

2023/2024 ANNUAL PERFORMANCE REPORT

ARTHUR WASTEWATER
TREATMENT PLANT



For the period of
October 1st, 2023 to May 31st, 2024

Prepared for the Township of Wellington North by the Ontario Clean Water Agency



ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

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The enclosed 2023/2024 Annual Performance Report for the Arthur Wastewater Treatment Plant (WWTP) summarizes the performance and related activities in accordance with its Amended Environmental Compliance Approval (ECA) Number 7654-BEMKVD (issued September 10, 2019) as per Section 14(4) elements a through o during the reporting period of October 1, 2023 to May 31, 2024.

1. System Description

The Arthur Waste Water Treatment Plant (WWTP) is an extended aeration plant and is located at 160 Preston Street in Arthur, Ontario. The WWTP and its collection system are owned by the Township of Wellington North and the Operating Authority is the Ontario Clean Water Agency (OCWA). As per ECA 7654-BEMKVD, the plant's rated capacity is 1,860 m³/d. The major process units consist of: inlet works, preliminary treatment consisting of screening and grit removal, influent flow measurement, secondary treatment systems consisting of biological treatment in aerations tanks, secondary sedimentation in one clarifier, and tertiary treatment consisting of a sand filtration system, phosphorus removal and UV disinfection. Sludge is managed through sludge digestion in a primary and secondary digester and stored in four sludge storage tanks prior to haulage. The WWTP discharges the treated effluent via its outfall into the Conestogo River.

The Arthur WWTP sewage collection system consists of a network of sewage collection pipework and maintenance access points, and two sewage Pumping Stations (PS's). Frederick Sewage Pumping Station is located at 176 Frederick Street West and is connected via a forcemain to the inlet works at the WWTP. Well Street Sewage Pumping Station is located on Well Street and is also connected via a forcemain to the inlet works at Arthur WWTP. On January 10, 2023, The Township of Wellington North was issued its first Municipal Sewage Collection System ECA #113-W601, Issue 1. Further information regarding the performance of the 2023 Township of Wellington North Municipal Sewage Collection System, inclusive of the Arthur Sewage Collection System, can be found in the Collection System Annual Report located on the Township Website: <http://www.wellington-north.com>.

An overview of the Arthur Wastewater Treatment System can be found in the following table:

Table 1: Arthur WWTP System Overview

Facility Name	Arthur Wastewater Treatment Plant
Facility Type	Extended Aeration, Sand Filtration, Chemical Phosphorus Removal, and UV Treatment
Plant Classification	Class III WWT/Class II WWC
Works Number	110000882
Rated Capacity	1,860 m ³ /d
Discharge Point	Conestogo River
Environmental Compliance Approval	7654-BEMKVD (September 10, 2019)

2. Influent Monitoring

Where ECA 7654-BEMKVD, Section 13 (4)(a) requires:

“a summary and interpretation of all Influent, Processed Organic Waste monitoring data, and a review of the historical trend of the sewage characteristics and flow rates;”

2.1 Influent ECA Monitoring Program

The following tables outline the monitoring programs at the Arthur Wastewater Treatment Plant (WWTP) as required by the most current ECA for the reporting period. There are additional in-house samples taken and analyzed throughout the year in order to help with process performance monitoring, adjustment, and optimization. The parameters were analyzed by an accredited analytical laboratory (SGS (Lakefield) Canada Inc.).

Table 2: Influent Monitoring Program– Discharge of Inlet Sewer- *as per ECA 7656-BEMKVD, Schedule E*

Parameters	Sample Type	Frequency
Biochemical Oxygen Demand (BOD ₅)	24-hour Composite	Monthly
Total Suspended Solids (TSS)	24-hour Composite	Monthly
Total Phosphorous (TP)	24-hour Composite	Monthly
Total Kjeldahl Nitrogen (TKN)	24-hour Composite	Monthly

2.2 Raw Sewage (Influent) Characteristics: Summary and Interpretation of Reporting Year

The following parameters in Table 3 are not reportable as they do not have limits or objectives but are monitored as required by the ECA and used to characterize the contents of incoming sewage flow.

A summary of the influent laboratory results can be found in the following table for samples taken and analyzed during the reporting period.

Table 3: Raw Sewage (Influent) Quality Analysis – Discharge of Inlet Sewer

Month & Year	BOD ₅ (mg/L)	TSS (mg/L)	TP (mg/L)	TKN (mg/L)
October 2023	196.00	183.00	4.55	26.60
November 2023	416.00	225.00	5.25	35.10
December 2023	157.00	215.00	3.98	25.30
January 2024	238.00	184.00	3.20	26.80
February 2024	266.00	173.00	5.03	32.40
March 2024	244.00	202.00	3.22	27.70
April 2024	140.00	208.00	3.04	27.50
May 2024	115.00	172.00	1.88	16.50
Reporting Period Annual Average	221.50	195.25	3.77	27.24

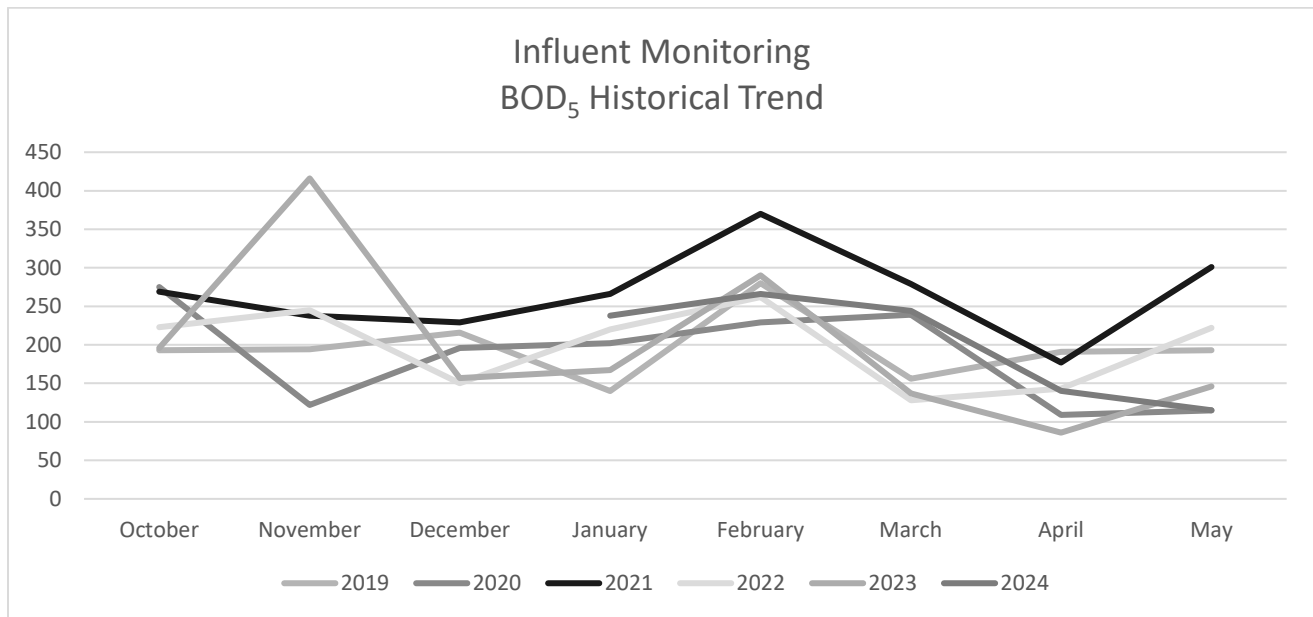
Inlet Sewer laboratory analysis throughout this reporting period averaged a Biochemical Oxygen Demand (BOD₅) concentration of 221.50 mg/L, a Total Suspended Solids (TSS) concentration of 195.25 mg/L, a Total Phosphorus (TP) concentration of 3.77 mg/L and a Total Kjeldahl Nitrogen concentration of 27.24 mg/L.

2.3 Raw Sewage (Influent) Characteristics: Review of Historical Trends

A review of historical trends of the influent sewage characteristics are shown below in the following graphs 1-4:

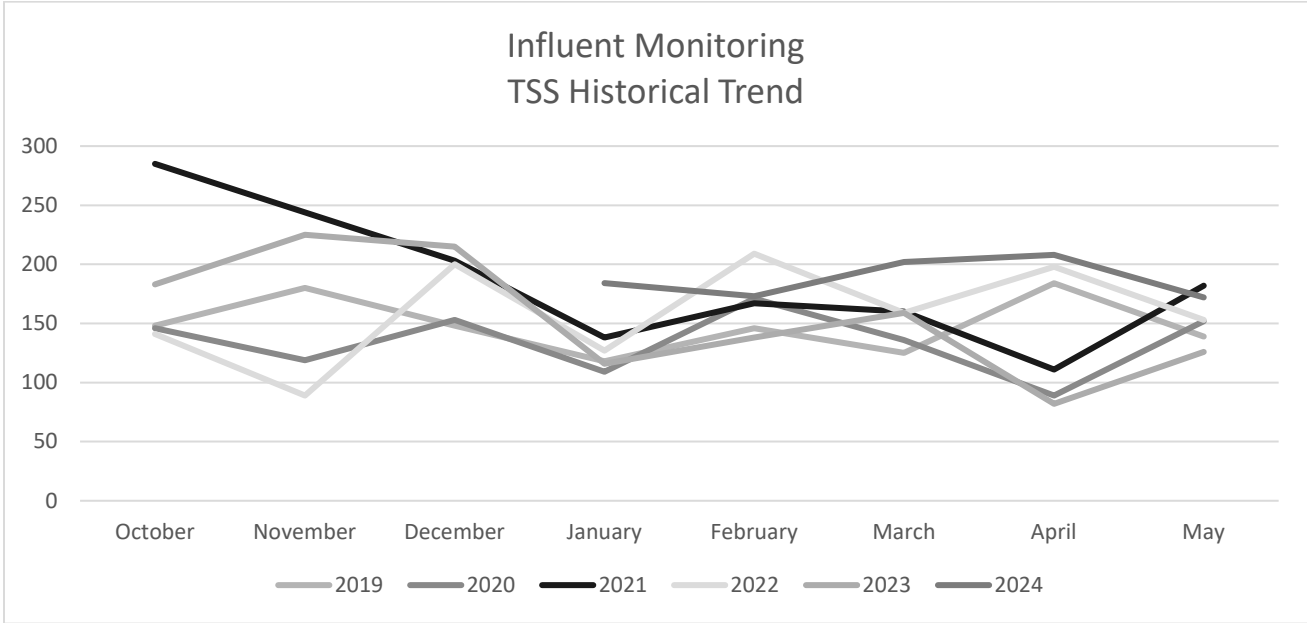
The below graph shows historical raw Biochemical Oxygen Demand (BOD₅) trending from 2020 to 2024. A review of the trends from the last 5 years for BOD₅ shows that the reporting period average BOD₅ concentration in the raw sewage has fluctuated year per year.

Graph 1: BOD₅ Historical Trending Laboratory Results (Influent) – Discharge of Inlet Sewer



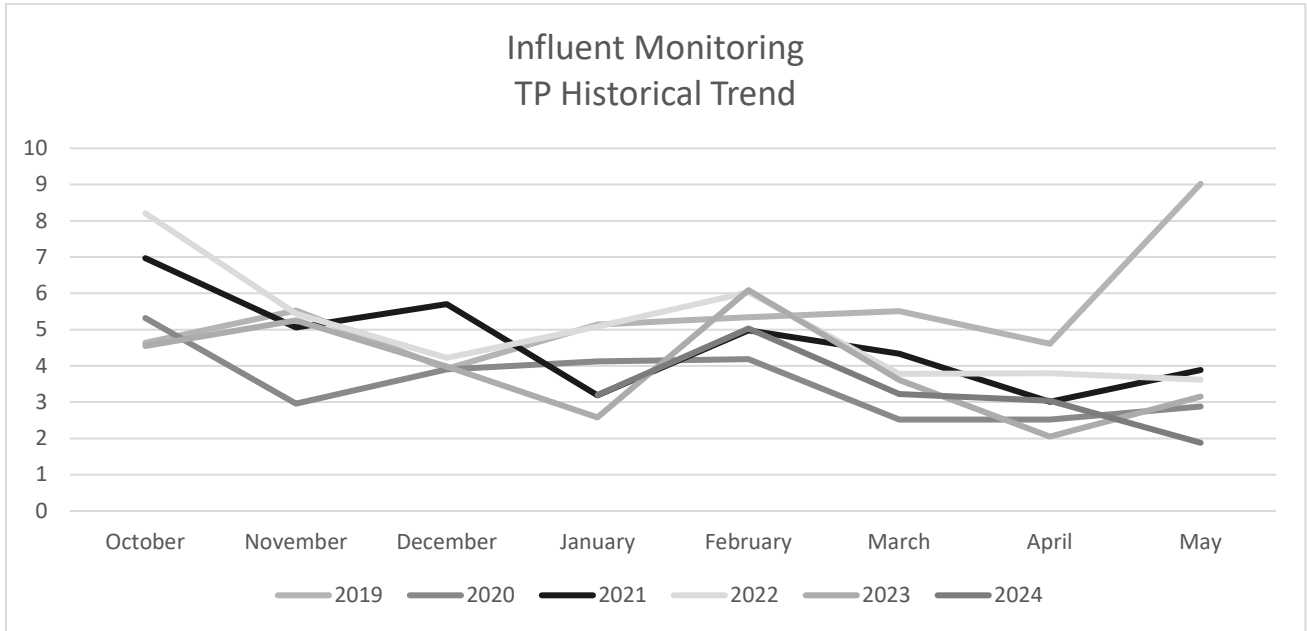
The below graph shows the historical raw Total Suspended Solids trending from 2020 to 2024. A review of the trends from the last 5 years for TSS has shown similar concentrations to previous reporting periods.

Graph 2: TSS Historical Trending Laboratory Results (Influent) – Discharge of Inlet Sewer



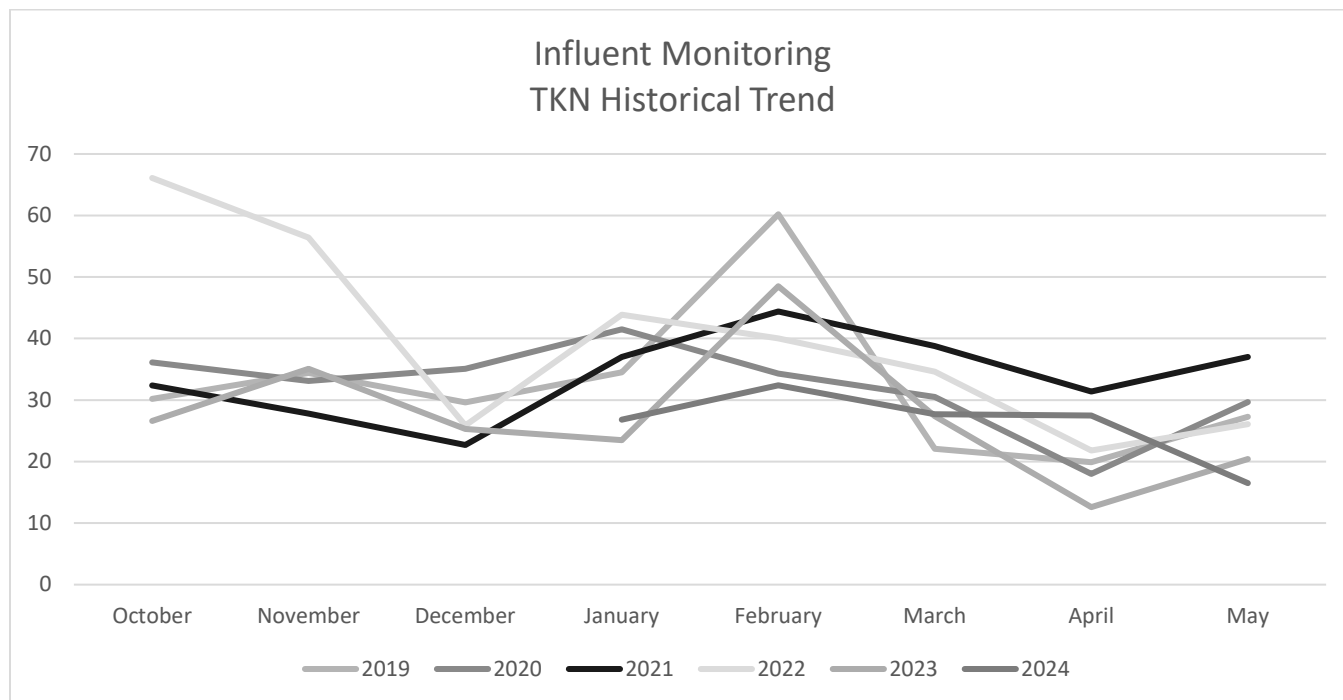
The below graph shows the historical raw Total Phosphorus trending from 2020 to 2024. A review of the trends from the last 5 years for TP has shown similar concentrations to previous reporting periods.

Graph 3: TP Historical Trending Laboratory Results (Influent) – Discharge of Inlet Sewer



The below graph shows the historical raw Total Kjeldahl Nitrogen trending from 2020 to 2024. A review of the trends from the last 5 years for TP has shown similar concentrations to previous reporting periods.

Graph 4: TKN Historical Trending Laboratory Results (Influent) – Discharge of Inlet Sewer



2.4 Influent Flows

A summary of Influent Flows during the reporting period is included in the following table:

Table 4: Influent Flows

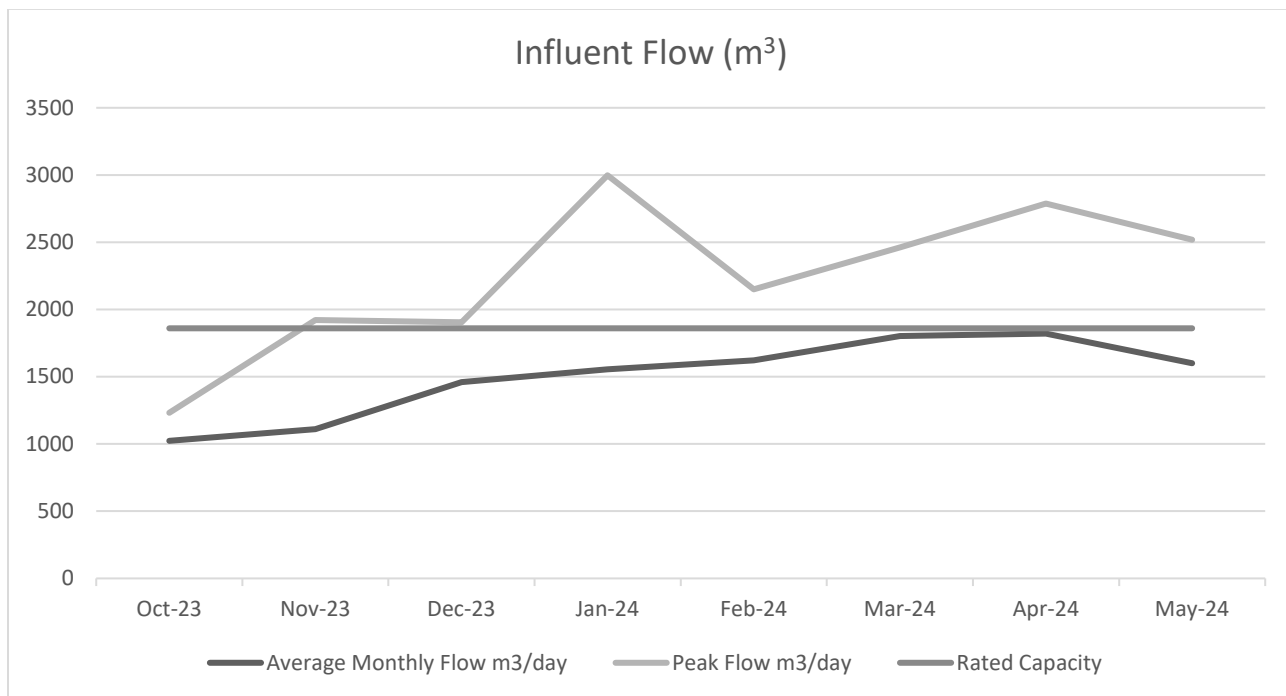
Month	Average Daily Flow (m ³ /day)	Peak Flow (m ³ /day)	Total Flow (m ³)
October 2023	1023.22	1231.80	31719.80
November 2023	1108.84	1921.40	33265.10
December 2023	1459.49	1904.80	45244.30
January 2024	1555.53	2997.90	48221.40
February 2024	1621.59	2150.90	47026.10
March 2024	1803.55	2461.60	55909.90
April 2024	1820.65	2787.40	54619.40
May 2024	1600.28	2518.30	49608.70
Reporting Period Average	1196.14	-	-
Reporting Period Max	-	2997.90	-
Reporting Period Total	-	-	365614.70

Note: Influent flow is calculated based on River Discharge Flow along with Lagoon Flow as there is no Raw Flow Meter

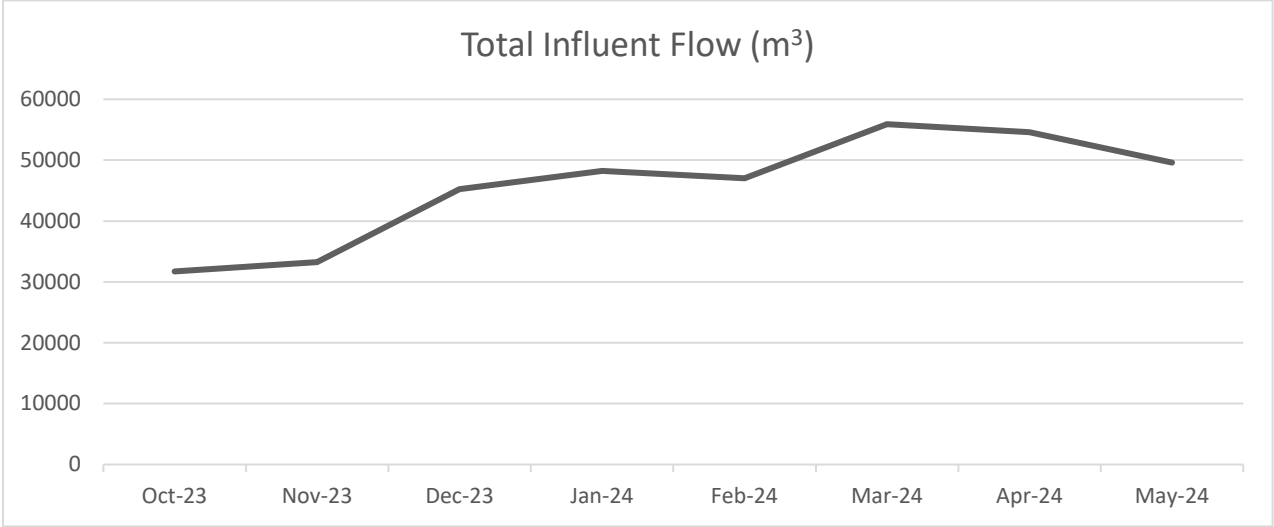
The average daily flow for the reporting period was 1,196.14 m³, which is approximately 64.32% of the specified design flow of 1,860.00 m³/day. The highest recorded Monthly Average Daily Flow occurred in January 2024 at 2,997.90 m³ and was due to increased precipitation and inflows from the un-seasonal melts during January. The total precipitation for January 2024 was one of the highest for the reporting period apart from December 2023, April, and May 2024 based on data from Environment Canada.

Please refer to below for graphical representation of influent flows for the reporting period:

Graph 5: Influent: Average Daily Flows & Peak Flows Versus Designed Limits for Reporting Period



Graph 6: Influent: Total Flows for the Reporting Period

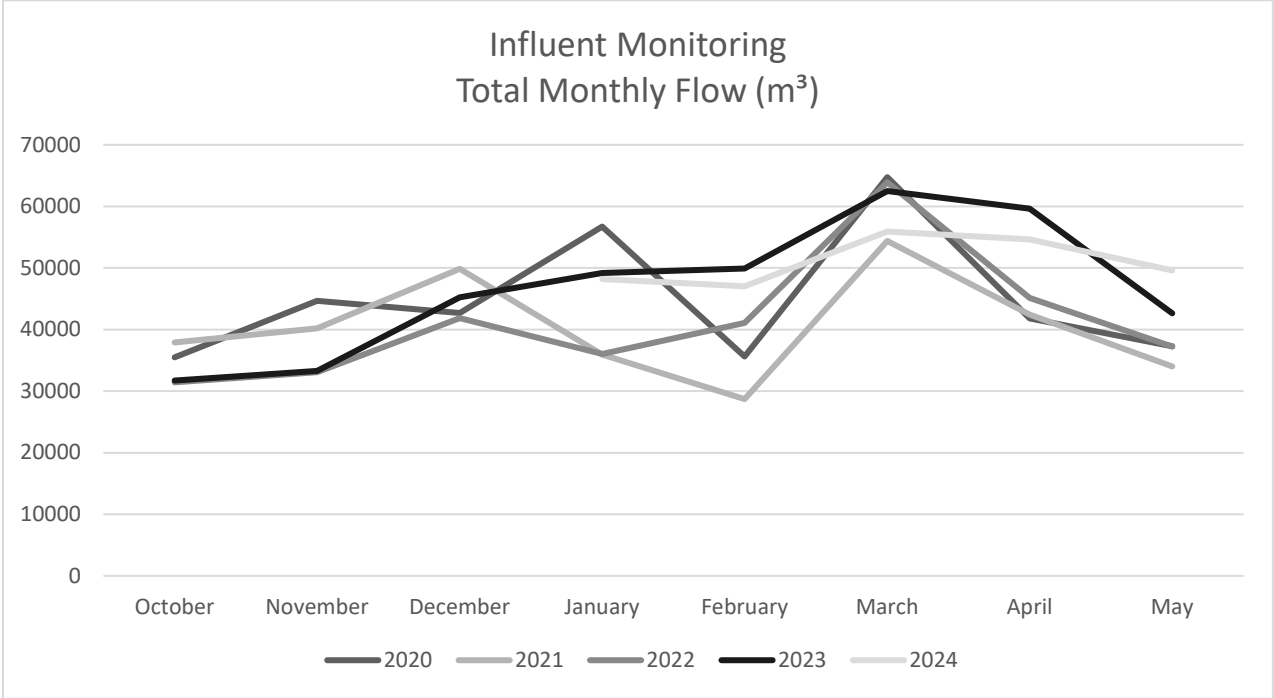


2.5 Influent Flow and Volume: Review of Historical Trends

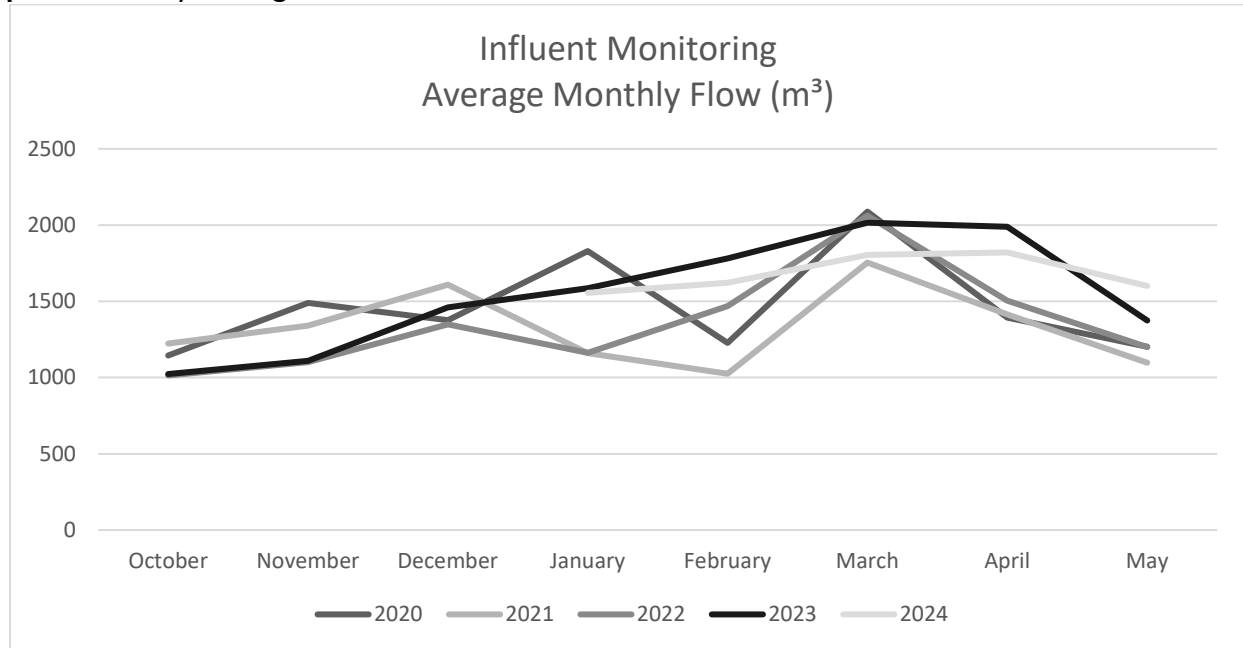
A review of historical trend of the influent flows are shown below in the following graphs 7-9:

The below graphs (7-9) show the historical monthly influent flow trending from 2020 to 2024. A review of the trends from the last five (5) years has shown similar flows in the months of September to December and a fluctuation of flow in the months of January to May.

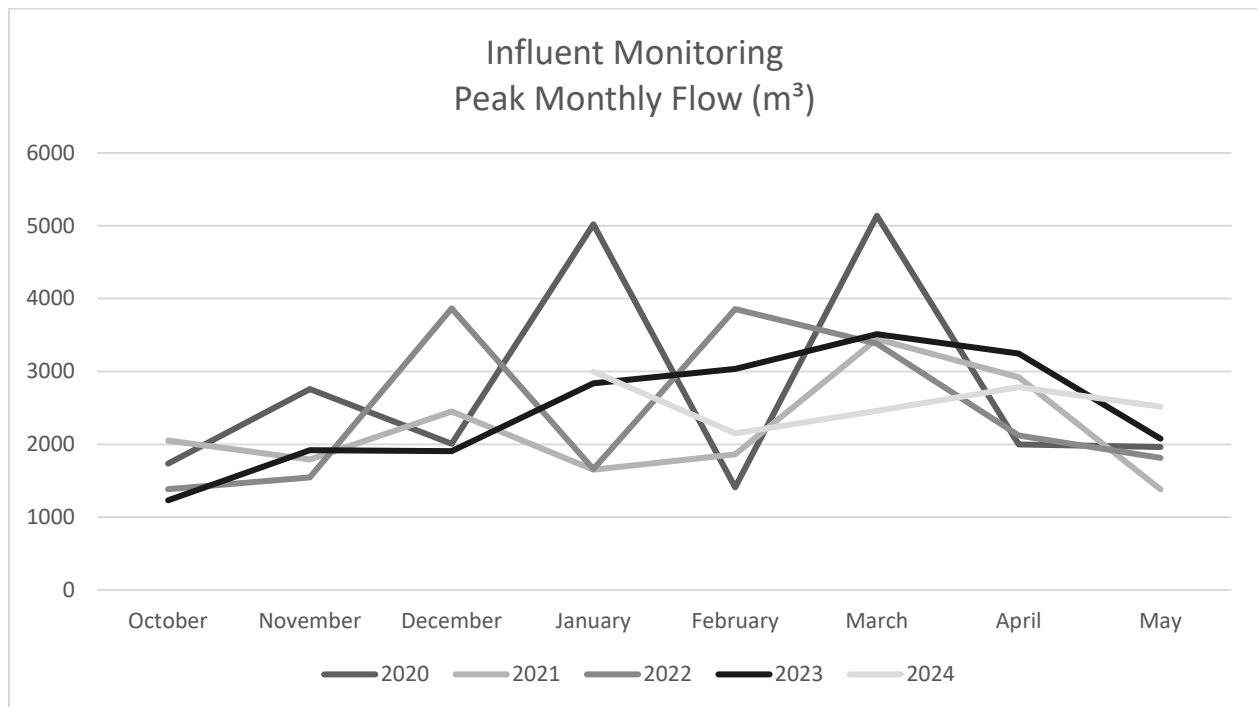
Graph 7: Monthly Total Influent Flow Historical Trend



Graph 8: Monthly Average Influent Flow Historical Trend



Graph 9: Monthly Peak Influent Flow Historical Trend



3. Effluent Monitoring

Where ECA 7654-BEMKVD, Section 13 (4)(b) 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 in this Approval, including an overview of the success and adequacy of the Works;”

3.1 Effluent ECA Monitoring Program

The following table outlines the monitoring programs at the Arthur Wastewater Treatment Plant (WWTP) as required by the ECA that was issued for the reporting period. The parameters were analyzed by an accredited analytical laboratory (SGS (Lakefield) Canada Inc.). Additional in-house samples are taken and analyzed in-house throughout the year to assist with process performance monitoring, adjustment, and optimization.

Table 5: Effluent Monitoring Program – Plant Outfall Pipe - Weekly during approved discharge period, as per ECA 7656-BEMKVD, Schedule E

Parameters	Sample Type	Frequency
Carbonaceous Biochemical Oxygen Demand (CBOD ₅)	24-hour Composite	Weekly
Total Suspended Solids (TSS)	24-hour Composite	Weekly
Total Phosphorous (TP)	24-hour Composite	Weekly
Total Ammonia Nitrogen	24-hour Composite	Weekly
Total Kjeldahl Nitrogen (TKN)	24-hour Composite	Weekly
Nitrate as Nitrogen	24-hour Composite	Weekly
Nitrite as Nitrogen	24-hour Composite	Weekly
Unionized Ammonia	As Calculated	Weekly
E.Coli	Grab	Weekly
Dissolved Oxygen	Grab/Probe	Weekly
pH ^{5A}	Grab/Probe	Weekly
Temperature ^{5A}	Grab/Probe	Weekly

^{5A}As per ECA 7654-BEMKVD- Schedule E, pH and temperature of the Final Effluent shall be determined in the field at the time of sampling for Total Ammonia Nitrogen

3.2 Monitoring Final Effluent Design Objectives, Limits and Loadings

The following tables outline the final effluent objectives, limits and loadings at the Arthur Wastewater Treatment Plant as per its most recent ECA. The applicable effluent parameters are either “concentrations” expressed as milligrams per litre or “loadings” expressed as kilograms per day, and they are reportable either “Monthly” or “Seasonally.”

Table 6: Arthur WWTP Final Effluent Design Objectives and Limits upon completion of construction of all Proposed Works in Phase 1, *as per ECA 7654-BEMKVD Schedule B and Schedule C*

Source	Parameter	Objective Monthly Average Concentration (mg/L)	Limit Monthly Average Concentration (mg/L)	Limit Seasonal Average Waste Loading (Kg/d)
Final Effluent	CBOD ₅	6.0	10.0	18.6
	Total Suspended Solids	6.0	10.0	18.6
	Total Phosphorus	0.21	0.25	0.47
	Total Ammonia Nitrogen	0.6	3.5 (Jan 01-May 31) 2.8 (Oct 01-Oct 31) 3.5 (Nov 01-Dec 31)	6.5 (Jan 01-May 31) 5.2 (Oct 01-Oct 31) 6.5 (Nov 01-Dec 31)
	<i>E. coli</i> (GMD) ^{6A}	100 CFU/100 mL	100 CFU/100 mL	n/a
	pH	6 to 8 inclusive		

^{6A} Geometric Mean Density

3.3 Effluent Monitoring Data: Summary and Interpretation of Reporting Year and Comparison to Objectives and Limits

A review of the effluent monitoring data shows that the following parameters were within the objectives (as applicable) and limits set out in the most current ECA for the duration of the 2023/2024 reporting period:

- CBOD₅ monthly average effluent concentration
- TP monthly average effluent concentration
- *E.Coli* monthly geometric mean density
- pH single sample

A review of the effluent monitoring data shows that the following parameters were within the limits set out in the most current ECA during the reporting period but were unable to meet the objectives in the following instances:

- TSS monthly effluent concentration – for November, December 2023 and in January, March, and April, 2024
- TAN monthly effluent concentration – for December, 2023 and in January and February, 2024

It should be noted that as per the ECA, the objectives are non-enforceable design objectives to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs. Exceedances of objectives is not reportable.

A review of the effluent monitoring data shows that the following parameters were not within the limits set out in the most current ECA during the reporting period in the following instances and were reportable as non-compliance events with the ECA:

- TSS monthly effluent concentration – for February, 2024

The following tables (7 to 12) summarize monthly and seasonal annual data in comparison to the applicable ECA objectives and limits for the reporting period October 1, 2023 – May 31, 2024 at the Arthur WWTP.

Table 7: Effluent Sampling Results: CBOD₅ and CBOD₅ Loading Concentrations versus ECA Objectives and Compliance Limits

	Monthly Average Concentration (mg/L)	Within Monthly Objective? (6.0 mg/L)	Within Monthly Limit? (10.0 mg/L)	Seasonal Average Loading (kg/d)	Within Seasonal Limit? (18.6 kg/d)
October 2023	-	-	-	-	N/A
November 2023	3.40	Yes	Yes	8.04	N/A
December 2023	<2.75	Yes	Yes	<6.59	N/A
January 2024	2.67	Yes	Yes	2.99	N/A
February 2024	<2.00	Yes	Yes	<5.82	N/A
March 2024	3.50	Yes	Yes	10.16	N/A
April 2024	<2.00	Yes	Yes	<5.04	N/A
May 2024	<2.00	Yes	Yes	<2.28	N/A
Seasonal Annual Average	N/A	N/A	N/A	4.91	Yes

Table 8: Effluent Sampling Results: TSS and TSS Loading Concentrations versus ECA Objectives and Compliance Limits

	Monthly Average Concentration (mg/L)	Within Monthly Average Objective? (6.0 mg/L)	Within Monthly Average Limits? (10.0 mg/L)	Seasonal Average Loading (kg/d)	Within Seasonal Limit? (18.6 kg/d)
October 2023	-	-	-	-	N/A
November 2023	7.60	No	Yes	17.98	N/A
December 2023	8.75	No	Yes	20.98	N/A
January 2024	8.33	No	Yes	9.35	N/A
February 2024	10.25	No	No ^{8A}	29.81	N/A
March 2024	9.38	No	Yes	27.21	N/A
April 2024	7.75	No	Yes	19.53	N/A
May 2024	4.60	Yes	Yes	5.25	N/A
Seasonal Annual Average	N/A	N/A	N/A	12.81	Yes

^{8A}February 2024 Total Suspended Solids Monthly Average Limit exceedance was verbally reported on March 12, 2024 and follow-up written notification was also provided on March 12, 2024, as required under the most recent ECA.

Table 9: Effluent Sampling Results: TP and TP Loading Concentrations versus ECA Objectives and Compliance Limits

	Monthly Average Concentration (mg/L)	Within Monthly Average Objective? (0.21 mg/L)	Within Monthly Average Limits? (0.25 mg/L)	Seasonal Average Loading (kg/d)	Within Seasonal Limit? (0.47 kg/d)
October 2023	-	-	-	-	N/A
November 2023	0.12	Yes	Yes	0.29	N/A
December 2023	0.11	Yes	Yes	0.26	N/A
January 2024	0.10	Yes	Yes	0.11	N/A
February 2024	0.07	Yes	Yes	0.20	N/A
March 2024	0.10	Yes	Yes	0.29	N/A
April 2024	0.07	Yes	Yes	0.17	N/A
May 2024	<0.08	Yes	Yes	<0.10	N/A
Seasonal Annual Average	N/A	N/A	N/A	0.19	Yes

Table 10: Effluent Sampling Results: TAN and TAN Loading Concentrations versus ECA Objectives and Compliance Limits

	Monthly Average Concentration (mg/L)	Within Monthly Average Objective? (0.6 mg/L)	Within Monthly Average Limits? 3.5 mg/L (Jan 1-May 31) 2.8 mg/L (Oct 1-Oct 31) 3.5 mg/L (Nov 1-Dec 31)	Seasonal Average Loading (kg/d)	Within Seasonal Limit? 6.5 mg/L (Jan 1-May 31) 5.2 mg/L (Oct 1-Oct 31) 6.5 mg/L (Nov 1-Dec 31)
October 2023	-	-	-	-	N/A
November 2023	0.18	Yes	Yes	0.43	N/A
December 2023	1.20	No	Yes	2.88	N/A
January 2024	1.27	No	Yes	1.42	N/A
February 2024	0.63	No	Yes	1.82	N/A
March 2024	0.48	Yes	Yes	1.38	N/A
April 2024	<0.13	Yes	Yes	<0.32	N/A
May 2024	<0.24	Yes	Yes	<0.27	N/A
Seasonal Annual Average	N/A	N/A	N/A	1.00	Yes

Table 11: Effluent Sampling Results: E.coli Concentrations versus ECA Compliance Limits

	Monthly Geometric Mean Density	Within Monthly Objective/Limits? (100 CFU/ 100mL)
October 2023	-	-
November 2023	24.21	Yes
December 2023	34.93	Yes
January 2024	32.79	Yes

	Monthly Geometric Mean Density	Within Monthly Objective/Limits? (100 CFU/ 100mL)
February 2024	4.13	Yes
March 2024	57.23	Yes
April 2024	2.63	Yes
May 2024	3.64	Yes

Table 12: Effluent Sampling Results: pH versus ECA Compliance Limits

	pH Ranges	Within Objective/Limits? (6 – 8 inclusive)
October 2023	-	-
November 2023	8-8	Yes
December 2023	8-8	Yes
January 2024	8-8	Yes
February 2024	7-8	Yes
March 2024	7-8	Yes
April 2024	7-8	Yes
May 2024	7-8	Yes

3.4 Success & Adequacy of the System

In 2023/2024, the Arthur WWTP produced effluent with the following removal rates:

Parameter	Average Removal Rate
Total Suspended Solids	94.08%
Total Phosphorus	95.53%

During the reporting period, Arthur WWTP provided effective wastewater treatment, producing effluent with removal rates for Total Suspended Solids at 94.08% and 95.53% for Total Phosphorus.

The parameter cBOD₅ objective for the seasonal discharge was not exceeded during the reporting period. There were no limit exceedances.

The parameter TSS objective for the seasonal discharge was exceeded for the months of December 2023 and February, March and April of 2024. There was one limit exceedance in February 2024 as noted in Table 8 of this report.

The parameter TP objective for the seasonal discharge was not exceeded during the reporting period. There were no limit exceedances.

The parameter TAN objective for the seasonal discharge was not exceeded during the reporting period. There were no limit exceedances.

E.Coli concentrations reached a maximum geometric mean density of 57.24 in May 2024, which did not exceed the compliance objective and limit of 100 CFU/100mL. During the seasonal discharge period, there were no exceedances.

pH remained within the compliance limits for the duration of the reporting year.

Please refer to **Section 3** of this report for more details regarding the discharge period exceedances.

Refer to Appendix A for a detailed Performance Assessment Report.

3.5 Effluent Flows - Discharges

The below chart summarizes the effluent discharged during the discharge period:

Table 13: Effluent Discharge Summary

Month	Average Daily Flow (m ³ /day)	Peak Flow (m ³ /day)	Total Flow (m ³)	Max Daily Effluent Flow Limit (m ³)	Within Limit?
October 2023	-	-	-	1400.00	Yes
November 2023	2365.81	3066.60	70974.30	4600.00	Yes
December 2023	2398.00	2849.00	74337.90	3800.00	Yes
January 2024	1122.00	3548.80	34782.10	5000.00	Yes
February 2024	2908.23	3538.80	84338.60	5000.00	Yes
March 2024	2902.00	3466.30	89962.00	5500.00	Yes
April 2024	2520.38	3201.00	75611.30	3200.00	No ^{13A}
May 2024	1141.87	1202.90	35398.10	1300.00	Yes
Reporting Period Average	1579.48	-	-	-	-
Reporting Period Max	-	3548.80	-	-	-
Reporting Period Total	-	-	465404.30	-	-

^{13A} April 13th 2024 the Maximum Daily Effluent Flow limit exceedance was verbally reported on April 15, 2024 and follow-up written notification was also provided on April 19, 2024, as required under the most recent ECA.

During the reporting period, the average annual daily flow for final effluent to outfall (Conestogo River) was 1,579.48 m³/day. The maximum peak final effluent daily flow was 3,548.80 m³/day, which occurred on January 10, 2024 corresponding with the maximum peak daily influent flows that occurred January 2024.

4. Annual Update to the Stage-Discharge Curve

Where ECA 7654-BEMKVD, Section 13 (4)(c) requires:

“a summary of the annual update to the stage-discharge curve as required in Paragraph 9 (e);”

9(e). The Owner shall operate, calibrate and maintain the Conestogo River at Arthur hydrometric station (17T 536350E 4853113N) and collect and record daily streamflow measurements for that station or for any replacement gauging station approved by the District Manager.

The Conestogo River Arthur hydrometric station equipment is calibrated as per manufacturer’s recommendations. A third party on an annual basis also calibrates monitoring and metering equipment. Preventative maintenance is scheduled for all equipment at the sewage treatment plant and pumping stations at regular frequency (frequency depends on the equipment and type of maintenance).

Maintenance activities are scheduled within OCWA's work management system (Maximo) and upon completion operations staff set the work order to complete. On a monthly basis, preventative work orders are reviewed for completion.

Indus Control successfully calibrated the hydrometric station measuring equipment on September 20, 2023.

Refer to Appendix C for the Calibration Reports.

Operation staff collect and record daily streamflow measurements for the Conestogo River hydrometric station on their daily check sheets and enter it into OCWA's PDM (WISKI) Management System.

Table 14: Conestogo River Streamflow Measurements

Month	Monthly Minimum Daily River Height (cm)	Monthly Average Daily River Height (cm)	Monthly Max Daily River Height (cm)
October 2023	12.28	14.04	15.42
November 2023	13.01	22.94	64.76
December 2023	26.13	42.59	83.04
January 2024	24.53	51.68	126.42
February 2024	25.11	43.57	90.16
March 2024	28.86	45.72	79.95
April 2024	24.07	44.49	92.41
May 2024	23.87	37.77	81.32
Annual Minimum	12.28	-	-
Annual Average	-	37.84	-
Annual Max	-	-	126.42

Refer to Appendix E for Report of Daily Streamflow Measurements

Refer to Appendix F for the Grand River Conservation Authority Manual Discharge Measurements and TAN Concentrations

5. Monitoring Schedule

Where ECA 7654-BEMKVD, Section 13 (4)(d) requires:

"a summary of any deviation from the monitoring schedule and reasons for the current reporting year and a schedule for the next reporting year;"

Operational staff at the Arthur WWTP maintained a sampling schedule where samples were taken on Tuesdays for the majority of the 2023 reporting period. For the 2024 reporting period the sampling schedule was revised and updated to rotate the day of the week to Wednesdays as per the ECA requirement in section 11 (b). Fluctuations on the below summarized sample dates were due to training for operations and sludge haulage being completed. The 2023/2024 reporting period sampling calendar can be found in **Appendix B**

Table 15: Summary of dates deviated from the monitoring schedule

Sample	Scheduled Sample Date	Date Sample was Taken
Monthly Raw Influent/Sludge and Weekly Effluent	December 5, 2023	December 6, 2023
Monthly Sludge	May 1, 2024	May 29, 2024

6. Operational Issues and Corrective Actions

Where ECA 7654-BEMKVD, Section 13 (4)(e) requires:

“a summary of all operating issues encountered and corrective actions taken;”

There were three operating problems during the reporting period. They are summarized below:

December 20, 2023 operations noticed clarifier inner ring weld had broken on one side, upon troubleshooting and attempt to fix issue the ring broke loose and dropped down approximately 2 feet into the clarifier. More extensive repairs were required and were completed in January 2024. During this occurrence no plant process was affected.

February 2024 Total Suspended Solids Monthly Average Limit exceedance occurred. It was verbally reported on March 12, 2024 and follow-up written notification was also provided on March 12, 2024, as required under the most recent ECA. This occurrence was due to early ice melt and warmer temperatures at the lagoons, lagoon effluent quality was noticeable cloudy. Operations decreased lagoon return flow, increased backwash flow, completed effluent channel and UV cleaning and continued to monitor.

April 13th 2024 the Maximum Daily Effluent Flow limit exceedance occurred. It was verbally reported on April 15, 2024 and follow-up written notification was also provided on April 19, 2024, as required under the most recent ECA. This occurrence was due to SCADA program set points for maximizing the return flow from the lagoons, heavy precipitation overwhelming the effluent chamber. Operations adjusted set points to continue to maximize the return flow from the lagoons but turn effluent pumps on sooner.

7. Maintenance Activities

Where ECA 7654-BEMKVD, Section 13 (4)(f) requires:

“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;”

7.1 Work Management System

Planned maintenance, including scheduled and non-scheduled maintenance activities are scheduled using a computerized Work Management System (WMS) that allows user to:

- Enter detailed asset information
- Generate and process work orders
- Access maintenance and inspection procedures
- Plan, schedule, and document all asset related tasks and activities
- Access maintenance records and asset histories

Work Orders are automatically generated by the WMS program and are assigned to the applicable Operations staff accordingly.

7.2 Preventative Maintenance

There were a number of maintenance tasks throughout 2023/24 reporting period. They are as follows:

- Monthly Lagoon Inspection (May-Oct)
- Monthly panel alarm, float and generator testing
- Annual generator inspections and load testing
- Annual calibrations
- Annual lifting device inspection
- UV inspection and servicing
- Semi-annual Lagoon Perimeter Inspection

7.3 Repairs & Improvements

There were a number of repairs and/or improvements during the reporting period. They are as follows:

- Compressor Rebuild
- Frederick Street SPS Alarm Dialer Replacement
- Lagoon Sludge Depth Measurements
- Monthly Grit Channel Cleanout
- Supernatant Pump Repair
- Digester Blower Motor Replacement
- Clarifier Repairs

8. Effluent Quality Assurance & Control

Where ECA 7654-BEMKVD, Section 13 (4)(g) requires:

“a summary of any effluent quality assurance or control measures undertaken;”

Quality assurance and control measures undertaken during the reporting period include adherence to provincial regulations, use of accredited laboratories, operation of the system by licensed Operators, scheduled sampling and analysis, in-house laboratory analysis, and calibration and preventative maintenance of equipment. The sections below provide further details of these measures.

8.1 Adherence to Provincial Regulations

The Ontario Clean Water Agency operates the Arthur WWTP in accordance with provincial regulations and the Environmental Compliance Approval.

8.2 Use of Accredited Laboratories

During the reporting period, all chemical sample analyses were conducted by SGS (Lakefield) Canada Inc.; a laboratory audited by the Canadian Association for Laboratory Accreditation Inc. (CALA) and accredited by the Standards Council of Canada (SCC). Accreditation ensures that the laboratory has acceptable laboratory protocols and test methods in place. It also requires the laboratory to provide evidence and assurances of the proficiency of the analysts performing the test methods.

8.3 Operation by Licensed Operators

The Arthur WWTP was operated and maintained by licensed Operators. The mandatory licensing program for operators of sewage treatment facilities in Ontario is regulated under the Ontario Water Resources Act (OWRA) Regulation 435/93 and Ontario Regulation 129/04. A Licensed individual has successfully passed the licensing exam and meets the education and experience requirements set out in the regulation.

8.4 Sampling and Analysis

The Ontario Clean Water Agency followed a sampling and analysis schedule that meets the requirements of the ECA.

8.5 In-house Analysis

In-house samples were collected and analyzed at the WPCP laboratory throughout the year in order to support process performance monitoring, adjustment, and optimization. In-house analysis were conducted by Licensed Operators for monitoring purposes using standard methods. The data generated from these tests is used to determine the treatment efficiency while effectively maintaining process control. All in-house monitoring equipment is calibrated based on the manufacturer's recommendations. Using their expertise, Operators of the facility make best efforts to stay within the ECA Effluent Objectives and Limits.

9. Calibration and Maintenance Procedures

Where ECA 7654-BEMKVD, Section 13 (4)(h) requires:

"a summary of the calibration and maintenance carried out on all Influent 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;"

All in-house monitoring equipment is calibrated as per manufacturer's recommendations. Monitoring and metering equipment is also calibrated by a third party on an annual basis. Preventative maintenance is scheduled for all equipment at the sewage treatment plant and pumping stations at regular frequency (frequency depends on the equipment and type of maintenance). Maintenance activities are scheduled within the work management system Maximo, upon completion, Operators set the work order to complete. On a monthly basis, preventative work orders are reviewed for completion.

Indus Control successfully calibrated flow measuring equipment on September 20, 2023. All program parameters received a passing inspection.

Refer to Appendix C for the Calibration Reports.

10. Design Objective Requirements

Where ECA 7654-BEMKVD, Section 13 (4)(i) requires:

“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 are not achieved more than 50% of the time in a year, or there is an increasing trend of deterioration of Final Effluent quality;*
- ii. When Annual Average Daily Influent Flow reaches 80% of the Rated Capacity;”*

Best efforts are being made to meet the objectives under the amended ECA #7654-BEMKVD (September 10, 2019) once Phase 1 construction onwards improves plant performance and output effluent quality. Phase 2 design is completed and currently being review by the Municipalities Engineer on Record.

The design objective for TSS was exceeded six of the seven months and TAN was exceeded two of the seven months for the reporting period. It is a possibility this is due to higher loadings from incoming sewage.

The average daily flow for the reporting period was 1,196.14 m³, which is approximately 64.32% of the specified design flow of 1,860.00 m³/day. The highest recorded Monthly Average Daily Flow occurred in January 2024 at 2,997.90 m³ and was due to increased precipitation and inflows from the un-seasonal melts during January. The total precipitation for January 2024 was one of the highest for the reporting period apart from December 2023, April and May 2024 based on data from Environment Canada.

There were no instances when the daily peak of 6,500 m³ was exceeded. The highest recorded peak flow of 2,997.90 m³/day occurred in January 2024. This maximum peak flow is approximately 46.12% of the approved Peak Flow Rating for the Works.

Schedule B is imposed “to establish non-enforceable effluent quality objectives which the Owner is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs and before the compliances limits of Schedule C are exceeded.”

OCWA as the Operating Authority (on behalf of the Township of Wellington North) has made best efforts to stay within the Effluent Objectives in the ECA. These efforts are supported through:

- Continuous monitoring equipment
- Regular plant inspections/checks
- In-house sampling and testing
- Laboratory (3rd party) analysis of influent and effluent samples
- Data review
- Process optimization and adjustments (as required)
- Scheduled/preventative maintenance
- Repairs as necessary

A summary of the effluent quality in comparison to the effluent objectives can be found in Tables 7-12 of section 3.3 of this report. These results show that sewage treatment operations for 2023/2024 provided effluent quality that was within all effluent objectives outlined in the ECA and minimized environmental impairment with the exception of Total Suspended Solids (November, December 2023 and January, February, March, April 2024) and Total Ammonia Nitrogen (December 2023, January and February 2024). Higher loading from incoming sewage could account for some effluent objective exceedances. Minor operational changes were implemented to provide higher effluent quality in order to achieve the effluent objectives outlined in the ECA.

Refer to **Appendix A** for detailed Performance Assessment Report for the facility, including raw and final effluent discharge data and influent and effluent flow data.

11. Sludge Production and Disposal

Where ECA 7654-BEMKVD, Section 13 (4)(j) requires:

“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;”

The table below shows a summary of sludge haulage for the October 1, 2023 to the May 31, 2024 reporting period:

Table 16: Sludge Haulage

Date	NASM #	Volume Hauled (m ³)	Comments
October 13, 2023	25079	308.00	Hauled by Saugeen Agri. for Land Application at Leroy May's 75 Acre Field
October 16, 2023	21576	176.00	Hauled by Saugeen Agri. for Land Application at Oscar Brubacher's Farm
October 17, 2023	21576	220.00	
December 1, 2023	N/A	42.00	Hauled to Lystek International Inc.
December 8, 2023	N/A	42.00	
January 5, 2024	N/A	84.00	
January 19, 2024	N/A	86.00	
January 26, 2024	N/A	87.00	
February 2, 2024	N/A	44.00	
February 23, 2024	N/A	43.00	
March 8, 2024	N/A	129.00	
April 24, 2024	61308	200.00	Hauled by Saugeen Agri. for Land Application at Lavon Martin Belwood Farms
April 25, 2024	61308	505.00	
	Total:	1,966.00	

Digested sludge produced at the Arthur WWTP is land-applied in accordance with the Nutrient Management Act 2002 and Ontario Regulation 267/03. Additional sludge haulage is directed towards Lystek International Inc., located in Dundalk, Ontario. This facility converts biosolids into “market ready” fertilizer products.

Grab samples of digested (aerobic) sludge are collected and tested as per the guidelines. During the reporting period, sludge sample analysis was carried out by SGS (Lakefield) Canada Inc. A summary of sludge sample results is provided in **Appendix D**.

One hauler was used during the reporting period October 1, 2023 – May 31, 2024:

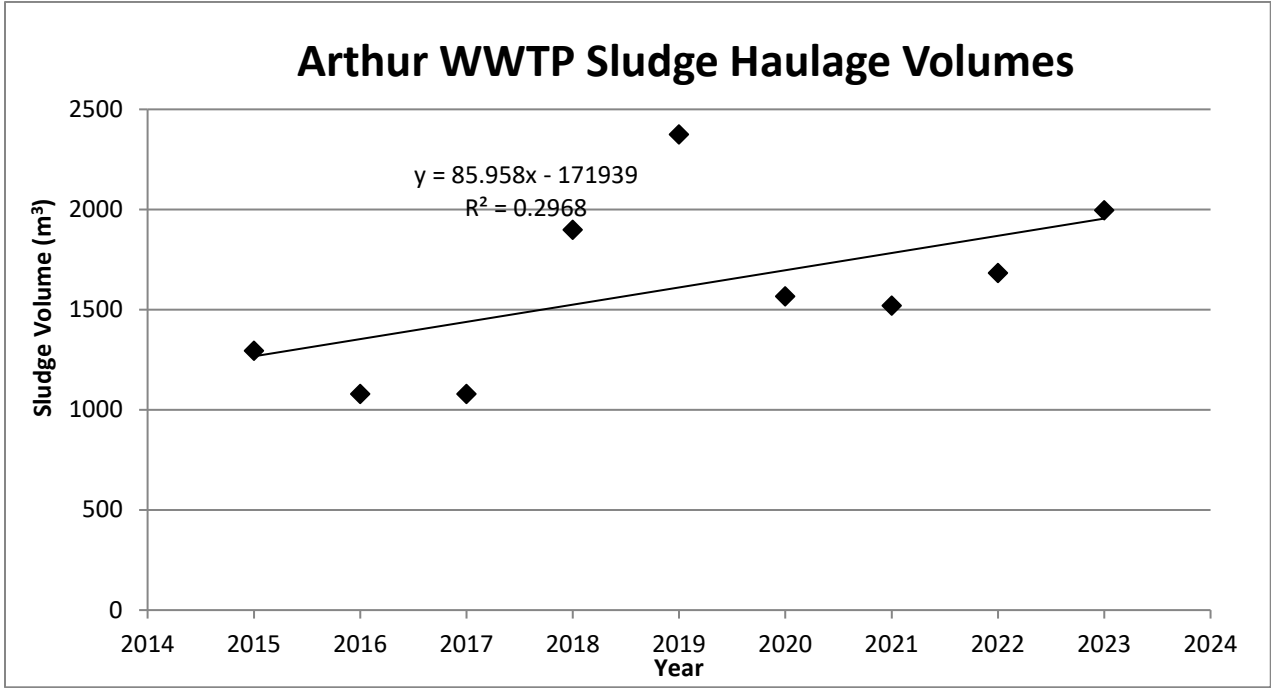
- Saugeen Agri. - Certificate of Approval: Waste Management System # 9566-6HYKC3

The Certificate of Approval for the Mount Forest Sludge Storage Facility #6134-73FHHU allows the storage of sludge from the Arthur WWTP. There was no sludge stored at the Mount Forest facility for this reporting period.

Trending sludge production can be seen in Graph 10. Please note: the reporting year noted on the X-axis is the first year of the reporting period, meaning 2023 would include the period from October 1, 2023 to May 31, 2024.

Based on the design flow, predicted sludge haulage, average wastewater quality and a linear regression with an R^2 value of 29.68%, the anticipated volume to be generated in the next reporting period is approximately 2000 m³.

Graph 10: Arthur WWTP Sludge Haulage Trending



12. Community Complaints

Where ECA 7654-BEMKVD, Section 13 (4)(k) requires:

“a summary of any complaints received and any steps taken to address the complaints;”

There is a standard operating procedure (SOP) in place that outlines the steps required for receiving and addressing community complaints. All complaints are to be discussed and/or investigated, and resolved as required. The community complaint is logged in detail in the facility logbook and then various details

are entered into OCWA's electronic database system "Maximo." This database contains the history of all complaints with the relevant information enclosed.

There were no community complaints received for the Arthur WWTP during the October 1, 2023 – May 31, 2024 reporting period.

13. By-pass, Spill or Abnormal Discharge Events

Where ECA 7654-BEMKVD, Section 13 (4)(l) requires:

"a summary of all By-pass, Overflows, other situations outside Normal Operating Conditions and spills within the meaning of Part X of EPA and abnormal discharge events;"

All quarterly bypass and overflow reports, as per Section 4(6) and 5(6) of the ECA were submitted as required to the Ministry's local office prior to or by the reporting deadlines listed in the most current ECA. There were no reportable incidents during the reporting period.

13.1 By-pass events

There were no bypass events during the reporting period.

13.2 Overflow events

There were no overflow events during the reporting period.

13.3 Spills

There were no spills during the reporting period.

13.4 Abnormal Discharge Events

There were no abnormal discharge events during the reporting period.

14. Notice of Modifications (Limited Operational Flexibility)

Where ECA 7654-BEMKVD, Section 13 (4)(m) requires:

"a summary of all Notice of Modifications to the Sewage Works completed under Paragraph 1.d. of Condition 10, including a report on status of implementation of all modification;"

There were no Notice of Modifications under Schedule B, Section 1 submitted during this reporting period.

14.1 Modification Completion Reports

There were no modifications completed under Schedule B, Section 3 during this reporting period.

15. Conformance with Procedure F-5-1

Where ECA 7654-BEMKVD, Section 13 (4)(n) requires:

“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;”

Sanitary Sewage Pumping Stations

Frederick Street Pumping Station and Forcemain

Upgrade to the existing Frederick Street Pumping Station having a firm capacity of 110 L/s, located at 176 Frederick Street West, comprising;

- Construction of a new wet well having dimension of 5.5m x 5.3m x 7.2m, having an active storage volume of 90 m³, equipped with three variable speed controlled sewage pumps, two for duty and one for standby, each with a rated capacity of 55 L/s under 30m TDH, discharging through a common header to Arthur Wastewater Treatment Plant through an existing 755m long 250mm diameter forcemain, complete with a MCC, a new PLC based control system, high level floats and alarms;
- Conversion of existing wet well in to a bypass chamber, complete with one (1) sewage drain pump, located in the existing wet well, with a capacity of 10 L/s under 8m TDH, receiving sewage overflow from the inlet sewer under extreme flow events with an Emergency Overflow to the Conestogo River;

Arthur Wastewater Treatment Plant (WWTP)

Equalization Tank (to be upgraded to Extended Aeration Plant B during Phase 2)

- Construction of the equalization tank 1 (to be used as the future secondary treatment/extended aeration tank during Phase 2), having a total capacity of 2,100 m³, and operated in a manner to allow the flows entering the secondary treatment in Phase 1 to be reduced to 5,270 m³/d, comprising of two cells and a central future secondary clarifier tank, receiving diverted peak flow through a weir located in the headworks building outlet pipe under peak flow conditions, complete with a sewer line connecting a new hopper adjacent to the existing Headworks to a new Headworks channel upstream of Plant B;
- One (1) submersible drain pump, to be located in a precast manhole (to be converted to a scum collection pit and transfer pump in Phase 2), connected to the equalization tank, with a capacity of 10 L/s under a TDH of 8m, discharging to Headworks channel;

Proposed Works - Phase 2

Inlet Works

- Diversion of existing sanitary Sewers from Preston Street to the new Headworks building of sewage treatment plant;
- Diversion of existing sanitary sewage forcemain from Frederick Street Sewage Pumping Station in to the new Headworks building of sewage treatment plant;

Headworks Building

Inlet Channels

- One (1) duty inlet channel 0.8m wide, 1.2m deep, equipped with an inclined mechanically cleaned screen with 6mm spacing, designed to handle an average daily flow of 2,300 m³/d and a maximum daily flow of 12,700 m³/d, equipped with washer/compactor conveyor for screenings, complete with diffusers for intermittent channel aeration;
- one (1) back-up channel 0.8m wide, 1.2m deep, equipped with an inclined manual bar screen having 50mm spacing, complete with diffusers for intermittent channel aeration;

Grit Removal

- A Grit removal system with by-pass capability, comprising of a Vortex Grit Tank 2.5m in diameter with a 0.37 kW vortex drive, a Vortex Grit Classifier Unit designed for a peak flow rate of 12,700 m³/d, screenings/grit disposal bin in the Screen room;

Flow Channels and Parshall Flume

- Two flow splitting channels, complete with flow control weirs and two Parshall Flume flowmeters, one in each channel, downstream of the Vortex Tank, with duty channel discharging to the existing and new treatment units (Plant A and Plant B);

The increased capacity and upgrade to the Sewage Pump Station will aid in directing influent flows to the plant more effectively and efficiently. In addition to having an additional pump and all pumps being upsized with Variable Frequency Drives (VFD) this will allow the pumps to adjust to the required pumping speeds in increments as needed, increasing overall pump efficiency. This upgrade will further reduce the chance of potential future bypass/overflow events through increased reliability and capacity.

During high flow events, the increased flows from the pump station will be split at the head of the plant and will allow part of the flow to go through treatment and a portion to be captured in the equalization tank to not overwhelm the treatment system and be pumped back to the Headworks at a later time.

There are no estimated budget forecasts at this time as the current construction upgrades has mitigated the bypass/overflow events at the plant and at the pump station.

16. Construction and Commissioning Schedule Updates

Where ECA 7654-BEMKVD, Section 13 (4)(o) requires:

“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;”

Substantial completion of all Phase 1 construction was achieved on December 16, 2020. Letter of Substantial Completion of Phase 1 dated December 17, 2020 and was completed by CIMA Engineering. Phase 2 design is completed and currently being review by the Municipalities Engineer on Record.

**2022 – 2023 Annual Performance Report
Arthur Wastewater Treatment Plant
ECA 7654-BEMKVD**

Appendix A

Performance Assessment Report

5767 ARTHUR WASTEWATER TREATMENT PLANT 110000882

	10 / 2023	11/ 2023	12/ 2023	1/ 2024	2/ 2024	3/ 2024	4/ 2024	5/ 2024	6/ 2024	7/ 2024	8/ 2024	9/ 2024	<--Total-->	<--Avg-->	<--Max-->	<-Criteria-->
Flows																
Raw Flow: Total - Raw Sewage m³/d	31,719.80	33,265.10	45,244.30	48,221.40	47,026.10	55,909.90	54,619.40	49,608.70	0.00	0.00	0.00	0.00	365,614.70			0.00
Raw Flow: Avg - Raw Sewage m³/d	1,023.22	1,108.84	1,459.49	1,555.53	1,621.59	1,803.55	1,820.65	1,600.28	0.00	0.00	0.00	0.00		1,198.14		1,860.00
Raw Flow: Max - Raw Sewage m³/d	1,231.80	1,921.40	1,904.80	2,997.90	2,150.90	2,461.60	2,787.40	2,518.30	0.00	0.00	0.00	0.00			2,997.90	0.00
Raw Flow: Count - Raw Sewage m³/d	31.00	30.00	31.00	31.00	29.00	31.00	30.00	31.00	0.00	0.00	0.00	0.00	244.00			0.00
Eff. Flow: Total - Final Effluent m³/d	0.00	70,974.30	74,337.90	34,782.10	84,338.60	89,962.00	75,611.30	35,398.10	0.00	0.00	0.00	0.00	465,404.30			0.00
Eff. Flow: Avg - Final Effluent m³/d	0.00	2,365.81	2,398.00	1,122.00	2,908.23	2,902.00	2,520.38	1,141.87	0.00	0.00	0.00	0.00		1,579.48		
Eff. Flow: Max - Final Effluent m³/d	0.00	3,066.60	2,849.00	3,548.80	3,538.80	3,466.30	3,201.00	1,202.90	0.00	0.00	0.00	0.00			3,548.80	0.00
Eff Flow: Count - Final Effluent m³/d	31.00	30.00	31.00	31.00	29.00	31.00	30.00	31.00	0.00	0.00	0.00	0.00	244.00			0.00
Carbonaceous Biochemical Oxygen Demand: CBOD																
Eff: Avg cBOD5 - Final Effluent mg/L	0.00	3.40	< 2.75	2.67	< 2.00	3.50	< 2.00	< 2.00	0.00	0.00	0.00	0.00		3.11	3.50	
Eff: # of samples of cBOD5 - Final Effluent	0.00	5.00	4.00	3.00	4.00	4.00	4.00	5.00	0.00	0.00	0.00	0.00	29.00			0.00
Loading: cBOD5 - Final Effluent kg/d	0.000	8.044	< 6.594	2.992	< 5.816	10.157	< 5.041	< 2.284	0.000	0.000	0.000	0.000		4.91	10.16	
Biochemical Oxygen Demand: BOD5																
Raw: Avg BOD5 - Raw Sewage mg/L	196.00	416.00	157.00	238.00	266.00	244.00	140.00	115.00	0.00	0.00	0.00	0.00		221.50	416.00	0.00
Raw: Avg BOD5 - Raw Extra mg/L	280.00	256.00	173.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		236.33	280.00	0.00
Raw: # of samples of BOD5 - Raw Sewage	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	9.00			0.00
Raw: # of samples of BOD5 - Raw Extra	2.00	3.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00			0.00
Percent Removal: BOD5 - Raw Extra %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00
Total Suspended Solids: TSS																
Raw: Avg TSS - Raw Sewage mg/L	183.00	225.00	215.00	184.00	173.00	202.00	208.00	172.00	0.00	0.00	0.00	0.00		195.25	225.00	0.00
Raw: Avg TSS - Raw Extra mg/L	185.00	237.33	199.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		207.36	237.33	0.00
Raw: # of samples of TSS - Raw Sewage	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	9.00			0.00
Raw: # of samples of TSS - Raw Extra	2.00	3.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00			0.00
Eff: Avg TSS - Final Effluent mg/L	0.00	7.60	8.75	8.33	10.25	9.38	7.75	4.60	0.00	0.00	0.00	0.00		8.11	10.25	
Eff: # of samples of TSS - Final Effluent	0.00	5.00	4.00	3.00	4.00	8.00	4.00	5.00	0.00	0.00	0.00	0.00	33.00			0.00
Loading: TSS - Final Effluent kg/d	0.000	17.980	20.982	9.350	29.809	27.206	19.533	5.253	0.000	0.000	0.000	0.000		12.81	29.81	
Percent Removal: TSS - Final Effluent %	0.00	96.62	95.93	95.47	94.08	95.36	96.27	97.33	0.00	0.00	0.00	0.00			97.33	0.00
Percent Removal: TSS - Raw Sewage %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00
Percent Removal: TSS - Raw Extra %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00
Total Phosphorus: TP																
Raw: Avg TP - Raw Sewage mg/L	4.55	5.25	3.98	3.20	5.03	3.22	3.04	1.88	0.00	0.00	0.00	0.00		3.77	5.25	0.00

Raw: Avg TP - Raw Extra mg/L		5.51	5.65	4.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.21	5.65	0.00
Raw: # of samples of TP - Raw Sewage		2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	9.00			0.00
Raw: # of samples of TP - Raw Extra		2.00	3.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00			0.00
Eff: Avg TP - Final Effluent mg/L		0.00	0.12	0.11	0.10	0.07	0.10	0.07	< 0.08	0.00	0.00	0.00	0.00		0.12	0.12	
Eff: # of samples of TP - Final Effluent		0.00	5.00	4.00	3.00	4.00	4.00	4.00	5.00	0.00	0.00	0.00	0.00	29.00			0.00
Loading: TP - Final Effluent kg/d		0.000	0.293	0.264	0.108	0.204	0.290	0.170	< 0.096	0.000	0.000	0.000	0.000		0.19	0.29	
Percent Removal: TP - Final Effluent %		0.00	97.64	97.24	96.98	98.61	96.89	97.78	95.53	0.00	0.00	0.00	0.00			98.61	0.00
Percent Removal: TP - Raw Extra %		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00		0.00

Nitrogen Series

Raw: Avg TKN - Raw Sewage mg/L		26.60		35.10		25.30		26.80		32.40		27.70		27.50		16.50		0.00		0.00		0.00		0.00		0.00		27.24		35.10		0.00
Raw: Avg TKN - Raw Extra mg/L		40.70		35.70		28.83		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		35.08		40.70		0.00
Raw: # of samples of TKN - Raw Sewage		2.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		0.00		0.00		0.00		0.00		9.00					0.00	
Raw: # of samples of TKN - Raw Extra		2.00		3.00		4.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		9.00					0.00	
Eff: Avg TAN - Final Effluent mg/L		0.00		0.18		1.20		1.27		0.63		0.48	<	0.13	<	0.24		0.00		0.00		0.00		0.00				0.63		1.27		
Eff: # of samples of TAN - Final Effluent		0.00		5.00		4.00		3.00		4.00		4.00		4.00		5.00		0.00		0.00		0.00		0.00		29.00					0.00	
Loading: TAN - Final Effluent kg/d		0.000		0.426		2.878		1.421		1.818		1.378	<	0.315	<	0.274		0.000		0.000		0.000		0.000				1.00		2.88		
Eff: Avg NO3-N - Final Effluent mg/L		0.00		9.78		7.08		7.14		9.46		5.74		8.50		10.01		0.00		0.00		0.00		0.00				8.25		10.01		0.00
Eff: # of samples of NO3-N - Final Effluent		0.00		5.00		4.00		3.00		4.00		4.00		4.00		5.00		0.00		0.00		0.00		0.00		29.00					0.00	
Eff: Avg NO2-N - Final Effluent mg/L		0.00	<	0.04	<	0.07		0.12	<	0.07	<	0.06	<	0.03		0.05		0.00		0.00		0.00		0.00			<	0.06	<	0.12		0.00
Eff: # of samples of NO2-N - Final Effluent		0.00		5.00		4.00		3.00		4.00		4.00		4.00		5.00		0.00		0.00		0.00		0.00		29.00					0.00	

Disinfection

Eff: GMD E. Coli - Final Effluent cfu/100mL	0.00	24.21	34.93	32.79	4.13	57.23	2.63	3.64	0.00	0.00	0.00	0.00				100.00
Eff: # of samples of E. Coli - Final Effluent	0.00	5.00	4.00	3.00	4.00	4.00	4.00	5.00	0.00	0.00	0.00	0.00	29.00			0.00

**2022 – 2023 Annual Performance Report
Arthur Wastewater Treatment Plant
ECA 7654-BEMKVD**

Appendix B

Sampling Schedules

2023 Sampling Calendar
ARTHUR WWTP (Org #5767)
WWT III

JANUARY						
M	T	W	TH	F	St	Su
						1
2	3-W/M/BS	4	5	6	7	8
9	10-W	11-ER	12	13	14	15
16	17-W	18	19-ER	20	21	22
23	24-W	25	26	27-ER	28	29
30	31-W					

FEBRUARY						
M	T	W	TH	F	St	Su
		1	2	3	4	5
6	7-W/M/BS	8	9	10	11	12
13	14-W	15-ER	16	17	18	19
20	21-W	22	23-ER	24	25	26
27	28-W					

MARCH						
M	T	W	TH	F	St	Su
		1	2	3-ER	4	5
6	7-W/M/BS	8	9	10	11	12
13	14-W	15-ER	16	17	18	19
20	21-W	22	23-ER	24	25	26
27	28-W	29	30	31-ER		

APRIL						
M	T	W	TH	F	St	Su
					1	2
3	4-W/M/BS	5	6	7	8	9
10	11-W	12-ER	13	14	15	16
17	18-W	19	20-ER	21	22	23
24	25-W	26	27	28-ER	29	30

MAY						
M	T	W	TH	F	St	Su
1	2-W/M/BS	3	4	5	6	7
8	9-W	10-ER	11	12	13	14
15	16-W	17	18-ER	19	20	21
22	23-W	24	25	26-ER	27	28
29-ER	30-W	31				

JUNE						
M	T	W	TH	F	St	Su
			1	2	3	4
5	6-M/BS	7	8	9	10	11
12	13	14-ER/SC	15	16	17	18
19	20	21	22-ER/SC	23	24	25
26	27	28	29	30-ER/SC		

Stat Holiday/Weekend
Sample Day

W=Weekly Effluent; M=Monthly Raw; BS=Monthly Bio-Solids; ER=Extra Raw; SC=Secondary Effluent;

Discharge Period: October 1-May 31

If you are NOT able to sample on the scheduled day, call your PCT as soon as possible

S:\WestHighlands\19 WELLINGTON NORTH (Township of)\Arthur\01 OPERATIONAL\1-1 Sampling Schedules\Sampling Calendar_Arthur_Waste_2023_2023.01.04.xlsx

2023 Sampling Calendar
ARTHUR WWTP (Org #5767)
WWT III

JULY						
M	T	W	TH	F	St	Su
					1	2
3	4-M/BS	5	6	7	8	9
10	11	12-ER/SC	13	14	15	16
17	18	19	20-ER/SC	21	22	23
24	25	26	27	28-ER/SC	29	30
31						

AUGUST						
M	T	W	TH	F	St	Su
	1-M/BS	2	3	4	5	6
7	8	9-ER/SC	10	11	12	13
14	15	16	17-ER/SC	18	19	20
21	22	23	24	25-ER/SC	26	27
28-ER/SC	29	30	31			

SEPTEMBER						
M	T	W	TH	F	St	Su
				1	2	3
4	5-M/BS	6	7	8	9	10
11	12	13-ER/SC	14	15	16	17
18	19	20	21-ER/SC	22	23	24
25	26	27	28	29-ER/SC	30	

OCTOBER						
M	T	W	TH	F	St	Su
						1
2	3-W/M/BS	4	5	6	7	8
9	10-W	11-ER	12	13	14	15
16	17-W	18	19-ER	20	21	22
23	24-W	25	26	27-ER	28	29
30-ER	31-W					

NOVEMBER						
M	T	W	TH	F	St	Su
		1	2	3	4	5
6	7-W/M/BS	8	9	10	11	12
13	14-W	15-ER	16	17	18	19
20	21-W	22	23-ER	24	25	26
27	28-W	29	30			

DECEMBER						
M	T	W	TH	F	St	Su
				1-ER	2	3
4	5-W/M/BS	6	7	8	9	10
11	12-W	13-ER	14	15	16	17
18	19-W	20	21-ER	22	23	24
25	26	27-W	28	29-ER	30	31

Stat Holiday/Weekend
Sample Day

W=Weekly Effluent; M=Monthly Raw; BS=Monthly Bio-Solids; ER=Extra Raw; SC=Secondary Effluent;

Discharge Period: October 1-May 31

If you are NOT able to sample on the scheduled day, call your PCT as soon as possible

S:\WestHighlands\19 WELLINGTON NORTH (Township of)\Arthur\01 OPERATIONAL\1-1 Sampling Schedules\Sampling Calendar_Arthur_Waste_2023_2023.01.04.xlsx

2024 Sampling Calendar
ARTHUR WWTP (Org #5767)
WWT III

JANUARY						
M	T	W	TH	F	St	Su
1	2	3-W/M/BS	4	5	6	7
8	9	10-W	11	12	13	14
15	16	17-W	18	19	20	21
22	23	24-W	25	26	27	28
29	30	31-W				

FEBRUARY						
M	T	W	TH	F	St	Su
			1	2	3	4
5	6	7-W/M/BS	8	9	10	11
12	13	14-W	15	16	17	18
19	20	21-W	22	23	24	25
26	27	28-W	29			

MARCH						
M	T	W	TH	F	St	Su
				1	2	3
4	5	6-W/M/BS	7	8	9	10
11	12	13-W	14	15	16	17
18	19	20-W	21	22	23	24
25	26-ER	27-W	28	29	30	31

APRIL						
M	T	W	TH	F	St	Su
1	2	3-W/M/BS	4	5	6	7
8	9	10-W	11	12	13	14
15	16	17-W	18	19	20	21
22	23	24-W	25	26	27	28
29	30					

MAY						
M	T	W	TH	F	St	Su
		1-W/M/BS	2	3	4	5
6	7	8-W	9	10	11	12
13	14	15-W	16	17	18	19
20	21	22-W	23	24	25	26
27	28	29-W	30	31		

JUNE						
M	T	W	TH	F	St	Su
					1	2
3	4	5-M/BS/SE	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Stat Holiday/Weekend
Sample Day

W=Weekly Effluent/Raw; **M**=Monthly Raw; **BS**=Monthly Bio-Solids; **SE**=Secondary Effluent

Discharge Period: October 1-May 31

If you are NOT able to sample on the scheduled day, call your PCT as soon as possible

S:\WestHighlands\19 WELLINGTON NORTH (Township of)\Arthur\01 OPERATIONAL\1-1 Sampling Schedules\2024 Sampling Calendar_Arthur_Waste_2023.12.15.xlsx

2024 Sampling Calendar
ARTHUR WWTP (Org #5767)
WWT III

JULY						
M	T	W	TH	F	St	Su
1	2	3-M/BS/SE	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

AUGUST						
M	T	W	TH	F	St	Su
			1	2	3	4
5	6	7-M/BS/SE	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

SEPTEMBER						
M	T	W	TH	F	St	Su
						1
2	3	4-M/BS/SE	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

OCTOBER						
M	T	W	TH	F	St	Su
	1	2-M/W/BS	3	4	5	6
7	8	9-W	10	11	12	13
14	15	16-W	17	18	19	20
21	22	23-W	24	25	26	27
28	29	30-W	31			

NOVEMBER						
M	T	W	TH	F	St	Su
				1	2	3
4	5	6-W/M/BS	7	8	9	10
11	12	13-W	14	15	16	17
18	19	20-W	21	22	23	24
25	26	27-W	28	29	30	

DECEMBER						
M	T	W	TH	F	St	Su
						1
2	3	4-W/M/BS	5	6	7	8
9	10	11-W	12	13	14	15
16	17	18-W	19	20	21	22
23-W	24	25	26	27	28	29
30-W	31	1				

Stat Holiday/Weekend
Sample Day

W=Weekly Effluent/Raw; M=Monthly Raw; BS=Monthly Bio-Solids;

Discharge Period: October 1-May 31

If you are NOT able to sample on the scheduled day, call your PCT as soon as possible

S:\WestHighlands\19 WELLINGTON NORTH (Township of)\Arthur\01 OPERATIONAL\1-1 Sampling Schedules\2024 Sampling Calendar_Arthur_Waste_2023.12.15.xlsx

**2022 – 2023 Annual Performance Report
Arthur Wastewater Treatment Plant
ECA 7654-BEMKVD**

Appendix C

Calibration Reports

Plant operator: INDUSCONTROL INC.

Device information

Location	Arthur WWTP
Device tag	Promag
Module name	K323-00
Nominal diameter	DN150 / 6"
Device name	Promag 400
Order code	5W4C1F-16LA0/0
Serial number	R701CC16000
Firmware version	02.01.00

**Calibration**

Calibration factor	1.0683
Zero point	-1.6

Verification information

Operating time (counter)	1021d21h37m39s
Date/time (manually recorded)	20.09.23 11:48
Verification ID	16
Verification mode	Standard verification

Overall verification result*

 Passed	Details see next page
--	-----------------------

*Result of the complete device functionality test via Heartbeat Technology

Confirmation

Heartbeat Verification verifies the function of the flowmeter within the specified measuring tolerance, over the useful lifetime of the device, with a total test coverage > 94 %, and complies with the requirements for traceable verification according to DIN EN ISO 9001:2008 – Section 7.6 a. (attested by TÜV-SÜD Industrieservices GmbH)

Notes

20.09.23

Date



Operator's signature

Inspector's signature

Plant operator: INDUSCONTROL INC.

Device identification and verification identification

Serial number	R701CC16000
Device tag	Promag
Verification ID	16



Sensor	✓ Passed
Shot time symmetry	✓ Passed
Hold voltage symmetry	✓ Passed
Coil current loss	✓ Passed
Coil current stability	✓ Passed
Coil resistance	✓ Passed
E1 electrode cable	✓ Passed
E2 electrode cable	✓ Passed
EPD electrode cable	✓ Passed
Sensor electronic module (ISEM)	✓ Passed
Supply voltage	✓ Passed
Internal voltages	✓ Passed
Linearity and reference voltage	✓ Passed
Offset of electrode measuring circuit	✓ Passed
Hold voltage feedback	✓ Passed
Shot voltage feedback	✓ Passed
Electronic current loss	✓ Passed
Coil circuit measurement	✓ Passed
Shot control circuit	✓ Passed
Electrode signal integrity	✓ Passed
System status	✓ Passed
I/O module	✓ Passed
Input/output 1	✓ Passed
Input/output 2	? Not done
Input/output 3	? Not done

Plant operator: INDUSCONTROL INC.

Device identification and verification identification

Serial number	R701CC16000
Device tag	Promag
Verification ID	16



Test item with value	Unit	Actual	Min.	Max.	Visualization
Sensor					
Shot time symmetry deviation		1.0000	0.9000	1.1000	□□□□■□□□□□
Hold voltage symmetry deviation		1.0000	0.9000	1.1000	□□□□■□□□□□
Coil current loss deviation	%	0.1393	-10.0000	10.0000	□□□□■□□□□□
Coil current offset	%	0.0000	-0.1000	0.1000	□□□□■□□□□□
Coil current deviation	%	-0.008123	-0.1000	0.1000	□□□□■□□□□□
Coil resistance value	Ohm	122.9	50.0	240.0	□□□■□□□□□□
E1 electrode impedance	Ohm	230.78			
E2 electrode impedance	Ohm	228.09			
EPD electrode impedance	Ohm	290.08			
E1/E2 electrode impedance on E1	Ohm	233.59			
E1/E2 electrode impedance on E2	Ohm	231.02			
Sensor electronic module (ISEM)					
Supply voltage 30.0V	V	31.23	27.000	35.000	□□□□■□□□□□
Linearity and reference voltage 1		0.9997	0.9900	1.0100	□□□□■□□□□□
Linearity and reference voltage 2		0.9997	0.9900	1.0100	□□□□■□□□□□
Measuring point offset		-7.0793	-100.0000	100.0000	□□□□■□□□□□
Hold voltage feedback value	%	0.84	-10.0	10.0	□□□□■□□□□□
Shot voltage feedback value	%	-0.70	-20.0	20.0	□□□□■□□□□□
Electronic current loss deviation	%	0.24	-10.0000	10.0000	□□□□■□□□□□
Coil circuit value	%	0.00	-1.0	1.0	□□□□■□□□□□
Shot control circuit value	%	-0.18	-10.0	10.0	□□□□■□□□□□
Electrode signal integrity deviation	%	-0.24	-40.0	40.0	□□□□■□□□□□

Test item with value	Unit	Actual	Min.	Max.	Visualization
I/O module					
Output 1 value 1	mA	4.0361	3.8600	4.1400	□□□□□■□□□□
Output 1 value 2		0.0000	0.0000	0.0000	□□□□□□□□□□
Output 2 value 1		0.0000	0.0000	0.0000	□□□□□□□□□□
Output 3 value 1		0.0000	0.0000	0.0000	□□□□□□□□□□

Plant operator: INDUSCONTROL INC.

Device identification and verification identification

Serial number	R701CC16000
Device tag	Promag
Verification ID	16



Test item with value	Unit	Actual
Process conditions		
Volume flow value verification	l/s	0.0000
Conductivity value verification	$\mu\text{S}/\text{cm}$	-nan
Electronic temperature	$^{\circ}\text{F}$	96.1
Current difference potential	V	0.08640
Current potential electrode 1	V	0.4471
Current potential electrode 2	V	0.3609
Current potential electrode Pipe GND	V	0.0008443



Induscontrol Inc
3170 Ridgeway Drive, Unit #11
Mississauga, ON L5L 5R4

VERIFICATION REPORT - ROSEMOUNT ELECTRO-MAGNETIC FLOW MEASUREMENT

Customer Name: OCWA-Georgian Highlands Region
Plant Name: Arthur WPCP

Site/Plant Address: 160 preston St,
Arthur, ON, N0G 1A0

Device Information

Make: Rosemount
Model: 8712D
Order Code: NA
Serial No.: 860220959
Tag: EP000-FI01
Job Location: Plant Effluent
OCWA ID: 0000205612

Service Information

Date: September 20, 2023
Report No: CO1481-2308-38
Job No: CO1481-2308

Sensor Details

Line size: 6"
Flow Cal Tube No.: 0916605509025005
Mounting: Remote

Flow Details

Unit: l/sec
Flow Range: 0-100
Current Output: 4-20 mA
4 mA Set Point: 0
20 mA Set Point: 100

Inst. Reading	AS FOUND	AS LEFT
TOTALIZER (m)	2171270	0
FLOW (l/sec)	22.9	0.0

Maintenance Checklist

Visual Inspection:	☒ OK	☐ NOT OK
Electrical Inspection:	☒ OK	☐ NOT OK
Sensor Installation:	☒ OK	☐ NOT OK
Transmitter Installation:	☒ OK	☐ NOT OK

Remarks

Instrument Test Information and Results

Test-Point as Per Calibration KIT	Calculated Flow (FPS)	Calculated O/P (mA)	UUT Display (FPS)	UUT Measured Output (mA)	Deviation (FPS)
0.00	0.00	4.00	0.01	3.99	0.01
3.00	3.00	5.60	3.02	5.59	0.02
10.00	10.00	9.33	10.01	9.32	0.01
30.00	30.00	20.00	29.98	19.99	-0.02

Information of Tools used for Verification of the Instruments

Details	Tool/Kit 1	Tool/Kit 2	Tool/Kit 3
Device Description:	Calibrator	Electrical Multimeter	N/A
Manufacturer:	Rosemount	Fluke	N/A
Model No:	8714D	179	N/A

* Refer Calibration Tools Certificates submittal for more Information

Verification Test Result: ☒ Passed ☐ Fail ☐ Not Verified

Overall Remarks: Measurement Works within Specification.

Service Technician : Chetan Parekh

Stamp/Signature

Printed Date: September 20, 2023

End of Report

Version: 19-12



Induscontrol Inc
3170 Ridgeway Drive, Unit #11
Mississauga, ON L5L 5R4

VERIFICATION REPORT - OCM III OPEN CHANNEL FLOW MEASUREMENT

Customer Name:	OCWA-Georgian Highlands Region		Site/Plant Address:	160 preston St,		
Plant Name:	Arthur WPCP			Arthur, ON, N0G 1A0		
<u>Device Information</u>			<u>Service Information</u>			
Make:	Milltronics		Date:	September 20, 2023		
Model:	OCM III		Report No:	CO1481-2308-39		
SIN:	PBD1W3100009		Job No:	CO1481-2308		
Job Location:	Plant effluent					
			<u>Flow Details</u>			
			Unit:	l/sec		
			Flow Range:	0-100		
			Current Output:	4-20 mA		
			4 mA Set Point	0		
			20 mA Set Point	100		
Inst. Reading	<u>AS FOUND</u>	<u>AS LEFT</u>				
TOTALIZER (m3)	04641263X 1000	04641263X 1000				
FLOW (l/sec)	0.00	0.00				
<u>Maintenance Checklist</u>			<u>Remarks</u>			
Visual Inspection:	☒ OK	☐ NOT OK				
Electrical Inspection:	☒ OK	☐ NOT OK				
<u>Programming Parameter of Instrument</u>						
Parameter	Discription	Value	Parameter	Discription	Value	
F0	Access Code	2.71828	P7	Height of Max. Head	33.4 cm	
P1	Dimension Unit (cm)	0	P32	Totalizer Multiplier	6*1000	
P3	Exponential Device	0	P42	Head by OCM III	0	
P4	Cal. Method -Ratiometric	1	P45	Low Flow Cut-off	2.5 cm	
P5	Flow Unit - l/sec	0	P46	Range at Zero Head	95.34 cm	
P6	Max Flow rate	100	P47	Blanking Distance	30.482 cm	
<u>Test Point Report</u>						
Reference Distance (cm)	Measured Distance (cm)	Calculated Flow (l/sec)	UUT Flow Display (l/sec)	Calculated (mA)	Measured (mA)	Devaiiton Full Scale (l/sec)
0.00	0.00	0.00	0.00	4.00	4.00	0.00
<u>Calculations</u>						
Flow Calculations $Q = q_{cal} (h/h_{cal})^{Exp}$ Where, Q= Discharge Flow, qcal = max flow, h = head, hcal = max head Exp = 2.5 , Hence, $Q = 100 (0/33.4)^{1.53}$ Q = 0						
<u>Instrument Test Information and Results</u>						
Input (%)	Calculated Flow(l/sec)	Calculated Input (mA)	Flow on UUT (l/sec)	UUT Measured Output (mA)	Deviation (l/sec)	
0	0.00	4.00	0.02	3.99	0.02	
25	25.00	8.00	25.02	8.01	0.02	
50	50.00	12.00	49.97	11.98	-0.03	
75	75.00	16.00	75.04	16.03	0.04	
100	100.00	20.00	99.98	19.99	-0.02	
<u>Information of Tools used for Verification of the Instruments</u>						
Device Description:	Manufacturer		Model			
Electrical Multimeter	Fluke		179			
* Refer Calibration Tools Certificates submittal for more Information						
Verification Test Result:	☒ Passed	☐ Fail	☐ Not Verified			
Overall Remarks:	Program parameters verified.					
Service Technician :	Chetan Parekh		Stamp/Signature			
Printed Date:	September 20, 2023					
End of Report						
Version: 19-12						



Induscontrol Inc
3170 Ridgeway Drive, Unit #11
Mississauga, ON L5L 5R4

VERIFICATION REPORT- MULTIRANGER 200 LEVEL MEASUREMENT

Customer Name: OCWA-Georgian Highlands Region
Plant Name: Arthur WPCP

Site/Plant Address: 160 preston St,
Arthur, ON, N0G 1A0

Device Information
Make: Siemens
Model: Multiranger 100
Order Code: NA
Serial No.: PBD/V9180052
Tag: LIT-201
Job Location: River Guage

Service Information
Date: September 20, 2023
Report No: CO1481-2308-40
Job No: CO1481-2308

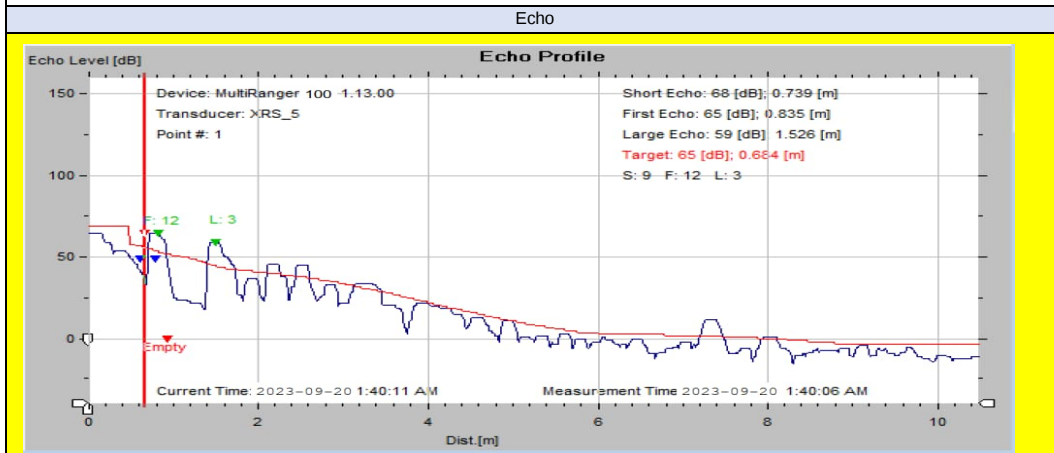
Inst. Reading **AS FOUND** **AS LEFT**
Level (cm) 13.37 13.31

Flow Details
Unit: cm
Range: 0-167.66
Current Output: 4-20 mA
4 mA Set Point 0
20 mA Set Point 167.66

Maintenance Checklist			Remarks
Visual Inspection:	☒ OK	☐ NOT OK	
Electrical Inspection:	☒ OK	☐ NOT OK	

Programming Parameter of Instrument					
Parameter	Discription	Value	Parameter	Discription	Value
P001	Operation	1.00000	P006	unit	2.00
P002	Material	1.000	P006	Empty	200.66 cm
P004	Transducer	112	P007	Span	167.66 cm

Instrument Test Information and Results					
Input (%)	Calculated Level(cm)	Calculated Input (mA)	Level on UUT (cm)	UUT Measured Output (mA)	Deviation (cm)
0	0.00	4.00	0.01	4.01	0.01
25	41.91	8.00	41.89	7.99	0.02
50	83.83	12.00	83.85	11.99	-0.02
75	125.74	16.00	125.70	15.98	0.04
100	167.66	20.00	167.62	19.98	0.04



Information of Tools used for Verification of the Instruments		
Device Description:	Manufacturer	Model
Electrical Multimeter	Fluke	179

* Refer Calibration Tools Certificates submittal for more Information

Verification Test Result:	☒ Passed	☐ Fail	☐ Not Verified
---------------------------	--	-------------------------------	---------------------------------------

Overall Remarks:	Program parameters verified
------------------	-----------------------------

Service Technician : Chetan Parekh
Printed Date: September 20, 2023

Stamp/Signature

Flowmeter Verification Certificate Transmitter

Georgian Highlands Region

Customer

Order code

PROMAG 53 W DN100

Device type

M4053819000

Serial number

V2.03.00

Software Version Transmitter

20.09.2023

Verification date

Arthur WPCP

Plant

FIT 001

Tag Name

1.3156 - 1.3156

K-Factor

4

Zero point

V1.06.00

Software Version I/O-Module

08:53

Verification time

Verification result Transmitter: Passed

Test item	Result	Applied Limits
Amplifier	Passed	Basis: 0.55 %
Current Output 1	Passed	0.05 mA
Pulse Output 1	Not tested	0 P
Test Sensor	Passed	

FieldCheck Details

551032

Production number

1.07.10

Software Version

04/2023

Last Calibration Date

Simubox Details

8714684

Production number

1.00.01

Software Version

04/2023

Last Calibration Date

20.09.2023



Date

Operator's Sign

Inspector's Sign

Overall results:

The achieved test results show that the instrument is completely functional, and the measuring results lie within +/- 1% of the original calibration. ¹⁾

The calibration of the Fieldcheck test system is fully traceable to national standards.

¹⁾ Prerequisite is an additional proof of electrode integrity with a high voltage test.

FieldCheck - Result Tab Transmitter

Customer		Plant	
Order code		Tag Name	FIT 001
Device type	PROMAG 53 W DN100	K-Factor	1.3156 - 1.3156
Serial number	M4053819000	Zero point	4
Software Version Transmitter	V2.03.00	Software Version I/O-Module	V1.06.00
Verification date	20.09.2023	Verification time	08:53

Verification Flow end value (100 %): 31.416 l/s

Flow speed 4.00 m/s

Passed / Failed	Test item	Simul. Signal	Limit Value	Deviation
	Test Transmitter			
✓	Amplifier	1.571 l/s (5%)	1.50 %	0.28 %
✓		3.142 l/s (10.0%)	1.00 %	0.28 %
✓		15.708 l/s (50.0%)	0.60 %	-0.03 %
✓		31.416 l/s (100%)	0.55 %	-0.02 %
✓	Current Output 1	4.000 mA (0%)	0.05 mA	-0.004 mA
✓		4.800 mA (5%)	0.05 mA	-0.005 mA
✓		5.600 mA (10.0%)	0.05 mA	-0.016 mA
✓		12.000 mA (50.0%)	0.05 mA	-0.000 mA
✓		20.000 mA (100%)	0.05 mA	0.011 mA
—	Pulse Output 1	---	---	---
		Start value	Limits range	Measured value
	Test Sensor			
✓	Coil Curr. Rise	5.000 ms	0.000..14.250 ms	7.980 ms
✓	Coil Curr. Stability		---	---
✓	Electrode Integrity	mV	0.0..300.001 mV	3.289 mV

Legend of symbols

✓	✗	—	?	!
Passed	Failed	not tested	not testable	Attention

FieldCheck: Parameters Transmitter

Customer		Plant	
Order code		Tag Name	FIT 001
Device type	PROMAG 53 W DN100	K-Factor	1.3156 - 1.3156
Serial number	M4053819000	Zero point	4
Software Version Transmitter	V2.03.00	Software Version I/O-Module	V1.06.00
Verification date	20.09.2023	Verification time	08:53

Curent Output	Assign	Current Range	Value 0_4mA	Value 20 mA		
Terminal 26/27	VOLUME FLOW	4-20 mA activ	0.0 l/s	20.00 l/s		
Pulse Output	Assign	Pulse Value	Output signal	Pulse width		
Terminal 24/25	OFF	---	---	---		

Actual System Ident.

115.0

Flowmeter Verification Certificate Transmitter

Georgian Highlands Region

Customer

Order code

PROMAG 53 W DN100

Device type

M4053919000

Serial number

V2.03.00

Software Version Transmitter

20.09.2023

Verification date

Arthur WPCP

Plant

Tag Name

1.3323 - 1.3323

K-Factor

4

Zero point

V1.06.00

Software Version I/O-Module

09:33

Verification time

Verification result Transmitter: Passed

Test item	Result	Applied Limits
Amplifier	Passed	Basis: 0.55 %
Current Output 1	Passed	0.05 mA
Pulse Output 1	Not tested	0 P
Test Sensor	Passed	

FieldCheck Details

551032

Production number

1.07.10

Software Version

04/2023

Last Calibration Date

Simubox Details

8714684

Production number

1.00.01

Software Version

04/2023

Last Calibration Date

20.09.2023



Date

Operator's Sign

Inspector's Sign

Overall results:

The achieved test results show that the instrument is completely functional, and the measuring results lie within +/- 1% of the original calibration. ¹⁾

The calibration of the Fieldcheck test system is fully traceable to national standards.

¹⁾ Prerequisite is an additional proof of electrode integrity with a high voltage test.

FieldCheck - Result Tab Transmitter

Customer		Plant	
Order code		Tag Name	-----
Device type	PROMAG 53 W DN100	K-Factor	1.3323 - 1.3323
Serial number	M4053919000	Zero point	4
Software Version Transmitter	V2.03.00	Software Version I/O-Module	V1.06.00
Verification date	20.09.2023	Verification time	09:33

Verification Flow end value (100 %): 31.416 l/s

Flow speed 4.00 m/s

Passed / Failed	Test item	Simul. Signal	Limit Value	Deviation
	Test Transmitter			
✓	Amplifier	1.571 l/s (5%)	1.50 %	0.42 %
✓		3.142 l/s (10.0%)	1.00 %	0.33 %
✓		15.708 l/s (50.0%)	0.60 %	0.12 %
✓		31.416 l/s (100%)	0.55 %	0.10 %
✓	Current Output 1	4.000 mA (0%)	0.05 mA	-0.000 mA
✓		4.800 mA (5%)	0.05 mA	0.000 mA
✓		5.600 mA (10.0%)	0.05 mA	-0.014 mA
✓		12.000 mA (50.0%)	0.05 mA	0.001 mA
✓		20.000 mA (100%)	0.05 mA	0.006 mA
—	Pulse Output 1	---	---	---
		Start value	Limits range	Measured value
	Test Sensor			
✓	Coil Curr. Rise	5.000 ms	0.000..14.250 ms	8.170 ms
✓	Coil Curr. Stability		---	---
✓	Electrode Integrity	mV	0.0..300.001 mV	0.000 mV

Legend of symbols

✓	✗	—	?	!
Passed	Failed	not tested	not testable	Attention

FieldCheck: Parameters Transmitter

Customer		Plant	
Order code		Tag Name	-----
Device type	PROMAG 53 W DN100	K-Factor	1.3323 - 1.3323
Serial number	M4053919000	Zero point	4
Software Version Transmitter	V2.03.00	Software Version I/O-Module	V1.06.00
Verification date	20.09.2023	Verification time	09:33

Curent Output	Assign	Current Range	Value 0_4mA	Value 20 mA		
Terminal 26/27	VOLUME FLOW	4-20 mA activ	0.0 l/s	20.00 l/s		
Pulse Output	Assign	Pulse Value	Output signal	Pulse width		
Terminal 24/25	VOLUME FLOW	1000.001 l/P	Passive/Positive	100.01 ms		

Actual System Ident.

121.0

Plant operator: INDUSCONTROL INC

Device information

Location	ARTHUR WWTP
Device tag	SSTPO-FI01
Module name	Promag L
Nominal diameter	DN150 / 6"
Device name	Promag 400
Order code	5L4C1F-LKF3/0
Serial number	R109EB16000
Firmware version	02.00.01

Heartbeat
Technology**Calibration**

Calibration factor	1.0563
Zero point	-1

Verification information

Operating time (counter)	1058d03h16m36s
Date/time (manually recorded)	20.09.23 12:52
Verification ID	22

Overall verification result

Passed

Details see next page

*Result of the complete device functionality test via Heartbeat Technology

Confirmation

Heartbeat Verification verifies the function of the flowmeter within the specified measuring tolerance, over the useful lifetime of the device, with a total test coverage > 94 %, and complies with the requirements for traceable verification according to DIN EN ISO 9001:2008 Section 7.6 a.

Notes

20.09.23

Date

Operator's signature

Inspector's signature

Plant operator: INDUSCONTROL INC

Device identification and verification identification

Serial number	R109EB16000
Device tag	SSTP0-FI01
Verification ID	22

Heartbeat
Technology

Sensor

	☒ Passed
Shot time symmetry	☒ Passed
Hold voltage symmetry	☒ Passed
Coil current loss	☒ Passed
Coil current stability	☒ Passed
Coil resistance	☒ Passed
Cable defect	☒ Passed
Cable defect	☒ Passed
Cable defect	☒ Failed

Sensor electronic module (ISEM)

	☒ Passed
External reference voltage	☒ Passed
Linearity of electrode measuring circuit	☒ Passed
Offset of electrode measuring circuit	☒ Passed

System status

	☒ Passed
--	--

I/O module

	☒ Passed
Input/output 1	☒ Passed
Input/output 2	☐ Not done
Input/output 3	☐ Not done

**2022 – 2023 Annual Performance Report
Arthur Wastewater Treatment Plant
ECA 7654-BEMKVD**

Appendix D

Sludge Quality Analysis

Solids & Nutrients

Period: 10/01/2023 to 05/31/2024

Works: 5767 / Digester Type: Aerobic

Solids & Nutrients	Metals & Criteria	Last 4 Samples	
Facility Works Number:	110000882	Receiver:	Conestoga River
Facility Owner:	Municipality: Township of Wellington North	Service Population:	2500
Facility Classification:	Class 3 Wastewater Treatment	Total Design Capacity:	1465 m3/day

Note: all parameters in this report are derived from the Bslq Station

Month	Hauled Vol. (m³)	Total Solids (mg/L)	Total Phosphorus (mg/L)	Total Ammonia Nitrogen (mg/L)	Nitrate as N (mg/L)	Nitrite as N (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Ammonia + Nitrate (mg/L)	Potassium (mg/L)
Parameter Short Name	HauledVol	TS	TP	NH3p_NH4p_N	NO3-N	NO2-N	TKN	Calculation in Report	K
T/S	IH Month.Total	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	- no T/S	Lab Published Month Mean
Oct	704.00	10,600.00	221.00	12.70	3.00	3.00	360.00	7.85	44.00
Nov		9,920.00	228.00	5.20	19.00	3.00	361.00	12.10	43.00
Dec	84.00	30,800.00	969.00	76.70	3.00	3.00	1,420.00	39.85	99.00
Jan	257.00	37,400.00	1,000.00	70.90	3.00	3.00	1,890.00	36.95	90.00
Feb	87.00	29,400.00	1,000.00	28.50	42.00	4.00	1,390.00	35.25	110.00
Mar	129.00	30,300.00	670.00	52.40	3.00	3.00	1,540.00	27.70	97.00
Apr	705.00	31,400.00	960.00	79.80	3.00	3.00	1,800.00	41.40	150.00
May	0.00	21,200.00	540.00	185.00	3.00	3.00	1,340.00	94.00	100.00
Average	280.86	25,127.50	698.50	63.90	9.88	3.13	1,262.63	36.89	91.63
Total	1,966.00	201,020.00	5,588.00	511.20	79.00	25.00	10,101.00	295.10	733.00

Solids & Nutrients		Metals & Criteria		Last 4 Samples							
Note: all parameters in this report are derived from the Bslq Station											
Month	Arsenic (mg/L)	Cadmium (mg/L)	Cobalt (mg/L)	Chromium (mg/L)	Copper (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Nickel (mg/L)	Lead (mg/L)	Selenium (mg/L)	Zinc (mg/L)
Parameter Short Name	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn
T/S	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean	Lab Published Month Mean
Oct	0.10	0.01	0.04	0.23	2.90	0.00	0.05	0.16	0.10	0.10	4.00
Nov	0.10	0.01	0.03	0.19	3.00	0.00	0.08	0.20	0.10	0.10	5.00
Dec	0.20	0.01	0.08	0.82	13.00	0.00	0.16	0.56	0.30	0.10	16.00
Jan	0.20	0.01	0.08	0.79	12.00	0.01	0.19	0.54	0.30	0.10	15.00
Feb	0.20	0.01	0.09	1.00	14.00	0.01	0.19	0.66	0.30	0.10	16.00
Mar	0.10	0.01	0.05	0.76	11.00	0.01	0.12	0.47	0.20	0.10	9.00
Apr	0.20	0.02	0.08	1.10	18.00	0.01	0.18	0.68	0.30	0.10	12.00
May	0.10	0.01	0.05	0.56	9.50	0.00	0.09	0.34	0.20	0.10	6.00
Average	0.15	0.01	0.06	0.68	10.43	0.00	0.13	0.45	0.23	0.10	10.38
Max. Permissible Metal Concentrations (mg/kg of Solids)	170.00	34.00	340.00	2,800.00	1,700.00	11.00	94.00	420.00	1,100.00	34.00	4,200.00
Metal Concentrations in Sludge (mg/kg)	5.97	0.34	2.49	27.11	414.88	0.16	5.27	17.96	8.95	3.98	412.89

Solids & Nutrients		Metals & Criteria		Last 4 Samples				
Note: all parameters in this report are derived from the Bslq Station								
Parameter Short Name	Time Series	02/07/2024	03/06/2024	04/03/2024	05/29/2024	Average	Metal Concentrations in Sludge (mg/kg)	Max. Permissible Metal Concentrations (mg/kg of Solids)
As (mg/L)	Lab Published	0.20	0.10	0.20	0.10	0.15	5.34	170
Cd (mg/L)	Lab Published	0.01	0.01	0.02	0.01	0.01	0.34	34
Co (mg/L)	Lab Published	0.09	0.05	0.08	0.05	0.07	2.40	340
Cr (mg/L)	Lab Published	1.00	0.76	1.10	0.56	0.86	30.45	2800
Cu (mg/L)	Lab Published	14.00	11.00	18.00	9.50	13.13	467.50	1700
Hg (mg/L)	Lab Published	0.01	0.01	0.01	0.00	0.01	0.20	11
Mo (mg/L)	Lab Published	0.19	0.12	0.18	0.09	0.15	5.16	94
Ni (mg/L)	Lab Published	0.66	0.47	0.68	0.34	0.54	19.15	420
Pb (mg/L)	Lab Published	0.30	0.20	0.30	0.20	0.25	8.90	1100
Se (mg/L)	Lab Published	0.10	0.10	0.10	0.10	0.10	3.56	34
Zn (mg/L)	Lab Published	16.00	9.00	12.00	6.00	10.75	382.90	4200
E.Coli Dry Wt (cfu/g)	Lab Published	24,490.00	82,508.00	98,726.00	150,943.00	74,076.82	E. Coli average is the GMD	
TS (mg/L)	Lab Published	29,400.00	30,300.00	31,400.00	21,200.00	28,075.00		
TP (mg/L)	Lab Published	1,000.00	670.00	960.00	540.00	792.50		
NO2-N (mg/L)	Lab Published	4.00	3.00	3.00	3.00	3.25		
TKN (mg/L)	Lab Published	1,390.00	1,540.00	1,800.00	1,340.00	1,517.50		
K (mg/L)	Lab Published	110.00	97.00	150.00	100.00	114.25		
NH3p_NH4p_N (mg/L)	Lab Published	28.50	52.40	79.80	185.00	86.43		
NO3-N (mg/L)	Lab Published	42.00	3.00	3.00	3.00	12.75		

**2022 – 2023 Annual Performance Report
Arthur Wastewater Treatment Plant
ECA 7654-BEMKVD**

Appendix E

Daily Streamflow Measurements

Ontario Clean Water Agency
Time Series Info Report

Report extracted 22/07/2024 12:11

From: 01/10/2023 to 31/05/2024

Facility Org Number: 5767
Facility Works Number: 110000882
Facility Name: ARTHUR WASTEWATER TREATMENT PLANT
Facility Owner: Municipality: Township of Wellington North
Facility Classification: Class 3 Wastewater Treatment

	Final Effluent / River Height - cm	Final Effluent / River Height - cm	Final Effluent / River Height - cm	Final Effluent / River Height - cm	Final Effluent / River Height - cm
	IH Count	IH Total	IH Month.Max	IH Month.Mean	IH Month.Min
10/2023	31	435.29	15.42	14.042	12.28
11/2023	30	688.16	64.76	22.939	13.01
12/2023	31	1320.3	83.04	42.59	26.13
01/2024	31	1602.11	126.42	51.681	24.53
02/2024	29	1263.57	90.16	43.571	25.11
03/2024	31	1417.23	79.95	45.717	28.86
04/2024	30	1334.75	92.41	44.492	24.07
05/2024	31	1170.93	81.32	37.772	23.87
Total	244	9232.34			
Avg				37.837	
Max			126.42		
Min					12.28

**2023 – 2024 Annual Performance Report
Arthur Wastewater Treatment Plant
ECA 7654-BEMKVD**

Appendix F

Grand River Conservation Authority Manual
Discharge Measurements & TAN Concentrations

**Arthur WWTP Stream Gauge
Tentative Rating Table**

Last Updated:
Sept. 9, 2017

Level (cm)	Flow (m ³ /s)	Level (cm)	Flow (m ³ /s)	Level (cm)	Flow (m ³ /s)	Level (cm)	Flow (m ³ /s)
10.1	0.000	14.3	0.035	18.5	0.09	22.7	0.17
10.2	0.001	14.4	0.036	18.6	0.09	22.8	0.17
10.3	0.001	14.5	0.037	18.7	0.09	22.9	0.17
10.4	0.002	14.6	0.038	18.8	0.09	23.0	0.17
10.5	0.003	14.7	0.039	18.9	0.09	23.1	0.18
10.6	0.003	14.8	0.040	19.0	0.10	23.2	0.18
10.7	0.004	14.9	0.041	19.1	0.10	23.3	0.18
10.8	0.005	15.0	0.042	19.2	0.10	23.4	0.18
10.9	0.005	15.1	0.043	19.3	0.10	23.5	0.19
11.0	0.006	15.2	0.045	19.4	0.10	23.6	0.19
11.1	0.007	15.3	0.046	19.5	0.10	23.7	0.19
11.2	0.008	15.4	0.047	19.6	0.11	23.8	0.19
11.3	0.008	15.5	0.048	19.7	0.11	23.9	0.20
11.4	0.009	15.6	0.049	19.8	0.11	24.0	0.20
11.5	0.010	15.7	0.050	19.9	0.11	24.1	0.20
11.6	0.011	15.8	0.052	20.0	0.11	24.2	0.20
11.7	0.011	15.9	0.053	20.1	0.12	24.3	0.20
11.8	0.012	16.0	0.054	20.2	0.12	24.4	0.21
11.9	0.013	16.1	0.055	20.3	0.12	24.5	0.21
12.0	0.014	16.2	0.056	20.4	0.12	24.6	0.21
12.1	0.015	16.3	0.058	20.5	0.12	24.7	0.22
12.2	0.015	16.4	0.059	20.6	0.12	24.8	0.22
12.3	0.016	16.5	0.060	20.7	0.13	24.9	0.22
12.4	0.017	16.6	0.062	20.8	0.13	25.0	0.22
12.5	0.018	16.7	0.063	20.9	0.13	25.1	0.23
12.6	0.019	16.8	0.064	21.0	0.13	25.2	0.23
12.7	0.020	16.9	0.066	21.1	0.13	25.3	0.23
12.8	0.021	17.0	0.067	21.2	0.14	25.4	0.23
12.9	0.021	17.1	0.068	21.3	0.14	25.5	0.24
13.0	0.022	17.2	0.070	21.4	0.14	25.6	0.24
13.1	0.023	17.3	0.071	21.5	0.14	25.7	0.24
13.2	0.024	17.4	0.072	21.6	0.14	25.8	0.24
13.3	0.025	17.5	0.074	21.7	0.15	25.9	0.25
13.4	0.026	17.6	0.075	21.8	0.15	26.0	0.25
13.5	0.027	17.7	0.077	21.9	0.15	26.1	0.25
13.6	0.028	17.8	0.078	22.0	0.15	26.2	0.26
13.7	0.029	17.9	0.080	22.1	0.15	26.3	0.26
13.8	0.030	18.0	0.081	22.2	0.16	26.4	0.26
13.9	0.031	18.1	0.083	22.3	0.16	26.5	0.26
14.0	0.032	18.2	0.084	22.4	0.16	26.6	0.27
14.1	0.033	18.3	0.086	22.5	0.16	26.7	0.27
14.2	0.034	18.4	0.087	22.6	0.16	26.8	0.27

**Arthur WWTP Stream Gauge
Tentative Rating Table**

Last Updated:
Sept. 9, 2017

Level (cm)	Flow (m3/s)	Level (cm)	Flow (m3/s)	Level (cm)	Flow (m3/s)	Level (cm)	Flow (m3/s)
26.9	0.28	31.1	0.42	35.3	0.61	39.5	0.85
27.0	0.28	31.2	0.43	35.4	0.62	39.6	0.86
27.1	0.28	31.3	0.43	35.5	0.62	39.7	0.87
27.2	0.29	31.4	0.44	35.6	0.63	39.8	0.87
27.3	0.29	31.5	0.44	35.7	0.63	39.9	0.88
27.4	0.29	31.6	0.44	35.8	0.64	40.0	0.89
27.5	0.30	31.7	0.45	35.9	0.65	40.1	0.89
27.6	0.30	31.8	0.45	36.0	0.65	40.2	0.90
27.7	0.30	31.9	0.46	36.1	0.66	40.3	0.91
27.8	0.31	32.0	0.46	36.2	0.66	40.4	0.91
27.9	0.31	32.1	0.47	36.3	0.67	40.5	0.92
28.0	0.31	32.2	0.47	36.4	0.67	40.6	0.93
28.1	0.31	32.3	0.47	36.5	0.68	40.7	0.93
28.2	0.32	32.4	0.48	36.6	0.68	40.8	0.94
28.3	0.32	32.5	0.48	36.7	0.69	40.9	0.95
28.4	0.32	32.6	0.49	36.8	0.69	41.0	0.95
28.5	0.33	32.7	0.49	36.9	0.70	41.1	0.96
28.6	0.33	32.8	0.50	37.0	0.71	41.2	0.97
28.7	0.33	32.9	0.50	37.1	0.71	41.3	0.97
28.8	0.34	33.0	0.50	37.2	0.72	41.4	0.98
28.9	0.34	33.1	0.51	37.3	0.72	41.5	0.99
29.0	0.35	33.2	0.51	37.4	0.73	41.6	1.00
29.1	0.35	33.3	0.52	37.5	0.73	41.7	1.00
29.2	0.35	33.4	0.52	37.6	0.74	41.8	1.01
29.3	0.36	33.5	0.53	37.7	0.75	41.9	1.02
29.4	0.36	33.6	0.53	37.8	0.75	42.0	1.02
29.5	0.36	33.7	0.54	37.9	0.76	42.1	1.03
29.6	0.37	33.8	0.54	38.0	0.76	42.2	1.04
29.7	0.37	33.9	0.55	38.1	0.77	42.3	1.05
29.8	0.37	34.0	0.55	38.2	0.77	42.4	1.05
29.9	0.38	34.1	0.56	38.3	0.78	42.5	1.06
30.0	0.38	34.2	0.56	38.4	0.79	42.6	1.07
30.1	0.39	34.3	0.56	38.5	0.79	42.7	1.07
30.2	0.39	34.4	0.57	38.6	0.80	42.8	1.08
30.3	0.39	34.5	0.57	38.7	0.80	42.9	1.09
30.4	0.40	34.6	0.58	38.8	0.81	43.0	1.10
30.5	0.40	34.7	0.58	38.9	0.82	43.1	1.10
30.6	0.40	34.8	0.59	39.0	0.82	43.2	1.11
30.7	0.41	34.9	0.59	39.1	0.83	43.3	1.12
30.8	0.41	35.0	0.60	39.2	0.84	43.4	1.13
30.9	0.42	35.1	0.60	39.3	0.84	43.5	1.14
31.0	0.42	35.2	0.61	39.4	0.85	43.6	1.14

**Arthur WWTP Stream Gauge
Tentative Rating Table**

Last Updated:
Sept. 9, 2017

Level (cm)	Flow (m3/s)	Level (cm)	Flow (m3/s)	Level (cm)	Flow (m3/s)	Level (cm)	Flow (m3/s)
43.8	1.16	52.2	1.95	60.6	3.03	69.0	4.47
44.0	1.17	52.4	1.97	60.8	3.06	69.2	4.51
44.2	1.19	52.6	1.99	61.0	3.09	69.4	4.55
44.4	1.21	52.8	2.01	61.2	3.12	69.6	4.58
44.6	1.22	53.0	2.04	61.4	3.15	69.8	4.62
44.8	1.24	53.2	2.06	61.6	3.18	70.0	4.66
45.0	1.25	53.4	2.08	61.8	3.22	70.2	4.70
45.2	1.27	53.6	2.11	62.0	3.25	70.4	4.74
45.4	1.29	53.8	2.13	62.2	3.28	70.6	4.78
45.6	1.30	54.0	2.15	62.4	3.31	70.8	4.82
45.8	1.32	54.2	2.18	62.6	3.34	71.0	4.87
46.0	1.34	54.4	2.20	62.8	3.37	71.2	4.91
46.2	1.36	54.6	2.22	63.0	3.40	71.4	4.95
46.4	1.37	54.8	2.25	63.2	3.44	71.6	4.99
46.6	1.39	55.0	2.27	63.4	3.47	71.8	5.03
46.8	1.41	55.2	2.30	63.6	3.50	72.0	5.07
47.0	1.43	55.4	2.32	63.8	3.54	72.2	5.12
47.2	1.44	55.6	2.35	64.0	3.57	72.4	5.16
47.4	1.46	55.8	2.37	64.2	3.60	72.6	5.20
47.6	1.48	56.0	2.40	64.4	3.64	72.8	5.24
47.8	1.50	56.2	2.42	64.6	3.67	73.0	5.29
48.0	1.52	56.4	2.45	64.8	3.70	73.2	5.33
48.2	1.54	56.6	2.47	65.0	3.74	73.4	5.37
48.4	1.56	56.8	2.50	65.2	3.77	73.6	5.42
48.6	1.57	57.0	2.53	65.4	3.81	73.8	5.46
48.8	1.59	57.2	2.55	65.6	3.84	74.0	5.51
49.0	1.61	57.4	2.58	65.8	3.88	74.2	5.55
49.2	1.63	57.6	2.61	66.0	3.91	74.4	5.60
49.4	1.65	57.8	2.63	66.2	3.95	74.6	5.64
49.6	1.67	58.0	2.66	66.4	3.98	74.8	5.69
49.8	1.69	58.2	2.69	66.6	4.02	75.0	5.73
50.0	1.71	58.4	2.72	66.8	4.06	75.2	5.78
50.2	1.73	58.6	2.74	67.0	4.09	75.4	5.82
50.4	1.75	58.8	2.77	67.2	4.13	75.6	5.87
50.6	1.77	59.0	2.80	67.4	4.16	75.8	5.92
50.8	1.80	59.2	2.83	67.6	4.20	76.0	5.96
51.0	1.82	59.4	2.86	67.8	4.24	76.2	6.01
51.2	1.84	59.6	2.89	68.0	4.28	76.4	6.06
51.4	1.86	59.8	2.91	68.2	4.31	76.6	6.11
51.6	1.88	60.0	2.94	68.4	4.35	76.8	6.15
51.8	1.90	60.2	2.97	68.6	4.39	77.0	6.20
52.0	1.92	60.4	3.00	68.8	4.43	77.2	6.25

**Arthur WWTP Stream Gauge
Tentative Rating Table**

Last Updated:
Sept. 9, 2017

Level (cm)	Flow (m3/s)	Level (cm)	Flow (m3/s)	Level (cm)	Flow (m3/s)	Level (cm)	Flow (m3/s)
77.5	6.3	98.5	13.0	119.5	23.2	140.5	38
78.0	6.4	99.0	13.2	120.0	23.5	141.0	38
78.5	6.6	99.5	13.4	120.5	23.8	141.5	39
79.0	6.7	100.0	13.6	121.0	24.1	142.0	39
79.5	6.8	100.5	13.8	121.5	24.4	142.5	39
80.0	7.0	101.0	14.0	122.0	24.7	143.0	40
80.5	7.1	101.5	14.2	122.5	25.0	143.5	40
81.0	7.2	102.0	14.4	123.0	25.3	144.0	41
81.5	7.4	102.5	14.6	123.5	25.6	144.5	41
82.0	7.5	103.0	14.9	124.0	26.0	145.0	42
82.5	7.6	103.5	15.1	124.5	26.3	145.5	42
83.0	7.8	104.0	15.3	125.0	26.6	146.0	42
83.5	7.9	104.5	15.5	125.5	26.9	146.5	43
84.0	8.1	105.0	15.7	126.0	27.2	147.0	43
84.5	8.2	105.5	16.0	126.5	27.6	147.5	44
85.0	8.3	106.0	16.2	127.0	27.9	148.0	44
85.5	8.5	106.5	16.4	127.5	28.2	148.5	45
86.0	8.6	107.0	16.7	128.0	28.6	149.0	45
86.5	8.8	107.5	16.9	128.5	28.9	149.5	46
87.0	8.9	108.0	17.1	129.0	29.2	150.0	46
87.5	9.1	108.5	17.4	129.5	29.6	150.5	47
88.0	9.3	109.0	17.6	130.0	29.9	151.0	47
88.5	9.4	109.5	17.9	130.5	30.3	151.5	47
89.0	9.6	110.0	18.1	131.0	30.6	152.0	48
89.5	9.7	110.5	18.3	131.5	31.0	152.5	48
90.0	9.9	111.0	18.6	132.0	31.3	153.0	49
90.5	10.1	111.5	18.9	132.5	31.7	153.5	49
91.0	10.2	112.0	19.1	133.0	32.1	154.0	50
91.5	10.4	112.5	19.4	133.5	32.4	154.5	50
92.0	10.6	113.0	19.6	134.0	32.8	155.0	51
92.5	10.8	113.5	19.9	134.5	33.2	155.5	51
93.0	10.9	114.0	20.2	135.0	33.5	156.0	52
93.5	11.1	114.5	20.4	135.5	33.9	156.5	52
94.0	11.3	115.0	20.7	136.0	34.3	157.0	53
94.5	11.5	115.5	21.0	136.5	34.7	157.5	53
95.0	11.6	116.0	21.2	137.0	35.0	158.0	54
95.5	11.8	116.5	21.5	137.5	35.4	158.5	54
96.0	12.0	117.0	21.8	138.0	35.8	159.0	55
96.5	12.2	117.5	22.1	138.5	36.2	159.5	55
97.0	12.4	118.0	22.4	139.0	36.6	160.0	56
97.5	12.6	118.5	22.6	139.5	37.0	160.5	56
98.0	12.8	119.0	22.9	140.0	37.4	161.0	57

AMMONIA

NH3-N	X 1.22	X 1.29	T.A.N.
0.01	0.01220	0.0129	0.0251
0.02	0.02440	0.0258	0.0502
0.03	0.03660	0.0387	0.0753
0.04	0.04880	0.0516	0.1004
0.05	0.06100	0.0645	0.1255
0.06	0.07320	0.0774	0.1506
0.07	0.08540	0.0903	0.1757
0.08	0.09760	0.1032	0.2008
0.09	0.10980	0.1161	0.2259
0.10	0.12200	0.1290	0.2510
0.11	0.13420	0.1419	0.2761
0.12	0.14640	0.1548	0.3012
0.13	0.15860	0.1677	0.3263
0.14	0.17080	0.1806	0.3514
0.15	0.18300	0.1935	0.3765
0.16	0.19520	0.2064	0.4016
0.17	0.20740	0.2193	0.4267
0.18	0.21960	0.2322	0.4518
0.19	0.23180	0.2451	0.4769
0.20	0.24400	0.2580	0.5020
0.21	0.25620	0.2709	0.5271
0.22	0.26840	0.2838	0.5522
0.23	0.28060	0.2967	0.5773
0.24	0.29280	0.3096	0.6024
0.25	0.30500	0.3225	0.6275
0.26	0.31720	0.3354	0.6526
0.27	0.32940	0.3483	0.6777
0.28	0.34160	0.3612	0.7028
0.29	0.35380	0.3741	0.7279
0.30	0.36600	0.3870	0.7530
0.31	0.37820	0.3999	0.7781
0.32	0.39040	0.4128	0.8032
0.33	0.40260	0.4257	0.8283
0.34	0.41480	0.4386	0.8534
0.35	0.42700	0.4515	0.8785
0.36	0.43920	0.4644	0.9036
0.37	0.45140	0.4773	0.9287
0.38	0.46360	0.4902	0.9538
0.39	0.47580	0.5031	0.9789
0.40	0.48800	0.5160	1.0040
0.41	0.50020	0.5289	1.0291
0.42	0.51240	0.5418	1.0542
0.43	0.52460	0.5547	1.0793

AMMONIA

NH3-N	X 1.22	X 1.29	T.A.N.
0.44	0.54900	0.5805	1.1295
0.45	0.56120	0.5934	1.1546
0.46	0.57340	0.6063	1.1797
0.47	0.58560	0.6192	1.2048
0.48	0.59780	0.6321	1.2299
0.49	0.61000	0.6450	1.2550
0.50	0.62220	0.6579	1.2801
0.51	0.63440	0.6708	1.3052
0.52	0.64660	0.6837	1.3303
0.53	0.65880	0.6966	1.3554
0.54	0.67100	0.7095	1.3805
0.55	0.68320	0.7224	1.4056
0.56	0.69540	0.7353	1.4307
0.57	0.70760	0.7482	1.4558
0.58	0.71980	0.7611	1.4809
0.59	0.73200	0.7740	1.5060
0.60	0.74420	0.7869	1.5311
0.61	0.75640	0.7998	1.5562
0.62	0.76860	0.8127	1.5813
0.63	0.78080	0.8256	1.6064
0.64	0.79300	0.8385	1.6315
0.65	0.80520	0.8514	1.6566
0.66	0.81740	0.8643	1.6817
0.67	0.82960	0.8772	1.7068
0.68	0.84180	0.8901	1.7319
0.69	0.85400	0.9030	1.7570
0.70	0.86620	0.9159	1.7821
0.71	0.87840	0.9288	1.8072
0.72	0.89060	0.9417	1.8323
0.73	0.90280	0.9546	1.8574
0.74	0.91500	0.9675	1.8825
0.75	0.92720	0.9804	1.9076
0.76	0.93940	0.9933	1.9327
0.77	0.95160	1.0062	1.9578
0.78	0.96380	1.0191	1.9829
0.79	0.97600	1.0320	2.0080
0.80	0.98820	1.0449	2.0331
0.81	1.00040	1.0578	2.0582
0.82	1.01260	1.0707	2.0833
0.83	1.02480	1.0836	2.1084
0.84	1.03700	1.0965	2.1335
0.85	1.04920	1.1094	2.1586
0.86	0.00000	0.0000	0.0000