TORONTO Water

ASHBRIDGES BAY WASTEWATER TREATMENT PLANT

2022 Annual Report

March 31, 2023

EXECUTIVE SUMMARY

The Ashbridges Bay Treatment Plant (ABTP) is one of four wastewater treatment facilities operated by the City of Toronto. This facility, located at 9 Leslie Street, has a rated capacity of 818,000 m^3/day, or 818 ML/day, and serves an equivalent population of approximately 1,393,845. The Ashbridges Bay Treatment Plant discharges into Lake Ontario and operated under Amended Environmental Compliance Approval (ECA) Sewage No. 1336-B6GM3S, issued on June 26, 2019, at which point it was replaced by Amended ECA No. 5039-C9CK5L, issued on May 31, 2022.

The average daily flow rate in 2022 was 570.4 ML/day. Influent concentrations of Biochemical Oxygen Demand (BOD_5), Total Phosphorus (TP) and Total Suspended Solids (TSS) averaged 203.1 mg/L, 6.5 mg/L, and 324.1 mg/L, respectively.

Ashbridges Bay Treatment Plant achieved the following effluent quality and loading rates in 2022 in comparison to ECA limits:

Parameter	ECA[1]	2022 Final Effluent
Total Suspended Solids (TSS)	25.0 mg/L	13.8
Carbonaceous Biological Oxygen Demand ($CBOD_5$)	25.0 mg/L	6.4
Total Phosphorus (TP)	1.0 mg/L	0.7
Escherichia Coli (E. Coli)[2]	200 CFU/100 mL	60.0
pH	6.0-9.5	7.1
TSS Loading Rate	20,450 kg/day	7,567
$CBOD_5$ Loading Rate	20,450 kg/day	3,257
TP Loading Rate	818 kg/day	407

[1] Referenced from ECA Sewage No. 5039-C9CK5L Schedule C.

[2] Arithmetic mean of monthly geometric mean data.

In 2022, a process upset in November resulted in elevated phosphorus levels over several days causing the monthly average to exceed the total phosphorus compliance limit specified in Schedule C of the ECA. Corrective measures have since been implemented to eliminate the recurrence of non-compliance in the future.

During 2022, the biosolids generated at Ashbridges Bay were managed through agricultural land application, soil amendment use, pelletization, and mine reclamation. The total amount of biosolids generated at the plant in 2022 was 155,604 wet tonnes at an average of 28.02 % total solids (TS). The biosolids generated met all the metal and *E. coli* concentration requirements set out in O.Reg 267/03.

Ferrous chloride consumption for phosphorus removal totalled 1,722 tonnes as Fe. Polymer consumption in 2022 for waste activated sludge (WAS) thickening and sludge dewatering totalled 165 and 607.5 tonnes, respectively. Total sodium hypochlorite (12% w/v) consumption for disinfection totalled 3,842 m^3.

There were thirteen secondary treatment system bypass occurrences in 2022 where portions of the flow did not receive secondary treatment, but still received preliminary treatment, primary treatment, and nutrient removal before being disinfected and discharged into Lake Ontario. Total bypassed flows were estimated to be 2,859 ML.

The plant continued with numerous capital projects. Notable projects included: construction of a new ultraviolet (UV) disinfection facility; construction of a new influent pumping station; construction of a new WAS thickening facility; construction of a new plant outfall; design of D Building Phase 2; design of a dewatering polymer system; and construction of Digesters 9-12 upgrade. A variety of scheduled, preventative, predictive and reactive maintenance was performed, including annual calibration of effluent monitoring equipment.

Total annual consumption for potable water, hydro, and natural gas was 555,218 m^3, 131.7 GWh, and 6.7 M scm, respectively. Direct operating costs for 2022 totalled $65.9 M. In 2022, the Ashbridges Bay Treatment Plant had a staffing compliment of 145 full time equivalent (FTE) employees. As of December 31st, 2022, there were 11 health and safety incidents and 138 lost time days due to work related injuries in 2022.

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GLOSSARY OF ABREVIATIONS

AAC	Annual Average Concentration
BOD5	Five-Day Biochemical Oxygen Demand
CBOD5	Five-Day Carbonaceous Biochemical Oxygen Demand
CEPT	Chemically Enhanced Primary Treatment
CEU	Continuing Education Units
CFU	Colony Forming Units
DAF	Dissolved Air Flotation
E. coli	*Escherichia coli*
ECA	Environmental Compliance Approval
Fe	Iron
HTP	Humber Treatment Plant
HRT	Hydraulic Retention Time
kg	Kilogram
kWh	Kilowatt-hour
MAC	Monthly Average Concentration
MGMD	Monthly Geometric Mean Concentration
MWh	Megawatt-hour
m3	Cubic metre
m3 /day	Cubic metre per day
mg/L	Milligrams per litre
mL	Millilitre
ML	Million litres
MECP	Ministry of the Environment, Conservation and Parks
Q	Flow Rate
RAS	Return Activated Sludge
SBS	Sodium Bisulphite
SBS (P)	Sodium Bisulphite Presence
scm	Standard cubic metre
SS	Suspended Solids
TCR	Total Residual Chlorine
TP	Total Phosphorus
TS	Total Solids
TSS	Total Suspended Solids
TVS	Total Volatile Solids
TWAS	Thickened Waste Activated Sludge
µg/L	Micrograms per litre
WAS	Waste Activated Sludge
% w/v	Percent concentration of components of a solution expressed as weight by volume
% w/w	Percent concentration of components of a solution expressed as weight by weight

Definitions

Bypass: Means diversion of sewage around one or more treatment processes, excluding Preliminary Treatment System, within the Sewage Treatment Plant with the diverted sewage flows being returned to the Sewage Treatment Plant treatment train upstream of the Final Effluent sampling point(s) and discharged via the approved effluent disposal facilities.

Overflow: An overflow is defined as a discharge to the environment from the plant at a location other than the plant outfall downstream of the final effluent sampling station.

Spill: A spill is defined within the meaning of Part X of the Environmental Protection Act. "Spill", when used in reference to a pollutant, means a discharge,

a) into the natural environment,
b) from or out of a structure, vehicle or other container, and
c) that is abnormal in quality or quantity in light of the discharge.

Abnormal Discharge: A discharge of a pollutant designated by the regulations at a location designated by the regulations shall be deemed to be in a quantity or with a quality abnormal at the location. R.S.O. 1990, c. E.19, s. 91 (2).

$$Loading\ \left(\frac{kg}{day}\right) = Concentration\ \left(\frac{mg}{L}\right) \times Flow\ \left(\frac{ML}{day}\right)$$

$$Percent\ Removal\ (\%) = 1 - \frac{Concentration\ (Final)}{Concentration\ (Initial)}$$

$$Aeration\ Loading = \left(\frac{kg\ cBOD}{m^3\ aeration\ capacity}\right) = \frac{(Q_{Primary\ Effluent} + Q_{RAS}) \times [cBOD_{5_{primary\ effluent}}]}{V_{aeration\ Tanks}}$$

$$Solids\ Capture\ (\%) = \frac{Centrifuge\ Feed\ TS - Centrate\ TSS}{Centrifuge\ Feed\ TS} \times 100$$

1 INTRODUCTION

The Ashbridges Bay Treatment Plant (ABTP) is one of four wastewater treatment facilities operated by the City of Toronto under the responsibility of the Wastewater Treatment section of Toronto Water. The facility is located at 9 Leslie Street, in Toronto's east end and also includes two raw sewage pump stations located north of Lake Shore Boulevard at 1091 Eastern Avenue. The Ashbridges Bay Treatment Plant services a sewershed of approximately 25,000 ha and an estimated connected population of 1,393,000[1]; bounded by Steeles Avenue on the north, the Humber sewershed on the west, the Highland Creek sewershed on the east, and the lakeshore on the south. The plant also provides production of biosolids for beneficial use, including the biosolids that are generated and transferred from the Humber and North Toronto Treatment Plants. The Ashbridges Bay Treatment Plant has a rated capacity of 818,000 m3/day, or 818 ML/day.

Major liquid treatment processes include screening and grit removal, primary treatment, secondary treatment, nutrient removal, and effluent disinfection. Treated effluent is discharged to Lake Ontario. Solids handling processes include waste activated sludge thickening, sludge stabilization by anaerobic digestion, dewatering using high speed centrifuges and biosolids management. Numerous auxiliary systems are required for proper operation of plant processes and include: potable water, process water (i.e. "plant water"), heating, ventilation and air conditioning (HVAC), SCADA, odour control, electrical power distribution, natural gas, chemicals, and instrument air.

The Ministry of the Environment, Conservation and Parks (MECP) has classified the Ashbridges Bay Treatment Plant as a Class IV wastewater treatment facility under Regulation 129/04. In 2022, the plant operated under Amended Environmental Compliance Approval (ECA) Sewage No. 1336-B6GM3S, issued on June 26, 2019, at which point it was replaced by Amended ECA No. 5039-C9CK5L, issued on May 31, 2022.

This report is a summary of plant operations and performance in 2022. Highlights of the report include a discussion of effluent quality and summaries of process operations, maintenance, chemical and utility consumption, capital projects, operational costs and human resources.

[1] Population estimated by sewershed delineation and 2021 census data

2 PLANT PROCESS OVERVIEW

A description of the plant process is included below. A plant process flow diagram is available in Appendix A. Additional information on the plant's process can be found on the City of Toronto website[2].

2.1 Influent

The Ashbridges Bay Treatment Plant treats wastewater flows from the Mid-Toronto, High Level, Low Level, and Lakefront Interceptor Sewers, as well as the Queen Street and Coxwell Avenue Trunk Sewers. The Mid-Toronto Interceptor flows are pumped to the plant via the Pumping Station known as "T Building". The High Level and Low Level Interceptor Sewers, and the Queen Street Trunk Sewer flows are pumped to the plant via the Pumping Station known as '"M Building". The Lakefront Interceptor Sewer flows are pumped to the plant via the M Building or the T Building. The Coxwell Avenue Trunk Sewer flows come to the plant by gravity. Once wastewater enters the plant, it flows by gravity through the plant's processes.

Influent to the Ashbridges Bay Treatment Plant also includes sludge flows received from the Humber Treatment Plant and the North Toronto Treatment Plant via the Mid-Toronto Interceptor and Coxwell Sanitary Trunk Sewer, respectively.

2.2 Preliminary Treatment

Raw wastewater enters the Headworks (known as "P" and "D" Buildings) for grit and screenings removal. The P Building has six aerated grit channels and six mechanical screens. D Building has five mechanical screens and four aerated grit channels. The removed grit and screenings from P and D Buildings are hauled to a sanitary landfill site. Ferrous chloride is applied for nutrient removal (i.e. phosphorous removal) to the distribution conduits upstream of the aerated grit channels.

2.3 Primary Treatment

Primary Treatment occurs in the Primary Clarification Tanks, where the flow velocity of the wastewater is reduced to allow heavier solids to settle to the bottom. There are 12 Primary Clarification Tanks. Sludge collectors in the tanks sweep the settled sludge, called primary or raw sludge, into sludge hoppers. Floating solids, called scum, are collected from the top of the water

[2] https://www.toronto.ca/services-payments/water-environment/managing-sewage-in-toronto/wastewater-treatment-plants-and-reports/

and swept into scum hoppers. The primary sludge and scum are then pumped out for further treatment and the wastewater, called primary effluent, continues onto secondary treatment.

2.4 Secondary Treatment

The primary effluent receives secondary treatment through a conventional, suspended biomass activated sludge process in the Aeration Tanks. The mixed liquor consists of primary effluent mixed with return activated sludge (RAS), which is removed from the Final Clarification Tanks and contains micro-organisms that naturally occur in wastewater and facilitate its degradation. In the presence of oxygen, these micro-organisms break down organic material in the wastewater. Air is supplied to the Aeration Tanks through 10 electrically driven blowers. There are a total of 11 Aeration Tanks that employ a step feed aeration process with four passes per tank. Aeration Tank No.1 and 3 – 9 are equipped with plastic disc coarse air bubble diffusers; Aeration Tank No. 10 and 11 are equipped with stainless steel coarse bubble diffusers; and Aeration Tank No. 2 is equipped with a mix of ceramic and membrane fine bubble diffusers.

The mixed liquor from the Aeration Tanks flows to 11 large Final Clarification Tanks, where the activated sludge is allowed to settle. A controlled quantity of this sludge is returned to the Aeration Tanks as RAS in order to maintain a sufficient biomass concentration. The excess is removed as waste activated sludge (WAS).

The plant has 10 Dissolved Air Flotation (DAF) Tanks to thicken WAS with the use of air and a thickening polymer, which is used as a coagulant. The plant also has the capacity to co-settle WAS from the Final Clarification Tanks in the Primary Clarification Tanks. At the DAF facility, incoming WAS first enters an inlet splitter box, dividing the inlet flow between the DAF tanks in operations. This splitter box also contains an overflow pipe which allows the excess WAS flow to return to the Aeration Tanks.

2.5 Final Effluent

Through operating and maintaining preliminary, primary, and secondary treatment processes, final effluent is treated to meet Schedule B of the ECA (No. 5039-C9CK5L). Sodium Hypochlorite is used to disinfect and kill pathogens in the final effluent.

The final effluent is discharged to Lake Ontario through an outfall pipe equipped with diffusers and extending approximately 1000 m into the lake from the shore. During periods of wet weather flows, the plant also has the capability of discharging final effluent through the seawall gates to prevent flooding.

2.6 Solids Handling

All primary sludge, thickened WAS (TWAS), co-settled WAS from the Primary Clarification Tanks, and scum from the Primary and Secondary Clarification Tanks, collectively called "sludge", is treated, handled and disposed of in a similar manner, consisting of anaerobic digestion, dewatering and then hauled or pelletized.

Anaerobic digestion is the biological degradation (stabilization) of organic materials in the absence of oxygen – it reduces volume of solids, destroys pathogens and mitigates sludge odour. The process produces digester gas, made up predominantly of methane. This gas is used as a supplementary fuel for plant needs, including process and space heating, thereby reducing the plant's operating costs and carbon footprint. The digesters are operated in the mesophilic temperature range (34 – 38^{o}C). The Digestion process at Ashbridges Bay Treatment Plant consists of 20 primary digesters.

The resulting anaerobically digested sludge, called "biosolids", is subsequently conditioned with a polymer and dewatered by centrifugation. Twelve solid bowl dewatering centrifuges are used to dewater the biosolids. The resulting biosolids "cake" is pumped either to the plant's Truck Loading Facility, or to the onsite pelletizer facility.

2.7 Solids Management

The dewatered biosolids are managed in a number of ways, including agricultural land application, third party process stabilization, pelletization, landfilling, and mine reclamation.

3 PROCESS SUMMARY

3.1 Process Parameters

In 2022, the Ashbridges Bay Treatment Plant continued to produce a high quality effluent. A summary of key secondary treatment effluent and final effluent parameters against the ECA objectives and limits are shown in Table 1. Influent and effluent performance charts are available in Appendix B. Historical performance data is included in Appendix C.

Table 1: Secondary Treatment and Final Effluent Parameters

Parameter	$cBOD_5$ [1] ,mg/L	TSS, mg/L	TP, mg/L	Total Residual Chlorine, mg/L	E-Coli, count/100mL	pH	
						Min	Max
Secondary Effluent							
January	5.3	10.5	0.8	0.52	15	6.8	7.4
February	5.0	8.0	0.4	0.55	25	6.5	7.5
March	4.9	7.4	0.4	0.52	17	6.6	7.3
April	5.3	6.6	0.5	0.51	32	6.7	7.1
May	5.5	9.1	0.7	0.54	19	6.7	7.3
June	6.4	9.7	0.5	0.53	40	6.8	7.6
July	5.1	11.1	0.8	0.54	79	6.8	7.5
August	5.8	13.2	0.7	0.55	29	6.8	7.4
September	4.7	17.5	0.9	0.53	69	6.7	7.4
October	6.2	16.5	0.9	0.53	102	7.0	7.5
November	8.4	29.3	1.3	0.55	100	6.8	7.8
December	6.9	22.6	0.84	0.56	190	6.8	7.5
Annual Average Effluent Concentration	**5.8**	**13.5**	**0.7**	**0.53**	**60**	**7.1**	
Loading[2], kg/d	3257	7567	407	N/A	N/A	N/A	N/A
Removal Efficiency ,%	96%	96%	89%	N/A	N/A	N/A	N/A

[1] cBOD = 0.8 * BOD assumed for removal efficiency calculatons.

[2] Loading is calculated based on the flow rates as provided in Table 2.

Table 1: Secondary Treatment and Final Effluent Parameters (continued)

ECA Requirements [4,5]						
Final Effluent Objective	AAC: 25.0 mg/L	AAC: 25.0 mg/L	MAC: 1.0 mg/L	N/A	N/A	6.5-8.5
Secondary Treatment Effluent Objective	AAC: 15.0 mg/L	AAC: 15.0 mg/L	MAC: 0.9 mg/L	N/A	N/A	6.5-8.5
Secondary Treatment Effluent Limit	AAC: 25.0 mg/L	AAC: 25.0 mg/L	MAC: 1.0 mg/L	N/A	N/A	6.0-9.5
Average Waste Loading Limit[3]	AAL: 20,450 kg/d	AAL: 20,450 kg/d	AAL: 818 kg/d	N/A	N/A	N/A

[3] Loading is calculated based on the flow rates as provided in Table 2.

[4] Referenced from ECA Sewage 5039-C9CK5L, issued on May 31, 2022.

[5] AAC refers to Annual Average Concentration, MAC refers to Monthly Average Concentration, MGMD refers to Monthly Geometric Mean Density, and AAL refers to Annual Average Daily Loading

Influent and Final effluent concentrations of eleven select heavy metals have been included in Appendix E. Any discharge into City sewers must meet the sewer use By-law limits. Final effluent concentrations are presented to assess the treatment plant's removal capacity.

A summary of the annual average of process parameters over the past three years is shown in *Table 2*.

Table 2: Process Parameters

Parameter	Units	2022	2021	2020
Influent Parameters				
Flow[1]	ML/day	570.4	512.8	556.3
Total Annual Flow[1]	ML	208,083	187,270	203,657
Total Suspended Solids (TSS)	mg/L	324.1	329.7	252.9
Biological Oxygen Demand (BOD_5)	mg/L	203.1	218.5	179.3
Total Phosphorus (TP)	mg/L	6.5	6.3	5.6
Transfer from Humber TP: liquid biosolids	Dry tonnes/day	69.9	53.0	53.0
Transfer from Humber TP: WAS	Dry tonnes/day	1.9	4.3	4.3
Transfer from North Toronto TP: sludge (primary sludge, WAS, and scum)	ML/day	0.46	0.55	0.55
Preliminary Treatment				
Grit and Screenings	Tonnes/day	5.1	5.0	4.7
Primary Treatment				
TSS	mg/l	250.8	246.2	186.0
cBOD5	mg/L	118.6	132.5	117.0
Secondary Treatment				
Aeration Loading	kg $CBOD^5/m^3$·day	0.36	0.37	0.35

Parameter	Units	2022	2021	2020
Mixed Liquor Suspended Solids	mg/L	3,003	3,029	3,106
Flow through Seawall Gates	ML	2101	1462	1462
Solids Handling				
Primary Sludge Treated	m^3/day	3,822	3,357	4,874
Primary Sludge TS	%	2.5	1.9	2.4
Primary Sludge TVS	%	70.1	69.1	73.7
WAS to Primary Treatment and Excess Was to Aeration	m^3/day	4778	3430	1816
WAS to Thickening	m^3/day	8,222	8,266	7,787
WAS TS	%	1.00	1.05	0.94
TWAS Treated	m^3/day	2,258	2,527	2,257
TWAS TS	%	3.8	3.3	3.4
TWAS TVS	%	70.4	70.4	70.7
Volume to Digestion	m^3/day	6,080	5,885	7,131
Digesters Hydraulic Retention Time	days	20.2	20.9	17.3
Organic Loading to Digesters	TVS / m^3/day	1.0	0.8	1.1
Digester Gas Volume	m^3/day	54,497	52,682	59,945
Dewatering Centrifuge Feed TS	%	1.87	1.7	1.8
Dewatered Biosolids TS	%	28.02	27.0	26.9
Centrate Quality	mg/L	474.9	985	635
Solids Capture Rate	%	97.4	94.3	96.4
Centrifuge Run-time	hours	48,372	48,347	47,578

Influent flow to the Ashbridges Bay Treatment Plant increased by 11% in 2022. Influent strength of BOD, and TSS decreased by 7.1% and 1.7%, while TP, and TKN increased by 3.2% and 2.7%.

Final effluent annual average concentration for cBOD, TSS, and TP was 5.8 mg/L, 13.5 mg/L, and 0.7 mg/L, respectively and met the average effluent concentration specified in Schedule C of the ECA throughout 2022, with the exception of TP in November. The final effluent annual average for e. Coli monthly geometric mean density in 2022 was 60 CFU/100 mL. Final effluent pH remained between the range of 6.0 – 9.5 throughout the course of 2022.

Further to the TP limit exceedance in November, a process upset resulted in elevated phosphorus levels over several days causing the monthly average to exceed the compliance limit for that month. Corrective measures have since been implemented to eliminate the likelihood of recurrence of non-compliance in the future.

The Ashbridges Bay Treatment Plant encountered no chronic operating problems and continued to produce a high quality effluent through the continued improvement of operations and

maintenance of treatment processes. The plant consistently surpassed the design objectives highlighted in Condition 6 as well as Schedule B of the ECA.

There was one deviation from the monitoring schedule in 2022. On September 28th, 2022, there was an electrical shutdown which affected the weekly E. Coli sample collection. Consequently, it was deferred and collected on September 29th, 2022. *E. coli* sampling is conducted weekly, so it has been moved from Wednesday in 2022 to Thursday of every week in 2023. All other parameters specified in *Schedule D - Monitoring Program* of the ECA exceed the sampling frequency of 3 times/week specified by Condition 9(1)(b), negating the requirement for future sampling forecasts and scheduling.

3.2 Biosolids Management

The flow projections for 2023 do not exceed the plant rated capacity of 818 ML/day and are expected to generate a sludge volume that will be +/- 5% of the volume generated in 2022.

Biosolids analysis are included in Appendix F and compared against *Ontario Regulation 267/03* under the *Nutrient Management Act*, which governs the maximum acceptable metal concentration in biosolids that are applied to land. The average metal and *E. coli* concentrations met all criteria as designated in O. Reg 267/03.

Biosolids management from the Ashbridges Bay Treatment Plant in 2022 totalled 155,604 wet tonnes and was managed as follows.

3.2.1 Agricultural Land Application

A total of 41,268 wet tonnes of biosolids were sent to approved agricultural land application sites in Ontario. During the 2022 land application season, the City contracted an independent field inspector to monitor the practices of the City's land appliers. The independent field inspector observed the application of biosolids on numerous agricultural land sites in Ontario. The inspector was responsible for ensuring the Nutrient Management Act and accompanying Regulations were adhered to, site specific requirements were followed, and monitoring and recording of odour measurements were taken before, during and after application.

3.2.2 Third Party Process Stabilization (Soil Amendment)

In 2022, a total of 37,804 wet tonnes of biosolids were further processed off-site by licensed external service providers and beneficially used as Class A biosolids and soil amendments.

3.2.3 Pelletization

The operation and maintenance of the Ashbridges Bay Treatment Plant Pelletizer facility and marketing of pellets is managed by an outside contractor. In 2022, 68,248 wet tonnes of biosolids were processed by the on-site pelletizer. Pellet quality in 2022 met the standards set out by the Canadian Fertilizers Act.

3.2.4 Landfill Management of Biosolids

No biosolids were transported to landfill sites in 2022.

3.2.5 Mine Reclamation

A total of 8,283 wet tonnes of biosolids was utilized at mine reclamation sites. *Table 3* below summarizes the biosolids management methods utilized and the total amount of biosolids sent to each management option.

Table 3: Biosolids Management Methods

Biosolids Management Method	Wet Tonnes		
	2022	2021	2020
Agricultural Land Application	41,268	30,914	28,205
Alkaline Stabilization	37,804	28,849	36,617
Pelletization	68,248	73,055	77,661
Landfill	0	0	0
Mine Reclamation	8,283	7,700	5,874
TOTAL	**155,604**	**140,518**	**148,357**

3.3 Chemical Usage

Several chemicals are used during the treatment process at the plant. *Table 4* outlines the chemical consumption for the current and previous year. Costs listed exclude applicable taxes.

Table 4: Chemical Usage Summary

Process	Chemical	Parameters	2022	2021	2020
Phosphorus Removal	Ferrous Chloride as Fe	Dosage (mg/L)	8.18	10.56	9.20
		Consumption (tonnes)	1,722	1,962	1,846
		Cost ($)	$1,927,101	$2,199,462	$1,509,041
Disinfection[1]	Sodium Hypochlorite (12% w/v)	Dosage (mg/L)	2.22	2.24	2.16
		Consumption (m3)	3,842	3,520	3,684
		Cost ($)	$790,122	$584,629	$611,818
WAS Thickening	Polymer	Dosage (kg/DT)	5.49	6.20	6.03
		Consumption (tonnes)	165.00	196.50	160.50
		Cost ($)	$753,889	$863,546	$720,613
Biosolids Dewatering	Polymer	Dosage (kg/DT)	13.57	14.72	13.45
		Consumption (tonnes)	608	593	558
		Cost ($)	$4,165,652	$2,629,407	$2,290,431
CEPT	Ferric Chloride as FE	Dosage (kg/DT)	0.20	N/A	N/A
		Consumption (tonnes)	40.83		
		Cost ($)	$107,619		
CEPT	Polymer	Dosage (kg/DT)	N/A	N/A	N/A
		Consumption (tonnes)	2		
		Cost ($)	$8,929		

3.4 Bypasses, Overflows, Spills, and Abnormal Discharge Events

3.4.1 Bypasses

There were thirteen bypass events in 2022; all were secondary treatment bypasses. The total volume of bypass flow was 2,859 ML, or 1.39 % of the annual flow. Table 5 summarizes the bypass events that occurred in 2022.

Bypass flows do not receive secondary treatment (i.e. the Aeration Tanks) but receive preliminary, primary treatment, nutrient removal, as well as disinfection before the final effluent sampling point. All bypass flows are blended with fully treated plant effluent prior to discharge. Secondary bypasses result from high wet weather flows that exceed the plant's secondary treatment capacity. Each instance was reported to the MECP Spills Action Center and recorded

in the plant's Monthly report. Total precipitation in the Toronto area[3] was 728.9 mm in 2022, an 3.2% decrease compared to 2021.

Table 5: Bypass Summary

No.	Date	Start of Event	End of Event	Duration (hrs)	Volume (m^3)	Average Chlorine Dose (mg/L)
1	February 2nd, 2022	6:30:00 PM	9:13:00 PM	2.92	50,140	9.48
2	February 17th, 2022	7:46:12 AM	8:32:00 PM	12.77	591,830	9.48
3	February 22nd, 2022	6:09:06 PM	9:46:14 PM	3.62	111,810	9.53
4	June 7th, 2022	10:49:07 AM	6:27:24 PM	7.63	291,650	9.49
5	July 18th, 2022	6:45:37 AM	11:56:01 AM	5.22	208,520	9.96
6	August 22nd to 23rd	11:07:00 AM	12:24:00 AM	7.2	199,610	9.96
7	October 13th, 2022	8:25:00 AM	9:58:00 AM	1.42	27,660	9.45
8	November 8th, 2022	9:00:00 AM	10:56:00 AM	1.68	43	10.0
9	November 11th, 2022	3:52:00 PM	8:01:00 PM	4.13	52,150	9.87
10	November 30th, 2022	7:40:00 AM	3:01:00 PM	7.65	220,430	9.4
11	December 15th to 16th	1:17:26 PM	11:34:01 AM	22.27	636,910	9.51
12	December 23rd	12:48:00 AM	1:15:00 PM	8.50	232,650	9.5
13	December 31st	10:55:10 AM	8:08:58 PM	9.23	235,370	9.94

3.4.2 Overflows

There were no overflow events at the Ashbridges Bay Treatment Plant in 2022. An overflow is defined as a discharge to the environment from the plant at a location other than the plant outfall downstream of the final effluent sampling station.

3.4.3 Spills

There were 7 spills reported to the MECP in 2022; they are summarized below.

Table 6: Spill Summary

Date	Volume (m^3)	Nature of event	Description
Feb. 22nd, 2022	0.15	Wet weather	Primary effluent was observed entering a catch basin in the vicinity of the west side of D Building. This spill was caused by a sudden surge of flow into the plant occurring over a short duration of time during a rain event on Feb. 22nd, 2022.
Mar. 8th, 2022	1,049	Due to a crack in the steel of a water tower	Spill of Plant Water (Chlorinated Final Effluent) was noticed on March 8th, 2022 due to a crack in the steel of a water tower. This water tower was demolished in Spring 2022.

[3] *Adapted from http://climate.weather.gc.ca/historical_data/search_historic_data_e.html, Toronto City Station*

Date	Volume (m^3)	Nature of event	Description
Apr. 4th, 2022	1.5	A small amount of plant water (chlorinated final effluent) remained in the pipes drained.	On April 4th, 2022, the plant was installing a blank/ blind to isolate the pipes connecting to the plant water tower for the purpose of preventing spills reoccurring from this plant water tower (which occurred on March 8th, 2022). With all valves which connected to the plant water tower closed during this blank/blind installation, it was noticed that a small amount of plant water (chlorinated final effluent) which was remained in the pipes was drained to nearby soil / catch basin and subsequently to the lake.
Apr. 20th, 2022	10	Underground plant water (chlorinated final effluent) pipe rupture.	On April 20th, 2022, water was noticed coming out from a pavement area on north of Dewatering Building and going to a nearby catch basin. It was suspected that the spilled material was plant water (chlorinated final effluent) due to underground plant water line potential rupture. The plant tried to stop the spill by closing the isolation valves and pumped the spilled material back to treatment process. The repair on the leaking pipe couldn't be finished due to a Crane operation in the vicinity until April 26th, 2022.
July 3rd, 2022	?	Malfunctional Pressure Relieve Valve	On July 3rd, it was noticed some Ferrous Chloride was overflowing out of an indoor day tank and came out to a nearby catch basin. The catch basin was covered to stop the spilled material entering the catch basin and later the material was stopped coming out of the building. On July 4th, the outdoor affected area was neutralized and cleaned up. The contaminated soils were excavated and put into a bin for approved disposal through a 3-rd party contractor.
August 16th, 2022	2.5	Residual plant water (chlorinated final effluent) within the pipe.	During a shutdown of the plant water line, the Contractor was to cut and cap a plant water line. After confirmation on the line being isolated and fully drained of any residual plant water within the pipe, the pipe was cut on August 15 and left open overnight to complete the work on August 16. However, upon arriving to site on August 16, the trench/excavation was found to be full of approximately 2.5 m3 of the plant water. The water was pumped out of the excavation and back into the treatment process. The spoiled material within the trench/excavation was removed via a hydrovac truck and has been disposed off-site appropriately.

Date	Volume (m^3)	Nature of event	Description
November 16th, 2022	60	Failed vent valve on the plant water line.	On November 16, 2022, a spill of plant water was noticed due to a failure and breakage of a vent valve on the plant water line. The spill stopped by closing the controlling isolation valves. Estimated 60 m3 of plant water (chlorinated final effluent) went to a low-lying area which was pumped back to the process.

3.4.4 Abnormal Discharge Events

There were no abnormal discharge events at the Ashbridges Bay Treatment Plant in 2022. An abnormal discharge event is defined within the meaning of Part X of the Environmental Protection Act. For additional information, please refer to Section 7.6 – MECP/MOL Correspondence.

3.5 Complaints

The Ashbridges Bay Treatment Plant investigated 1 complaint in 2022; the sole complaint was an odour complaint. The complaint was recorded, investigated by Toronto Water staff, reported to the MECP, and followed up with the complainant. The complaint was not found to be related to plant operation.

3.6 MECP Procedures F-5-1 and F-5-5

Condition 11 (4)(m) of the ECA describes requirements to summarize efforts to achieve conformance with MECP Procedure F-5-1 – Determination of Treatment Requirements for Municipal and Private Sewage Works and MECP Procedure F-5-5 – Determination of Treatment Requirements for Municipal and Private Combined and Partially Separated Sewer Systems.

In reference to procedure F-5-1, the plant utilizes the activated sludge treatment process to meet secondary or equivalent treatment and consistently achieves effluent quality at or beyond the objectives outlined in the ECA.

Furthermore, Toronto Water is committed to efforts to control the frequency and volume of CSO discharges and bypass events referenced in Procedure F-5-5. The City is currently implementing a 25 year plan related to its Wet Weather Flow Master Plan (WWFMP), which aims to reduce and eliminate the adverse impacts of storm water runoff and CSO discharges associated with wet weather events. It is expected that the on-going implementation of capital projects related to the City's WWFMP will eliminate CSO discharges and ultimately improve plant effluent.

3.7 Effluent Quality Assurance and Control Measures

Analytical tests to monitor required parameters are performed by the Toronto Water Laboratory which is accredited to ISO/IEC 17025 by Canadian Association for Laboratory Accreditation Inc. Plant operation and performance is monitored by licensed operators as well as by the facility management team. Standard Operation Procedures, emergency plans, equipment preventative and predictive maintenance, and a network of support staff, help ensure a rapid and effective response to issues, and maintain the high quality of the effluent and biosolids. An Integrated Quality Management System emphasizing environmental, and health and safety objectives is also in the early implementation stages across Toronto Water and is expected to further standardize facility operations and improve facility performance.

4 CAPITAL PROJECTS

Under Toronto Water's capital program, the Ashbridges Bay Treatment Plant commenced or continued with the capital works projects and studies listed in Table 7 in 2022.

Table 7: Capital Projects

Project Name	Project Description	Project Stage (Dec 31, 2022)	Estimated Completion
Digester 9-12, II	Complete upgrade of Digester 9-12 cluster, including replacement of the mixing system and sludge recirculation pumps and sludge transfer pumps.	Construction	2023
D Building Phase 2 Upgrade	Upgrades to existing systems including screening handling and ferrous chloride dosing. Includes chemically enhanced primary treatment and upgrades to enhance maintainability of equipment.	Design	2025
D Building Solar Roof	Installation of solar energy cells on the roof of D Building.	Construction	2023
Effluent Disinfection	New UV disinfection facility. Also includes new secondary west bypass conduits, plant water station upgrades, seawall substation upgrades, and seawall gate refurbishment.	Construction	2024
IPS Contract 2	Preliminary civil work for the future IPS.	Construction	2024
IPS Contract 3	Replacement of M&T pumping station with new Integrated sewage/wet weather flow pumping station located South of Lakeshore.	Design	2035
Outfall	New plant outfall that includes a new effluent drop shaft, new outfall pipe with diffusers.	Construction	2024
Polymer Upgrades	Replacement of dewatering polymer system, dewatering centrifuges, upgrades to sludge feed system, centrate storage, as well as the WAS polymer system.	Design	2030
WAS Thickening and South Station Upgrades	New WAS thickening facility using centrifuges and overhaul of South Substation.	Construction	2028
Blower Building Upgrades	Upgrades to blower building admin space and stores.	Construction	2023
Digester 13 & 16 Cleaning	Cleaning program for Digesters 13 and 16. Additional digester clusters to follow.	Construction	2023
Pelletizer Upgrade	Upgrades to various system to extend life of facility.	Construction	2025
Heating and Air Systems - Contract 1	Replacement of hot water boilers	Design	2025
Heating and Air Systems - Contract 2	Replacement of compressors, dryers and chillers	Design	2028
Cross Collector Pilot	Pilot test of new technology on final tank 2.	Construction	2023

Project Name	Project Description	Project Stage (Dec 31, 2022)	Estimated Completion
Digester 13-22 Upgrade Study	Mechanical and electrical upgrade and cleaning of digesters 13-22 (study only).	Complete	2022
East Bypass and Wet Weather Flow Study	Investigation of East bypass and wet weather flow management (study only).	Complete	2022
Pelletizer 2.0	Construction of a new Pelletizer based on Pelletizer Design project.	Design	2029
Secondary Treatment Upgrades	Addition of 2 new secondary treatment trains including aeration tanks and final tanks, conversion of tank 11 to fine bubble with complete replacement of associated equipment, new blower building and air header, misc. upgrades to supporting systems.	Design	2035
STS Upgrades – B12	Installation of blower 12.	Design	2027
Grit Study	Study seeks to understand the performance of the grit removal system by computational fluid dynamics (CFD) modeling and field grit sampling.	Design	2023
Elevator Modernization Project	Upgrade of existing elevators.	Design	2025
Pelletizer Upgrades - Fans	Replacement of 3 exhaust fans.	Complete	2022
Digester 1-8 Cleaning	Cleaning and rehabilitation of Digesters 1 to 8. Upgrade associated equipment as needed.	Design	2029

5 MAINTENANCE

Staff from the Ashbridges Bay Treatment Plant performed a variety of scheduled, preventative, predictive and reactive maintenance activities on a diverse spectrum of equipment. Equipment availability and reliability ensures operational objectives are achieved.

The annual calibration and maintenance records of flow meters and on-line analysers was completed in 2022 and found to be within acceptable limits. A summary of effluent monitoring equipment calibration and maintenance performed in 2022 is included in Table 8.

Table 8: Summary of Regulated Monitoring Equipment Calibration and Maintenance

Calibration and/or Maintenance Record	Completion Date
pH Analyzer: TAB-DIS-METR-3018 - Calibration	2022/01/25
Influent Sampler - TAB-PLT-SP-0500 - D Building - Calibration	2022/07/22
Influent Sampler - TAB-PLT-SP-0500 - D Building - Calibration	2022/09/16
Influent Sampler - TAB-PLT-SP-0041 - P Building - Calibration	2022/02/08
Influent Sampler - TAB-PLT-SP-0041 - P Building - Calibration	2022/07/07
Online Chlorine Analyzer (CL 17) - North - Calibration	2022/01/26
Online Chlorine Analyzer (CL 17) - South - Calibration	2022/01/26
Pocket Colorimeter II Chlorine System - TAB-DIS-METR-3011 Calibration	2022/03/23
Pocket Colorimeter II Chlorine System - TAB-DIS-METR-3011 Calibration	2022/07/20
Autosampler - West Bypass - TAB-STR-SP-4001 - Verification	Quarterly
Autosampler - East Bypass - TAB-STR-SP-3001 - Verification	Quarterly
Final Effluent - Autosampler - North - TAB-STR-SP-3132 Verification	Monthly
Final Effluent - Autosampler - South - TAB-STR-SP-3334 Verification	Monthly
Pocket Colorimeter II Chlorine System - Calibration	2022/03/23
Pocket Colorimeter II Chlorine System - TAB-DIS-METR-3016 Calibration	2022/03/23
Pocket Colorimeter II Chlorine System - TAB-DIS-METR-3012 Calibration	2022/03/23
Pocket Colorimeter II Chlorine System - Calibration	2022/07/20
Pocket Colorimeter II Chlorine System - TAB-DIS-METR-3016 Calibration (might be 3017)	2022/07/20
Pocket Colorimeter II Chlorine System - TAB-DIS-METR-3012 Calibration	2022/07/20
pH Analyzer: TAB-DIS-AIT-3006 Calibration	2022/08/22
pH Analyzer: TAB-DIS-AIT-3003 Calibration	2022/08/22
Influent Flow Meter - D Building - Channel 11 - TAB-PLT-FIT-1103 - Verification	2022/06/22
Influent Flow Meter - D Building - Channel 10 - TAB-PLT-FIT-1003 - Verification	2022/06/22
Influent Flow Meter - D Building - Channel 09 - TAB-PLT-FIT-0903 - Verification	2022/06/22
Influent Flow Meter - D Building - Channel 08 - TAB-PLT-FIT-0803 - Verification	2022/06/22
Influent Flow Meter - P Building - Grit Diversion- TAB-PLT-FIT-0033 - Verification	2022/10/26
Influent Flow Meter - P Building – Screening Diversion - TAB-PLT-FIT-0031 - Verification	2022/10/26
Effluent Flow Meter - South Conduit - TAB-STR-FIT-8003 - Verification	2022/07/18

Calibration and/or Maintenance Record	Completion Date
Effluent Flow Meter - North Conduit - TAB-STR-FIT-8004 - Verification	2022/07/18
Bypass Flow Meter - West - TAB-STR-PIT-0004X - Verification	2022/10/26
Bypass Flow Meter - East - TAB-STR-PIT-0003X - Verification	2022/10/26
P Building - Grit Tank Flow Meter - Tank 1 - TAB-PLT-FIT-0101 - Verification	2022/10/11
P Building - Grit Tank Flow Meter - Tank 2 - TAB-PLT-FIT-0201 – Verification	2022/10/11
P Building - Grit Tank Flow Meter - Tank 3 - TAB-PLT-FIT-0301 - Verification	2022/10/11
P Building - Grit Tank Flow Meter - Tank 4 - TAB-PLT-FIT-0401 – Verification	2022/06/06
P Building - Grit Tank Flow Meter - Tank 5 - TAB-PLT-FIT-0501– Verification	2022/06/06
P Building - Grit Tank Flow Meter - Tank 6 - TAB-PLT-FIT-0601– Verification	2022/06/06

In 2022, there were a total of 32,428 work orders completed on routine maintenance and emergency repairs; refer to Appendix H for a summary of major maintenance activities as per Condition 11(4) of the ECA.

None of the maintenance activities undertaken at the plant fell under Limited Operational Flexibility. A summary of the Notice of Modifications is shown in Section 7.6 MECP/MOL Correspondence.

6 UTILITIES

A summary of monthly utility consumption for the previous three years at Ashbridges Bay Treatment Plant is provided in Figure 1. Table 9 below summarizes the total cost and average unit cost for water, hydro, and natural gas. Total annual consumption for potable water, hydro, and natural gas was 587,688 m^3, 131.7 GWh, and 6.7 Mscm, respectively.

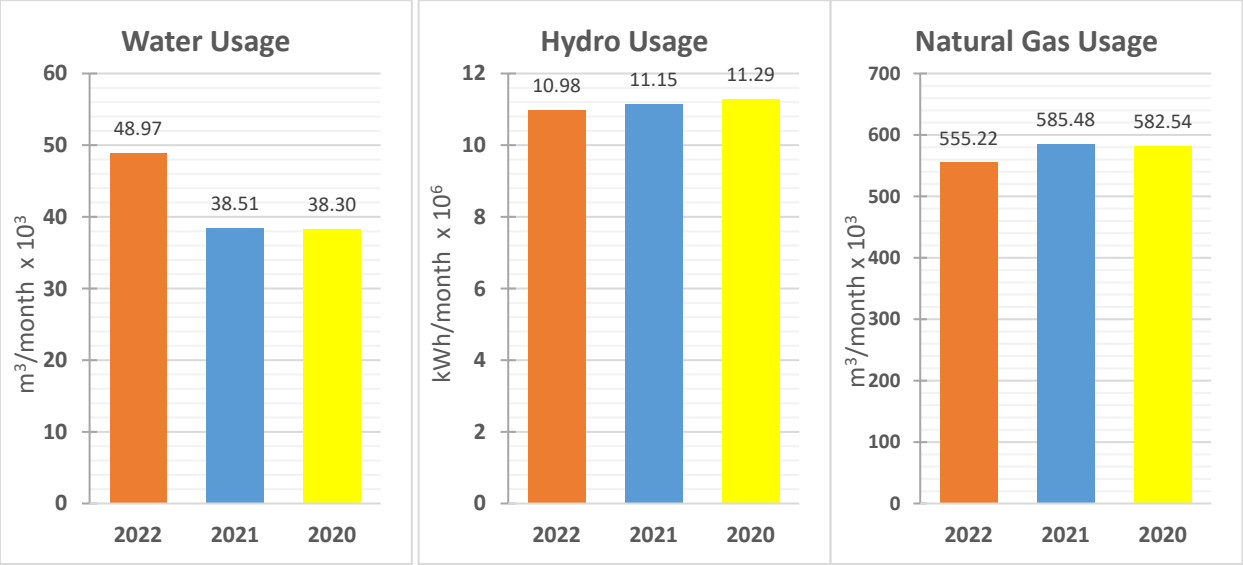


Figure 1: Annual Utility Consumption (Water, Hydro, Gas)

Table 9: Average Unit and Total Utility Cost

Utility	2022	2021	2020
Water Unit Cost ($/$m^3$)	$4.48	$4.35	$4.29
Water Total Cost ($/year)	$2.63M	$2.01M	$1.97M
Hydro Unit Cost ($/kWh)	$0.10	$0.09	$0.09
Hydro Total Cost ($/year)	$13.1M	$12.7M	$12.5M
Natural Gas Unit Cost ($/$m^3$)	$0.32	$0.24	$0.23
Natural Gas Total Cost ($/year)	$2.1M	$1.7M	$1.6M

7 ADMINISTRATION

7.1 Operations and Maintenance Costs

The 2022 plant direct operational costs are broken down into five categories: Salaries and Benefits, Materials and Supplies, New Equipment, Services and Rents, and Inter-Divisional Charges. Materials and Supplies is further segregated into Utilities, Machine & Equipment Parts, Chemicals and Other Materials and Supplies. A breakdown of annual operations and maintenance costs for the past three years is illustrated in Figure 2. Overall, operational costs increased by 5.7 % from 2021.

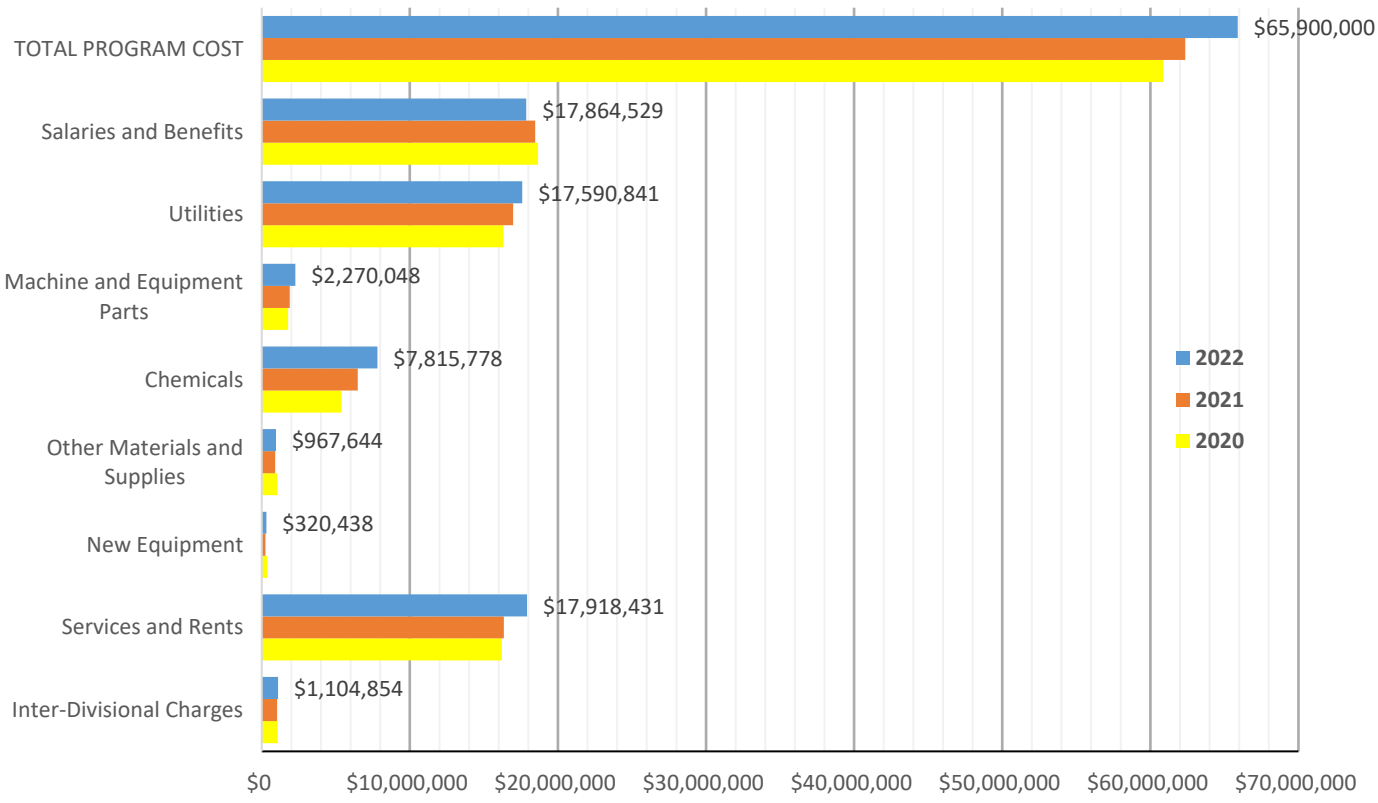


Figure 2: Operations and Maintenance Cost Breakdown

7.2 Human Resources

Plant Staffing at the Ashbridges Bay Treatment Plant in 2022 is shown in Table 10.

Table 10: Plant Staffing

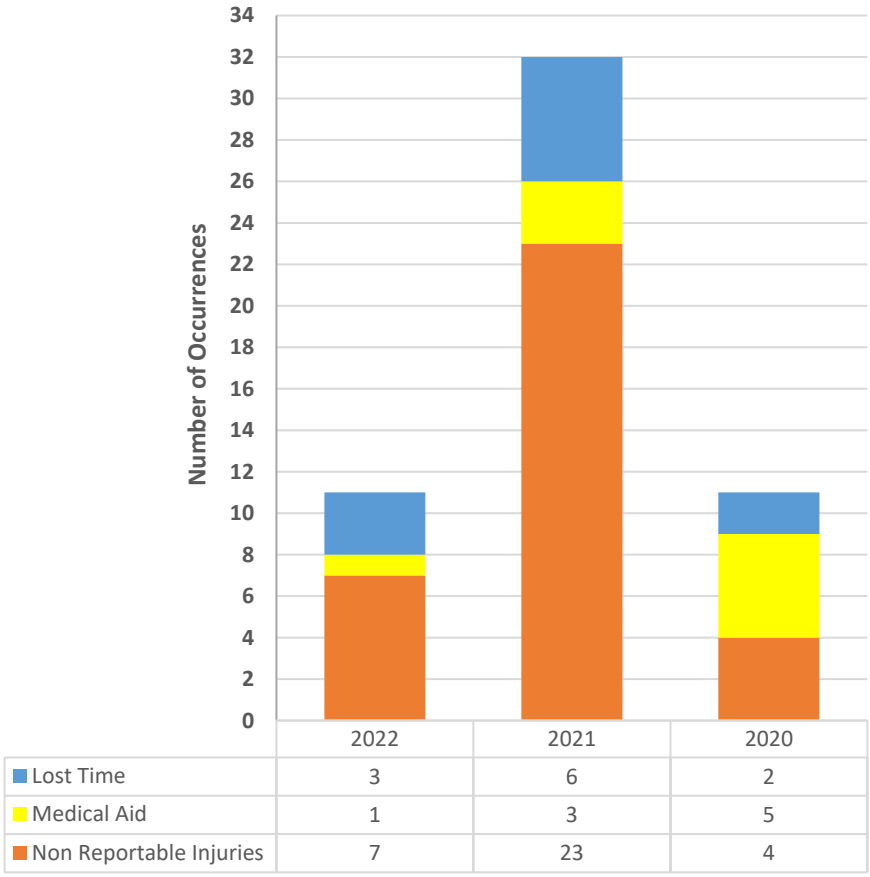
Positon	Number of FTE[1]
Sr. Plant Manager	1
Manager, Engineering Services	2
Superintendent, Plant Process and Operations	2
Senior Engineer	2
Engineer	1
Area Supervisor Plant Operations and Maintenance	8
Supervisor, Operational Support	1
Co-Ordinator Business Support	1
Supervisor, Operating Engineers A/R-C	1
Stationary Engineer Operator	8
Electrical Instrumentation Specialist	2
Engineering Technologist Technician	2
Plant Technician/Wastewater	35
Industrial Millwrights	42
EICT	22
Support Assistant	2
Materials Management Assistant	2
Materials Management Clerk	0
Wastewater Plant Worker	7
Administration Trainee	0.5
Technical Trainee	0.5
Labourer 2	3
Total FTE Positions	**145**

[1] FTE refers to Full Time Equivalent staff. Seasonal staff are considered 0.5 FTE staff.

7.3 Occupational Health & Safety

Continuous efforts are made to ensure a safe working environment at the Ashbridges Bay Treatment Plant. The Joint Health and Safety Committee (JHSC) assists management in resolving issues through regular meetings and monthly workplace inspections. Plant Health and Safety statistics for the Ashbridges Bay Treatment Plant are included in Figure 3[4].

As of December 31st, 2022, there were 11 health and safety incidents, and a total of 138 lost time days due to work related injuries.



	2022	2021	2020
Lost Time	3	6	2
Medical Aid	1	3	5
Non Reportable Injuries	7	23	4

Figure 3: Ashbridges Bay Treatment Plant Health & Safety Injury Summary

[4] The previously reported values for 2021 and 2020 have been changed to reflect the status of those WSIB claims as of December 31st 2022

7.4 Staff Training and Development

The Strategic Planning and Workforce Development unit of Toronto Water facilitates a comprehensive training program for all staff.

Training attended by Ashbridges Bay Treatment Plant operations and skilled trades staff in 2022 includes the list of courses shown in Appendix I. Some of these courses were eligible for Continuing Education Units (CEU's) as specified by the Ontario Water and Wastewater Certification Office. Additional training related to the start-up and commissioning of new equipment/systems installed as part of the capital program was provided as required.

7.5 Utility Operator Certification

Toronto Water trains and provides the required resources to ensure all operators achieve and maintain Class IV certifications. In addition, all skilled trade positions are required to achieve and maintain a Class I operator's license. As part of this initiative, general operational/process training was delivered in order to prepare staff for any certification examination that they need to write. Table 11 summarizes the status of operator certification at the Ashbridges Bay Treatment Plant in 2022.

Table 11: Wastewater Treatment Certificates

Class Level	Licensed
Class I	48
Class II	8
Class III	10
Class IV	33
OIT	26
Total	**125**

7.6 MECP Correspondence

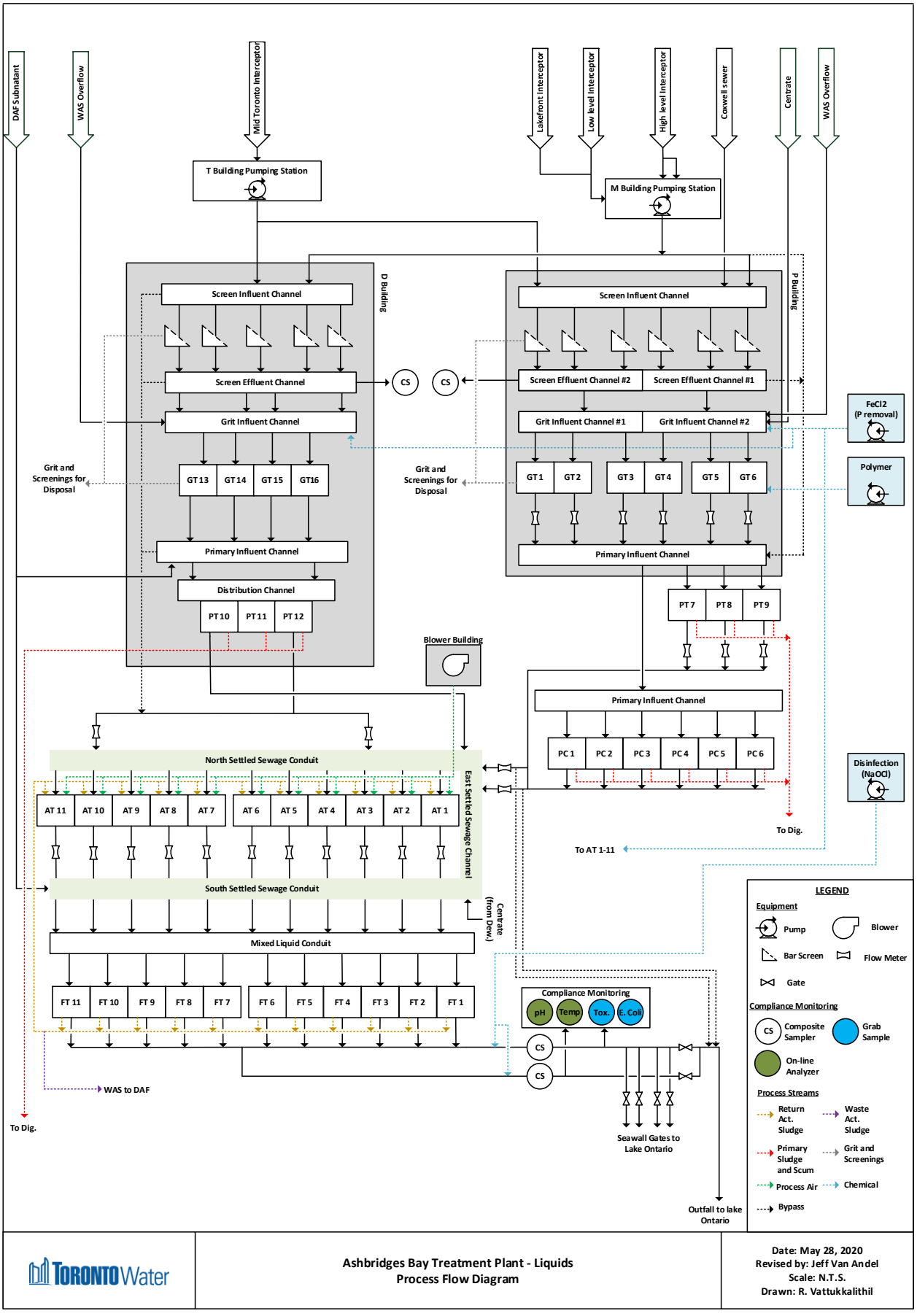
There were no orders issued by the Ministry of the Environment, Conservation and Parks (MECP).

Table 12 summarizes the correspondence submitted to the MECP for the Ashbridges Bay Treatment Plant. Correspondence related to spills and bypasses can be referenced in Section 3.4.

Table 12: Correspondence submitted to the MECP

Event Date	Type	Description	Resolution	Resolution Date
Complaints				
June 24th, 2022	Odor complaint	An odour complaint was received on June 24th, 2022. An investigation was completed, and no possible source of odour was identified at the plant. The plant contacted the complainant and provided updates.	NA	NA
Consent Letters				
Sept. 9th, 2022	Request for Consent	Planned releases of primary effluent due to bypass gates annual maintenance.	Consent was granted.	Sept. 20th, 2022
Nov. 2nd, 2022	Request for Consent	Planned releases of Digester Gas due to automatic actuators installation and commissioning.	Consent was granted.	Nov. 4th, 2022
Notice of Modification to Sewage Works				
NA	NA	NA	NA	NA
Notification on Construction of Proposed Works				
NA	NA	NA	NA	NA
Notification on Commissioning				
NA	NA	NA	NA	NA
MECP Inspection				
NA	NA	NA	NA	NA

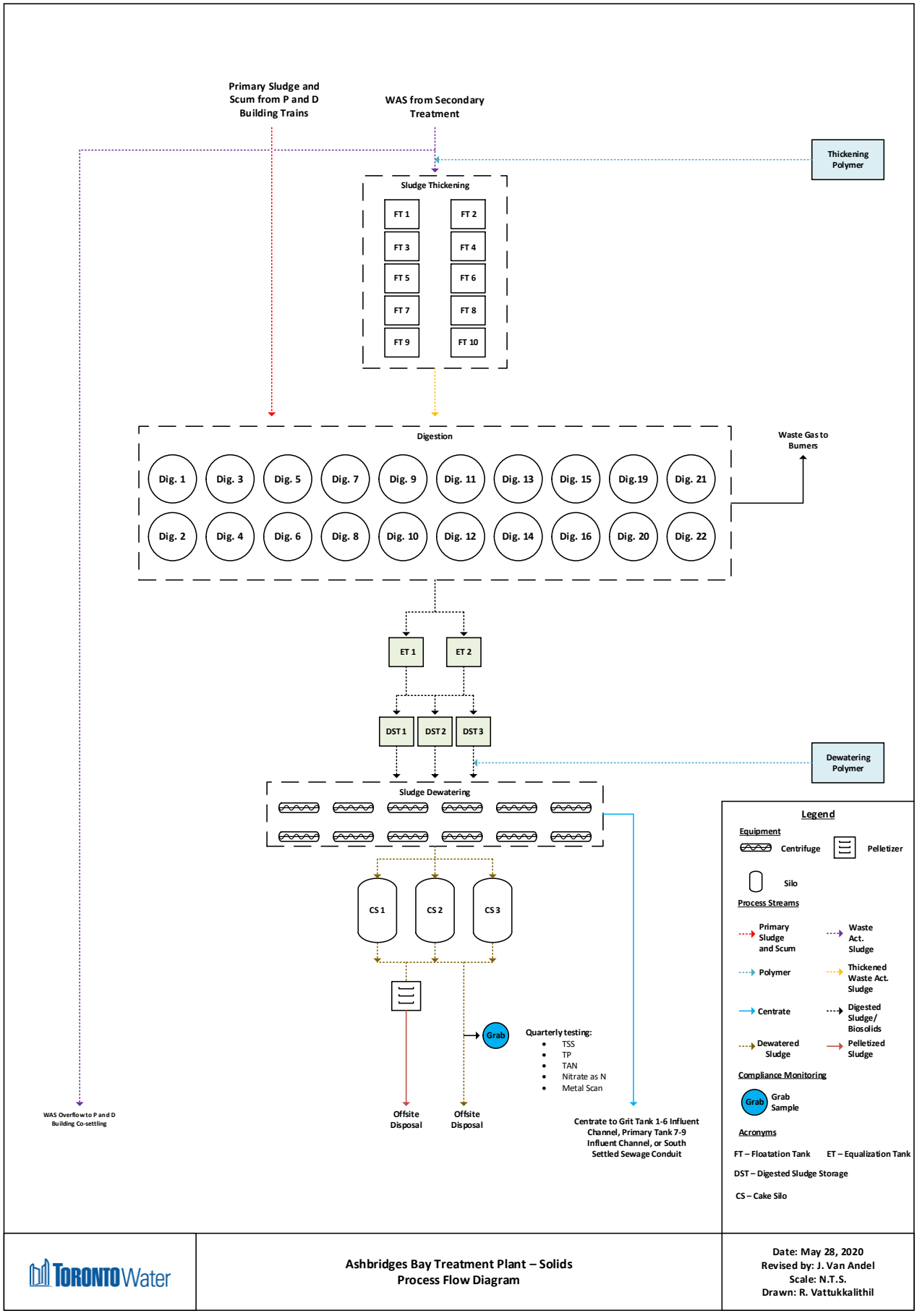
APPENDIX A – Plant Schematic



TORONTO Water

Ashbridges Bay Treatment Plant - Liquids
Process Flow Diagram

Date: May 28, 2020
Revised by: Jeff Van Andel
Scale: N.T.S.
Drawn: R. Vattukkalithil



TORONTO Water

Ashbridges Bay Treatment Plant – Solids Process Flow Diagram

Date: May 28, 2020
Revised by: J. Van Andel
Scale: N.T.S.
Drawn: R. Vattukkalithil

APPENDIX B – Influent and Effluent 2022 Performance Charts

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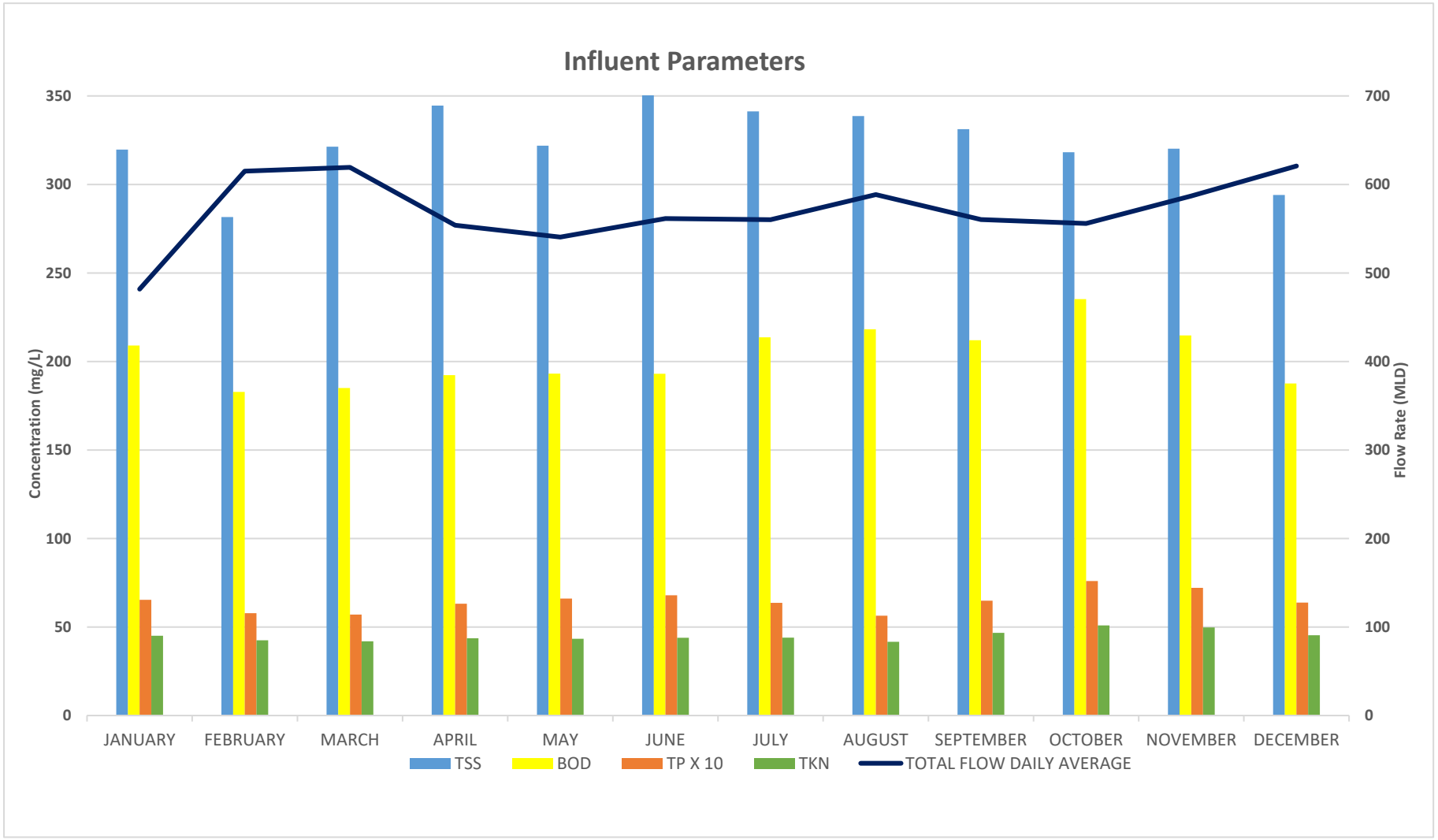
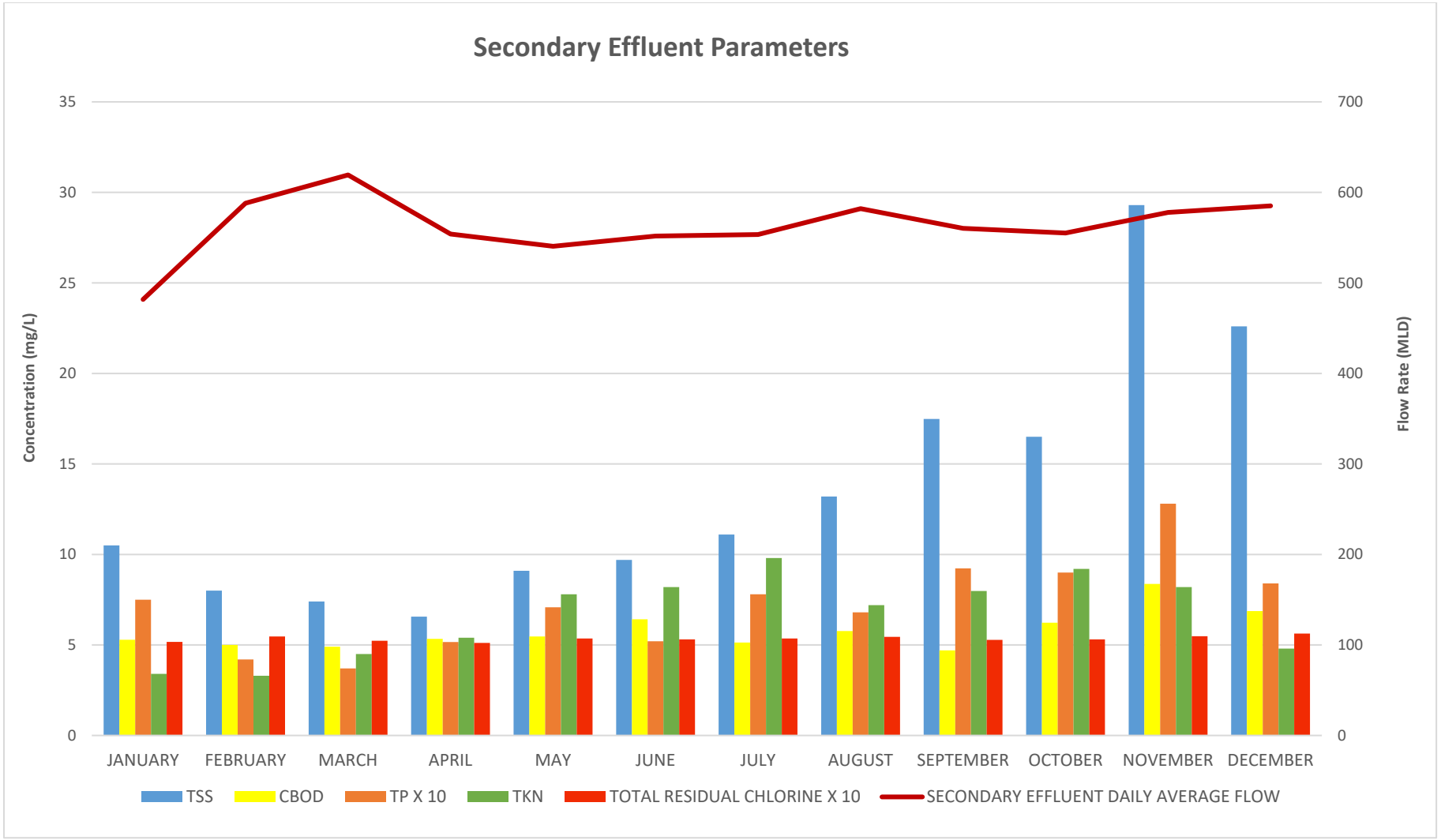


APPENDIX B – Influent and Effluent 2022 Performance Charts



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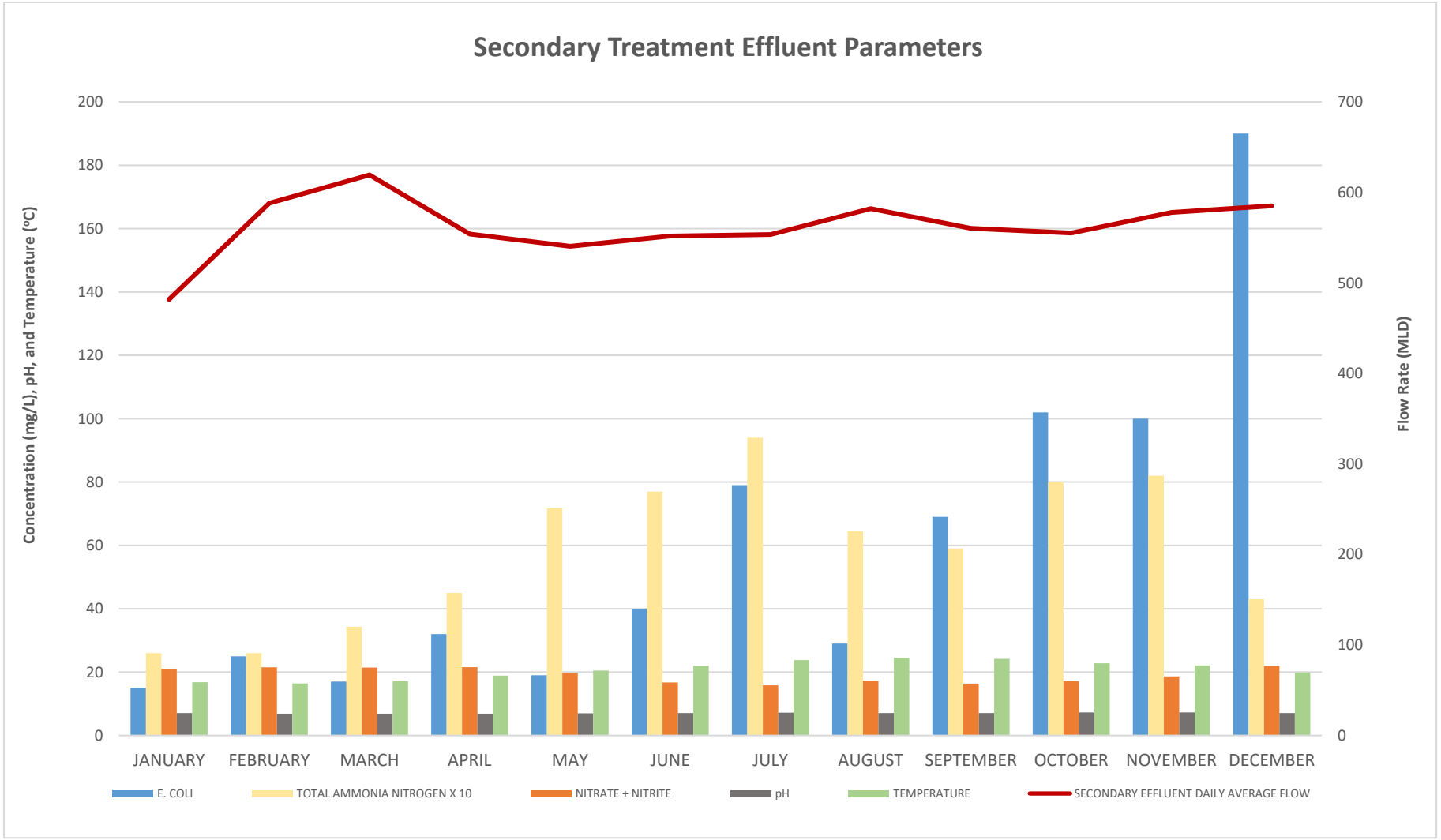
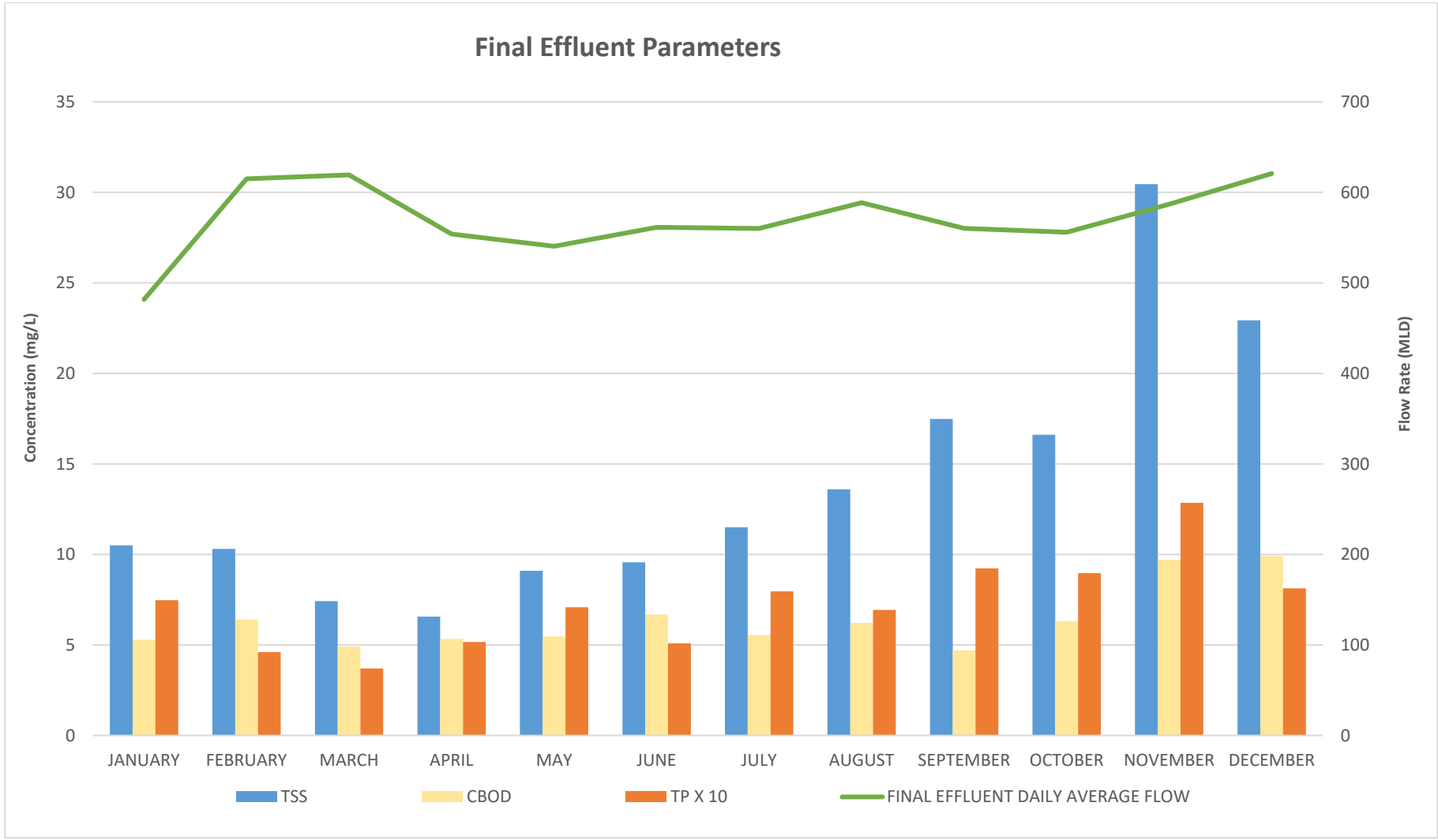


APPENDIX B – Influent and Effluent 2022 Performance Charts



APPENDIX C – Historical Performance Data

APPENDIX C – Historical Performance Data

Parameters	Units	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Influent												
Flow	ML/day	570.4	512.8	556.3	651.5	563.9	659.8	549.8	585.2	638.4	631.6	576.1
Total Annual Flow	ML	208,083	187,270	203,657	237,723	205,750	240,817	201,229	212,831	232,932	230,456	210,834
Total Suspended Solids (TSS)	mg/L	324.1	329.7	252.9	207.8	303.7	279.5	318.6	334.6	328.5	271.2	275.2
Biochemical Oxygen Demand (BOD_5)	mg/L	203.1	218.5	179.3	153.8	207.9	201.9	244.6	274.9	258.3	174.9	178.2
Total Phosphorus (TP)	mg/L	6.5	6.3	5.6	4.9	6.3	6.4	7.5	7.5	6.6	5.9	6.2
Total Kjeldahl Nitrogen (TKN)	mg/L	44.9	42.8	38.2	37.2	42.6	40.3	45.4	43.7	44.7	46.6	47.7
Preliminary Treatment												
Grit and Screenings	tonnes/day	5.1	5.0	4.7	4.6	4.9	5.5	5.7	5.6	11.0	13.0	9.2
Primary Treatment												
TSS	mg/L	250.8	246.2	186.0	99.8	89.3	142.9	123.9	233.3	205.9	162.7	216.1
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	mg/L	118.6	132.5	117.0	99.8	89.3	68.7	84.3	98.9	92.9	90.3	113.3
Secondary Treatment												
Aeration Loading	kg $CBOD_5$/ m^3.day	0.36	0.37	0.35	0.35	0.27	0.25	0.25	0.32	0.32	0.32	0.53
Mixed Liquor Suspended Solids	mg/L	2994	2899	2933	3,285	3389	2,372	2,643	2,969	2,696	1,830	1,467
Flow through Seawall Gates	ML	2101	1462	1732	3,834	3278	3,187	2,004	2,908	4,751	5,227.9	-
Secondary Treatment Effluent												
Secondary Effluent Daily Average Flow	ML/day	562.5	509.3	549.5	637.3	559.6	654.9	548.7	576.9	632.4	625.7	571.2
TSS	mg/L	13.5	13.2	11.8	14.7	8.0	5.2	6.4	10.1	8.2	8.0	8.4
TSS Loading Rate	kg/day	7567	6732	6465	9,336	4453	3,415	3,489	5,021	5,021	4,981	4,810
cBOD5	mg/L	5.8	5.5	4.6	7.3	4.7	4.1	4.3	5	4.6	8.5	6.9
cBOD5 Loading Rate	kg/day	3257	2814	2509	4,668	2627	2,668	2,381	2,838	2,837	5,262	3,926
TP	mg/L	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.8	0.8	0.6	0.6
TP Loading Rate	kg/day	407	368	359	487	376	458	365	495	495	330	330
Escherichia Coli (E. Coli)	CFU/100 mL	60.0	29.0	17.0	32.0	25.6	53	36.8	66.5	7.4	90.0	31.3

APPENDIX C – Historical Performance Data

Parameters	Units	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
pH	-	7.1	7.0	6.9	7.1	7.0	6.8	6.8	7.0	7.0	7.2	7.2
Total Residual Chlorine	mg/L	0.5	0.5	0.55	0.54	0.59	0.60	0.60	0.50	0.80	1.00	0.60
Total Kjeldahl Nitrogen (TKN)	mg/L	6.6	4.4	3.8	10.4	6.2	5.0	3.8	6.7	7.3	14.5	14.4
Total Ammonia Nitrogen	mg/L	5.9	3.2	3.0	10.9	6.0	4.6	3.3	5.3	5.9	11.2	13.8
Nitrate + Nitrite	mg/L	19.1	17.8	17.5	14.4	17.4	17.1	18.5	17.0	16.3	13.1	17.1
Temperature	degrees Celsius	20.8	18.8	20.8	19.7	21.0	20.2	20.9	20.1	19.5	20.2	19.7
Final Effluent												
TSS	mg/L	13.8	13.7	11.9	15.0	8.1	5.4	6.5	10.4	9.2	-	-
cBOD5	mg/L	6.4	5.6	4.7	7.9	4.7	4.1	4.4	5.2	5.0	-	-
TP	mg/L	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.8	0.8	-	-
Solids Handling												
Primary Sludge Treated	m^3/day	3,822	3,357	4,874	5,429	5,978	5,640	6,420	4,440	4,292	5,067	5,546
Primary Sludge Total Solids (TS)	%	2.5	1.9	2.4	2.3	2.3	2.5	2.6	3	3.05	2.9	2.72
Primary Sludge Total Volatile Solids (TVS)	%	70.1	69.1	73.7	71.6	73.9	73	73.8	73.5	72.9	62.9	74.9
Waste Activated Sludge (WAS) co-settled in Primary Clarification Tanks or excess WAS to Aeration	m^3/day	4,778	3,430	1,816	1,795	911	1,260	2,130	1,240	2,405	8,800	14,523
WAS to Thickening	m^3/day	8,222	8,266	7,787	7,910	6,944	7,380	7,360	8,470	8,163	10,469	9,665
WAS TS	mg/L	1.0	1.1	0.9	0.9	0.8	0.7	0.7	0.8	0.82	0.54	0.49
Thickened WAS (TWAS) Treated	m^3/day	2,258	2,527	2,257	2,119	1,952	1,440	1,600	2,090	2,366	876	677
TWAS TS	%	3.8	3.3	3.4	3.5	3.6	3.7	3.4	3.3	3.4	4.8	4.6
TWAS TVS	%	70.4	70.4	70.7	73.8	73.9	73.2	71.6	71	72.9	69.1	72.0
Volume to Digestion	m^3/day	6,080	5,885	7,131	7,548	7930	7,080	8,020	6,530	6,658	5,933	6,222
Digesters Hydraulic Retention Time	days	20.2	20.9	17.3	20.0	19.3	20.2	18.1	23.3	23.1	21.8	21.1
Organic Loading to Digesters	TVS per m3 of digester capacity per day	1.0	0.8	1.1	1.0	1.0	0.9	1.1	1.0	1.0	2.1	1.3
Digester Gas Volume	m^3/day	54,497	52,682	59,945	65,698	61,856	61,640	62,330	64,560	65,921	77,781	115,174

APPENDIX C – Historical Performance Data

Parameters	Units	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Dewatering Centrifuge Feed TS	%	1.9	1.7	1.8	1.7	1.6	1.7	1.8	1.8	1.8	1.8	1.7
Dewatered Biosolids TS	%	28.0	27.0	26.9	27.7	27.9	27.9	28.1	27.7	26.5	27.8	28.3
Centrate Quality	mg/L	475	985	635	626	428	299	319	665.32	2091	1959	1196
Solids Capture Rate	%	97	94	96	96	97	98	98	96.44	88	77	96
Centrifuge Run Time	hours	48,372	48,347	47,578	51,226	52,790	52,400	52,329	48,049	43,507	51,451	102,922
Biosolids Management	wet tonnes/year	155,604	140,518	148,357	154,656	155,756	159,288	149,733	145,321	143,190	142,908	139,562

APPENDIX D – Secondary Treatment Effluent Parameters (Leachate Related)

APPENDIX D – Secondary Treatment Effluent Parameters (Leachate Related)

Quarterly Average	Boron	Cobalt	Magnesium	Manganese	Potassium	Strontium	Bis(2-ethlhexyl) Phthalate
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L
Q1	0.307	0.002	0.082	0.293	10.3	13.3	5.3
Q2	0.121	0.002	0.050	0.339	10.9	11.8	0.25
Q3	0.142	0.002	0.062	0.276	11.4	13.7	0.25
Q4	0.154	0.002	0.064	0.234	10.9	14.5	0.25

Values in red are half the MDL

APPENDIX E - Influent and Effluent Metal Concentrations

APPENDIX E - Influent and Effluent Metal Concentrations

Influent (Daily Composite tested once/month for metals)

Parameters	Arsenic	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
January	0.005	0.002	0.006	0.002	0.127	3.71	0.0025	0.071	0.00005	0.0063	0.149
February	0.005	0.002	0.006	0.002	0.12	2.98	0.0025	0.063	0.00005	0.0062	0.134
March	0.005	0.002	0.008	0.002	0.128	4.34	0.0059	0.080	0.00019	0.0066	0.143
April	0.005	0.002	0.008	0.002	0.13	3.7	0.0060	0.082	0.00005	0.0058	0.172
May	0.005	0.002	0.007	0.002	0.13	2.85	0.0059	0.066	0.00005	0.0066	0.171
June	0.005	0.002	0.009	0.002	0.148	5.25	0.0090	0.107	0.00005	0.0084	0.198
July	0.005	0.002	0.009	0.002	0.149	4.67	0.0105	0.093	0.00011	0.0089	0.192
August	0.005	0.002	0.008	0.002	0.142	4.1	0.0099	0.083	0.00005	0.0067	0.204
September	0.005	0.002	0.007	0.002	0.138	3.49	0.0067	0.065	0.00005	0.0067	0.184
October	0.005	0.002	0.006	0.002	0.144	3.15	0.0052	0.064	0.00014	0.0062	0.175
November	0.005	0.002	0.007	0.002	0.139	4.28	0.0059	0.079	0.00015	0.0064	0.159
December	0.005	0.002	0.008	0.002	0.117	3.78	0.0069	0.069	0.00012	0.0063	0.141
Annual Average	**0.005**	**0.002**	**0.00746917**	**0.002**	**0.1343333**	**3.8583333**	**0.006385833**	**0.07678**	**0.0000882**	**0.00675**	**0.1685**

Data in red are half the MDL

APPENDIX E - Influent and Effluent Metal Concentrations

Final Effluent (Daily Composite tested once/month for metals)

Parameters	Arsenic	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Zinc
Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
January	0.005	0.002	0.002	0.010	0.694	0.0025	0.082	0.00005	0.0025	0.030	0.002
February	0.005	0.002	0.002	0.010	0.541	0.0025	0.051	0.00005	0.0025	0.029	0.002
March	0.005	0.002	0.002	0.010	0.466	0.0025	0.050	0.00005	0.0025	0.034	0.002
April	0.005	0.002	0.002	0.009	0.392	0.0025	0.048	0.00005	0.0025	0.032	0.002
May	0.005	0.002	0.002	0.009	0.541	0.0025	0.060	0.00005	0.0025	0.034	0.002
June	0.005	0.002	0.002	0.007	0.658	0.0025	0.058	0.00005	0.0025	0.031	0.002
July	0.005	0.002	0.002	0.007	0.718	0.0025	0.062	0.00005	0.0025	0.031	0.002
August	0.005	0.002	0.002	0.008	0.774	0.0025	0.086	0.00005	0.0025	0.031	0.002
September	0.005	0.002	0.002	0.012	1.15	0.0025	0.067	0.00005	0.0025	0.034	0.002
October	0.005	0.002	0.002	0.012	1.07	0.0025	0.064	0.00005	0.0025	0.035	0.002
November	0.005	0.002	0.002	0.016	1.64	0.0025	0.060	0.00005	0.0025	0.046	0.002
December	0.005	0.002	0.002	0.016	1.55	0.0025	0.048	0.00005	0.0025	0.045	0.002
Annual Average	**0.005**	**0.002**	**0.002**	**0.0106**	**0.8495**	**0.0025**	**0.0612**	**0.0001**	**0.0025**	**0.0344**	**0.002**

Data in red are half the MDL

APPENDIX F – Biosolids Analysis

Appendix F – Biosolids Analysis

Ashbridges Bay Treatment Plant - Summary of Dewatered Biosolids Analysis for 2022

Dewatered Cake	January	February	March	April	May	June	July	August	September	October	November	December	Max Allowable Dry Wt Conc mg/Kg [1]	Annual Average
TKN	**35,800**	**40,500**	**31,750**	**45,600**	**49,100**	**49,500**	**44650**	**44,950**	**49,650**	**45,200**	**52,700**	**49,000**		**44,867**
Ammonia(N)	7,920	6,305	6,960	8,325	6,090	7,040	4,875	4,850	4,365	5,660	7,035	6,450		6,323
Nitrate as N	0.67	0.25	0.25	0.06	0.60	0.42	0.11	0.11	0.94	0.11	0.25	0.25		0
Nitrite as N	0.35	0.87	0.75	1.49	0.76	0.70	0.64	0.58	0.81	0.18	0.35	1.33		1
As	2.69	2.41	2.63	2.185	1.545	2.03	2.58	2.57	3.085	2.87	2.515	2.97	**170**	3
B**	19.05	5	20.4	15.7	5	5	24	19.7	25.4	20	22.25	19.95		17
Cd	0.78	0.28	0.50	0.80	0.50	0.50	0.68	0.70	0.66	0.69	0.50	0.50	**34**	1
Cr	58.3	66.6	91.8	94.5	69.6	66.4	71.3	74.3	65.1	60.0	60.7	63.4	**2,800**	70
Co	3.87	3.71	5.06	5.49	4.19	3.45	5.51	5.10	4.94	4.16	4.71	5.92	**340**	5
Cu	683	642	651	590	695	707	553	561	605	646	706	679	**1,700**	643
Pb	30.1	26.9	35.1	30.2	34.6	31.7	34.5	37.8	39.9	31.7	30.1	32.7	**1,100**	33
Mn	295	232	255	289	263	229	303	285	280	257	255	279		268
Hg	0.25	0.33	0.46	0.31	0.40	0.46	0.39	0.40	0.42	0.29	0.44	0.39	**11**	0
Mo	9.53	9.02	8.78	8.19	9.17	10.07	7.78	8.45	8.67	9.48	10.85	9.8	**94**	9
Ni	27.0	28.2	40.2	43.5	29.9	26.8	32.6	35.1	31.6	28.6	26.4	27.2	**420**	31
Total P	32,000	31,300	29,550	25,900	30,850	29,500	28,000	25,100	28,450	27,400	32,300	31,250		29,300
K	1315	1265	1390	1650	959	917	1895	1705	1775	1350	1325	1505		1,421
Se	4.26	4.43	4.70	4.34	2.87	1.59	4.26	3.84	4.67	3.67	4.10	4.43	**34**	4
Zn	650	597	601	577	665	701	564	582	645	641	667	647	**4,200**	628
TS%	27.0	27.1	28.3	28.5	27.5	26.1	29.4	29.9	28.5	28.0	26.7	27.2		28
VS%	64.5	62.6	61.1	57.3	63.2	66.8	54.9	55.2	56.3	61.1	63.3	61.4		61
E. Coli[2]	250,583	280,885	273,038	1,238,813	518,786	549,608	475,603	810,637	335,755	487,144	339,792	260,529	**2,000,000**	485,097

[1]As per MECP Regulations for Biosolids Utilization on Agricultural lands.

[2]CFU/g dry weight.

APPENDIX G – Maintenance Activities

APPENDIX G – Maintenance Activities

Preliminary and Primary Treatment

Preliminary and Primary Treatment includes two raw sewage pumping stations (M and T Buildings), preliminary treatment areas (P and D Buildings), and three primary treatment areas (Primary Clarification Tanks No. 1 to 6, Tanks No. 7 to 9, and Tanks No. 10 to 12). The following maintenance was completed in 2022.

- Overhauled D Building Screen #2
- Overhauled D Building Screen #3
- Fabricate new inlet gate nuts for D Building Bar Screen #1
- Fabricate new sliding block and liner fabrication for D Building Bar Screen #1
- Repaired and reset isolation gate for D Building screen effluent channel #1
- Replaced screw D Building screening conveyor liner
- Fabricated impeller rings for TAS pumps from raw casting
- Replaced broken panel and chains on P Building screen #1
- Rebuilt D Building screening transfer pump #2
- Complete overhaul of scum collector for primary tank #9
- Realigned primary tank #12 bridge, off rail/track, replaced pin and rollers on cog wheels
- Repaired D Building grit and screenings conveyor & screw
- Replaced brush assembly on D Building Screen #5
- Replaced broken shaft on grit tank conveyor #14?
- Overhauled D Building Screenings Transfer Pump #1500
- Overhauled D Building Screening Transfer Pump #1600 and rebuilt bearing box of pump
- Overhauled P Building Screw Conveyor
- Repaired P Building compactor and weld back piping
- Rebuild D Building screening grinders
- Replaced D Building screening transfer pump #5
- Replaced primary tank #8 bridge worn out bearings
- Repositioned primary tank bridge back on track and the trail
- Overhauled M Building Bosker unit
- Overhauled pressure relief valve discharge line medication for all ferrous pumps
- Overhauled scum collector for Primary tank #7 & #8
- Replaced D Building scum pump
- Overhauled D Building screenings washer/compactor

Secondary Treatment

Secondary Treatment includes eleven Aeration Tanks, eleven Final Clarification Tanks, and the Plant Water System. The following maintenance was completed in 2022.

- Complete overhaul of Final Clarifier #5
- Retrofit piping to install heat exchanger drain line and cooling water pipe
- Repaired chains and flygths at North pass #1
- Overhauled motor for Pump
- Replaced gear box assembly on clarifier #4

APPENDIX G – Maintenance Activities

- Upgrade eyewash station from Ferrous Chloride unloading station to Phosphorous Removal Building
- Modify plumbing on 2nd floor of Blower Building to add wash sink in bathroom
- Add new gland water line for RAS Pumps in Aeration Gallery
- Overhauled collector mechanism
- Replacement of RAS header valves on final clarifiers #1 & #2
- Repair of Check Valve and pump on RAS pump #1 & #2 for final clarifier #1
- Replaced broken flights on Secondary Tank #3
- Replaced isolation valve
- Repaired Scum collector mechanism on Secondary clarifier #1
- Repair Aeration Blower #1 IGV assembly
- Repair Final Tank #1 rotatory skimmer for final clarifier #1
- Overhaul of Return Sludge Pump for final clarifier #3/4
- Repaired chains and flyghts on final clarifier #9
- Troubleshoot valve, actuator required electronic board replacement
- Overhaul motor for RAS pump for Final Clarifiers #10/11
- Renew drive gearbox for Final Clarifier #9 pass #3

Dewatering

Dewatering includes the Centrifuges, Schwing Silo Pumps, Polymer/Sludge Feed Pumps and all electrical control equipment for dewatering operations. The following maintenance was completed in 2022.

- Overhaul of Centrifuge #8
- Overhaul of Centrifuge #4
- Overhaul of Centrifuge #9
- Overhaul of Schwing Pump #2
- Replacement of polymer feed pump #10
- Replacement of bearing on Centrifuge #1
- Replacement of Centrate Pump #2 and valves
- Centrifuge #12 main motor for overhaul and reinstalled
- Replacement of Centrate Pump #1 valves
- Fabricated and installed new polymer line
- Overhauled Schwing pump and power pack pump
- Replaced conveyor screws on Schwing pump #3
- Overhaul of Centrifuge #5

Solids Handling:

Solids Handling includes Disinfection, the Biosolids Storage Silos, Sludge Cake Transfer Pumps, Truck Loading Facility and Biofilters, Odour Control Building, and maintenance for the Lab Building. The following maintenance was completed in 2022.

- Overhauled two discharge poppet valves and hydraulic cylinders, and replaced ram on cake transfer pump 201

APPENDIX G – Maintenance Activities

- Modified water box piping on power pack 201A
- Replaced bushing on power pack 201B
- Ram change on cake transfer pump 202
- Repaired poppet valve seal issue on power pack 202A
- Upgraded water box on screw extractor 202A
- Installed new conveyor and gearboxes on screw feeder 202B
- Replaced ram and two discharge poppet hydraulic cylinders for cake transfer pump 203
- Replaced hydraulic tank and rebuilt associated fittings, pumps and hoses for power pack 203A
- Installed new water box sensor for power pack 203A
- Replaced screw conveyor and bushing, and refurbished screw feeder extension shaft for screw feeder 203B
- Rebuilt pneumatic cylinder for hopper #1 inlet knife gate valve
- Replaced worn liners on hopper conveyors
- Replaced hoses for sodium hypochlorite dosing pumps
- Installed new spill container for sodium hypochlorite tank

Digestion, Air Flotation, and Bio-Gas

Digestion, Air floatation, and Bio-gas includes twenty Anaerobic Digesters, ten DAF tanks and five Waste Gas Burners. The following maintenance were completed in 2022.

- Overhaul Flotation Tank #8
- Repair of skimmer flights for flotation tank #6
- Overhaul of Digester 13-16 gas mixing compressor for Digester 14
- Overhaul and rebuild TWAS transfer pump for Flotation Tank #1
- Install new TWAS transfer pump and re-built old pump for Flotation Tank #1
- Overhaul and rebuild TWAS transfer pump for Flotation Tank #6
- Repair of skimmer for flotation tank #2
- Repair of skimmer for flotation tank #3
- Overhaul and rebuild TWAS transfer pump for Flotation Tank #2
- Complete overhaul on 26 recirculation valves for Digester 13
- Repair of skimmer flights for flotation tank #5
- Rebuild TWAS transfer pump for Flotation Tank #5
- Repair of skimmer for flotation tank #6
- Installed Re-built sludge mixing pump for Digester #7
- Overhauled TWAS transfer pump for Flotation Tank #7
- Re-installed overhauled sludge recirculation pump for Digester 22
- Replacement of safety valve for gas compressor #1 for Digesters 19 & 21
- Replace broken skimmer on Flotation Tank #5
- Re-Built Sludge Mixing Pump for Digester #7
- Re-built TWAS Transfer pump for Flotation Tank #3
- Replaced plugged sump pump in Digester 1-4 cluster
- Removed pump and installed re-built sludge transfer pump for Digester # 19

APPENDIX G – Maintenance Activities

- Installed isolation valves for sludge transfer pump for Digester #1
- Repair of skimmer flights for flotation tank #6
- Overhaul sludge recirculation pump for Digester #20

Boilers, Air Compressors, and HVAC

Boilers, Air Compressors, and HVAC include the plant-wide hot water system, heating, ventilation, and air conditioning (HVAC), and instrument air compressors (Auxiliary Building). The following maintenance was completed in 2022.

- Cleaned burner and adjusted fuel/air ratio for boiler #4
- Investigated glycol leakage and replaced heat exchanger in dewatering building
- Repaired leakage issue on digester gas compressor #2
- Repaired fire damaged panels on Boiler #1
- Replaced regulator and pilot vent solenoid on Boiler #3
- Dismantled, rehabilitated, and re-assembled D Building Old Screen Room heat exchanger
- Dismantled, rehabilitated, and re-assembled Auxiliary Building heat exchanger
- Installed new lighting and replaced existing lighting in P Building
- Replaced leaking drain lines in Z Building
- Replaced defective motor on Z building office air conditioner unit
- Repaired, covered, and painted service air lines to address corrosion issue
- Repaired Seawall tunnel Air Handling Unit tubing
- Replaced defective mount on M Building Air Handling Unit
- Cleaned and rehabilitated Digester Gas Control Building heat exchanger
- Repaired wiring issue on D Building glycol pump motor

Consumables, Mechanical and Welding, Grounds Keeping and Licensed Vehicles

The following maintenance was completed in 2022 for consumables, mechanical and welding, grounds keeping and licensed vehicles.

Machine Shop

- Fabricated pump casing rings and sleeves, collector mechanism parts for flotation, pump shafts and gate nuts;
- Fabricated parts in welding shop for various work areas.
- Fabricated bronze nuts for various gate valves
- Fabricate guide pins for gate valves in the Biosolids Truck Loading Facility

City Water System & Backflow Preventers (BFP)

APPENDIX G – Maintenance Activities

- Attending all service calls and repairing done on priority basis.
- Installation of oil filled pressure gauges at all main water feed lines

Grounds keeping

- Snow plowing and salting throughout the plant.
- Spills clean up, retaining and disinfecting throughout the plant.
- Ensured that waste oil is removed from work areas pump into holding tank in a safe manner and scheduled pickup
- Scheduled annual maintenance inspection and repairs for all RTVs, Pick-up truck, boom truck, case tractor forklifts.
- Scheduled annual maintenance inspection and repairs for all lifting devices in the plant.
- Implemented a comprehensive program across the plant with signs installed at the gate entrance, office entrance, along the roadway, in the washroom, meeting rooms, workshops, elevators etc. These signs provided information on social distancing, limitation of the number of persons inside a location the use of masks, hand washing hand sanitizing and other related safety requirements.
- Sanitizing stations were installed at various locations across the plant.
- Implemented new policy of disinfecting twice per day all offices and common rooms including change rooms, training room and stairwells.
- Scheduling waste oil pick up, ensure all empty drums, paint cans, etc. are in the storage area so they can be removed from the plant. All waste oil manifest copy are send to the appropriate personnel
- Reviewed and upgraded overhead crane maintenance operation and maintenance program

Electrical Department

Electrical and Instrumentation department provides support to process and non- process activities across the facility at the ABTP and NTTP. Below is a number of maintenance activities that was completed in ABTP for the year 2022.

- Installed new telephone lines for new offices and operator rooms in Blower building (project)
- Participate the part of the TWAS project, which communication/paging/phone lines were rerouted
- Maintained PQM and PA Systems throughout plant
- Replaced fluorescent fixtures and installed LED light fixtures in Admin building including locker-room areas
- Involved the maintenance activities in substations/transformer yards
- Maintained UPS batteries for critical RPUs throughout plant
- Upgraded lighting in machine shop lobby
- Installed emergency lighting throughout plant to areas that had issues
- Maintained PQM and PA Systems throughout plant
- Maintained auto-samplers throughout plant
- Maintained UPS batteries for critical RPUs throughout plant
- Upgrade 3 UPS device for load sharing of RPU’s-0201, 0202, 0203, 0204 & 0206 at M-Building

APPENDIX G – Maintenance Activities

- Modification from wireless to hard wire transmission on 2 level sensors in Aeration
- Complete service/overhaul on Emission Stack Lighting System at all levels
- Completed all annual verification/calibration to influent & secondary bypass flowmeters
- Major repairs/service/verification on final effluent conduit flowmeters
- Complete inspection/test/repairs to Vibration System on Blower # 11 in Blower Bldg.
- Upgrade lighting install new emergency exit lights and organize New Primary Section control room
- Completed annual inspection/service/testing on 2 secondary bypass actuated gates
- Upgraded lighting to LEDs in B3 Pump level in T-Building
- Installed new breaker and 600V 3-phase welding outlet in P-Building pump gallery
- Repaired/relocated all lighting fixtures in chemical room D-Building
- Installed new lighting pole and flooding fixture at main gate entrance at NTTP
- Upgraded 4 actuators, design pump control system, program & commissioned at NTTP
- Upgraded all lighting systems in boiler room at NTTP
- Repaired to T-Bldg. TSP-2 EM-Drive oil leak to slip-ring preventing damages
- Modifications to lube oil sensors installation on 5 pumps at T-Bldg. due to oil flow alarms
- Modifications to 2 TSS meters inlet sampling lines due to turbulence from final effluent
- Installation of grounding rings to motor shaft on RAS pumps TK. 7-11 to reduce bearing failures in Aeration
- Upgrade to direct coupled motors from load cell on sludge collectors in Aeration
- Replaced 15 defective control PCB's on AUMA sludge valves in P-Building gallery
- Replace/verify flow sensors in grit tank discharge 1 P-Bldg.
- 600V 3 ph. welding outlets installed shop & PT 7/8/9 in P-Bldg.
- Replaced main drive contactors on bridges 7 & 8 P-Bldg.

APPENDIX H – Staff Training Courses

APPENDIX H – Staff Training Courses

Training attended by Ashbridges Bay Treatment Plant operations and skilled trades staff in 2022 includes the list of courses below.

Capital Projects Training

ABTP - DECANTER ADVANCED SPEED CONTROLLER
ABTP - VOGELSANG - PUMPS, INLINE ROTA-CUT AND X-PIPPER

Health and Safety Training

- ASBESTOS AWARENESS
- CHAINSAW SAFETY AWARENESS (2019-2022)
- CITY OF TORONTO FIRE WARDEN/SUPERVISORY STAFF TRAINING
- CONFINED SPACE AWARENESS
- CONFINED SPACE AWARENESS 1/2 DAY (2019-2022)
- CONFINED SPACE ENTRY & RESCUE - 2 DAY
- COPING WITH SHIFT WORK
- COVID-19 VACCINATION: UNDERSTANDING THE BENEFITS AND RISKS
- DESIGNATED SUBSTANCES AWARENESS
- DOMESTIC/INTIMATE PARTNER VIOLENCE FOR SUPERVISORS
- ELECTRICAL AWARENESS
- ELECTRICAL SAFETY FOR DISTRICT OPERATIONS & MAINTENANCE OPERATORS (2019-2021)
- FALL PROTECTION AWARENESS
- FALL PROTECTION IN AN INDUSTRIAL WORK SETTING
- FIRE SAFETY AND EXTINGUISHER USE
- FIRE WARDEN ESSENTIALS TRAINING
- FUNDAMENTALS OF LADDER SAFETY AWARENESS
- G PERMIT DRIVER ASSESSMENT
- G PERMIT VEHICLE OPERATOR ORIENTATION
- HEALTH AND SAFETY ASPECTS OF CONTRACTS FOR SERVICES
- HEALTH AND SAFETY COMPETENCY FOR FRONT-LINE SUPERVISORS
- HEALTH AND SAFETY ORIENTATION TRAINING PROGRAM - PART B
- HUMAN RIGHTS 101
- HUMAN RIGHTS AND WORKPLACE HARASSMENT ESSENTIALS FOR MANAGEMENT
- HYBRID WORK – FIRE SAFETY REVIEW
- IN-SERVICE HEALTH & SAFETY ORIENTATION
- JHSC RECOGNITION EVENT
- JOINT HEALTH AND SAFETY COMMITTEE (JHSC) CERTIFICATION TRAINING – CERTIFICATION REFRESHER
- JOINT HEALTH AND SAFETY COMMITTEES - (JHSC) CERTIFICATION TRAINING PART I - BASIC
- JOINT HEALTH AND SAFETY COMMITTEES - (JHSC) CERTIFICATION TRAINING PART II - WORKPLACE SPECIFIC HAZARD TRAINING
- LOCKOUT, TAG OUT AND TEST AWARENESS
- MOULD AWARENESS
- ONTARIO ELECTRICAL SAFETY CODE (28TH EDITION/2022) GENERAL LEVEL 1
- PSYCHOSOCIAL RISK ASSESSMENT
- QUICK CUT SAW SAFETY AWARENESS (CEU)
- RIGGING SAFETY AWARENESS (2022-2024)
- SAFETY DATA SHEET INTERPRETATION FOR WHMIS 2015
- SCAFFOLD SAFETY AWARENESS (2019-2022)
- SITE INCIDENT MANAGEMENT TEAM TRAINING
- STANDARD FIRST AID - LEVEL "C" CPR & AED - 2 DAY (2022-2024)
- STANDARD FIRST AID/CPR/AED AWARENESS (2021-2022)

APPENDIX H – Staff Training Courses

- SUPERVISOR HEALTH AND SAFETY AWARENESS IN 5 STEPS
- SW FIT TESTING FOR RESPIRATORS
- SW ST - LIFTING AND CARRYING WASTE/MATERIALS
- SW ST - MSD PREVENTION POLICY
- SW ST - NO DRUGS OR ALCOHOL
- SW ST - PROTECTIVE EQUIPMENT AND CLOTHING
- SW ST - SLIPS, TRIPS AND FALLS PREVENTION
- SW ST - WORKER'S RIGHTS & DUTIES (MINISTRY OF LABOUR)
- TORONTO WATER - NFPA 10 - STANDARD FOR PORTABLE FIRE EXTINGUISHERS TRAINING
- TRAFFIC CONTROL ROADWAY WORK (2019-2022)
- TRANSPORTATION OF DANGEROUS GOODS (2021-2023)
- TRENCHING AND EXCAVATION AWARENESS (CEU) -2024
- WHMIS 2015 ELEARNING MODULE
- WORKER HEALTH AND SAFETY AWARENESS IN 4 STEPS
- WORKING AT HEIGHTS (2022-2024)
- WORKING AT HEIGHTS REFRESHER (CEU) 2022-2024
- WORKPLACE VIOLENCE LEGISLATION & POLICY REVIEW
- ARC FLASH FOR NON-QUALIFIED PERSONS (2020)
- INCIDENT REPORTING (2020)

Site Specific Training

- ABTP - BLOWER BLDG UPGRADES PROJECT
- ABTP - CONTRACTOR SAFETY MANAGEMENT PROGRAM
- ABTP - DECANTER ADVANCED SPEED CONTROLLER
- ABTP - DIGESTER GAS E2 PLAN ANNUAL EXERCISE AND TAILGATE TRAINING
- ABTP - EXISTING PELLETIZERS UPGRADES PROJECTY-HEALTH & SAFETY ORIENTATION
- ABTP - GLOBAL ADJUSTMENT AWARENESS FOR ASHBRIDGES BAY TREATMENT PLANT
- ABTP - HYDRAULICS 101
- ABTP - SIEMENS VFD MANUFACTURER TRAINING (FOR PRIMARY HOT WATER PUMPS)
- ABTP - CAPITAL PLANT WATER: PHASE 1B PROCESS TRAINING
- ABTP - TAILGATE FLUSHING SOP-TW-054

Mandatory Tailgate

- ABTP - TAILGATE INJURY REPORTING
- ABTP - TAILGATE ACCESS & WORKING NEAR HIGH VOLTAGE ELECTRICAL AREAS - SOP
- ABTP - TAILGATE AIR QUALITY AND YOUR HEALTH
- ABTP - TAILGATE CIVILITY IN THE WORKPLACE
- ABTP - TAILGATE COLD STRESS
- ABTP - TAILGATE COVID-19 RAPID ANTINGEN TESTING (RAT)
- ABTP - TAILGATE DISTRACTED DRIVING
- ABTP - TAILGATE EQUIPMENT SAFETY INSPECT IT BEFORE YOU USE IT
- ABTP - TAILGATE ERGONOMICS INJURIES SIMPLE PRECAUTIONS
- ABTP - TAILGATE HEAD PROTECTION HARD HATS/SAFETY SHOES/FLASH UNIFORM
- ABTP - TAILGATE HEAT STRESS
- ABTP - TAILGATE INJURY REPORTING
- ABTP - TAILGATE LADDER SAFETY
- ABTP - TAILGATE LOCKOUT, TAG & TEST (LOTO) PROGRAM
- ABTP - TAILGATE PREVENTING BACK INJURIES
- ABTP - TAILGATE SAFE LIFTING
- ABTP - TAILGATE SAFETY ON THE ROAD
- ABTP - TAILGATE SEWAGE WORKS AND SURFACE WATER SPILL RESPONSE

APPENDIX H – Staff Training Courses

- ABTP - TAILGATE SLIPS, TRIPS AND FALLS
- ABTP - TAILGATE TW EMERGENCY PLAN AWARENESS
- ABTP - TAILGATE VEHICLE IDLING
- ABTP - TAILGATE WINTER DRIVING
- ABTP - TAILGATE WORKPLACE VIOLENCE
- ABTP - TAILGATE WHMIS 2015 NEW CHEMICAL SAFETY INFO SYSTEM
- DEFENSIVE DRIVING- TORONTO WATER MANDATORY TAILGATE-NOVEMBER 2022
- PREVENTING SLIPS, TRIPS AND FALLS AT WORK (TW MANDATORY TAILGATE FEBRUARY 2022)
- THE RIGHT TO REFUSE UNSAFE WORK- TORONTO WATER MANDATORY TAILGATE AUGUST 2022
- TORONTO WATER EMERGENCY PLAN AWARENESS- MANDATORY TAILGATE (MAY 2022)

Technical Training

- PTP - CREATING AND AWARDING UNIT PRICE CONTRACTS – VIRTUAL INSTRUCTOR-LED TRAINING (VILT)
- A PRACTICAL INTRODUCTION TO CLOUD COMPUTING
- ACTIVATED SLUDGE
- AGILE MANIFESTO PRINCIPLES
- AGILE PLANNING AND ESTIMATION
- AGILE PROBLEM RESOLUTION AND QUALITY MANAGEMENT
- AGILE STAKEHOLDER ENGAGEMENT AND COMMUNICATION
- AIR PURIFYING RESPIRATORS (2020)
- ASSET MANAGEMENT - 1. DECOMMISSIONING ASSETS
- ASSIGN TRAINING TO YOUR STAFF
- BACKFLOW PREVENTION RE-CERTIFICATION
- BACKFLOW PREVENTION AWARENESS (2019-2022)
- BASIC PUMPS AND PUMPING HYDRAULICS
- CENTRIFUGAL AND POSITIVE DISPLACEMENT PUMP OPERATION (2020-2022)
- CLASSROOM REVIEW OF COMMON WEAR ITEMS FOR PLANT MACHINERY (2019-2021)
- CQI TOOLKIT: AGILE
- DISINFECTION OF POTABLE WATER PIPING (2020)
- DRINKING WATER QUALITY MANAGEMENT STANDARD (2020)
- EXCEL 2013 INTRODUCTION
- GAS CHLORINATION AND DISINFECTION TRAINING - 4 DAYS (CEU)
- GETTING STARTED WITH ONEDRIVE FOR BUSINESS - VIRTUAL INSTRUCTOR-LED TRAINING (VILT)
- GETTING STARTED WITH ONEDRIVE MOBILE - VIRTUAL INSTRUCTOR LED TRAINING (VILT)
- GETTING STARTED WITH OUTLOOK MOBILE - VIRTUAL INSTRUCTOR LED TRAINING (VILT)
- GETTING STARTED WITH OUTLOOK WEB APP AND DESKTOP APP - VIRTUAL INSTRUCTOR-LED TRAINING (VILT)
- INDUSTRIAL MAINTENANCE TECHNICIAN (IMT) E & M CERTIFICATION (2021-2022)
- INSTRUMENT AIR VENDOR TRAINING
- LOCATING TORONTO WATER INFRASTRUCTURE WITH RD TOOLS
- LOGBOOK ENTRY (2020-2022)
- MANDATORY CERTIFICATE RENEWAL COURSE (2021 - 2023)
- MAXIMO INVENTORY MANAGEMENT FOR SWMS - VIRTUAL INSTRUCTOR LED TRAINING (VILT)
- MAXIMO OVERVIEW AND NAVIGATION, SERVICE REQUEST FOR SWMS - VIRTUAL INSTRUCTOR LED TRAINING (VILT)
- MAXIMO WORK ORDER AND MOBILE FOR SWMS - VIRTUAL INSTRUCTOR LED TRAINING (VILT)
- MMR – SELF-CONTAINED BREATHING APPARATUS (CEU) -(2022-2024)
- OIT EXAM IN ALL 4 DISCIPLINES (WATER TREATMENT, WATER DISTRIBUTION, WASTEWATER TREATMENT, AND WASTEWATER COLLECTION).
- PART 1: GETTING STARTED WITH ERIS
- SAFE DRINKING WATER ACT AND APPLICABLE DRINKING WATER REGULATIONS (CEU)

APPENDIX H – Staff Training Courses

- SAP ARIBA - CLIENT DIVISION: SOURCING REQUEST
- SAP INTRODUCTION: NAVIGATION AND REPORTS
- SAP INVENTORY MANAGEMENT
- SEWAGE WORKS AND SURFACE WATER SPILL RESPONSE
- SOURCE WATER PROTECTION (2022-2025)
- SUPPLY CHAIN MANAGEMENT: LOGISTICS
- VALVE ACTUATOR (2019-2021)
- WATER SYSTEM REPAIRS: INTRODUCTION TO OXY-ACETYLENE CUTTING AND STICK WELDING -2 DAY (CEU)
- WINTERWISE: THE COLD HARD FACTS ABOUT DISTRIBUTION SYSTEMS-2022
- WMS AVANTIS WORKSHOP
- WWT-MECP EXAM PREP FOR WASTEWATER TREATMENT LEVEL 1 AND 2
- WWT-MECP EXAM PREP FOR WASTEWATER TREATMENT LEVEL 3 AND 4

Other Training

- 10 TIPS TO MANAGE YOUR ANGER
- 2022 PERFORMANCE MANAGEMENT CYCLE - VIRTUAL INFORMATION SESSIONS FOR EMPLOYEES
- 5 TIPS TO IMPROVE YOUR CRITICAL THINKING | SAMANTHA AGOOS
- 5 WAYS TO LISTEN BETTER | JULIAN TREASURE
- 8 TIPS FOR FINISHING WHAT YOU START
- 9 EASY WAYS TO BE SMARTER EVERY DAY
- A POWERFUL WAY TO UNLEASH YOUR NATURAL CREATIVITY | TIM HARFORD
- ACCESSIBILITY 101
- ADJUST YOUR MOVEMENT TO INCREASE YOUR EXECUTIVE PRESENCE
- ADJUST YOUR VOICE TO INCREASE YOUR EXECUTIVE PRESENCE
- ANTI-ISLAMOPHOBIA VIRTUAL WORKSHOP
- AODA - IASR EMPLOYMENT STANDARD
- AODA - IASR INFORMATION AND COMMUNICATIONS STANDARD
- AODA - OHRC
- BECOMING A FLUENT LEADER: GET OUT OF YOUR COMFORT ZONE
- BUILD AN INNOVATION MACHINE
- BUSINESS EMAIL COMPROMISE
- CALL IT OUT: RACISM, RACIAL DISCRIMINATION AND HUMAN RIGHTS
- CHOOSE YOUR OWN ADVENTURE: CURSE OF THE MUMMY'S DATA
- CHOOSE YOUR OWN ADVENTURE: DEEP SPACE DANGER
- CHOOSE YOUR OWN ADVENTURE: LEAGUE OF CYBERHEROES
- CHOOSE YOUR OWN ADVENTURE: PLUNGE INTO PERIL
- CHOOSE YOUR OWN ADVENTURE: YETI ESCAPE
- CHOOSE YOUR OWN ADVENTURE: ZOMBIE INVASION
- CITY BENEFIT AND PENSION SEMINARS
- CONFLICT RESOLUTION & NEGOTIATION SKILLS
- DEEP SPACE DANGER ASSESSMENT
- DIVISIONAL PURCHASE ORDER TRAINING
- EXTERNAL TRAINING APPROVAL FOR MANAGERS
- EXTERNAL TRAINING FOR END-USERS
- HOW WE'LL EARN MONEY IN A FUTURE WITHOUT JOBS: MARTIN FORD
- INDIGENOUS AWARENESS TRAINING: TRUTH AND RECONCILIATION
- JUST THE FACTS: DATA DESTRUCTION
- JUST THE FACTS: INSIDER THREATS
- JUST THE FACTS: INTRODUCTION
- JUST THE FACTS: MALWARE

APPENDIX H – Staff Training Courses

- JUST THE FACTS: MOBILE SECURITY
- JUST THE FACTS: PHISHING
- JUST THE FACTS: PHYSICAL SECURITY
- JUST THE FACTS: PUBLIC WI-FI
- JUST THE FACTS: RANSOMWARE
- JUST THE FACTS: SAFE WEB BROWSING
- JUST THE FACTS: SOCIAL ENGINEERING
- JUST THE FACTS: TRAVEL SECURITY
- JUST THE FACTS: WORKING REMOTELY
- MUNICIPAL FINANCE ESSENTIALS
- PASSWORD SECURITY BRIEF
- PLUNGE INTO PERIL ASSESSMENT
- PMMD - NON COMPETITIVE PROCUREMENT MODULE - CLIENT DIVISION
- PROTECTING PRIVACY ON THE JOB
- RESPECT IN OUR WORKPLACE (2020)
- RESPONDING TO WORKPLACE HARASSMENT: WHAT YOU NEED TO KNOW
- RETIREMENT PLANNING SEMINARS
- SUPPORTING BLACK COLLEAGUES & THE ANTI-BLACK RACISM MOVEMENT
- THE CURSE OF THE MUMMY'S DATA ASSESSMENT
- THE LEAGUE OF CYBERHEROES ASSESSMENT
- THE TORONTO PUBLIC SERVICE BY-LAW E-LEARNING
- TORONTO AT YOUR SERVICE VIDEO
- TORONTO WATER EMPLOYEE ENGAGEMENT SESSION
- TORONTO WATER ORIENTATION
- UNCONSCIOUS BIAS TRAINING
- WEBEX MEETINGS: HOSTING POWERFUL MEETINGS - VIRTUAL INSTRUCTOR-LED TRAINING (VILT)
- YETI ESCAPE ASSESSMENT
- ZOMBIE INVASION ASSESSMENT