Walkerton Water Pollution Control Plant

#120001489

2021 Summary Report

Prepared by Veolia Water Canada
For the Municipality of Brockton

Contents

Plant Description

The Walkerton Water Pollution Control Plant is a conventional activated sludge process with a rated capacity of 7,560 m3 per day with a peak capacity of 18,160 m3 per day. The collection system consists of approximately 40 km of gravity sewers flowing to a sewage pumping facility. The sewage pumping facility is equipped with 3 pumps with variable speed drives. It has screening and grit removal with 3 primary clarifiers, 4 aeration cells and 4 secondary clarifiers. Phosphorus removal is enhanced by the addition of ferric chloride. Chlorine gas is used for disinfection during the period of April 1st to November 30th each year. The facility has two stage anaerobic digestion and additional sludge storage to ensure favorable conditions for land application. A bio-gas/natural gas generator provides stand-by power to the entire facility. In 2020 the Fischer Dairy Lift Station was connected to the Wastewater Collection System.

Plant Performance Summary

VEOLIA WATER

Walkerton Wastewater Annual Report 2021

Facility Classification: Class 3 Waste Water Treatment
Total Design Capacity: 7,560 m3/day
Receiving Waters: Saugeen River

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Average	Maximum	Limit
Flow																
Influent Total Flow (m3/mth)	93,836	75,628	139,778	104,254	87,634	82,250	84,788	75,184	96,802	103,772	111,788	125,082	1,180,796	98,400		**18160**
Influent Average Day Flow (m3/d)	3,027	2,701	4,509	3,475	2,827	2,742	2,735	2,425	3,227	3,347	3,726	4,035		3,235.1	4,509	**7560**
Influent Max Day Flow (m3/d)	4,116	3,670	7,284	4,484	3,446	4,308	3,454	2,766	8,158	4,492	4,878	5,860			8,158	
Biochemical O2 Demand																
Influent Average Raw CBOD (mg/L)	118	134	84	134	145	134	188	238	238	121	120	75		144	439	
Effluent Average CBOD (mg/L)	2	2	2	2	2	2	2	2	2	2	3	2		2	3	**25**
CBOD Loading (kg/d)	6.41	5.32	8.76	6.94	5.32	4.84	5.58	4.83	6.13	6.63	10.70	7.97		6.6		
Percent Removal	98.3	98.5	97.6	98.5	98.9	98.5	98.9	99.2	99.2	98.3	97.5	97.3		98.4	%	
Suspended Solids														138	240	
Influent Average TSS (mg/L)	132	157	91	127	176	189	170	116	131	127	109	103		138	240	
Effluent Average TSS (mg/L)	2	2	2	3	3	3	4	4	2	2	5	3		3	6	**25**
SS Loading (kg/d)	6.41	4.04	7.56	10.40	9.90	7.72	9.66	8.33	7.53	6.63	18.24	9.76		8.8		
Percent Removal	98.5	99.0	98.2	97.6	98.1	98.2	97.9	97.0	98.2	98.4	95.4	97.6		97.8	%	
Phosphorus																
Influent Average TP (mg/L)	3.22	3.00	2.01	2.62	4.28	3.32	3.55	2.66	2.24	2.52	1.73	1.31		2.82	5.25	
Effluent Average TP (mg/L)	0.31	0.69	0.70	0.70	0.71	0.29	0.34	0.38	0.41	0.43	0.44	0.24		0.42	1.16	**1**
Phosphorus Loading (kg/d)	0.99	1.81	0.93	2.67	2.03	0.71	0.93	0.92	1.15	1.43	1.53	0.93		1.3		
Percent Removal	90.5	77.2	65.2	73.2	83.5	91.3	90.4	85.7	81.5	83.1	74.9	82.1		81.6	%	
Nitrogen Series																
Influent Average NH3+NH4 (mg/L)	18.00	22.90	14.80	18.25	20.90	23.75	20.05	23.40	20.60	18.95	7.30	12.90		18.34	29.00	
Effluent Average NH3+NH4 (mg/L)	0.04	0.27	0.08	0.10	0.20	0.10	0.10	0.15	0.10	0.10	0.10	0.10		0.12	0.50	**3**
NH3+NH4 Loading (kg/d)	0.11	0.68	0.35	0.35	0.56	0.24	0.28	0.36	0.31	0.33	0.36	0.44		0.4		
Effluent Average Nitrate (mg/L)	20.95	26.35	24.23	22.45	22.50	19.53	20.80	22.50	21.83	19.90	18.20	6.82		20.72	44.20	
Effluent Average Nitrite (mg/L)	0.04	0.11	0.06	0.03	0.05	0.14	0.10	0.04	0.05	0.03	0.03	0.07		0.06	0.37	
Unionized Ammonia (ug/L)	0.000	0.003	0.001	0.002	0.005	0.002	0.003	0.005	0.002	0.002	0.001	0.002		0.002	0.013	**0.02**
pH																
Influent Average pH	7.64	7.69	7.69	8.05	7.59	7.50	7.51	7.51	7.44	7.53	7.67	7.58		7.56	7.89	
Effluent Average pH	7.85	7.90	7.98	8.05	8.02	7.93	7.96	7.95	7.81	7.90	7.71	7.92		7.92	8.22	
Total Chlorine																
Avg. Chlorine Analyzer Reading (mg/L)			0.61	0.47	0.40	0.47	0.57	0.70	0.61	0.66	0.58	0.35		0.55	1.60	
													Geometric			
Disinfection													**Mean**			
E.Coli Geo.Mean per 100mL				1	53	5	13	13	2	22	14		6	15.4	53	**200**

June 15, 2021 - Effluent Toxicity Sample was collected. Samples were not lethal.

Metals Summary

VEOLIA WATER	Walkerton Wastewater Annual Report								2021		Facility Classification:		Class 3 Waste Water Treatment		
											Total Design Capacity:			7560	m3/day
											Receiving Waters:			Saugeen River	
Final Effluent	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**		**PWQO**	**ODWO**
Nickel; Ni (mg/L)															
Min:	0.004	0.007	0.006	0.010	0.016	0.012	0.007	0.005	0.005	0.005	0.006	0.007	**0.004**		
Max:	0.009	0.008	0.008	0.013	0.019	0.021	0.009	0.012	0.010	0.009	0.006	0.009	**0.021**		
Avg:	0.007	0.008	0.007	0.011	0.017	0.017	0.008	0.008	0.007	0.007	0.006	0.008	**0.010**	0.025	
Zinc; Zn (mg/L)															
Min:	0.040	0.040	0.020	0.030	0.030	0.020	0.020	0.030	0.020	0.010	0.020	0.020	**0.010**		
Max:	0.040	0.040	0.030	0.040	0.040	0.040	0.030	0.040	0.020	0.020	0.030	0.030	**0.040**		
Avg:	0.040	0.040	0.023	0.035	0.033	0.030	0.025	0.035	0.020	0.015	0.025	0.025	**0.029**	0.030	5.0
Copper (mg/L)															
Min:	0.005	0.005	0.004	0.005	0.008	0.004	0.004	0.009	0.004	0.004	0.005	0.003	**0.003**		
Max:	0.006	0.006	0.005	0.009	0.009	0.013	0.007	0.009	0.010	0.005	0.006	0.004	**0.013**		
Avg:	0.006	0.006	0.005	0.007	0.008	0.007	0.006	0.009	0.007	0.005	0.006	0.004	**0.006**	0.005	1.0
Chromium (mg/L)															
Min:	0.0030	0.0030	0.0002	0.0004	0.0002	0.0000	0.0004	0.0001	0.0002	0.0001	0.0003	0.0002	**0.0000**		
Max:	0.0030	0.0040	0.0030	0.0005	0.0003	0.0005	0.0004	0.0004	0.0003	0.0003	0.0005	0.0003	**0.0040**		
Avg:	0.0030	0.0035	0.0012	0.0005	0.0003	0.0003	0.0004	0.0003	0.0002	0.0002	0.0004	0.0003	**0.0008**	0.001	0.05
	Notes:														
	Limits are taken from the "Provincial Water Quality Objectives" July 1994 and "Ontario Drinking Water Objectives"														

- Nickel concentration in the final effluent averaged 40% of the level stated in the Provincial Water Quality Objectives (PWQO)
- Average Copper levels were over the PWQO objective of 0.005 mg/l. The annual average exceeded the PWQO by 0.001 mg/L with an average of 0.006 mg/L. The average concentration of Copper was less than Ontario Drinking Water Objective of 1.0mg/l.
- Average Zinc levels were under the PWQO objective of 0.030 mg/l. The annual average was 97% of the PWQO at an average of 0.029 mg/L. The average concentration of Zinc was less than Ontario Drinking Water Objective of 5.0mg/l.
- Average Chromium levels were under the PWQO objective of 0.001 mg/l . The annual average was 80% of the PWQO at an average of 0.0008 mg/l. The average concentration of Chromium was less than Ontario Drinking Water Objective of 0.05mg/l.
- All Processed Hauled Sludge met the requirements for metals listed in the Nutrient Management Act.

Operating Problems Encountered

- Low loading levels to the plant allow for clarifiers and two of the aeration cells to be cycled in and out of operation. This allows for more energy efficiency and improved plant operation.
- The effluent quality from the plant continues to be excellent. Monitoring of Copper, Zinc and Chromium is ongoing.
- There are significant differences between “dry period” flows and “wet period” flows. This is not unusual for older collection systems.

Major Maintenance at the Wastewater Treatment Plant

In 2021 there were no Major Maintenance issues that had a significant impact on the quality of the Final Effluent. Additional maintenance other than routine maintenance included:

January 15 - The Mechanical seal was replaced for Raw Sewage Pump #2
March 22 - Hooked up Chlorination and Dechlorination Systems for disinfection season
April 21 - Price Schonstrom repaired and replaced a portion of a leaking air line in the Return Sludge Hopper
June 9 - Price Schonstrom on site to begin Final Clarifier 1 and 2 Scum Trough Installation
July 28 - Gas Logics replaced the gaskets for the boiler Heat Exchanger
August 12 - Installed new stainless cable on Floating Carriage for Final Clarifier #4
October 5 - Price Schonstrom installed new Stainless Grease lines on Primary Clarifier #3
December 15 - Found a damaged wear ring on Raw Sewage Pump #3. Removed the pump from service.
December 16 - Raw Sewage Pump #1 Motor Failed. Installed the motor for Raw Sewage Pump #3 motor onto Raw Sewage Pump #1

Collection System Maintenance Activities

February 11 - The on-call Operator was called in for a Pump #1 Failure at the Fischer Dairy Sewage Pumping Station
March 22 - Repaired a damaged sewer service at 802 Durham Street East that was hit by Enbridge Gas
March 23 - The on-call Operator was called to the Fischer Dairy Sewage Pumping Station. Found Pump 2 plugged. Hawkins Electrical Contracting was called in to clean out the debris in the Pumping Station with their Vac Truck.
August 24 - Met with Cobide Engineering and BM Ross Engineering to review the list of deficiencies at the Fischer Dairy Sewage Pumping Station.
October 19 - SCG Installed flow monitoring system throughout the collection system as part of a sewer infiltration study
November 16 - A screening device was installed at the Fischer Dairy SPS in an effort to reduce the frequency that the pumps are clogging.

QA/QC Measures

All required regulatory and ECA required analyses were performed by E3 Laboratory Services. In addition routine in house laboratory sampling was undertaken to ensure compliance. This included, but was not limited to, 30 minute suspended solids, mixed liquor suspended solids, final effluent dissolved and total phosphorus, pH, NH3&4, temperature and total chlorine (when chlorinating).

Effluent Monitoring Equipment

The following is a list of the monitoring equipment at the WPCP for the final effluent:

- Hach CL17 – Total Chlorine analyzer.
- Hach DR2800 – Total Phosphorus, Dissolved Phosphorus, Ammonia, and Total Solids
- Hach Sension 1 – pH
- Hach DO Analyzer- Dissolved Oxygen
- Hach Pocket colorimeter – Total Cl2 residual
- Digital Scale - MLSS

Calibration and Service of Equipment

March 15, 2021 - Backflow prevention device inspections by Troy's Plumbing
May 21, 2021 - Hetek was on site to Calibrate Gas Monitors
June 1, 2021 - The Annual inspection of the lifting equipment was completed.
June 24, 2021 - ICS Instrumentation was on site to complete the Raw Sewage Flow meter Verification
September 28, 2021 - ICS Instrumentation was on site to complete the Final Effluent Parshall Flume Verification
November 19, 2021 - Calibration of gas detectors by Hetek

Effluent Objectives

Operations staff completed the following testing to ensure Effluent Objectives were met :

1. Ammonia tests are performed to monitor overall plant performance.
2. Dissolved Phosphorus tests were used to indicate the required Ferric Chloride dosage.
3. Total Chlorine was measured to ensure that E Coli. levels were kept below the objective of an Annual Geometric Mean Density of 150 cfu/100ml.
4. pH measurements were taken to ensure levels were between 6.0 and 9.0 and water quality.
5. Dissolved oxygen was measured to ensure that adequate aeration is being carried out.
6. Mixed liquor suspended solids tests are used to determine adequate microbiological populations and to set the sludge wasting rates.

Biosolids Volume

The total volume of biosolids hauled in 2021 was approximately 2303 m3. This volume decreased from 2020. This decrease was due to extra haulage that had taken place in 2020 in order to allow for Holding Tank Mixer Replacements. A total volume of 2303 m3 of biosolids were hauled to NASM Plan # 23493. This haulage took place on June 16th, 17th, and November 1st.
In 2022 it is expected that a similar volume of biosolids will be hauled based on current levels in the Digesters and Holding Tank.

Customer Complaints

No complaints were known to have been received.

By-Passes/Abnormal Discharge Events

There were no by-passes in 2021.

Information for the District Manager

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

Recommendations

1. An alternative to the coarse bar screen, such as a step screen, should be considered to reduce excess solids into the entry of the wet well of the sewage pumping station. This would also decrease the wear on the sewage pumps as well as the frequency of plugging.
2. The existing chlorine disinfection process should be replaced with Ultra Violet disinfection in time for the 2021 Federal Regulation Deadline. *Commissioning of the UV disinfection system is scheduled for March 29, 30, 2022.*
3. Upgrading of the sewage collection system should continue to take place. A decrease in infiltration would decrease costs and risks of operational by-passes during extreme wet periods.
4. Long term plans to replace secondary clarifier floating traveling bridges with chain and flight sludge collection should be considered due to the reliability issues of the floating carriage system.
5. Long term plans to replace the existing comminutor with a second step screen as a stand-by or for higher flows.
6. Investigate concrete failure and steps to repair or prevent further corrosion.
7. Install a continuous gas monitor in the dry/wet well including an audio/visual alarm inside and outside of the building.

Safety Incidents

There were no significant Safety Incidents at the Walkerton Wastewater Treatment Plant in 2021.

Walkerton Sewage Treatment Plant

2020 Annual Report

Appendix 1

Sludge Holding Tank Summary

VEOLIA WATER	Walkerton Wastewater Annual Report								2021	Facility Classification:		Class 3 Waste Water Treatment		
										Total Design Capacity:			7,560 m3/day	
										Receiving Waters:			Saugeen River	
	Sludge Holding Tank													
	Phosphorus Average	Total Suspended Solids	Ammonia Average	Arsenic Average	Cadium Average	Cobalt Average	Chromium Average	Copper Average	Mercury Average	Molybendium Average	Nickel Average	Lead Average	Selenium Average	Zinc Average
Month	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Jan '21														
Feb '21														
Mar '21	36	11,800		0.10	0.01	0.18	1.10	12.0	0.01	0.13	1.70	0.3	0.40	13.00
Apr '21														
May '21														
Jun '21	165	9,250	367.5	0.10	0.01	0.09	0.75	7.5	0.01	0.09	0.97	0.2	0.25	7.50
Jul '21														
Aug '21	470	21,000	0.0	0.10	0.02	0.21	1.80	18.0	0.02	0.23	2.20	0.5	0.50	16.00
Sep '21	840	24,900	426.0	0.10	0.02	0.29	2.50	24.0	0.02	0.35	3.50	0.6	0.60	24.00
Oct '21	1,600	35,200	1,820.0	0.20	0.03	0.43	3.60	35.0	0.30	0.43	4.20	0.9	0.90	33.00
Nov '21														
Dec '21														
Average	622.20	20,430.00	653.38	0.12	0.02	0.24	1.95	19.30	0.06	0.25	2.51	0.50	0.53	18.70
Ratio				5445	36299	2722	335	34	10770	2656	260	1307	1,233	35
Min Limit				**100**	**500**	**50**	**6**	**10**	**1500**	**180**	**40**	**15**	**500**	**4**