



Teeswater Formosa Sewer System and Wastewater Treatment Plant

120003735

2022 Summary Report

February 15, 2023

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 m³/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 Formosa Brewery

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 the 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 a 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 m³/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 m³/h at 69 kPa.

- **Effluent Filtration Systems**

Six (6) deep bed, continuous backwash effluent filters with total surface area of 27.87 m² rated at 3.3 L/m²/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 m³ 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 m³ stage 1 sludge digestion tank and one (1) 245 m³ stage 2 digestion tank, complete with aeration systems and decant assemblies.

Two (2) submersible centrifugal waste activated sludge pumps rated at 29 m³/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 m³ 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.

	Teeswater Wastewater Compliance Report 2022												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	Minimum	Average	Maximum	Limit
Flow																	
Total Raw Flow (m3/mth)	32,995	27,483	32,131	30,671	33,055	31,409	30,077	29,231	27,687	29,009	28,825	26,751	359,324		29,944		
Raw Average Day Flow (m3/d)	1,064	982	1,036	1,022	1,066	1,047	970	943	923	936	961	863			984		1350
Raw Max Day Flow (m3/d)	1,256	1,727	1,392	1,279	1,405	1,391	1,173	1,092	1,139	1,206	1,353	1,129					1,727
Biochemical O2 Demand																	
Influent Average BOD (mg/L)	639	617	547	603	665	785	896	663	600	484	584	394		221.0	632.2	1,690.0	
Effluent Average CBOD (mg/L)	4	3	6	3	8	2	2	2	2	3	2	2			3.1	21.0	10
Percent Removal	99.4	99.5	99.0	99.6	98.8	99.7	99.8	99.7	99.7	99.5	99.6	99.5			99.5 %		
Suspended Solids																	
Influent Average TSS (mg/L)	349	493	308	258	305	309	364	275	244	217	306	180			299.6	992.0	
Effluent Average TSS (mg/L)	10	9	8	7	7	5	5	5	4	6	5	6			6.5	15.0	10
Percent Removal	97.3	98.1	97.6	97.2	97.7	98.3	98.7	98.0	98.2	97.2	98.4	96.5			97.8 %		
Phosphorus																	
Influent Average TP (mg/L)	8.35	8.12	7.24	6.79	10.43	10.10	9.92	7.79	6.33	6.80	7.90	5.14			8.03	36.40	
Effluent Average TP (mg/L)	0.15	0.13	0.13	0.13	0.13	0.13	0.09	0.11	0.14	0.09	0.10	0.08			0.12	0.26	0.15
Percent Removal	98.2	98.4	98.3	98.0	98.7	98.7	99.1	98.6	97.8	98.6	98.8	98.4			98.5 %		
Nitrogen Series																	
Influent Average NH3+4 (mg/l)	27.23	30.03	30.32	34.93	32.43	40.00	42.80	33.08	33.84	32.08	25.88	25.93			32.44	74.40	
Influent Average TKN (mg/L)	50.75	76.75	50.10	48.08	86.93	82.08	71.56	66.91	54.31	63.24	59.68	48.23			66.83	288.00	
Effluent Average NH3+NH4 (mg/L)	0.68	0.10	0.86	0.18	0.10	0.12	0.10	0.10	0.10	0.30	0.10	0.10			0.24	1.90	2
Effluent Average Nitrate (mg/L)	4.90	5.46	3.85	5.43	3.82	10.43	5.10	7.24	6.55	4.72	6.41	8.05			6.07	13.90	
Effluent Average Nitrite (mg/L)	0.10	0.09	0.21	0.51	0.03	0.04	0.03	0.08	0.03	0.03	0.03	0.04			0.10	1.64	
Effluent TKN (mg/L)	3.03	1.48	2.34	1.40	1.30	1.94	1.55	0.94	1.25	1.20	1.16	0.75			1.53	4.90	
pH																	
Influent Average pH	7.04	7.00	7.03	7.21	7.26	6.87	7.50	7.13	7.44	7.38	7.48	7.36		5.63	7.23	8.06	
Effluent Average pH	8.14	8.13	8.18	8.33	8.35	8.21	8.49	8.46	8.54	8.24	8.29	8.32		7.95	8.31	8.69	
UV Disinfection																	
Average UV Intensity	9.04	16.30	8.02	3.70	7.86	33.95	76.39	89.33	85.51	64.20	46.31	34.85			39.8	100.0	
Disinfection																	
E.Coli Geo.Mean per 100mL	16	2	3	3	3	1	1	2	1	1	1	1			5	520	100

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

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 2022 there were 8 months (January to June and August to September) that the Total Phosphorus (0.10 mg/l) objective was not met. The objective for Total Suspended Solids (5mg/l) was not met for the months of January, February, March, April, May, October, and December.

The objective for Effluent CBOD was not met in March.

All Final Effluent Limits were met throughout 2022. See the Teeswater Compliance Report (Page 5) for more details.

Operating Problems

During 2022 there were several operating issues which impacted the effluent quality. However, the effluent limits were not exceeded for any parameters. Corrective actions for any Operating problems are summarized in the Maintenance and Events Section of this Report.

Maintenance and Events

Additional maintenance other than routine maintenance included:

February 11 - Sensaphone Sentinel Monitoring Systems were installed at the small Lift Stations in Teeswater.

April 21-30 - Staffed the Teeswater WWTP 24/7 due to settling issues in the Sequencing Batch Reactors.

QA/QC Measures

All required regulatory and ECA analyses were performed by SGS 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, Temperature (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

- July 6, 2022 – Annual inspection of lifting equipment.
- May 17, 18, and November 15, 2022 - Calibration of flow monitoring equipment at the Wastewater Treatment Plant and Teeswater Collection System
- May 30, 2022 - Calibration of gas detectors by Hetek
- November 16, 2022 – Calibration of gas detectors by Hetek

Bio Solids Volume

In 2022 approximately 6,889 m³ of Biosolids were hauled and land applied. Based on the volume of Sludge that was in the holding tank compared to the prior year the total volume generated was approximately 6,728 m³. The hauled Bio-Solids were applied to the following sites: Johnson (NASM #22521), Parker (NASM#24235), Marley (NASM #24161).

Overall the Biosolids production decreased by 2453 m³ in 2022 compared to 2021. This amount was less due to pretreatment that was undertaken by Gay Lea Foods.

Based on plant operations and biosolids production so far in 2023 we expect the total volume to be similar to or slightly less than 2022.

Customer Complaints

2022 (Throughout) – Odor complaints continued to be received from Formosa residents, however the number of residents with complaints appears to have been reduced. 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. In May of 2020 smoke testing was conducted to help identify odor sources from the sewer system. This also helped identify issues with some of the property owner's plumbing.

In 2022 Sewer Flushing of the Low Pressure System was completed in Formosa on August 17th.

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 and Veolia continue to be in discussions with 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. An EA has been initiated to explore these potential options, and a tender is being prepared.

By-Passes

There were no by-passes or spills to report for 2022.

Table 2 BYPASS AND OVERFLOW SUMMARY FOR 2022



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		
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0

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.

