MEMORANDUM

May 10, 2022

TO: Historical Memo

FM: Matt Macdonald

RE: Vashon Wastewater Treatment Plant – April 2022

The Vashon Wastewater Treatment Plant effluent met all water quality requirements in April 2022. Effluent Biochemical Oxygen Demand (BOD_5) averaged 4.4-mg/l and Total Suspended Solids (TSS) averaged <3.5-mg/l. BOD_5 and TSS removals were 98% and 99%, respectively. All required analytical testing was completed.

Influent flow averaged 0.154 million gallons per day (MGD) in April. The maximum daily flow of 0.225-MGD occurred on April 4 as a result of 0.77-inches of rainfall. Peak hourly flow on April 4 was 0.354-MGD during which the average turbidity was 3.0-NTU. Effluent temperature ranged from 12.5℃ to 14.0℃ over April.

A total of 2.57-inches of precipitation fell in April (as measured at the Judd Creek rain gage). SeaTac airport weather station reported 2.71-inches of rainfall in April (versus a 30-year average of 3.18-inches).

The oxidation ditch was operated at an average SRT of 34-days with a control DO concentration of 0.8-mg/L. Mixed liquor TSS (MLSS) averaged 5,400-mg/L and ranged from 4,800-mg/L to 5,900-mg/L. The sludge volume index (SVI) – which measures the MLSS's settling characteristics – averaged 170-mL/g for the month. Both clarifiers were service for the duration of the month. An estimated 5,200 dry pounds of waste activated sludge were hauled to South Plant for further treatment in April.

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

A set of samples was collected on April 7 and 20 for nutrient analysis. Total nitrogen (TN) removal was 96%, with an average effluent total inorganic nitrogen (TIN) concentration of 0.9-mg/L (<0.06-mg/L NH_3-N and 0.8-mg/L NO_2+NO_3 as N). The average of daily effluent TIN loads was 1.1-lbs/day as N which results in a calculated 32-lbs of TIN load as N discharged during April. The cumulative annual TIN loading was calculated beginning from April 1, as that is the first day of reporting under the Puget Sound Nutrient General Permit; the cumulative annual effluent TIN loading at the end of April was 32-lbs[1]. Effluent total phosphorus (Total-P) was 0.8-mg/L on April 7, resulting in a Total-P removal of 92%. No soda ash was added to the ditch for pH adjustment in April.

[1] As a "Permittee with a small TIN load", the Vashon Wastewater Treatment Plant does not have a numeric limit for annual cumulative TIN load under the Puget Sound Nutrient General Permit.

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
4.61	0.154	0.125	0.225	2.57

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	4.4	98	30	3.5	99	200	E1.0

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	4.5	45	2.8	400	<1.0
Week 2	45	4.7	45	3.1	400	<1.0
Week 3	45	4.2	45	4.2	400	E0.8
Week 4	45	4.3	45	4.0	400	E1.3

Table 4. Summary of Effluent Nitrogen

Average NH_3 mg/L as N	Average $NO_{2+}NO_3$ mg/L as N	Average TIN[2] mg/L as N	Average TKN lb/d as N	Monthly TIN lbs as N	Annual[3] TIN lbs as N	Average Monthly Total N removal %
<0.06	0.8	<0.9	1.1	32	32	96%

[2] TIN = Total Inorganic Nitrogen = NH3 + NO2+NO3 (as N)
[3] Year-to-date annual TIN load beginning April 2022.