TORONTO Water

ASHBRIDGES BAY WASTEWATER TREATMENT PLANT

2015 Annual Report

March 31, 2016

EXECUTIVE SUMMARY

The Ashbridges Bay Treatment Plant (ABTP) is the largest of four wastewater treatment plants operated by the City of Toronto. Located in Toronto's east end, the plant has a nominal treatment capacity of 818,000 m^3/day and serves an equivalent population of 1,524,000. Treated effluent is discharged to Lake Ontario. The facility was operated under the ECA No. 2539-9HRRPQ last amended June 11, 2014.

The average daily influent flow rate in 2015 was 585.2 ML/day. The 2015 average influent concentrations were 334.6 mg/L of Suspended Solids (SS), 274.9 mg/L of Biological Oxygen Demand (BOD_5), and 7.5 mg/L of Total Phosphorus (TP).

Ashbridges Bay achieved the following effluent quality in 2015:

	ECA[1]	2015 Treated Effluent
Suspended Solids (SS)	25 mg/L	10.1 mg/L
Carbonaceous Biological Oxygen Demand ($CBOD_5$)	25 mg/L	5.0 mg/L
Total Phosphorus (TP)	1.0 mg/L	0.8 mg/L
pH	6.5 – 9.5	7.0
Escheria Coli (E. Coli) [2]	200 CFU/100 mL	66.5 CFU/100 mL
SS Loading Rate	20,450 kg/day	5,021 kg/day
$CBOD_5$ Loading Rate	20,450 kg/day	2,838 kg/day
TP Loading Rate	818 kg/day	495 kg/day

[1] Referenced from ECA No. 2539-9HRRPQ issued June 11, 2014.
[2] Annual Geometric Mean

There were 13 secondary treatment bypass occurrences in 2015 where portions of the flow received preliminary and primary treatment before being disinfected and discharged into Lake Ontario. Total bypassed flows were estimated to be 3,049 ML.

During 2015, the biosolids generated at Ashbridges Bay were managed through agricultural land application, pelletization, mine reclamation, and soil amendment use. The total amount of biosolids generated at the plant in 2015 was 145,321 wet tonnes. The biosolids generated met all the metal concentration requirements set out in O.Reg 267/03.

The plant continued with numerous capital projects. Notable projects included: the design of a UV disinfection facility; the design of a new WAS thickening facility; the design of a phosphorous removal facility; the design of dewatering and polymer system; the construction of P building headworks upgrades; and the construction of Aeration Tank #2 upgrades.

Polymer consumption in 2015 was 170.3 tonnes for Waste Activated Sludge thickening, and 540.0 tonnes for biosolids dewatering. Ferrous chloride consumption was 1,918 tonnes as Fe. Sodium Hypochlorite consumption and liquid chlorine for effluent disinfection totalled 1.7 ML and 174.6 tonnes, respectively. Total annual consumption for potable water, hydro, and natural gas in 2015 was 744,345 m^3, 131M kWh, and 6.1M m^3, respectively.

The plant operating costs for 2015 totalled $56.4M. In 2015, the Ashbridges Bay Treatment Plant had 161 employees. There were 70 Total Lost Days due to work-related injuries.

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1. INTRODUCTION

The Ashbridges Bay Treatment Plant is one of four wastewater treatment plants operated by the City of Toronto under the responsibility of the Wastewater Treatment section of Toronto Water. Built in 1910, Ashbridges Bay is one of Canada's largest and oldest wastewater treatment plants. 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 plant is on a site approximately 40.5 hectares in the City of Toronto. The Ashbridges Bay plant services the area 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. It is the largest secondary wastewater treatment plant in Canada, with a sewershed of approximately 25,000 ha, and a connected population of 1,524,000 people.

Construction of the plant was carried out in several phases and commenced in 1910 by the former City of Toronto. Construction of the present plant began in 1943 and has continued in various stages since that date. The plant is rated for 818 ML/day, provides complete wastewater treatment, including removal of suspended solids, dissolved organics, and phosphorus. The plant also provides effluent disinfection and disposal of biosolids, including the biosolids that are generated and transferred from the Humber and North Toronto Treatment Plants.

Major treatment processes include screening and grit removal, primary treatment, secondary treatment, phosphorus removal, effluent disinfection, waste activated sludge thickening, anaerobic digestion, biosolids dewatering and biosolids management. Treated effluent is discharged to Lake Ontario. Numerous auxiliary systems are required for proper operation of many plant processes including: potable water, process water, HVAC, electrical power distribution, gas, chemicals, instrument air, etc.

The Ministry of the Environment and Climate Control (MOECC) has classified the Ashbridges Bay Treatment Plant as a Class IV wastewater treatment facility under Regulation 129/04. The facility was operated under the ECA No. 2539-9HRRPQ last amended June 11, 2014.

This report is a summary of plant operations and performance in 2015. In addition to a discussion of effluent quality and the plant's success in meeting treatment objectives, the report contains summaries of 2015 plant operation, maintenance, chemicals and utilities, operational costs and human resources.

2. OPERATIONS

2.1 Influent Quality

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

A summary of annual flow and influent parameter concentrations for the past 2 years is shown in Table 1. The plant experienced an 8.3% decrease in influent flow from 2014 to 2015. A comparison of monthly influent flow rates and characteristics for 2015 is illustrated in Appendix C.

Influent to the Ashbridges Bay Treatment Plant also includes sludge flows received from the Humber Treatment Plant and the North Toronto Treatment Plant. Ashbridges Bay received an average of 74 dry tonnes/day of liquid biosolids, and 822 m^3/day of waste activated sludge from the Humber Treatment Plant via the Mid-Toronto Interceptor. The North Toronto Treatment Plant transferred an average of 0.3 MLD of co-settled sludge (raw sludge and waste activated sludge) to Ashbridges Bay Treatment Plant via the Coxwell Sanitary Trunk Sewer.

Table 1: Influent Parameters

Parameter	2015	2014
Influent Flow [ML/day]	585.2	638.4
Total Annual Flow [ML]	212,831	232,932
Influent SS [mg/L]	334.6	328.5
Influent BOD_5 [mg/L]	274.9	258.3
Influent TP [mg/L]	7.5	6.6

Influent concentrations for eleven (11) select metals have been included in Appendix D and presented against the sewer Bylaw limits for comparison purposes only.

2.2 Preliminary Treatment

Raw wastewater flows into two preliminary treatment facilities, P and D Buildings where grit and screenings are removed.

The P Building has twelve grit channels – six non-aerated chain and bucket type each having a hydraulic capacity of 64,000 m^3/day, and six aerated clam shell bucket type each having a hydraulic capacity of 141,000 m^3/day. There are also ten automatic bar screens, each having a hydraulic capacity of 272,500 m^3/day. The grit and screenings from P Building are hauled to a sanitary landfill site.

The D Building preliminary treatment facility was commissioned in 2013. Wastewater passes through five mechanical screens, with each screen channel rated at a peak flow rate of 545,000 m^3/day. The wastewater then flows into four aerated grit channels, each rated at a peak flow rate of 545,000 m^3/day. The grit and screenings from D Building are further processed prior to hauling to the landfill.

The quantity of grit and screenings removed by the grit channels and screening systems averaged 5.6 tonnes per day in 2015.

2.3 Primary Treatment

The next step in the treatment process is called Primary Settling or Sedimentation where the flow enters large tanks and its velocity is reduced, allowing heavier solids in the wastewater to settle to the bottom. Sludge collectors in the tanks sweep the settled sludge (called Raw Sludge) into sludge hoppers located at the bottom of the tank at one end, from where it is pumped to the anaerobic digestion tanks. There are twelve Primary Clarifiers, six tanks (#1 to #6) with dimensions of 61 m x 19.5 m x 4.5 m and rated at a peak flow capacity of 100,000 m^3/day, three tanks (#7 to #9) with dimensions of 76.2 m x 32.04m x 4.8[1] m and rated at a peak flow capacity of 292,333 m^3/day, and three tanks (#10 to #12) with dimensions of 91.4 m x 35.05 m x 5.09 m and rated at a peak flow capacity of 418,000 m^3/day, with a total installed peak flow capacity of 2,730,999 m^3/day.

Table 2 contains a summary of key primary treatment effluent parameter concentrations for 2015 and 2014.

The plant has the capacity to co-settle waste activated sludge from the Final Clarifiers in the Primary Clarifiers, this rarely occurs.

Table 2: Primary Treatment Effluent Parameters

Parameter	2015	Primary Removal Efficiency	2014	Primary Removal Efficiency
Primary SS [mg/L]	223.3	33%	205.9	38%
Primary $CBOD_5$ [mg/L]	98.9	64%	92.9	64%

2.4 Secondary Treatment

In the activated sludge process, effluent from the Primary Clarifiers is mixed with Return Activated Sludge from the Final Clarifiers and aerated. The activated sludge is made up of naturally occurring bacteria and other micro-organisms. The micro-organisms use oxygen and dissolved organics in the wastewater for their metabolic functions and in doing so purify the wastewater. There are eleven rectangular Aeration Tanks that employ a step feed aeration process with four passes per tank. Each tank has an average flow capacity of 91,000 m^3/day and each pass has dimensions of 161.5 m x 6.17 m x 4.6 m. Ten out of the eleven tanks are equipped with coarse air bubble diffusers. Tank# 2 was refurbished with fine bubble diffusers in 2015.

The mixed liquor from the Aeration Tanks flows to large quiescent Final Clarifiers where Activated Sludge is allowed to settle. A controlled quantity of this sludge is "returned" to the Aeration Tanks to repeat the treatment process, and the excess is removed as Waste Activated Sludge and directed to the Primary Clarifiers, or the Flotation process for thickening, and then pumped to the Digestion Tanks. There are eleven Final Clarifiers, each with dimensions of 124.4 m x 24 m x 5.3 m and rated at a peak flow capacity of 182,000 m^3/day.

A summary of key aeration parameters for the last three years is shown in Table 3.

[1] Design information was incorrectly reported in previous annual reports and has been corrected as shown.

Table 3: Secondary Treatment Process Parameters

Parameter	2015	2014	2013
Aeration Loading [kg $CBOD_5/m^3 \cdot day$]	0.32	0.32	0.35
Mixed Liquor Suspended Solids [mg/L]	2969	2696	1839

2.5 Final Effluent Quality and Disinfection

Chlorine is mainly used to disinfect the final effluent prior to discharging into Lake Ontario; however, on occasion, Sodium hypochlorite is used to disinfect the final effluent. The plant outfall is equipped with a number of diffusers and extends 1000 m into the lake from the shore. In addition to the plant outfall, 2,908 ML of final effluent was discharged through seawall gates.

A combination of high flows due to wet weather, increased average influent Total Phosphorous concentration and the plant's reduced capacity due to the temporary impact of plant improvement projects led to a slight exceedance, 0.06 mg/L of the ECA's limit for the monthly average of Total Phosphorous in October 2015. Apart from this one instance, Ashbridges Bay Treatment Plant continued to produce a high quality effluent which surpassed requirements of the effluent objectives as described in condition 6 of the plant's ECA. This was achieved by continuous improvement in operations and maintenance of the treatment process, and infrastructure delivery.

A summary of key secondary treatment effluent parameters for the previous two years is shown in Table 4, Table 5 and Table 6. Details of the plant final effluent characteristics are presented in graphical form in Appendix C.

Table 4: Annual Average Secondary Treatment Effluent Parameter Limits

Parameter	ECA Limit*	2015	Removal Efficiency	2014	Removal Efficiency
SS [mg/L]	25	10.1	97%	8.2	97%
$CBOD_5$ [mg/L]	25	5.0	98%	4.6	98%
SS Loading Rate (kg/day)	20,450 kg/day	5,906 kg/day	-	5,021 kg/day	-
$CBOD_5$ Loading Rate (kg/day)	20,450 kg/day	2,884 kg/day	-	2,837 kg/day	-

* Referenced from condition 7 of ECA No. 2539-9HRRPQ issued June 11, 2014.

Table 5: Monthly Average Secondary Treatment Effluent Parameter Limits

Parameter	ECA*	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
TP [mg/L]	1.0	0.9	0.7	0.8	0.7	0.8	0.8	0.5	0.6	1.0	1.1	0.6	0.7
TP Loading Rate [kg/day]	818	535	400	470	454	465	554	258	345	572	590	367	347

* Referenced from condition 7 of ECA No. 2539-9HRRPQ issued June 11, 2014.

Table 6: Annual Average Secondary Treatment Effluent Parameter Objectives

Parameter	Secondary Effluent		Plant Effluent[3]	
	Objective[1]	2015	Objective[1]	2015
SS [mg/L]	15	10.1	25	10.4
$CBOD_5$ [mg/L]	15	5.0	25	5.2
TP	0.9	0.8	1.0	0.8
pH	6.5 – 8.5	7.0	-	-
E-Coli[2] (CFU/100ml)	200	66.5	-	-

[1] Referenced from condition 6 of ECA No. 2539-9HRRPQ issued June 11, 2014.
[2] Annual Geometric Mean
[3] Plant Effluent concentrations are calculated as weighted averages of the flows and concentrations of the Secondary Effluent stream and the Secondary Treatment Bypass Channel.

Final effluent concentrations for eleven (11) select metals have been included in Appendix D.

2.6 Bypasses

There were 13 secondary treatment bypasses in 2015 where portions of the flow received preliminary and primary treatment before being disinfected and discharged into Lake Ontario. Each instance was reported to the MOECC Spills Action Center and recorded in the plant's Monthly Report. Secondary bypass occurs due to high wet weather flows that exceed the plant's secondary treatment capacity. There were 20 secondary treatment bypasses in 2014.

A summary of secondary bypasses occurring in 2015 is presented in Table 7. Secondary bypass resulted in a total annual bypass volume of 3,049 ML. Total precipitation in the Toronto area[2] was 675 mm in 2015, a 4.7% decrease from 2014.

Table 7: Secondary Bypass Summary

No.	Date	Duration (hrs)	Volume (m^3)
1	April 8	4.00	101,927
2	April 20	16.40	619,006
3	May 30 – May 31	13.92	131,532
4	June 8	9.63	334,012
5	June 16	4.33	12,079
6	June 23	3.67	14,320
7	June 27 – June 28	19.60	381,597
8	August 10	6.27	190,009
9	August 20	1.20	22,657
10	September 29	4.25	115,767
11	October 28 – October 29	15.35	709,226
12	November 10	2.20	35,786
13	December 29	5.25	143,296

2.7 Solids Handling

The plant has 10 Dissolved Air Flotation (DAF) tanks to thicken Waste Activated Sludge (WAS) from the Final Clarifiers with the use of air and a thickening polymer. Each WAS tank has a surface area of 74.3 m^2. WAS was also occasionally pumped to the Primary Clarifier for co-settling. 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.

In 2015, an average of 8,470 m^3/day of WAS was thickened, whereas 1,240 m^3/day of WAS was either co-settled to the Primary Clarifier or returned to the aeration tanks. The average WAS total solids concentration was 0.80%. An average of 2,090 m^3/day of thickened waste activated sludge (TWAS) was pumped to the anaerobic digesters for treatment. Average total solids concentrations of TWAS was 3.34% and its total volatile solids content was 71.04% of TS.

The plant has 20 Anaerobic Digestion tanks of raw and thickened waste activated sludge. Anaerobic digestion is the biological degradation of organic materials (stabilization) in the absence of oxygen, which produces digester gas, made up predominantly of methane, as a by-product. This gas is used as

[2] *Adapted from http://climate.weatheroffice.gc.ca/climatedata*

a supplementary fuel for plant needs, reducing the plant's operating costs. The digesters are operated in the mesophilic temperature range (34 - 38°C). The target operating temperature for the digesters is 36°C. There are twelve Primary Digesters of 30.5 m diameter, and eight Primary Digesters of 33.5 m diameter.

In 2015, 20 Anaerobic Digesters were in operation from January to August and 19 Anaerobic Digesters were in operation from September to December. An average of 4,440 m^3/day of raw sludge from primary treatment was pumped to the anaerobic digesters. Average total solids (TS) concentration of raw sludge was 3.0% and total volatile solids (TVS) content was 73.5% of TS.

The average hydraulic retention time of sludge in the Anaerobic Digesters was 23.3 days. Organic loading of the digesters averaged approximately 1.0 kg TVS per m^3 of digester capacity per day.

The anaerobic digestion process reduces sludge volume and stabilizes the solids to form biosolids. A summary of the digestion process for the previous three years can be seen in Table 8. The volume transferred to the digesters averaged 6,530 m^3/day in 2015.

Table 8: Solids Handling Process Parameters

Parameter	2015	2014	2013
Primary Sludge Treated [m^3/day]	4,440	4,292	5,067
Primary Sludge TS (%)	2.95	3.05	2.9
WAS to Primary Treatment and Excess WAS to Aeration [m^3/day]	1,240	2,409	9,160
WAS to Thickening [m^3/day]	8,470	8,163	10,469
WAS TS (%)	0.80	0.82	0.54
TWAS Treated [m^3/day]	2,090	2,366	876
TWAS TS (%)	3.3	3.4	4.8
Volume to Digestion [m^3/day]	6,530	6,658	5,933
Liquid Biosolids TS (%)	1.8	1.8	1.8
Dewatered Sludge Cake (%)	27.7	26.5	27.8

Anaerobically digested biosolids are conditioned with a polymer and dewatered using 12 high speed centrifuges, with a total capacity of about 180 L/s. The resulting biosolids "cake" is pumped either to the plant's truck-loading facility for haulage and disposal, or to the onsite pelletizer facility. The total centrifuge run-time in 2015 was 48,049 unit-hours.

In 2015, the average solids concentration of dewatered biosolids cake was 27.7%, and centrate quality averaged 665 mg/L of suspended solids. The overall average solids capture rate was 96%.

Concentrations of eleven metals in digested sludge are compared to metal concentrations regulated by *Ontario Regulation 267/03, The Nutrient Management Act*, which governs the maximum metal concentration in biosolids that are applied to land. The analyses may be found in Appendix E. These results indicate that the biosolids met MOECC regulations for all metals and E. Coli.

The average digester gas volume generated in 2015 was estimated to be 64,560 m^3/day. This was a decrease of 2.1% from the 2014 volume.

In 2015, the daily average inflow to the Ashbridges Bay Treatment Plant was 585.2 ML/day. The flow projections for 2016 do not exceed the rated plant capacity of 818 ML/day and are expected to generate a sludge volume that will be +/-5% of the given volume for 2015.

2.8 Biosolids Management

Biosolids generated at the plant are managed in a number of ways, including agricultural land application, alkaline stabilization, landfilling, pelletization, and mine reclamation. Biosolids management from the Ashbridges Bay Treatment Plant in 2015 totalled 145,321 wet tonnes and was managed as follows:

2.8.1 Land Application

A total of 33,115 wet tonnes of biosolids were sent to approved agricultural land application sites in Ontario. During the 2015 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 fifty out of a total of sixty nine agricultural land sites in Ontario. The inspector was responsible for ensuring the Nutrient Management Act (NMA) 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.

2.8.2 Alkaline Stabilization

In 2015, a total of 37,515 wet tonnes of biosolids was further processed and used as a soil amendment.

2.8.3 Pelletization

The operation and maintenance of the facility and marketing of pellets is managed by an outside contractor. In 2015, 71,911 wet tonnes of biosolids were processed by the pelletizer. Pellet quality in 2014 met the standards set out by the Canadian Fertilizers Act.

2.8.4 Landfill Management of Biosolids

A total of 0 wet tonnes was transported to various approved landfill sites.

2.8.5 Mine Reclamation

A total of 2,780 wet tonnes of biosolids was utilized at mine reclamation sites.

Table 9 below summarizes the biosolids management methods utilized and the total amount of biosolids sent to each management option.

Table 9: Biosolid Management Methods

Biosolids Management Method	Wet Tonnes 2015	2014	2013
Agricultural Land Application	33,115	30,663	38,109
Alkaline Stabilization (Soil Amendment)	37,515	48,656	28,389
Pelletization[1]	71,911	61,336	61,379
Landfill	0	1,096	7,356
Mine Reclamation	2,780	1,438	7,969
TOTAL	**145,321**	**143,190**	**143,202**

[1]Quantities incorrectly reported in 2013 have been corrected as shown.

2.9 Complaints

The Ashbridges Bay Treatment Plant personnel logged 2 complaints related to odour and 0 complaints related to noise in 2015. All reported complaints were investigated by City of Toronto staff and, where possible, action was taken immediately.

2.10 Odour Reduction Plan

As per Section 22 of the ABTP Amended ECA – AIR Number 3771-92NP7X, a review of the Odour Reduction Plan summarizing the work progress in 2015, including odour and total sulphur reduction activities undertaken with associated reduction levels achieved can be found in Appendix H.

3. CAPITAL PROJECTS AND STUDIES

As part of the Toronto Water Capital Program, the Ashbridges Bay Treatment Plant commenced or continued with the following capital works projects and studies in 2015:

- Upgrade of air compressors and general electrical upgrades in the Auxiliary building.
- Conversion to fine bubble and tank cover replacement for Aeration Tank No. 2
- Replacement of boiler number 4.
- Replacement of all roof surfaces not replaced or new under the D-Bldg. contract.
- Complete upgrade of Digester 9-12 cluster, including improvements to work done under Dig 1-8 contract and tunnel NFPA upgrades.
- UV disinfection for secondary effluent, chlorine contact tank for bypass disinfection including plant water pumping station upgrades and Sea Wall substation upgrades. May include effluent pumping station and or additional seawall gates.
- Distributed gen-sets for critical load standby power.
- Replacement of existing ferrous gallery with new ferrous building
- General upgrades to M&T building to extend the life of the pumping station until the integrated pumping station is built.
- Replacement of a number of T-Bldg. gates and sump pumps.
- Upgrade to existing system for odour control and NFPA compliance.
- Preliminary treatment upgrades including grit, screenings, odour control, bypass and gallery, including chemically enhanced primary treatment.
- Upgrades to allow monitoring of various plant services including power, water and gas.
- Replacement of dewatering polymer system in the old dewatering building, including space for TWAS polymer system, upgrades to sludge feed system, upgrades to centrifuge control system and possible upgrades to sludge feed storage system.
- Replacement of chain and flight for 3 final tanks and 3 primary clarifiers, including upgrades to primary clarifier 1-6 gallery, centrate distribution and plant water piping.
- Rehabilitation of Digester 15 post cleaning.
- Replacement of PLCs
- Replacement of MCC in pigeon alley, silo building, Z-Bldg and NFPA upgrades.
- Replacement of MCC in the West control building. New above grade VFD building.
- North sub transformer replacement, North sub PCS upgrades, North sub breaker upgrades.
- Replacement of MCC in the blower building including lighting upgrades.
- New WAS thickening facility using centrifuges most likely located in the old heat recovery and incinerator building, including overhaul of South Substation.
- Replacement of truck loading facility biofilter, new odour sources from equalization tanks, new pelletizer up blast fans, conversion of scrubber building into workshop and admin space and upgrades to truck loading facility.
- Replacement of Waste Gas Burners
- Replacement of M&T pumping station with new integrated sewage/wet weather flow pumping station located South of Lakeshore.
- New Outfall
- Disinfection control system upgrade
- Gas Detection System Upgrade in Truck Loading Building

4. MAINTENANCE

The Ashbridges Bay Treatment Plant maintenance activities in 2015 were distributed between eight Work Areas. Staff from these groups performed a variety of scheduled, preventative, predictive and breakdown maintenance on a diverse spectrum of equipment. The main goal of maintenance activities is to ensure equipment availability to meet plant process operation requirements.

The following is a summary of significant maintenance accomplishments over the past year. These activities are considered to be maintenance activities, as required by conditions 10(6) (c) and (j) of the ECA. Under condition 12 of the ECA, relating to Limited Operability Flexibility, no notices of modifications were submitted to the Water Supervisor, MOECC as no work performed in 2015 fell under Schedule B of the ECA.

4.1 Effluent Monitoring Calibration and Maintenance Records

Flow is metered in the North and South Final Effluent channels, and the East and West Bypass channels. The annual calibration and maintenance records of flow meters, automatic samplers and on-line analyzers for regulated parameters was completed in 2015, and found to be within acceptable limits. Calibration data sheets for flow meters are attached in Appendix G.

4.2 Preliminary and Primary Treatment (Work Area 1)

Work Area 1 includes two raw sewage pumping stations (‘M’ and ‘T’ Buildings), preliminary treatment areas (‘D’ and ‘P’ Buildings), and three primary treatment areas (Tanks #1-6, Tanks #7-9, and Tanks #10-12). The following maintenance was completed in 2015:

a) M & T Pumping Stations

- Installed two new sump pumps in T-Bldg. basement
- Installed new emergency City Water Line from M-Bldg. to T-Bldg.
- Replaced old city water line from P-Bldg. to M-Bldg.
- Completed overhauled Bosker # 1.
- Re-manufactured RSP-1 pump in M-Bldg.
- Installed City Water Meters at M-Bldg. & T-Bldg. optimized monitoring.
- Overhauled RSP-3 check valve hydraulic unit.
- Replaced eight actuators
  - M-Bldg. – 8 - (MGV 3, 4, 8 and MSG 3, 4, 5, 7, 8)
  - T-Bldg. – 7 - (TSG 1, 2, 11, 12, 13, 14, 15).

b) P, D, & OPS Buildings:

- Welded 4' long screw to two conveyors to stop plugging - D-Bldg.
- Overhauled four grit pumps to improve efficiency - D-Bldg.
- Re-built two unwatering pumps in - OPS.
- Replaced old Moyno scum pumps with Vogelsang pumps.
- Replaced four brushes on compactors - D-Bldg.
- Overhauled fan assembly from Biofilter - D-Bldg.
- Installed kick plates on screen room mezzanine - D-Bldg.
- Rebuilt humidifier on Biofilter, broken due to freezing - D-Bldg.
- Rebuilt/repaired cooling fan on motor of # 1 blower - P-Bldg.

- Overhauled three screen machines in - P-Bldg.
- Repaired with modifications to universal pin on four gates - D-Bldg.
- Replaced 3" sump pump with 4" sump pump, installed SS line - D-Bldg.
- Replaced gearbox with new design on scum hopper # 10 & 12 - D-Bldg.
- Modified three 4" grit transfer lines to ease unplugging issues - D-Bldg.
- Replaced grinder with Vogelsang for improve cutting of screening - D-Bldg.
- Replaced 600V 3 phase copper rails on four bridges.
- Overload protection for conveyors replaced with correct ratings - D-Bldg.
- Installed new 2" back flushing connection to cyclones - D-Bldg.
- Fabricated and installed new air lubrication system – D-Bldg.

4.3 Secondary Treatment (Work Area 2)

Work Area 2 includes eleven Aeration Tanks and eleven Final Clarifiers. The following maintenance was completed in 2015:

a) General
- Complete mechanical overhaul of Blower 8
- Emergency Repairs to Collector mechanism on AT 11
- Capping of all Aeration Header B Air lines
- Emergency Repairs to 24" RAS Header
- Completion of Aeration Tank 2 Upgrade Project
- Overhaul of AT 1 & AT3
- Installation of new Scum Collector Unit on AT 1
- Electrical Relay upgrades on Blowers 1-11
- Heat Exchanger Replacement on Blower 8
- Heat Exchanger Replacement on Blower #7
- Heat exchanger piping upgrade on Blower 1
- Outdoor Lighting Upgrades to Bypass & Seawall Gates
- Installation of new Blower Drain line piping
- Lighting fixture upgrades in Blower Building & Aeration Gallery
- Safety upgrades to Ferrous Railcar Unloading Station
- Commissioning of Back-up power systems to Aeration Gallery & Blower Building
- Rebuild of Aeration Tank 3 Rotating scum collectors
- Inlet gate actuator replacement on AT 10 & 11

4.4 Dewatering (Work Area 3)

Work Area 3 includes the Centrifuges for dewatering operations. The following maintenance was completed in 2015:

a) General
- #12 Centrifuge Major Overhaul
- # 2 Centrifuge Major Overhaul
- #3 Centrifuge Back drive was replaced from rigid couplings to belt drive.
- #4 Centrifuge Back drive was replaced from rigid couplings to belt drive.
- Sludge Feed pump #7 VFD was replaced.

- Sludge Feed pump #8 VFD was replaced.
- #3 Centrifuge Backdrive Motor was converted for DC to AC.
- #4 Centrifuge Backdrive Motor was converted for DC to AC.
- # 6 Polymer preparation transfer pump new Pump & Drive.
- # 1 & 2 Polymer preparation system new Level sensor installed.
- Bring in Power supply for lightening transformer in Dewatering from Incinerator MCC.
- Installed 6 new emergency lights in Old Dewatering basement.
- Designed, built and installed VFD controls for Polymer transfer pump #5.
- Rewire new wet well PLC control Panel.
- Installed Time delay start control on #5, 6, 7 & 8 Centrifuge.
- Installed three new Eye wash station in Old Dewatering.
- Installed new screw feeder on #3 Schwing pump.
- Installed two half shaft on Screw conveyor for Silos #2 & #4.
- Overhaul Poppet assembly on Schwing Pump # 2.3 & #4.
- Main distribution Screw conveyor installed 2 new hanger bearing and 8 solid coupling.
- Inspect Silo #1 Sliding frame.
- Installed new Air valve on main Sludge feed manifold.
- Installed 6 Sludge feed actuating valves.
- Installed 2 new Sludge feed Pump.
- Installed new Polymer Transfer pump.
- Installed two 4" # 909 RPZ BFP.
- Daily Operation and Preventative maintenance activities.

4.5 Solids Handling (Work Area 4)

Work Area 4 includes the Biosolids Storage Silos, Sludge Cake Transfer Pumps, Truck Load Facility, Biofilters, Odour Control Building, Instrument Air Compressors (Auxiliary Building), Lab Building Maintenance, Training Center Building Maintenance, Operational responsibilities include Disinfection of Final Effluent. The following maintenance was completed in 2015:

a) Schwing Pumps

- Schwing Pump – 201:
    - Heat Exchanger replacement for hydraulic power packs A&B
    - Poppet valves housing replacement
    - Top & bottom differential cylinder replacement

- Schwing Pump – 202:
    - Extraction screw's inboard and outboard shaft replacement
    - Sliding frame wear bars inspection
    - Installation of modified end cover for S2 directional control valve

- Schwing Pump – 203:
    - Heat Exchanger replacement for hydraulic power packs A&B
    - Feeder screw and bushing/bearing replacement
    - Hydraulic pump replacement
    - Sliding frame's hydraulic cylinder replacement
    - Sliding frame wear bars inspection

- Extraction screw's inboard and outboard shaft replacement
- Extraction screw's gearbox replacement and overhaul

- Others:
  - Installation of brand new sump pump (TAB-INC-P-2057)
  - Regular Material rams replacement
  - Scheduled machine lubrication and inspection

b) Truck Loading Facility:
- Rebuilt 11 knife gate valves under hoppers for loading
- Replaced 3 set of screw spirals
- Rebuilt 1 gearbox for shaft less conveyors on top of hopper
- Installed new pressure gauges and digital flow meters for irrigating system of bio-beds

c) Auxiliary Building:
- Air Compressor #4:
  - Replaced High Pressure Head valves
  - Rebuilt oil pump on #4 air compressor

- Air Compressor #3
  - Overhauled High Pressure side
    - Installed new piston rod
    - Installed new piston rings
    - Replaced head gasket
  - Replaced all valves
  - Replaced scrapers and seals

- All air Compressors:
  - Continuous Preventive maintenance based on Air Compressor running hours.

- Receivers Tanks
  - Replaced all auto drain valves and installed strainers in drain lines.

d) Silo Building:
- Inspected and re-installed 90" wear bar for Silo# 3 with improvements for dis-assembly
- Inspected and re-installed 30" wear bar for Silo# 3
- Inspected and re-installed 24" wear bar for Silo# 3
- Replaced inboard & outboard shafts
- Installed newly refurbished gearbox
- Installed new packing

e) Electrical
- Console room intercom installation
- Incinerator bldg. outside Val pack lights repair
- Replaced existing fluorescent lights with LED lights at Truck loading Bldg. Mezzanine
- Truck loading and odor control Bldg. outside lights repair.
- Truck loading / odor control bldg. roof top light repairs

- Training centre outside lights repair
- NW silo Bldg. staircase lights replaced
- Installed new light fixture for a new test centre at 1 Floor silo Bldg.
- Installed power supply for storage room (Washer Drier) 1 floor incinerator Bldg.
- Silo building roof top new light installation
- MOL required testing and calibration of the existing equipment

4.6 Digestion & Air Flotation (Work Area 5)

Work Area 5 includes twenty Anaerobic Digesters and ten DAF tanks. The following maintenance was completed in 2015:

a) Flotation:
- Tank#2 Overhaul completion including chain jig fabrication, installing skimmer chain, drive motor and assembled skimmers.
- Tank#3 Major repairs to worn skimmers and chain
- Tank#4 and Tank#6: Fabricate/Weldon new skimmer shackles and fix scarper pans.
- Polymer transfer pump #3: reparation to connections and clearing foreign and cleaning foreign matter from volute
- Polymer powder feed: Auger reweld
- Tank#3 manufacturing of replacement components for rebuilding tank in 2016

b) Digestion Tanks:
- #6 TWAS Pump rebuilt/installation.
- #7 TWAS Pump rebuilt/installation.
- #7 TWAS Pump gearbox rebuilt/installation.
- #9 Digester recirc. Pump rebuilt/installation.
- #12 Digester recirc. Pump rebuilt/installation.
- #13 Digester manometer retrofit.
- #14 Digester manometer retrofit.
- #1-4 Digester recirc. Pump lifting frame fabrication
- #4 Digester recirc. Pump rebuilt/installation.
- #16 Digester recirc. Pump rebuilt/installation.
- #13-16 Digester sump Pump (2) rebuilt/installation.
- #16 Digester recirc. Pump inlet/Disch. Gauge/valves retrofit.
- #16 Digester gauge/thief whole mechanism fabrication/inst.

c) Electrical Upgrades:
- Digester 13, 15, 16: complete upgrade of heating loop system; modified system from manual control to automatic.
- Replaced two of the process sump pumps Dig 19-22 west side with brand new Flgyt sump pumps.
- Replaced two of the process sump pumps dig 13-16 east side with brand new flgyt sump pumps.
- Dip in the tunnel sump pump between digesters 9-12 and 5-8 upgrade automatic float controls.
- Repair lighting in "M" tunnel with new ballasts and lamps.

- Upgraded gas sensors digester 13-16
- Flotation tank#2 removed old DC motor and drive. Installed new AC high torque motor with VFD and Associated controls.
- Sub, sub-basement "Z" bldg. replaced both sump pumps with new flgyt pumps.
- Repaired and replaced lighting fixtures seawall tunnel east side.
- Ongoing overhaul of the pneumatic air switches digester 13-16 and 19-22. Switched are failing due to age of "o" rings.
- Installation of new LED light fixtures seawall tunnel west side.
- Assisted with the transfer of all loads to the new generator back up panels, commissioning and testing of generators.
- Calibration and tested heating control loops Dig 1-8. Documented and verified calibration with outside contractor.

4.7 Steam System, HVAC & Odour Control (Work Area 6)

Work Area 6 includes the plant-wide steam system, HVAC, and odour control. The following maintenance was completed in 2015:

a) HVAC, Steam & Hot Water System:
- Two HVAC systems renewed in plant water pumping building.
- Centrifuge process chiller Refrigerant Chillgard monitoring system installed, calibrated, and tested a
- Installed ventilation in Z building refrigerant for leak protection as per TSSA
- Replaced new 100 ton chiller compressor in Z building
- Gas compressor chiller, compressor cooling system and plant wide HVAC system maintenance and repaired as required.
- Continues routine overhaul and maintenance of hot water circulating pumps, ventilation fans and all auxiliary equipment.
- Installed 4 new 16" valves in auxiliary basements
- Installed 4 new 16" 4 valves at road way before sea wall tunnel
- Regular safety inspection and testing done on all boilers, gas streams and all associated equipment.
- Hot water boiler# 3 - side panels renewed and cleaned tubes.
- Pressure tested and calibrations done on necessary safety relief valves.
- Temporary air compressor commissioned and trial test run completed.
- Tested new installed dryer in the tunnel.
- Installed isolation valve at Instrument air compressor building
- Installed new air receiver with pressure reducing control
- Removed and replaced hot water boiler# 4
- Fixed leak on glycol system, steam, and on hot water piping.
- Replaced & upgraded heat exchanger with additional pump at bio solid building.
- Replaced Centrifuge building air handling unit
- Renewed ventilation fan for boiler room basement softener area.
- Installed guard rails and secured middle grilled walk way in heat recovery basement.

b) Electrical:

- New electrical panels and wiring done for new emergency power generator
- New electrical panels, monitoring system and wiring for gas detectors, flow meters, and sump pumps.
- Renewed circuit breaker at Z building roof chiller.
- All lighting in Heat Recovery building on all floors were renewed for health and safety requirement

c) Instrumentation:
- All boiler instruments calibrated, air-fuel ratio adjusted, and damaged instruments replaced.
- Calibrated water softener system and replaced damaged instruments.
- Overhauled and calibrated feed water to steam boilers and all steam regulators.
- Boiler flue gas analyser replace and calibrated.
- Migration of PLC for plant wide heating system and stand-alone boilers SCADA
- Replaced and up-graded MSA gas detection system in Gas control building and in the boiler room.
- Calibrated and replaced three way valves
- Calibrated and repaired all portable gas detectors

4.8 Consumables, Mechnical & Welding, Groundskeeping & Licensed Vehicles (Work Area 7)

Work Area 7 includes consumables, mechanical & welding, grounds keeping, and licensed vehicles. The following maintenance was completed in 2015:

a) General
- All windsocks in the plant inspected and torn ones renewed.
- Inspected and repaired all overhead cranes including lifting devices.
- Inspected, repaired and PM done on all Fork lift vehicles including Gators and Kubota's.
- Preventive maintenance done on all licensed vehicles in the plant.
- Inspected and repaired plant water pumping station leaky roof, Pelletizer roof, north hydro sub- station roof and administration roof.
- Road repairs was done throughout the plant.
- Lawn and snow removal done on, an as and when required.
- Rail tracks in the plant inspected and rail track ties renewed as required.
- Waste oil storage area maintained and the oil shipped off using a licensed vender.
- Recycling fluorescent lights, bulbs and used batteries are place in their proper storage.

b) Machinist
- Fabricated new bridge wheel shafts Area 1.
- Fabricated return pump wear rings Area 2.
- Gate nuts and stems.
- Parts for collector mechanism sleeves, shear pins, flanges, couplings etc.

c) Electrical and Instrumentation
- Overhauled south gate electrical control panel
- Ongoing upgrade of fluorescent lights at lockers room Z building.

- Emergency/exit lights upgraded to LED.
- Upgraded strobe lights at North and South gate.
- Ethernet cabling at incinerator and dewatering area.
- Installed and terminated new fiber optic cable to provide up to date Ethernet service to third floor Z building.

4.9 Disinfection, Plant Water, Elevators (Work Area 8)

Work Area 8 includes disinfection, plant water, fuel safety, fire protection and elevators. The following maintenance was completed in 2015:

- Completed preventative maintenance on all Backflow Preventers
- Replaced Gas Control building Plant water automatic filter
- Inspected and refilled all SCBA units, monthly inspections
- Inspected and serviced all Fire Protection systems and equipment
- Inspected and serviced all Elevators
- Inspection and maintenance on all gas process and fuel equipment
- Major overhaul of Gas Control Building Stream #1 (Scrubber, Compressor, Dryer).
- Inspection and maintenance on disinfection equipment.

5. CHEMICALS AND UTILITIES

5.1 Chemicals

Several chemicals are used for a variety of treatment processes at the plant. Major process chemicals are discussed below and include:

- Polymer (WAS Thickening)
- Polymer (Biosolids Dewatering)
- Ferrous Chloride (Nutrient Removal)
- Chlorine (Disinfection)
- Sodium Hypochlorite (Disinfection, Air Handling)

5.1.1 Polymer for WAS Thickening

Polymer applied at the Dissolved Air Flotation (DAF) tanks is used as a coagulant to aid in the thickening of the Waste Activated Sludge (WAS). Polymer consumption for WAS thickening during 2015 was approximately 170,250 kg.

The polymer consumption decreased by 31% in comparison to 2014. Polymer for WAS thickening was purchased at a cost of $4,160.00 per tonne, plus applicable taxes.

5.1.2 Polymer for Biosolids Dewatering

Polymer is applied to the biosolids feed into the dewatering centrifuges. The polymer consumption for biosolids dewatering during 2015 was approximately 540,000 kg. This represents a decrease of 10% over the previous year's consumption.

Polymer for biosolids dewatering was purchased at a cost of $3,090.00 per tonne, plus applicable taxes.

5.1.3 Ferrous Chloride for Nutrient Removal

Ferrous chloride is applied to the distribution conduits upstream of the aerated grit channels, or applied to the aeration tanks for nutrient removal (i.e. phosphorus). Ferrous chloride consumption during 2015 was approximately 1,918 tonne as Fe. The average ferrous chloride dosage rate was 9.11 mg/L as Fe during the year, which is an 18% increase from 2014 due to an increase of influent phosphorous concentration.

In 2015, ferrous chloride for nutrient removal was purchased at a cost of $720.00 per tonne Fe, plus applicable taxes.

5.1.4 Chlorine for Disinfection

Chlorine is applied to the final effluent just prior to the outfall for disinfection. The consumption during 2015 was approximately 174,625 kg, a decrease of 1% of the consumption in 2014. Chlorine was used from January to June and September to December of 2015 and was purchased at a cost of $140.00 per tonne, plus applicable taxes.

5.1.5 Sodium Hypochlorite for Disinfection and Odour Control

Sodium hypochlorite consumption for disinfection during 2015 was approximately 1.70 ML, a decrease of 38% of the consumption in 2014. Sodium hypochlorite was used from June to September

of 2015. It is also used to disinfect plant water for housekeeping and in the air scrubbers for odour control.

Sodium hypochlorite for disinfection and odour control was purchased at a cost of $127.80 per 1,000L, plus applicable taxes.

5.2 Utilities

A summary of utility consumption for the previous two years at Ashbridges Bay Treatment Plant is provided in Table 10, below.

Table 10: Monthly Utility Consumption for 2013, 2014 and 2015

Utility	2015	2014	2013
Water [m^3 / month]	62,029	62,648	33,121
Hydro [kWh / month]	10,915,593	11,195,340	9,960,584
Natural Gas [m^3/ month]	508,560	479,460	414,204

5.2.1 Water

Total potable water consumption decreased by 1% from 2014 to an annual use of 744,345 m^3. Total cost for potable water was $2.47M. The average unit cost of water was $3.32 per cubic meter.

5.2.2 Hydro

Total electrical energy consumption decreased 2.5% from 2014 to 131M kWh. The total cost for hydro was $12.5M. The average unit cost of power was $0.10 per kWh.

5.2.3 Natural Gas

Total natural gas consumption increased 6% from 2014 to 6.1M m^3. Total cost for natural gas was $1.6M. The average unit cost of natural gas was $0.26 per m^3.

6. OPERATIONAL COSTS

Plant operational costs are broken down into five (5) categories: Salaries & Benefits, Materials & Supplies, New Equipment, Services & Rents and Other Charges. Materials & Supplies is further segregated into Utilities (power, natural gas and water), Machine & Equipment Parts, Chemicals and Other Materials & Supplies. The total cost of plant operation in 2015 was $56.4 M, a 1.92% decrease in comparison to the operating costs for 2014. A breakdown of annual operational costs for the previous year is shown in Table 11. Current year operating costs are illustrated in Figure 1.

Table 11: Operating Costs

Operating Cost	2015	2014
Salaries & Benefits	$16,422,381	$ 16,939,100
Materials & Supplies		
Utilities	$16,456,776	$ 14,892,048
Machine & Equipment Parts	$1,674,868	$ 2,001,952
Chemicals	$4,561,765	$ 5,667,169
Other Materials & Supplies	$1,078,346	$ 922,896
New Equipment	$370,535	$ 444,280
Services & Rents	$14,976,957	$ 15,652,255
Other Charges	$808,912	$ 935,438
TOTAL PROGRAM COST:	**$56,350,540**	**$ 57,455,137**

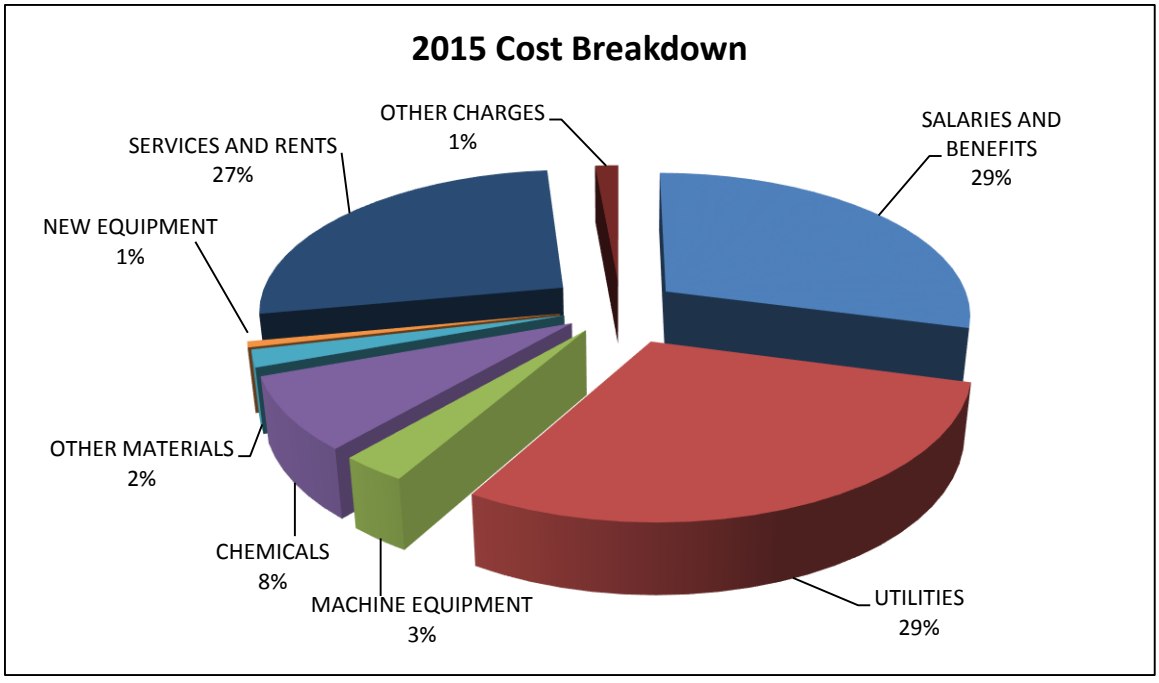


Figure 1: Ashbridges Bay Treatment Plant Operating Cost Breakdown for 2015

7. HUMAN RESOURCES

7.1 Staffing

In 2015, the Ashbridges Bay Treatment Plant had 161 employees. Plant Staffing is shown in Table 12, below:

Table 12: Plant Staffing

Position Title	Number
Sr. Plant Manager	1
Manager, Engineering Services	1
Superintendent, Plant Process & Ops	2
Senior Engineer	2
Engineer	1
Area Supervisor PO&M	10
Supervisor, Operational Support	1
Supervisor Operating Engineers A/R-C	1
Stationary Engineer Operator	7
Electronic Instrumentation Specialist	2
Engineering Technologist Technician	2
Plant Technician/Wastewater	45
Plant Maintenance Operator	1
Developmental Plant Technician	4
Industrial Millwrights	47
EICT	24
Support Assistant	3
Materials Management Assistant	2
Wastewater Plant Worker	5

7.2 Occupational Health & Safety

Continuous efforts are made in maintaining a safe working environment at the Ashbridges Bay Treatment Plant facility. The Joint Health and Safety Committee (JHSC) assisted management in resolving issues through monthly meetings and Plant Audits.

Plant Health and Safety statistics for the Ashbridges Bay Treatment Plant in 2015 were as follows:

Incident	3
First Aid	2
Medical Aid	10
Lost Time	11
Near Miss	2
Recurrence	1
Total	**29**

In 2015, total lost days due to work related injuries was 70 days.

7.3 Staff Training & Development

The Strategic Planning and Workforce Development, Toronto Water has developed a comprehensive Operator Training Program that expands the abilities of the operational staff, resulting in better service to the public.

All Ashbridges Bay Treatment Plant operating staff and skilled trades staff attended the training. Courses were eligible for Continuing Education Units (CEU's) from the Ontario Environmental Training Consortium (OETC).

The Ashbridges Bay Treatment Plant sent its operations and maintenance staff on the following training courses:

- Standard First Aid Level "C" CPR and Automated External Defibrillation (AED)
- Confined Space Entry
- Electrical Safety Authority (Conductors & Safety in a High Voltage Environment)
- Electrical Safety for District Operators
- Hydraulics Unplugged
- Industrial Maintenance Technician (IMT)- 2 day update course
- Industrial Maintenance Technician (IMT) Certification- Mechanical
- Lockout, Tagout & Test
- Lubrication
- Machinery Health
- Managing Water Quality
- Mathematics for Operators Module 1
- Microbiology of Wastewater
- MMR Self-Contained Breathing Apparatus
- Motor Analysis
- Problem Solving in the Plants (Wastewater)
- Handheld Orthophosphate Sampling & Testing
- General Sampling & Testing
- SKF Bearing
- Technical writing
- Vibration analysis advanced
- Work Management System (WMS)
- Creative thinking & Workplace innovation
- Energy management training
- Transportation of Dangerous goods/WHMIS Review
- Designated Substances, Asbestos Awareness & Construction Safety for PTs
- Log Book Entry
- Confined Space Entry & Rescue (Awareness Level) Training
- Review & Practical Application of GroupWise & Excel
- Chlorine Safety & B- KIT
- Source Water Protection Planning

7.4 Utility Operator Certification

Toronto Water has incorporated the requirement of a Class 1 operating licence into the job profiles of the skilled trades in the Water and Wastewater Treatment facilities. As part of this initiative, general operational/process training was delivered in order to prepare new staff for the OWWCO Level 1 examination.

Table 13 summarizes the status of operator certification at the Ashbridges Bay Treatment Plant for 2015.

Table 13: Wastewater Treatment Certificates

Class Level	Licensed
Class IV	34
Class III	4
Class II	7
Class I	37
O. I. T.	41
TOTAL	**123**

7.5 MOECC Correspondence

In addition to reports submitted for 2 Odour complaints received at the plant in 2015 and reports submitted for 13 bypasses, the following correspondence was submitted to the MOECC for ABTP.

Table 14: Correspondence submitted to the MOECC for ABTP.

Date	Type	Description
January 1st, 2015	Clarification regarding the interpretation of ECA Total Phosphorus (TP) limits.	Clarified with H. Williams, Senior Environmental Officer (MOECC) that a monthly result of 1.02 for TP is not an exceedance to the average concentration limit of 1.0 for the secondary treatment effluent.
February 10, 2015	10 Day report as per Amended ECA	Written report re: Release of digester gas at Ashbridges Bay Treatment Plant
March 31, 2015	Administrative amendment to the Air ECA in relation to the Waste Gas Burner Facility Expansion project	An administrative Amendment to the Air ECA (with conditions) was issued by H. Williams, Senior Environmental Officer (MOECC) to ensure the City remains compliant with the Air ECA while implementing its intent to construct the WGB facility with 5 burners and to maintain the approval of the 6th flare which could be installed at some point in the future.
April 22, 2015	10 Day report as per Amended ECA	Written report re: Release of influent wastewater at Ashbridges Bay Treatment Plant
November 10, 2015	10 Day report as per Amended	Written report re: Exceedance of

	ECA	Secondary Treatment Effluent Limit for Total Phosphorus.
Consent Letters		
January 16, 2015	Director Consent Letter	Director Consent Letter - planned Bypass Gate Maintenance.
May 25, 2015	Director Consent	Clarifications regarding planned shutdown of Aeration Odour Control System for less than 30 minutes with low risk of off-site odour impact: Director Consent Letter not required. Written notice (email) is sufficient.
September 8, 2015	Director Consent Letter	Director Consent - Planned Venting of Digester Gas.
November 9, 2015	Director Consent Letter	Director Consent Letter – Planned Winter Shutdown of Aeration Odour Control System.
Notice of Start-up		
March 31, 2015	Notice of Start-up Not required for Primary Clarifiers 1-6 Scrubbers identified in new Air ECA.	H. Williams, Senior Environmental Officer (MOECC) clarified that a notice of start-up is not required as the installation of the 3 new units and the commencement of operation of 2 of the units occurred in 2012 and the third unit prior to 2012 when these units were not identified in previous ECA's. At the next Air ECA amendment, City to request that ECA be updated to reflect current conditions.
MOE Inspection		
N/A	MOE Communal Sewage Inspection	N/A

Appendix A

Glossary of Abbreviations & Definitions

Glossary of Abbreviations

ABTP	Ashbridges Bay Treatment Plant
BOD	Biological Oxygen Demand
$CBOD_5$	Five-Day Carbonaceous Biological Oxygen Demand
CEU	Continuing Education Units
CFU	Colony Forming Units
CSO	Combined Sewer Overflow (Tank)
DAF	Dissolved Air Flotation
E. Coli	Escheria Coli
HP	horsepower
HRT	Hydraulic Retention Time
kg	kilogram
kWh	Kilowatt-hour
MWh	Megawatt-hour
m^3	cubic metre
mA	milliamps
mg/L	milligrams per litre
mL	Millilitre
ML	Megalitre
MTI	Mid-Toronto Interceptor Forcemain
SS	Suspended Solids
TP	Total Phosphorus
TS	Total Solids
TVS	Total Volatile Solids
TWAS	Thickened Waste Activated Sludge
µg/L	micrograms per litre
WAS	Waste Activated Sludge

Definitions

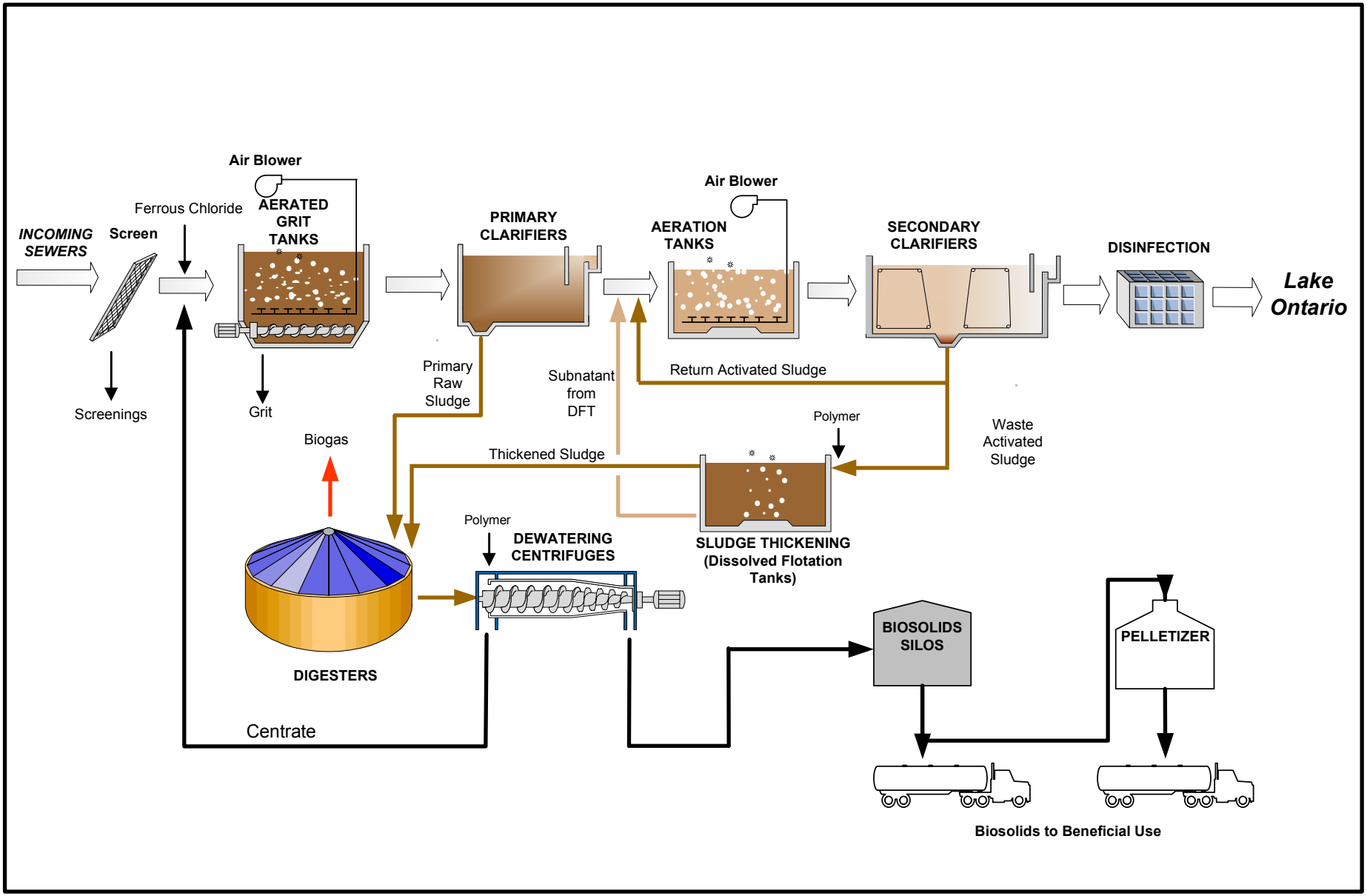
$$\text{Percent Removal (\%)} = 1 - \frac{\text{Concentration (Final)}}{\text{Concentration (Initial)}}$$

$$\text{Aeration Loading (kg CBOD/ m3 Aeration Capacity)} = \frac{\text{Primary } CBOD_5 \text{ x Secondary Treatment Volume}}{\text{Capacity of Aeration Tanks}}$$

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

Appendix B

Plant Schematic

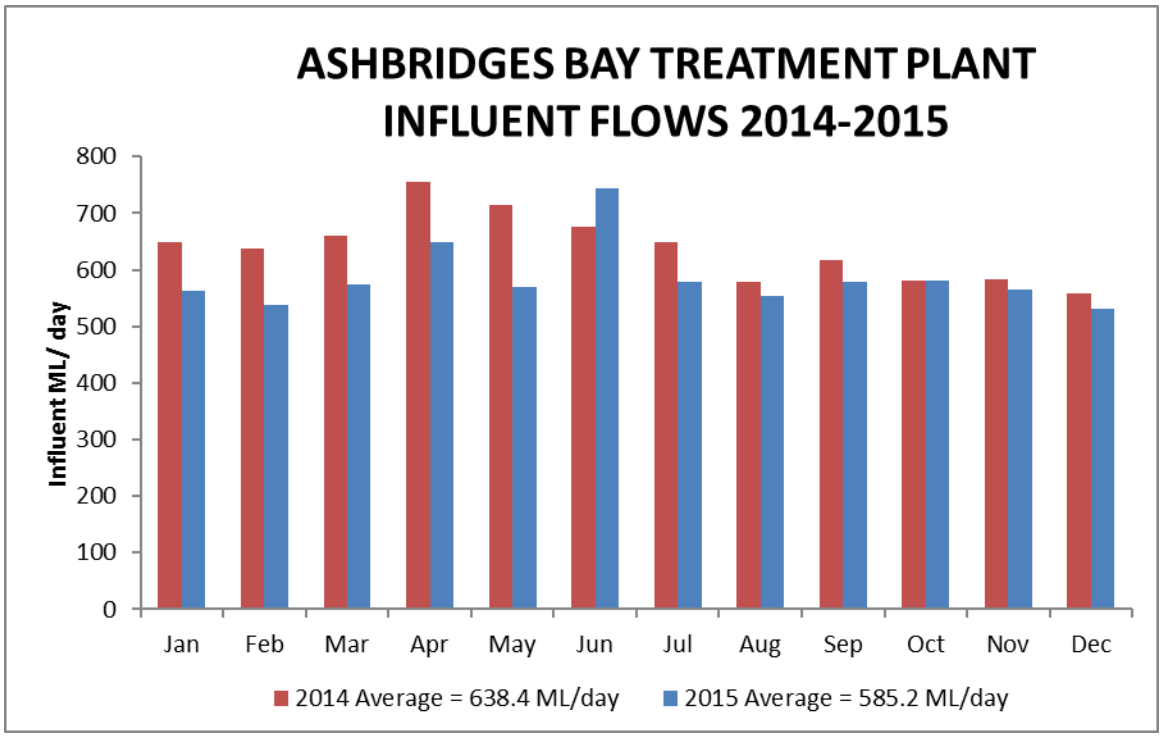


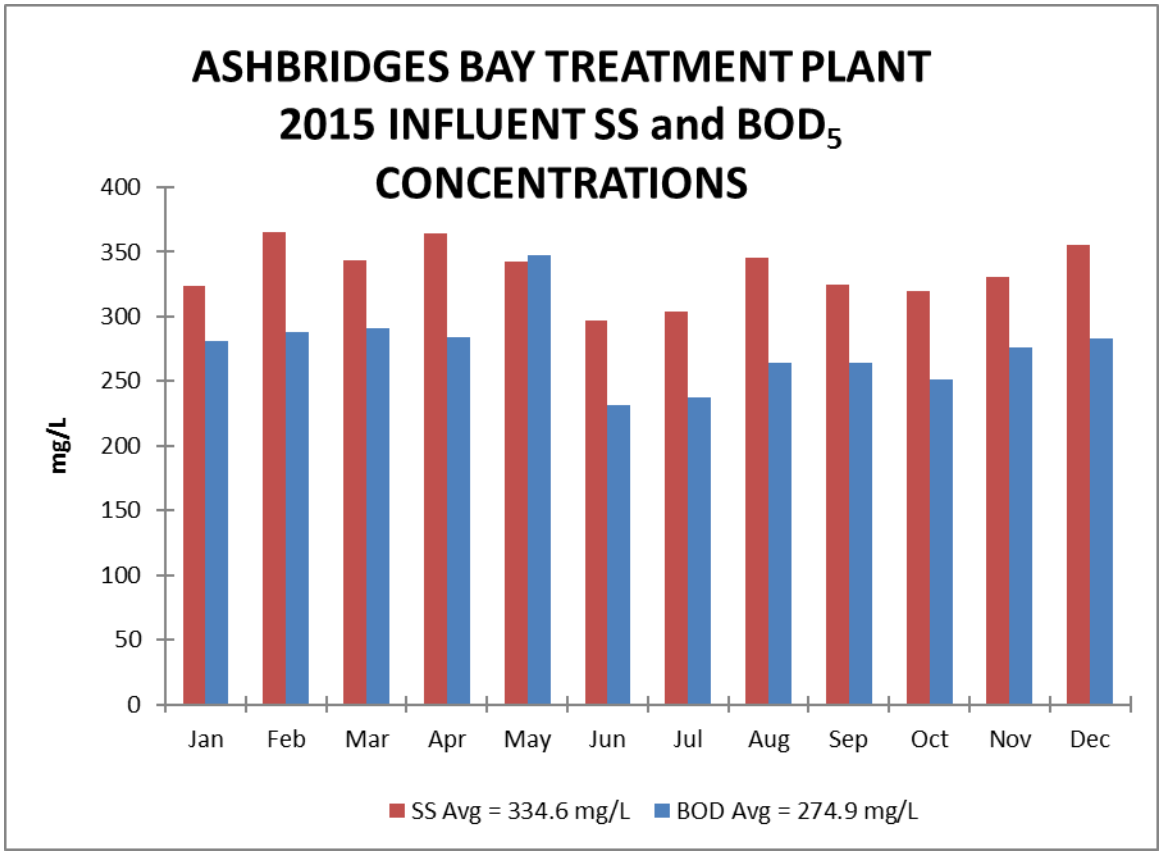
Process Flow Diagram for Ashbridges Bay Wastewater Treatment Plant

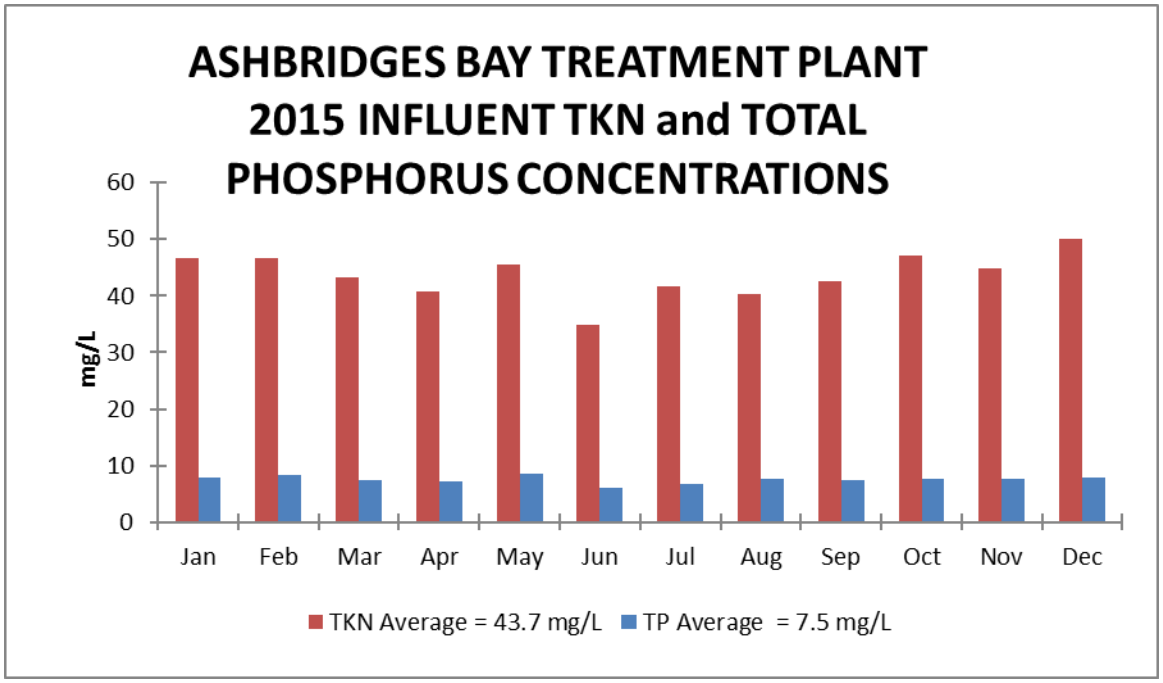
Appendix C

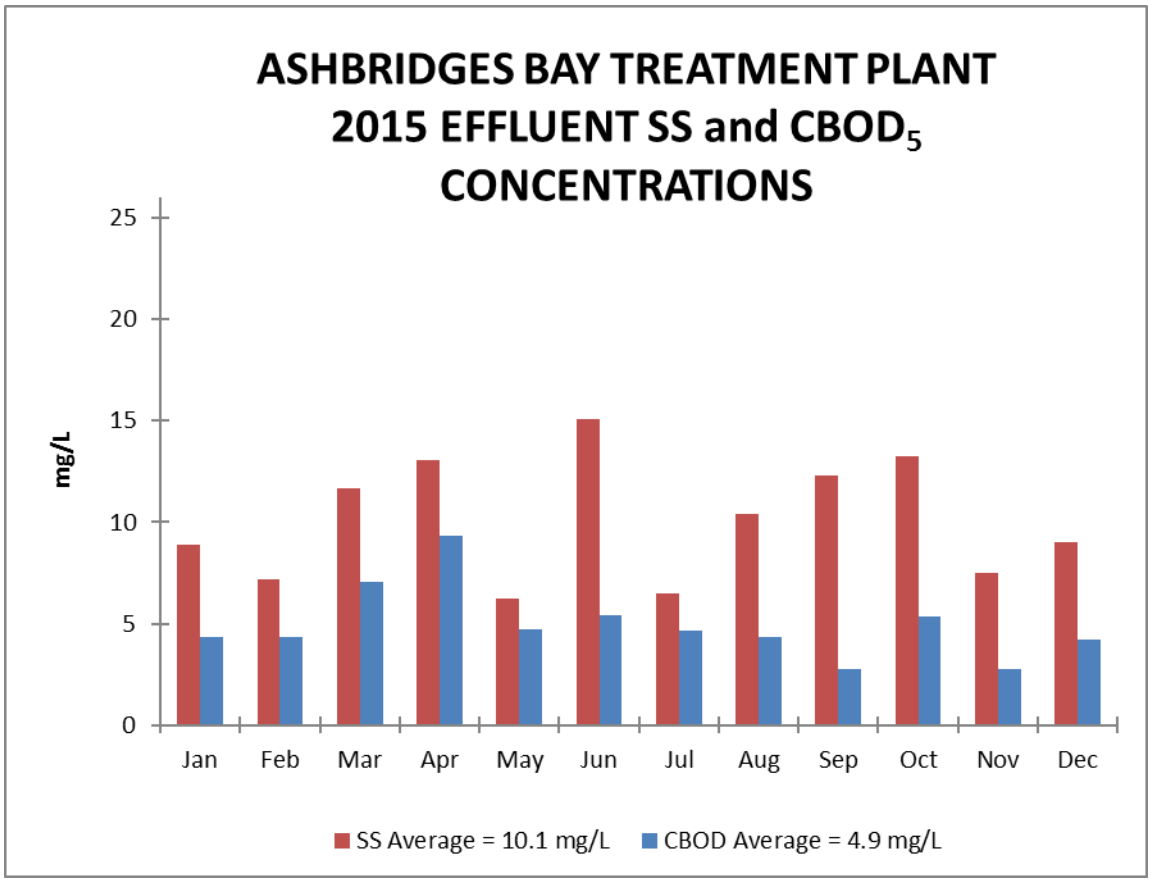
Performance Charts

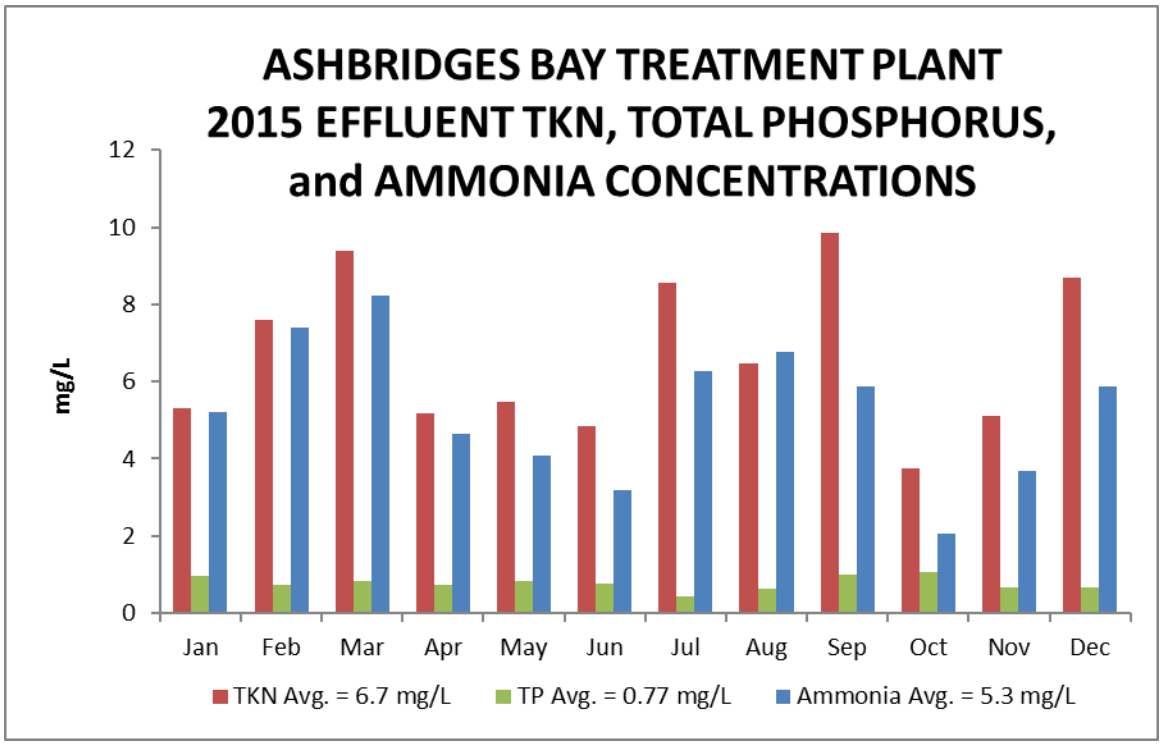
- **Influent Flows**
- **Influent SS & BOD Concentrations**
- **Influent TKN & Total Phosphorus Concentrations**
- **Effluent SS & $CBOD_5$ Concentrations**
- **Effluent TKN, Total Phosphorus, & Ammonia Concentrations**
- **Digester Gas Production**

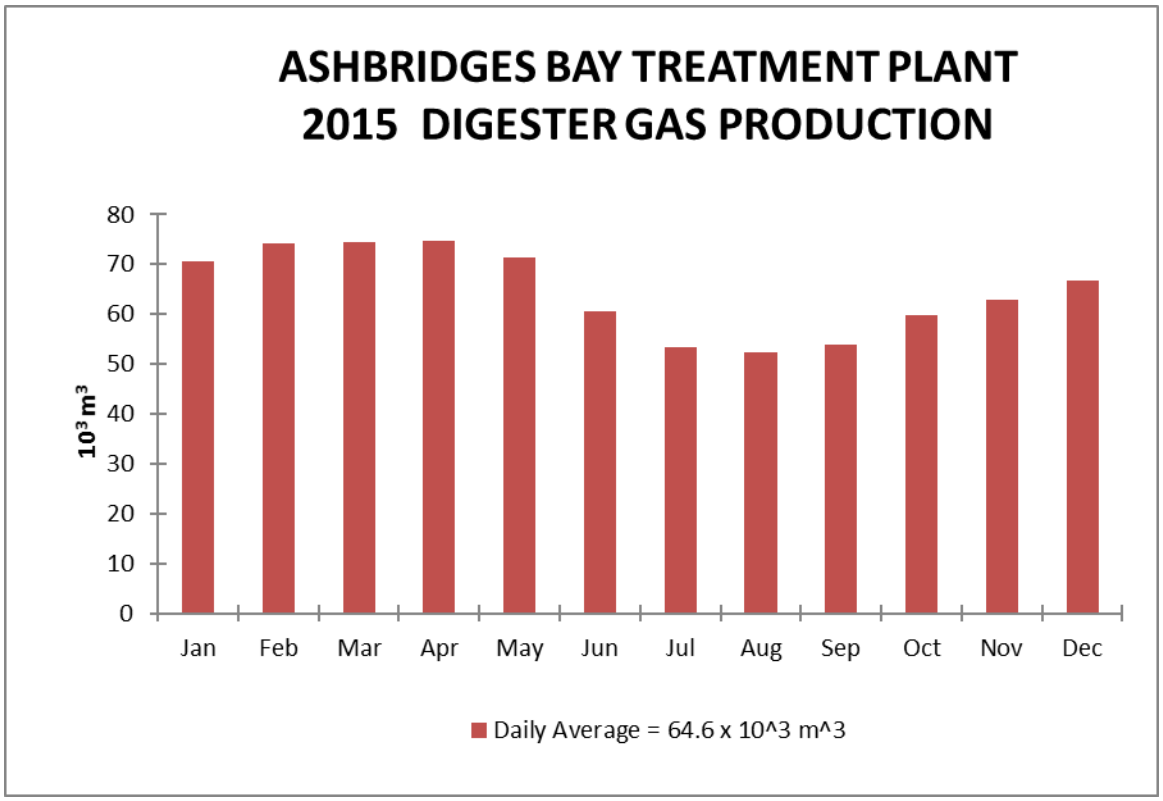

ASHBRIDGES BAY TREATMENT PLANT
INFLUENT FLOWS 2014-2015
Influent ML/ day
800
700
600
500
400
300
200
100
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2014 Average = 638.4 ML/day
2015 Average = 585.2 ML/day


ASHBRIDGES BAY TREATMENT PLANT
2015 INFLUENT SS and BOD5
CONCENTRATIONS
mg/L
400
350
300
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
SS Avg = 334.6 mg/L
BOD Avg = 274.9 mg/L


ASHBRIDGES BAY TREATMENT PLANT
2015 INFLUENT TKN and TOTAL PHOSPHORUS CONCENTRATIONS
mg/L
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
TKN Average = 43.7 mg/L
TP Average = 7.5 mg/L


ASHBRIDGES BAY TREATMENT PLANT
2015 EFFLUENT SS and CBOD5 CONCENTRATIONS
mg/L
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
SS Average = 10.1 mg/L
CBOD Average = 4.9 mg/L


ASHBRIDGES BAY TREATMENT PLANT
2015 EFFLUENT TKN, TOTAL PHOSPHORUS,
and AMMONIA CONCENTRATIONS
mg/L
12
10
8
6
4
2
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
TKN Avg. = 6.7 mg/L
TP Avg. = 0.77 mg/L
Ammonia Avg. = 5.3 mg/L


ASHBRIDGES BAY TREATMENT PLANT
2015 DIGESTER GAS PRODUCTION
10³ m³
80
70
60
50
40
30
20
10
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Daily Average = 64.6 x 10^3 m^3

Appendix D

Influent & Effluent Metal Concentrations

TORONTO Water

Central Laboratory
545 Commissioners Street,
Toronto,Ontario, M4M 1A5

Tel: 416-392-2894
Fax: 416-397-0342

TORONTO WATER LABORATORY

Treatment Plant Monthly Metal Analysis for: January 2015

DESCRIPTION	NAME	RESULT	UNITS	LIMITS	NOTES
Ashbridges Bay Treatment Plant					
FINAL EFFLUENT - Monthly Metals @ Dee.	Arsenic	<0.006	mg/L	0.0200	
	Cadmium	<0.001	mg/L	0.0080	
	Chromium	<0.004	mg/L	0.0800	
	Copper	0.0135	mg/L	0.0400	
	Iron	0.688	mg/L		
	Lead	<0.005	mg/L	0.1200	
	Manganese	0.0607	mg/L	0.0500	
	Mercury	<0.00006	mg/L	0.0004	
	Nickel	<0.005	mg/L	0.0800	
	Zinc	0.0319	mg/L	0.0400	
INFLUENT - Monthly Metals @ Dee.	Arsenic	<0.006	mg/L	1.0000	
	Cadmium	<0.001	mg/L	0.7000	
	Chromium	0.00830	mg/L	4.0000	
	Copper	0.156	mg/L	2.0000	
	Iron	3.67	mg/L		
	Lead	0.00658	mg/L	1.0000	
	Manganese	0.0724	mg/L	5.0000	
	Mercury	<0.00006	mg/L	0.0100	
	Nickel	0.00685	mg/L	2.0000	
	Zinc	0.180	mg/L	2.0000	

Notes: All Results in mg/L. These samples are monthly composites.

Underlined Results have exceeded respective Sanitary or Storm Sewer Bylaw limits of the Sewer Use Bylaw Chapter 681 of the Toronto Municipal Code. limits.

Date Report Printed: 19-Feb-2015

Approved By: TP Chief Chemist

TORONTO Water

Central Laboratory
545 Commissioners Street,
Toronto,Ontario, M4M 1A5

Tel: 416-392-2894
Fax: 416-397-0342

TORONTO WATER LABORATORY

Treatment Plant Monthly Metal Analysis for: February 2015

DESCRIPTION	NAME	RESULT	UNITS	LIMITS	NOTES
Ashbridges Bay Treatment Plant					
FINAL EFFLUENT- Monthly Metals @ Dee	Arsenic	<0.006	mg/L	0.0200	
	Cadmium	<0.001	mg/L	0.0080	
	Chromium	<0.004	mg/L	0.0800	
	Copper	0.0134	mg/L	0.0400	
	Iron	0.488	mg/L		
	Lead	<0.005	mg/L	0.1200	
	Manganese	0.0653	mg/L	0.0500	
	Mercury	<0.00006	mg/L	0.0004	
	Nickel	<0.005	mg/L	0.0800	
	Zinc	0.0360	mg/L	0.0400	
INFLUENT- Monthly Metals @ Dee	Arsenic	<0.006	mg/L	1.0000	
	Cadmium	<0.001	mg/L	0.7000	
	Chromium	0.0130	mg/L	4.0000	
	Copper	0.165	mg/L	2.0000	
	Iron	5.19	mg/L		
	Lead	0.00697	mg/L	1.0000	
	Manganese	0.0727	mg/L	5.0000	
	Mercury	0.0002200	mg/L	0.0100	
	Nickel	0.00688	mg/L	2.0000	
	Zinc	0.180	mg/L	2.0000	

Notes: All Results in mg/L. These samples are monthly composites.

Underlined Results have exceeded respective Sanitary or Storm Sewer Bylaw limits of the Sewer Use Bylaw Chapter 681 of the Toronto Municipal Code. limits.

Date Report Printed: 24-Mar-2015

Approved By: TP Chief Chemist

TORONTO Water

Central Laboratory
545 Commissioners Street,
Toronto,Ontario, M4M 1A5

Tel: 416-392-2894
Fax: 416-397-0342

TORONTO WATER LABORATORY

Treatment Plant Monthly Metal Analysis for: March 2015

DESCRIPTION	NAME	RESULT	UNITS	LIMITS	NOTES
Ashbridges Bay Treatment Plant					
FINAL EFFLUENT - Monthly Metals @ Dee.	Arsenic	<0.006	mg/L	0.0200	
	Cadmium	<0.001	mg/L	0.0080	
	Chromium	<0.004	mg/L	0.0800	
	Copper	0.0126	mg/L	0.0400	
	Iron	0.635	mg/L		
	Lead	<0.005	mg/L	0.1200	
	Manganese	0.0583	mg/L	0.0500	
	Mercury	<0.00006	mg/L	0.0004	
	Nickel	<0.005	mg/L	0.0800	
	Zinc	0.0429	mg/L	0.0400	
INFLUENT - Monthly Metals @ Dee.	Arsenic	<0.006	mg/L	1.0000	
	Cadmium	<0.001	mg/L	0.7000	
	Chromium	0.0114	mg/L	4.0000	
	Copper	0.156	mg/L	2.0000	
	Iron	4.61	mg/L		
	Lead	0.00676	mg/L	1.0000	
	Manganese	0.0751	mg/L	5.0000	
	Mercury	0.00008600	mg/L	0.0100	
	Nickel	0.00714	mg/L	2.0000	
	Zinc	0.194	mg/L	2.0000	

Notes: All Results in mg/L. These samples are monthly composites.

Underlined Results have exceeded respective Sanitary or Storm Sewer Bylaw limits of the Sewer Use Bylaw Chapter 681 of the Toronto Municipal Code. limits.

Date Report Printed: 30-Apr-2015

Approved By: TP Chief Chemist

TORONTO Water

Central Laboratory
545 Commissioners Street,
Toronto,Ontario, M4M 1A5

Tel: 416-392-2894
Fax: 416-397-0342

TORONTO WATER LABORATORY

Treatment Plant Monthly Metal Analysis for: April 2015

DESCRIPTION	NAME	RESULT	UNITS	LIMITS	NOTES
Ashbridges Bay Treatment Plant					
FINAL EFFLUENT - Monthly Metals @ Dee.	Arsenic	<0.006	mg/L	0.0200	
	Cadmium	<0.001	mg/L	0.0080	
	Chromium	<0.004	mg/L	0.0800	
	Copper	0.0209	mg/L	0.0400	
	Iron	0.782	mg/L		
	Lead	<0.005	mg/L	0.1200	
	Manganese	0.0564	mg/L	0.0500	
	Mercury	<0.00006	mg/L	0.0004	
	Nickel	0.00549	mg/L	0.0800	
	Zinc	0.0634	mg/L	0.0400	
INFLUEN - Monthly Metals @ Dee.	Arsenic	<0.006	mg/L	1.0000	
	Cadmium	<0.001	mg/L	0.7000	
	Chromium	0.00956	mg/L	4.0000	
	Copper	0.160	mg/L	2.0000	
	Iron	3.81	mg/L		
	Lead	0.00893	mg/L	1.0000	
	Manganese	0.0767	mg/L	5.0000	
	Mercury	0.0001020	mg/L	0.0100	
	Nickel	0.00776	mg/L	2.0000	
	Zinc	0.190	mg/L	2.0000	

Notes: All Results in mg/L. These samples are monthly composites.

Underlined Results have exceeded respective Sanitary or Storm Sewer Bylaw limits of the Sewer Use Bylaw Chapter 681 of the Toronto Municipal Code. limits.

Date Report Printed: 28-May-2015

Approved By: TP Chief Chemist

TORONTO Water

Central Laboratory
545 Commissioners Street,
Toronto,Ontario, M4M 1A5

Tel: 416-392-2894
Fax: 416-397-0342

TORONTO WATER LABORATORY

Treatment Plant Monthly Metal Analysis for: May 2015

DESCRIPTION	NAME	RESULT	UNITS	LIMITS	NOTES
Ashbridges Bay Treatment Plant					
FINAL EFFLUENT - Monthly Metals at Dee.	Arsenic	<0.006	mg/L	0.0200	
	Cadmium	<0.001	mg/L	0.0080	
	Chromium	<0.004	mg/L	0.0800	
	Copper	0.0111	mg/L	0.0400	
	Iron	0.308	mg/L		
	Lead	<0.005	mg/L	0.1200	
	Manganese	0.0571	mg/L	0.0500	
	Mercury	<0.00006	mg/L	0.0004	
	Nickel	<0.005	mg/L	0.0800	
	Zinc	0.0321	mg/L	0.0400	
INFLUENT- Monthly Metals @ Dee	Arsenic	<0.006	mg/L	1.0000	
	Cadmium	<0.001	mg/L	0.7000	
	Chromium	0.0132	mg/L	4.0000	
	Copper	0.175	mg/L	2.0000	
	Iron	4.96	mg/L		
	Lead	0.00675	mg/L	1.0000	
	Manganese	0.0810	mg/L	5.0000	
	Mercury	0.00009000	mg/L	0.0100	
	Nickel	0.00809	mg/L	2.0000	
	Zinc	0.206	mg/L	2.0000	

Notes: All Results in mg/L. These samples are monthly composites.

Underlined Results have exceeded respective Sanitary or Storm Sewer Bylaw limits of the Sewer Use Bylaw Chapter 681 of the Toronto Municipal Code. limits.

Date Report Printed: 22-Jun-2015

Approved By: TP Chief Chemist

TORONTO Water

Central Laboratory
545 Commissioners Street,
Toronto,Ontario, M4M 1A5

Tel: 416-392-2894
Fax: 416-397-0342

TORONTO WATER LABORATORY

Treatment Plant Monthly Metal Analysis for: June 2015

DESCRIPTION	NAME	RESULT	UNITS	LIMITS	NOTES
Ashbridges Bay Treatment Plant					
FINAL EFFLUENT - Monthly Metals @ Dee.	Arsenic	<0.006	mg/L	0.0200	
	Cadmium	<0.001	mg/L	0.0080	
	Chromium	<0.004	mg/L	0.0800	
	Copper	0.0122	mg/L	0.0400	
	Iron	0.792	mg/L		
	Lead	<0.005	mg/L	0.1200	
	Manganese	0.0462	mg/L	0.0500	
	Mercury	<0.00006	mg/L	0.0004	
	Nickel	<0.005	mg/L	0.0800	
	Zinc	0.0334	mg/L	0.0400	
INFLUENT - Monthly Metals @ Dee.	Arsenic	<0.006	mg/L	1.0000	
	Cadmium	<0.001	mg/L	0.7000	
	Chromium	0.0109	mg/L	4.0000	
	Copper	0.132	mg/L	2.0000	
	Iron	3.98	mg/L		
	Lead	0.00682	mg/L	1.0000	
	Manganese	0.0743	mg/L	5.0000	
	Mercury	0.0001170	mg/L	0.0100	
	Nickel	0.00731	mg/L	2.0000	
	Zinc	0.164	mg/L	2.0000	

Notes: All Results in mg/L. These samples are monthly composites.

Underlined Results have exceeded respective Sanitary or Storm Sewer Bylaw limits of the Sewer Use Bylaw Chapter 681 of the Toronto Municipal Code. limits.

Date Report Printed: 23-Jul-2015

Approved By: TP Chief Chemist

TORONTO Water

Central Laboratory
545 Commissioners Street,
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TORONTO WATER LABORATORY

Treatment Plant Monthly Metal Analysis for: July 2015

DESCRIPTION	NAME	RESULT	UNITS	LIMITS	NOTES
Ashbridges Bay Treatment Plant					
FINAL EFFLUENT - Monthly Metals @ Dee.	Arsenic	<0.006	mg/L	0.0200	
	Cadmium	<0.001	mg/L	0.0080	
	Chromium	<0.004	mg/L	0.0800	
	Copper	0.00754	mg/L	0.0400	
	Iron	0.445	mg/L		
	Lead	<0.005	mg/L	0.1200	
	Manganese	0.0646	mg/L	0.0500	
	Mercury	<0.00006	mg/L	0.0004	
	Nickel	<0.005	mg/L	0.0800	
	Zinc	0.0271	mg/L	0.0400	
INFLUENT - Monthly Metals @ Dee.	Arsenic	<0.006	mg/L	1.0000	
	Cadmium	<0.001	mg/L	0.7000	
	Chromium	0.00769	mg/L	4.0000	
	Copper	0.121	mg/L	2.0000	
	Iron	3.70	mg/L		
	Lead	0.00613	mg/L	1.0000	
	Manganese	0.0723	mg/L	5.0000	
	Mercury	0.00009700	mg/L	0.0100	
	Nickel	0.00770	mg/L	2.0000	
	Zinc	0.163	mg/L	2.0000	

Notes: All Results in mg/L. These samples are monthly composites.

Underlined Results have exceeded respective Sanitary or Storm Sewer Bylaw limits of the Sewer Use Bylaw Chapter 681 of the Toronto Municipal Code. limits.

Date Report Printed: 21-Aug-2015

Approved By: TP Chief Chemist

TORONTO Water

Central Laboratory
545 Commissioners Street,
Toronto,Ontario, M4M 1A5

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Fax: 416-397-0342

TORONTO WATER LABORATORY

Treatment Plant Monthly Metal Analysis for: August 2015

DESCRIPTION	NAME	RESULT	UNITS	LIMITS	NOTES
Ashbridges Bay Treatment Plant					
FINAL EFFLUENT- Monthly Metals @ Dee.	Arsenic	<0.006	mg/L	0.0200	
	Cadmium	<0.001	mg/L	0.0080	
	Chromium	<0.004	mg/L	0.0800	
	Copper	0.00977	mg/L	0.0400	
	Iron	0.751	mg/L		
	Lead	<0.005	mg/L	0.1200	
	Manganese	0.0654	mg/L	0.0500	
	Mercury	<0.00006	mg/L	0.0004	
	Nickel	<0.005	mg/L	0.0800	
	Zinc	0.0310	mg/L	0.0400	
INFLUENT- Monthly Metals @ Dee.	Arsenic	<0.006	mg/L	1.0000	
	Cadmium	<0.001	mg/L	0.7000	
	Chromium	0.0118	mg/L	4.0000	
	Copper	0.164	mg/L	2.0000	
	Iron	4.59	mg/L		
	Lead	0.00900	mg/L	1.0000	
	Manganese	0.0770	mg/L	5.0000	
	Mercury	0.00009000	mg/L	0.0100	
	Nickel	0.00823	mg/L	2.0000	
	Zinc	0.209	mg/L	2.0000	

Notes: All Results in mg/L. These samples are monthly composites.

Underlined Results have exceeded respective Sanitary or Storm Sewer Bylaw limits of the Sewer Use Bylaw Chapter 681 of the Toronto Municipal Code. limits.

Date Report Printed: 25-Sep-2015

Approved By: TP Chief Chemist

TORONTO Water

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545 Commissioners Street,
Toronto,Ontario, M4M 1A5

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Fax: 416-397-0342

TORONTO WATER LABORATORY

Treatment Plant Monthly Metal Analysis for: September 2015

DESCRIPTION	NAME	RESULT	UNITS	LIMITS	NOTES
Ashbridges Bay Treatment Plant					
FINAL EFFLUENT - Monthly Metals @ Dee.	Arsenic	<0.01	mg/L	0.0200	
	Cadmium	<0.004	mg/L	0.0080	
	Chromium	<0.004	mg/L	0.0800	
	Copper	0.0109	mg/L	0.0400	
	Iron	0.813	mg/L		
	Lead	<0.005	mg/L	0.1200	
	Manganese	0.0553	mg/L	0.0500	
	Mercury	<0.00006	mg/L	0.0004	
	Nickel	<0.005	mg/L	0.0800	
	Zinc	0.0286	mg/L	0.0400	
INFLUENT - Monthly Metals @ Dee.	Arsenic	<0.01	mg/L	1.0000	
	Cadmium	<0.004	mg/L	0.7000	
	Chromium	0.0109	mg/L	4.0000	
	Copper	0.152	mg/L	2.0000	
	Iron	3.25	mg/L		
	Lead	0.00725	mg/L	1.0000	
	Manganese	0.0697	mg/L	5.0000	
	Mercury	<0.00006	mg/L	0.0100	
	Nickel	0.00683	mg/L	2.0000	
	Zinc	0.271	mg/L	2.0000	

Notes: All Results in mg/L. These samples are monthly composites.

Underlined Results have exceeded respective Sanitary or Storm Sewer Bylaw limits of the Sewer Use Bylaw Chapter 681 of the Toronto Municipal Code. limits.

Date Report Printed: 27-Oct-2015

Approved By: TP Chief Chemist

TORONTO Water

Central Laboratory
545 Commissioners Street,
Toronto,Ontario, M4M 1A5

Tel: 416-392-2894
Fax: 416-397-0342

TORONTO WATER LABORATORY

Treatment Plant Monthly Metal Analysis for: October 2015

DESCRIPTION	NAME	RESULT	UNITS	LIMITS	NOTES
Ashbridges Bay Treatment Plant					
FINAL EFFLUENT - Biometals @ Dee.	Arsenic	<0.01	mg/L	0.0200	
	Cadmium	<0.004	mg/L	0.0080	
	Chromium	<0.004	mg/L	0.0800	
	Copper	0.0108	mg/L	0.0400	
	Iron	0.897	mg/L		
	Lead	<0.005	mg/L	0.1200	
	Manganese	0.0617	mg/L	0.0500	
	Mercury	<0.00006	mg/L	0.0004	
	Nickel	0.00524	mg/L	0.0800	
	Zinc	0.0304	mg/L	0.0400	
INFLUENT - Biometals @ Dee.	Arsenic	<0.01	mg/L	1.0000	
	Cadmium	<0.004	mg/L	0.7000	
	Chromium	0.0102	mg/L	4.0000	
	Copper	0.149	mg/L	2.0000	
	Iron	3.52	mg/L		
	Lead	0.00709	mg/L	1.0000	
	Manganese	0.0736	mg/L	5.0000	
	Mercury	0.00009500	mg/L	0.0100	
	Nickel	0.00710	mg/L	2.0000	
	Zinc	0.182	mg/L	2.0000	

Notes: All Results in mg/L. These samples are monthly composites.

Underlined Results have exceeded respective Sanitary or Storm Sewer Bylaw limits of the Sewer Use Bylaw Chapter 681 of the Toronto Municipal Code. limits.

Date Report Printed: 30-Nov-2015

Approved By: TP Chief Chemist

TORONTO Water

Central Laboratory
545 Commissioners Street,
Toronto,Ontario, M4M 1A5

Tel: 416-392-2894
Fax: 416-397-0342

TORONTO WATER LABORATORY

Treatment Plant Monthly Metal Analysis for: November 2015

DESCRIPTION	NAME	RESULT	UNITS	LIMITS	NOTES
Ashbridges Bay Treatment Plant					
FINAL EFFLUENT - Monthly @ Dee.	Arsenic	<0.01	mg/L	0.0200	
	Cadmium	<0.004	mg/L	0.0080	
	Chromium	<0.004	mg/L	0.0800	
	Copper	0.00967	mg/L	0.0400	
	Iron	0.665	mg/L		
	Lead	<0.005	mg/L	0.1200	
	Manganese	0.0627	mg/L	0.0500	
	Mercury	<0.00006	mg/L	0.0004	
	Nickel	0.0116	mg/L	0.0800	
	Zinc	0.0290	mg/L	0.0400	
INFLUENT - Monthly @ Dee.	Arsenic	<0.01	mg/L	1.0000	
	Cadmium	<0.004	mg/L	0.7000	
	Chromium	0.0109	mg/L	4.0000	
	Copper	0.150	mg/L	2.0000	
	Iron	4.08	mg/L		
	Lead	0.00776	mg/L	1.0000	
	Manganese	0.0737	mg/L	5.0000	
	Mercury	0.00007900	mg/L	0.0100	
	Nickel	0.0186	mg/L	2.0000	
	Zinc	0.189	mg/L	2.0000	

Notes: All Results in mg/L. These samples are monthly composites.

Underlined Results have exceeded respective Sanitary or Storm Sewer Bylaw limits of the Sewer Use Bylaw Chapter 681 of the Toronto Municipal Code. limits.

Date Report Printed: 29-Dec-2015

Approved By: TP Chief Chemist

TORONTO Water

Central Laboratory
545 Commissioners Street,
Toronto,Ontario, M4M 1A5

Tel: 416-392-2894
Fax: 416-397-0342

TORONTO WATER LABORATORY

Treatment Plant Monthly Metal Analysis for: December 2015

DESCRIPTION	NAME	RESULT	UNITS	LIMITS	NOTES
Ashbridges Bay Treatment Plant					
FINAL EFFLUENT	Arsenic	<0.01	mg/L	0.0200	
	Cadmium	<0.004	mg/L	0.0080	
	Chromium	<0.004	mg/L	0.0800	
	Copper	0.0248	mg/L	0.0400	
	Iron	0.779	mg/L		
	Lead	<0.005	mg/L	0.1200	
	Manganese	0.0822	mg/L	0.0500	
	Mercury	<0.00006	mg/L	0.0004	
	Nickel	0.00933	mg/L	0.0800	
	Zinc	0.0323	mg/L	0.0400	
INFLUENT	Arsenic	<0.01	mg/L	1.0000	
	Cadmium	<0.004	mg/L	0.7000	
	Chromium	0.0205	mg/L	4.0000	
	Copper	0.159	mg/L	2.0000	
	Iron	4.35	mg/L		
	Lead	0.00653	mg/L	1.0000	
	Manganese	0.0705	mg/L	5.0000	
	Mercury	<0.00006	mg/L	0.0100	
	Nickel	0.0115	mg/L	2.0000	
	Zinc	0.204	mg/L	2.0000	

Notes: All Results in mg/L. These samples are monthly composites.

Underlined Results have exceeded respective Sanitary or Storm Sewer Bylaw limits of the Sewer Use Bylaw Chapter 681 of the Toronto Municipal Code. limits.

Date Report Printed: 29-Jan-2016

Approved By: TP Chief Chemist

Appendix E

Biosolids Metals Analyses

Ashbridges Bay T.P. - Summary of Biosolids Analyses for 2015

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Max Allowable Dry wt. (mg/kg)[1]	Annual Average
TKN	53,500	47,800	52,050	44,850	50,150	48,550	46,600	49,600	50,650	60,700	60,650	59,600		52,058
Ammonia (N)[2]	6,710	6,005	6,595	5,600	6,605	5,800	6,800	8,745	6,370	5,575	5,245	6,295		6,362
Nitrate as N[3]	0.495	0.51	0.64	0.755	0.57	0.625	0.565	0.61	0.76	0.495	0.455	0.51		0.58
Nitrite as N[3]	9.855	3.715	7.16	1.62	3.17	5.93	7.34	19.6	3.04	5.48	9.1	0.405		6.37
As	4.3	4.585	3.885	4.265	4.87	4.64	3.985	4.625	5.08	3.845	2.595	3.565	**170**	4.19
B[4]	19.1	20.6	17.85	15.1	17.95	13.55	15.35	16.25	20.3	21.45	20.55	22.1		18.35
Cd	0.8645	0.8115	0.8215	0.9035	0.919	0.9625	0.9205	0.8695	1.0005	0.9625	0.9505	0.943	**34**	0.91
Cr	88.6	95.4	102.5	100.45	100.6	111	104	101.7	99.75	105	121	124	**2,800**	104.50
Co	4.165	4.08	4.72	4.83	4.66	4.7	4.705	4.245	4.16	4.685	4.955	4.89	**340**	4.57
Cu	834.5	832	802	757	774	727.5	744	739	758.5	707.5	706	723	**1,700**	758.75
Pb	37.25	36.25	36.45	37.85	37.9	44.7	45.35	41.4	38.9	37.1	39.6	37.85	**1,100**	39.22
Mn[4]	285	262.5	260.5	251.5	253	275	274	251	240.5	265.5	284	260		263.54
Hg	0.8	0.74	0.77	0.435	0.51	0.475	0.495	0.555	0.595	0.58	0.76	0.695	**11**	0.62
Mo	9.185	9.485	8.91	8.23	8.645	8.82	8.44	9.075	9.87	10.45	9.87	10.345	**94**	9.28
Ni	22.8	23.05	22.5	24.3	24.1	27.3	32.1	29.75	26.3	26.1	31.3	39.3	**420**	27.41
P[4]	27,450	27,400	27,950	26,300	26,000	24,600	24,800	25,300	25,700	27,050	25,550	25,250		26,113
K[4]	1,110	1,160	1,350	1,310	1,255	1,185	1,120	1,165	1,185	998	1,120	1,080		1,170
Se	3.64	4.68	4.265	4.475	4.655	4.25	5.955	4.575	4.09	4.11	3.325	4.255	**34**	4.36
Zn	759.5	756	732.5	734.5	757	740	777.5	796	833	787	741.5	785	**4,200**	766.63
TS%	25.15	25.85	26.48	27.4	27.15	28.2	28.6	28.6	27.8	27	27.85	26.75		27.24
VS%[4]	64.15	65.25	63.925	63.25	64.85	61.95	60.1	61.95	64.15	64.6	62.15	65.55		63.49
E.Coli[5]	356,548	394,605	168,530	341,242	577,962	1,698,545	1,800,548	950,475	707,561	2,372,365	510,724	1,097,363	**2,000,000**	914,705
Salmonella[6]	1.16	8.71	58.4	15.6	3850	1640	33.9	336	135	5.66	517	6.07		550.63

[1] As per MOE regulations for biosolids utilization on agricultural lands

[2] Ammonia (N) includes ammonia + ammonium

[3] Analysis by City of Hamilton Lab

[4] Required for Quebec analysis only

[5] Results and limit for E.Coli are CFU/g, dry wt, average is geometric mean- analysis by Durham Region Lab

[6] Analysis by University of Guelph

Note: All values are expressed in mg metal/kg dry weight unless otherwise noted and as the average of the previous 4 results (excluding B, Mn, P, K, TS, VS% and Salmonella which are monthly averages)

Where values are less than the method detection limit, half of the limit is used to calculate the annual average

Appendix F

Analytical Testing Summary

Toronto Water Laboratory LIMS Sample and Result Counts **From:** 01/01/2015 **To:** 12/31/2015 **Printed on:** 2/1/2016

Client
Ashbridges Bay Treatment Plant

Number of Samples
5942

	ALK pH DS COND	Alkalinity	BOD	CBOD	Chlorine	COD	Dioxins and Furans	ECOLI	Ferric Chloride	IONS	Mercury	METALS	NH3(as N)	Orthophosphate	P	pH_15	Salmonella	SOLUBLE METALS	TKN(as N)	Toxicity	TS	TSS	Un-ionized NH3(as N)	VA	Total
ABTP FE SAMPLE	0	0	0	0	0	0	0	0	172	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	**176**
BYPASS FINAL EFFLUENT	0	0	0	14	0	0	0	16	0	140	0	0	14	0	14	0	0	0	14	0	0	14	0	0	**226**
CAKE (BIOSOLIDS)	0	0	0	0	0	0	1	0	0	0	52	600	48	0	0	0	12	0	0	0	200	0	0	0	**913**
CENTRATE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	0	0	**47**
CENTRIFUGE FEED (COMPOSITE)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	53	0	0	0	**53**
FINAL EFFLUENT	1	3	0	364	51	0	0	54	0	520	12	108	156	37	367	156	0	0	52	36	0	365	155	1	**2,438**
FINAL EFFLUENT North	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	**3**
FINAL EFFLUENT South	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	0	0	**4**
FLOTATION (TWAS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	303	0	0	0	**303**
FLOTATION (WAS)	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	193	0	0	**198**
FLOTATION SUBNATANT	0	0	0	0	0	0	0	0	0	110	0	0	0	0	0	0	0	0	0	0	0	163	0	0	**273**
INFLUENT	0	0	10	16	0	23	0	0	0	0	12	108	22	0	0	0	0	0	9	0	0	41	0	0	**241**
INFLUENT D BUILDING	0	2	360	0	0	0	0	0	0	0	0	0	52	0	365	0	0	0	52	0	0	362	0	0	**1,193**
INFLUENT P BUILDING	0	2	359	0	0	0	0	0	0	0	0	0	52	0	364	0	0	0	52	0	0	363	0	0	**1,192**
MIXED LIQUOR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	513	0	0	**513**
ML - METER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	**1**
POLYMER - DEWATERING TANK 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	0	0	0	**47**
POLYMER - FLOTATION TANK 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	0	0	0	**50**
POLYMER - FLOTATION TANK 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	0	0	0	**47**
POLYMER - FLOTATION TANK 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	0	0	0	**51**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 1	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	67	0	0	0	**92**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 10	0	0	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	56	0	0	0	**75**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 11	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	67	0	0	0	**92**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 12	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	66	0	0	0	**91**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 13	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	**71**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 14	0	0	0	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	**43**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 15	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	**73**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 16	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	**73**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 19	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	49	0	0	0	**74**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 2	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	66	0	0	0	**91**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 20	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	**73**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 21	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	**73**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 22	0	0	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	48	0	0	0	**73**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 3	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	62	0	0	0	**85**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 4	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	61	0	0	0	**82**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 5	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	66	0	0	0	**88**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 6	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0	0	0	0	56	0	0	0	**74**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 7	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	62	0	0	0	**82**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 8	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	60	0	0	0	**83**
PRIMARY DIGESTED SLUDGE TRANSFER TANK 9	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	**38**
PRIMARY DIGESTED SLUDGE VA TANK 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	**54**
PRIMARY DIGESTED SLUDGE VA TANK 10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	**54**
PRIMARY DIGESTED SLUDGE VA TANK 11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	**63**
PRIMARY DIGESTED SLUDGE VA TANK 12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	**63**
PRIMARY DIGESTED SLUDGE VA TANK 13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	**66**
PRIMARY DIGESTED SLUDGE VA TANK 14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	36	**36**
PRIMARY DIGESTED SLUDGE VA TANK 15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	**66**
PRIMARY DIGESTED SLUDGE VA TANK 16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	**63**
PRIMARY DIGESTED SLUDGE VA TANK 19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	57	**58**
PRIMARY DIGESTED SLUDGE VA TANK 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	**63**
PRIMARY DIGESTED SLUDGE VA TANK 20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	**66**
PRIMARY DIGESTED SLUDGE VA TANK 21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	**66**
PRIMARY DIGESTED SLUDGE VA TANK 22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	**66**
PRIMARY DIGESTED SLUDGE VA TANK 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	**54**
PRIMARY DIGESTED SLUDGE VA TANK 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	**54**
PRIMARY DIGESTED SLUDGE VA TANK 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	**63**
PRIMARY DIGESTED SLUDGE VA TANK 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	**63**
PRIMARY DIGESTED SLUDGE VA TANK 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	**63**
PRIMARY DIGESTED SLUDGE VA TANK 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	63	**63**
PRIMARY DIGESTED SLUDGE VA TANK 9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	**24**
PRIMARY EFFLUENT D BUILDING	3	2	0	52	0	0	0	0	0	0	0	0	0	19	11	0	0	0	0	0	0	154	0	0	**241**
PRIMARY EFFLUENT N & S	3	2	0	52	0	0	0	0	0	0	0	0	0	17	9	0	0	0	0	0	0	154	0	0	**237**
PRIMARY EFFLUENT P BUILDING 7-9	0	0	0	1	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	1	0	0	**6**
RAS - METER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	**3**
RAW SLUDGE D BUILDING 10-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	304	0	0	0	**304**
RAW SLUDGE NEW P.S. 7-9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	304	0	0	0	**304**
RAW SLUDGE OLD P.S. 1-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	280	0	0	0	**280**
Total	**7**	**11**	**729**	**504**	**51**	**23**	**1**	**514**	**172**	**770**	**76**	**816**	**344**	**75**	**1,134**	**156**	**12**	**4**	**179**	**36**	**2,722**	**2,379**	**155**	**1,168**	**12,038**

Ions include: Cl, SO4, NO3, NO2, Br, Ca, Mg, Na, K
Metals by ICP include: Cd, Cr, Cu, Ni, Pb, Zn, Al, Mn, Fe, B
Volatlie Total Solids (VS) are done on 80% of Total Solids, Volatile Suspend Solids (VSS) are done on 2% of the Total Suspended Solids samples.

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TORONTO WATER LABORATORY

Sampling Point: TAB01 INFLUENT

Group: BOD	Minimum	Maximum	Average	Units	Reporting Limit
Biochemical Oxygen Demand (BOD)	49.00	417.00	227.09	mg/L	<2
Group: CBOD	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Carbonaceous Biochemical Oxygen Demand	61.00	265.00	158.18	mg/L	<2
Group: COD	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Chemical Oxygen Demand	185.00	590.00	431.74	mg/L	<10
Group: METALS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Arsenic	0.006000	0.01000	0.00733	mg/L	<0.01
Cadmium	0.001000	0.00400	0.00200	mg/L	<0.004
Chromium	0.007700	0.02050	0.01153	mg/L	<0.004
Copper	0.121000	0.17500	0.15325	mg/L	<0.004
Iron	3.250000	5.19000	4.14250	mg/L	<0.02
Lead	0.006100	0.00900	0.00723	mg/L	<0.005
Manganese	0.069700	0.08100	0.07408	mg/L	<0.004
Nickel	0.006800	0.01860	0.00867	mg/L	<0.005
Zinc	0.163000	0.27100	0.19433	mg/L	<0.02
Group: Mercury	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Mercury	0.000100	0.00020	0.00011	mg/L	<0.00003
Group: NH3(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Ammonia(as N)	31.00	51.00	38.68	mg/L	<0.05
Group: TKN and NH3	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Kjeldahl Nitrogen	30.60	55.60	44.19	mg/L	
Group: TKN(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Kjeldahl Nitrogen	40.50	62.30	55.19	mg/L	<0.2
Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	60.00	424.00	247.48	mg/L	<2
Volatile Suspended Solids	79.50	99.00	87.46	%	

Sampling Point: TAB04 PRIMARY EFFLUENT D BUILDING

Group: ALK pH DS COND	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	212.00	212.00	212.00	mg/L	<1.6
Conductivity	1,340.00	1,340.00	1,340.00	µS/cm	<0.4
pH	7.70	7.70	7.70	SU	<0.10
Group: Alkalinity	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Alkalinity	210.00	210.00	210.00	mg/L	<10
Group: CBOD	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Carbonaceous Biochemical Oxygen Demand	28.00	962.00	122.42	mg/L	<2
Group: Orthophosphate	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Orthophosphate	0.50	19.00	3.70	mg/L	<0.5
Group: P	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Phosphorus (HACH)	3.30	24.00	8.96	mg/L	<0.08

Printed on: 2/1/2016

Group: TSS	Minimum	Maximum	Average	Units	Reporting Limit
Total Suspended Solids	72.00	15,140.00	399.14	mg/L	<2

Sampling Point: TAB06 PRIMARY EFFLUENT N & S

Group: ALK pH DS COND	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	255.00	255.00	255.00	mg/L	<1.6
Conductivity	1,320.00	1,320.00	1,320.00	µS/cm	<0.4
pH	7.60	7.60	7.60	SU	<0.10
Group: Alkalinity	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Alkalinity	230.00	230.00	230.00	mg/L	<10
Group: CBOD	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Carbonaceous Biochemical Oxygen Demand	2.00	215.00	77.60	mg/L	<2
Group: Orthophosphate	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Orthophosphate	0.50	8.40	3.95	mg/L	<0.5
Group: P	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Phosphorus (HACH)	2.20	4.80	4.20	mg/L	<0.08
Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	60.00	1,084.00	153.95	mg/L	<2

Sampling Point: TAB07 FINAL EFFLUENT

Group: ALK pH DS COND	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	65.70	65.70	65.70	mg/L	<1.6
Group: Alkalinity	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Alkalinity	80.00	100.00	90.00	mg/L	<10
Group: CBOD	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Carbonaceous Biochemical Oxygen Demand	2.00	39.00	5.18	mg/L	<2
Group: Chlorine	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Residual Chlorine	0.40	1.80	0.67	mg/L	<0.01
Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
EColi	0.00	4,733.00	271.06	CFU/100 mL	
Group: IONS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Bromide	0.200000	2.75000	1.87019	mg/L	<0.1
Calcium	52.500000	103.00000	69.36923	mg/L	<0.2
Chloride	88.000000	388.00000	171.44231	mg/L	<0.2
Hardness (Calculation)	182.000000	330.00000	233.09615	mg/L	<1
Magnesium	11.500000	20.40000	14.52308	mg/L	<0.1
Nitrate(as N)	8.460000	22.60000	13.97462	mg/L	<0.01
Nitrite(as N)	0.452000	8.70000	3.03673	mg/L	<0.002
Potassium	8.630000	15.90000	12.10750	mg/L	<0.05
Sodium	61.800000	255.00000	106.63654	mg/L	<0.4
Sulfate	34.000000	64.20000	43.43269	mg/L	<0.2
Group: METALS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Arsenic	0.006000	0.01000	0.00733	mg/L	<0.01
Cadmium	0.001000	0.00400	0.00200	mg/L	<0.004
Chromium	0.004000	0.00400	0.00400	mg/L	<0.004
Copper	0.007500	0.02480	0.01310	mg/L	<0.004
Iron	0.308000	0.89700	0.67025	mg/L	<0.02
Lead	0.005000	0.00500	0.00500	mg/L	<0.005

Manganese	0.046200	0.08220	0.06133	mg/L	<0.004
Nickel	0.005000	0.01160	0.00597	mg/L	<0.005
Zinc	0.027100	0.06340	0.03484	mg/L	<0.02
Group: Mercury	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Mercury	0.000100	0.00010	0.00010	mg/L	<0.00003
Group: NH3(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Ammonia(as N)	0.20	16.00	5.31	mg/L	<0.05
Group: Orthophosphate	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Orthophosphate	0.58	2.70	1.62	mg/L	<0.5
Group: P	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Dilution	2.00	2.00	2.00		
P_HACH(reading)	0.62	0.62	0.62		
Phosphorus (HACH)	0.22	3.90	0.77	mg/L	<0.08
Group: TKN(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Kjeldahl Nitrogen	1.82	15.80	6.80	mg/L	<0.2
Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	2.00	92.00	10.14	mg/L	<2
Volatile Suspended Solids				%	
Group: Toxicity	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
96h_ Mortality	0.00	0.00	0.00		
96h_LC50	100.00	100.00	100.00	%	
Un-ionized Ammonia	0.01	0.10	0.04	mg/L	
Group: Un-ionized NH3(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Ammonia(as N)Un-ionized (Calculation)	0.00	0.24	0.05	mg/L	<0.001
Group: pH_15	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
pH_15C	5.90	7.90	7.51	SU	

Sampling Point: TAB10 — RAW SLUDGE OLD P.S. 1-6

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	0.10	8.10	2.24	%	
Volatile Total Solids	33.30	87.80	70.64	%	

Sampling Point: TAB11 — RAW SLUDGE NEW P.S. 7-9

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	0.10	14.21	3.13	%	
Volatile Total Solids	35.59	88.90	75.07	%	

Sampling Point: TAB12 — RAW SLUDGE D BUILDING 10-12

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	0.40	14.54	3.42	%	
Volatile Total Solids	51.66	87.50	74.25	%	

Sampling Point: TAB13 — PRIMARY DIGESTED SLUDGE VA TANK 5

Group: VA	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Alkalinity	1,800.00	3,250.00	2,671.43	mg/L	<10
Volatile Acids	100.00	290.00	162.38	mg/L	
pH	7.10	8.10	7.60	SU	

Sampling Point: TAB14 PRIMARY DIGESTED SLUDGE VA TANK 6

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	1,750.00	3,100.00	2,592.86	mg/L	<10
Volatile Acids	70.00	260.00	160.95	mg/L	
pH	7.10	8.10	7.63	SU	

Sampling Point: TAB15 PRIMARY DIGESTED SLUDGE VA TANK 7

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	1,800.00	3,200.00	2,600.00	mg/L	<10
Volatile Acids	110.00	210.00	159.52	mg/L	
pH	7.10	8.20	7.60	SU	

Sampling Point: TAB16 PRIMARY DIGESTED SLUDGE VA TANK 8

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	1,850.00	3,350.00	2,666.67	mg/L	<10
Volatile Acids	80.00	420.00	171.90	mg/L	
pH	7.10	8.10	7.61	SU	

Sampling Point: TAB17 PRIMARY DIGESTED SLUDGE VA TANK 9

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	2,750.00	3,800.00	3,287.50	mg/L	<10
Volatile Acids	190.00	260.00	222.50	mg/L	
pH	7.40	8.10	7.70	SU	

Sampling Point: TAB18 PRIMARY DIGESTED SLUDGE VA TANK 10

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	280.00	3,600.00	2,748.89	mg/L	<10
Volatile Acids	160.00	490.00	268.89	mg/L	
pH	7.30	8.10	7.67	SU	

Sampling Point: TAB19 PRIMARY DIGESTED SLUDGE VA TANK 11

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	2,200.00	3,400.00	2,992.86	mg/L	<10
Volatile Acids	100.00	1,550.00	388.10	mg/L	
pH	7.30	8.10	7.64	SU	

Sampling Point: TAB20 PRIMARY DIGESTED SLUDGE VA TANK 12

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	2,250.00	3,500.00	2,959.52	mg/L	<10
Volatile Acids	150.00	390.00	251.90	mg/L	
pH	7.30	8.10	7.69	SU	

Sampling Point: TAB21 PRIMARY DIGESTED SLUDGE VA TANK 13

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	1,900.00	2,900.00	2,415.91	mg/L	<10
Volatile Acids	70.00	220.00	125.91	mg/L	
pH	6.70	8.00	7.49	SU	

Sampling Point: TAB22 PRIMARY DIGESTED SLUDGE VA TANK 14

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	2,450.00	2,900.00	2,662.50	mg/L	<10
Volatile Acids	110.00	240.00	169.17	mg/L	
pH	7.10	8.00	7.54	SU	

Sampling Point: TAB23 PRIMARY DIGESTED SLUDGE VA TANK 15

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	1,950.00	3,000.00	2,493.18	mg/L	<10
Volatile Acids	80.00	200.00	119.09	mg/L	
pH	7.00	8.00	7.60	SU	

Sampling Point: TAB24 PRIMARY DIGESTED SLUDGE VA TANK 16

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	1,900.00	2,850.00	2,421.43	mg/L	<10
Volatile Acids	80.00	180.00	124.29	mg/L	
pH	7.00	8.00	7.56	SU	

Sampling Point: TAB25 PRIMARY DIGESTED SLUDGE VA TANK 19

Group: TS	Minimum	Maximum	Average	Units	Reporting Limit
Total Solids	1.20	1.20	1.20	%	

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	2,050.00	3,350.00	2,634.21	mg/L	<10
Volatile Acids	100.00	160.00	122.63	mg/L	
pH	7.00	8.00	7.61	SU	

Sampling Point: TAB26 PRIMARY DIGESTED SLUDGE VA TANK 20

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	800.00	3,700.00	2,497.73	mg/L	<10
Volatile Acids	80.00	230.00	136.82	mg/L	
pH	7.00	8.10	7.59	SU	

Sampling Point: TAB27 PRIMARY DIGESTED SLUDGE VA TANK 21

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	1,900.00	4,050.00	2,820.45	mg/L	<10
Volatile Acids	40.00	370.00	175.91	mg/L	
pH	7.00	8.00	7.58	SU	

Sampling Point: TAB28 PRIMARY DIGESTED SLUDGE VA TANK 22

Group: VA	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	1,900.00	3,500.00	2,652.27	mg/L	<10
Volatile Acids	90.00	210.00	135.00	mg/L	
pH	7.00	8.10	7.60	SU	

Sampling Point: TAB29 PRIMARY DIGESTED SLUDGE TRANSFER TANK 5

Group: ECOLI	Minimum	Maximum	Average	Units	Reporting Limit
EColi	100,000.00	332,000.00	189,000.00	CFU/g(dry wt)	

GM of last 8 EColi	148,754.00	228,945.00	195,537.09	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	1.50	2.30	1.82	%	
Volatile Total Solids	58.80	68.00	63.83	%	

Sampling Point: TAB30 PRIMARY DIGESTED SLUDGE TRANSFER TANK 6

Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
EColi	55,600.00	442,000.00	229,511.11	CFU/g(dry wt)	
GM of last 8 EColi	137,228.00	203,569.00	168,753.33	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	1.50	2.20	1.82	%	
Volatile Total Solids	59.38	71.00	64.12	%	

Sampling Point: TAB31 PRIMARY DIGESTED SLUDGE TRANSFER TANK 7

Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
EColi	36,800.00	719,000.00	383,980.00	CFU/g(dry wt)	
GM of last 8 EColi	243,511.00	354,580.00	298,660.10	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	1.60	2.40	1.89	%	
Volatile Total Solids	58.10	70.80	63.88	%	

Sampling Point: TAB32 PRIMARY DIGESTED SLUDGE TRANSFER TANK 8

Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
ECOLI-BCIG-44.5	1,250,000.00	1,250,000.00	1,250,000.00		
EColi	18,600.00	1,180,000.00	311,245.45	CFU/g(dry wt)	
GM of last 8 EColi	146,324.00	264,972.00	183,926.82	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	1.10	13.09	2.67	%	
Volatile Total Solids	28.46	67.90	58.10	%	

Sampling Point: TAB33 PRIMARY DIGESTED SLUDGE TRANSFER TANK 9

Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
EColi	20,500.00	1,280,000.00	354,780.00	CFU/g(dry wt)	
GM of last 8 EColi	263,061.00	706,864.00	423,676.40	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	1.30	3.90	1.95	%	
Volatile Total Solids	54.80	67.90	59.94	%	

Sampling Point: TAB34 PRIMARY DIGESTED SLUDGE TRANSFER TANK 10

Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
ECOLI-BCIG-44.5	380,000.00	380,000.00	380,000.00		
EColi	5,410.00	1,790,000.00	390,167.78	CFU/g(dry wt)	
GM of last 8 EColi	124,302.00	509,631.00	315,097.56	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	0.40	2.50	1.32	%	
Volatile Total Solids	50.00	70.00	59.70	%	

Sampling Point: TAB35 PRIMARY DIGESTED SLUDGE TRANSFER TANK 11

Group: ECOLI	Minimum	Maximum	Average	Units	Reporting Limit
ECOLI-BCIG-44.5	4,100,000.00	4,100,000.00	4,100,000.00		
EColi	5,260.00	2,060,000.00	496,050.00	CFU/g(dry wt)	
GM of last 8 EColi	67,552.00	376,058.00	153,118.25	CFU/g(dry wt)	

Group: TS	Minimum	Maximum	Average	Units	Reporting Limit
Total Solids	0.40	2.20	1.28	%	
Volatile Total Solids	50.00	66.70	59.13	%	

Sampling Point: TAB36 PRIMARY DIGESTED SLUDGE TRANSFER TANK 12

Group: ECOLI	Minimum	Maximum	Average	Units	Reporting Limit
ECOLI-BCIG-44.5	280,000.00	280,000.00	280,000.00		
EColi	556.00	1,150,000.00	274,538.00	CFU/g(dry wt)	
GM of last 8 EColi	39,732.00	425,903.00	160,509.92	CFU/g(dry wt)	

Group: TS	Minimum	Maximum	Average	Units	Reporting Limit
Total Solids	0.29	2.20	1.30	%	
Volatile Total Solids	40.00	66.70	59.04	%	

Sampling Point: TAB37 PRIMARY DIGESTED SLUDGE TRANSFER TANK 13

Group: ECOLI	Minimum	Maximum	Average	Units	Reporting Limit
ECOLI-BCIG-44.5	220,000.00	220,000.00	220,000.00		
EColi	111,000.00	611,000.00	280,000.00	CFU/g(dry wt)	
GM of last 8 EColi	156,377.00	211,974.00	183,735.00	CFU/g(dry wt)	

Group: TS	Minimum	Maximum	Average	Units	Reporting Limit
Total Solids	1.40	2.10	1.72	%	
Volatile Total Solids	56.30	68.60	64.23	%	

Sampling Point: TAB38 PRIMARY DIGESTED SLUDGE TRANSFER TANK 14

Group: ECOLI	Minimum	Maximum	Average	Units	Reporting Limit
ECOLI-BCIG-44.5	460,000.00	460,000.00	460,000.00		
EColi	76,900.00	681,000.00	250,557.14	CFU/g(dry wt)	
GM of last 8 EColi	211,006.00	281,094.00	238,005.86	CFU/g(dry wt)	

Group: TS	Minimum	Maximum	Average	Units	Reporting Limit
Total Solids	1.30	2.10	1.73	%	
Volatile Total Solids	58.60	66.70	63.57	%	

Sampling Point: TAB39 PRIMARY DIGESTED SLUDGE TRANSFER TANK 15

Group: ECOLI	Minimum	Maximum	Average	Units	Reporting Limit
ECOLI-BCIG-44.5	4,000,000.00	4,000,000.00	4,000,000.00		
EColi	11,100.00	2,900,000.00	422,508.33	CFU/g(dry wt)	
GM of last 8 EColi	28,052.00	292,256.00	103,983.25	CFU/g(dry wt)	

Group: TS	Minimum	Maximum	Average	Units	Reporting Limit
Total Solids	0.40	1.80	1.09	%	
Volatile Total Solids	50.00	72.73	60.32	%	

Sampling Point: TAB40 PRIMARY DIGESTED SLUDGE TRANSFER TANK 16

Group: ECOLI	Minimum	Maximum	Average	Units	Reporting Limit
ECOLI-BCIG-44.5	500,000.00	500,000.00	500,000.00		
EColi	100,000.00	1,880,000.00	492,750.00	CFU/g(dry wt)	

GM of last 8 EColi	182,936.00	489,974.00	287,587.83	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	1.20	3.20	1.66	%	
Volatile Total Solids	57.10	69.60	63.55	%	

Sampling Point: TAB41 PRIMARY DIGESTED SLUDGE TRANSFER TANK 19

Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
ECOLI-BCIG-44.5	190,000.00	190,000.00	190,000.00		
EColi	8,330.00	1,440,000.00	402,444.17	CFU/g(dry wt)	
GM of last 8 EColi	168,314.00	401,829.00	245,814.58	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	0.80	2.20	1.66	%	
Volatile Total Solids	55.60	68.40	62.74	%	

Sampling Point: TAB42 PRIMARY DIGESTED SLUDGE TRANSFER TANK 20

Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
ECOLI-BCIG-44.5	250,000.00	250,000.00	250,000.00		
EColi	121,000.00	1,470,000.00	365,250.00	CFU/g(dry wt)	
GM of last 8 EColi	189,821.00	276,893.00	246,092.33	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	0.50	2.30	1.66	%	
Volatile Total Solids	50.00	68.40	62.93	%	

Sampling Point: TAB43 PRIMARY DIGESTED SLUDGE TRANSFER TANK 21

Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
ECOLI-BCIG-44.5	150,000.00	150,000.00	150,000.00		
EColi	81,100.00	582,000.00	239,316.67	CFU/g(dry wt)	
GM of last 8 EColi	158,673.00	288,833.00	205,973.92	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	1.20	2.40	1.73	%	
Volatile Total Solids	57.70	68.00	63.09	%	

Sampling Point: TAB44 PRIMARY DIGESTED SLUDGE TRANSFER TANK 22

Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
ECOLI-BCIG-44.5	5,000,000.00	5,000,000.00	5,000,000.00		
EColi	142,000.00	2,310,000.00	529,916.67	CFU/g(dry wt)	
GM of last 8 EColi	245,724.00	493,193.00	356,666.25	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	0.60	2.30	1.58	%	
Volatile Total Solids	58.30	68.20	64.81	%	

Sampling Point: TAB45 CENTRIFUGE FEED (COMPOSITE)

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	1.50	2.20	1.79	%	
Volatile Total Solids	62.86	68.18	65.52	%	

Sampling Point: TAB47 CAKE (BIOSOLIDS)

Group: Dioxins and Furans	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**

Dioxins and Furans (TEQ)	0.58	0.58	0.58	Ng TEQ/Kg	
Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
EColi	84,306.00	4,377,358.00	914,663.75	CFU/g(dry wt)	
Group: IONS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
AVG of Last 8 NO2 Results	3.430000	10.34000	7.21583	mg/Kg (DW)	
AVG of Last 8 NO3 Results	0.300000	0.57000	0.49000	mg/Kg (DW)	
Nitrate(as N)	0.300000	0.95000	0.58250	mg/Kg (DW)	
Nitrite(as N)	0.350000	26.30000	6.31500	mg/Kg (DW)	
Group: METALS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
AVG of Last 8 As Results	3.770000	5.01000	4.28833	mg/Kg (DW)	<2.0
AVG of Last 8 Cd Results	1.000000	1.00000	1.00000	mg/Kg (DW)	<1
AVG of Last 8 Co Results	3.840000	4.74000	4.32708	mg/Kg (DW)	<1
AVG of Last 8 Cr Results	88.990000	112.44000	98.39875	mg/Kg (DW)	<11
AVG of Last 8 Cu Results	641.750000	890.38000	762.28417	mg/Kg (DW)	<72
AVG of Last 8 Mo Results	7.750000	10.13000	8.99417	mg/Kg (DW)	<1
AVG of Last 8 Ni Results	23.160000	30.75000	25.59708	mg/Kg (DW)	<8
AVG of Last 8 P Results	21,900.000000	27,275.00000	25,276.04167	mg/Kg (DW)	<2000
AVG of Last 8 Pb Results	34.440000	43.84000	38.57167	mg/Kg (DW)	<5
AVG of Last 8 Se Results	3.700000	4.83000	4.24042	mg/Kg (DW)	<0.5
AVG of Last 8 Zn Results	675.630000	806.50000	748.43958	mg/Kg (DW)	<63
Arsenic	1.920000	5.73000	4.18667	mg/Kg (DW)	
Boron	11.900000	23.60000	18.34583	mg/Kg (DW)	
Cadmium	0.776000	1.03000	0.91075	mg/Kg (DW)	
Chromium	86.000000	130.00000	104.50000	mg/Kg (DW)	
Cobalt	3.710000	5.17000	4.56625	mg/Kg (DW)	
Copper	688.000000	847.00000	758.75000	mg/Kg (DW)	
Lead	34.900000	48.30000	39.21667	mg/Kg (DW)	
Manganese	232.000000	293.00000	263.54167	mg/Kg (DW)	
Molybdenum	7.990000	10.70000	9.27708	mg/Kg (DW)	
Nickel	21.900000	39.60000	27.40833	mg/Kg (DW)	
Potassium	909.000000	1,430.00000	1,169.79167	mg/Kg (DW)	
Selenium	2.370000	5.99000	4.35625	mg/Kg (DW)	
Total Phosphorus	23,900.000000	29,100.00000	26,112.50000	mg/Kg (DW)	
Zinc	717.000000	834.00000	766.62500	mg/Kg (DW)	
Group: Mercury	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
AVG of Last 4 Hg Results	0.490000	0.49000	0.49000	mg/Kg (DW)	<0.25
AVG of Last 8 Hg Results	0.480000	0.82000	0.63208	mg/Kg (DW)	<0.25
Mercury	0.350000	0.91000	0.61750	mg/Kg (DW)	
Trigger	1.000000	1.00000	1.00000		
Volume	50.000000	50.00000	50.00000	mL	
Wet weight	0.050100	0.05010	0.05010	g	
Group: NH3(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
AVG of Last 8 NH3 Results	5,871.00	7,010.00	6,540.83	mg/Kg (DW)	
Ammonia(as N)	4,350.00	9,540.00	6,362.08	mg/Kg (DW)	
Group: Salmonella	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Salmonella (MPN/g)	1.16	3,850.00	550.63	MPN/g(dry wt)	
Group: TKN and NH3	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Ammonia(as N)	3,910.00	8,410.00	5,325.45	mg/Kg (DW)	
Total Kjeldahl Nitrogen	39,900.00	55,100.00	49,282.35	mg/Kg (DW)	
Group: TKN(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**

Total Kjeldahl Nitrogen	49,600.00	71,800.00	58,800.00	mg/Kg (DW)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	24.70	95.63	43.45	%	
Volatile Total Solids	57.30	66.70	63.36	%	

Sampling Point: TAB48 CENTRATE

Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	70.00	4,180.00	692.34	mg/L	<2

Sampling Point: TAB51 FLOTATION (WAS)

Group: CBOD	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Carbonaceous Biochemical Oxygen Demand	148.00	234.00	201.80	mg/L	<2

Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	480.00	18,660.00	7,248.34	mg/L	<2
Volatile Suspended Solids	75.30	97.90	85.41	%	

Sampling Point: TAB52 FLOTATION (TWAS)

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	2.20	4.90	3.34	%	
Volatile Total Solids	66.00	76.40	71.03	%	

Sampling Point: TAB53 FLOTATION SUBNATANT

Group: IONS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Bromide	2.750000	2.75000	2.75000	mg/L	<0.1
Calcium	59.600000	91.50000	75.76364	mg/L	<0.2
Chloride	86.900000	137.00000	112.74545	mg/L	<0.2
Hardness (Calculation)	206.000000	299.00000	253.09091	mg/L	<1
Magnesium	12.400000	19.10000	15.51818	mg/L	<0.1
Nitrate(as N)	16.100000	38.00000	30.10000	mg/L	<0.01
Nitrite(as N)	0.055000	0.05500	0.05500	mg/L	<0.002
Potassium	7.850000	12.20000	10.51000	mg/L	<0.05
Sodium	63.900000	102.00000	86.41818	mg/L	<0.4
Sulfate	37.400000	50.60000	43.80000	mg/L	<0.2

Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	2.00	212.00	30.26	mg/L	<2

Sampling Point: TAB54 MIXED LIQUOR

Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	1,280.00	7,500.00	3,107.25	mg/L	<2
Trigger	1.00	1.00	1.00		
Volatile Suspended Solids	69.20	91.20	74.98	%	

Sampling Point: TAB55 POLYMER - FLOTATION TANK 1

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	0.17	0.55	0.39	%	

Sampling Point: TAB56 POLYMER - FLOTATION TANK 2

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**

Total Solids	0.09	0.51	0.37	%	

Sampling Point: TAB57 — POLYMER - DEWATERING TANK 1

Group: TS	Minimum	Maximum	Average	Units	Reporting Limit
Total Solids	0.28	0.61	0.44	%	

Sampling Point: TAB63 — POLYMER - FLOTATION TANK 3

Group: TS	Minimum	Maximum	Average	Units	Reporting Limit
Total Solids	0.21	0.55	0.32	%	

Sampling Point: TAB66 — BYPASS FINAL EFFLUENT

Group: CBOD	Minimum	Maximum	Average	Units	Reporting Limit
Carbonaceous Biochemical Oxygen Demand	2.00	150.00	72.86	mg/L	<2
Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
EColi	1,410,000.00	7,440,000.00	3,264,375.00	CFU/100 mL	
Group: IONS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Bromide	0.200000	2.75000	0.63929	mg/L	<0.1
Calcium	39.500000	83.00000	51.50714	mg/L	<0.2
Chloride	61.600000	594.00000	150.80714	mg/L	<0.2
Hardness (Calculation)	123.000000	264.00000	167.64286	mg/L	<1
Magnesium	5.990000	13.70000	9.47214	mg/L	<0.1
Nitrate(as N)	0.020000	0.92000	0.16179	mg/L	<0.01
Nitrite(as N)	0.004000	0.22000	0.04579	mg/L	<0.002
Potassium	6.500000	15.50000	9.65357	mg/L	<0.05
Sodium	40.000000	365.00000	91.37143	mg/L	<0.4
Sulfate	19.800000	43.00000	29.04286	mg/L	<0.2
Group: NH3(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Ammonia(as N)	15.00	66.00	34.29	mg/L	<0.05
Group: P	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Phosphorus (HACH)	1.30	5.30	3.72	mg/L	<0.08
Group: TKN(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Kjeldahl Nitrogen	20.30	60.60	39.73	mg/L	<0.2
Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	64.00	216.00	110.29	mg/L	<2

Sampling Point: TAB72 — ABTP FE SAMPLE

Group: Ferric Chloride	Minimum	Maximum	Average	Units	Reporting Limit
Absolute Difference	0.00	0.13	0.01		
Bill of Lading #	1,734,142.00	82,334,517.00	70,172,796.15		
Specific Gravity	1.16	1.36	1.25		
Supplier Specific Gravity	1.15	1.38	1.25		
Group: SOLUBLE METALS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Soluble Iron	87,700.00	151,000.00	123,925.00	mg/L	<0.012

Sampling Point: TAB78 — PRIMARY EFFLUENT P BUILDING 7-9

Group: CBOD	Minimum	Maximum	Average	Units	Reporting Limit
Carbonaceous Biochemical Oxygen Demand				mg/L	<2
Group: Orthophosphate	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**

Orthophosphate	2.60	6.30	4.45	mg/L	<0.5

Group: P	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Phosphorus (HACH)	3.40	4.50	3.95	mg/L	<0.08

Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	424.00	424.00	424.00	mg/L	<2

Sampling Point: TAB79 PRIMARY DIGESTED SLUDGE VA TANK 1

Group: VA	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Alkalinity	2,000.00	3,600.00	2,686.11	mg/L	<10
Volatile Acids	110.00	220.00	149.44	mg/L	
pH	7.00	8.00	7.52	SU	

Sampling Point: TAB80 PRIMARY DIGESTED SLUDGE VA TANK 2

Group: VA	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Alkalinity	1,900.00	3,000.00	2,533.33	mg/L	<10
Volatile Acids	60.00	240.00	140.00	mg/L	
pH	7.10	8.00	7.61	SU	

Sampling Point: TAB81 PRIMARY DIGESTED SLUDGE VA TANK 3

Group: VA	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Alkalinity	1,450.00	3,000.00	2,511.11	mg/L	<10
Volatile Acids	100.00	240.00	164.44	mg/L	
pH	7.20	8.00	7.69	SU	

Sampling Point: TAB82 PRIMARY DIGESTED SLUDGE VA TANK 4

Group: VA	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Alkalinity	1,750.00	3,050.00	2,591.67	mg/L	<10
Volatile Acids	90.00	200.00	151.11	mg/L	
pH	7.20	8.10	7.66	SU	

Sampling Point: TAB83 PRIMARY DIGESTED SLUDGE TRANSFER TANK 1

Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
ECOLI-BCIG-44.5	220,000.00	220,000.00	220,000.00		
EColi	94,700.00	750,000.00	297,891.67	CFU/g(dry wt)	
GM of last 8 EColi	189,566.00	302,925.00	246,302.00	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	1.50	2.70	1.89	%	
Volatile Total Solids	58.30	69.00	63.76	%	

Sampling Point: TAB84 PRIMARY DIGESTED SLUDGE TRANSFER TANK 2

Group: ECOLI	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
ECOLI-BCIG-44.5	230,000.00	230,000.00	230,000.00		
EColi	83,300.00	1,210,000.00	250,525.00	CFU/g(dry wt)	
GM of last 8 EColi	173,298.00	292,910.00	224,665.17	CFU/g(dry wt)	

Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	1.30	3.50	1.98	%	
Volatile Total Solids	47.20	66.70	62.03	%	

Sampling Point: TAB85 PRIMARY DIGESTED SLUDGE TRANSFER TANK 3

Group: ECOLI	Minimum	Maximum	Average	Units	Reporting Limit
ECOLI-BCIG-44.5	1,200,000.00	1,200,000.00	1,200,000.00		
EColi	111,000.00	1,280,000.00	382,545.45	CFU/g(dry wt)	
GM of last 8 EColi	197,192.00	314,629.00	248,881.82	CFU/g(dry wt)	
Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	1.40	4.10	1.99	%	
Volatile Total Solids	40.70	70.37	64.01	%	

Sampling Point: TAB86 PRIMARY DIGESTED SLUDGE TRANSFER TANK 4

Group: ECOLI	Minimum	Maximum	Average	Units	Reporting Limit
ECOLI-BCIG-44.5	450,000.00	450,000.00	450,000.00		
EColi	20,000.00	667,000.00	250,620.00	CFU/g(dry wt)	
GM of last 8 EColi	135,930.00	216,741.00	177,538.70	CFU/g(dry wt)	
Group: TS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Solids	1.70	30.50	4.65	%	
Volatile Total Solids	10.20	67.70	51.79	%	

Sampling Point: TAB87 RAS - METER

Group: TSS	Minimum	Maximum	Average	Units	Reporting Limit
Total Suspended Solids	1,830.00	3,270.00	2,740.00	mg/L	<2

Sampling Point: TAB88 ML - METER

Group: TSS	Minimum	Maximum	Average	Units	Reporting Limit
Total Suspended Solids	1,240.00	1,240.00	1,240.00	mg/L	<2

Sampling Point: TAB89 INFLUENT P BUILDING

Group: Alkalinity	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	240.00	240.00	240.00	mg/L	<10
Group: BOD	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Biochemical Oxygen Demand (BOD)	11.00	622.00	235.46	mg/L	<2
Group: NH3(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Ammonia(as N)	12.00	35.00	23.75	mg/L	<0.05
Group: P	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Dilution	10.00	10.00	10.00		
P_HACH(reading)	1.63	1.63	1.63		
Phosphorus (HACH)	2.60	78.00	6.48	mg/L	<0.08
Group: TKN(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Kjeldahl Nitrogen	20.50	52.30	39.22	mg/L	<0.2
Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	120.00	4,380.00	279.03	mg/L	<2
Volatile Suspended Solids				%	

Sampling Point: TAB90 INFLUENT D BUILDING

Group: Alkalinity	Minimum	Maximum	Average	Units	Reporting Limit
Alkalinity	250.00	250.00	250.00	mg/L	<10

Group: BOD	Minimum	Maximum	Average	Units	Reporting Limit
Biochemical Oxygen Demand (BOD)	98.00	814.00	312.57	mg/L	<2
Group: NH3(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Ammonia(as N)	17.00	57.00	27.81	mg/L	<0.05
Group: P	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Dilution	10.00	10.00	10.00		
P_HACH(reading)	2.82	2.82	2.82		
Phosphorus (HACH)	3.40	21.00	8.57	mg/L	<0.08
Group: TKN(as N)	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Kjeldahl Nitrogen	32.20	68.10	47.82	mg/L	<0.2
Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	120.00	1,036.00	388.99	mg/L	<2
Volatile Suspended Solids				%	

Sampling Point: TAB93 FINAL EFFLUENT North

Group: P	Minimum	Maximum	Average	Units	Reporting Limit
Phosphorus (HACH)	15.00	15.00	15.00	mg/L	<0.08
Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	2.00	4.00	3.00	mg/L	<2

Sampling Point: TAB94 FINAL EFFLUENT South

Group: P	Minimum	Maximum	Average	Units	Reporting Limit
Phosphorus (HACH)	21.00	21.00	21.00	mg/L	<0.08
Group: TSS	**Minimum**	**Maximum**	**Average**	**Units**	**Reporting Limit**
Total Suspended Solids	2.00	4.00	3.00	mg/L	<2

Note: Averages are based on raw data

Note: Minimum values are normally reported as < the reporting limit for that parameter.

Note: Average is calculated for ECOLI, if Geometric Mean is required ask the lab for a separate data file.

Appendix G

Flow Meter Calibration/Maintenance Record

Industrial Technical Services

951 Matheson Blvd. East
Mississauga, ON L4W 2R7
Ph: 905-275-2717 Fax: 905-275-2724
www.itsinstruments.com

File Ref.:
Certificate No: 25085-001

Certificate Of Calibration

Customer:
City of Toronto - Ashbridges Bay Treatment Plant
9 Leslie Street, Toronto, ON M4M 3M9
Phone: (416) 738-1689
Fax:

Cal. Date: November 27, 2015
Due Date: November 27, 2016

Instrument Identification:

Description:	pH Meter
Manufacturer:	YSI
Model No:	PH100
Serial No:	JC05280
Range:	0 to 14 pH / 0 to 60°C
Tolerance:	± 2% FS (pH) / ± 1°C
Tag No:	N/Av
Location:	N/Av

Standards Used:

Asset No	*Manufacturer*	*Calibration Date*	*Due Date*
BU1400R	AlphaChem	N/Ap	May, 2016
BU1700Y	AlphaChem	N/Ap	May, 2016
BU1100B	AlphaChem	N/Ap	April, 2016
LTB001	Cole-Parmer	December 9, 2014	December 9, 2015

Test Report:

AS FOUND			*AS LEFT*		
Reference	***Instrument***	***Error***	***Reference***	***Instrument***	***Error***
pH	pH	% FS	pH	pH	% FS
4.00	3.75	-1.79	4.00	3.96	-0.29
7.00	6.76	-1.71	7.00	7.00	0.00
10.00	9.75	-1.79	10.00	9.99	-0.07
°C	°C	°C	°C	°C	°C
15.5	15.3	-0.20	15.5	15.3	-0.20
25.0	24.8	-0.20	25.0	24.8	-0.20
35.0	34.8	-0.20	35.0	34.8	-0.20

	Yes	*No*		*Yes*	*No*
Passed:	✓		*As found in tolerance:*	✓	
Failed:			*As left in tolerance:*	✓	
Calibration Sticker applied?	✓		*Repair performed:*		✓
Restricted Use:			*Adjustment performed:*	✓	

Comments: pH/Temperature sensor calibrated in loop.

Performed By: A. Shah - Technician
Date: December 7, 2015

Reviewed By: C. Ramnarine - Service Manager
Date: December 7, 2015

Industrial Technical Services

951 Matheson Blvd. East
Mississauga, ON L4W 2R7
Ph: 905-275-2717 Fax: 905-275-2724
www.itsinstruments.com

File Ref.:
Certificate No: 25085-002

Certificate Of Calibration

Customer:
City of Toronto - Ashbridges Bay Treatment Plant
9 Leslie Street, Toronto, ON M4M 3M9
Phone: (416) 738-1689
Fax:

Cal. Date: December 2, 2015
Due Date: December 2, 2016

Instrument Identification:

Description:	pH Meter
Manufacturer:	YSI
Model No:	PH100A
Serial No:	JC000828
Range:	0 to 14 pH / 0 to 60°C
Tolerance:	± 2% FS (pH) / ± 1°C
Tag No:	N/Av
Location:	N/Av

Standards Used:

Asset No	*Manufacturer*	*Calibration Date*	*Due Date*
BU1400R	AlphaChem	N/Ap	May, 2016
BU1700Y	AlphaChem	N/Ap	May, 2016
BU1100B	AlphaChem	N/Ap	April, 2016
LTB001	Cole-Parmer	December 9, 2014	December 9, 2015

Test Report:

AS FOUND			*AS LEFT*		
Reference	***Instrument***	***Error***	***Reference***	***Instrument***	***Error***
pH	pH	% FS	pH	pH	% FS
4.00	4.31	2.21	4.00	3.96	-0.29
7.00	7.17	1.21	7.00	7.00	0.00
10.00	10.06	0.43	10.00	10.10	0.71
°C	°C	°C	°C	°C	°C
15.4	15.0	-0.40	15.4	15.0	-0.40
25.0	24.6	-0.40	25.0	24.6	-0.40
34.2	33.8	-0.40	34.2	33.8	-0.40

	Yes	*No*		*Yes*	*No*
Passed:	✓		*As found in tolerance:*		✓
Failed:			*As left in tolerance:*	✓	
Calibration Sticker applied?	✓		*Repair performed:*		✓
Restricted Use:			*Adjustment performed:*	✓	

Comments: pH/Temperature sensor calibrated in loop.

Performed By: A. Shah - Technician
Date: December 7, 2015

Reviewed By: C. Ramnarine - Service Manager
Date: December 7, 2015

Certificate of Instrument Performance
Certificat de Conformité

Company Name / Nom de la Compagnie : CITY OF TORONTO

Account Number / No. de compte : 40170851

Certification Number / Numéro du Certificat : 4123326

Part Number / No. de pièce : 5440000	CL17 FINAL ASSEMBLY W/KITS
Serial Number / No. de série : 131200489314	
External Reference / Référence externe : NORTH	

Hach Sales & Service Canada Ltd. certifies that your instrument has been serviced, calibrated, verified with standards and now meets new product specifications.

Hach Sales & Service Canada Ltd. atteste que votre instrument a été entretenu, calibré et vérifié selon les normes en vigueur. Ses spécifications actuelles sont équivalentes à celles d'un produit neuf.

Certified by / Certifié par :
Kurup, Suresh

Certification Date / Date de certification :
25-FEB-15

Certificate of Instrument Performance
Certificat de Conformité

Company Name / Nom de la Compagnie : CITY OF TORONTO

Account Number / No. de compte : 40170851

Certification Number / Numéro du Certificat : 4123326

Part Number / No. de pièce : 5440000	CL17 FINAL ASSEMBLY W/KITS
Serial Number / No. de série : 131100488310	
External Reference / Référence externe : SOUTH	

Hach Sales & Service Canada Ltd. certifies that your instrument has been serviced, calibrated, verified with standards and now meets new product specifications.

Hach Sales & Service Canada Ltd. atteste que votre instrument a été entretenu, calibré et vérifié selon les normes en vigueur. Ses spécifications actuelles sont équivalentes à celles d'un produit neuf.

Certified by / Certifié par :
Kurup, Suresh

Certification Date / Date de certification :
25-FEB-15

Effluent Monitoring Equipment Calibration and Maintenance Records

Entity Number	Entity Name	Activity	Date/Time Activity Performed	Activity Performed by
TAB-STR-FIT-8003	Transmitter,Flow Indication, South Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8003	01/09/2015 14:21	EICT
TAB-STR-FIT-8004	Transmitter,Flow Indication, North Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8004	01/09/2015 14:21	EICT
TAB-STR-FIT-8003	Transmitter,Flow Indication, South Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8003	03/05/2015 13:32	EICT
TAB-STR-FIT-8004	Transmitter,Flow Indication, North Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8004	03/05/2015 13:32	EICT
TAB-STR-FIT-8003	Transmitter,Flow Indication, South Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8003	06/01/2015 13:47	EICT
TAB-STR-FIT-8004	Transmitter,Flow Indication, North Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8004	06/01/2015 13:47	EICT
TAB-STR-FIT-8003	Transmitter,Flow Indication, South Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8003	07/14/2015 10:30	EICT
TAB-STR-FIT-8004	Transmitter,Flow Indication, North Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8004	07/14/2015 10:30	EICT
TAB-STR-FIT-8003	Transmitter,Flow Indication, South Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8003	09/11/2015 8:00	EICT
TAB-STR-FIT-8004	Transmitter,Flow Indication, North Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8004	09/11/2015 8:00	EICT
TAB-STR-FIT-8003	Transmitter,Flow Indication, South Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8003	09/11/2015 8:01	EICT
TAB-STR-FIT-8004	Transmitter,Flow Indication, North Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8004	09/11/2015 8:01	EICT
TAB-STR-FIT-8004	Transmitter,Flow Indication, North Effluent Conduit	Calibration of Final Effluent Conduit Flow IndicationTransmitter- Annual (Legislative), Ref: TAB-STR-0003 for TAB-STR-FIT-8004	11/17/2015 13:41	EICT
TAB-STR-FIT-8003	Transmitter,Flow Indication, South Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8003	11/20/2015 11:01	EICT
TAB-STR-FIT-8004	Transmitter,Flow Indication, North Effluent Conduit	Offset correction for the water level for Hydrovision Flow Transmitter- Two monthly, Ref: TAB-STR-0005 for TAB-STR-FIT-8004	11/20/2015 11:01	EICT

Appendix H

Odour Reduction Plan

Odour Reduction Plan (Dec 31 2015 Status)

1. Program Summary

The details of the Odour Reduction Plan status including odour reduction activities, scheduled completion, and estimated emissions reductions of odour are summarized in the following Sections. The plan provides details for Phases I and II, as approved under the Environmental Compliance Approval (Air) ECA number 3771-92NP7X dated January 23, 2013. The facility currently operates under an updated ECA (Air) number 2815-9PWTWV, dated January 15, 2015.
The goal of the Odour Reduction Program is to reduce the plant-wide odour and Total Reduced Sulphur (TRS) impact beyond the plant property. The program achieves this with a combination of air capture and ventilation, improved dispersion, process changes, and treatment. Of these, only process changes and treatment have the potential to reduce odour emissions. For all new odour sources, odour and TRS emissions were estimated on a conservative basis and are not necessarily reduced at each implementation step. However, the overall odour and TRS impact is always reduced, thus meeting the objectives of the odour reduction program.

Following each project, phase emission sampling will be performed and impact assessment will be calculated as required by the Certificate of Approval (Air).

2. Phase I Scope by Building

The building-by-building details of the odour reduction activities for Phase I are presented in this section for the Ministry's information. The current status of the activities and estimated completion dates have been updated to reflect the current project status.

2.1 T Building

The scope for the T Building includes:

* New air collection and ventilation system
* Re-use of existing activated carbon scrubber
* 3 new roof stacks, all 4m above roof (wet well, dry Well, and scrubber)
* Monument Building – new activated carbon scrubber

	Odour (impact)	TRS (emission)
Current	0.34 OU	3.43E-03 g/s
Future	0.34 OU	3.43E-03 g/s
Project Status	In Operation	
Estimated Completion Date	Completed	

2.2 M Building

The scope for the M Building includes:

* New ventilation system
* Installation of new activated carbon scrubber
* One new exhaust stack

	Odour (impact)	TRS (emission)
Current	0.32 OU	5.49E-03 g/s
Future	0.32 OU	5.49E-03 g/s
Project Status	In Operation	
Estimated Completion Date	Completed	

2.3 Aeration Tanks

The scope for the Aeration Tanks includes:

* Process aeration air capture and exhausted to incinerator stack

	Odour (impact)	TRS (emission)
Current	306 OU	2.23E-01 g/s
Future	1.8 OU	2.23E-01 g/s
Project Status	In Operation	
Estimated Completion Date	Completed	

2.4 D Building

The scope for the D Building includes:

* New enclosed loading bay
* New ventilation systems

* Odour segregation and treatment including collection of air from channels, weirs, grit tanks and screens for biological odour treatment
* New biofilter with 35 m stack
* New 40 m stack for dispersion of air from primary clarifiers building

	Odour (impact)	TRS (emission)
Current	12.5 OU	2.55E-02 g/s
Future	3.5 OU	2.55E-04 g/s
Project Status	In Operation	
Estimated Completion Date	Completed	

3. Phase II Scope by Building

3.1 Truck Loading Facility Biofilter

The scope for the Truck Loading Biofilter includes:

* Replacement of dewatering equalization tanks scrubber
* Replacement of the existing biofilters
* Future conveyance of odourous air from WAS thickening to biofilter
* A new dedicated 20m stack for dispersion of treated air

	Odour (impact)	TRS (emission)
Current	9.6 OU	2.67E-02 g/s
Future	0.62 OU	2.67E-02 g/s
Project Status	Under Construction	
Estimated Completion Date	December 2017	

3.2 P Building

The proposed upgrade of P Building is part of the City's overall strategy to rehabilitate and modernize aging infrastructure, enhance treatment processes, as well as to reduce odours emitted from the facility. In general, this upgrade comprises of the following:

* Selective odour collection of the preliminary clarifiers 7 to 9
* Replacement of the odour control system for primary clarifiers 1 to 6
* Odour segregation / treatment and a new odour collection system for the head works
* A new biofilter and stack

	Odour (impact)	TRS (emission)
Current	243 OU	1.32E-01 g/s
Future	106 OU[1]*	1.22E-02 g/s
Project Status	Under Construction	
Estimated Completion Date	December 2017	

* The odour impact assessment of the P building has increased from 17.3 OU to 106 OU due to the primary clarifier 7 to 9 design scope change. After the completion of this project and the other Phase I and Phase II Odour projects, the City will reassess the odours at the facility to determine next steps.

4. Operational Initiatives

Plant staff implemented a number of operational changes to reduce odour. Below is a list of what's been done so far and what is on-going:

Odour initiative	Timing	Benefit
Replaced Activated Carbon Scrubber media for Equalization tanks	On-going, once a year	Ensures existing odour control equipment operate at maximum efficiency.
Biosolids inventory management	On-going	Keeping in-plant biosolids inventory as low as possible reduces likelihood of septic conditions in certain open tanks.
Good housekeeping	On-going	Includes ensuring tanks taken out of service for maintenance are quickly washed down.
Odour Facility Re-Assessment	2018	The Facility's odour performance will be reassessed after all Phase I and Phase II Odour Projects are complete

[1] *Final number will be recalculated upon completion of construction.*