

## **Teeswater Formosa Sewer System and Wastewater Treatment Plant**

### **2019 Summary Report**

**Prepared by Veolia Water  
For the Municipality of South Bruce**

#### **Contents**

ECA (#0279-8Q8JD6) Reporting Requirements

## Plant Description

The Teeswater Wastewater Treatment Plant is a Sequencing Batch Reactor plant with a Rated Capacity of 1,350 m<sup>3</sup>/day. Treated water is discharged into the Teeswater River. The facility receives waste from households, businesses and industries in Formosa and Teeswater included, but not limited to dairy waste from Gay Lea Food Co-operatives Limited and brewery waste from the Brick Brewing Ltd.

### **Teeswater Wastewater Treatment Plant**

- **Influent Works**

One (1) 600 mm wide and 1,300 mm deep screen channel equipped with a mechanically cleaned, 3 mm diameter perforated plate debris screen rated at 110 L/s and a bypass channel with an overflow weir and manual bar screen with custom aluminum rake.

One (1) 2.0 m diameter circular vortex grit removal unit rated with a *peak flow rate* of 110 L/s equipped with a grit removal system.

One (1) screw conveyor grit classifier serving the grit removal unit.

One (1) 9,500 L capacity alum solution storage tank, together with two (2) chemical metering pumps (one standby) each rated at 0 to 12 L/h, with an alum solution feed line to grit tank outlet channel.

- **Secondary Treatment Facilities**

A 350 mm diameter inflow pipe connected to an influent splitter box designed to distribute the influent sewage evenly between two sequential batch reactors (SBR). The reactors are 29.5 m long x 10.5 m wide x 6.4 m (5.8 m top water level) deep parallel continuous inflow SBRs with a baffle wall at the upstream end of each tank to direct all influent into the bottom of the tank and equipped with fine bubble aeration system.

One (1) motorized effluent decanter rated at 196 L/s peak rate for each SBR with, a fixed float scum guard, and discharging into a 26.7 m by 4 m equalization tank.

Two (2) submersible centrifugal waste activated sludge pumps for each SBR, each rated at 29 m<sup>3</sup>/h at a TDH of 8.0 m, with discharge line to the sludge digestion facility.

- **Air Blowers**

Three (3) positive displacement air blowers (one standby) serving as the compressed air supply for the SBR aeration system and sludge digestion system, each rated at 1860 m<sup>3</sup>/h at 69 kPa.

- **Effluent Filtration Systems**

Six (6) deep bed, continuous backwash effluent filters with total surface area of 27.87 m<sup>2</sup> rated at 3.3 L/m<sup>2</sup>/s for *Peak Flow Rate* of 92 L/s.

A 200 mm diameter inlet magmeter to allow supplementary flow-proportional chemical dosing to the filters;

One (1) 4,100 L chemical storage tank and two dosing pumps (one standby) to the inlet pipe to filters, each with a capacity range of 0 L/h to 12 L/h;

One (1) 2.4 m<sup>3</sup> flocculation (mixing chamber) ahead of filters equipped with a variable speed, 5 hp mixer.

Two (2) submersible, 7.5 hp well-type pumps each rated at 5 L/s at 73.7 m TDH for effluent water reuse in the headworks.

- **Effluent Disinfection Facilities**

A 4.41 m long x 406 mm wide x 780 mm deep indoor UV disinfection channel, equipped with a UV disinfection unit with a *peak flow rate* of 152 L/s, complete with a level control serpentine weir.

- **Plant Effluent Outfall Sewer**

A 525 mm diameter outfall sewer to Teeswater River;

- **Sludge Digestion and Storage Facilities**

One (1) 550 m<sup>3</sup> stage 1 sludge digestion tank and one (1) 245 m<sup>3</sup> stage 2 digestion tank, complete with aeration systems and decant assemblies.

Two (2) submersible centrifugal waste activated sludge pumps rated at 29 m<sup>3</sup>/h at a TDH of 14.5 m in digester 2, one for truck loading and one for discharge to the sludge storage facilities.

One (1) 4,461 m<sup>3</sup> capacity thickened sludge holding tank with cover.

One (1) 20 hp sludge mixer and an option for an additional second mixer if required.

- **Emergency Power Supply System**

One (1) 360 kW diesel engine standby power generator with integral fuel storage.

- **On-Site Wastewater Pumping Station**

An on-site wastewater pumping station equipped with two (2) 20 hp solids chopping centrifugal submersible sewage pumps (one standby) for pumping Formosa sewage, septage, filter backwash, domestic sewage and digester decant to the inlet works.

Includes a septage receiving station with manual bar screen and stainless steel custom rake.

### **Teeswater Sewage Collection System**

- **Teeswater Main Sewage Pumping Station**

A wet well/dry well style sewage pumping station located at the northwest corner of Mill Street and Hillcrest Street East at 6 Mill Street, Teeswater that is equipped with 2 submersible pumps, a backup generator and inlet manual bar screen complete with custom stainless steel rake.

- **Teeswater Local Sewage Pumping Station A1**

Located at the intersection of Reid Street and Logan Street, a duplex E-One grinder pump station and a 50 mm diameter forcemain along Logan Street to a maintenance hole east of Wright Street.

- **Teeswater Local Sewage Pumping Station A2**

Located at the end of Riverview Terrace, a duplex E-One grinder pump station and a 50 mm diameter forcemain along Riverview Terrace to a maintenance hole on Hillcrest Street E

- **Teeswater Local Sewage Pumping Station A3**

Located at the end of Andrew Street, a duplex pump station with grinder style centrifugal sewage pumps and a 75 mm diameter forcemain along Andrew Street to a maintenance hole on Hillcrest Street W  
This station is equipped with a backup diesel generator.


### **Formosa Sewage Collection System**

- **Formosa Main Sewage Pumping Station**

A 3.0 m diameter precast concrete wet well sewage pumping station, located on the east side of Bruce Road No. 12 at 1114 Bruce Road 12 and approximately 150 m south of Council Road equipped with two (2) submersible pumps, a backup generator, flow meter, bypass piping and alarms.

- **Formosa Teeswater Sewage Transmission Line** – a 200 mm diameter sanitary forcemain along Bruce Road 12, Concession 10, Sideroad 1B and Concession Road 8 from the pumping station to a grit removal chamber which discharges to a 300 mm/250 mm diameter gravity sewer along Concession Road 8, followed by a 250 mm/200 mm diameter sag sewer along Concession Road 8, with intermediate flush chambers, followed by a 250 mm diameter gravity sewer along Concession Road 8, followed by a second 250 mm/200 mm diameter sag sewer along Concession 8 and Sideroad 10A with intermediate flush chambers, followed by a 250 mm diameter gravity sewer along Sideroad 10A and finally discharges to the on-site sewage pumping station at the wastewater treatment plant;

- **Formosa Low Pressure Sanitary Sewer System** – Low pressure Sewers Serviced with Grinder Pumps at individual service locations.

	<b>Teeswater Wastewater Compliance Report 2019</b>												Facility Classification: Class 3 Waste Water Treatment Rated Capacity: 1350 m3/day Peak Flow: 7949 m3/day (92 l/s) Receiving Waters: Teeswater River			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Average	Maximum	Limit
<b>Flow</b>																
Total Raw Flow (m3/mth)	28,564	22,423	25,664	25,754	24,847	26,060	23,515	22,677	22,761	24,212	24,228	24,843	295,548	24,629		
Raw Average Day Flow (m3/d)	921	801	828	858	802	869	759	732	759	781	808	801		810		1350
Raw Max Day Flow (m3/d)	1,117	1,120	1,105	1,094	1,001	1,124	1,068	998	1,023	1,011	1,013	975			1,124	
<b>Biochemical O2 Demand</b>																
Influent Average BOD (mg/L)	701	385	501	486	449	605	733	1,056	1,261	682	673	1,039		714.8	3,580.0	
Effluent Average CBOD (mg/L)	4	2	2	3	3	2	2	2	2	2	2	2		2.5	6.3	10
Percent Removal	99.4	99.4	99.6	99.3	99.4	99.7	99.7	99.8	99.8	99.7	99.7	99.8		99.6 %		
<b>Suspended Solids</b>																
Influent Average TSS (mg/L)	496	464	531	526	273	283	410	532	1,559	451	366	598		531.7	5,280.0	
Effluent Average TSS (mg/L)	4	3	2	3	4	3	2	2	4	8	3	2		3.4	15.0	10
Percent Removal	99.3	99.4	99.6	99.4	98.7	99.0	99.5	99.6	99.8	98.2	99.2	99.6		99.3 %		
<b>Phosphorus</b>																
Influent Average TP (mg/L)	9.66	9.20	10.73	11.68	8.83	9.60	14.34	16.19	16.58	13.78	10.75	15.11		12.22	33.30	
Effluent Average TP (mg/L)	0.140	0.147	0.093	0.197	0.135	0.090	0.076	0.051	0.117	0.100	0.068	0.076		0.113	0.370	0.15
Percent Removal	98.6	98.4	99.1	98.3	98.5	99.1	99.5	99.7	99.3	99.3	99.4	99.5		99.1 %		
<b>Nitrogen Series</b>																
Influent Average NH3+4 (mg/l)	13.30	14.15	17.80	22.38	15.88	15.10	19.64	17.05	19.20	22.78	22.85	21.68		18.55	25.60	
Influent Average TKN (mg/L)	52.02	52.03	65.95	68.45	49.52	51.13	77.92	110.70	73.45	68.68	54.25	77.08		66.60	221.00	
Effluent Average NH3+NH4 (mg/L)	0.69	3.62	3.95	4.55	0.09	0.06	0.08	0.09	0.08	0.06	0.17	0.30		1.54	13.75	3
Effluent Average Nitrate (mg/L)	1.01	1.89	4.86	4.84	5.04	1.66	2.87	6.37	2.86	3.29	1.14	3.01		3.25	17.50	
Effluent Average Nitrite (mg/L)	0.23	0.19	0.11	0.21	0.17	0.01	0.01	0.03	0.04	0.05	0.09	0.10		0.11	0.78	
Effluent TKN (mg/L)	3.16	5.80	8.10	10.20	1.60	1.38	1.50	1.25	1.43	1.16	1.10	1.56		3.19	16.90	
<b>pH</b>																
Influent Average pH	7.59	7.60	7.39	7.48	7.35	7.07	7.07	7.24	7.05	7.24	7.38	7.18		7.30	8.50	
Effluent Average pH	8.13	8.00	7.72	7.70	8.01	8.10	8.20	8.11	8.06	7.96	7.83	8.01		7.99	8.33	
<b>UV Disinfection</b>																
Average UV Intensity	50.92	49.98	53.81	43.70	63.18	79.61	84.72	84.62	81.93	78.26	71.46	60.92		67.0	96.6	
<b>Disinfection</b>																
E.Coli Geo.Mean per 100mL	1	1	1	1	1	1	3	1	2	1	1	1		1	9	100

\* Note: The Effluent Ammonia limit from December 1<sup>st</sup> to April 30<sup>th</sup> is 4 mg/l  
 Values exceeding Monthly Effluent limits have been highlighted orange  
 Values exceeding Monthly Effluent Objectives have been highlighted yellow

## Operating Problems

- During 2019 there were several operating issues which impacted the effluent quality. However, there was only one month that effluent parameters were exceeded. In April both effluent Total Phosphorus (0.047 above limit) and effluent Ammonia (0.55 above limit) were exceeded. The cause of the exceedances was heavy loading due to elevated flows and spills from an industrial customer. The ministry and The Municipality of South Bruce were notified of the exceedances.

## Major Maintenance and Events

Additional maintenance other than routine maintenance included:

**January 17** - Installed a replacement flow meter to monitor flow from Gay Lea Foods. SCADA work was completed January 21, to accurately continuously monitor the flow.

**March 22** - Aerzen was on site to commission the overhauled Blower #2. Final Installation took place April 23rd.

**March (throughout)** - Biosolids were hauled from the Sludge Holding Tank to the Lystek Biosolids facility.

**April 16** - Electrician was on site to connect a new motor for the filter building compressor.

**April (throughout)** - Biosolids were hauled from the Sludge Holding Tank to the Lystek Biosolids facility.

**June 19** - An Inspection report was received from the Ministry of the Environment, Conservation and Parks (MECP). 2 Non-Compliance Items were noted related to the exceeded effluent parameters for the month of April 2019. The inspector also recommended an assessment be done relating to the Wastewater Treatment Plant Capacity. The Municipality, Veolia, and BM Ross are working to address these issues.

**June 5** - Veolia and Municipal staff flushed the Formosa low pressure sewer system in an effort to reduce odor issues.

**June 18** - Veolia and Municipal staff flushed the Formosa low pressure sewer system in an effort to reduce odor issues.

**June 27** - Aerzen was on site to commission the new stage for Blower #1.

**July 17** - Veolia and Municipal staff flushed the Formosa low pressure sewer system in an effort to reduce odor issues.

**August 21** - Aerzen was on site to address an oil leak on the recently replaced Air Blower #1 Stage. The oil leak was successfully repaired.

**September 18** - Veolia and Municipal staff flushed the Formosa low pressure sewer system in an effort to reduce odor issues.

**November 11-13** - Foster's completed annual sewer flushing for the Teeswater Collection system.

## **QA/QC Measures**

All required regulatory and ECA analyses were performed by E3 Labs. In addition, routine in house laboratory sampling was undertaken to ensure compliance. These tests include: 30 minute Settling, Suspended Solids, Final Effluent Total Phosphorus, pH, and temperature.

Filamentous Bacteria analysis was completed by GAP Labs.

## **Monitoring Equipment**

The following is a list of the monitoring equipment at the Teeswater WWTP:

- Hach DR 2800 – Total Phosphorus, Dissolved Phosphorus, Ammonia, Total Solids (Effluent)
- Hach HQ 40d– pH, Dissolved Oxygen (Effluent, and SBR Tanks)
- Endress Hauser online Analyzer - Dissolved Oxygen, Temperature (SBR Tanks)
- Digital Scale for MLSS and TSS (Effluent, SBR Tanks)
- Lab Oven for MLSS and TSS (Effluent, SBR Tanks)

## **Calibration and Service of Equipment**

- April 4<sup>th</sup> 2019 – Annual inspection of all safety equipment.
- May 3<sup>rd</sup> 2019 – Calibration of gas detectors by Hetek
- June 28<sup>th</sup> 2019- Calibration of flow monitoring equipment at the Wastewater Treatment Plant and Teeswater Collection System
- July 18<sup>th</sup> 2019- Calibration of flow monitoring equipment at the Formosa Sewage Pumping Station
- October 28<sup>th</sup> 2019 – Calibration of gas detectors by Hetek

## **Effluent Objectives**

1. Dissolved Phosphorus tests were used to indicate the required Alum dosage.
2. pH measurements were taken to ensure levels were between 6.0 and 9.0 and water quality.
3. Dissolved oxygen was measured to ensure that adequate aeration is being carried out.
4. Mixed liquor suspended solids and 30 minute settling tests are used to determine adequate microbiological populations and to set the sludge wasting rates.

In 2019 there were several months the Total Phosphorus (0.10 mg/l) objective was not met. The objective for Total Suspended Solids (5mg/l) was not met for the month of October. The Objective for Ammonia was not met for the months of February and March. See the Teeswater Compliance Report (above) for more details.

## **Bio Solids Volume**

In 2019 approximately 11,874 m3 of Biosolids were hauled and land applied. These Bio-Solids were hauled to the following sites: Johnson (NASM #22521), Gowland (NASM#22511), McKee (NASM #21855), Vandervliss (NASM #24050) and Batte (NASM #23122, and #21931).

In addition to land applied biosolids 3,394.5 m3 of biosolids were hauled to the Lystek facility.

In total Biosolids production increased by 10,175.5 m3 in 2019 compared to 2018.

Based on plant operations and biosolids production so far in 2020 we expect the total volume to be significantly reduced.

## **Customer Complaints**

2019 (Throughout) – Odor complaints continued to be received from Formosa residents. Veolia and South Bruce will continue to take additional measures to further reduce odor complaints. Several sewer deodorizing units have been installed into suspect man holes. Additionally, more frequent sewer main flushing has been implemented. The Municipality and Veolia have been working with WSP to find a long term solution for this issue.

## **Information for the District Manager**

No additional information was known to have been requested from the District Manager.

## **Recommendations**

1. Due to ongoing fluctuations in plant loading, The Municipality should continue to work with the Industrial Customers in order to either reduce the strength of the incoming waste, or make improvements to the current plant to increase the capacity of the Wastewater Treatment Plant.
2. Continue to address odor issues associated with the Formosa Collection System.



**By-Passes**

There were no by-passes or spills to report for 2019.

**Table 2 BYPASS AND OVERFLOW SUMMARY FOR 2019**



MONTH	Primary Bypass			Secondary Bypass			Plant Overflows			Collection System Overflows		
	No. of Events (events)	Duration (hours)	Volume (1000m3)	No. of Events (events)	Duration (hours)	Volume (1000m3)	No. of Events (events)	Duration (hours)	Volume (1000m3)	No. of Events (events)	Duration (hours)	Volume (m3)
January	0			0			0			0		
February	0			0			0			0		
March	0			0			0			0		
April	0			0			0			0		
May	0			0			0			0		
June	0			0			0			0		
July	0			0			0			0		
August	0			0			0			0		
September	0			0			0			0		
October	0			0			0			0		
November	0			0			0			0		
December	0			0			0			0		
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Note: An 'Event' means an occurrence or occurrences of a bypass or overflow separated by a period of more than 12 hours between the occurrence(s) or the event(s) and the previous event, at each location.