FACT SHEET FOR NPDES PERMIT WA0024660

City of Montesano Wastewater Treatment Plant

Date of Public Notice: September 9, 2024

Permit Effective Date: December 1, 2024

Purpose of this fact sheet

This fact sheet explains and documents the decisions the Department of Ecology (Ecology) made in drafting the proposed National Pollutant Discharge Elimination System (NPDES) permit for the City of Montesano Wastewater Treatment Plant (Montesano WWTP).

This fact sheet complies with Section 173-220-060 of the Washington Administrative Code (WAC), which requires Ecology to prepare a draft permit and accompanying fact sheet for public evaluation before issuing an NPDES permit.

Ecology makes the draft permit and fact sheet available for public review and comment at least thirty (30) days before issuing the final permit. Copies of the fact sheet and draft permit for Montesano WWTP, NPDES permit WA0024660, are available for public review and comment from September 9, 2024, to October, 10, 2024. For more details on preparing and filing comments about these documents, please see Appendix A - Public Involvement Information.

Montesano WWTP reviewed the draft permit and fact sheet for factual accuracy. Ecology corrected any errors or omissions regarding the facility's location, history, discharges, or receiving water prior to publishing this draft fact sheet for public notice.

After the public comment period closes, Ecology will summarize substantive comments and provide responses to them. Ecology will include the summary and responses to comments in this fact sheet as Appendix E - Response to Comments, and publish it when issuing the final NPDES permit. Ecology generally will not revise the rest of the fact sheet. The full document will become part of the legal history contained in the facility's permit file.

Summary

The City of Montesano operates an activated sludge (Biolac®) wastewater treatment plant that discharges to the Chehalis River at river mile 13.41. Ecology issued the previous permit for this facility on August 7, 2014. The previous permit became effective September 1, 2014. Ecology has administratively extended the previous permit since it expired on August 31, 2019.

The proposed permit includes the same effluent limits for biochemical oxygen demand (BOD_5) concentration, total suspended solids (TSS) concentration, total residual chlorine, pH, and fecal coliform. Ecology implemented the requirement that Montesano

WWTP reduce BOD_5 and TSS mass loading by at least 85%. This change decreased the effluent mass limits for BOD_5 to a monthly average of 159 lbs/day and a weekly average of 239 lbs/day. This change also decreased the effluent mass limits for TSS to a monthly average of 33 lbs/day and a weekly average of 50 lbs/day. Ecology increased effluent total residual chlorine monitoring from twice per week to five times per week. Ecology added monitoring requirements for *E. coli* and groundwater.

TABLE OF CONTENTS

I. Introduction

The Federal Clean Water Act (FCWA, 1972, and later amendments in 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One mechanism for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System (NPDES), administered by the federal Environmental Protection Agency (EPA). The EPA authorized the state of Washington to manage the NPDES permit program in our state. Our state legislature accepted the delegation and assigned the power and duty for conducting NPDES permitting and enforcement to Ecology. The Legislature defined Ecology's authority and obligations for the wastewater discharge permit program in 90.48 RCW (Revised Code of Washington).

The following regulations in the Washington Administrative Code (WAC) apply to domestic wastewater NPDES permits:

- Procedures Ecology follows for issuing NPDES permits (chapter 173-220 WAC)
- Discharge standards for domestic wastewater facilities (chapter 173-221 WAC)
- Water quality criteria for surface waters (chapter 173-201A WAC)
- Water quality criteria for ground waters (chapter 173-200 WAC)
- Whole effluent toxicity testing and limits (chapter 173-205 WAC)
- Sediment management standards (chapter 173-204 WAC)
- Submission of plans and reports for construction of wastewater facilities (chapter 173-240 WAC)

These rules require any treatment facility owner/operator to obtain an NPDES permit before discharging wastewater to state waters. They also help define the basis for limits on each discharge and for performance requirements imposed by the permit.

Under the NPDES permit program and in response to a complete and accepted permit application, Ecology must prepare a draft permit and accompanying fact sheet and make them available for public review before final issuance. Ecology must also publish an announcement (public notice) telling people where they can read the draft permit, and where to send their comments, during a period of thirty days (WAC 173-220-050). (See *Appendix A-Public Involvement Information* for more detail about the public notice and comment procedures). After the public comment period ends, Ecology may make changes to the draft NPDES permit in response to comment(s). Ecology will summarize the responses to comments and any changes to the permit in Appendix E.

II. Background information

Table 1 - Facility information

Applicant:	
Facility name and address	City of Montesano Wastewater Treatment Plant 128 State Route 107 Montesano, WA 98563
Contact at facility	Name: Jeff McElliott Title: Chief Operator Telephone #: 360-470-2419 Email: jmcelliott@montesano.us
Responsible official	Name: Tyler Trimble Title: Mayor Address: 112 N Main St Montesano, WA 98563 Email: ttrimble@montesano.us
Type of treatment	Activated Sludge (Biolac®)
Facility location (NAD83/WGS84 reference datum)	Latitude: 46.9676 Longitude: -123.6068
Discharge waterbody name and location (NAD83/WGS84 reference datum)	Chehalis River at River Mile 13.41 Latitude: 46.9640° Longitude: -123.6020°

Permit status

Renewal date of previous permit: September 1, 2014

Application for permit renewal submittal date: February 25, 2019

Date of Ecology acceptance of application: May 8, 2019

Inspection status

Date of last non-sampling inspection: April 2, 2024

Figure 1 - Facility location map

This picture shows the Montesano WWTP in the upper left relative to State Route 107 and the Chehalis River. The yellow cross in the upper left indicates the treatment plant influent and the yellow cross in the lower right indicates the outfall to the Chehalis River.

Figure 2 - Facility aerial view

This picture gives a close-up aerial view of Montesano WWTP.

II.A. Facility description

1. History

Before 1992, the Montesano WWTP discharged primary treated effluent to the Chehalis River. The original sewer system consisted of gravity sewers and mains constructed before 1968. In 1992, the City of Montesano (City) commissioned a full sewer system replacement to address deterioration. Regulations required the City to also add secondary treatment to the wastewater plant.

To meet these requirements and renovate the deteriorating system, the City completed construction of a secondary lagoon system in 1991. The City also switched the collection system to include septic tank effluent pumps (STEP) in 1991. This system is discussed further in the 'Collection system status' section below. In 1999, the treatment system was further upgraded to a complete-mix activated sludge (Biolac®) treatment system.

Since the early 2000s, the Montesano WWTP has been working to stop erosion on the north and west sides of the treatment facility. The Wynoochee River has migrated toward the facility over time, cutting a deep channel directly next to the facility. The City has taken measures to reduce this threat to the WWTP.

As a first attempt to fortify the WWTP, in 2007 the City drove 60-foot sheet pile 59 feet deep on the north and west sides of the facility. The design of this fortification accounted for some erosion of the river bank, exposing the buried sheet pile. However, within ten years an inspection showed that the river had eroded the bank to a depth of 30 feet from the top of the sheet pile.

In 2009, an extreme rain event caused significant flooding in the Montesano area. Floodwaters at the Montesano WWTP reached within two inches of the rim of the secondary clarifiers. Operators were forced to access the WWTP by boat. In response to the flood, in 2010 the City installed an additional barrier of 10-foot sheet pile around the WWTP at the elevation of the 500-year flood plain.

In 2017, the City partnered with Parametrix Consultants on a Technical Memorandum to evaluate alternate facility locations and treatment technologies for wastewater treatment. The memo identified three alternate locations but indicated that fortifying and modifying the existing facility would be the most cost-effective alternative in the short term.

After the report, the City began fortifying the scoured sheet pile with 10-inch rock fill. Next, they installed log jams on the northwest corner of the WWTP in 2017. The log jams were meant to slow the river flow next to the WWTP, encourage sediment and debris buildup, and attempt to push the river back from the WWTP. Additional log jams were installed in 2018 totaling 240 jams. Since installation, some sediment has returned to the gravel bar on the north side of the facility. The City is working with the Office of the Chehalis Basin to complete a technical evaluation of this log jam project.

In 2019, the City emptied the sludge basin and filled in the northwest half of the basin to keep sludge further from the encroaching river. This project included installing a new high-density polyethylene (HDPE) double liner with leak detection for the sludge basin. The City asserts that fortification of the WWTP has been effective, and the plant is no longer in danger.

2. Collection system status

The City completed construction of the current septic tank effluent pumping (STEP) collection system in 1991. Each single-family house in the service area has its own septic tank, while multi-family housing units share a tank. As additional home and business connections are added to the system, they are incorporated into the STEP system. The septic tanks collect settleable solids while wastewater and suspended waste material is pumped from the septic tanks to the WWTP.

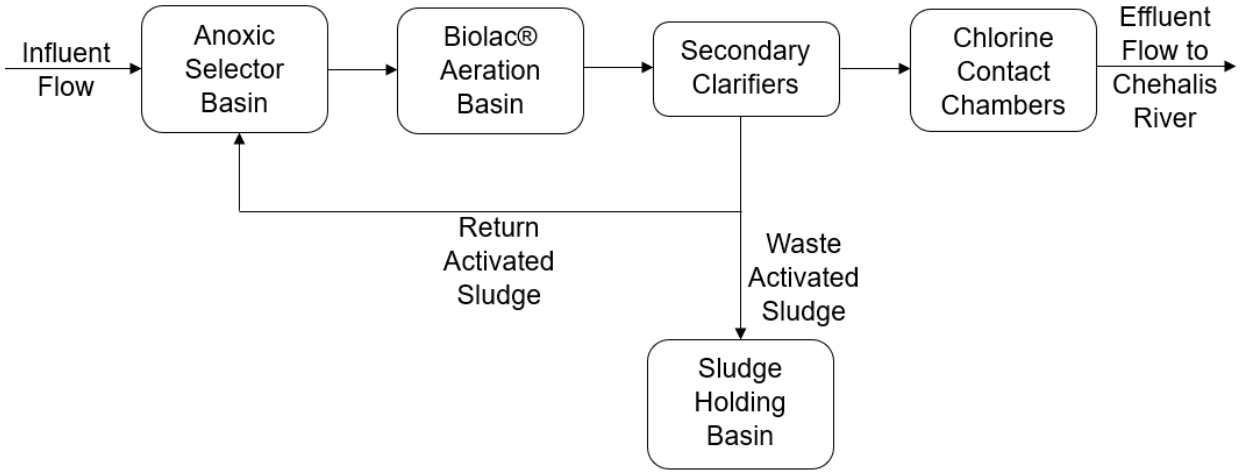
The system originally had approximately 86,000 feet of 2 inch to 8 inch diameter pressure mains that connected the 1,000 STEP tanks throughout the City to the Montesano WWTP force main. In 2024, Montesano reports the collection system has about 144,000 feet of force main and over 1,500 STEP tanks.

Individual force mains connect the STEP systems to the Montesano WWTP force main. The Montesano WWTP force main includes 5,000 feet of 10 inch pipe with railroad, creek, and freeway crossings before reaching the treatment plant.

Influent flow data from the WWTP indicates there is not a significant inflow and infiltration (I/I) issue in the collection system at this time. However, consistent maintenance of the collection system is important to prevent future issues.

3. Treatment process

Figure 3 – Montesano WWTP treatment process flow diagram



Montesano WWTP treats wastewater using an activated sludge (Biolac®) process followed by secondary clarification and disinfection using chlorine gas. The facility does not screen the influent or remove grit because these materials are captured by the STEP system prior to the WWTP.

The process starts in a three-cell anoxic selector basin where influent wastewater mixes with return activated sludge (RAS). The anoxic selector is controlled in a low dissolved oxygen, high BOD condition to encourage the desired bacterial conditions in the aeration basin. If the influent alkalinity is low, the operator can add lime to increase alkalinity.

Wastewater flows from the anoxic selector to the Biolac® aeration basin. The Biolac® aeration system includes eight floating, parallel lines of gas diffusers to enhance the aeration and mixing of the wastewater. These diffusers are extended on HDPE piping below the surface near the bottom of the basin.. The HDPE single-layer liner for the aeration basin was installed in 1991 and has reached the end of its service life. The liner has methane venting but does not

have a leak detection system. Four groundwater monitoring wells are located on the northern, eastern, southern, and north-western boundaries of the WWTP. However, to date, Montesano WWTP has not submitted a hydrogeologic study of these wells to Ecology to verify they can adequately monitor groundwater quality.

Following aeration, wastewater flows to the two secondary clarifiers. The clarifiers are redundant, with one in operation during low flows and two during high flows. Sludge from the bottom of the clarifier is separated into RAS and waste activated sludge (WAS). Pumps send RAS continuously to the anoxic selector basin. Pumps divert WAS to a sludge pond when sludge wasting is required. The City installed a new sludge pond double liner in 2019 with a leak detection system.

Clarified effluent flows from the top of the clarifier to the chlorine contact chambers for disinfection. Montesano WWTP uses chlorine gas to disinfect their effluent followed by sulfur dioxide de-chlorination to reduce the total residual chlorine in the final effluent.

Following de-chlorination, Montesano WWTP discharges treated effluent to the Chehalis River at river mile 13.41. The outfall is a single-port diffuser. If the river is high or there are increased effluent flows, the treatment plant can use an effluent pump to force the discharge into the river.

Montesano WWTP is a Class II plant, which requires a Group II certified operator in responsible charge. The plant has a Group II operator responsible for day-to-day operations on staff, eight-hours per day, Monday through Friday, and on-call on the weekends.

Montesano WWTP has no significant industrial users (SIUs) or potential significant industrial users (PSIUs). Therefore, the discharge of toxic substances to the treatment plant is likely minimal.

4. Solid wastes and residual solids

The City of Montesano has a septic tank effluent pumping (STEP) collection system that removes grit, screenings, and some solids from influent wastewater prior to the WWTP. Solids are removed from these STEP tanks as needed and sent to the Shelton WWTP for further processing.

Wastewater is pumped from the STEP tanks to the Montesano WWTP. The treatment facility removes additional solids at the secondary clarifiers and holds them in a sludge holding pond. Once the pond is full, the WWTP sends the solids to a landfill for disposal, typically every 7-8 years. The last time Montesano WWTP removed solids from the sludge pond was 2019, and they disposed of them at a landfill in Wasco County, OR.

This facility has met the solid waste requirements for screening, as required by WAC 173-308-205, by use of 1/8 inch screens at the inlets to each individual STEP tank. These screenings are removed by the City and sent to the local landfill.

5. Discharge outfall

The treated and disinfected effluent flows into the Chehalis River at river mile 13.41. The effluent force main/gravity pipe is 1200 ft long with a submerged, 8-inch diameter, single-port outfall. The outfall is located about 2,000 ft upstream of the confluence of the Wynoochee and Chehalis Rivers and approximately 80 feet from the river bank. At mean lower low water (MLLW), the outfall is approximately 20.0 feet below the river surface.

II.B. Description of the receiving water

Montesano WWTP discharges to the Chehalis River at river mile 13.41. There are no other nearby point source outfalls. Significant nearby non-point sources of pollutants include agricultural runoff, silvicultural runoff, and industrial stormwater runoff. There are no nearby drinking water intakes on the Chehalis River. Section IIIE of this fact sheet describes any receiving waterbody impairments.

The ambient background data used for this permit includes the following data from Ecology's Environmental Information Management System (EIM) shown in Table 2. The EIM data Ecology used can be found at two location IDs: G07001163153 (data collected from 2006 to 2009) and GHEC_005 (data collected in July 2022).

Table 2 - Ambient background data

Parameter	Value
Temperature (90th Percentile)	17.3°C
pH (Minimum / Maximum)	7.0 / 8.1 standard units
Dissolved Oxygen (10th Percentile)	8.3 mg/L
Total Ammonia-N (90th Percentile)	0.026 mg/L
Fecal Coliform (90th Percentile)	18/100 mL
Turbidity (90th Percentile)	14.9 NTU
Alkalinity (Average)	34.3 mg/L as $CaCO_3$
Hardness (Average)	31.3 mg/L as $CaCO_3$
Total Suspended Solids (Average)	11.6 mg/L
Biochemical Oxygen Demand (Average)	1.7 mg/L

II.C. Wastewater influent characterization

Montesano WWTP reported the concentration of pollutants in the wastewater influent in the permit application and in discharge monitoring reports. The tabulated data represents the quality of the wastewater influent from February 1, 2019, to January 31, 2024.

Table 3 - Wastewater influent characterization

Parameter	Units	Number of Samples	Average value	Maximum value
Flow	MGD	1826	0.298	0.977
Biochemical Oxygen Demand (BOD_5)	mg/L	522	143	187
Biochemical Oxygen Demand (BOD_5)	lbs/day	522	351	585
Total Suspended Solids (TSS)	mg/L	522	41	94
Total Suspended Solids (TSS)	lbs/day	522	102	298

II.D. Wastewater effluent characterization

Montesano WWTP reported the concentration of pollutants in the discharge in the permit application and in discharge monitoring reports. The tabulated data represents the quality of the wastewater effluent discharged from February 1, 2019, to January 31, 2024.

Table 4 - Wastewater effluent characterization

Parameter	Units	Number of Samples	Average value	Maximum value
Flow	MGD	1826	0.272	0.969
Biochemical Oxygen Demand (BOD_5)	mg/L	522	3.7	12.0
Biochemical Oxygen Demand (BOD_5)	lbs/day	522	8.7	57
Total Suspended Solids (TSS)	mg/L	522	1.8	6.5
Total Suspended Solids (TSS)	lbs/day	522	3.9	24.3
Chlorine (Total Residual)	mg/L	1231	0.01	0.33
Ammonia (Total)	mg/L	19	0.11	0.45
Kjeldahl Nitrogen (Total)	mg/L	19	3.1	4.7
Nitrate + Nitrite (Total)	mg/L	19	28	43
Phosphorus (Total)	mg/L	19	6.6	12
Phosphorus (Soluble Reactive)	mg/L	19	5.6	8.1
Hardness	mg/L	4	102	130
Total Dissolved Solids	mg/L	4	278	320

Parameter	Units	Number of Samples	Maximum Monthly Geometric Mean	Maximum Weekly Geometric Mean
Fecal Coliform	#/100mL	522	7	108

Parameter	Units	Number of Samples	Average Value	Minimum value	Maximum value
pH	Standard Units	1826	Not Applicable	6.1	7.0

Parameter	Units	Number of Samples	Average Value	Minimum value	Maximum value
Dissolved Oxygen	mg/L	4	4.2	3.5	5.1
Temperature	°C	1826	16.1	5.8	25.7

II.E. Summary of compliance with previous permit issued 9/1/2014

The previous permit placed effluent limits on biochemical oxygen demand (BOD_5), total suspended solids (TSS), total residual chlorine, pH, and fecal coliform bacteria.

Montesano WWTP has complied with the effluent limits and permit conditions throughout the duration of the permit issued on September 1, 2014, except for two days of missed sampling for pH and temperature of the effluent. The facility reported that this was an employee error. Montesano WWTP immediately initiated retraining, which resulted in no further missed sampling. Ecology assessed compliance based on its review of the facility's information in the Ecology Permitting and Reporting Information System (PARIS), discharge monitoring reports (DMRs) and on inspections.

Table 5 – Violations, September 1, 2014 to January 3, 2024

Violation date	Parameter type	Unit type	Max limit	Min limit	Statistical base type	Violation
6/24/2017	pH (Hydrogen Ion)	Standard Units	9	6	Single Sample	Analysis Not Conducted
6/24/2017	Temperature	Degrees Celsius	Not Applicable (NA)	NA	Single Sample	Analysis Not Conducted
6/25/2017	pH (Hydrogen Ion)	Standard Units	9	6	Single Sample	Analysis Not Conducted
6/25/2017	Temperature	Degrees Celsius	NA	NA	Single Sample	Analysis Not Conducted

The following table summarizes compliance with report submittal requirements over the permit term.

Table 6 - Permit submittals, September 1, 2014 to January 3, 2024

Submittal name	Submittal status	Due date	Received date
Wasteload Assessment	Accepted	06/30/2015	06/1/2015
Annual List Of Industrial Users	Accepted	08/15/2015	07/23/2015
Noncompliance Notification	Accepted		05/20/2016

Submittal name	Submittal status	Due date	Received date
Wasteload Assessment	Accepted	06/30/2016	06/17/2016
Annual List Of Industrial Users	Submitted	08/15/2016	07/28/2016
Wasteload Assessment	Reviewed	06/30/2017	06/13/2017
Wasteload Assessment	Reviewed	06/30/2017	06/13/2017
Annual List Of Industrial Users	Accepted	08/15/2017	08/02/2017
Wasteload Assessment	Accepted	06/30/2018	05/22/2018
Annual List Of Industrial Users	Accepted	08/15/2018	07/20/2018
Outfall Evaluation	Accepted	08/15/2018	07/20/2018
Application for Permit Renewal	Received	03/01/2019	02/25/2019
Wasteload Assessment	Accepted	06/30/2019	02/26/2019
Treatment Plant Improvements Basis of Design Tech Memo	Approved		06/09/2019
Treatment Plant Improvements Contract Documents Vol 1 & 2	Approved		06/09/2019
Treatment Plant Improvements Plans	Approved		06/09/2019
Annual List Of Industrial Users	Accepted	08/15/2019	08/01/2019
Wasteload Assessment	Accepted	06/30/2020	06/02/2020
Annual List Of Industrial Users	Accepted	08/15/2020	07/14/2020
Wasteload Assessment	Accepted	06/30/2021	06/02/2021
Annual List Of Industrial Users	Submitted	08/15/2021	07/20/2021
Wasteload Assessment	Reviewed	06/30/2022	05/24/2022
Annual List Of Industrial Users	Reviewed	08/15/2022	05/25/2022
Wasteload Assessment	Accepted	06/30/2023	02/22/2023
Annual List Of Industrial Users	Accepted	08/15/2023	02/22/2023

II.F. State environmental policy act (SEPA) compliance

State law exempts the issuance, reissuance or modification of any wastewater discharge permit from the SEPA process as long as the permit contains conditions that are no less stringent than federal and state rules and regulations (RCW 43.21C.0383). The exemption applies only to existing discharges, not to new discharges.

III. Proposed permit limits

Federal and state regulations require that effluent limits in an NPDES permit must be either technology- or water quality-based.

- Technology-based limits are based upon the treatment methods available to treat specific pollutants. Technology-based limits are set by the EPA and published as a regulation, or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).

- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC), or the Federal Water Quality Criteria Applicable to Washington (40 CFR 131.45).
- Ecology must apply the most stringent of these limits to each parameter of concern. These limits are described below.

The limits in this permit reflect information received in the application and from supporting reports (engineering, hydrogeology, etc.). Ecology evaluated the permit application and determined the limits needed to comply with the rules adopted by the state of Washington. Ecology does not develop effluent limits for all reported pollutants. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation.

Ecology does not usually develop limits for pollutants not reported in the permit application but may be present in the discharge. The permit does not authorize discharge of the non-reported pollutants. During the permit term, the facility's effluent discharge conditions may change from those conditions reported in the permit application. The facility must notify Ecology if significant changes occur in any constituent [40 CFR 122.42(a)]. Until Ecology modifies the permit to reflect additional discharge of pollutants, a permitted facility could be violating its permit.

III.A. Design criteria

Under WAC 173-220-150 (1)(g), flows and waste loadings must not exceed approved design criteria. Ecology approved design criteria for this facility's treatment plant in the facility plan dated February 1997 and prepared by Parametrix, Inc. (Parametrix, Inc., 1997). The table below includes design criteria from the referenced report.

Table 7 - Design criteria for Montesano WWTP

Parameter	Design quantity
Maximum Month Design Flow (MMDF)	0.670 MGD
Maximum Day Flow	1.60 MGD
Peak Instantaneous Design Flow (PIDF)	2.00 MGD
BOD_5 Loading for Maximum Month	1060 lb/day
TSS Loading for Maximum Month	220 lb/day
Ammonia (NH_3-N) Loading for the Maximum Month	340 lbs/day

III.B. Technology-based effluent limits

Federal and state regulations define some technology-based effluent limits for domestic wastewater treatment plants. These effluent limits are given in 40 CFR

Part 133 (federal) and in chapter 173-221 WAC (state). WAC 173-220-130 requires that "effluent limitations shall not be less stringent than those based upon the treatment facility design efficiency contained in approved engineering plans and reports." The proposed permit includes technology-based limits based on the approved treatment facility design.

The table below identifies technology-based limits for pH, fecal coliform, BOD_5, and TSS, as listed in chapter 173-221 WAC, and chlorine. Section III.F of this fact sheet describes the potential for water quality-based limits.

Table 8 - Technology-based limits

Parameter	Average Monthly	Average Weekly
BOD_5	30 mg/L	45 mg/L
BOD_5	The BOD_5 effluent concentration must not exceed fifteen percent (15%) of the average influent concentration	
TSS	30 mg/L	45 mg/L
TSS	The TSS effluent concentration must not exceed fifteen percent (15%) of the average influent concentration	

Parameter	Average Monthly	Average Weekly
Chlorine	0.50 mg/L	0.75 mg/L

Parameter	Monthly Geometric Mean	Weekly Geometric Mean
Fecal coliform bacteria	200 organisms/100 mL	400 organisms/100 mL

Parameter	Daily Minimum	Daily Maximum
pH	6.0 standard units	9.0 standard units

Ecology derived the technology-based monthly average limit for chlorine from standard operating practices. ***Chlorination of Wastewater*** (Water Pollution Control Federation, 1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.50 mg/L chlorine residual is maintained after fifteen minutes of contact time. See also ***Wastewater Engineering, Treatment, Disposal and Reuse***, (Metcalf & Eddy, Inc., 1991). A treatment plant that provides adequate chlorination contact time can meet the 0.50 mg/L chlorine limit on a monthly average basis. According to WAC 173-221-030(11)(b), the corresponding weekly average is 0.75 mg/L.

Technology-based mass limits for BOD_5 and TSS are based on WAC 173-220-130(3)(b) and WAC 173 221-030(11)(b). Ecology calculated the monthly and weekly average mass limits for BOD_5 and TSS as follows:

Technology-based mass limits for BOD_5 and TSS are based on WAC 173-220-130(3)(b), WAC 173 221 030(11)(b), WAC 173-220-130(1)(a) and (g), and WAC 173-221-040(1). Ecology calculated the monthly and weekly average mass limits for BOD_5 and TSS as follows:

Average monthly mass limit = Influent mass monthly design load (lbs/day) x 0.15

Average weekly mass limit = Average monthly mass limit x 1.5

Table 9 - Technology-based mass limits

Parameter	Influent design load (lbs/day)	Mass limit (lbs/day)
BOD_5 Monthly Average	1,060	159
BOD_5 Weekly Average	NA (Not Applicable)	239
TSS Monthly Average	220	33
TSS Weekly Average	NA	50

III.C. Surface water quality-based effluent limits

The Washington State surface water quality standards (chapter 173-201A WAC) are designed to protect existing water quality and preserve the beneficial uses of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet the surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin wide total maximum daily load study (TMDL).

1. Numeric criteria for the protection of aquatic life and recreation

Numeric water quality criteria are listed in the water quality standards for surface waters (chapter 173-201A WAC). They specify the maximum levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numeric criteria along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

2. Numeric criteria for the protection of human health

Numeric criteria for the protection of human health are promulgated in chapter 173-201A WAC and 40 CFR 131.45. These criteria are designed to protect human health from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters.

The water quality standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

3. Narrative criteria

Narrative water quality criteria (e.g., WAC 173-201A-240(1)) limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values.
- Adversely affect human health.

Narrative criteria protect the specific designated uses of all fresh waters (WAC 173-201A-200) and of all marine waters (WAC 173-201A-210) in the state of Washington.

4. Antidegradation

The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330) 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 (AKART).
- Apply three tiers of protection (described below) for surface waters of the state.

Tier I: ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollutions.

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

Tier III: prevents the degradation of waters formally listed as "outstanding resource waters," and applies to all sources of pollution.

A facility must prepare a Tier II analysis when all three of the following conditions are met:

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

Facility specific requirements – This facility must meet Tier I requirements.

- Dischargers must maintain and protect existing and designated uses. Ecology must not allow any degradation that will interfere with, or become injurious to, existing or designated uses, except as provided for in chapter 173-201A WAC.
- Ecology's analysis described in this section of the fact sheet demonstrates that the proposed permit conditions will protect existing and designated uses of the receiving water.

5. Mixing zones

A mixing zone is the defined area in the receiving water surrounding the discharge port(s), where wastewater mixes with receiving water. Within mixing zones the pollutant concentrations may exceed water quality numeric standards, so long as the discharge doesn't interfere with designated uses of the receiving water body (for example, recreation, water supply, and aquatic life and wildlife habitat, etc.) The pollutant concentrations outside of the mixing zones must meet water quality numeric standards.

State and federal rules allow mixing zones because the concentrations and effects of most pollutants diminish rapidly after discharge, due to dilution. Ecology defines mixing zone sizes to limit the amount of time any exposure to the end-of-pipe discharge could harm water quality, plants, or fish.

The state's water quality standards allow Ecology to authorize mixing zones for the facility's permitted wastewater discharges only if those discharges already receive all known, available, and reasonable methods of prevention, control, and treatment (AKART). Mixing zones typically require compliance with water quality criteria within a specified distance from the point of discharge and must not use more than 25% of the available width of the water body for dilution (WAC 173-201A-400 (7)).

Ecology uses modeling to estimate the amount of mixing within the mixing zone. Through modeling Ecology determines the potential for violating the water quality standards at the edge of the mixing zone and derives any necessary effluent limits. Steady-state models are the most frequently used tools for conducting mixing zone analyses. Ecology chooses values for each effluent and for receiving water variables that correspond to the time period when the most critical condition is likely to occur. Each critical condition parameter, by itself, has a low

probability of occurrence and the resulting dilution factor is conservative. The term “reasonable worst-case” applies to these values.

The mixing zone analysis produces a numerical value called a dilution factor (DF). A dilution factor represents the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. For example, a dilution factor of 4 means the effluent is 25% and the receiving water is 75% of the total volume of water at the boundary of the mixing zone. Ecology uses dilution factors with the water quality criteria to calculate reasonable potentials and effluent limits. Water quality standards include both aquatic life-based criteria and human health-based criteria. The former are applied at both the acute and chronic mixing zone boundaries; the latter are applied only at the chronic boundary. The concentration of pollutants at the boundaries of any of these mixing zones may not exceed the numerical criteria for that zone.

Each aquatic life acute criterion is based on the assumption that organisms are not exposed to that concentration for more than one hour and more often than one exposure in three years. Each aquatic life chronic criterion is based on the assumption that organisms are not exposed to that concentration for more than four consecutive days and more often than once in three years.

The two types of human health-based water quality criteria distinguish between those pollutants linked to non-cancer effects (non-carcinogenic) and those linked to cancer effects (carcinogenic). The human health-based water quality criteria incorporate several exposure and risk assumptions. These assumptions include:

- A 70-year lifetime of daily exposures.
- An ingestion rate for fish or shellfish measured in kg/day.
- An ingestion rate of two and four tenths (2.4) liters/day for drinking water (increased from two liters/day in the 2016 Water Quality Standards update).
- A one-in-one-million cancer risk for carcinogenic chemicals.

This permit authorizes a small acute mixing zone, surrounded by a chronic mixing zone around the point of discharge (WAC 173-201A-400). The water quality standards impose certain conditions before allowing the discharger a mixing zone:

a. Ecology must specify both the allowed size and location in a permit.

The proposed permit specifies the size and location of the allowed mixing zone (as specified below).

b. The facility must fully apply “all known, available, and reasonable methods of prevention, control and treatment” (AKART) to its discharge.

Ecology has determined that the treatment provided at Montesano WWTP meets the requirements of AKART (see "Technology-based Limits").

c. Ecology must consider critical discharge conditions.

Surface water quality-based limits are derived for the water body's critical condition (the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or designated waterbody uses). The critical discharge condition is often pollutant-specific or waterbody-specific.

Critical discharge conditions are those conditions that result in reduced dilution or increased effect of the pollutant. Factors affecting dilution include the depth of water, the density stratification in the water column, the currents, and the rate of discharge. Density stratification is determined by the salinity and temperature of the receiving water. Temperatures are warmer in the surface waters in summer. Therefore, density stratification is generally greatest during the summer months. Density stratification affects how far up in the water column a freshwater plume may rise. The rate of mixing is greatest when an effluent is rising. The effluent stops rising when the mixed effluent is the same density as the surrounding water. After the effluent stops rising, the rate of mixing is much more gradual. Water depth can affect dilution when a plume might rise to the surface when there is little or no stratification. Ecology's ***Permit Writer's Manual*** (Ecology, 2018) describes additional guidance on criteria/design conditions for determining dilution factors.

Table 10 - Critical conditions used to model the discharge

Critical condition	Value
Seven-day-average low river flow with a recurrence interval of ten years (7Q10)	500 cfs
Outfall depth at mean lower low water (MLLW)	20.0 feet
Outfall depth at mean higher high water (MHHW)	27.7 feet
Outfall diameter	8 inches
Effluent temperature	23°C
Salinity	0.2 ppt
River temperature	20.5°C
River velocity	0.007 m/s
Vertical angle of outfall	22.5°
Maximum average monthly dry weather effluent flow	0.64 MGD
Maximum daily flow for acute mixing zone	0.85 MGD

Ecology obtained ambient data at critical conditions in the vicinity of the outfall from the Montesano Outfall Dilution Ratio Study conducted in 1993 by Parametrix Inc (Parametrix, Inc., 1993). Although this study is over 31 years old, Ecology determined it remains conservative enough to calculate limits from it.

The 7Q10 low flow of this portion of the Chehalis River based on the United States Geological Survey's (USGS) StreamStats tool is 998 cfs. The 500 cfs 7Q10 low flow value used for this mixing zone study is much more conservative. This value was based on the USGS gauge station near Porter, WA which is about 21 miles upstream of the WWTP outfall and experiences lower flows than those near the outfall. Additionally, the average monthly flow for Montesano WWTP for the past five years is only 0.272 MGD, including flows during wet weather. This is still less than half the average monthly dry weather effluent flow of 0.64 MGD used for this study. The modelled river velocity of 0.007 m/s also accounts for the slowing and reversal of the river at low flows and high tides.

d. Supporting information must clearly indicate the mixing zone would not:

- Have a reasonable potential to cause the loss of sensitive or important habitat.
- Substantially interfere with the existing or characteristic uses.
- Result in damage to the ecosystem.
- Adversely affect public health.

Ecology established Washington State water quality criteria for toxic chemicals using EPA criteria. EPA developed the criteria using toxicity tests with numerous organisms and set the criteria to generally protect the species tested and to fully protect all commercially and recreationally important species.

EPA sets acute criteria for toxic chemicals assuming organisms are exposed to the pollutant at the criteria concentration for one hour. They set chronic standards assuming organisms are exposed to the pollutant at the criteria concentration for four days. Dilution modeling under critical conditions generally shows that both acute and chronic criteria concentrations are reached within minutes of discharge.

The discharge plume does not impact drifting and non-strong swimming organisms because they cannot stay in the plume close to the outfall long enough to be affected. Strong swimming fish could maintain a position within the plume, but they can also avoid the discharge by swimming away. Mixing zones generally do not affect benthic organisms (bottom dwellers) because the buoyant plume rises in the water column. Ecology has additionally determined that the effluent will not exceed 33 degrees C for more than two seconds after discharge; and that the temperature of the water will not create lethal conditions or blockages to fish migration.

Ecology evaluates the cumulative toxicity of an effluent by testing the discharge with whole effluent toxicity (WET) testing.

Ecology reviewed the above information, the specific information on the characteristics of the discharge, the receiving water characteristics and the

discharge location. Based on this review, Ecology concluded that the discharge does not have a reasonable potential to cause the loss of sensitive or important habitat, substantially interfere with existing or characteristics uses, result in damage to the ecosystem, or adversely affect public health if the permit limits are met.

e. The discharge/receiving water mixture must not exceed water quality criteria outside the boundary of a mixing zone.

Ecology conducted a reasonable potential analysis, using procedures established by the EPA and by Ecology, for each pollutant and concluded the discharge/receiving water mixture will not violate water quality criteria outside the boundary of the mixing zone if permit limits are met.

f. The size of the mixing zone and the concentrations of the pollutants must be minimized.

At any given time, the effluent plume uses only a portion of the acute and chronic mixing zone, which minimizes the volume of water involved in mixing. The plume mixes as it rises through the water column therefore much of the receiving water volume at lower depths in the mixing zone is not mixed with discharge. Similarly, because the discharge may stop rising at some depth due to density stratification, waters above that depth will not mix with the discharge. Ecology determined it is impractical to specify in the permit the actual, much more limited volume in which the dilution occurs as the plume rises and moves with the current.

Ecology minimizes the size of mixing zones by requiring dischargers to install diffusers when they are appropriate to the discharge and the specific receiving waterbody. When a diffuser is installed, the discharge is more completely mixed with the receiving water in a shorter time. Ecology also minimizes the size of the mixing zone (in the form of the dilution factor) using design criteria with a low probability of occurrence. For example, Ecology uses the expected 95th percentile pollutant concentration, the 90th percentile background concentration, the centerline dilution factor, and the lowest flow occurring once in every ten years to perform the reasonable potential analysis.

Because of the above reasons, Ecology has effectively minimized the size of the mixing zone authorized in the proposed permit.

g. Maximum size of mixing zone.

The authorized mixing zone does not exceed the maximum size restriction.

h. Acute mixing zone.

- The discharge/receiving water mixture must comply with acute criteria as near to the point of discharge as practicably attainable.

Ecology determined the acute criteria will be met at 10% of the distance (or volume fraction) of the chronic mixing zone at the ten-year low flow.

- The pollutant concentration, duration, and frequency of exposure to the discharge will not create a barrier to migration or translocation of indigenous organisms to a degree that has the potential to cause damage to the ecosystem.

As described above, the toxicity of any pollutant depends upon the exposure, the pollutant concentration, and the time the organism is exposed to that concentration. Authorizing a limited acute mixing zone for this discharge assures that it will not create a barrier to migration. The effluent from this discharge will rise as it enters the receiving water, assuring that the rising effluent will not cause translocation of indigenous organisms near the point of discharge (below the rising effluent).

- Comply with size restrictions.

The mixing zone authorized for this discharge complies with the size restrictions published in chapter 173-201A WAC.

i. Overlap of Mixing Zones.

This mixing zone does not overlap another mixing zone.

III.D. Designated uses and surface water quality criteria

Applicable designated uses and surface water quality criteria are defined in chapter 173-201A WAC. The table included below summarizes the criteria applicable to this facility's receiving water and its designated uses.

1. Freshwater aquatic life uses and associated criteria

Aquatic life uses are designated based on the presence of, or the intent to provide protection for the key uses. All indigenous fish and non-fish aquatic species must be protected in waters of the state in addition to the key species. The aquatic life uses for this receiving water are identified below.

Table 11 - Salmonid spawning, rearing, and migration

Criteria	Value
Temperature – Highest 7-DAD MAX	17.5°C (63.5°F)
Dissolved oxygen – Lowest 1-Day minimum	8.0 mg/L
Turbidity	5 NTU over background when the background is 50 NTU or less; or A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.

Criteria	Value
Total dissolved gas	Total dissolved gas must not exceed 110 percent of saturation at any point of sample collection.
pH	The pH must measure within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 units.

2. Recreational use and criteria

The recreational use for this receiving water is primary contact recreation. *E.coli* organism levels must not exceed a geometric mean value of 100 CFU or MPN per 100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained within the averaging period exceeding 320 CFU or MPN per 100 mL.

3. Water supply uses

The water supply uses are domestic, agricultural, industrial, and stock watering.

4. Miscellaneous freshwater uses

The miscellaneous freshwater uses are wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

III.E. Water quality impairments

In the vicinity of the Montesano WWTP outfall, the Chehalis River is listed on the current 303(d) and is impaired for dissolved oxygen. It has been 303(d) listed for dissolved oxygen since 2018. This assessment was made based on samples taken in 2006 and 2007. Currently, there is no TMDL for this section of the Chehalis River and no wasteload allocations for Montesano WWTP. In the analysis for this permit, Montesano WWTP did not show reasonable potential to violate the 8.0 mg/L dissolved oxygen minimum limit. Ecology will reevaluate limits on dissolved oxygen and BOD_5 for Montesano WWTP in the next permit cycle along with any new TMDLs and wasteload allocations for this portion of the Chehalis River.

III.F. Evaluation of surface water quality-based effluent limits for narrative criteria

Ecology must consider the narrative criteria described in WAC 173-201A-260 when it determines permit limits and conditions. Narrative water quality criteria limit the toxic, radioactive, or other deleterious material concentrations that the facility may discharge which have the potential to adversely affect designated uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health.

Ecology considers narrative criteria when it evaluates the characteristics of the wastewater and when it implements all known, available, and reasonable methods of treatment and prevention (AKART) as described above in the technology-based

limits section. When Ecology determines if a facility is meeting AKART it considers the pollutants in the wastewater and the adequacy of the treatment to prevent the violation of narrative criteria.

In addition, Ecology considers the toxicity of the wastewater discharge by requiring whole effluent toxicity (WET) testing when there is a reasonable potential for the discharge to contain toxics. Ecology's analysis of the need for WET testing for this discharge is described later in the fact sheet.

III.G. Evaluation of surface water quality-based effluent limits for numeric criteria

1. Mixing zones and dilution factors

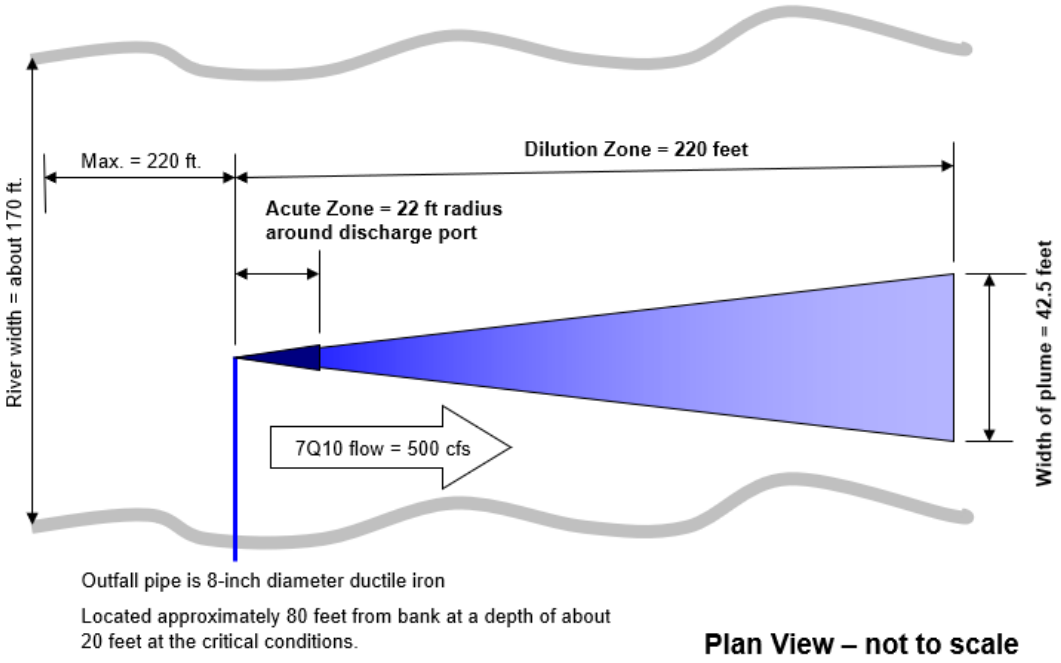
Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants; their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as biological oxygen demand (BOD) is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality based effluent limits varies with the point at which the pollutant has its maximum effect.

With technology-based controls (AKART), predicted pollutant concentrations in the discharge exceed water quality criteria. Ecology therefore authorizes a mixing zone in accordance with the geometric configuration, flow restriction, and other restrictions imposed on mixing zones by chapter 173-201A WAC.

The diffuser at Outfall 001 is a single port diffuser with a diameter of 8 inches. The diffuser depth is about 27.7 feet at mean higher high water (MHHW). The mean lower low water (MLLW) depth is 20.0 feet. Ecology obtained this information from the Montesano Outfall Dilution Ratio Study submitted February 1993 (Parametrix, Inc., 1993).

Ecology's regulations do not have criteria for rivers that act like an estuary, or criteria for estuaries that act like a river. The Chehalis River at Montesano is not strictly an estuary because of the unidirectional flows at lower tides or higher river flows. It is also not strictly a river because of the reversal of flows at higher tides and lower flows. Therefore, the mixing zone is based on best professional judgment that uses a combination of the river and estuary criteria that apply in this case. The determination meets the intent of the regulation for a river but limits the dimensions of the mixing zone based on an estuary because of the reversal of flows.

Figure 4 – Diagram of mixing zone for Montesano WWTP



Chronic mixing zone – WAC 173-201A-400(7)(b) specifies that mixing zones must not extend in any horizontal direction from the discharge ports for a distance greater than 200 feet plus the depth of water over the discharge ports and may not occupy more than 25% of the width of the water body as measured during MLLW.

This mixing zone was restricted by both water body width and upstream and downstream distance due to its mixed riverine and estuarine characteristics. The upstream and downstream distance of the chronic mixing zone is 220 feet. The mixing zone width is restricted to 42.5 feet cross stream in both directions from the discharge port, perpendicular to the stream flow. The mixing zone extends from the bottom to the top of the water column.

Acute mixing zone – WAC 173-201A-400(8)(b) specifies that in estuarine waters a zone where acute criteria may be exceeded must not extend beyond 10% of the distance established for the chronic zone. The acute mixing zone extends 22 feet in any direction from the single discharge port. The mixing zone extends from the bottom to the top of the water column.

Ecology used dilution factors that occur within these zones at the critical condition determined during the Montesano Outfall Dilution Ratio Study (Parametrix, Inc., 1993). For this study, Parametrix Consultants used Rhodamine Water Tracer dye injected into the effluent at critical conditions and measured the dilution of the dye/effluent using a Turner Model 10 flow-through fluorometer. The dilution factors are listed below.

Table 12 - Dilution factors

Criteria	Acute	Chronic
Aquatic Life	10.5	147
Human Health, Carcinogen		147
Human Health, Non-carcinogen		147

Ecology determined the impacts of dissolved oxygen deficiency, pH, fecal coliform, turbidity, chlorine, ammonia, and temperature as described below, using the dilution factors in the above table. The derivation of surface water quality-based limits also takes into account the variability of pollutant concentrations in both the effluent and the receiving water.

2. Dissolved Oxygen: BOD_5 and Ammonia Effects

Natural decomposition of organic material in wastewater effluent impacts dissolved oxygen in the receiving water at distances far outside of the regulated mixing zone. The 5-day Biochemical Oxygen Demand (BOD_5) of an effluent sample indicates the amount of biodegradable material in the wastewater and estimates the magnitude of oxygen consumption the wastewater will generate in the receiving water. The amount of ammonia-based nitrogen in the wastewater also provides an indication of oxygen demand in the receiving water.

The Chehalis River is tidally influenced at the point of discharge. Ecology evaluated the impact of BOD_5 on the receiving water using two modeling scenarios. The first scenario treated the receiving water as a free-flowing river with a 7Q10 river flow of 500 cfs. For this scenario Ecology used the Streeter-Phelps model at critical conditions and with the technology-based effluent limit for BOD_5 described under "Technology-Based Effluent Limits" above. The river velocity was calculated using the 7Q10 flow and the approximate river dimensions at low flow, low tide conditions. For the second scenario, Ecology assumed a high, slack tide and low river flow resulting in the slow river velocity of 0.007 m/s from the 1993 Montesano Outfall Dilution Ratio Study (Parametrix, Inc., 1993). Ecology used spreadsheet tools to model this scenario as a marine discharge due to the low flow velocity while still using the technology-based limit for BOD_5. The calculations to determine dissolved oxygen impacts are shown in Appendix D.

Ecology predicted no violation of the surface water quality standards for dissolved oxygen at the edge of the mixing zone due to the impacts of biochemical oxygen demand (BOD_5) under critical conditions using both modelling scenarios. Therefore, the proposed permit contains the technology-based effluent limit for BOD_5. Ecology will reevaluate the limits on BOD_5 and dissolved oxygen in the next permit cycle. The permit also does not contain a limit on ammonia based on dissolved oxygen impacts (ammonia toxicity is examined in section III.G.6 this fact sheet).

3. pH

Ecology modeled the impact to receiving waters under critical conditions using technology-based limits for pH (6.0 – 9.0) and the *pH-mix-fresh* worksheet in Ecology's PermitCalc spreadsheet. Appendix D includes the model results. Model calculations predict no violation of the pH criteria under critical conditions. The proposed permit includes technology-based limits for pH.

4. Bacteria

In the previous permit cycle, Ecology modeled the number of fecal coliforms by simple mixing analysis using the technology-based limit of 400 organisms per 100 mL and a dilution factor of 147. That analysis showed no violation of the fecal coliform recreational use criterion under critical conditions. The domestic technology-based limits for fecal coliform in chapter 173-221 WAC are still in effect. Without effluent data for *E.coli*, Ecology cannot determine whether the discharge will violate the recreational use criterion for *E.coli*. Given that the characteristics of the receiving water and the discharge have not changed substantially since the analysis conducted in the previous permit cycle, and the transition is a change in bacterial indicator not more or less stringent than the previous criterion, the proposed permit will maintain the technology-based effluent limit for fecal coliform. In addition, the permittee will be required to monitor for both fecal coliform and *E. coli*. Ecology will then use this data to assess the reasonable potential to exceed the applicable recreational use criterion in the next iteration of this permit.

5. Turbidity

Ecology evaluated the impact of turbidity based on the range of total suspended solids in the effluent and turbidity of the receiving water. Ecology expects no violations of the turbidity criteria outside the designated mixing zone provided the facility meets its technology-based total suspended solids permit limits.

6. Toxic pollutants – aquatic life criteria

Federal regulations at 40 CFR 122.44 require Ecology to place limits in NPDES permits on toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. Ecology does not exempt facilities with technology-based effluent limits from meeting the surface water quality standards.

The following toxic pollutants are present in the discharge: chlorine and ammonia. Ecology conducted a reasonable potential analysis (See Appendix D) on these parameters to determine whether it would require effluent limits in this permit.

Ammonia's toxicity depends on the portion that is available in the unionized form. The amount of unionized ammonia depends on the temperature and pH in the

receiving freshwater. To evaluate ammonia toxicity, Ecology used the available receiving water information from Ecology's Environmental Information Management System (EIM) and Ecology spreadsheet tools.

Valid ambient background data were available for ammonia in Ecology's EIM database under location ID GHEC_005. This study included recent data from July 2022 near the point of discharge, but only two ammonia data points. Ecology used these two data points with a correction factor to evaluate reasonable potential for this discharge to cause a violation of water quality standards.

Ecology determined that chlorine and ammonia pose no reasonable potential to cause or contribute to exceedances of the water quality criteria at the critical conditions using procedures given in the ***Technical Support Document for Water Quality-Based Toxics Control*** (EPA/505/2-90-001) (USEPA, 1991) (Appendix D) and as described above. Ecology's determination assumes that this facility meets the other effluent limits of this permit.

7. Temperature

The state temperature standards (chapter 173-201A WAC, WAC 173-201A-200, WAC 173-201A-600, and WAC 173-201A-602) include multiple elements:

a. Annual summer maximum threshold criteria (June 15 to September 15)
b. Supplemental spawning and rearing season criteria (September 15 to June 15)
c. Incremental warming restrictions
d. Guidelines on preventing acute lethality and barriers to migration of salmonids

Ecology evaluates each criterion independently to determine reasonable potential and derive permit limits.

a. Annual summer maximum and supplementary spawning/rearing criteria

Each water body has an annual maximum temperature criterion [WAC 173-201A-200(1)(c), and WAC 173-201A-602, Table 602]. These threshold criteria (e.g., 12, 16, 17.5, 20°C) protect specific categories of aquatic life by controlling the effect of human actions on summer temperatures.

Some waters have an additional threshold criterion to protect the spawning and incubation of salmonids (9°C for char and 13°C for salmon and trout) [WAC 173-201A-602, Table 602]. These criteria apply during specific date-windows.

The threshold criteria apply at the edge of the chronic mixing zone. Criteria for most fresh waters are expressed as the highest 7-Day average of daily maximum temperature (7-DADMax). The 7-DADMax temperature is the arithmetic average of seven consecutive measures of daily maximum temperatures. Criteria for some fresh waters are expressed as the highest 1-Day annual maximum temperature (1-DMax).

b. Incremental warming criteria

The water quality standards limit the amount of warming human sources can cause under specific situations [WAC 173-201A-200(1)(c)(i)-(ii)]. The incremental warming criteria apply at the edge of the chronic mixing zone.

At locations and times when background temperatures are cooler than the assigned threshold criterion, point sources are permitted to warm the water by only a defined increment. These increments are permitted only to the extent doing so does not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

c. Guidelines to prevent acute lethality or barriers to migration of salmonids. These site-level considerations do not override the temperature criteria listed above.
   i. Instantaneous lethality to passing fish: The upper 99th percentile daily maximum effluent temperature must not exceed 33°C, unless a dilution analysis indicates ambient temperatures will not exceed 33°C two seconds after discharge.
   ii. General lethality and migration blockage: The temperature at the edge of a chronic mixing zone must not exceed either a 1DMax of 23°C or a 7DADMax of 22°C. When adjacent downstream temperatures are 3°C or more cooler, the 1DMax at the edge of the chronic mixing zone must not exceed 22°C.
   iii. Lethality to incubating fish: The temperature must not exceed 17.5°C at locations where eggs are incubating.

Reasonable potential analysis

Annual summer maximum, supplementary spawning criterion, and incremental warming criteria: Ecology calculated the reasonable potential for the discharge to exceed the annual summer maximum, the supplementary spawning criterion, and the incremental warming criteria (See temperature calculations in Appendix D).

The discharge is allowed to warm the water by a defined increment only when the background (ambient) temperature is cooler than the assigned threshold criterion. Ecology allows warming increments only when they do not cause temperatures to exceed either the annual maximum or supplemental spawning criteria.

The incremental increase for this discharge is within the allowable amount. Therefore, the proposed permit does not include a temperature limit. Ecology will reevaluate the reasonable potential to exceed the temperature criteria during the next permit renewal.

Lethality to incubating fish: Human actions must not cause warming above 17.5°C at locations where eggs are incubating. A reasonable potential exists if $T_{spawning}$ is greater than 17.5°C. The calculation below indicates that warming caused by the discharge is negligible. Reasonable potential to impact spawning does not exist:

$T_{spawning} = T_{ambient90} + (T_{effluent99} – T_{ambient90})/(DF_{spawning})$.

$T_{spawning}$ = 17.3°C + (23.2°C – 17.3°C) / (147) = 17.3°C

Where:

$T_{spawning}$ = the temperature at times and locations used for spawning.

$T_{ambient90}$ = 90th percentile of annual maximum 1-DMax background temperatures during first month of fall spawning or last month of spring spawning.

$T_{effluent99}$ = 99th percentile of maximum 1DMax effluent temperatures.

$DF_{spawning}$ = dilution factor at times and locations used for spawning.

III.H. Evaluation of human health-based water quality criteria

Washington's water quality standards include numeric human health-based criteria for priority pollutants that Ecology must consider when writing NPDES permits.

Ecology determined the applicant's discharge is unlikely to contain chemicals regulated to protect human health. Ecology made this determination based on the character of the wastewater and the absence of significant or potentially significant industrial users discharging to Montesano WWTP. Ecology will reevaluate this discharge for impacts to human health at the next permit reissuance.

III.I. Sediment quality

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards Ecology may require a facility to evaluate the potential for its discharge to cause a violation of sediment standards (WAC 173-204-400). You can obtain additional information about sediments at the Aquatic Lands Cleanup Unit website[1].

Through a review of the discharger characteristics and of the effluent characteristics, Ecology determined that this discharge has no reasonable potential to violate the sediment management standards.

[1] https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Sediment-cleanups

III.J. Groundwater quality limits

The groundwater quality standards (chapter 173-200 WAC) protect beneficial uses of groundwater. Permits issued by Ecology must not allow violations of those standards (WAC 173-200-100).

Montesano WWTP discharges all effluent into the Chehalis River and does not discharge any effluent directly to the ground. However, Ecology determined Montesano WWTP has the potential for an inadvertent discharge to ground due to the single-layer liner used for the aeration basin. The Criteria for Sewage Works Design (Ecology, 2008) states that "For Systems with single geomembrane liner, Ecology will require a system of groundwater monitoring wells." Therefore, the proposed permit requires the permittee to monitor groundwater to ensure the treatment system does not violate the groundwater quality standards due to leakage from through the aeration basin single-layer liner. Ecology will assess the results and include any required groundwater quality limits in the next permit cycle, if necessary.

Before beginning groundwater monitoring, the proposed permit requires Montesano WWTP complete a hydrogeologic study and a groundwater monitoring plan. Ecology will use these submittals to verify the network of groundwater monitoring wells will adequately monitor groundwater for potential contamination from the aeration basin in the target aquifer. The permittee can find guidance on how to complete these requirements in Ecology's Implementation Guidance for the Ground Water Quality Standards (Ecology, 2005). Groundwater monitoring requirements will start following Ecology's acceptance of the hydrogeologic study and groundwater monitoring plan.

III.K. Whole effluent toxicity

The water quality standards for surface waters forbid discharge of effluent that has the potential to cause toxic effects in the receiving waters. Many toxic pollutants cannot be measured by commonly available detection methods. However, laboratory tests can measure toxicity directly by exposing living organisms to the wastewater and measuring their responses. These tests measure the aggregate toxicity of the whole effluent, so this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Using the screening criteria in WAC 173-205-040, Ecology determined that toxic effects caused by unidentified pollutants in the effluent are unlikely. Therefore, this permit does not require WET testing. Ecology may require WET testing in the future if it receives information indicating that toxicity may be present in this effluent.

III.L. Comparison of effluent limits with the previous permit issued September 1, 2014

Table 13 - Comparison of previous and proposed effluent limits – Outfall 001

Limit	Basis of Limit	Existing permit limit	Proposed permit limit
Biochemical Oxygen Demand (5-day) – Average Monthly	Technology	30 mg/L 167 lbs/day	30 mg/L 159 lbs/day
Biochemical Oxygen Demand (5-day) – Average Weekly	Technology	45 mg/L 251 lbs/day	45 mg/L 239 lbs/day
Biochemical Oxygen Demand (5-day) – Average Monthly	Technology	85% removal	85% removal
Total Suspended Solids – Average Monthly	Technology	30 mg/L 167 lbs/day	30 mg/L 33 lbs/day
Total Suspended Solids – Average Weekly	Technology	45 mg/L 251 lbs/day	45 mg/L 50 lbs/day
Total Suspended Solids – Average Monthly	Technology	85% removal	85% removal
Fecal Coliform Bacteria – Monthly Geometric Mean	Technology	200 cfu/100 mL	200 cfu/100 mL
Fecal Coliform Bacteria – Weekly Geometric Mean	Technology	400 cfu/100 mL	400 cfu/100 mL
pH – Daily Minimum	Technology	6.0 standard units	6.0 standard units
pH – Daily Maximum	Technology	9.0 standard units	9.0 standard units
Chlorine – Average Monthly	Technology	0.50 mg/L	0.50 mg/L
Chlorine – Average Weekly	Technology	0.75 mg/L	0.75 mg/L

IV. Monitoring requirements

Ecology requires monitoring, recording, and reporting (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits.

If a facility uses a contract laboratory to monitor wastewater, it must ensure that the laboratory uses the methods and meets or exceeds the method detection levels required by the permit. The permit describes when facilities may use alternative methods. It also describes what to do in certain situations when the laboratory encounters matrix effects. When a facility uses an alternative method as allowed by the permit, it must report the test method, detection level (DL), and quantitation level (QL) on the discharge monitoring report or in the required report.

IV.A. Wastewater monitoring

The monitoring schedule is detailed in the proposed permit under Special Condition S.2. Specified monitoring frequencies consider the quantity and variability of the discharge, the treatment method, past compliance, significance of pollutants, and

cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's ***Permit Writer's Manual,*** Publication 92-109 (Ecology, 2018) for municipal wastewater treatment facilities.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Biosolids monitoring is required by the current state and local solid waste management program and by EPA under 40 CFR 503.

Ecology revised the water contact recreation bacteria criteria effective January 1, 2021, and eliminated all recreational uses except for primary contact criteria in both fresh and marine waters. Primary contact criteria changed to *E. coli* for freshwater and to enterococci for marine water. Because Montesano WWTP has an effluent limit based on recreation, this permit requires monitoring of both fecal coliform and *E. coli* during this permit cycle. Ecology will reevaluate the bacteria limit based on the new indicator during the next permit cycle.

Ecology has required monitoring of both fecal coliform and *E. coli* in the permit application. This dual monitoring will help inform both Ecology and Montesano WWTP of the correlation between the two indicators. To complete these dual monitoring requirements, the permittee must split an effluent grab sample taken to analyze fecal coliform. Half the split sample must be used to analyze fecal coliform and the other half to analyze *E. coli*. This *E. coli* monitoring must be completed annually and reported on the annual DMR. Ecology will reevaluate the bacteria limit based on the new indicator during the next permit cycle.

IV.B. Lab accreditation

Ecology requires that facilities must use a laboratory registered or accredited under the provisions of chapter 173-50 WAC, Accreditation of Environmental Laboratories, to prepare all monitoring data (with the exception of certain parameters). Ecology accredited the laboratory at this facility for:

Table 14 - Accredited parameters

Parameter name	Category	Method name	Matrix description
Solids, Total Suspended	General Chemistry	SM 2540 D-2011	Non-Potable Water
Chlorine (Residual), Total	General Chemistry	SM 4500-Cl G-2011	Non-Potable Water
pH	General Chemistry	SM 4500-H+ B-2011	Non-Potable Water
Dissolved Oxygen	General Chemistry	SM 4500-O G-2011	Non-Potable Water
Biochemical Oxygen Demand (BOD)	General Chemistry	SM 5210 B-2011	Non-Potable Water
Fecal coliform-count	Microbiology	SM 9222 D (mFC)-06	Non-Potable Water

V. Other permit conditions

V.A. Reporting and record keeping

Ecology based Special Condition S3 on its authority to specify any appropriate reporting and record keeping requirements to prevent and control waste discharges (WAC 173-220-210).

V.B. Prevention of facility overloading

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require Montesano WWTP to:

- Take the actions detailed in proposed permit Special Condition S.4.
- Design and construct expansions or modifications before the treatment plant reaches existing capacity.
- Report and correct conditions that could result in new or increased discharges of pollutants.

Special Condition S.4 restricts the amount of flow.

The municipality should contact Ecology's regional office as early as practical before planning a project that may include Ecology-administered funding.

V.C. Operation and maintenance

The proposed permit contains Special Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, chapter 173-230 WAC, and WAC 173-240-080. Ecology included it to ensure proper operation and regular maintenance of equipment, and to ensure that Montesano WWTP takes adequate safeguards so that it uses constructed facilities to their optimum potential in terms of pollutant capture and treatment.

Special Condition S.5 requires Montesano WWTP to review and update as needed an operation and maintenance manual as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-080). Implementation of the procedures in the operation and maintenance manual ensures the facility's compliance with the terms and limits in the permit.

V.D. Pretreatment

1. Duty to enforce discharge prohibitions

This provision prohibits the publicly owned treatment works (POTW) from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer.

- The first section of the pretreatment requirements prohibits the POTW from accepting pollutants which causes "pass through" or "interference". This

general prohibition is from 40 CFR §403.5(a). Appendix C of this fact sheet defines these terms.

- The second section reinforces specific state and federal pretreatment prohibitions found in WAC 173-216-060 and 40 CFR §403.5(b). The POTW may not accept certain wastes, which:
    - Are prohibited due to dangerous waste rules.
    - Are explosive or flammable.
    - Have too high or low of a pH (too corrosive, acidic or basic).
    - May cause a blockage such as grease, sand, rocks, or viscous materials.
    - Are hot enough to cause a problem.
    - Are of sufficient strength or volume to interfere with treatment.
    - Contain too much petroleum-based oils, mineral oil, or cutting fluid.
    - Create noxious or toxic gases at any point.

40 CFR Part 403 contains the regulatory basis for these prohibitions, except for the pH provisions which are based on WAC 173-216-060.

- The third section of pretreatment conditions reflects state prohibitions on the POTW accepting certain types of discharges unless the discharge has received prior written authorization from Ecology. These discharges include:
    - Cooling water in significant volumes.
    - Stormwater and other direct inflow sources.
    - Wastewaters significantly affecting system hydraulic loading, which do not require treatment.

2. Federal and state pretreatment program requirements

Ecology administers the Pretreatment Program under the terms of the addendum to the "Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10" (1986) and 40 CFR Part 403. Under this delegation of authority, Ecology issues wastewater discharge permits for significant industrial users (SIUs) discharging to POTWs which have not been delegated authority to issue wastewater discharge permits. Ecology must approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) [40 CFR 403.8 (f)(1)(i)(iii)].

Industrial dischargers must obtain a permit from Ecology before discharging waste to the Montesano WWTP [WAC 173-216-110(5)]. Industries discharging wastewater that is similar in character to domestic wastewater do not require a permit.

3. Industrial user survey update

This provision requires the POTW to submit an updated list of existing and proposed significant industrial users (SIUs) and potential significant industrial

users (PSIUs). This provides Ecology with notice of any new or proposed industrial users in the POTW's service area without a more rigorous “complete” industrial user survey. This level of effort is often sufficient for small municipalities which have not seen any adverse effects potentially attributable to industries, have loadings commensurate with domestic flows, and have a small proportion of industrial flow.

V.E. Solid waste

To prevent water quality problems the facility is required in permit Special Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and state water quality standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under chapter 70.95J RCW, chapter 173-308 WAC “Biosolids Management,” and chapter 173-350 WAC “Solid Waste Handling Standards.” The disposal of other solid waste is under the jurisdiction of the Grays Harbor County Health Department.

Requirements for monitoring sewage sludge and record keeping are included in this permit. Ecology will use this information, required under 40 CFR 503, to develop or update local limits.

V.F. Facility plan

Montesano WWTP’s aeration basin single-layer HDPE liner was installed in 1991. The Criteria for Sewage Works Design (Ecology, 2008) states that “For all single-lined surface impoundments, engineers should ensure that the bottom of the lowest component is at least five feet above the seasonal high ground water level. Ecology will require a double-liner with leak detection system for any lagoon that cannot meet the minimum requirement five-foot separation between the seasonal high ground water level and the lowest lagoon system component.” Due to the liner’s age and the reported proximity of the aeration basin to the static groundwater level, Ecology requires a facility plan in the proposed permit to ensure groundwater below the aeration basin is protected from leaking contamination.

If the solution identified in the facility plan has not been implemented by the next permit cycle, the next permit will require implementation of the solution. The proposed permit requires groundwater monitoring of the aeration basin to ensure Montesano WWTP is meeting groundwater quality standards until the solution identified in the facility plan is implemented.

V.G. Outfall evaluation

The proposed permit requires Montesano WWTP to conduct an outfall inspection and submit a report detailing the findings of that inspection (Special Condition S11). The inspection must evaluate the physical condition of the discharge pipe and

diffusers, and evaluate the extent of sediment accumulations in the vicinity of the outfall.

V.H. General conditions

Ecology bases the standardized General Conditions on state and federal law and regulations. They are included in all individual domestic wastewater NPDES permits issued by Ecology.

VI. Permit issuance procedures

VI.A. Permit modifications

Ecology may modify this permit to impose numeric limits, if necessary to comply with water quality standards for surface waters, with sediment quality standards, or with water quality standards for groundwaters, after obtaining new information from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

Ecology may also modify this permit to comply with new or amended state or federal regulations.

VI.B. Proposed permit issuance

This proposed permit includes all statutory requirements for Ecology to authorize a wastewater discharge. The permit includes limits and conditions to protect human health and aquatic life, and the beneficial uses of waters of the state of Washington. Ecology proposes to issue this permit for a term of five years.

VII. References for text and appendices

Ecology. (2005). *Implementation Guidance for the Ground Water Quality Standards, Publication 96-02*. Retrieved from https://apps.ecology.wa.gov/publications/documents/9602.pdf

Ecology. (2008). *Criteria for Sewage Works Design.* Retrieved from https://apps.ecology.wa.gov/publications/documents/9837.pdf

Ecology. (2011). *Waters Requiring Supplemental Spawning and Incubation Protection for Salmonid Species.* Publication 06-10-038. Retrieved from https://apps.ecology.wa.gov/publications/documents/0610038.pdf

Ecology. (2016). *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria (Publication 95-80).* Retrieved from https://apps.ecology.wa.gov/publications/SummaryPages/9580.html

Ecology. (2018). *Water Quality Program Permit Writer's Manual.* Publication 92-109. Retrieved from https://apps.ecology.wa.gov/publications/summarypages/92109.html

Ecology and Department of Health. (2019). *Reclaimed Water Facilities Manual: The Purple Book.* Retrieved from https://apps.ecology.wa.gov/publications/SummaryPages/1510024.html

Lewis, E. W. (1998). *Program developed for CO2 system calculations.* Retrieved from https://doi.org/10.2172/639712

Metcalf & Eddy, Inc. (1991). *Wastewater engineering : treatment, disposal, and reuse.* New York: McGraw-Hill.

Parametrix, Inc. (1993). *Montesano Outfall Dilution Ratio Study.* Sumner, Washington.

Parametrix, Inc. (1997). *City of Montesano Wastewater System Facilities Plan.* Sumner, WA.

USEPA. (1985). *Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. Part 2,, EPA/600/6-85/002B.*

USEPA. (1987). *Enhanced Stream Water Quality Models QUAL2E and QUAL2E-UNCAS: Documentation and User Manual, EPA/600/3-87/007.*

USEPA. (1988). *Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling.*

USEPA. (1989). *Ambient Water Quality for Ammonia (Saltwater), EPA 440/5-88-004.*

USEPA. (1991). *Handbook: Sewer System Infrastructure Analysis and Rehabilitation, EPA/625/6-91/030.* Retrieved from https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=NRMRL&dirEntryId=124654

USEPA. (1991). *Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001).* Washington, DC. Retrieved from https://www3.epa.gov/npdes/pubs/owm0264.pdf

USEPA Region 10. (2021). *Columbia and Lower Snake Rivers Temperature Total Maximum Daily Load.* Seattle, WA.

Washington State Department of Transportation. (2023). *Standard Specifications for Road, Bridge, and Municipal Construction, M 41-10.* Retrieved from https://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/SS.pdf

Water Environment Federation, American Society of Civil Engineers. (2020). *Existing Sewer Evaluation and Rehabilitation: Manual of Practice FD 6.*

Water Pollution Control Federation. (1976). *Chlorination of Wastewater.*

Washington State and Ecology website general reference links:

Laws and Regulations[2]

Permit and Wastewater Related Information[3]

Appendix A – Public Involvement Information

Ecology proposes to reissue a permit to Montesano WWTP. The permit includes wastewater discharge limits and other conditions. This fact sheet describes the facility and Ecology's reasons for requiring permit conditions.

Ecology placed a Public Notice of Application on **June 7, 2022**, in The Daily World to inform the public about the submitted application and to invite comment on the reissuance (or issuance) of this permit.

Ecology will place a Public Notice of Draft on **September 10, 2024**, to inform the public and to invite comment on the proposed draft National Pollutant Discharge Elimination System permit and fact sheet.

The notice:

- Tells where copies of the draft Permit and Fact Sheet are available for public evaluation (a local public library, the closest Regional or Field Office, posted on our website).
- Offers to provide the documents in an alternate format to accommodate special needs.
- Urges people to submit their comments, in writing, before the end of the Comment Period
- Tells how to request a public hearing of comments about the proposed NPDES permit.
- Explains the next step(s) in the permitting process.

Frequently Asked Questions about Effective Public Commenting[4]

You may obtain further information from Ecology by telephone or by writing to the address listed below.

Water Quality Permit Coordinator Department of Ecology

[2] http://leg.wa.gov/LawsAndAgencyRules/Pages/default.aspx
[3] https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Water-quality-permits-guidance
[4] https://apps.ecology.wa.gov/publications/SummaryPages/0307023.html

Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775

The primary author of this permit and fact sheet is Joe Rauzi.

Appendix B – Your Right to Appeal

You have a right to appeal this permit to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. “Date of receipt” is defined in RCW 43.21B.001(2) (see glossary).

To appeal you must do the following within 30 days of the date of receipt of this permit:

- File your appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours as defined in WAC 371-08-305 and -335. “Notice of appeal” is defined in WAC 371-08-340.
- Serve a copy of your appeal and this permit on Ecology on the Department of Ecology mail, in person, or by email (see addresses below).
- You must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

Filing with the PCHB

For the most current information regarding filing with the PCHB:
visit https://eluho.wa.gov/[5] or call 360-664-9160.

Service on Ecology

Street Address:

Department of Ecology
Attn: Appeals Processing Desk
300 Desmond Drive SE
Lacey, WA 98503

Mailing Address:

Department of Ecology
Attn: Appeals Processing Desk
PO Box 47608
Olympia, WA 98504-7608

E-Mail Address:

ecologyappeals@ecy.wa.gov

[5] https://eluho.wa.gov/

Appendix C – Glossary

1-DMax or 1-day maximum temperature – The highest water temperature reached on any given day. This measure can be obtained using calibrated maximum/minimum thermometers or continuous monitoring probes having sampling intervals of thirty minutes or less.

7-DADMax or 7-day average of the daily maximum temperatures – The arithmetic average of seven consecutive measures of daily maximum temperatures. The 7-DADMax for any individual day is calculated by averaging that day's daily maximum temperature with the daily maximum temperatures of the three days prior and the three days after that date.

Acute toxicity – The lethal effect of a compound on an organism that occurs in a short time period, usually 48 to 96 hours.

AKART – The acronym for "all known, available, and reasonable methods of prevention, control and treatment." AKART is a technology-based approach to limiting pollutants from wastewater discharges, which requires an engineering judgment and an economic judgment. AKART must be applied to all wastes and contaminants prior to entry into waters of the state in accordance with RCW 90.48.010 and RCW 90.48.520, WAC 173-200-030(2)(c)(ii), and WAC 173-216-110(1)(a).

Alternate point of compliance – An alternative location in the groundwater from the point of compliance where compliance with the groundwater standards is measured. It may be established in the groundwater at locations some distance from the discharge source, up to, but not exceeding the property boundary and is determined on a site specific basis following an AKART analysis. An "early warning value" must be used when an alternate point is established. An alternate point of compliance must be determined and approved in accordance with WAC 173-200-060(2).

Ambient water quality – The existing environmental condition of the water in a receiving water body.

Ammonia – Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Annual average design flow (AADF) – average of the daily flow volumes anticipated to occur over a calendar year.

Average monthly (intermittent) discharge limit – The average of the measured values obtained over a calendar months' time taking into account zero discharge days.

Average monthly discharge limit – The average of the measured values obtained over a calendar months' time.

Background water quality – The concentrations of chemical, physical, biological or radiological constituents or other characteristics in or of groundwater at a particular point in time upgradient of an activity that has not been affected by that activity, [WAC 173-200-020(3)]. Background water quality for any parameter is statistically defined as the 95% upper tolerance interval with a 95% confidence based on at least eight hydraulically upgradient water quality samples. The eight samples are collected over a period of at least one year, with no more than one sample collected during any month in a single calendar year.

Best management practices (BMPs) – Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the state. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD_5 – Determining the five-day Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD_5 is used in modeling to measure the reduction of dissolved oxygen in receiving waters after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD_5 is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass – The intentional diversion of waste streams from any portion of a treatment facility.

Categorical pretreatment standards – National pretreatment standards specifying quantities or concentrations of pollutants or pollutant properties, which may be discharged to a POTW by existing or new industrial users in specific industrial subcategories.

Chlorine – A chemical used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic toxicity – The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean water act (CWA) – The federal Water Pollution Control Act enacted by Public Law 92 500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Compliance inspection-without sampling – A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance inspection-with sampling – A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations. In addition it includes as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Ecology may conduct additional sampling.

Composite sample – A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction activity – Clearing, grading, excavation, and any other activity, which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous monitoring – Uninterrupted, unless otherwise noted in the permit.

Critical condition – The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Date of receipt – This is defined in RCW 43.21B.001(2) as five business days after the date of mailing; or the date of actual receipt, when the actual receipt date can be proven by a preponderance of the evidence. The recipient's sworn affidavit or declaration indicating the date of receipt, which is unchallenged by the agency, constitutes sufficient evidence of actual receipt. The date of actual receipt, however, may not exceed forty-five days from the date of mailing.

Days (compliance period interval) – When the compliance period is stated in days: (A) exclude the day of the event that triggers the period; (B) count every day, including intermediate Saturdays, Sundays, and legal holidays; and (C) include the last day of the period, but if the last day is a Saturday, Sunday, or legal holiday, the period continues to run until the end of the next day that is not a Saturday, Sunday, or legal holiday.

Detection level – or method detection limit means the minimum concentration of an analyte (substance) that can be reported with 99% confidence that the measured concentration is distinguishable from method blank results as determined by the procedure given in 40 CFR part 136, Appendix B.

Dilution factor (DF) – A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction, for example, a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Distribution uniformity – The uniformity of infiltration (or application in the case of sprinkle or trickle irrigation) throughout the field expressed as a percent relating to the average depth infiltrated in the lowest one-quarter of the area to the average depth of water infiltrated.

Early warning value – The concentration of a pollutant set in accordance with WAC 173-200-070 that is a percentage of an enforcement limit. It may be established in the effluent, groundwater, surface water, the vadose zone or within the treatment process. This value acts as a trigger to detect and respond to increasing contaminant concentrations prior to the degradation of a beneficial use.

Enforcement limit – The concentration assigned to a contaminant in the groundwater at the point of compliance for the purpose of regulation, [WAC 173-200-020(11)]. This limit assures that a groundwater criterion will not be exceeded and that background water quality will be protected.

Engineering report – A document that thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report must contain the appropriate information required in WAC 173-240-060 or WAC 173-240-130.

Enterococci – A subgroup of fecal streptococci that includes *S. faecalis*, *S. faecium*, *S. gallinarum*, and *S. avium*. The enterococci are differentiated from other streptococci by their ability to grow in 6.5% sodium chloride, at pH 9.6, and at 10°C and 45°C.

E. coli – A bacterium in the family Enterobacteriaceae named Escherichia coli and is a common inhabitant of the intestinal tract of warm-blooded animals, and its presence in water samples is an indication of fecal pollution and the possible presence of enteric pathogens.

Fecal coliform bacteria – Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab sample – A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Groundwater – Water in a saturated zone or stratum beneath the surface of land or below a surface water body.

Immediate reporting – Report permit violations immediately without delay of any interval of time from the moment the permittee becomes aware of the violation. Priority should first be given to stopping an active noncompliance.

Industrial user – A discharger of wastewater to the sanitary sewer that is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial wastewater – Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated stormwater and, also, leachate from solid waste facilities.

Interference – A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and
- Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Local limits – Specific prohibitions or limits on pollutants or pollutant parameters developed by a POTW.

Major facility – A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum daily discharge limit – The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Maximum day design flow (MDDF) – The largest volume of flow anticipated to occur during a one-day period, expressed as a daily average.

Maximum month design flow (MMDF) – The largest volume of flow anticipated to occur during a continuous 30-day period, expressed as a daily average.

Maximum week design flow (MWDF) – The largest volume of flow anticipated to occur during a continuous 7-day period, expressed as a daily average.

Method detection limit (MDL) – See Detection level.

Minor facility -- A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing zone – An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The permit specifies the area of the authorized mixing zone that Ecology defines following procedures outlined in state regulations (chapter 173-201A WAC).

National pollutant discharge elimination system (NPDES) – Section 402 of the Clean Water Act, the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State are joint NPDES/State permits issued under both state and federal laws.

pH – The pH of a liquid measures its acidity or alkalinity. It is the negative logarithm of the hydrogen ion concentration. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

Pass-through – A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

Peak hour design flow (PHDF) – The largest volume of flow anticipated to occur during a one-hour period, expressed as a daily or hourly average.

Peak instantaneous design flow (PIDF) – The maximum anticipated instantaneous flow.

Point of compliance – The location in the groundwater where the enforcement limit must not be exceeded and a facility must comply with the Ground Water Quality Standards. Ecology determines this limit on a site-specific basis. Ecology locates the point of compliance in the groundwater as near and directly downgradient from the pollutant source as technically, hydrogeologically, and geographically feasible, unless it approves an alternative point of compliance.

Potential significant industrial user (PSIU) – A potential significant industrial user is defined as an Industrial User that does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

Ecology may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation level (QL) – also known as Minimum level (ML) – The term ‘‘minimum level’’ refers to either the sample concentration equivalent to the lowest calibration point in a method or a multiple of the method detection limit (DL), whichever is higher. Minimum levels may be obtained in several ways: They may be published in a method; they may be based on the lowest acceptable calibration point used by a laboratory; or they may be calculated by multiplying the DL in a method, or the DL determined by a laboratory, by a factor of 3. For the purposes of NPDES compliance monitoring, EPA considers the following terms to be synonymous: ‘‘quantitation limit,” ‘‘reporting limit,’’ and ‘‘minimum level’’.

Reasonable potential – A reasonable potential to cause or contribute to a water quality violation, or loss of sensitive and/or important habitat.

Responsible corporate officer – A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding $25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

Sample Maximum – No sample may exceed this value.

Significant industrial user (SIU) –

- All industrial users subject to Categorical Pretreatment Standards under 40 CFR Chapter I, Subchapter N and 40 CFR 403.6 and;
- Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in the second paragraph has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at

any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

Slug discharge – Any discharge of a non-routine, episodic nature, including but not limited to an accidental spill or a non-customary batch discharge to the POTW. This may include any pollutant released at a flow rate that may cause interference or pass through with the POTW or in any way violate the permit conditions or the POTW's regulations and local limits.

Soil scientist – An individual who is registered as a Certified or Registered Professional Soil Scientist or as a Certified Professional Soil Specialist by the American Registry of Certified Professionals in Agronomy, Crops, and Soils or by the National Society of Consulting Scientists or who has the credentials for membership. Minimum requirements for eligibility are: possession of a baccalaureate, masters, or doctorate degree from a U.S. or Canadian institution with a minimum of 30 semester hours or 45 quarter hours professional core courses in agronomy, crops or soils, and have 5, 3, or 1 years, respectively, of professional experience working in the area of agronomy, crops, or soils.

Solid waste – All putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition and construction wastes, abandoned vehicles or parts thereof, contaminated soils and contaminated dredged material, and recyclable materials.

Soluble BOD_5 – Determining the soluble fraction of Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of soluble organic material present in an effluent that is utilized by bacteria. Although the soluble BOD_5 test is not specifically described in Standard Methods, filtering the raw sample through at least a 1.2 um filter prior to running the standard BOD_5 test is sufficient to remove the particulate organic fraction.

State waters – Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

Stormwater – That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based effluent limit – A permit limit based on the ability of a treatment method to reduce the pollutant.

Total coliform bacteria – A microbiological test, which detects and enumerates the total coliform group of bacteria in water samples.

Total dissolved solids – That portion of total solids in water or wastewater that passes through a specific filter.

Total maximum daily load (TMDL) – A determination of the amount of pollutant that a water body can receive and still meet water quality standards.

Total suspended solids (TSS) – Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset – An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water quality-based effluent limit – A limit imposed on the concentration of an effluent parameter to prevent the concentration of that parameter from exceeding its water quality criterion after discharge into receiving waters.

Appendix D — Technical Calculations

Simple Mixing:

Ecology uses simple mixing calculations to assess the impacts of certain conservative pollutants, such as the expected increase in fecal coliform bacteria at the edge of the chronic mixing zone boundary. Simple mixing uses a mass balance approach to proportionally distribute a pollutant load from a discharge into the authorized mixing zone. The approach assumes no decay or generation of the pollutant of concern within the mixing zone. The predicted concentration at the edge of a mixing zone (C_{mz}) is based on the following calculation:

$C_{mz} = C_a + [(C_e – C_a)/DF]$

C_a = ambient concentration

C_e = effluent concentration

DF = dilution factor

Reasonable Potential Analysis:

Ecology uses spreadsheet tools to determine reasonable potential (to cause or contribute to violations of the aquatic life and human health water quality numeric standards) and to calculate effluent limits. The process and formulas for determining reasonable potential and effluent limits in these spreadsheets come from the Technical Support Document for Water Quality-based Toxics Control, (EPA 505/2-90-001) (USEPA, 1991).

Calculation of Water Quality-Based Effluent Limits:

Ecology calculates water quality-based effluent limits by the two-value wasteload allocation process as described on page 100 of the TSD (USEPA, 1991) and shown below.

1. Calculate the acute wasteload allocation WLA_a by multiplying the acute criteria by the acute dilution factor and subtracting the background factor. Calculate the chronic wasteload allocation (WLA_c) by multiplying the chronic criteria by the chronic dilution factor and subtracting the background factor.

WLA_a = (acute criterion x DF_a) – (background concentration x (DF_a – 1))

WLA_c = (chronic criterion x DF_c) – (background concentration x (DF_a – 1))

Where:

DF_a = acute dilution factor

DF_c = chronic dilution factor

2. Calculate the long-term averages (LTA_a and LTA_c) which will comply with the wasteload allocations WLA_a and WLA_c.

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

Where:

$\sigma^2 = \ln(CV^2 + 1)$

$z = 2.326$

CV = coefficient of variation = standard deviation/mean

$LTA_c = WLA_c \times e^{(0.5\sigma^2 - z\sigma)}$

Where:

$\sigma^2 = \ln(CV^2/4 + 1)$

$z = 2.326$

3. Use the smallest LTA of the LTA_a or LTA_c to calculate the maximum daily effluent limit (MDL) and the monthly average effluent limit (AML).

$MDL = LTA \times e^{(z\sigma - 0.5\sigma^2)}$

Where:

$\sigma^2 = \ln(CV^2 + 1)$

$z = 2.326$ (99^{th} percentile)

LTA = limiting long-term average

$AML = LTA \times e^{(z\sigma - 0.5\sigma^2)}$

Where:

$\sigma^2 = \ln(CV^2/n + 1)$

n = number of samples per month

$z = 1.645$ (95^{th} percentile)

LTA = limiting long-term average

Dilution Factor Calculations and Receiving Water Critical Conditions

Step 1: Enter Waterbody Type

Water Body Type	Freshwater

Facility Name	Montesano WWTP
Receiving Water	Chehalis River

Step 2: Enter Dilution Factors -OR- Calculate DFs by entering Facility/Receiving Water Flow Data

Do you want to enter dilution factors -or- flow data?	Dilution Factors

	Max Dilution Factor Allowed
Aquatic Life - Acute	10.5
Aquatic Life - Chronic	147.0
HH-Non-Carcinogen	147.0
HH-Carcinogen	147.0

Step 3: Enter Critical Data

	Effluent	Receiving Water
Temp, °C	22.5	17.3
pH, s.u.	6.5 / 6.9	7.0 / 8.1
Alkalinity, mg/L as CaCO3	Not Applicable	34.3
Hardness, mg/L CaCO3	130	31.3
Salinity, ppt	Not Applicable	0.2
Receiving water **TSS, mg/L** (leave blank if unknown)		6.7
If TSS is annual data, enter 'A'; if from critical period, enter 'S'; If no TSS, leave blank		S

Step 4: Specifiy if using 'Mixed' values for hardness, temperature, and pH

	Use 'Mixed Hardness' (Y/N)	Use 'Mixed Max Temp' (Y/N)	Use 'Mixed pH (Y/N)
	N	N	N
Acute Zone Boundary	40.7	17.8	
Chronic Zone Boundary	32.0	17.3	
Whole river at 7Q10			

Freshwater Un-ionized Ammonia Criteria Calculation

Based on Chapter 173-201A WAC, amended November 20, 2006

		mixed @ Acute Boundary	mixed @ Chronic Boundary	mixed @ Whole River
INPUT				
1. Receiving Water Temperature (deg C):	17.3	17.8	17.3	#DIV/0!
2. Receiving Water pH:	8.1	#VALUE!	#VALUE!	#DIV/0!
3. Is salmonid habitat an existing or designated use?	Yes	Yes	Yes	Yes
4. Are non-salmonid early life stages present or absent?	Present	Present	Present	Present
OUTPUT				
Using mixed temp and pH at mixing zone boundaries?	no			
Ratio	13.500	#VALUE!	#VALUE!	#DIV/0!
FT	1.400	1.400	1.400	#DIV/0!
FPH	1.000	#VALUE!	#VALUE!	#DIV/0!
pKa	9.489	9.473	9.488	#DIV/0!
Unionized Fraction	0.035	#VALUE!	#VALUE!	#DIV/0!
Unionized ammonia NH3 criteria (mg/L as NH_3)				
Acute:	0.218	#VALUE!	#VALUE!	#DIV/0!
Chronic:	0.042	#VALUE!	#VALUE!	#DIV/0!
RESULTS				
Total ammonia nitrogen criteria (mg/L as N):				
Acute:	5.107	**#VALUE!**		#DIV/0!
Chronic:	0.992		**#VALUE!**	#DIV/0!

Reasonable Potential Calculation

Facility	Montesano WWTP
Water Body Type	Freshwater
Rec. Water Hardness	31.3 mg/L

Dilution Factors:	Acute	Chronic
Aquatic Life	10.5	147.0
Human Health Carcinogenic		147.0
Human Health Non-Carcinogenic		147.0

Pollutant, CAS No. & NPDES Application Ref. No.			AMMONIA, Criteria as Total NH3	CHLORINE (Total Residual) 7782505										
Effluent Data	# of Samples (n)		19	1231										
	Coeff of Variation (Cv)		0.6	1.2	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
	Effluent Concentration, ug/L (Max. or 95th Percentile)		446	0.04										
	Calculated 50th percentile Effluent Conc. (when n>10)													
Receiving Water Data	90th Percentile Conc., ug/L		26	0										
	Geo Mean, ug/L													
Water Quality Criteria	Aquatic Life Criteria, ug/L	Acute	5,107	19										
		Chronic	992	11										
	WQ Criteria for Protection of Human Health, ug/L		-	-										
	Metal Criteria Translator, decimal	Acute	-	-										
		Chronic	-	-										
	Carcinogen?		N	N										

Aquatic Life Reasonable Potential

Effluent percentile value			0.950	0.950
s	$s^2=\ln(CV^2+1)$		0.555	0.944
Pn	$Pn=(1\text{-confidence level})^{1/n}$		0.854	0.998
Multiplier			1.39	1.00
Max concentration (ug/L) at edge of…		Acute	83	0.004
		Chronic	30	0.000
Reasonable Potential? Limit Required?			**NO**	**NO**

Calculation of Fecal Coliform at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	147.0
Receiving Water Fecal Coliform, #/100 ml	24
Effluent Fecal Coliform - worst case, #/100 ml	400
Surface Water Criterion, #/100 ml	*100*
OUTPUT	
[bacteria indicator] at Mixing Zone Boundary, #/100 ml	**27**
Difference between mixed and ambient, #/100 ml	3

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

Calculation of pH of a Mixture of Two Flows

Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

	@ Acute Boundary	@ Chronic Boundary
INPUT		
1. Dilution Factor at Mixing Zone Boundary	10.5	147.0
2. Ambient/Upstream/Background Conditions		
Temperature (deg C):	17.30	17.30
pH:	8.05	8.05
Alkalinity (mg CaCO3/L):	34.30	34.30
3. Effluent Characteristics		
Temperature (deg C):	22.50	22.50
pH:	6.00	6.00
Alkalinity (mg CaCO3/L):	0.01	0.01
4. Aquatic Life Use Designation	Char spawning & rearing and/or core summer habitat	
OUTPUT		
1. Ionization Constants		
Upstream/Background pKa:	6.40	6.40
Effluent pKa:	6.37	6.37
2. Ionization Fractions		
Upstream/Background Ionization Fraction:	0.98	0.98
Effluent Ionization Fraction:	0.30	0.30
3. Total Inorganic Carbon		
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	35	35
Effluent Total Inorganic Carbon (mg CaCO3/L):	0	0
4. Condtions at Mixing Zone Boundary		
Temperature (deg C):	17.80	17.34
Alkalinity (mg CaCO3/L):	31.03	34.07
Total Inorganic Carbon (mg CaCO3/L):	31.73	34.83
pKa:	6.40	6.40
5. Allowable pH change	NA	0.20
RESULTS		
pH at Mixing Zone Boundary:	**8.04**	**8.05**
pH change at Mixing Zone Boundary:	0.01	0.00
Is permit limit needed?	NO	NO

Calculation of pH of a Mixture of Two Flows

Based on the procedure in EPA's DESCON program (EPA, 1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington D.C.)

INPUT		
	@ Acute Boundary	**@ Chronic Boundary**
1. Dilution Factor at Mixing Zone Boundary	10.5	147.0
2. Ambient/Upstream/Background Conditions		
Temperature (deg C):	17.30	17.30
pH:	6.99	6.99
Alkalinity (mg CaCO3/L):	34.30	34.30
3. Effluent Characteristics		
Temperature (deg C):	22.50	22.50
pH:	9.00	9.00
Alkalinity (mg CaCO3/L):	0.01	0.01
4. Aquatic Life Use Designation	Char spawning & rearing and/or core summer habitat	
OUTPUT		
1. Ionization Constants		
Upstream/Background pKa:	6.40	6.40
Effluent pKa:	6.37	6.37
2. Ionization Fractions		
Upstream/Background Ionization Fraction:	0.79	0.79
Effluent Ionization Fraction:	1.00	1.00
3. Total Inorganic Carbon		
Upstream/Background Total Inorganic Carbon (mg CaCO3/L):	43	43
Effluent Total Inorganic Carbon (mg CaCO3/L):	0	0
4. Condtions at Mixing Zone Boundary		
Temperature (deg C):	17.80	17.34
Alkalinity (mg CaCO3/L):	31.03	34.07
Total Inorganic Carbon (mg CaCO3/L):	39.04	42.86
pKa:	6.40	6.40
5. Allowable pH change	NA	0.20
RESULTS		
pH at Mixing Zone Boundary:	**6.99**	**6.99**
pH change at Mixing Zone Boundary:	0.00	0.00
Is permit limit needed?	NO	NO

Calculation of Dissolved Oxygen at Chronic Mixing Zone

INPUT	
Chronic Dilution Factor	147.0
Receiving Water DO Concentration, mg/L	8.3
Effluent DO Concentration, mg/L	3.5
Effluent Immediate DO Demand (IDOD), mg/L	0
Surface Water Criteria, mg/L	*8*
OUTPUT	
DO at Mixing Zone Boundary, mg/L	**8.27**
DO decrease caused by effluent at chronic boundary, mg/L	**0.03**

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

References: EPA/600/6-85/002b and EPA/430/9-82-011

Streeter-Phelps Analysis of Critical Dissolved Oxygen Sag

INPUT			
1. EFFLUENT CHARACTERISTICS			
Discharge (cfs):			1.04
$CBOD_5$ (mg/L):			40
NBOD (mg/L):			23.4
Dissolved Oxygen (mg/L):			3.52
Temperature (deg C):			22.5
2. RECEIVING WATER CHARACTERISTICS			
Upstream Discharge (cfs):			500
Upstream $CBOD_5$ (mg/L):			1.7
Upstream NBOD (mg/L):			1.86
Upstream Dissolved Oxygen (mg/L):			8.27
Upstream Temperature (deg C):			17.3
Elevation (ft NGVD):			2
Downstream Average Channel Slope (ft/ft):			0.00013
Downstream Average Channel Depth (ft):			5.94
Downstream Average Channel Velocity (fps):			0.495
3. REAERATION RATE (Base e) at 20 deg C (day^{-1}):			0.63
Reference	Applic. Vel (fps)	Applic. Dep (ft)	Suggested Values
Churchill	1.5 - 6	2 - 50	0.30
O'Connor and Dobbins	0.1 - 1.5	2 - 50	0.63
Owens	0.1 - 6	1 - 2	0.50
Tsivoglou-Wallace	0.1 - 6	0.1 - 2	0.27
4. BOD DECAY RATE (Base e) AT 20 deg C (day^{-1}):			0.23
(or use Wright and McDonnell eqn, 1979, for small rivers.) Enter this value –>			0.49

OUTPUT	
1. INITIAL MIXED RIVER CONDITION	
$CBOD_5$ (mg/L):	1.8
NBOD (mg/L):	1.9
Dissolved Oxygen (mg/L):	8.3
Temperature (deg C):	17.3
2. TEMPERATURE ADJUSTED RATE CONSTANTS (Base e)	
Reaeration (day^-1):	0.59
BOD Decay (day^-1):	0.20
3. CALCULATED INITIAL ULTIMATE CBODU AND TOTAL BODU	
Initial Mixed CBODU (mg/L):	2.7
Initial Mixed Total BODU (CBODU + NBOD, mg/L):	4.6
4. INITIAL DISSOLVED OXYGEN DEFICIT	
Saturation Dissolved Oxygen (mg/L):	9.602
Initial Deficit (mg/L):	1.34
5. TRAVEL TIME TO CRITICAL DO CONCENTRATION (days):	0.64
6. DISTANCE TO CRITICAL DO CONCENTRATION (miles):	5.20
7. CRITICAL DO DEFICIT (mg/L):	1.38
8. CRITICAL DO CONCENTRATION (mg/L):	**8.22**

Calculation of BOD_5 Oxidation with Temperature Adjustment

INPUT	
Effluent BOD_5 (mg/L)	45
Effluent Dissolved Oxygen (DO) (mg/L)	3.52
Receiving Water Temperature (deg C)	17.3
Receiving Water DO (mg/L)	8.27
DO WQ Standards (mg/L)	8.0
Chronic Mixing Dilution Factor	147.0
Time for effluent to travel from outfall to chronic mixing boundary (days)	0.111
Oxidation rate of BOD, base e at 20 deg C, k_1 (day^-1)*	0.23
OUTPUT	
Effluent Ultimate BOD (mg/L)	65.85
Oxidation rate of BOD at ambient temperature, base e (day^-1)	0.20
BOD oxidized between outfall and chronic mixing zone (mg/L)	1.47
RESULTS	
DO at chronic mixing zone	8.23
Difference between ambient DO and DO at chronic mixing boundary	0.04
There is no reasonable potential of not meeting the DO criteria under these conditions.	

Freshwater Temperature Reasonable Potential and Limit Calculation

Based on WAC 173-201A-200(1)(c)(i)--(ii) and the Water Quality Program Guidance. All data inputs must meet WQ guidelines.

	Salmonid Spawning, Rearing, and Migration
INPUT	July 1-Sept 14
1. Chronic Dilution Factor at Mixing Zone Boundary	147.0
2. Ambient Temperature (T) (Upstream Background 90th percentile)	17.3 °C
3. 7DADMax Effluent Temperature (95th percentile)	22.5 °C
4. Aquatic Life Temperature WQ Criterion in Fresh Water	17.5 °C
OUTPUT	
5. Temperature at Chronic Mixing Zone Boundary:	17.3 °C
6. Incremental Temperature Increase or decrease:	0.0 °C
7. Maximum Allowable Incremental Temperature Increase:	1.2 °C
8. Maximum Allowable Temperature at Mixing Zone Boundary:	17.5 °C
A. If ambient temp is warmer than WQ criterion	
9. Does temp fall within this warmer temp range?	NO
10. **If YES - Use TMDL-based or performance-based limit - Do Not use this spreadsheet**	
B. If ambient temp is cooler than WQ criterion but within $28/(T_{amb}+7)$ of the criterion	
11. Does temp fall within this Incremental temp. range?	YES
12. Temp increase allowed at mixing zone boundary, if required:	NO LIMIT
C. If ambient temp is cooler than (WQ criterion - $28/(T_{amb}+7)$)	
13. Does temp fall within this Incremental temp. range?	NO
14. Temp increase allowed at mixing zone boundary, if required:	---
RESULTS	
15. Do any of the above cells show a temp increase?	**NO**
16. Temperature Limit if Required?	**NO LIMIT**

Appendix E — Response to Comments

The legal notice that informed the public that a draft permit and fact sheet were available for review was published in The Daily World on September 10, 2024. Ecology received comments on the draft documents during the 30-day public comment period. Below are the comments and Ecology's responses. Copies of the original comment letters received by Ecology during the public comment period are available upon request.

Ecology received one comment from the City of Montesano on September 19, 2024, via email. No other parties provided feedback. The comment below is followed by Ecology's response indicating corresponding changes to the permit and fact sheet.

Comment 1:

Thank you for the opportunity to submit public comments on the draft NPDES Permit for the City of Montesano WWTP. The City has given serious consideration to the proposed changes to the permit and we are concerned about the reduction in discharge limits and requirements for the groundwater study and facility plan, but we understand and accept the premise for those changes. However, we are strongly opposed to the imposition of a Receiving Water Study on the City.

We believe the information from the Fact Sheet supports our position that a Receiving Water Study is not needed to determine if there is no reasonable potential to exceed water quality standards at the outfall. On page 22 of the fact sheet, it is stated that the 1993 study remains conservative enough to calculate limits from it. On page 23 of the fact sheet, it is stated that the 7Q10 low flow in the 1993 study is very conservative (by a factor of 2 of the expected actual 7Q10 at the outfall). The fact sheet also acknowledges that the 1993 study results are even more conservative when looking at actual wet weather flow over the past five years (0.272 MGD) versus the 1993 study average wet weather flow assumption of 0.64 MGD. There is also no current Total Maximum Daily Load (TMDL) or other documented temperature concerns for this stretch of the river. The reasonable potential analysis and modeling results in the fact sheet is very clear that there is no reasonable potential to exceed water quality standards.

The proposed Receiving Water Study will place an undue burden on the City compared to any expected benefit. The City is not in a position to take on the additional work of a Receiving Water Study. We are a very small community and have very limited staffing. Our staff is already operating at full capacity to meet the current requirements to successfully operate the WWTP. We are also generally at capacity for managing consultants for the various City-wide projects that we typically have underway each year.

In summary, we believe there is very limited potential benefit of conducting a Receiving Water Study compared to the burden that would be placed on the City to conduct such

a study. We are not opposed to the concept of conducting a study to update information, but the City does not have the resources to do it. We respectfully request removal of the Receiving Water Study requirement from the proposed NPDES Permit for the City.

Response 1:

This comment uses Ecology's justification for using the City's 1993 Mixing Zone Study to also argue that updated receiving water data is not needed. However, even with a sufficiently conservative mixing zone study, receiving water data need to be updated periodically to accurately assess a discharge's reasonable potential to exceed water quality standards.

With this in mind, Ecology finds that the City of Montesano's request to remove the receiving water study from the final permit and fact sheet is reasonable. Although the available receiving water data should be updated, they were sufficient to assess reasonable potential to exceed water quality standards for this permit. There are also several new compliance requirements in this permit renewal. Ecology acknowledges that this will impact the City of Montesano's staffing and resources. To reduce the burden on the City, Ecology removed the receiving water study from the final permit and fact sheet. Ecology also removed text that referenced the receiving water study. Ecology may look into other ways to update the receiving water data or include this requirement in the next permit issuance.