Lindsay WWTP

Works # 110000383

Annual Wastewater Performance Report

Prepared For: The City of Kawartha Lakes

Reporting Period of January 1st – December 31st, 2021

Issued: March 16, 2022

Operating Authorities:

Kawartha Lakes

OCWA

ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

2021 Performance Report for the Lindsay Wastewater Treatment Plant

During 2021, the Lindsay WWTP was licensed under Environmental Compliance Approval (ECA)1696-BPLL4R. Rivera Park Sewage Pumping Station was licensed under an individual ECA #1328-AN5PBL. Reporting requirements for all ECAs are contained in this Performance Report.

ECA1696-BPLL4R Section 4 AND ECA 1328-AN5PBL Section 8(3), require the Performance Report to contain the following:

a) a summary and interpretation of all Influent and Imported Sewage monitoring data, and a review of the historical trend of the sewage characteristics and flow rates;

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;

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

d) a 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;

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

f) a summary of the calibration and maintenance carried out on all Influent, Imported Sewage and Final Effluent monitoring equipment to ensure that the accuracy is within the tolerance of that equipment as required in this Approval or recommended by the manufacturer;

g) a summary of efforts made to achieve the design objectives in this Approval, including an assessment of the issues and recommendations for pro-active actions if any are required under the following situations:

i. when any of the design objectives is not achieved more than 50% of the time in a year, or there is an increasing trend in deterioration of Final Effluent quality;

ii. when the Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;

h) a 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; a tabulation of the measured volume of sludge accumulated in the lagoon cells in five year intervals and the estimated volume in the interim years and when sludge was disposed of during the reporting period, a summary of disposal locations and volumes of sludge disposed at each location;

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

j) a summary of all Bypasses, Overflows, other situations outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;

k) a summary of all Notice of Modifications to Sewage Works completed under Paragraph 1.d. of Page 20 - NUMBER 1696-BPLL4R Condition 10, including a report on status of implementation of all modification.

l) a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated budget forecast for the year following that for which the report is submitted.

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

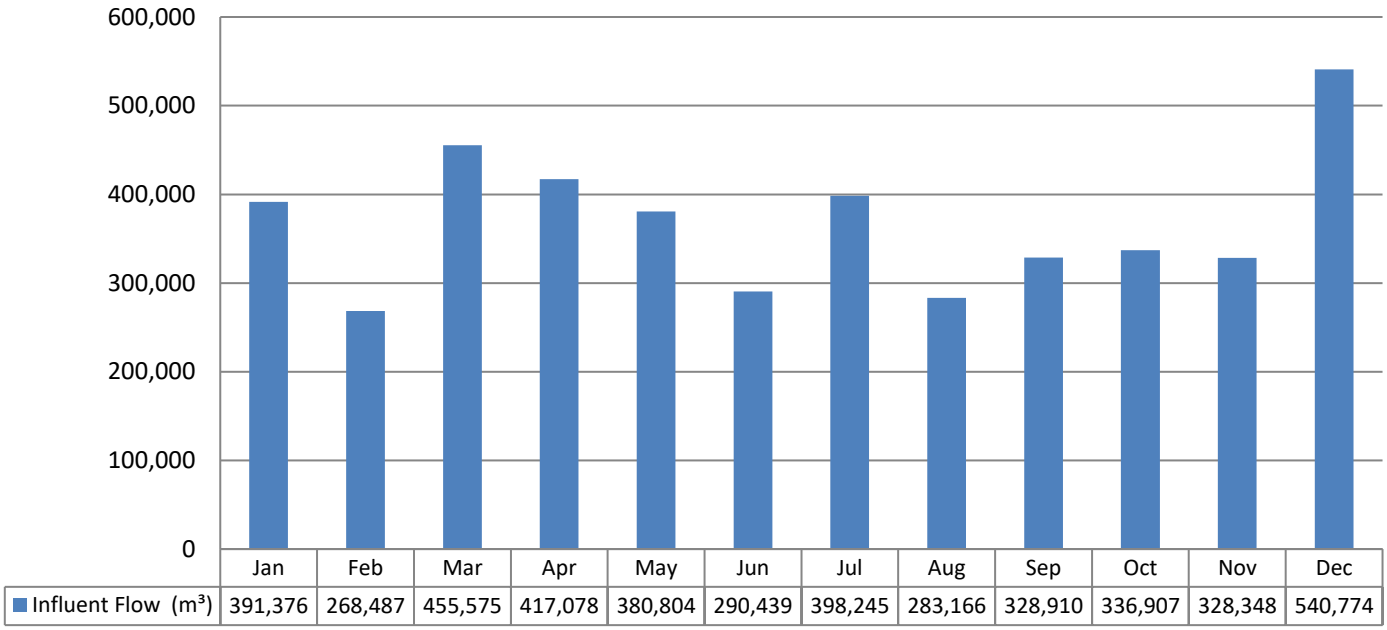
n) a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year.

ECA #1696-BPLL4R requires a summary and interpretation of all Influent and Imported Sewage monitoring data, and a review of the historical trend of the sewage characteristics and flow rates.

The Lindsay WWTP has a Rated Capacity of 21,500 m^3/day and Actiflo rated capacity of 30,100 m^3/day under ECA 1696-BPLL4R. ECA 1696-BPLL4R requires that everything practicable be undertaken to operate the Sewage Treatment Plant so that the annual average daily influent is within the Rated Capacity. The Rated Capacity of the Lindsay WWTP is 21,500 m^3/day and the 2021 annual average daily influent flow was 12,109.9 m^3/day or 56.3% of the Rated Capacity.

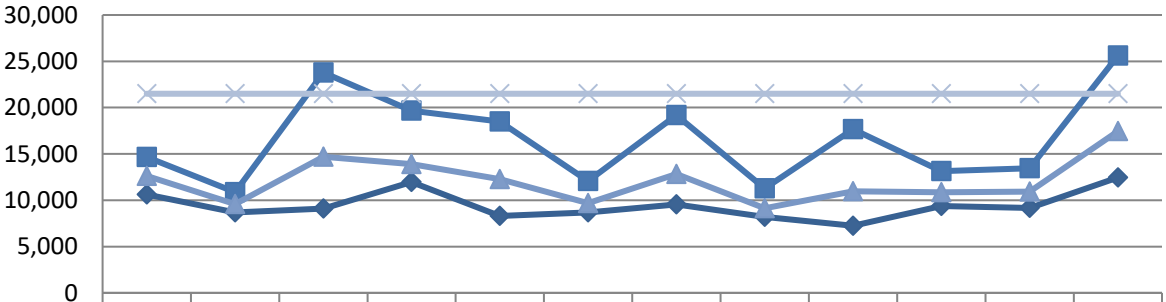
The total Influent flow in 2021 was 4,420,109.0 m^3.

Graph 1: 2021 Influent Flow Monthly Totals



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Influent Flow (m^3)	391,376	268,487	455,575	417,078	380,804	290,439	398,245	283,166	328,910	336,907	328,348	540,774

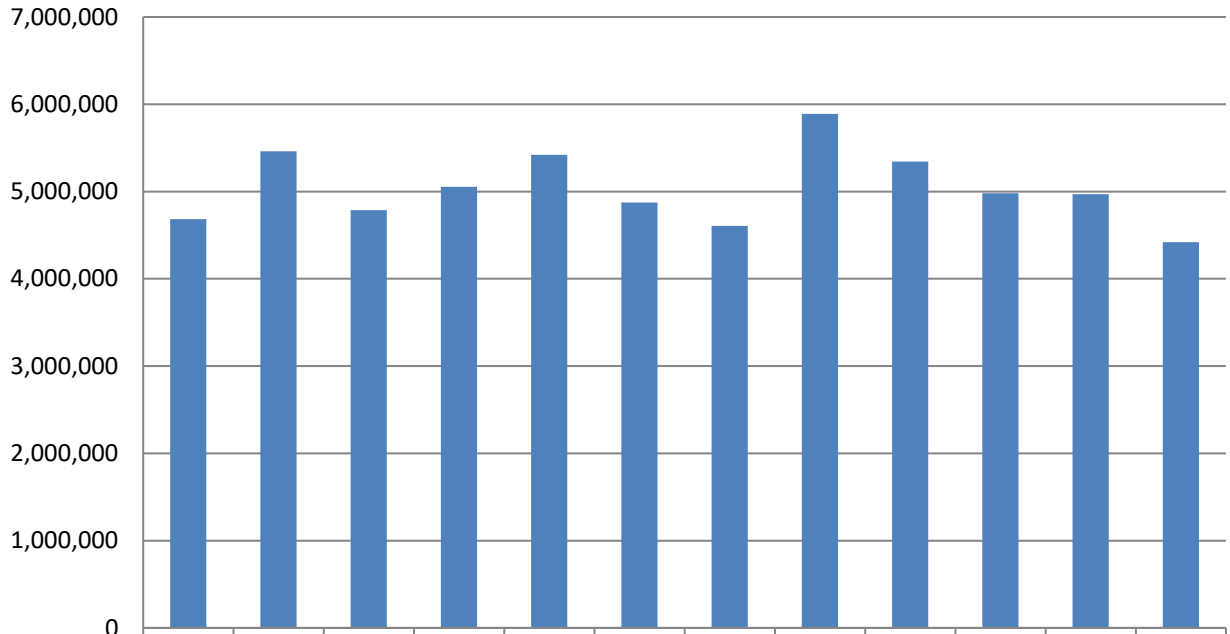
Graph 2: Influent Daily Minimum, Maximum and Average Flows



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min (m3/day)	10,617	8,673	9,116	11,950	8,315	8,697	9,551	8,197	7,245	9,378	9,177	12,453
Max (m^3/day)	14,666	10,876	23,788	19,658	18,491	12,068	19,196	11,279	17,681	13,129	13,436	25,604
Avg(m^3/day)	12,625	9,589	14,696	13,903	12,284	9,681	12,847	9,134	10,964	10,868	10,945	17,444
Limit (m^3/day)	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500	21,500

There may be instances where influent flow exceeded the Rated Capacity on a monthly basis. However, Rated Capacity is calculated as an annual average daily flow rate, which was met in 2021.

Graph 3: Historical Influent Flows from 2010 to 2021

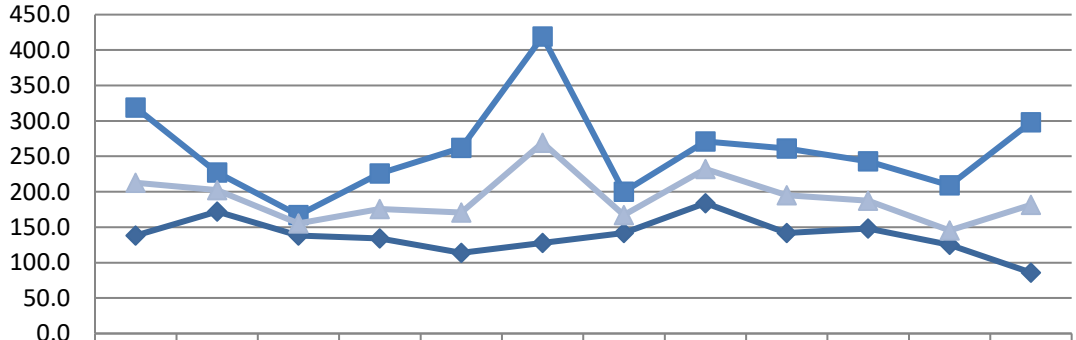


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Influent Flow (m^3)	4,684,27	5,459,20	4,785,26	5,054,16	5,420,32	4,874,88	4,606,89	5,891,44	5,345,29	4,980,99	4,968,97	4,420,10

Biochemical Oxygen Demand (BOD5)

ECA 1696-BPLL4R requires at least one composite sample be collected and analyzed weekly for Biochemical Oxygen Demand (BOD5). The Biochemical Oxygen Demand (BOD5) monthly average results ranged from 86 mg/L to 419 mg/L.

Graph 4: 2021 Monthly BOD5 Influent Concentration Comparisons



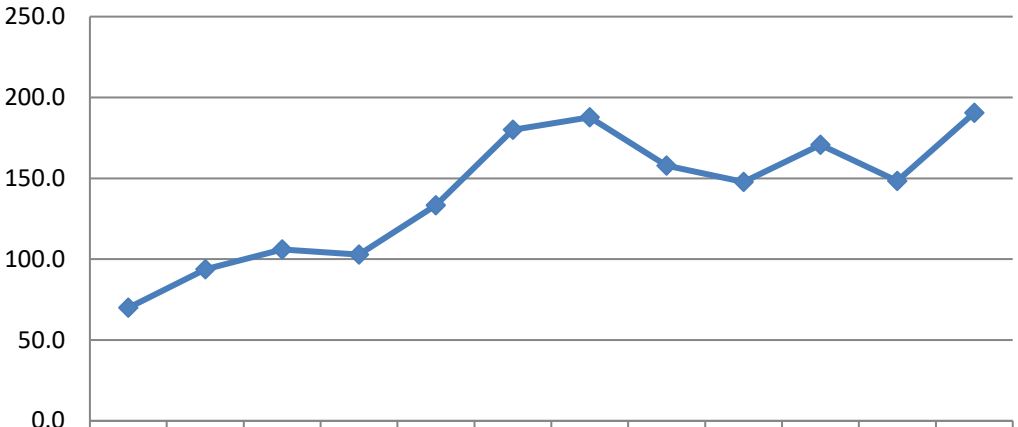
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min (mg/L)	138.0	172.0	138.0	134.0	114.0	128.0	142.0	184.0	142.0	148.0	125.0	86.0
Max (mg/L)	319.0	227.0	167.0	226.0	262.0	419.0	200.0	271.0	261.0	243.0	209.0	298.0
Avg (mg/L)	212.8	202.5	155.6	175.9	170.8	269.2	167.0	232.2	195.0	187.3	145.4	181.8

Biochemical Oxygen Demand Historical Trends

The Biochemical Oxygen Demand annual average has increased significantly between 2010 and 2021. The 2021 annual average is more than double the 2010 annual

average. Although not confirmed, increased raw influent concentrations could be related to increased abattoir and septage receiving.

Graph 5: Historical Influent BOD5 Concentration Comparisons

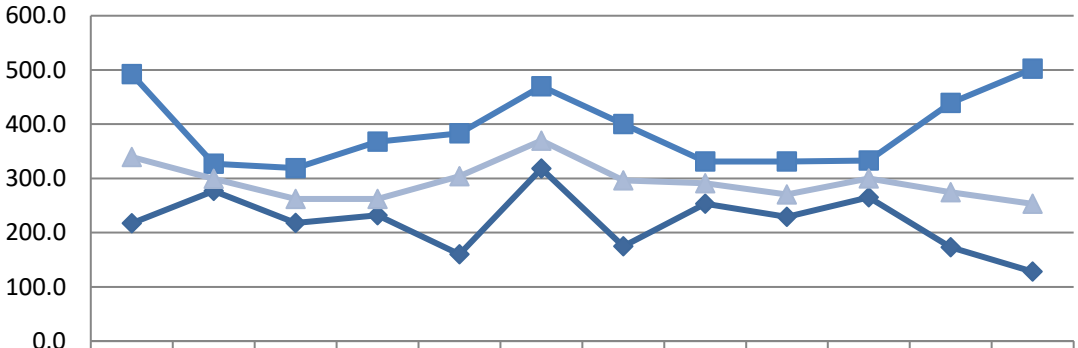


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Avg (mg/L)	69.9	93.8	106.0	102.9	133.3	180.0	187.7	157.9	147.8	170.6	148.3	190.5

Total Suspended Solids

ECA 1696-BPLL4R requires at least one composite sample be collected and analyzed weekly for Total Suspended Solids The monthly average results ranged from 128 mg/L to 502 mg/L.

Graph 6: 2021 Monthly Total Suspended Solids Influent Concentration Comparisons

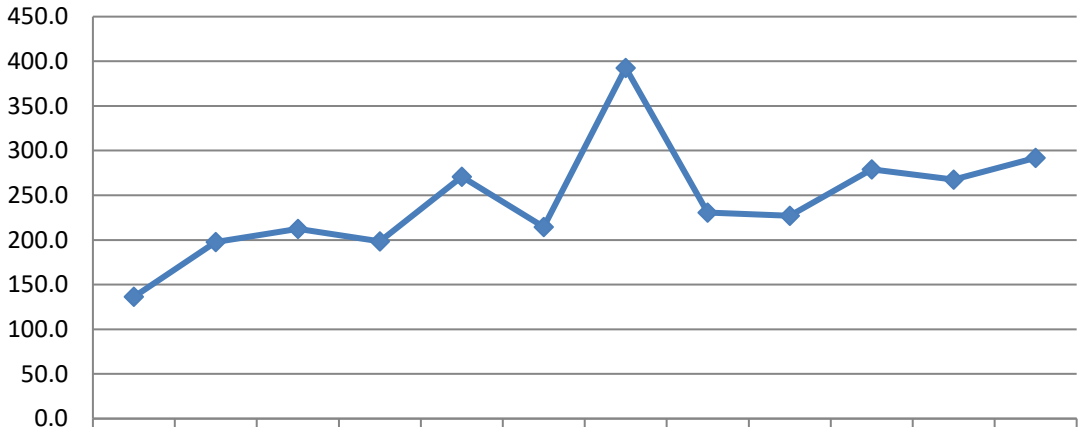


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min (mg/L)	217.0	277.0	218.0	232.0	160.0	318.0	175.0	253.0	229.0	265.0	173.0	128.0
Max (mg/L)	492.0	327.0	319.0	368.0	383.0	470.0	400.0	331.0	331.0	333.0	439.0	502.0
Avg (mg/L)	339.3	299.0	262.4	262.3	304.2	369.8	296.3	291.0	270.3	299.8	274.4	253.0

Total Suspended Solids Historical Review

The Total Suspended Solids annual average has increased significantly between 2010 and 2021 with the peak annual average in 2016. Although not confirmed, increased raw influent concentrations could be related to increased abattoir and septage receiving.

Graph 7: Historical Influent Total Suspended Solids Concentration Comparisons

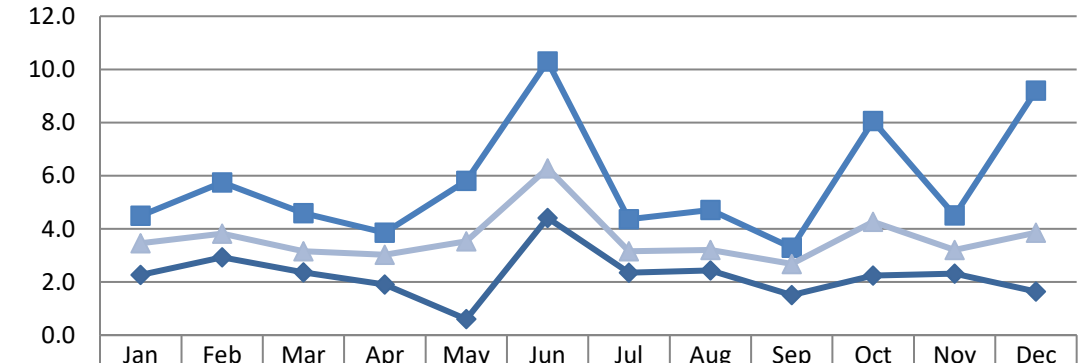


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Avg (mg/L)	136.3	197.6	212.3	198.3	270.8	214.5	392.7	230.7	227.0	279.0	267.6	291.9

Total Phosphorus

ECA 1696-BPLL4R requires at least one composite sample be collected and analyzed weekly for Total Phosphorus. The monthly average Total Phosphorus results ranged from 0.6 mg/L to 10.3 mg/L.

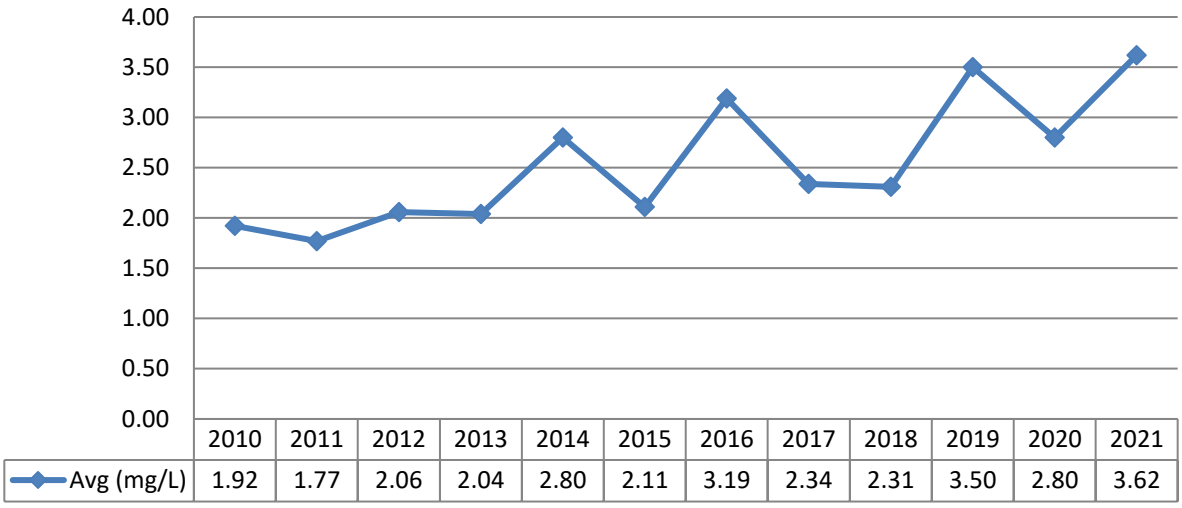
Graph 8: 2021 Monthly Total Phosphorus Influent Concentration Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min (mg/L)	2.3	2.9	2.36	1.9	0.6	4.4	2.4	2.4	1.5	2.2	2.3	1.6
Max (mg/L)	4.5	5.8	4.6	3.9	5.8	10.3	4.4	4.7	3.3	8.1	4.5	9.2
Avg (mg/L)	3.5	3.8	3.2	3.0	3.5	6.3	3.2	3.2	2.7	4.3	3.2	3.9

Total Phosphorus Historical Trends

Graph 9: Historical Influent Total Phosphorus Concentration Comparisons



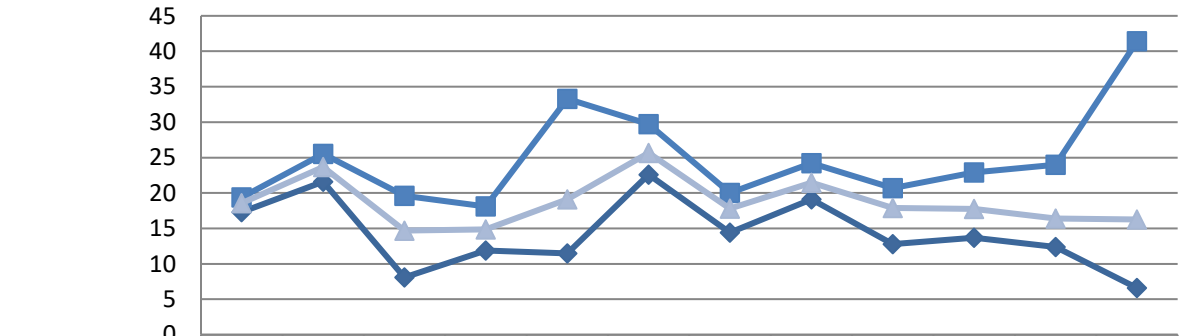
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Avg (mg/L)	1.92	1.77	2.06	2.04	2.80	2.11	3.19	2.34	2.31	3.50	2.80	3.62

The Total Phosphorus annual average has increased between 2010 and 2021 with the minimum value being 1.77 mg/L and the maximum value being 3.62 mg/L. Although not confirmed, increased raw influent concentrations could be related to increased abattoir and septage receiving.

Total Kjeldahl Nitrogen (TKN)

ECA 1696-BPLL4R requires at least one composite sample be collected and analyzed weekly for Total Kjeldahl Nitrogen. The monthly average Total Kjeldahl Nitrogen results ranged from 6.6 mg/L to 41.4 mg/L.

Graph 10: 2021 Monthly Total Kjeldahl Nitrogen Influent Concentration Comparisons

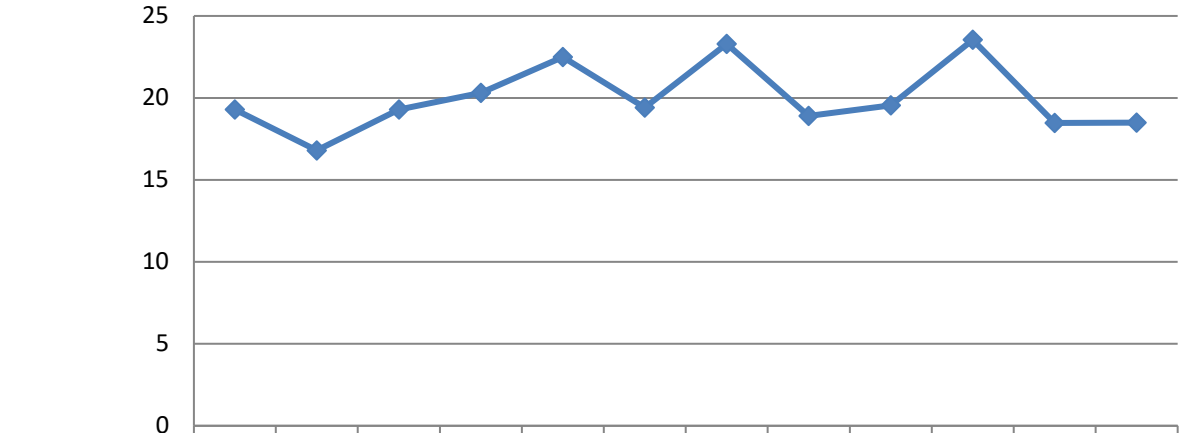


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min (mg/L)	17.3	21.6	8.1	11.9	11.5	22.6	14.4	19.1	12.8	13.7	12.4	6.6
Max (mg/L)	19.4	25.5	19.6	18.1	33.3	29.7	20.0	24.2	20.7	22.9	24.0	41.4
Avg (mg/L)	18.6	23.7	14.7	14.9	19.1	25.7	17.8	21.5	17.9	17.8	16.4	16.3

Total Kjeldahl Nitrogen Historical Review

The Total Kjeldahl Nitrogen annual average has remained fairly consistent between 2010 and 2021. The minimum annual average occurred in 2011 and the maximum annual average occurred in 2019.

Graph 11: Historical Influent Total Kjeldahl Nitrogen Concentration Comparisons

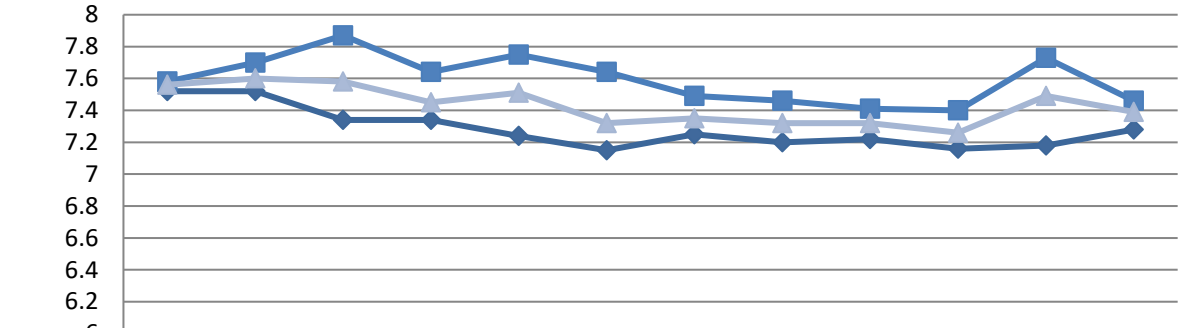


	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Avg (mg/L)	19.3	16.8	19.3	20.3	22.5	19.4	23.3	18.9	19.54	23.54	18.48	18.5

pH

ECA 1696-BPLL4R does not require a pH sample be collected nor prescribes the sample frequency on the influent. pH results were fairly consistent throughout 2021 ranging from 7.15 to 7.87.

Graph 12: 2021 Monthly pH Influent Concentration Comparisons



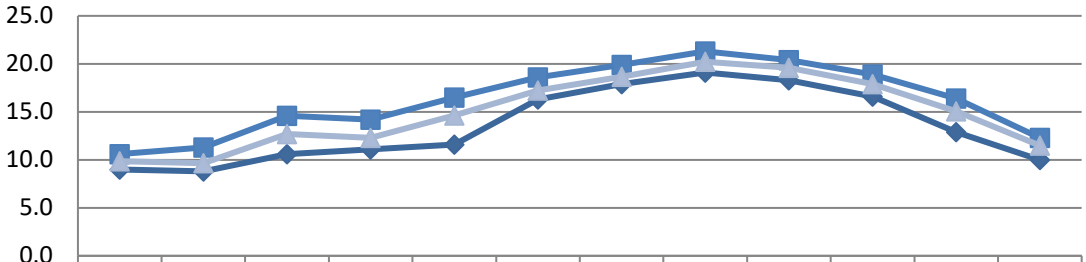
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min	7.52	7.52	7.34	7.34	7.24	7.15	7.25	7.2	7.22	7.16	7.18	7.28
Max	7.58	7.70	7.87	7.64	7.75	7.64	7.49	7.46	7.41	7.40	7.73	7.46
Avg	7.56	7.60	7.58	7.45	7.51	7.32	7.35	7.32	7.32	7.26	7.49	7.39

Historical pH data is only available from 2016 to 2021 and the pH levels remained fairly consistent between 6.54 and 8.03.

Temperature

ECA 1696-BPLL4R do not require a temperature sample be collected or prescribe sample frequency on the influent. Samples were collected throughout 2021. Variations in results were consistent with seasonal fluctuations. Historically, the influent water temperature drops in the freezing season (i.e. winter) and raises in the non-freezing season (i.e. summer) and this trend continued throughout 2021. Historical data is only available from 2016 to 2021 and the temperature ranged from 8.8º to 21.37º.

Graph 13: 2021 Monthly Temperature Influent Concentration Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min (oC)	9.0	8.8	10.6	11.1	11.6	16.3	17.9	19.1	18.3	16.6	12.9	10.0
Max (oC)	10.6	11.3	14.6	14.2	16.5	18.6	19.9	21.3	20.4	18.9	16.4	12.3
Avg (oC)	9.9	9.7	12.7	12.3	14.6	17.2	18.7	20.2	19.6	17.9	15.1	11.5

Imported Sewage

Imported Sewage is sewage that is hauled to the sewage treatment plant by licensed waste treatment system operators. At the Lindsay WWTP Imported Sewage consists of sewage hauled to the Receiving Station at 38 Lagoon St, Lindsay and abattoir waste hauled to the Lindsay WWTP onsite storage lagoon.

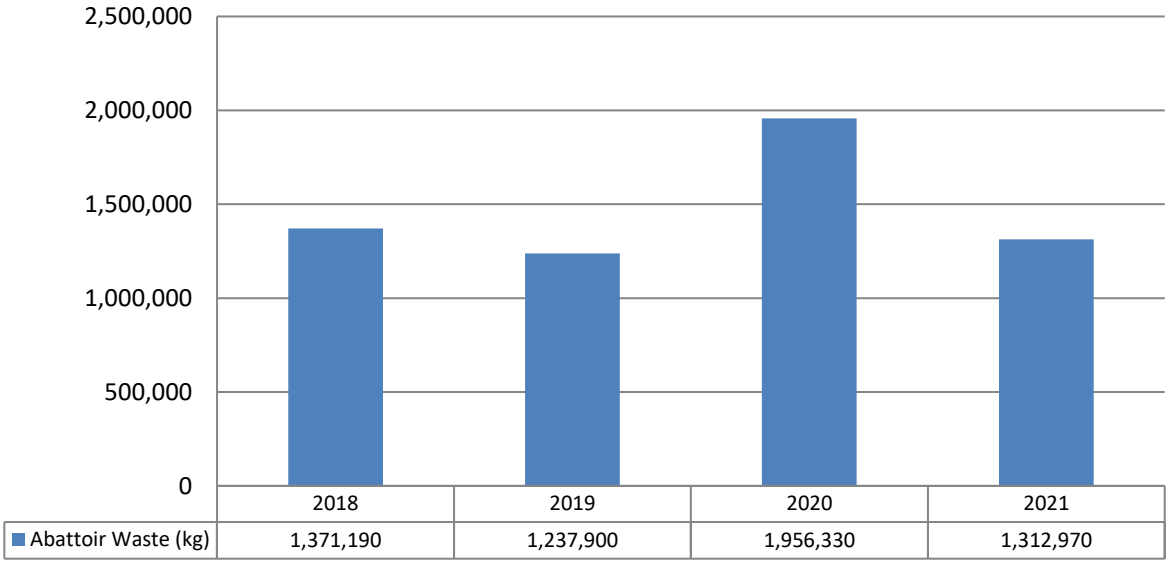
ECA 1696-BPLL4R requires monthly sampling of Imported Sewage.

Abattoir Waste

Waste from local Abattoirs is hauled to the Lindsay WWTP and deposited into Lagoon 5 which acts as a storage lagoon. During high flow events, excess raw water from the collection system is diverted into Lagoon 5 where it is stored until the collection system flows subside enough to feed the water in Lagoon 5 back into the facility Inlet. The abattoir waste mixes with the raw water in Lagoon 5 and is returned to the wastewater treatment plant through the Inlet.

Trucks hauling abattoir waste are weighed at the Lindsay Landfill Inbound Scale and the Outbound Scale and the difference between the two readings is the amount of abattoir waste deposited into Lagoon 5. The amount of abattoir waste deposited in 2021 was 1,312,970.00kg. This was a decrease in abattoir waste deposited over 2020, equaling a 39% decrease in volume.

Graph 14: Historical Abattoir Volume Comparisons

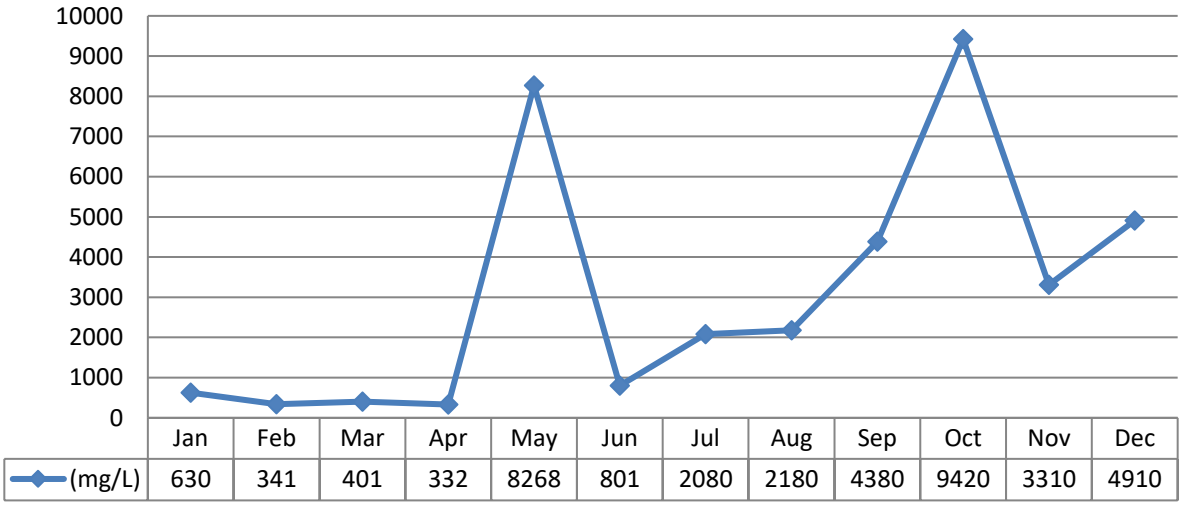


ECA 1696-BPLL4R requires a grab sample be collected monthly and analyzed for BOD5, Total Suspended Solids, Total Phosphorus and Total Kjeldahl Nitrogen for each type of imported sewage. Although not required by the ECA, Total Ammonia Nitrogen was sampled and analyzed monthly in 2021.

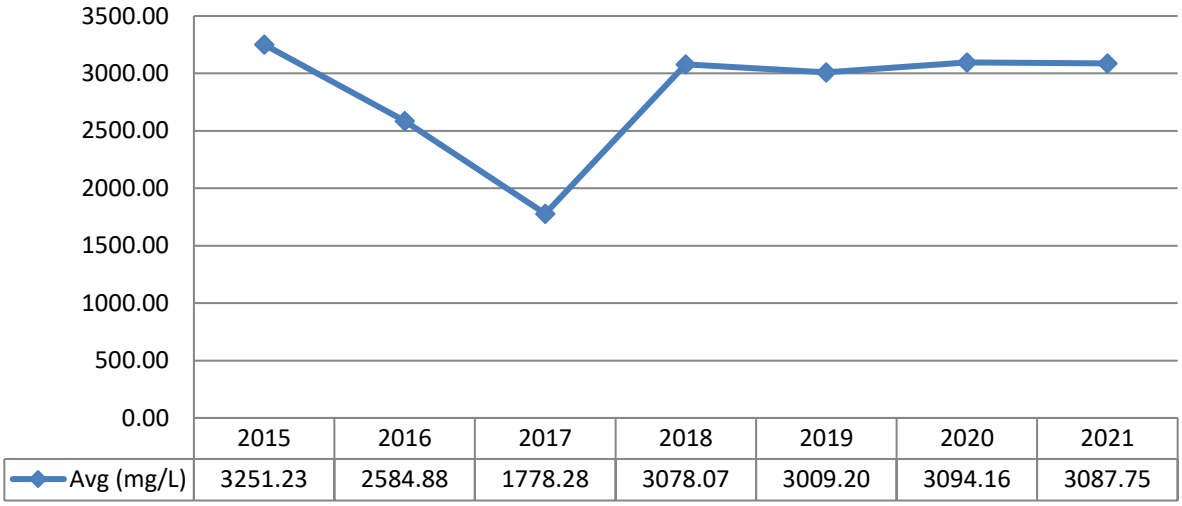
Biochemical Oxygen Demand (BOD5)

ECA 1696-BPLL4R require one grab sample be collected monthly and analyzed for BOD5. The BOD5 sample results ranged from 341 mg/L to 8286 mg/L.

Graph 15: 2021 Monthly BOD5 Abattoir Waste Concentration Comparisons



Graph 16: Historical BOD5 Abattoir Waste Concentration Comparisons

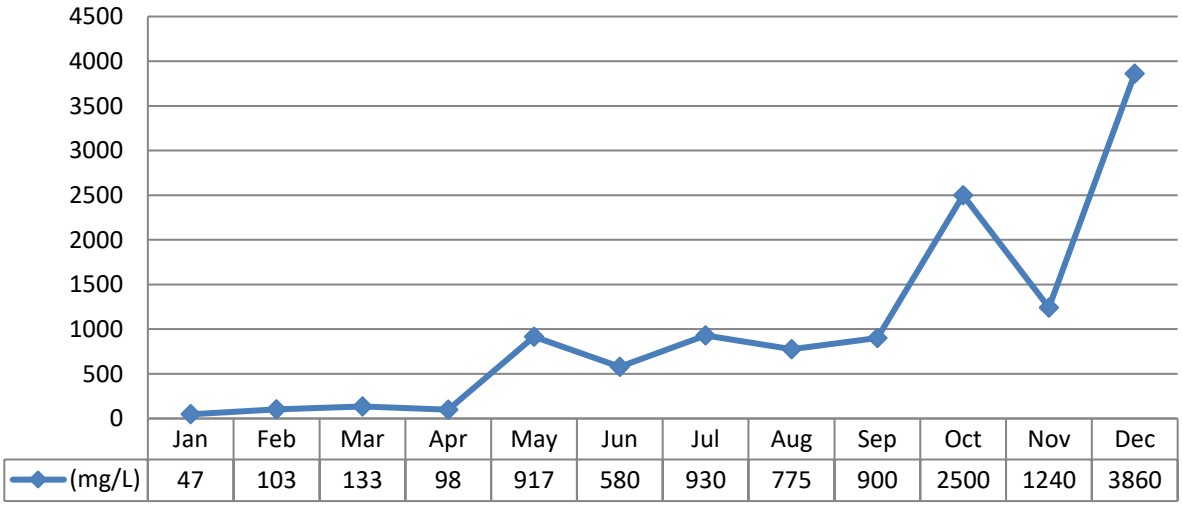


The BOD5 annual average has remained fairly consistent between 2015 and 2021. The minimum annual average concentration occurred in 2017 and the maximum annual average concentration occurred in 2015.

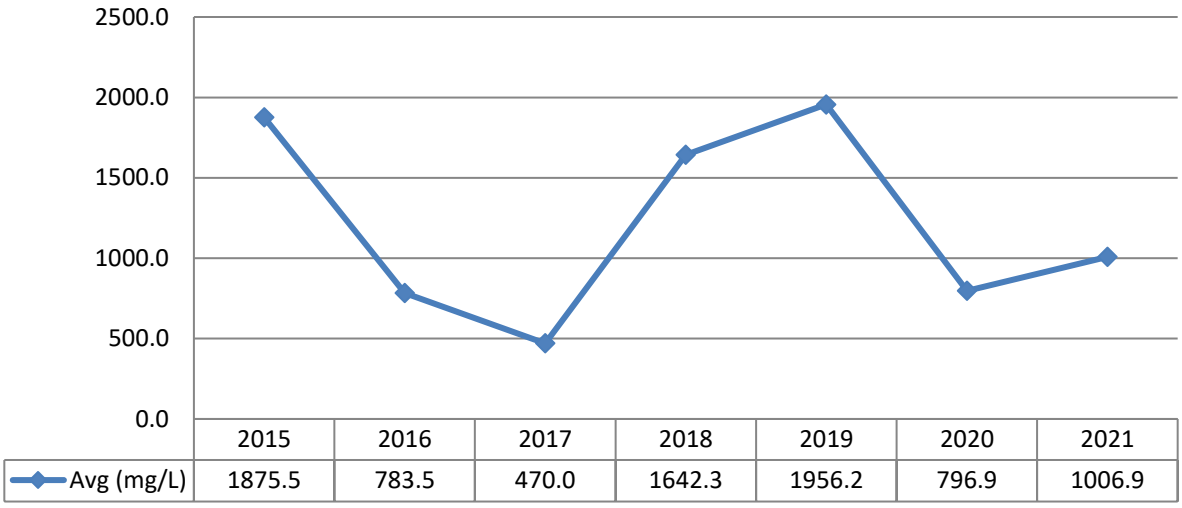
Total Suspended Solids

ECA 1696-BPLL4R requires one grab sample be collected monthly and analyzed for Total Suspended Solids. The Total Suspended Solids sample results ranged from 35 mg/L to 2740 mg/L in 2021.

Graph 17: 2021 Monthly Total Suspended Solids Abattoir Waste Concentration Comparisons



Graph 18: Historical Total Suspended Solids Abattoir Waste Concentration Comparisons



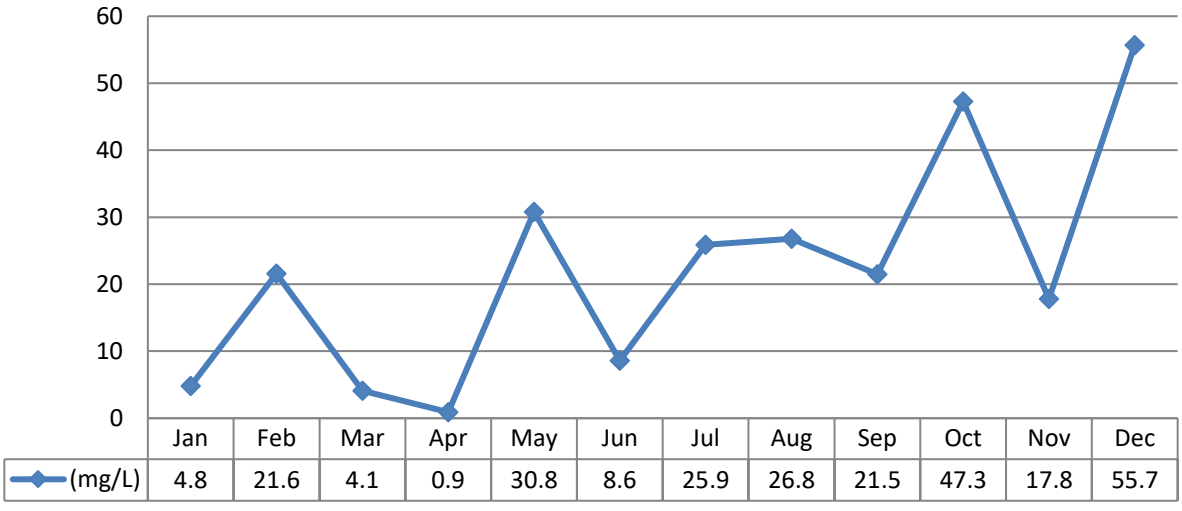
	2015	2016	2017	2018	2019	2020	2021
Avg (mg/L)	1875.5	783.5	470.0	1642.3	1956.2	796.9	1006.9

The Total Suspended Solids annual average has remained fairly consistent between 2015 and 2021. The minimum annual average concentration occurred in 2017 and the maximum annual average concentration occurred in 2019.

Total Phosphorus

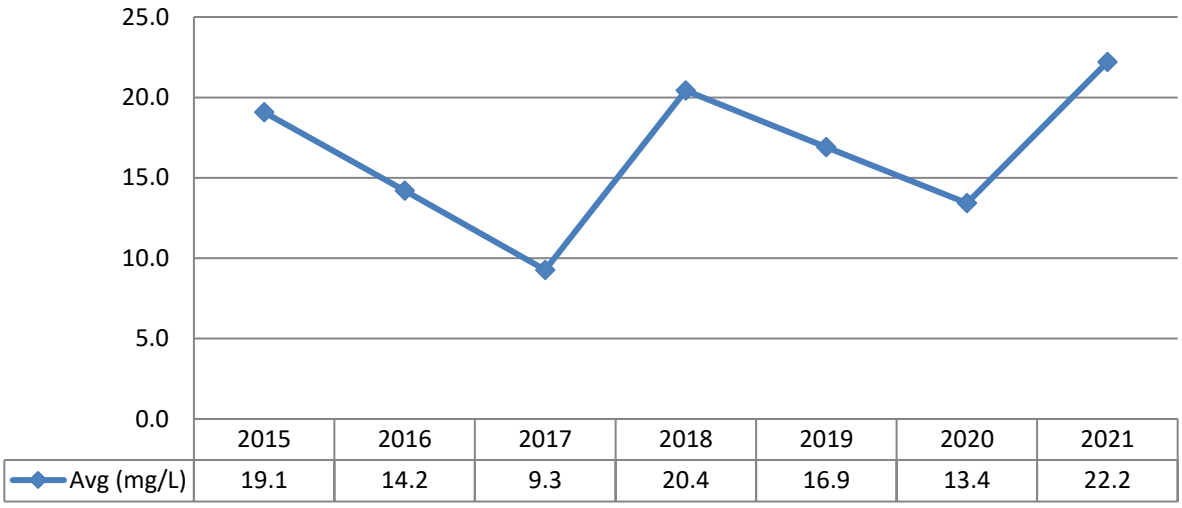
ECA 1696-BPLL4R requires one grab sample be collected monthly and analyzed for Total Phosphorus. Results ranged from 0.9 mg/L to 47.3 mg/L.

Graph 19: 2021 Monthly Total Phosphorus Abattoir Waste Concentration Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(mg/L)	4.8	21.6	4.1	0.9	30.8	8.6	25.9	26.8	21.5	47.3	17.8	55.7

Graph 20: Historical Total Phosphorus Abattoir Waste Concentration Comparisons



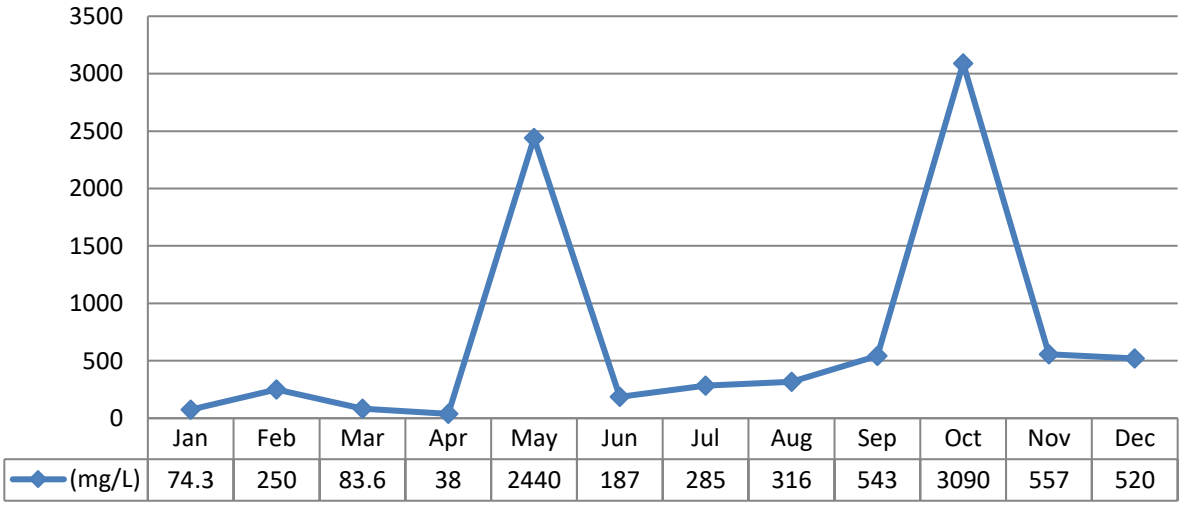
	2015	2016	2017	2018	2019	2020	2021
Avg (mg/L)	19.1	14.2	9.3	20.4	16.9	13.4	22.2

The Total Phosphorus annual average has remained fairly consistent between 2015 and 2021. The minimum annual average concentration occurred in 2017 and the maximum annual average concentration occurred in 2021.

Total Kjeldahl Nitrogen (TKN)

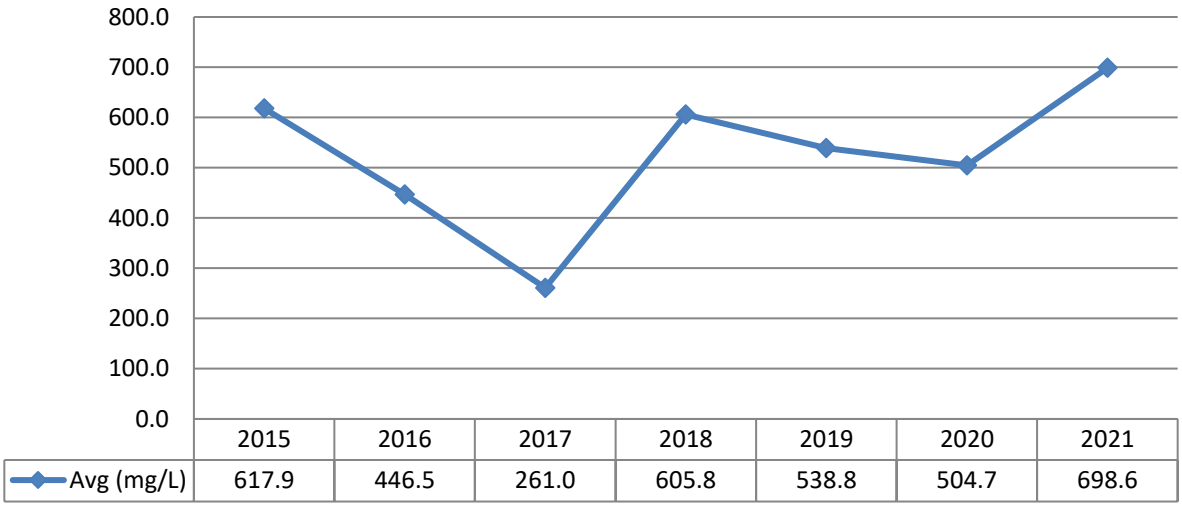
ECA 1696-BPLL4R requires one grab sample be collected monthly and analyzed for Total Kjeldahl Nitrogen. The Total Kjeldahl Nitrogen results ranged from 38 mg/L to 3090 mg/L.

Graph 21: 2021 Monthly TKN Abattoir Waste Concentration Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(mg/L)	74.3	250	83.6	38	2440	187	285	316	543	3090	557	520

Graph 22: Historical Total Kjeldahl Nitrogen Abattoir Waste Concentration Comparisons



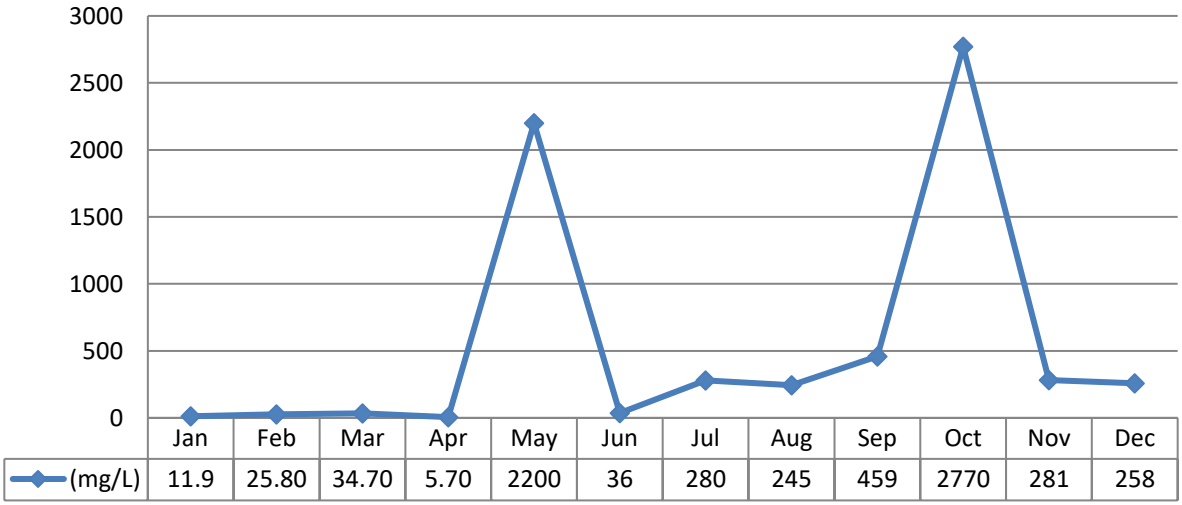
	2015	2016	2017	2018	2019	2020	2021
Avg (mg/L)	617.9	446.5	261.0	605.8	538.8	504.7	698.6

The Total Kjeldahl Nitrogen annual average has ranged between 261.0 mg/L and 698.6 mg/L. The minimum annual average concentration occurred in 2017 and the maximum annual average concentration occurred in 2021.

Total Ammonia Nitrogen (TAN)

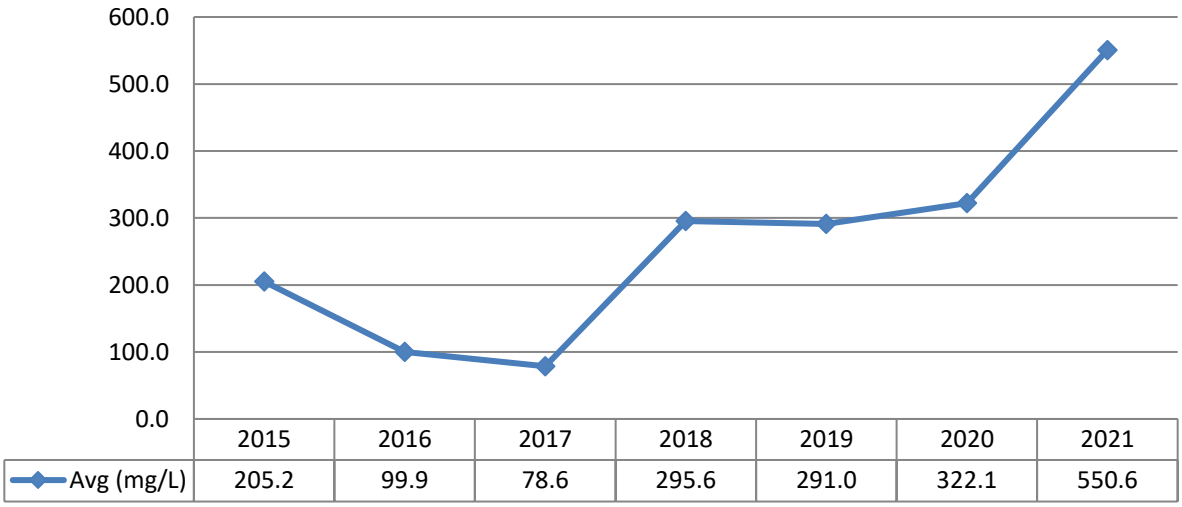
One grab sample was collected of the Abattoir waste each month in 2021 and analyzed for Total Ammonia Nitrogen. The results ranged from 5.7 mg/L to 2770.0 mg/L.

Graph 23: 2021 Monthly TAN Abattoir Waste Concentration Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(mg/L)	11.9	25.80	34.70	5.70	2200	36	280	245	459	2770	281	258

Graph 24: Historical TAN Abattoir Waste Concentration Comparisons



Since 2015 the Total Ammonia Nitrogen annual average has fluctuated between 78.6 mg/L and 550.6 mg/L. The minimum annual average concentration occurred in 2017 and the maximum annual average concentration occurred in 2021.

Receiving Station

ECA 1696-BPLL4R requires monthly sampling of the Receiving Station testing for BOD5, Total Suspended Solids, Total Phosphorus, Total Kjeldahl Nitrogen. Although not required by the ECA, Total Ammonia Nitrogen was sampled and analyzed monthly in 2021.

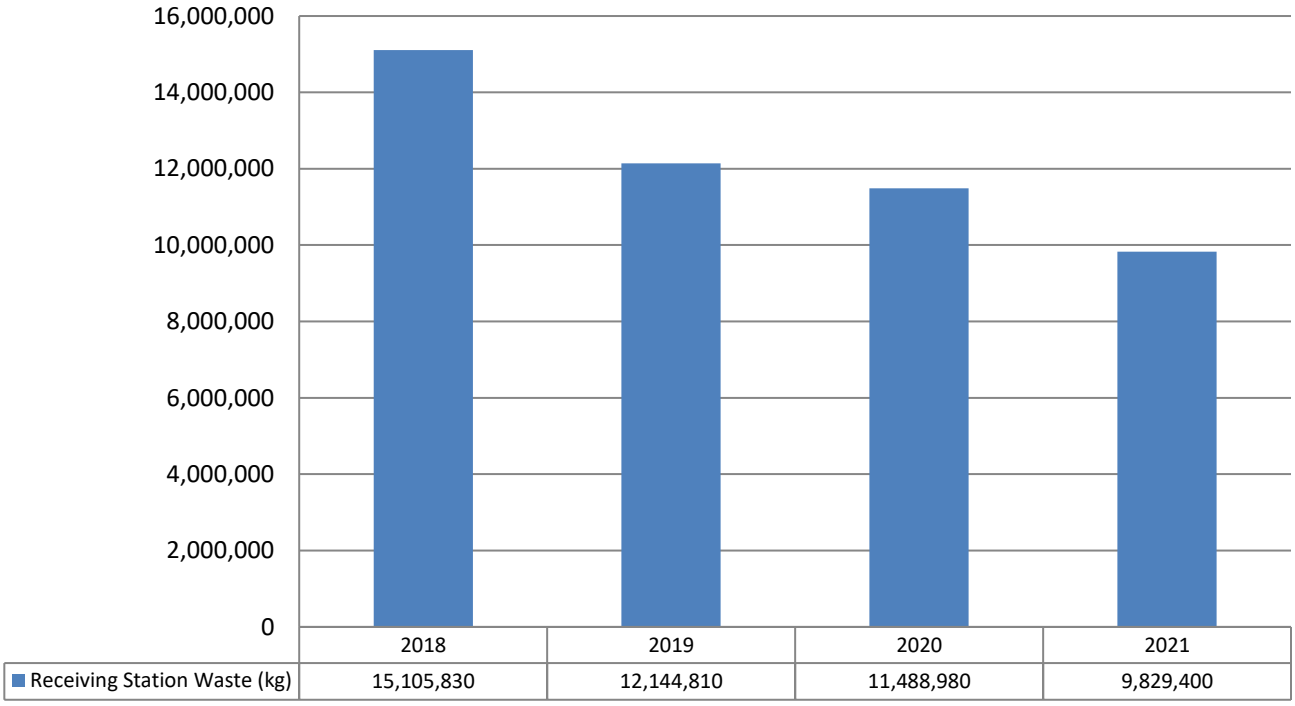
As sampling of the Receiving Station began in November 2018 a historical review of the result is limited. The 2018-2021 results are included below. It should be noted that the sewage from the Receiving Station flows to the Inlet Building where the Inlet (Raw) samples are collected so Receiving Station water would form a portion of the Inlet (Raw) sample results.

Table 1: Historical Review Receiving Station Sample Results

Parameter	November, 2018	December, 2018	2019 Annual	2020 Annual	2021 Annual
BOD5 (mg/L)	5884	1060	3094.2	4549.40	4797.77
Total Suspended Solids (mg/L)	2880	740	5397.5	8390.00	7046.85
Total Phosphorus (mg/L)	13.5	23.6	128.75	106.42	132.50
Total Kjeldahl Nitrogen (mg/L)	104	196	2239.5	1238.40	1148.05
Total Ammonia Nitrogen (mg/L)	4.5	156	1417.8	753.74	788.35

Trucks hauling waste are weighed at the Lindsay Landfill Inbound Scale prior to arriving at the Receiving Station and at the Outbound Scale after leaving the Receiving Station. The difference between the two scale readings is the amount of waste deposited into the Lagoon St Receiving Station. The amount of waste deposited into the receiving station in 2021 was 9,829,400kg. This is a 15% decrease in the volume deposited in 2020, and represents an overall declining trend.

Graph 25: Historical Receiving Station Volume Comparisons



	2018	2019	2020	2021
Receiving Station Waste (kg)	15,105,830	12,144,810	11,488,980	9,829,400

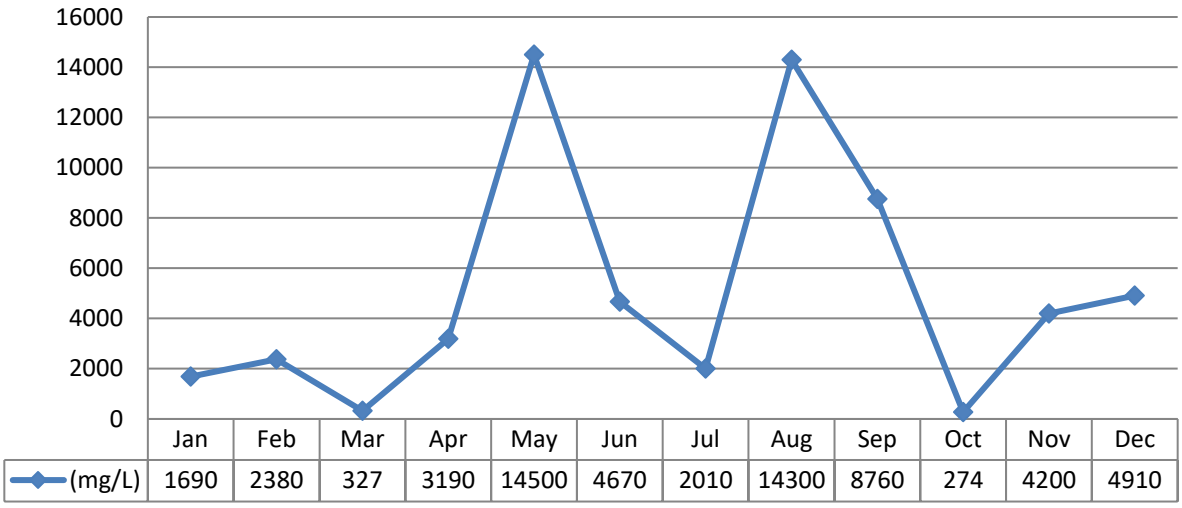
Sample Results

ECA 1696-BPLL4R requires a grab sample be collected monthly and analyzed for BOD5, Total Suspended Solids, Total Phosphorus and Total Kjeldahl Nitrogen. Although not required by the ECA, Total Ammonia Nitrogen was sampled and analyzed monthly in 2021.

Biochemical Oxygen Demand (BOD5)

ECA 1696-BPLL4R requires one grab sample be collected monthly and analyzed for BOD5. The BOD5 sample results ranged from 274 mg/L to 14500 mg/L.

Graph 26: 2021 Monthly BOD5 Receiving Station Waste Concentration Comparisons

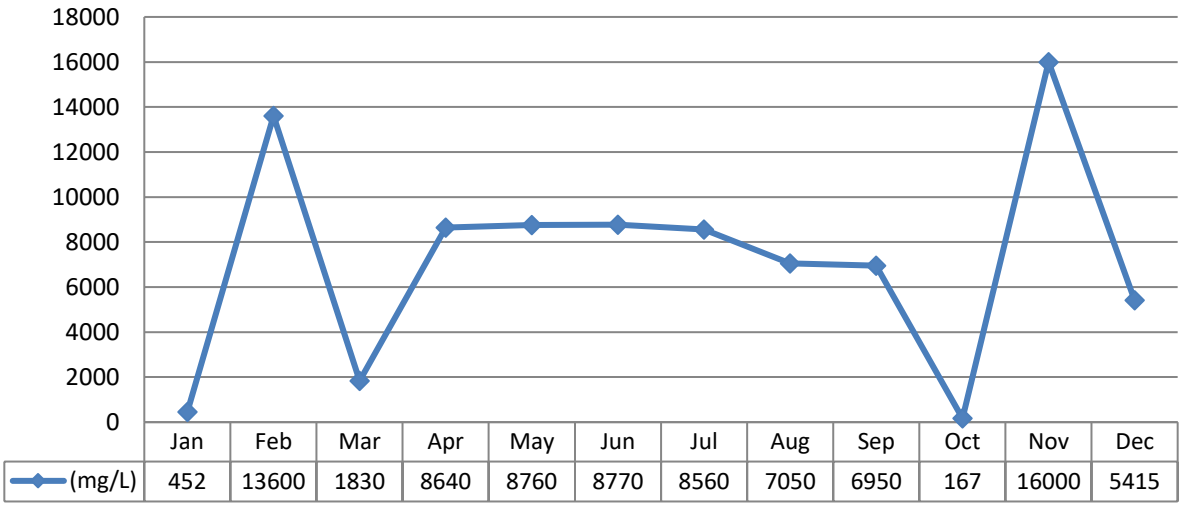


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(mg/L)	1690	2380	327	3190	14500	4670	2010	14300	8760	274	4200	4910

Total Suspended Solids

ECA 1696-BPLL4R requires a grab sample be collected monthly and analyzed for Total Suspended Solids. The Total Suspended Solids sample results ranged from 167 mg/L to 16000 mg/L in 2021.

Graph 27: 2021 Monthly Total Suspended Solids Receiving Station Waste Concentration Comparisons

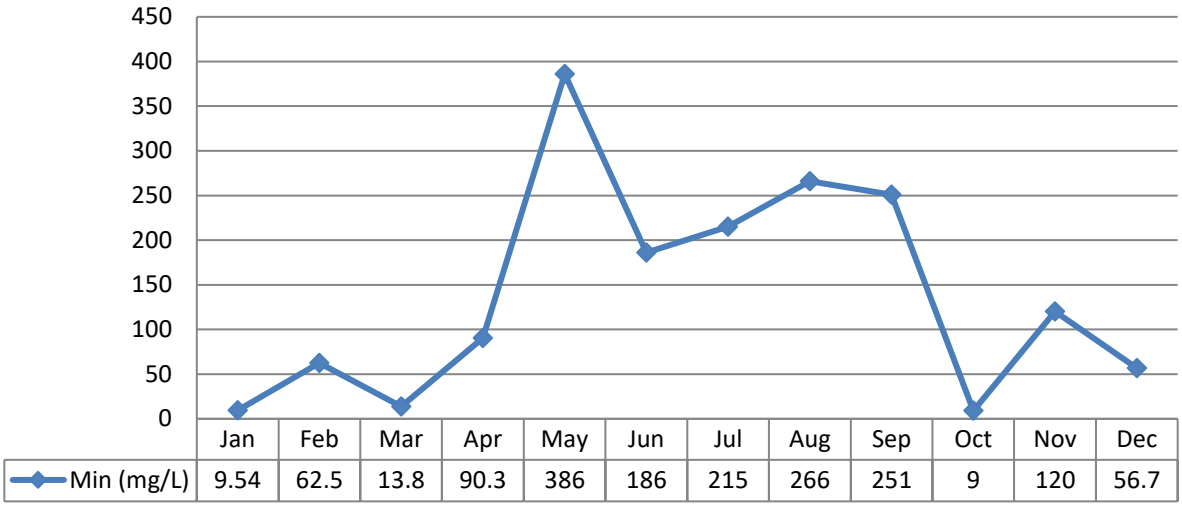


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(mg/L)	452	13600	1830	8640	8760	8770	8560	7050	6950	167	16000	5415

Total Phosphorus

ECA 1696-BPLL4R requires one grab sample be collected monthly and analyzed for Total Phosphorus. Results ranged from 9.0 mg/L to 386 mg/L.

Graph 28: 2021 Monthly Total Phosphorus Receiving Station Waste Concentration Comparisons

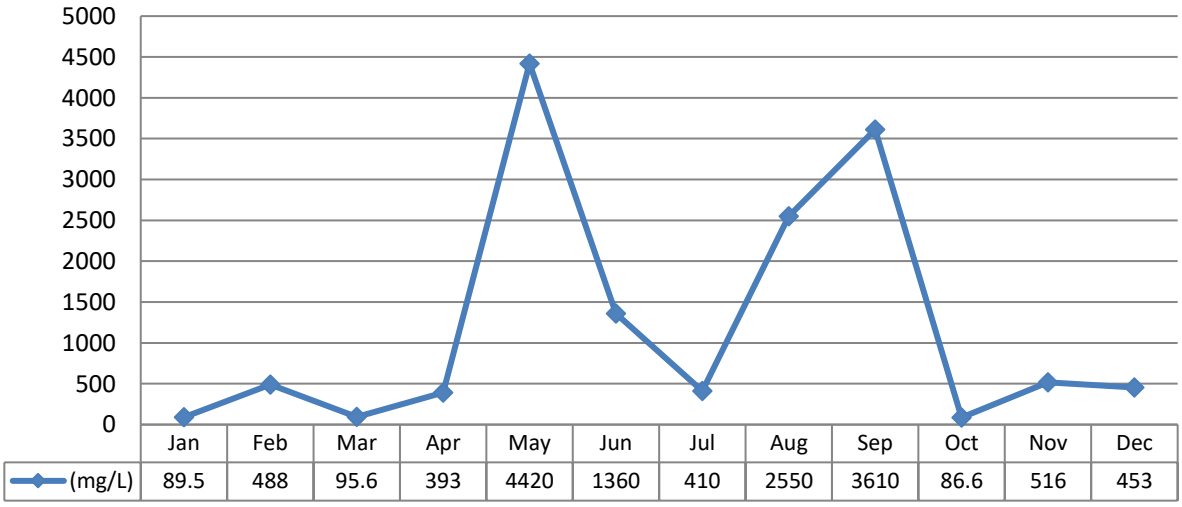


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min (mg/L)	9.54	62.5	13.8	90.3	386	186	215	266	251	9	120	56.7

Total Kjeldahl Nitrogen (TKN)

ECA 1696-BPLL4R requires one grab sample be collected monthly and analyzed for Total Kjeldahl Nitrogen. Monthly Total Kjeldahl Nitrogen results ranged from 86.6 mg/L to 4420 mg/L.

Graph 29: 2021 Monthly TKN Receiving Station Waste Concentration Comparisons

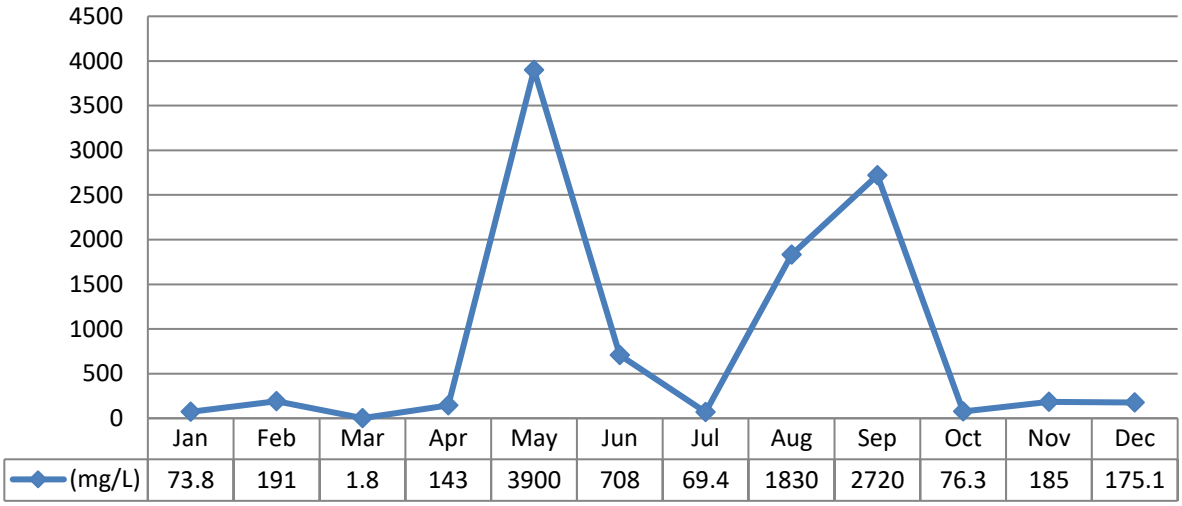


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(mg/L)	89.5	488	95.6	393	4420	1360	410	2550	3610	86.6	516	453

Total Ammonia Nitrogen (TAN)

One grab sample was collected from the Receiving Station waste each month in 2021 and analyzed for Total Ammonia Nitrogen. The monthly average concentration results ranged from 1.8 mg/L to 3900 mg/L.

Graph 30: 2021 Monthly TAN Receiving Station Waste Concentration Comparisons



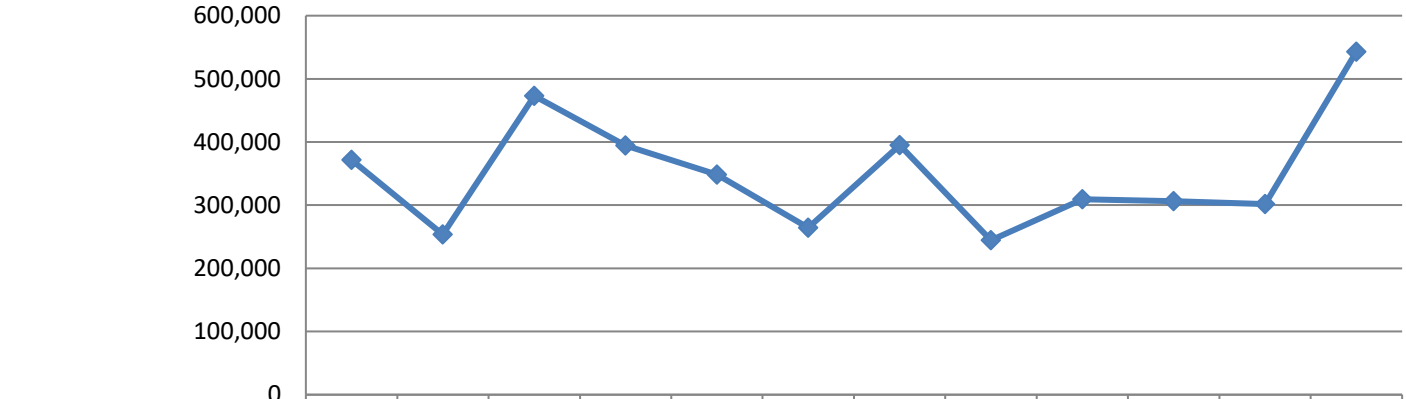
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(mg/L)	73.8	191	1.8	143	3900	708	69.4	1830	2720	76.3	185	175.1

B) Environmental Compliance Approval # ECA 1696-BPLL4R requires 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, including an overview of the success and adequacy of the works be included in the report.

The 2021 Lindsay WWTP annual average daily effluent flow was 11,520.60 m^3/day and the total Effluent flow in 2021 was 4,205,019.00 m^3.

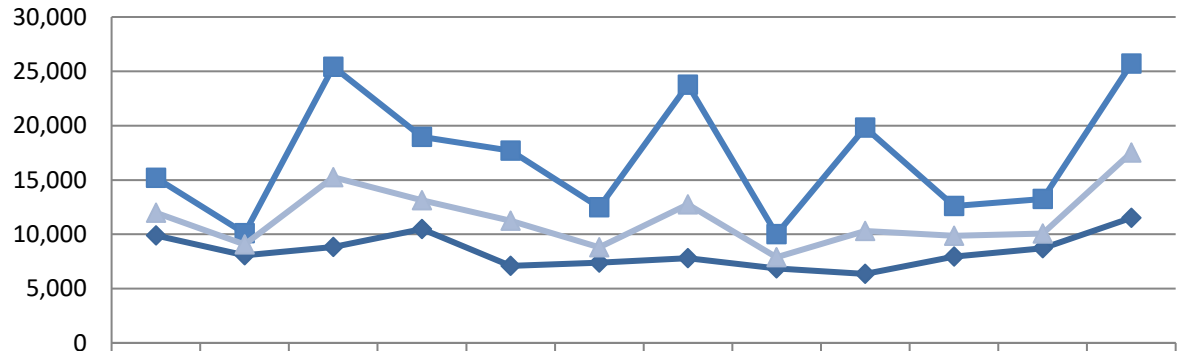
Effluent Flow Monthly Totals

Graph 31: 2021 Final Effluent Monthly Flows



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly Total (m^3/day)	371,770	253,526	473,218	394,266	348,211	264,320	394,835	244,408	309,393	306,092	301,838	543,142

Graph 32: 2021 Final Effluent Daily Minimum, Maximum and Average Flows



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min (m^3/day)	9,887	8,077	8,821	10,478	7,093	7,389	7,788	6,861	6,350	7,936	8,719	11,512
Max (m^3/day)	15,193	10,092	25,405	18,958	17,700	12,482	23,749	10,002	19,829	12,611	13,243	25,700
Avg (m^3/day)	11,993	9,055	15,265	13,142	11,233	8,811	12,737	7,884	10,313	9,874	10,061	17,521

Final Effluent Lab Results

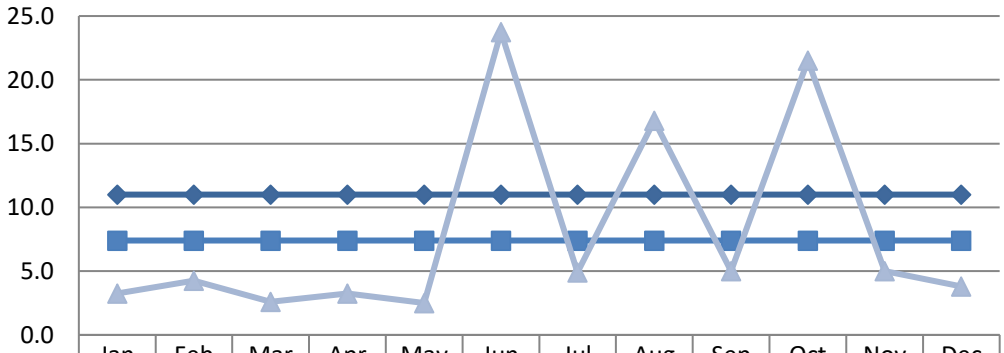
<u>Carbonaceous Biochemical Oxygen Demand (CBOD5)</u>

ECA 1696-BPLL4R set the CBOD5 annual average concentration limit at 11.0 mg/L and the monthly objective at 7.4 mg/L. The 2021 annual average concentration was 10.33 mg/L and the maximum monthly average concentration was 23.75 mg/L.

The annual average waste loading limit is 238 kg/day and the annual average waste loading was 81.07 kg/day.

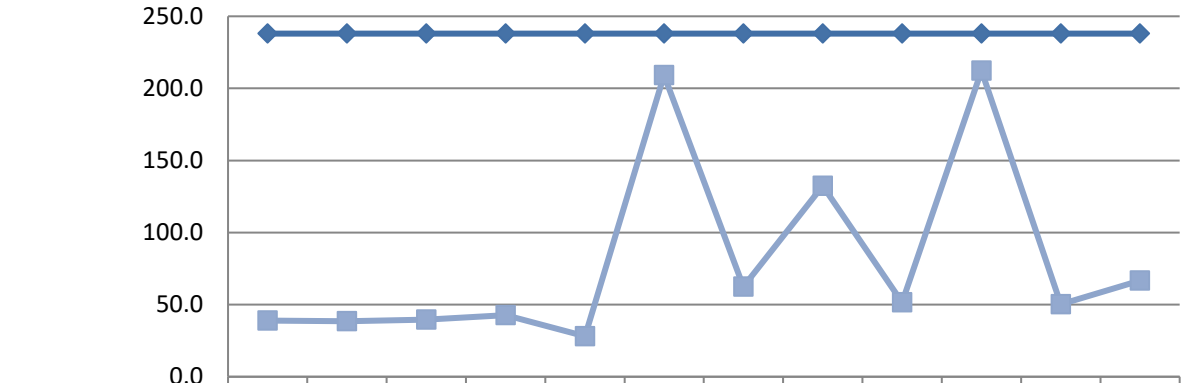
The monthly objective was not met in June, August, and October 2021. However, the ECA requirement is based on the annual average and all CBOD5 limits were met in 2021

Graph 33: 2021 Monthly Final Effluent CBOD5 Concentration Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit (mg/L)	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Objective (mg/L)	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Avg (mg/L)	3.3	4.3	2.6	3.3	2.5	23.8	4.9	16.8	5.0	21.5	5.0	3.8

Graph 34: 2021 Monthly Final Effluent CBOD5 Average Waste Loading Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit (kg/day)	238.0	238.0	238.0	238.0	238.0	238.0	238.0	238.0	238.0	238.0	238.0	238.0
Avg (kg/day)	39.0	38.5	39.7	42.7	28.1	209.3	62.5	132.5	51.6	212.3	50.3	66.6

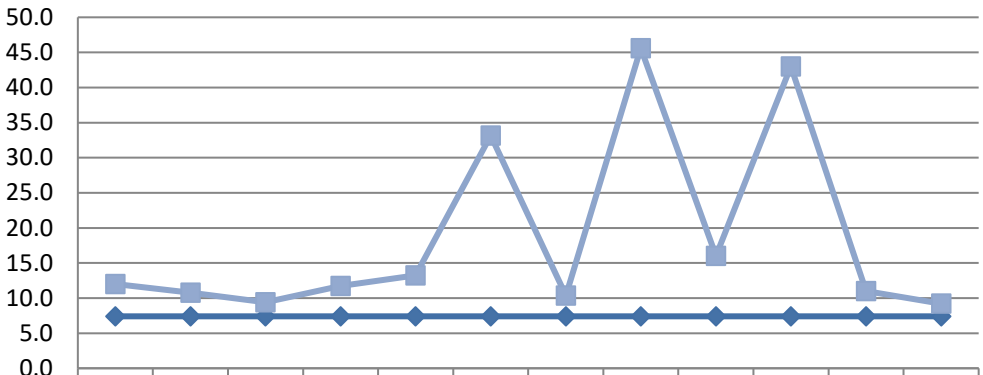
Total Suspended Solids (TSS)

ECA 1696-BPLL4R set the TSS annual average concentration limit at 11.0 mg/L and the annual average waste loading at 238 kg/day. The TSS annual average concentration exceeded the annual average concentration at 19.81 mg/L. The annual average waste loading was 194.44 kg/day which was within the limits set in the ECA.

The annual exceedance was reported to the Ministry of the Environment, Conservation and Parks in accordance with ECA-BPLL4R Section 11.

ECA 1696-BPLL4R set the Total Suspended Solids monthly concentration objective at 7.4 mg/L and this objective was not met in 2021. Throughout 2021, the Total Suspended Solids monthly removal rates ranged from 84.3% to 96.5%. Continuous efforts made to meet the Effluent Objectives are discussed in Section H.

Graph 35: 2021 Monthly Final Effluent TSS Concentration Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Objective (mg/L)	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Avg (mg/L)	12.0	10.8	9.4	11.8	13.3	33.2	10.4	45.6	16.0	43.0	11.0	9.2

Total (Ammonia+Ammonium) Nitrogen (TAN)

ECA 1696-BPLL4R set the Total (Ammonia+Ammonium) Nitrogen (TAN) monthly average concentration limit at 1.5 mg/L between May 1 – September 30 and 3.0 mg/L between October 1 to April 30.

The monthly average waste loading limit is 32.3 kg/day between January 1 to April 30 and between October 1 to December 31 is 64.5 kg/day. The TAN monthly concentration objective is 1.0 mg/L between May 1 – September 30 and is 2.0 mg/L between January 1 to April 30 and between October 1 to December 31.

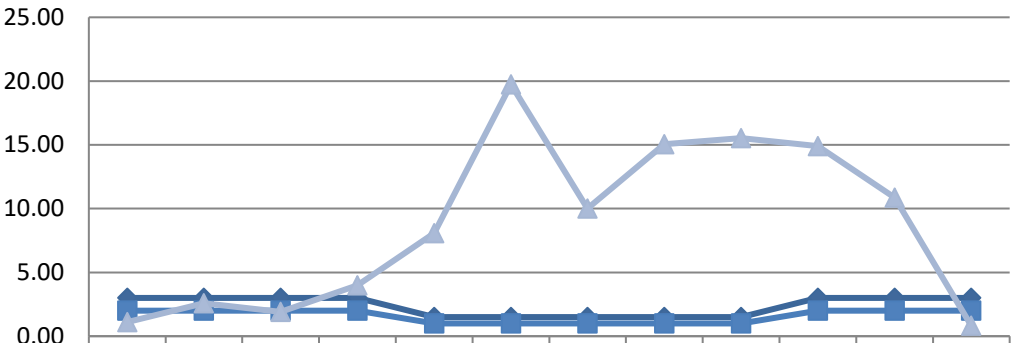
The TAN limit was met each month in 2021 except for April, May, June, July, August September, October and November. These exceedances were reported to the Ministry of the Environment, Conservation and Parks in accordance with ECA-BPLL4R Section 11.

The TAN monthly average waste loading limit was met in each month in 2021 except for May, June, July, August, September, October and November.

Repeated failures of mechanical aerators caused significant impediments to TAN removal. The loss of aerators affected the dissolved oxygen levels in the aeration lagoon which impacted the TAN results.

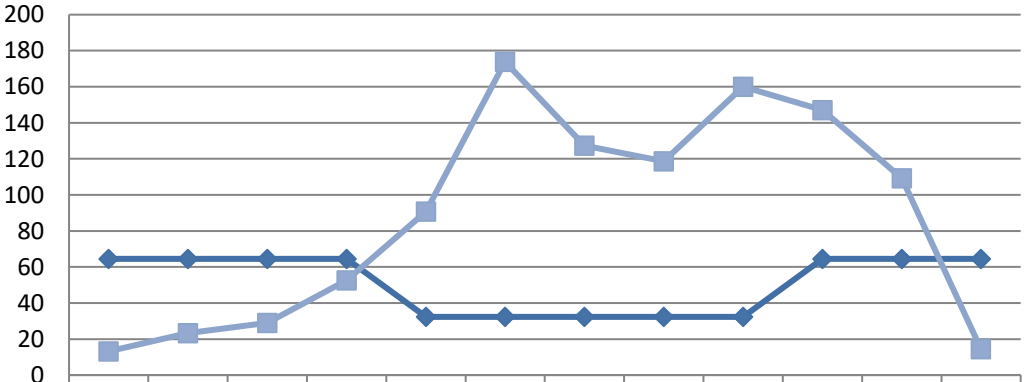
Continuous efforts made to meet the Effluent Objectives are discussed in Section H.

Graph 36: 2021 Monthly Final Effluent TAN Concentration Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit (mg/L)	3.00	3.00	3.00	3.00	1.50	1.50	1.50	1.50	1.50	3.00	3.00	3.00
Objective (mg/L)	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Avg (mg/L)	1.10	2.58	1.90	4.00	8.08	19.74	10.00	15.06	15.52	14.90	10.86	0.82

Graph 37: 2021 Monthly Final Effluent TAN Average Waste Loading Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit (kg/day)	64.5	64.5	64.5	64.5	32.3	32.3	32.3	32.3	32.3	64.5	64.5	64.5
Avg (kg/day)	13.2	23.3	29.0	52.6	90.7	173.9	127.4	118.7	160.1	147.1	109.3	14.5

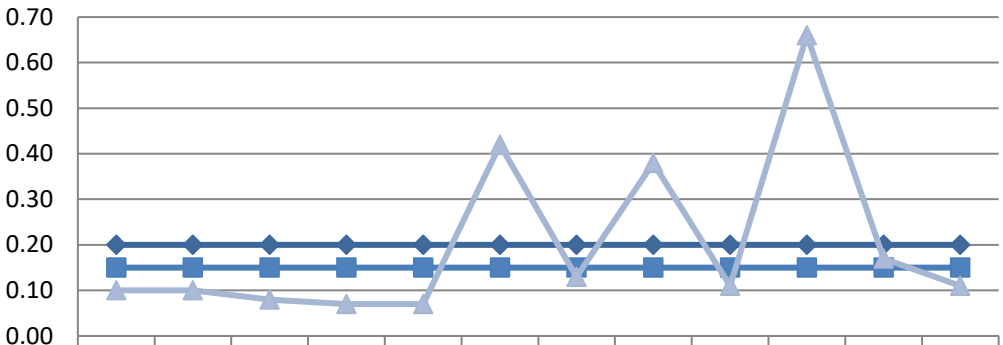
Total Phosphorus (TP)

ECA 1696-BPLL4R set the Total Phosphorus monthly average concentration limit at 0.2 mg/L and the monthly average waste loading at 4.3 kg/day. The monthly Total Phosphorus average concentration results and monthly average waste loading results throughout 2021 were in compliance with the limits outlined in the ECA except for June, August and October.

ECA 1696-BPLL4R set the Total Phosphorus monthly concentration objective at 0.15 mg/L. The monthly Total Phosphorus average concentration results throughout 2021 were less than the concentration objectives except for June, August, October and November.

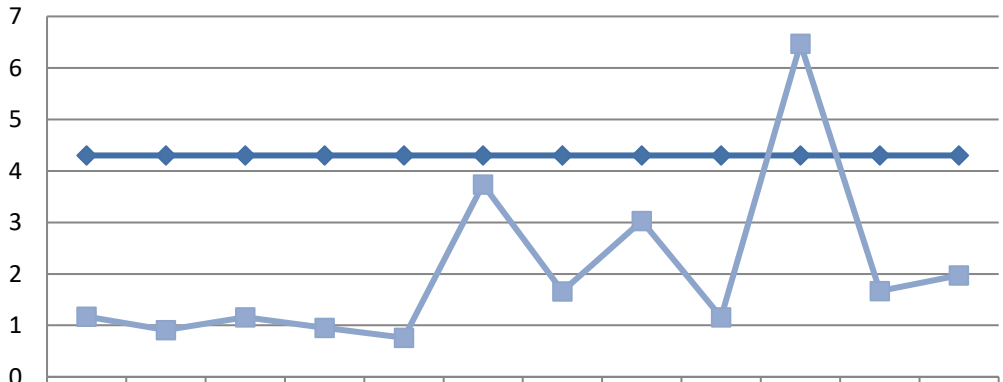
These exceedances were reported to the Ministry of the Environment, Conservation and Parks in accordance with ECA-BPLL4R Section 11.

Graph 38: 2021 Monthly Final Effluent Total Phosphorus Concentration Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit (mg/L)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Objective (mg/L)	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Avg (mg/L)	0.10	0.10	0.08	0.07	0.07	0.42	0.13	0.38	0.11	0.66	0.17	0.11

Graph 39: 2021 Monthly Final Effluent Total Phosphorus Average Waste Loading Comparisons



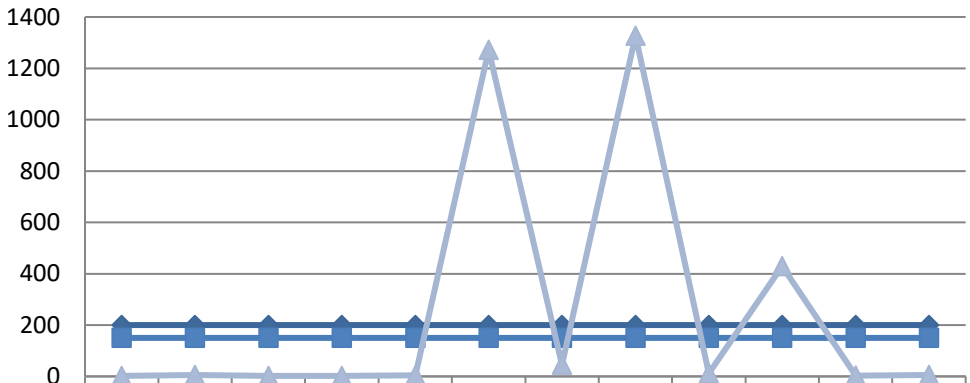
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit (kg/day)	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Avg (kg/day)	1.2	0.9	1.2	1.0	0.8	3.7	1.7	3.0	1.2	6.5	1.7	2.0

E.coli

ECA 1696-BPLL4R sets the monthly geometric mean density concentration limit at 200 CFU/100 and the monthly objective at 150 CFU/100 mL.

The final effluent results were less than the E. coli monthly geometric mean density limit and objective throughout 2021 except for June, August and September.

Graph 40: 2021 Monthly Final Effluent E. coli Concentration Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Limit (CFU/100mL)	200	200	200	200	200	200	200	200	200	200	200	200
Objective (CFU/100mL)	150	150	150	150	150	150	150	150	150	150	150	150
Geomean (CFU/100mL)	2.0	5.5	2.0	2.0	4.7	1272.2	45.9	1327.0	11.7	429.2	3.4	5.0

Acute Lethality to Rainbow Trout and Daphnia Magna

Quarterly effluent samples were collected on January 5, April 26, July 6, July 13, July 27, August 18 and October 5, 2021 for analysis for acute lethality to rainbow trout and daphnia magna.

Sample analysis on the July 6 sample failed for Rainbow Trout with 90% mortality. As per the Wastewater Systems Effluent Regulation, acute lethality to Rainbow Trout was resampled on July 13, July 27 and August 18, all returning in a 0% mortality rate.

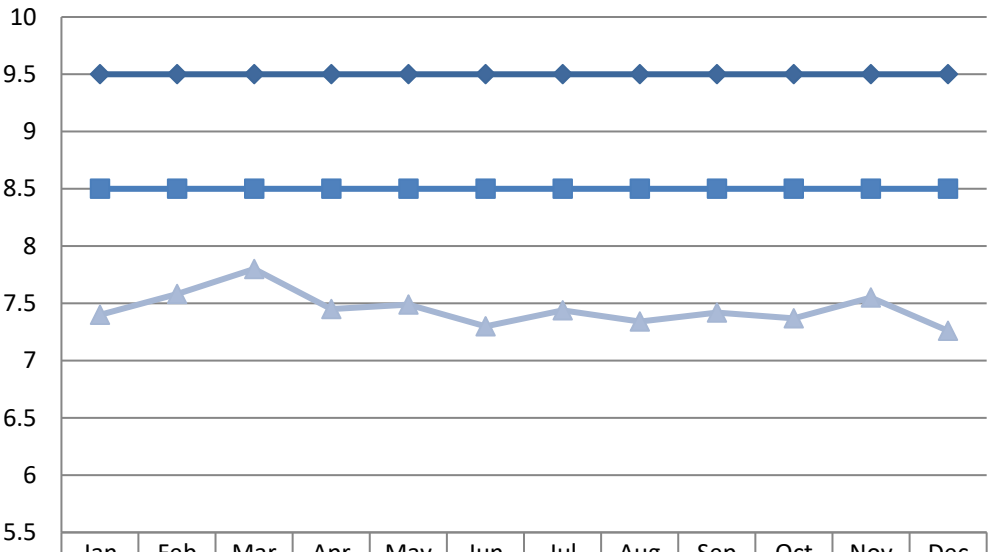
All of the remaining 2021 samples resulted in a 0% mortality rate for both Rainbow Trout and Daphnia Magna. A summary of the results are provided in **Appendix I: Acute Lethality Analysis Results**.

pH

ECA 1696-BPLL4R set a pH compliance limit within the range of 6.0 to 9.5, inclusive, at all times on the effluent. Every pH reading in 2021 was within the compliance limits set by the ECA.

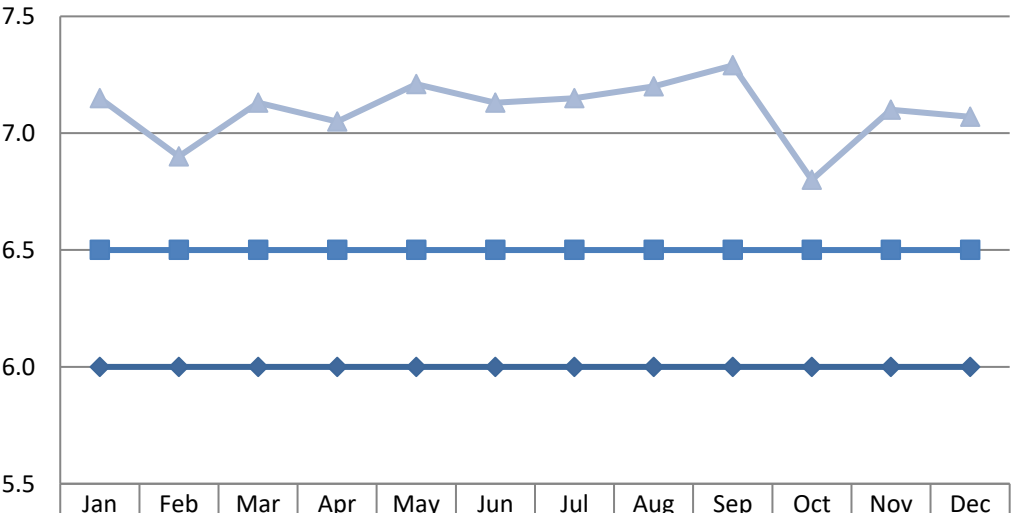
ECA 1696-BPLL4R set the pH objective of each single sample result between 6.5 and 8.5, inclusive, at all times on the effluent. Every pH reading in 2021 was within the compliance objectives set by the ECA.

Graph 41: 2021 Monthly Final Effluent Maximum pH Concentration Comparisons



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max Limit	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
Max Objective	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Max	7.40	7.58	7.80	7.45	7.49	7.30	7.44	7.34	7.42	7.37	7.55	7.26

Graph 42: 2021 Monthly Final Effluent Minimum pH Concentration Comparisons

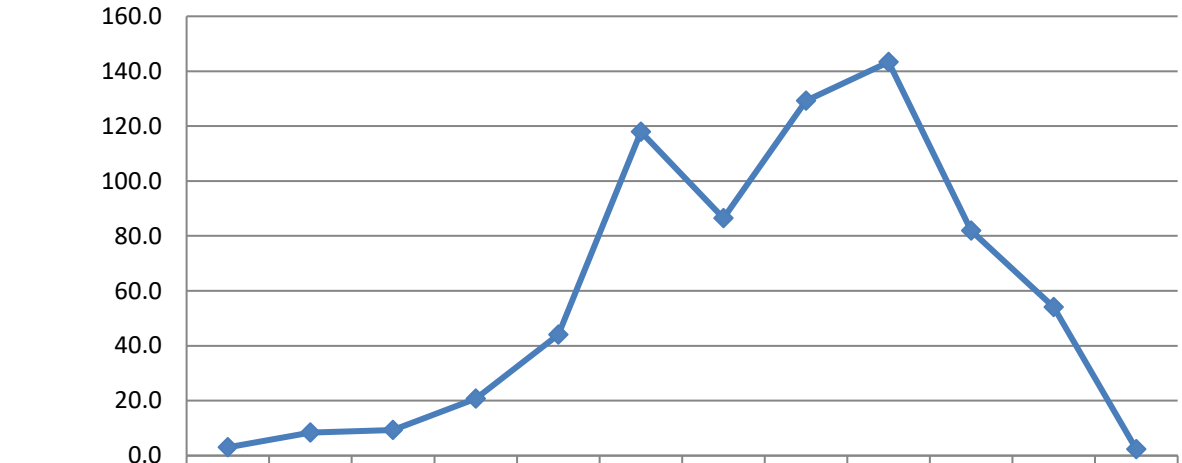


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Min Limit	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Min Objective	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Min	7.15	6.90	7.13	7.05	7.21	7.13	7.15	7.20	7.29	6.80	7.10	7.07

Unionized Ammonia

Unionized Ammonia is calculated monthly based on the final effluent total ammonia nitrogen results and the field pH and temperature collected at the same time as the TAN sample. The average monthly results ranged between 2.3 ug/L and 143.3 ug/L. ECA 1696-BPLL4R does not set a Unionized Ammonia limit or objective.

Graph 43: 2021 Monthly Final Effluent Unionized Average Concentration



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg (ug/L)	3.1	8.4	9.3	20.7	44.1	117.9	86.5	129.2	143.3	82.0	54.1	2.3

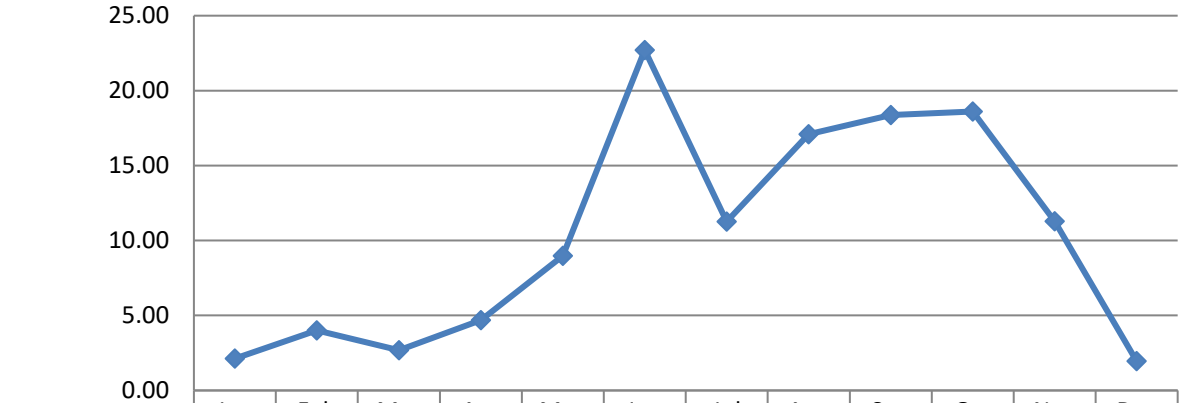
Additional Parameters

The following parameters are requirements of ECA 1696-BPLL4R, but are not designated average concentration limits or average waste loading limits.

TKN

Total Kjeldahl Nitrogen is sampled weekly and the average monthly results ranged between 1.95 mg/L and 22.71 mg/L.

Graph 44: 2021 Monthly Final Effluent TKN Average Concentration

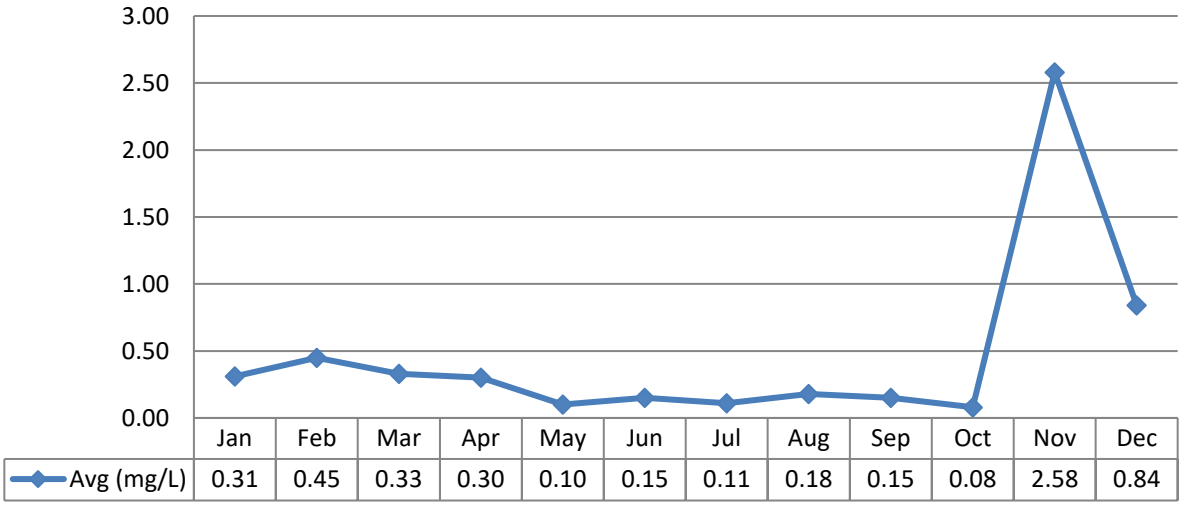


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg (mg/L)	2.12	4.00	2.68	4.70	8.98	22.71	11.26	17.10	18.38	18.60	11.28	1.95

Nitrite as Nitrogen

Nitrite is sampled weekly and the average monthly results ranged between 0.08 mg/L and 2.58 mg/L.

Graph 45: 2021 Monthly Final Effluent Nitrite Average Concentration

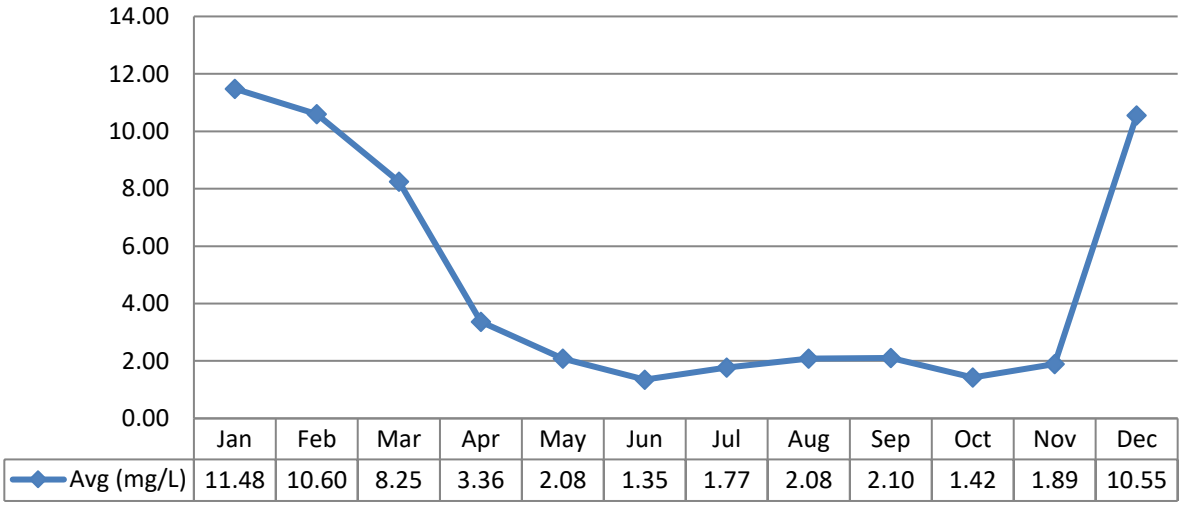


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg (mg/L)	0.31	0.45	0.33	0.30	0.10	0.15	0.11	0.18	0.15	0.08	2.58	0.84

Nitrate as Nitrogen

Nitrate is sampled weekly and the average monthly results ranged between 1.35 mg/L and 11.48 mg/L.

Graph 46: 2021 Monthly Final Effluent Nitrate Average Concentration

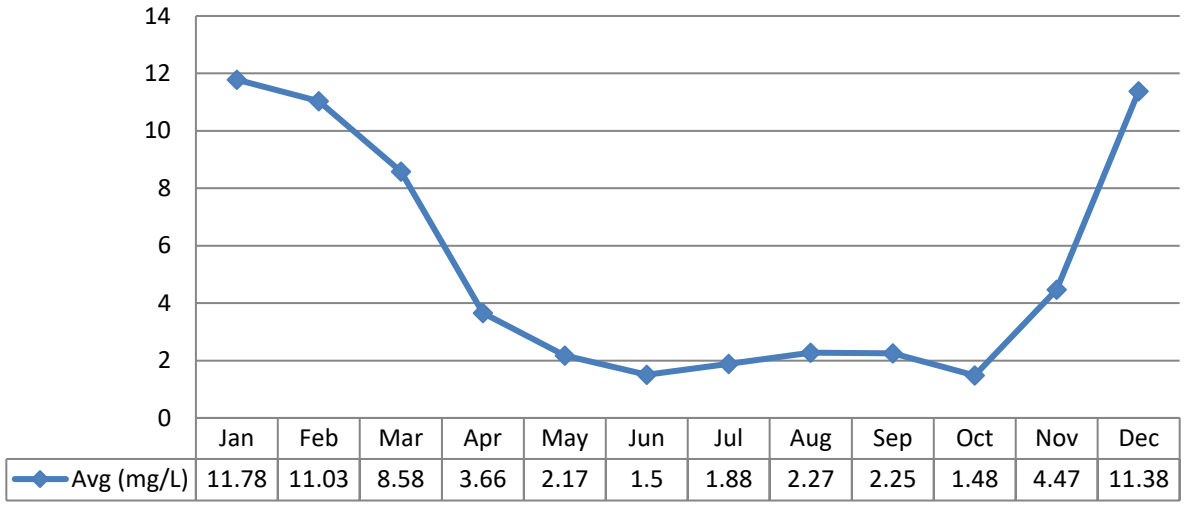


	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg (mg/L)	11.48	10.60	8.25	3.36	2.08	1.35	1.77	2.08	2.10	1.42	1.89	10.55

Nitrite+Nitrate as Nitrogen

Nitrite+Nitrate is sampled weekly and the average monthly results ranged between 1.48 mg/L and 11.78 mg/L.

Graph 47: 2021 Monthly Final Effluent Nitrite+Nitrate Average Concentration



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg (mg/L)	11.78	11.03	8.58	3.66	2.17	1.5	1.88	2.27	2.25	1.48	4.47	11.38

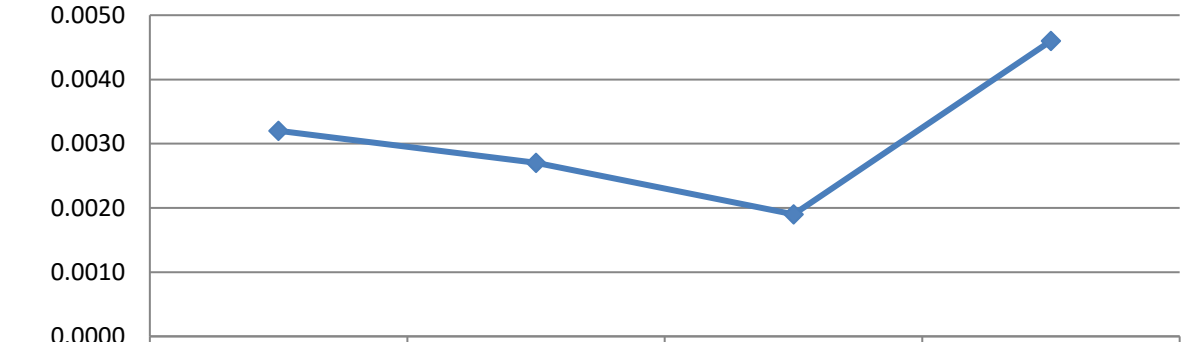
Final Effluent Samples Used For Leachate Related Monitoring

Samples are collected of the Final Effluent quarterly for the purpose of Leachate related monitoring for the Lindsay Landfill as a requirements of ECA 1696-BPLL4R

Copper

Copper was sampled quarterly in 2021 and the results ranged between 0.0019 mg/L and 0.0046 mg/L.

Graph 48: 2021 Final Effluent Copper Concentration

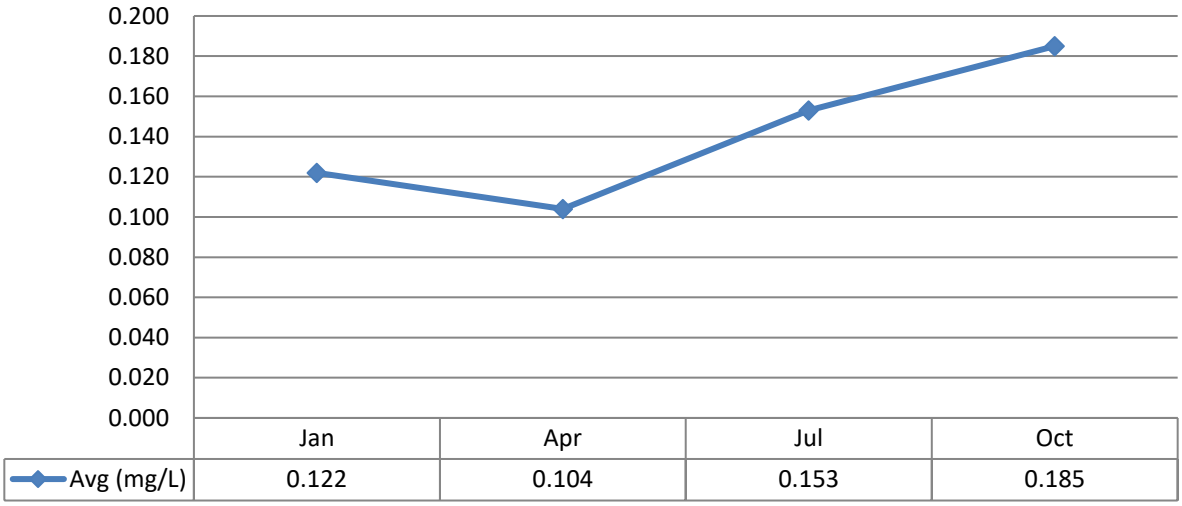


	Jan	Apr	Jul	Oct
(mg/L)	0.0032	0.0027	0.0019	0.0046

Boron

Boron was sampled quarterly in 2021 and the results ranged between 0.104 mg/L and 0.185 mg/L.

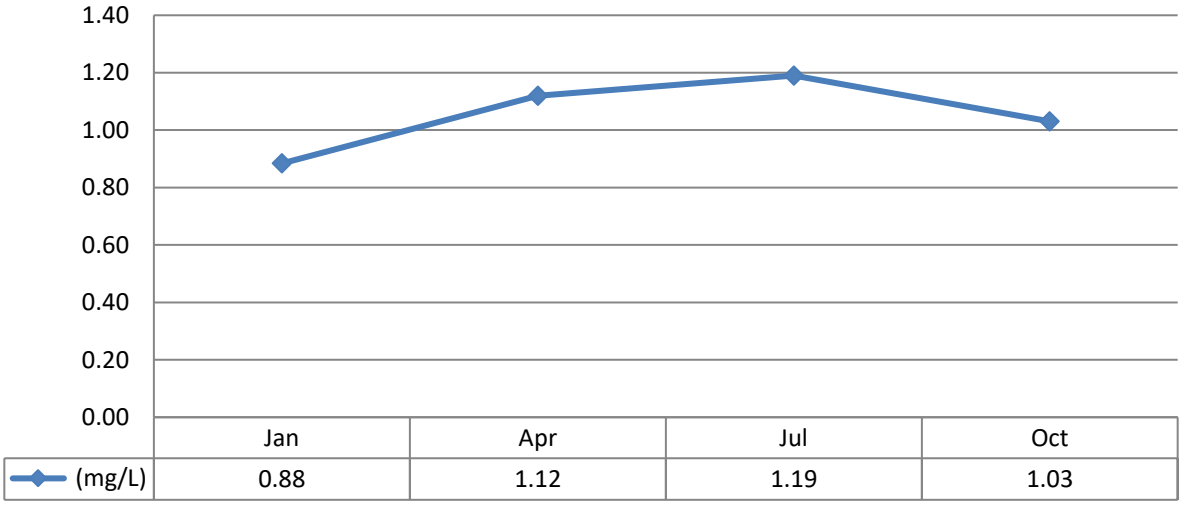
Graph 49: 2021 Final Effluent Boron Concentration



Aluminum (Total)

Aluminum was sampled quarterly in 2021 the results ranged between 0.88 mg/L and 1.19 mg/L.

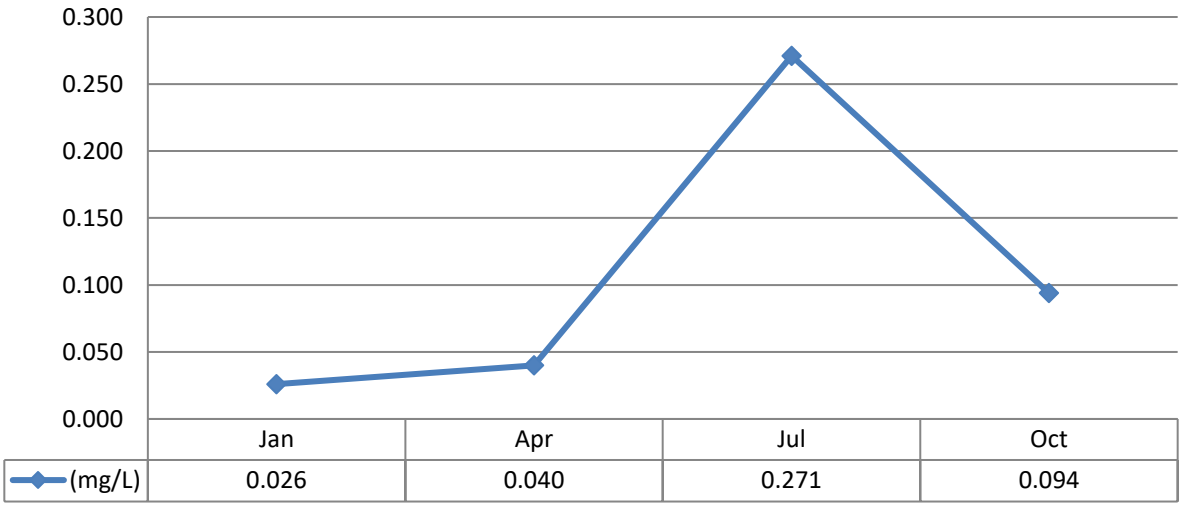
Graph 50: 2021 Final Effluent Aluminum Concentration



Iron (total)

Iron was quarterly in 2021 and the results ranged between 0.026 mg/L and 0.271 mg/L.

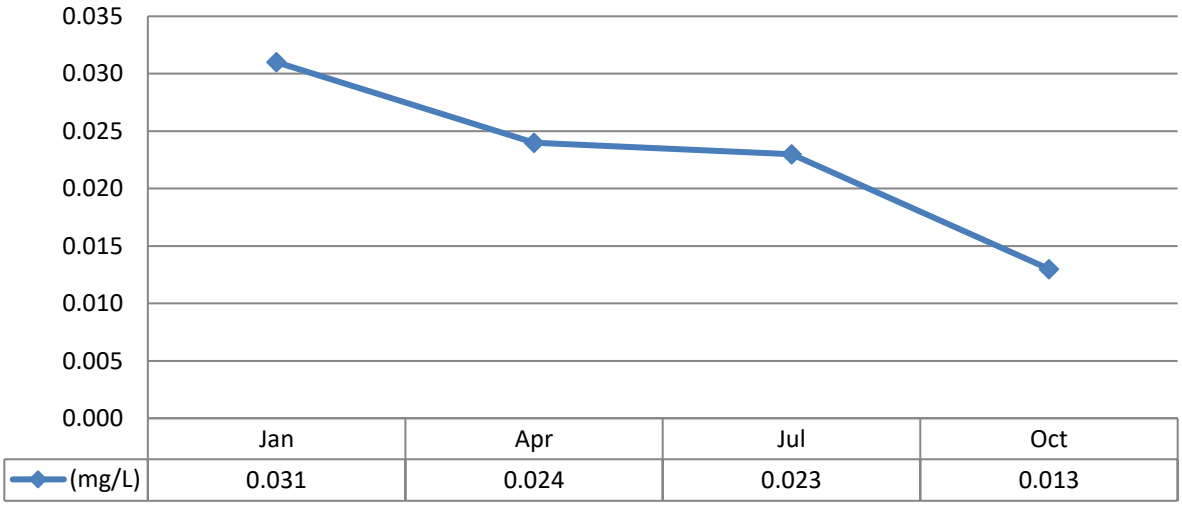
Graph 51: 2021 Final Effluent Iron Concentration



Zinc (total)

Zinc was sampled quarterly in 2021 and the results ranged between 0.013 mg/L and 0.031 mg/L.

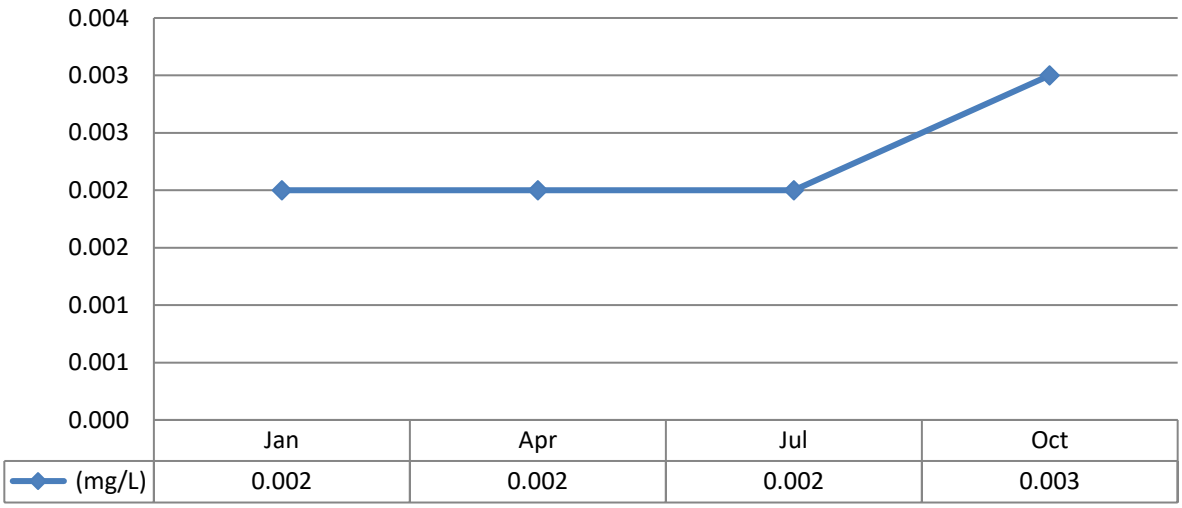
Graph 52: 2021 Final Effluent Zinc Concentration



4AAP-Phenolics

4AAP-Phenolics was sampled quarterly in 2021 and the results ranged between 0.002 mg/L and 0.003 mg/L.

Graph 53: 2021 Final Effluent 4AAP-Phenolics Concentration



Benzene

Benzene was sampled quarterly in 2021 and the results were consistent each quarter at <0.5 ug/L.

Toluene

Toluene was sampled quarterly in 2021 and the results were consistent each quarter at <0.5 ug/L.

Ethylbenzene

Ethylbenzene was sampled quarterly in 2021 and the results were consistent each quarter at <0.5 ug/L.

Xylene

Xylene was sampled quarterly in 2021 and the results were consistent each quarter at <0.5 ug/L

Quarterly Samples

ECA 1696-BPLL4R requires a grab sample be collected at least quarterly and analyzed for Bis (2-ethylhexyl) Phthalate, Cobalt, Magnesium, Manganese, Potassium and Strontium. Limits are not defined in the ECA.

Table 2: 2021 Final Effluent Results for Samples Required by ECA 1696-BPLL4R.

Parameter	January 5, 2021	April 6, 2021	July 6, 2021	October 5, 2021
Bis (2-ethylhexyl) Phthalate (ug/L)	<2	<2	<2	<2
Cobalt (mg/L)	0.000159	0.000177	0.000167	0.000161
Magnesium (mg/L)	13.4	14.5	13.4	14.2
Manganese (mg/L)	0.0268	0.0284	0.102	0.0651
Potassium (mg/L)	11.3	12.5	13.8	15.8
Strontium (mg/L)	0.418	0.394	0.385	0.321

C) The following details describe all operating problems encountered during the reporting period and the corrective actions taken.

Table 3: 2021 Lindsay WWTP Operational Challenges

January	Logie SPS Level Transducer Failure	Replaced transducer
	Grit Removal Blower Failure	Replaced blower
	Actiflo Alum Pump 1 Failure	Replaced diaphragm pump
February	Aerator 311	Temporarily attached spare 10hp motor. New motor installed March 11, 2021
	Mary St SPS Milltronics – Grease Affecting Readings	Cleaned milltronics sensor
March	Actiflo 1 Injection Mixer Repair – Blades Sheared Off	Replaced three blades
	Fairgrounds SPS – Valve Chamber Sump Pump	Pump failed – replaced with new
	Alum Pump 703 Troubleshoot	Replace brushes on motor.
April	April 2021 Monthly TAN Exceedance	Environmental Compliance Approval #1696-BPLL4R sets the monthly TAN average concentration effluent limit between October and April at 3.0 mg/L and the April 2021 TAN average concentration was 4.0 mg/L. See **Appendix VI - Bypasses, Overflows, Spills, Abnormal Events** for details.
	Aerator 301 Failure	Motor rewound and reinstalled on May 10, 2021
	Screw Compactor Failure	Shaft repaired and replaced

May	Jennings Creek SPS Pump 1 Seal Failure	Sent for repair and reinstalled on July 15, 2021
	Bar screen failure	Repaired December 21, 2021
	Aerator 304 Failure – Sheered propeller	Taken out of service, replaced with 10 hp spare motor June 11, 2021
	Aerator 305 Failure – Bearing issue	Bearing repaired and put back into service May 31, 2021
	Aerator 311 – Tipped Over	In operation but tipped due to broken cable, corrected June 11, 2021
	May 2021 Monthly TAN Exceedance	Environmental Compliance Approval #1696-BPLL4R sets the monthly TAN average concentration effluent limit between May and September at 1.5 mg/L and the May 2021 TAN average concentration was 8.08 mg/L. See **Appendix VI - Bypasses, Overflows, Spills, Abnormal Events** for details.
June	June 9, 2021 – Outside Normal Operating Conditions	Low dissolved oxygen caused by mechanical aerator breakdown, and increasing Total Suspended Solids, TAN and TP in the final effluent. Returned to Normal Operating Conditions July 30, 2021 See **Appendix VI - Bypasses, Overflows, Spills, Abnormal Events** for Action Plan submitted to MECP.
	Jet Aerator 302 Failure– Recovery	Divers hired to recover aerator on July 5, 2021
	Aerator 304 Failure	Replaced with 10hp spare
	June 2021 Monthly Total Phosphorus (TP), Total (Ammonia+Ammonium) Nitrogen (TAN) and E.coli Exceedances	•Total Phosphorus (TP) average concentration effluent limit is 0.2mg/L. The June 2021 TP average concentration was 0.43 mg/L. •Total (Ammonia+Ammonium) Nitrogen (TAN) average concentration effluent limit between May and September is 1.5 mg/L, and the monthly average waste loading limit is 32.3 kg/day. The June 2021 TAN average concentration was 19.71 mg/L and loading 173.66 kg/day. •E.coli (EC) monthly geomean effluent limit is 200 cfu/100ml. The June 2021 EC geomean average concentration was 1272.21 cfu/100ml.

		See **Appendix VI - Bypasses, Overflows, Spills, Abnormal Events** for details.
July	Jennings Creek SPS Pump 3 Seal Failure	Sent for repair and reinstalled on November 17, 2021
	Aerator 307 Repair – Drive Shaft	Repaired and reinstalled on August 19, 2021
	Aerator 301 Repair – Impeller and Bearings	Repaired and reinstalled on August 19, 2021
	Alum Pump 702 Failure	Temporary motor installed on diaphragm pump, replacement motor purchased July 29, 2021
	July 2021 Monthly Total (Ammonia+Ammonium) Nitrogen (TAN) Exceedance	Environmental Compliance Approval #1696-BPLL4R sets the monthly TAN average concentration effluent limit between May and September at 1.5 mg/L and the July 2021 TAN average concentration was 10.00 mg/L. The monthly average waste loading limit between May and September is 32.3 kg/day and the July 2021 TAN loading was 127.37 kg/day. See **Appendix VI - Bypasses, Overflows, Spills, Abnormal Events** for details.
August	Aerator 301, 304	Installed 25 hp motors August 19, 2021
	August 2021 Monthly Total Phosphorus (TP), Total (Ammonia+Ammonium) Nitrogen (TAN) and E.coli Exceedances	• TP average concentration effluent limit is 0.2mg/L. The August 2021 TP average concentration was 0.334 mg/L. The loading limit for TP was not exceeded. •TAN average concentration effluent limit between May and September is 1.5 mg/L, and the monthly average waste loading limit is 32.3 kg/day. The August 2021 TAN average concentration was 15.06 mg/L and loading 118.73 kg/day. •E.coli monthly geomean effluent limit is 200 cfu/100ml. The August 2021 EC geomean average concentration was 1327.00. See **Appendix VI - Bypasses, Overflows, Spills, Abnormal Events** for details.
September	September 2021 Monthly TAN Exceedance	The monthly TAN average concentration effluent limit between May and September

		at 1.5 mg/L and the September 2021 TAN average concentration was 15.53 mg/L. The monthly average waste loading limit between May and September is 32.3 kg/day and the September 2021 TAN loading was 160.11 kg/day. See **Appendix VI - Bypasses, Overflows, Spills, Abnormal Events** for details.
	Aerator 302 Fault	Cleared rock from impeller September 2, 2021
	Aerator 304 Failure	Replace feed cable from local electrical disconnect on September 15, 2021
	Aerator 314 Repair – Cable Wrapped Around Impeller	Re-secured October 18, 2021
October	October Monthly Total Phosphorus (TP), Total (Ammonia+Ammonium) Nitrogen (TAN) and E.coli Exceedances	• (TP) average concentration effluent limit is 0.2mg/L and the TP monthly loading limit is 4.3 kg/d. The October 2021 TP average concentration was 0.65 mg/L and the loading was 6.39 kg/d. • (TAN) average concentration effluent limit between October 1 and April 30 is 3.0 mg/L, and the monthly average waste loading limit is 64.5 kg/day. The October 2021 TAN average concentration was 41.9 mg/L and loading 147.12 kg/day. • E.coli monthly geomean effluent limit is 200 cfu/100ml. The October 2021 EC geomean average concentration was 429.24. See **Appendix VI - Bypasses, Overflows, Spills, Abnormal Events** for details.
	Aerator 304 Failure	New motor installed November 5, 2021
November	November 2021 Monthly Total TAN Exceedance	Total (Ammonia+Ammonium) Nitrogen (TAN) average concentration effluent limit between October 1 and April 30 is 3.0 mg/L, and the monthly average waste loading limit is 64.5 kg/day. The November 2021 TAN average concentration was 10.86 mg/L and loading 109.27 kg/day. See **Appendix VI - Bypasses, Overflows, Spills, Abnormal Events** for details.
	Faulty Oxygen Sensor	Sensor replaced December 3, 2021

Operating issues which impacted the Lindsay WWTP meeting the Final Effluent concentration limits, loading limits or concentration objectives are addressed above in Section B.

D) OCWA uses a Work Maintenance System (WMS) to schedule normal maintenance activities and track repairs. WMS is a maintenance tracking system that can generate work orders as well as give summaries of completed and scheduled work. During the year, the operating authority at the facility generates scheduled work orders on a weekly, monthly and annual basis. The service work is recorded in the work order history. This ensures routine and preventive maintenance is carried out and assets are maintained to manufacturer's and/or industry standards. Emergency and capital repair maintenance is completed and added to the system.

Refer to **Appendix III: WMS Work Order Summary**.

E) Effluent quality assurance is maintained in several ways. Laboratory samples are sent to an accredited laboratory (SGS Canada Inc. or AquaTox Testing & Consulting Inc.) for analysis of all effluent parameters. Sampling calendars issued to the operators denoting frequency of sampling and these calendars are submitted to the Process Compliance Technician at the end of each month. Raw and effluent samples are collected as per the Environmental Compliance Approval and the results are reviewed on a regular basis to ensure compliance with the site's objectives and limits.

Work orders illustrating all scheduled and preventative maintenance to be completed are issued to the operator and/or mechanic. Upon completion staff enter results of the work order into OCWA's WMS system. OCWA conducts internal audits of the facility and develops Action Plans to ensure deficiencies are identified.

F) Calibrations on effluent monitoring equipment were performed by Franklin Empire in December 2021 for equipment located at the Lindsay Wastewater Treatment Plant and Pumping Stations. Masstec Weighing Systems completed calibrations on the Inbound and Outbound scales at the Lindsay Landfill on February 24, 2021 and December 29, 2021.

Refer to **Appendix IV: Calibration Reports**.

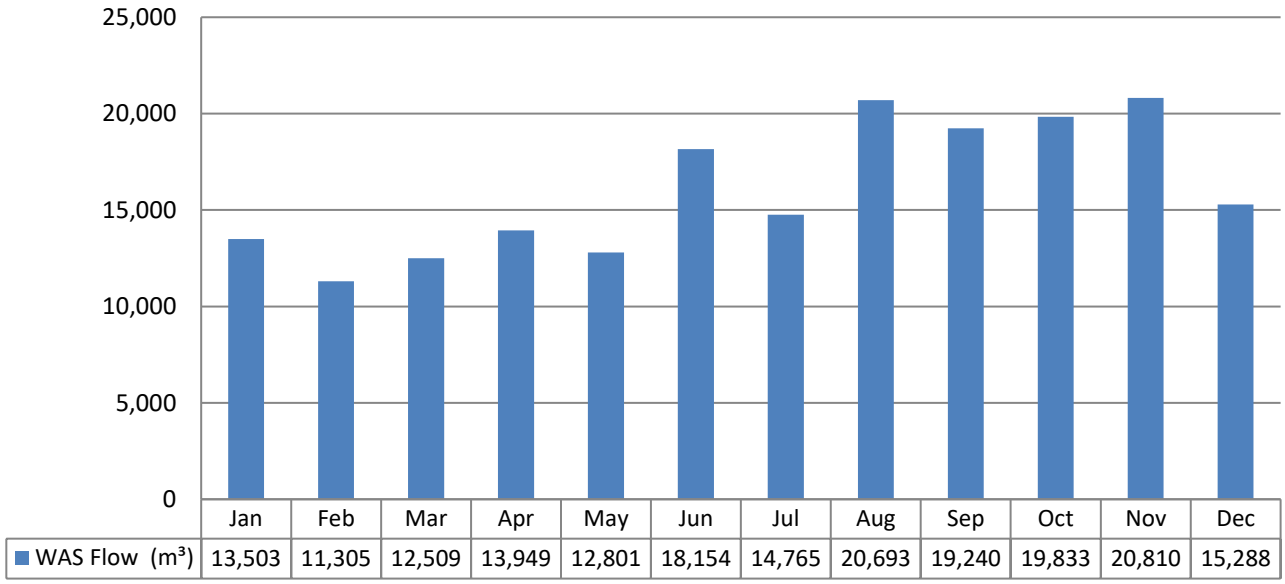
G) Continuous efforts were made to meet the Effluent Objectives in 2021:

1. Development of the sampling plan which meets or exceeds the minimum sample requirements as required in the ECA;
2. Visual Inspection of the entire process while performing rounds;

3. Influent monitoring;
4. Ensuring that chemicals are being dosed and adjusting as required;
5. Continually optimizing the Actiflo process;
6. Calibration of lab equipment;
7. Annual calibration of flow meters;
8. Performing preventative maintenance activities in accordance with work order schedules;
9. Performing in-house lab tests on days that data is collected;
10. Monitoring treatment processes by performing regular laboratory analysis and reviewing of lab results;
11. Sludge monitoring of primary clarifiers & adjustments to pumping volume based on tank levels to reduce solids carryover to the secondary clarifiers;
12. Visual review of microbiological activity of activated sludge to ensure appropriate F/M ratio;
13. Removing vegetation from the aeration lagoon.
14. Continual maintenance of aerators to ensure adequate oxygenation and ammonia removal.
15. Desludging project which will help reduce sludge lagoon decant liquid concentrations and lower influent loadings.
16. Pumping lagoon wastewater back to headworks was managed to reduce influent loadings when DO was low.

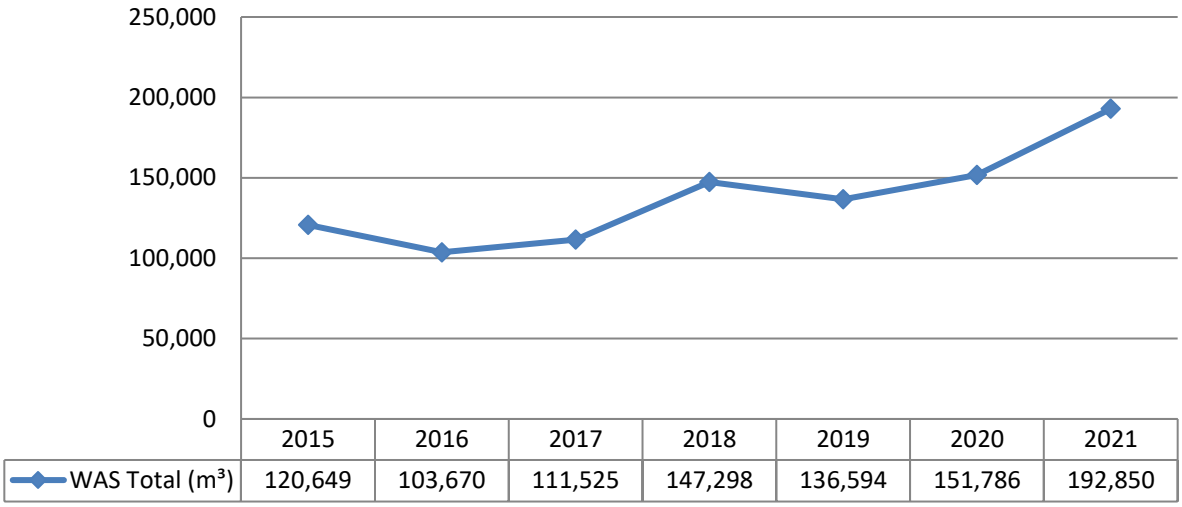
H) The total volume of sludge generated in 2021 was 192,850 m^3 which was a 24 percent (%) increase over the volume generated in 2020. Sludge is stored in onsite storage lagoons at the Lindsay WWTP and the volume is not expected to be appreciably different in the next reporting period.

Graph 54: 2021 Monthly Sludge Generation Volumes



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WAS Flow (m^3)	13,503	11,305	12,509	13,949	12,801	18,154	14,765	20,693	19,240	19,833	20,810	15,288

Graph 55: Historical Sludge Volume Comparisons



	2015	2016	2017	2018	2019	2020	2021
WAS Total (m^3)	120,649	103,670	111,525	147,298	136,594	151,786	192,850

Sludge Removal
There was no sludge removed from the Lindsay WWTP in 2021.

I) Summary of community complaints received during 2021 can be found in **Appendix V: Community Complaints.**

j) Summary of By-passes, Overflows, situations outside Normal Operation Conditions, spills within the meaning of Part X of EPA and abnormal discharge events during 2021.

Bypasses
There were not any bypasses at the Lindsay WWTP in 2021

Overflows
There were not any overflows at the Lindsay WWTP or pumping stations in 2021.

Refer to **Appendix VI: Bypasses, Overflows, Spills or Abnormal Events** for copies of the quarterly Bypass and Overflow reports submitted to the Ministry of the Environment, Conservation and Parks.

Situations outside Normal Operation Conditions

"Normal Operating Condition" means the condition when all unit process (es), excluding Preliminary Treatment System, in a treatment train is operating within its design capacity. In the instances of Situations outside Normal Operation Conditions, ECA 1696-BPLL4R directs to collect daily sample(s) of the Final Effluent, on any day when there is any situation outside Normal Operating Conditions and sample for CBOD, TSS, Total phosphorus, TKN. As a best practice, samples were also tested for TAN, Nitrite, Nitrate and Nitrite+Nitrate.

There was one instance of Situations outside Normal Operating Conditions in 2021.

Low dissolved oxygen caused by mechanical aerator breakdown, and increasing Total

Suspended Solids, TAN and TP in the final effluent, resulted in the facility to be outside of its Normal Operating Conditions beginning on June 9th, 2021 until July 30, 2021. Information was communicated to the Ministry of Environment, Conservation and Parks Water Inspector Brad Jackson that the plant is not operating as designed, and additional effluent sampling began alongside measures to remediate the operational deficiencies.

Refer to **Appendix VI: Bypasses, Overflows, Spills or Abnormal Events** for the Certificate of Analysis.

Spills

There was one spill in 2021. Alongside the aeration lagoon at the northeast corner, a portable recirculation pump was set up to assist in increasing dissolved oxygen in the aeration lagoon. Sometime between 17:30 on July 20, 2021 and 06:30 on July 21, 2021, the hose of the discharge of the pump split and failed, releasing mixed liquor. A significant portion of mixed liquor flowed back into the aeration lagoon, with some flowing along the access roadway along the lagoon cell and into Lagoon 3. All mixed liquor spilled was contained on site, with no direction to a receiving stream or end user. Maximum calculated volume 2,952.6m^3 .

Please note: This volume is a worst case scenario volume based on estimated pump flow and maximum time between pump observations. The actual Spill volume may be much less.

Abnormal Discharge Events

There were not any abnormal discharge events at the Lindsay WWTP in 2021.

K) There were not any Notices of Modifications to Sewage Works initiated, worked on or completed in 2021.

A summary of all modifications completed which did not require a Notices of Modifications to Sewage Works are included in **Appendix III: WMS Work Order Summary.**

L) During the 2021 reporting period there were no incidents of a bypass or overflow within the sanity sewer system or the WWTP. Therefore, no proposed projects to eliminate bypasses or overflows are forecasted for the 2022 reporting period.

M) ECA 1696-BPLL4R states that the annual report must contain “any change or updates to the schedule for the completion of construction and commissioning operations of major process(es)/equipment groups in the Proposed Works”

N) ECA 1696-BPLL4R states that the annual report must contain “a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year”

The 2021 sample plan states that weekly samples would be collected on Tuesdays and monthly samples would be collected on the first Tuesday of each month. Annual samples were scheduled to be sampled on July 6 2021. Weekly samples around the Christmas holidays were pre-planned to be taken on the Wednesday December 29, 2021 to accommodate for accredited lab holiday hours.

As noted in an email from Sargol Okhovatian, Ministry of the Environment, Conservation and Parks – Review Engineer Assistant, dated October 12, 2018, since neither the City of Kawartha Lakes nor the Ontario Clean Water Agency has control of the delivery schedule of Imported Sewage the monthly Imported Sewage samples are not required to be sampled on specific dates. As long as there is a minimum of one sample from each Imported Sewage stream (Abattoir Waste and Receiving Station) each month then there will be no deviation from the Sample Plan.

There were no deviations from the Sample Plan in 2021.

For the Lindsay WWTP 2022 Sample Plan refer to **Appendix II: 2022 Sample Plan**.