

Lindsay WWTP

Works # 110000383

Annual Wastewater Performance Report

Prepared For: The City of Kawartha Lakes

Reporting Period of January 1st – December 31st, 2020

Issued: March 15, 2021

Revision: 0

Operating Authorities:



OCWA

 ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

2020 Performance Report for the Lindsay Wastewater Treatment Plant

During 2020, the Lindsay WWTP was licensed under two Amended Environmental Compliance Approvals. (ECA) 7748-AYRL8C beginning January 1, 2020 ending June 28, 2020 and the current ECA 1696-BPLL4R beginning June 29, 2020. Rivera Park Sewage Pumping Station was licensed under an individual ECA #1328-AN5PBL. Reporting requirements for all ECAs are contained in this Performance Report.

ECA 7748-AYRL8C Section 11(4), ECA 1328-AN5PBL Section 8(3), and ECA1696-BPLL4R Section 4 require the Performance Report to contain the following:

- a. a summary and interpretation of all Influent, Imported Sewage and Processed Organic Waste 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 any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year;
- d. a summary of all operating issues encountered and corrective actions taken;
- e. 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;
- f. a summary of any effluent quality assurance or control measures undertaken;
- g. 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;
- h. 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;

i. 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;

j. a summary of any complaints received and any steps taken to address the complaints;

k. 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;

l. a summary of all Notice of Modifications to Sewage Works completed under ECA 7748-AYRL8C Paragraph 1.d. of Condition 10 and ECA 1328-AN5PBL, including a report on status of implementation of all modification along with report summarizing all modifications completed as a result of ECA 1328-AN5PBL Schedule B, Section 3.

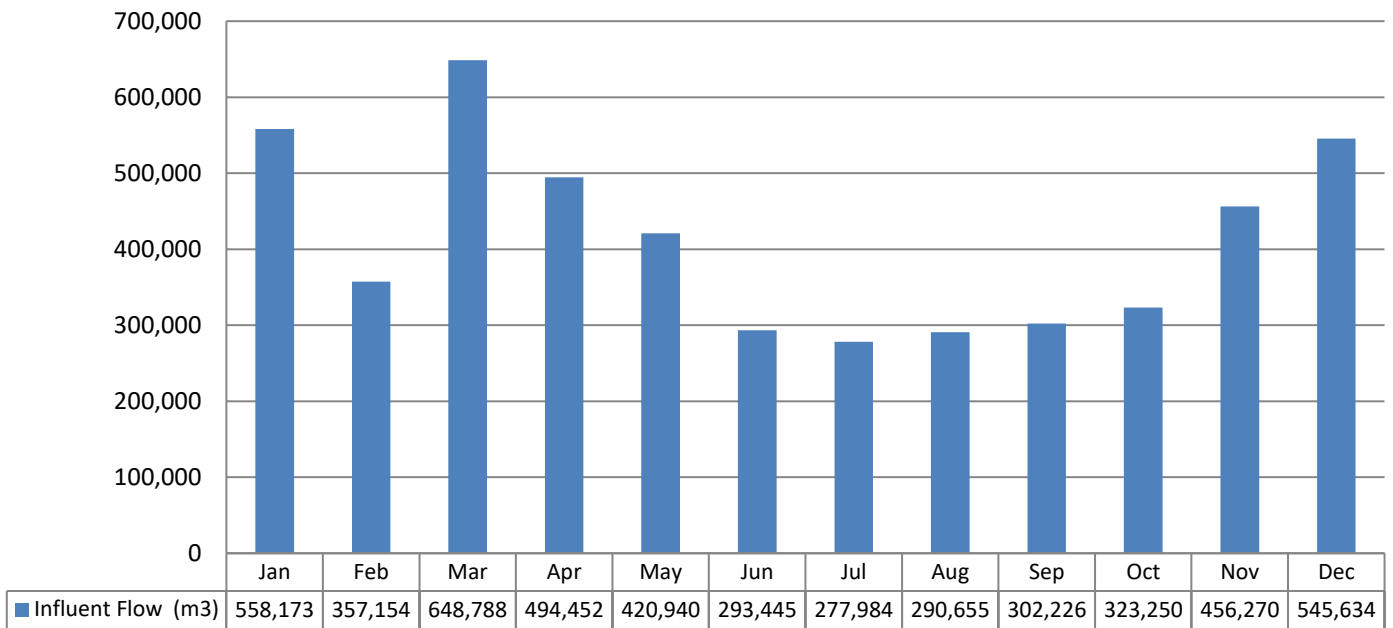
m. a summary of efforts made to achieve conformance with Procedure F-5-1 including but not limited to projects undertaken and completed in the sanitary sewer system that result in overall Bypass/Overflow elimination including expenditures and proposed projects to eliminate Bypass/Overflows with estimated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

a) Environmental Compliance Approval #7748-AYRL8C and #1696-BPLL4R requires a summary and interpretation of all Influent, Imported Sewage and Processed Organic Waste monitoring data, and a review of the historical trend of the sewage characteristics and flow rates.

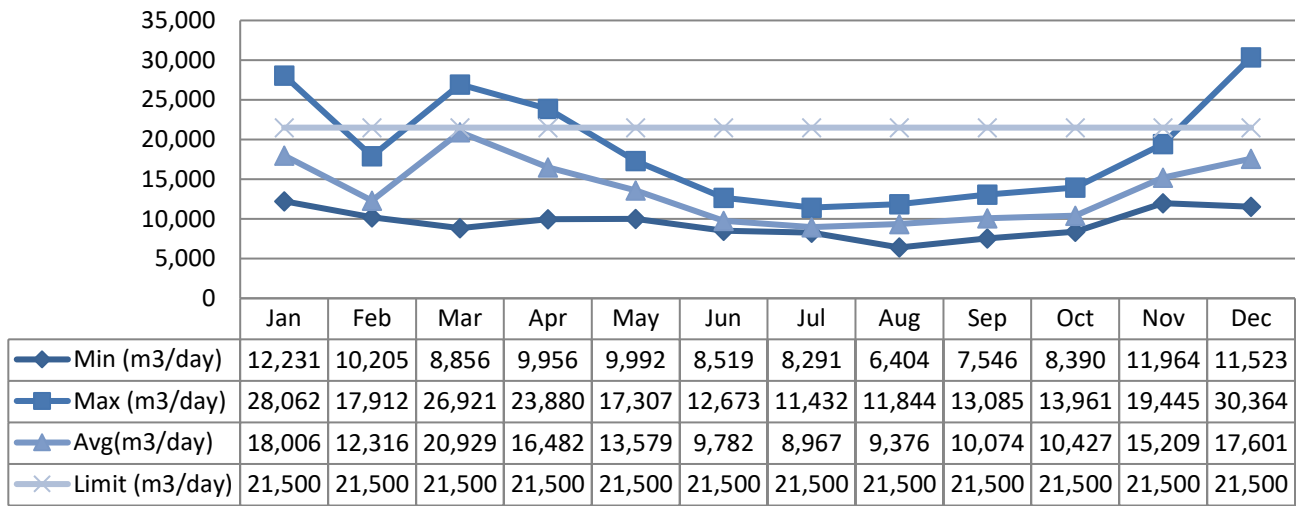
The Lindsay WWTP has a Rated Capacity of 21,500 m³/day and Actiflo rated capacity of 15,050 m³/d per train under #7748-AYRL8C and 30,100 m³/day under ECA 1696-BPLL4R. ECA 7748-AYRL8C and 1696-BPLL4R requires that everything practicable be undertaken to operate the Sewage Treatment Plant so that the annual average daily influent is within the Rated Capacity. The Rated Capacity of the Lindsay WWTP is 21,500 m³/day and the 2020 annual average daily influent flow was 13,576 m³/day or 63.1% of the Rated Capacity.

The total Influent flow in 2020 was 4,968,971 m³.

Graph 1: 2020 Influent Flow Monthly Totals

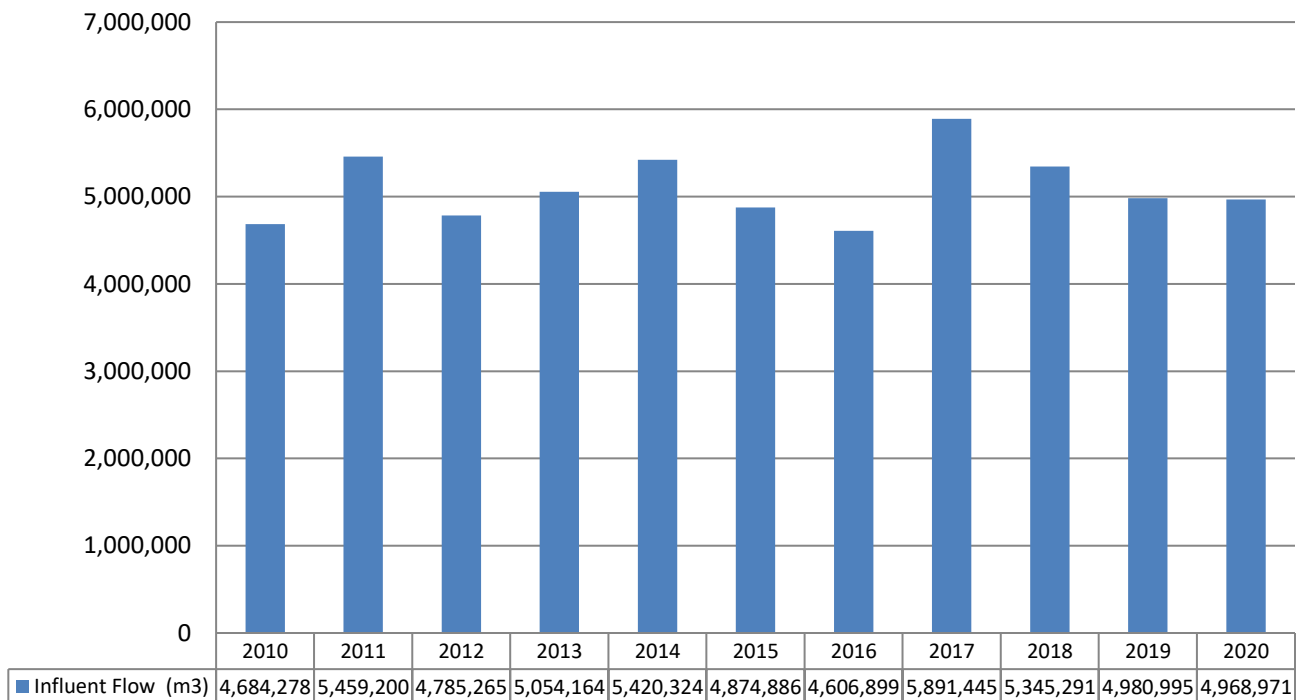


Graph 2: Influent Daily Minimum, Maximum and Average Flows



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 2020.

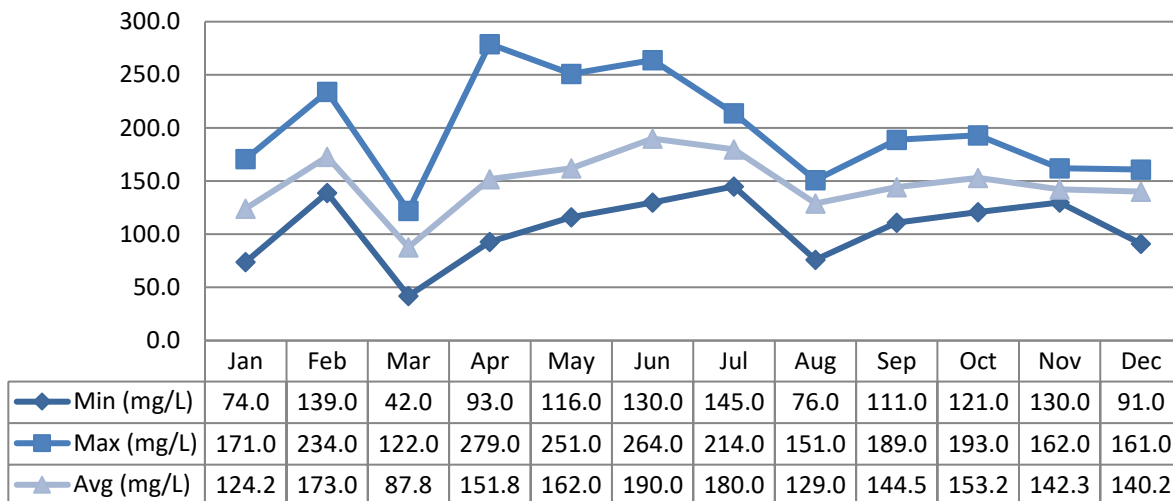
Graph 3: Historical Influent Flows from 2010 to 2020



Biochemical Oxygen Demand (BOD5)

ECA 7748-AYRL8C requires at least one composite sample be collected and analyzed monthly for 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 42mg/L to 279 mg/L.

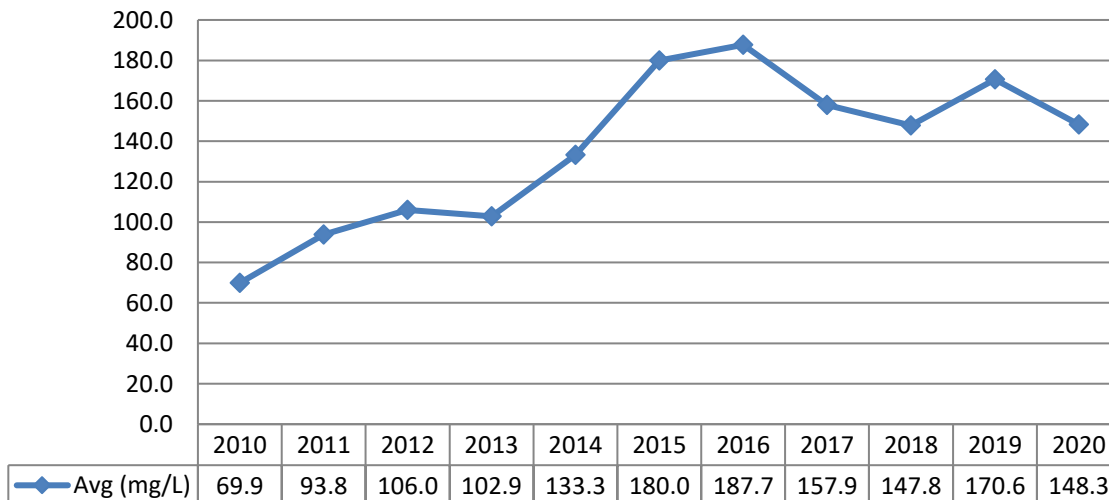
Graph 4: 2020 Monthly BOD5 Influent Concentration Comparisons



Biochemical Oxygen Demand Historical Trends

The Biochemical Oxygen Demand annual average has increased significantly between 2010 and 2020. The 2020 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.

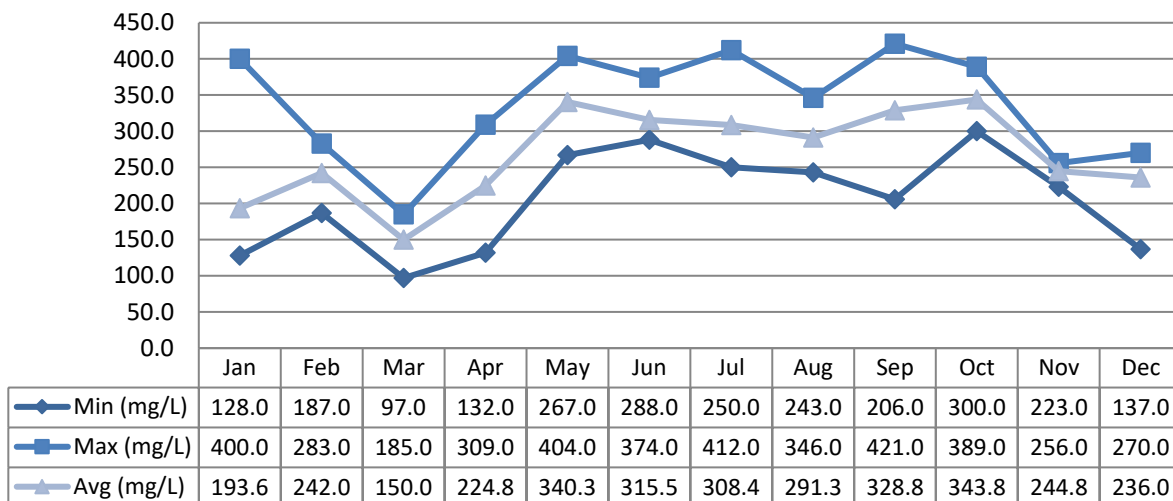
Graph 5: Historical Influent BOD5 Concentration Comparisons



Total Suspended Solids

ECA 7748-AYRL8C requires at least one composite sample be collected and analyzed monthly for 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 97 mg/L to 421 mg/L.

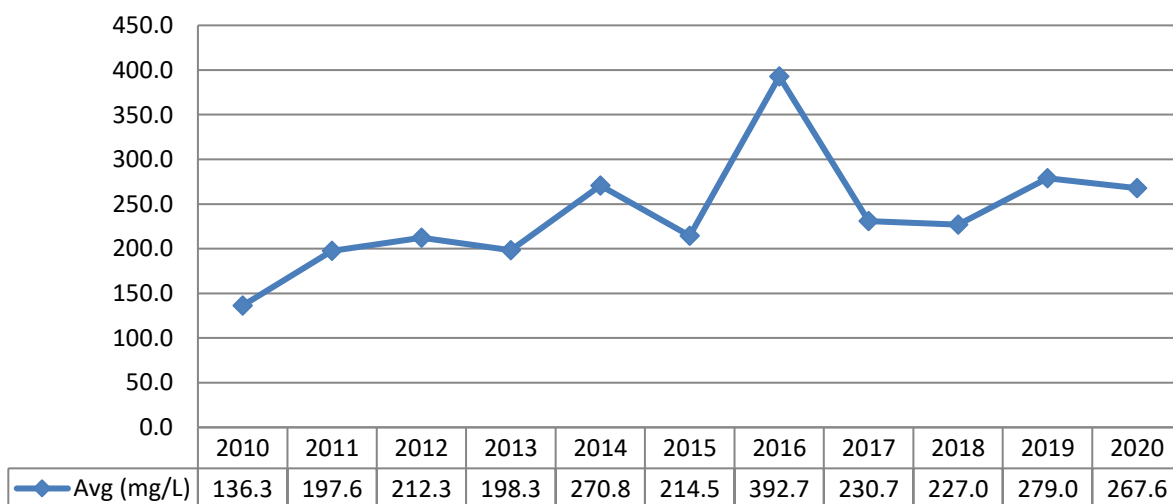
Graph 6: 2020 Monthly Total Suspended Solids Influent Concentration Comparisons



Total Suspended Solids Historical Review

The Total Suspended Solids annual average has increased significantly between 2010 and 2020 with the peak annual average in 2016. Although not confirmed, increased raw influent concentrations could be related to increased abattoir and septage receiving.

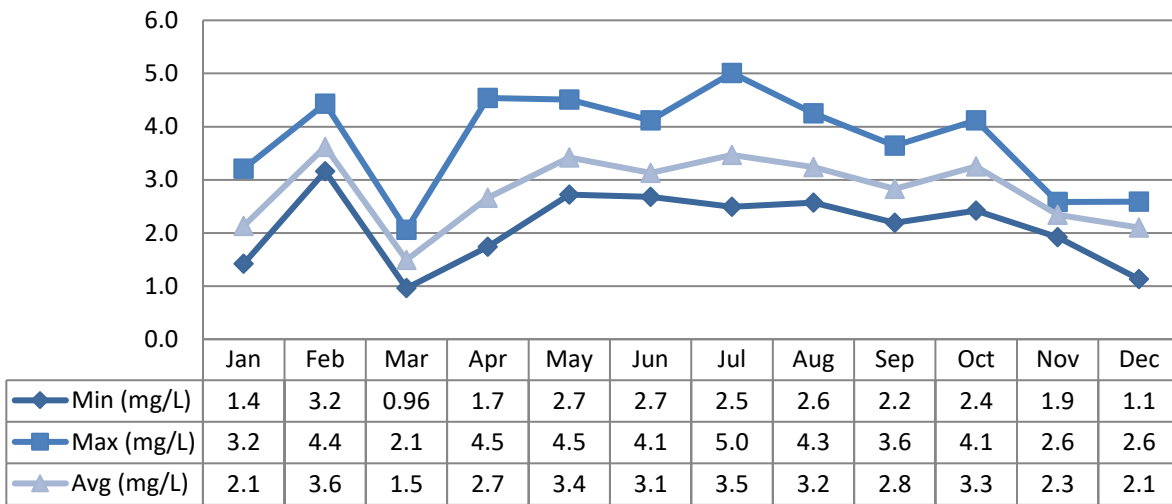
Graph 7: Historical Influent Total Suspended Solids Concentration Comparisons



Total Phosphorus

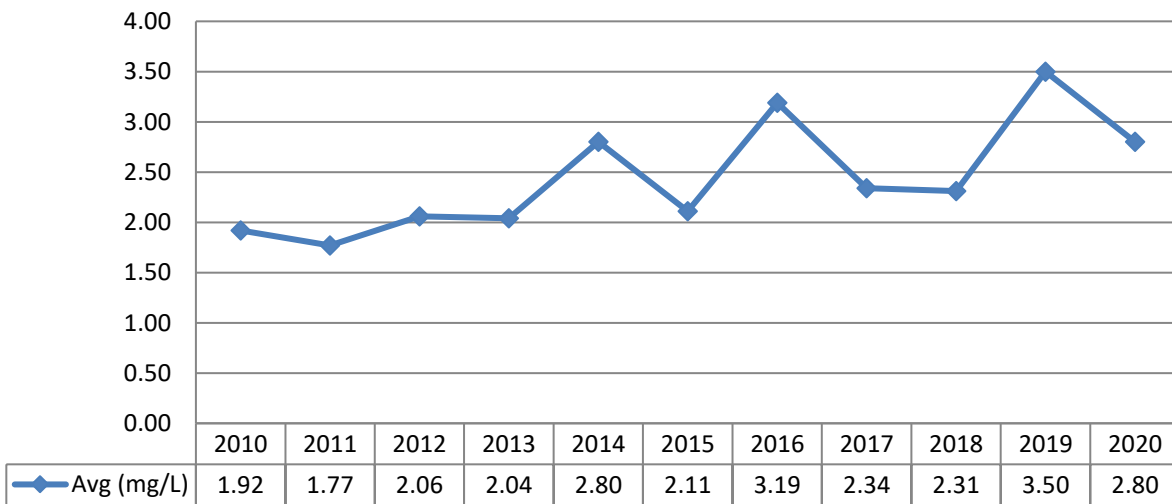
ECA 7748-AYRL8C require at least one composite sample be collected and analyzed monthly for Total Phosphorus. ECA 1696-BPLL4R requires at least one composite sample be collected and analyzed weekly for Total Phosphorus. The monthly average Total Phosphorus results ranged from 0.96 mg/L to 5.0 mg/L.

Graph 8: 2020 Monthly Total Phosphorus Influent Concentration Comparisons



Total Phosphorus Historical Trends

Graph 9: Historical Influent Total Phosphorus Concentration Comparisons



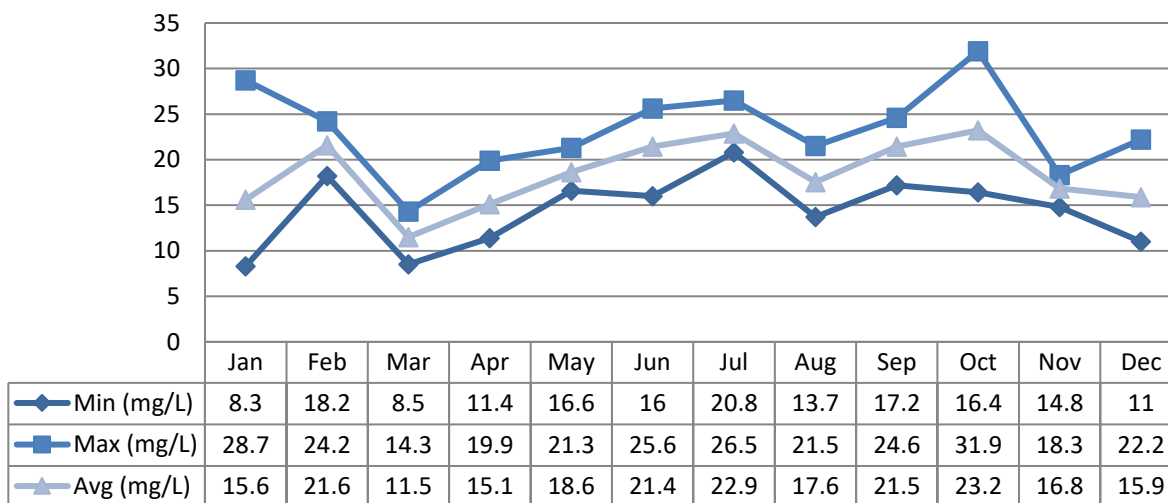
The Total Phosphorus annual average has increased between 2010 and 2020 with the minimum value being 1.77 mg/L and the maximum value being 3.50 mg/L. Although not

confirmed, increased raw influent concentrations could be related to increased abattoir and septage receiving.

Total Kjeldahl Nitrogen (TKN)

ECA 7748- AYRL8C require at least one composite sample be collected and analyzed monthly for Total Kjeldahl Nitrogen. 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 8.3 mg/L to 31.9 mg/L.

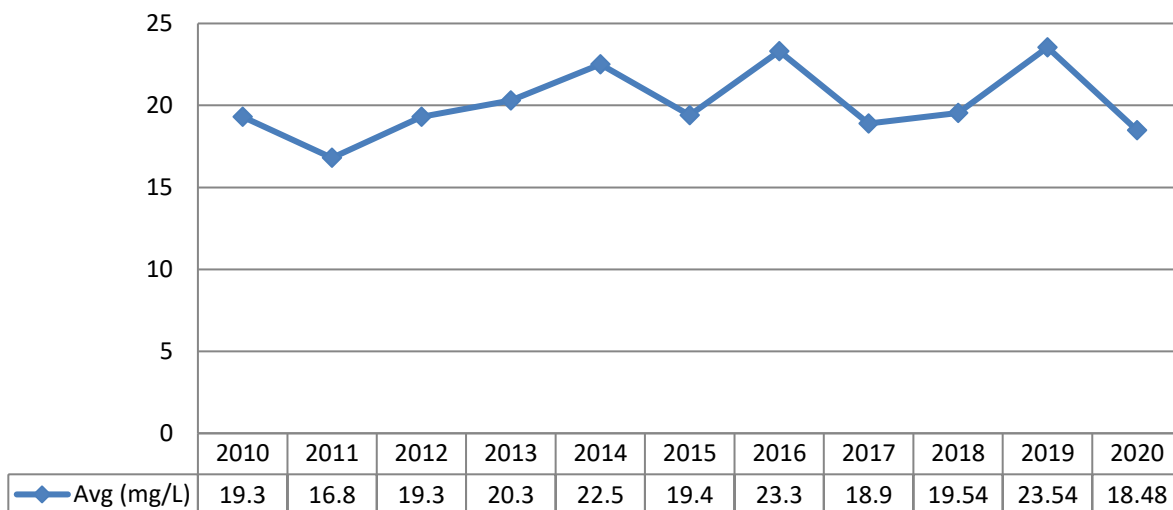
Graph 10: 2020 Monthly Total Kjeldahl Nitrogen Influent Concentration Comparisons



Total Kjeldahl Nitrogen Historical Review

The Total Kjeldahl Nitrogen annual average has remained fairly consistent between 2010 and 2020. The minimum annual average occurred in 2011 and the maximum annual average occurred in 2019.

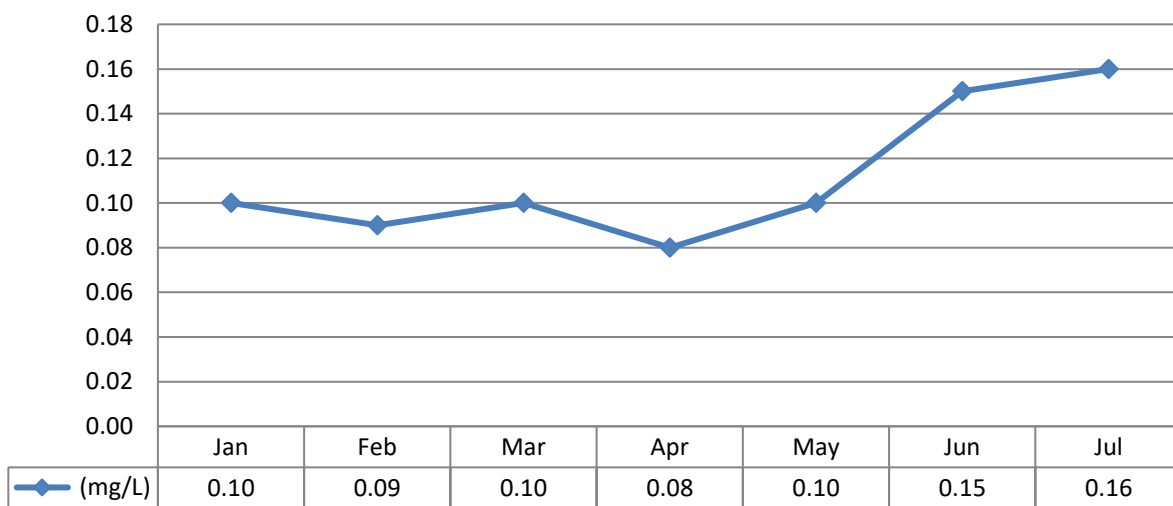
Graph 11: Historical Influent Total Kjeldahl Nitrogen Concentration Comparisons



Boron

ECA 7748-AYRL8C requires at least one composite sample be collected and analyzed monthly for Boron on the influent. This requirement was removed under ECA 1696-BPLL4R, effective June 29, 2020. The monthly average Boron results ranged from 0.09 mg/L to 0.16 mg/L in 2020.

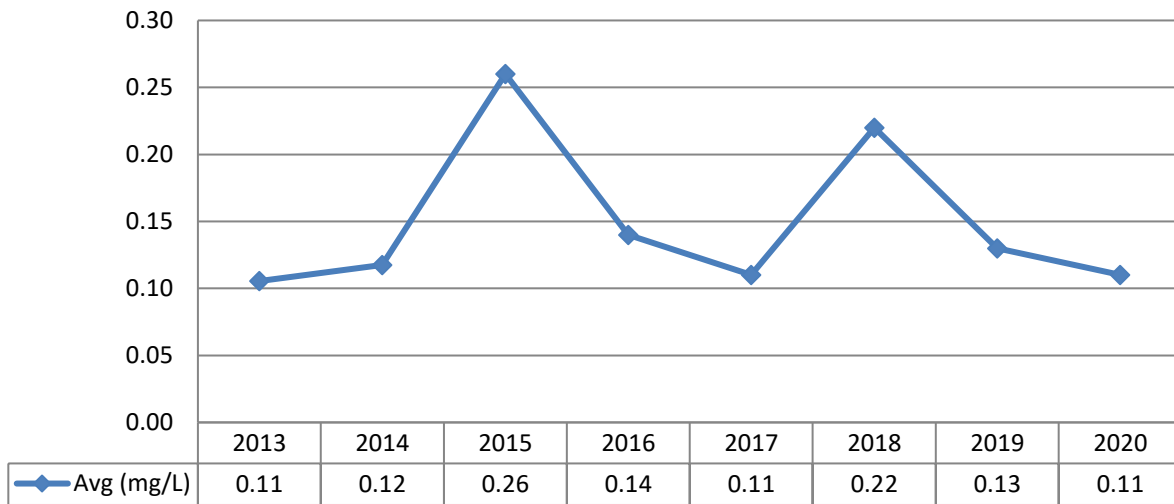
Graph 12: 2020 Monthly Boron Influent Concentration Comparisons



Boron Historical Review

The Boron annual average concentration has ranged from 0.11 mg/L in 2020 to 0.26 mg/L in 2015.

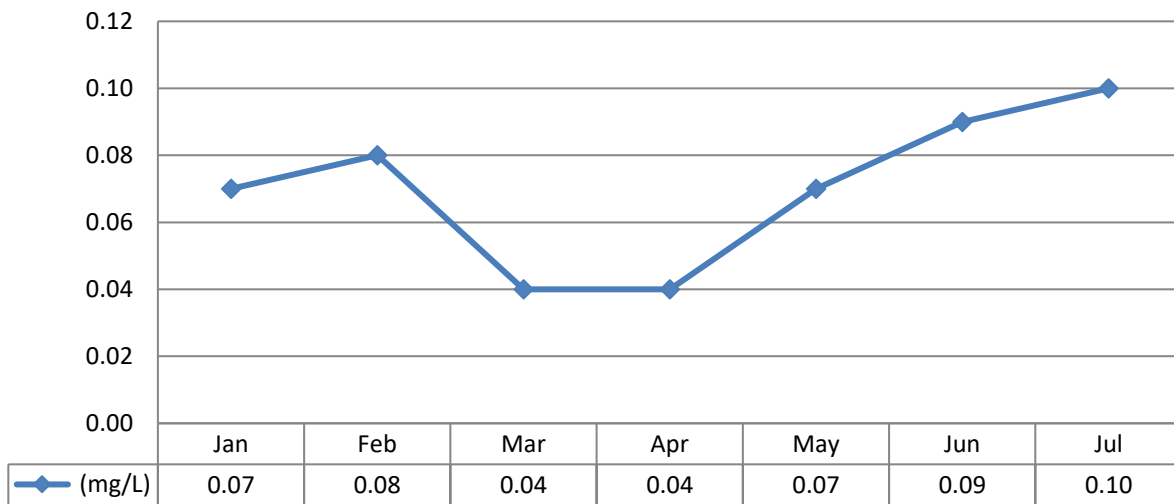
Graph 13: Historical Influent Boron Concentration Comparisons



Copper

ECA 7748-AYRL8C requires at least one composite sample be collected and analyzed monthly for Copper on the influent. This requirement was removed under ECA 1696-BPLL4R, effective June 29, 2020. The monthly average Copper results ranged from 0.04 mg/L to 0.10 mg/L.

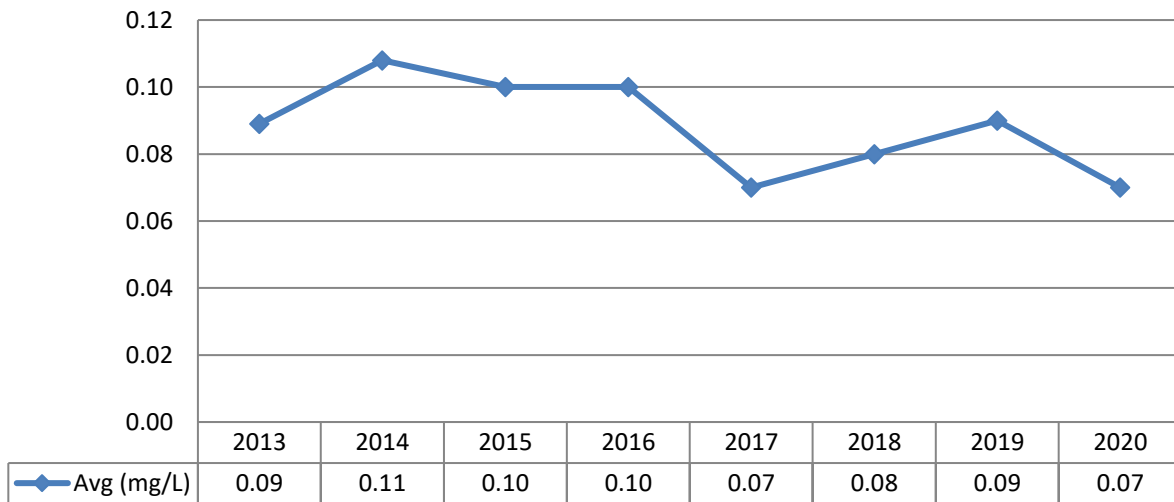
Graph 14: 2020 Monthly Copper Influent Concentration Comparisons



Copper Historical Review

The Copper annual average has remained fairly consistent between 2013 and 2020. The minimum annual average concentration occurred in 2017 and the maximum annual average concentration occurred in 2014.

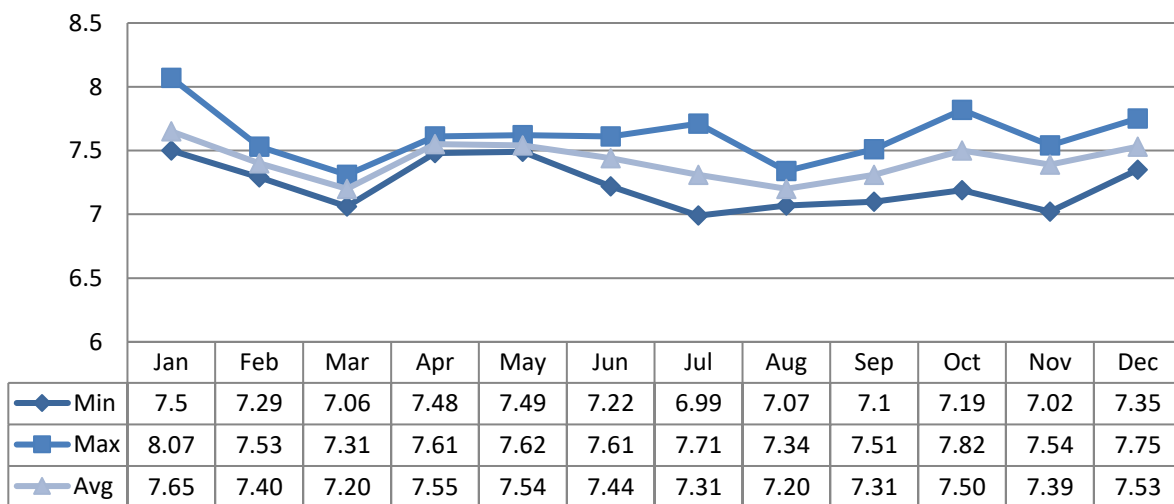
Graph 15: Historical Influent Copper Concentration Comparisons



pH

ECA 7748-AYRL8C and ECA 1696-BPLL4R do not require a pH sample be collected nor prescribes the sample frequency on the influent. pH results were fairly consistent throughout 2020 ranging from 6.99 to 8.07.

Graph 16: 2020 Monthly pH Influent Concentration Comparisons

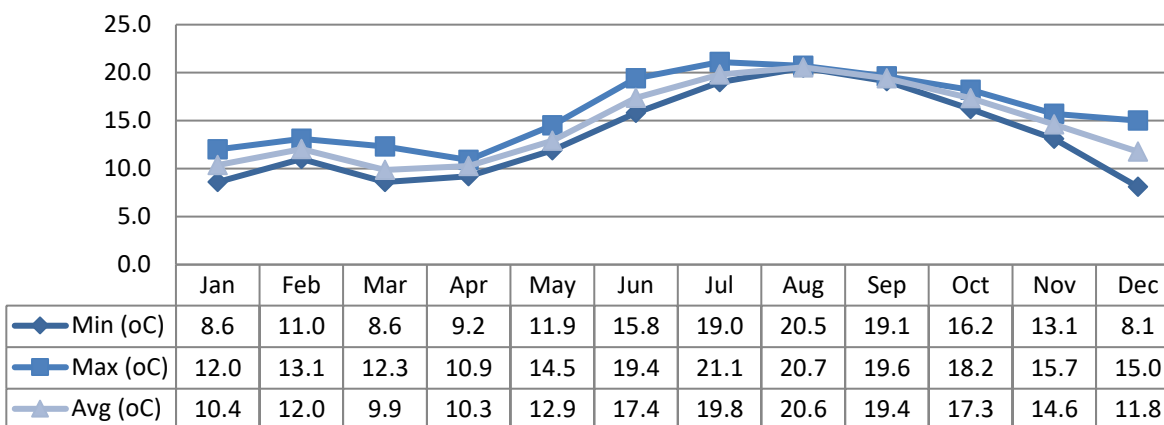


Historical pH data is only available from 2016 to 2020 and the pH levels remained fairly consistent between 6.54 and 8.03.

Temperature

Temperature samples were collected throughout 2020. ECA 7748-AYRL8C and ECA 1696-BPLL4R do not require a temperature sample be collected or prescribe sample frequency on the influent. 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 2019. Historical data is only available from 2016 to 2020 and the temperature ranged from 8.7° to 20.7°.

Graph 17: 2020 Monthly Temperature Influent Concentration Comparisons



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.

The requirement to sample Imported Sewage monthly was added as a condition of ECA 7748-AYRL8C (issued October 18, 2018). Prior to the issuance of ECA 7748-AYRL8C samples were collected of the Abattoir Waste but not of sewage from the Receiving Station. ECA 7748-AYRL8C requires monthly samples be collected of Imported Sewage and an email from the Ministry of Environment, Conservation and Parks (October 12, 2018) further outlines that monthly samples be collected from each stream of Imported Sewage. This directive continues with ECA 1696-BPLL4R.

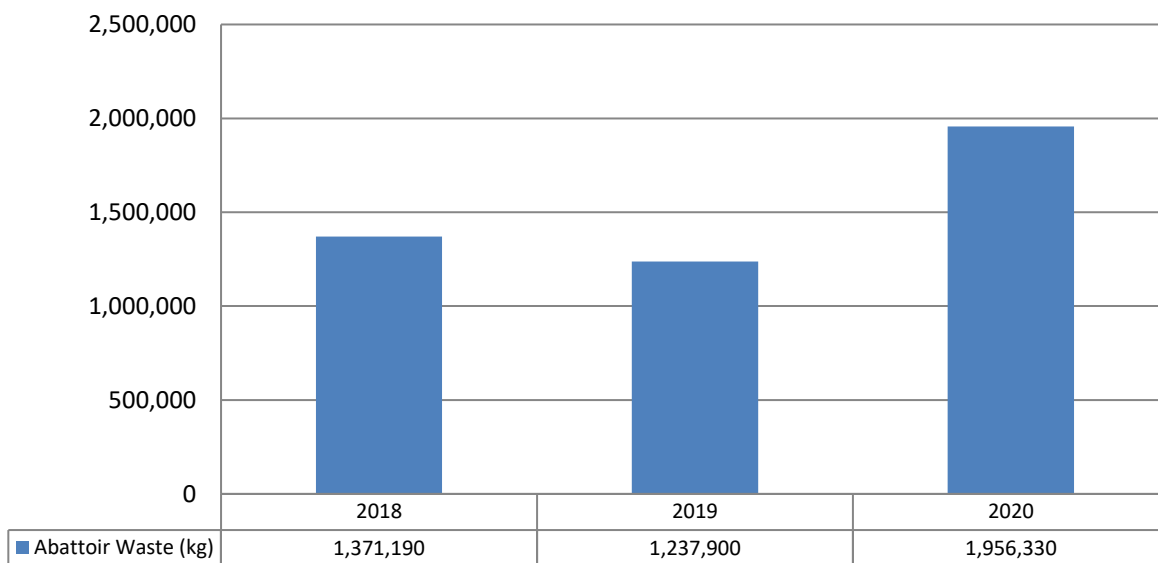
Abattoir Waste

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 2020 was 1,956,330.00kg. This was a significant increase in abattoir waste deposited over 2019, equaling a 58% increase in volume.

Graph 18: Historical Annual Abattoir Volume Comparisons

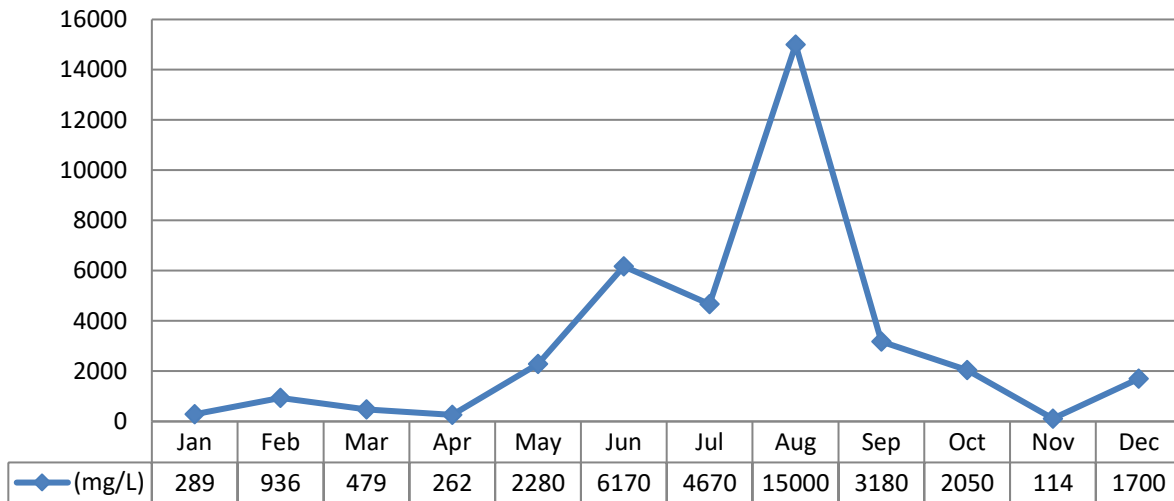


ECA 7748-AYRL8C and ECA 1696-BPLL4R require a grab sample be collected monthly and analyzed for BOD5, Total Suspended Solids, Total Phosphorus and Total Kjeldahl Nitrogen for each type of imported sewage. Although not required by either ECA, Total Ammonia Nitrogen was sampled and analyzed monthly in 2020. One sample in January 2020 was taken and analyzed for CBOD5, Nitrite as Nitrogen, Nitrate as Nitrogen and Nitrite+Nitrate as Nitrogen. Prior to 2020 Imported Sewage samples were tested for CBOD5, Nitrite, Nitrate and Nitrite+Nitrate as a best management practice. It was determined that CBOD5 sampling end as both ECAs requires BOD5 be tested. Nitrite, Nitrate and Nitrite+Nitrate were also discontinued as process optimization focused on ammonia removal (TAN).

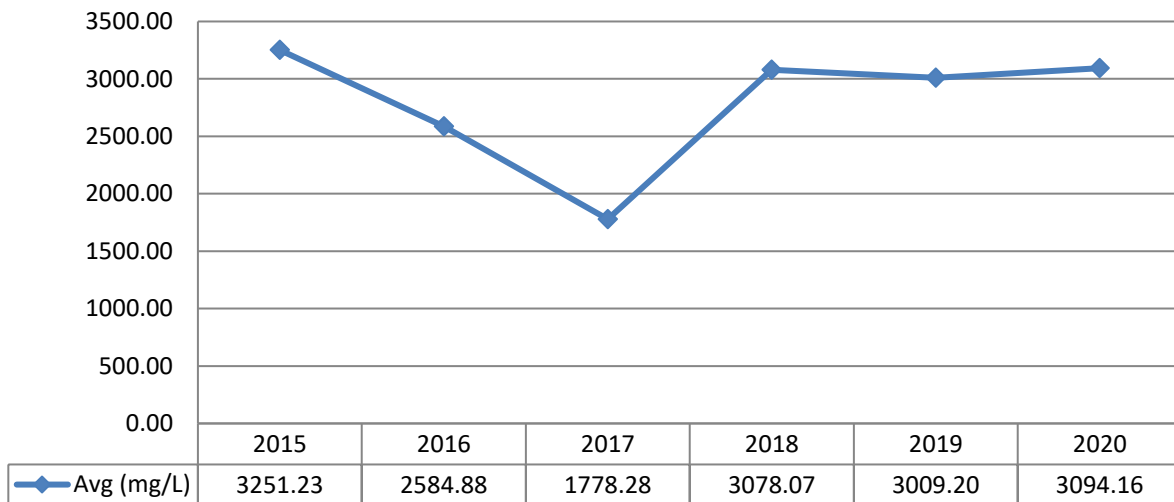
Biochemical Oxygen Demand (BOD5)

ECA 7748-AYRL8C and ECA 1696-BPLL4R require one grab sample be collected monthly and analyzed for BOD5. The BOD5 sample results ranged from 114 mg/L to 15000 mg/L.

Graph 19: 2020 Monthly BOD5 Abattoir Waste Concentration Comparisons



Graph 20: Historical BOD5 Abattoir Waste Concentration Comparisons

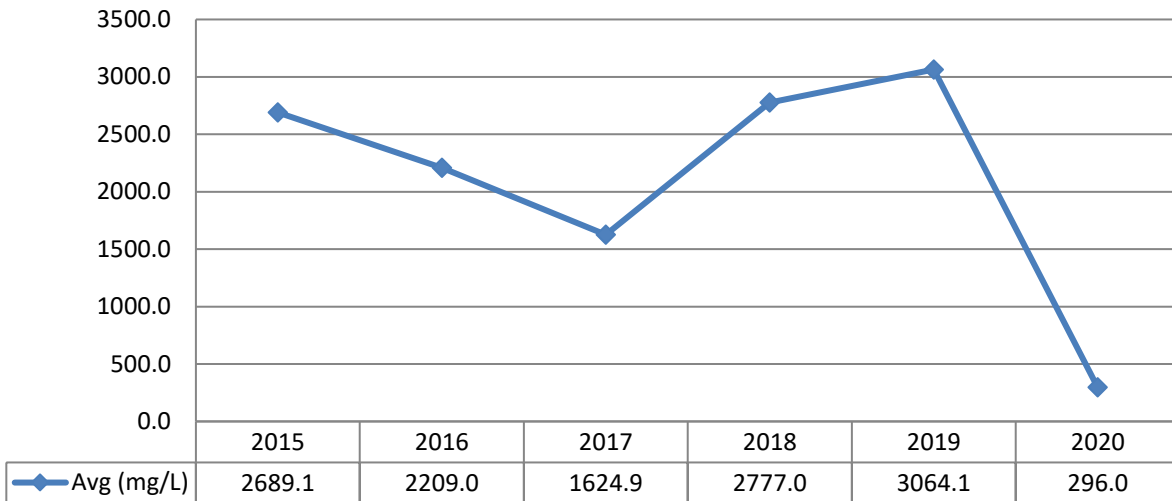


The BOD5 annual average has remained fairly consistent between 2015 and 2020. The minimum annual average concentration occurred in 2017 and the maximum annual average concentration occurred in 2015.

Carbonaceous Biochemical Oxygen Demand (CBOD5)

One grab sample was collected of the Abattoir waste in January 2020 and analyzed for CBOD5. The CBOD5 sample result was 296 mg/L.

Graph 21: Historical CBOD5 Abattoir Waste Concentration Comparisons

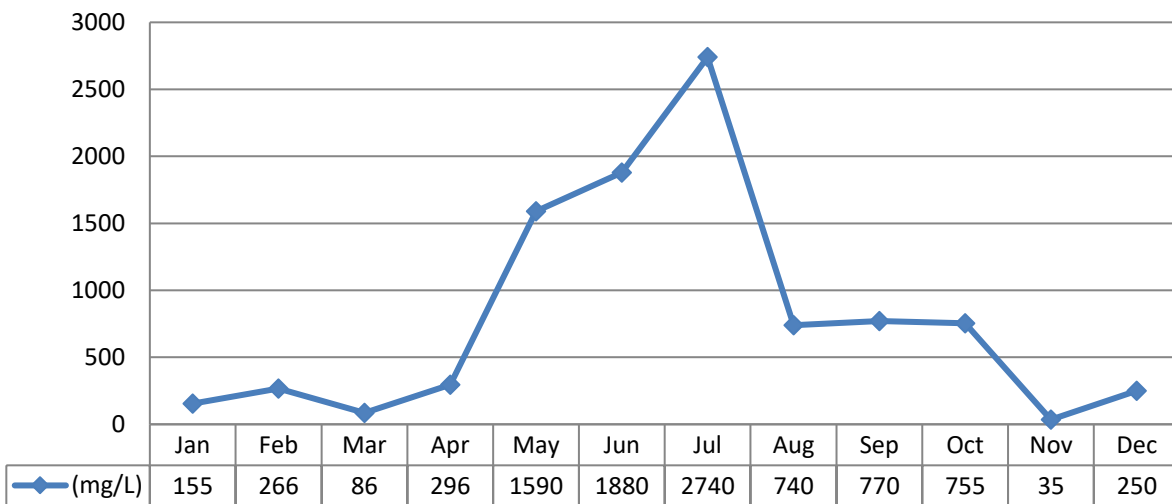


The CBOD5 annual average has remained fairly consistent between 2015 and 2020. The minimum annual average concentration occurred in 2020 and the maximum annual average concentration occurred in 2019.

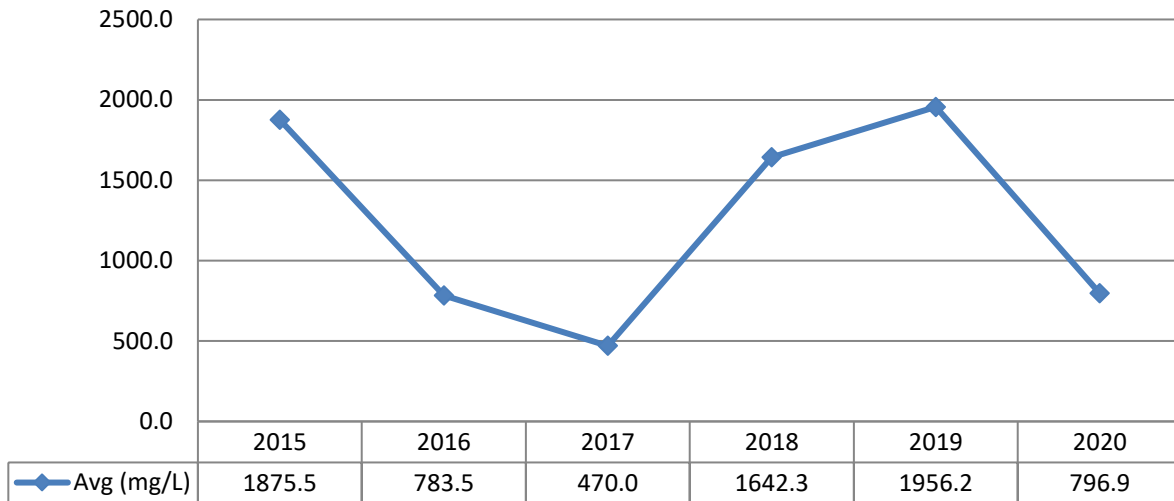
Total Suspended Solids

ECA 7748-AYRL8C and ECA 1696-BPLL4R require 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 2020.

Graph 22: 2020 Monthly Total Suspended Solids Abattoir Waste Concentration Comparisons



Graph 23: Historical Total Suspended Solids Abattoir Waste Concentration Comparisons

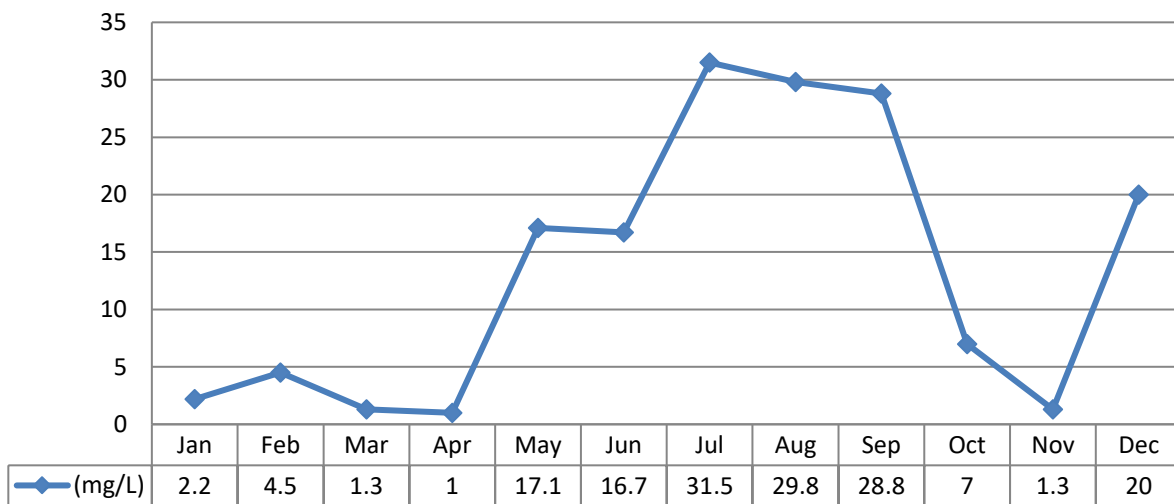


The Total Suspended Solids annual average has remained fairly consistent between 2015 and 2020. The minimum annual average concentration occurred in 2017 and the maximum annual average concentration occurred in 2019.

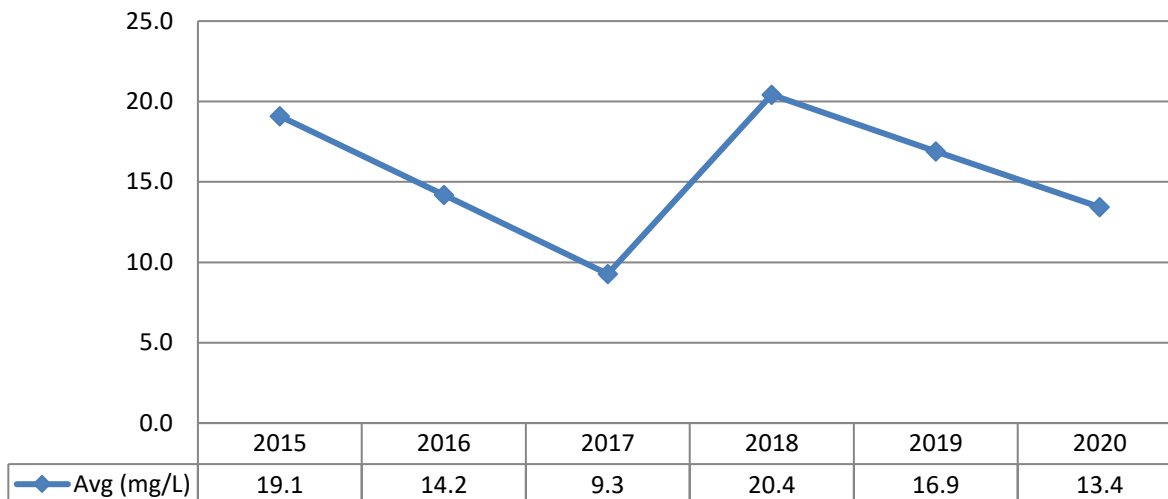
Total Phosphorus

ECA 7748-AYRL8C and ECA 1696-BPLL4R require one grab sample be collected monthly and analyzed for Total Phosphorus. Results ranged from 1.0 mg/L to 31.5 mg/L.

Graph 24: 2020 Monthly Total Phosphorus Abattoir Waste Concentration Comparisons



Graph 25: Historical Total Phosphorus Abattoir Waste Concentration Comparisons

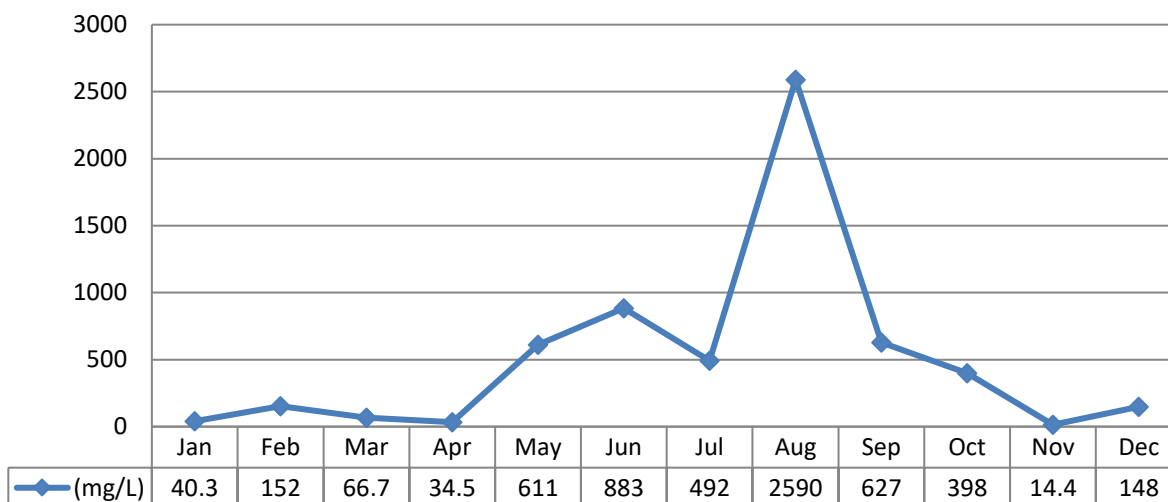


The Total Phosphorus annual average has remained fairly consistent between 2015 and 2020. The minimum annual average concentration occurred in 2017 and the maximum annual average concentration occurred in 2018.

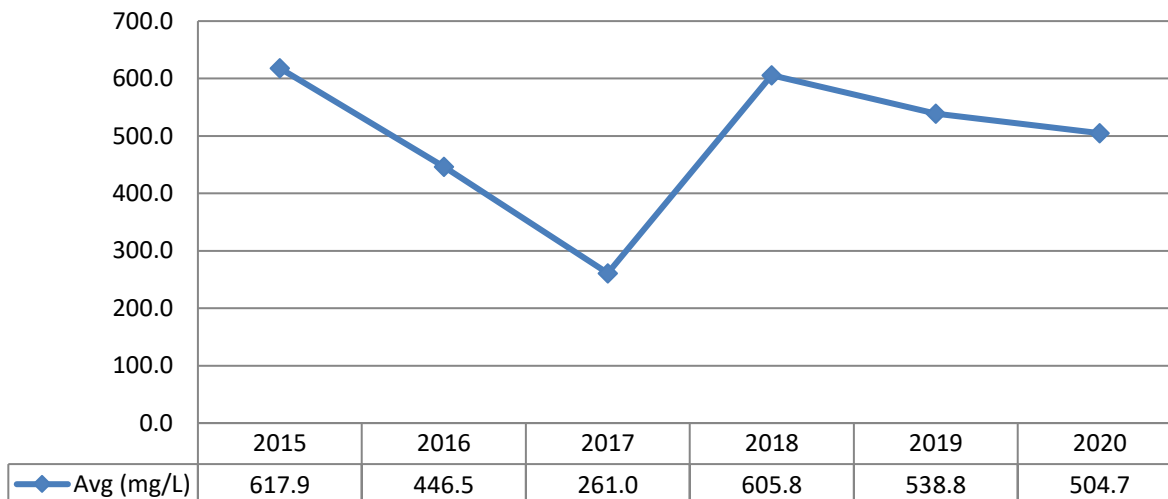
Total Kjeldahl Nitrogen (TKN)

ECA 7748-AYRL8C and ECA 1696-BPLL4R require one grab sample be collected monthly and analyzed for Total Kjeldahl Nitrogen. The Total Kjeldahl Nitrogen results ranged from 14.4 mg/L to 2590 mg/L.

Graph 26: 2020 Monthly TKN Abattoir Waste Concentration Comparisons



Graph 27: Historical Total Kjeldahl Nitrogen Abattoir Waste Concentration Comparisons

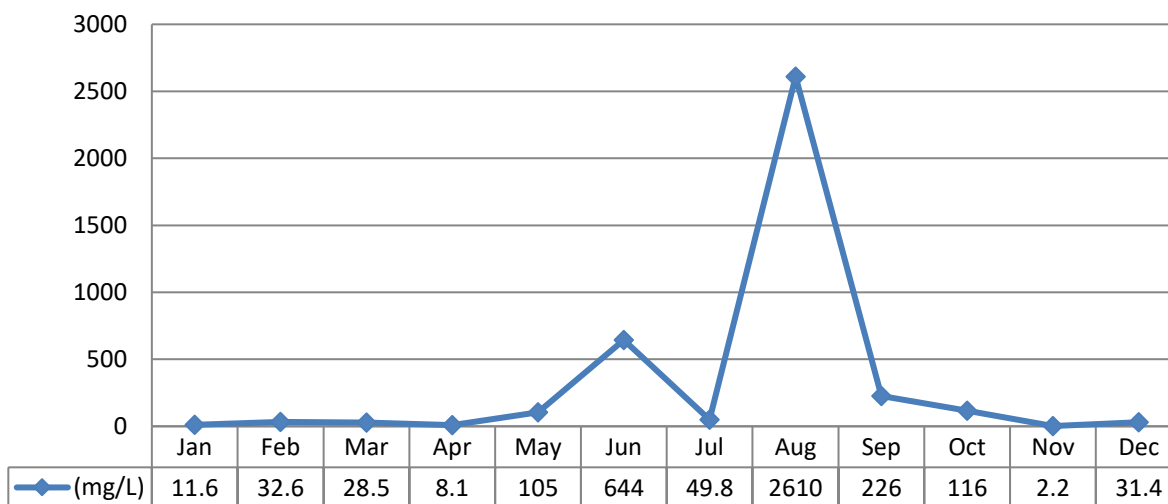


The Total Kjeldahl Nitrogen annual average has ranged between 261.0 mg/L and 617.9 mg/L. The minimum annual average concentration occurred in 2017 and the maximum annual average concentration occurred in 2015.

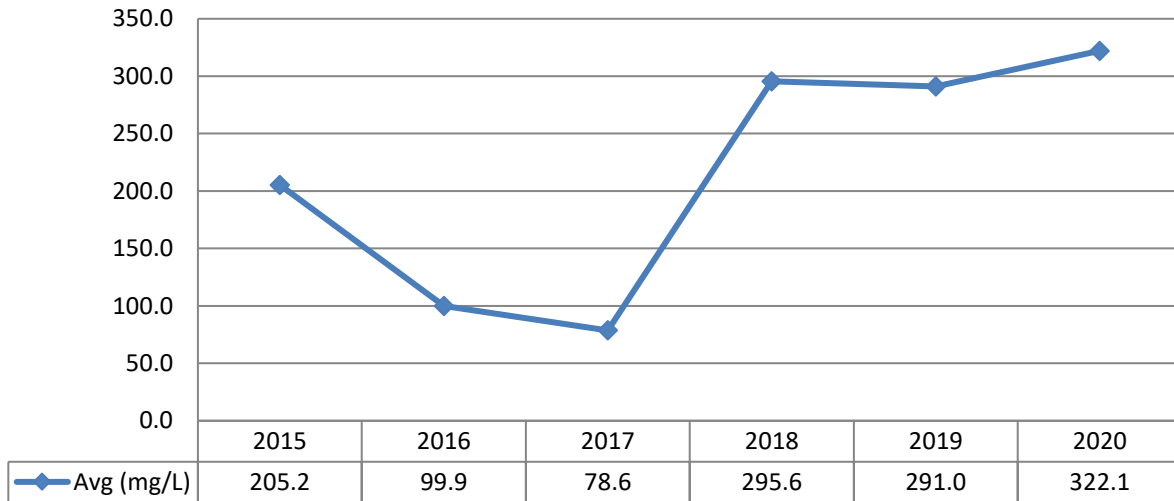
Total Ammonia Nitrogen (TAN)

One grab sample was collected of the Abattoir waste each month in 2020 and analyzed for Total Ammonia Nitrogen. The results ranged from 2.2 mg/L to 2610.0 mg/L.

Graph 28: 2020 Monthly TAN Abattoir Waste Concentration Comparisons



Graph 29: Historical TAN Abattoir Waste Concentration Comparisons

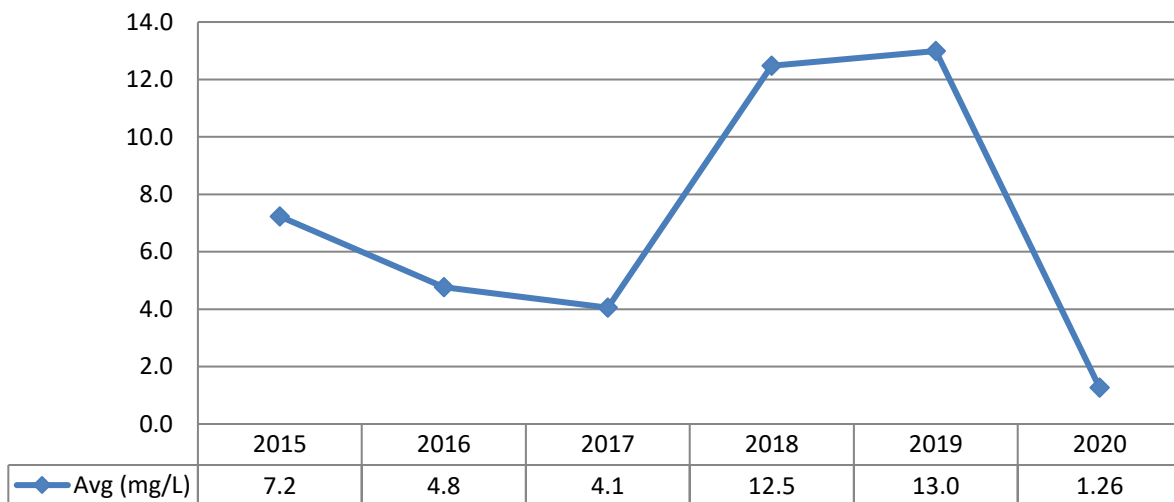


Since 2015 the Total Ammonia Nitrogen annual average has fluctuated between 78.6 mg/L and 322.1 mg/L. The minimum annual average concentration occurred in 2017 and the maximum annual average concentration occurred in 2020.

Nitrite as Nitrogen

One grab sample was collected of the Abattoir waste in January 2020 and analyzed for Nitrite as Nitrogen. The result was 1.26 mg/L.

Graph 30: Historical Nitrite Abattoir Waste Concentration Comparisons

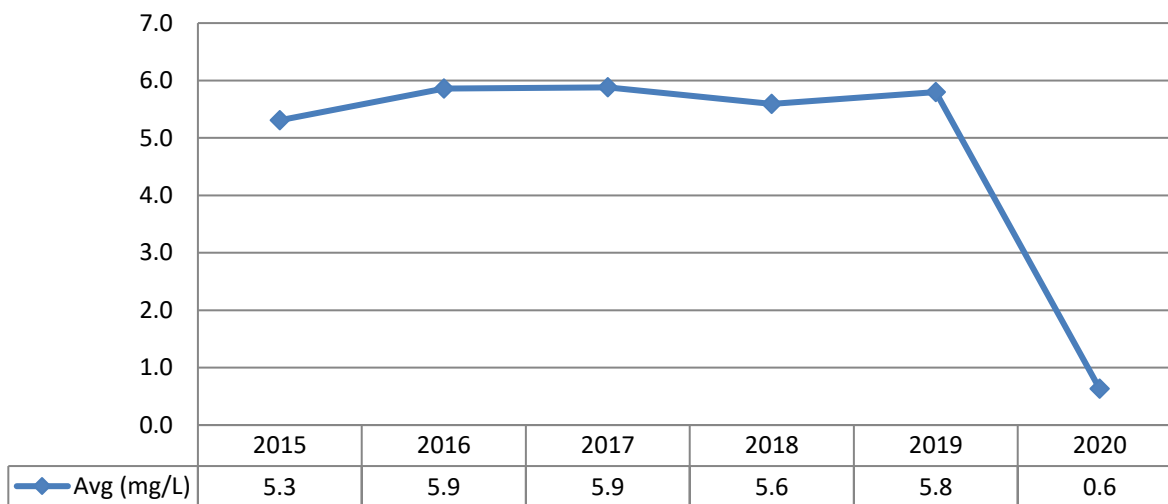


The Nitrite annual average results ranged from 1.26 mg/L to 12.99 mg/L between 2015 and 2020. The minimum annual average concentration occurred in 2020 and the maximum annual average concentration occurred in 2019.

Nitrate as Nitrogen

One grab sample was collected of the Abattoir waste in January 2020 and analyzed for Nitrate as Nitrogen. The result was 0.6 mg/L.

Graph 31: Historical Nitrate Abattoir Waste Concentration Comparisons

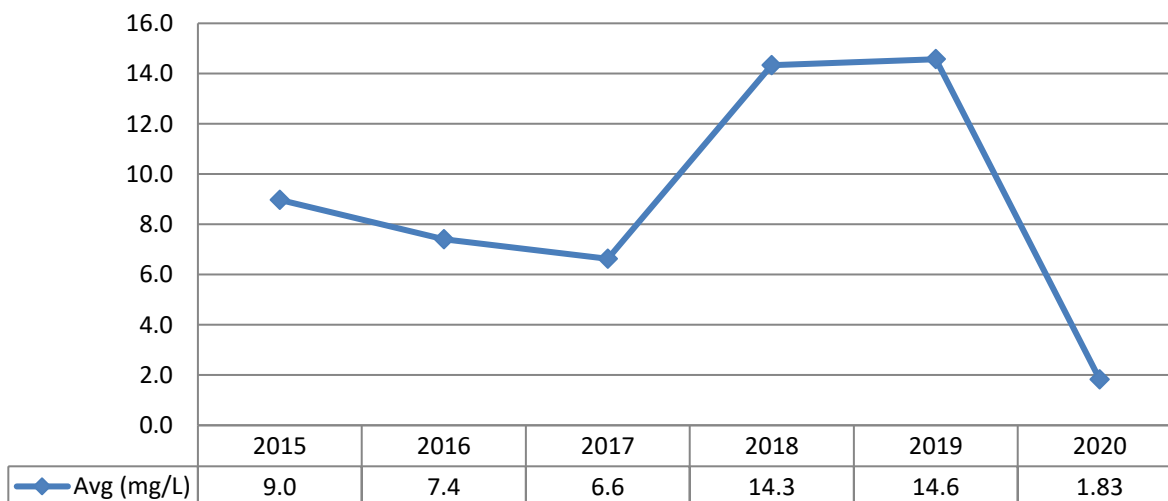


The Nitrate annual average has remained fairly consistent between 2015 and 2020. The minimum annual average concentration of 0.6 mg/L occurred in 2020 and the maximum annual average concentration of 5.88 mg/L occurred in 2017.

Nitrite+Nitrate as Nitrogen

One grab sample was collected of the Abattoir waste in January 2020 and analyzed for Nitrite+Nitrate as Nitrogen. The result was 1.83 mg/L.

Graph 32: Historical Nitrite+Nitrogen Abattoir Waste Concentration Comparisons



The Nitrite+Nitrate annual average has fluctuated between 2015 and 2020 ranging from 1.83 mg/L and 14.57 mg/L. The minimum annual average concentration occurred in 2020 and the maximum annual average concentration occurred in 2019.

Receiving Station

The requirement to sample at the Receiving Station was added as a condition of ECA 7748-AYRL8C (issued October 18, 2018). Monthly sampling of the Receiving Station began in November 2018. This directive continues with ECA 1696-BPLL4R.

As sampling of the Receiving Station began in November 2018 a historical review of the result is limited. The 2018-2020 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.

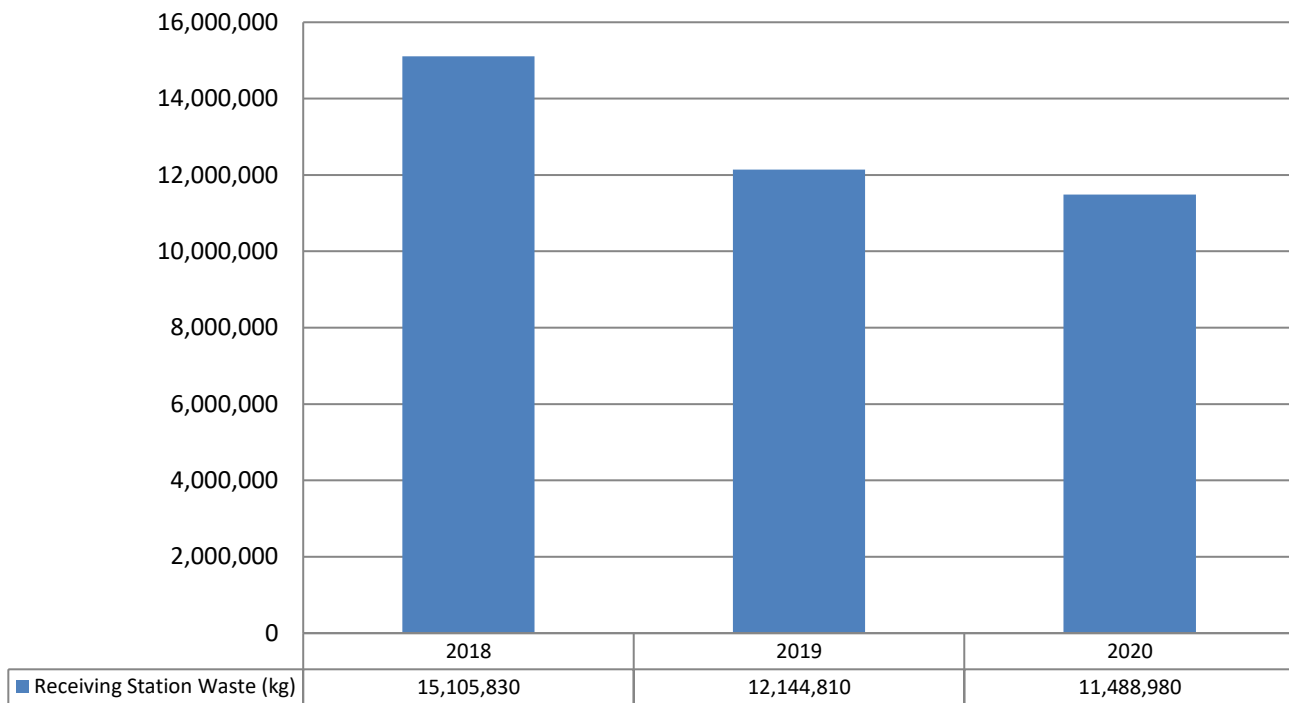
Prior to 2020 Imported Sewage samples were tested for CBOD5, Nitrite, Nitrate and Nitrite+Nitrate as a best management practice. It was determined that CBOD5 sampling end as both ECAs requires BOD5 be tested. Nitrite, Nitrate and Nitrite+Nitrate were also discontinued as process optimization focused on ammonia removal (TAN).

Table 1: Historical Review Receiving Station Sample Results

Parameter	November, 2018	December, 2018	2019 Annual	2020 Annual
BOD5 (mg/L)	5884	1060	3094.2	4549.40
Total Suspended Solids (mg/L)	2880	740	5397.5	8390.00
Total Phosphorus (mg/L)	13.5	23.6	128.75	106.42
Total Kjeldahl Nitrogen (mg/L)	104	196	2239.5	1238.40
Total Ammonia Nitrogen (mg/L)	4.5	156	1417.8	753.74
CBOD5 (mg/L)	4250	802	4263	N/A
Nitrite as Nitrogen (mg/L)	3	0.03	3.57	N/A
Nitrate as Nitrogen (mg/L)	6	0.06	3.34	N/A
Nitrite+Nitrate as Nitrogen (mg/L)	6	0.06	4.49	N/A

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 2020 was 11,488,980.00kg. This is a slight decrease in the volume deposited in 2019, and represents an overall declining trend.

Graph 33: Historical Receiving Station Volume Comparisons



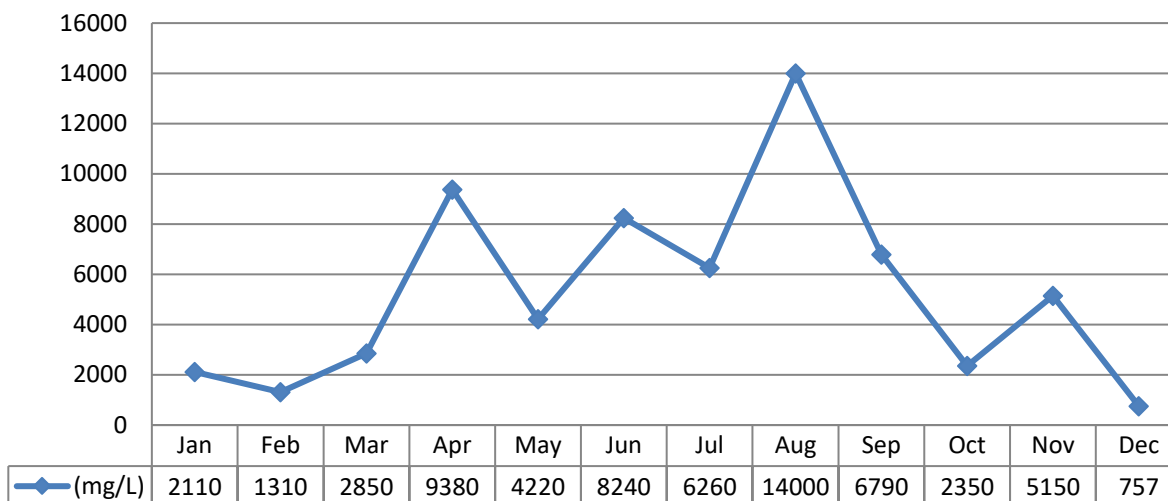
Sample Results

ECA 7748-AYRL8C and ECA 1696-BPLL4R require a grab sample be collected monthly and analyzed for BOD5, Total Suspended Solids, Total Phosphorus and Total Kjeldahl Nitrogen. Although not required by either ECA, Total Ammonia Nitrogen was sampled and analyzed monthly in 2020. Four samples were taken in 2020 and tested for CBOD5, Nitrite as Nitrogen, Nitrate as Nitrogen and Nitrite+Nitrate as Nitrogen

Biochemical Oxygen Demand (BOD5)

ECA 7748-AYRL8C and ECA 1696-BPLL4R require one grab sample be collected monthly and analyzed for BOD5. The BOD5 sample results ranged from 757 mg/L to 14000 mg/L.

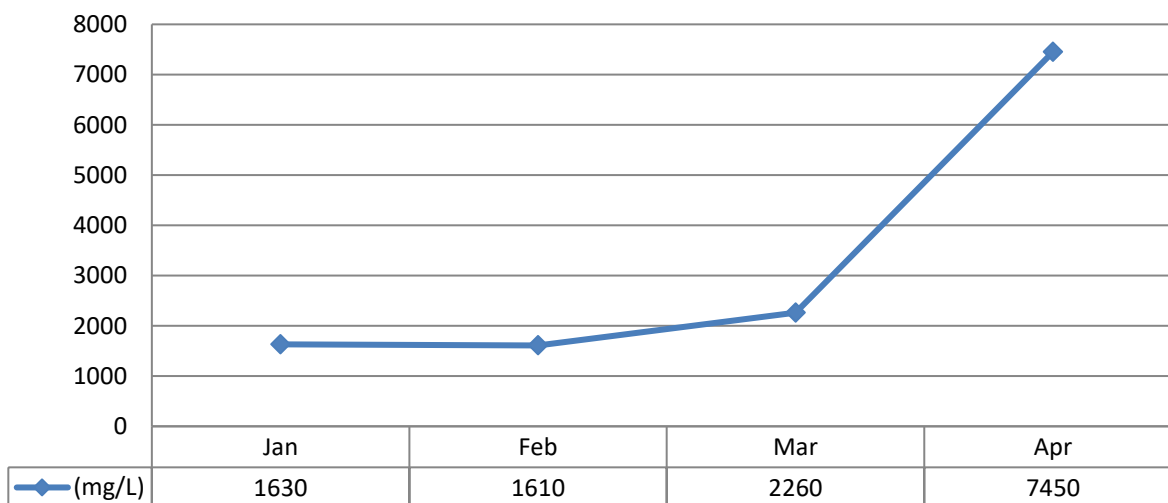
Graph 34: 2020 Monthly BOD5 Receiving Station Waste Concentration Comparisons



Carbonaceous Biochemical Oxygen Demand (CBOD5)

One grab sample was collected from the Receiving Station waste each month in 2020 until April 2020 and analyzed for CBOD5. The CBOD5 sample results ranged from 1610 mg/L to 7450 mg/L.

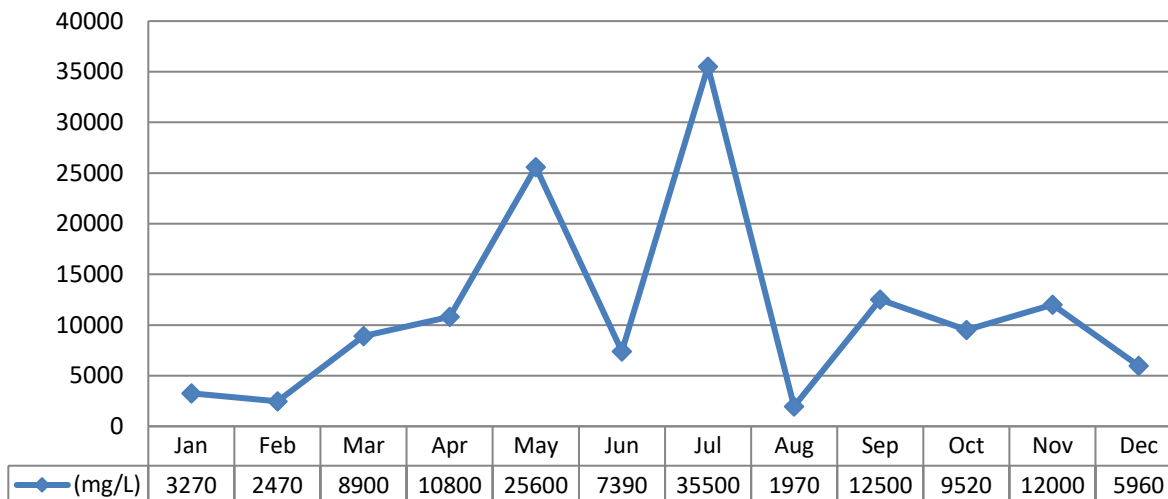
Graph 35: 2020 Monthly CBOD5 Receiving Station Waste Concentration Comparisons



Total Suspended Solids

ECA 7748-AYRL8C and ECA 1696-BPLL4R require a grab sample be collected monthly and analyzed for Total Suspended Solids. The Total Suspended Solids sample results ranged from 1970 mg/L to 35500 mg/L in 2020.

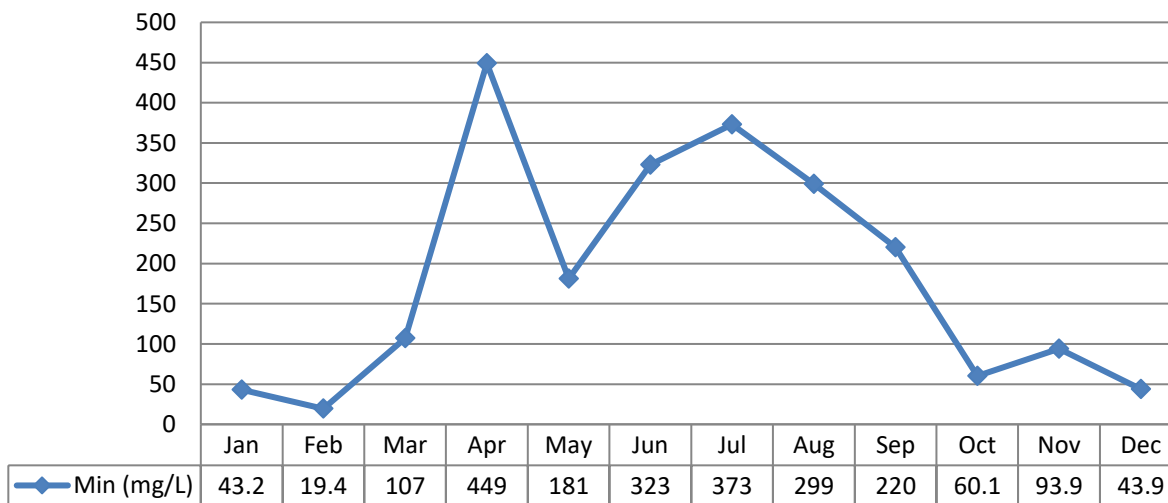
Graph 36: 2020 Monthly Total Suspended Solids Receiving Station Waste Concentration Comparisons



Total Phosphorus

ECA 7748-AYRL8C and ECA 1696-BPLL4R require one grab sample be collected monthly and analyzed for Total Phosphorus. Results ranged from 19.4 mg/L to 449 mg/L.

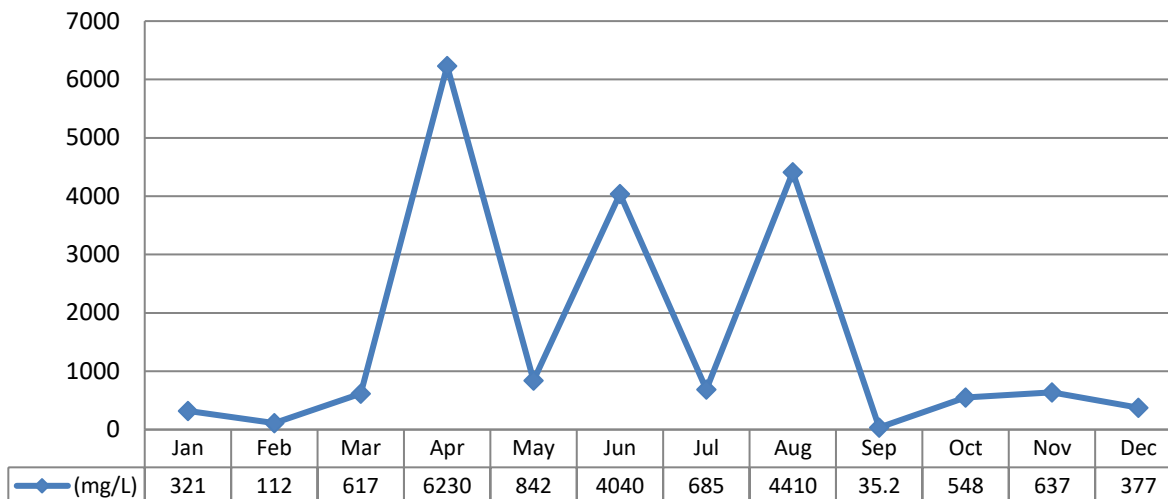
Graph 37: 2020 Monthly Total Phosphorus Receiving Station Waste Concentration Comparisons



Total Kjeldahl Nitrogen (TKN)

ECA 7748-AYRL8C and ECA 1696-BPLL4R require one grab sample be collected monthly and analyzed for Total Kjeldahl Nitrogen. Monthly Total Kjeldahl Nitrogen results ranged from 35.2 mg/L to 6230 mg/L.

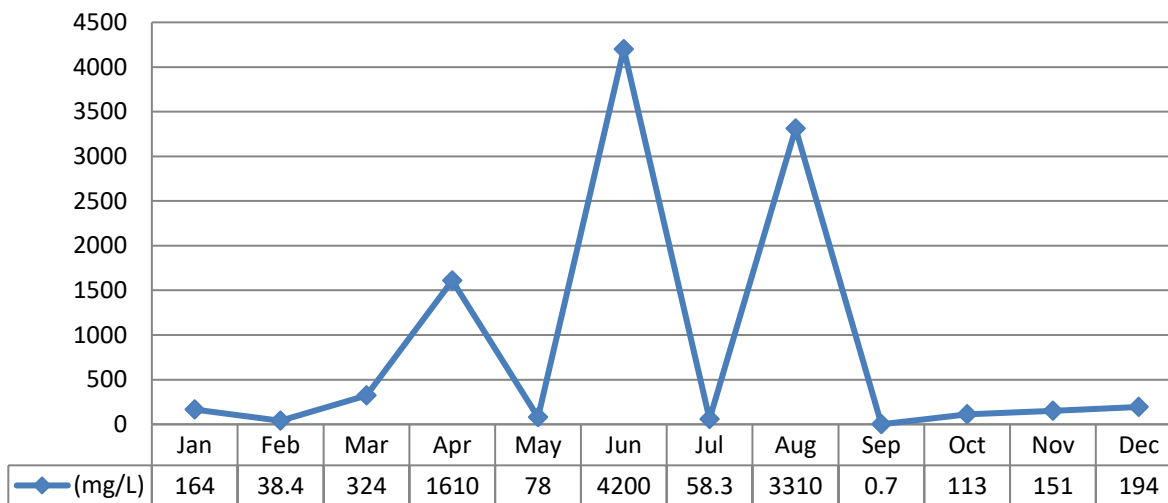
Graph 38: 2020 Monthly TKN Receiving Station Waste Concentration Comparisons



Total Ammonia Nitrogen (TAN)

One grab sample was collected from the Receiving Station waste each month in 2020 and analyzed for Total Ammonia Nitrogen. The monthly average concentration results ranged from 0.7mg/L to 4200 mg/L.

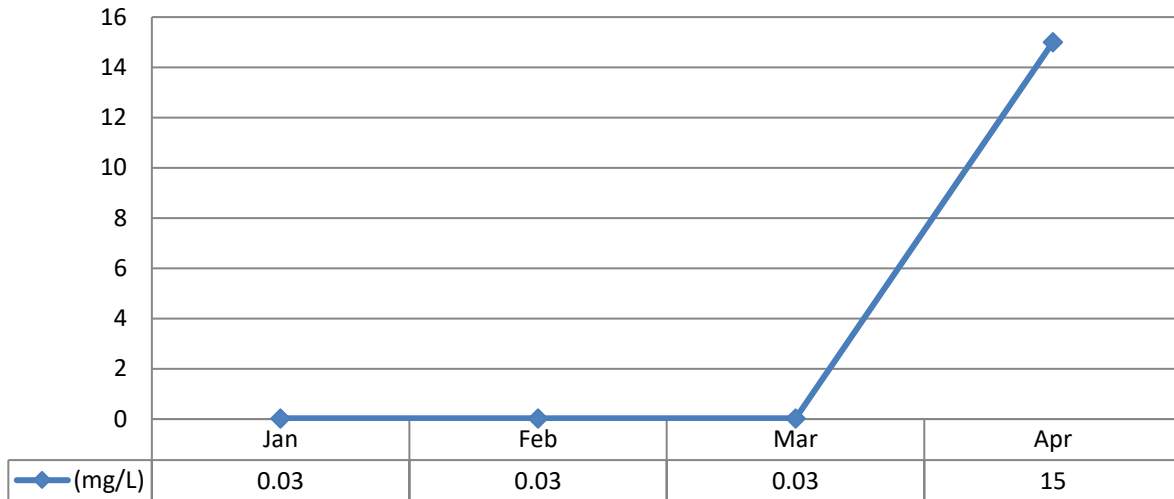
Graph 39: 2020 Monthly TAN Receiving Station Waste Concentration Comparisons



Nitrite as Nitrogen

One grab sample was collected from the Receiving Station waste each month in 2020 until April 2020 and analyzed for Nitrite as Nitrogen. The monthly average concentration results ranged from 0.03 mg/L to 15.0mg/L.

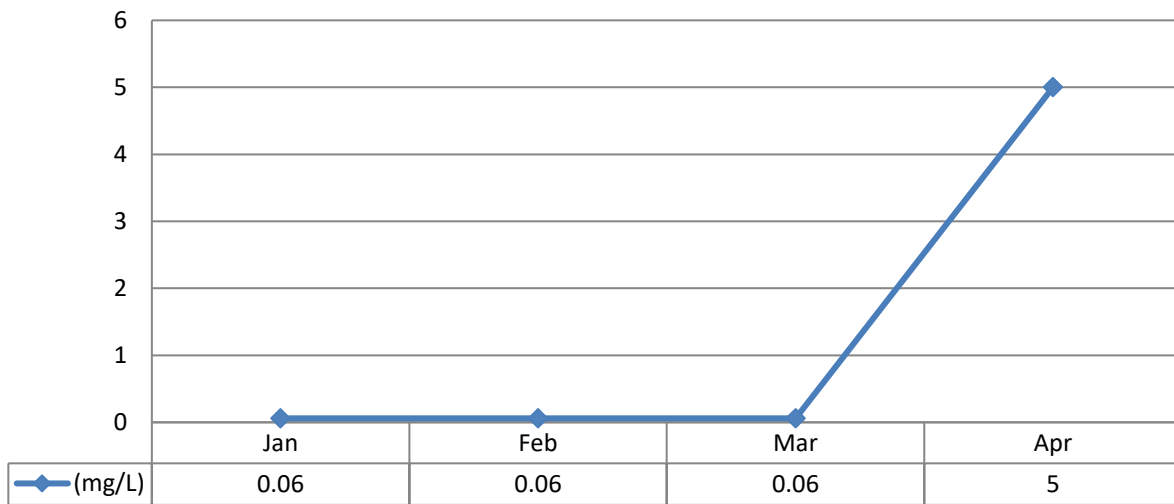
Graph 40: 2020 Monthly Nitrite as Nitrogen Receiving Station Waste Concentration Comparisons



Nitrate as Nitrogen

One grab sample was collected from the Receiving Station waste each month in 2020 until April 2020 and analyzed for Nitrate as Nitrogen. The monthly average concentration results ranged from 0.06 mg/L to 5.0 mg/L.

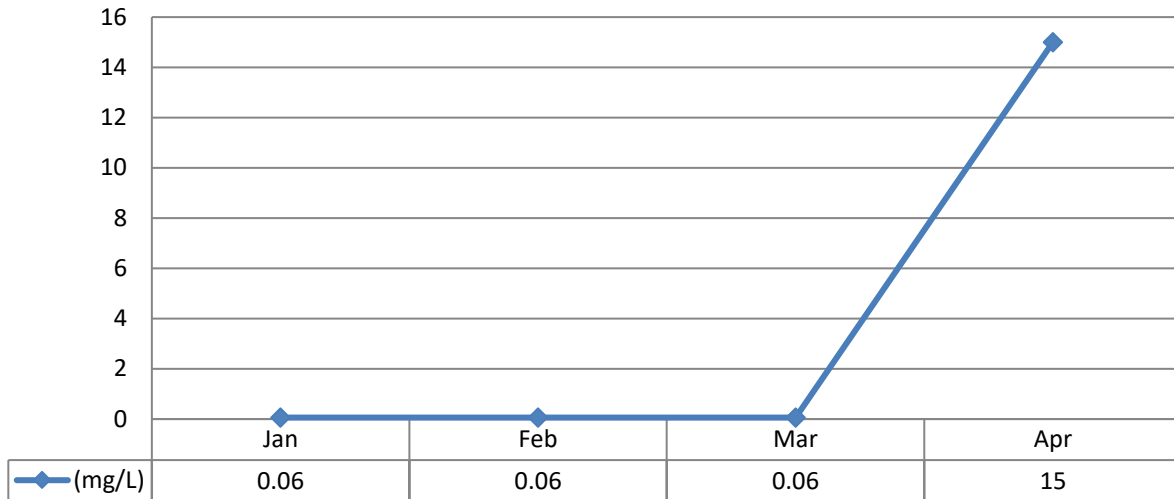
Graph 41: 2020 Monthly Nitrate as Nitrogen Receiving Station Waste Concentration Comparisons



Nitrite+Nitrate as Nitrogen

One grab sample was collected from the Receiving Station waste each month in 2020 until April 2020 and analyzed for Nitrite+Nitrate as Nitrogen. The monthly average concentration results ranged from 0.06 mg/L to 11.3 mg/L.

Graph 42: 2020 Monthly Nitrite+Nitrogen as Nitrogen Receiving Station Waste Concentration Comparisons

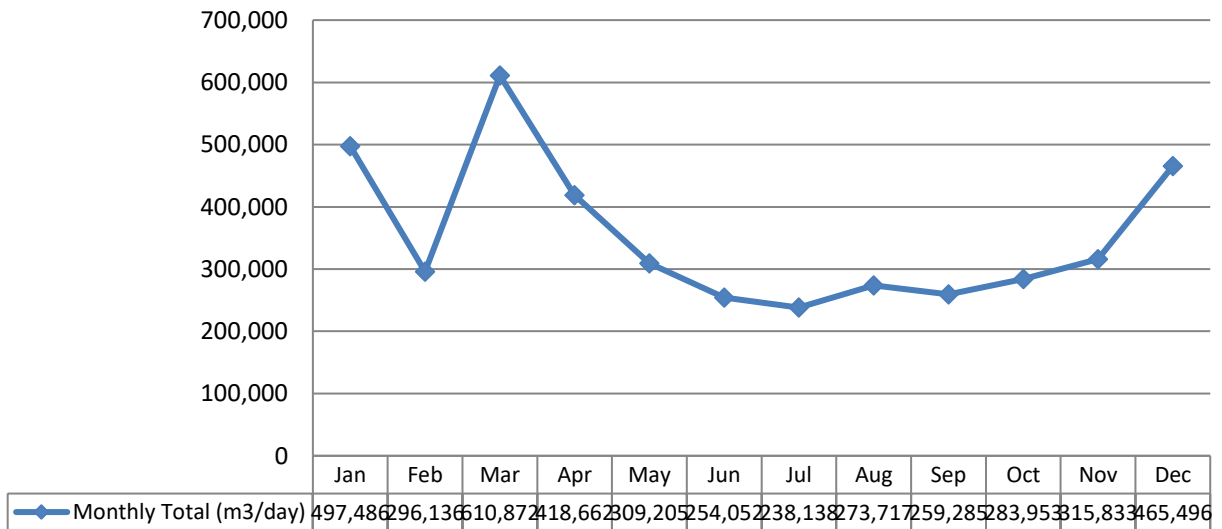


B) Environmental Compliance Approval #7748-AYRL8C and ECA 1696-BPLL4R require a summary and interpretation of all Effluent monitoring data, including concentration, flow rates, loading and a comparison to the design objectives and compliance limits, including an overview of the success and adequacy of the works be included in the report.

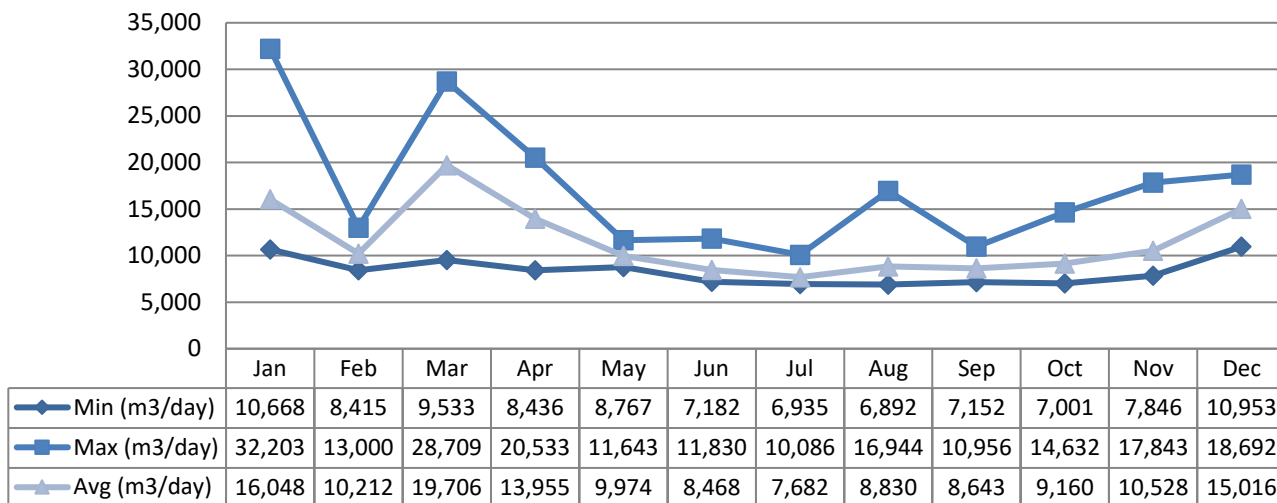
The 2020 Lindsay WWTP annual average daily effluent flow was 11,537.80 m³/day and the total Effluent flow in 2020 was 4,222,835.0 m³.

Effluent Flow Monthly Totals

Graph 43: 2020 Final Effluent Monthly Flows



Graph 44: 2020 Final Effluent Daily Minimum, Maximum and Average Flows



Final Effluent Lab Results

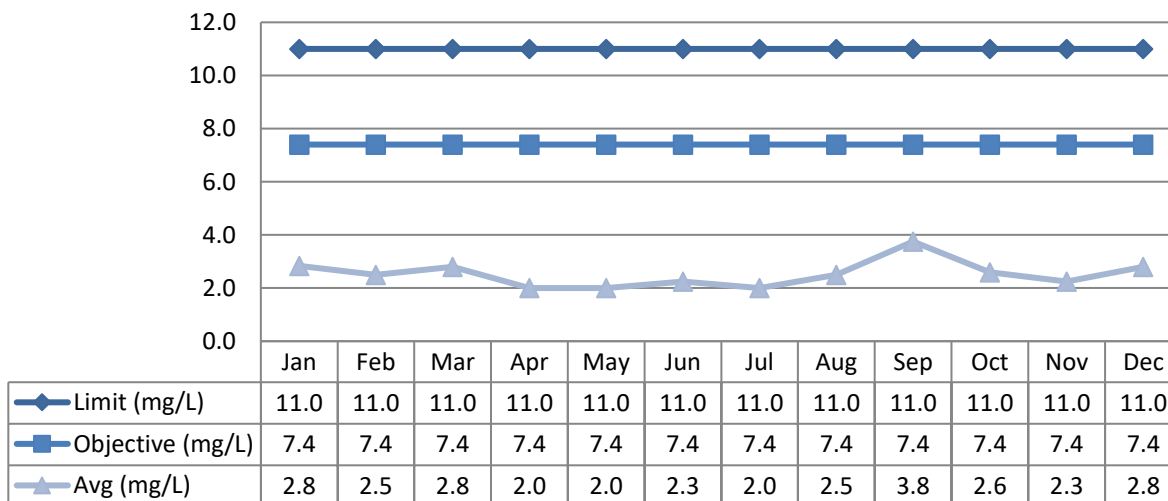
Carbonaceous Biochemical Oxygen Demand (CBOD5)

ECA 7748-AYRL8C (issued October 18, 2018) and ECA 1696-BPLL4R (issued June 29, 2020) set the CBOD5 annual average concentration limit at 11.0 mg/L and the monthly objective at 7.4 mg/L. The 2020 annual average concentration was 2.53 mg/L and the maximum monthly average concentration was 3.8 mg/L.

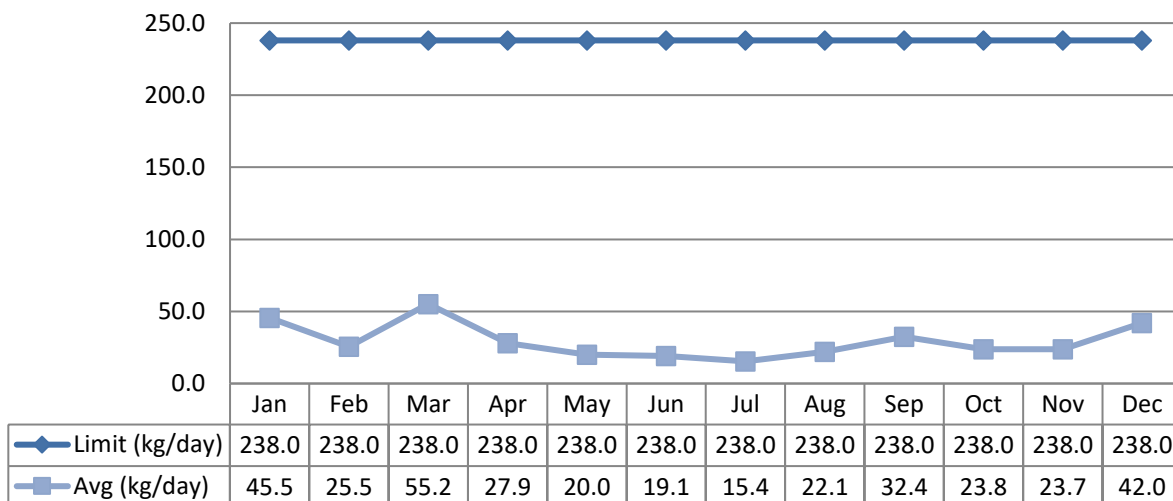
The annual average waste loading limit is 238 kg/day and the annual average waste loading was 29.37 kg/day.

All CBOD5 limits and objectives were met in 2020.

Graph 45: 2020 Monthly Final Effluent CBOD5 Concentration Comparisons



Graph 46: 2020 Monthly Final Effluent CBOD5 Average Waste Loading Comparisons

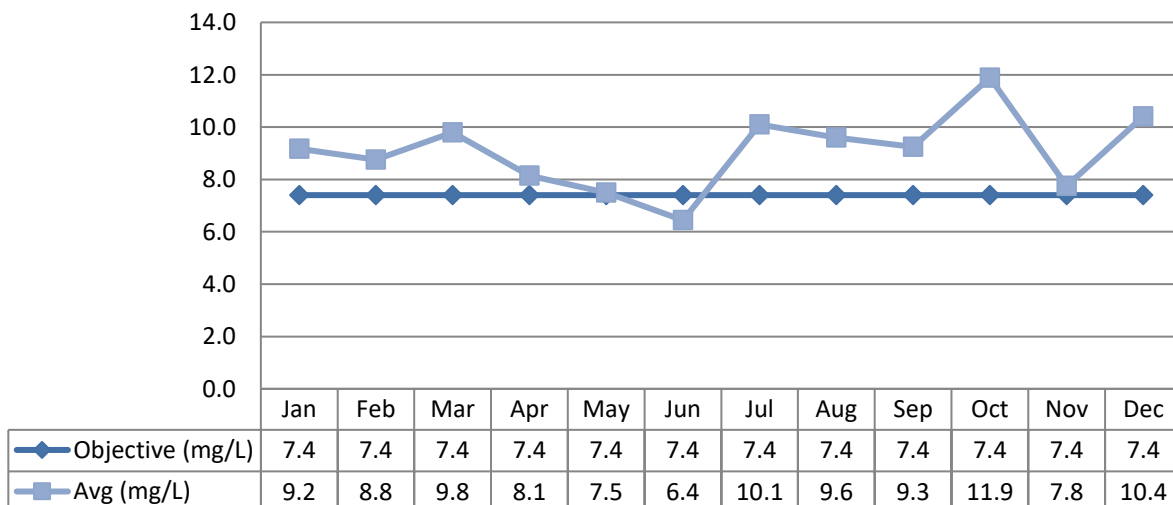


Total Suspended Solids (TSS)

ECA 7748-AYRL8C (issued October 18, 2018) and ECA 1696-BPLL4R (issued June 29, 2020) 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 was 9.66 mg/L and the annual average waste loading was 105.13 kg/day which are both within the limits set in both ECAs.

ECA 7748-AYRL8C and ECA 1696-BPLL4R set the Total Suspended Solids monthly concentration objective at 7.4 mg/L and this objective was not met in 2020. Throughout 2020, the Total Suspended Solids monthly removal rates ranged from 93.5% to 98.0%. Continuous efforts made to meet the Effluent Objectives are discussed in Section h.

Graph 47: 2020 Monthly Final Effluent TSS Concentration Comparisons



Total (Ammonia+Ammonium) Nitrogen (TAN)

ECA 7748-AYRL8C (issued October 18, 2018) and ECA 1696-BPLL4R (issued June 29, 2020) 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 2020 except for February and September

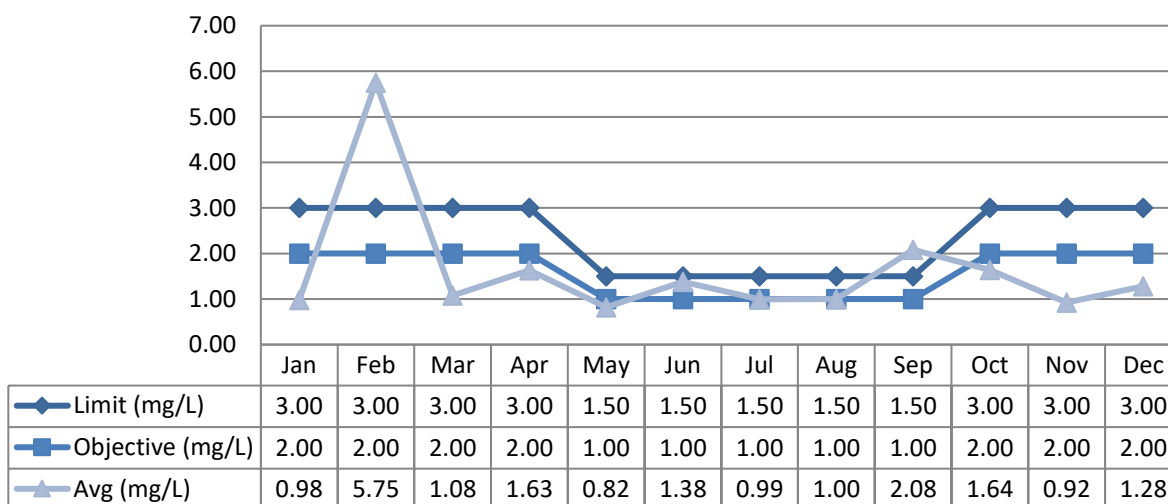
One aerator had failed on January 16th, followed by a second aerator on February 4th. The first aerator was reinstalled February 14th and the second aerator was installed with all 14 aerators in service by March 2, 2020.

Two aerators failed the week of September 7 to 11, 2020. One aerator was reinstalled on September 21, 2020 and the second aerator was reinstalled on September 28, 2020. All 14 aerators were back in service on September 28, 2020.

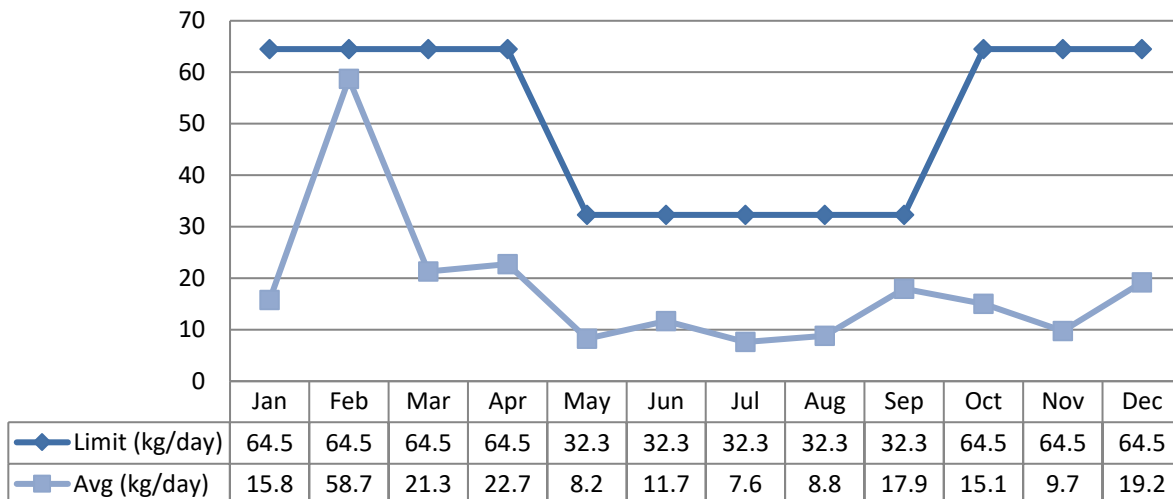
The loss of aerators affected the dissolved oxygen levels in the aeration lagoon which impacted the TAN results

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

Graph 48: 2020 Monthly Final Effluent TAN Concentration Comparisons



Graph 49: 2020 Monthly Final Effluent TAN Average Waste Loading Comparisons

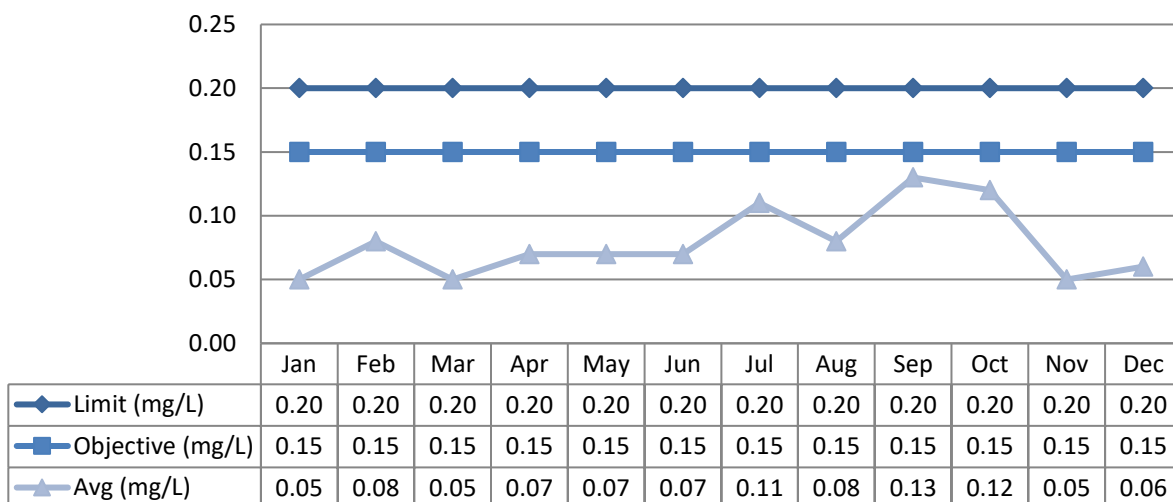


Total Phosphorus (TP)

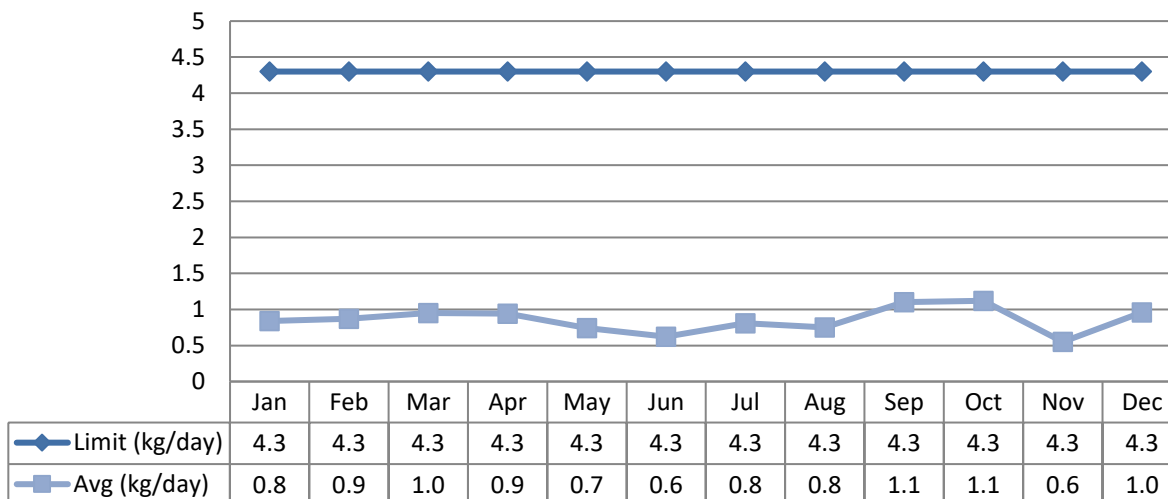
ECA 7748-AYRL8C (issued October 18, 2018) and ECA 1696-BPLL4R (issued June 29, 2020) set the Total Phosphorus monthly average concentration limit at 0.2 mg/L and the monthly average waste loading at 4.3 kg/day. The monthly Total Phosphorus average concentration results and monthly average waste loading results throughout 2020 were in compliance with the limits outlined in both ECAs.

ECA 7748-AYRL8C and ECA 1696-BPLL4R set the Total Phosphorus monthly concentration objective at 0.15 mg/L. The monthly Total Phosphorus average concentration results throughout 2020 were less than the concentration objectives.

Graph 50: 2020 Monthly Final Effluent Total Phosphorus Concentration Comparisons



Graph 51: 2020 Monthly Final Effluent Total Phosphorus Average Waste Loading Comparisons

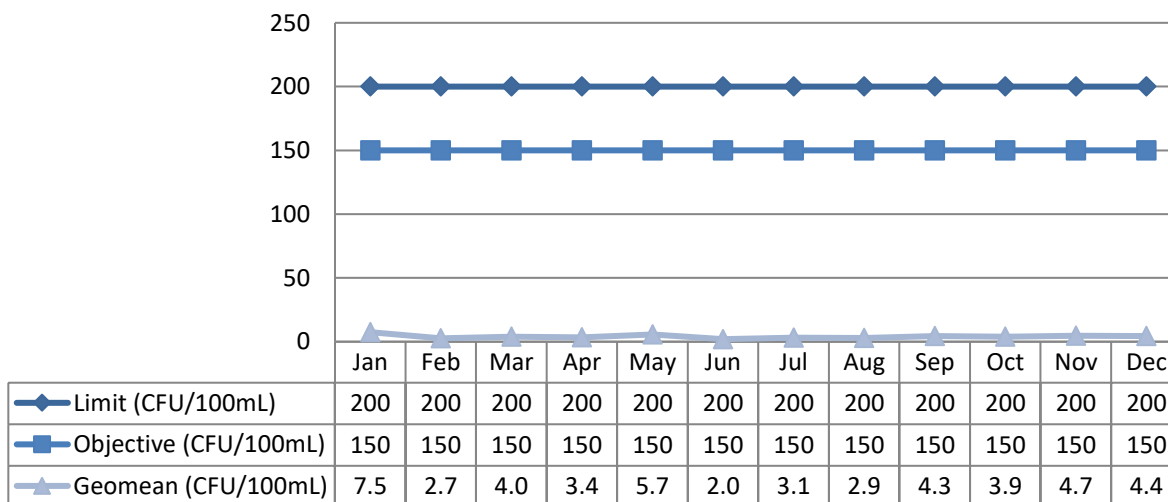


E.coli

ECA 7748-AYRL8C and 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 2020.

Graph 52: 2020 Monthly Final Effluent E. coli Concentration Comparisons



Acute Lethality to Rainbow Trout and Daphnia Magna

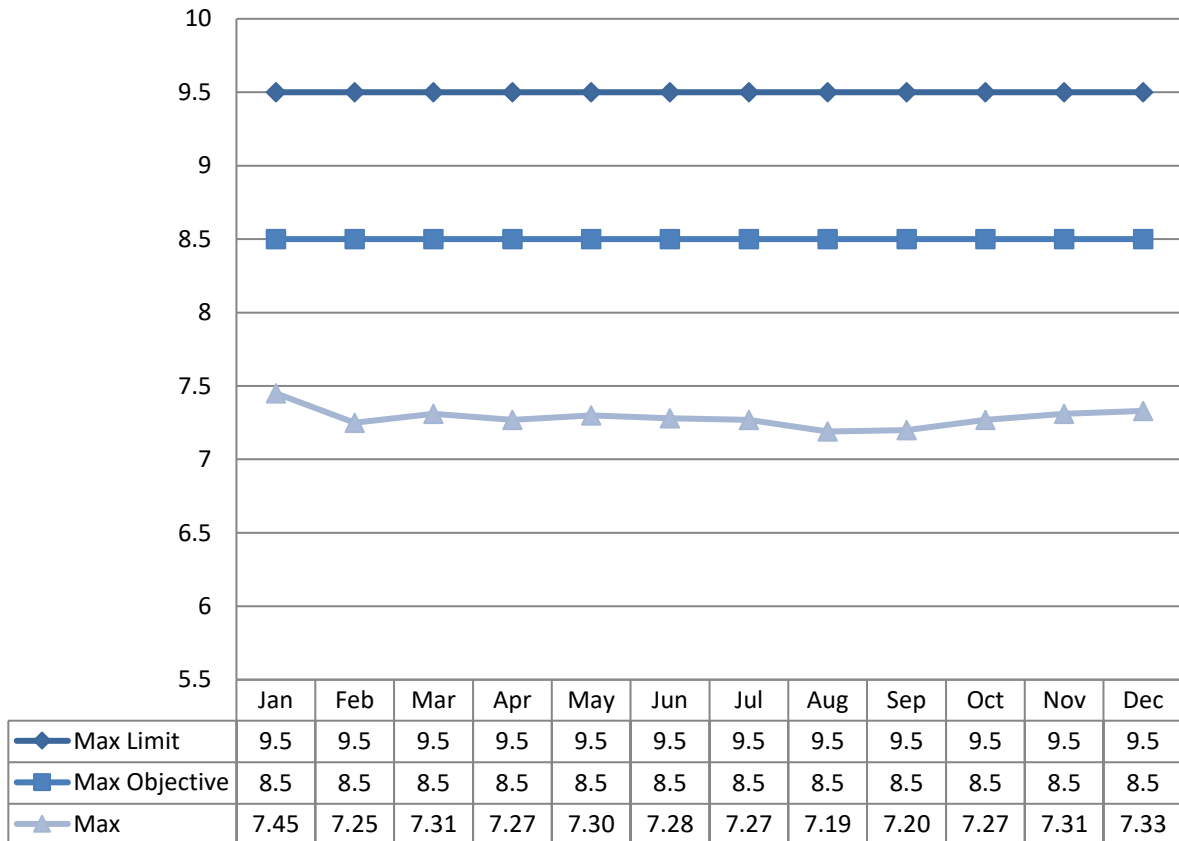
Quarterly effluent samples were collected on January 2, April 2, July 2 and October 1, 2020 for analysis for acute lethality to rainbow trout and daphnia magna. All of the 2020 samples resulted in a 0% mortality rate for both Rainbow Trout and Daphnia Magna. A summary of the results is provided in **Appendix I: Acute Lethality Analysis Results**.

pH

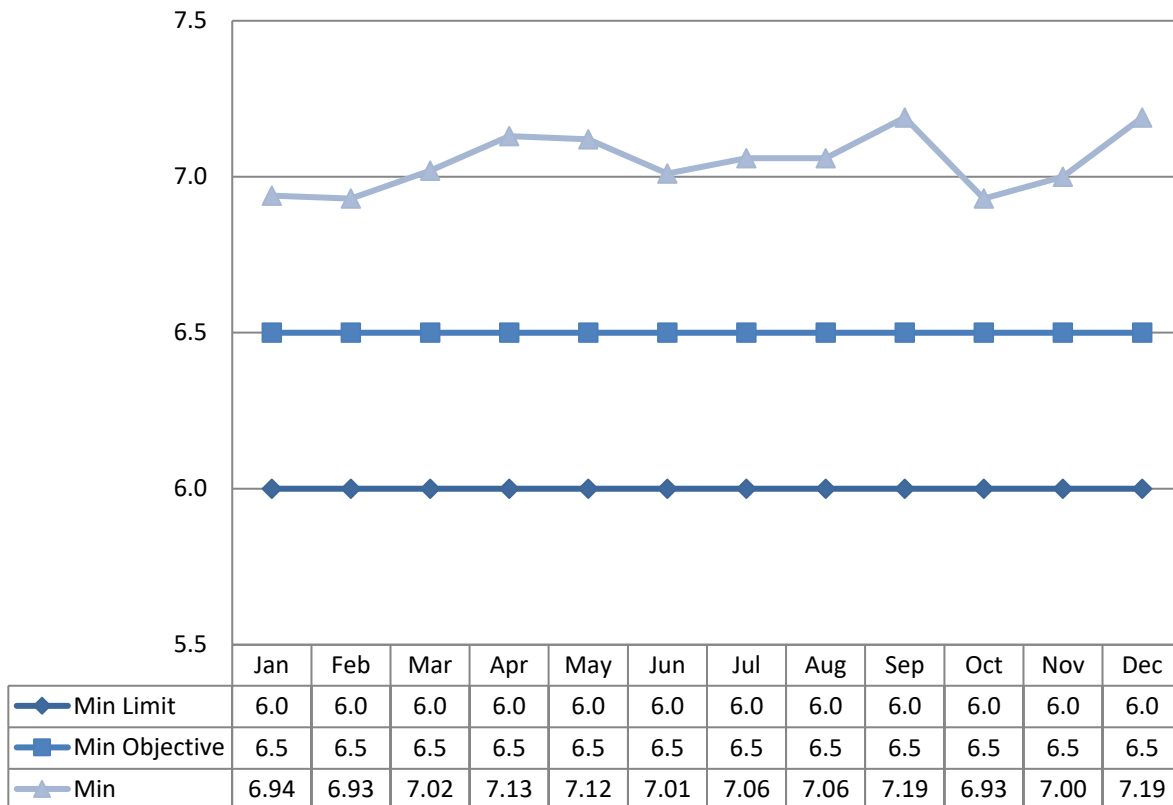
ECA7748-AYRL8C and ECA 1696-BPLL4R set a pH compliance limit within the range of 6.0 to 9.5, inclusive, at all times on the effluent. Every pH reading in 2020 was within the compliance limits set by the ECAs.

ECA 7748-AYRL8C and 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 2020 was within the compliance objectives set by the ECAs.

Graph 53: 2020 Monthly Final Effluent Maximum pH Concentration Comparisons



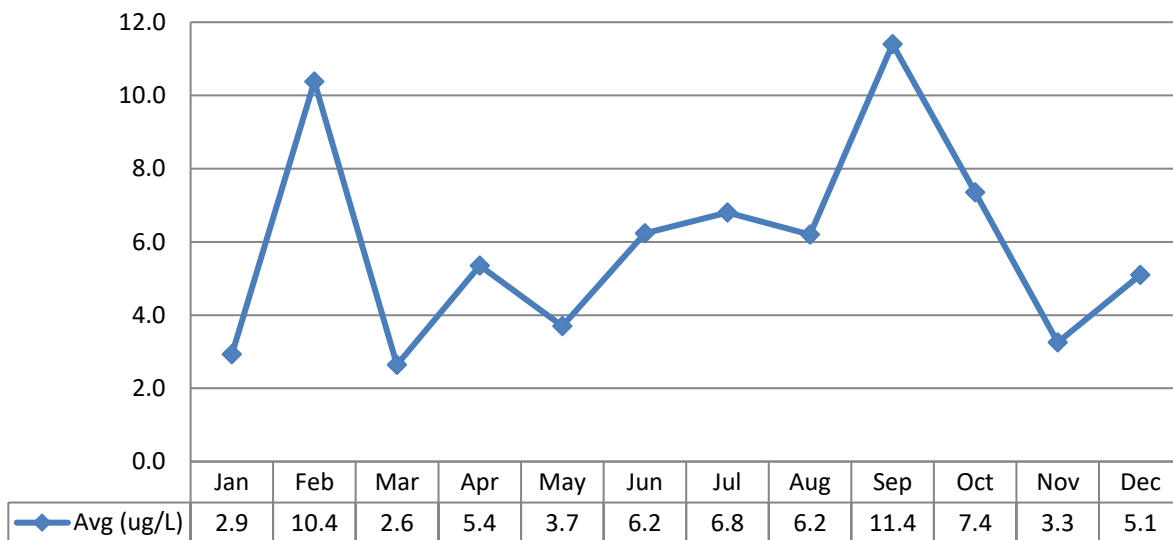
Graph 54: 2020 Monthly Final Effluent Minimum pH Concentration Comparisons



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 2.6 ug/L and 11.4 ug/L. ECA 7748-AYRL8C and ECA 1696-BPLL4R do not set an Unionized Ammonia limit or objective.

Graph 55: 2020 Monthly Final Effluent Unionized Average Concentration

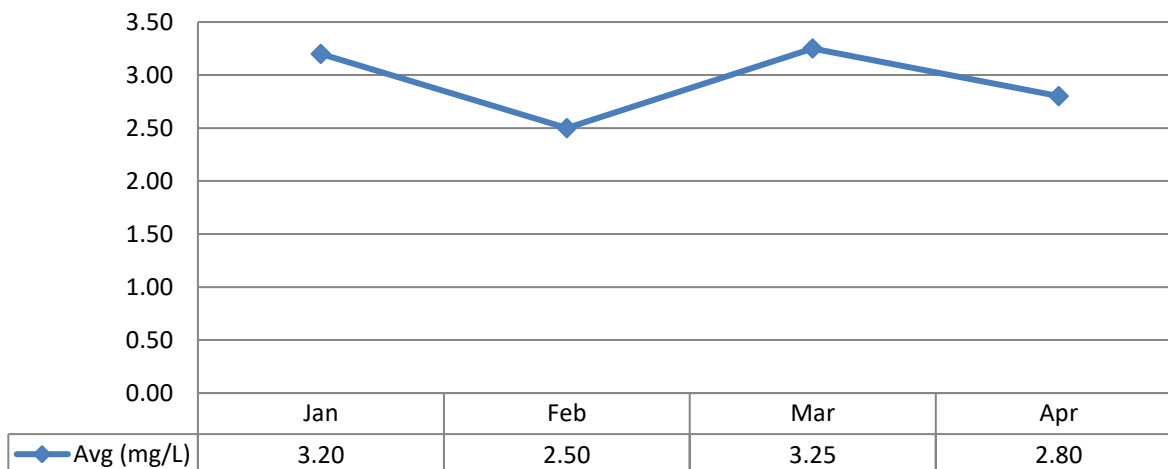


Additional Parameters

BOD5

BOD5 was sampled weekly until April 2020 and the average monthly results ranged between 2.25 mg/L and 12.0 mg/L.

Graph 56: 2020 Monthly Final Effluent BOD5 Average Concentration

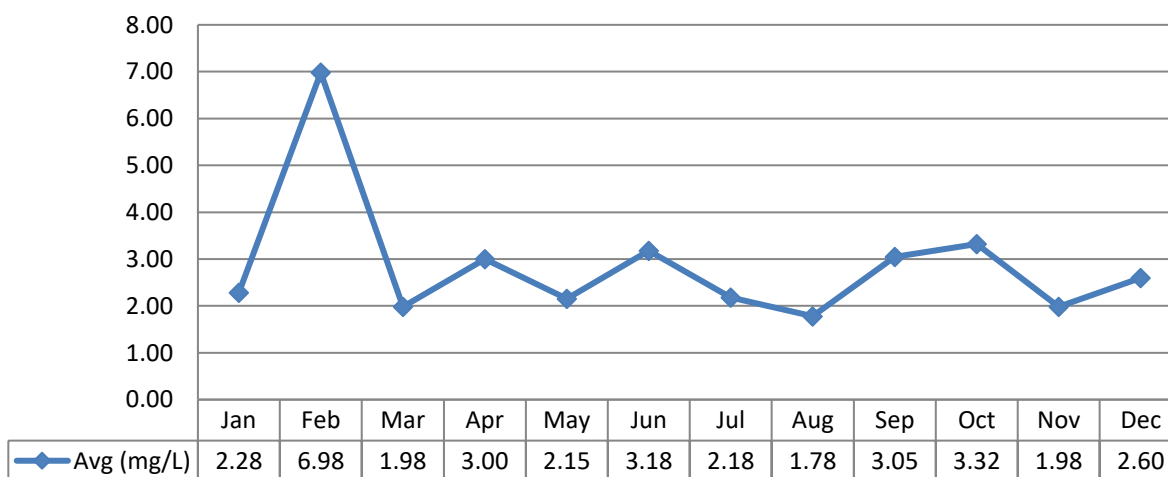


The following parameters are requirements of ECA 7748-AYRL8C and ECA 1696-BPLL4R, but are not designated average concentration limits or average waste loading limits.

TKN

Total Kjeldahl Nitrogen is sampled weekly and the average monthly results ranged between 1.98 mg/L and 6.98 mg/L.

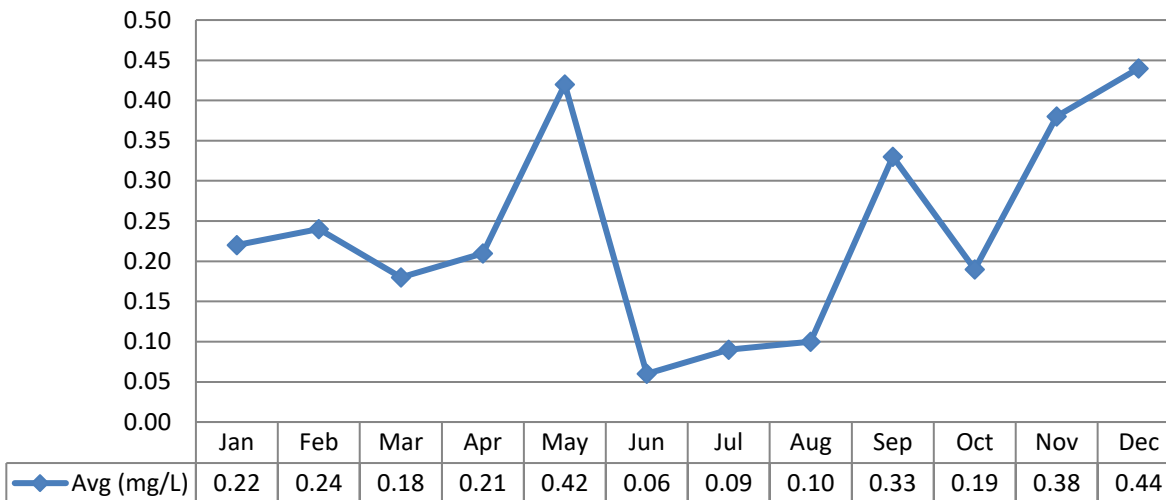
Graph 57: 2020 Monthly Final Effluent TKN Average Concentration



Nitrite as Nitrogen

Nitrite is sampled weekly and the average monthly results ranged between 0.06 mg/L and 0.44 mg/L.

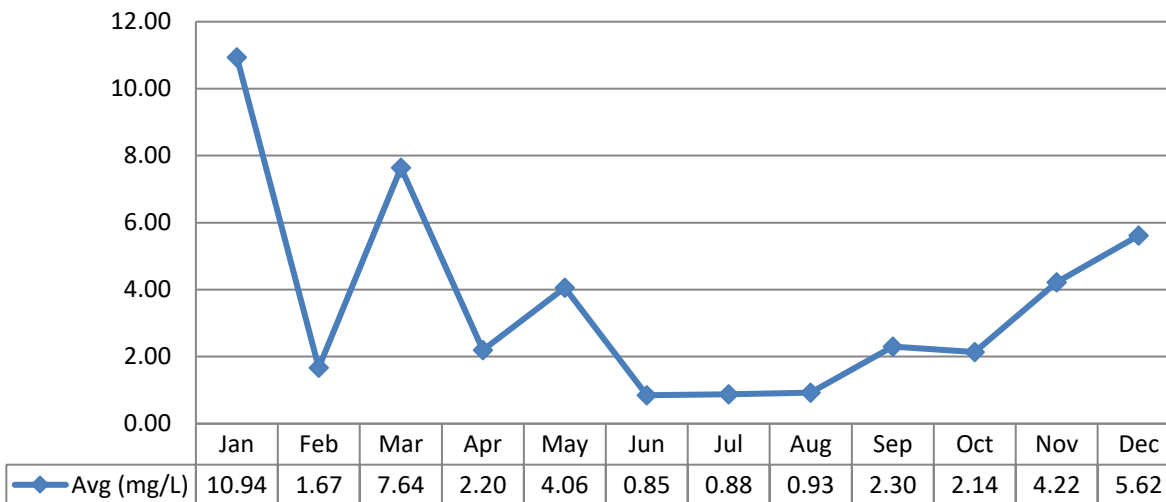
Graph 58: 2020 Monthly Final Effluent Nitrite Average Concentration



Nitrate as Nitrogen

Nitrate is sampled weekly and the average monthly results ranged between 0.88 mg/L and 10.94 mg/L.

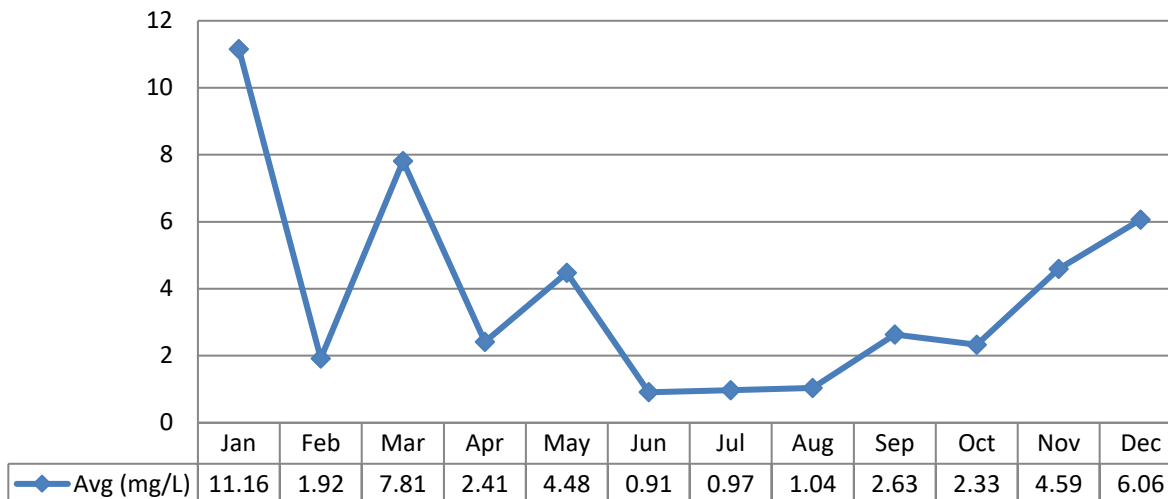
Graph 59: 2020 Monthly Final Effluent Nitrate Average Concentration



Nitrite+Nitrate as Nitrogen

Nitrite+Nitrate is sampled weekly and the average monthly results ranged between 0.91 mg/L and 11.16 mg/L.

Graph 60: 2020 Monthly Final Effluent Nitrite+Nitrate Average Concentration



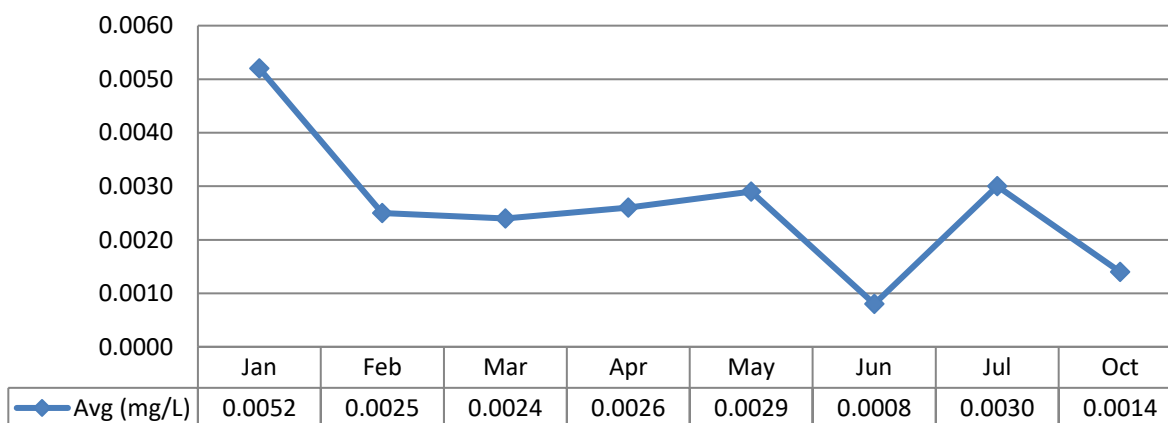
Final Effluent Samples Used For Leachate Related Monitoring

Samples are collected of the Final Effluent for the purpose of Leachate related monitoring for the Lindsay Landfill. Although some parameters were required under previous ECAs, some parameters are requirements of ECA 7748-AYRL8C or ECA 1696-BPLL4R

Copper

Copper was sampled monthly under ECA 7748-AYRL8C and then moved to quarterly under ECA 1696-BPLL4R and the average monthly results ranged between 0.0008 mg/L and 0.0052 mg/L.

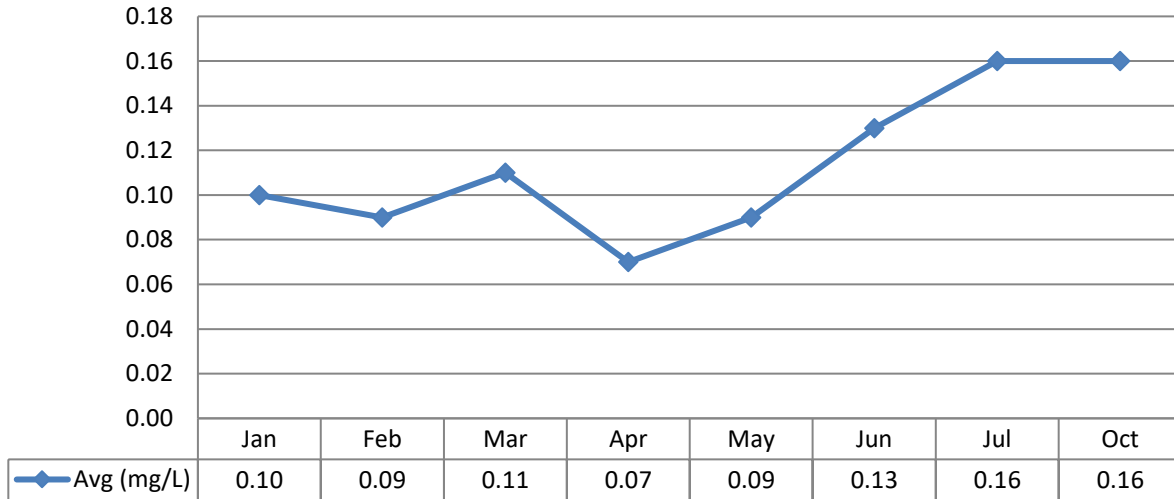
Graph 61: 2020 Final Effluent Copper Average Concentration



Boron

Boron is sampled on the monthly under ECA 7748-AYRL8C and then moved to quarterly on the under ECA 1696-BPLL4R and the average monthly results ranged between 0.07 mg/L and 0.16 mg/L.

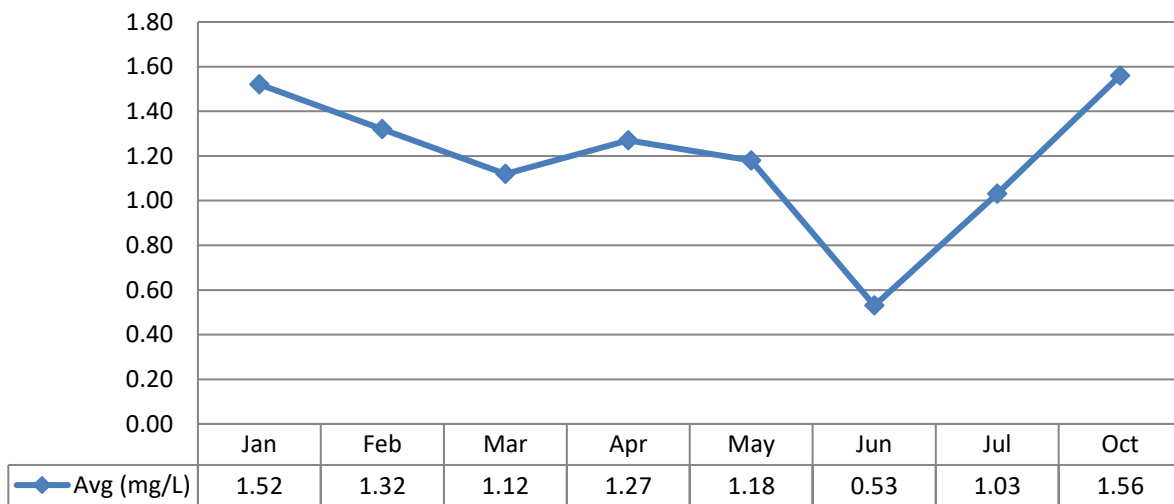
Graph 62: 2020 Final Effluent Boron Average Concentration



Aluminum (Total)

Aluminum is sampled monthly under ECA 7748-AYRL8C and then moved to quarterly under ECA 1696-BPLL4R and the average monthly results ranged between 0.53 mg/L and 1.56 mg/L.

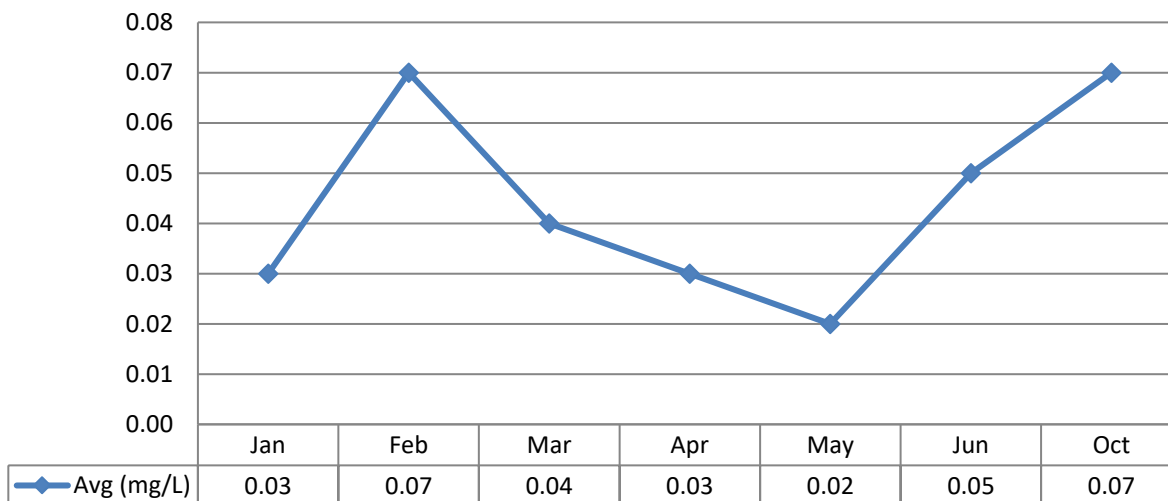
Graph 63: 2020 Final Effluent Aluminum Average Concentration



Iron (total)

Iron is sampled monthly under ECA 7748-AYRL8C and then moved to quarterly under ECA 1696-BPLL4R and the average monthly results ranged between 0.02 ug/L and 0.07 ug/L.

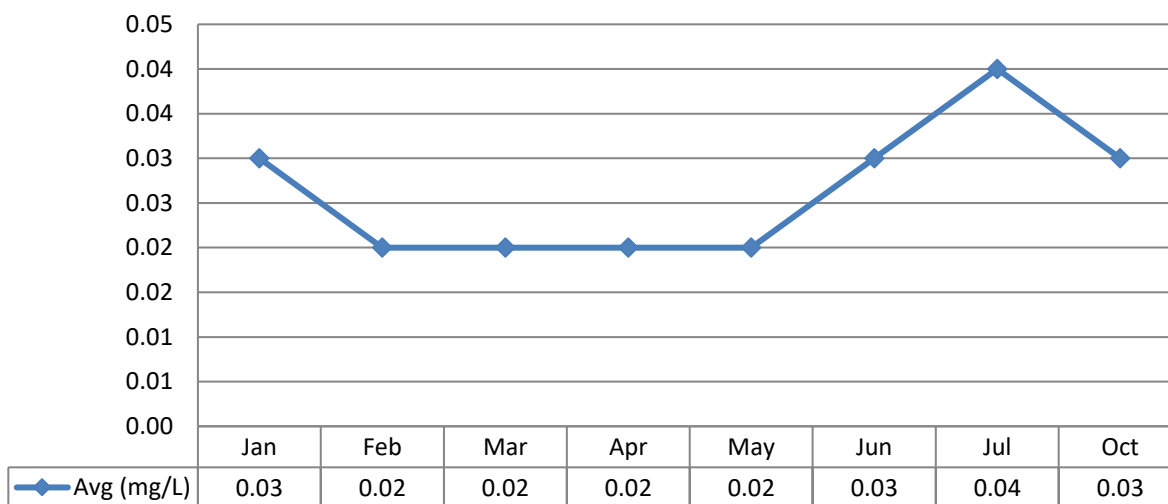
Graph 64: 2020 Final Effluent Iron Average Concentration



Zinc (total)

Zinc is sampled monthly under ECA 7748-AYRL8C and then moved to quarterly under ECA 1696-BPLL4R and the average monthly results ranged between 0.02 ug/L and 0.04 ug/L.

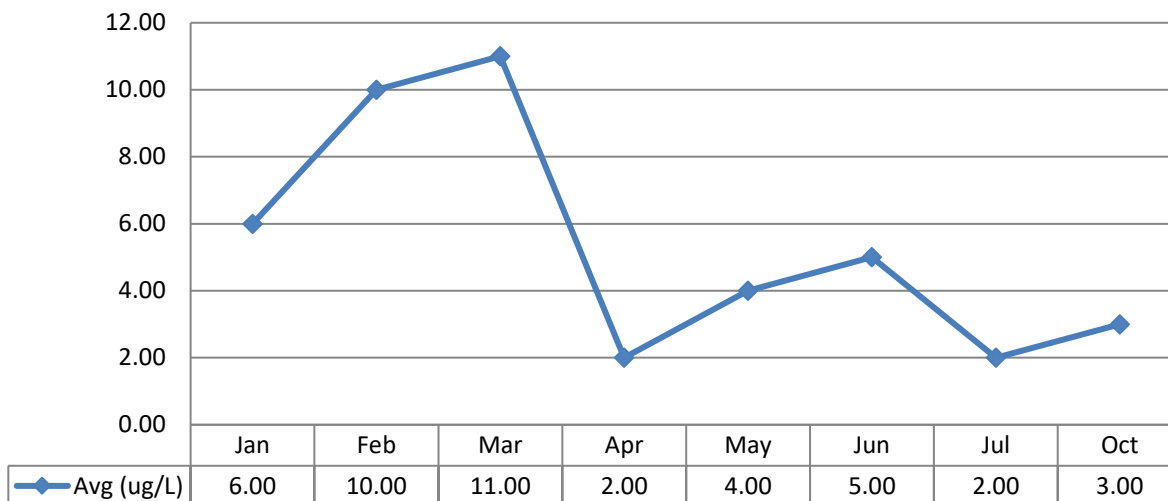
Graph 65: 2020 Final Effluent Zinc Average Concentration



4AAP-Phenolics

4AAP-Phenolics is sampled monthly under ECA 7748-AYRL8C and then moved to quarterly under ECA 1696-BPLL4R and the average monthly results were between 2.0 and 11.0 ug/L.

Graph 66: 2020 Final Effluent 4AAP-Phenolics Average Concentration



Benzene

Benzene is sampled monthly under ECA 7748-AYRL8C and then moved to quarterly under ECA 1696-BPLL4R and the results were consistent each month at <0.5 ug/L.

Toluene

Toluene is sampled monthly under ECA 7748-AYRL8C and then moved to quarterly under ECA 1696-BPLL4R and the results were consistent each month at <0.5 ug/L.

Ethylbenzene

Ethylbenzene is sampled monthly under ECA 7748-AYRL8C and then moved to quarterly under ECA 1696-BPLL4R and the results were consistent each month at <0.5 ug/L.

Xylene

Xylene is sampled monthly under ECA 7748-AYRL8C and then moved to quarterly under ECA 1696-BPLL4R and the results were consistent each month at <0.5 ug/L.

Quarterly Samples

ECA 7748-AYRL8C requires a grab sample be collected at least quarterly and analyzed for Bis (2-ethylhexyl) Phthalate, Cobalt, Magnesium, Manganese, Potassium and Strontium. This requirement continues into ECA 1696-BPLL4R. Limits are not defined in the ECA.

Table 2: 2020 Final Effluent Results for Samples Required by ECA 7748-AYRL8C & ECA 1696-BPLL4R.

Parameter	January 2, 2020	April 4, 2020	July 2, 2020	October 1, 2020
Bis (2-ethylhexyl) Phthalate (ug/L)	2	2	2.00	2
Cobalt (mg/L)	0.000178	0.000123	0.00011	0.000161
Magnesium (mg/L)	14.3	12.5	15.1	14.4
Manganese (ug/L)	0.0255	0.0328	0.0730	0.0520
Potassium (mg/L)	11.6	11.6	20.7	15.9
Strontium (mg/L)	0.405	0.373	0.379	0.267

c) ECA 7748-AYRL8C (issued October 18, 2018) introduced the requirement to develop a sample plan which would identify the dates on which required samples would be collected. The 2020 sample plan states that weekly samples would be collected on Thursdays and monthly samples would be collected on the first Thursday of each month. Annual samples were scheduled to be sampled on June 4, 2020. Weekly samples around the Christmas and New Year's holidays were pre-planned to be taken on the Wednesday of those respective weeks 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 2020.

For the Lindsay WWTP 2021 Sample Plan refer to **Appendix II: 2021 Sample Plan**.

d) ECA Condition 11(4)(d) and 11(4)(c) states that the annual performance report shall contain "a summary of all operating issues encountered and corrective actions taken."

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

Table 3: 2020 Lindsay WWTP Operational Challenges

Month	Challenges	Corrective Actions
January	Bar screen Fault – dewatering screw	New auger machined and replaced.
	High inlet level	High flow events. Reduce flow to clarifiers, close return from Lagoon 5, utilize Lagoon 5 storage

Month	Challenges	Corrective Actions
	Actiflo Recirculation Pump Faults	Plastics issue, exacerbated by high flows, cleared obstruction, return to service
	Aerator 304 failure	Repaired bearings and re-installed
	Mary St SPS Pump Fault	Reset faulted pump
	UV Fault	Replace bulbs
	Lindsay St N Leachate Pump 1 Failure	Replace pump
February	UV Bank 1B Major Fault	Replace faulty sensor
	Aerator 301 failure	Replace with new aerator
	High TAN	Due to aerator failures in January and February. Aerators maintenance/replaced and returned to service.
	Clarifier 2 RAS Pump Failure	Install new RAS pump
	Mary St SPS Pump Fault	Reset faulted pump
	Ridout St SPS Pump 2	Remove rocks/concrete from impeller
March	High flows	Reduce flow to clarifiers, close return from Lagoon 5, utilize Lagoon 5 storage
	UV Fault	Replace bulbs
	Actiflo Recirculation Pump Faults	Plastics issue, exacerbated by high flows, cleared obstruction, return to service
	Mary St SPS Pump Fault	Reset faulted pump
	Aerator 313 failure	Repair and re-install
	Aerator 314 failure	Replace motor and re-install
April	UV Fault	Replace bulbs
	Mary St SPS Pump Fault	Reset faulted pump
	Actiflo 1 & 2 Mixer Blade	Replace broken fan blades
	RAS Pump 2 Failure	Install new RAS pump
May	UV Fault	Replace bulbs
	Mary St SPS Pump Fault	Reset faulted pump
	Ridout St SPS Pump Fault	Reset faulted pump
	Actiflo 1 & 2 Sand Return	Rebuild Actiflo 1 & 2 Hydrocyclones
June	UV Fault	Replace bulbs
	Mary St SPS Pump Fault	Reset faulted pump
July	UV Fault	Replace bulbs
	Mary St SPS Pump Fault	Reset faulted pump
	Tertiary building master PLC comms fault	Reset PLC fault – heat issue
	Aerator 308 Failure	Replace fuse
August	Actiflo Recirculation Pump 1 Fault	Replace blown fuse
	Actiflo 2 Mixer Blade	Reattach blade to shaft
September	Two Aerator failure 308 and 309	Replace 308 shaft, replace 309 bearing, return to service

Month	Challenges	Corrective Actions
	Actiflo Recirculation Pump Faults	Plastics issue, cleared obstruction, return to service
	Mary St SPS Pump Fault	Reset faulted pump
	Clarifier RAS 2 Faults	Flow too high or low, adjust flow to balance between two clarifiers
	UV Fault	Replace bulbs
October	Aerator 309 failure	Replace motor, return to service
	Lindsay St N SPS Generator Fault	High temperature warning – Contractor maintenance
	Actiflo Recirculation Pump Faults	Cleared obstruction, return to service
	Mary St SPS Pump Fault	Reset faulted pump
November	Actiflo Recirculation Pump Faults	Cleared obstruction, return to service
	Mary St SPS Pump Fault	Reset faulted pump
	Actiflo 2 Mixer Blade	Replace fan blade
December	Actiflo Recirculation Pump Faults	Cleared obstruction, return to service
	Mary St SPS Pump Fault	Reset faulted pump – electrical staff found issue inside panel at water treatment plant
	Lindsay St N SPS Pump 1 VFD failure	Replace VFD cooling fan

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

e) 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**.

f) 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.

g) Calibrations on effluent monitoring equipment were performed by Franklin Empire in December 2020 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 in June 2020.

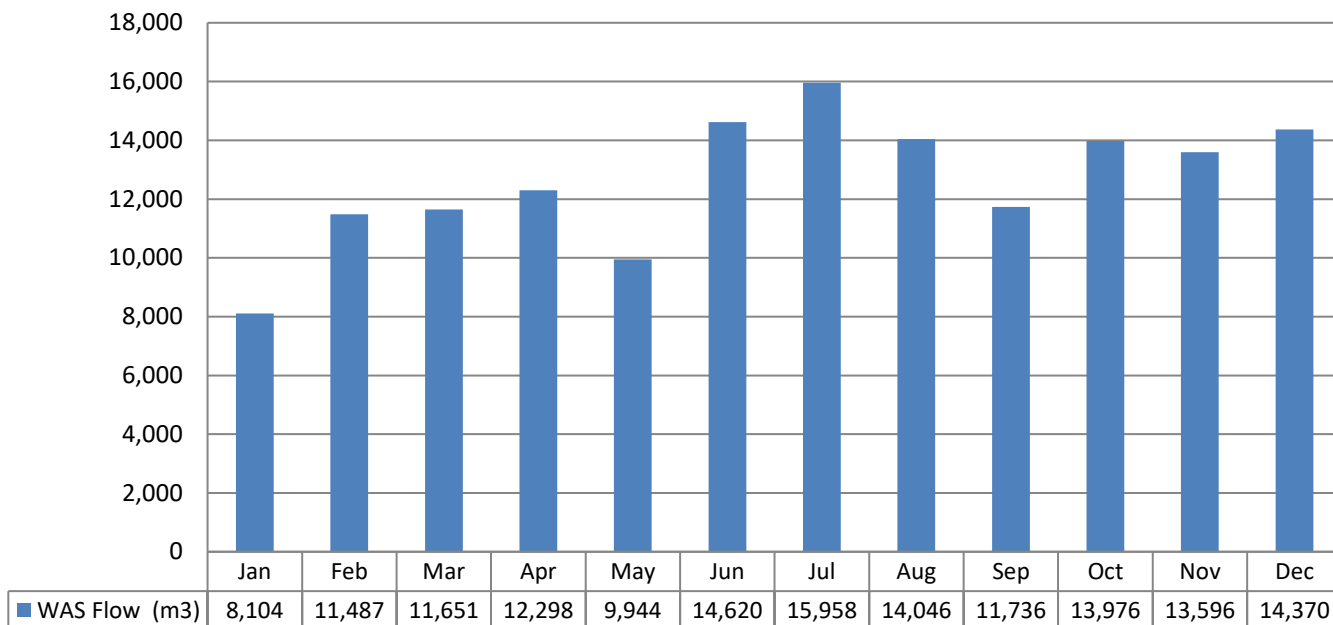
Refer to **Appendix IV: Calibration Reports**.

h) Continuous efforts were made to meet the Effluent Objectives in 2020:

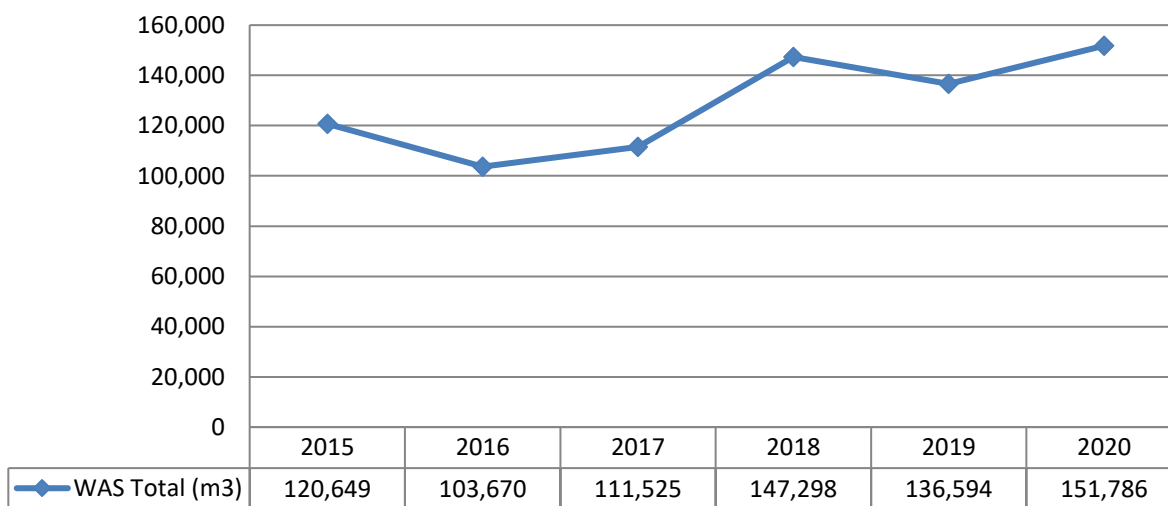
1. Development of the sampling plan which meets or exceeds the minimum sample requirements as required in the ECA;
2. Visual Inspection of the entire process while performing rounds;
3. Influent monitoring;
4. Ensuring that chemicals are being dosed and adjusting as required;
5. Continually optimizing 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.

i) The total volume of sludge generated in 2020 was 151,786 m³ which was a slight increase over the volume generated in 2019. 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 67: 2020 Monthly Sludge Generation Volumes



Graph 68: Historical Sludge Volume Comparisons



Sludge Removal

There was no sludge removed from the Lindsay WWTP in 2020.

j) Summary of community complaints received during 2020 can be found in **Appendix V: Community Complaints**.

k) Summary of By-passes, Overflows, situations outside Normal Operation Conditions, spills within the meaning of Part X of EPA and abnormal discharge events during 2020.

Bypasses

There were not any bypasses at the Lindsay WWTP in 2020

Overflows

There were not any overflows at the Lindsay WWTP or pumping stations in 2020.

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 7748-AYRL8C and ECA 1696-BPLL4R both direct 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 were two instances of Situations outside Normal Operating Conditions in 2020.

On January 12, 2020, Actiflo units #1 and #2 exceeded their rated design capacity of 15, 050 m³/d due to heavy melt event. .

On March 13, 2020, Actiflo unit #1 exceeded its rated design capacity of 15, 050 m³/d due to heavy rain event.

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

Spills

On March 17, 2020 a spill of approximately 500 gallons of wastewater occurred at a sanitary main that runs through Wilson Fields (City owned property). The sanitary main became partially blocked causing flows to back up in the lateral that services the washroom building for the park. Sewage spilled from a clean-out out onto the ground and into the building. The Ministry of the Environment, Conservation and Parks and the Medical Officer of Health (Haliburton Kawartha Pine Ridge District Health Unit) were notified. The City's Vac truck was on site to clear the blockage and clean up any residual sewage on the ground. There were no surface water sources impacted at all. Once sanitary lines returned to normal flow, system flushed again to complete cleaning.

Abnormal Discharge Events

There were not any abnormal discharge events at the Lindsay WWTP in 2020.

l) There were not any Notices of Modifications to Sewage Works initiated, worked on or completed in 2020.

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**.

m) During the 2020 reporting period, there were no incidents of a bypass or overflow within the sanitary sewer system or the WWTP. Therefore, no proposed projects to eliminate bypasses or overflows are forecasted for the 2021 reporting period.