

Prescott Wastewater System

Waterworks # 110001122

Annual Report

Prepared For: Town of Prescott

Reporting Period of January 1st – December 31st 2022

Issued: February 1, 2023

Revision: 0

Operating Authority:



This report has been prepared to meet the requirements set out in:

Document	Document #	Issue Date	Issue Number
Facility ECA	6996-9ZYNWH	October 5, 2015	N/A
ECA for Municipal Sewage Collection System	5215-6VRQTA	November 22, 2006	N/A

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1 Revision History

Date	Rev#	Revisions	Revised By
01-Feb-2023	0	Annual Report Issued	PCT

2 Operations and Compliance Reliability Indices

Compliance Event	Details
Ministry of Environment Inspections	<ul style="list-style-type: none"> No inspections in 2022
Ministry of Labour Inspections	<ul style="list-style-type: none"> No inspections in 2022
Non-Compliance	<ul style="list-style-type: none"> None to report
Community Complaints	<ul style="list-style-type: none"> None to report
Spills	<ul style="list-style-type: none"> None to report
Overflows	<ul style="list-style-type: none"> None to report
Bypass	<ul style="list-style-type: none"> None to report
Diversion (if applicable)	<ul style="list-style-type: none"> None to report

3 Process Description

Prescott’s sewage collection system is a gravity fed collection system consisting of combined sanitary and storm sewers. Five pumping stations pump wastewater from the collection system to the wastewater treatment facility.

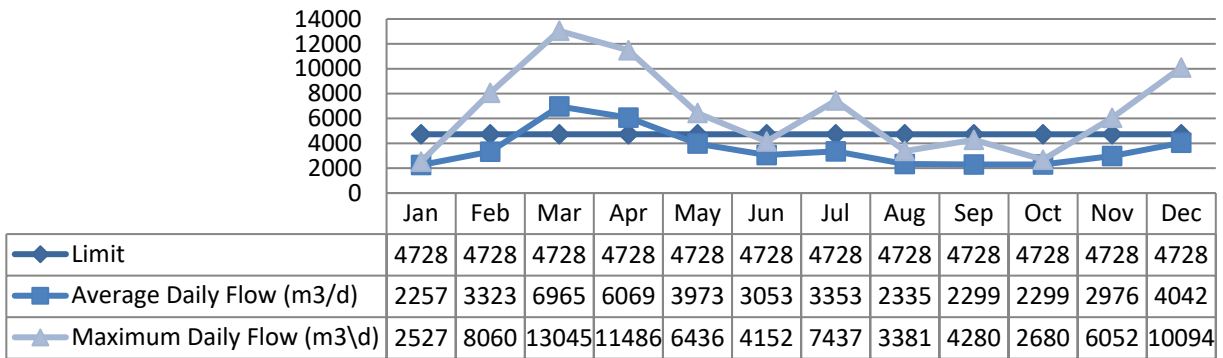
Prescott’s wastewater treatment plant is a Class III treatment facility. Raw sewage is pumped to the facility from an onsite pumping station (SPS #6), which is equipped with an influent bar screen and three dry well pumps. Wastewater passes through the inlet headworks where solids are removed using a mechanical rotary screen and conveyor. Grit is then removed using two parallel vortex grit separators. Aluminum sulphate is injected downstream of the grit separators to assist in phosphorous removal. The wastewater then enters three parallel, continuous-flow Sequencing Batch Reactors (SBRs) which operate with automated cycles (air off, air on, settle, and decant). Each SBR is equipped with a fine bubble aeration system, submersible mixer, variable speed effluent decanter and sludge removal pump. Effluent decanted from the SBRs enters an equalization tank where a pinch valve acts to ensure consistent flow through the UV disinfection system. The UV disinfection system consists of one channel with two units, one duty and one standby. Following disinfection, the effluent passes through an outfall chamber where grey water is recovered for plant processes before discharging to the St. Lawrence River.

Activated sludge which has been removed from the SBRs is pumped to a two-stage aerobic digester equipped with a coarse bubble aeration system and manual decant arms. Activated sludge is stabilized (or digested) and dewatered, with the supernatant returning to the plant headworks. Digested sludge is then pumped to one of two large holding tanks, each equipped with a coarse bubble aeration system and manual decant arm, where further dewatering occurs. From the holding tanks, liquid sludge can be pumped to one of two large drying beds or hauled offsite for land application.

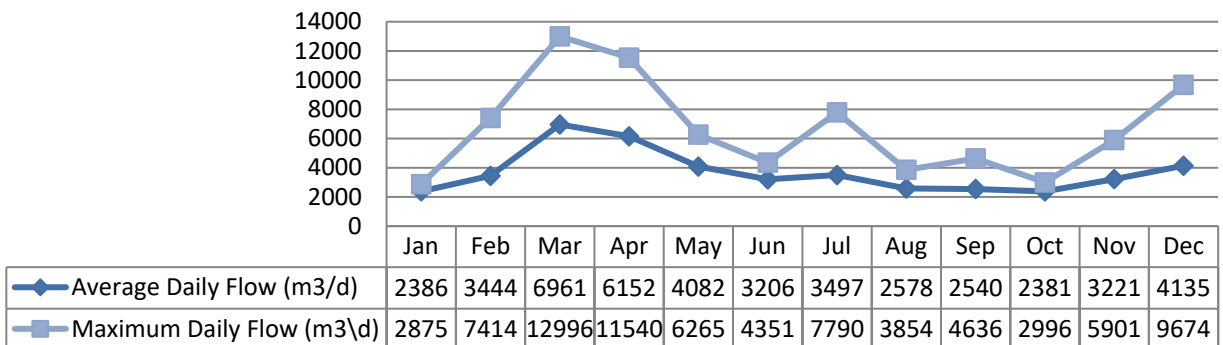
4 Treatment Flows

The hydraulic flows reaching the treatment facility in 2022 averaged 3579 m³/day which represents 76% of the 4,728 m³/day design.

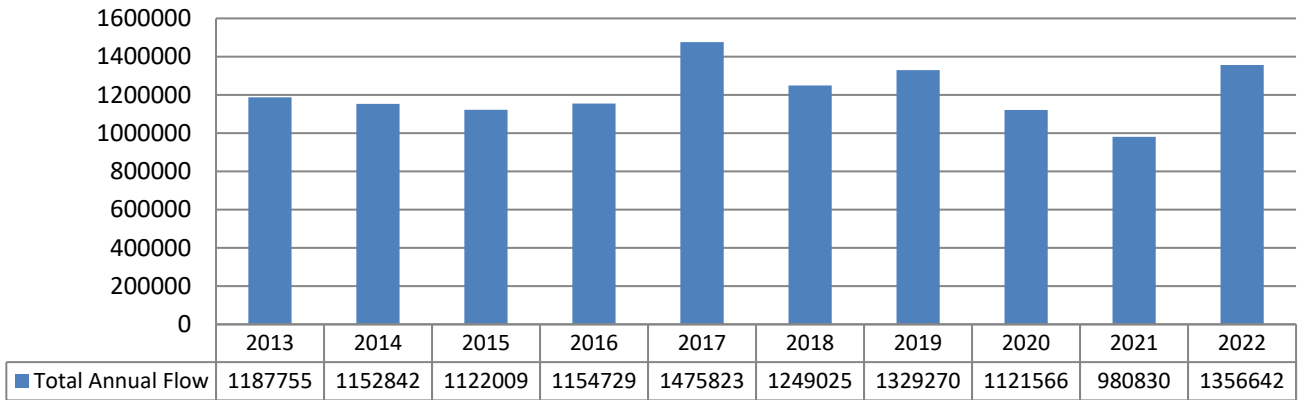
4.1 Raw Flow (m³/d)



4.2 Effluent Flow (m³/d)

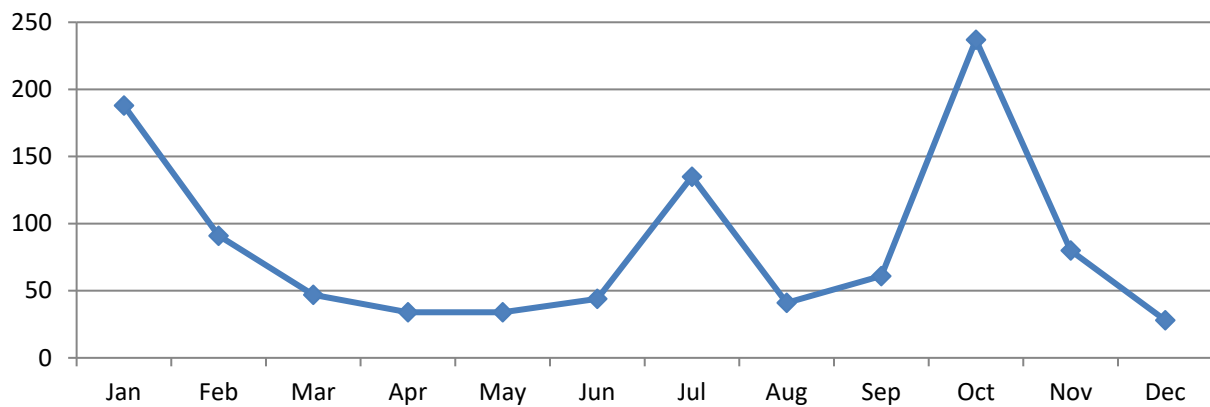


4.2.1 Annual Comparison (m3)

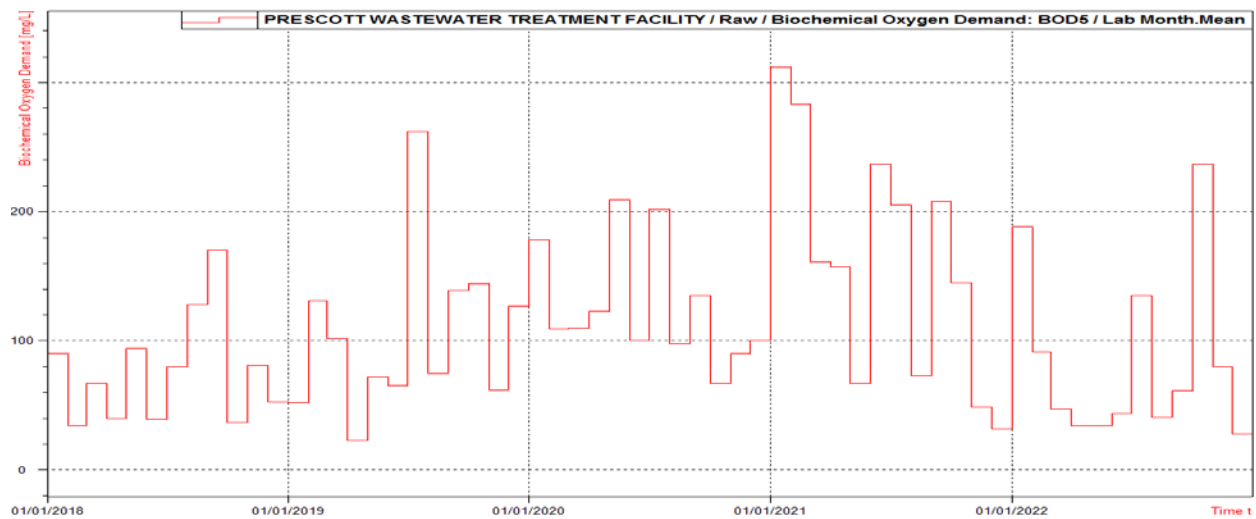


5 Raw Sewage Quality

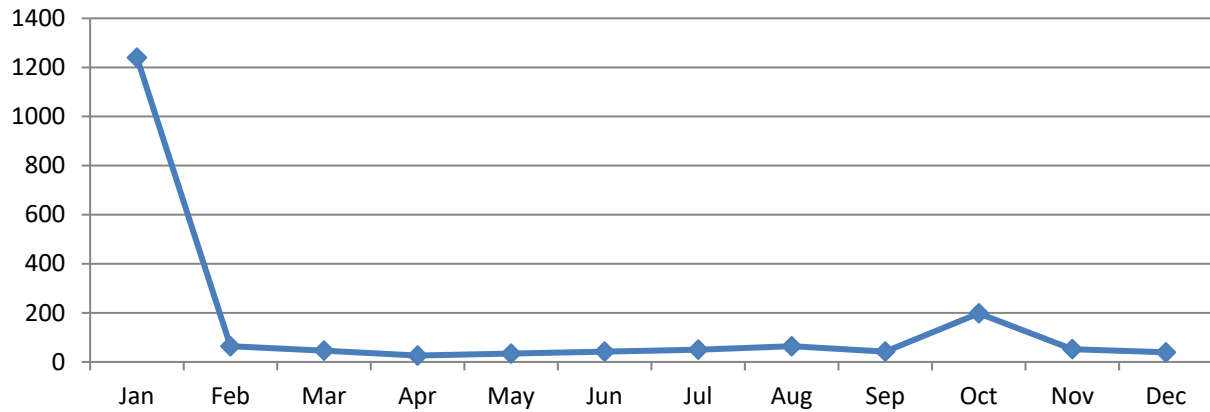
5.1 BOD5 (mg/L)



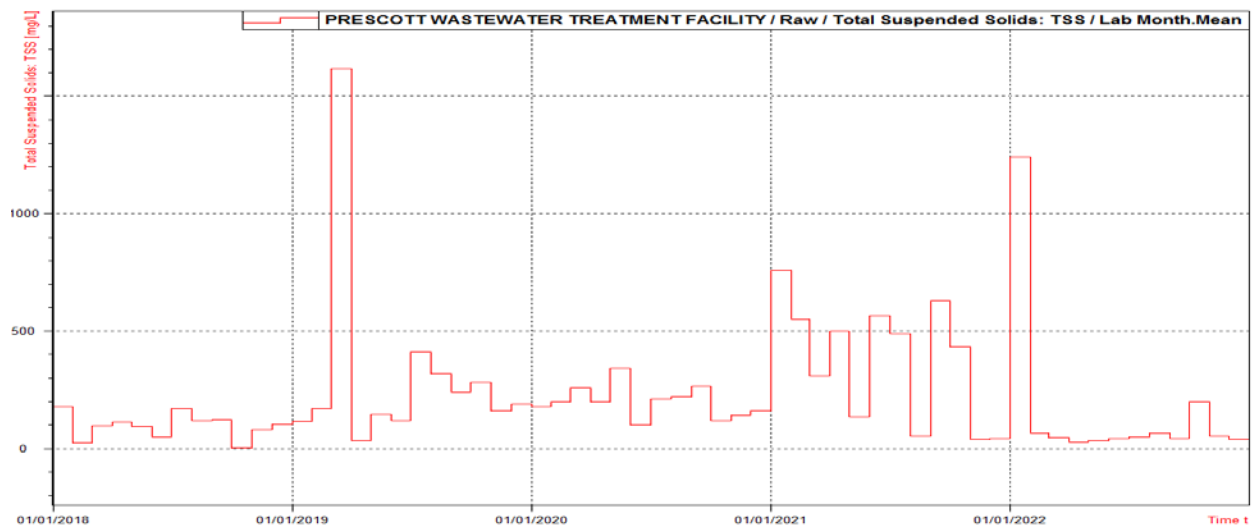
5.1.1 5-year BOD5 Trend



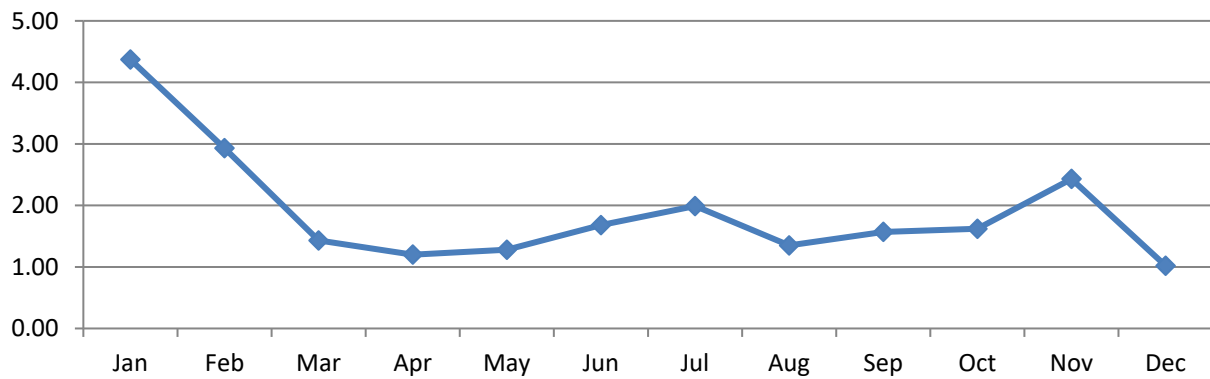
5.2 Total Suspended Solids (mg/L)



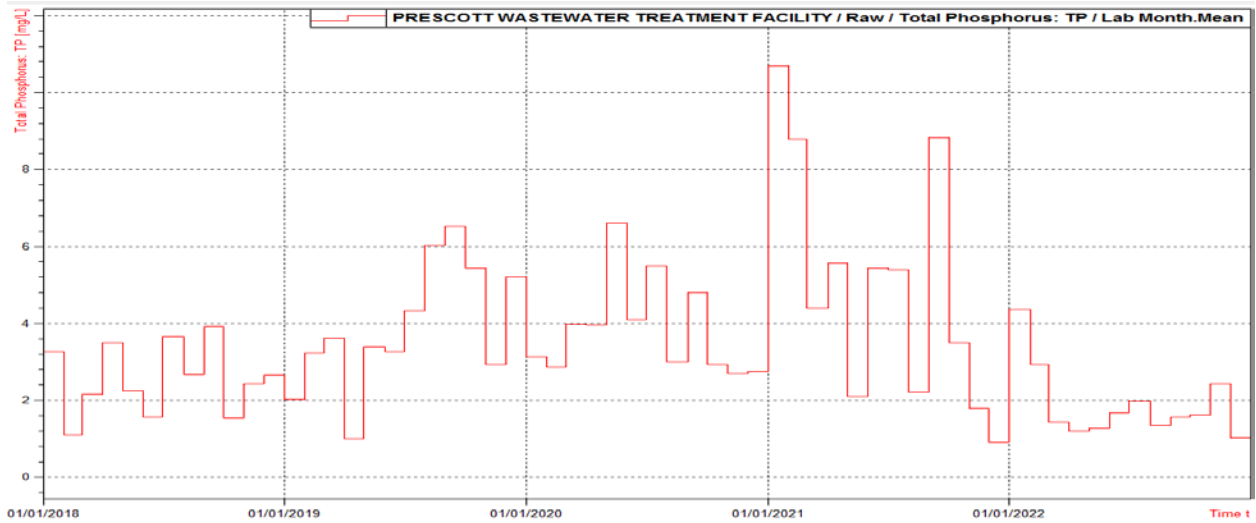
5.2.1 5-year Total Suspended Solids Trend



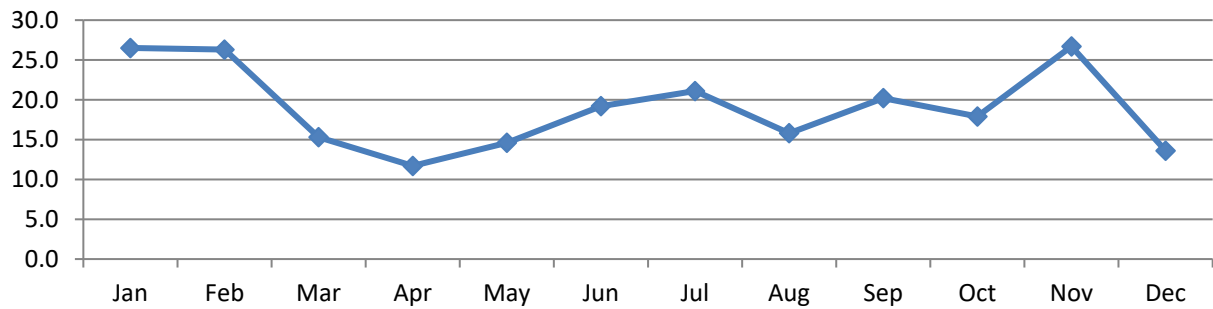
5.3 Total Phosphorus (mg/L)



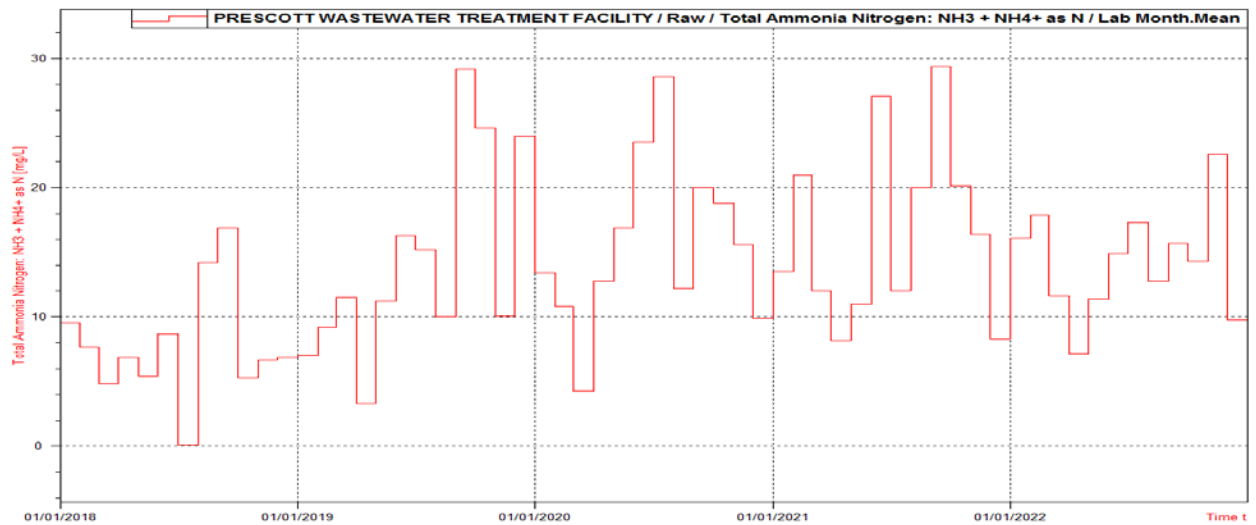
5.3.1 5-year Total Phosphorus Trend



5.4 Total Ammonia Nitrogen (mg/L)



5.4.1 5-year Total Ammonia Nitrogen Trend



5.5 Imported Waste Quality

There was no imported waste in 2022.

6 Effluent Quality

The monthly average concentrations of the carbonaceous biochemical oxygen demand (CBOD5), total suspended solids (TSS), total ammonia nitrogen (TAN), and total phosphorus (TP) remained below the effluent objectives and limits outlined in the facility's ECA during 2022. In addition, the effluent pH remained within the limits and objectives throughout the year. The geometric mean density of E. Coli in the effluent also remained within the ECA limit and objective in 2022.

6.1 Effluent Quality Assurance and Control Measures Taken

This system is part of OCWA's Seaway Valley Cluster. The cluster is supported by the Eastern Regional Hub, and corporate resources. Operational Services are delivered by OCWA staff that live and work in the community. The systems are operated to meet compliance with applicable regulations. The system has comprehensive manuals detailing operations, maintenance, instrumentation, and emergency procedures. All procedures are treated as active documents and are updated as required. These documents are also part of OCWA's Quality & Environmental Management System.

The process is reviewed and maintained by certified operators. These operators complete in-house rounds and testing to monitor the process. All Sampling and analysis follow approved methods and protocols for sampling, analysis and recording as specified in the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", the Ministry's publication, "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the publication, "Standard Methods for the Examination of Water and Wastewater".

All final effluent samples collected during the reporting period to meet legislated sampling requirements are submitted to Caduceon Kingston for analysis, with the exception of pH and temperature. Caduceon Kingston has been deemed accredited by the Canadian Association for Laboratory Accreditation (CALA), meeting strict provincial guidelines including an extensive quality assurance/quality control program. By choosing this laboratory, the Ontario Clean Water Agency is ensuring appropriate control measures are undertaken during sample analysis. The pH and temperature parameters are analyzed in the field at the time of sample collection by certified operators, to ensure accuracy and precision of the results obtained.

OCWA uses several computer systems which include:

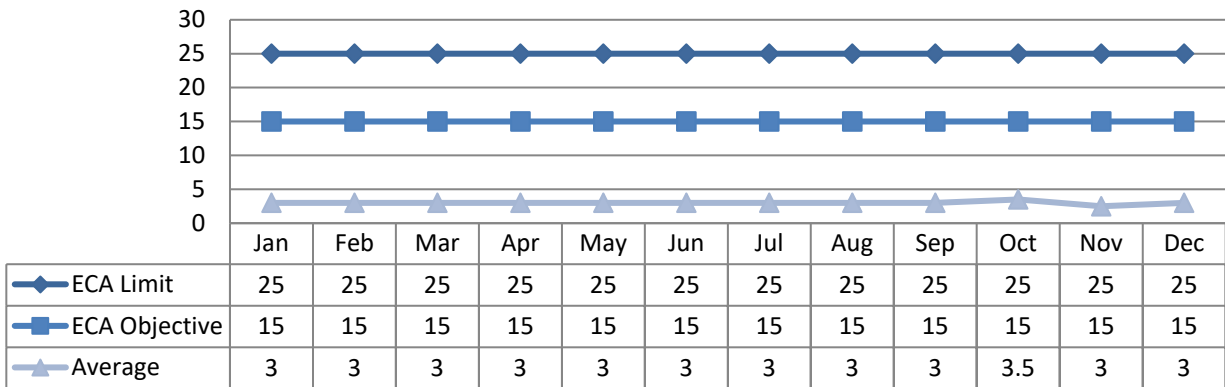
- Process Data Management (PDM)
 - This database program consolidates all operational data from a variety of sources including field data, online instrumentation, and electronic receipt of lab test results for reporting, tracking and analysis.
- Maximo – OCWA's Work Management System (WMS)
 - This program is used to track and schedule maintenance activities for all equipment in the system. It is also used to assign tasks for specific operational tasks.
- Wonderware (OUTPOST5)/SCADA
 - Wide-area SCADA system allows for process optimization and data logging, process trending, remote alarming.

The operations team also has access to a network of operational compliance and process specialists to assist for emerging process issues. This aids in establishing additional control measures to ensure a quality effluent product.

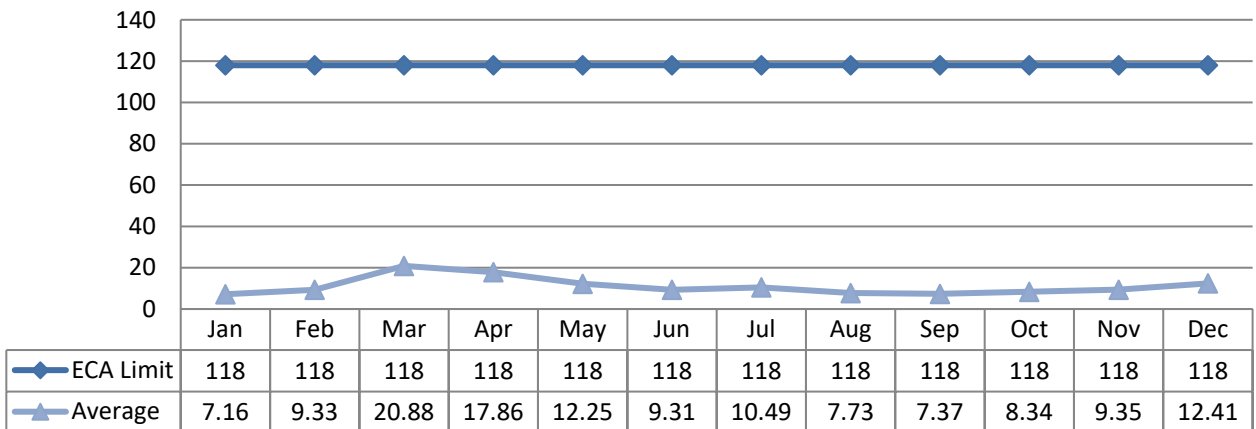
Detailed individual sample results for both raw sewage and final effluent can be requested from the operating authority.

6.2 CBOD5 (mg/L)

The compliance limit and objective for this parameter were met in 2022.

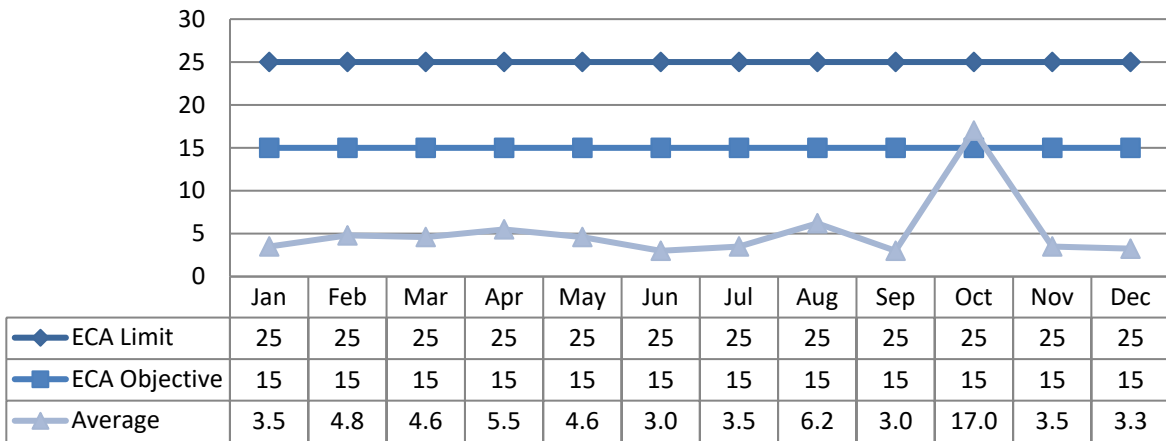


6.2.1 Loading (kg/d)

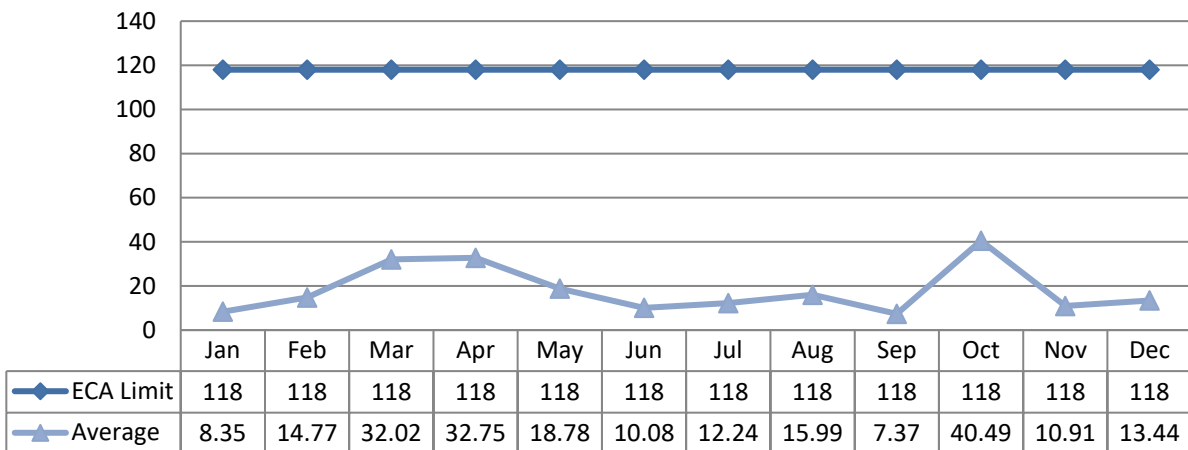


6.3 Total Suspended Solids (mg/L)

The compliance limit for this parameter was met in 2022.

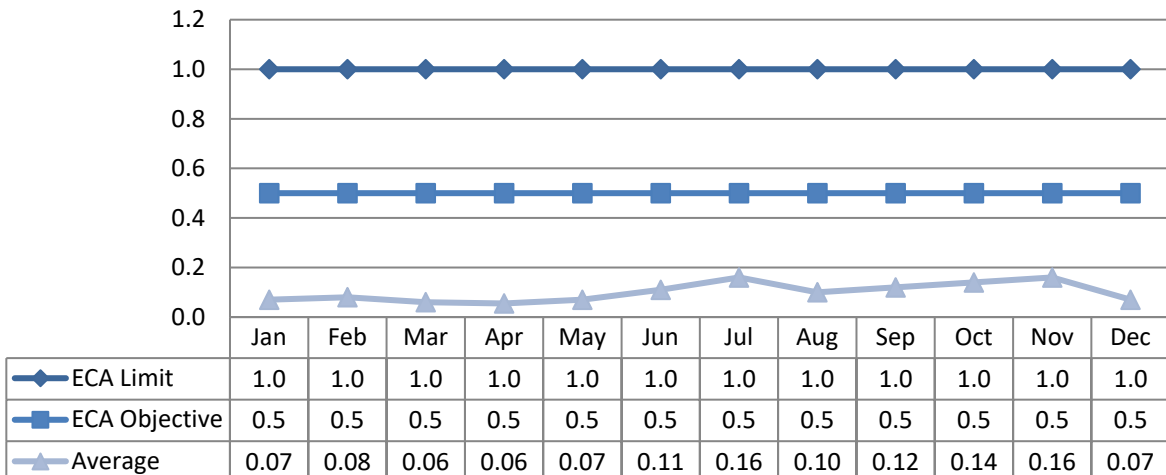


6.3.1 Loading (kg/d)

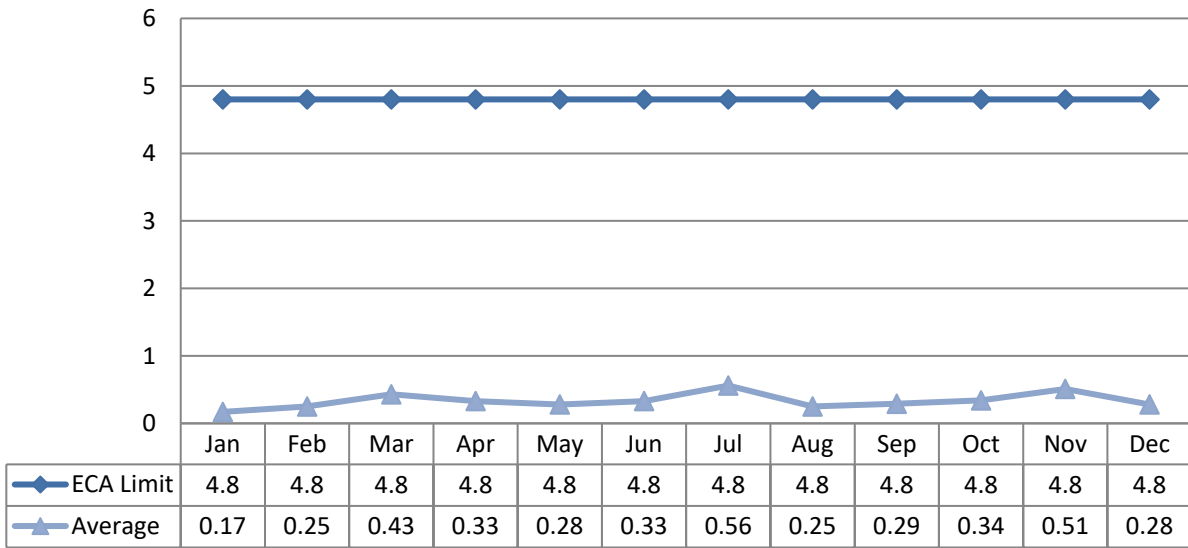


6.4 Total Phosphorus (mg/L)

The compliance limit and objective for this parameter were met in 2022.

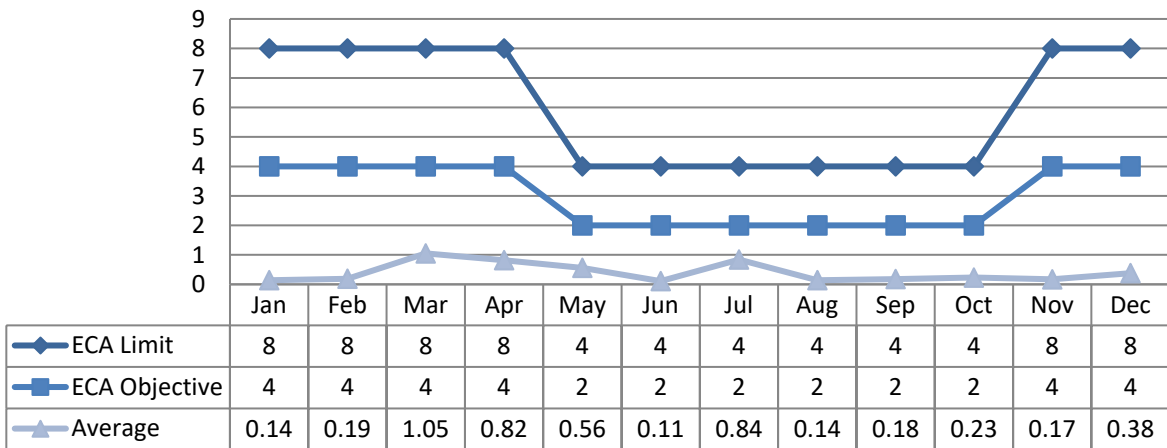


6.4.1 Loading (kg/d)

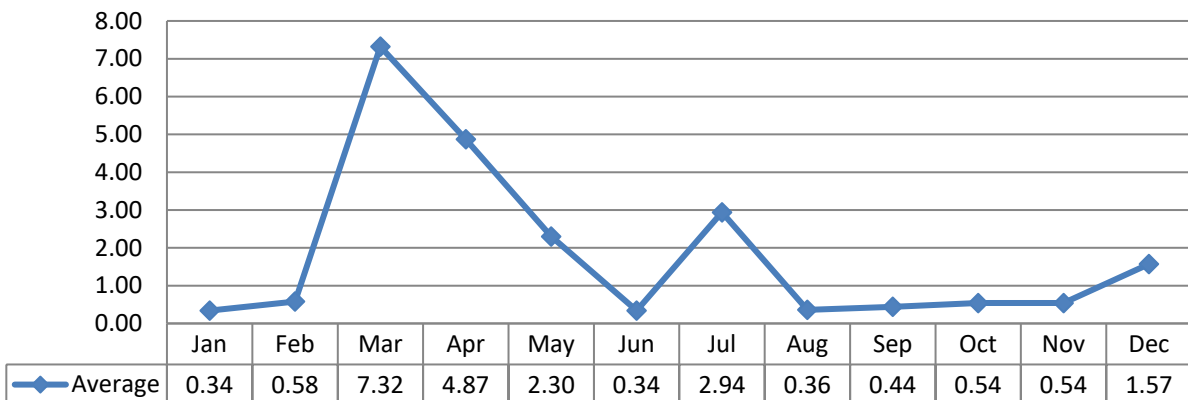


6.5 Total Ammonia Nitrogen (mg/L)

The compliance limit and objective for this parameter were met in 2022.



6.5.1 Loading (kg/d)



6.9 Acute Lethality

There was one (1) sample collected in 2022 and tested for acute lethality (Rainbow Trout and Daphnia Magna). This sampling is required both provincially and federally. Results are displayed as % mortality. An adverse result is a > 50% mortality rate.

The Federal and Provincial limit for this parameter was met in 2022.

Date	Rainbow Trout	Daphnia Magna
August 3, 2022	0%	0%

7 Monitoring Schedule

The 2023 Calendar can be viewed in Appendix B.

7.1 Deviations

Date	Details	Cause of Deviation
There were no deviations from the sample calendar or any missed samples in 2022.		

8 Operating Issues/Problems

There were no significant operating issues/problems to report on in 2022.

8.1 Effluent Quality Non-Compliance Summary

Date	Exceedance of	Objective	Value	Corrective Action
October 2022	Total Suspended Solids ECA Objective	15 mg/L	17 mg/L	October 4 th result was elevated. Inspected effluent composite sampler for debris. Monitored future results, all back to normal.

8.2 Summary of Abnormal Sewage Discharge Events

Abnormal Discharge Events include Bypass, Overflows, Diversions and Spills of Sewage. Summary Details are included in Appendix D.

8.3 Spills (Other than Sewage)

Date	Location	Details	Volume (m3)	Start Date and Time	End Date and Time
There were no spills (other than sewage) to report on in 2022.					

9 Maintenance

Routine planned maintenance activities are scheduled in WMS and include:

- Inspect, adjust and calibrate process control equipment to ensure proper operation of water distribution systems, pumps, chemical feeders, and all other equipment installed at the facilities.
- Carry out a routine maintenance program including greasing and oiling as specified in the lubrication schedule.
- Perform day-to-day maintenance duties to equipment including checking machinery and electrical equipment when required.
- Maintain an equipment inventory
- Maintain accurate records of work conducted, activities, and achievements.

Planned maintenance activities are communicated to the person responsible for completing the task through the issuance of WMS work orders. Work orders are automatically generated on a schedule as determined based on manufacturer’s recommendations and site specific operational and maintenance needs and are assigned directly to the appropriate operations personnel. This schedule is set up by the designated WMS Primary. Work orders are completed and electronically entered into WMS by the person responsible for completing the task.

Unplanned maintenance is conducted as required.

9.1 Normal Maintenance and Repairs

Work Order	Details
2174648	Grease holding/dewatering tank
2639123	SCADA HMI upgrade
2723987	Grey Water pump repair
2680614	UV system components, spare parts for repairs
2723912	SBR #1 drained/inspected, diffusers repaired
2680965	SBR Blower # repaired
2723985	SBR Blower #3 VFD replaced
2723991	Digester Stage 2 drained/inspected
2680612	Safety walkway for drying beds installed
2723987	Grey water hose bib installed headworks
2680959	WAS pump rebuilt
2680617	Multi-Ranger 200 HMI & Transducer for spare level meter
2723985	Lab stirrer to assist with jar testing
2723989	Gas detector calibrations
2680611	Generator maintenance
2680967	SPS 3 pump rebuild
2680968	SPS 6 pump rebuild
2680591	Entrance Gate SPS 6 installed
2680610	SPS generator maintenance

9.2 Emergency Maintenance and Repairs

Work Order	Details
2773523	Auger monster brush replaced
2824020	Siding repair on administration building due to wind storm

9.3 Flow Meter Calibrations and Maintenance

Location	Date of Calibration	Additional Maintenance
FIT-103 Sludge Loading Flow	April 6, 2022	N/A
FIT-102 Supernatant Flow	April 6, 2022	N/A
FIT-101 RAS/WAS Flow	April 6, 2022	N/A
FIT-104 Sewage Influent Flow	April 6, 2022	N/A
FIT-301 Plant Effluent Flow	April 6, 2022	N/A
FIT-701 SPS #5 Flow	April 6, 2022	N/A

9.4 Authorized Alterations in Collection System

Work Order	Details	Significant Drinking Water Threat (Y/N)
There were no alterations in the collection system made in 2022		

9.5 Notice of Modifications

Date	Process	Modification	Status
There were no modifications to the collection system made in 2022			

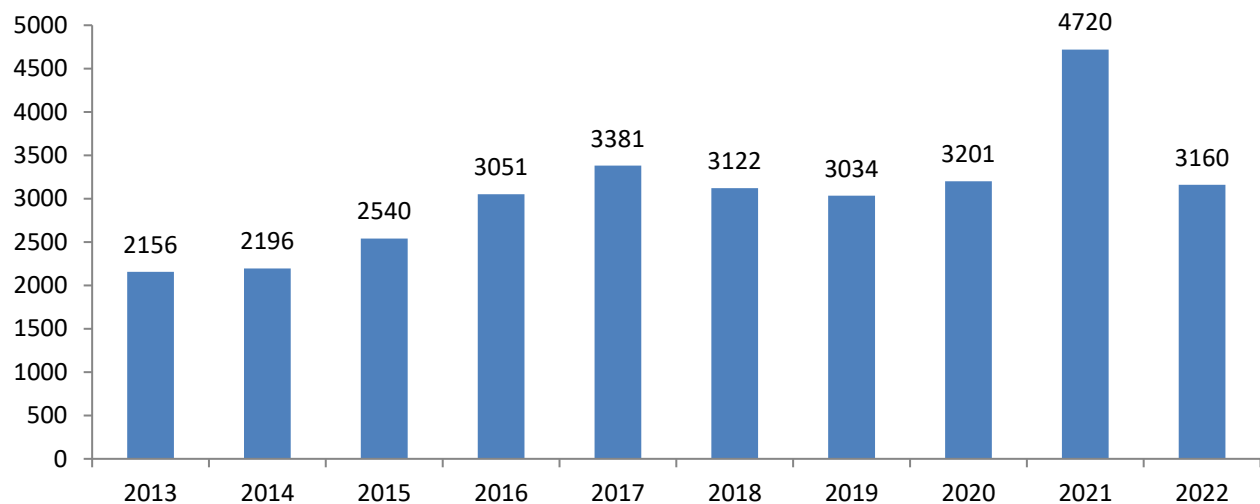
10 Sludge Generation

10.1 Sludge Disposal Summary

Date	Disposal Location	Approval Number	Total Volume (m3)
May 2022	Edwardsburgh/Cardinal, Concession: 3, Lot 2/3	ECA# H480300	2640
May 2022	Nine Mile Storage Tank, ECA # A710174	ECA# H480300	520

In 2022, a total of 3,160 m3 of liquid bio-solids was hauled offsite by GFL and some was utilized as soil conditioner. Of this, 520 m3 was hauled to a processing facility in May, and 2640 m3 was spread in May (NASM Submission ID #23351). It is anticipated that approximately the same volume of sludge will be generated in 2023.

10.2 Annual Comparison (m3/year)



It is anticipated that sludge volumes will remain similar to the 2022 volumes.

11 Summary of Complaints

Location	Date	Nature of Complaint	Actions Taken
There were no complaints to report in 2022			

Appendix A

Appendix A - Imported Sewage Sample Results

There was no imported sewage received in 2022.

Appendix B

Appendix B – 2023 Sample Calendar

Prescott Water Pollution Control Plant - 2023

	Monthly Raw Sewage Composite	Weekly Effluent				Bi-Monthly Digested Sludge		Acute Lethality	Weekly Effluent Monitoring												
									Composite Samples					Grab Samples							
January								---													
February								---													
March								---													
April								---													
May								---													
June								---													
July																					
August								---													
September								---													
October								---													
November								---													
December								---													

Monthly Raw Sewage Monitoring Composite Samples: BOD, SS, TP, TKN

Bi-monthly Digested Sludge: *E. coli*, % Moisture, Alkalinity as CaCO₃, N-NH₃ (Ammonia), N-NH₃ (unionized), NO₂ (nitrite), NO₃ (nitrate), pH, TKN, Phosphorus, Total Volatile Solids, Volatile Acids as Acetic Acid, Potassium, Aluminum, Arsenic, Cadmium, Mercury, Molybdenum, Nickel, Total Solids, Chromium, Cobalt, Copper, Lead, Selenium, Zinc

Weekly Effluent Composite Samples: BOD, SS, TP, Ammonia, Calculated Unionized Ammonia

Weekly Effluent Grab Samples: *E. coli*, pH, Temperature

Appendix C

Appendix C - Biosolids Quality Report

2022 - PRESCOTT WWTP MONTHLY AEROBIC BIOSOLIDS CONCENTRATION RATIO

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Ammonia	25	23.5	59.45	66.5	32	123	193.5	118.5	87.55	97.10	124.0	29.1
Nitrate	0	0	1	1	1	1	1.1	1	0.3	1.10	1	1.6
Ammonia + Nitrate	25	23.9	60.5	67.1	32.8	124.0	194.6	119.5	87.85	98	125.0	30.7
Total Phosphorus	579	479	562	590	517	632.0	779.5	531	674.5	634	722.5	465
Total Solids	22500	19000	26300	30850	19000	33300.0	30550	27300	31200	34950	34950	14350
Aluminum	651	968	965	1200	843	1780.0	1650	1225	1125	1450	1515	938.5
Arsenic	0.15	0.20	0.25	0.24	0.20	0.30	0.3	0.3	0.2	0.15	0.35	0.2
Cadmium	0.04	0.03	0.03	0.03	0.03	0.03	0.035	0.03	0.03	0.03	0.03	0.03
Chromium	0.57	0.70	0.75	0.94	0.59	1.08	1.45	0.91	0.72	0.96	1.125	0.645
Cobalt	0.06	0.05	0.08	0.09	0.05	0.10	0.11	0.085	0.05	0.09	0.09	0.07
Copper	7.47	9.48	10.38	11.95	7.67	13.45	14.45	11.95	8.905	12	13.65	8.45
Lead	0.50	0.55	0.65	0.80	0.50	0.95	1.45	1	0.55	0.85	0.95	0.6
Mercury	0.01	0.01	0.01	0.01	0.01	0.01	0.0115	0.0105	0.008	0.01	0.009	0.0095
Molybdenum	0.19	0.23	0.24	0.28	0.19	0.31	0.33	0.29	0.24	0.33	0.36	0.24
Nickel	0.46	0.59	0.60	0.74	0.49	0.78	0.86	0.65	0.535	0.66	0.815	0.485
Selenium	0.10	0.15	0.10	0.20	0.10	0.20	0.2	0.2	0.1	0.10	0.2	0.15
Zinc	8.03	9.50	9.95	11.90	8.07	14.30	15.8	12.35	10.4	14.0	15.8	11.7

Metals ratio = mg metals/kg solids

	Metal/Solids Ratio (Sludge)												
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Limit
Arsenic	6.67	10.53	9.51	7.62	10.53	9.01	9.82	10.99	6.41	4.29	10.01	13.94	170
Cadmium	1.56	1.58	1.14	0.97	1.58	0.90	1.15	1.10	0.96	0.86	0.86	2.09	34
Chromium	25.3	36.6	28.5	30.3	31.1	32.3	47.5	33.3	23.1	27.47	32.19	44.95	2800
Cobalt	2.44	2.63	2.85	2.76	2.37	2.85	3.60	3.11	1.60	2.58	2.58	4.88	340
Copper	332	499	394	387	404	404	473	438	285	335.62	390.56	588.85	1700
Lead	22.22	28.95	24.71	25.93	26.32	28.53	47.46	36.63	17.63	24.32	27.18	41.81	1100
Mercury	0.27	0.39	0.29	0.31	0.34	0.38	0.38	0.38	0.26	0.31	0.26	0.66	11
Molybdenum	8.44	12.11	8.94	8.91	9.74	9.31	10.80	10.62	7.69	9.30	10.30	16.72	94
Nickel	20.22	31.05	22.62	23.82	25.53	23.42	28.15	23.81	17.15	18.74	23.32	33.80	420
Selenium	4.44	7.89	3.80	6.48	5.26	6.01	6.55	7.33	3.21	2.86	5.72	10.45	34
Zinc	357	500	378	386	425	429	517	452	333	400.57	452.07	815.33	4200

Sludge is Acceptable	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
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SOME ANALYSIS RESULTS EXPRESSED AS "<" (LESS THAN); HOWEVER, IN ORDER TO COMPLETE THE CALCULATION, ONLY THE NUMERIC VALUE WAS USED; THEREFORE THE AVG. CONC. IS GREATER THAN ACTUAL.

Appendix D

Appendix D - Details of Abnormal Sewage Discharge Events

Facility Bypass

Date	Location	Details	Volume (m3)	Start Time	End Time	Duration (h)	Discharge Receiver	Disinfection Provided
There was no facility bypass to report in 2022								

Facility Overflow

Date	Location	Details	Volume (m3)	Start Time	End Time	Duration (h)	Discharge Receiver	Disinfection Provided
There was no facility overflow to report in 2022								

Collection Overflow

Date	Location	Details	Volume (m3)	Start Time	End Time	Duration (h)	Discharge Receiver	Disinfection Provided
There were no collection system overflows to report in 2022								

Spills of Sewage

Date	Location	Details	Volume (m3)	Start Time	End Time	Duration (h)	Discharge Receiver	Disinfection Provided
There were no spills of sewage to report in 2022								

Collection System Monitoring Data

Event Date	Event Location	Volume (m3)	Parameter	mg/L	Source Loading	Any Adverse Impacts & Corrective Actions
There were no collection system overflows to report in 2022						

Appendix E

Appendix E - ECA Annual Report Requirements

Facility ECA # 6996-9ZYNWH Section 10(6)	Section in Report
a) Summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in condition 7, including an overview of the success and adequacy of the Works	Section 6 – Effluent Quality
b) Description of any operating problems encountered and corrective actions taken	Section 8 – Operating Problems/Issues
c) Summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Works	Section 9 – Maintenance
d) Summary of any effluent quality assurance or control measures undertaken in the reporting period	Section 6 – Effluent Quality
e) Summary of the calibration and maintenance carried out on all effluent monitoring equipment	Section 9.3 – Flow Meter Calibrations
f) Description of efforts made and results achieved in meeting the Effluent Objectives of Condition 6	Section 8 – Operating Problems/Issues
g) Tabulation of the volume of sludge generated in the reporting period, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations where the sludge was disposed	Section 10 – Sludge Generation
h) Summary of any complaints received during the reporting period and any steps taken to address the complaints	Section 11 – Summary of Complaints
i) Summary of all By-pass, spill or abnormal discharge events	Appendix D, Section 8 – Operating Problems/Issues
j) Copy of all Notice of Modifications submitted to the Water Supervisor as a result of Schedule B, Section 1, with a status report on the implementation of each modification	Section 9 – Maintenance
k) Report summarizing all modifications completed as a result of Schedule B, Section 3	Section 9 - Maintenance
l) Any other information the Water Supervisor requires from time to time	N/A
Collection ECA # 5215-6VRQTA	
No reference of annual reports in Collection system ECA	N/A