



**Ontario Clean Water Agency**  
**Agence Ontarienne Des Eaux**

March 30, 2023

Saif Sumbal  
Ministry of the Environment, Conservations and Parks  
733 Exeter Road  
London, ON N6E 1L3

Attention: Mr. Sumbal

**RE: Rodney Wastewater Treatment Plant Annual Report 2022**

The Ontario Clean Water Agency is the Operating Authority for the Rodney Wastewater Treatment Plant on behalf of the Municipality of West Elgin. The system is operated under Environmental Compliance Approval 3-0871-88-949. Please find attached the 2022 Annual Report for the Rodney Wastewater Treatment Plant.

Feel free to contact me should you require any additional information regarding the report. I can be reached at 519-312-0847.

Sincerely,

Terri-Lynn Thomson  
Process and Compliance Technician,  
Ontario Clean Water Agency

C.c. Madga Badura, Municipality of West Elgin  
Dale LeBritton, OCWA's Regional Hub Manager  
Sam Smith, OCWA's Senior Operations Manager  
Maegan Garber, OCWA's Safety, Process and Compliance Manager

**MUNICIPALITY OF WEST ELGIN**

**RODNEY WASTEWATER TREATMENT PLANT**

**2022 ANNUAL REPORT**  
**January 1 to December 31, 2022**

**Environmental Compliance Approval # 3-0871-88-949**

Prepared by:



**Ontario Clean Water Agency**  
**Agence Ontarienne Des Eaux**

## Table of Contents

Section 1: Overview .....	1
Section 2: Monitoring Data.....	2
Section 3: Operating Problems and Corrective Actions .....	9
Section 4: Maintenance .....	9
Section 5: Effluent Quality Assurance.....	10
Section 6: Calibration and Maintenance .....	10
Section 7: Effluent Quality.....	10
Section 8: Biosolids.....	11
Section 9: Community Complaints .....	11
Section 10: Bypasses, Spills, and Abnormal Discharges.....	11
Section 11: Alterations, Extensions or Replacement of the Works .....	11
Section 12: Summary.....	12

Appendix A: Analytical Data

## **Section 1: Overview**

The wastewater treatment plant was operated under Environmental Compliance Approval 3-0871-88-949 dated April 12, 1994 with amendments September 24, 1998.

### **Collection System**

The collection system contains gravity sewers that lead to the Main Pumping Station located on Furnival Road. It contains a wet well with two submersible pumps that pump to the treatment plant. Backup power is supplied by an onsite generator.

### **Plant Description**

The Rodney Wastewater Treatment Plant is an extended aeration facility which consists of: extended aeration, settling, UV disinfection (seasonal), phosphorus removal, and filtration. The extended aeration process is designed to remove carbonaceous and nitrogenous organic compounds (BOD). Aluminum Sulphate is used for phosphorus removal. After the clarifier the effluent is filtered and seasonally disinfected using ultraviolet light, then discharged to Sixteen Mile Creek. Sludge is directed to the lagoon for storage and settling. Decant liquid off the lagoon is returned to the influent of the plant.

### **Process Details**

- Wastewater is directed into the sewage lift station from the Village of Rodney by gravity. Wastewater is pumped from the sewage lift station located near the junction of Furnival Road and King Street by force main into a reinforced concrete splitter chamber, provided with a mechanical rake bar screen.
- The secondary treatment system consists of two aeration basins, one reinforced concrete clarifier tank and two return activated sludge pumps.
- The phosphorous removal system consists of one 30,000 L fiber reinforced tank with spills containment equipped with 2 diaphragm type metering pumps (1 duty and 1 standby).
- Three mechanical aerators in each aeration tank provide oxygen at a low pressure in the aeration tanks.
- The tertiary treatment system consists of four (4) continuous back wash 2 metre deep bed, granular single media sand filtration units housed in the filter building. Hydrogen peroxide is introduced for filter cleaning when necessary.
- The disinfection system consists of a ultra-violet (UV) unit through which the effluent is discharged seasonally.
- A concrete V-notch weir flow measuring chamber is installed between the clarifier and the filter building.
- Operations are controlled by a programmable logic controller (PLC). A data logging computer system with local monitoring capability is used to monitor, trend, and record select process parameters.
- Laboratory space is also located at the WWTP to allow for basic laboratory analyses to be conducted by the plant operator.
- Process control is monitored by SCADA.

## **Section 2: Monitoring Data**

### **Sample Collection and Testing**

All samples are collected and tested as per the requirements of the Environmental Compliance Approval.

Raw sewage is sampled bi-weekly and tested for BOD<sub>5</sub>, total suspended solids, total phosphorus, and total Kjeldahl nitrogen. The raw samples are collected as 24 hour composite samples.

Final effluent is sampled bi-weekly and tested for BOD<sub>5</sub>, total suspended solids, total phosphorus, free ammonia nitrogen, total Kjeldahl nitrogen, nitrite, nitrate, pH and alkalinity. Samples are collected using an automatic composite sampler and collected over a twenty-four hour period. Grab samples for dissolved oxygen and temperature are collected bi-weekly. A grab sample for E. coli is also sampled bi-weekly during the disinfection period from April 15 to October 15.

In-house tests are conducted on a weekly basis on the final effluent, raw influent and the mixed liquor suspended solids at the plant to check plant performance and to make any operational changes required.

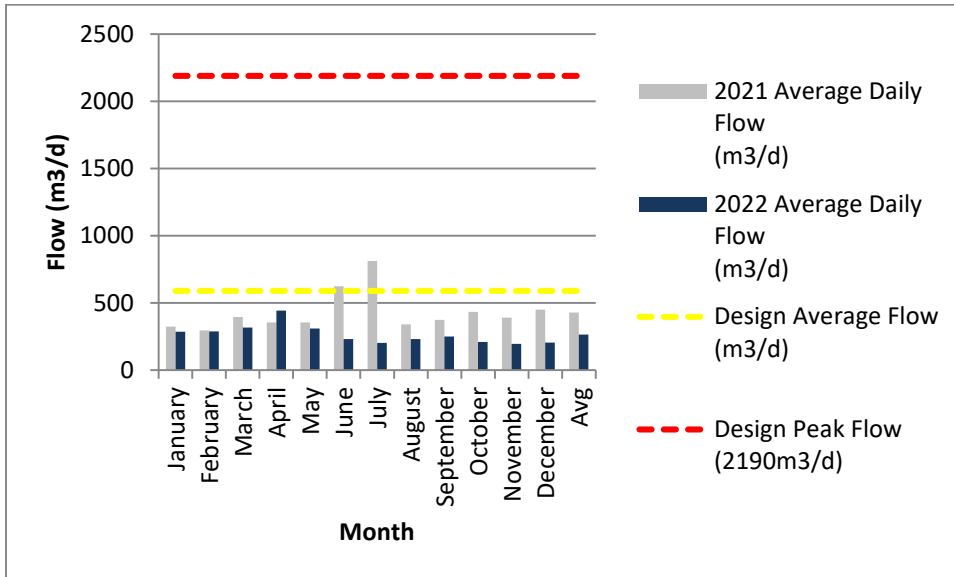
In 2022, all chemical and microbiological sample analyses were conducted by SGS Lakefield Research. Temperature, pH, dissolved oxygen and alkalinity were conducted by staff at the treatment plant.

The receiving stream temperature is performed at Sixteen Mile Creek.

### **Flows**

Detailed monthly flow information is summarized in Appendix A. The total flow treated in 2022 was 96,548.4m<sup>3</sup>, which corresponds to a 38% decrease from 2021 raw flows. The annual average daily flow for the reporting period was 264.5m<sup>3</sup>/day, or 45% of the plant's rated design capacity of 590m<sup>3</sup>/day (refer to Chart 1).

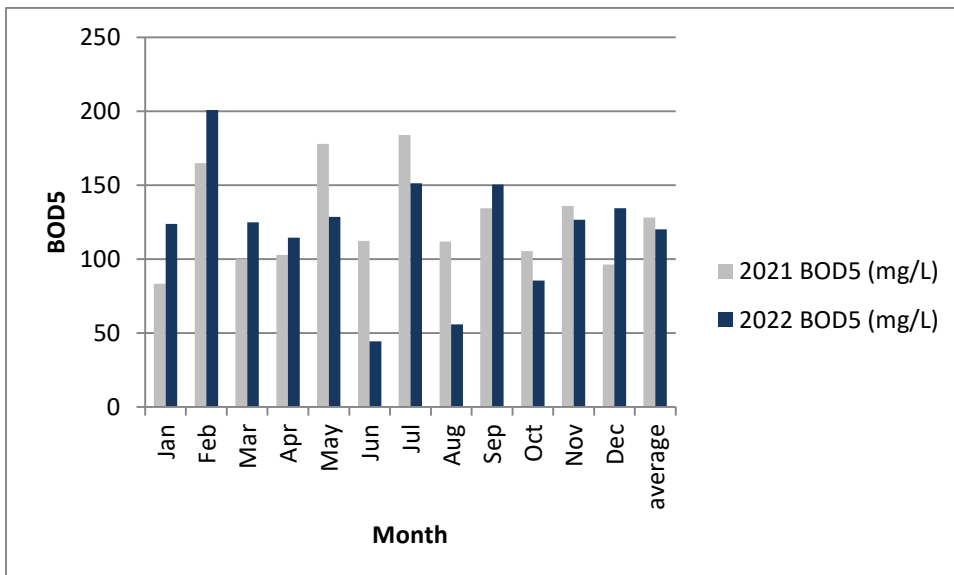
Chart 1. The average daily raw sewage flow to the plant in 2022 compared to 2021.



### Raw Sewage Quality

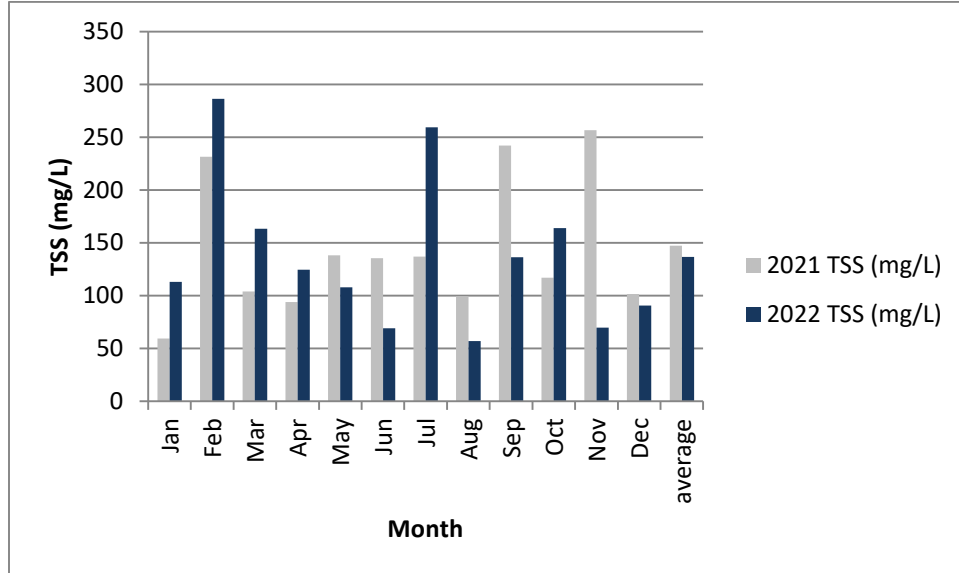
The annual average raw sewage BOD<sub>5</sub> concentration to the plant was 120.2mg/L with a maximum concentration of 201mg/L. The annual average concentration of BOD<sub>5</sub> has decreased 6.3% from 2021, refer to Chart 2.

Chart 2. Average monthly raw concentration of BOD<sub>5</sub> for 2022 compared to 2021.



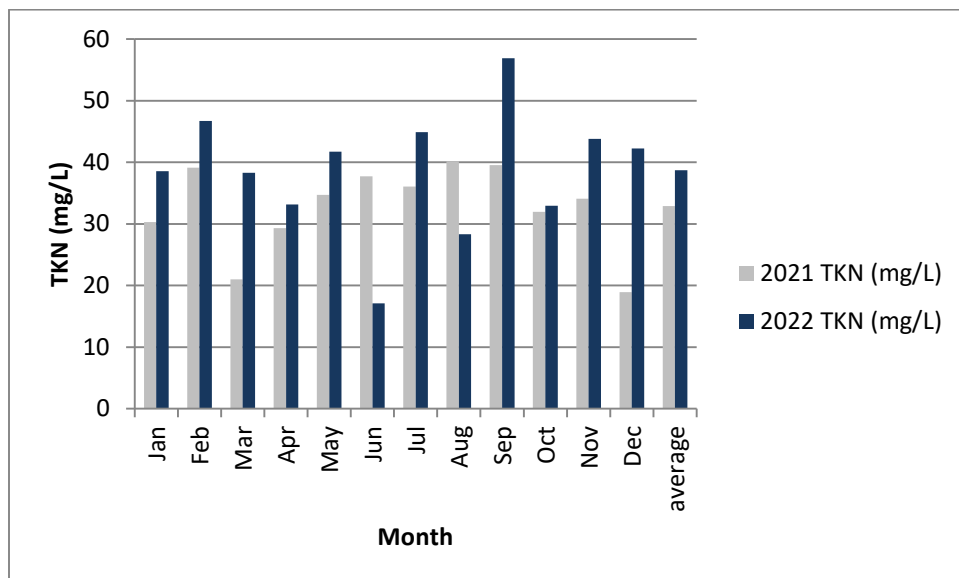
The annual average raw sewage suspended solids (TSS) concentration to the plant was 136.8mg/L, with a maximum of 286.5mg/L. The average concentration of TSS has decreased 7% from 2021, refer to Chart 3.

Chart 3. The average monthly raw concentration of TSS for 2022 compared to 2021.



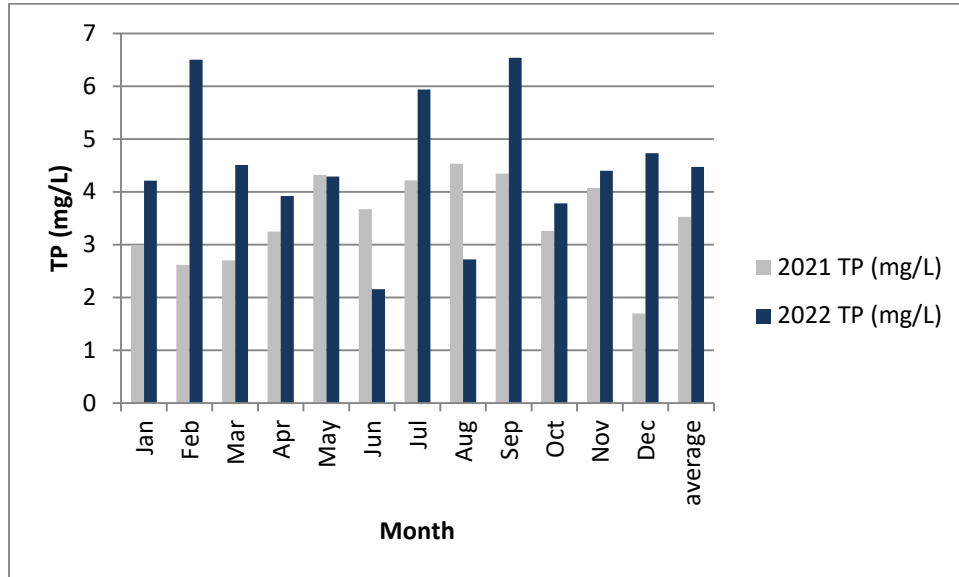
The annual average raw sewage Total Kjeldahl Nitrogen (TKN) concentration to the plant was 38.7mg/L, with a maximum of 56.9mg/L. The average concentration of TKN has increased 17.8% from 2021, refer to Chart 4.

Chart 4. The average monthly raw concentration of TKN for 2022 compared to 2021.



The annual average raw sewage Total Phosphorus (TP) concentration to the plant was 4.5mg/L, with a maximum of 6.5mg/L. The average concentration of TP has increased 26.7% from 2021, refer to Chart 5.

Chart 5. The average monthly raw concentration of TP for 2022 compared to 2021.



### Effluent Limits

Detailed analytical data is attached to this report as Appendix A. The following table provides a summary of the monthly average concentration and loading ranges compared to the limits set in the Environmental Compliance Approval.



## Summary and Comparison of Compliance Data

Table 1. Monthly average concentration and loading ranges for 2022.

Parameter	Monthly Average Effluent Limit (mg/L)	Monthly Average Effluent Result Ranges (mg/L)	Monthly Average Loading Limit (kg/d)	Monthly Average Loading Result Ranges (kg/d)
BOD <sub>5</sub>	10(a)	<2 – 3.5	6.9	0.4 – 1.11
	15(b)	3 – 3.5		
Suspended Solids	10(a)	<2 – 6	6.9	0.465 – 2.67
	15(b)	3.5 – 12.75		
Total Phosphorus	0.5(a)	0.145 - 0.395	0.4	0.017 -0.095
	1.0(b)	0.08 – 0.467		
Total (Ammonia + Ammonium) Nitrogen	3.0(a)	<0.1 – 0.2	2.2	0.02 – 0.06
	5.0(b)	<0.1 –0.167		
E. coli	200	2 – 8.94		
Unionized Ammonia*	0.1	0.000– 0.005		

NOTE: (a) limit applies during the non-freezing period

(b) limit applies during the freezing period

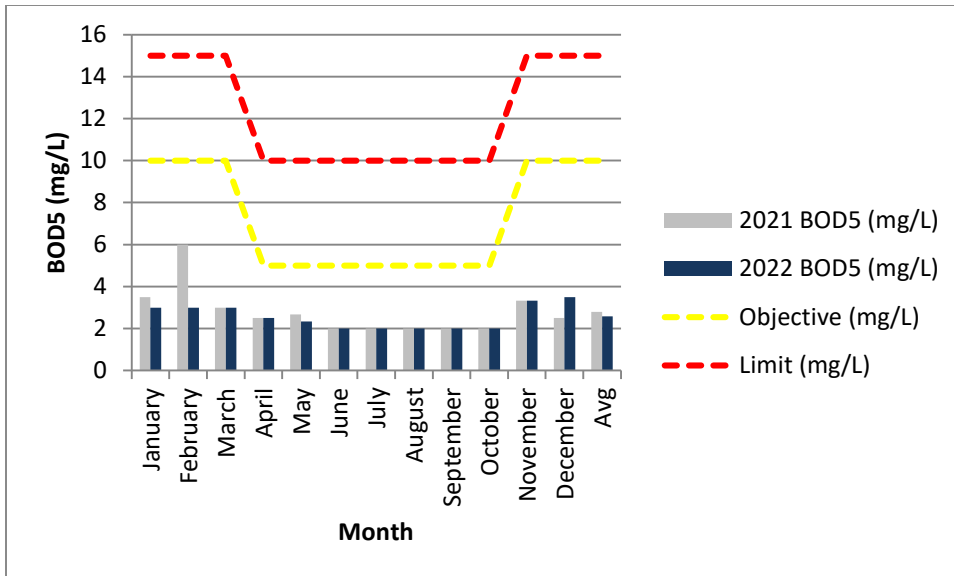
\*single sample results

### Discussion on Monitoring Data as Compared to the Effluent Limits

There were no non-compliances with Environmental Compliance Approval limits during the 2022 reporting year.

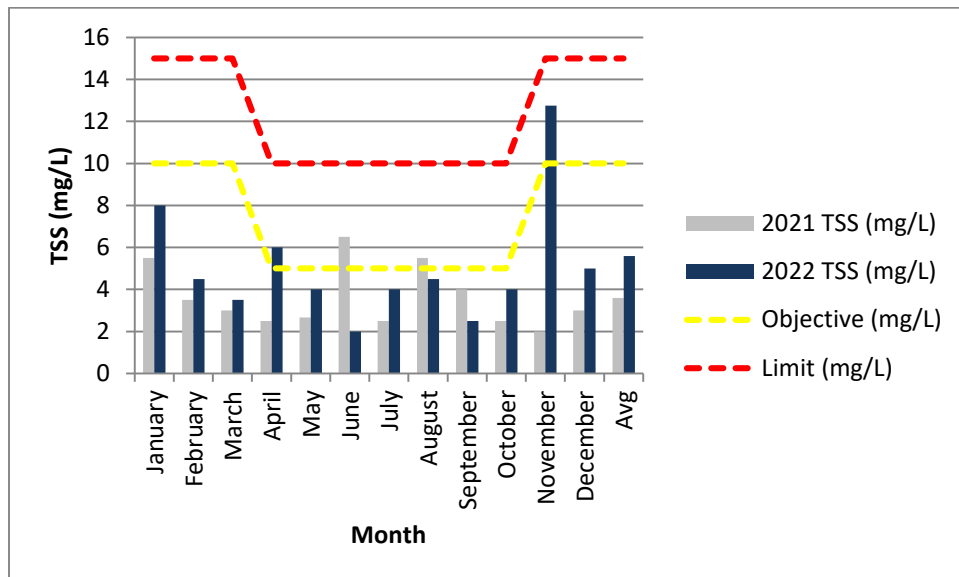
The annual average effluent BOD<sub>5</sub> for 2022 was 2.58mg/L, which is a 7.6% decrease from 2021 (refer to Chart 6). The annual average loading of BOD<sub>5</sub> in 2022 was 0.68kg/d. Refer to Table 1 for a list of monthly average effluent limits and loading limits.

Chart 6. The effluent monthly average concentration of BOD<sub>5</sub> in 2022 compared to 2021 concentrations.



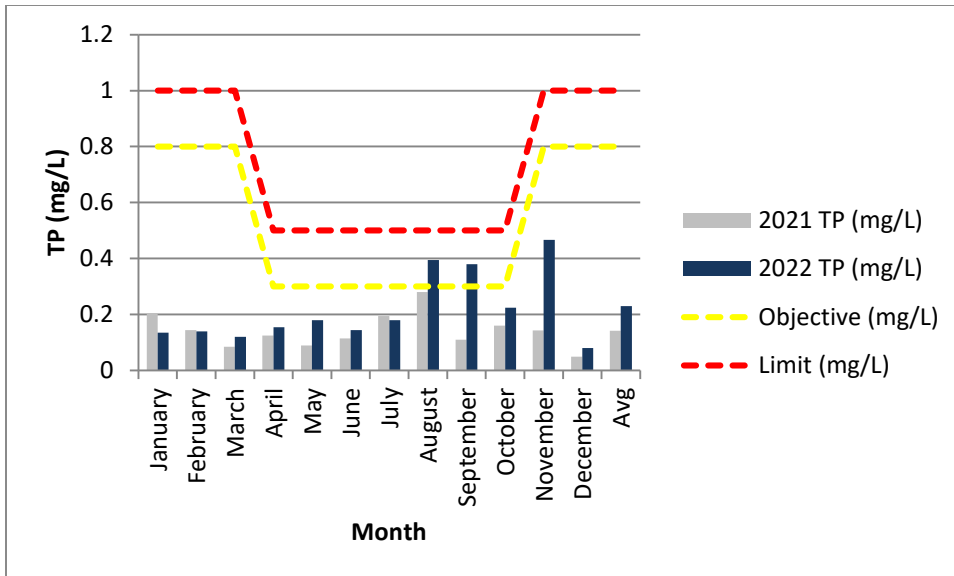
The annual average effluent Total Suspended Solids (TSS) for 2022 was 5.59mg/L, which is a 55% increase from 2021 (refer to Chart 7). The annual average loading of TSS in 2022 was 1.3kg/d. Refer to Table 1 for a list of monthly average effluent limits and loading limits.

Chart 7. The effluent monthly average concentration of TSS in 2022 compared to 2021 concentrations.



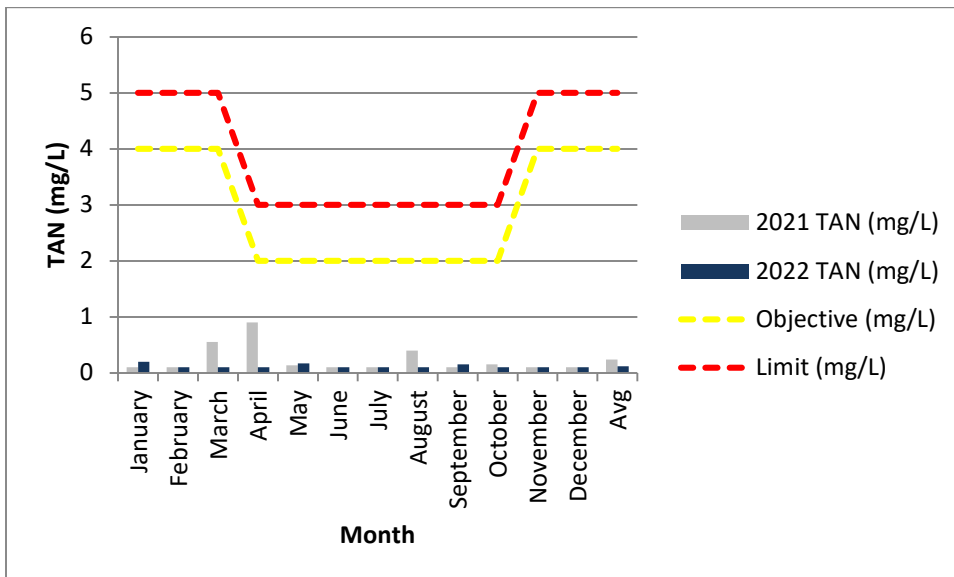
The annual average effluent Total Phosphorus (TP) for 2022 was 0.23mg/L, which is a 62% increase from 2021 (refer to Chart 8). The annual average loading of TP in 2022 was 0.05kg/d. Refer to Table 1 for a list of monthly average effluent limits and loading limits.

Chart 8. The effluent monthly average concentration of TP in 2022 compared to 2021 concentrations.



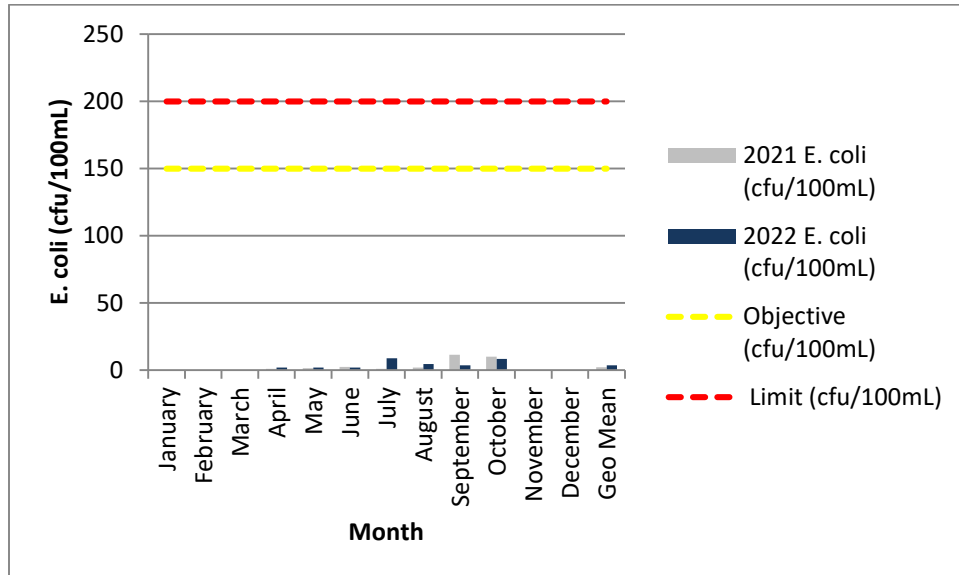
The annual average effluent Total Ammonia + Ammonium Nitrogen (TAN) for 2022 was 0.12mg/L, which is a 49% decrease from 2021 (refer to Chart 9). The annual average loading of TAN in 2022 was 0.03kg/d. Refer to Table 1 for a list of monthly average effluent limits and loading limits.

Chart 9. The effluent monthly average concentration of TAN in 2022 compared to 2021 concentrations.



The annual effluent geometric mean for E. coli in 2022 was 3.7cfu/100mL, which is a 78% increase from 2021 (refer to Chart 10). Refer to Table 1 for a list of monthly geometric mean effluent limits.

Chart 10. The effluent monthly geometric mean concentration of E. coli in 2022 compared to 2021 concentrations.



### **Section 3: Operating Problems and Corrective Actions**

Cold temperatures can affect the treatment of the sewage, inhibiting the nitrification process. The mechanical surface aerators in the aeration tanks further lower the temperature of the mixed liquors thus affecting the nitrification process. Adjustments are made to the mixed liquor suspended solids concentrations in the aeration tanks during the winter months which has ensured compliance with effluent limits however, during periods of extreme cold temperatures this is not enough. A replacement of the surface aerators with mechanical aerators has been proposed. This will not only improve the treatment process but will also be more energy efficient.

The collection system on Third Street has required frequent monitoring due to sewage backing up. This area is inspected and flushed routinely.

RAS pump issues were experienced later in the year which required frequent flushing to regain proper flow. This caused higher solids in the effluent. The pump is to be replaced early 2023.

### **Section 4: Maintenance**

Regular scheduled monthly preventative maintenance is assigned and monitored using the Workplace Management System (WMS) program. The following is a summary of maintenance performed other than WMS work orders:

- Scum pump replacement
- RAS pump maintenance
- Pump Station pump repairs
- RAS/WAS valve maintenance
- Backflow preventer repair

## **Section 5: Effluent Quality Assurance**

Effluent quality assurance is evaluated by monitoring parameters and changes throughout the plant processes. The operators monitor the aeration tanks by performing weekly tests on the mixed liquor. These tests include dissolved oxygen, pH, temperature, settling tests, Mixed Liquor Suspended Solids (MLSS), and Mixed Liquor Volatile Suspended Solids (MLVSS). As well, monitoring of the alum dosages, wasting volumes and Return Activated Sludge Suspended Solids is completed. Data collected from these tests provide information to the operator to make the appropriate adjustments in the treatment process and take corrective actions before the plant reaches its effluent limits.

## **Section 6: Calibration and Maintenance**

Annual maintenance on the generator was completed by Albert's Generator Services in July.

Flowmetrix Technical Services Inc. performed the annual calibration on the flow meter in April.

In house meters for pH and dissolved oxygen are calibrated by OCWA operators as per manufacturer's instructions.

## **Section 7: Effluent Quality**

### **Effluent Objectives**

The following table shows the monthly average effluent concentration ranges and loadings compared to the effluent objectives outlined in the Environmental Compliance Approval.

Table 3. Monthly average effluent concentration and loadings compared to objectives.

Parameter	Average Monthly Effluent Objective (mg/L)	Average Monthly Effluent Result Ranges (mg/L)	Average Monthly Loading Objectives (kg/day)	Average Monthly Loading Result Ranges (kg/day)
BOD <sub>5</sub>	5(a)	<2 – 3.5	3.9	0.4 – 1.11
	10(b)	3 – 3.5		
Suspended Solids	5(a)	<2 – 6	3.9	0.465 – 2.67
	10(b)	3.5 – 12.75		
Total Phosphorus	0.3(a)	0.145 - 0.395	0.28	0.017 -0.095
	0.8(b)	0.08 – 0.467		
Total (Ammonia + Ammonium) Nitrogen	2.0(a)	<0.1 – 0.2	1.57	0.02 – 0.06
	4.0(b)	<0.1 –0.167		
E. coli	150	2 – 8.94		
Dissolved Oxygen	5	6.7 – 11.4		

### **Discussion of Effluent Objectives**

The Rodney WWTP met all the monthly average loading objectives and monthly average concentration objectives in 2022 set out in the Environmental Compliance Approval with a few exceptions.

The TSS objective was exceeded in April and November. High suspended solids were experienced in April due to higher influent flows and in November due to RAS pump issues that required frequent flushing. The RAS pump is scheduled to be replaced in early 2023.

The TP objective was exceeded in August and September which required adjustments to be made to the alum dosage.

The annual average flow for 2022 was 264.52m<sup>3</sup>/d, which is below the design flow of 590m<sup>3</sup>/d. The design average daily flow for the plant was exceeded three times in 2022 compared to forty times in 2021. The hydraulic peak flow of 2,190m<sup>3</sup>/day for the plant was not exceeded in 2022.

## **Section 8: Biosolids**

The lagoon is used for sludge digestion and storage as per the Environmental Compliance Approval. The waste activated sludge (WAS) process transfers to the lagoon. The sludge is allowed to settle at the bottom of the lagoon and the liquid is pumped back to the head of the plant for treatment. In 2022, the amount of WAS transferred to the lagoon was approximately 1,460m<sup>3</sup>. It is anticipated that a similar amount will be transferred in 2023, approximately 1,500m<sup>3</sup>.

## **Section 9: Community Complaints**

No community complaints were received in 2022.

## **Section 10: Bypasses, Spills, and Abnormal Discharges**

There were no by-pass events for the Rodney WWTP during 2022.

The Rodney Wastewater Treatment Plant can direct raw sewage from the pump station to the lagoon when there is a power failure of long duration or if there is high flow to the plant.

## **Section 11: Alterations, Extensions or Replacement of the Works**

Recommended capital upgrades to the system for 2023 (brought forward from 2021) include: clarifier overhaul, alum tank replacement (including building work), lagoon decant upgrade, dissolved oxygen analyzer, lagoon dredging, facility lighting, valve replacement, collection system flushing/inspection and pump station clean out. A substantial funding application was submitted by OCWA on behalf of the municipality to help fund the above upgrades.

## **Section 12: Summary**

Overall the Rodney Wastewater Treatment Plant provided effective treatment in 2022, with no non-compliances and very few objective exceedances. Capital improvements to the system will ensure continued success in the operation of the plant and improve the effluent quality.

## **APPENDIX A**

### **Analytical Data**



5834 RODNEY WASTEWATER TREATMENT PLANT 110001667																	
	1 / 2022	2/ 2022	3/ 2022	4/ 2022	5/ 2022	6/ 2022	7/ 2022	8/ 2022	9/ 2022	10/ 2022	11/ 2022	12/ 2022	<--Total-->	<--Avg-->	<--Max-->	<-Criteria-->	
Flows																	
Raw Flow: Total - Raw m³/d	8,895.70	8,115.50	9,849.40	13,338.10	9,588.80	6,973.10	6,301.90	7,148.53	7,511.40	6,516.90	5,910.10	6,399.00	96,548.43			0.00	
Raw Flow: Avg - Raw m³/d	286.96	289.84	317.72	444.60	309.32	232.44	203.29	230.60	250.38	210.22	197.00	206.42		264.52		2,190.00	
Raw Flow: Max - Raw m³/d	419.30	573.80	418.30	1,834.50	500.50	346.70	259.30	337.00	428.20	448.90	237.80	351.00			1,834.50	0.00	
Raw Flow: Count - Raw m³/d	31.00	28.00	31.00	30.00	31.00	30.00	31.00	31.00	30.00	31.00	30.00	31.00	365.00			0.00	
Eff. Flow: Total - Effluent m³/d	8,895.70	8,115.50	9,849.40	13,338.10	9,588.80	6,973.10	6,301.90	7,148.53	7,511.40	6,516.90	5,910.10	6,399.00	96,548.43			0.00	
Eff. Flow: Avg - Effluent m³/d	286.96	289.84	317.72	444.60	309.32	232.44	203.29	230.60	250.38	210.22	197.00	206.42		264.52			
Eff. Flow: Max - Effluent m³/d	419.30	573.80	418.30	1,834.50	500.50	346.70	259.30	337.00	428.20	448.90	237.80	351.00			1,834.50	0.00	
Eff Flow: Count - Effluent m³/d	31.00	28.00	31.00	30.00	31.00	30.00	31.00	31.00	30.00	31.00	30.00	31.00	365.00			0.00	
Carbonaceous Biochemical Oxygen Demand: CBOD																	
Eff: Avg cBOD5 - Effluent mg/L	2.00	< 2.50	< 2.50	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 3.00	< 2.33	< 3.00		< 2.27			
Eff: # of samples of cBOD5 - Effluent	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	26.00			0.00	
Loading: cBOD5 - Effluent kg/d	0.574	< 0.725	< 0.794	< 0.889	< 0.619	< 0.465	< 0.407	< 0.461	< 0.501	< 0.631	< 0.460	< 0.619		< 0.60	< 0.89		
Biochemical Oxygen Demand: BOD5																	
Raw: Avg BOD5 - Raw mg/L	124.00	201.00	125.00	114.50	128.67	< 44.50	151.50	56.00	150.50	85.50	126.67	134.50		120.19	201.00	0.00	
Raw: # of samples of BOD5 - Raw	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	26.00			0.00	
Eff: Avg BOD5 - Effluent mg/L	< 3.00	< 3.00	< 3.00	< 2.50	< 2.33	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 3.33	< 3.50		< 2.58	< 3.50	15.00	
Loading: BOD5 - Effluent kg/d	< 0.861	< 0.870	< 0.953	< 1.112	< 0.722	< 0.465	< 0.407	< 0.461	< 0.501	< 0.420	< 0.657	< 0.722		< 0.68	< 1.11	6.900	
Percent Removal: BOD5 - Raw %	97.58	98.51	97.60	97.82	98.19	< 95.51	98.68	96.43	98.67	97.66	97.37	97.40			98.68	0.00	
Total Suspended Solids: TSS																	
Raw: Avg TSS - Raw mg/L	113.00	286.50	163.50	124.50	108.00	69.00	259.50	57.00	136.50	164.00	69.67	90.50		136.81	286.50	0.00	
Raw: # of samples of TSS - Raw	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	26.00			0.00	
Eff: Avg TSS - Effluent mg/L	8.00	4.50	3.50	6.00	< 4.00	< 2.00	4.00	4.50	< 2.50	4.00	< 12.75	5.00		5.59	12.75	15.00	
Eff: # of samples of TSS - Effluent	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	4.00	2.00	27.00			0.00	
Loading: TSS - Effluent kg/d	2.296	1.304	1.112	2.668	< 1.237	< 0.465	0.813	1.038	< 0.626	0.841	< 2.512	1.032		1.33	2.67	6.900	
Percent Removal: TSS - Raw %	92.92	98.43	97.86	95.18	96.30	97.10	98.46	92.11	98.17	97.56	81.70	94.48			98.46	0.00	
Total Phosphorus: TP																	
Raw: Avg TP - Raw mg/L	4.21	6.50	4.51	3.92	4.29	2.16	5.94	2.72	6.54	3.78	4.40	4.73		4.47	6.54	0.00	
Raw: # of samples of TP - Raw	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	26.00			0.00	
Eff: Avg TP - Effluent mg/L	0.14	0.14	0.12	0.16	0.18	0.15	0.18	0.40	0.38	0.23	0.47	0.08		0.23	0.47	1.00	
Eff: # of samples of TP - Effluent	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	26.00			0.00	
Loading: TP - Effluent kg/d	0.039	0.041	0.038	0.069	0.056	0.034	0.037	0.091	0.095	0.047	0.092	0.017		0.05	0.10	0.400	
Percent Removal: TP - Raw %	96.79	97.85	97.34	96.04	95.80	93.29	96.97	85.48	94.19	94.05	89.40	98.31			98.31	0.00	
Nitrogen Series																	
Raw: Avg TKN - Raw mg/L	38.55	46.70	38.30	33.15	41.73	17.10	44.90	28.35	56.90	32.95	43.80	42.25		38.72	56.90	0.00	
Raw: # of samples of TKN - Raw	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	26.00			0.00	
Eff: Avg TAN - Effluent mg/L	< 0.20	< 0.10	< 0.10	< 0.10	< 0.17	< 0.10	< 0.10	< 0.10	< 0.15	< 0.10	< 0.10	< 0.10		< 0.12	< 0.20	5.00	
Eff: # of samples of TAN - Effluent	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	26.00			0.00	
Loading: TAN - Effluent kg/d	< 0.057	< 0.029	< 0.032	< 0.044	< 0.052	< 0.023	< 0.020	< 0.023	< 0.038	< 0.021	< 0.020	< 0.021		< 0.03	< 0.06	2.200	
Eff: Avg NO3-N - Effluent mg/L	24.55	10.57	23.45	22.95	25.67	29.05	43.60	39.15	40.80	27.35	40.83	38.80		30.56	43.60	0.00	
Eff: # of samples of NO3-N - Effluent	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	26.00			0.00	
Eff: Avg NO2-N - Effluent mg/L	0.33	2.06	0.07	< 0.03	< 0.05	< 0.07	< 0.08	0.11	0.10	< 0.03	< 0.03	< 0.07		0.25	2.06	0.00	
Eff: # of samples of NO2-N - Effluent	2.00	2.00	2.00	2.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	2.00	26.00			0.00	
Disinfection																	
Eff: GMD E. Coli - Effluent cfu/100mL	0.00	0.00	0.00	2.00	2.00	2.00	8.94	4.47	3.61	8.49	0.00	0.00				200.00	
Eff: # of samples of E. Coli - Effluent	0.00	0.00	0.00	1.00	3.00	2.00	2.00	2.00	2.00	2.00	0.00	0.00	14.00			0.00	