REGIONAL DISTRICT OF NANAIMO

2025 Annual Report

Greater Nanaimo Pollution Control Centre

February 2026

Submitted to the Ministry of Environment and Parks
envauthorizationsreporting@gov.bc.ca

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Executive Summary

The Regional District of Nanaimo (RDN) owns and operates the Greater Nanaimo Pollution Control Centre (GNPCC), located at 4600 Hammond Bay Road in Nanaimo. GNPCC provides secondary treatment using Modified Ludzack-Ettinger (MLE) activated sludge process. In 2017, construction began on the Secondary Treatment Upgrade Project. Construction achieved substantial completion in September 2020. Treated effluent from GNPCC is discharged to the Strait of Georgia.

Operation of GNPCC is regulated by Environmental Management Permit No. PE00338, most recently amended by the BC Ministry of Environment and Parks in 2020. The authorized treatment works include a screening facility; grit and scum removal systems; primary sedimentation tanks; secondary treatment bioreactors; secondary clarifiers; sludge thickening systems, sludge digestion systems; sludge dewatering facility; an outfall extending 2,030 m out from mean low water to a maximum depth of 70 m below mean low water; a diffuser; and related appurtenances.

This report was written by RDN staff as a permit requirement and summarizes and interprets the GNPCC monitoring data for 2025. The summary of 2025 monitoring data at GNPCC is as follows:

Summary of Compliance	Permit Maximum Limit	2025	Permit Exceedances
Maximum Daily Flow	80,870 m^3/day	71,553 m^3/day	0
Average Daily Flow	40,950 m^3/day	33,339 m^3/day	-
Average Daily $cBOD_5$	130 mg/L	7.06 mg/L	0
Average Daily TSS	130 mg/L	9.33 mg/L	0

- **Flow** – The total flow discharged from GNPCC in 2025 was 12,168,814 m^3, at an average daily flow of 33,339 m^3/day. GNPCC had no maximum daily flow permit exceedances.
- **5-day Carbonaceous Biochemical Oxygen Demand** – The influent and effluent average 5-day Carbonaceous Biochemical Oxygen Demand ($cBOD_5$) concentration for 2025 was 300 mg/L and 7.06 mg/L, respectively. The average removal efficiency in 2025 was 97.4%.
- **Total Suspended Solids** – The influent and effluent average Total Suspended Solids (TSS) concentration in 2025 was 505 mg/L and 9.33 mg/L, respectively. The average TSS removal efficiency in 2025 was 97.9 %.
- **Ammonia and Toxicity** – The average ammonia nitrogen concentration in the effluent for 2025 was 17.7 mg/L and the average toxicity (LC_{50}) of the effluent for 2025 was >100%.
- **General parameters, metals, volatile and semi-volatile compounds** – results from this reporting year were consistent with historical data.
- **Biosolids** – Biosolids generated by GNPCC in 2025 met the standards for Class B biosolids in Schedules 3 and 4 of the Organic Matter Recycling Regulation. GNPCC biosolids are currently land applied in a Forest Fertilization Program.

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1) Introduction

The Regional District of Nanaimo (RDN) owns and operates the Greater Nanaimo Pollution Control Centre (GNPCC) located at 4600 Hammond Bay Road in Nanaimo. GNPCC provides secondary treatment using Modified Ludzack-Ettinger (MLE) activated sludge process. Treated effluent from GNPCC is discharged to the Strait of Georgia. Operation of the treatment plant is regulated by the Ministry of Environment and Parks (ENV) under Environmental Management Permit No. PE00338 (the Permit), issued on April 15, 1970, and most recently amended on December 11, 2020 (see Appendix A). The RDN has been in discussion with ENV about establishing an Operational Certificate at GNPCC.

The authorized treatment works include a screenings facility, grit and scum removal systems, primary sedimentation tanks, secondary treatment bioreactors, secondary clarifiers, sludge thickening systems, sludge digestion systems, sludge dewatering facility, and outfall extending 2,030 m from mean low water to a minimum depth of 70 m, diffusers, and related appurtenances.

Notable upgrades over the years include:

- From 2009 until the commissioning of secondary treatment, GNPCC operated with Chemically Enhanced Primary Treatment (CEPT).
- In 2009, two gravity thickeners were added to the treatment process.
- In September 2012, a cogeneration system was installed. It produced electricity from 2012 to mid-2018, which was sold to BC Hydro.
- A third digester and fourth sedimentation tank were added in 2013.
- In 2016, the RDN commissioned a new outfall for GNPCC.
- In October 2020, the secondary treatment process commenced operation.

This report was written by RDN staff as a permit requirement to summarize and interpret the 2025 GNPCC monitoring data.

1.1 Environmental Management System

The RDN's Wastewater Services department's Environmental Management System is ISO 14001:2015 certified. ISO 14001 is an international Environmental Management System standard based on a model of continual improvement. The overall aim of ISO 14001 is to support environmental protection and prevent pollution in balance with socio-economic needs. Visit www.rdn.bc.ca/environmental-management-system for more information.

2) Site Description and Neighborhood

The neighbourhood surrounding GNPCC is predominately a single- and multi-family residential area. There are about 1,000 residential properties within a 1 km radius of the treatment facility. Ecole Hammond Bay School is also nearby. Neck Point Park borders the property to the northeast. There were no significant changes to the layout of the neighbourhood last year. Walley Creek runs in front of the treatment facility parallel to Hammond Bay Road.

3) Permit Requirements

3.1 Authorized Discharges

Section 1.1.1 of the Permit states the following daily effluent discharge limits:

- Average annual flow: 40,950 m^3/day
- Maximum daily flow: 80,870 m^3/day.

Section 1.1.2 of the Permit states that the characteristics of the discharge shall not exceed:

- 5-Day Carbonaceous Biochemical Oxygen Demand ($cBOD_5$): 130 mg/L
- Total Suspended Solids (TSS): 130 mg/L.

3.2 Monitoring Requirements

Table 1 summarizes the Permit monitoring requirements. Quarterly reports were submitted to ENV.

Table 1. Monitoring Requirements by Permit Subsection Number

3.1.1 Flow Measurement A flow-measuring device must be provided and maintained to record, once per day, the effluent volume discharged over the preceding 24-hour period.
3.1.2 Sampling and Analysis Suitable sampling facilities must be installed and maintained to obtain composite samples and analyses of the effluent.
3.2 Biosolids Monitoring A sample of the treated biosolids must be obtained once every quarter for chemical analysis.
3.3 Monitoring of the Receiving Environment The receiving environment in the vicinity of the treatment plant outfall shall be monitored, and the monitoring program is subject to approval by the Regional Waste Manager.
3.4.1 Sampling and Analytical Procedures Sampling and flow measurement shall be carried out in accordance with the procedures described in the *British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air Emission, Water, Wastewater, Sediment and Biological Samples (2013 Edition)*, or by suitable alternative procedures authorized by the Regional Waste Manager. Analyses are to be carried out in accordance with procedures described in the *British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Air Samples (2020)*, or by suitable alternative procedures authorized by the Regional Waste Manager.
3.4.2 Toxicity Toxicity analyses for effluent are conducted by an external laboratory.

Additional methodologies used for the analyses are described in the "*Standard Methods for the Examination of Water and Wastewater*," 24th Edition, American Public Health Association, 2023.

An automatic sampler was used to withdraw flow-proportioned effluent samples over a 24-hour period.

3.3 Outfall Inspection

The Permit requires inspection of the GNPCC outfall every five years. The outfall was last inspected by GreatPacific Consulting Ltd. in November 2022 and was reported to be in good condition. The outfall inspection report was submitted to ENV. The next inspection is scheduled for 2027.

4) Flow Monitoring

Flow was measured in 2025 by a Parshall Flume and totalized by GNPCC's SCADA system.

4.1 2025 Flows

Daily flow monitoring data for GNPCC in 2025 is presented in Appendix B. The total flow discharged from GNPCC in 2025 was 12,168,814 m^3, at an average daily flow of 33,339 m^3/day. Higher daily flows recorded in February and March were associated with seasonal patterns of rainfall. GNPCC had no maximum daily flow non-conformances in 2025.

The Average Dry Weather Flow (ADWF) for 2025 was 28,292 m^3/day based on average daily flow in July, the month with the lowest total precipitation. The 2025 precipitation data was obtained from the Nanaimo City Works Yard weather station (see Environment and Climate Change Canada).

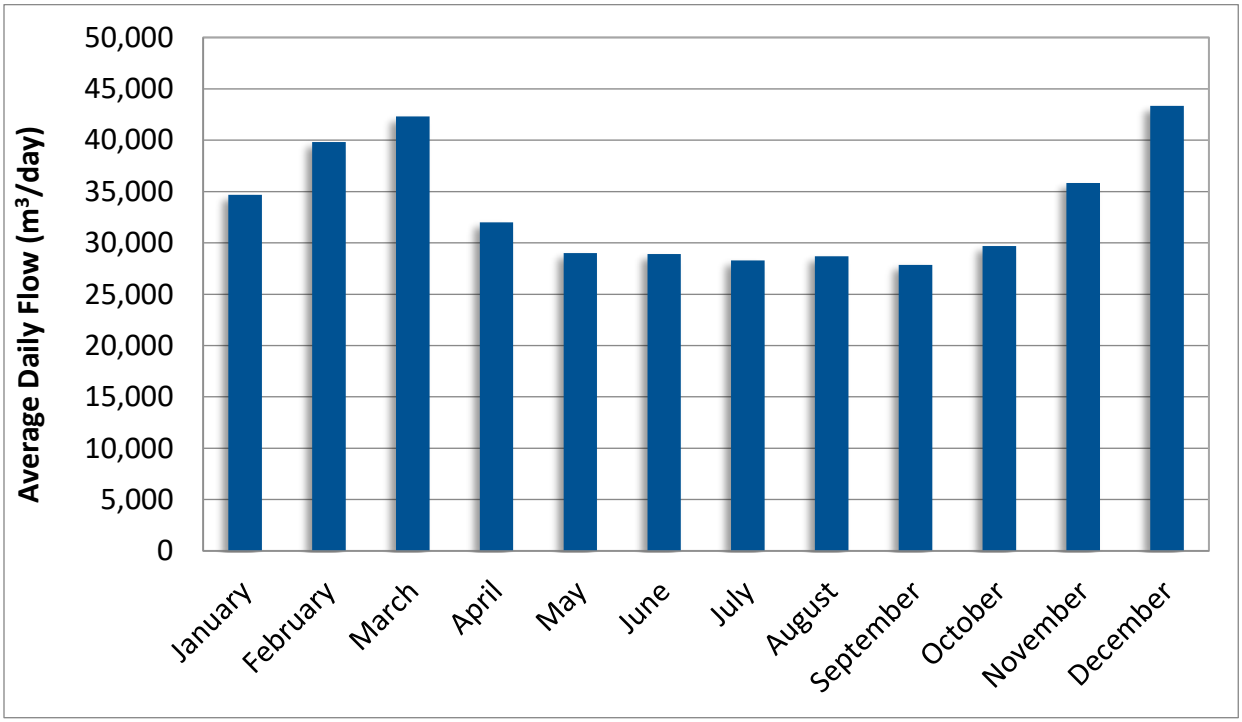
Maximum daily flow non-conformances in previous years have been attributed to inflow and infiltration (I&I) entering the sanitary collection system. As part of the LWMP process, the RDN is working collaboratively with the City of Nanaimo and the District of Lantzville to reduce I&I in the sanitary sewer collection system.

Flows are summarized in Table 2 and graphed in Figure 1.

Table 2. 2025 Summary of Flows from GNPCC

Month	Average Daily Flow (m^3/day)	Total Flow (m^3)	Maximum Flow (m^3/day)	Minimum Flow (m^3/day)	Non-Compliances (Max daily flow)	Total Monthly Precipitation (mm)
January	34,669	1,074,732	48,837	27,467	0	51.8
February	39,806	1,114,564	71,553	28,366	0	117.8
March	42,319	1,311,874	57,492	33,660	0	160.2
April	31,997	959,912	38,330	24,598	0	29.4
May	28,995	898,830	32,735	27,081	0	51.4
June	28,910	867,294	30,256	27,212	0	30.8
July	28,292	877,037	29,790	26,845	0	3.8
August	28,707	889,922	31,631	24,027	0	36.0
September	27,850	835,514	30,889	25,355	0	29.2
October	29,704	920,819	36,902	27,374	0	134.0
November	35,841	1,075,220	50,213	30,430	0	124.6
December	43,326	1,343,096	58,514	34,485	0	171.4
Average	**33,339**					**940.4**
Total		**12,168,814**			**0**	
Maximum			**71,553**			
Minimum				**24,027**		

Figure 1. 2025 Average Daily Flow Per Month



4.1.1 Historical Trends

Flow data reported over the past ten years are summarised in Table 3 and graphed in Figures 2 and 3. Note, flow measurement techniques have varied over the years:

- Flow from December 2014 to January 2018 was measured by an ISCO LaserFlow meter. It is believed that the LaserFlow meter was reading high.
- Flows after January 2018 were measured using a new Parshall Flume.

Table 3. Historical Trends: GNPCC Flows

Year	Average Daily Flow (m^3/day)	Total Flow (m^3)	Maximum Flow (m^3/day)	Non-Conformances (Max daily flow)
2016	41,151	15,061,083	96,700	6
2017	42,535	15,525,250	133,200	3
2018	29,945	10,930,000	91,100	2
2019	28,189	10,289,016	102,400	1
2020	29,426	10,769,976	92,213	2
2021	32,112	11,720,796	90,730	2
2022	32,290	11,785,797	104,451	4
2023	33,547	12,244,604	95,897	2
2024	35,239	12,897,453	84,271	1
2025	33,339	12,168,814	71,553	0

Figure 2. Historical Flows from GNPCC

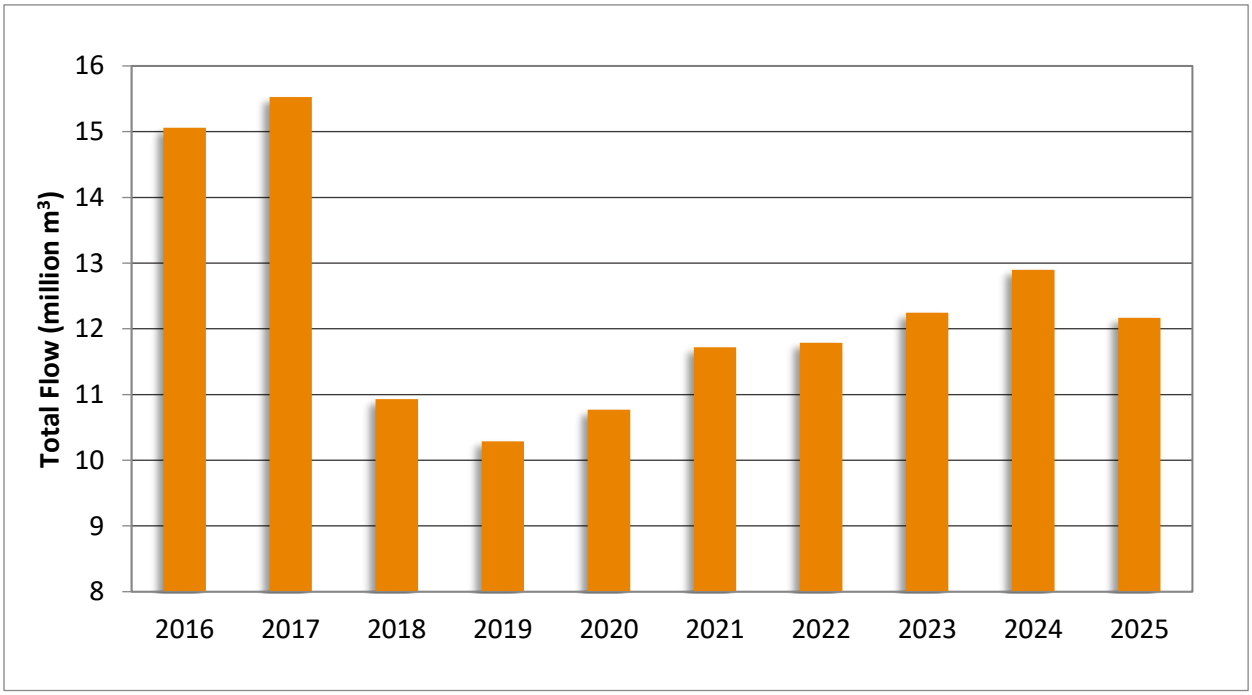
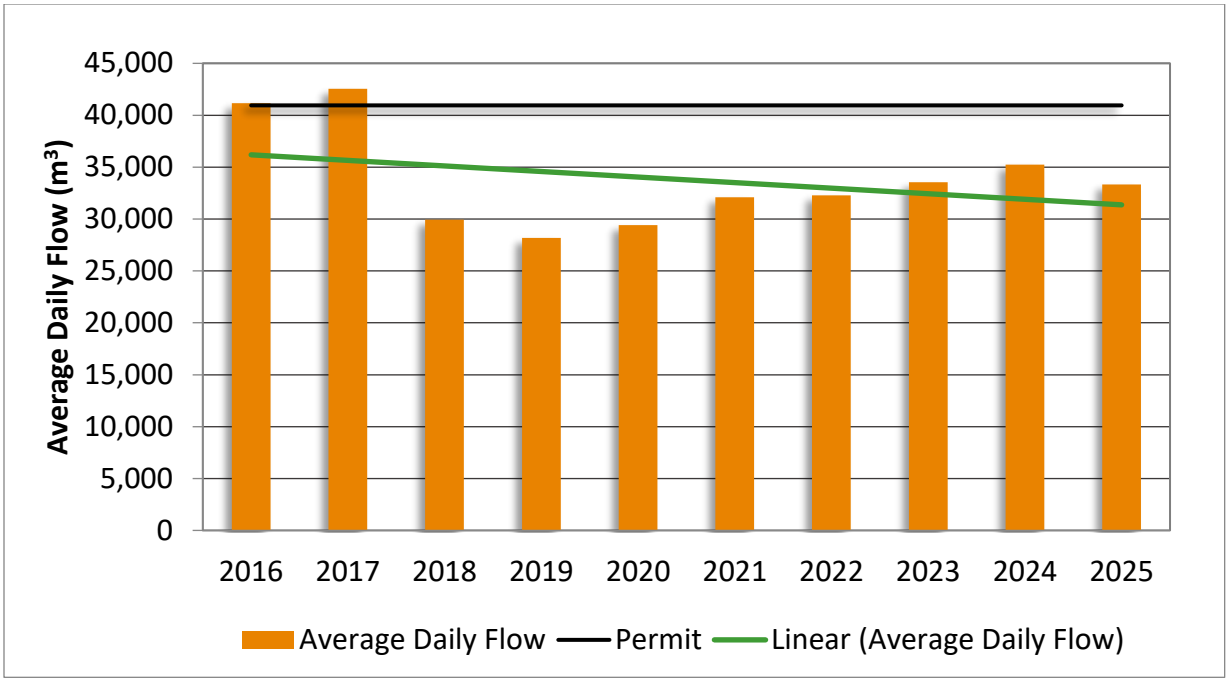


Figure 3. Historical Trends: Average Daily Flow by Year



5) Effluent Monitoring

5.1 5-Day Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)

Five-day carbonaceous biochemical oxygen demand ($cBOD_5$) is a measure of the quantity of oxygen consumed by microorganisms to break down organic matter in water in which the contribution from nitrogenous bacteria has been suppressed. A high $cBOD_5$ means less oxygen is available to support aquatic life. Thus, high $cBOD_5$ levels result in the contamination of the receiving environment.

The Permit requires $cBOD_5$ testing of the effluent once per day and establishes the maximum permitted concentration at 130 mg/L. The average influent and effluent $cBOD_5$ concentration for 2025 was 278 mg/L and 7.06 mg/L, respectively. The average $cBOD_5$ removal efficiency was 97.1%. Appendix B contains the daily $cBOD_5$ test results.

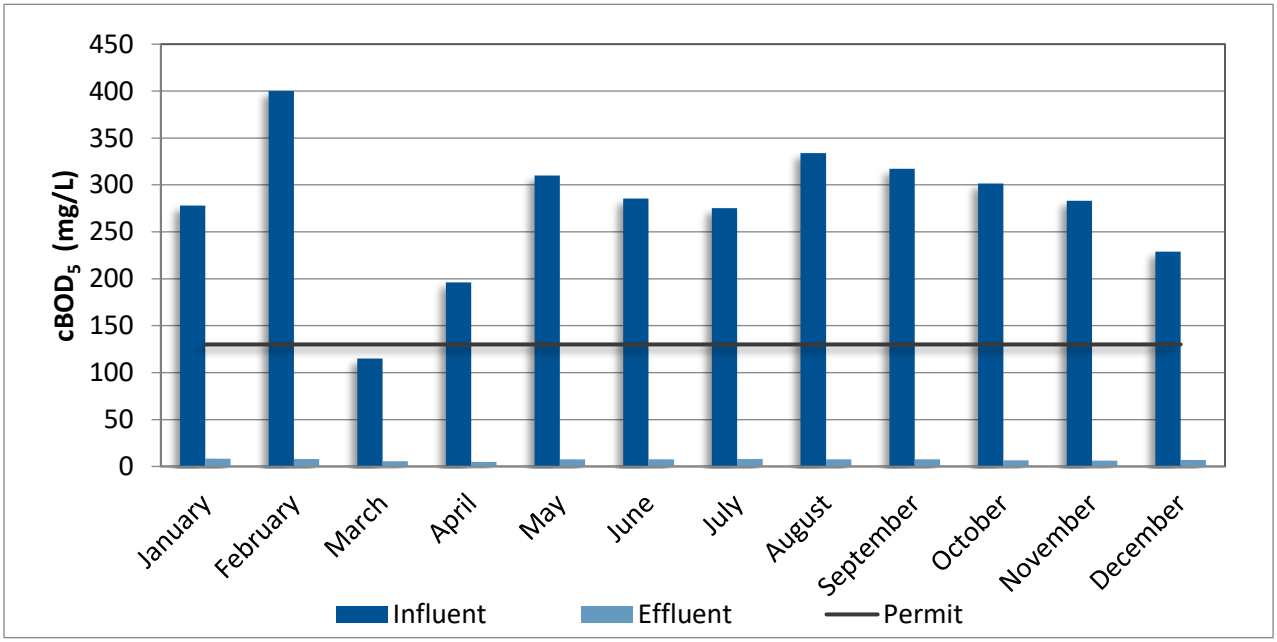
Monthly averages are summarized Table 4 and graphed in Figure 4.

Table 4. 2025 Influent & Effluent $cBOD_5$ Concentrations

Month	Average $cBOD_5$ (mg/L)		Average % Reduction in $cBOD_5$	Permit Exceedances ($cBOD_5$ > 130 mg/L)
	Influent*	Effluent		
January	278	8.15	97.6%	0
February	400	8.04	98.5%	0
March	<115	5.68	95.6%	0
April	196	4.67	97.9%	0
May	310	7.67	97.3%	0
June	285	7.54	97.0%	0
July	275	8.02	97.1%	0
August	334	7.59	98.0%	0
September	317	7.42	97.4%	0
October	302	6.46	97.7%	0
November	283	6.29	97.5%	0
December	229	7.05	95.6%	0
Average	**278**	**7.06**	**97.1%**	
Total				**0**

-March and April influent $cBOD_5$ result reflects influent grab sampling (composite sampler not in service).
-Detection limit for < results used to determine influent $cBOD_5$ average.

Figure 4. 2025 Influent & Effluent Monthly Average $cBOD_5$ Concentration



-March and April influent $cBOD_5$ result reflects influent grab sampling (composite sampler not in service).
-Detection limit for < results used to determine influent $cBOD_5$ average.

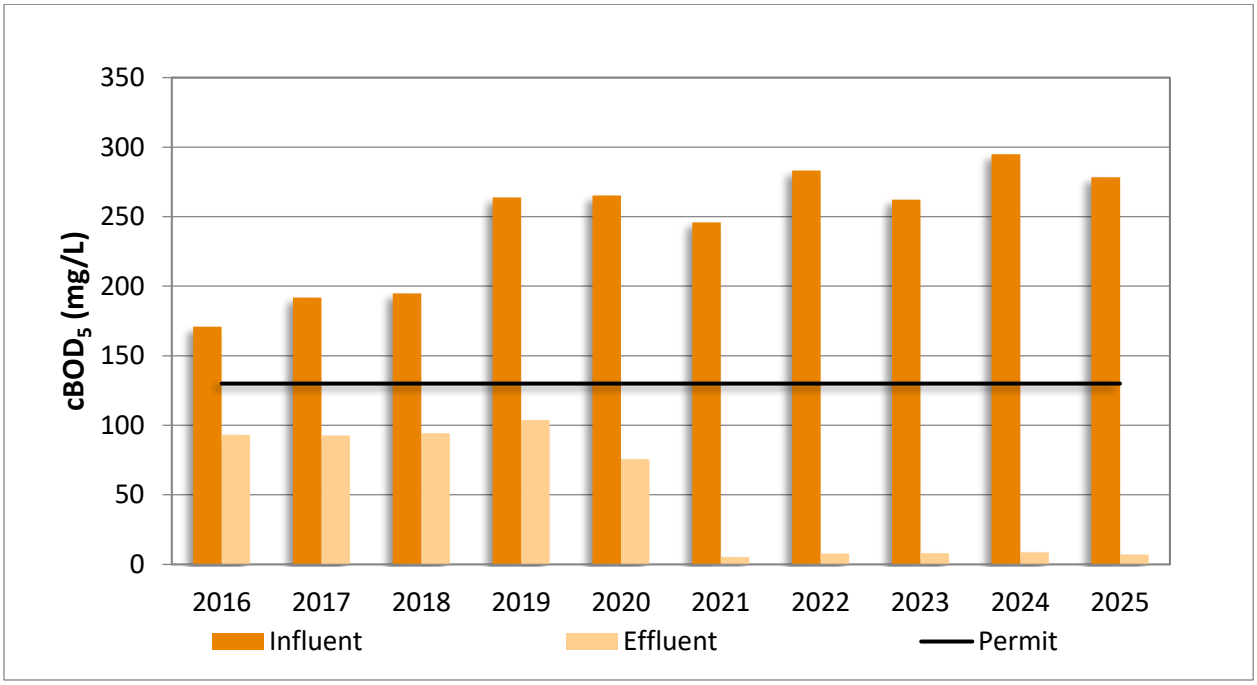
5.1.1 Historical Trends

Historical influent and effluent $cBOD_5$ concentrations, reduction efficiencies and number non-compliances over the past ten years are summarised in Table 5 and graphed in Figure 5. The removal of $cBOD_5$ increased after October 2020 with the addition of secondary treatment.

Table 5. Historical Trends: Influent & Effluent $cBOD_5$ Concentrations

Year	Average $cBOD_5$ (mg/L)		Average % Reduction in $cBOD_5$	Non-Compliances
	Influent	Effluent		
2016	171	93.0	44.9%	3
2017	192	92.6	49.2%	7
2018	195	94.3	48.2%	3
2019	264	103.7	57.3%	4
2020	265	75.5	63.5%	11
2021	246	5.32	97.8%	0
2022	283	7.69	97.1%	0
2023	262	7.97	96.7%	0
2024	295	8.65	96.9%	0
2025	278	7.06	97.1%	0

Figure 5. Historical Trends: Influent & Effluent Yearly Average $cBOD_5$ Concentration



5.2 Total Suspended Solids

Total suspended solids (TSS) are solids in wastewater that can be captured on fine filter paper. They are visible in water and decrease water clarity. High TSS concentrations can cause problems for aquatic life.

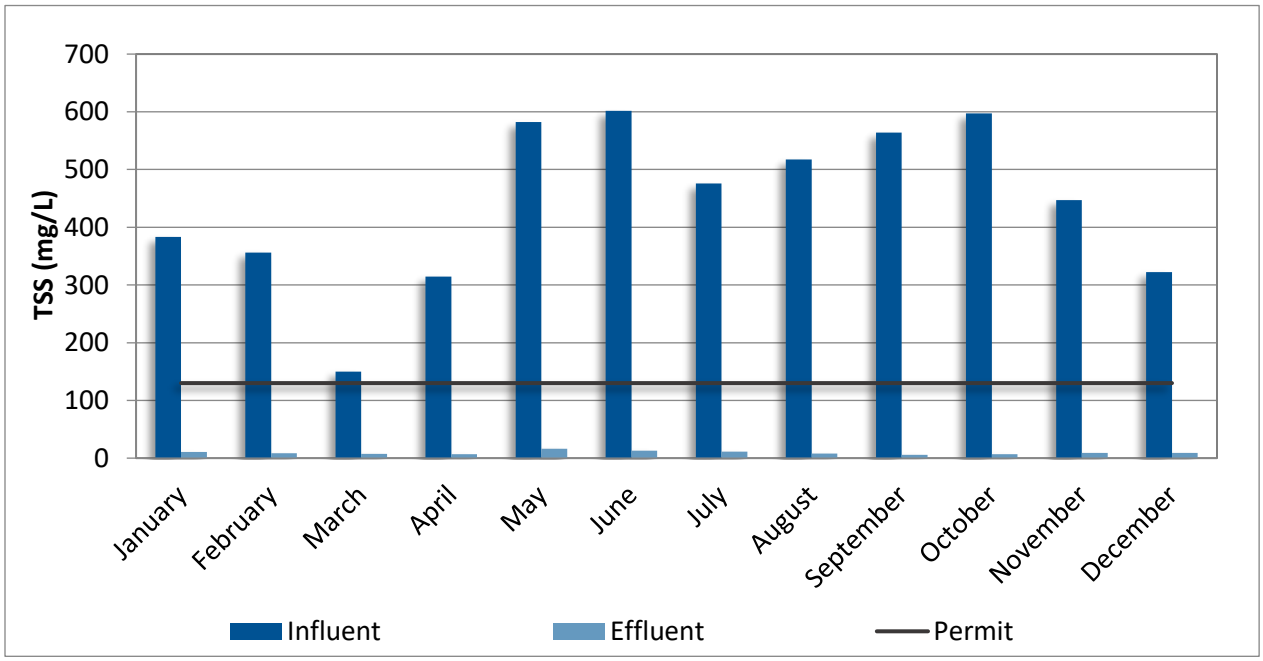
The Permit requires daily TSS testing of the effluent, with a maximum permitted concentration of 130 mg/L. Influent and effluent average TSS concentrations in 2025 were 447 mg/L and 9.33 mg/L, respectively. The average TSS removal efficiency in 2025 was 97.6%. Appendix B contains the daily TSS results. Results are summarized in Table 6 and graphed in Figure 6.

Table 6. 2025 Influent & Effluent TSS Concentrations

Month	Average TSS (mg/L)		Average % Reduction in TSS	Permit Exceedances (TSS>130 mg/L)
	Influent	Effluent		
January	384	10.6	97.2%	0
February	356	8.46	97.6%	0
March	150	7.36	95.1%	0
April	315	6.63	97.6%	0
May	582	16.3	97.4%	0
June	602	12.8	97.5%	0
July	476	11.6	97.8%	0
August	518	7.74	98.6%	0
September	564	5.88	98.8%	0
October	598	6.73	98.9%	0
November	447	8.94	97.8%	0
December	322	8.85	96.1%	0
Average	**447**	**9.33**	**97.6%**	
Total				**0**

- Influent TSS results from February 26 to April 23 reflect influent grab sampling (composite sampler not in service).

Figure 6. 2025 Influent & Effluent Monthly Average TSS



- Influent TSS results from February 26 to April 23 reflect influent grab sampling (composite sampler not in service).

5.2.1 Historical Trends

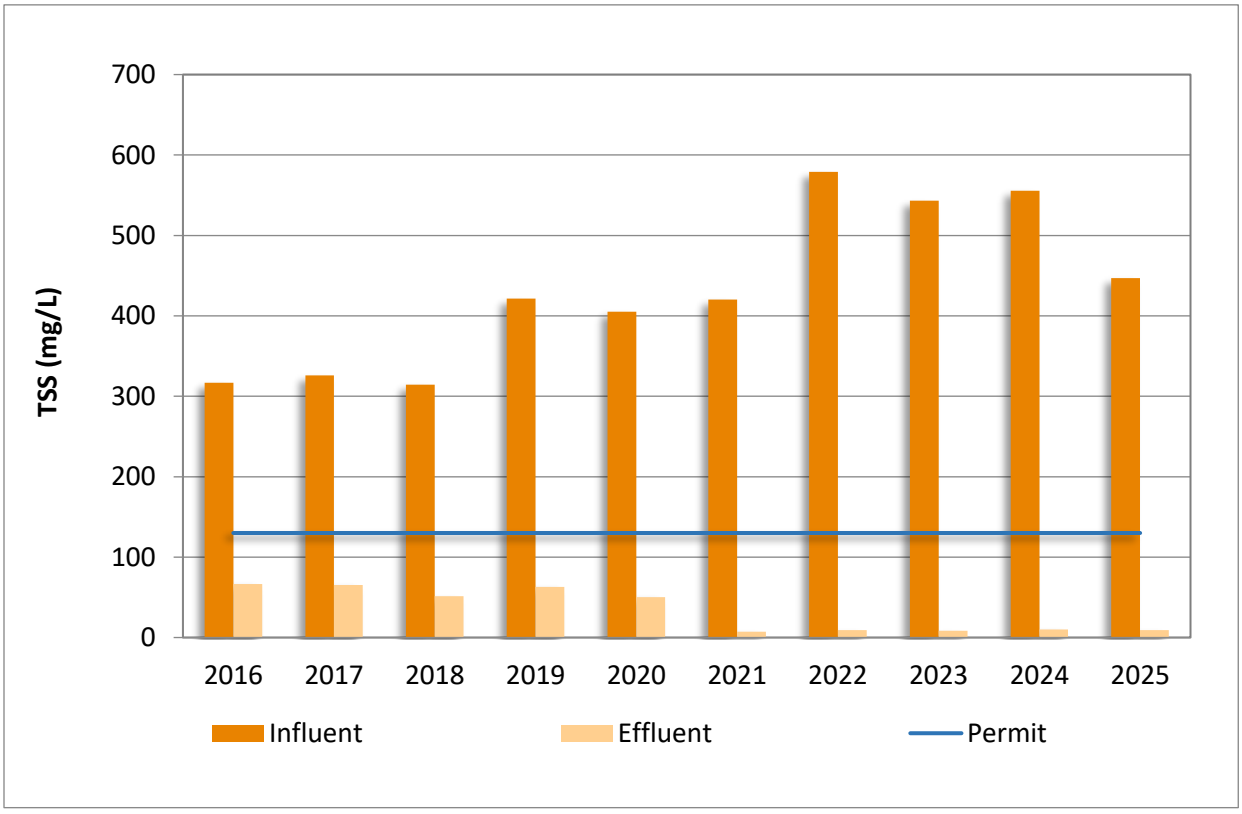
Historical influent and effluent average TSS concentration, reduction efficiencies and the number of non-compliances over the past ten years are summarised in Table 7 and graphed in Figure 7. Data from 2025 are consistent with historical values.

Effluent TSS results decreased after the secondary treatment was operational in October 2020.

Table 7. Historical Trends: Influent & Effluent TSS

Year	Average TSS (mg/L)		Average % Reduction in TSS	Non-Compliances
	Influent	Effluent		
2016	317	66.4	77.8%	0
2017	326	65.5	78.6%	0
2018	314	51.3	82.1%	0
2019	421	63.0	82.8%	0
2020	405	50.2	83.3%	1
2021	420	7.09	98.0%	1
2022	579	9.28	98.0%	0
2023	543	8.52	98.1%	0
2024	556	9.98	97.8%	0
2025	447	9.33	97.6%	0

Figure 7. Historical Trends: Influent & Effluent Yearly Average TSS



5.3 Ammonia and Toxicity

Ammonia is one of the typical constituents found in domestic wastewater. Ammonia can be harmful to both freshwater and marine fish. Ammonia and toxicity are monitored to measure potential impacts to the receiving environment.

Toxicity testing, or a bioassay, is used to determine the strength of a material by studying the reaction of a living organism exposed to it. The accepted method used to determine the toxicity of water and wastewater is called an LC_{50} 96-hour test. This means the lethal concentration at which 50% of test organisms die within 96 hours. The result is given as a percentage, referring to the amount of effluent, in relation to dilution water, used in the test. A toxicity result of 100% is not acutely toxic. The lower the toxicity result (expressed as a percentage), the more toxic the effluent.

Ammonia testing is completed internally at the GNPCC lab on composite samples from the effluent. Table 8 contains the average of the 2025 Ammonia testing results for each month. Appendix B contains daily test results. The average ammonia nitrogen concentration in the effluent for 2025 was 17.7 mg/L.

Table 8. 2025 Effluent Ammonia Nitrogen Concentrations

Month	Effluent Ammonia Nitrogen (mg/L)
January	12.7
February	12.8
March	16.2
April	12.3
May	21.3
June	18.5
July	19.2
August	25.7
September	18.9
October	21.8
November	15.7
December	16.3
AVERAGE	**17.7**

*Total as N

The GNPCC laboratory conducts daily testing of un-ionized ammonia levels to exceed the requirements of its Wastewater Systems Effluent Regulations (WSER) transitional authorization. Un-ionized ammonia levels were lower than the WSER limit of 1.25 mg N/L. Table 9 contains the average monthly un-ionized ammonia testing results. Appendix B contains the daily test results.

Table 9. 2025 Un-ionized Ammonia Results

Month	Un-ionized Ammonia (mg/L)
January	0.033
February	0.022
March	0.042
April	0.024
May	0.070
June	0.066
July	0.077
August	0.143
September	0.081
October	0.091
November	0.050
December	0.054
AVERAGE	**0.063**

*Total as N

The Permit requires the effluent be tested quarterly for toxicity. Toxicity testing is conducted by an external laboratory (see Appendix C for test reports) based on per cent survival of rainbow trout in undiluted effluent. Table 10 contains the LC_{50} Toxicity testing results. The average LC_{50} toxicity of the effluent was >100% survival of rainbow trout as determined in four tests.

Table 10. 2025 LC_{50} Toxicity Results

Date	Effluent LC_{50} Toxicity (%)
27-Jan-25	>100%
22-Apr-25	>100%
17-Jul-25	>100%
21-Oct-25	>100%
Average	**>100%**
test organisms = rainbow trout	

5.3.1 Historical Trends

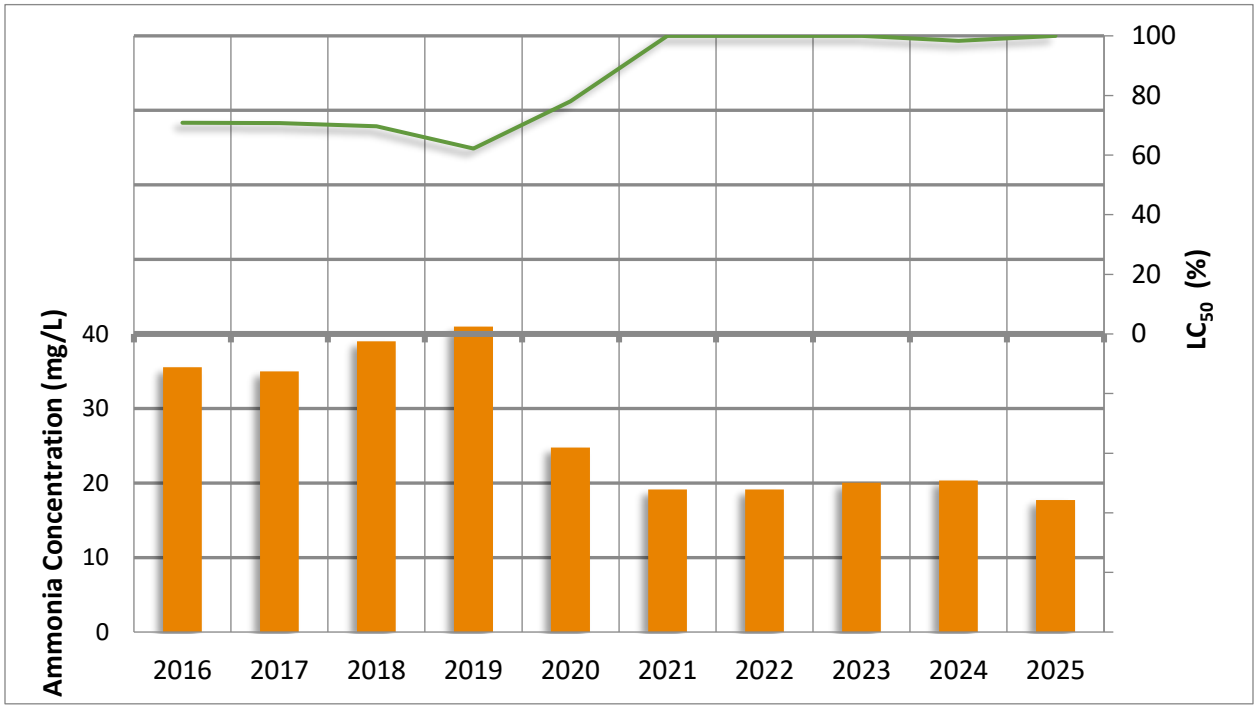
Historical average ammonia nitrogen and toxicity results for effluent reported over the past ten years are summarised in Table 11 and graphed in Figure 8.

Ammonia results since 2021 are lower than historical values due to ammonia nitrification occurring in the secondary treatment process. Results after October 2020 reflect the secondary process in operation.

Table 11. Historical Trends: Effluent Average Ammonia Nitrogen Concentrations and LC_{50} Toxicity

Year	Effluent Average Ammonia (mg/L)	Effluent Average LC_{50} (%)
2016	35.5	70.9
2017	35.0	70.7
2018	39.0	69.7
2019	41.0	62.2
2020	24.7	78.0
2021	19.1	>100
2022	19.1	>100
2023	20.0	>100
2024	20.4	98.6
2025	17.7	>100

Figure 8. Historical Trends: Effluent Yearly Average Ammonia Nitrogen and LC_{50} Toxicity



The > symbols were removed for graphing.

5.4 Alkalinity and Total Phosphorous

Total Phosphorous and Alkalinity were tested by the internal laboratory starting in 2022. In previous years, these parameters were tested by an external laboratory.

Monthly average results for 2025 are shown in Table 12 and Figure 9 and 10. No testing for total phosphorous was completed in January, February, April, and August due to laboratory time constraints. Current permit only requires semi-annual monitoring.

Table 12. Effluent Total Phosphorous and Alkalinity Results

Month	Total Phosphorous (mg/L)	Average Alkalinity (mg/L)
January	-	73.9
February	-	71.6
March	2.41	96.0
April	-	64.6
May	4.90	109
June	4.18	103
July	4.47	93.7
August	-	121
September	4.69	87.0
October	4.23	101
November	3.53	81.1
December	3.34	90.5
Average*	**4.12**	**91.1**

Figure 9. Effluent Monthly Total Phosphorous Results

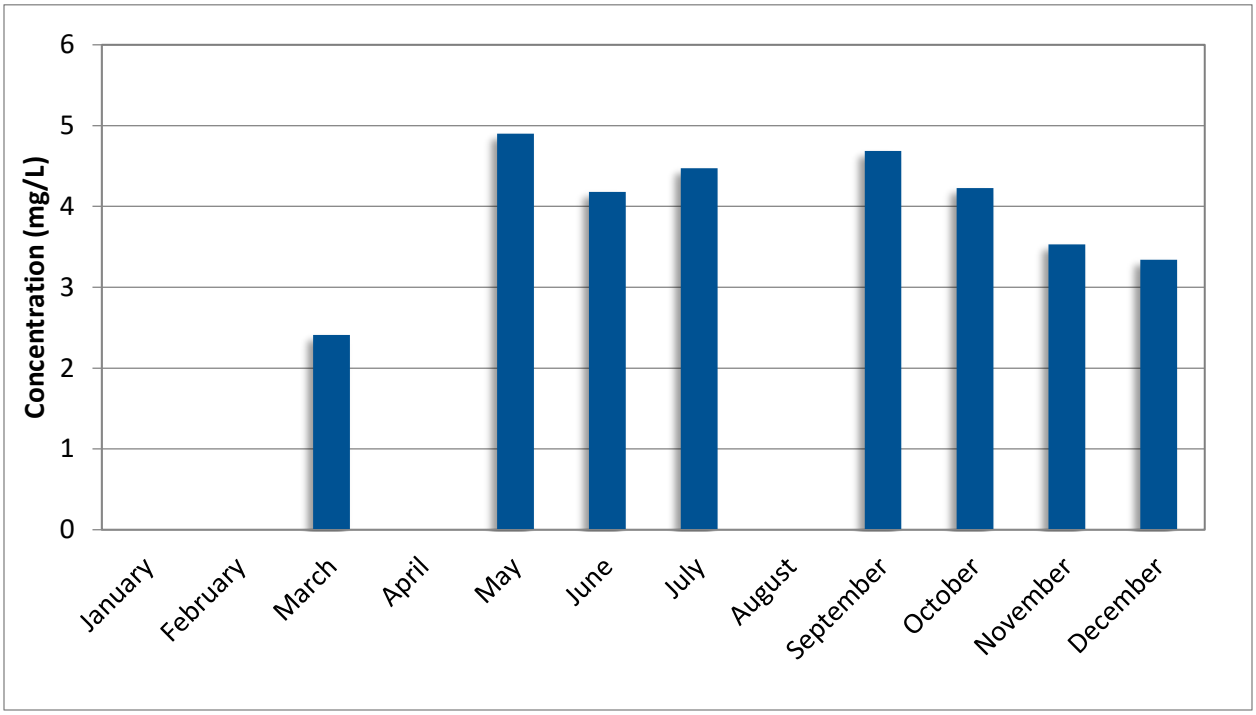
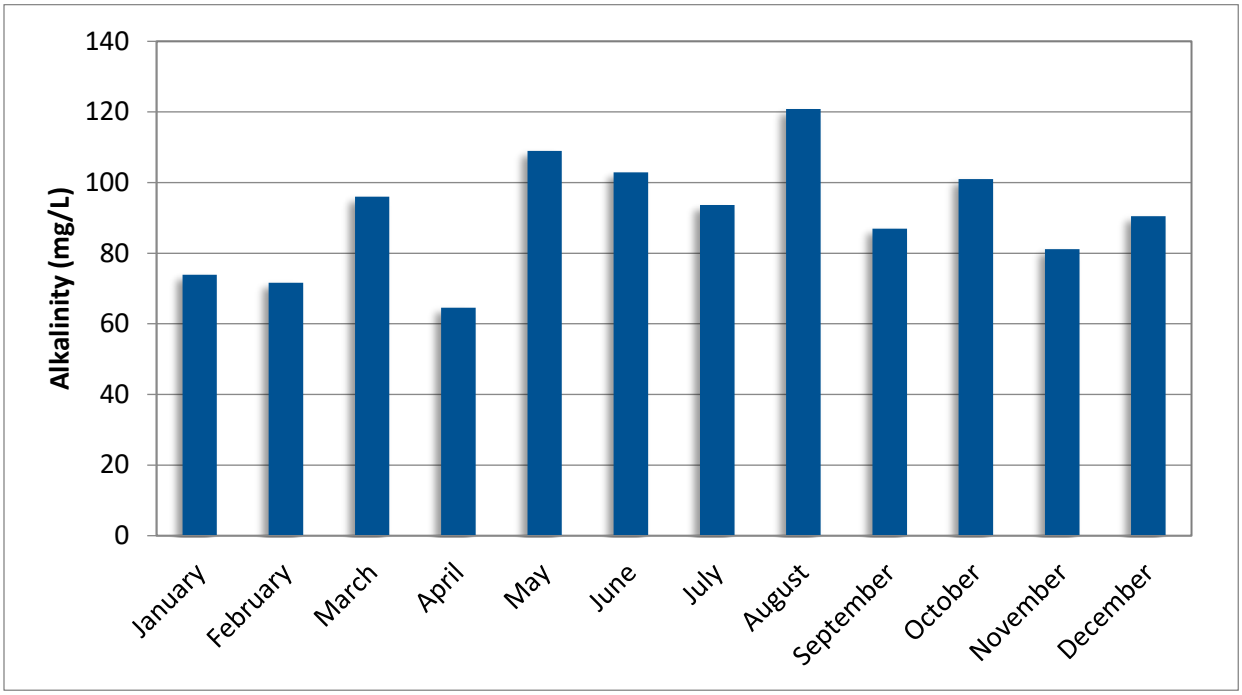


Figure 10. Effluent Monthly Alkalinity Results



5.5 Other General Parameters

The Permit requires testing of the effluent for the following parameters every six months:

Alkalinity	Dissolved Sulphate	pH	Total Organic Carbon
Chloride	Total Sulphide	Total Cyanide	Total Phosphorus
Dissolved Fluoride	Oil and Grease	Total Kjeldahl Nitrogen	

Samples of the effluent are tested in June and late November/December of each year by an external laboratory (see Appendix C for test results). Historical trends of the general parameters reported over the past ten years are summarised in Table 13.

Decreases in pH, alkalinity, oil and grease, and Total Kjeldahl Nitrogen were observed after 2020 due to the secondary treatment process. Total Alkalinity, pH, and Total Phosphorous are tested by the internal laboratory. Prior to 2022, these parameters were tested by an external lab.

Table 13. Historical Trends: Effluent General Parameters

Parameter	Units	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
pH*	-	7.63	7.29	7.22	7.22	7.51	7.17	6.96	7.24	7.25	6.84
Total Alkalinity*	mg/L	153	153	128	214	157	107	206	100	106	91.1
Dissolved Chloride	mg/L	165	150	133	220	104	200	150	145	181	145
Total Kjeldahl Nitrogen	mg/L	46	37	40	46	36	13	19	15	14	18
Total Oil and Grease	mg/L	8.1	7.9	4.9	14.8	<9.6	<1.0	<1.0	<1.3	<1.0	<1.0
Dissolved Sulphate	mg/L	52	48	53	70	42	39	35	34	38	35
Dissolved Sulphide (total)	mg/L	0.059	0.082	0.064	0.100	0.053	0.013	0.022	<0.012	0.008	0.024
Total Cyanide	mg/L	0.00167	0.00146	<0.0050	0.00579	<1.86	0.00177	0.00154	0.00161	0.00157	0.00235
Dissolved Fluoride	mg/L	0.051	0.043	0.037	0.109	<0.085	<0.056	<0.053	<0.052	<0.050	0.074
Total Organic Carbon	mg/L	33	47	33	35	25	32	15	16	15	18
Total Phosphorus*	µg/L	2,845	3,125	2,770	2,680	2,510	2,550	3,847	4,146	4,500	4,120

*Results reflect average annual internal laboratory results starting in 2022. Prior to 2022, Alkalinity and Total Phosphorous determined by external laboratory testing.

5.6 Metals

The Permit requires testing of the effluent for the following metals every six months:

Aluminum (total)	Chromium (total)	Manganese (dissolved)	Selenium (total)
Arsenic (total)	Cobalt (dissolved)	Mercury (total)	Silver (total)
Barium (dissolved)	Copper (dissolved)	Molybdenum (total)	Tin (total)
Boron (dissolved)	Iron (Dissolved)	Nickel (dissolved)	Zinc (total)
Cadmium (dissolved)	Lead (total)		

Samples of the effluent are typically tested in June and late November/December of each year by an external laboratory (see Appendix C for test reports). The average concentrations of the metals reported over the past ten years are summarised in Tables 14 and 15.

The Total Aluminum concentration went down after October 2020 with the discontinuation of Aluminum Sulphate and the Chemically Enhanced Primary Treatment (CEPT) process.

Table 14. Historical Trends: Effluent Total Metal Concentrations

Total Metals	Units	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Aluminum	µg/L	2,260	2,980	2,780	3,110	1,770	14.4	16.1	19.4	17.7	35.0
Arsenic	µg/L	1.06	0.50	0.49	0.76	0.44	0.49	0.47	0.44	0.41	0.4
Chromium	µg/L	1.35	2.00	2.25	3.27	<1.9	0.39	<1.2	<1.0	<1.0	<2.1
Lead	µg/L	1.13	1.07	0.93	1.86	<0.74	<0.22	<0.29	0.33	0.23	0.36
Mercury	µg/L	<0.016	<0.017	<0.032	<0.012	<0.015	<0.020	<0.027	<0.029	0.0026	0.0056
Molybdenum	µg/L	<1.1	<1.0	1.1	1.515	1.9	<1.3	<1.5	<1.0	<1.0	<1.0
Selenium	µg/L	0.31	0.27	0.34	<0.40	<0.31	0.12	0.15	0.15	0.13	<0.12
Silver	µg/L	0.077	0.076	0.132	0.120	<0.049	<0.020	<0.024	<0.020	<0.020	0.027
Tin	µg/L	<5.0	<5.0	<5.0	3.20	<2.9	<5.0	<5.0	<5.0	<5.0	<5.0
Zinc	µg/L	48.6	51.7	45.25	117.5	75.5	31.1	30.6	32.1	26.3	33.9

Table 12. Historical Trends: Effluent Dissolved Metal Concentrations

Dissolved Metals	Units	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Barium	µg/L	208.5	235.0	246.0	174.4	<4.4	5.1	3.6	4.6	33.0	60.0
Boron	µg/L	184.5	217.5	240	178.5	178.5	183.5	203.5	218	233	190
Cadmium	µg/L	0.067	0.0635	0.0355	0.0825	0.0475	<0.017	<0.014	<0.080	<0.016	0.039
Cobalt	µg/L	<0.50	0.42	0.45	0.64	0.61	0.39	0.54	0.35	0.50	0.52
Copper	µg/L	44	10.6	8.67	11.00	7.96	8.69	14.0	12.3	5.8	11.8
Iron	µg/L	427	346	418	306	194	91	126	90	81	144.0
Manganese	µg/L	80.1	68.3	72.9	85.5	39.1	36.2	55.9	32.7	40.2	55.7
Nickel	µg/L	2.0	1.9	2.3	3.7	3.3	1.4	2.0	2.1	1.8	2.2

5.7 Volatile and Semi-Volatile Compounds

The Permit requires effluent be tested for these volatile and semi-volatile compounds every six months:

Benzene	Ethylbenzene	1,1,1-Trichloroethane
Di(2-ethylhexyl) phthalate	Methyl chloride	1,1,2-Trichloroethane
Chloroform	Napthalene	Trichloroethylene
Dichlorobromoethane	PCBs	Toluene
Dichloromethane	Tetrachloroethylene	Total Phenols
Di-n-butyl phthalate		

Samples of the effluent are tested in June and late November/December by an external laboratory (see Appendix C for test reports). The average concentrations of the volatile and semi-volatile compounds reported over the past ten years are summarised in Table 16. 2025 data are consistent with historical data.

Table 16. Historical Trends: Effluent Semi Volatile and Volatile Compounds

Parameter	Units	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Benzene	µg/L	<0.40	<0.52	<0.40	<0.5	<0.5	<0.40	<0.40	<0.40	<0.40	<0.40
Di(2-ethylhexyl)phthalate	µg/L	<10	<7.0	<5.2	<6.3	<2.4	<6.0	<2.0	<2.0	<6.0	<2.0
Chloroform	µg/L	2.75	4	3.25	4.0	2.8	2.5	2.9	3.2	2.2	2.5
Dichlorobromomethane	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dichloromethane	µg/L	<2.0	<2.0	<2.0	<2.5	<2.5	<2.0	<2.0	<1.8	<2.0	<2.0
Di-N-Butyl Phthalate	µg/L	<10	<6.0	<5.0	<6.3	<1	<6.0	<2.0	<2.0	<8.0	<2.0
Ethylbenzene	µg/L	<0.40	<0.40	<0.40	<0.70	<0.70	<0.40	<0.40	<0.40	<0.40	<0.40
Methyl Chloride	µg/L	<1.0	<1.0	<1.0	<6.2	<4.5	<1.0	<1.0	<1.0	<1.0	<1.0
PCBs	µg/L	<0.28	<0.53	<0.15	<0.050	<0.050	<0.050	<0.050	<0.50	<0.050	<0.050
Tetrachloroethylene	µg/L	<0.50	<0.50	<0.50	<0.075	<0.80	<0.50	<0.50	<0.50	<0.50	<0.50
Toluene	µg/L	<0.52	<0.64	0.54	1.545	<0.80	<0.40	<0.40	<0.40	<0.40	<0.40
Total Phenols	mg/L	0.024	0.032	0.044	0.020	0.497	<0.0027	<0.0015	<0.0016	0.011	<0.0018
1,1, 1-Trichloroethane	µg/L	<0.50	<0.50	<0.50	<0.075	<0.75	<0.50	<0.50	<0.50	<0.50	<0.50
1,1, 2-Trichloroethane	µg/L	<0.50	<0.50	<0.50	<1.0	<0.75	<0.50	<0.50	<0.50	<0.50	<0.50
Trichloroethylene	µg/L	<0.50	<0.50	<0.50	<0.075	<075	<0.50	<0.50	<0.50	<0.50	<0.50
Naphthalene	µg/L	<0.10	<0.10	<0.10	<2.6	<2.6	<0.10	<0.10	<0.10	<0.10	<0.10

6) Biosolids

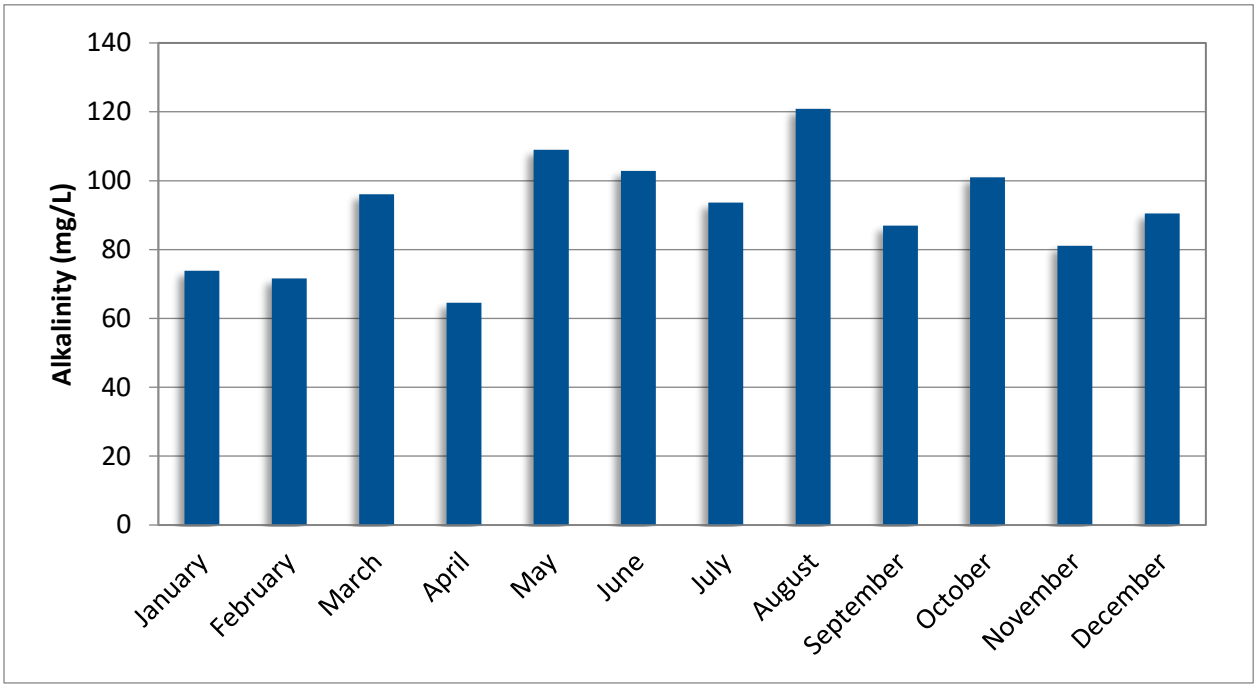
6.1 Biosolids Production

GNPCC produces Class B Biosolids. The average monthly production of biosolids in 2025 is summarized in Table 17 and graphed in Figure 11.

Table 13. 2025 Biosolids Production

Month	Trucked Biosolids (Dry Tonnes)	Trucked Biosolids (Wet Tonnes)	% Solids (Pressed Solids)
January	93.9	486.34	19.3%
February	90.8	470.23	19.3%
March	108.6	532.32	20.4%
April	101.7	503.38	20.2%
May	94.3	463.73	20.3%
June	91.9	449.21	20.5%
July	103.5	482.75	21.5%
August	107.1	487.85	22.0%
September	100.6	474.71	21.2%
October	105.5	529.52	19.9%
November	100.5	515.48	19.5%
December	104.9	533.73	19.7%
Average	**100.3**	**494.10**	**20.3%**
Total	**1,203.6**	**5,929.3**	

Figure 11. 2025 Monthly Biosolids Production (Trucked Dry Tonnes)



6.1.1 Historical Trends

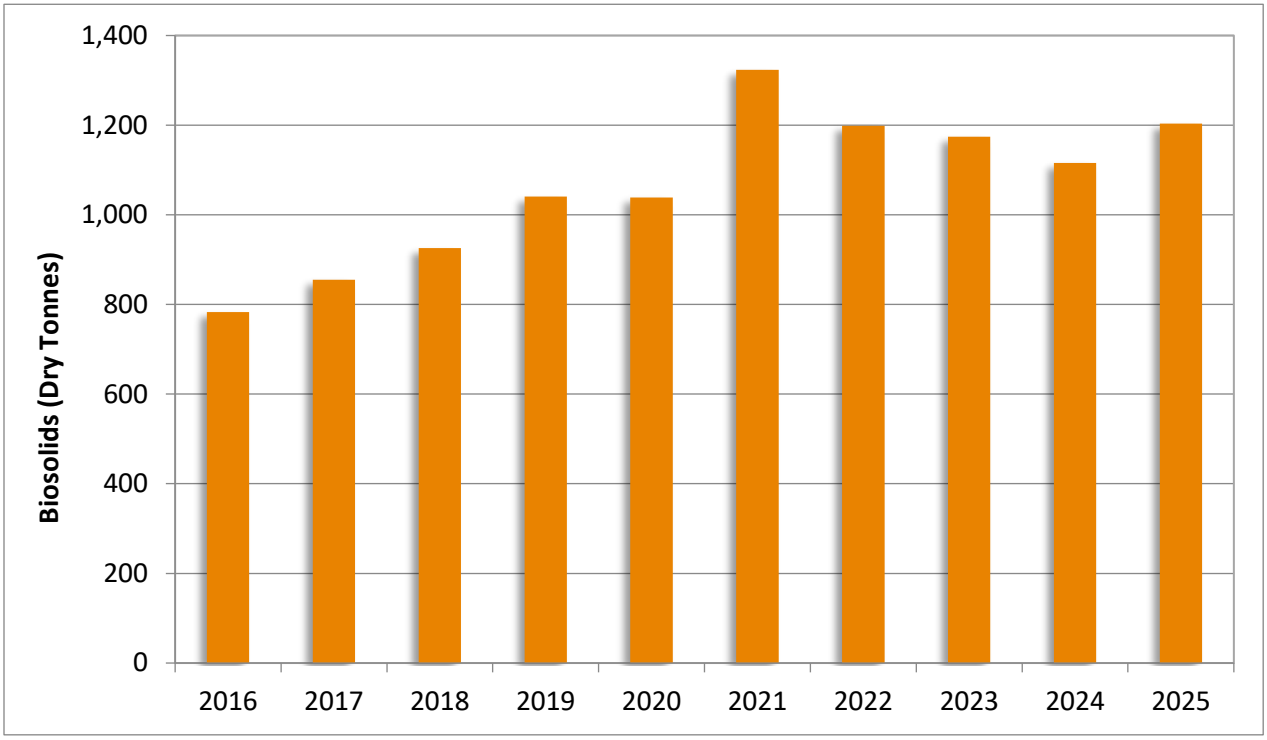
Historical average polymer use, total trucked solids (wet tonnes and dry tonnes) and yearly average percent solids reported for biosolids produced over previous years are shown in Table 18 and Figure 12. Biosolids production and polymer use increased after October 2020 with the secondary process.

Monthly biosolids production increased after October 2020 with the secondary treatment process. Percent solids decreased after secondary treatment. This trend is due to the consistency of the secondary sludge which retains moisture and tends to be more difficult to dewater.

Table 14. Historical Trends: Biosolids Production

Year	Polymer Use (Kg/year)	Trucked Biosolids (Dry Tonnes/year)	Trucked Biosolids (Wet Tonnes/year)	% Solids (Average Pressed Solids)
2016	10,538	783	3,094	25.3%
2017	10,800	855	3,337	25.6%
2018	12,925	926	3,658	25.3%
2019	18,422	1,040	4,337	24.0%
2020	22,429	1,039	4,361	23.8%
2021	42,380	1,323	6,272	21.1%
2022	40,408	1,199	5,897	20.3%
2023	49,044	1,174	5,716	20.5%
2024	49,553	1,116	5,727	19.5%
2025	43,630	1,204	5,929	20.3%

Figure 12. Historical Trends: Biosolids Production per Year (Trucked Dry Tonnes)



6.2 Biosolids Analysis

The Permit requires quarterly testing of the biosolids for the following parameters:

Total Solids	Arsenic*	Copper*	Nickel*
Volatile Suspended Solids	Cadmium*	Lead*	Phosphorus
Moisture	Chromium*	Mercury*	Selenium*
Total Kjeldahl Nitrogen	Cobalt*	Molybdenum*	Zinc*
PCBs			

*Monitoring required by the *Organic Matter Recycling Regulation* (OMRR).

Samples of the biosolids are typically tested quarterly by an external laboratory. Average concentrations of these parameters reported in previous years are summarised in Table 19.

2025 data are consistent with historical data.

All 2025 samples from GNPCC met the Class B regulatory limits for metals in the Organic Matter Recycling Regulation (OMRR).

Table 19. Historical Trends: Biosolids General Parameters

Parameter	Units	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	OMRR Limit (Class B)
Total Solids	%	32.7	26.1	27.5	24.5	23.1	21.6	20.3	21.0	19.9	21.0	-
Volatile Solids	%	67.3	64.1	64.6	67.9	70.0	74.4	76.8	77.7	78.4	76.9	-
Moisture	%	75	75	73	76	76	78	80	79	80	79.0	-
Total Kjeldahl Nitrogen	% dry weight	8.23	9.33	5.23	5.31	5.40	7.03	7.98	6.93	6.83	6.20	-
Phosphorus	µg/g	24,800	29,500	30,000	23,500	27,500	23,700	18,700	18,200	15,000	19,600	-
PCBs	µg/g	<12	<15	<4.4	<8.5	<4.1	<1.6	<2.7	<3.2	<1.5	<1.5	
Arsenic	µg/g	3.21	3.36	2.80	2.44	2.70	2.49	2.26	2.33	2.24	2.41	**75**
Cadmium	µg/g	2.62	2.43	1.73	2.10	1.98	1.31	1.52	1.52	1.28	1.27	**20**
Chromium	µg/g	26.4	30.6	34.5	29.1	30.9	32.0	23.2	25.0	21.5	30.3	**1,060**
Cobalt	µg/g	3.27	3.84	3.39	2.86	2.68	3.12	2.87	3.40	2.99	2.96	**150**
Copper	µg/g	797	618	525	457	478	559	575	653	613	583	**2,200**
Iron	µg/g	30,000	38,700	35,100	28,000	31,000	42,100	28,500	25,600	19,600	33,400	-
Lead	µg/g	32.6	31.8	29.0	23.6	23.0	23.7	25.2	25.9	26.3	25.5	**500**
Mercury	µg/g	1.80	1.55	1.76	1.29	1.47	0.889	0.801	0.856	0.809	0.813	**15**
Molybdenum	µg/g	6.63	7.46	6.55	6.09	6.37	7.76	7.57	8.06	7.44	7.97	**20**
Nickel	µg/g	16.3	18.4	18.0	16.1	15.3	13.9	12.0	14.2	13.7	14.7	**180**
Potassium	µg/g	892	1,010	985	891	920	925	927	870	843	777	-
Selenium	µg/g	4.32	4.96	4.50	3.65	3.93	4.76	5.01	5.48	5.81	5.56	**14**
Zinc	µg/g	972	1,050	980	824	871	912	928	972	905	912	**1,850**

6.3 Fecal Coliforms

Twelve discrete samples of biosolids were sent to Bureau Veritas in 2025 for fecal coliform analysis (see Appendix C for test reports). The geometric mean of the biosolids fecal coliform results in 2025 was 2,000 MPN/g dry biosolids. For Class B biosolids, OMRR requires a fecal coliform level of <2,000,000 MPN per gram of total solids (dry weight basis) to be met for the geometric mean of seven discrete samples, once per year or every 1,000 tonnes of dry weight, whichever comes first. Biosolids from GNPCC in 2025 met these requirements.

Note, sampling in this report was conducted by the RDN to meet permit conditions. SYLVIS Environmental conducts a separate sampling program which is used for the Land Application Plan to meet OMRR requirements (see Appendix F).

There has been a reduction in fecal coliform levels since commissioning secondary treatment. Fecal coliform results for 2025 are summarised in Table 20.

Table 20. 2025 Biosolids Fecal Coliforms Concentrations

Date	Fecal Coliforms (MPN/g dry)	External Laboratory
15-Jan-25	4,100	Bureau Veritas
25-Feb-25	4,100	Bureau Veritas
12-Mar-25	1,600	Bureau Veritas
14-Apr-25	2,400	Bureau Veritas
12-May-25	1,000	Bureau Veritas
16-Jun-25	3,600	Bureau Veritas
7-Jul-25	780	Bureau Veritas
18-Aug-25	2,000	Bureau Veritas
08-Sep-25	8,100	Bureau Veritas
20-Oct-25	4,200	Bureau Veritas
18-Nov-25	830	Bureau Veritas
01-Dec-25	330	Bureau Veritas
Geometric Mean	**2,000**	

6.4 Stabilization and Dewatering

GNPCC biosolids are stabilized by anaerobic digestion. Sludge collected from the sedimentation tanks is pumped via gravity thickeners and heat exchangers to three digesters. Sludge is held in the tanks during which time it is decomposed and stabilized by biological processes. Once digested, the stabilized sludge is dewatered through a centrifuge, producing biosolids with a moist soil-like consistency. Pathogen reduction is achieved in anaerobic digesters to create Class B biosolids (according to parameters identifies in OMRR). Stabilization and dewatering process data are presented in Tables 21 and 22.

Table 21. 2025 Stabilization Process Data

Stabilization Process		
Total Mass of Sludge Delivered for Stabilization	3,231	Tonnes (dry)
% of TSS as VSS in Sludge Feed	76.1	%
Mass of Biosolids Remaining after Stabilization	1485.6	Tonnes (dry)

Table 22. 2025 Dewatering Process Data

Dewatering Process		
Volume of Biosolids delivered for dewatering	85,929	m^3
% solids in biosolids dewatering feed	1.73	%
Average Volatile Solids Reduction	64.13	%
% solids in dewatered biosolids	20.3	%
Polymer dosage to aid dewatering	0.508	kg/m^3

6.5 Biosolids Management

In 2025, GNPCC Class B biosolids were land applied in a Forest Fertilization Program. Forest fertilization occurs on private forested land managed by Mosaic Forest Management (Mosaic). The program is located southwest of Nanaimo, and the project is managed by SYLVIS Environmental (SYLVIS). SYLVIS's 2025 Biosolids Management Summary Report, attached in Appendix F, provides a summary and interpretation of the effects of biosolids applications on the receiving environment (Section 4).

This program won the Northwest Biosolids *Excellence in Biosolids Award* which recognizes significant contributions to the development and implementation of cost-effective and environmentally beneficial biosolids management practices two times in 2013 and 2019.

7) Process Control Monitoring

7.1 Biogas Production

Biogas, which consists mostly of methane gas, is a byproduct of the anaerobic sludge digestion. Gas production is recorded daily at GNPCC. The average daily biogas production rate in 2025 was 4,771 m^3/day. The total volume produced in 2025 was approximately 1,741,304 m^3. Of the total produced, 429,670 m^3 (24.6% of total production) was used as fuel for the boilers to heat operations and wastewater treatment process water and for cogeneration. The remaining 1,311,634 m^3 (75.3 % of total production) was wasted (flared).

7.1.1 Historical Trends

Historical biogas production, use and waste rates are summarized in Tables 23 and 24.

The cogeneration system was commissioned in mid-2012. Refer to Cogeneration section for details on the Cogeneration Facility project. The cogeneration system has been mostly offline since mid-2018 although servicing was completed in 2022.

Table 23. Historical Trends: Biogas Production

Year	Average Daily Biogas Production (m^3/day)	Total Biogas Production (m^3)	Average Daily Biogas Wasted (m^3/day)	Total Biogas Wasted (m^3)	Average Daily Biogas Use (m^3/day)	Biogas Use Cogen (total)	Biogas Use Boiler (m^3)	Total Biogas Used Total (m^3)
2016	3,942	1,407,176	2,578	920,357	1,364	191,697	295,122	486,819
2017	4,090	1,492,730	2,471	902,057	1,618	285,450	305,224	590,674
2018	3,950	1,441,721	2,780	1,014,539	1,170	90,601	336,581	427,181
2019	3,746	1,367,432	2,742	1,000,857	1,004	1,765	364,811	366,575
2020	3,976	1,451,406	2,884	1,052,755	1,092	3,231	395,421	398,651
2021	4,491	1,639,123	3,212	1,172,274	1,279	2,254	464,595	466,849
2022	4,512	1,646,897	3,243	1,183,649	1,269	11,118	452,131	463,249
2023	4,682	1,708,832	3,533	1,289,667	1,148	6,056	413,109	419,165
2024	4,875	1,779,266	3,746	1,367,263	1,129	2,058	409,945	412,003
2025	4,716	1,721,349	3,594	1,311,634	1,123	3,133	406,582	409,715

Table 24. Historical Trends: Percentage Biogas Consumption and Wasting

Year	% Biogas Wasted	% Biogas Used (Boiler)	% Biogas Used (Cogen)
2016	65.4%	21.0%	13.6%
2017	60.4%	20.4%	19.1%
2018	70.4%	23.3%	6.3%
2019	73.2%	26.7%	0.1%
2020	72.5%	27.2%	0.2%
2021	71.5%	28.3%	0.1%
2022	71.9%	27.5%	0.7%
2023	75.5%	24.2%	0.4%
2024	76.8%	23.0%	0.1%
2025	76.2%	23.6%	0.2%

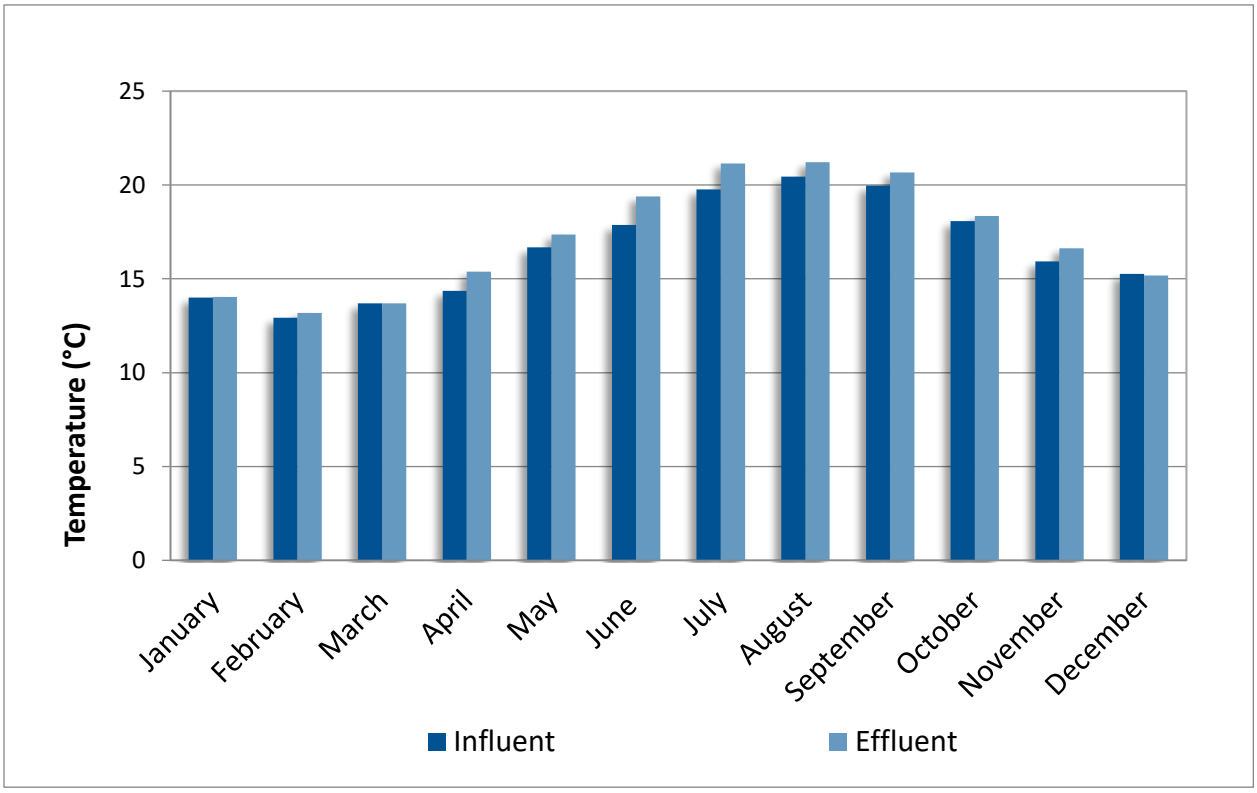
7.2 Temperature

RDN staff test the temperature of the influent and effluent daily. Results from 2025 are presented in Appendix B. The average temperature data for each month are summarized in Table 25 and Figure 13.

Table 25. 2025 Influent & Effluent Temperatures

Month	Average Temperature (°C)	
	Influent	Effluent
January	14.0	14.0
February	12.9	13.2
March	13.7	13.7
April	14.4	15.4
May	16.7	17.4
June	17.9	19.4
July	19.8	21.1
August	20.5	21.2
September	20.0	20.7
October	18.1	18.3
November	15.9	16.6
December	15.3	15.2
Average	**16.8**	**17.2**

Figure 13. 2025 Influent & Effluent Monthly Average Temperature



7.2.1 Historical Trends

Historical average temperatures for influent and effluent over the past ten years are summarized in Table 26. Data from 2025 are consistent with historical data.

Table 26. Historical Trends: Influent & Effluent Average Temperature

Year	Average Temperature (°C)	
	Influent	Effluent
2016	16.5	16.0
2017	15.7	15.3
2018	15.7	15.7
2019	15.7	15.8
2020	15.5	15.7
2021	16.5	16.9
2022	16.7	16.9
2023	17.2	17.2
2024	16.3	16.8
2025	16.8	17.2

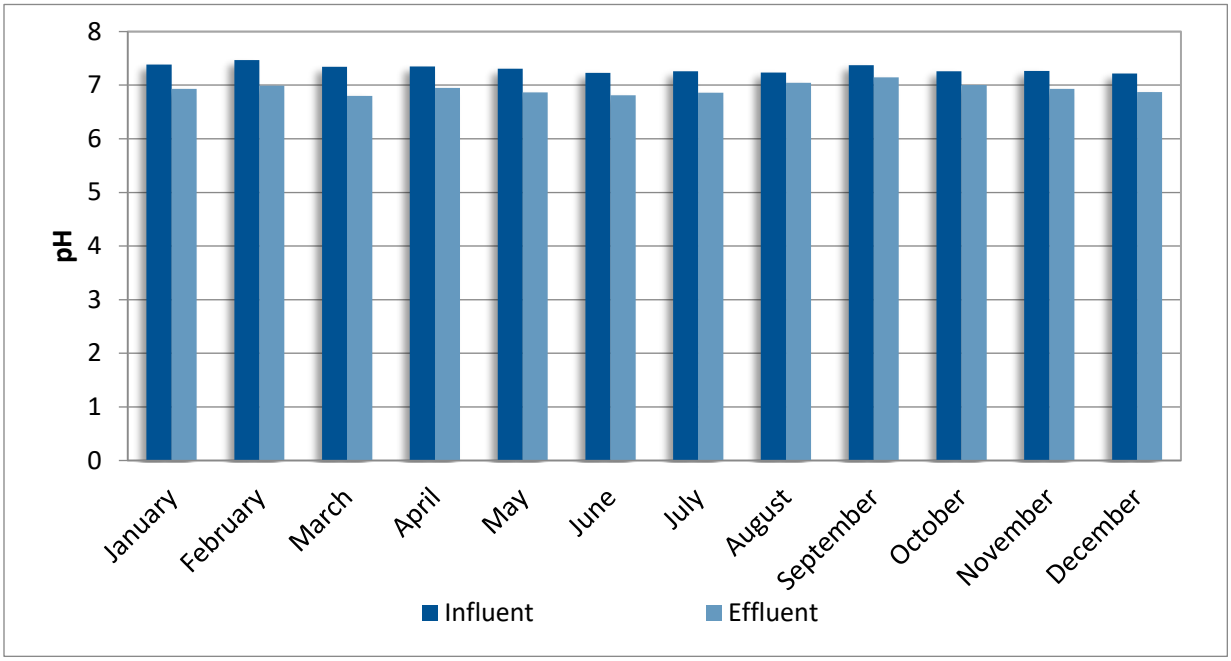
7.3 pH

Laboratory staff conduct pH testing on grab samples of the influent weekly, and the effluent daily. The pH monitoring data for GNPCC from 2025 is presented in Appendix B. The average pH concentrations for each month are summarized in Table 27 and Figure 14.

Table 27. 2025 Influent & Effluent Average pH Concentration

Month	Average pH	
	Influent	Effluent
January	7.27	6.71
February	7.09	6.63
March	7.14	6.80
April	7.19	6.68
May	7.14	6.79
June	7.16	6.84
July	7.15	6.89
August	7.13	7.04
September	7.23	6.97
October	7.28	6.99
November	7.22	6.83
December	7.23	6.90
Average	**7.19**	**6.84**

Figure 9. 2025 Influent & Effluent Monthly Average pH Concentration



7.3.1 Historical Trends

Historical average influent and effluent pH concentration reported over the past ten years are summarized in Table 28. Data from 2025 are consistent with historical data.

Table 15. Historical Trends: Influent & Effluent pH Concentration

Year	Average pH	
	Influent	Effluent
2016	7.30	7.18
2017	7.30	7.16
2018	7.25	7.08
2019	7.28	7.09
2020	7.38	7.13
2021	7.42	7.00
2022	7.32	7.01
2023	7.32	6.96
2024	7.33	6.93
2025	7.19	6.84

7.4 Volatile Solids in the Thickeners and Digesters

The construction and commissioning of two gravity thickeners at GNPCC was completed in 2008. Prior to the addition of the gravity thickeners, sludge was held in the primary sedimentation tanks to thicken to approximately 3-4%, with the aid of aluminum sulphate (coagulant). From there the sludge was conveyed to the digesters for stabilization.

With the addition of the gravity thickeners, the sludge from the primary sedimentation tanks is conveyed to the gravity thickeners at a lower percent solid and thickened to approximately 5% solids before conveyance to the digesters for stabilization. There are several advantages to this; sludge is held in the primary sedimentation tanks for less time; less chemicals are required in the sedimentation tanks to keep the sludge coagulated; it maintains the effluent total suspended solids within permitted limits for discharge; and the higher percent solids reduce the volume loading on the digesters.

The average total solids and volatile solids in the sludge from the thickeners and the digesters as well as the average percent volatile solids reduction are summarized in Table 29. The volatile solids reduction increased after 2015 due to Digester #3 functioning well and thickened primary sludge entering the digesters in a stable solids level (refer to Table 29).

In 2025, the digestion process at GNPCC achieved a 64.1% reduction in volatile solids.

Table 29. Historical Trends: Sludge Volatile Solids Reduction

Year	Average Solids in Sludge from Thickeners (%)	Average Volatile Solids in Sludge from Thickeners (%)	Average Solids in Digested Sludge (%)	Average Volatile Solids in Digested Sludge (%)	Average Reduction in Volatile Solids in Digesters (%)
2016	4.6	86.6	1.8	65.1	72.3
2017	4.6	86.3	1.7	64.4	68.4
2018	4.4	86.2	1.7	63.1	67.0
2019	4.1	85.9	1.6	65.7	65.5
2020	4.0	86.4	1.3	67.3	65.7
2021	4.1	88.9	1.6	72.7	58.8
2022	4.3	90.4	1.6	75.1	61.5
2023	4.6	90.7	1.6	76.2	60.9
2024	4.9	90.2	1.7	77.6	59.6
2025	5.1	90.6	1.7	76.1	64.1

8) Resource Consumption

8.1 Chemical Consumption

Table 30 summarizes the consumption and costs of chemicals used in the treatment process and at the pump stations for the Southern Communities in 2025.

The total cost of chemicals purchased at GNPCC in 2025 increased in comparison to previous years due to year-round dosing by operations of ferrous chloride to optimize the secondary treatment process. Previously, ferrous chloride dosing was only done during the summer months for odour control.

Table 30. 2025 Chemical Consumption

Chemical 2025	Consumption	Units	Cost	Use
Wes-Floc 6614 A	43,630	kg	$342,492	Dewatering Polymer
Wes-Floc 7510 A	26,622	kg	$165,583	DAFT (Thickening) Polymer
Ferrous Chloride*	125,317	kg	$224,861	Odour Control / Secondary Treatment
Defoamer	-	-	$38,932	Defoamer
Other Chemicals	-	-	$6,197	Other Chemicals
TOTAL			**$778,065**	

* Used at Chase River Pump Station

8.1.1 Historical Trends

Historical annual costs of chemicals consumed in previous years are summarized in Table 31.

The use of Aluminum Sulphate and Superfloc A-1883 has been discontinued since October 2020 with the secondary treatment process. Dewatering polymer was changed from Zetag 7557 to Wes-Floc 6816 A after completion of secondary treatment to treat secondary sludge. Dewatering polymer was then switched to Wes-Floc 6614 A in December 2023. Wes-Floc 7510 A was used as the thickening polymer.

The dewatering polymer increased in consumption after secondary treatment to dewater the secondary sludge in the secondary treatment process. The dewatering polymer was initially changed from Zetag 7557 to Wes-Floc 6816 A which is more effective dewatering the secondary sludge. Following an RFP process, the dissolved air flotation thickening (DAFT) polymer used was Wes-Floc 7510 A supplied by Alumichem Canada Ltd.

In 2023, GNPCC conducted dewatering polymer trials in an RFP process. The dewatering polymer was then switched from Wes-Floc 6816 A to Wes-Floc 6614 A in December 2023.

Pricing for many chemicals increased in 2020-2023 due to ongoing market trends and supply chain issues. In 2024, prices decreased due to the establishment of long-term supply agreements for polymers via an RFP process.

The increase in total in 2025 was a result of increase dosing of ferrous chloride in the collection system to optimize the secondary treatment process.

Table 31. Historical Trends: Chemical Purchases

Year	Dewatering Polymer	Kemira Superfloc A-1883RS	DAFT Polymer	Ferrous Chloride	Kemira PAX XL6**	Aluminum Sulphate	Secondary Polymer	Defoamer	Odour Control	Other	Total Cost
2016	$86,934	$18,616	-	$58,346	-	$271,384	-	-	-	-	$435,280
2017	$89,100	$25,906	-	$51,131	-	$279,749	-	-	-	-	$445,887
2018	$106,631	$39,421	-	$52,163	-	$320,279	-	-	-	-	$518,494
2019	$146,456	$40,180	-	$66,054	-	$394,943	-	-	-	$8,660	$656,293
2020	$178,311	$27,664	-	$50,978	-	$316,817	$27,332	$7,448	$2,065	$4,696	$615,311
2021	$326,666	-	$115,622	$48,392	-	-	-	$13,087	$6,628	$873	$511,268
2022	$349,169	-	$106,292	$52,389	-	-	-	$10,618	-	$24,500	$542,968
2023	$451,434	-	$106,518	$100,336	-	-	-	$10,618	-	$24,500	$693,406
2024	$354,301	-	$134,516	$85,466	-	-	-	$22,718	$6,673	$16,770	$620,444
2025	$342,492	-	$165,583	$224,861	-	-	-	$38,932	-	$6,197	$778,065

8.2 Electrical Consumption

Historical annual electrical consumption and costs are summarized in Table 32 and graphed in Figure 15. In general, electrical consumption increases during major construction projects. Also, while not directly measured, the increased reliance on mechanical mixing in the digesters resulted in increased electrical consumption, as the mixing pumps use a substantial amount of electricity.

A connection issue prevented BC Hydro from reading GNPCC's electrical meter during the secondary upgrade and the RDN did not receive invoices in 2020 and part of 2021. Electrical consumption and cost were estimated based on metered consumption data from BC Hydro from July 22, 2021, to present.

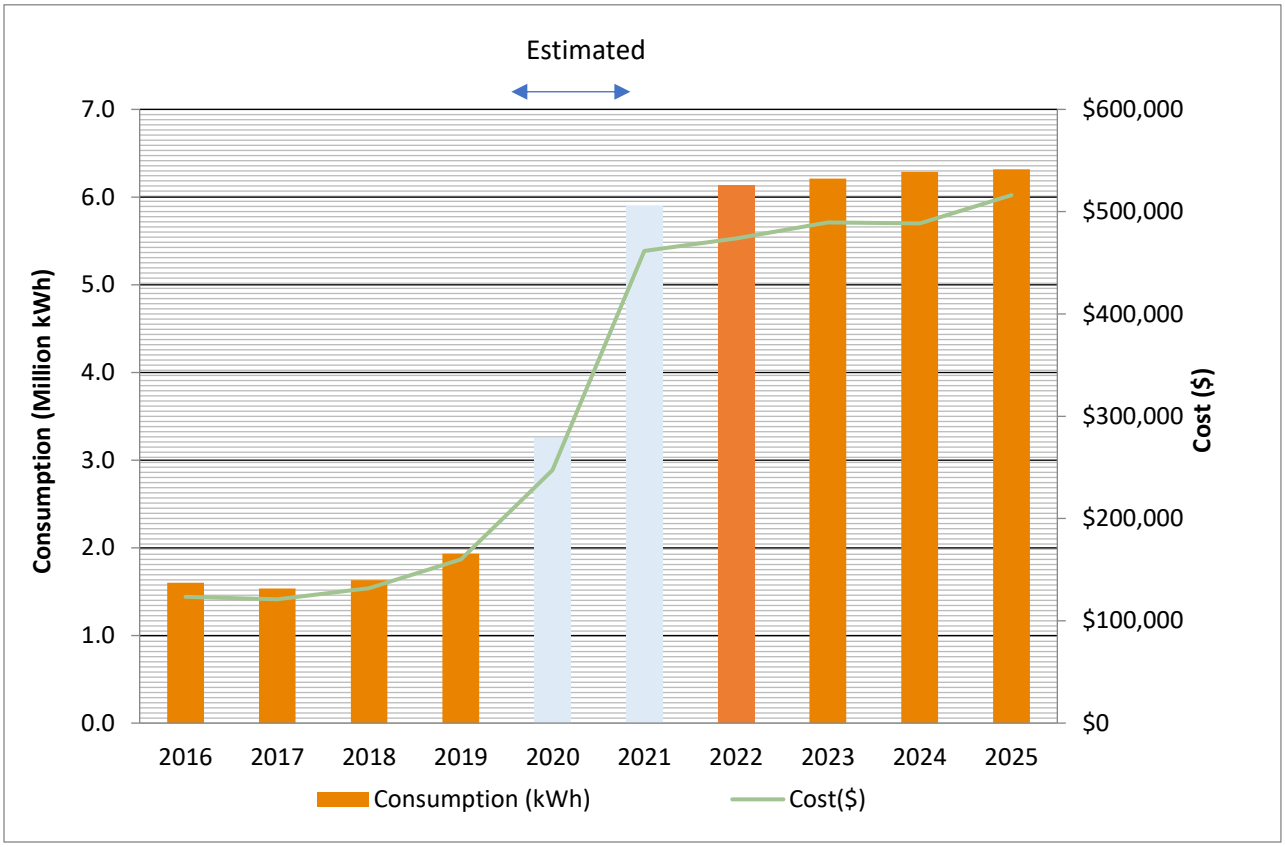
Electricity consumption at GNPCC increased after the bioreactors and process equipment were installed in 2020 for the secondary upgrade. Increased electricity use was offset by installing turbo-blowers. The blowers are more efficient and were purchased with assistance from a BC Hydro energy efficiency grant.

Table 32 Historical Trends: GNPCC Electrical Consumption

Year	Consumption (kWh)	Cost ($)
2016	1,602,000	$123,425
2017	1,533,600	$121,043
2018	1,631,700	$131,851
2019	1,931,400	$159,954
2020	3,252,043	$247,216
2021	5,893,329	$461,730
2022	6,127,665	$473,888
2023	6,209,011	$489,531
2024	6,285,600	$488,671
2025	6,317,818	$516,104

Note: Electrical consumption at the treatment plant only (pump stations are excluded).
* No electricity invoices were received for 2020. 2021 use was metered after July 22, 2021. Annual consumption and cost were estimated for both 2020 and 2021.
** Excluding tax.

Figure 10. Historical Trends: GNPCC Electrical Consumption and Costs (Treatment Plant Only)



8.3 Water Consumption

The estimated water consumption at GNPCC for 2025 was estimated to be 63,632 m^3. Water consumption increased in 2020 and early-2021 due to the commission of secondary treatment and filling of tanks due to commissioning of the secondary treatment process. The lower water consumption in 2024 and 2025 was due to optimization of the dewatering process.

Historical treatment plant water consumption (pump stations excluded) is summarized in Table 33.

Table 33. Historical Trends: GNPCC Water Consumption

Year	Water Consumption (m^3)
2016	35,994
2017	64,871
2018	70,852
2019	77,738
2020	105,500
2021	118,810
2022	93,706
2023	111,281
2024	67,777
2025	63,632

9) Cogeneration

In 2005, Wastewater Services applied to the Federation of Canadian Municipalities (FCM) for a Green Municipal Fund grant to install a cogeneration system at GNPCC. A cogeneration system would convert wasted digester biogas into electricity to be used in treatment plant operations. It is estimated that a cogeneration system using 100% of wasted gas could produce enough electricity to satisfy 90-100% of the present electrical requirements of the plant. A cogeneration system would eliminate the emissions currently flared to the environment and result in electrical cost savings to GNPCC. FCM awarded Wastewater Services this grant in the summer of 2006. This grant money was only to be used for a field test, and not the full-scale implementation of a cogeneration system. Thus, Wastewater Services applied for another grant under the Gas Tax Program Incentive Fund to install a full-scale, permanent cogeneration system, including the construction of a cogeneration building to house the associated generators. The grant was awarded in July 2008.

Construction of the GNPCC Cogeneration Facility was commissioned in September 2012, producing methane gas to run the generator. All cogenerated electricity is sold to BC Hydro. The cogeneration system has generated a total of 2,246 MWhr of electricity with a total revenue of $236,880.

The cogeneration system was offline since mid-2018 because the system's gas skid was inoperable, operator resources were taken up by the secondary upgrade, and due to the need for repairs to safely operate the system. The cogeneration system was run between June 15 and 20 in 2022 for a recommissioning test.

Table 34 contains a summary of the energy generated by the cogeneration unit and the revenue obtained from selling this electricity to BC Hydro.

Table 34. Historical Cogeneration Unit Electricity Production and Revenue Generated

Year	Eligible Energy (MWh)	Revenue ($) excluding tax
2016	236.2	$24,044
2017	448.5	$50,429
2018	135.5	$13,583
2019	0.0	$0
2020	0.0	$0
2021	0.0	$0
2022	0.0	$0
2023	0.0	$0
2024	0.0	$0
2025	0.0	$0

10) Odour

Seven odour concerns were received in 2025 for GNPCC, pump stations, and interceptor. See Appendix D for individual incident reports. Table 35 quantifies the monthly odour concerns received in 2025.

Table 35. 2025 Odour Concerns

Month	Odour Concerns		
	GNPCC	Pump Stations and Interceptor	Unknown
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	1	0
August	2	0	0
September	3	1	2
October	0	0	0
November	0	0	0
December	0	0	0
Total	**3**	**2**	**2**

In 2025, GNPCC personnel investigated a total of seven odour concerns relating to GNPCC and the Nanaimo Pump Stations and wastewater trunk collection system.

More information on these odour concerns can be found in Appendix D.

10.1 Historical Trends

The number of odour concerns reported in the past ten years are summarized in Table 36.

Table 16. Historical Trends: GNPCC and Pump Stations – Number of Odour Concerns

Year	Odour Concerns
2016	6
2017	11
2018	6
2019	6
2020	8
2021	10
2022	6
2023	3
2024	2
2025	7

10.2 Odour Episode

An odour episode is a disruption in the regular operation of the treatment plant or operations that may cause odour. Two odour episodes were identified in the records for 2025 associated with maintenance on the secondary clarifiers and the blocking of a ventilation line at Wellington Pump Station.

11) Septage Receiving

Septage and pump and haul are received at the Chase River Pump Station (CRPS) Septage Receiving Site. The total combined volume of Septage and pump and haul discharged in 2025 was 3,134,312 Imperial gallons (14,592 m^3).

This volume does not include sludge from the Duke Point Pollution Control Centre (DPPCC) wastewater treatment process which undergoes further treatment at GNPCC. This volume is reported in the 2025 DPPCC Annual Report.

11.1 Historical Trends

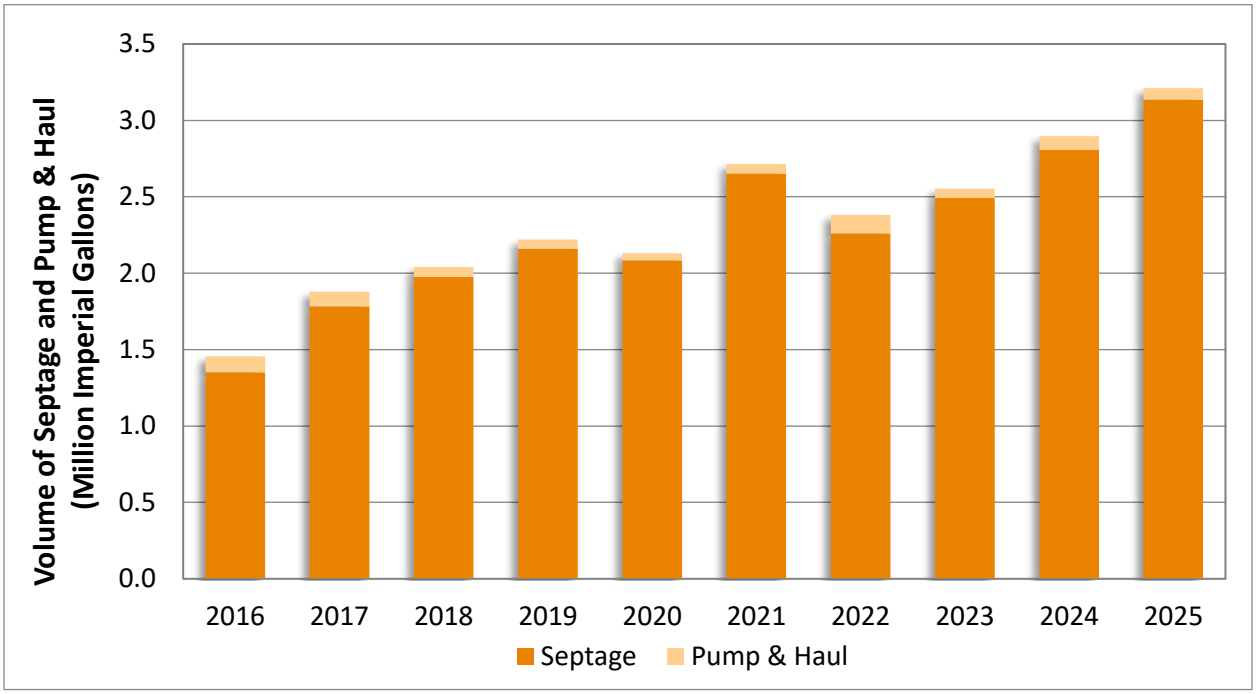
The volumes of septage and pump and haul discharged in previous years are summarized in Table 37 and graphed in Figure 16. The volume of septage discharged to CRPS has shown an increasing trend over the last 10 years.

At Chase River Pump Station, several policies were implemented over the last several years to improve tracking of septage deliveries including locking out the rock trap, and auditing pump and haul and reduced loads. It is worth noting that there has been a large amount of annual variability in the amount of septage and pump and haul discharged at CRPS.

Table 37. Historical Trends: Septage and Pump & Haul discharged at Chase River Pump Station

Year	Septage (Imperial gallons)	Pump & Haul (Imperial gallons)	Combined Total (Imperial gallons)	Combined Total (m^3)
2016	1,351,493	103,382	1,454,875	6,614
2017	1,782,232	96,982	1,879,214	8,543
2018	1,974,861	66,036	2,040,897	9,278
2019	2,159,556	60,480	2,220,036	10,092
2020	2,084,085	46,637	2,130,722	9,686
2021	2,652,432	62,791	2,715,223	12,344
2022	2,259,010	122,408	2,381,418	10,826
2023	2,492,843	59,618	2,552,461	11,604
2024	2,805,714	90,373	2,896,087	13,166
2025	3,134,312	75,511	3,209,823	14,592

Figure 11. Annual Volume of Septage and Pump & Haul Discharged at CRPS (GNPCC)



12) Contributory Population and Remaining Plant Capacity

The estimated population serviced in 2025 was 110,526 with a projected annual growth rate of approximately 1.96%, based on 2021 Census data. In 2025, the average daily flow was 33,339 m^3/day and the maximum daily flow was 71,553 m^3/day.

The capacity of GNPCC increased when Digester #3 and Sedimentation Tank #4 were installed in 2013 and during the secondary treatment upgrade in 2020. The design capacity of the secondary upgrade was an average annual flow of 46,000 m^3/day and a maximum daily flow of 126,000 m^3/day. The secondary upgrade was designed to provide treatment for service population of 120,000.

The RDN continues to install new equipment and upgrade existing technology to ensure the future carrying capacity of the treatment plant is adequate and permit levels are not exceeded.

13) Environmental Incidents

Records are maintained regarding any environmental incidents that are associated with the RDN's wastewater infrastructure and treatment facilities.

In 2025, there was one environmental incident recorded from a spill detected resulting from a crack in the side of the bottom of the influent channel. The wastewater leaked into the ground and eventually found it's way into a decommissioned conduit. The quantity of wastewater that was spilled was estimated at 2,000 L. The RDN retained a contractor to excavate dirt surrounding the channel, contain the influent and pump it to the process, and repaired and sealed the crack. This incident was reported to the BC Ministry of Environment and Parks.

More information on this incident can be found in Appendix E.

14) Upgrades and Major Projects

14.1 Upgrades and Repairs Completed in 2025

- Digester 2 Mixing pump rebuild/repair.
- Departure Bay Pump Station and Force main Project – IPD Design Validation (ongoing)
- Wellington Pump Station Upgrade (ongoing).

14.2 Studies and Projects Completed in 2025

- ISO 17025 lab certification audit
- VIU Odour Monitoring Program
- Geotechnical Assessment of the GNPCC Rock Face.

14.3 Upgrades and Repairs Planned for 2026

- Chase River Flygt Pump Replacement
- Departure Bay Pump Station and Force main Project – IPD Design Validation
- Wellington Pump Station Upgrade (ongoing).

14.4 Studies and Projects Planned for 2026

- Development Cost Charge (DCC) Study

15) Resource Recovery

15.1 Biosolids Reuse

GNPCC biosolids management in 2025 is discussed in Section 6.5.

15.2 Effluent Reuse

GNPCC reuses final effluent in operational processes for secondary clarifier sprayers, influent plate screen wash water, grit classifier wash water, and sludge thickener sprayers, which decreases the demand for potable water from the community's supply.

15.3 Solid Waste Recycling

Wastewater Services has a general recycling program at the treatment plant, initiated as part of the department's ISO 14001 Environmental Management System, and continues to recycle metals, cardboard, plastics, waste oils, paints, and paint thinners.

16) Education Programs

16.1 Source Control

Source Control Bylaw No. 1730 regulates the discharge of waste into any sewer or drain connected to an RDN sewage facility, including discharges to municipal collection systems. The bylaw provides a process for issuing Waste Discharge Permits and a fee structure based on waste strength and volume. The Bylaw also lists prohibited waste items and has provisions for fees and enforcement.

Trucked Liquid Waste Rates and Regulations Bylaw No. 1732 includes source control provisions including a schedule of prohibited wastes and a schedule of restricted wastes. It also includes enforcement tools.

16.2 Water Conservation

The RDN has a water conservation and outreach program, called Team WaterSmart, for municipalities in the region and electoral areas. The RDN's Board also approved a Water Conservation Plan in 2020. This plan was completed in collaboration with member municipalities.

16.3 Tour Day

Tour days are occasionally offered at GNPCC to provide the public with opportunities to tour the facilities, learn about recent upgrades, browse information, and ask questions. The RDN held a tour day at GNPCC on March 8, 2025. This event was attended by 109 participants.

16.4 SepticSmart

SepticSmart is and RDN educational program that provides information on septic system operation and maintenance. It aims to prolong the life of functioning systems in the region. More information on the SepticSmart Program is available at: https://www.rdn.bc.ca/septicsmart.

The SepticSmart program includes an information package, annual workshops and a rebate program. Two SepticSmart workshops were held in 2025. To date, the SepticSmart rebate program has issued more than $450,000 in rebates to homeowners to help with septic tank repairs and maintenance.

16.5 Liquid Waste Management Plan

The RDN Liquid Waste Management Plan (LWMP) is a long-range plan to support sustainable wastewater management in the region. This plan authorizes the RDN to find community-driven and cost-effective solutions to protect public health and achieve a standard level of wastewater treatment over a reasonable timeframe. The BC Minister of the Environment approved the RDN's LWMP in October 2014. An LWMP annual report will be submitted under separate cover in June.

In December 2023, the RDN submitted a request to the Province of BC for an LWMP Amendment.

16.6 Website

The RDN's Wastewater Services department website www.rdn.bc.ca/wastewater-services is regularly updated and provides education material related to wastewater treatment, environmental management, pollution prevention and septic system maintenance (the SepticSmart program).

The Get Involved RDN webpage is an online public engagement space that hosts outreach information specific to the regional projects. In 2025, the following GNPCC projects were highlighted:

- Departure Bay Pump Station and Forcemain Project
- Wellington Pump Station Upgrade
- Liquid Waste Management Plan Amendment.

Appendix A – Waste Management Permit No. PE00338 & Amendments

Province of
British Columbia

MINISTRY OF
ENVIRONMENT,
LANDS AND PARKS

BC Environment

Vancouver Island Region
Environmental Protection
2569 Kenworth Road
Nanaimo, British Columbia
V9T 4P7
Telephone: (604) 751-3100
Fax: (604) 755-2473

REGISTERED MAIL

Date: JUN 0 2 1994

File: PE00338

Regional District of Nanaimo
6300 Hammond Bay Road
PO Box 40
Lantzville BC V0R 2H0

Dear Permittee:

Enclosed is a copy of amended Permit No. PE00338 issued under the provisions of the Waste Management Act. Your attention is respectfully directed to the terms and conditions outlined in the Permit.

The Ministry of Environment, Lands and Parks has established the policy that secondary treatment is the minimum level of treatment required for municipal sewage discharges to surface waters. This policy will apply to existing discharges with no or primary treatment, in stages, taking into account the assimilative capacity of the receiving environment, the ability to finance the upgraded sewage treatment facilities, population growth and public input to the waste planning process. Liquid Waste Management Plans (LWMPs) may be used to determine the schedule for upgrading to secondary treatment. The Regional District of Nanaimo has indicated its intention to develop a LWMP for School District 68. Please note the requirements of Section 4.1 of the Permit and, if necessary, contact this office for further discussion on this matter.

Section 3.3 of the Permit requires the Permittee to undertake a receiving environment monitoring program. L.J. Erickson, P.Bio., of this office should be consulted during development of the program.

Section 1.1.1 of the permit specifies average and maximum discharge rates which correspond to the present population served and the design capacity of the treatment works. Section 4.4 of the Permit states that the Permittee may be required to undertake an infiltration and inflow control program.

This Permit does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority shall rest with the Permittee.

The Permittee shall ensure that any discharge under this Permit meets the requirements of other regulatory agencies including, but not restricted to, Environment Canada and the Department of Fisheries and Oceans (Canada).

. . . 2

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01-Jun-94

An annual Permit fee will be determined according to the Waste Management Permit Fees Regulation.

This Permit may be appealed by persons who consider themselves aggrieved by this decision in accordance with Part 5 of the Waste Management Act. Written notice of intent to appeal must be received by the Regional Waste Manager within twenty-one (21) days.

The administration of this Permit will be carried out by staff from our Regional Office located at 2569 Kenworth Road, Nanaimo, British Columbia, V9T 4P7 (telephone 751-3100). Plans, data, and reports pertinent to the Permit are to be submitted to the Environmental Protection office at this address.

Yours truly,

G.E. Oldham, P.Eng.
Regional Waste Manager
Vancouver Island Region

Enclosure

ACL 94/5/31
→ 01-6-94

PROVINCE OF
BRITISH COLUMBIA

Environmental Protection
2569 Kenworth Road
Nanaimo
British Columbia, V9T 4P7
Telephone: (604) 751-3100

MINISTRY OF ENVIRONMENT,
LANDS AND PARKS

PERMIT
PE00338

Under the Provisions of the Waste Management Act

Regional District of Nanaimo

6300 Hammond Bay Road

PO Box 40

Lantzville, British Columbia

V0R 2H0

is authorized to discharge effluent from a municipal sewage treatment plant located in Nanaimo, British Columbia to the Strait of Georgia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the Waste Management Act and may result in prosecution.

1. AUTHORIZED DISCHARGES

1.1 The discharge of effluent to which this Section is applicable is from a municipal sewage treatment plant as shown on the attached Site Plan A. The B.C. Environment reference number (S.E.A.M. site number) for this discharge is E100008.

1.1.1 The rate at which effluent may be discharged is:

Average - $27{,}730 \times (1.0417)^{(\text{calendar year} - 1994)}$ m^3/d
to a maximum of 40,950 m^3/d

Maximum Daily - 80,870 m^3/d

1.1.2 The characteristics of the discharge shall not exceed:

5-Day Biochemical Oxygen Demand - 130 mg/L
Total Suspended Solids - 130 mg/L

G.E. Oldham, P. Eng.
Regional Waste Manager

Date issued: April 15, 1970
Amendment Date: JUN 02 1994
(most recent)

PERMIT NO. : PE00338

10-5-94

1.1.3 The works authorized are a headworks channel, screening facilities, grit and scum removal facilities, primary sedimentation facilities, sludge digestion facilities, sludge dewatering facilities, an outfall extending 2,030 m from mean low water to a minimum depth of 70 m below mean low water, diffuser, and related appurtenances approximately located as shown on the attached Site Plan A.

1.1.4 The works authorized must be complete and in operation on and from the date of this amended Permit.

1.1.5 The location of the works authorized, excepting the outfall and diffuser, is Lot 1, Plan 26263, District Lot 51, Wellington Land District.

1.1.6 The location of the point of discharge is the Strait of Georgia approximately as shown on the attached Site Plan A.

2. GENERAL REQUIREMENTS

2.1 Maintenance Of Works

The Permittee shall inspect the pollution control works regularly and maintain them in good working order. Notify the Regional Waste Manager of any malfunction of these works.

2.2 Emergency Procedures

In the event of an emergency or condition beyond the control of the Permittee which prevents continuing operation of the approved method of pollution control, the Permittee shall immediately notify the Regional Waste Manager and take appropriate remedial action.

2.3 Bypasses

The discharge of effluent which has bypassed the designated treatment works is prohibited unless the consent of the Regional Waste Manager is obtained and confirmed in writing.

2.4 Process Modifications

The Permittee shall notify the Regional Waste Manager prior to implementing changes to any process that may affect the quality and/or quantity of the discharge.

G.E. Oldham, P. Eng.
Regional Waste Manager

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01-6-94

2.5 Posting of Outfall

The Permittee shall erect a sign along the alignment of the outfall above high water mark. The sign shall identify the nature of the works. The wording and size of the sign requires the consent of the Regional Waste Manager.

2.6 Disinfection

Although disinfection of the effluent is not required at this time, suitable provisions should be made to include disinfection facilities in the future. If disinfection is by chlorination, dechlorination facilities will also be required.

2.7 Sludge Wasting and Disposal

Sludge wasted from the treatment plant shall be disposed of to a site and in a manner authorized by the Regional Waste Manager.

2.8 Outfall Inspection

The Permittee shall conduct a dye test on the outfall line (or inspect by another method approved by the Regional Waste Manager) every five years or as may otherwise be required by the Regional Waste Manager.

2.9 Facility Classification

The Permittee shall classify the wastewater treatment facility authorized in Section 1 (the facility) and the classification shall be maintained with the "British Columbia Water and Wastewater Operators Certification Program Society" (BCWWOCPS). The Permittee shall submit an application to classify the facility to BCWWOCPS by October 31, 1994.

2.10 Operator Certification

If the facility is classified by the BCWWOCPS (the Program) at Level II or higher, the Permittee shall ensure that all operators of the facility shall be certified by the Program to a Class I level, at a minimum, by December 1, 1994.

G.E. Oldham, P. Eng.
Regional Waste Manager

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01-6-94

Operators in Training

The Permittee shall ensure that all operators in training (OIT) working at the facility classified by the BCWWOCPS at Level II or higher shall be required to successfully pass an OIT examination within three (3) months of commencement of employment at the facility. The OIT certificate shall be valid for fifteen (15) months from the date of issue. Prior to the expiry date of the OIT certificate, but not sooner than twelve (12) months from the date when the OIT commenced facility operation, the OIT shall successfully complete a Class I certification examination in order to continue to operate at the facility.

Chief Operator: Level II or Higher

If the facility is classified by the BCWWOCPS at level II or higher, the Permittee shall designate at least one operator to be the "Chief Operator" of the facility by December 1, 1996. The "Chief Operator" shall be certified at a Class II level, at a minimum.

After December 1, 1996, no person shall have "Direct Responsible Charge", as defined by the BCWWOCPS, of a municipal wastewater treatment facility classified at Level II or higher unless they possess a valid operator's certificate not more than one level below the classification level of the facility.

Chief Operator: Level III and IV

If the facility is classified by the BCWWOCPS at level III, the Permittee shall designate a "Chief Operator", certified at a Class III level by December 1, 1998.

If the facility is classified by the BCWWOCPS at Level IV, the Permittee shall designate a "Chief Operator" certified at a Class IV level by December 1, 1998.

3. MONITORING AND REPORTING REQUIREMENTS

3.1 Discharge Monitoring

3.1.1 Flow Measurement

Provide and maintain a suitable flow measuring device and record once per day the effluent volume discharged over the preceding 24-hour period.

G.E. Oldham, P. Eng.
Regional Waste Manager

ACL 94/5/31
01.6.94

3.1.2 Sampling and Analysis

The Permittee shall install, provide, and maintain suitable sampling facilities and obtain composite samples and analyses of the effluent as follows:

Contaminant	Frequency
5-Day Biochemical Oxygen Demand	Daily
Total Suspended Solids	Daily
Ammonia Nitrogen	Quarterly
Toxicity	Quarterly

The following contaminants at a frequency of once every six months:

pH,	Cyanide (total),	Tetrachloroethylene,
Alkalinity,	Fluoride (dissolved),	Trichloroethane,
Chloride,	Iron (dissolved),	Trichloroethylene,
Nitrogen (total kjeldahl),	Lead (total),	
Oil and Grease,	Manganese(dissolved),	Benzene,
Phosphorous (total),	Mercury (total),	Ethylbenzene,
Sulphate (dissolved),	Molybdenum (total),	Toluene,
Sulphide (dissolved),	Nickel (dissolved),	
	Selenium (total),	Phenols,
Aluminum (total),	Silver (total),	Total Organic Carbon,
Arsenic (total),	Tin (total),	
Barium (dissolved),	Zinc (total),	2-EthylHexyl Phthalate,
Boron (dissolved),		Di-N-Butyl Phthalate,
Cadmium (dissolved),	Chloroform,	
Chromium (total),	Dichlorobromo-methane,	Naphthalene,
Cobalt (dissolved),	Dichloromethane,	
Copper (dissolved),	Methylene Chloride,	Polychlorinated Biphenyls.

Samples shall be composited in proportion to effluent flow over 24 hours. All sampling facilities, locations, techniques and equipment require the consent of the Regional Waste Manager.

G.E. Oldham, P. Eng.
Regional Waste Manager

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3.2 Biosolids Monitoring

The Permittee shall obtain a representative sample of the treated biosolids once every quarter and obtain analyses of the sample for the following:

Total Solids,	Arsenic,	Molybdenum,
Moisture,	Cadmium,	Nickel,
Volatile Suspended	Chromium,	Phosphorous,
Solids,	Cobalt,	Selenium,
Polychlorinated	Copper,	Zinc.
Biphenyls,	Lead,	
Total Kjeldahl Nitrogen,	Mercury,	

3.3 Monitoring of the Receiving Environment

The Permittee shall monitor the receiving water quality and carry out chemical, physical and biological studies on the receiving environment as required by the Regional Waste Manager.

The Permittee shall submit a proposed receiving environment monitoring program to the Regional Waste Manager by October 31, 1994 for approval. The program should be established in consultation with the Regional Waste Manager. Based on the results of this monitoring program, the receiving environment monitoring requirements may be extended or altered by the Regional Waste Manager. The approved program shall commence by January 1, 1995.

3.4 Monitoring Procedures

3.4.1 Sampling And Analytical Procedures

Sampling and flow measurement shall be carried out in accordance with the procedures described in "Field Criteria for Sampling Effluents and Receiving Waters", April 1989, or by suitable alternative procedures as authorized by the Regional Waste Manager.

Analyses are to be carried out in accordance with procedures described in "A Laboratory Manual for the Chemical Analysis of Waters, Wastewaters, Sediments and Biological Materials, (1976 edition including updates)", April 1989, or by suitable alternative procedures as authorized by the Regional Waste Manager.

G.E. Oldham, P. Eng.
Regional Waste Manager

ACL 94/5/31

Copies of the above manuals are available from the Environmental Protection Division, Ministry of Environment, Lands and Parks, 777 Broughton Street, Victoria, British Columbia, V8V 1X4, at a cost of $20.00 and $70.00 respectively, and are also available for inspection at all Environmental Protection offices.

Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination, breakage, etc.

3.4.2 Toxicity

Analyses for determining the toxicity of liquid effluents to fish shall be carried out in accordance with the procedures described in the "Provincial Guidelines and Laboratory Proceedures for Measuring Acute Lethal Toxicity of Liquid Effluents to Fish" November 1982. The Regional Waste Manager will advise the Permittee which method of measurement for expressing lethal toxicity shall be used. The method of sampling and the method of bioassay will be determined by the Regional Waste Manager.

Copies of the above manual are available from the Environmental Protection Division, 777 Broughton Street, Victoria, British Columbia, V8V 1X4, at a cost of $5.00, and are also available for inspection at all Environmental Protection offices.

3.5 Reporting

Maintain data of analyses and flow measurements, collected under Sections 3.1 through 3.3, for inspection and every quarter submit the data, suitably tabulated in a machine readable format, for entry in the Ministry of Environment, Lands and Parks computer database, to the Regional Waste Manager for the previous quarter. All reports shall be submitted within 31 days of the end of each quarter. The first report is to be submitted by October 31, 1994. Based on the results of the monitoring program, the Permittee monitoring requirements may be extended or altered by the Regional Waste Manager.

G.E. Oldham, P. Eng.
Regional Waste Manager

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3.6 Annual Report

The Permittee shall submit an annual report which shall include a summary and interpretation of the data submitted under Section 3.5, an interpretation of the effects of the effluent and biosolids discharges on the receiving environment, and a summary of treatment plant operations, for the preceding calendar year. In addition, the Regional Waste Manager may require that the annual report include summaries and progress reports of the matters identified in Sections 4.2 through 4.8, and any 5Rs (Reduce, Reuse, Recycle, Recover, Residual) activities, for the preceding calendar year. The annual report shall be submitted within 60 days of the end of each calendar year and shall be made available by the Regional District of Nanaimo to the public upon request. The first annual report shall be submitted by February 28, 1995.

4. ADDITIONAL REQUIREMENTS

4.1 Liquid Waste Management Plan

The Regional District of Nanaimo has indicated its intention to develop a Liquid Waste Management Plan for School District 68. Accordingly, the Permittee shall submit a proposed schedule for the development of a Liquid Waste Management Plan to the Regional Waste Manager by October 31, 1994 for approval. The Plan shall be developed in accordance with ministry guidelines and shall include, but not be limited to, a schedule to upgrade the discharge to secondary treatment, an infiltration and inflow control program, a source control program, a stormwater management program, a biosolids management program, and an odour control program. All aspects of the Plan shall be to the satisfaction of the Regional Waste Manager.

4.2 Effluent Upgrading

The Permittee may be required to submit a schedule, for upgrading of the discharge to secondary treatment, to the Regional Waste Manager for approval. Based on receiving environment monitoring data and/or other information obtained in connection with this discharge, the Permittee may be required to provide additional treatment facilities and/or upgrade the discharge to secondary treatment.

4.3 Land Requirements

The Permittee shall secure and hold in reserve sufficient land to allow for future expansion and upgrading of the sewage treatment facilities to secondary treatment.

G.E. Oldham, P. Eng.
Regional Waste Manager

ACL 94/5/31
01.6.94

4.4 Infiltration and Inflow Control Program

The Permittee may be required to develop, submit to the Regional Waste Manager for approval, and implement an identification, remediation, and control program to reduce the quantity of infiltration and inflow into the sewage collection system.

4.5 Source Control Program

The Permittee may be required to implement a source control program and/or develop a sewer use bylaw to control the quantity and quality of wastes discharged into the sewer system.

4.6 Stormwater Management Program

The Permittee may be required to develop, submit to the Regional Waste Manager for approval, and implement a stormwater management program.

4.7 Biosolids Management Program

The Permittee may be required to develop, submit to the Regional Waste Manager for approval, and implement a biosolids management program.

4.8 Odour

Should objectionable odours attributable to the operation of the treatment plant occur, the Regional Waste Manager may require steps to be taken or works to be provided to reduce the odours to acceptable levels.

GEO

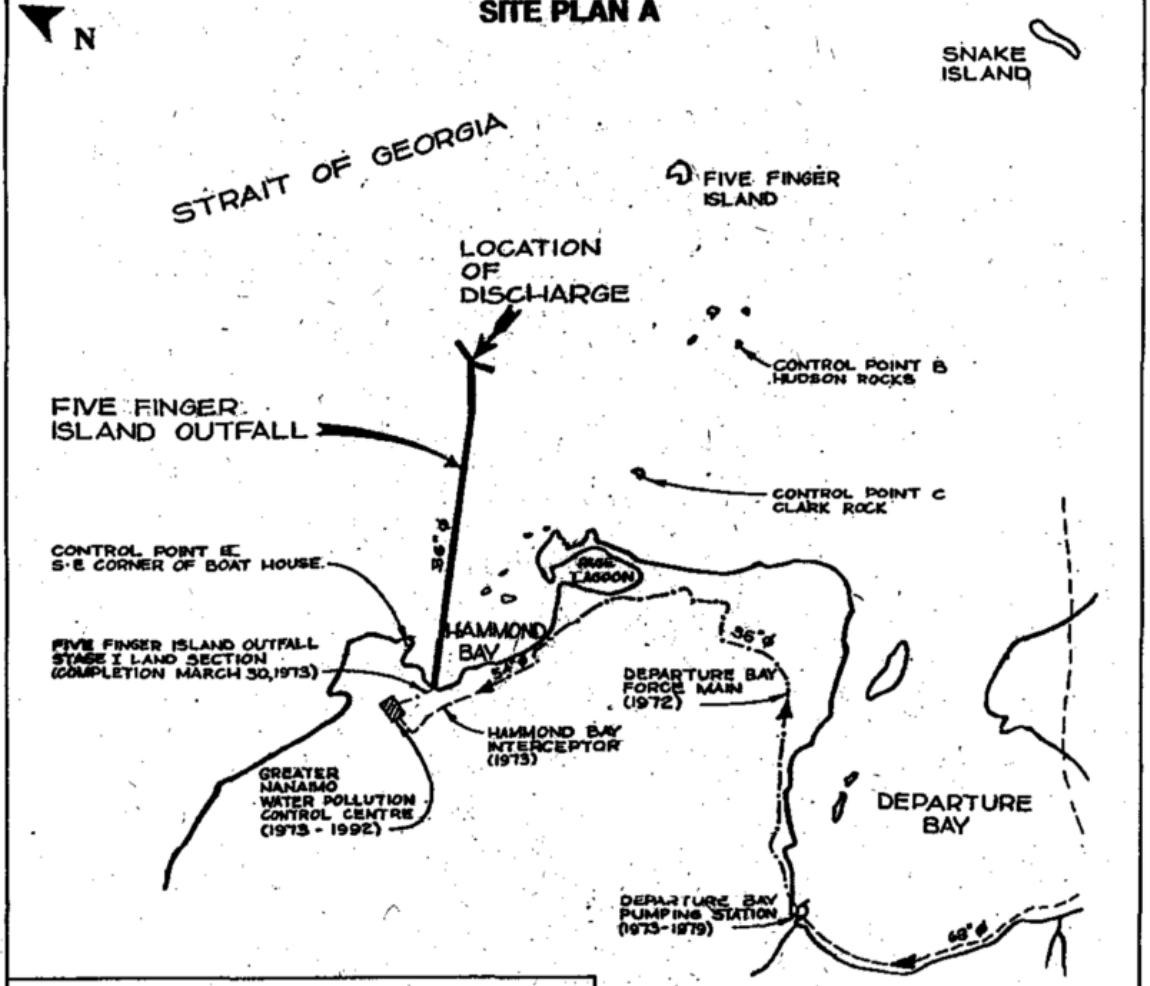
G.E. Oldham, P. Eng.
Regional Waste Manager

ACL 94/5/31
01-6-94

PROVINCE OF
BRITISH COLUMBIA

Environmental Protection

SITE PLAN A



Location Map

Scale: 1:36,000

Permit No.: PE00338

Date: JUN 0 2 1994

G.E. Oldham, P.Eng.
Regional Waste Manager

ACL 94/05/31
01-6-94

Province of
British Columbia

MINISTRY OF
ENVIRONMENT,
LANDS AND PARKS

BC Environment

Vancouver Island Region
Environmental Protection
2569 Kenworth Road
Nanaimo, British Columbia
V9T 4P7
Telephone: (604) 751-3100
Fax: (604) 755-2473

Date: AUG 11 1994

File: PE00338

REGISTERED MAIL

Regional District of Nanaimo
6300 Hammond Bay Road
PO Box 40
Lantzville BC V0R 2H0

ATTENTION: W. R. Colclough, ASCT
Director of Operational Services

Dear W. R. Colclough:

Re: Notice of Correction to Waste Management Permit No. PE00338, presently in the name of Regional District of Nanaimo

Further to recent related correspondence, we provide the following:

1. Section 1.1.1 of the permit has been corrected to specify a maximum daily effluent discharge rate of 80 870 m^3/day which corresponds to the maximum day design capacity of the treatment works.

   Please remove and destroy the original page in your permit package and replace it with the revised version enclosed.

2. Pursuant to Section 2.8 of the permit, your request to conduct video inspection of the outfall in lieu of dye testing is approved.

3. Your concerns regarding Sections 4.4 and 4.6 of the permit are noted. It is expected that a Liquid Waste Management Plan for School District 68 would address these items.

   Infiltration and inflow into the sewer collection system is a serious concern, and we remain supportive of efforts to address it.

. . . 2

Thank you for meeting with us. We understand that you have chosen not to proceed with your appeal, dated June 22, 1994, of the subject permit.

If you have any questions regarding the above, please contact A. C. Leuschen, Environmental Protection Officer, at 751-3100.

Yours truly,

G. E. Oldham, P.Eng.
Regional Waste Manager
Vancouver Island Region

GEO/acl/mg

encl.

BRITISH COLUMBIA

September 12, 2019

Tracking Number: 385715
Authorization Number: 338

REGIONAL DISTRICT OF NANAIMO
6300 HAMMOND BAY RD.
NANAIMO, BC V9T 6N2

Dear REGIONAL DISTRICT OF NANAIMO,

Re: Your application for an amendment to a Permit under the Environmental Management Act

Pursuant to Section 14(4) of the *Environmental Management* Act, Permit 338 is hereby amended as follows:

Adding the following to **Section 1.1.3**:

"After September 8, 2019, the works authorized are screening facility, grit and scum removal systems, primary sedimentation tanks, secondary treatment bioreactors, secondary clarifiers, sludge thickening systems, sludge digestion systems, sludge dewatering facility, an outfall extending 2,030m from mean low water to a minimum depth of 70m below mean low water, diffusers, and related appurtenances approximately located as shown in the attached Site Plan A."

All other terms and conditions of Permit 338 remain in effect.

This permit does not authorize entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorized by the owner of such lands or works. The responsibility for obtaining such authority rests with the permittee. This permit is issued pursuant to the provisions of the Environmental Management Act to ensure compliance with Section 120(3) of that statute, which makes it an offence to discharge waste, from a prescribed industry or activity, without proper authorization. It is also the responsibility of the permittee to ensure that all activities conducted under this authorization are carried out with regard to the rights of third parties,and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board in accordance with Part 8 of the Environmental Management Act. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Ministry of Environment and Climate Change Strategy

Environmental Protection Division 2080-A Labieux Rd Nanaimo, B.C. V9T 6J9

Authorizations - South Region
Telephone: (250) 751-3100
Facsimile: (250) 751-3103

Administration of this permit will be carried out by staff from the Environmental Protection Division's Regional Operations Branch. Plans, data and reports pertinent to the permit are to be submitted by email or electronic transfer to the Director, designated Officer, or as further instructed.

Yours truly,

Bryan Vroom
for Director, Environmental Management Act

Appendix B – Internal Flow Monitoring & Laboratory Raw Data (Permit Data)

2025 Total Flows (Cubic Metres)

Day	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	40,814	30,463	38,567	38,330	28,434	30,256	27,793	28,675	28,612	30,056	43,536	36,095
2	40,957	30,751	37,750	36,286	28,668	29,833	29,790	27,540	30,889	31,517	36,459	34,857
3	42,114	28,552	35,532	35,684	27,989	29,017	28,989	27,864	29,913	28,445	33,322	34,485
4	45,146	29,505	35,690	33,998	28,523	29,340	28,815	29,315	28,153	27,902	32,797	39,307
5	48,837	30,154	34,901	33,407	32,735	29,222	27,506	30,027	27,607	28,262	39,311	41,073
6	43,660	30,553	33,898	35,470	28,206	29,144	28,363	31,631	26,980	27,811	48,124	37,988
7	40,119	30,224	33,660	34,888	27,733	28,625	29,085	29,333	25,355	27,745	40,558	37,503
8	37,821	30,516	44,030	36,089	27,548	29,721	29,122	28,653	27,850	27,526	36,145	43,670
9	37,538	30,990	57,492	34,454	27,677	29,021	28,897	28,809	27,914	28,162	34,823	45,125
10	38,351	29,789	47,792	34,490	27,240	28,766	28,093	29,397	27,874	28,445	32,860	54,964
11	36,057	28,366	47,201	33,376	28,153	27,212	28,875	30,456	27,419	27,782	32,189	46,887
12	35,511	29,571	48,999	32,452	27,936	30,008	27,675	29,835	27,175	30,407	32,865	42,339
13	34,461	30,112	43,872	32,919	27,081	27,714	28,770	29,158	26,992	29,133	34,242	39,245
14	32,970	29,898	40,873	32,835	27,873	27,900	29,145	30,754	29,135	28,256	33,191	43,810
15	33,005	36,436	41,341	31,606	28,617	27,923	28,146	31,278	28,859	27,548	32,813	49,363
16	32,944	47,171	39,477	31,417	29,099	28,450	28,006	28,847	27,700	27,964	33,210	58,514
17	31,532	45,688	37,104	30,503	30,034	28,352	28,163	28,652	27,757	27,374	31,847	54,082
18	31,389	43,399	35,747	30,187	28,184	28,972	27,838	29,586	27,450	29,819	31,134	53,987
19	31,509	45,970	37,151	29,617	32,082	28,514	26,845	28,976	27,264	30,148	30,843	47,565
20	30,816	41,689	38,635	30,489	31,255	28,552	27,215	28,557	28,105	28,703	30,858	45,743
21	30,312	49,051	42,251	30,846	30,326	29,065	28,480	24,027	28,213	28,335	30,430	43,966
22	29,966	71,553	41,481	32,589	29,081	29,580	27,668	28,238	27,736	28,656	31,732	46,011
23	30,078	61,527	47,308	30,064	28,926	27,486	27,847	28,015	27,908	28,445	32,432	44,483
24	29,609	57,735	50,769	24,598	28,463	29,541	27,755	28,603	26,994	31,091	33,599	47,109
25	29,241	60,923	48,346	29,093	29,970	29,263	27,971	29,406	27,375	32,900	41,999	43,364
26	30,200	49,922	47,894	28,494	29,032	29,879	26,901	25,042	27,349	30,828	42,122	45,083
27	29,529	43,795	50,029	28,910	29,685	29,565	27,905	28,644	27,167	29,883	50,213	40,672
28	27,467	40,261	46,668	29,615	29,454	28,050	28,601	28,103	28,611	36,902	41,883	38,416
29	30,169		43,630	28,596	29,345	28,894	28,763	28,327	28,457	33,521	35,776	37,058
30	30,471		42,790	28,610	29,388	29,429	29,310	26,877	26,701	31,425	33,907	35,320
31	32,139		40,996		30,093		28,705	27,297		35,828		35,012
Total:	**1,074,732**	**1,114,564**	**1,311,874**	**959,912**	**898,830**	**867,294**	**877,037**	**889,922**	**835,514**	**920,819**	**1,075,220**	**1,343,096**
Average:	**34,669**	**39,806**	**42,319**	**31,997**	**28,995**	**28,910**	**28,292**	**28,707**	**27,850**	**29,704**	**35,841**	**43,326**
Minimum:	**27,467**	**28,366**	**33,660**	**24,598**	**27,081**	**27,212**	**26,845**	**24,027**	**25,355**	**27,374**	**30,430**	**34,485**
Maximum:	**48,837**	**71,553**	**57,492**	**38,330**	**32,735**	**30,256**	**29,790**	**31,631**	**30,889**	**36,902**	**50,213**	**58,514**
Non compliance (max flow)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Non-compliant days are highlighted in yellow.
Maximum daily flow: 80,870 m^3/day
Non-compliant days are highlighted yellow,

2025 Influent 5-day Biochemical Oxygen Demand (BOD_5) (mg/L)												
Day	**Jan**	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1							230					
2				160					350			
3			< 100									240
4		277									254	
5			123					331				
6					266							
7	210											
8										348		
9				212					352			227
10						294						
11		523										
12			< 100					368				
13					338							
14										308		
15							266					
16									256			220
17						296						
18											312	
19			142					287				
20					270							
21	320									306		
22							284					
23				216					311			
24						266						
25												
26			112					349				
27					366							
28	304									244		
29							321					
30												
31												
Average:	**278**	**400**	**<115**	**196**	**310**	**285**	**275**	**334**	**317**	**302**	**283**	**229**

Results in blue font represent influent grab samples. Results in black font represent influent composite samples.

2025 Effluent 5-day Biochemical Oxygen Demand (BOD_5) (mg/L)

Day	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	5.24	5.30	5.24	4.15	5.13	7.22	4.86	9.01	7.11	4.60	4.94	9.97
2	6.09	5.04	6.97	3.71	4.26	8.30	4.20	8.54	9.15	5.25	5.11	9.88
3	7.11	4.46	5.06	2.56	4.26	6.31	4.76	8.18	9.00	6.35	5.17	8.13
4	7.26	4.98	5.50	3.84	4.83	7.24	4.04	6.40	7.70	5.88	5.22	7.86
5	8.74	5.46	5.86	3.98	19.60	8.24	4.85	6.90	5.49	6.55	4.92	6.97
6	6.92	5.93	9.84	4.14	7.22	8.34	4.61	8.00	6.30	6.20	6.14	6.94
7	7.24	5.94	7.58	4.20	6.25	7.14	5.45	7.84	5.34	5.54	3.38	6.32
8	7.02	6.30	6.00	4.41	6.96	13.20	5.94	11.20	4.69	6.00	3.88	6.43
9	9.92	6.74	16.20	4.12	3.58	13.80	6.27	12.20	5.28	4.88	5.42	6.83
10	9.32	6.08	3.84	6.98	8.19	9.90	7.66	11.00	4.74	5.00	5.59	7.08
11	12.30	5.99	5.52	4.64	9.26	11.40	7.00	10.90	5.36	5.51	5.80	5.85
12	12.80	6.78	5.22	4.52	10.10	8.58	9.54	7.20	7.92	5.66	5.23	4.92
13	9.23	7.14	5.60	5.02	11.30	6.73	10.80	5.76	9.39	7.41	4.50	5.24
14	9.83	7.13	5.03	4.92	11.90	6.14	13.60	11.40	9.19	8.40	5.76	5.91
15	14.90	7.66	3.12	5.79	12.00	5.70	10.80	6.62	8.03	7.10	6.83	6.90
16	12.90	7.73	5.00	6.02	12.70	5.53	8.66	5.49	8.09	9.52	8.50	15.00
17	11.20	7.15	8.40	5.19	10.80	7.15	9.11	6.32	7.50	9.14	8.72	6.10
18	11.90	7.90	5.58	5.66	10.20	5.32	10.10	6.08	8.18	8.94	9.48	6.44
19	11.40	7.32	5.30	4.12	7.94	6.09	11.80	5.51	6.87	9.17	7.06	5.94
20	6.50	8.43	6.00	4.22	9.30	6.64	9.98	6.80	9.57	8.78	5.54	5.95
21	6.89	8.30	5.76	5.35	9.90	8.83	11.60	8.66	11.20	8.59	5.70	6.40
22	4.71	23.50	5.45	5.68	7.05	9.08	9.18	7.57	9.00	6.94	6.90	6.89
23	11.40	15.10	5.32	4.33	6.41	6.72	7.34	6.12	9.54	8.44	7.40	7.82
24	6.36	12.60	< 2.68	5.04	5.28	8.54	7.85	5.92	9.92	6.21	6.76	7.50
25	5.20	20.40	3.96	5.68	6.48	6.12	9.42	6.74	8.37	6.26	6.82	7.43
26	6.13	5.06	4.02	3.84	4.97	4.52	8.43	7.33	6.94	5.88	6.34	7.95
27	5.03	4.74	3.16	4.54	4.74	4.94	9.58	6.33	7.13	5.17	7.24	6.44
28	4.65	6.08	4.51	3.42	2.16	6.32	9.42	5.86	6.62	5.22	6.72	6.04
29	5.24		4.04	5.02	4.30	6.58	7.58	6.52	4.26	5.73	8.22	5.85
30	4.56		4.43	5.15	5.02	5.55	5.41	6.59	4.65	3.20	9.36	5.80
31	4.64		5.87		5.64		8.91	6.37		2.84		5.62
Average	**8.15**	**8.04**	**5.68**	**4.67**	**7.67**	**7.54**	**8.02**	**7.59**	**7.42**	**6.46**	**6.29**	**7.05**
Non compliance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Quarterly Average (for WSER)	**7.27**			**6.64**			**7.68**			**6.60**		

GNPCC Maximum BOD_5: 130 mg/L

Non-compliant days are highlighted in yellow.

NT – No testing competed.

2025 Influent Total Suspended Solids (TSS) (mg/L)												
Day	**Jan**	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1							537					
2				237		467			567			
3												370
4		473									437	
5			160					587				
6					443							
7	280											
8										557		
9				353					547			330
10						593						
11		433										
12			113					553				
13					473							
14	317									540		
15							473					
16				193					507			267
17						737						
18											457	
19			147					473				
20					393							
21	587									640		
22							507					
23				333					493			
24						610						
25												
26		163	180					457				
27					1020							
28	350									653		
29				457			387					
30									707			
31												
Average:	**384**	**356**	**150**	**315**	**582**	**602**	**476**	**518**	**564**	**598**	**447**	**322**

Results in blue font represent influent grab samples. Results in black font represent influent composite samples.

2025 Effluent Total Suspended Solids (TSS) (mg/L)												
Day	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	6.50	5.60	8.80	4.86	7.80	11.8	9.20	7.60	6.40	7.00	6.28	13.3
2	5.12	6.00	10.0	5.50	6.42	15.2	7.60	8.80	7.20	7.00	6.28	11.8
3	9.40	5.20	9.20	3.75	5.60	11.4	10.6	8.40	8.80	5.28	6.72	10.8
4	13.2	5.20	8.60	5.38	6.40	11.0	8.8	7.60	7.40	6.57	6.42	10.4
5	17.6	6.10	9.00	7.50	123	13.6	10.0	9.70	5.40	6.72	7.57	9.86
6	11.6	6.10	11.2	5.00	10.2	16.4	10.2	10.1	4.00	6.43	6.86	7.43
7	12.4	7.40	8.40	4.75	8.4	12.0	11.0	9.00	3.40	5.28	7.28	7.42
8	10.0	5.60	7.60	5.00	8.6	32.6	9.00	10.2	3.00	6.72	6.00	8.14
9	12.5	6.50	17.0	6.62	10.6	26.0	10.2	8.67	5.43	5.43	6.57	8.00
10	14.0	5.90	8.20	8.00	12.0	25.6	12.5	12.2	4.28	5.60	7.43	9.57
11	18.8	6.70	8.40	5.25	11.0	28.4	17.8	14.8	5.20	4.40	6.28	7.14
12	17.2	7.00	7.60	7.67	16.0	25.4	19.2	6.00	4.20	6.00	7.00	7.28
13	14.3	13.1	7.60	6.62	13.0	16.7	23.8	6.20	7.43	6.00	7.42	8.00
14	14.5	6.16	5.40	9.12	21.6	8.00	25.4	13.4	6.57	5.86	9.00	7.00
15	16.8	8.00	6.00	8.72	22.6	7.33	17.6	6.20	5.72	7.28	10.0	8.28
16	14.8	7.00	6.60	7.86	35.0	8.00	15.0	5.67	5.86	6.14	10.3	16.7
17	14.8	8.16	7.00	7.14	19.2	7.00	13.8	5.84	6.40	7.57	12.7	9.00
18	11.6	6.84	8.40	6.00	19.0	6.40	11.8	5.40	5.40	7.71	13.6	11.2
19	10.8	8.00	6.00	6.00	17.0	7.80	13.2	6.00	6.80	8.28	12.4	9.20
20	9.40	7.16	5.75	5.00	18.2	10.40	10.4	6.84	4.80	8.60	11.8	8.40
21	7.60	8.00	3.66	6.80	18.0	9.20	10.0	8.33	5.40	8.57	10.4	7.57
22	6.20	27.2	6.40	7.20	14.8	9.80	8.16	8.80	6.40	7.00	7.71	9.40
23	8.00	16.2	8.00	7.00	13.4	10.60	8.16	7.33	7.80	8.14	11.0	6.20
24	6.84	11.0	6.20	5.80	8.80	9.00	8.80	5.50	6.60	8.42	8.86	9.00
25	6.80	15.2	4.40	6.50	9.60	8.20	9.84	5.00	5.86	7.71	9.00	7.14
26	8.50	7.40	6.00	7.20	8.40	5.80	8.33	6.60	6.90	6.28	9.42	7.72
27	6.84	7.00	5.12	8.20	7.00	5.40	8.33	7.00	6.28	5.86	8.14	7.60
28	3.34	7.20	6.12	7.80	7.40	6.40	13.4	4.60	6.43	6.14	9.86	7.20
29	4.16		5.60	8.40	6.80	9.00	6.20	5.60	5.00	7.28	13.1	7.80
30	7.60		4.80	8.20	10.40	8.67	4.60	7.20	6.14	6.71	12.7	7.80
31	5.88		5.00		9.60		5.28	5.40		6.57		7.86
Average:	**10.6**	**8.46**	**7.36**	**6.6**	**16.3**	**12.77**	**11.6**	**7.7**	**5.88**	**6.73**	**8.94**	**8.85**
Non-Compliance	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Quarterly Average (for WSER)	**8.80**			**11.95**			**8.42**			**8.16**		

Non-compliant days are highlighted yellow.
GNPCC Maximum TSS: 130 mg/L
NT- No testing completed.

2025 Influent Temperature

Day	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1										19.3		
2				13.5			19.3					
3						16.8			21.0			
4												15.9
5		13.9	14.7								17.1	
6								19.1				
7					16.3							
8												
9				14.2			19.3			18.6		
10									20.3			14.8
11						17.7						
12		12.0	12.9									
13								21.3				
14					16.0							
15	13.5									18.0		
16				13.8			20.3					
17									19.5			15.1
18						18.0						
19			13.6								16.1	
20								20.1				
21					15.9							
22	14.1									17.6		
23				14.6			19.2					
24									19.1			
25						19.0						
26		12.9	13.6								14.6	
27								21.3				
28					18.5							
29	14.4									16.9		
30				15.7			20.7					
31												
Average	**14.0**	**12.9**	**13.7**	**14.4**	**16.7**	**17.9**	**19.8**	**20.5**	**20.0**	**18.1**	**15.9**	**15.3**

2025 Effluent Temperature

Day	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	13.6	13.0	14.0	16.4	17.1		21.1	21.6	21.0	19.0	17.6	15.8
2	14.0			14.3	17.2	18.6	20.8	21.5	20.6	19.6		16.2
3	14.0	14.2	14.0	14.0	16.3	18.4	21.3		21.8	19.6	17.4	16.0
4	13.8	13.4	13.9	14.2		18.9	20.6	21.0	21.8	19.6	17.4	16.1
5		13.6	14.2	14.6	16.2	19.0	20.7	20.9	21.4		17.1	15.7
6	15.4	12.6	13.8		17.2	19.9		20.7	21.6	19.3	17.4	15.8
7	13.4	12.7	14.5	14.0	17.5	19.4	20.8	21.1		19.7	16.6	
8	13.7	13.6	14.0	14.4	17.0		21.4	21.0	21.0	19.0	16.4	16.6
9	14.6			14.8	17.0	19.1	20.6	21.2	20.8	18.9		15.8
10	14.6	14.8	12.6	15.4	16.9	19.9	20.8		21.0	19.2	17.7	15.8
11	13.8	12.6	13.4	14.4		19.2	22.1	21.1	20.7	19.1		15.8
12		12.5	13.0	14.8	17.2	18.8	21.7	22.6	20.7		17.6	15.6
13	14.6	12.4	13.2		17.4	18.8		21.8	20.6	18.2	16.4	16.3
14	14.0	12.9	12.8	16.8	17.2	18.7	21.0	21.2		18.0	16.8	
15	14.4	12.8	13.6	15.4	17.6		21.6	20.2	21.0	17.8	17.2	16.6
16	14.0			14.6	16.8	18.8	21.8	20.8	20.8	17.4		15.8
17	14.0	13.1	13.9	15.2	16.7	18.8	21.6		20.7	18.1	16.4	15.0
18	13.8	13.0	13.4	15.9		19.9	20.9	20.8	19.9	18.3	15.9	14.9
19		12.6	14.1	15.0	16.0	19.8	20.8	21.0	20.0		15.8	13.8
20	14.7	15.0	13.6		16.9	19.6		20.4	20.4	18.2	16.7	13.7
21	13.7	13.0	13.4	16.0	16.8	18.8	21.2	20.6		18.0	16.3	
22	13.8	12.9	13.6	16.2	18.0		21.1	21.1	20.1	18.2	17.0	14.9
23	13.8			15.3	19.5	19.2	21.3	21.6	20.2	18.0		13.6
24	13.4	13.1	14.0	16.2	17.9	20.4	21.3		20.2	17.8	15.3	13.2
25	13.8	13.2	13.9	16.1		20.4	20.7	21.4	20.6	18.0	16.9	15.4
26		12.5	14.9	16.2	17.6	19.3	20.8	21.4	20.2		15.2	14.7
27	15.0	13.4	14.6		17.5	19.4		21.8	20.2	17.2	15.9	14.4
28	13.1	13.5	13.4	16.4	19.0	20.0	20.8	21.8		17.6	15.8	
29	13.8		13.4	16.6	18.2		21.2	21.8	20.5	17.5	16.2	13.8
30	14.0			16.9	18.2	21.4	21.4	21.3	19.6	16.4		14.3
31	14.0		13.0		17.8		21.6			17.5		14.0
Average	**14.0**	**13.2**	**13.7**	**15.4**	**17.4**	**19.4**	**21.1**	**21.2**	**20.7**	**18.3**	**16.6**	**15.2**

2025 Influent pH

Day	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1										7.12		
2				7.23			7.16					
3			NR			7.28			7.21			
4			NR									7.16
5		7.26	7.18								7.13	
6								7.10				
7					7.32							
8												
9				7.13			7.30			7.18		
10			NR						7.28			7.18
11			NR			7.18						
12		7.08	7.07									
13					NR			7.14				
14					7.17							
15	7.42									7.40		
16				7.12			7.20					
17			NR						7.06			7.35
18			NR			7.05						
19			7.15**								7.32	
20								7.17				
21					7.07							
22	7.26			NR						7.34		
23				7.21			7.02					
24			NR						7.37			
25			NR			7.13						
26		6.93	7.16								7.20	
27								7.12				
28					7.01							
29	7.13			NR						7.34		
30				7.27			7.05					
31												
Average	**7.27**	**7.09**	**7.14**	**7.19**	**7.14**	**7.16**	**7.15**	**7.13**	**7.23**	**7.28**	**7.22**	**7.23**

2025 Effluent pH

Day	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	6.76	6.64	6.76	6.81	6.64	7.04	6.82	7.03	6.94	7.00	6.76	6.78
2	6.84			6.78	6.59	6.99	6.92	7.22	7.02	7.04		6.98
3	6.83	6.66	6.88	6.70	6.66	6.93	6.92		7.10	7.00	6.76	7.04
4	6.87	6.54	6.80	6.73		6.88	6.92	7.08	7.04	7.08	6.77	6.98
5		6.70	6.82	6.68	6.72	6.84	6.86	7.28	7.08		6.74	7.06
6	6.84	6.62	6.80		6.54	6.88		7.14	6.92	7.00	6.74	7.02
7	6.82	6.60	6.86	6.74	6.58		6.78	7.08		7.06	6.73	
8	6.82	6.68	6.89	6.64	6.62	6.76	6.58	7.17	6.97	7.10	6.72	7.04
9	6.82			6.64	6.58	6.62	6.64	7.12	6.94	7.10		7.00
10	6.82	6.58	6.74	6.52	6.66	6.78	6.66		6.84	7.04	6.82	6.94
11	6.62	6.66	6.68	6.52		6.62	6.88	6.98	6.94	7.09		6.88
12		6.60	6.77	6.60	6.69	6.66	6.82	7.15	6.86		6.72	6.96
13	6.72	6.62	6.74		6.71	6.62		7.18	6.90	7.06	6.78	6.92
14	6.80	6.64	6.76	6.67	6.72		7.00	7.04		7.13	6.76	
15	6.69	6.65	6.82	6.62	6.82	6.70	7.10	7.16	7.02	7.11	6.80	6.99
16	6.73			6.60	6.87	6.78	7.12	7.10	7.00	7.12		6.88
17	6.71	6.56	6.80	6.70	7.02	6.68	6.98		6.97	7.08	6.92	6.86
18	6.58	6.60	6.80	6.64		6.75	6.98	6.96	7.00	7.06	6.90	6.76
19		6.58	6.82	6.64	7.00	6.84	7.02	7.00	6.93		6.92	6.86
20	6.58	6.51	6.83		7.01	6.88		6.98	6.98	6.94	6.92	6.85
21	6.58	6.73	6.88	6.57	6.94		6.85	6.94		6.83	7.01	
22	6.70	6.74	6.81	6.58	6.87	7.01	6.86	7.03	7.00	6.86	7.00	6.91
23	6.62			6.78	6.94	6.96	6.84	6.96	7.00	6.91		6.94
24	6.64	6.56	6.80	6.82	6.94	7.08	6.81		7.00	6.86	7.06	6.92
25	6.62	6.79	6.76	6.76		6.98	6.89	6.86	7.00	6.88	7.06	6.84
26		6.52	6.76	6.86	6.98	6.88	6.97	6.95	6.76		6.86	6.80
27	6.63	6.65	6.83		6.90	6.92		6.89	6.94	6.90	6.86	6.86
28	6.66	6.78	6.81	6.66	6.73		7.00	6.86		6.90	6.67	
29	6.62		6.78	6.66	6.86	6.84	6.92	6.84	6.96	6.92	6.72	6.79
30	6.70			6.70	6.80		6.93	6.91	7.00	6.85		6.76
31	6.66		6.79		6.86		7.01			6.84		6.76
Average	**6.71**	**6.63**	**6.80**	**6.68**	**6.79**	**6.84**	**6.89**	**7.04**	**6.97**	**6.99**	**6.83**	**6.90**

2025 Effluent Ammonia (Total N as mg/L)

Day	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	13.0	10.4	17.6	10.4	10.8	21.8	17.6	31.6	19.8	19.4	14.5	19.7
2	14.1	10.4	19.6	11.4	10.4	23.8	23.0	33.1	22.0	22.2	12.8	22.5
3	14.2	10.4	17.6	10.8	10.9	20.1	20.6	35.4	21.4	23.1	13.0	20.8
4	13.4	12.8	18.4	12.7	12.0	23.0	18.2	42.2	22.8	22.8	14.1	21.4
5	12.3	15.7	19.8	13.5	10.6	19.1	19.5	37.6	17.5	21.8	14.8	21.1
6	14.0	12.9	20.8	13.1	11.2	19.0	16.1	35.6	19.6	20.8	14.6	20.8
7	11.4	12.8	19.0	12.3	10.8	14.7	14.4	34.4	15.6	23.2	12.0	21.2
8	12.7	12.5	21.8	11.2	12.0	15.2	11.7	35.6	17.0	26.6	10.7	20.4
9	12.8	11.4	18.0	10.7	12.4	12.4	12.3	30.1	21.4	25.2	11.9	17.9
10	12.2	13.2	13.8	10.6	12.0	13.6	13.1	26.4	19.4	24.4	13.7	15.6
11	11.2	13.9	14.4	11.4	10.6	10.2	16.7	25.6	17.4	27.9	13.6	13.6
12	9.2	13.0	15.6	12.7	13.6	14.8	15.7	29.2	17.6	28.1	12.4	15.4
13	11.0	14.8	16.5	12.6	16.3	13.2	18.1	29.6	18.0	25.2	12.8	14.4
14	11.6	14.8	15.8	11.8	18.6	13.0	21.4	28.2	20.4	25.8	13.5	15.6
15	12.3	NR	16.8	10.8	22.2	12.5	22.7	25.4	18.4	27.3	15.7	15.8
16	14.8	NR	16.4	11.0	22.6	13.2	22.6	23.4	19.2	28.9	15.6	13.4
17	12.2	11.6	15.6	13.4	28.5	12.8	22.2	21.8	20.8	24.4	16.3	12.2
18	12.0	12.7	18.0	13.0	28.4	14.2	21.6	19.7	21.7	24.4	18.9	13.8
19	13.1	12.6	19.4		29.5	20.4	18.5	21.6	18.5	19.8	19.8	13.1
20	10.6	13.8	18.2		29.2	17.8	17.6	20.2	19.0	19.0	18.0	13.4
21	11.4	14.2	18.0	10.8	31.2	20.8	20.2	20.4	17.6	18.6	23.1	13.6
22	12.7	13.2	17.0	12.8	35.0	25.8	21.0	21.7	16.8	18.9	23.0	15.6
23	15.9	8.2	14.8	15.2	33.1	20.2	18.1	18.2	19.0	19.2	20.8	14.3
24	13.6	11.2	13.2	15.0	31.6	26.6	17.4	18.3	18.1	18.1	23.0	13.8
25	11.0	13.4	12.4	13.6	34.6	29.7	18.0	18.2	16.8	18.4	19.1	14.5
26	12.3	11.6	13.9	14.0	28.6	24.4	19.1	18.4	18.6	16.8	14.9	16.2
27	11.6	14.8	13.2	12.4	28.5	23.4	19.4	19.6	19.1	17.4	15.5	14.8
28	12.8	17.0	12.8	11.3	30.1	21.1	20.8	17.2	18.7	18.6	11.4	13.6
29	15.0		12.6	12.4	25.7	18.6	22.8	17.5	17.8	16.7	13.9	14.8
30	15.4		11.6	13.2	24.4	19.2	27.0	19.4	16.8	16.6	17.0	15.4
31	13.3		10.6		24.1		27.6	20.0		15.4		17.2
Average	**12.7**	**12.8**	**16.2**	**12.3**	**21.3**	**18.5**	**19.2**	**25.7**	**18.9**	**21.8**	**15.7**	**16.3**

** Tested by both the Hach TNT and ISE methodology in 2025.
NT- No test completed

2025 Un-ionized Ammonia (Total N as mg/L)

Day	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	0.0559	0.0166	0.0300	0.0230	0.0180	0.0937	0.0598	0.2020	0.1010	0.0912	0.0304	0.0630
2	0.0380	0.0177	0.0530	0.0250	0.0170	0.1120	0.0989	0.1700	0.1190	0.1130	0.0333	0.0760
3	0.0380	0.0150	0.0480	0.0180	0.0140	0.0864	0.0886	0.2090	0.1010	0.0990	0.0351	0.0770
4	0.0389	0.0220	0.0500	0.0254	0.0260	0.0851	0.0928	0.4260	0.1460	0.0912	0.0367	0.0856
5	0.0455	0.0251	0.0574	0.0200	0.0212	0.0821	0.0566	0.3010	0.1300	0.0937	0.0400	0.0844
6	0.0410	0.0194	0.0707	0.0260	0.0213	0.0551	0.0547	0.2100	0.0843	0.0894	0.0336	0.0890
7	0.0280	0.0180	0.0480	0.0270	0.0240	0.0250	0.0490	0.2200	0.0733	0.1000	0.0324	0.0848
8	0.0340	0.0200	0.0501	0.0190	0.0276	0.0410	0.0316	0.2420	0.0918	0.1570	0.0289	0.0877
9	0.0512	0.0194	0.0400	0.0203	0.0250	0.0322	0.0295	0.1540	0.0920	0.1360	0.0357	0.0519
10	0.0281	0.0264	0.0359	0.0150	0.0190	0.0354	0.0393	0.1930	0.0912	0.0830	0.0466	0.0577
11	0.0291	0.0220	0.0290	0.0160	0.0230	0.0170	0.0534	0.1380	0.0818	0.1000	0.0408	0.0462
12	0.0238	0.0208	0.0340	0.0190	0.0370	0.0385	0.0340	0.1990	0.0480	0.1430	0.0270	0.0570
13	0.0286	0.0311	0.0330	0.0265	0.0440	0.0304	0.0615	0.1510	0.0770	0.1400	0.0280	0.0461
14	0.0986	0.0222	0.0458	0.0200	0.0460	0.0220	0.0856	0.1660	0.0755	0.1300	0.0351	0.0530
15	0.0330	0.0000	0.0437	0.0180	0.0600	0.0325	0.1340	0.1500	0.1250	0.1200	0.0340	0.0537
16	0.0330	0.0000	0.0476	0.0180	0.0770	0.0300	0.1330	0.0940	0.0710	0.1600	0.0420	0.0456
17	0.0210	0.0220	0.0390	0.0300	0.0770	0.0333	0.1130	0.1110	0.0707	0.1320	0.0550	0.0281
18	0.0252	0.0241	0.0490	0.0290	0.1100	0.0412	0.0799	0.0788	0.0803	0.0903	0.0600	0.0300
19	0.0341	0.0214	0.0480	0.0000	0.1400	0.0592	0.0740	0.1100	0.0629	0.0792	0.0792	0.0420
20	0.0180	0.0290	0.0490	0.0000	0.1300	0.0570	0.0827	0.0869	0.0608	0.0510	0.0770	0.0389
21	0.0262	0.0298	0.0580	0.0162	0.1250	0.0560	0.0747	0.1100	0.0704	0.0595	0.0993	0.0462
22	0.0203	0.0220	0.0544	0.0220	0.2060	0.1200	0.0714	0.0868	0.0620	0.0605	0.0989	0.0500
23	0.0320	0.0123	0.0429	0.0410	0.1400	0.0808	0.0525	0.0582	0.0760	0.0710	0.0710	0.0390
24	0.0258	0.0213	0.0343	0.0400	0.0700	0.1570	0.0505	0.0732	0.0620	0.0490	0.1080	0.0469
25	0.0209	0.0300	0.0285	0.0300	0.1380	0.1510	0.0670	0.0728	0.0570	0.0460	0.0898	0.0460
26	0.0295	0.0200	0.0361	0.0320	0.0770	0.0903	0.0650	0.0791	0.0484	0.0571	0.0477	0.0518
27	0.0200	0.0503	0.0304	0.0270	0.0912	0.0936	0.0912	0.0627	0.0707	0.0644	0.0418	0.0400
28	0.0120	0.0442	0.0294	0.0260	0.1020	0.0910	0.1060	0.0550	0.0542	0.0595	0.0285	0.0340
29	0.0300		0.0250	0.0459	0.0740	0.0632	0.0844	0.0508	0.0712	0.0534	0.0361	0.0330
30	0.0293		0.0267	0.0343	0.0903	0.0653	0.1380	0.0718	0.0722	0.0498	0.0390	0.0340
31	0.0230		0.0339		0.1040		0.1300	0.0860		0.0524		0.0460
Average	**0.0326**	**0.0222**	**0.0420**	**0.0237**	**0.0701**	**0.0659**	**0.0769**	**0.143**	**0.0809**	**0.0910**	**0.0497**	**0.0537**

** Tested by both the Hach TNT and ISE methodology in 2025.
NT – No test completed.

Appendix C – External Laboratory Results

2025 GNPCC EFFLUENT

Parameter	Units	27-Jan-25	22-Apr-25	08-Jun-25	17-Jul-25	21-Oct-25	30-Nov-25	Year End
pH*	pH units	6.7	6.5	-	7.1	6.9	-	6.8
Survival Rate (Rainbow Trout)*	%	>100%	>100%	-	>100%	>100%	-	>100%
Dissolved Chloride	mg/L	-	-	100	-	-	190	145
Total Kjeldahl Nitrogen / TKN	mg/L	-	-	21	-	-	15	18
Total Nitrogen	mg/L	-	-	26.3	-	-	31.5	28.9
Oil and Grease (total)	mg/L	-	-	<1.0	-	-	<1.0	<1.0
Dissolved Sulphate	mg/L	-	-	26	-	-	44	35
Nitrate+Nitrite (as N)	mg/L	-	-	5.52	-	-	16.7	11.1
Sulphide (total)	mg/L	-	-	0.030	-	-	0.017	0.0235
Cyanide (total)	mg/L	-	-	0.00328	-	-	0.00142	0.00235
Fluoride (dissolved)	mg/L	-	-	0.093	-	-	0.055	0.074
Total Organic Carbon / TOC	mg/L	-	-	20	-	-	16	18
Total Phenols	mg/L	-	-	<0.0015	-	-	0.0021	<0.0018
Polychlorinated Biphenyls / PCBs	ug/L	-	-	<0.050	-	-	<0.050	<0.050
METALS Scan by ICP								
Aluminum (total)	ug/L	-	-	34.6	-	-	35.3	35.0
Arsenic (total)	ug/L	-	-	0.49	-	-	0.38	0.44
Barium (dissolved)	ug/L	-	-	81.0	-	-	38.9	60.0
Boron (dissolved)	ug/L	-	-	195	-	-	184	190
Cadmium (dissolved)	ug/L	-	-	0.028	-	-	0.049	0.016
Chromium (total)	ug/L	-	-	<1.0	-	-	3.1	<2.0
Cobalt (dissolved)	ug/L	-	-	0.47	-	-	0.56	0.52
Copper (dissolved)	ug/L	-	-	17.3	-	-	6.21	11.8
Iron (dissolved)	ug/L	-	-	173	-	-	115	144
Lead (total)	ug/L	-	-	0.47	-	-	0.24	0.36
Manganese (dissolved)	ug/L	-	-	60.3	-	-	51.1	55.7
Mercury (total)	ug/L	-	-	0.0072	-	-	0.0040	0.0056
Selenium (total)	ug/L	-	-	<0.10	-	-	0.14	<0.12
Molybdenum (total)	ug/L	-	-	<1.0	-	-	<1.0	<0.10
Nickel (dissolved)	ug/L	-	-	2.6	-	-	1.7	2.2
Silver (total)	ug/L	-	-	0.034	-	-	0.020	0.027
Tin (total)	ug/L	-	-	<5.0	-	-	<5.0	<5.0
Zinc (total)	ug/L	-	-	34.3	-	-	33.4	33.9
VOC Scan								
Chloroform	ug/L	-	-	1.9	-	-	3.0	2.5
Dichloromethane	ug/L	-	-	<2.0	-	-	<2.0	<2.0
Chloromethane	ug/L	-	-	<1.0	-	-	<1.0	<1.0
Tetrachloroethylene	ug/L	-	-	<0.50	-	-	<0.50	<0.50
1,1,1-Trichloroethane	ug/L	-	-	<0.50	-	-	<0.50	<0.50
1,1,2-Trichloroethane	ug/L	-	-	<0.50	-	-	<0.50	<0.50
Trichloroethylene	ug/L	-	-	<0.50	-	-	<0.50	<0.50
Benzene	ug/L	-	-	<0.40	-	-	<0.40	<0.40
Ethylbenzene	ug/L	-	-	<0.40	-	-	<0.40	<0.40
Toluene	ug/L	-	-	<0.40	-	-	<0.40	<0.40
Naphthalene	ug/L	-	-	<0.10	-	-	<0.10	<0.10
Phthalate Esters								
Di(2-ethylhexyl)phthalate	ug/L	-	-	<2.0	-	-	<2.0	<2.0
Di-n-Butylphthalate	ug/L	-	-	<2.0	-	-	<2.0	<2.0

2025 GNPCC INFLUENT		
Parameter	**Unit**	**08-Jun-25**
pH	pH Units	-
Alkalinity (total, as CaCO3)	mg/L	-
Ammonia	mg/L	-
Dissolved Chloride	mg/L	110
Total Kjeldahl Nitrogen / TKN	mg/L	67.0
Total Nitrogen	mg/L	66.6
Oil and Grease (total)	mg/L	11
Sulphate	mg/L	22
Dissolved Fluoride	mg/L	0.087
Nitrite (N)	mg/L	<0.025
Nitrate(N)	mg/L	<0.10
Nirate (plus Nitrite) (N)	mg/L	<0.10
Total Organic Carbon / TOC	mg/L	170
Dissolved Phosphorous	mg/L	3.07
Total Sulphide	mg/L	0.57
Strong Acid Dissoc. Cyanide	mg/L	0.00471
Polychlorinated Biphenyls / PCBs	ug/L	<0.050
Total Phenols*	mg/L	0.049
METALS Scan by ICP		
Aluminum (total)	ug/L	309
Arsenic (total)	ug/L	0.68
Barium (dissolved)	ug/L	199
Boron (dissolved)	ug/L	218
Cadmium (dissolved)	ug/L	0.080
Chromium (total)	ug/L	6.0
Cobalt (dissolved)	ug/L	0.56
Copper (dissolved)	ug/L	26.1
Iron (dissolved)	ug/L	1,930
Lead (total)	ug/L	3.58
Manganese (dissolved)	ug/L	64.8
Mercury (total)	ug/L	0.0276
Molybdenum (total)	ug/L	1.7
Nickel (dissolved)	ug/L	3.0
Selenium (total)	ug/L	0.53
Silver (total)	ug/L	0.278
Tin (total)	ug/L	<5.0
Zinc (total)	ug/L	176
VOC Scan		
Chloroform	ug/L	3.6
Dichloromethane	ug/L	<2.0
Chloromethane	ug/L	<1.0
Tetrachloroethylene	ug/L	<0.50
1,1,1-Trichloroethane	ug/L	<0.50
1,1,2-Trichloroethane	ug/L	<0.50
Trichloroethylene	ug/L	<0.50
Benzene	ug/L	<0.40
Toluene	ug/L	3.4
Ethylbenzene	ug/L	<0.40
Naphthalene	ug/L	0.13
Phthalate Esters		
Di(2-ethylhexyl)phthalate	ug/L	<20
Di-n-Butylphthalate	ug/L	<20

2025 GNPCC BIOSOLIDS															OMRR Regulatory Limits (Class B Biosolids)
Parameter	Unit	15-Jan-25	25-Feb-25	12-Mar-25	14-Apr-25	12-May-25	16-Jun-25	07-Jul-25	18-Aug-25	08-Sep-25	20-Oct-25	18-Nov-25	01-Dec-25	Average *	
Fecal coliforms nw (dry weight) (MPN / PA)	MPN/g	4,100	4,100	1,600	2,400	1,000	3,600	780	2,000	8,100	4,200	830	330	**2,000**	**2,000,000**
Percent Moisture	%	81	81	79	80	79	78	78	77	79	82	80	80	**80**	-
Total Solids	%	-	-	24.5	-	-	21.7	-	-	24.7	-	-	21.4	**23.1**	-
Volatile Solids	%	-	-	75.5	-	-	78.2	-	-	75.3	-	-	78.6	**76.9**	-
Total Kjeldahl Nitrogen / TKN	%	-	-	5.20	-	-	8.00			5.10			6.50	**6.20**	-
Phosphorus nw (total)	mg/kg	-	-	18,400	-	-	19,800	-	-	19,900	-	-	20,400	**19,600**	-
Polychlorinated Biphenyls / PCBs nw	mg/kg	-	-	<0.48	-	-	<0.46	-	-	<0.010	-	-	<0.49	**<0.36**	-
Arsenic nw (total)	mg/kg	-	-	1.97	-	-	2.61	-	-	2.38	-	-	2.68	**2.41**	**75**
Cadmium nw (total)	mg/kg	-	-	1.01	-	-	1.47	-	-	1.18	-	-	1.43	**1.27**	**20**
Chromium nw (total)	mg/kg	-	-	29.3	-	-	33.1	-	-	28.1	-	-	30.6	**30.3**	**1,060**
Cobalt nw (total)	mg/kg	-	-	2.51	-	-	3.13	-	-	2.64	-	-	3.54	**2.96**	**150**
Copper nw (total)	mg/kg	-	-	417	-	-	622	-	-	664	-	-	627	**583**	**2,200**
Iron nw (total)	mg/kg	-	-	30,100	-	-	32,400	-	-	34,700	-	-	36,200	**33,400**	-
Lead nw (total)	mg/kg	-	-	22.5	-	-	28.6	-	-	25.1	-	-	25.8	**25.5**	**500**
Mercury nw (total)	mg/kg	-	-	0.591	-	-	0.843	-	-	0.983	-	-	0.835	**0.813**	**15**
Molybdenum nw (total)	mg/kg	-	-	6.20	-	-	8.64	-	-	7.83	-	-	9.20	**7.97**	**20**
Nickel nw (total)	mg/kg	-	-	11.6	-	-	16.4	-	-	13.8	-	-	17.1	**14.7**	**180**
Potassium nw (total)	mg/kg	-	-	759	-	-	768	-	-	692	-	-	889	**777**	-
Selenium nw (total)	mg/kg	-	-	4.77	-	-	5.78	-	-	5.31	-	-	6.36	**5.56**	**14**
Zinc nw (total)	mg/kg	-	-	627	-	-	1060	-	-	983	-	-	979	**912**	**1,850**

* Note – Geometric Mean presented in this column for Fecal coliforms nw (dry weight) (MPN / PA)

Appendix D – Odour Concern Reports

Odour Complaints

Date of Occurrence	Suspected Location	Odour or Noise Complaint Description, as per the Complainant	Location or Source Odour / Noise Originated within WWS Site	Immediate Actions Taken to Address the Odour or Noise Complaint	Description of Response to Complainant
GNPCC - Odour (x2)					
25-07-31 21:00:00	GNPCC	Odour in the evening last 3-4 nights around 9:00 pm	GNPCC sedimentation tanks	Checked on odor control system to ensure working well	
25-07-31 00:00:00	GNPCC	I noticed that there are strong odours near the Nanaimo pollution control centre on a daily basis. I'm wondering what the cause of this might be? Is this related to the recent large population increases in the City of Nanaimo/Lantzville? Is the cause of the odours 100% safe to nearby residents?			
WPS- Odour (x3)					
25-07-25 00:00:00	WPS	Wellington Pump Station Odour complaint	Venting line at WPS	Inspected WPS and had pipe vent blocked of from wetwell	Called individual back to thank them and let them know that action was taken
25-08-26 15:35:00	WPS	Wellington pump station Overpowering smell constant in hot weather We are unable to have our ocean side windows open at 5190 Fillinger Crescent	WPS wetwell	Added odor modifier	Called back following day and explained that we added odour masker to wet well.

25-09-26 11:30:00	WPS	,I heard a report from a concerned citizen in the Hammond Bay/Fillinger Crescent area regarding a strong smell of sewer/garbage. I'm not sure if this is linked to the ongoing Wellington Pump Station project, which has seen ramped up construction activity lately.I figured I'd reach out to see if there had been some kind of failure. I'll also reach out to the City. Best, Reporter	Wellington Pump Station/Fillinger Crescent	An Operator and the Project Engineer went to site to investigate the complaint around 11:30am on September 26th, 2025. No odour was detected at the time, and the site ventilation was operating. Operator added "Florida orange" odour modifier to the surface of the wet well hatch as a precaution.	
Unknown- Odour (x2)					
25-07-31 21:00:00	Unknown	Last month there was a lot of odour all around Nanaimo, I am based near long lake, but the I could feel the odour everywhere I went obviously if the wind blew from the south, which was almost every day >We can see a black smoke coming from Harmac pulp mill. I am wondering if there could be something done about it? Could there be some filters added, or a renovation with modern utilities that do not produce that odour nor harmfull substances into the air? Anyting would be really helpful. The odour causes not only disguse in our nose but also headache. I am really concerned about my family health! If there is any plan to solve that, I would be happy to see its plan and timeline. The city is growing so I am sure you get many messages like mine	GNPCC sedimentation tanks		Told them that we would check up on the odour control system

25-07-31 00:00:00	Unknown	10:40 am Esplanade it smells horrible it like this like 3 times a day it's awful all my neighbor hate it the town should not be letting this happen it devalues the town			Hello, Thank you for reaching out. We have checked all our odour control measures and everything is functioning normally. Is there a particular time or area that you are noticing the odour? The Greater Nanaimo Pollution Control Centre is a secondary treatment facility that uses a process called biological treatment. The heart of the facility are the Bioreactors that are used to grow a microbial population to treat the sewage. The process is completely natural but does have an â€œearthyâ€ odour similar to compost. We also use anaerobic digestion to stabilize the treated solids. Methane is produced in the digesters but is not released unless flared from a controlled flare stack. We have gas detection instrumentation around our biogas system to ensure there are no accidental releases. We are also partnered with the Applied Chemistry Department at Vancouver Island University. The university comes to site, and surrounding areas, periodically to characterize all odour producing compounds with highly specialized and sensitive equipment. With this data, we can be sure that the community is safe. Please feel free to ask any questions that arise.

Appendix E – Environmental Incident Reports

Environmental Incidents:

Date of Occurrence	Incident Title	Quantity of Material Spilled	Accident Location	Incident Description	Extent of damage (if applicable)	Preventative Measures Identified	Notes	Conclusion for this Environmental Incident
GNPCC Spill (x1)								
August 12, 2025	GNPCC Influent Channel Spill (DGIR #253138)	2,000 L	Influent Channel to GNPCC	A spill was detected that had resulting from a crack in the side of the bottom of the influent channel. The wastewater leaked into the ground and eventually found it's way into a decommissioned conduit. The quantity of wastewater that was spilled was estimated at 2,000 L. The spill was reported to EMBC.	Environmental damage was mitigated as it occurred on a paved industrial treatment plant site.	The RDN retained a contractor to excavate dirt surrounding the channel, contain the influent and pump it to the process, and repaired and sealed the crack. This incident was reported to the BC Ministry of Environment and Parks.		Repairs were completed August 19 as the best method for repair had to first be identified, and then the correct material ordered. Repairs were completed once repair material was received.

Appendix F – 2025 Biosolids Management Summary Report

Regional District of Nanaimo

2025 Biosolids Management Summary Report

February 2026

Prepared for:

Regional District of Nanaimo
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1 PROGRAM OVERVIEW

The Regional District of Nanaimo (RDN) operates two wastewater treatment plants that produce municipal biosolids:

1. Greater Nanaimo Pollution Control Centre (GNPCC) - Class B biosolids
2. French Creek Pollution Control Centre (FCPCC) - Class A biosolids

This report provides a summary management of GNPCC biosolids. In 2025, GNPCC biosolids were managed at one site in the Nanaimo area: private forest lands off Nanaimo River Road (Blackjack) managed by Mosaic Forest Management (Mosaic).

At Blackjack, Class B GNPCC biosolids were used by SYLVIS in a forest fertilization program. The objectives of biosolids forest fertilization were to increase soil quality and nutrients for tree growth. Since the GNPCC biosolids management program was begun at Blackjack in 2021, over 22,600 wet tonnes (wt) have been managed at this site through forest fertilization and reclamation.

A total of 5,929 wt of biosolids were produced from the GNPCC in 2025, all of which were delivered to Blackjack (Table 1, Appendix One). Total GNPCC biosolids production in 2025 was consistent with the five-year average annual production, since the implementation of secondary treatment operations at the GNPCC has stabilized (Table 1, Appendix One).

2 REGULATORY AUTHORIZATION

RDN biosolids were managed at Blackjack under the *2024 Blackjack – Forest Fertilization & Reclamation Land Application Plan* (SYLVIS document #1701-24) associated with Authorization #112120 valid April 22, 2024 to April 21, 2025 and under the *2025 Blackjack – Forest Fertilization & Reclamation Land Application Plan* (SYLVIS document #1805-25) associated with Authorization #112589 valid April 21, 2025 to April 21, 2025 to April 20, 2026.

3 2025 BIOSOLIDS MANAGEMENT

3.1 BIOSOLIDS MANAGEMENT SUMMARY

In 2025, all GNPCC biosolids were managed at Blackjack on Nanaimo River Road in Nanaimo, British Columbia (BC). Contractual tasks under the 2021-2026 contract relating to biosolids quality monitoring, biosolids delivery coordination, site safety, environmental monitoring, public engagement, First Nations communications, sustainability activities, and reporting were completed in 2025 are summarized in Table 3 (Appendix One).

3.2 BIOSOLIDS TRANSPORTATION

Biosolids produced at GNPCC are scaled at the plant and tonnages are provided by the RDN. In 2025, all biosolids produced at the GNPCC (5,929 wt) were transported by DBL Disposal to Blackjack (Table 1 and Table 2, Appendix One). Monthly tonnage delivered to this site in 2025 is shown in Figure 1 (Appendix One).

3.3 BIOSOLIDS STORAGE

Two storage sites were used at Blackjack in 2025. The majority of biosolids were delivered to the newer application area south of Nanaimo Lakes. In May 2025, the Old Jump Main stockpile was paved and lock blocks were installed along three sides (Photograph 1, Appendix Three). All other biosolids were delivered to the main stockpile which also consists of a paved base and lock blocks delineating three sides of the stockpile. Biosolids storage conformed to OMRR requirements for Vancouver Island where biosolids are required to be covered from October 1 to March 31 of every year. At the end of 2025, no biosolids remained stored onsite at Blackjack (Table 2, Appendix One).

3.4 2025 PRE-APPLICATION MEASURES

At Blackjack, site inspections were carried out by a SYLVIS Qualified Professional or designate prior to biosolids forest fertilization. During site inspections, water features and other sensitive site features were identified, mapped, and appropriate setback distances were determined. Pre-application soil samples were collected in order to determine an appropriate agronomic rate for biosolids applications. Groundwater depth was assessed using a soil auger or visually in road cuts and was confirmed to be in excess of 1 metre (m) prior to commencing biosolids applications.

3.5 BIOSOLIDS LAND APPLICATION

Biosolids (6,049 wt) were land-applied to 65.4 hectares (ha) of forested lands for forest fertilization (Figure 2 and Figure 3, Appendix Two). Biosolids were land-applied in forested areas using a side-discharge spreader equipped with a hydraulic fan which propels the biosolids up to 30 m into forest stands. Forest fertilization biosolids applications occurred throughout 2025 except during periods of extreme weather (i.e., snowfall, heavy rainfall, heat waves), during bud break in the late spring, or when the ground was snow-covered. All biosolids applications adhered to a 30-m setback distance from permanent water features and identified ephemeral water features.

Forest fertilization application rates were specific to the individual fertilization units based on pre-application soil sampling and nutrient requirements of the trees, understory vegetation, and soils. The biosolids application rate for forested land averaged 18.1 dry tonnes per ha (dt/ha) which does not exceed the lower of the maximum agronomic application rates specified in the LAPs for forest fertilization (35 dry tonnes per ha).

3.6 BIOSOLIDS QUALITY

The OMRR requires that a set of seven discrete samples be collected for fecal coliform analysis and one sample for trace elements annually or for every 1,000 dry tonnes of biosolids applied, whichever comes first. Biosolids quality was characterized throughout 2025 to ensure biosolids met quality requirements for trace element concentrations, foreign matter, and pathogen reduction set forth in the OMRR.

In 2025, 1,061 dt of biosolids were produced by the GNPCC. Three composite samples, each composed of eight equal-volume subsamples, were collected by SYLVIS at the GNPCC. Composite samples were analyzed for physical parameters, nutrients, and trace elements (Table

4, Appendix One). All RDN biosolids samples collected in 2025 met the OMRR Class B criteria for trace elements concentrations.

SYLVIS collected 14 fecal samples from the GNPCC, the geometric mean of the sampling sets was 5,500 MPN/g (Table 4), meeting OMRR Class B criterion of 2,000,000 MPN/g.

3.7 SOIL MONITORING

Soil monitoring was conducted prior to applications in forest fertilization areas at Blackjack in 2025. Soil samples, each comprised of 15 sub-samples, were collected from the top 15 cm of soil by SYLVIS. Soil trace element concentrations were below applicable OMRR soil criteria for this site. Further details on soil sampling and nutrient concentrations can be found in the LAP.

3.8 REGULATORY COMPLIANCE

A Qualified Professional Certification was provided to Mosaic for biosolids applied at Blackjack under Authorization #112120. Authorization #112589 remains active until April 20, 2026; a Qualified Professional Certification will be authored upon completion of the Authorization term.

3.9 CARBON ACCOUNTING RELATED TO BIOSOLIDS MANAGEMENT

The management of all GNPCC biosolids delivered (5,929 bt) and applied (6,049 bt) to Blackjack in 2025 resulted in -1,536 t/CO2e of net emissions (emissions and emissions removals), of which transport represents +60 t CO2e GHG emissions.

This carbon emissions estimate considers biosolids transport, biosolids storage, land application, soil carbon sequestration, and soil nitrous oxide emissions. Carbon sequestration related to tree growth is accounted for separately by Mosaic and vehicle (i.e., pickup truck) emissions related to project operations are accounted for externally by SYLVIS.

4 SUMMARY AND INTERPRETATION OF THE EFFECTS OF BIOSOLIDS DISCHARGES ON RECEIVING ENVIRONMENT

The objectives of biosolids forest fertilization at Blackjack are to increase soil quality and tree growth while remaining compliant with the OMRR. Biosolids fertilization has increased organic matter content and available nutrients in the surface horizon. These enriched soils store more carbon and enable accelerated tree growth (Photograph 2, Appendix Three), which has been documented at this site and other biosolids forest fertilization sites. It has been observed at the previous TimberWest Properties site on Doumont Road that deer browsing of trees is increased in biosolids-fertilized areas[1]. Other biosolids fertilization sites in BC have documented similar results with improved wildlife habitat from biosolids applications on grasslands[2]. Elk are frequently seen browsing in biosolids-fertilized stands at Blackjack (Photograph 3, Appendix Three).

[1] Danjou, B. 2014. Effect of Biosolid on Vegetation Development Within Two Douglas-fir Plantations: Third Year Progress Report - DRAFT. Vancouver Island University, Nanaimo, B.C.
[2] Meineke, J., Doyle, F. I., Oukil, L., & Hodges, K. E. (2023). Small mammal responses to biosolids on grazed rangelands in British Columbia. *Restoration Ecology*, e14063.

Water sampling upstream and downstream of biosolids applications were completed by SYLVIS in April and November 2025. No adverse impacts from biosolids were seen; data can be provided upon request.

5 CONCLUSION

RDN's GNPCC biosolids were managed at Blackjack in 2025; 5,929 wt were delivered and 6,049 wt were applied onsite (Table 2). All biosolids land application activities at Blackjack occurred as specified in the applicable LAPs and according to management requirements included in the OMRR. Since transitioning the biosolids management program to Blackjack in 2021, over 22,600 wt of GNPCC biosolids have been managed onsite while being set up to become a successful long-term management site.

SYLVIS looks forward to continuing this productive relationship and providing biosolids management services and support to the RDN throughout 2026.

APPENDIX ONE – TABLES

Table 1: Historical management of Regional District of Nanaimo's Greater Nanaimo Pollution Control Centre biosolids at the TimberWest Properties and Blackjack from 2014 to 2025.

Year	TimberWest Properties	Blackjack	Total Production
2014	3,506 wt	-	3,506 wt
2015	3,087 wt	-	3,087 wt
2016	3,074 wt	-	3,074 wt
2017	2,686 wt	-	2,686 wt
2018	3,550 wt	-	3,550 wt
2019	3,776 wt	-	3,776 wt
2020	3,653 wt	-	3,653 wt
2021	5,060 wt	317 wt	5,377 wt
2022	802 wt	5,095 wt	5,897 wt
2023	-	5,717 wt	5,717 wt
2024	-	5,727 wt	5,727 wt
2025	-	5,929 wt	5,929 wt
Total	**29,194 wt**	**22,785 wt**	**51,979 wt**

Table 2: Regional District of Nanaimo's Greater Nanaimo Pollution Control Centre Class B biosolids management summary - 2025.

Site	**Blackjack** (wt)
Storage from 2024	120
Delivered	5,929
Land Applied	6,049
Storage to 2026	0

Table 3: Summary of SYLVIS 2025 deliverables as outlined in the RDN-SYLVIS 2021-2026 Agreement for GNPCC biosolids management.

Task or Activity	Description
Biosolids Quality	RDN biosolids quality was monitored throughout 2025 through the collection of three full suite samples and 14 fecal coliform samples.
Biosolids Quantity	5,929 tonnes of RDN biosolids were transported to the Blackjack site by DBL Disposal in 2025. 6,049 tonnes of biosolids were land-applied in 2025. No biosolids remained stored at Blackjack at the end of 2025.
Biosolids Transportation & Delivery Coordination	The RDN coordinated biosolids deliveries with DBL and SYLVIS throughout 2025.
Contingency Plan & Management	A Contingency Plan was written for the 2021-2026 biosolids management contract and the following contingency sites were available for use in 2025: TimberWest Properties, Harmac, Hamm Road, 155-A Pit, and Haslam Pit. No contingency management was required in 2025.
Storage of Biosolids	Biosolids were stored at the south and north storage sites at Blackjack and covered with tarps from October 1 to March 31 as per OMRR requirements.
Invoicing	Biosolids deliveries were invoiced on a monthly basis.
Environmental Incidents	No environmental incidents occurred in 2025.
Site Safety	No safety incidents occurred at Blackjack in 2025. SYLVIS maintained COR and BC Forest SAFE safety accreditations in 2025.
Complaints Management	There were no inquiries or complaints received about the biosolids forest fertilization program in 2025.
Odour Management Plan	The program Odour Management Plan was adhered to in 2025.
Communications Plan & Engagement	The program Communications Plan was adhered to in 2025. SYLVIS participated in the GNPCC open house in March 2025, there was excellent turn out and interest from the public. Engagement regarding biosolids operations at the Blackjack site was carried out with the Snuneymuxw First Nation through Mosaic during 2025. Mosaic familiarized a new staff member with the project and met with senior staff member to discuss program benefits, opportunities to be involved, and discussing a path for engagement going forward. Questions around media attention to biosolids were addressed by Mosaic. One email inquiry to the RDN was received regarding potential impacts to drinking water from The Vancouver Island Water Watch Coalition. A response was provided by the RDN.
Annual Reporting	Qualified Professional Certification of Compliance report, fulfilling the regulatory requirement for written certification under OMRR Section 5(3), were provided to the RDN and Mosaic for land applications at Blackjack under Authorization #112120.
Biosolids Beneficial Use	Two biosolids Land Application Plans for Authorizations #112120 and #112589 were submitted to the Ministry of Environment and Climate Change on May 5, 2024 and March 21, 2025 respectively, for Blackjack. 6,049 tonnes of biosolids were land-applied to 65.4 ha of forest.
Review of Biosolids Technology &	A review was completed of emerging biosolids treatment technologies and management strategies across BC and Canada. A summary is provided in Appendix Four.

Management Advancements	

Table 4: Regional District of Nanaimo – Greater Nanaimo Pollution Control Centre biosolids quality summary - 2025.

Parameter	GNPCC	Regulatory Criteria[a]	Units
Available Nutrients, Physical Properties, Acidity			
Total Nitrogen - TKN	57,626	-	µg/g
Ammonia + Ammonium- N (available)	6,213	-	µg/g
Nitrate - N	7	-	µg/g
Phosphorus (available)	1,283	-	µg/g
Potassium (available)	725	-	µg/g
Organic Matter	68.1	-	%
Total Solids	17.9	-	%
pH	7.0	-	pH
Electrical Conductivity	3.79	-	dS/m
Trace Elements			
Arsenic	2.4	75	µg/g
Cadmium	1.21	20	µg/g
Chromium	32.9	1,060	µg/g
Cobalt	2.9	150	µg/g
Copper	548	2,200	µg/g
Lead	23.2	500	µg/g
Mercury	0.743	15	µg/g
Molybdenum	8.3	20	µg/g
Nickel	15.0	180	µg/g
Selenium	5.5	14	µg/g
Zinc	870	1,850	µg/g
Microbiological Analysis - Fecal Coliforms			
Fecal Coliforms	5,500[b]	2,000,000	MPN/g

Note: Unless otherwise noted, values are the mean of three composite samples, each composed of eight equal-volume subsamples, collected during 2025 by SYLVIS Environmental and analyzed by Element Laboratories. All analyses based on dry weight.

a Class B trace element criteria specified in Schedule 4 and microbiological criteria in Schedule 3 of the BC *Organic Matter Recycling Regulation*.

b Value is the geometric mean of 14 samples collected by SYLVIS throughout 2025 and analyzed by ALS Laboratories.

APPENDIX TWO – FIGURES

Figure 1: Tonnage of Regional District of Nanaimo – Greater Nanaimo Pollution Control Centre (GNPCC) dewatered biosolids delivered and applied at Blackjack by month in 2025.

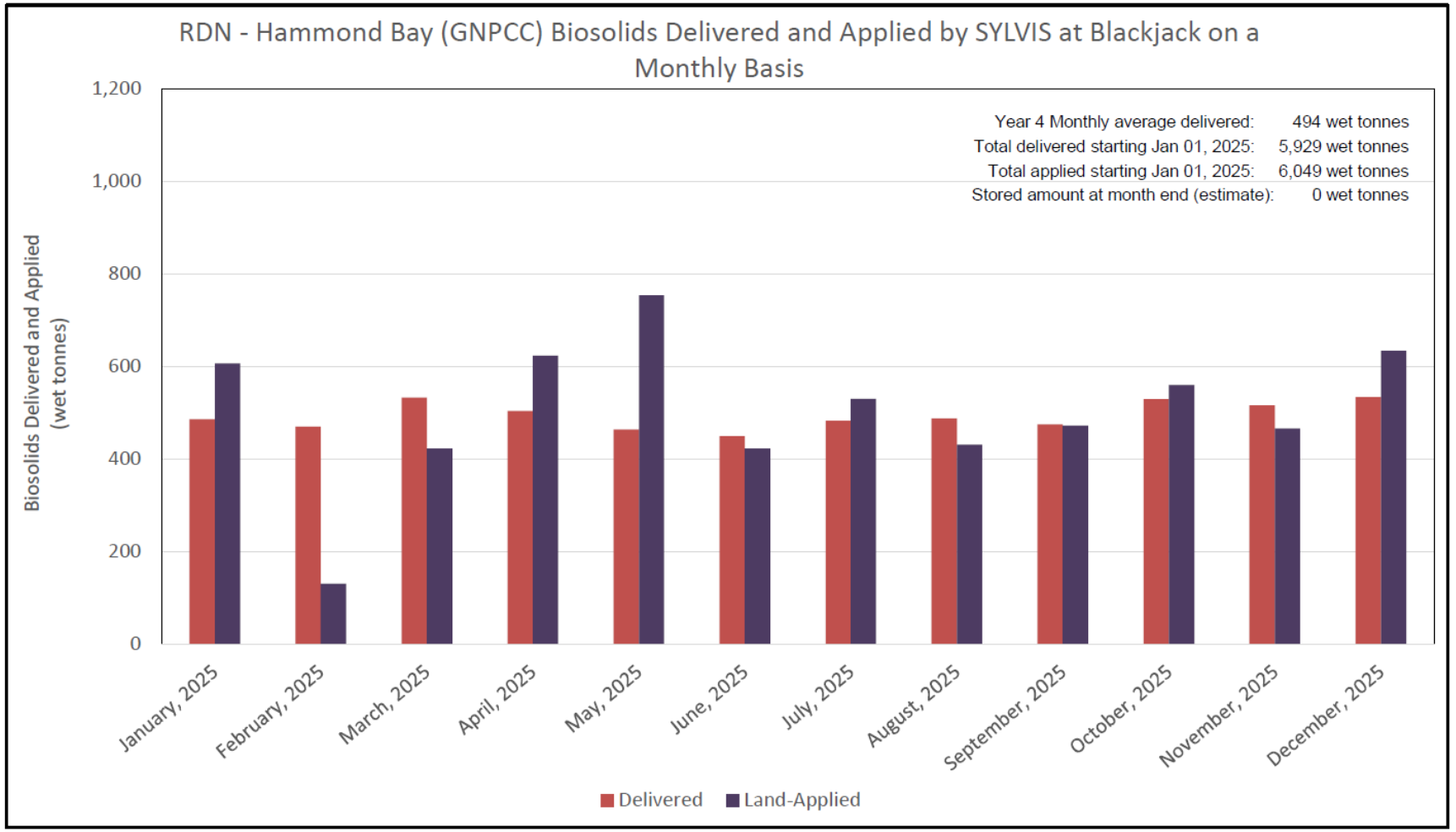


Figure 2: Blackjack application areas north of the lake fertilized with Regional District of Nanaimo biosolids in 2025.

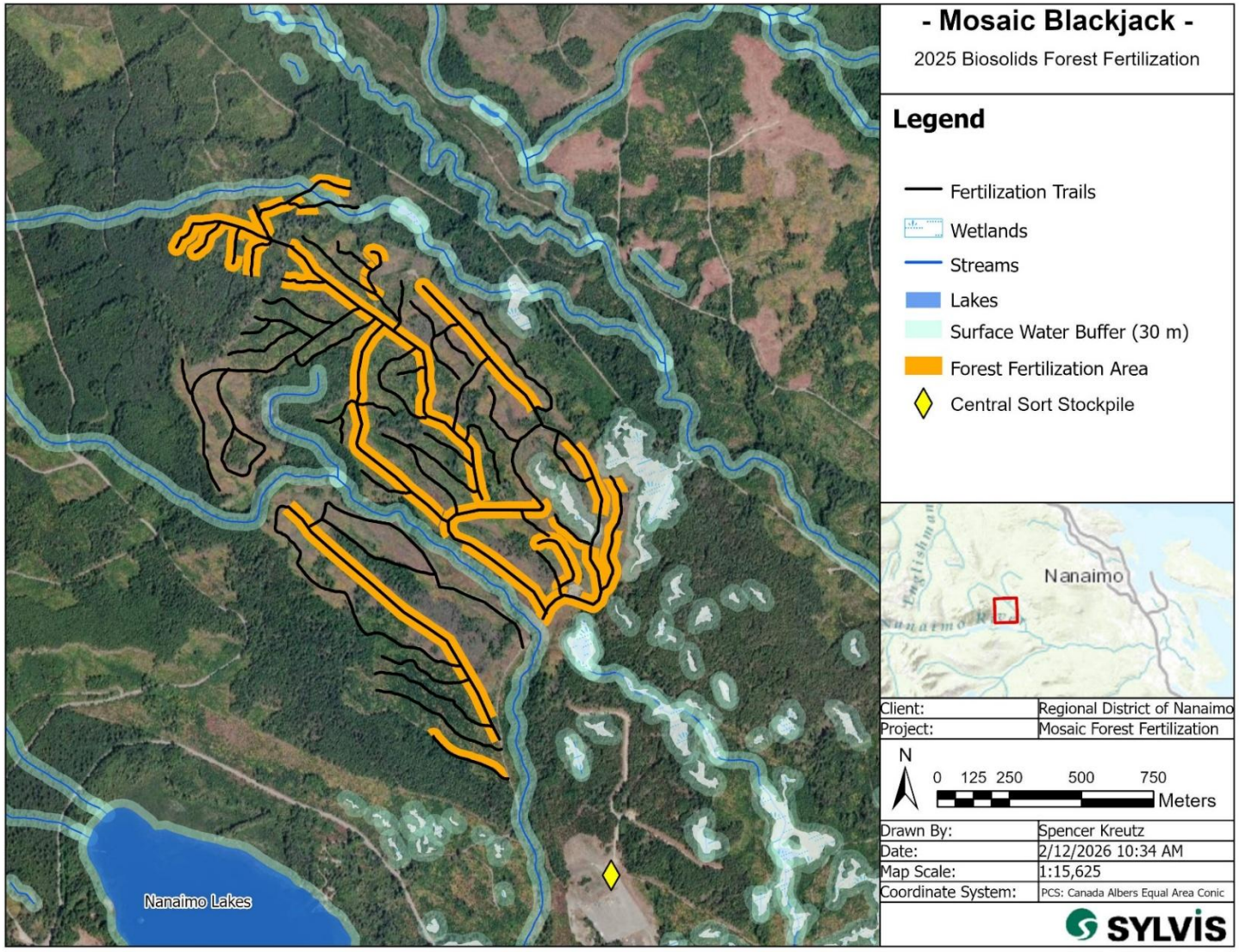
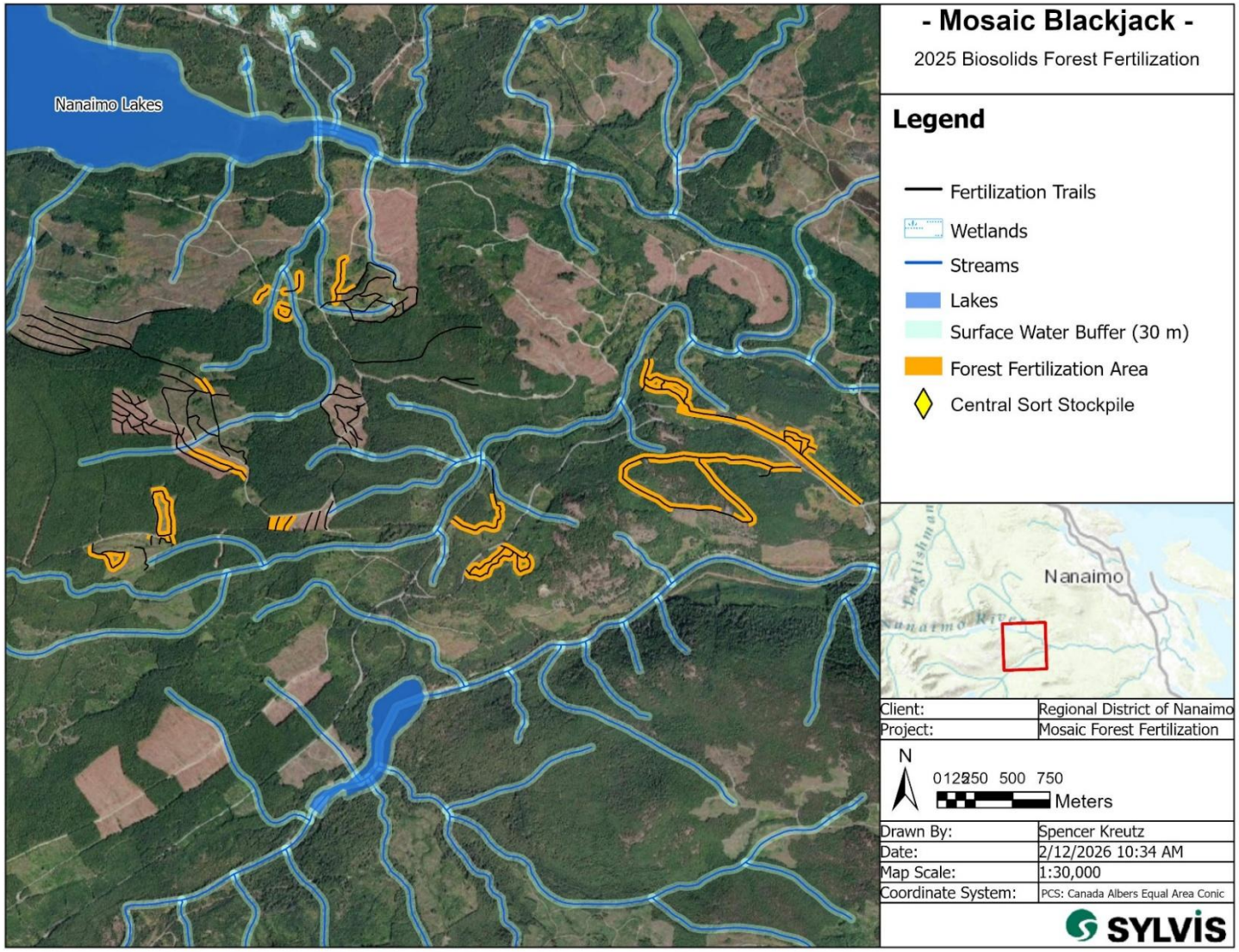


Figure 3: Blackjack application areas south of the lake fertilized with Regional District of Nanaimo biosolids in 2025.



APPENDIX THREE – PHOTOGRAPHS

Photograph 1: Upgraded secondary biosolids storage site on the south portion of forest fertilization site. (May 2025)

Photograph 2: Aerial photograph comparing fertilized (dark green) and unfertilized (light green) forest stands as a result of applying biosolids onto a forest block. (July 2025)

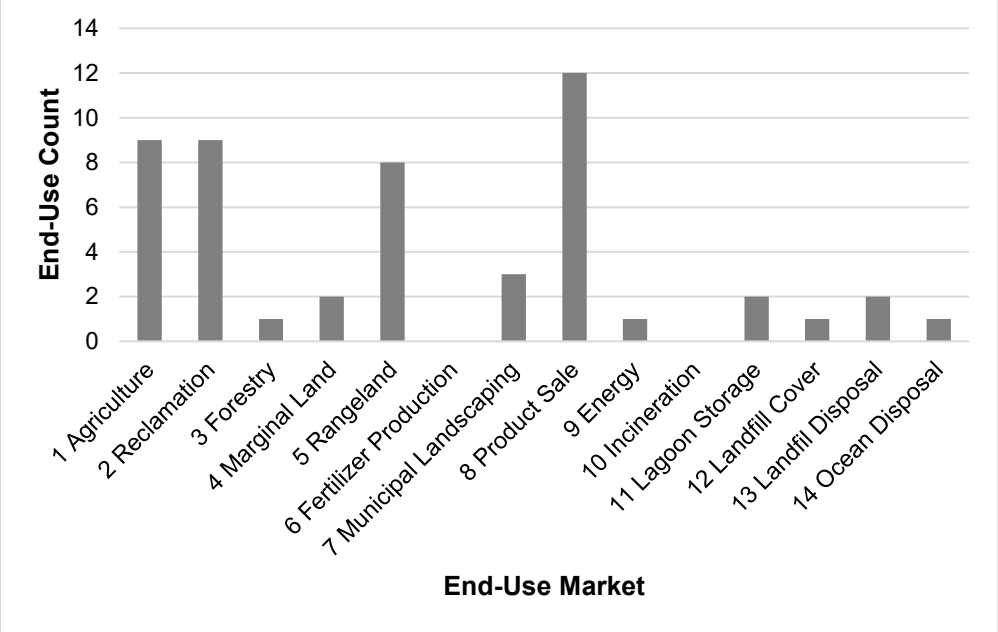
Photograph 3: Bull elk (*Cervus canadensis roosevelti*) utilizing a biosolids-fertilized forest stand. (October 2025)

APPENDIX FOUR – REVIEW OF BIOSOLIDS TECHNOLOGY IMPROVEMENTS & MANAGEMENT ADVANCEMENTS

The RDN is interested in understanding how biosolids are managed in other jurisdictions across Canada and in keeping up-to-date on emerging treatment technologies. A high-level review of improvements in biosolids processing technologies and management programs across Canada was conducted in 2023 and is updated annually, the summary is provided below.

Fourteen biosolids management methods and uses were found across BC and Canada. Biosolids management by 38 municipalities in British Columbia are presented in Figure B 1. Reported values are counts of municipalities and are not based on the tonnage of biosolids managed; if a municipality manages biosolids through multiple methods then each method is presented as an individual result.

Figure B 1: Biosolids products and markets in British Columbia.

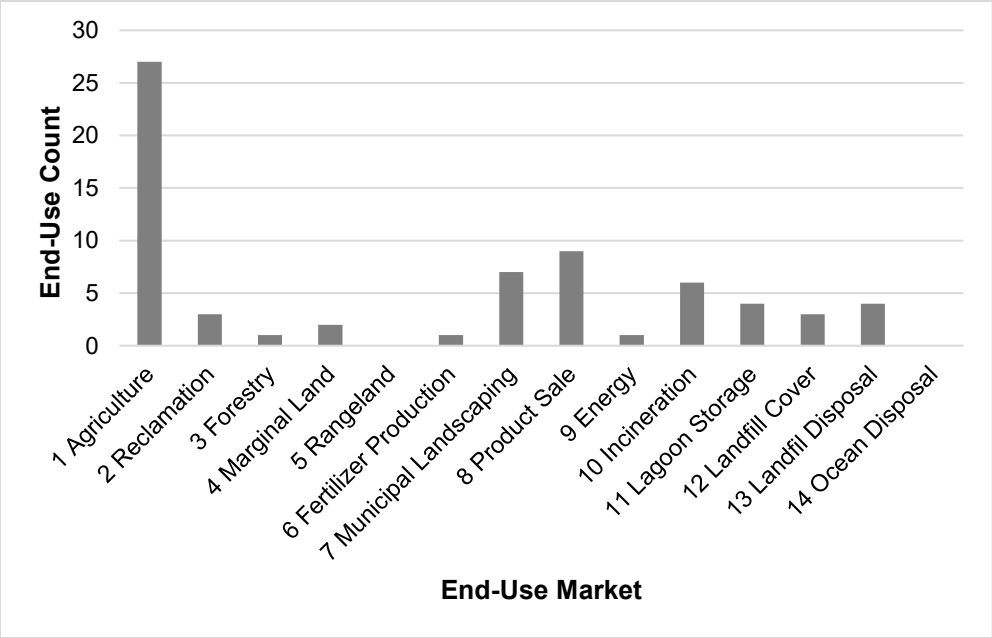


Most BC municipalities are managing biosolids and biosolids-derived products in land application markets (end-use markets 1-8). Numerous small biosolids generators are managed in large composting facilities which produce compost for sale or for use in mine reclamation. The RDN's current management programs using biosolids in forest fertilization is similar to land application processes in other BC jurisdictions, and the distribution of soils fabricated using biosolids (biosolids growing medium (BGM) and non-BGM) aligns with many other BC municipalities. Changes in biosolids management in BC in 2025 were an increase in agricultural and rangeland applications.

SYLVIS conducted a high-level review and update of biosolids management across the rest of Canada. Basic management information for the most populous city or cities in each province or territory was gathered using information readily available through internet research. Biosolids

management by 69 Canadian municipalities outside of BC are presented in Figure B 2. Similar to the figure above, counts represent municipalities and are not based on tonnage produced; if a municipality manages biosolids through multiple methods then each method has been included as an individual result.

Figure B 2: Biosolids products and markets in Canada outside of British Columbia.



Similar to BC, most municipalities are managing biosolids and biosolids-derived products in land application markets (markets 1-8). According to the limited data gathered, the RDN's forest fertilization project continues to be one of two forest fertilization projects in the country, while the BGM project is one of three similar projects. There were no significant changes found in biosolids management in Canada outside of BC in 2025.

Currently there are numerous innovative wastewater solids treatment technologies under development in the world. Many of these technologies can replace digestion at a wastewater treatment plant but can also accept digested biosolids. A selection of these technologies is presented in the following table.

Table A 1: Example innovative wastewater processing technologies.

Technology	Acronym	Product & Value
Precision membranes	-	Prevent fouling and increase flow
Ultraviolet light radiation	-	Degradation of PFAS
Heat drying	-	Dried Class A biosolids
Pyrolysis	-	Biochar
Gasification	-	Renewable natural gas (RNG)
Hydrothermal liquefaction	HTL	Biocrude, hydrochar
Super critical water oxidation	SCWO	CO_2, inert ash

Thermal hydrolysis	-	Class A biosolids
Advanced Oxidation Processes	AOPs	Biosolids, degradation of organic pollutants and odors
Artificial Intelligence/ Machine Learning	AI	Increased plant efficiency and decreased downtime
Ultraviolet light-emitting diode reactors	UV LED	Disinfection process during treatment process

Filters are an essential process in all forms of wastewater treatment, from initial screening to remove large contaminants through to media filtration to remove suspended particulates. In 2025, the manufacturing of precision membranes progressed significantly. Improved uniformity in pore size allows for higher flow rates and less energy consumption which decrease fouling while producing a similar filtered output. These precision membranes offer superior functionality in systems with high solids content and oil contamination.

Per- and polyfluoroalkyl substances (PFAS), termed “forever chemicals” because of their persistence, have received significant media attention related to biosolids in recent years due to the land application of industrially-impacted biosolids. Those biosolids were generated where industries use large amounts of PFAS leading to elevated concentrations in their biosolids. It is important to note that the RDN’s municipal wastewater treatment plants receive significantly different inputs and would therefore having correspondingly low PFAS concentrations. While ultraviolet (UV) light has long been used as a method for disinfection, researchers are now advancing the use of UV light to degrade PFAS molecules into water, fluoride, and simple organic compounds.

Some of these technologies have been implemented in Canada, while others have not. A non-exhaustive list of innovative technologies implemented and planned at Canadian sites is presented in the following table.

Table A 2: Canadian examples of innovative wastewater solids processing technologies.

Technology	Location	Feedstock	End-Use Market	Stage
Lystek - thermal hydrolysis	Ontario, Saskatchewan, Manitoba	digested biosolids	agriculture	commissioned & under construction
N-Viro alkaline stabilization	Alberta, Nova Scotia, Prince Edward Island, Ontario	biosolids	agriculture, fertilizer	commissioned
heat drying	Metro Vancouver	biosolids	agriculture, fertilizer	-
hydrothermal liquefaction (HTL)	Metro Vancouver	biosolids	unknown	design
Pyrolysis	Ontario, Quebec, CRD	biosolids	syngas, biochar	under development & consideration
Gasification	CRD	biosolids	unknown	potential future option

The Lystek thermal hydrolysis process produces a number of products including a liquid Class A biosolids which is appropriate for use in agricultural regions but is less suited to Vancouver Island. The N-Viro alkaline stabilization process uses a considerable amount of lime to stabilize wastewater solids. Heat drying can reduce the mass of wet biosolids by 90% or more, reducing transport costs, but is expensive to implement and operate. Other thermal conditioning and treatment technologies for biosolids (pyrolysis, gasification, HTL) are less mature and are not currently implemented, even at pilot scale, in Canada though some pilots are planned.

The RDN's current approach of anaerobic digestion and centrifuge-dewatering, while not innovative, is reliable and predictable. RDN's forest fertilization program is relatively uncommon at the national scale and represents an innovative end-use of the RDN's biosolids. RDN's fabricated soil production aligns with the second most common biosolids management use across Canada. The findings of this section are based on limited research and investigation; should the RDN wish to understand more about how its program compares to other biosolids management programs, both in Canada and elsewhere, SYLVIS would be pleased to carry this out under a separate scope of work.

Qualified Professional Certification

2024-2025 Blackjack Forest Fertilization & Reclamation Biosolids Land Application Plan

Authorization #112120

As per section 5(3) of the *Organic Matter Recycling Regulation* (OMRR), this certification has been prepared by a SYLVIS Qualified Professional for biosolids fertilization activities at the Mosaic Nanaimo River Road "Blackjack" site. This certifies that biosolids fertilization activities at this site were carried out under BC Ministry of Environment & Climate Change Strategy authorization #112120, in accordance with a Land Application Plan (LAP) authored by SYLVIS.

I, Mike Van Ham, confirm by signature and seal below that, to the best of my knowledge, biosolids were land applied between April 22, 2024 and April 21, 2025 according to the information contained in the 2024-2025 Blackjack – Forest Fertilization & Reclamation Biosolids LAP, (SYLVIS Document #1701-24). These applications are considered a beneficial use of the resource and to the best of my knowledge were completed in accordance with the *Organic Matter Recycling Regulation*.

This certification is valid only if it bears the original signature and seal of the author.

Professional Seal

Signature:

Date: July 2, 2025

SYLVIS

Appendix G – GNPCC Annual Status Form (ASF)

Annual Compliance Status Form

AUTHORIZATION NUMBER: 338

AUTHORIZATION TYPE: Effluent, Permit

LEGAL AUTHORIZATION HOLDER NAME: Regional District of Nanaimo

PERIOD OF COMPLIANCE STATUS ASSESSMENT: 2025-01-01 to 2025-12-31

AUTHORIZED PERSON NAME: Adrian Limpus, Wastewater Program Coordinator

AUTHORIZED PERSON SIGNATURE: *Adrian Limpus*

SIGNATURE DATE: February 26, 2026

I understand that it is an offense to mislead a government official, and I declare that all of the information presented is accurate and true.
I have been given the authority by the authorization holder to sign this form.

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
1.1.1	The discharge of effluent to which this Section is applicable is from a municipal sewage treatment plant as shown on the attached Site Plan A. The B.C. Environment reference number (S.E.A.M. site number) for this discharge is E100008. 1.1.1 The rate at which effluent may be discharged is: Average - 27,730 X (1.0417)(calendar year-1994) m^3/d to a maximum of 40,950 m^3/d; **Maximum Daily - 80,870 m^3/d.**	Yes	GNPCC had no non-compliances of the maximum daily flow permit limit of 80,870 m^3/day in 2025. The maximum daily flow in 2025 was 71,553 m^3/day . As part of the LWMP process, the RDN is working collaboratively with the City of Nanaimo and the District of Lantzville to reduce I&I in the sanitary sewer collection system.	Section 4 - Flow Monitoring , Appendix B - Internal Flow Monitoring and Laboratory Data (Permit Data),
1.1.1	The discharge of effluent to which this Section is applicable is from a municipal sewage treatment plant as shown on the attached Site Plan A. The B.C. Environment reference number (S.E.A.M. site number) for this discharge is E100008. 1.1.1 The rate at which effluent may be discharged is: **Average - 27,730 X (1.0417)(calendar year-1994) m^3/d to a maximum of 40,950 m^3/d**; Maximum Daily - 80,870 m^3/day.	Yes	The average daily discharge for the facility was 33,339 m^3/day for 2025, which was below the maximum allowable average annual discharge of 40,950 m^3/d.	Section 4 - Flow Monitoring and Appendix B - Internal Flow Monitoring and Laboratory Data (Permit Data)
1.1.2	The discharge of effluent to which this Section is applicable is from a municipal sewage treatment plant as shown on the attached Site Plan A. The B.C. Environment reference number (S.E.A.M. site number) for this discharge is E100008. 1.1.2 The characteristics of the discharge shall not exceed: 5-Day Biochemical Oxygen Demand - Total Suspended Solids - 130 mg/L, 130 mg/L	Yes	There were no BOD or TSS permit excedances in 2025.	Section 5 .1 - Carbonaceous Biochemical Oxygen Demand and Section 5.2 - Total Suspended Solids
1.1.3	The discharge of effluent to which this Section is applicable is from a municipal sewage treatment plant as shown on the attached Site Plan A. The B.C. Environment reference number (S.E.A.M. site number) for this discharge is E100008. 1.1.3 After September 8, 2019, the works authorized are screening facility, grit and scum removal systems, primary sedimentation tanks, secondary treatment bioreactors,secondary clarifiers, sludge thickening systems, sludge digestion systems, sludgedewatering facility, an outfall extending 2,030 m from mean low water to a minimum depth of 70 m below mean low water, diffusers,	Yes	The authorized works are described as per the September 8, 2019 permit amendment.	Section 1 - Introduction
2.1	The Permittee shall inspect the pollution control works regularly and maintain them in good working order. Notify the Regional Waste Manager of any malfunction of these works.	Yes	On-site operators perform daily inspections and preventative maintenance on the pollution control works. There were no submitted notification reports of any malfunction of the works during the inspection period covered by this report.	
2.2	In the event of an emergency or condition beyond the control of the Permittee which prevents continuing operation of the approved method of pollution control, the Permittee shall immediately notify the Regional Waste Manager and take appropriate remedial action.	Yes	There were no emergency or condition beyond the control of the Permittee which prevents continuing operation of the approved method of pollution control (see Section 13).	Section 13 - Environmental Incidents, Appendix E Environmental Incident Reports.
2.3	The discharge of effluent which has bypassed the designated treatment works is prohibited unless the consent of the Regional Waste Manager is obtained and confirmed in writing.	No	There was one reported environmental incident in 2025 resulting from a spill from a crack in the bottom of the GNPCC influent channel. This incident was reported to EMBC. More information on this environmental incident can be found in Section 13 - Environmental Incidents and Appendix E.	Section 13 - Environmental Incidents

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
2.4	The Permittee shall notify the Regional Waste Manager prior to implementing changes to any process that may affect the quality and/or quantity of the discharge.	Yes	There were no changes to the treatment process in 2025.	Section 1 - Introduction
2.5	The Permittee shall erect a sign along the alignment of the outfall above high water mark. The sign shall identify the nature of the works. The wording and size of the sign requires the consent of the Regional Waste Manager.	Yes	An outfall sign reading "OUTFALL, 2100m LONG, 73 m DEEP" was installed on the shore along the alignment of the outfall line.	See 2022 GNPCC Outfall Inspection Report by GreatPacific Consulting Ltd.
2.7	Sludge wasted from the treatment plant shall be disposed of to a site and in a manner authorized by the Regional Waste Manager.	Yes	Biosolids generated by GNPCC in 2025 met Class B standards for biosolids in Schedule 3 and 4 of the Organic Matter Recycling Regulation (OMRR). Biosolids are currently being land applied in a Forest Fertilization program.	Appendix G - 2025 Biosolids Management Summary from SYLVIS Environmental. Section 4 includes a summary and interpretation of the effects of biosolids discharges on the receiving environment.
2.8	The Permittee shall conduct a dye test on the outfall line (or inspect by another method approved by the Regional Waste Manager) every five years or as may otherwise be required by the Regional Waste Manager.	Yes	In November 2022, an outfall inspection was conducted and described in the Condition Inspection Report - Five Fingers Outfall prepared by Great Pacific Consulting, which was submitted under separate cover to the Ministry. The inspection utilized a Remote Operated Vehicle (ROV) to record all notable features and components as it traveled along the entire exposed marine section of the pipe. A Ministry letter dated August 11, 1994 approves inspection "by another method" wherein Section 2. of the letter states, "Pursuant to Section 2.8 of the permit, your request to conduct video inspection of the outfall line in lieu of dye testing is approved".	Section 3.6 - Outfall Inspection
2.9	The Permittee shall classify the wastewater treatment facility authorized in Section 1 (the facility) and the classification shall be maintained with the "British Columbia Water and Wastewater Operators Certification Program Society" (BCWWOCPS). The Permittee shall submit an application to classify the facility to BCWWOCPS by October 31, 1994.	Yes	The Environmental Operators Certification Program (EOCP) database, which has since replaced the BCWWOCPS, confirms that the Facility is classified as a Level IV Municipal Waste Water Treatment (MWWT) system with the following facility details: Facility Number: 8 Classification Number: 103951, expiring on June 19, 2028.	EOCP Database
2.10	If the facility is classified by the BCWWOCPS (the Program) at Level II or higher, the Permittee shall ensure that all operators of the facility shall be certified by the Program to a Class I level, at a minimum, by December 1, 1994. Operators in Training: The Permittee shall ensure that all operators in training (OIT) working at the facility classified by the BCWWOCPS at Level II or higher shall be required to successfully pass an OIT examination within three (3) months of commencement of employment at the facility. The OIT certificate shall be valid for fifteen (15) months from the date of issue. Prior to the expiry date of the OIT certificate, but not sooner than twelve (12) months from the date when the OIT commenced facility operation, the OIT shall successfully complete a Class I certification examination in order to continue to operate at the facility. Chief Operator: Level II or Higher: If the facility is classified by the BCWWOCPS at level II or higher, the Permittee shall designate at least one operator to be the "Chief Operator" of the facility by December 1, 1996. The "Chief Operator" shall be certified at a Class II level, at a minimum. After December 1, 1996, no person shall have "Direct Responsible Charge", as defined by the BCWWOCPS; of a municipal wastewater treatment facility classified at Level II or higher unless they possess a valid operator's certificate not more than one level below the classification level of the facility. Chief Operator: Level III and IV:If the facility is classified by the BCWWOCPS at level III, the Permittee shall designate a "Chief Operator", certified at a Class III level by December 1, 1998. If the facility is classified by the BCWWOCPS at Level IV, the Permittee shall designate a "Chief Operator" certified at a Class IV level by December 1, 1998.	Yes	The EOCP database confirms the facility "Has Required Operator" and lists multiple operators of the Facility in employ with the RDN. There are two designated Chief Operators (both certified MWWT IV) listed in good standing and several certified MWWT II and MWWT III operators within the EOCP database, which satisfies the requirements of this section.	EOCP Database

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
3.1.1	Provide and maintain a suitable flow measuring device and record once per day the effluent volume discharged over the preceding 24-hour period.	Yes	Quarterly data reports from flow measured from a Parshall Flume were submitted by the RDN include daily records of effluent volume discharged over the preceding 24-hour period.	Section 4 - Flow Monitoring
3.1.2	The Permittee shall install, provide, and maintain suitable sampling facilities and obtain composite samples and analyses of the effluent as follows: See PDF file "1994_06_02 338 - Section 3.1.2".	Yes	There were no sampling $cBOD_5$ non-compliance in 2025 for the effluent. Daily composite analysis for 5-Day Biochemical Oxygen Demand ($cBOD_5$) and Total Suspended Solids (TSS), weekly composite sampling for Ammonia and quarterly grab samples for Toxicity(LC_{50} were completed). Comprehensive analysis of composite samples for all the remaining contaminants listed inthis section were conducted once every six months (June 8, 2025 and November 30, 2025) as required by this section.	Section 5.1 5-Day Carbonaceous Biochemical Oxygen Demand ($cBOD_5$), 5.2 Total Suspended Solids, Section 5.5 Other General Parameters, and Appendix D - External Laboratory Test Results.
3.2	The Permittee shall obtain a representative sample of the treated biosolids once every quarter and obtain analyses of the sample for the following: Total Solids, Moisture, Volatile Suspended Solids, Polychlorinated Biphenyls, Total Kjeldahl Nitrogen, Arsenic, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Phosphorous, Selenium, Zinc.	Yes	Quarterly sampling of treated biosolids were completed in 2025. Samples were sent to Bureau Veritas for analysis which is an accredited lab.	Section 6.2 - Biosolids Analysis and Appendix D - External Laboratory Test Results
3.3	The Permittee shall monitor the receiving water quality and carry out chemical, physical and biological studies on the receiving environment as required by the Regional Waste Manager. The Permittee shall submit a proposed receiving environment monitoring program to the Regional Waste Manager by October 31, 1994 for approval. The program should be established in consultation with the Regional Waste Manager. Based on the results of this monitoring program, the receiving environment monitoring requirements may be extended or altered by the Regional Waste Manager. The approved program shall commence by January 1, 1995.	Yes	The RDN retained GreatPacific Consulting to conduct another 3 year REM monitoring program starting in 2025.	RDN Receiving Environment Monitoring Report will be submitted under separate cover following completion of the 3 year monitoring program.
3.4	Sampling and flow measurement shall be carried out in accordance with the procedures described in "Field Criteria for Sampling Effluents and Receiving Waters", April 1989, or by suitable alternative procedures as authorized by the Regional Waste Manager. Analyses are to be carried out in accordance with procedures described in "A Laboratory Manual for the Chemical Analysis of Waters, Wastewaters, Sediments and Biological Materials, (1976 edition including updates)", April 1989, or by suitable alternative procedures as authorized by the Regional Waste Manager. Copies of the above manuals are available from the Environmental Protection Division, Ministry of Environment, Lands and Parks, 777 Broughton Street, Victoria, British Columbia, V8V 1X4, at a cost of $20.00 and $70.00 respectively, and are also available for inspection at all Environmental Protection offices. Proper care should be taken in sampling, storing and transporting the samples to adequately control temperature and avoid contamination, breakage, etc.	Yes	Flow was measured in 2025 by a Parshall Flume installed in the secondary upgrade. Flow measurements are totalized by GNPCC's SCADA system. Samples were obtained via automatic (composite) sampler that was used to withdraw effluent samples on a flow-proportioned basis over a 24-hour period which remained functional over the entire period.	Section 4 - Flow Monitoring
3.4.2	Analyses for determining the toxicity of liquid effluents to fish shall be carried out in accordance with the procedures described in the "Provincial Guidelines and Laboratory Procedures for Measuring Acute Lethal Toxicity of Liquid Effluents to Fish" November 1982. The Regional Waste Manager will advise the Permittee which method ofmeasurement for expressing lethal toxicity shall be used. The method of sampling and the method of bioassay will be determined by the Regional Waste Manager.	Yes	Toxicity analysis is carried out as a an LC_{50} 96-hour test (bioassay). Samples were taken quarterly in 2025 and sent to Bureau Veritas which is an accredited lab.	Section 5.3 Ammonia and Toxicity Appendix D in the Annual Report has Toxicity test results.
3.5	3.5: Maintain data of analyses and flow measurements, collected under Sections 3.1 through 3.3, for inspection and every quarter submit the data, suitably tabulated in a machine readable format, for entry in the Ministry of Environment, Lands and Parks computer database, to the Regional Waste Manager for the previous quarter. All reports shall be submitted within 31 days of the end of each quarter. The first report is to be submitted by October 31, 1994. Based on the results of the monitoring program, the Permittee monitoring requirements may be extended or altered by the Regional Waste Manager.	Yes	Quarterly reports containing data and flow measurements were submitted to the Ministry throughout 2025 via the environmental reporting portal.	

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
3.6	The Permittee shall submit an annual report which shall include a summary and interpretation of the data submitted under Section 3.5, an interpretation of the effects of the effluent and biosolids discharges on the receiving environment, and a summary of treatment plant operations, for the preceding calendar year. In addition, the Regional Waste Manager may require that the annual report include summaries and progress reports of the matters identified in Sections 4.2 through 4.8, and any 5Rs (Reduce, Reuse, Recycle, Recover, Residual) activities, for the preceding calendar year. The annual report shall be submitted within 60 days of the end of each calendar year and shall be made available by the Regional District of Nanaimo to the public upon request. The first annual report shall be submitted by February 28, 1995.	Yes	The 2025 Annual Report was submitted to the Ministry on February 28, 2026 with the Annual Status Form (ASF) within the required 60 days of the end of each calendar year. The RDN submitted the 2020 REM report to the Ministry on December 17, 2020 for the 2017 to 2019 cycle. The RDN has retained GreatPacific Consulting Ltd. Montioring for the first year of the three year cycle commenced in 2025.	2025 GNPCC Annual Report and Annual Status Form. 2020 REM report submitted to ENV. Montioring was ongoing for the 2025-2028 cycle completed by GreatPacific Consulting Ltd.
4.1	The Regional District of Nanaimo has indicated its intention to develop a Liquid Waste Management Plan. Accordingly, the Permittee shall submit a proposed schedule for the development of a Liquid Waste Management Plan to the Regional Waste Manager by October 31, 1994 for approval. The Plan shall be developed in accordance with ministry guidelines and shall include, but not be limited to, a schedule to upgrade the discharge to secondary treatment, an infiltration and inflow control program, a source control program, a stormwater management program, a biosolids management program, and an odour control program. All aspects of the Plan shall be to the satisfaction of the Regional Waste Manager.	Yes	The Annual Report confirms that the RDN has a Liquid Waste Management Plan (LWMP). A Ministry letter dated October 30, 2014 confirms the Minister approval for an amended LWMP submitted in January 2014. A LWMP Amendment was submitted on December 15, 2023.	Section 16.5 Liquid Waste Management Plan
4.2	The Permittee may be required to submit a schedule, for upgrading of the discharge to secondary treatment, to the Regional Waste Manager for approval. Based on receiving environment monitoring data and/or other information obtained in connection with this discharge, the Permittee may be required to provide additional treatment facilities and/or upgrade the discharge to secondary treatment.	Yes	Secondary treatment achieved substantial completion in October 2020. A schedule for the upgrading of the discharge to secondary treatment was submitted as part of the approvals required for this project.	Section 1 - Introduction

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