**Ontario Clean Water Agency**
**Agence Ontarienne Des Eaux**

136 Main Street East
Shelburne, Ontario
Canada L9V 3K5

TEL: 1 866 214 6987
TEL: 519 925 1938
FAX: 519 925 0322
WWW.OCWA.COM

**March 28, 2019**

**Ms. Denyse Morrissey**
**CAO**
**Town of Shelburne**
**203 Main Street East**
**Shelburne, ON**
**L9V 3K7**

**Re: 2018 Annual Performance Report for Shelburne Wastewater Treatment Plant**

Attached is the 2018 Performance Report for the **Shelburne Wastewater Treatment Plant** located at 300 Centennial Street in the Town of Shelburne. This report has been completed in accordance with the Amended Environmental Compliance Approval # 6413-ABLQQS dated July 19, 2016 and issued to the Town of Shelburne.

This report was prepared by the Ontario Clean Water Agency on behalf of the Town of Shelburne based on the information we have in our records. The report covers the period from January 1, 2018 to December 31, 2018.

If you have questions regarding the attached report please do not hesitate to contact me at (519) 925-1938.

Kind Regards,

**Don Irvine**
Senior Operations Manager
Ontario Clean Water Agency
Highlands Hub

DI/mc

Ontario Clean Water Agency
Agence Ontarienne Des Eaux

# SHELBURNE
# WASTEWATER TREATMENT PLANT

## ANNUAL PERFORMANCE REPORT

**For the period of**
**JANUARY 1, 2018 TO DECEMBER 31, 2018**

Prepared by the Ontario Clean Water Agency
For The Town of Shelburne

# Table of Contents

# 1. System Description

The Town of Shelburne is a community of approximately 8,900 people located approximately 100 kilometers northwest of Toronto. The community first obtained a waste disposal system in 1968 with the construction of a 5.5 ha lagoon and associated gravity collection and pumping system. The Town grew consistently over the years and eventually overloaded the lagoon system. In July 1981 construction was completed on a wastewater treatment system located at the present location. This expansion consisted of a new trunk sewer, pumping facilities, secondary and tertiary treatment and modifications to the existing lagoons which now provide storm and effluent holding during excess storm flows and plant upsets and maintenance.

The facility consisted of a wet well, a manual screen, grit channels, an oxidation ditch, one secondary clarifier, four effluent sand filters and a chlorine contact chamber. The oxidation ditch used two brush rotors. The facility operated as an extended aeration plant in this configuration from 1981 until December 1999.

A major expansion (Phase 1) took place at the Shelburne WWTP in 1999, changing the configuration of the plant and the method of treating wastewater. The plant went under construction starting in April 1999 with the start-up of the new process in December of 1999. The Shelburne WWTP is still an extended aeration plant. As an extended aeration plant it is designed to remove suspended solids, $CBOD_5$ and phosphorus from the wastewater. Major improvements were two aeration tanks constructed with fine bubble diffusers. The sludge treatment system consists of a two stage aerobic sludge digestion system with a total storage volume of $580m^3$, equipped with coarse bubble aeration system and supernatant decanting. The former oxidation ditch was converted to a sludge storage facility with approximately six months storage.

Sludge loading facilities provide for transfer of digested aerobic sludge to trucks. Digested sludge is land-applied as farm fertilizer.

Two ultra-violet radiation banks replaced the sodium hypochlorite disinfection system.

In March 2006 the Ministry of the Environment issued an amended Certificate of Approval # 9046-6GAJUM for the Phase 2 extension and upgrading including;

- Construction of a hauled sewage receiving station;
- Replacement of the raw sewage pumping station - two submersible pumps;
- Replacement of the inlet works;
- Construction of a secondary clarifier ;
- Replacement of the clarifier effluent pump system; and
- Reconfiguration of the stormwater and effluent holding ponds.

In 2017 the Ministry of the Environment and Climate Change issued an amended Environmental Compliance Approval #6413-ABLQQS for upgrading of the filtration and standby power which included;

- Two cloth-filter treatment units with a design capacity of 4,400 $m^3$ each
- One 650 kW standby power diesel generator and 9000L diesel tank with double-walled containment

This facility receives residential, commercial, institutional and industrial wastewater and provides a level of treatment to meet the amended "Environmental Compliance Approval - # 6413-ABLQQS" for discharging into the Beasley Drain a minor tributary of the Boyne River. The Boyne Creek empties into the Nottawasaga River, ultimately meeting Georgian Bay.

A "Process Flow Schematic" is included in Appendix D of this report.

An overview of Shelburne Wastewater Treatment Plant can be found in Table 1:

**Table 1.** Shelburne Wastewater Treatment Plant Overview

| | |
|---|---|
| **Facility Name** | Shelburne Wastewater Treatment Plant |
| **Facility Type** | Extended Air STP with Tertiary Treatment |
| **Plant Classification** | WWT III |
| **Works Number** | 110000659 |
| **Design Capacity** | 3,420 $m^3$/day |
| **Receiving Water** | Besley Drain to Boyne Creek to Nottawasaga River |
| **Certificate of Approval** | 6413-ABLQQS (Sewage Treatment Plant) |

## 2. Monitoring Data and Comparison to Effluent Limits

As per Section 6a of ECA 6413-ABLQQS, *a summary and interpretation of all monitoring data and a comparison to the effluent limits outlined in Effluent Limits of Condition 7, including an overview of the success and adequacy of the Works* is required.

### 2.1 Sampling Frequency

Hauled sewage, raw sewage, and final effluent are sampled on a regular basis. The sampling types and frequencies are summarized in Tables 2, 3 and Table 4. The sampling frequencies meet the requirements set out in Section 9 of ECA 6413-ABLQQS.

**Table 2. Hauled Sewage** Monitoring – Sampling Frequencies

| Parameter | Sample Type | Frequency |
|---|---|---|
| BOD5 | Grab | Monthly |
| Total Suspended Solids | Grab | Monthly |
| Total Phophorus | Grab | Monthly |
| Total Kjeldahl Nitrogen | Grab | Monthly |

**Table 3.** Raw Sewage Monitoring – Sampling Frequencies

| Parameter | Sample Type | Frequency |
|---|---|---|
| $BOD_5$* | Composite | Monthly |
| Total Suspended Solids* | Composite | Monthly |
| Total Phosphorous* | Composite | Monthly |
| Total Kjeldahl Nitrogen* | Composite | Monthly |

*Refer to Appendix A for monthly sample results.

**Table 4.** Effluent Sampling Monitoring – Sampling Frequencies

| Parameters | Sample Type | Frequency |
|---|---|---|
| $CBOD_5$* | Composite | Weekly |
| Total Suspended Solids* | Composite | Weekly |
| Total Phosphorous* | Composite | Weekly |
| Total Ammonia Nitrogen* | Composite | Weekly |
| E. Coli* | Grab | Weekly |
| pH | Grab/Probe | Weekly |
| Temperature | Grab/Probe | Weekly |

*Refer to Appendix A for monthly sample results.

## 2.2 Effluent Objectives and Effluent Limits

The effluent objectives as per Section 6 of ECA 6413-ABLQQS for the Shelburne Wastewater Treatment Plant are:

**Table 5.** Effluent Objectives as per Section 6 of ECA 6413-ABLQQS

| Effluent Parameter | Concentration Objective (mg/L) |
|---|---|
| $CBOD_5$ | 4.0 |
| Total Suspended Solids | 4.0 |
| Total Phosphorous | 0.12 |
| Total Ammonia Nitrogen<br>June 01 to Sept 30<br>Oct 01 to May 31 | <br>0.5<br>2.0 |
| E-coli | 150 organisms /100 mL (monthly Geometric Mean Density) |
| pH of the effluent to be maintained between 6.5 to 8.5, inclusive, at all times | |

The effluent limits that are to be met as per Section 7 of ECA 6413-ABLQQS for the Shelburne Wastewater Treatment Plant are found in Table 5. Any exceedance with the limits found in Table 5 constitutes a non-compliance with ECA 6413-ABLQQS.

**Table 6.** Effluent Limits as per Section 7 of ECA 6413-ABLQQS

| Effluent Parameter | Average Concentration Limit (mg/L) | Average Waste Loading Limit (kg/day) |
|---|---|---|
| $CBOD_5$ | 5.0 | 17.1 |
| Total Suspended Solids | 5.0 | 17.1 |
| Total Phosphorous | 0.25 | 0.86 |
| Total Ammonia Nitrogen<br>Jun 01 to Sep 30<br>Oct 01 to May 31 | <br>0.8<br>2.4 | <br>2.7<br>8.2 |
| E-coli | 200 organisms /100 mL (monthly Geometric Mean Density) | n/a |
| pH of the effluent to be maintained between 6.0 to 9.5, inclusive, at all times | | |

## 2.3 Comparison of Data to Effluent Objectives and Effluent Limits

Analytical and monitoring data for the Shelburne Wastewater Treatment Facility is stored in OCWAs data management system (PDM). Annual and monthly averages for flows, CBOD, $BOD_5$, Suspended Solids, Total Phosphorous, Nitrogen-series and E.coli can be found in Appendix A. A comparison of analytical data from effluent samples to the effluent objectives and effluent limits shown in the below Tables 7-11:

**Table 7.**

| | $CBOD_5$ | | | | | |
|---|---|---|---|---|---|---|
| | Monthly Average Concentration (mg/L) | Within Objectives (4.0 mg/L) | Within Limits (5.0 mg/L) | Monthly Average Loading (kg/d) | Within Objectives ( kg/d) | Within Limits (17.1 kg/d) |
| **January** | <2.00 | Yes | Yes | <4.99 | n/a | Yes |
| **February** | <2.75 | Yes | Yes | <6.94 | n/a | Yes |
| **March** | <2.00 | Yes | Yes | <4.35 | n/a | Yes |
| **April** | <2.38 | Yes | Yes | <7.15 | n/a | Yes |
| **May** | <2.00 | Yes | Yes | <5.19 | n/a | Yes |
| **June** | <2.00 | Yes | Yes | <4.86 | n/a | Yes |
| **July** | <2.75 | Yes | Yes | <7.11 | n/a | Yes |
| **August** | <2.25 | Yes | Yes | <5.00 | n/a | Yes |
| **September** | <2.00 | Yes | Yes | <3.88 | n/a | Yes |
| **October** | <2.60 | Yes | Yes | <6.26 | n/a | Yes |
| **November** | <2.00 | Yes | Yes | <5.27 | n/a | Yes |
| **December** | <2.50 | Yes | Yes | <6.87 | n/a | Yes |

**Table 8.**

| | Total Suspended Solids | | | | | |
|---|---|---|---|---|---|---|
| | Monthly Average Concentration (mg/L) | Within Objectives (4.0 mg/L) | Within Limits (5.0 mg/L) | Monthly Average Loading (kg/d) | Within Objectives ( kg/d) | Within Limits (17.1 kg/d) |
| **January** | <2.20 | Yes | Yes | <5.49 | n/a | Yes |
| **February** | <2.00 | Yes | Yes | <5.05 | n/a | Yes |
| **March** | <2.00 | Yes | Yes | <4.35 | n/a | Yes |
| **April** | <2.00 | Yes | Yes | <6.02 | n/a | Yes |
| **May** | <2.40 | Yes | Yes | <6.22 | n/a | Yes |
| **June** | 3.75 | Yes | Yes | 9.12 | n/a | Yes |
| **July** | 2.75 | Yes | Yes | 7.11 | n/a | Yes |
| **August** | <2.25 | Yes | Yes | <5.00 | n/a | Yes |
| **September** | <2.00 | Yes | Yes | <3.88 | n/a | Yes |
| **October** | <2.60 | Yes | Yes | <6.26 | n/a | Yes |
| **November** | <2.00 | Yes | Yes | <5.27 | n/a | Yes |
| **December** | <2.00 | Yes | Yes | <5.50 | n/a | Yes |

**Table 9.**

| | Total Phosphorus | | | | | |
|---|---|---|---|---|---|---|
| | Monthly Average Concentration (mg/L) | Within Objectives (0.12 mg/L) | Within Limits (0.25 mg/L) | Monthly Average Loading (kg/d) | Within Objectives ( kg/d) | Within Limits (0.86 kg/d) |
| **January** | 0.06 | Yes | Yes | 0.15 | n/a | Yes |
| **February** | 0.04 | Yes | Yes | 0.10 | n/a | Yes |
| **March** | 0.04 | Yes | Yes | 0.08 | n/a | Yes |
| **April** | 0.04 | Yes | Yes | 0.12 | n/a | Yes |
| **May** | 0.04 | Yes | Yes | 0.11 | n/a | Yes |
| **June** | 0.04 | Yes | Yes | 0.11 | n/a | Yes |
| **July** | 0.05 | Yes | Yes | 0.12 | n/a | Yes |
| **August** | 0.04 | Yes | Yes | 0.08 | n/a | Yes |
| **September** | 0.03 | Yes | Yes | 0.05 | n/a | Yes |
| **October** | 0.05 | Yes | Yes | 0.13 | n/a | Yes |
| **November** | 0.05 | Yes | Yes | 0.12 | n/a | Yes |
| **December** | 0.03 | Yes | Yes | 0.09 | n/a | Yes |

**Table 10.**

| | Total Ammonia Nitrogen (Ammonia Nitrogen + Ammonium Nitrogen) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Monthly Average Concentration (mg/L) | Within Objectives (Jun 01-Sept 30 0.5 mg/L) | Within Objectives (Oct 01-May 31 2.0 mg/L) | Within Limits (Jun 01-Sept 30 0.8 mg/L) | Within Limits (Oct 01-May 31 2.4 mg/L) | Monthly Average Loading (kg/d) | Within Objectives (Dec 01-Apr 30 kg/d) | Within Objectives (May 01-Nov 30 kg/d) | Within Limits (June 01-Sept 30 2.7 kg/d) | Within Limits (Oct 01-May 31 8.2 kg/d) |
| **January** | <0.32 | n/a | Yes | n/a | Yes | <0.80 | n/a | n/a | n/a | Yes |
| **February** | <1.00 | n/a | Yes | n/a | Yes | <2.52 | n/a | n/a | n/a | Yes |
| **March** | <1.78 | n/a | Yes | n/a | Yes | <3.86 | n/a | n/a | n/a | Yes |
| **April** | <1.94 | n/a | Yes | n/a | Yes | <5.83 | n/a | n/a | n/a | Yes |
| **May** | <0.62 | n/a | Yes | n/a | Yes | <1.61 | n/a | n/a | n/a | Yes |
| **June** | <0.20 | Yes | n/a | Yes | n/a | <0.49 | n/a | n/a | Yes | n/a |
| **July** | <0.10 | Yes | n/a | Yes | n/a | <0.26 | n/a | n/a | Yes | n/a |
| **August** | <0.57 | No | n/a | Yes | n/a | <1.27 | n/a | n/a | Yes | n/a |
| **September** | <0.61 | No | n/a | Yes | n/a | <1.19 | n/a | n/a | Yes | n/a |
| **October** | <0.20 | n/a | Yes | n/a | Yes | <0.48 | n/a | n/a | n/a | Yes |
| **November** | <0.13 | n/a | Yes | n/a | Yes | <0.33 | n/a | n/a | n/a | Yes |
| **December** | <1.52 | n/a | Yes | n/a | Yes | 4.17 | n/a | n/a | n/a | Yes |

**Table 11.**

| | E.coli | | |
|---|---|---|---|
| | Monthly Geometric Mean Density (Counts/100mL) | Within Objectives (100 counts/100mL) | Within Limits (200 counts/100mL) |
| **January** | 2.49 | Yes | Yes |
| **February** | 14.97 | Yes | Yes |
| **March** | 2.00 | Yes | Yes |
| **April** | 3.89 | Yes | Yes |
| **May** | 3.48 | Yes | Yes |
| **June** | 3.56 | Yes | Yes |
| **July** | 4.64 | Yes | Yes |
| **August** | 2.00 | Yes | Yes |
| **September** | 5.64 | Yes | Yes |
| **October** | 2.17 | Yes | Yes |
| **November** | 3.13 | Yes | Yes |
| **December** | 4.47 | Yes | Yes |

## 2.4 Additional Monitoring Parameters

The following parameters in Table 12 do not have limits or objectives but are monitored on a regular basis (see Section 2.1 for sampling frequency) as required by ECA 6413-ABLQQS. Table 12 and Table 13 summarize the monitoring data for the reporting period.

Raw Sewage Quality:

**Table 12.** Raw Sewage Monitoring Parameters as required by ECA 6413-ABLQQS for Shelburne Wastewater Treatment Plant, 2018

| Parameter | Average | Minimum | Maximum |
|---|---|---|---|
| $BOD_5$* (mg/L) | 371.250 | 236.000 | 490.000 |
| Total Suspended Solids* (mg/L) | 551.583 | 262.000 | 1,010.000 |
| Total Phosphorous* (mg/L) | 7.322 | 4.600 | 10.500 |
| Total Kjeldahl Nitrogen* (mg/L) | 48.533 | 22.200 | 93.500 |

*Refer to Appendix A for monthly sample results.

Effluent Limits:

**Table 13.** Effluent Monitoring Parameters as required by ECA 6413-ABLQQS for Shelburne Treatment Plant, 2018

| Parameters | Average | Minimum | Maximum | Average Annual Loading |
|---|---|---|---|---|
| $CBOD_5$ | <2.27 | <2.00 | <2.75 | <5.66 |
| Total Suspended Solids | <2.33 | <2.00 | 3.75 | <5.773 |
| Total Phosphorus | 0.04 | 0.03 | 0.06 | 0.104 |
| Total Ammonia Nitrogen (Jun 1-Sept 30) | <0.37 | <0.10 | 7 | - |
| Total Ammonia Nitrogen (Oct 1- May 31) | <0.94 | <0.10 | <9.8 | - |
| E.Coli | 4.37 | 2.00 | 14.967 | - |
| pH | 7.78 | 7.31 | 8.07 | - |
| Temperature | 11.22 | 5.4 | 22.1 | - |

*Refer to Appendix A for monthly sample results.

**Table 14.** Hauled Sewage Monitoring

| Parameter | Average | Minimum | Maximum |
|---|---|---|---|
| $BOD_5$ (mg/L) | 3084 | 798 | 8870 |
| Total Suspended Solids (mg/L) | 13,202.22 | 3,150 | 46,700 |
| Total Phosphorous (mg/L) | 148.43 | 33.4 | 490 |
| Total Kjeldahl Nitrogen (mg/L) | 628.78 | 227 | 2000 |

### 2.5 Overview of Success and Adequacy of the Works;

The annual average effluent $CBOD_5$ concentration was 2.27 mg/L with a removal efficiency of 99.48%. The annual average effluent TSS concentration was 2.33 mg/L with a removal efficiency of 99.78%. The annual average effluent Total Phosphorus concentration was 0.04 mg/L with a removal efficiency of 99.64%.

The bacteriological quality of the effluent complied with the certificate of approval requirement of <200 organisms per 100 ml sample. The annual geometric mean density of organisms for 2018 was 4.369 per 100 ml, indicating extremely effective effluent disinfection.

The total raw sewage volume of wastewater treated in 2018 was 905,276.20 $m^3$. The annual average daily flow of raw sewage was 2,480.81 $m^3$/day was 72.5 % of the design flow (3,420 $m^3$/day). The maximum peak flow of 4,467.80 $m^3$/day occurred on January 12, 2018 due to higher then seasonal temperatures which resulted in rapid snow melt and heavy precipitation. This represents a peak flow of 1.3 times the rated capacity. The wastewater treatment plant operated within the rated capacity 94.5%% of the time (345 out of 365 days of the year)

## 3. Operating Problems and Corrective Actions

As per Section 6b of ECA 6413-ABLQQS, *a description of any operating problems encountered and corrective actions taken* is required.

There were no operating problems encountered or corrective actions required at the Shelburne Wastewater Treatment Plant during 2018 that affected the quality of the effluent leaving the plant. All repairs/maintenance can be found in Section 4.

## 4. Major Maintenance Activities

As per 6c of ECA 6413-ABLQQS, *a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanisms or thing forming part of the works* is required.

For 2018, major maintenance activities that occurred include:

Plant maintenance, including non-scheduled maintenance is monitored using Maximo Workplace Management System. All routine and preventative maintenance was conducted as scheduled in 2018.

- Belwood Electric on-site to replace fan in VFD drive for raw sewage pump #1
- Peter Chung of Selog on-site regarding feedback issue with PLC4, issue corrected
- Belwood Electric on-site issues with soft start on blower #2
- Caldecott Millwright on-site to remove and refurbish mechanical seal on bar screen auger
- Hetek onsite to calibrate gas detectors
- Wessuc/Terrain onsite for East Storm Pond Clean Out
- Belwood Electric onsite blower #4 motor issues, swapped motor 4 for motor 3, motor 4 not needed pending future blower upgrade
- Caldecott Millwright on-site to put rental raw sewage pump in
- Cummins on-site for full bi-annual generator service
- Belwood Electric on-site, Milltronics level sensor replaced on biosolids tank
- Caldecott Millwright on-site for south clarifier repairs
- Meehan's Industrial (contracted by Directrik) on-site to remove RAS pump 1 for repair

## 5. Effluent Quality Assurance and Control

As per 6d of ECA 6413-ABLQQS, *a summary of any effluent quality assurance or control measures undertaken in the reporting period* is required:

All laboratory analyzed raw sewage and effluent samples (Section 2.1) are analyzed by SGS Canada Inc., which is an ISO 17025 accredited laboratory. In-house tests are conducted for monitoring purposes by licensed operators using standardized methods. The results from in-house tests are used to determine treatment efficiency and to effectively maintain process control. Calibrations and preventative maintenance are performed on facility equipment and monitoring equipment, see Section 4 for more details. In addition to sample analysis, preventative maintenance is scheduled for 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 in the work management system Maximo.

Operation by Licensed Operators: This sewage system is operated and maintained by the OCWA's licensed staff. The mandatory licensing program for operators of sewage treatment facilities in Ontario is regulated under the Ontario Water Resources Act (OWRA) Ontario Regulation 129/04. A licensed individual meets the education and experience requirements and has successfully passed the licensing exam.

The following are certified operators who operated this facility during 2018 with current certified classification, certificate numbers and certificate expiry dates.

**Table 15.**

| Operator | Level | Certificate # | Expiry Date |
|---|---|---|---|
| Alex Solomonov | WWT 2<br>WWC 2 | 49144<br>16652 | Jul 31, 2021<br>Jan 31, 2021 |
| Bill Smith | WWT 2<br>WWC 1 | 65685<br>Deemed | Aug 31, 2020<br>Aug 31, 2020 |
| Curtis Parker | WWT 4<br>WWC 3 | 79166<br>79167 | Mar 31, 2022<br>Jul 31, 2021 |
| Emanuel Castro | WWT 1<br>WWC 1 | 95067<br>102934 | Oct 31, 2019<br>Nov 30, 2021 |

## 6. Calibration and Maintenance Procedures

As per 6e of ECA 6413-ABLQQS, *a summary of the calibration and maintenance carried out on all effluent monitoring equipment* is required.

All in-house monitoring equipment is calibrated/verified 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.

Flowmetrix Technical Services Inc. was contracted to calibrate flow measuring equipment on September 19, 2018. Copies of these calibration reports can be found in Appendix C of this report.

## 7. Efforts and Results Achieved in Meeting Effluent Objectives

As per 6f of ECA 6413-ABLQQS, *a description of efforts made and results achieved in meeting the Effluent Objectives of Condition 6* is required.

Condition 6 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 Condition 7 are exceeded."

OCWA as the Operating Authority (on behalf of the Owner) 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 7-11 of section 2.3 of this report. These results show that sewage treatment operations for 2018 provided effluent quality that was within all effluent objectives outlined in the ECA and minimized environmental impairment.

## 8. Sludge Generation

As per 6g of ECA 6413-ABLQQS, *a tabulation of the volume of sludge generated in the reporting period, 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* is required.

Digested sludge produced at the Shelburne WWTP is land-applied in accordance with the Nutrient Management Act 2002 and Ontario Regulation 267/03.

Grab samples of digested (aerobic) sludge are collected and tested as per these requirements. In 2018 sludge sample analysis were carried out by SGS Lakefield Research Limited. A summary of sludge sample results is provided in Appendix B of this report.

Wessuc Environmental Services Inc. was contracted to haul and spread sludge from the Shelburne plant in 2018. (Certificate of Approval - Waste Management System # 1603-4LGJBN)

The following certified sites were utilized in 2018:

**Table 11.** Volume of Sludge Generated from Shelburne Wastewater Treatment Plant in 2018

| Site | Site Location | Volume of Biosolids ($m^3$) | Hauler |
|---|---|---|---|
| NASM Submission ID: 23344 | D2003 | 3,781 | Wessuc |
| NASM Submission ID: 23284 | W1003 | 721 | Wessuc |
| NASM Submission ID: 23284 | S4006 | 129 | Wessuc |
| NASM Submission ID: 23002 | W1001 | 654 | Wessuc |
| NASM Submission ID: 23461 | D1002 | 2,083 | Wessuc |

A total volume of 7,368 $m^3$ of sludge was applied to the above fields from the Shelburne WWTP in 2018.

Based on the design flow and average wastewater quantity and a linear regression with an $R^2$ value of 88.07% the anticipated volume of sludge generated for 2019 would be approximately 7,554 $m^3$.

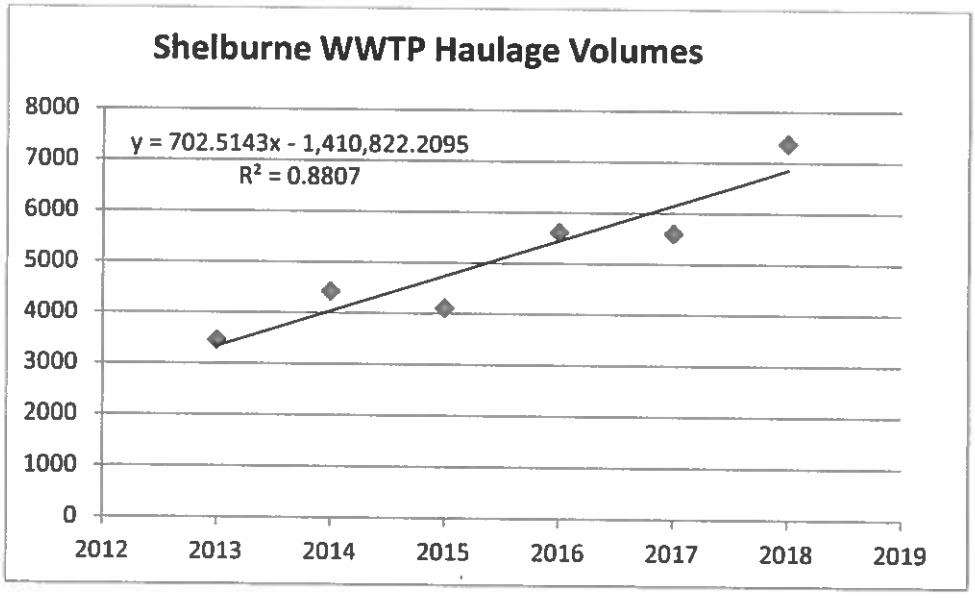



**Figure 1.** Shelburne Wastewater Treatment Plant Haulage Volumes (2013 to 2018)

## 9. Complaints

As per 6h of ECA 6413-ABLQQS, *a summary of any complaints received during the reporting period and any steps taken to address the complaints* is required.

A standard operating procedure (SOP) is in place for addressing complaints received from the community. All complaints are addressed and documented in the facility logbook. Community complaint information is entered in OCWA's electronic database system "OPEX". This system contains all the required information and history of all complaints.

No complaints were received during this reporting period with regard to the Shelburne Wastewater Treatment Plant.

## 10. By-pass, Spill or Abnormal Discharge Events

As per 6i of ECA 6413-ABLQQS, *a summary of all By-pass, spill or abnormal discharge events* is required.

There were no bypasses, spills or abnormal discharge events at the Shelburne Wastewater Treatment Plant during the reporting period.

## 11. Notice of Modifications

As per 6j of ECA 6413-ABLQQS, *a copy of all Notice of Modifications submitted to the Water Supervisor as a result of Schedule B, Section 1, with a status report on the implementation of each modification* is required.

There were no modifications at the Shelburne Wastewater Treatment Plant during the reporting period.

## 12. Summary of Completed Modifications

As per 6k of ECA 6413-ABLQQS, *a report summarizing all modifications completed as a result of Schedule B, Section 3* is required.

There were no modifications at the Shelburne Wastewater Treatment Plant during the reporting period.

## 13. Additional Information

As per 6l of ECA 6413-ABLQQS, *any other information the Water Supervisor requires from time to time* is required.

There were no requests from the Water Supervisor for any other information during the reporting period.

# Appendix A

# Performance Assessment Report

# 2018

Ontario Clean Water Agency
Performance Assessment Report Wastewater/Lagoon

Report extracted 03/28/2019 11:54

From: 01/01/2018 to 31/12/2018

Facility: [5773] SHELBURNE WASTEWATER TREATMENT FACILITY

Works: [110000658]

| | 01/2018 | 02/2018 | 03/2018 | 04/2018 | 05/2018 | 06/2018 | 07/2018 | 08/2018 | 09/2018 | 10/2018 | 11/2018 | 12/2018 | <--Total--> | <--Avg --> | <--Max --> |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Flows:** | | | | | | | | | | | | | | | |
| **Raw Flow: Total - Raw Sewage (m³)** | 77368.80 | 70671.00 | 67431.10 | 90256.40 | 80396.90 | 72950.60 | 80170.20 | 68929.10 | 58178.10 | 74659.90 | 79040.80 | 85225.50 | 905278.20 | | |
| **Raw Flow: Avg - Raw Sewage (m³/d)** | 2495.70 | 2523.96 | 2175.20 | 3008.55 | 2593.45 | 2431.69 | 2586.14 | 2223.52 | 1939.27 | 2408.38 | 2634.69 | 2749.21 | | 2480.81 | |
| **Raw Flow: Max - Raw Sewage (m³/d)** | 4467.80 | 3965.80 | 2747.20 | 4010.20 | 3485.70 | 3089.40 | 3443.00 | 3106.10 | 2476.80 | 3065.30 | 3648.40 | 3819.40 | | | 4467.80 |
| **Eff. Flow: Total - Final Effluent (m³)** | 77368.80 | 70671.00 | 67431.10 | 90256.40 | 80396.90 | 72950.60 | 80170.20 | 68929.10 | 58178.10 | 74659.90 | 79040.80 | 85225.50 | 905278.20 | | |
| **Eff. Flow: Avg - Final Effluent (m³/d)** | 2495.70 | 2523.96 | 2175.20 | 3008.55 | 2593.45 | 2431.69 | 2586.14 | 2223.52 | 1939.27 | 2408.38 | 2634.69 | 2749.21 | | 2480.81 | |
| **Eff. Flow: Max - Final Effluent (m³/d)** | 4467.80 | 3965.80 | 2747.20 | 4010.20 | 3485.70 | 3089.40 | 3443.00 | 3106.10 | 2476.80 | 3065.30 | 3648.40 | 3819.40 | | | 4467.80 |
| **Carbonaceous Biochemical Oxygen Demand: CBOD:** | | | | | | | | | | | | | | | |
| **Raw: Avg cBOD5 - Raw Sewage (mg/L)** | 383.000 | 391.000 | 382.000 | 369.000 | 278.000 | 262.000 | 334.000 | 354.000 | 231.000 | 231.000 | 229.000 | 192.000 | | 304.583 | 391.000 |
| **Raw: # of samples of cBOD5 - Raw Sewage (mg/L)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 12 | | |
| **Eff: Avg cBOD5 - Final Effluent (mg/L)** | < 2.000 | < 2.750 | < 2.000 | < 2.375 | < 2.000 | < 2.000 | < 2.750 | < 2.250 | < 2.000 | < 2.800 | < 2.000 | < 2.500 | | < 2.269 | < 2.750 |
| **Eff: # of samples of cBOD5 - Final Effluent (mg/L)** | 5 | 4 | 4 | 8 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 55 | | |
| **Loading: cBOD5 - Final Effluent (kg/d)** | < 4.991 | < 6.941 | < 4.350 | < 7.145 | < 5.187 | < 4.863 | < 7.112 | < 5.003 | < 3.879 | < 6.262 | < 5.269 | < 6.873 | | < 5.656 | < 7.145 |
| **Percent Removal: cBOD5 - Final Effluent (mg/L)** | 99.478 | 99.297 | 99.478 | 99.389 | 99.281 | 99.237 | 99.177 | 99.364 | 99.134 | 98.874 | 99.127 | 98.998 | | | 99.478 |
| **Biochemical Oxygen Demand: BOD5:** | | | | | | | | | | | | | | | |
| **Raw: Avg BOD5 - Raw Sewage (mg/L)** | 470.000 | 490.000 | 466.000 | 447.000 | 328.000 | 315.000 | 261.000 | 418.000 | 454.000 | 238.000 | 258.000 | 314.000 | | 371.250 | 490.000 |
| **Raw: # of samples of BOD5 - Raw Sewage (mg/L)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 12 | | |
| **Eff: Avg BOD5 - Final Effluent (mg/L)** | < 2.000 | < 2.000 | 3.000 | < 2.000 | 2.000 | < 2.000 | < 2.000 | 2.000 | < 2.000 | < 2.000 | 4.000 | 2.000 | | < 2.250 | 4.000 |
| **Loading: BOD5 - Final Effluent (kg/d)** | < 4.991 | < 5.048 | 6.526 | < 6.017 | 5.187 | < 4.863 | < 5.172 | 4.447 | < 3.879 | < 4.817 | 10.539 | 5.498 | | < 5.582 | 10.539 |
| **Percent Removal: BOD5 - Final Effluent (mg/L)** | 99.574 | 99.592 | 99.356 | 99.553 | 99.390 | 99.365 | 99.234 | 99.522 | 99.559 | 99.153 | 98.438 | 99.363 | | | 99.592 |
| **Total Suspended Solids: TSS:** | | | | | | | | | | | | | | | |
| **Raw: Avg TSS - Raw Sewage (mg/L)** | 788.000 | 700.000 | 732.000 | 807.000 | 392.000 | 262.000 | 497.000 | 1010.000 | 548.000 | 269.000 | 350.000 | 258.000 | | 551.583 | 1010.000 |
| **Raw: # of samples of TSS - Raw Sewage (mg/L)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 12 | | |
| **Eff: Avg TSS - Final Effluent (mg/L)** | < 2.200 | < 2.000 | < 2.000 | < 2.000 | < 2.400 | 3.750 | 2.750 | < 2.250 | < 2.000 | < 2.800 | < 2.000 | < 2.000 | | < 2.329 | 3.750 |
| **Eff: # of samples of TSS - Final Effluent (mg/L)** | 5 | 4 | 4 | 8 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 55 | | |
| **Loading: TSS - Final Effluent (kg/d)** | < 5.491 | < 5.048 | < 4.350 | < 6.017 | < 6.224 | 9.119 | 7.112 | < 5.003 | < 3.879 | < 6.262 | < 5.269 | < 5.498 | | < 5.773 | 9.119 |
| **Percent Removal: TSS - Final Effluent (mg/L)** | 99.720 | 99.714 | 99.727 | 99.752 | 99.388 | 98.569 | 99.447 | 99.777 | 99.634 | 99.033 | 99.429 | 99.254 | | | 99.777 |
| **Total Phosphorus: TP:** | | | | | | | | | | | | | | | |
| **Raw: Avg TP - Raw Sewage (mg/L)** | 7.780 | 8.510 | 8.800 | 9.120 | 5.700 | 9.610 | 10.500 | 9.760 | 5.880 | 5.580 | 5.040 | 4.600 | | 7.322 | 10.500 |
| **Raw: # of samples of TP - Raw Sewage (mg/L)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 12 | | |
| **Eff: Avg TP - Final Effluent (mg/L)** | 0.081 | 0.040 | 0.037 | 0.040 | 0.041 | 0.043 | 0.048 | 0.035 | 0.029 | 0.052 | 0.048 | 0.031 | | 0.042 | 0.081 |
| **Eff: # of samples of TP - Final Effluent (mg/L)** | 5 | 4 | 4 | 8 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 55 | | |
| **Loading: TP - Final Effluent (kg/d)** | 0.152 | 0.100 | 0.081 | 0.121 | 0.106 | 0.105 | 0.123 | 0.078 | 0.050 | 0.126 | 0.121 | 0.086 | | 0.104 | 0.152 |
| **Percent Removal: TP - Final Effluent (mg/L)** | 99.219 | 99.533 | 99.577 | 99.560 | 99.281 | 99.349 | 99.548 | 99.639 | 99.558 | 99.058 | 99.087 | 99.321 | | | 99.639 |
| **Nitrogen Series:** | | | | | | | | | | | | | | | |
| **Raw: Avg TKN - Raw Sewage (mg/L)** | 61.000 | 93.500 | 58.100 | 56.900 | 33.200 | 45.500 | 63.900 | 43.100 | 38.300 | 26.300 | 30.400 | 22.200 | | 48.533 | 93.500 |
| **Raw: # of samples of TKN - Raw Sewage (mg/L)** | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 12 | | |
| **Eff: Avg TAN - Final Effluent (mg/L)** | < 0.320 | < 1.000 | < 1.775 | < 1.938 | < 0.620 | < 0.200 | < 0.100 | < 0.571 | < 0.614 | < 0.200 | < 0.125 | 1.517 | | < 0.748 | 1.938 |
| **Eff: # of samples of TAN - Final Effluent (mg/L)** | 5 | 4 | 4 | 8 | 5 | 4 | 4 | 7 | 14 | 5 | 4 | 8 | 70 | | |
| **Loading: TAN - Final Effluent (kg/d)** | < 0.799 | < 2.524 | < 3.861 | < 5.829 | < 1.608 | < 0.486 | < 0.258 | < 1.271 | < 1.191 | < 0.482 | < 0.329 | 4.170 | | < 1.901 | 5.829 |
| **Eff: Avg NO3-N - Final Effluent (mg/L)** | 6.282 | 3.170 | 3.043 | 7.065 | 14.940 | 17.778 | 13.475 | 3.810 | 5.102 | 9.286 | 10.663 | 5.695 | | 8.361 | 17.778 |
| **Eff: # of samples of NO3-N - Final Effluent (mg/L)** | 5 | 4 | 4 | 8 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 55 | | |
| **Eff: Avg NO2-N - Final Effluent (mg/L)** | < 0.064 | 0.123 | 0.272 | < 0.063 | 0.190 | < 0.078 | < 0.053 | 0.232 | < 0.088 | < 0.038 | < 0.033 | 0.090 | | < 0.113 | 0.272 |
| **Eff: # of samples of NO2-N - Final Effluent (mg/L)** | 5 | 4 | 4 | 8 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 55 | | |
| **Disinfection:** | | | | | | | | | | | | | | | |
| **Eff: GMD E. Coli - Final Effluent (cfu/100mL)** | 2.491 | 14.967 | 2.000 | 3.866 | 3.482 | 3.557 | 4.841 | 2.000 | 5.635 | 2.189 | 3.130 | 4.472 | | 4.389 | 14.967 |
| **Eff: # of samples of E. Coli - Final Effluent (cfu/100mL)** | 5 | 4 | 4 | 6 | 5 | 4 | 4 | 4 | 4 | 5 | 4 | 4 | 53 | | |

# Appendix B

# Sludge Haulage Summary & Sludge Quality

# 2018

| Shelburne WWTP - Daily Haulage Summary | | | |
|---|---|---|---|
| **Date** | **Site** | **NASM #** | **Sludge Hauled** |
| **May** | | | |
| **5/11/18** | D2003 | 23344 | 1,081 |
| **5/14/18** | D2003 | 23344 | 1,125 |
| **5/16/18** | D2003 | 23344 | 540 |
| **5/17/18** | D2003 | 23344 | 900 |
| **5/18/18** | D2003 | 23344 | 135 |
| **5/24/18** | W1003 | 23284 | 376 |
| **5/25/18** | W1003 | 23284 | 345 |
| **5/25/18** | S4006 | 23284 | 129 |
| **5/28/18** | W1001 | 23002 | 523.5 |
| **5/29/18** | W1001 | 23002 | 130.5 |
| **Total** | **m3** | | **5,285** |
| **September** | | | |
| **9/27/18** | D1002 | 23461 | 965 |
| **9/28/18** | D1002 | 23461 | 1,118 |
| **Total** | **m3** | | **2,083** |
| **Annual** | | | **7,368** |

Ontario Clean Water Agency
Biosolids Quality Report - Liquid
Digestor Type: AEROBIC
Solids and Nutrients

Facility: SHELBURNE WASTEWATER TREATMENT FACILITY
Works: 5773
Period: 01/01/2018 to 12/01/2018

Facility Works Number: *1.10000659EB*
Facility Name: *SHELBURNE WASTEWATER TREATMENT FACILITY*
Facility Owner: *Corporation/Company: The Corporation of the Town of Shelburne*
Facility Classification: *Class 3 Wastewater Treatment*
Receiver: *Besley Drain to Boyne Creek*
Service Population: *7900.0*
Total Design Capacity: *3420.0 m3/day*
Period Being Reported: 01/01/2018 12/01/2018

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

| Month | Total Sludge Hauled (m3) | Avg. Total Solids (mg/L) | Avg. Volatile Solids (mg/L) | Avg. Total Phosphorus (mg/L) | Ammonia (mg/L) | Nitrate (mg/L) | Nitrite (mg/L) | TKN (mg/L) | Ammonia + Nitrate (mg/L) | Potassium (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|
| Site | SHELBURNE WASTEWATER TREATMENT FACILITY | | | | | | | | | |
| Station | Bslq Station only | | | | | | | | | |
| Parameter Short Name | HauledVol | TS | VS | TP | NH3p_NH4p_N | NO3-N | NO2-N | TKN | calculation in report - no T/S | 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 | Lab Published Month Mean | | Lab Published Month Mean |
| Jan | | 30,300.000 | | 450.000 | 332.000 | 0.300 | 1.000 | 1,400.000 | 166.150 | 91.000 |
| Feb | | 30,000.000 | | 550.000 | 264.000 | 0.300 | 1.400 | 1,780.000 | 132.150 | 100.000 |
| Mar | | 39,350.000 | | 665.000 | 329.500 | 0.300 | 0.800 | 1,970.000 | 164.900 | 115.000 |
| Apr | | 37,450.000 | | 615.000 | 350.500 | 0.300 | 0.850 | 2,085.000 | 175.400 | 105.000 |
| May | 5,457.000 | 36,200.000 | | 600.000 | 367.000 | 0.300 | 1.500 | 2,040.000 | 183.650 | 100.000 |
| Jun | | 26,600.000 | | 560.000 | 266.000 | 0.300 | 0.400 | 1,480.000 | 133.150 | 99.000 |
| Jul | | 22,100.000 | | 390.000 | 299.000 | 0.300 | 2.000 | 1,100.000 | 149.650 | 66.000 |
| Aug | | 19,800.000 | | 290.000 | 371.000 | 0.300 | 0.300 | 1,020.000 | 185.650 | 48.000 |
| Sep | 2,153.000 | 24,900.000 | | 390.000 | 398.000 | 0.800 | 8.200 | 1,230.000 | 199.400 | 53.000 |
| Oct | | 23,800.000 | | 410.000 | 317.000 | 0.300 | 0.200 | 1,110.000 | 158.650 | 70.000 |
| Nov | | 23,400.000 | | 420.000 | 278.000 | 0.300 | 0.300 | 1,220.000 | 139.150 | 89.000 |
| Dec | | 23,700.000 | | 330.000 | 251.000 | 0.300 | 0.200 | 1,360.000 | 125.650 | 77.000 |
| | | | | | | | | | | |
| Average | 3,805.000 | 28,150.000 | | 472.500 | 318.583 | 0.342 | 1.429 | 1,482.917 | 159.463 | 84.417 |
| Total | 7,610.000 | 337,800.000 | 0.000 | 5,670.000 | 3,823.000 | 4.100 | 17.150 | 17,795.000 | 1,913.550 | 1,013.000 |
| | | | | | | | | | | |

Ontario Clean Water Agency
Biosolids Quality Report - Liquid
Digestor Type: AEROBIC
Metals and Criteria

Facility: SHELBURNE WASTEWATER TREATMENT FACILITY
Works: 5773
Period: 01/01/2018 to 12/01/2018

Note: all parameters in this report will be 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Site | SHELBURNE WASTEWATER TREATMENT FACILITY | | | | | | | | | | |
| Station | Bslq Station only | | | | | | | | | | |
| 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 |
| Jan | 0.400 | 0.020 | 0.080 | 0.430 | 7.700 | 0.010 | 0.220 | 0.200 | 0.700 | 0.100 | 11.000 |
| Feb | 0.500 | 0.028 | 0.100 | 0.730 | 9.100 | 0.018 | 0.350 | 0.420 | 0.800 | 0.100 | 13.000 |
| Mar | 0.550 | 0.030 | 0.130 | 0.940 | 11.500 | 0.025 | 0.370 | 0.560 | 0.850 | 0.100 | 16.500 |
| Apr | 0.550 | 0.031 | 0.115 | 0.875 | 11.000 | 0.020 | 0.375 | 0.510 | 0.850 | 0.100 | 15.500 |
| May | 0.500 | 0.027 | 0.110 | 0.870 | 11.000 | 0.021 | 0.370 | 0.510 | 0.800 | 0.100 | 15.000 |
| Jun | 0.300 | 0.029 | 0.080 | 0.780 | 7.700 | 0.017 | 0.260 | 0.430 | 0.500 | 0.100 | 11.000 |
| Jul | 0.300 | 0.020 | 0.070 | 0.710 | 6.700 | 0.023 | 0.210 | 0.390 | 0.500 | 0.100 | 9.200 |
| Aug | 0.200 | 0.013 | 0.060 | 0.580 | 5.100 | 0.013 | 0.190 | 0.320 | 0.400 | 0.100 | 7.600 |
| Sep | 0.300 | 0.018 | 0.080 | 0.710 | 6.400 | 0.017 | 0.240 | 0.390 | 0.500 | 0.100 | 10.000 |
| Oct | 0.300 | 0.022 | 0.090 | 0.910 | 6.500 | 0.017 | 0.210 | 0.480 | 0.600 | 0.100 | 11.000 |
| Nov | 0.300 | 0.022 | 0.080 | 0.900 | 7.100 | 0.021 | 0.240 | 0.500 | 0.600 | 0.100 | 11.000 |
| Dec | 0.300 | 0.017 | 0.080 | 0.780 | 5.900 | 0.011 | 0.170 | 0.430 | 0.600 | 0.100 | 8.800 |
| | | | | | | | | | | | |
| Average | 0.375 | 0.023 | 0.090 | 0.768 | 7.975 | 0.018 | 0.267 | 0.428 | 0.642 | 0.100 | 11.633 |
| Max. Permissible Metal Concentrations (mg/kg of | 170.000 | 34.000 | 340.000 | 2,800.000 | 1,700.000 | 11.000 | 94.000 | 420.000 | 1,100.000 | 34.000 | 4,200.000 |
| Metal Concentrations in Sludge (mg/kg) | 13.321 | 0.819 | 3.182 | 27.279 | 283.304 | 0.631 | 9.488 | 15.216 | 22.795 | 3.552 | 413.262 |
| | | | | | | | | | | | |

Ontario Clean Water Agency
Biosolids Quality Report - Liquid - Based on Last 4 Samples
Digester Type: AEROBIC

Facility: SHELBURNE WASTEWATER TREATMENT FACILITY
Works: 5771
Period: 01/01/2018 to 12/01/2018

Note: all parameters in the report will be derived from the Daily Stream

| Parameter Short Name | Time Series | 09/25/2018 | 10/31/2018 | 11/30/2018 | 12/10/2018 | Average | Metal Concentrations in Sludge (mg/kg): | Max. Permissible Metal Concentrations (mg/kg of Solids): |
|---|---|---|---|---|---|---|---|---|
| As (mg/L) | Lab Published | 0.300 | 0.300 | 0.300 | 0.300 | 0.300 | 12.526 | 170 |
| Cd (mg/L) | Lab Published | 0.016 | 0.022 | 0.022 | 0.017 | 0.070 | 0.835 | 34 |
| Co (mg/L) | Lab Published | 0.080 | 0.090 | 0.080 | 0.080 | 0.082 | 3.426 | 340 |
| Cr (mg/L) | Lab Published | 0.710 | 0.910 | 0.900 | 0.780 | 0.825 | 34.447 | 2800 |
| Cu (mg/L) | Lab Published | 6.400 | 6.500 | 7.100 | 5.900 | 6.475 | 270.355 | 1700 |
| Hg (mg/L) | Lab Published | 0.017 | 0.017 | 0.021 | 0.011 | 0.017 | 0.710 | 11 |
| Mo (mg/L) | Lab Published | 0.240 | 0.210 | 0.240 | 0.170 | 0.215 | 8.977 | 94 |
| Ni (mg/L) | Lab Published | 0.390 | 0.480 | 0.500 | 0.430 | 0.450 | 18.789 | 420 |
| Pb (mg/L) | Lab Published | 0.500 | 0.600 | 0.600 | 0.600 | 0.575 | 24.008 | 1100 |
| Se (mg/L) | Lab Published | 0.100 | 0.100 | 0.100 | 0.100 | 0.100 | 4.175 | 34 |
| Zn (mg/L) | Lab Published | 10.000 | 11.000 | 11.000 | 8.800 | 10.200 | 425.867 | 4200 |
| E. Coli: Dry Wt (cfu/g) | Lab Published | 19,679.000 | 25,830.000 | 76,923.000 | 118,143.000 | 46,270.475 | E Coli average in the GMD | |
| TS (mg/L) | Lab Published | 24,900.000 | 23,800.000 | 23,400.000 | 23,700.000 | 23,950.000 | | |
| VS (mg/L) | Lab Published | | | | | | | |
| TP (mg/L) | Lab Published | 390.000 | 410.000 | 420.000 | 330.000 | 387.500 | | |
| NO2-N (mg/L) | Lab Published | 0.200 | 0.200 | 0.300 | 0.200 | 2.225 | | |
| TKN (mg/L) | Lab Published | 1,230.000 | 1,110.000 | 1,220.000 | 1,360.000 | 1,230.000 | | |
| K (mg/L) | Lab Published | 53.000 | 70.000 | 89.000 | 77.000 | 72.250 | | |
| NH3p_NH4p_N (mg/L) | Lab Published | 398.000 | 317.000 | 278.000 | 251.000 | 311.000 | | |
| NO3-N (mg/L) | Lab Published | 0.800 | 0.300 | 0.300 | 0.300 | 0.425 | | |

# Appendix C

# Calibration Reports

# 2018

**Flowmetrix**
**Technical Services Inc.**

**Western Office**
**2088 Jetstream Road**
**London, Ontario**
**N5V 3P6**

**Eastern Office**
**1602 Old Wooler Road**
**Wooler, Ontario**
**K0K 3M0**

# dP Pressure Transmitter
## Verification Report

## AS FOUND CERTIFICATION

## PASS

**CLIENT DETAIL**

| | |
|---|---|
| CUSTOMER | OCWA - West Highlands Hub |
| CONTACT | Don Irvine |
| | Process Compliance Technician |
| | p 519 925-1938 x225 |
| | c 519-321-9474 |
| | e dirvine@ocwa.com |

**EQUIPMENT DETAIL**

| | |
|---|---|
| [MUT] MANUFACTURER | Magnehelic |
| MODEL | 2000 Series |
| CONVERTER SERIAL NUMBER | N/A |

| | |
|---|---|
| PLANT ID | Shelburne WWTP |
| METER ID | Digester Flow |
| FIT ID | N/A |
| CLIENT TAG | N/A |
| OTHER | OCWA# 62546 |
| GPS COORDINATES | N/A |

VER. BY - FM Paris Machuk/Travis Krayetski

Quality Management Standards Information - Reference equipment and instrumentation used to conduct this verification test is found in our AC-QMS document at the time this test was

| | |
|---|---|
| VERIFICATION DATE | September 19 2018 |
| CAL. FREQUENCY | Annual |
| CAL. DUE DATE | September 2019 |

**PRIMARY DEVICE**

| | | |
|---|---|---|
| MANUFACTURER | | unknown |
| PRIMARY ELEMENT | | Venturi |
| DIAMETER | inches | ? |

**TRANSMITTER INFORMATION**

| | | |
|---|---|---|
| LSL (Lower Sensor Limit) | PSI | 0.00 |
| USL (Upper Sensor Limit) | PSI | 15.00 |
| **SCALING INFORMATION** | | |
| LVL (Lower Value Limit) | PSI | 0.00 |
| UVL (Upper Value Limit) | PSI | 0.92 |
| Full-scale Diff. Pressure | PSI | 0.92 |
| Full-scale Flow Rate | LPS | 1000.00 |

**TEST CRITERIA**

| | |
|---|---|
| AS FOUND CERTIFICATION TEST | yes |
| ALLOWABLE [%] ERROR | 5 |
| ERROR, represented as % F.S | no |

**COMPONENTS TESTED**

| | |
|---|---|
| CONVERTER DISPLAY | yes |
| mA OUTPUT | NO |
| Flow (F) or Pressure (P) | F |
| OUTPUT - Linear (L) or SQRT (S) | S |

**COMPARISON TESTING**

| | | | | | | |
|---|---|---|---|---|---|---|
| | 0.02 | 0.06 | 0.23 | 0.52 | 0.92 | Target Press. |
| | 0.00 | 6.51 | 24.97 | 56.46 | 99.89 | % dP F.S. |
| REF. PRESSURE, actual | 0.00 | 0.06 | 0.23 | 0.52 | 0.92 | PSI |
| REF. FLOW RATE, calculated | | 255.24 | 499.73 | 751.40 | 999.46 | LPS |
| MUT [Reading] | 0.00 | 260.00 | 505.00 | 755.00 | 1000.00 | LPS |
| MUT [Difference] | 0.00 | 4.76 | 5.27 | 3.60 | 0.54 | LPS |
| MUT [% Error], PRESSURE | n/a | n/a | n/a | n/a | n/a | % O.R. |
| MUT [% Error], FLOWRATE | | 1.87 | 1.05 | 0.48 | 0.05 | % O.R. |
| mA OUTPUT | | | | | | |
| MUT [Reading] min 4.000 mA | | | | | | |
| MUT [Difference max. 20.000 mA | | | | | | |
| MUT [% Error] | | | | | | |

**ZERO Balance/Equalization Test**

| | | |
|---|---|---|
| [AF] | PSI | ? LPS |
| [AL] | PSI | ? LPS |

**QUALITY MANAGEMENT STANDARDS INFO.**

| | | |
|---|---|---|
| [QMS] INFORMATION | IDENT | ID # |
| [REFERENCE] | CRYS | 1 |
| PROCESS METER | PM | 2 |

**COMMENTS**

Note: Poor resolution on gauge at lower flows
Flows estimated based on visual observation

**TESTING RESULTS**

| TEST | AVG % O.R. | PASS FAIL |
|---|---|---|
| DISPLAY | 0.86 | PASS |
| mA OUTPUT | N/A | N/A |

A reference pressure gauge was used to verify the overall reading accuracy of this device to within the tolerance limits as define above in this report

**Serving Ontario In Calibration Services** **For Service Call 519-870-3569**

**Flowmetrix**
**Technical Services Inc.**

**Western Office**
**2088 Jetstream Road**
**London, Ontario**
**N5V 3P6**

**Eastern Office**
**1602 Old Wooler Road**
**Wooler, Ontario**
**K0K 3M0**

# dP Pressure Transmitter
## Verification Report

### AS FOUND CERTIFICATION

### PASS

**CLIENT DETAIL**

| | |
|---|---|
| CUSTOMER | Ontario Clean Water Agency |
| CONTACT | Lisa Benoit |
| | *Process Compliance Technician* |
| | Highlands Hub |
| | 136 Main St East |
| | Shelburne ON L9V 3K5 |
| | Tel 519-925-1938 x225 |
| | Cel 519-938-7255 |
| | E lbenoit@ocwa.com |

VER. BY - FM Travis Krayetski/Paris Machuk

**Quality Management Standards Information - Reference equipment and instrumentation used to conduct this verification test is found in our AC-QMS document at the time this test was**

**EQUIPMENT DETAIL**

| | |
|---|---|
| [MUT] MANUFACTURER | Magnehelic |
| MODEL | 2000 Series |
| CONVERTER SERIAL NUMBER | N/A |
| PLANT ID | Shelburne WWTP |
| METER ID | Aeration Flow |
| FIT ID | N/A |
| CLIENT TAG | N/A |
| OTHER | OCWA# 62544 |
| GPS COORDINATES | N/A |
| VERIFICATION DATE | September 19 2018 |
| CAL. FREQUENCY | Annual |
| CAL. DUE DATE | September 2019 |

**PRIMARY DEVICE**

| | | |
|---|---|---|
| MANUFACTURER | | unknown |
| PRIMARY ELEMENT | | Venturi |
| DIAMETER | inches | ? |

**TRANSMITTER INFORMATION**

| | | |
|---|---|---|
| LSL (Lower Sensor Limit) | psi | 0.00 |
| USL (Upper Sensor Limit) | psi | 15.00 |
| **SCALING INFORMATION** | | |
| LVL (Lower Value Limit) | psi | 0.00 |
| UVL (Upper Value Limit) | psi | 0.92 |
| Full-scale Diff. Pressure | psi | 0.92 |
| Full-scale Flow Rate | LPS | 1000.00 |

**TEST CRITERIA**

| | |
|---|---|
| AS FOUND CERTIFICATION TEST | yes |
| ALLOWABLE [%] ERROR | 5 |
| ERROR, represented as % F.S. | no |

**COMPONENTS TESTED**

| | |
|---|---|
| CONVERTER DISPLAY | yes |
| mA OUTPUT | no |
| Flow (F) or Pressure (P) | F |
| OUTPUT - Linear (L) or SQRT (S) | S |

**COMPARISON TESTING**

| | | | | | | |
|---|---|---|---|---|---|---|
| | 0.02 | 0.06 | 0.23 | 0.52 | 0.92 | Target Press. |
| | 0.00 | 6.51 | 24.97 | 56.46 | 100.00 | % dP F.S. |
| REF. PRESSURE, actual | 0.00 | 0.06 | 0.23 | 0.52 | 0.92 | psi |
| REF. FLOW RATE, calculated | 0.00 | 255.24 | 499.73 | 751.40 | 1000.00 | LPS |
| MUT [Reading] | 0.00 | 245.00 | 495.00 | 740.00 | 1000.00 | LPS |
| MUT [Difference] | 0.00 | -10.24 | -4.73 | -11.40 | 0.00 | LPS |
| MUT [% Error], PRESSURE | n/a | n/a | n/a | n/a | n/a | % O.R. |
| MUT [% Error], FLOWRATE | | -4.01 | -0.95 | -1.52 | 0.00 | % O.R. |
| mA OUTPUT | | | | | | |
| MUT [Reading] min. 4.000 mA | | | | | | |
| MUT [Difference max. 20.000 mA | | | | | | |
| MUT [% Error] | | | | | | |

**ZERO Balance/Equalization Test**

| | | |
|---|---|---|
| [AF] | psi | ? LPS |
| [AL] | psi | ? LPS |

**QUALITY MANAGEMENT STANDARDS INFO.**

| [QMS] INFORMATION | IDENT. | ID # |
|---|---|---|
| [REFERENCE] | CRYS | 1 |
| PROCESS METER | PM | 2 |

**COMMENTS**

Note: Poor resolution on gauge at lower flows
Flows estimated based on visual observation

**TESTING RESULTS**

| TEST | AVG % O.R. | PASS FAIL |
|---|---|---|
| DISPLAY | -1.62 | PASS |
| mA OUTPUT | N/A | N/A |

A reference pressure gauge was used to verify the overall reading accuracy of this device to within the tolerance limits as define above in this report

**Serving Ontario in Calibration Services** **For Service Call 519-870-3569**

**Flowmetrix**
Technical Services Inc.

Western Office
2088 Jetstream Road
London, Ontario
N5V 3P6

Eastern Office
1602 Old Wooler Road
Wooler, Ontario
K0K 3M0

# Krohne
## Verification Report

AS FOUND CERTIFICATION

FORWARD FLOW DIRECTION

**PASS**

**CLIENT DETAIL**

CUSTOMER: OCWA - West Highlands Hub
CONTACT: Don Irvine
Process Compliance Technician
p 519-925-1938 x225
c 519-321-9474
e dirvine@ocwa.com

VER. BY - FM: *Travis Krayetski*

Quality Management Standards Information - Reference equipment and instrumentation used to conduct this verification test is found in our AC-QMS document at the time this test was

**EQUIPMENT DETAIL**

| | |
|---|---|
| [MUT] MANUFACTURER | Krohne |
| MODEL | IFC010D |
| SERIAL NUMBER | A99 15693 |
| FUSE | |
| PLANT ID | Shelburne WWTP |
| METER ID | WAS Flow |
| FIT ID | FIT-01 |
| CLIENT TAG | OCWA# 62478 |
| OTHER | N/A |
| GPS COORDINATES | N44 05 063 W080 11 535 |
| VERIFICATION DATE | September 19, 2018 |
| CAL. FREQUENCY | Annual |
| CAL. DUE DATE | September 2019 |

**PROGRAMMING PARAMETERS**

| | | |
|---|---|---|
| DIAMETER (DN) | mm | 80 |
| F.S. FLOW - MAG | LPS | 39.5 |
| F.S. RANGE - O/P | LPS | 27.800 |
| CAL. k-FACTOR | GKE | 5.16200 |
| Zero Offset Flow | LPS | 0.0120 |

**FORWARD TOTALIZER INFORMATION**

| | | |
|---|---|---|
| AS FOUND | 452622 | M3 |
| AS LEFT | 452627 | M3 |
| DIFFERENCE | 5 | M3 |

**TEST CRITERIA**

| | |
|---|---|
| AS FOUND CERTIFICATION TEST | Yes |
| FORWARD FLOW DIRECTION | Yes |
| ALLOWABLE [%] ERROR | 5 |

**COMPONENTS TESTED**

| | |
|---|---|
| CONVERTER DISPLAY | yes |
| mA OUTPUT | yes |
| TOTALIZER | Yes |
| ACCURACY BASED ON [% or] | yes |
| ERROR DOCUMENTED IN THIS REPORT, BASED ON % or | |

**FLOW TUBE SIMULATION**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | 0.0 | 0.5 | 1.0 | 2.0 | 5.0 | m/s |
| | | | | 0.0 | 5.0 | 10.0 | 20.0 | 50.0 | % F.S. Flow |
| | | | | 0.0 | 7.2 | 14.3 | 28.5 | 71.2 | % F.S. Range |
| REF. FLOW RATE | | | | 0.012 | 1.989 | 3.966 | 7.921 | 19.784 | LPS |
| MUT [Reading] | | | | 0.010 | 1.999 | 3.963 | 7.922 | 19.795 | LPS |
| MUT [Difference] | | | | -0.002 | 0.010 | -0.003 | 0.001 | 0.011 | LPS |
| MUT [% Error] | | | | -16.67 | 0.49 | -0.08 | 0.02 | 0.06 | % |
| mA OUTPUT | | | | 4.000 | 5.145 | 6.283 | 8.559 | 15.386 | mA |
| MUT [Reading] | min | 4.000 | mA | 3.992 | 5.132 | 6.290 | 8.553 | 15.387 | mA |
| MUT [Difference] | max. | 20.000 | mA | -0.008 | -0.013 | 0.007 | -0.006 | 0.001 | mA |
| MUT [% Error] | | | | -0.20 | -0.25 | 0.11 | -0.07 | 0.00 | % |
| TOTALIZER - REF. FLOW RATE | | | | | | | | 19.784 | LPS |
| TOTALIZER [MUT] | | | | | | | | 3 | M3 |
| TEST TIME | | | | | | | | 151.76 | SECONDS |
| CALC. TOTALIZER | | | | | | | | 3.002 | M3 |
| ERROR | | | | | | | | -0.08 | % |

**COMMENTS**

**QUALITY MANAGEMENT STANDARDS INFO.**

| [QMS] INFORMATION | IDENT | ID # |
|---|---|---|
| [REFERENCE] FTS | KRO | 1 |
| PROCESS METER | PM | 2 |
| ANALOG METER | AM | N/A |
| STOP WATCH | SW | N/A |

**RESULTS**

| TEST | AVG % o r | PASS FAIL |
|---|---|---|
| DISPLAY | 0.12 | PASS |
| mA OUTPUT | -0.08 | PASS |
| TOTALIZER | -0.08 | PASS |

This report reflects the test results of the overall accuracy for the above flow converter using the specified manufacturers flow tube simulator to within the specified tolerance as identified with n this report.

# Flowmetrix
## Technical Services Inc.


**Western Office**
2088 Jetstream Road
London, Ontario
N5V 3P6

**Eastern Office**
1602 Old Wooler Road
Wooler, Ontario
K0K 3M0


# Krohne
## Verification Report

AS FOUND CERTIFICATION

FORWARD FLOW DIRECTION

PASS

**CLIENT DETAIL**

CUSTOMER OCWA - West Highlands Hub
CONTACT Don Irvine
Process Compliance Technician
p 519-925-1938 x225
c 519-321-9474
e dirvine@ocwa.com

VER. BY - FM *Travis Krayetski*

Quality Management Standards Information - Reference equipment and instrumentation used to conduct this verification test is found in our AC-QMS document at the time this test was

**EQUIPMENT DETAIL**

| | |
|---|---|
| [MUT] MANUFACTURER | Krohne |
| MODEL | IFC010D |
| SERIAL NUMBER | A99 15978 |
| FUSE | On Board Plug |
| PLANT ID | Shelburne WWTP |
| METER ID | RAS Tank #1 |
| FIT ID | FIT-02 |
| CLIENT TAG | OCWA# 62479 |
| OTHER | N/A |
| GPS COORDINATES | N/A |
| VERIFICATION DATE | September 19 2018 |
| CAL. FREQUENCY | Annual |
| CAL. DUE DATE | September 2019 |

**PROGRAMMING PARAMETERS**

| | | |
|---|---|---|
| DIAMETER (DN) | mm | 100 |
| F.S. FLOW - MAG | LPS | 62.8 |
| F.S. RANGE - O/P | LPS | 66.700 |
| CAL. k-FACTOR | GKL | 5.24300 |

**FORWARD TOTALIZER INFORMATION**

| | | |
|---|---|---|
| AS FOUND | 7809020 | M3 |
| AS LEFT | 7809031 | M3 |
| DIFFERENCE | 11 | M3 |

**TEST CRITERIA**

| | |
|---|---|
| AS FOUND CERTIFICATION TEST | Yes |
| FORWARD FLOW DIRECTION | Yes |
| ALLOWABLE [%] ERROR | 5 |

**COMPONENTS TESTED**

| | |
|---|---|
| CONVERTER DISPLAY | yes |
| mA OUTPUT | yes |
| TOTALIZER | Yes |
| ACCURACY BASED ON [% o.r.] | yes |

ERROR DOCUMENTED IN THIS REPORT, BASED ON % o.r.

Zero Offset Flow LPS 0.0200

**FLOW TUBE SIMULATION**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | 0.0 | 1.0 | 2.0 | 5.0 | 10.0 | m/s |
| | | 0.0 | 10.0 | 20.0 | 50.0 | 100.0 | % F.S. Flow |
| | | 0.0 | 9.4 | 18.8 | 47.1 | 94.1 | % F.S. Range |
| REF. FLOW RATE | | 0.020 | 6.296 | 12.571 | 31.398 | 62.776 | LPS |
| MUT [Reading] | | 0.010 | 6.300 | 12.560 | 31.400 | 62.790 | LPS |
| MUT [Difference] | | -0.010 | 0.004 | -0.011 | 0.002 | 0.014 | LPS |
| MUT [% Error] | | -50.00 | 0.07 | -0.09 | 0.01 | 0.02 | % |
| mA OUTPUT | | 4.000 | 5.510 | 7.016 | 11.532 | 19.059 | mA |
| MUT [Reading] | min. 4.000 mA | 3.995 | 5.506 | 7.010 | 11.525 | 19.042 | mA |
| MUT [Difference] | max. 20.000 mA | -0.005 | -0.004 | -0.006 | -0.007 | -0.017 | mA |
| MUT [% Error] | | -0.12 | -0.08 | -0.08 | -0.06 | -0.09 | % |
| TOTALIZER - REF. FLOW RATE | | | | | | 62.776 | LPS |
| TOTALIZER [MUT] | | | | | | 6 | M3 |
| TEST TIME | | | | | | 95.87 | SECONDS |
| CALC. TOTALIZER | | | | | | 6.018 | M3 |
| ERROR | | | | | | -0.31 | % |

**COMMENTS**

**QUALITY MANAGEMENT STANDARDS INFO.**

| [QMS] INFORMATION | IDENT | ID # |
|---|---|---|
| [REFERENCE] FTS | KRO | 1 |
| PROCESS METER | PM | 2 |
| ANALOG METER | AM | N/A |
| STOP WATCH | SW | N/A |

**RESULTS**

| TEST | AVG % o.r. | PASS FAIL |
|---|---|---|
| DISPLAY | 0.00 | PASS |
| mA OUTPUT | -0.09 | PASS |
| TOTALIZER | -0.31 | PASS |

This report reflects the test results of the overall accuracy for the above flow converter using the specified manufacturers flow tube simulator to within the specified tolerance as identified within this report.

**Flowmetrix**
Technical Services Inc.

Western Office
2088 Jetstream Road
London, Ontario
N5V 3P6

Eastern Office
1602 Old Wooler Road
Wooler, Ontario
K0K 3M0

# Krohne
## Verification Report

AS FOUND CERTIFICATION

FORWARD FLOW DIRECTION

PASS

**CLIENT DETAIL**

| | |
|---|---|
| CUSTOMER | OCWA - West Highlands Hub |
| CONTACT | Don Irvine |
| | Process Compliance Technician |
| | p 519-925-1938 x225 |
| | c 519-321-9474 |
| | e dirvine@ocwa.com |

VER. BY - FM *Travis Krayetski*

Quality Management Standards Information - Reference equipment and instrumentation used to conduct this verification test is found in our AC-QMS document at the time this test was

**EQUIPMENT DETAIL**

| | |
|---|---|
| [MUT] MANUFACTURER | Krohne |
| MODEL | IFC010D |
| SERIAL NUMBER | A99 15977 |
| FUSE | Pull Plug on Board |
| PLANT ID | Shelburne WWTP |
| METER ID | RAS Tank #2 |
| FIT ID | FIT 03 |
| CLIENT TAG | OCWA# 62480 |
| OTHER | N/A |
| GPS COORDINATES | N/A |
| VERIFICATION DATE | September 19 2018 |
| CAL. FREQUENCY | Annual |
| CAL. DUE DATE | September 2019 |

**PROGRAMMING PARAMETERS**

| | | |
|---|---|---|
| DIAMETER (DN) | mm | 100 |
| F.S. FLOW - MAG | LPS | 63.7 |
| F.S. RANGE - O/P | LPS | 66.700 |
| CAL k-FACTOR | GKL | 5.31800 |
| Zero Offset Flow | LPS | 0.0400 |

**FORWARD TOTALIZER INFORMATION**

| | | |
|---|---|---|
| AS FOUND | 8231859 | M3 |
| AS LEFT | 8231878 | M3 |
| DIFFERENCE | 19 | M3 |

**TEST CRITERIA**

| | |
|---|---|
| AS FOUND CERTIFICATION TEST | Yes |
| FORWARD FLOW DIRECTION | Yes |
| ALLOWABLE [%] ERROR | 5 |

**COMPONENTS TESTED**

| | |
|---|---|
| CONVERTER DISPLAY | yes |
| mA OUTPUT | yes |
| TOTALIZER | Yes |
| ACCURACY BASED ON [% o.r.] | yes |

ERROR DOCUMENTED IN THIS REPORT, BASED ON % o.r

**FLOW TUBE SIMULATION**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | 0.0 | 1.0 | 2.0 | 5.0 | 10.0 | m/s |
| | | | 0.1 | 10.1 | 20.1 | 50.1 | 100.1 | % F.S. Flow |
| | | | 0.1 | 9.6 | 19.1 | 47.8 | 95.5 | % F.S. Range |
| REF. FLOW RATE | | | 0.040 | 6.405 | 12.771 | 31.867 | 63.694 | LPS |
| MUT [Reading] | | | 0.000 | 6.390 | 12.760 | 31.870 | 63.710 | LPS |
| MUT [Difference] | | | -0.040 | -0.015 | -0.011 | 0.003 | 0.016 | LPS |
| MUT [% Error] | | | -100.00 | -0.24 | -0.08 | 0.01 | 0.03 | % |
| mA OUTPUT | | | 4.000 | 5.537 | 7.063 | 11.644 | 19.279 | mA |
| MUT [Reading] | min. | 4.000 mA | 3.997 | 5.531 | 7.063 | 11.650 | 19.287 | mA |
| MUT [Difference] | max. | 20.000 mA | -0.003 | -0.006 | 0.000 | 0.006 | 0.008 | mA |
| MUT [% Error] | | | -0.08 | -0.10 | -0.01 | 0.05 | 0.04 | % |
| TOTALIZER - REF. FLOW RATE | | | | | | | 63.694 | LPS |
| TOTALIZER [MUT] | | | | | | | 7 | M3 |
| TEST TIME | | | | | | | 110.93 | SECONDS |
| CALC. TOTALIZER | | | | | | | 7.066 | M3 |
| ERROR | | | | | | | -0.94 | % |

**COMMENTS**

**QUALITY MANAGEMENT STANDARDS INFO.**

| [QMS] INFORMATION | IDENT | ID # |
|---|---|---|
| [REFERENCE] FTS | KRO | 1 |
| PROCESS METER | PM | 2 |
| ANALOG METER | AM | N/A |
| STOP WATCH | SW | N/A |

**RESULTS**

| TEST | AVG % o.r. | PASS FAIL |
|---|---|---|
| DISPLAY | -0.07 | PASS |
| mA OUTPUT | -0.02 | PASS |
| TOTALIZER | -0.94 | PASS |

This report reflects the test results of the overall accuracy for the above flow converter using the specified manufacturers flow tube simulator to within the specified tolerance as identified within this report

**Flowmetrix**
Technical Services Inc.

Western Office
2080 Jetstream Road
London, Ontario
N5V 3P6

Eastern Office
1602 Old Wooler Road
Wooler, Ontario
K0K 3M0

# Krohne
## Verification Report

AS FOUND CERTIFICATION

FORWARD FLOW DIRECTION

PASS

**CLIENT DETAIL**

CUSTOMER OCWA - West Highlands Hub
CONTACT Don Irvine
Process Compliance Technician
p 519-925-1938 x225
c 519-321-9474
e dirvine@ocwa.com

VER. BY - FM Pans Machuk

Quality Management Standards Information - Reference equipment and instrumentation used to conduct this verification test is found in our AC-QMS document at the time this test was

**EQUIPMENT DETAIL**

| | |
|---|---|
| [MUT] MANUFACTURER | Krohne |
| MODEL | IFC010D |
| SERIAL NUMBER | A99 15979 |
| FUSE | Pull plug on Board |
| PLANT ID | Shelburne WWTP |
| METER ID | Truck Fill Flow |
| FIT ID | FIT-04 |
| CLIENT TAG | n/a |
| OTHER | OCWA# 62618 |
| GPS COORDINATES | n/a |
| VERIFICATION DATE | September 19 2018 |
| CAL. FREQUENCY | Annual |
| CAL. DUE DATE | September 2019 |

**PROGRAMMING PARAMETERS**

| | | |
|---|---|---|
| DIAMETER (DN) | mm | 100 |
| F.S. FLOW - MAG | LPS | 60.4 |
| F.S. RANGE - O/P | LPS | 75 000 |
| CAL. k-FACTOR | GKL | 5 04500 |
| Zero Offset Flow | LPS | 0 0300 |

**FORWARD TOTALIZER INFORMATION**

| | | |
|---|---|---|
| AS FOUND | 47402 | M3 |
| AS LEFT | 47422 | M3 |
| DIFFERENCE | 20 | M3 |

**TEST CRITERIA**

| | |
|---|---|
| AS FOUND CERTIFICATION TEST | Yes |
| FORWARD FLOW DIRECTION | Yes |
| ALLOWABLE [%] ERROR | 5 |

**COMPONENTS TESTED**

| | |
|---|---|
| CONVERTER DISPLAY | yes |
| mA OUTPUT | yes |
| TOTALIZER | Yes |
| ACCURACY BASED ON [% o.r.] | yes |

ERROR DOCUMENTED IN THIS REPORT, BASED ON % o.r.

**FLOW TUBE SIMULATION**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | 0.0 | 1.0 | 2.0 | 5.0 | 10.0 | m/s |
| | | | 0.0 | 10.0 | 20.0 | 50.0 | 100.0 | % F.S. Flow |
| | | | 0.0 | 8.1 | 16.1 | 40.3 | 80.6 | % F.S. Range |
| REF. FLOW RATE | | | 0.03 | 6.07 | 12.11 | 30.22 | 60.42 | LPS |
| MUT [Reading] | | | 0 03 | 6 04 | 12 08 | 30 14 | 60 24 | LPS |
| MUT [Difference] | | | 0 00 | -0 03 | -0.05 | -0.08 | -0.18 | LPS |
| MUT [% Error] | | | 0 00 | -0.47 | -0.39 | -0 27 | -0 29 | % |
| mA OUTPUT | | | 4.000 | 5.295 | 6.593 | 10.448 | 16.889 | mA |
| MUT [Reading] | min | 4 000 mA | 3 998 | 5 292 | 6 586 | 10 443 | 16 873 | mA |
| MUT [Difference] | max. | 20 000 mA | -0 002 | -0 003 | 0.003 | 0 001 | -0 016 | mA |
| MUT [% Error] | | | -0 05 | -0.05 | 0 05 | 0 01 | -0 09 | % |
| TOTALIZER - REF. FLOW RATE | | | | | | | 60.416 | LPS |
| TOTALIZER [MUT] | | | | | | | 15 | M3 |
| TEST TIME | | | | | | | 248 91 | SECONDS |
| CALC. TOTALIZER | | | | | | | 15 038 | M3 |
| ERROR | | | | | | | -0 25 | % |

**COMMENTS**

**QUALITY MANAGEMENT STANDARDS INFO.**

| [QMS] INFORMATION | IDENT. | ID # |
|---|---|---|
| [REFERENCE] FTS | KRO | 1 |
| PROCESS METER | PM | 11 |
| ANALOG METER | AM | N/A |
| STOP WATCH | SW | N/A |

**RESULTS**

| TEST | AVG % o.r | PASS FAIL |
|---|---|---|
| DISPLAY | -0 36 | PASS |
| mA OUTPUT | -0 03 | PASS |
| TOTALIZER | -0 25 | PASS |

This report reflects the test results of the overall accuracy for the above flow converter using the specified manufacturers flow tube simulator to within the specified tolerance as identified within this report.

**Flowmetrix**
Technical Services Inc.

Western Office
2088 Jetstream Road
London, Ontario
N5V 3P6

Eastern Office
1602 Old Wooler Road
Wooler, Ontario
K0K 3M0

# Parshall Flume
## Verification/Calibration Report

### AS FOUND CERTIFICATION

**PASS**

**CLIENT DETAIL**

| | |
|---|---|
| CUSTOMER | OCWA - West Highlands Hub |
| CONTACT | Don Irvine |
| | Process Compliance Technician |
| | p 519-925-1938 x225 |
| | c 519-321-9474 |
| | e dirvine@ocwa.com |

VER. BY - FM Paris Machuk/Travis Krayetski

Quality Management Standards Information - Reference equipment and instrumentation used to conduct this verification test is found in our AC-QMS document at the time this test was

**EQUIPMENT DETAIL**

| | |
|---|---|
| [MUT] MANUFACTURER | Milltronics |
| MODEL | OCM-III |
| CONVERTER SERIAL NUMBER | N/A |
| PLANT ID | Shelburne WWTP |
| METER ID | Effluent Flow |
| FIT ID | FIT 05 |
| CLIENT TAG | OCWA# 62506 |
| OTHER | N/A |
| GPS COORDINATES | N/A |
| VERIFICATION DATE | September 19 2018 |
| CAL. FREQUENCY | Annual |
| CAL. DUE DATE | September 2019 |

**PROGRAMMING PARAMETERS**

| | | |
|---|---|---|
| THROAT DIMENSION (DN) | inches | 9 |
| EMPTY DISTANCE | m | 0.870 |
| MAX. HEAD | m | 0.345 |
| DEAD ZONE | m | 0.525 |
| BLANKING DISTANCE | m | 0.305 |
| MAX. FLOW | LPS | 105.0 |
| F.S. RANGE - O/P | LPS | 105.0 |

**TOTALIZER**

| | | |
|---|---|---|
| AS FOUND | 15271950 | M3 |
| AS LEFT | 15271975 | M3 |
| DIFFERENCE | 25 | M3 |

**TEST CRITERIA**

| | |
|---|---|
| AS FOUND CERTIFICATION TEST | Yes |
| ALLOWABLE [%] ERROR | 5 |

**COMPONENTS TESTED**

| | |
|---|---|
| CONVERTER DISPLAY | yes |
| mA OUTPUT | yes |
| TOTALIZER | yes |
| ACCURACY BASED ON [% o.r.] | no |

ERROR DOCUMENTED IN THIS REPORT BASED ON % F.S.

Ultrasonic sensor installed to ensure full scale flow condition

**AS FOUND TEST RESULTS**

| | | 0.0 | 15.0 | 43.5 | 80.8 | 89.2 | % F.S. Range |
|---|---|---|---|---|---|---|---|
| | | 0.000 | 0.100 | 0.200 | 0.300 | 0.320 | m |
| REF. FLOW RATE | | 0.000 | 15.801 | 45.630 | 84.854 | 93.661 | LPS |
| MUT [Reading] | | 0.000 | 16.100 | 45.230 | 84.400 | 93.086 | LPS |
| MUT [Difference] | | 0.000 | 0.299 | -0.400 | -0.454 | -0.575 | LPS |
| MUT [% Error] | | n/a | 0.28 | -0.38 | -0.43 | -0.55 | % |
| mA OUTPUT | | 4.000 | 6.408 | 10.954 | 16.931 | 18.273 | mA |
| MUT [Reading] | min. 4.000 mA | 3.981 | 6.433 | 10.882 | 16.843 | 18.167 | mA |
| MUT [Difference] | max. 20.000 mA | -0.019 | 0.025 | -0.072 | -0.088 | -0.106 | mA |
| MUT [% Error] | | -0.10 | 0.13 | -0.36 | -0.44 | -0.53 | % |
| TOTALIZER - REF. FLOW RATE | | | | | | 93.661 | LPS |
| TOTALIZER [MUT] | | | | | | 10 | M3 |
| TEST TIME | | | | | | 107.82 | SECONDS |
| CALC. TOTALIZER | | | | | | 10.099 | M3 |
| ERROR | | | | | | -0.99 | % |

**COMMENTS**

**QUALITY MANAGEMENT STANDARDS INFO.**

| [QMS] INFORMATION | IDENT. | ID # |
|---|---|---|
| [REFERENCE] LEVEL | Sim. BOARD | n/a |
| PROCESS METER | PM | 2 |
| STOP WATCH | SW | n/a |

**RESULTS**

| TEST | AVG %FS | PASS FAIL |
|---|---|---|
| DISPLAY | -0.27 | PASS |
| mA OUTPUT | -0.26 | PASS |
| TOTALIZER | -0.99 | PASS |

This report reflects the test results of the overall accuracy for the above flow converter using the specified manufacturers flow tube simulator to within the specified tolerance as identified within this report.

**Flowmetrix**
Technical Services Inc.

Western Office
2088 Jetstream Road
London, Ontario
N5V 3P6

Eastern Office
1602 Old Wooler Road
Wooler, Ontario
K0K 3M0

# ROSEMOUNT
Verification Report

## AS FOUND CERTIFICATION

## FORWARD FLOW DIRECTION

## PASS

**CLIENT DETAIL**

| | |
|---|---|
| CUSTOMER | OCWA - West Highlands Hub |
| CONTACT | Don Irvine |
| | Process Compliance Technician |
| | p 519-925-1938 x225 |
| | c 519 321-9474 |
| | e dirvine@ocwa.com |

VER. BY - FM Paris Machuk

Quality Management Standards Information - Reference equipment and instrumentation used to conduct this verification test is found in our AC-QMS document at the time this test was

**EQUIPMENT DETAIL**

| | |
|---|---|
| [MUT] MANUFACTURER | ROSEMOUNT |
| MODEL | 8712 |
| CONVERTER SERIAL NUMBER | 0860188157 |
| PLANT ID | Shelburne WWTP |
| METER ID | Raw Sewage Flow |
| FIT ID | FIT-06 |
| CLIENT TAG | n/a |
| OTHER | n/a |
| GPS COORDINATES | n/a |
| VERIFICATION DATE | September 19 2018 |
| CAL. FREQUENCY | Annual |
| CAL. DUE DATE | September 2019 |

**PROGRAMMING PARAMETERS**

| | | |
|---|---|---|
| DIAMETER (DN) | mm | 200 |
| F.S. FLOW - MAG | LPS | 387.3 |
| F.S. RANGE - O/P | LPS | 150.000 |
| TUBE CAL. FACTOR | | 1025505911000011 |

**FORWARD TOTALIZER INFORMATION**

| | | |
|---|---|---|
| AS FOUND | 895950720 | LITER |
| AS LEFT | | LITER |
| DIFFERENCE | -895950720 | LITER |

**TEST CRITERIA**

| | |
|---|---|
| AS FOUND CERTIFICATION TEST | Yes |
| FORWARD FLOW DIRECTION | Yes |
| ALLOWABLE [%] ERROR | 5 |

**COMPONENTS TESTED**

| | |
|---|---|
| CONVERTER DISPLAY | yes |
| mA OUTPUT | yes |
| TOTALIZER | yes |
| ACCURACY BASED ON [% o r [ | yes |

ERROR DOCUMENTED IN THIS REPORT: BASED ON % o r

VERIFICATOR CAL. FACTOR [16-digits] 1000015010000000

**FLOW TUBE SIMULATION**

| | | | 0 | 3 | 10 | 30 | ft/s |
|---|---|---|---|---|---|---|---|
| DISPLAY | | | 0.000 | 3.000 | 10.000 | 30.000 | ft/s |
| MUT Reading | | | 0.000 | 3.000 | 10.000 | 30.010 | ft/s |
| MUT % Error | | | n/a | 0.00 | 0.00 | 0.03 | % |
| mA OUTPUT | | | 4.000 | 5.600 | 9.333 | 20.000 | mA |
| MUT Reading | 4 | mA | 3.999 | 5.601 | 9.336 | 20.009 | mA |
| MUT % Error | 20 | mA | -0.02 | 0.02 | 0.03 | 0.05 | % |
| TOTALIZER | | | | | | 30.00 | ft/s |
| TEST Accumulation | | | | | | 2032.00 | ft |
| TIME | | | | | | 67.69 | seconds |
| CALC. Velocity | | | | | | 30.02 | ft/s |
| % Error | | | | | | 0.06 | % |

*All values are for "As Found" values.

**COMMENTS**

**QUALITY MANAGEMENT STANDARDS INFO.**

| [QMS] INFORMATION | IDENT | ID # |
|---|---|---|
| [REFERENCE] FTS | ROS | 1 |
| PROCESS METER | PM | 11 |
| ANALOG METER | AM | n/a |
| STOP WATCH | SW | Yes |

**RESULTS**

| TEST | AVG % o r | PASS FAIL |
|---|---|---|
| DISPLAY | 0.01 | PASS |
| mA OUTPUT | 0.03 | PASS |
| TOTALIZER | 0.06 | PASS |

This report reflects the test results of the overall accuracy for the above flow converter using the specified manufacturers flow tube simulator to within the specified tolerance as identified within this report.

**Flowmetrix**
Technical Services Inc.

Western Office
2088 Jetstream Road
London, Ontario
N5V 3P6

Eastern Office
1602 Old Wooler Road
Wooler, Ontario
K0K 3M0

# ABB MAGMASTER
## Verification Report

AS FOUND CERTIFICATION

FORWARD FLOW DIRECTION

PASS

**CLIENT DETAIL**

| | |
|---|---|
| CUSTOMER | OCWA - West Highlands Hub |
| CONTACT | Don Irvine |
| | Process Compliance Technician |
| | p 519-525-1938 x225 |
| | c 519-321-9474 |
| | e dirvine@ocwa.com |

VER. BY - FM *Travis Krayetski*

Quality Management Standards Information - Reference equipment and instrumentation used to conduct this verification test is found in our AC-QMS document at the time this test was

**EQUIPMENT DETAIL**

| | |
|---|---|
| [MUT] MANUFACTURER | ABB |
| MODEL | MagMaster |
| CONVERTER SERIAL NUMBER | 3K620000015305 |
| FUSE | Panel G - Breaker #6 |
| PLANT ID | Shelburne WWTP |
| METER ID | Storm Return Flow |
| FIT ID | FIT-08 |
| CLIENT TAG | N/A |
| OTHER | N/A |
| GPS COORDINATES | N44 05 063 W080 11 535 |
| VERIFICATION DATE | September 19 2018 |
| CAL. FREQUENCY | Annual |
| CAL DUE DATE | September 2019 |

**PROGRAMMING PARAMETERS**

| | | |
|---|---|---|
| DIAMETER (DN) | mm | 200 |
| F.S. FLOW - MAG | LPS | 468.4 |
| F.S. RANGE - O/P | LPS | 100 000 |
| TUBE CAL. FACTOR | 1 | 1.49102 |

**FORWARD TOTALIZER INFORMATION**

| | | |
|---|---|---|
| AS FOUND | 539764 | M3 |
| AS LEFT | 539783 | M3 |
| DIFFERENCE | 19 | M3 |

**TEST CRITERIA**

| | |
|---|---|
| AS FOUND CERTIFICATION TEST | Yes |
| FORWARD FLOW DIRECTION | Yes |
| ALLOWABLE [%] ERROR | 5 |

**COMPONENTS TESTED**

| | |
|---|---|
| CONVERTER DISPLAY | yes |
| mA OUTPUT | yes |
| TOTALIZER | yes |
| ACCURACY BASED ON [% o r ] | yes |

ERROR DOCUMENTED IN THIS REPORT; BASED ON % o.r.

**FLOW TUBE SIMULATION**

| | | | 0.0 | 0.2 | 0.5 | 1.0 | 2.0 | m/s |
|---|---|---|---|---|---|---|---|---|
| | | | 0 | 2 | 5 | 10 | 20 | % F.S. Flow |
| | | | 0.0 | 9.4 | 23.4 | 46.8 | 93.7 | % F.S. Range |
| REF. FLOW RATE | | | 0.00 | 9.37 | 23.42 | 46.84 | 93.68 | LPS |
| MUT [Reading] | | | 0.00 | 9.33 | 23.42 | 46.83 | 93.68 | LPS |
| MUT [Difference] | | | 0.00 | -0.04 | 0.00 | -0.01 | 0.00 | LPS |
| MUT [% Error] | | | n/a | -0.41 | 0.00 | -0.03 | 0.00 | % |
| mA OUTPUT | | | 4.000 | 5.499 | 7.747 | 11.495 | 18.989 | mA |
| MUT [Reading] | min. | 4.000 mA | 3.991 | 5.493 | 7.732 | 11.471 | 18.954 | mA |
| MUT [Difference] | max. | 20.000 mA | -0.009 | -0.006 | -0.015 | -0.024 | -0.035 | mA |
| MUT [% Error] | | | -0.22 | -0.11 | -0.20 | -0.21 | -0.19 | % |
| TOTALIZER - REF. FLOW RATE | | | | | | | 93.683 | LPS |
| TOTALIZER [MUT] | | | | | | | 10 | M3 |
| TEST TIME | | | | | | | 107.04 | SECONDS |
| CALC. TOTALIZER | | | | | | | 10.028 | M3 |
| ERROR | | | | | | | -0.28 | % |

**COMMENTS**

**QUALITY MANAGEMENT STANDARDS INFO.**

| [QMS] INFORMATION | IDENT | ID # |
|---|---|---|
| [REFERENCE] FTS | ABBMM | 2 |
| PROCESS METER | PM | N/A |
| ANALOG METER | AM | N/A |
| STOP WATCH | SW | N/A |

**RESULTS**

| TEST | AVG % o r | PASS FAIL |
|---|---|---|
| DISPLAY | -0.11 | PASS |
| mA OUTPUT | -0.18 | PASS |
| TOTALIZER | -0.28 | PASS |

This report reflects the test results of the overall accuracy for the above flow converter using the specified manufacturers flow tube simulator to within the specified tolerance as identified within this report.

**Flowmetrix**
Technical Services Inc.

Western Office
2088 Jetstream Road
London, Ontario
N5V 3P6

Eastern Office
1602 Old Wooler Road
Wooler, Ontario
K0K 3M0

# ABB MAGMASTER
## Verification Report

AS FOUND CERTIFICATION

FORWARD FLOW DIRECTION

PASS

**CLIENT DETAIL**

CUSTOMER OCWA - West Highlands Hub
CONTACT Don Irvine
Process Compliance Technician
p 519 925 1938 x225
c 519-321-9474
e dirvine@ocwa.com

VER. BY - FM *Travis Krayetski*

Quality Management Standards Information - Reference equipment and instrumentation used to conduct this verification test is found in our AC-QMS document at the time this test was

**EQUIPMENT DETAIL**

| | |
|---|---|
| [MUT] MANUFACTURER | ABB |
| MODEL | MagMaster |
| CONVERTER SERIAL NUMBER | 3K620000015306 |
| FUSE | Panel G - Breaker #4 |
| PLANT ID | Shelburne WWTP |
| METER ID | Storm Flow |
| FIT ID | FIT-07 |
| CLIENT TAG | N/A |
| OTHER | N/A |
| GPS COORDINATES | N44 05 053 W080 11 535 |
| VERIFICATION DATE | September 19 2018 |
| CAL. FREQUENCY | Annual |
| CAL. DUE DATE | September 2019 |

**PROGRAMMING PARAMETERS**

| | | |
|---|---|---|
| DIAMETER (DN) | mm | 250 |
| F.S. FLOW - MAG | LPS | 670.8 |
| F.S. RANGE - O/P | LPS | 200.000 |
| TUBE CAL. FACTOR | 1 | 1.36650 |

**FORWARD TOTALIZER INFORMATION**

| | | |
|---|---|---|
| AS FOUND | 516708 | M3 |
| AS LEFT | 516734 | M3 |
| DIFFERENCE | 26 | M3 |

**TEST CRITERIA**

| | |
|---|---|
| AS FOUND CERTIFICATION TEST | Yes |
| FORWARD FLOW DIRECTION | Yes |
| ALLOWABLE [%] ERROR | 5 |

**COMPONENTS TESTED**

| | |
|---|---|
| CONVERTER DISPLAY | yes |
| mA OUTPUT | yes |
| TOTALIZER | yes |
| ACCURACY BASED ON [% o r [ | yes |

ERROR DOCUMENTED IN THIS REPORT; BASED ON % o.r

**FLOW TUBE SIMULATION**

| | | | 0.0 | 0.2 | 0.5 | 1.0 | 2.0 | m/s |
|---|---|---|---|---|---|---|---|---|
| | | | 0 | 2 | 5 | 10 | 20 | % F.S. Flow |
| | | | 0.0 | 6.7 | 16.8 | 33.5 | 67.1 | % F.S. Range |
| REF. FLOW RATE | | | 0.00 | 13.42 | 33.54 | 67.08 | 134.16 | LPS |
| MUT [Reading] | | | 0.00 | 13.39 | 33.55 | 67.03 | 134.15 | LPS |
| MUT [Difference] | | | 0.00 | -0.03 | 0.01 | -0.05 | -0.01 | LPS |
| MUT [% Error] | | | n/a | -0.19 | 0.03 | -0.07 | 0.00 | % |
| mA OUTPUT | | | 4.000 | 5.073 | 6.683 | 9.366 | 14.732 | mA |
| MUT [Reading] | min. | 4.000 mA | 3.991 | 5.062 | 6.672 | 9.347 | 14.704 | mA |
| MUT [Difference] | max. | 20.000 mA | -0.009 | -0.011 | -0.011 | -0.019 | -0.028 | mA |
| MUT [% Error] | | | -0.22 | -0.22 | -0.17 | -0.21 | -0.19 | % |
| TOTALIZER - REF. FLOW RATE | | | | | | | 134.156 | LPS |
| TOTALIZER [MUT] | | | | | | | 17 | M3 |
| TEST TIME | | | | | | | 126.66 | SECONDS |
| CALC. TOTALIZER | | | | | | | 17.019 | M3 |
| ERROR | | | | | | | -0.11 | % |

**COMMENTS**

**QUALITY MANAGEMENT STANDARDS INFO.**

| [QMS] INFORMATION | IDENT | ID # |
|---|---|---|
| [REFERENCE] FTS | ABBMM | 1 |
| PROCESS METER | PM | 1 |
| ANALOG METER | AM | N/A |
| STOP WATCH | SW | Yes |

**RESULTS**

| TEST | AVG % o r | PASS FAIL |
|---|---|---|
| DISPLAY | -0.06 | PASS |
| mA OUTPUT | -0.20 | PASS |
| TOTALIZER | -0.11 | PASS |

This report reflects the test results of the overall accuracy for the above flow converter using the specified manufacturers flow tube simulator to within the specified tolerance as identified within this report.

**Flowmetrix**
Technical Services Inc.

Western Office
2088 Jetstream Road
London, Ontario
N5V 3P6

Eastern Office
1602 Old Wooler Road
Wooler, Ontario
K0K 3M0

# ABB MAGMASTER
## Verification Report

AS FOUND CERTIFICATION

FORWARD FLOW DIRECTION

PASS

**CLIENT DETAIL**

CUSTOMER OCWA - West Highlands Hub
CONTACT Don Irvine
Process Compliance Technician
p 519-925-1938 x225
c 519-321-9474
e dirvine@ocwa.com

VER. BY - FM *Travis Krayetski*

Quality Management Standards Information - Reference equipment and instrumentation used to conduct this verification test is found in our AC-QMS document at the time this test was

**EQUIPMENT DETAIL**

| | |
|---|---|
| [MUT] MANUFACTURER | ABB |
| MODEL | MagMaster |
| CONVERTER SERIAL NUMBER | 3K620000015302 |
| FUSE | Panel G Breaker #8 |
| PLANT ID | Shelburne WWTP |
| METER ID | Sludge Transfer Flow |
| FIT ID | FIT-09 |
| CLIENT TAG | N/A |
| OTHER | N/A |
| GPS COORDINATES | N44 05 063 W080 11 535 |
| VERIFICATION DATE | September 19 2018 |
| CAL. FREQUENCY | Annual |
| CAL. DUE DATE | September 2019 |

**PROGRAMMING PARAMETERS**

| | | |
|---|---|---|
| DIAMETER (DN) | mm | 200 |
| F.S. FLOW - MAG | LPS | 468.7 |
| F.S. RANGE - O/P | LPS | 80.000 |
| TUBE CAL. FACTOR | 1 | 1.49194 |

**FORWARD TOTALIZER INFORMATION**

| | | |
|---|---|---|
| AS FOUND | 27652 | M3 |
| AS LEFT | 27664 | M3 |
| DIFFERENCE | 12 | M3 |

**TEST CRITERIA**

| | |
|---|---|
| AS FOUND CERTIFICATION TEST | Yes |
| FORWARD FLOW DIRECTION | Yes |
| ALLOWABLE [%] ERROR | 5 |

**COMPONENTS TESTED**

| | |
|---|---|
| CONVERTER DISPLAY | yes |
| mA OUTPUT | yes |
| TOTALIZER | yes |
| ACCURACY BASED ON [% o.r.] | yes |
| ERROR DOCUMENTED IN THIS REPORT, BASED ON % o.r. | |

**FLOW TUBE SIMULATION**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | 0.0 | 0.1 | 0.2 | 0.5 | 1.0 | m/s |
| | | | 0 | 1 | 2 | 5 | 10 | % F.S. Flow |
| | | | 0.0 | 5.9 | 11.7 | 29.3 | 58.6 | % F.S. Range |
| REF. FLOW RATE | | | 0.00 | 4.69 | 9.37 | 23.44 | 46.87 | LPS |
| MUT [Reading] | | | | 4.68 | 9.34 | 23.42 | 46.74 | LPS |
| MUT [Difference] | | | 0.00 | -0.01 | -0.03 | -0.02 | -0.13 | LPS |
| MUT [% Error] | | | n/a | -0.15 | -0.36 | -0.07 | -0.28 | % |
| mA OUTPUT | | | 4.000 | 4.937 | 5.875 | 8.687 | 13.374 | mA |
| MUT [Reading] | min. | 4.000 mA | 3.992 | 4.923 | 5.860 | 8.664 | 13.333 | mA |
| MUT [Difference] | max. | 20.000 mA | -0.008 | -0.015 | -0.015 | -0.023 | -0.041 | mA |
| MUT [% Error] | | | -0.20 | -0.31 | -0.25 | -0.27 | -0.31 | % |
| TOTALIZER - REF. FLOW RATE | | | | | | | 46.871 | LPS |
| TOTALIZER [MUT] | | | | | | | 5 | M3 |
| TEST TIME | | | | | | | 106.84 | SECONDS |
| CALC. TOTALIZER | | | | | | | 5.008 | M3 |
| ERROR | | | | | | | -0.15 | % |

**COMMENTS**

**QUALITY MANAGEMENT STANDARDS INFO.**

| [QMS] INFORMATION | IDENT | ID # |
|---|---|---|
| [REFERENCE] FTS | ABBMM | 1 |
| PROCESS METER | PM | 1 |
| ANALOG METER | AM | N/A |
| STOP WATCH | SW | Yes |

**RESULTS**

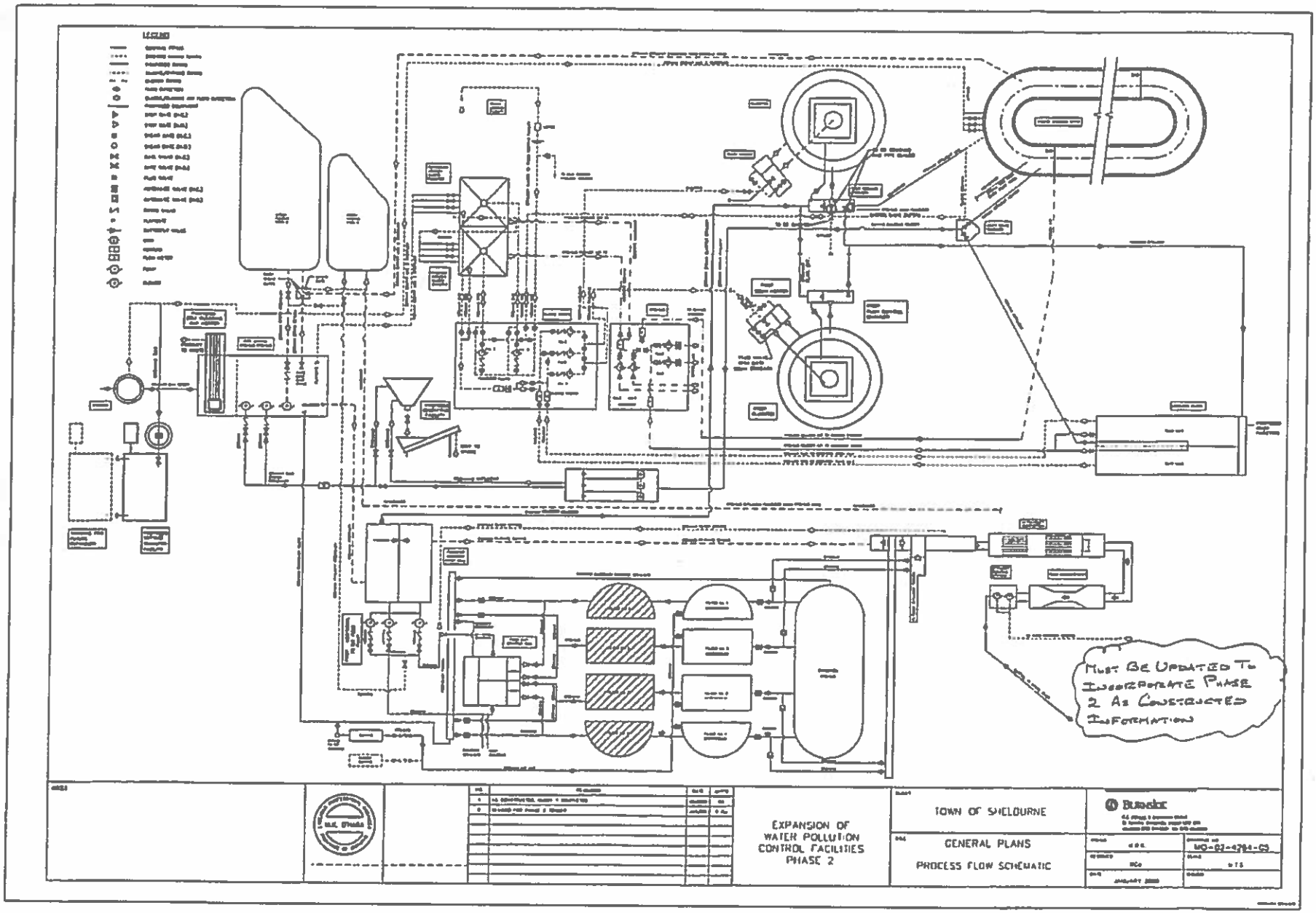
| TEST | AVG % o.r. | PASS FAIL |
|---|---|---|
| DISPLAY | -0.21 | PASS |
| mA OUTPUT | -0.27 | PASS |
| TOTALIZER | -0.15 | PASS |

This report reflects the test results of the overall accuracy for the above flow converter using the specified manufacturers flow tube simulator to within the specified tolerance as identified within this report.

# Appendix D

# Process Flow Schematic

# 2018


Must Be Updated To Incorporate Phase 2 As Constructed Information
EXPANSION OF WATER POLLUTION CONTROL FACILITIES PHASE 2
TOWN OF SHELBURNE
GENERAL PLANS
PROCESS FLOW SCHEMATIC
Burodot