBOD_5$ during the dry weather season and a monthly average concentration of 30 mg/L BOD_5 will substitute for 25 mg/L $CBOD_5$ during the wet weather season. DEQ uses the maximum monthly design flow to calculate the mass load limits as shown below for the dry and wet weather seasons.

DEQ uses the maximum monthly design flow to calculate the mass load limits as shown below for the dry and wet weather seasons.

Monthly Avg Mass Load = Design Flow* x Monthly Concentration Limit x Unit Conversion factor

Weekly Average Mass Load = 1.5 x Monthly Average Mass Load Limit

Daily Maximum Mass Load = 2 x Monthly Average Mass Load Limit

* Design flow is the design maximum monthly dry weather flow (DMMDWF) or design maximum monthly wet weather flow (DMMWWF).
The following table lists the effluent flows and concentration limits used for the calculations.

Table 3-3: Design Flows and Concentrations Limits

Season	Design Flow (mgd)	Monthly TSS Concentration Limit (mg/L)	Monthly BOD_5 Concentration Limit (mg/L)
Dry Weather	0.157	20	20
Wet Weather	0.263	30	30
Design flow comments: Dry weather design flow basis is the design maximum monthly dry weather flow (DMMDWF) and wet weather design flow basis is design maximum monthly average wet weather flow (DMMWWF)			

Cascade Locks STP's summer mass load limits for BOD_5 and TSS are calculated using the design maximum monthly dry weather flow of 0.157 mgd and a concentration of 20 mg/L. The summer calculations for BOD_5 and TSS are:

Monthly Average: 0.157 mgd x 20 mg/L x 8.34 = 26.2 lbs/day rounded off to 26 lbs/day (two significant figures)

Weekly Average: 26 lbs/day monthly average x 1.5 = 39 lbs/day

Daily Maximum: 26 lbs/day monthly average x 2 = 52 lbs/day

Cascade Locks STP's winter mass load limits for BOD_5 and TSS are calculated using the design maximum monthly wet weather flow of 0.263 mgd and a concentration of 30 mg/L. The winter mass load calculations for BOD_5 and TSS are:

Monthly Average: 0.263 mgd x 30 mg/L x 8.34 = 65.8 lbs/day rounded off to 66 lbs/day (two significant figures)

Weekly Average: 66 lbs/day monthly average x 1.5 = 99 lbs/day

Daily Maximum: 66 lbs/day monthly average x 2 = 132 lbs/day rounded off to 130 lbs/day (two significant figures)

Cascade Locks STP's summer and winter mass load limits for TSS are more stringent than those in the existing permit due to plant upgrades and changes in facility design, specifically maximum monthly design flows and design effluent concentrations. Cascade Locks STP has not requested a mass load increase. Likewise, DEQ reviewed the existing $CBOD_5$ limits as BOD_5 and found the proposed BOD_5 limits to be more stringent. Therefore, antibacksliding review is not needed. The proposed BOD_5 and TSS limits are listed in the following table.

Table 3-4: BOD_5 and TSS Technology Based Effluent Limits

Parameter	Units	Average Monthly	Average Weekly	Daily Maximum
BOD_5 (May 1 – October 31)	mg/L	20	30	NA
	lbs/day	26	39	52
	% removal	85	85	NA
TSS (May 1 – October 31)	mg/L	20	30	NA
	lbs/day	26	39	52
	% removal	85	85	NA
BOD_5 (November 1 – April 30)	mg/L	30	45	NA
	lbs/day	66	99	130
	% removal	85	85	NA
TSS (November 1 – April 30)	mg/L	30	45	NA
	lbs/day	66	99	130
	% removal	85	85	NA

3.3 Water Quality-Based Effluent Limit Development

40 CFR 122.44(d) requires that permits include limitations more stringent than technology-based requirements where necessary to meet water quality standards. Water quality-based effluent limits may be in the form of a wasteload allocation required as part of a Total Maximum Daily Load (TMDL). They may also be required if a site-specific analysis indicates the discharge has the reasonable potential to cause or contribute to an exceedance of a water quality criterion. DEQ establishes effluent limits for pollutants that have a reasonable potential to exceed a criterion. The analyses are discussed below.

3.3.1 Designated Beneficial Uses

NPDES permits issued by DEQ must protect the following designated beneficial uses of the Columbia River. These uses are listed in OAR-340-041-0101 for the Main Stem Columbia River.

- Public and private domestic water supply

- Industrial water supply
- Irrigation and livestock watering
- Fish and aquatic life (including salmonid rearing, migration and spawning)
- Wildlife and hunting
- Fishing
- Boating
- Water contact recreation
- Aesthetic quality
- Hydro power
- Commercial navigation and transportation

3.3.2 303(d) Listed Parameters and Total Maximum Daily Loads

The following table lists the parameters that are on the 2022 303(d) list (Category 5) within the discharge's stream reach. The table also lists any parameters with a TMDL wasteload allocation assigned to the facility (Category 4).

Table 3-5: 303(d) and TMDL Parameters

Water Quality Limited Parameters (Category 5)	
AU ID:	OR_LK_1707010512_88_100134
AU Name:	Columbia River
AU Status:	Impaired
Year Listed	1998
Year Last Assessed	2022
303d Parameters (Category 5)	Methylmercury; Polychlorinated Biphenyls (PCBs)
TMDL Parameters (Category 4)	
Dioxin (2,3,7,8-TCDD), Temperature, and Total Dissolved Gas	

DEQ has developed Total Dissolved Gas and Dioxin Total Maximum Daily Loads (TMDLs) for the Columbia River. These TMDLs do not indicate Cascade Locks STP as a source of total dissolved gas or dioxin. Methylmercury and PCBs are not pollutants of concern because they are not expected to be present in the effluent from a domestic minor facility.

3.3.3 TMDL Wasteload Allocations

EPA issued a Temperature TMDL for the Columbia River. The WLA from this TMDL that is applicable to the permittee is listed in the following table.

Table 3-6: Applicable WLAs

Parameter	WLA	Time Period
Thermal Load	5.21×10^7 kcal/day	June 1 – October 31

3.3.4 Pollutants of Concern

To ensure that a permit is protecting water quality, DEQ must identify pollutants of concern. These are pollutants that are expected to be present in the effluent at concentrations that could adversely impact water quality. DEQ uses the following information to identify pollutants of concern:

- Effluent monitoring data.
- Knowledge about the permittee's processes.
- Knowledge about the receiving stream water quality.
- Pollutants identified by applicable federal effluent limitation guidelines.

Based on EPA's NPDES permit application requirements, toxic pollutants of concern for domestic facilities are listed in the following table.

Table 3-7: Domestic Toxic Pollutants of Concern

Flow Rate	Pollutants
< 0.1 mgd	Total Residual Chlorine
≥ 0.1 mgd and < 1.0 mgd	Total Residual Chlorine, Total Ammonia Nitrogen
≥ 1.0 mgd	Total Residual Chlorine, Total Ammonia Nitrogen, Metals, Volatile Organic Compounds, Acid Extractable Compounds, Base Neutral Compounds

DEQ identified the following pollutants of concern for this facility listed in the following table.

Table 3-8: Pollutants of Concern

Pollutant	How was pollutant identified?
pH	Effluent Monitoring
Temperature	Effluent Monitoring
E. coli	Effluent Monitoring
Total Ammonia Nitrogen	Application Requirement

The sections below discuss the analyses that were conducted for the pollutants of concern to determine if water quality based effluent limits are needed to meet water quality standards.

3.3.5 Regulatory Mixing Zone

The proposed permit contains a mixing zone as allowed per OAR 340-041-0053. The regulatory mixing zone from the existing permit is described as follows:

> *The allowable mixing zone is that portion of the Columbia River 5 feet upstream and 100 feet downstream from the diffuser or point of discharge. The Zone of Immediate Dilution (ZID) shall be defined as that portion of the allowable mixing zone that is within 10 feet of the point of discharge.*

However, this description allows for a ZID that does not completely overlap with the RMZ upstream of the discharge since the ZID extends 10 ft while the RMZ only extends 5 ft. Furthermore, tidal influence on the Columbia River ends at the Bonneville Dam. Therefore, the RMZ and ZID will be updated to remove the upstream flow, resize the ZID, and clarify language as follows:

> *The allowable regulatory mixing zone is that portion of the Columbia River 100 feet downstream from the diffuser. The Zone of Immediate Dilution (ZID) shall be defined as that portion of the allowable regulatory mixing zone that is within 10 feet downstream of the diffuser.*

The dilution factors at the edge of the zone of initial dilution and mixing zone are shown in Tables 3-9 and 3-10. For this memo, DEQ used CORMIX 12.0 to simulate the discharge and provide updated dilution values at the edge of the ZID (10 feet) and edge of the regulatory mixing zone (100 feet). These updated model runs are documented in a 2023 Mixing Zone Memo which is part of the administrative record. Outfall information was taken from the most recent outfall inspection while updated effluent flow and temperature values were used. The model inputs and data sources are shown in the Outfall Description and Receiving Water and Effluent Flow Parameters tables in the mixing zone memo. The exact model inputs used in each design case are included in the mixing zone memo and model files are available in the administrative record.

Table 3-9: Dry Weather Dilution Summary

Dilution Summary – May 1 to October 31 (Dry Weather)						
Water Quality Standard	**Stream Flow (cfs)**		**Effluent Flow (mgd)**		**Dilution Factor**	**Location**
	Statistic	**Flow**	**Statistic**	**Flow**		
Aquatic Life, Acute	1Q10	67,715	☐ ADWDF x PF ☐ Max Daily Avg ☒ Other	1.3	39	ZID
Aquatic Life, Chronic	7Q10	80,452	☐ ADWDF ☐ Max Monthly Avg ☒ Other	1.3	178	MZ
Human Health, Non-Carcinogen	30Q5	93,007	☐ ADWDF ☐ Max Monthly Avg ☒ Other	1.3	205	MZ
ADWDF = Average dry weather design flow *PF = Peaking factor (1.5)*						
Comments: Effluent flow statistic is based off of batch flow rate						

Table 3-10: Wet Weather Dilution Summary

Dilution Summary – November 1 to April 30 (Wet Weather)						
Water Quality Standard	**Stream Flow (cfs)**		**Effluent Flow (mgd)**		**Dilution Factor**	**Location**
	Statistic	**Flow**	**Statistic**	**Flow**		
Aquatic Life, Acute	1Q10	76,007	☐ ADWDF x PF ☐ Max Daily Avg ☒ Other	1.1	52	ZID
Aquatic Life, Chronic	7Q10	86,797	☐ ADWDF ☐ Max Monthly Avg ☒ Other	1.1	211	MZ
Human Health, Non-Carcinogen	30Q5	101,487	☐ ADWDF ☐ Max Monthly Avg ☒ Other	1.1	265	MZ
ADWDF = Average dry weather design flow *PF = Peaking factor (1.5)*						
Comments: Effluent flow statistic is based off of batch flow rate						

3.3.6 pH

The pH criterion for this basin is 7.0 – 8.5 per OAR 340-041-0104. The facility's current permit limits are 6.0 – 8.5. DEQ determined there is no reasonable potential for the discharge to exceed the pH criterion at the edge of the mixing zone. The lower limit remains 6.0 and is a TBEL. The upper limit is 8.5 and is a WQBEL.

Table 3-11: pH Reasonable Potential Analysis

INPUT	Lower pH Criteria	Upper pH Criteria
1. Dilution at mixing zone boundary	178.0	178.0
2. Upstream characteristics		
a. Temperature (deg C)	22.3	5.5
b. pH	7.2	8.3
c. Alkalinity (mg CaCO3/L)	48.9	48.9
3. Effluent characteristics		
a. Temperature (°C)	23.0	9.8
b. pH (S.U.)	6.0	8.5
c. Alkalinity (mg CaCO3/L)	134.6	134.6
4. Applicable pH criteria	7.0	8.5
pH at mixing zone boundary	7.1	8.3
Is there reasonable potential?	No	No
Proposed effluent limits	6.0	8.5
Effluent data source: DMRs 2022-2024. Alkalinity default used.		
Ambient data source: Columbia River Shoreline at The Dalles Marina Jetty Midpoint, Hood River STP Ambient Sampling Location, and US197 South end of The Dalles Bridge - Columbia River		

3.3.7 Temperature

3.3.7.1 Temperature Criteria OAR 340-041-0028

The following table summarizes the temperature criteria that apply at the discharge location along with whether the receiving stream is water quality-limited for temperature and whether a TMDL wasteload allocation has been assigned. Using this information, DEQ performed several analyses to determine if effluent limits were needed to comply with the temperature criteria.

Table 3-12: Temperature Criteria Information

Applicable Temperature Criterion	Migration Corridor 20ºC (OAR 340-041-0028(4)(d)
Applicable dates: Year-round	
Salmon/Steelhead Spawning 13 °C? OAR 340-041-0028(4)(a)	☐Yes ☒No
Applicable dates: NA	
WQ-limited?	☒Yes ☐No
TMDL wasteload allocation assigned?	☒Yes ☐No
Applicable dates: June 1 – October 31	
TMDL based on natural conditions criterion?	☐Yes ☒No
Cold water summer protection criterion applies?	☐Yes ☒No
Cold water spawning protection applies?	☐Yes ☒No
Comments:	

The Columbia and Lower Snake Rivers Temperature Total Maximum Daily Load assigns a wasteload allocation to the facility, which applies to their discharge. This allocation is addressed in the proposed permit by including an effluent limit of 52.1 million kcal/day thermal load, expressed as a monthly average, from June through October.

To demonstrate compliance with the thermal load limit, the daily thermal load discharged is calculated by multiplying the daily effluent flow by the average daily effluent temperature and a standard conversion factor.

The following formula is to be used to calculate the thermal loading of the effluent:

$$TL_e = T_e \times Q_e \times c$$

Where,

TL_e = Daily Thermal Load (million kcal/day)

T_e = Daily average effluent temperature (°C).

Q_e = Effluent Flow (million gallon per day (MGD))

c = Conversion factor = 3.78

The daily thermal load values are then averaged over the month to give the monthly thermal load discharged, which must be equal to or less than 52.1 million kcal/day for the June through October period. The TMDL requires no limitation for the remainder of the year.

The final effluent limit is listed in the following table and is included in the proposed permit. This limit is less stringent than the existing permit's excess thermal load limit. A discussion of the antidegradation and antibacksliding considerations related to this change are discussed in sections 3.4 and 3.5, below.

Table 3-13: Temperature Criterion Effluent Limits

Effluent limit needed? ☒Yes ☐No
TMDL WLA Limit: 52.1 million kcal/day
Applicable time period: June 1 – October 31
Temperature Criterion Limit: NA

3.3.7.2 Thermal Plume OAR 340-041-0053(2)(d)

In addition to compliance with the temperature criteria, OAR 340-041-0053(2)(d) contains thermal plume limitation provisions designed to prevent or minimize adverse effects to salmonids that may result from thermal plumes. The discharge was evaluated for compliance with these provisions as follows:

- OAR 340-041-0053(2)(d)(A): Impairment of an active salmonid spawning area where spawning redds are located or likely to be located. This adverse effect is prevented or minimized by limiting potential fish exposure to temperatures of 13ºC or more for salmon and steelhead, and 9ºC or more for bull trout.

  OAR 340-041-0101 does not list spawning as a beneficial use for this section of the river, and thus, this rule does not apply.

- OAR 340-041-0053(2)(d)(B): Acute impairment or instantaneous lethality is prevented or minimized by limiting potential fish exposure to temperatures of 32ºC or more to less than 2 seconds.

  The facility's maximum daily effluent temperature is 27.6 ºC, which is well below the lethal criterion of 32 ºC, thus acute impairment or instantaneous lethality are prevented.

- OAR 340-041-0053(2)(d)(C): Thermal shock caused by a sudden increase in water temperature is prevented or minimized by limiting potential fish exposure to temperatures of 25ºC or more to less than 5% of the cross-section of 100% of the 7Q10 flow of the water body.

  An analysis related to thermal shock, included in Appendix B, indicates that when both the effluent and upstream receiving water temperatures are at their maximum measured values, the plume's temperature at 5% of the receiving stream's cross-sectional area will not be above 25°C. Based on this analysis, thermal shock caused by the discharge is prevented or minimized.

- OAR 340-041-0053(2)(d)(D): Unless ambient temperature is 21ºC or greater, migration blockage is prevented or minimized by limiting potential fish exposure to temperatures of 21ºC or more to less than 25% of the cross-section of 100% of the 7Q10 flow of the water body.

The migration blockage portion of the rule is based primarily on the USEPA document, *EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards* (April 2003). Section V.3. of the document gives guidance on protecting salmonids from thermal plume impacts and provides this discussion on migration blockage:

> *Adult migration blockage conditions can occur at 21°C ... Therefore, EPA suggests that the cross-sectional area of a river at or above 21°C be limited to less than 25% or, if upstream temperature exceeds 21°C, the thermal plume be limited such that 75% of the cross-sectional area of the river has less than a de minimis (e.g., 0.25°C) temperature increase.*

The maximum recorded receiving water temperature upstream of the discharge locations is 24.5 °C. An analysis related to migration blockage, included in Appendix B, indicates that when the receiving water temperature is 21.0°C and the effluent temperature is at the maximum recorded value (26.7°C), the effluent plume when it reaches 25% of the receiving stream's cross-sectional area will be 21.001°C. This 0.001 °C over the upstream temperature is considered a deminimis increase which prevents or minimizes migration blockage.

Table 3-14: Thermal Plume Effluent Limit

Effluent limit needed? ☐Yes ☒No
Calculated limit: NA
Applicable timeframe: NA
Comments:

3.3.8 Bacteria

OAR 340-041-0009(6)(b) requires discharges of bacteria into freshwaters meet a monthly geometric mean of 126 E. coli per 100 mL, with no single sample exceeding 406 E. coli per 100 mL. If a single sample exceeds 406 E. coli per 100 mL, then the permittee may take five consecutive re-samples. If the geometric mean of the five re-samples is less than or equal to 126, a violation is not triggered. The re-sampling must be taken at four-hour intervals beginning within 28 hours after the original sample was taken. The following table includes the proposed permit limits and apply year round.

Table 3-15: Proposed E. coli Limits

E. coli (#/100 ml)	Geometric Mean	Maximum
Existing Limit	126	406
Proposed Limit	126	406

3.3.9 Toxic Pollutants

DEQ typically performs the reasonable potential analysis for toxics according to EPA guidance provided in the Technical Support Document for Water Quality-Based Toxics Control (TSD) (Office of Water Enforcement and Permits, U.S. EPA, March 1991). The factors incorporated into this analysis include:

1. Effluent concentrations and variability
2. Water quality criteria for aquatic life and human health
3. Receiving water concentrations
4. Receiving water dilution (if applicable)

DEQ performs these analyses using spreadsheets that incorporate EPA's statistical methodology. The following sections describe the analyses for various toxic pollutants below.

3.3.9.1 Total Ammonia Nitrogen

DEQ's ammonia criteria vary with changes in pH and temperature. DEQ performed a reasonable potential analysis that accounts for changes in the effluent and receiving water pH and temperature to determine the appropriate ammonia criteria. The following table provides a summary of the data used for the ammonia analysis and the results of the analysis.

Cascade Locks STP does not have an existing ammonia limit. DEQ found no reasonable potential for Cascade Locks STP to exceed the ammonia criteria resulting from this analysis.

Table 3-16: Ammonia Analysis Information - Summer

	Acute	Chronic	
		4-day	30-day
Dilution	39	178	205
Ammonia Criteria	2.3	1.2	0.5
Effluent Data Used			
Ammonia (mg/L)	2.1	2.1	
pH (SU)	7.3	7.3	
Temperature (ºC)	26.0	26.0	
Alkalinity (mg/L CaCO3)	64.0	64.0	
Receiving Stream Data Used			
Ammonia (mg/L)	0.0	0.0	
pH (SU)	8.2	8.2	
Temperature (ºC)	22.6	22.6	
Alkalinity (mg/L CaCO3)	62.3	62.3	
Ammonia Limit Needed?	**No**		
Calculated Limits	AML	MDL	
Ammonia (mg/L)	n/a	n/a	
Effluent data source			

	Acute	Chronic	
		4-day	30-day
Ammonia: DMRs 2022-2024 Temperature and pH: ICIS summary statistics (90th percentile of the daily maximum)			
Ambient data source			
Ammonia: Columbia River Shoreline at The Dalles Marina Jetty Midpoint Temperature, pH, and Alkalinity: Columbia River Shoreline at The Dalles Marina Jetty Midpoint, Hood River STP Ambient Sampling Location, and US197 South end of The Dalles Bridge - Columbia River			

Table 3-17: Ammonia Analysis Information - Winter

	Acute	Chronic	
		4-day	30-day
Dilution	52	211	265
Ammonia Criteria	3.7	2.1	0.9
Effluent Data Used			
Ammonia (mg/L)	0.2	0.2	
pH (SU)	7.1	7.1	
Temperature (ºC)	18.0	18.0	
Alkalinity (mg/L CaCO3)	64.0	64.0	
Receiving Stream Data Used			
Ammonia (mg/L)	0.0	0.0	
pH (SU)	8.3	8.3	
Temperature (ºC)	11.6	11.6	
Alkalinity (mg/L CaCO3)	76.6	76.6	
Ammonia Limit Needed?	**No**		
Calculated Limits	AML	MDL	
Ammonia (mg/L)	n/a	n/a	
Effluent data source			
Ammonia: DMRs 2022-2024 Temperature and pH: ICIS summary statistics (90th percentile of the daily maximum)			
Ambient data source			
Ammonia: Columbia River Shoreline at The Dalles Marina Jetty Midpoint Temperature and pH: Columbia River Shoreline at The Dalles Marina Jetty Midpoint, Hood River STP Ambient Sampling Location, and US197 South end of The Dalles Bridge - Columbia River			

3.3.9.2 Mercury – Human Health Criterion

DEQ determined that this facility is not a likely source of mercury. Therefore, no additional controls or monitoring will be required.

3.4 Antibacksliding

The proposed permit complies with the antibacksliding provisions of CWA sections 402(o) and 303(d)(4) and 40 CFR 122.44(l). Except for the thermal load limit, the proposed limits are the same or more stringent than the existing permit so the antibacksliding provision is satisfied. As discussed in Section 3.3.7 above, during the June – October period, the excess thermal load limit in the proposed permit is less stringent than the thermal load limit in the existing permit. Although antibacksliding provisions generally do not allow relaxation of effluent limits in renewal permits, section 303(d)(4)(A) of the Clean Water Act allows relaxation when the receiving water is not in attainment for the limiting or related pollutant, the effluent limit is based on a TMDL wasteload allocation (WLA), and it can be shown that relaxation is consistent with antidegradation requirements. As noted above, the receiving water is water quality limited for temperature and the new, less stringent excess thermal load limit is based on a TMDL WLA. It also complies with the antidegradation requirement since TMDL WLA ensures the temperature increase is an insignificant increase according to the Oregon's antidegradation rule, OAR 340-041-0004(3)(c). Therefore, the new thermal load limit based on the TMDL wasteload allocation is allowed and is included in the proposed permit.

3.5 Antidegradation

DEQ must ensure the permit complies with Oregon's antidegradation policy found in OAR 340-041-0004. This policy is designed to protect water quality by limiting unnecessary degradation from new or increased sources of pollution.

DEQ has performed an antidegradation review for this discharge. The proposed permit contains the same or more stringent discharge loadings as the existing permit, except for the temperature (thermal load) limit as discussed in Section 3.3.7. Permit renewals with the same or more stringent discharge loadings as the previous permit are not considered to lower water quality from the existing condition.

Under Oregon's Antidegradation Rule, discharges with insignificant temperature increases are not considered degradation (OAR 340-041-0004(3)(c)). Specifically, the rule states that insignificant temperature increases authorized under OAR 340-041-0028(11) and (12) are not considered a reduction in water quality. Section 3.3.7 of this report provides an analysis of the temperature impacts of this discharge and determines appropriate effluent limits to ensure the discharge will result in temperature increases at or below those authorized under OAR 340-041-0028(11) and (12). Based on OAR 340-041-0004 and Section 3.3.7 of this report, this insignificant increase is not considered a degradation of water quality under the antidegradation rule.

DEQ is not aware of any information that the existing limits are not protecting the receiving stream's designated beneficial uses. DEQ is also not aware of any existing uses present within the water body that are not currently protected by standards developed to protect the designated uses. Therefore, DEQ has determined that the proposed discharge complies with DEQ's antidegradation policy. DEQ's antidegradation worksheet for this permit renewal is available upon request.

3.6 Whole Effluent Toxicity

DEQ does not require whole effluent toxicity testing (WET) for minor domestic facilities because concentrations of toxics are typically very low and WET testing is not warranted.

3.7 Groundwater

The treatment facility does not have any unlined basins, ponds or lagoons that are expected to have the potential to leach into the groundwater. No groundwater monitoring or limits are required.

4. Schedule A: Other Limitations

4.1 Mixing Zone

Schedule A describes the regulatory mixing zone as discussed above in section 3.

4.2 Chlorine Usage

Schedule A of the permit prohibits the permittee from using chlorine or chlorine compounds for effluent disinfection purposes.

5. Schedule B: Monitoring and Reporting Requirements

Schedule B of the permit describes the minimum monitoring and reporting necessary to demonstrate compliance with the proposed effluent limits. In addition, monitoring for other parameters is required to better characterize the effluent quality and the receiving stream. This data will be used during the next permit renewal. Detailed monitoring frequency and reporting requirements are in Schedule B of the proposed permit. The required monitoring, reporting and frequency for many of the parameters are based on DEQ's monitoring and reporting matrix guidelines, permit writer judgment, and to ensure the needed data is available for the next permit renewal. DEQ has determined that effluent characterization and monitoring of the receiving stream (Main stem Columbia River) for pH, ammonia, alkalinity, and temperature is necessary to fully evaluate the facility's site specific conditions.

6. Schedule C: Compliance Schedule

The permittee is expected to meet all effluent limits once the permit becomes effective and therefore a compliance schedule is not needed.

7. Schedule D: Special Conditions

The proposed permit contains the following special conditions. The conditions include the following:

7.1 Inflow and Infiltration

A requirement to submit an updated inflow and infiltration report in order to reduce groundwater and stormwater from entering the collection system.

7.2 Emergency Response and Public Notification Plan

A requirement to develop and submit an emergency and spill response plan or ensure the existing one is current per General Condition B.8 in Schedule F.

7.3 Exempt Wastewater Reuse at the Treatment System

A condition that exempts the permit holder from the recycled water requirements in OAR 340-055, when recycled water is used for landscape irrigation at the treatment facility or for in-plant processes, such as in plant maintenance activities.

7.4 Wastewater Solids Annual Report

This condition requires the permittee to submit a Wastewater Solids Annual Report each year documenting removal of wastewater solids from the facility during the previous calendar year.

7.5 Wastewater Solids Transfers

A condition that allows the facility to transfer treated or untreated wastewater solids to other in-state or out-of-state facilities that are permitted to accept the wastewater solids.

7.6 Hauled Waste Control Plan

A condition that allows the acceptance of hauled waste according to a DEQ-approved hauled waste plan. The hauled waste plan ensures waste is not accepted that could negatively impact the treatment capabilities of the facility.

7.7 Operator Certification

The permit holder is required to have a certified operator consistent with the size and type of treatment plant covered by the permit per OAR 340-049-0005. This special condition describes the requirements relating to operator certification.

7.8 Industrial User Survey

This condition requires the permittee to conduct or update an industrial user survey. The purpose of the survey is to identify whether there are any categorical industrial users discharging to the POTW, and ensure regulatory oversight of these discharges.

7.9 Outfall Inspection

A condition that requires the permittee to inspect the outfall and submit a report regarding its condition.

8. Schedule F: NPDES General Conditions

Schedule F contains the following general conditions that apply to all NPDES permittees. These conditions are reviewed by EPA on a regular basis.

- Section A. Standard Conditions
- Section B. Operation and Maintenance of Pollution Controls
- Section C. Monitoring and Records
- Section D. Reporting Requirements
- Section E. Definitions

Appendix A: Reasonable Potential Analyses

Thermal Plumes OAR 340-041-0053(2)(d) Part C Analysis

Temperature Thermal Plume Limitations within the Mixing Zone Rule (OAR 340-041-0053(2)(d))

Facility Name: Cascade Locks STP **Date: 02-13-2024**

OAR 340-041-0053(2)(d)(C): Thermal Shock

25 deg C at 5% of the stream cross section

Enter data into white cells below:

			Data Metric/Source
7Q10 =	80452	cfs	7Q10 flow from dry weather dilution summary (Table 3-9)
Ambient Temperature=	24.5	°C	Maximum ambient temperature - Dalles_Ambient, HoodRiver_Ambient, and 355594-ODEQ
Effluent Flow =	1.95	mgd	Critical monthly effluent flow (1.3 MGD) x 1.5 - dry weather dilution summary (Table 3-9)
Max Daily Effluent Temperature =	26.7	°C	DMRs 2019-2023

5% of 7Q10 =	4022.6	cfs	
5% dilution =	1334		dilution = (Qr*0.05)/Qe + 1
Temperature at 5% cross sectior	**24.5**	**°C**	**No Reasonable Potential**

Equation used to calculate ΔT at edge of MZ

$$\Delta T_{mz} = \frac{T_e + (S-1)T_a}{S} - T_a$$

Equation used to calculate thermal load limit

$$TLL = 3.7854 Q_e S \Delta T_{all} C_p \rho$$

Where:

Qe = Effluent Flow in mgd
S = Dilution
ΔT_{all} = Allowable temperature increase at edge of MZ (°C)
Cp = Specific Heat of Water (1 cal/g °C)
ρ = Density of Water (1 g/cm^3)
3785.41 = Flow conversion from mgd to m^3/day

Thermal Plumes OAR 340-041-0053(2)(d) Part D Analysis

Temperature Thermal Plume Limitations within the Mixing Zone Rule (OAR 340-041-0053(2)(d))

Facility Name: Cascade Locks STP **Date: 02-13-2024**

OAR 340-041-0053(2)(d)(D): Migration Blockage

21 deg C at 25% of the stream cross section

Enter data into white cells below:

			Data Metric/Source
7Q10 =	80452	cfs	7Q10 stream flow from dry weather dilution summary (Table 3-9)
Ambient Temperature =	21	°C	Max ambient temperature >21, so used 21 °C - Dalles_Ambient, HoodRiver_Ambient, and 355594-ODEQ
Effluent Flow =	1.95	mgd	Critical monthly effluent flow (1.3 MGD) x 1.5 - dry weather dilution summary (Table 3-9)
Max 7dAM Effluent Temperature =	26.7	°C	DMRS 2019-2023

25% of 7Q10 =	20113.0	cfs	
25% dilution =	6668		dilution = (Qr*0.25)/Qe + 1
Temperature at 25% cross section =	**21.0**	**°C**	
ΔT at 25% Stream Flow=	**0.0**	**°C**	**No Reasonable Potential**

Equation used to calculate ΔT at edge of MZ

$$\Delta T_{mz} = \frac{T_e + (S-1)T_a}{S} - T_a$$

Equation used to calculate thermal load limit

$$TLL = 3.7854 Q_e S \Delta T_{all} C_p \rho$$

Where:

Qe = Effluent Flow in mgd
S = Dilution
ΔT_{all} = Allowable temperature increase at edge of MZ (°C)
Cp = Specific Heat of Water (1 cal/g °C)
ρ = Density of Water (1 g/cm^3)
3785.41 = Flow conversion from mgd to m^3/day