

Iroquois Wastewater Treatment System

Sewage Works #120000159

Annual Report

Prepared for: Municipality of South Dundas

Reporting Period of January 1st – December 31st 2018

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Operations and Compliance Reliability Indices

Compliance Event	# of Events
Ministry of Environment Inspections	0
Ministry of Labour Inspections	0
Non-Compliance	0
Spills	0
Sewer Main Blockages	0

System Process Description

Iroquois's sewage collection system is a gravity fed sanitary sewage collection system. There are two pumping stations which pump wastewater from the collection system to the wastewater treatment facility.

The Iroquois Wastewater Treatment Plant (WWTP) is a Class II wastewater treatment facility owned and operated by the Municipality of South Dundas. Raw sewage is pumped to the WWTP by the plant pumping station which is equipped with three submersible pumps. From the pumping station, wastewater passes through the inlet works, including mechanically cleaned fine screens and a grit removal and disposal system. Aluminum Sulphate is added to assist in phosphorous removal. The wastewater then moves through either of two parallel Sequencing Batch Reactors (SBRs) equipped with individual aeration systems, mixers, decanters and sludge removal pumps. Effluent decanted from the SBRs is treated by UV disinfection and subsequently passes through an outfall pipe to the St. Lawrence River.

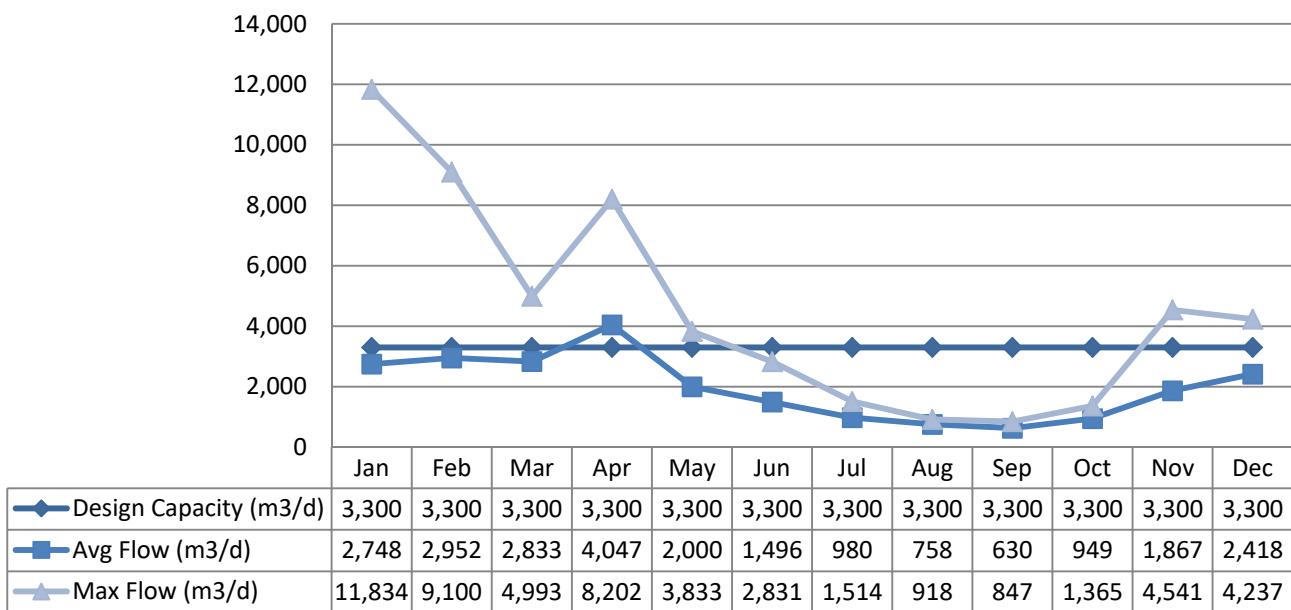
Sludge removed from the SBRs is transferred to a waste activated sludge tank. From the tank, the sludge enters a rotary drum thickener. Polymer is added to assist with the thickening process. Thickened sludge is pumped to an Autothermal Thermophilic Aerobic Digestion (ATAD) system for stabilization. The ATAD system is equipped with an off-gas scrubber and biofilter to provide odour control. The digested sludge is then pumped to one of three biosolids storage tanks. From the storage tanks, biosolids are hauled off site to be utilized as soil conditioner.

Wastewater System Flows

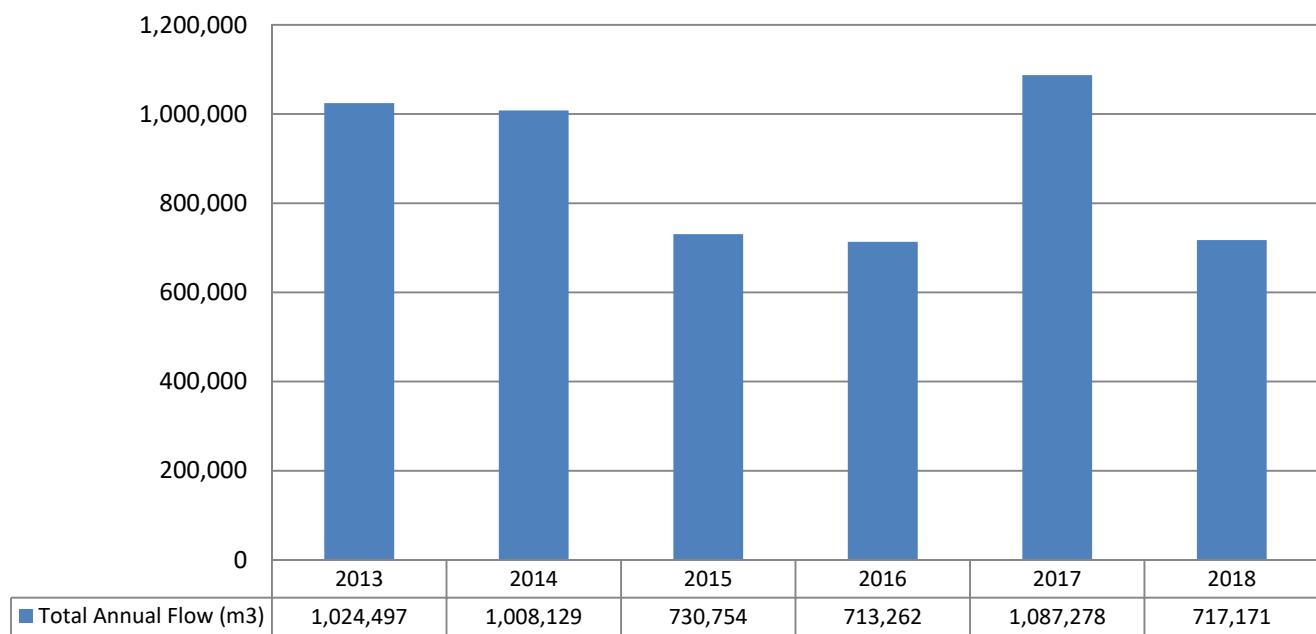
The hydraulic flows reaching the treatment facility in 2018 averaged 1,973 m³/day which represents 60% of the 3,300 m³/day design. Please see the Performance Assessment Reports attached in Appendix A for details.

Raw Flows

2018 Raw Flows:



Annual Raw Flow Comparison:



Effluent Flow

A total of 704,357 m³ of effluent was discharged from Iroquois' wastewater treatment facility in 2018.

Effluent Quality Assurance or Control Measures

Effluent control measures include in-house sampling and testing for operational parameters. In-house testing provides real time results which are then used to enhance process and operational performance. Samples are collected by the Municipality of South Dundas' competent and licensed staff using approved methods and protocols for sampling including those specified in the Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", the Ministry's publication, "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the publication, "Standard Methods for the Examination of Water and Wastewater".

Effluent samples collected during the reporting period were submitted to Caduceon laboratory in Ottawa for analysis, with the exception of pH, temperature and unionized ammonia. Caduceon is accredited by the Canadian Association for Laboratory Accreditation (CALA). Accredited labs must meet strict provincial guidelines including an extensive quality assurance/quality control program. By choosing this laboratory, the Municipality of South Dundas is ensuring appropriate control measures are undertaken during sample analysis.

The pH and temperature parameters were analyzed in the field at the time of sample collection by certified operators to ensure accuracy and precision of the results obtained. Un-ionized ammonia was calculated using the total ammonia nitrogen concentration, pH and temperature as required by the facility's Certificate of Approval.

Effluent Quality

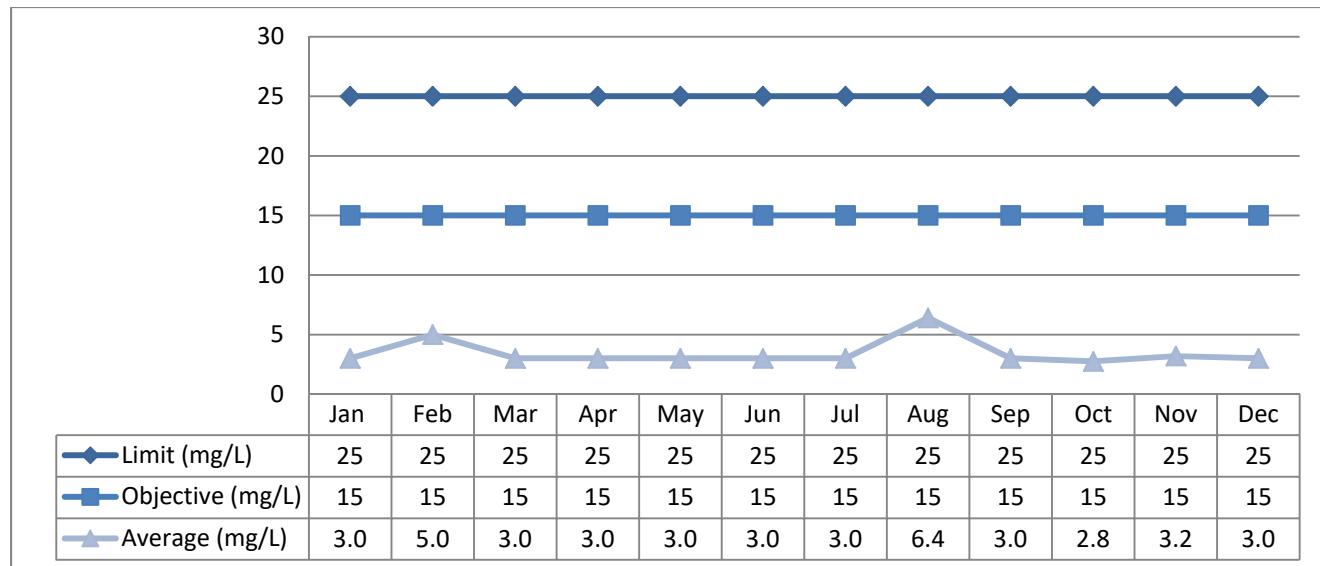
The monthly average concentrations of CBOD₅, Total Suspended Solids, Total Phosphorus and Total Ammonia Nitrogen remained below the effluent objectives and limits outlined in the facility's Certificate of Approval during 2018. The geometric mean density of E. Coli in the effluent also remained within the ECA limit and objective in 2018. In addition the effluent pH remained within the limits and objectives throughout the year.

Effluent results from the WWTP for 2018 are tabulated below.

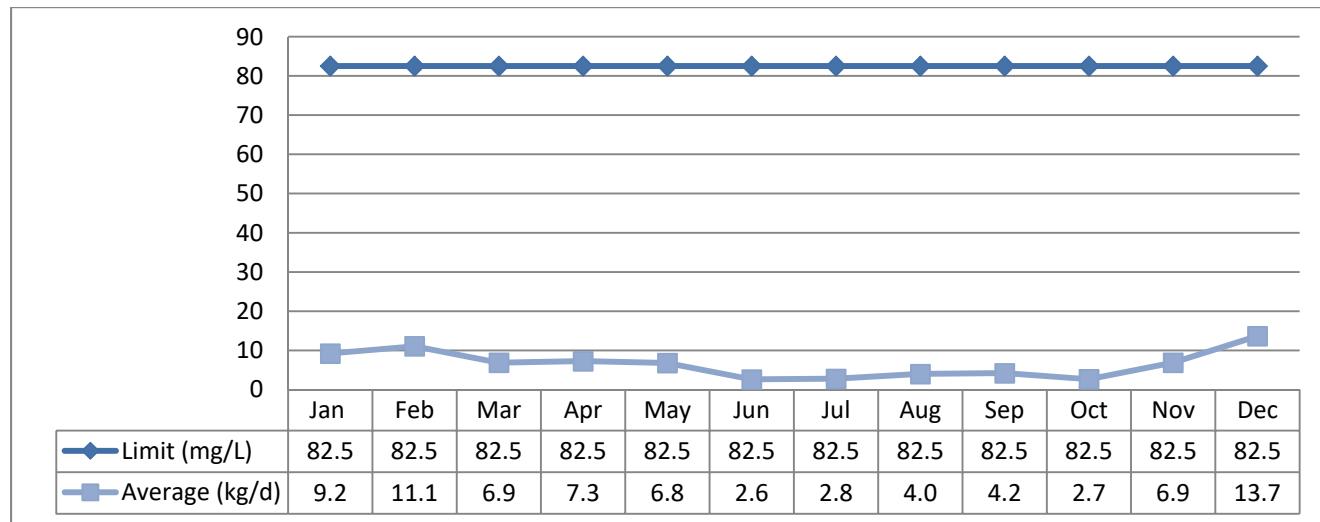
Carbonaceous Biochemical Oxygen Demand (5-Day)

Monthly Average	C of A Limit	C of A Objective	Exceedance
Concentration (mg/L)	25	15	No
Loading (kg/d)	82.5	n/a	No

CBOD₅ Effluent Monthly Average Concentrations:



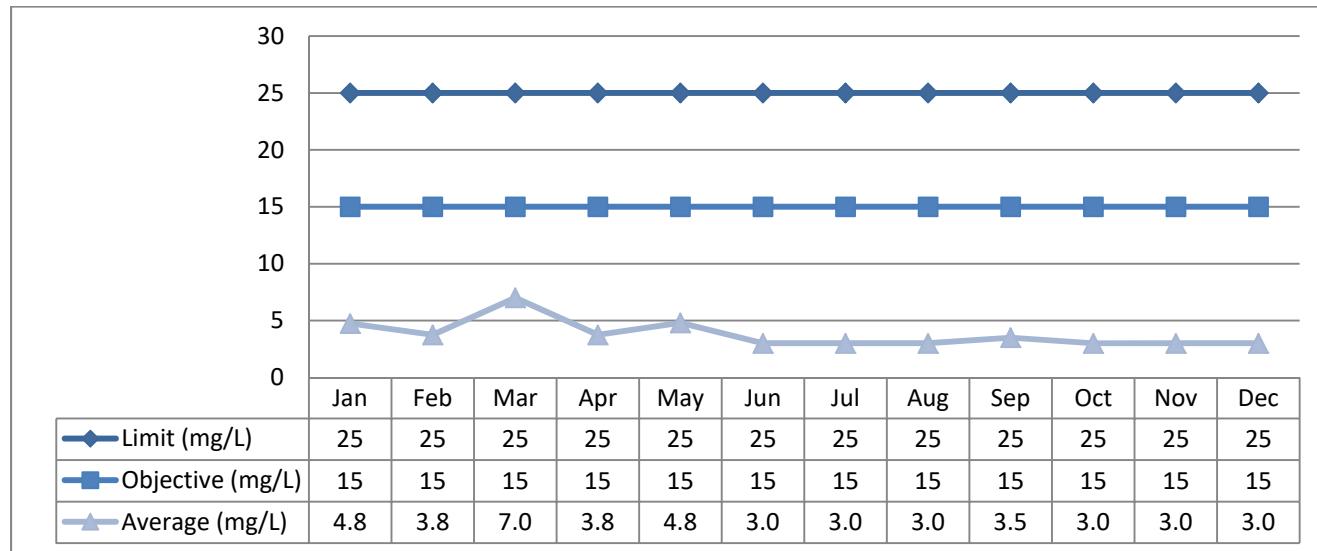
CBOD₅ Monthly Average Loading:



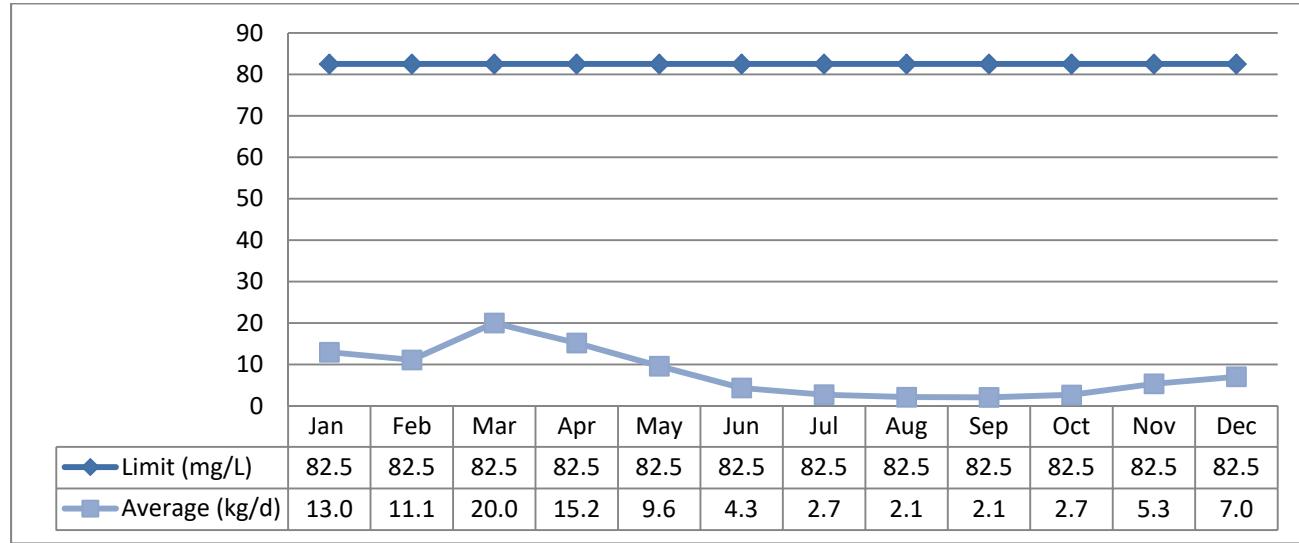
Total Suspended Solids

Monthly Average	C of A Limit	C of A Objective	Exceedance
Concentration (mg/L)	25	15	No
Loading (kg/d)	82.5	n/a	No

TSS Effluent Monthly Average Concentrations:



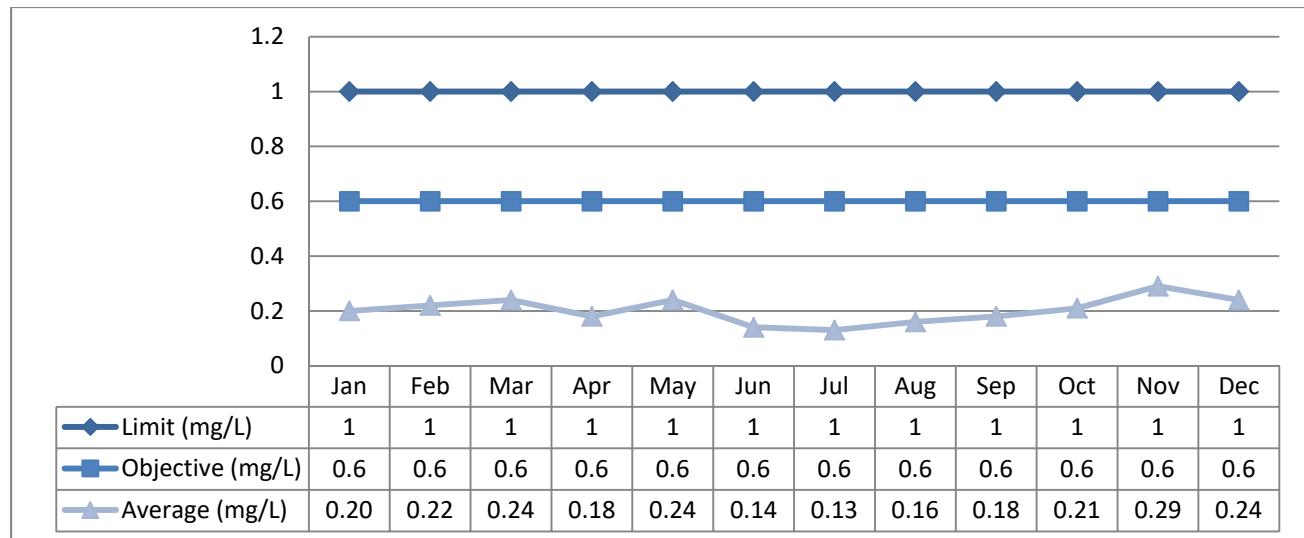
TSS Monthly Average Loading:



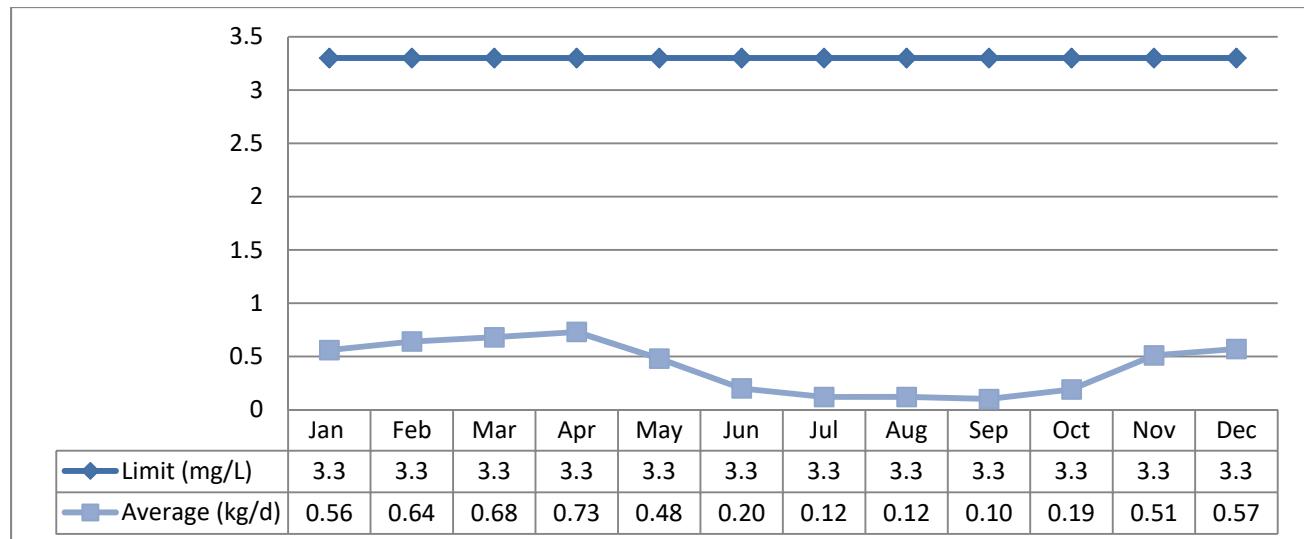
Total Phosphorus

Monthly Average	C of A Limit	C of A Objective	Exceedance
Concentration (mg/L)	1.0	0.6	No
Loading (kg/d)	3.3	n/a	No

TP Effluent Monthly Average Concentrations:



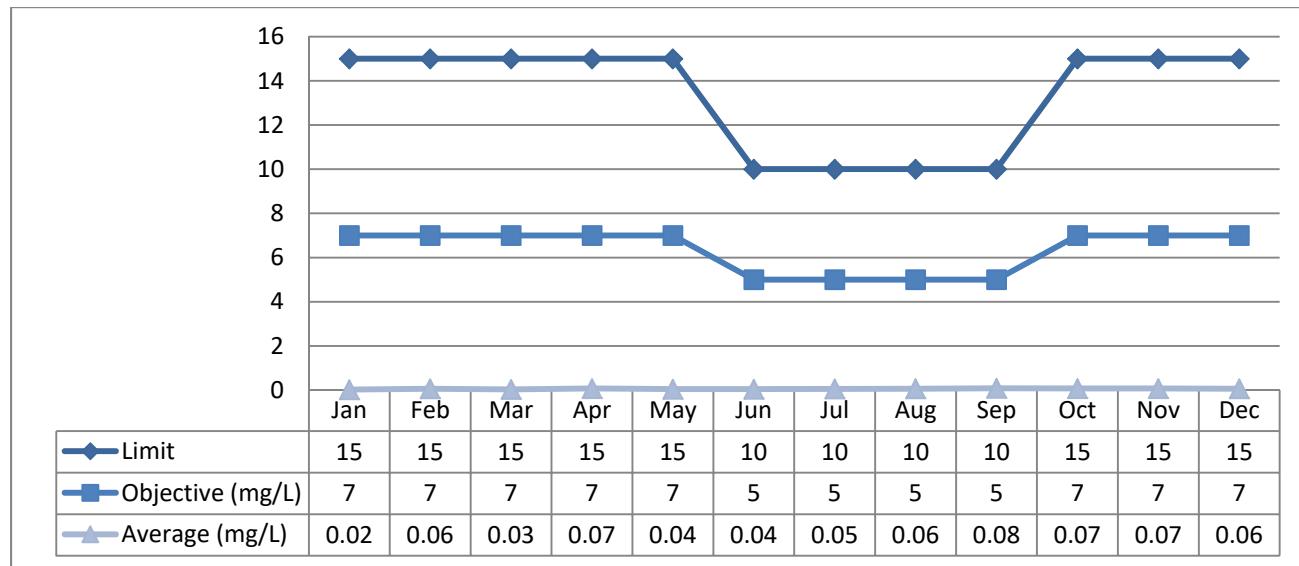
TP Monthly Average Loading:



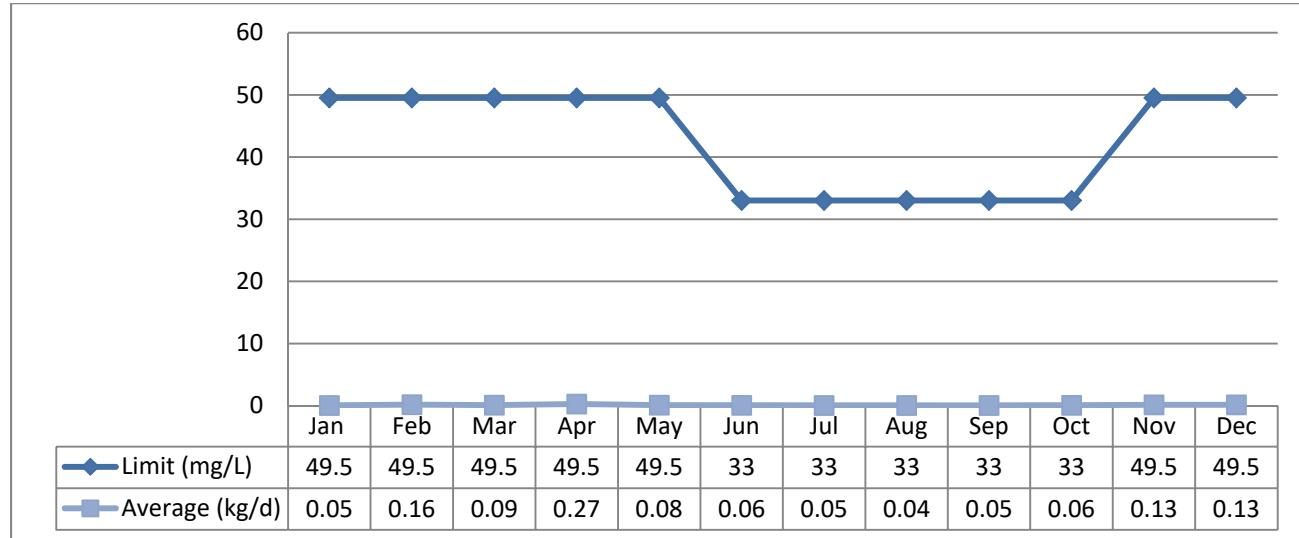
Total Ammonia Nitrogen

Monthly Average	Discharge Period	C of A Limit	C of A Objective	Exceedance
Concentration (mg/L)	Jun. 1 – Sept. 30	10	5	No
Loading (kg/d)		33	n/a	No
Concentration (mg/L)	Oct. 1 – May 31	15	7	No
Loading (kg/d)		49.5	n/a	No

TAN Effluent Monthly Average Concentrations:



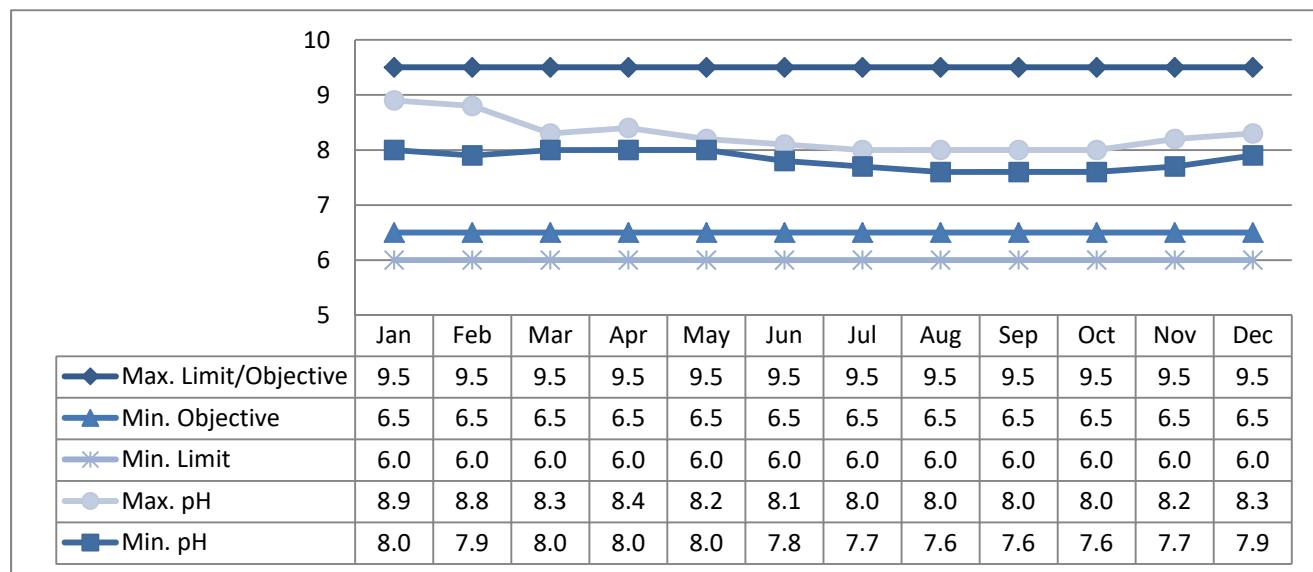
TAN Monthly Average Loading:



pH

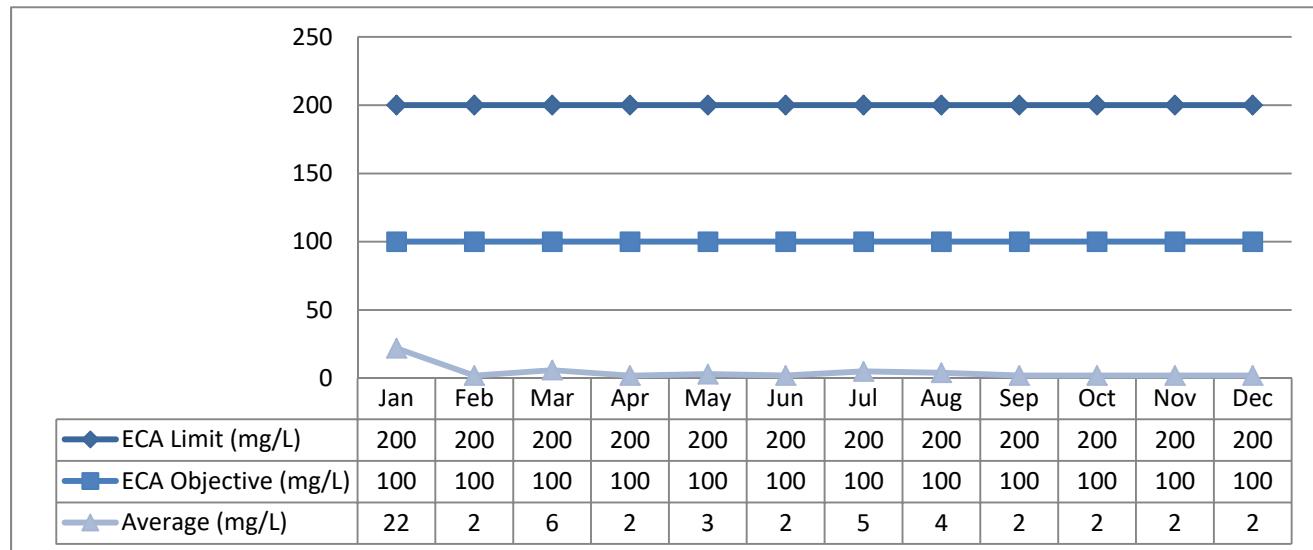
Reporting Period	C of A Limit	C of A Objective	Exceedance
All results	6.0 – 9.5	6.5 – 9.5	No

Monthly Minimum and Maximum pH Results:

**E. Coli**

Monthly Average	C of A Limit	C of A Objective	Exceedance
Geometric Mean Density	200	150	Yes*

E. Coli Monthly Geometric Mean Density (cfu/100 mL):



Acute Lethality

One sample was collected in 2018 and tested for acute lethality to Rainbow Trout and Daphnia Magna. Results are displayed as % mortality. An adverse result is indicated by a > 50% mortality rate.

Date	Rainbow Trout	Daphnia Magna
01-30-2018	0 %	0 %

Operating Issues

The maximum recorded flows during the months of January, February, March, April, November and December exceeded the average day design for the Iroquois WWTP. Based on a historical review of flows, it appears this system is impacted by inflow and infiltration.

Maintenance

Flow Meter Calibration and Maintenance

Copies of the flow meter calibration certificates for 2018 are attached in Appendix B.

Maintenance Summary

Description
- Replaced UV bulbs and ballast

Notice of Modifications

Date	Process	Modification	Status
None to report.			

Sludge Generation

In 2018, a total of 528.5 m³ of liquid sludge was removed from Iropquois' WWTP. Of this 408.5 m³ was utilized as soil conditioner in May (NASM Plan #23296), and 120 m³ was transported to a Waste Transfer Station by Terrapure Environmental (ECA #A710174). It is anticipated that approximately the same volume of sludge will be generated in 2019.

Summary of Complaints

Location	Date	Nature of Complaint	Actions Taken
No complaints were received during the reporting period.			

Summary of Abnormal Discharge Events

Bypass/Overflow

No bypasses or overflows occurred during the reporting period.

Spills

No spills occurred during the reporting period.

Appendix A

Performance Assessment Reports

IROQUOIS WWTP

PERFORMANCE ASSESSMENT REPORT

MUNICIPALITY: SOUTH DUNDAS
PROJECT: IROQUOIS WWTP
WORKS NUM.: 120000159
DESCRIPTION: TWO SEQUENTIAL

YEAR: 2018
WATER COURSE: ST. LAWRENCE
DESIGN CAPACITY: 3,300 m³/d

2018 - IROQUOIS WWTP EFFLUENT SAMPLING MONTHLY AVERAGES

MONTH	DATE	CBOD (mg/L)	TSS (mg/L)	TP (mg/L)	NH ₃ (mg/L)	E. Coli (CFU/100ml)
January	01/04/2018	< 3	5	0.18	< 0.01	< 2
	01/11/2018	< 3	< 3	0.18	0.02	< 2
	01/18/2018	< 3	4	0.18	0.02	< 2
	01/25/2018	< 3	7	0.28	0.02	< 2
	Monthly Average	3.0	4.8	0.21	0.02	2
	Compliant?	YES	YES	YES	YES	YES
February	02/01/2018	< 3	< 3	0.26	0.03	< 2
	02/08/2018	5	6	0.22	0.1	< 2
	02/15/2018	9	< 3	0.19	0.03	< 2
	02/22/2018	< 3	< 3	0.2	0.06	2
	Monthly Average	5.0	3.8	0.22	0.06	2
	Compliant?	YES	YES	YES	YES	YES
March	03/02/2018	< 3	4	0.31	0.04	22
	03/08/2018	< 3	12	0.32	0.02	6
	03/15/2018	< 3	11	0.21	0.03	20
	03/22/2018	< 3	< 3	0.14	0.04	< 2
	03/28/2018	< 3	5	0.21	0.02	< 2
	Monthly Average	3.0	7.0	0.24	0.03	6
April	Compliant?	YES	YES	YES	YES	YES
	04/05/2018	< 3	4	0.24	0.16	2
	04/12/2018	< 3	3	0.16	0.03	< 2
	04/19/2018	< 3	5	0.16	0.05	< 2
	04/26/2018	< 3	3	0.16	0.03	< 2
	Monthly Average	3.0	3.75	0.18	0.07	2
May	Compliant?	YES	YES	YES	YES	YES
	05/03/2018	< 3	7	0.16	0.03	< 2
	05/10/2018	< 3	7	0.31	0.03	8
	05/17/2018	< 3	3	0.21	0.06	2
	05/24/2018	< 3	< 3	0.34	0.04	< 2
	05/31/2018	< 3	4	0.18	0.04	< 2
June	Monthly Average	3.0	4.8	0.24	0.04	3
	Compliant?	YES	YES	YES	YES	YES
	06/07/2018	< 3	3	0.16	0.04	2
	06/14/2018	< 3	< 3	0.12	0.05	< 2
	06/21/2018	< 3	< 3	0.11	0.04	< 2
	06/28/2018	< 3	< 3	0.17	0.05	< 2
July	Monthly Average	3.0	3.0	0.14	0.05	2
	Compliant?	YES	YES	YES	YES	YES
	07/05/2018	< 3	< 3	0.17	0.04	< 2
	07/12/2018	< 3	< 3	0.14	0.06	20
	07/19/2018	< 3	3	0.1	0.05	< 2
	07/26/2018	< 3	< 3	0.12	0.05	8
August	Monthly Average	3.0	3.0	0.13	0.05	5
	Compliant?	YES	YES	YES	YES	YES
	08/02/2018	< 3	< 3	0.17	0.05	< 2
	08/09/2018	< 3	< 3	0.14	0.05	< 2
	08/16/2018	20	3	0.17	0.07	< 2
	08/23/2018	< 3	3	0.17	0.06	< 2
September	08/30/2018	< 3	< 3	0.17	0.07	34
	Monthly Average	6.4	3.0	0.16	0.06	4
	Compliant?	YES	YES	YES	YES	YES
	09/06/2018	< 3	4	0.16	0.1	< 2
	09/13/2018	< 3	< 3	0.16	0.06	2
	09/20/2018	< 3	4	0.16	0.1	*
October	09/27/2018	< 3	< 3	0.22	0.05	< 2
	Monthly Average	3.0	3.5	0.18	0.08	2
	Compliant?	YES	YES	YES	YES	YES
	10/04/2018	< 3	< 3	0.24	0.06	< 2
	10/11/2018	< 3	< 3	0.16	0.06	< 2
	10/18/2018	< 2	< 3	0.18	0.07	< 2
November	10/25/2018	< 3	< 3	0.26	0.09	< 2
	Monthly Average	2.75	3.0	0.21	0.07	2
	Compliant?	YES	YES	YES	YES	YES
	11/08/2018	3	< 3	0.31	0.13	< 2
	11/15/2018	4	< 3	0.33	0.06	< 2
	11/22/2018	< 3	< 3	0.34	0.05	< 2
December	11/29/2018	< 3	< 3	0.23	0.05	< 2
	Monthly Average	3.3	3.0	0.30	0.07	2
	Compliant?	YES	YES	YES	YES	YES
	12/06/2018	< 3	< 3	0.24	0.12	< 2
	12/13/2018	< 3	< 3	0.25	0.03	2
	20-Dec-18	< 3	< 3	0.23	0.05	< 2
	27-Dec-18	< 3	3	0.25	0.03	< 2
	Monthly Average	3.0	3	0.24	0.06	2
	Compliant?	YES	YES	YES	YES	YES

2018 - IROQUOIS WWTP LOADING CALCULATIONS

MONTH	Total Effluent Flow (m ³)		BOD	TSS	TP	NH ₃
January	84,622	Monthly Average (mg/L)	3.0	4.8	0.2	0.02
		Loading (kg/d)	8.19	12.97	0.56	0.05
		Compliant?	YES	YES	YES	YES
February	83,021	Monthly Average (mg/L)	5.0	3.75	0.22	0.055
		Loading (kg/d)	13.39	10.04	0.58	0.15
		Compliant?	YES	YES	YES	YES
March	88,643	Monthly Average (mg/L)	3.0	7.0	0.24	0.03
		Loading (kg/d)	8.58	20.02	0.68	0.09
		Compliant?	YES	YES	YES	YES
April	121,521	Monthly Average (mg/L)	3.0	3.75	0.18	0.07
		Loading (kg/d)	11.76	14.70	0.71	0.26
		Compliant?	YES	YES	YES	YES
May	62,038	Monthly Average (mg/L)	3.0	4.8	0.24	0.04
		Loading (kg/d)	6.00	9.61	0.48	0.08
		Compliant?	YES	YES	YES	YES
June	43,326	Monthly Average (mg/L)	3.0	3	0.14	0.05
		Loading (kg/d)	4.19	4.19	0.20	0.06
		Compliant?	YES	YES	YES	YES
July	28,044	Monthly Average (mg/L)	3.0	3.0	0.13	0.05
		Loading (kg/d)	2.71	2.71	0.12	0.05
		Compliant?	YES	YES	YES	YES
August	21,932	Monthly Average (mg/L)	6.4	3.0	0.16	0.06
		Loading (kg/d)	4.53	2.12	0.12	0.04
		Compliant?	YES	YES	YES	YES
September	17,698	Monthly Average (mg/L)	3.0	3.5	0.18	0.08
		Loading (kg/d)	1.71	2.00	0.10	0.04
		Compliant?	YES	YES	YES	YES
October	27,414	Monthly Average (mg/L)	2.8	3.0	0.21	0.07
		Loading (kg/d)	2.43	2.65	0.19	0.06
		Compliant?	YES	YES	YES	YES
November	53,426	Monthly Average (mg/L)	3.3	3.0	0.30	0.07
		Loading (kg/d)	5.60	5.17	0.52	0.12
		Compliant?	YES	YES	YES	YES
December	72,673	Monthly Average (mg/L)	3.0	3.0	0.24	0.06
		Loading (kg/d)	7.03	7.03	0.57	0.13
		Compliant?	YES	YES	YES	YES

2018 - IROQUOIS WWTP EFFLUENT UN-IONIZED AMMONIA

Sample Date	Sample Temperature °C	Sample Temp. Kelvin	Dissociation Constant pK _a	Effluent Sample pH on-site	Fraction of Un-ionized Ammonia	Total Ammonia (mg/L) (NH ₃ + NH ₄ as N)	Un-ionized Ammonia (mg/L)
01/04/2018	11.1	284.25	9.69	8.3	0.0388	<	0.01
01/11/2018	12.6	285.75	9.64	8.0	0.0222		0.02
01/18/2018	12.0	285.15	9.66	8.4	0.0517		0.02
01/25/2018	8.4	281.55	9.79	8.5	0.0492		0.02
01/02/2018	8.8	281.95	9.77	8.4	0.0407		0.03
02/08/2018	8.3	281.45	9.79	8.3	0.0314		0.10
02/15/2018	11.2	284.35	9.69	8.5	0.0606		0.03
02/22/2018	9.5	282.65	9.75	8.2	0.0275		0.06
02/03/2018	8.3	281.45	9.79	8.2	0.0251		0.04
03/08/2018	7.8	280.95	9.81	8.3	0.0302		0.02
03/15/2018	8.1	281.25	9.80	8.3	0.0309		0.03
03/22/2018	8.2	281.35	9.79	8.0	0.0158		0.04
03/28/2018	8.4	281.55	9.79	8.2	0.0253		0.02
04/05/2018	7.9	281.05	9.80	8.2	0.0243		0.16
04/12/2018	9.7	282.85	9.74	8.2	0.0279		0.03
04/19/2018	9.4	282.55	9.75	8.2	0.0273		0.05
04/26/2018	9.5	282.65	9.75	8.4	0.0429		0.03
05/03/2018	11.9	285.05	9.67	8.2	0.0330		0.03
05/10/2018	10.3	283.45	9.72	8.2	0.0292		0.03
05/17/2018	12.9	286.05	9.63	8.2	0.0355		0.06
05/24/2018	13.3	286.45	9.62	8.0	0.0234		0.04
05/31/2018	13.3	286.45	9.62	8.1	0.0293		0.04
06/07/2018	12.9	286.05	9.63	8.1	0.0284		0.04
06/14/2018	15.1	288.25	9.56	8.0	0.0268		0.05
06/21/2018	15.7	288.85	9.54	8.0	0.0280		0.04
06/28/2018	15.5	288.65	9.55	7.8	0.0176		0.05
07/05/2018	17.8	290.95	9.47	7.8	0.0208		0.04
07/12/2018	17.4	290.55	9.49	8.0	0.0316		0.06
07/19/2018	18.1	291.25	9.46	8.0	0.0333		0.05
07/26/2018	18.8	291.95	9.44	8.0	0.0350		0.05
08/02/2018	18.6	291.75	9.45	7.8	0.0220		0.05
08/09/2018	19.1	292.25	9.43	7.8	0.0228		0.05
08/16/2018	20.4	293.55	9.39	8.0	0.0392		0.07
08/23/2018	17.2	290.35	9.49	7.9	0.0249		0.06
08/30/2018	20.1	293.25	9.40	7.9	0.0307		0.07
09/06/2018	20.3	293.45	9.39	7.9	0.0311		0.1
09/13/2018	19.6	292.75	9.42	7.6	0.0151		0.06
09/20/2018	20.2	293.35	9.40	7.8	0.0247		0.1
09/27/2018	18.2	291.35	9.46	7.7	0.0171		0.05
10/04/2018	17.4	290.55	9.49	7.9	0.0253		0.06
10/11/2018	19.2	292.35	9.43	7.6	0.0146		0.06
10/18/2018	16.5	289.65	9.52	8.0	0.0296		0.07
10/25/2018	16.1	289.25	9.53	7.7	0.0146		0.09
11/08/2018	17	290.15	9.50	7.9	0.0246		0.13
11/15/2018	13.9	287.05	9.60	8.0	0.0245		0.06
11/22/2018	12.7	285.85	9.64	8.0	0.0224		0.05
11/29/2018	12.4	285.55	9.65	8.1	0.0274		0.05
12/06/2018	12.1	285.25	9.66	8.1	0.0268		0.12
12/13/2018	12	285.15	9.66	8.4	0.0517		0.03
12/20/2018	11.3	284.45	9.69	8.0	0.0201		0.05
12/27/2018	10.3	283.45	9.72	8.3	0.0365		0.03

pK_a = 0.09018 + 2729.92/T, where pK_a is the dissociation constant of ammonia at a given temperature.

T = (K = degrees C + 273.16), where T is the ambient water temperature in Kelvin.

2018 - IROQUOIS WWTP AEROBIC BIOSOLIDS RESULTS

SLUDGE RESULTS		04-Jan-18	01-Feb-18	01-Mar-18	05-Apr-18	03-May-19	07-Jun-18	05-Jul-18	02-Aug-18	06-Sep-18	04-Oct-18	01-Nov-19	06-Dec-18
Ammonia	mg/L	< 0.01	22.5	0.67	1.69	571	1860	945	961	1020	1430	986	1170
Nitrate	mg/L	61.8	84	109	170	0.8	1.7	3.8	6.6	1.2	4.8	6.2	8.2
Ammonia + Nitrate	mg/L	62	107	110	172	572	1862	949	968	1021	1435	992	1178
Total Phosphorus	mg/L	276	331	260	366	854	1500	1320	1580	1850	2710	2000	2010
Total Solids	mg/L	16600	11000	9290	14700	22800	35900	30100	32900	37500	45600	42700	34400
Aluminum	mg/L	496	426	349	500	1080	1100	1670	2130	2000	3010	2930	2790
Arsenic	mg/L	0.20	0.10	0.10	0.10	0.25	0.20	0.21	0.2	0.2	0.3	0.30	0.20
Cadmium	mg/L	< 0.030	0.030	0.030	0.030	0.030	0.040	0.03	0.04	0.040	0.05	0.060	0.050
Chromium	mg/L	0.53	0.31	0.63	1.91	0.79	1.41	0.9	1.17	1.04	1.41	1.54	1.32
Cobalt	mg/L	0.06	0.04	0.040	0.06	0.16	0.31	0.18	0.21	0.18	0.23	0.28	0.23
Copper	mg/L	16.50	13.00	9.30	14.00	26.60	38.30	32.3	44.5	44.1	67	75.00	69.50
Lead	mg/L	0.70	0.50	0.60	0.50	0.80	0.90	0.9	1.3	1.1	1.6	1.70	1.60
Mercury	mg/L	0.09	0.01	0.03	0.17	0.01	0.05	0.01	0.01	0.01	0.02	0.02	0.024
Molybdenum	mg/L	0.12	0.09	0.10	0.15	0.28	0.30	0.28	0.38	0.34	0.5	0.63	0.55
Nickel	mg/L	0.47	0.34	0.34	0.91	0.83	3.50	0.95	1.27	1.17	1.47	1.69	1.50
Selenium	mg/L	< 0.10	0.10	0.10	0.10	0.10	0.10	0.2	0.2	0.2	0.3	0.30	0.20
Zinc	mg/L	8.2	6.70	5.20	7.45	15.50	16.60	19.6	26.6	26.5	36.5	42.7	39.80

Appendix B

Flow Meter Calibration Reports



Electrical/Control Panels – PLC/SCADA Programming – Instrumentation Calibrations

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5 Iroquois W.P.C.P.

Site Reports July, 2018

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Electrical/Control Panels – PLC/SCADA Programming – Instrumentation Calibrations

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5.1 FIT-401 Waste Sludge Basin 1:

DTM Version: 3.29.00

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Flowmeter Verification Certificate Transmitter

Customer	Plant
Order code	Tag Name
PROMAG 10 W DN80	1.0381 - 1.0381
Device type	K-Factor
H107C818000	0
Serial number	Zero point
V1.03.00	
Software Version Transmitter	Software Version I/O-Module
07/18/2018	01:32 PM
Verification date	Verification time

Verification result Transmitter: Passed

Test item	Result	Applied Limits
Amplifier	Passed	Basis: 0.65 %
Current Output 1	Passed	0.05 mA
Pulse Output 1	Not tested	0 P
Test Sensor	Passed	

FieldCheck Details	Simubox Details
240223	8784351
Production number	Production number
1.07.08	1.00.01
Software Version	Software Version
06/2018	06/2018
Last Calibration Date	Last Calibration Date

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.

Endress+Hauser 

Business for Process Automation

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FieldCheck - Result Tab Transmitter

Customer		Plant	
Order code		Tag Name	—
Device type	PROMAG 10 W DN80	K-Factor	1.0381 - 1.0381
Serial number	H107C816000	Zero point	0
Software Version Transmitter	V1.03.00	Software Version I/O-Module	
Verification date	07/18/2018	Verification time	01:32 PM

Verification Flow end value (100 %): 20.106 l/s
 Flow speed 4.00 m/s

Passed / Failed	Test item	Simul. Signal	Limit Value	Deviation
Test Transmitter				
✓	Amplifier	1.005 l/s (5%)	1.60 %	-0.26 %
✓		2.011 l/s (10.0%)	1.10 %	0.24 %
✓		10.053 l/s (50.0%)	0.70 %	-0.03 %
✓		20.106 l/s (100%)	0.65 %	-0.03 %
✓	Current Output 1		0.05 mA	0.002 mA
✓		4.000 mA (0%)	0.05 mA	0.001 mA
✓		4.800 mA (5%)	0.05 mA	0.002 mA
✓		5.600 mA (10.0%)	0.05 mA	0.001 mA
✓		12.000 mA (50.0%)	0.05 mA	0.001 mA
✓		20.000 mA (100%)	0.05 mA	0.010 mA
—	Pulse Output 1	—	—	—
Test Sensor				
✓	Coll Curr. Rise	50.000 ms	13.340..50.000 ms	43.281 ms
✓	Coll Curr. Stability	—	—	—

Legend of symbols

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

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Electrical/Control Panels – PLC/SCADA Programming – Instrumentation Calibrations

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FieldCheck: Parameters Transmitter

Customer		Plant	
Order code		Tag Name	_____
Device type	PROMAG 10 W DN80	K-Factor	1.0381 - 1.0381
Serial number	H107C816000	Zero point	0
Software Version Transmitter	V1.03.00	Software Version I/O-Module	
Verification date	07/18/2018	Verification time	01:32 PM

Current Output	Assign	Current Range	Value 0 4mA	Value 20 mA		
Terminal 26/27	VOLUME FLOW	4-20 mA activ	0.0 l/s	50.00 l/s		
Pulse Output	Assign	Pulse Value	Output signal	Pulse width		
Terminal 24/25	VOLUME FLOW	0.008 m3/P	Passive/Positive	100.00 ms		

Actual System Ident.

129.0

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5.2 FIT-402 Waste Sludge Basin 2:

DTM Version: 3.29.00

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Flowmeter Verification Certificate Transmitter

Customer	Plant
Order code	Tag Name
PROMAG 10 W DN80	0.9737 - 0.9737
Device type	K-Factor
JA091316000	0
Serial number	Zero point
V1.04.00	
Software Version Transmitter	Software Version I/O-Module
07/18/2018	01:42 PM
Verification date	Verification time

Verification result Transmitter: Passed

Test item	Result	Applied Limits
Amplifier	Passed	Basis: 0.65 %
Current Output 1	Passed	0.05 mA
Pulse Output 1	Not tested	0 P
Test Sensor	Passed	

FieldCheck Details	Simubox Details
240223	8784351
Production number	Production number
1.07.08	1.00.01
Software Version	Software Version
06/2018	06/2018
Last Calibration Date	Last Calibration Date

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.

Endress+Hauser 
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FieldCheck - Result Tab Transmitter

Customer	Plant
Order code	Tag Name
Device type	K-Factor
Serial number	0.9737 - 0.9737
Software Version Transmitter	Zero point
V1.04.00	0
Verification date	Software Version I/O-Module
07/18/2018	Verification time
	01:42 PM

Verification Flow end value (100 %): 20.106 l/s

Flow speed 4.00 m/s

Passed / Failed	Test item	Simul. Signal	Limit Value	Deviation
Test Transmitter				
✓	Amplifier	1.005 l/s (5%)	1.60 %	-0.85 %
✓		2.011 l/s (10.0%)	1.10 %	-0.01 %
✓		10.053 l/s (50.0%)	0.70 %	-0.08 %
✓		20.106 l/s (100%)	0.65 %	-0.02 %
Test Output				
✓	Current Output 1	4.000 mA (0%)	0.05 mA	-0.005 mA
✓		4.800 mA (5%)	0.05 mA	-0.007 mA
✓		5.600 mA (10.0%)	0.05 mA	-0.009 mA
✓		12.000 mA (50.0%)	0.05 mA	-0.020 mA
✓		20.000 mA (100%)	0.05 mA	-0.024 mA
—	Pulse Output 1	—	—	—
Test Sensor				
✓	Coll Curr. Rise	50.000 ms	13.340..50.000 ms	42.891 ms
✓	Coll Curr. Stability		—	—

Legend of symbols

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

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FieldCheck: Parameters Transmitter

Customer		Plant	
Order code		Tag Name	_____
Device type	PROMAG 10 W DN80	K-Factor	0.9737 - 0.9737
Serial number	JA091316000	Zero point	0
Software Version Transmitter	V1.04.00	Software Version I/O-Module	
Verification date	07/18/2018	Verification time	01:42 PM

Current Output	Assign	Current Range	Value 0 4mA	Value 20 mA		
Terminal 26/27	VOLUME FLOW	4-20 mA activ	0.0 l/s	50.00 l/s		
Pulse Output	Assign	Pulse Value	Output signal	Pulse width		
Terminal 24/25	VOLUME FLOW	0.008 m3/P	Passive/Positive	100.00 ms		

Actual System Ident.

128.0

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5.3 FIT-305 Raw Sewage Influent Channel 1:

FIELD EQUIPMENT VERIFICATION / CALIBRATION REPORT

DATE: July 18 / 2018

DESCRIPTION: Iroquois WPCP Raw Sewage Influent Ch#1.		MODEL: OCM III Model: 7ML 1002-0AA05		TAG: FIT-305																																	
MANUFACTURER: Siemens		Serial # S/N. PDB/C0010053																																			
Client Name: Township of South Dundas.																																					
Device Output Signal : 4.00 - 20.0 mA																																					
	DESCRIPTION	INSTALLATION INSPECTION		COMMENTS																																	
		OK	FIXED	N/A	FAULTY																																
GENERAL						<i>Calibration by means of Simulating Channel Level</i>																															
1	TAGGING			X			Milltronics OCM-III Configuration																														
2							Flume Type = Parshall Size = 12"																														
MECHANICAL						P47- Blanking Distance = 61.01694 cm																															
3	MOUNTING: check for proper fastening, etc.	X					P46 - Zero Head = 175.3498 cm																														
4	ORIENTATION: check for proper angle, etc.)	X					P7 - Max. Head = 44.28499 cm																														
5	POSITION: relative position to other components (ie. for proper flow, blanking distance), etc.	X					P1 Linear Units = cm Flow Units = l/s																														
6						Type = Flow Parshall Damping = 20%																															
ELECTRICAL						Relay 1 = Off Relay 2 = Off Relay 2 = Off																															
7		X					Trending Configuration Sample at 60 min. Intervals																														
8	WIRE TAGGING: (exists and proper wire type)	X																																			
9	QUALITY OF CONNECTIONS:	X																																			
10	GROUNDING:	X																																			
11	SHIELDING: (check if grounded only at PLC end of wire)	X																																			
12	CERTIFICATION CSA, ULC:	X																																			
SET-UP/CALIBRATION																																					
DIGITAL		ADJUSTMENT USING		VERIFIED USING		SETPOINT / RANGE																															
14	SETPOINT ADJUSTMENT	MECHANICAL TYPE			Level Target		0 – 199.5 l/sec																														
		ELECTRONIC TYPE			Fluke 725 calibrator S/N 8759025																																
Configuration Parameters:		<table border="1"> <thead> <tr> <th>Calibration Data Test</th><th>Tolerance: 15.00%</th><th></th><th></th><th></th><th></th></tr> <tr> <th>Input Variable</th><th>Transmitter Value.</th><th>Cal. Value</th><th>% Error</th><th colspan="2">Notes</th></tr> </thead> <tbody> <tr> <td>(Calibration Jig set to 0.203 m)</td><td>0.203 m</td><td>61.06 l/s</td><td>60.8 l/s</td><td>0.13 %</td><td>Passed</td></tr> <tr> <td>(Calibration Jig set to 0.635 m)</td><td>0.635 m</td><td>10.98 l/s</td><td>9.83 l/s</td><td>0.58 %</td><td>Passed</td></tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>						Calibration Data Test	Tolerance: 15.00%					Input Variable	Transmitter Value.	Cal. Value	% Error	Notes		(Calibration Jig set to 0.203 m)	0.203 m	61.06 l/s	60.8 l/s	0.13 %	Passed	(Calibration Jig set to 0.635 m)	0.635 m	10.98 l/s	9.83 l/s	0.58 %	Passed						
Calibration Data Test	Tolerance: 15.00%																																				
Input Variable	Transmitter Value.	Cal. Value	% Error	Notes																																	
(Calibration Jig set to 0.203 m)	0.203 m	61.06 l/s	60.8 l/s	0.13 %	Passed																																
(Calibration Jig set to 0.635 m)	0.635 m	10.98 l/s	9.83 l/s	0.58 %	Passed																																
Error (% Full Scale) = ((Transmitter Value - Calculated Value) / Full Scale) * 100 = ((61.06-60.8) / 199.5) *100 = 0.13 % of full scale						Checked By: <i>Tim Stewart</i> Cell: 613 325 9213 Email: tim.stewart@capitalcontrols.ca																															

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5.4 FIT-306 Raw Sewage Influent Channel 2:

FIELD EQUIPMENT VERIFICATION / CALIBRATION REPORT						
DATE: July 18 / 2018						
DESCRIPTION: Iroquois WPCP Raw Sewage Influent Ch#2.			MODEL: OCM III Model: 7ML 1002-0AA05		TAG: FIT-306	
MANUFACTURER : Siemens			Serial # S/N. PDB/C0010053			
Client Name: Township of South Dundas.			Device Output Signal : 4.00 - 20.0 mA			
INSTALLATION INSPECTION						
	DESCRIPTION	FINDINGS				COMMENTS
		OK	FIXED	N/A	FAULTY	
	GENERAL					<i>Calibration by means of Simulating Channel Level</i>
1	TAGGING			X		Milltronics OCM-III Configuration
2						Flume Type = Parshall Size = 12"
	MECHANICAL					P47- Blanking Distance = 61.01694 cm
3	MOUNTING: check for proper fastening, etc.	X				P46 - Zero Head = 176.3498 cm
4	ORIENTATION: check for proper angle, etc.)	X				P7 - Max. Head = 44.1699 cm
5	POSITION: relative position to other components (ie. for proper flow, blanking distance), etc.	X				P1 Linear Units = cm Flow Units = l/s
6						Type = Flow Parshall Damping = 20%
	ELECTRICAL					Relay 1 = Off Relay 2 = Off Relay 2 = Off
7		X				Trending Configuration Sample at 60 min. Intervals
8	WIRE TAGGING: (exists and proper wire type)	X				
9	QUALITY OF CONNECTIONS:	X				
10	GROUNDING:	X				
11	SHIELDING: (check if grounded only at PLC end of wire)	X				
12	CERTIFICATION CSA, ULC:	X				
SET-UP/CALIBRATION						
DIGITAL		ADJUSTMENT USING		VERIFIED USING		SETPOINT / RANGE
14	SETPOINT ADJUSTMENT	MECHANICAL TYPE			Level Target	
		ELECTRONIC TYPE			Fluke 752 calibrator S/N 8759025	0 – 198.7 l/sec
Configuration Parameters:		Calibration Data Test Tolerance: 15.00%				
		Input Variable	Transmitter Value.	Cal. Value	% Error	Notes
(Calibration Jig set to 0.211 m)		0.211 m	65.46 l/s	63.13 l/s	1.17 %	Passed
(Calibration Jig set to 0.069 m)		0.069 m	13.56 l/s	11.15 l/s	1.21 %	Passed
Error (% Full Scale) = ((Transmitter Value - Calculated Variable) / Full Scale) * 100 = ((65.46-63.13 / 198.7)*100 = 1.17 % of full scale					Checked By: Tim Stewart Cell: 613 325 9213 Email: tim.stewart@capitalcontrols.ca	

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5.5 FIT-901 Effluent Pump Flow:

FIELD EQUIPMENT VERIFICATION / CALIBRATION REPORT

DATE: July 18 / 2018

DESCRIPTION: Iroquois WPCP Effluent Pump Flow		MODEL: 7ME69201AA101AA0		TAG: FIT-901	
MANUFACTURER : Siemens		Serial N1D6053478			
Client Name: Township of South Stormont .		Device Output Signal : 4.00 - 20.0 mA			
INSTALLATION INSPECTION					
	DESCRIPTION	FINDINGS			COMMENTS
		OK	FIXED	N/A	
GENERAL					
1	TAGGING		X		- Flow Verification by means of Coil Verification and output measurement
2					
MECHANICAL					
3	MOUNTING: Check for proper fastening, etc.	X			Coil resistance : 112.8 Ohms = passed
4	CELL: Check Operation / Slope, etc.)	X			
5	POSITION: Relative position to other components (ie. for proper flow, blanking distance), etc.	X			
6	Cleaning: Check for Staining or Deposits, etc.)				
ELECTRICAL					
7		X			
8	WIRE TAGGING: (exists and proper wire type)	X			
9	QUALITY OF CONNECTIONS:	X			
10	GROUNDING:	X			
11	SHIELDING: (check if grounded only at PLC end of wire)	X			
12	CERTIFICATION CSA, ULC:	X			
SET-UP/CALIBRATION					
DIGITAL		ADJUSTMENT USING		VERIFIED USING	
14	SETPOINT ADJUSTMENT	MECHANICAL TYPE			
		ELECTRONIC TYPE		Fluke 725 calibrator S/N 8759025	0.0 – 75.0 l/Sec = 4.00 to 20.0 mA
Configuration Parameters:		Calibration Data Test		Tolerance: 5.0%	
		Transmitter Value	SCADA Value	% Error	Status
					Notes
FIT-901		2.2 l/s	2.1 l/s	0.13%	Passed
Error (% Full Scale) = ((Transmitter Value - SCADA Value) / Full Scale) * 100 = ((2.2-2.1) / 75) *100 = 0.13 % of full scale					Checked By: Tim Stewart Cell: 613 25 9213 Email: tim.stewart@capitalcontrols.ca

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5.6 FIT-304 Raw Waste Water Flow:

FIELD EQUIPMENT VERIFICATION / CALIBRATION REPORT

DATE: July 18 2018

DESCRIPTION: Iroquois WPCP Raw Water Flow		MODEL: 7ME65204PJ132AA2		TAG: FIT-304	
MANUFACTURER : Siemens FM MAG 5100W		Serial: 192102H243			
Client Name: Township of South Stormont . Device Output Signal : 4.00 - 20.0 mA					
INSTALLATION INSPECTION					
	DESCRIPTION	FINDINGS			COMMENTS
		OK	FIXED	N/A	
GENERAL					
1	TAGGING		X		Flow verification by coil verification and output measurement
2					
MECHANICAL					
	MOUNTING: Check for proper fastening, etc.	X			
4	CELL: Check Operation / Slope, etc.)	X			
5	POSITION: Relative position to other components (ie. for proper flow, blanking distance), etc.	X			
6	Cleaning: Check for Staining or Deposits, etc.)				
ELECTRICAL					
7		X			
8	WIRE TAGGING: (exists and proper wire type)	X			
9	QUALITY OF CONNECTIONS:	X			
10	GROUNDING:	X			
11	SHIELDING: (check if grounded only at PLC end of wire)	X			
12	CERTIFICATION CSA, ULC:	X			
SET-UP/CALIBRATION					
DIGITAL		ADJUSTMENT USING		VERIFIED USING	
14	SETPOINT ADJUSTMENT	MECHANICAL TYPE			
		ELECTRONIC TYPE		Fluke 725 calibrator S/N 8759025	0.0 – 300.0 l/Sec = 4.00 to 20.0 mA
Configuration Parameters:		Calibration Data Test		Tolerance: 5.0%	
		Transmitter Value	SCADA Value	% Error	Status
FIT- 304		58.0 l/s	58.7 l/s	0.23%	Passed
Checked By: <i>Tim Stewart</i> Cell: 613 325 9213 Email: tim.stewart@capitalcontrols.ca					
Error (% Full Scale) = ((Transmitter Value – SCADA Value) / Full Scale) * 100 = ((58.0-58.7) / 300)*100 = -0.23 % of full scale					

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5.7 FIT-302 P.S Inlet Sewage Flow:

FIELD EQUIPMENT VERIFICATION / CALIBRATION REPORT

DATE: July 18 / 2018

DESCRIPTION: Iroquois WPCP Inlet Sewage Flow Elizabeth St. Pump Station				MODEL: 7ME65204PJ132AA2	TAG: FIT-302	
MANUFACTURER : Siemens FM MAG 6000W				Serial: N1D2087032		
Client Name: Township of South Stormont . Device Output Signal : 4.00 - 20.0 mA						
INSTALLATION INSPECTION						
	DESCRIPTION	FINDINGS			COMMENTS	
		OK	FIXED	N/A		FAULTY
GENERAL						
1	TAGGING		X		Flow verification by coil verification and output measurement	
2						
MECHANICAL						
	MOUNTING: Check for proper fastening, etc.	X			Coil Resistance = 99.8 Ohms = passed	
4	CELL: Check Operation / Slope, etc.)	X				
5	POSITION: Relative position to other components (ie. for proper flow, blanking distance), etc.	X				
6	Cleaning: Check for Staining or Deposits, etc.)					
ELECTRICAL						
7		X				
8	WIRE TAGGING: (exists and proper wire type)	X				
9	QUALITY OF CONNECTIONS:	X				
10	GROUNDED:	X				
11	SHIELDING: (check if grounded only at PLC end of wire)	X				
12	CERTIFICATION CSA, ULC:	X				
13						
SET-UP/CALIBRATION						
DIGITAL		ADJUSTMENT USING		VERIFIED USING		
14	SETPOINT ADJUSTMENT	MECHANICAL TYPE				
		ELECTRONIC TYPE		Fluke 725 calibrator S/N 8759025	0.0 – 400.0 l/Sec = 4.00 to 20.0 mA	
Configuration Parameters:		Calibration Data Test		Tolerance: 5.0%		
		<i>Input Variable</i>	<i>Output Variable</i>	<i>% Error</i>	<i>Status</i>	
<i>FIT-302</i>		86.1 l/Sec	86.0 l/s	0.025%	Passed	
Error (% Full Scale) = ((Transmitter Value – SCADA Value) / Full Scale) * 100 $= ((86.1 - 86.0) / 400) * 100$ $= 0.025\% \text{ of full scale}$						Checked By: <i>Tim Stewart</i> Cell: 613 325 9213 Email: tim.stewart@capitalcontrols.ca

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5.8 FIT-301 Inlet Sewage Plant Pump Station Flow

FIELD EQUIPMENT VERIFICATION / CALIBRATION REPORT

DATE: July 18 / 2018

DESCRIPTION: Iroquois Inlet Sewage Plant P.S Flow Sewage Flow		MODEL: 7ME69201AA101AA0		TAG: FIT-301	
MANUFACTURER : Siemens FM MAG 6000		Serial: N1D2087032			
Client Name: Township of South Stormont .		Device Output Signal : 4.00 - 20.0 mA			
INSTALLATION INSPECTION					
	DESCRIPTION	FINDINGS			COMMENTS
		OK	FIXED	N/A	
GENERAL					
1	TAGGING		X		- Flow Verification by means of coil verification and output measurement
2					
MECHANICAL					
3	MOUNTING: Check for proper fastening, etc.	X			Coil Resistance = 99.4 Ohms = passed
4	CELL: Check Operation / Slope, etc.)	X			
5	POSITION: Relative position to other components (ie. for proper flow, blanking distance), etc.	X			
6	Cleaning: Check for Staining or Deposits, etc.)				
ELECTRICAL					
7		X			
8	WIRE TAGGING: (exists and proper wire type)	X			
9	QUALITY OF CONNECTIONS:	X			
10	GROUNDING:	X			
11	SHIELDING: (check if grounded only at PLC end of wire)	X			
12	CERTIFICATION CSA, ULC:	X			
SET-UP/CALIBRATION					
DIGITAL		ADJUSTMENT USING		VERIFIED USING	
14	SETPOINT ADJUSTMENT	MECHANICAL TYPE			
		ELECTRONIC TYPE			Fluke 725 calibrator S/N 8759025
Configuration Parameters:		Calibration Data Test		Tolerance: 5.0%	
		Transmitter Value	SCADA Value	% Error	Status
					Notes
FIT- 301		55 l/sec	55.2 l/sec	.05%	Passed
Error (% Full Scale) = ((Transmitter Value – SCADA Value) / Full Scale) * 100 $= ((55.0 - 55.2) / 400) * 100$ $= -.05 \text{ % of full scale}$					
Checked By: Tim Stewart Cell: 613 325 9213 Email: tim.stewart@capitalcontrols.ca					

CapitalControls

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5.9 FIT-501 U.V Inlet Channel Flow:

FIELD EQUIPMENT VERIFICATION / CALIBRATION REPORT

DATE: July 18 / 2018

DESCRIPTION: Iroquois U.V Inlet Channel Flow		MODEL: 7ME65201AA101AA0		TAG: FIT-501	
MANUFACTURER : Siemens FM MAG 6000		Serial: N1D2087032			
Client Name: Township of South Stormont . Device Output Signal : 4.00 - 20.0 mA					
INSTALLATION INSPECTION					
	DESCRIPTION	FINDINGS			COMMENTS
		OK	FIXED	N/A	
GENERAL					
1	TAGGING			X	<i>Channel Configuration:</i>
2					H = 0.868m
MECHANICAL					
	MOUNTING: Check for proper fastening, etc.	X			<i>Sensor Configuration:</i>
4	CELL: Check Operation / Slope, etc.)	X			$h_{\text{Sensor}} = 0.000 \text{ m}$ (at bottom) $h_{\text{max}} = 0.868$ (max level)
5	POSITION: Relative position to other components (ie. for proper flow, blanking distance), etc.	X			Velocity = Sensor#1 Mounting = 0.000m Wedge Pos. Average = X1
6	Cleaning: Check for Staining or Deposits, etc.)				
ELECTRICAL					
7		X			Channel 1 = 0/4 mA to 20 mA
8	WIRE TAGGING: (exists and proper wire type)	X			Communications:
9	QUALITY OF CONNECTIONS:	X			Mask I/P = 255.255.255.0
10	GROUNDED:	X			Remote I/P = 192.168.000.010
11	SHIELDING: (check if grounded only at PLC end of wire)	X			Gateway = 192.168.000.001
12	CERTIFICATION CSA, ULC:	X			Calculated l/sec. = $(0.868 \times 0.900 \times (0.848 / 0.289)) \times 1000$
SET-UP/CALIBRATION					
DIGITAL		ADJUSTMENT USING		VERIFIED USING	
14	SETPOINT ADJUSTMENT	MECHANICAL TYPE			
		ELECTRONIC TYPE	Fluke 725 calibrator S/N 8759025		
Configuration Parameters: FIT-501		Calibration Data Test		Tolerance: 5%	
		Input Variable	Output Variable	% Error	Status Notes
Velocity Area					
0..155m/sec	.812 x .900 = .731 m ²	113.0 l/sec	8.48 mA	0.25%	passed
0 .172 m/sec	.817 x .900 = .735 m ²	126.9 l/sec	9.02 mA	0.31%	passed
NOTES:***Current calculated based on Display Variable 9.07 mA = $((126.9 / 400) * 16) + 4$ Error (% Full Scale) = $((\text{Measured Output} - \text{Calculated Variable}) / \text{Full Scale}) * 100$ $= ((9.02 \text{ mA} - 9.07 \text{ mA}) / 16 \text{ mA}) * 100$ $= -.31 \text{ % of full scale}$					
Checked By: Tim Stewart Cell: 613 325 9213 Email: tim.stewart@capitalcontrols.ca					