

# MEMORANDUM

November 9, 2022

TO: Historical Memo

FM: Matt Macdonald

RE: Vashon Wastewater Treatment Plant – October 2022

The Vashon Wastewater Treatment Plant effluent met all water quality requirements in October 2022. Effluent Biochemical Oxygen Demand (BOD<sub>5</sub>) averaged 3.5-mg/l and Total Suspended Solids (TSS) averaged <3.0-mg/l. BOD<sub>5</sub> and TSS removals were 99% and 99%, respectively. All required analytical testing was completed in October.

October was a dry month relative to the historical average with 2.30-inches of rainfall recorded at nearby Judd Creek and 2.76-inches of rainfall recorded at Seatac Airport; the past 30-year historical average for October is 3.91-inches. Nearly all of the monthly rainfall fell in the last 10 days of the month.

Influent flow averaged 0.091 million gallons per day (MGD) in October 2022. The maximum daily flow of 0.158-MGD occurred on October 30 in response to 0.44-inches of rainfall. Peak hourly flow on October 30 was 0.309-MGD during which the average turbidity was 7-NTU. Effluent temperature in October averaged 17.9°C, with a 3.5°C decrease over the month.

The oxidation ditch was operated at an average solids retention time of 22-days with a dissolved oxygen control set-point of 0.8-mg/L. Mixed liquor TSS averaged 3,600-mg/L, and ranged from 3,300-mg/L to 3,900-mg/L. The sludge volume index, which measures the mixed liquor's settling characteristics, averaged 157-mL/g for the month. Clarifier 2 was in service for the duration of the month. An estimated 2,600 dry pounds of waste activated sludge was hauled to South Plant for further treatment in October.

The UV system operated with both stages in AUTO for the duration of October.

A set of samples was collected on October 5 and 20 for nutrient analysis. Monthly total nitrogen (TN) removal was 95%, with an average effluent TIN concentration of 1.9-mg/L (0.13-mg/L NH<sub>3</sub>-N and 1.8-mg/L NO<sub>2</sub>+NO<sub>3</sub> as N). The average of daily effluent TIN load was 1.5-lbs/day as N, which results in 46-lbs of TIN as N discharged in October. The cumulative annual TIN loading is < 263-lbs<sup>1</sup> (calculated beginning from April 1, as that is the first day of reporting under the Puget Sound Nutrient General Permit). Effluent total phosphorus (Total-P) averaged 7.4-mg/L, resulting in a Total-P removal of just 9%. No soda ash was added to the ditch for pH adjustment in October.

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<sup>1</sup> As a "Permittee with a small TIN load", the Vashon Wastewater Treatment Plant does not have a numeric "action level" for annual cumulative TIN load under the Puget Sound Nutrient General Permit.

Vashon – October 2022  
Process Summary

Table 1. Summary of Monthly Flow & Rain

Monthly Total Flow Volume, MG	Monthly Average Flow, MGD	Minimum Daily Flow, MGD	Maximum Daily Flow, MGD	Total Rainfall, Inches
2.96	0.095	0.072	0.158	2.30

Table 2. Summary of Monthly Compliance/Exceptions

Biochemical Oxygen Demand 5-day			Total Suspended Solids			Fecal Coliform (no./100 mL)	
Permit mg/L	Actual mg/L	Rem %	Permit mg/L	Actual mg/L	Rem %	Permit	Actual
30	3.5	99	30	<3.0	99	200	E1.3

Table 3. Summary of Weekly Compliance/Exceptions

	Biochemical Oxygen Demand (mg/L)		Total Suspended Solids (mg/L)		Fecal Coliforms (Organisms/100 mL)	
	Permit	Actual	Permit	Actual	Permit	Actual
Week 1	45	3.3	45	<2.8	400	E1.8
Week 2	45	2.8	45	3.1	400	E1.5
Week 3	45	3.5	45	3.0	400	E1.3
Week 4	45	4.4	45	2.9	400	<1.0

Table 4. Summary of Effluent Nitrogen

Average NH <sub>3</sub> mg/L as N	Average NO <sub>2</sub> +NO <sub>3</sub> mg/L as N	Average TIN <sup>2</sup> mg/L as N	Average TKN lb/d as N	Monthly TIN lbs as N	Annual <sup>3</sup> TIN lbs as N	Average Monthly Total N removal %
0.13	1.8	1.9	1.7	46	<263	95%

<sup>2</sup> TIN = Total Inorganic Nitrogen = NH<sub>3</sub> + NO<sub>2</sub>+NO<sub>3</sub> (as N)

<sup>3</sup> Year-to-date annual TIN load beginning April 2022.