Duffin Creek Water Pollution Control Plant

2023 Annual Performance Report

The Regional Municipalities of Durham and York
Duffin Creek Water Pollution Control Plant 2023 Annual Performance Report

Environmental Compliance Approval (ECA): 5547-C43QV9 Dated October 26, 2021
Environmental Compliance Approval (ECA): 0288-CVPN8W Dated November 28, 2023
Environmental Compliance Approval (Air): 2693-BY5F5Y Dated May 17, 2021
Environmental Compliance Approval (Air): 0788-CVNPPF Dated November 24, 2023

International Organization for Standardization (ISO) 14001 Certification: CA05/3563/E

The Duffin Creek Water Pollution Control Plant (WPCP) Annual Performance Report provides staff, stakeholders and customers an overview of the performance of the Duffin Creek WPCP in 2023. Further, this report fulfills the annual reporting requirements of the Ontario Ministry of the Environment, Conservation and Parks (MECP) and demonstrates the commitment of ensuring the WPCP continues to deliver wastewater services to our customers in an environmentally responsible manner.

Water Pollution Control Plant Process Description

General

The Duffin Creek WPCP is jointly owned by The Regional Municipality of Durham and The Regional Municipality of York. It is operated in accordance with the terms and conditions of the ECAs noted above. The plant, located in the City of Pickering, is operated by The Regional Municipality of Durham. This MECP Class 4 conventional activated sludge treatment plant is designed to treat wastewater at an average daily flow rate of 630,000 cubic metres per day (m^3/d). The Duffin Creek WPCP is ISO 14001 certified.

The Duffin Creek WPCP treats wastewater for approximately 239,131 residents in the Town of Ajax and the City of Pickering in the Regional Municipality of Durham as well as 1,002,810 residents in the Regional Municipality of York, which includes the Municipalities of Aurora, East Gwillimbury, King, Markham, Newmarket, Richmond Hill, Whitchurch-Stouffville, and Vaughan. The total population served by Duffin Creek WPCP is approximately 1,241,941.

The Duffin Creek WPCP utilizes the following processes to treat wastewater:

- raw influent pumping,
- preliminary treatment,
- primary treatment,
- phosphorus removal,
- secondary treatment,
- disinfection (chlorination/dechlorination),
- solids management, and
- incineration.

Raw Influent Pumping

Wastewater collected through approximately 714 kilometres (km) of sanitary sewers in Ajax and Pickering is conveyed to the Water Pollution Control Plant (WPCP) by gravity and by the following sanitary sewage pumping stations located in the collection system: Bayly Street, Jodrel Road, Toy Avenue, Finch Avenue and Liverpool Road. Wastewater collected from York Region is conveyed to the WPCP via the Primary Trunk Sewer and the twin Southeast Collector Trunk Sewers which are part of the York Durham Sewage System (YDSS). Wastewater from York Region accounted for 82.1% of the plant flow treated in 2023. The remaining sanitary sewage flow of 17.9% was generated by the Town of Ajax and the City of Pickering in Durham Region. The combined flows enter a diversion chamber, which then splits the flow between Stages 1, 2 and 3 process areas at the Duffin Creek WPCP. There are two Influent Pumping Stations (IPS), each with eight submersible pumps, that direct the wastewater to the preliminary treatment process. From the IPS, the wastewater flows by gravity through the treatment processes.

Preliminary Treatment

Screening: Eight mechanically cleaned screens remove rags and large debris that could harm pumps and process equipment. Screenings are compacted for disposal in landfill.

Grit Removal: There are eight grit tanks equipped with coarse bubble diffusers to provide aeration in the grit removal process. Heavy suspended material such as sand and small stones (grit) is settled to the bottom of the tanks while lighter organic particles are kept in suspension and passed through the tanks for further treatment. The grit removed is dewatered for landfill disposal.

Primary Treatment

Fourteen primary clarifiers each equipped with a travelling bridge system utilize the physical process of sedimentation, which cause heavy particles to settle to the bottom of the tank as raw sludge and lighter particles to float to the surface as scum. The sludge, along with waste activated sludge from the secondary treatment process is collected by scraper blades, which push the sludge into hoppers. The sludge is then pumped to anaerobic digestion and/or dewatering holding tanks. The scum is collected by the travelling bridge and pumped to anaerobic digestion.

Phosphorus Removal

Iron salts are added throughout the treatment process to aid in phosphorus and suspended solids removal. Chemical addition can be supplemented by the addition of polymer at various locations throughout the plant for enhanced treatment.

Secondary Treatment

Aeration Tank: There are fourteen aeration tanks each containing anoxic and aerobic zones. In the first part of the tank no oxygen is introduced (anoxic), this is for denitrification. The second part of the

tank is where fine bubbled air is diffused into the wastewater (aerobic) to remove dissolved and suspended organics and nutrients from the wastewater.

Secondary Clarifier: Twenty-two secondary clarifiers receive effluent from the aeration tanks where solids settle quickly as activated sludge leaving a clear effluent on top. A portion of the activated sludge collected on the bottom of the clarifier is pumped back to the front of the aeration tanks and any excess activated sludge is 'wasted' to the primary clarifier to co-settle with primary sludge.

Disinfection (chlorination/dechlorination)

Chlorine in the form of liquid sodium hypochlorite is metered into the effluent stream for pathogen control. Adequate contact time is provided by the chlorine contact chambers. Disinfected effluent is dechlorinated with a sodium bisulphite solution before being discharged to Lake Ontario through a 3.05 metre (m) diameter outfall pipe, approximately 1,100 m long with a 183 m long diffuser pipe.

Solids Management

Anaerobic Digestion: A portion of the raw sludge collected from the primary clarifiers is pumped into one of the four primary digesters, which overflow into two secondary digesters for thickening. Digested sludge is pumped to dewatering storage tanks where it is blended with additional raw sludge from the primary clarifiers before being dewatered. All solids produced are dewatered and incinerated on site.

Imported Sludge: Durham's Regional Biosolids Management Program imports sludge from other Regionally owned Water Pollution Control Plants within Durham Region. In addition, sludge may be imported from York Region's facilities.

Dewatering: Duffin Creek WPCP utilizes eight dewatering solid bowl centrifuges in order to separate the heavier material and the liquid supernatant (centrate). All dewatered solids (sludge cake) are sent to incineration. The centrate is pumped to the head of the plant where it combines with the influent to undergo treatment.

Incineration

There are four fluidized bed process trains, which feeds the sludge cake through the combustion process to burn off organic substances contained in the sludge cake and convert the cake into ash and flue gas. Steam boilers are utilized for waste heat recovery. All solids at the Duffin Creek WPCP were incinerated during the reporting period. The ash from the incineration process is sent to St. Mary's Cement in Bowmanville, Ontario for reuse. No land application or landfill of biosolids occurred in 2023 from this facility.

Environmental Compliance Approval (ECA)

Under Condition 11.5 of ECA 5547-C43QV9 the Region of Durham must produce an annual performance report that contains the following information:

a) A summary and interpretation of all influent, imported sewage monitoring data, and a review of the historical trend of sewage characteristics and flow rates;

Based on an average of daily flows for the past 11 years, flow has increased by 7.2%. Please see Figure 1 for detailed historical annual average daily flows.

Refer to table 2 for raw influent analyses and table 6 for imported sewage monitoring data.

Table 3 and Figures 2-5 outline the historical characteristics of the raw influent.

b) A summary and interpretation of all Final Effluent monitoring data, including concentration, flow rates, loading and a comparison to the design objectives and compliance limits in this Approval, including an overview of the success and adequacy of the Works;

The Duffin Creek Water Pollution Control Plant (WPCP) effluent was determined to be compliant with the ECA limits during the reporting period.

The plant operated at 57% of its approved average daily flow rate of 630,000 cubic metres (m^3) for this reporting period. The plant received a maximum daily flow of 632,135 m^3 on February 10, 2023.

There were no objective exceedances for the reporting period.

Refer to Table 4 Final Effluent Analyses for detailed final effluent monitoring data.

c) Summary of all operating issues encountered and corrective actions taken;

Influx of influent rags/wipes – the influent pumping stations were flushed weekly to help reduce the buildup and residents are reminded of what is acceptable to flush via communication campaigns.

Stage one digester complex is offline which limits the capacity for sludge storage and digester gas production for hot water boilers. Imported sludge is forced to go to influent flow and directly to dewatering due to digester limitations. The increased sludge to dewatering results in decreased primary and digester sludge pumping and can impact centrifuge and incinerator operations. Digester capital construction is expected to be complete in 2027.

d) Summary of all normal and emergency repairs and maintenance activities carried out on any major structure, equipment, apparatus or mechanism forming part of the Works;

Operations

- Replaced turntables for secondary clarifier 12, 13, 16,
- Replaced gearbox for secondary 2,
- Replaced chemical sump pump in east headworks,

- Replaced mixer 302, 303, 403, and 803,
- Replaced inline grit screw and liner in east headworks,
- Replaced auger and liner for grit tank 12,
- Replaced wear strips, sprockets, and o-rings for secondary 17,
- Fibre wrapped draft tube for primary digester 4,
- Repaired cross collector and cables for primary 14,
- Inspected cables and cross collector for primary 9 and 13,
- Replaced ribbon in primary 10,
- Repaired ribbon on primary bridge 2,
- Replaced cables and shoes for primary bridge 11 and 12,
- Replaced cogwheel for primary bridge 13,
- Replaced flowmeter for septage receiving station,
- Replaced pump on chlorine analyzer for contact chamber 1,
- Installed nitrous oxide sensors throughout the plant,
- Replaced gear box, mechanical seal, and stub shaft for compactor 1 in west headworks,
- Replaced auger for compactor 2 in east headworks,
- Installed new flowmeter for secondary 5,
- Replaced motor and gearbox for cross collector 10,
- Installed and commissioned polymer skids for phosphorus treatment,
- Repaired gates for sludge mixing tanks 5 and 6,
- Performed yearly preventative maintenance on digester boilers,
- Replaced grinder in east headworks.

Incineration

- Cleaned the dome and tile joints for refractory 1,
- Repacked floor, lower, and upper side of refractory 1 dome with moldable refractory ceramic fibres,
- Repaired three water tubes for reactor 4,
- Installed multiple pipe guards in economizer 4,
- Restored and replaced multiple access doors and cutout windows.

e) Summary of any effluent quality assurance or control measures undertaken;

In-house laboratory test results are compared to the results of the Regional Environmental Laboratory on comparable samples to determine the in-house accuracy. All results were found to be within an acceptable range.

On-line instrumentation is verified by plant operators using various field or lab test equipment.

Analytical balances are calibrated by a third-party company.

In-house lab equipment was calibrated by operations staff and various manufacturers.

f) Summary of the calibration and maintenance carried out on all Influent, Imported Sewage and Final Effluent monitoring equipment;

Plant flows are measured at the influent of this plant.

All influent flow meters were calibrated on February 16, 2023.

All monitoring and laboratory equipment was calibrated and maintained according to manufacturer's specifications.

g) Summary of efforts made to achieve the design objectives in this Approval;

The annual average daily flow did not exceed the rated capacity of 630,000 cubic metres per day (m^3/d). There were no objective exceedances for the reporting period. Best efforts will continue to be applied to maintain results below the objectives.

h) Tabulation of the volume of sludge generated, an outline of anticipated volumes to be generated in the next reporting period and a summary of the locations to where the sludge was disposed;

Refer to Table 9 Dewatering and Incineration Summary.

There is no increase of sludge volume expected in the next reporting period.

All sludge generated at Duffin Creek Water Pollution Control Plant is incinerated.

i) A summary of any complaints received and any steps taken to address the complaints;

There were no complaints received during the reporting period.

j) Summary of all By-passes, Spill or Abnormal Discharge Events;

There is no mechanism for by-passing untreated wastewater at this facility. There are no anticipated by-passes planned for the next reporting period. There were no spill or abnormal discharge events for the reporting period.

k) Summary of all Notice of Modifications to Sewage Works;

No notice of modifications was submitted in 2023.

l) Summary of efforts made to achieve conformance with the Ministry's Treatment and Collection System Requirements (Procedure F-5-1);

Receiving Water Assessment

In 2006, lake modelling was undertaken to assess the potential impacts of the expanded plant's treated effluent on Lake Ontario, the shoreline, surrounding water users, and to examine the feasibility of increasing the average flow capacity to 630,000 cubic metres per day (m^3/d). The outfall diffusers were modified to accommodate the potential increase in flow capacity and to meet the 20:1 dilution requirement. The dilution guideline means that for every 1-part plant effluent, 20-parts of lake water dilute the effluent within the immediate area of the diffuser under normal lake water conditions.

Elimination of bypass/overflows

As of July 2023, the installation of variable diffusers for the outfall is complete. This will allow the maximum flow through the outfall to be increased from 1,050,000 m3/day to 1,900,000 m3/day. This project will reduce the potential for future overflows.

Industrial Wastes

Durham Region's Sewer Use By-Law (55-2013) outlines concentration limits for discharge into land drainage works or the sanitary sewer system. Violations of the by-law can result in fines of up to $100,000 for personal or corporate offences. Durham Region may establish a Compliance Program that will permit an industrial user to discharge non-complying sewage upon such terms and conditions deemed appropriate by the Durham Region Commissioner of Works. The compliance program allows industry to not be prosecuted for violating the concentration limits outlined in the by-law. The compliance program outlines the length of time necessary to plan, design, construct or install facilities to eliminate the non-compliance. A Sewage Surcharge Agreement is an agreement between Durham Region and a company, that permits the discharge of overstrength sewage to the Region's sanitary sewer collection system. Companies are billed for the overstrength sewage to pay for the additional cost of treatment and collection. The eligible parameters for a sewage Surcharge Agreement are Biochemical Oxygen Demand, Total Suspended Solids, Total Phosphorus, Total Kjeldahl Nitrogen, Animal/Vegetable Oil & Grease, and Sulphates. Sewer use by-law office staff routinely monitor and sample the wastewater collection system to ensure compliance with the by-law. Similarly, York Region has Sewer Use By-law programs in place to regulate discharges to the wastewater system. York Region's Environmental Monitoring and Enforcement team (EME) is responsible for administering the programs and enforcing the bylaw. These programs are being administered in ways that similarly align with Durham Region's programs, except York Region does not issue surcharge agreements for Animal/Vegetable Oil & Grease and Sulphates.

m) Changes or updates to the schedule for the completion of construction and commissioning operation of major process(es) / equipment groups in the Proposed Works;

Contract Number	Project Description	Original Projected Completion Date	Updated Projection Completion Date
T-1025-2021	Replacement of Variable Frequency Drives for Blower Buildings 1&2 at Duffin Creek WPCP	April 8 2023	Completed as of December 31 2023
T-20-08	Biosolids Treatment Replacement Project – Contract 1 (enabling)	June 1 2023	June 30 2025
T-20-230	Digester Mixing and Electrical Upgrades	July 15 2022	April 12 2028

Proposed Alterations, Extensions or Replacements

Replacement of Incineration Units 1 and 2

Detailed design of the new incinerator systems to replace Units 1 and 2 is underway. The detailed design is anticipated to be completed by the end of 2024 due to delays in receipt of pre-purchase equipment information required to complete the detailed design. Stage 1 of construction started on June 20, 2023, and will end in September 2025. Overall program completion is scheduled to occur in 2031.

Stage 3 Rehabilitation and Retrofit Work

Detailed design of the Stage 3 Liquid Rehabilitation work is completed. The project is currently put out to tender and its closing date is Feb 16, 2024. Construction of this project will begin in April, 2024 and the overall project completion is scheduled to occur in The fall 2026.

Ministry of the Environment, Conservation and Parks (MECP) Inspection

The last plant inspection was February 15, 2022.

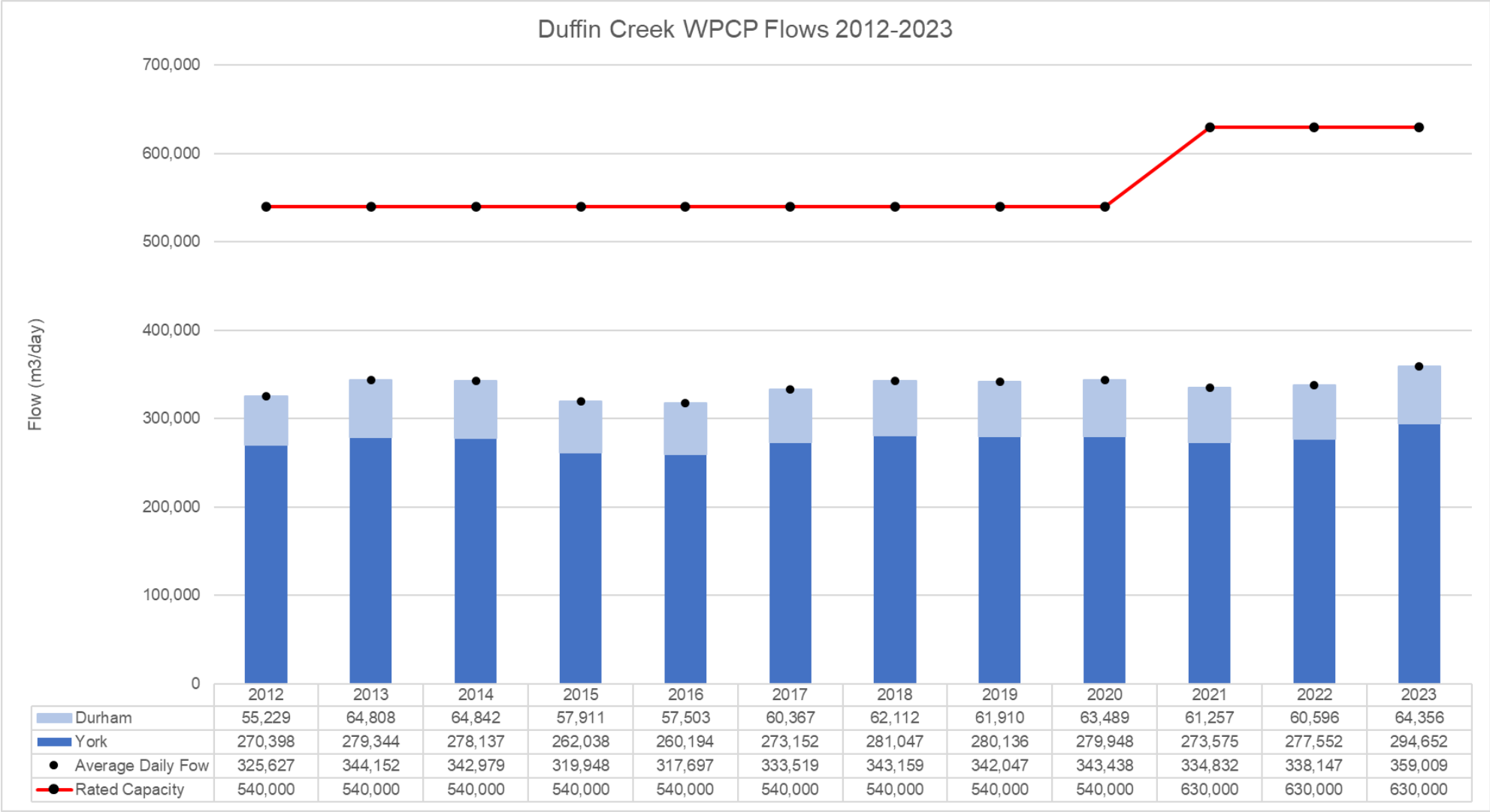
Table 1 Raw Influent Flows

Month	York Region Plant Flow cubic metre (m^3)	Durham Region Plant Flow m^3	Total Flow to Plant* m^3	Average Daily Flow cubic metre per day (m^3/d)	Maximum Daily Flow m^3/d
January	9,411,349	2,200,194	11,611,543	374,566	562,459
February	8,866,475	2,049,903	10,916,378	389,871	632,135
March	10,344,633	2,468,082	12,812,715	413,313	579,869
April	9,823,798	2,265,296	12,089,094	402,970	621,271
May	9,584,724	2,048,882	11,633,606	375,278	485,320
June	8,905,018	1,992,963	10,897,981	363,266	531,582
July	9,177,022	1,862,211	11,039,233	356,104	432,459
August	8,526,508	1,784,609	10,311,117	332,617	371,058
September	7,839,757	1,628,053	9,467,810	315,594	332,911
October	8,078,040	1,657,767	9,735,807	314,058	351,501
November	8,077,480	1,639,607	9,717,087	323,903	383,955
December	8,913,296	1,892,471	10,805,767	348,573	403,346
Total (%)	107,548,100 (82.1%)	23,490,038 (17.9%)	131,038,138 (100%)		
Average	8,962,342	1,957,503	10,919,845	359,009**	
Minimum	7,839,757	1,628,053	9,467,810		
Maximum	10,344,633	2,468,082	12,812,715		632,135
ECA Limit				630,000	
Compliance Met				Yes	

*Metered at the raw influent

**Annual average daily flow

Figure 1 – Annual Average Flow 2012-2023



	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Durham	55,229	64,808	64,842	57,911	57,503	60,367	62,112	61,910	63,489	61,257	60,596	64,356
York	270,398	279,344	278,137	262,038	260,194	273,152	281,047	280,136	279,948	273,575	277,552	294,652
Average Daily Fow	325,627	344,152	342,979	319,948	317,697	333,519	343,159	342,047	343,438	334,832	338,147	359,009
Rated Capacity	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	540,000	630,000	630,000	630,000

Table 2 Raw Influent Analyses

Month	Biochemical Oxygen Demand average concentration (conc.) milligram per litre (mg/L)	Total Suspended Solids average conc. mg/L	Total Phosphorus (TP) average conc. mg/L	Total Kjeldahl Nitrogen average conc. mg/L
January	188	312	5.3	42.41
February	220	340	5.9	45.84
March	165	263	5.0	39.26
April	181	253	5.2	39.73
May	182	272	5.8	40.92
June	202	255	5.6	46.29
July	194	246	5.9	46.64
August	209	287	6.0	48.26
September	261	380	6.7	54.08
October	240	292	6.5	53.22
November	231	291	6.4	51.74
December	195	220	5.4	45.96
Average	206	284	5.8	46.20
Minimum	165	220	5.0	39.26
Maximum	261	380	6.7	54.08
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes

Table 3 Historical Raw Influent Characteristics

Year	Biochemical Oxygen Demand average concentration (conc.) milligram per litre (mg/L)	Total Suspended Solids average conc. mg/L	Total Phosphorus (TP) average conc. mg/L	Total Kjeldahl Nitrogen average conc. mg/L
2012-2022	200	309	6.0	47.67
2023	206	284	5.8	46.20
Percent Change	2.9	-8.0	-4.1	-3.1

Figure 2 – Raw Influent – Annual Average Biochemical Oxygen Demand

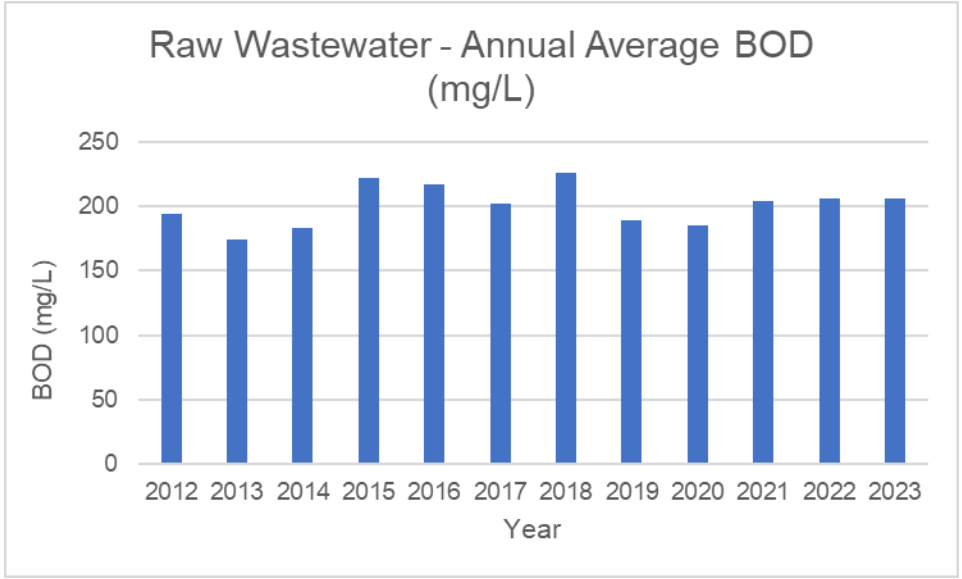


Figure 3 – Raw Influent - Annual Average Total Suspended Solids

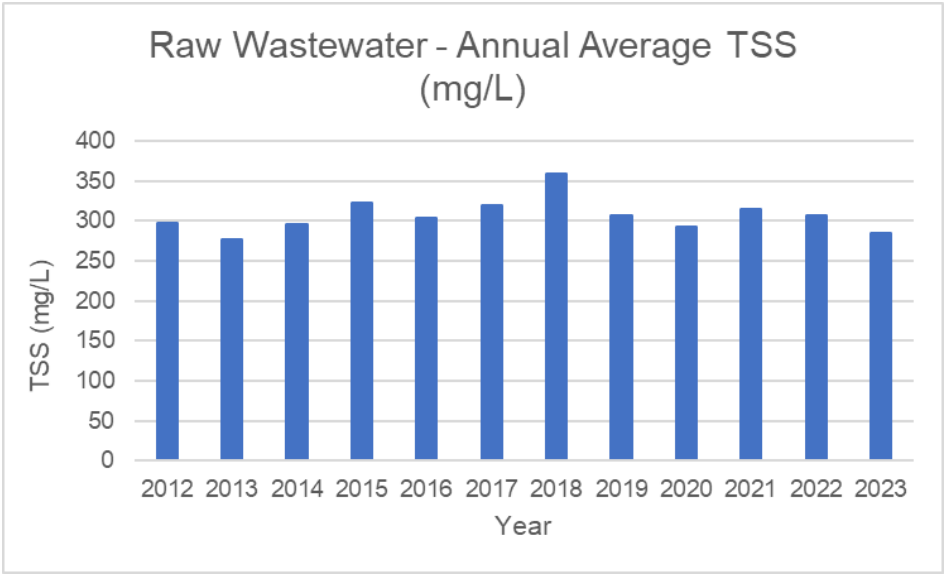


Figure 4 – Raw Influent – Annual Average Total Phosphorus

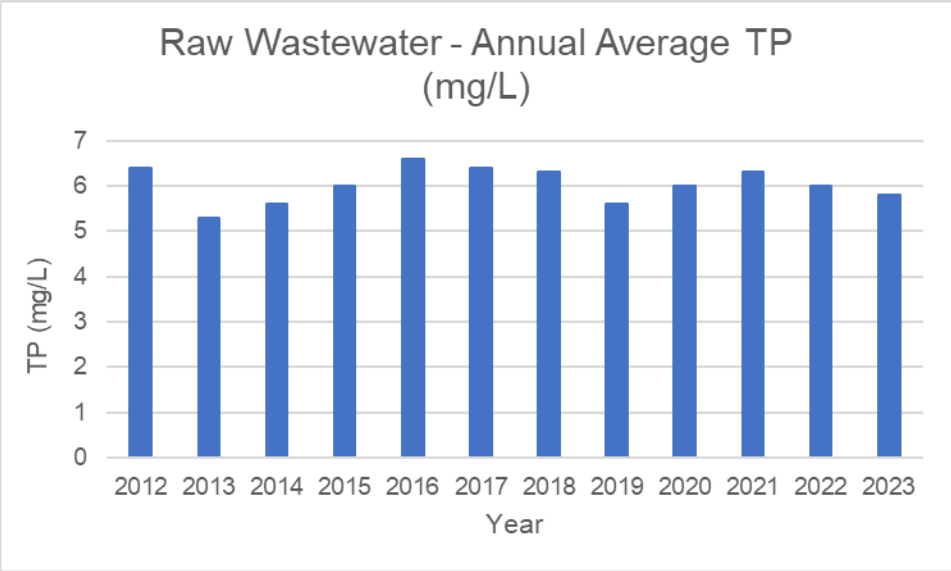


Figure 5 – Raw Influent – Annual Average Total Kjeldahl Nitrogen

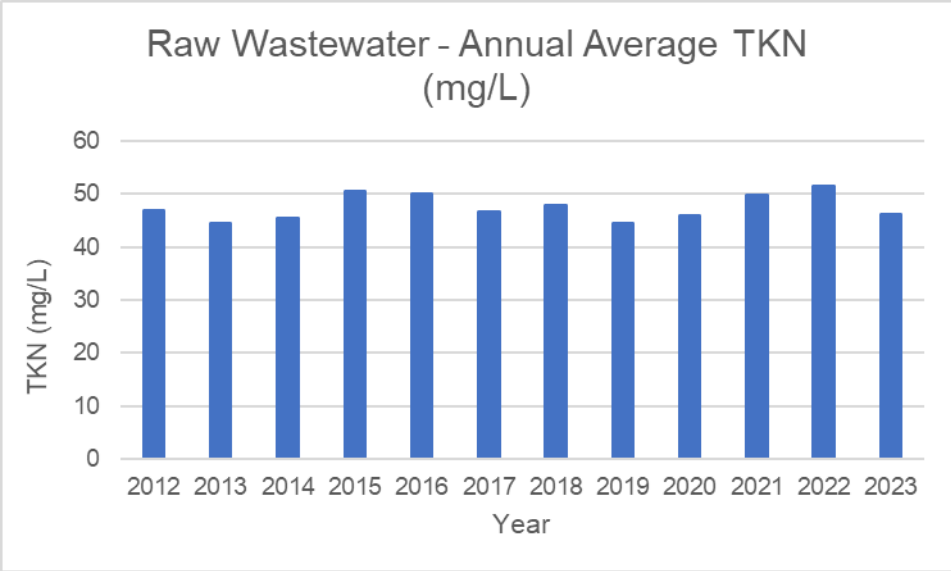


Table 4 Final Effluent Analyses

Month	Carbonaceous Biochemical Oxygen Demand average concentration (conc.) milligram per litre (mg/L)	Total Suspended Solids average conc. mg/L	Total Phosphorus (TP) average conc. mg/L	Total Ammonia Nitrogen average conc. mg/L winter	Total Ammonia Nitrogen average conc. mg/L summer
January	1.3	4.7	0.23	0.34	
February	1.3	4.1	0.21	0.27	
March	1.3	3.3	0.21	0.62	
April	1.0	3.7	0.23	0.43	
May	1.2	4.5	0.29		0.99
June	1.6	4.5	0.29		0.81
July	1.9	3.8	0.30		0.81
August	1.1	4.4	0.32		0.81
September	1.2	4.3	0.30		0.96
October	1.2	4.5	0.34	0.57	
November	1.9	4.6	0.30	0.73	
December	1.7	6.5	0.29	0.65	
Average	1.4	4.4	0.28	0.52	0.88
Minimum	1.0	3.3	0.21	0.27	0.81
Maximum	1.9	6.5	0.34	0.73	0.99
ECA Limit	25.0	25.0	0.8	10.0	6.0
ECA Objective	15.0	15.0	0.6	5.0	5.0
TP Annual Loading			97 kilogram per day (kg/d)		
ECA Limit			311 kg/d		
Within Compliance	Yes	Yes	Yes	Yes	Yes
Sampling Requirement Frequency Met	Yes	Yes	Yes	Yes	Yes

Table 4 Final Effluent Analyses continued

Month	Unionized Ammonia Nitrogen average concentration (conc.) milligram per litre (mg/L)	Total Chlorine Residual average conc. mg/L	pH minimum	pH maximum	Temperature Degree Celsius
January	0.0	0.00	6.8	7.1	15.0
February	0.0	0.00	6.8	7.2	14.3
March	0.0	0.00	6.9	7.3	14.0
April	0.0	0.00	6.5	7.7	15.6
May	0.0	0.00	6.8	7.2	17.9
June	0.0	0.00	6.6	7.3	20.2
July	0.0	0.00	6.8	7.4	21.7
August	0.0	0.00	6.6	7.3	21.7
September	0.0	0.00	6.7	7.1	21.5
October	0.0	0.00	6.5	7.3	19.9
November	0.0	0.00	6.6	7.2	17.9
December	0.0	0.00	6.6	7.3	17.0
Average	0.0	0.00			18.1
Minimum	0.0	0.00	6.5		14.0
Maximum	0.0	0.00		7.7	21.7
ECA Limit		0.02	6.0	9.5	
ECA Objective		Non-detectable	6.5	8.5	
Within Compliance		Yes	Yes	Yes	
Sampling Frequency Requirement Met	Yes	Yes	Yes	Yes	Yes

Table 5 *Escherichia coli* Sampling

Month	Monthly Geometric Mean Density	Number of Samples
January	33	21
February	67	19
March	32	23
April	55	18
May	36	22
June	88	21
July	27	21
August	47	22
September	60	19
October	79	21
November	30	21
December	35	19
ECA Limit	200	
ECA Objective	100	
Within Compliance	Yes	
Sampling Frequency Requirement Met		Yes

Table 6 Imported Wastewater Analyses and Septage Amounts

Month	Biochemical Oxygen Demand average concentration (conc.) milligram per litre (mg/L)	Total Suspended Solids average conc. mg/L	Total Kjeldahl Nitrogen average conc. mg/L	Total Phosphorus average conc. mg/L	York Septage Solids dry tonnes	Durham Septage Solids dry tonnes	Total Septage Solids dry tonnes
January	3,591	9,738	2,543.33	259.3	5.6	5.1	10.7
February	1,307	1,901	592.92	55.9	0.8	1.0	1.8
March	3,794	11,662	1,687.82	87.8	7.2	8.0	15.2
April	1,833	10,384	269.80	43.5	5.2	8.2	13.4
May	1,112	835	449.53	30.8	0.6	0.7	1.3
June	5,766	2,718	2,143.60	145.6	1.7	1.9	3.6
July	1,636	7,507	311.60	130.4	4.4	5.4	9.8
August	2,718	2,800	1,569.62	122.9	1.5	2.1	3.6
September	1,338	5,325	235.60	52.5	3.0	3.5	6.5
October	4,368	5,392	2,030.00	199.4	3.4	2.8	6.2
November	2,051	5,032	1,159.40	144.1	2.4	3.5	5.9
December	4,036	11,606	2,003.40	250.0	7.1	6.8	13.9
Total					42.9	49.0	91.9
Average	2,796	6,242	1,249.72	126.9	3.6	4.1	7.7
Sampling Requirement Frequency Met	Yes	Yes	Yes	Yes			

Table 7 Energy and Chemical Usage

Month	Iron Salt litre	Sodium Hypochlorite kilogram as chlorine	Sodium Bisulphite litre	Anionic Polymer kilogram*	Hydro kilowatt hour	Natural Gas cubic metre
January	624,021	21,184	21,260		5,925,862	363,891
February	525,424	20,294	19,200		5,320,189	374,275
March	576,144	25,132	22,959		5,925,728	265,224
April	521,473	24,453	22,336		5,405,948	391,525
May	547,837	22,563	21,607		5,800,789	140,293
June	601,719	21,645	21,724		6,294,706	322,988
July	625,006	21,963	23,230		6,627,097	179,158
August	671,118	19,156	22,405		6,579,880	220,566
September	680,051	18,143	19,062		4,846,085	219,294
October	717,329	20,806	19,600		6,113,317	303,785
November	689,089	18,696	19,016		5,746,948	383,222
December	688,118	19,881	24,172	9,000	6,462,751	342,434
Total	7,467,329	253,916	256,571	9,000	71,049,301	3,506,655

*Based on amount purchased

Table 8 Summary of Sludge Produced and Imported

Month	Sludge produced from York Influent Solids dry tonnes	Sludge produced from Durham Influent Solids dry tonnes	Total Sludge produced from all Influent Solids dry tonnes	York Imported Solids dry tonnes	Durham Imported Solids dry tonnes	Total Imported Solids dry tonnes
January	2,936	686	3,623	0	512	512
February	3,015	697	3,712	0	418	418
March	2,721	649	3,370	0	348	348
April	2,485	573	3,059	0	157	157
May	2,607	557	3,164	0	167	167
June	2,271	508	2,779	0	101	101
July	2,258	458	2,716	0	125	125
August	2,447	512	2,959	0	182	182
September	2,979	619	3,598	0	126	126
October	2,359	484	2,843	0	162	162
November	2,351	477	2,828	0	135	135
December	1,961	416	2,377	0	394	394
Total	30,390	6,636	37,028	0	2,827	2,827

Table 9 Dewatering and Incineration Summary

Month	Average Feed Solids percent (%) Total Solids (TS)	Average Sludge Cake % TS	Average Polymer* Dosage kilogram per tonne	Total Sludge Output dry tonnes	Dewatered Sludge Incinerated dry tonnes	Ash Produced by Incineration tonnes
January	2.6	25.6	7.5	3,805	2,915	1,140
February	2.7	25.5	7.3	2,985	2,449	819
March	2.8	25.6	7.2	3,517	2,959	986
April	3.2	26.5	7.7	2,912	2,224	592
May	2.7	25.9	7.6	4,044	3,396	1,084
June	2.7	26.3	7.1	2,994	2,516	640
July	2.6	26.7	5.9	3,138	2,492	869
August	2.6	25.8	6.0	3,101	2,605	812
September	2.5	26.0	6.5	2,917	2,531	726
October	2.3	25.0	6.3	2,592	2,348	772
November	2.2	24.7	7.3	3,057	2,666	939
December	2.3	24.6	6.8	2,920	2,607	850
Average	2.6	25.7	6.9	3,165	2,642	852
Total				37,982	31,708	10,229

*Polymer consumption based on active ingredient