

2020 Year End Report: Huntsville Golden Pheasant Clean Water Plant (CWP)



Environmental Compliance Approval: # 6591-&M9LU6 amended under ECA#9847B6KR4X Jan 14, 2019

Engineering and Public Works Department

70 Pine Street, Bracebridge, Ontario P1L 1N3

Phone: 705-645-6764

Toll-Free: 1-800-281-3483

Fax: 705-645-7599

Email: publicworks@muskoka.on.ca

Website: www.muskoka.on.ca

Introduction

The Huntsville Golden Pheasant Clean Water Plant (CWP), which services the Town of Huntsville, is owned and operated by the District Municipality of Muskoka. The plant is located at 620 Highway 60, Huntsville. It services a population of approximately 7,500 people.

The Plant operated under the MOE Environmental Compliance Approval (Sewage) # 6591-7M9LU6, issued December 2008 and under MECP Environmental Compliance Approval (ECA) (Air) #66234YLK6T issued August 2001. On January 14, 2019 the ECA #9847-B6KR4X was issued by the Ministry of Environment as an amended ECA to account for upgrades to the UV disinfection system, the installation of a Soda Ash batching system for alkalinity addition and to provide for the construction of a Sludge Thickening System. Also, the amended ECA allows for the addition of an additional process tank and conversion of the aeration/mixing systems from coarse air to fine bubble diffusion which will significantly improve plant efficiency. Under the terms of the ECA, the plant is permitted to treat an average daily flow of 4,456 m³/day, and a peak flow of 13,330 m³/day. Additionally, effluent limit criteria are as follows:

Table 1 Effluent Limit Criteria

Effluent Parameter	Concentration
CBOD	15 mg/L
Total Suspended Solids	15 mg/L
Total Phosphorous	0.50 mg/L 2.44 kg/day
Total Ammonia Nitrogen Summer (May 15 to September 30)	
Total Ammonia Nitrogen Winter (October 01 to May 14)	
E. coli	200 CFU/100mL Geometric Mean Density
pH	6.00 - 9.50 Inclusive

The plant is a conventional activated sludge treatment process, consisting of primary and secondary clarifiers with aeration basins. Tertiary filtration and Ultra-Violet disinfection is also part of the treatment process. The facility is also equipped with anaerobic digesters for bio-solids stabilization and a dewatering process for final disposal.

Waste sludge from the plant process is digested anaerobically at the plant and periodically hauled off site for disposal.

General Information

A review of the District of Muskoka's infrastructure needs is conducted annually by the Director of Water and Sewer Services, Area Manager and Chief Operator, and recommendations for maintenance, rehabilitation and renewal programs are considered.

Efforts to eliminate the discharge of untreated or partially treated wastewater to receiving waters are being accomplished by a long term financial commitment to correct excessive infiltration into the wastewater collection system by means of sewer main rehabilitation / replacement, manhole rehabilitation and pumping station rehabilitation programs.

The treatment facility is capable of effective operation during emergencies; maintenance shut downs, and power failures. This is achieved through such measures as preventive maintenance of duty /

standby units, the duplication of major treatment components, the provision of standby power sources and extensive use of the SCADA systems. All pumping stations and treatment control systems use SCADA (Supervisor control and Data Acquisition), in combination with Data Highway Plus, and programmable logic controllers.

All operators are qualified to operate the systems efficiently and effectively in order to achieve the highest level of treatment at all times. A commitment to provide Operator training and certification is being sustained.

Regulatory sampling is carried out to meet the requirements outlined in the ECA, and additional in house operational sampling beyond these regulatory requirements is being performed on a routine basis. These efforts have resulted in an effective treatment process which ensures that effluent discharges consistently meet effluent objectives and are environmentally safe. All final effluent sample results for the MBR facilities met their effluent limits.

All data in this report is a compilation of test results received from SGS Canada and their accredited laboratory, Lakefield Research. All in-plant sampling, analysis and recording of results conforms, in order of precedence, to the following 3 standards: Ministry's Procedure F-10-1, "Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works", Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" and the American Water Works Association/Water Environment Federation (AWWA/WEF) publication "Standard Methods for the Examination of Water and Wastewater".

Executive Summary

In all respects, test results of the treated effluent for the parameters of CBOD5, suspended solids, ammonia, total phosphorous, and E. Coli are in compliance with the limits outlined in the ECA regarding monthly allowable concentrations and total effluent loading throughout the entire year.

Overall, the plant treatment processes performed satisfactorily and are deemed to be adequate. All sample test results of the final effluent were within levels outlined in the plant ECA #9847-B6KR4X.

Quantity of Flow Summary

The plant has a daily average flow design capacity of 4,456 m³/day. The actual average daily flow for the 2020 was 2,146m³/day, however, the 3 year average is 2,174m³/day, which represents 49% of the plant capacity. None of the individual system components exceeded the design flow rating.

Plant Operational Upsets or Process Failures

There were no plant operational problems in 2020.

Summary of Maintenance

In 2020, significant upgrades were performed at Golden Pheasant under phase one (1) contract one (1) and contract two (2) improvements. Contract one (1) included construction of buildings to house new blowers and alkalinity addition equipment, renovation of the UV disinfection system and replacement of the centrifuge for the biosolids handling systems. As well, the second contract of phase one (1) commenced to add additional process tankage, construct a waste activated sludge thickening process and to convert the aeration systems from coarse aeration to fine bubble diffusion. During contract one (1), urgent need to replace the facility electrical switch gear was identified. This was completed under the second contract to the satisfaction of the electrical safety authority. The second construction contract is expected to be complete in spring 2021.

All equipment information at this plant is entered into a computer database. From this information, a scheduled preventive maintenance program has been established. The maintenance program includes (and not limited to):

- Monthly testing of emergency testing (under load) of the standby generators.
- Annual servicing of emergency standby generators.
- Annual replacement of U.V. bulbs.
- Periodic infrared inspection of Motor Control panels.
- Annual calibration of flow metering devices.
- Inspection and cleaning of all sewage pumping stations if required.
- Marine inspection of effluent outfall and diffuser completed in 2017. (5-year cycle)

Evaluation of the Need for Improvement Works

The treatment facility is operating at a plant capacity of 49% and is in compliance with specified effluent parameter criteria. In addition, there has been no significant treatment process upsets and plant bypasses. As a result, there is no need for improvements to the existing works for these reasons, however, as Mountview Clean Water Plant is scheduled for conversion to a pump station then decommissioned, and, the flows from Mountview collection area directed then to Golden Pheasant, a suite of phased projects is underway to provide sufficient treatment capacity.

To achieve the required treatment capabilities required by the ECA, the following upgrades will be necessary:

- Replacement of blowers and process tank diffusers (Currently underway)
- Additional process tankage installed including one new clarifier unit (Currently in design phase)
- Waste Activated Sludge Thickening systems (Currently underway)
- New plant outfall to Fairy Lake (Currently in design phase)
- New filtration system (Currently in design phase)
- Increased UV disinfection capacity. (Currently in design)

These phased plant improvement works are underway. The first phase of the first contract was completed in 2019 as listed in the “Summary of Maintenance”. The second contract of the first phase will be completed spring 2021. Once complete, the second phased contract will commence and was in design in late 2019 through 2020. The second phased contract will complete construction of additional tankage to provide the additional plant capacity to receive flow from the future Mountview sewage pump station, replace the filtration system and increase UV disinfection capacity as required to handle the increased flow. Inlet works equipment and septage handling capabilities will be modernized under this project.

In a related but separate project on the Golden Pheasant campus, a new outfall to Fairy Lake is in design phase.

Evaluation Summary of Proposed Work Requiring Approval under OWRA

All upgrade works described are subject to approval under OWRA. An application for amendment to the facility ECA was submitted and approval received in January 2019 which permits alteration/improvement of the works as part of the first phase of contracts. Further application will be required prior to commencement of construction of the second phase of contracts once design is complete in 2021.

Interpretation of Analytical Results

All sample results for Raw Sewage and Final Effluent are reported in this section. Other tables in this report include Chemical Usage, Biosolids Quality, and Biosolids Quantity.

Raw Sewage

The information reported in the Raw Sewage sample results summary table consists of test results of analysis conducted on composite samples of the plant influent flow as required by the plant ECA. Samples are sent for analysis to Lakefield Research, as well as analysis conducted on site using Standard Methods or equivalent. Weekly analysis has been performed and reported as specified under the terms outline in the ECA.

Influent Analysis

Table 2 Influent Analysis

Influent Parameter	Minimum	4 Week Average Maximum	Annual Average	Average loading kg/day
BOD5 (mg/L)	50	175	127	272.5
Suspended Solids (mg/L)	70	279	216	463.5
Total Phosphorus (mg/L)	1.17	7.62	3.55	7.6
Total Ammonia Nitrogen (mg/L)	5.3	30.4	22.6	48.5

Effluent Analysis

The information reported in the Final Effluent sample results summary table 3 consists of test results of analysis conducted on final effluent composite samples. Bacteriological samples, however, consisted of grab samples. Weekly analysis has been performed and reported as specified under the terms outlined in the ECA.

Effluent Objective Analysis

The effluent objectives were met during all sample periods.

Final Effluent Analysis Summary

All final effluent samples tested for CBOD5, suspended solids, ammonia, E. Coli, and total phosphorous were below non-compliance limits outlined in the ECA.

Table 3 Final Effluent Analysis Summary

Parameter	Minimum	4 Week Average Maximum	Annual Average	Average Loading kg/day
COBD5 (mg/L)	2	3	2	4.3
Suspended Solids (mg/L)	2	6.3	3	6.4
Ammonia (mg/L)	0.2	17.9	10.0	21.5
E. Coli (#/100 mL)	0	11.0	2.5	Not applicable
Total Phosphorus (mg/L)	0.03	0.12	0.05	0.11
pH	6.59	7.66	7.37	Not applicable

Average daily flow comparisons by day of week ensure ECA requirements for scheduled sampling are taken at a time, and in a location characteristic of the quality and quantity of the sewage stream over the time period being monitored. Average daily flow rates by day of the week compare the flow to the average daily flow for the entire year. This data is used to determine if a particular day of the week is best to ensure samples are taken to meet the requirements of scheduled monitoring sections of the ECA's. Sampling plans are reviewed and updated yearly based on the previous yearly flow data.

Final Effluent Sampling Summary

All samples were collected following the frequency and methods required by the facility approval. Weekly samples were gathered on Wednesdays every week unless this day fell on a statutory holiday. For the coming year, 2021, weekly samples are to be gathered each Thursday unless this day falls on a statutory holiday.

Biosolids Generation

The quality and volume of biosolids hauled from the facility for disposal is outlined in the table provided. Dewatered biosolids from the plant was hauled to an approved disposal site. Private contractors were used by the District of Muskoka to transfer all material for disposal in 2020, and will continue to do so in 2021. It is not anticipated that there will be a significant increase in the total volume of bio solids produced in 2021.

Biosolids Co-Treatment

The treatment plant has the capability to co-treat additional wastes through the Hauled Waste Receiving Facility, which located on site at headworks of the plant. Septage and holding tank waste are hauled in by vacuum trucks, and dumped to a 45 m³ holding tank which is then blended into the plant influent flow. Biosolids and water treatment sludge generated by smaller municipal treatment facilities may be processed in this fashion as well. Tables summarizing the septage analytical characteristics and monthly loading rates of the hauled wastes that have been co-treated at the plant in 2020 are included in this report.

Summary of Complaints received throughout the reporting period

There were no complaints received in the reporting period.

Huntsville Golden Pheasant Wastewater Collection Summary

New Sewer Services:

A total of 75 customers connected to existing sewer laterals in 2020 as well as three (3) new laterals installed.

1. One 150 mm PVC sewer service installed by owner's contractor. This service is located at 10 Hilltop Dr.
2. One 125mm PVC sewer service installed by owner's contractor. This service is located at 19 Hodges Ln.
3. One 125mm PVC sewer service installed by owner's contractor. This service is located at 13 Florence St W

New Sewer Mains:

A total of 89 meters of 200 mm gravity sewer was installed in 2020 on Tristan Lane by owner's contractor.

Sewer Main Replacements:

A total of 277 meters of 250 mm gravity sewer was replaced in 2020 on Earls Rd as part of District of Muskoka capital projects. A total of 784 meters of 250 mm gravity sewer was replaced in 2020 on King William St as part of District of Muskoka capital projects.

Low Pressure Sewer Breaks:

There were no low pressure sewer breaks in 2020.

Sewer Force Main Breaks:

There were no sewer forcemain breaks in 2020.

Sewer Force Main Replacement

There were no sewer force mains replaced in 2020.

Main Line Sewer Blockage

District of Muskoka had one sewer main blockage in 2020. Re-coverable cost was \$4996.25 to clear and clean blockage.

Sewer Lateral Blockage

District of Muskoka had 1 sewer lateral blockage in 2020, Re-coverable cost was \$3692.09 to repair damaged sewer lateral. Interference by another utility caused issue.

Service Low Pressure Sewer Blockages:

There were no low pressure sewer blockages in 2020.

Frozen Sewer Force Mains:

There were no frozen sewer force mains in 2020.

Frozen Sewer Service Laterals:

No sewer service laterals froze in 2020.

Frozen Low Pressure Sewer Services:

No low pressure sewer services froze in 2020.

Sewer Flushing/Video:

A total of 14824 meters of sewer main was flushed in 2020. A total of 3569 meters of sewer main was video inspected in 2020.

Sewer Locates:

There were 1101 sewer locate requests addressed in 2020.

Table 4 Effluent Flow Summary - 2020

Month	Plant Total Monthly (m³)	Average Day Flow (m³/d)	Maximum Day Flow (m³/d)	Minimum Day Flow (m³/d)	Lagoons Monthly Flow (m³)	Facility Total Monthly Flow (m³)
January	59,169	1,909	2,732	1,611	634.56	59,804
February	51,209	1,766	2,051	1,470	456.14	51,665
March	84,458	2,724	4,137	1,524	489.9	84,948
April	66,857	2,229	3,400	1,364	458.02	67,315
May	57,472	1,854	2,250	1,206	533.56	58,006
June	55,412	1,847	2,119	1,596	573.28	55,985
July	63,761	2,057	3,239	1,648	610.48	64,371
August	70,458	2,273	3,674	1,698	559.48	71,017
September	70,562	2,352	3,109	1,872	510.36	71,072
October	71,968	2,322	2,888	2,002	515.13	72,483
November	66,008	2,200	2,624	1,723	575.62	66,584
December	66,106	2,132	3,171	925	551.64	66,658

Total Flow: 789,908 m³
 Average Day: 2,146 m³
 Maximum Day: 4,137 m³
 Minimum Day: 925 m³

Table 5 Influent Quarterly Analysis Summary – Weekly 24 Hour Composite Sample Part 1

Sample Date	Sample Identification Number	BOD5 mg/L	Phosphate	Total Phosphorus mg/L	Suspended Solids mg/L
Feb 05, 2020	CA13143-FEB20	88	0.04	2.07	152
May 06, 2020	CA12162-MAY20	89	<0.03	1.83	173
Aug 05, 2020	CA13188-AUG20	161	< 3.74	5.4	268
Nov 11, 2020	CA12372-NOV20	212	< 0.05	2.6	66
Yearly Average		137.5	0.97	2.98	165
Maximum		212	3.74	5.4	268
Minimum		88	.03	1.83	66

Table 6 Influent Quarterly Analysis Summary – Weekly 24 Hour Composite Sample Part 2

Sample Date	Sample Identification Number	Total Kjeldahl Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Total Ammonia Nitrogen mg/L
Feb 05, 2020	CA13143-FEB20	32.8	<0.06	<0.03	31.2
May 06, 2020	CA12162-MAY20	46.1	<0.06	<0.03	39.5
Aug 05, 2020	CA13188-AUG20	40.3	<0.06	<0.03	37.5
Nov 11, 2020	CA12372-NOV20	279.0	0.68	0.05	289
Yearly Average		99.6	0.22	0.035	99.3
Maximum		279.0	0.68	0.05	289
Minimum		32.8	0.06	0.03	31.2

Table 7 Chemical Usage Summary: Clarion A405P

Month	Average Dosage mg/L	Total kg (dry)
January	60.2	3,497.5
February	66.7	3,351.7
March	41.1	3,345.4
April	47.9	3,079.0
May	52.5	2,965.2
June	53.8	2,952.6
July	47.1	2,984.3
August	50.9	3,503.8
September	48.6	3,345.4
October	58.3	4,156.4
November	57.2	3,719.2
December	58.0	3,712.8
Average	53.5	3384.4

Total Yearly Kilograms: 40,613.3

Table 8 Effluent Quarterly Analysis Summary – Weekly 24 Hour Composite Sample Part 1

Sample Date	Sample Identification Number	CBOD5 mg/L	pH	Phosphate	Total Phosphorus mg/L	Suspended Solids mg/L
Feb. 5, 2020	CA13143-FEB20	<2	7.23	<0.03	0.04	6
May-06-20	CA12162-MAY20	<2	7.59	<0.03	0.04	<2
Aug. 5, 2020	CA13188-AUG20	4	7.51	0.04	0.12	4
Nov. 11, 2020	CA12372-NOV20	<2	7.16	<0.03	<0.03	<2
Yearly Average		2.5	7.37	0.03	0.06	3.5
Maximum		4	7.59	0.04	0.12	6
Minimum		2	7.16	0.03	.03	2

Table 9 Effluent Quarterly Analysis Summary – Weekly 24 Hour Composite Sample Part 2

Sample Date	Sample Identification Number	Total Kjeldahl Nitrogen mg/L	Nitrate Nitrogen mg/L	Nitrite Nitrogen mg/L	Total Ammonia Nitrogen mg/L
Feb. 5, 2020	CA13143-FEB20	13.1	12.4	0.08	11.9
May-06-20	CA12162-MAY20	14.9	3.2	0.07	12.6
Aug. 5, 2020	CA13188-AUG20	18.7	6.25	0.34	12.4
Nov. 11, 2020	CA12372-NOV20	5.9	14.60	0.07	2
Yearly Average		13.2	9.1	0.14	9.7
Maximum		18.7	14.6	0.34	12.6
Minimum		5.9	3.2	0.07	2.0

Table 10 Effluent Loading and Concentration Summary 2020: COBD5

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	2.75	5.25	7.51
February	2.25	3.97	4.61
March	2.00	5.45	8.27
April	2.00	4.46	6.80
May	2.00	3.71	4.50
June	2.00	3.69	4.24
July	2.50	5.14	8.10
August	2.50	5.68	9.19
September	2.50	5.88	7.77
October	3.25	7.55	9.39
November	2.25	4.95	5.90
December	2.40	5.12	7.61
Average Monthly	2.37	5.07	6.99
Effluent Objective	10	44.56	44.56
Non-Compliance	15	66.84	66.84

Table 11 Effluent Loading and Concentration Summary 2020: Suspended Solids

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	4.25	8.11	11.61
February	3.50	6.18	7.18
March	4.25	11.58	17.58
April	2.00	4.46	6.80
May	2.00	3.71	4.50
June	3.00	5.54	6.36
July	4.75	9.77	15.39
August	3.25	7.39	11.94
September	5.17	12.16	16.07
October	2.25	5.22	6.50
November	2.00	4.40	5.25
December	2.20	4.69	6.98
Average Monthly	3.22	6.93	9.68
Effluent Objective	10	44.56	44.56
Non-Compliance	15	66.84	66.84

Table 12 Effluent Loading and Concentration Summary 2020: Total Ammonia Nitrogen Summer

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
May	14.78	27.40	33.25
June	9.48	17.51	20.09
July	5.83	11.99	18.88
August	12.10	27.50	44.46
September	12.55	29.52	39.02
Average Monthly	10.95	22.78	31.14
Effluent Objective	N/A	N/A	N/A
Non-Compliance	N/A	N/A	N/A

Table 13 Effluent Loading and Concentration Summary 2020: Total Ammonia Nitrogen Winter

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	9.85	18.80	26.91
February	14.50	25.60	29.73
March	12.88	35.09	53.29
April	15.36	34.23	52.22
October	5.45	12.65	15.74
November	3.70	8.14	9.71
December	3.08	6.57	9.77
Average Monthly	9.26	20.16	28.20
Effluent Objective	N/A	N/A	N/A
Non-Compliance	N/A	N/A	N/A

Table 14 Effluent Loading and Concentration Summary 2020: Fecal Coliform

Month	Geomean (#/100mL)	Maximum Daily (#/100mL)
January	3.50	12.00
February	0.00	0.00
March	0.00	0.00
April	0.20	1.00
May	0.00	0.00
June	0.00	0.00
July	1.50	6.00
August	9.50	22.00
September	3.33	10.00
October	0.75	3.00
November	10.50	38.00
December	0.60	3.00
Average Monthly	2.49	7.92
Effluent Objective	80	80
Non-Compliance	200	200

Table 15 Effluent Loading and Concentration Summary 2020: Total Phosphorus

Month	Average mg/L	Average kg/day	Maximum Daily kg/day
January	0.05	0.10	0.14
February	0.04	0.07	0.08
March	0.03	0.08	0.12
April	0.04	0.09	0.14
May	0.04	0.07	0.09
June	0.05	0.09	0.11
July	0.10	0.21	0.32
August	0.07	0.16	0.26
September	0.07	0.16	0.22
October	0.04	0.09	0.12
November	0.03	0.07	0.08
December	0.03	0.06	0.10
Average Monthly	0.05	0.10	0.15
Effluent Objective	0.30		
Non-Compliance	0.50		2.44

Table 16 Liquid Sludge Production Summary 2020

Month	Hauler	Cake Weight kg	Destination
January	Waste Connections	81,850	Lystek
February	Waste Connections	74,420	Lystek
March	Waste Connections	37,660	Lystek
April	Waste Connections	73,730	Lystek
May	Waste Connections	34,570	Lystek
June	Waste Connections	59,750	Lystek
July	Waste Connections	26,300	Lystek
August	Waste Connections	105,190	Lystek
September	Waste Connections	101,190	Lystek
October	Waste Connections	113,360	Lystek
November	Waste Connections	93,890	Lystek
December	Waste Connections	73,940	Lystek

Yearly Total Volume: 875,850
 Yearly Average Volume: 72,988
 Maximum Volume: 113,360
 Minimum Volume: 26,300

Table 17 Sludge Quality Analysis 2020

Parameter Sampled (mg/L)	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Date	Feb. 5/20	May 6/20	Aug. 5/20	Nov. 11/20
Sample ID	Digester Sludge	Digester Sludge	Digester Sludge	Digester Sludge
Nitrate	<0.3	<0.3	<0.3	<0.3
Mercury	0.005	0.006	0.005	0.006
Chromium	0.25	0.26	0.35	0.24
Cobalt	0.04	0.05	0.06	0.04
Copper	5.9	6.6	7.8	6.9
Lead	0.2	0.2	0.3	0.20
Molybdenum	0.10	0.10	0.12	0.10
Nickel	0.17	0.21	0.21	0.17
Selenium	<0.1	<0.1	<0.1	<0.1
Arsenic	<0.1	<0.1	<0.1	<0.1
Zinc	7	10	11	9
Cadmium	0.010	0.018	0.015	0.014
Ammonia+ Ammonium	444	493	417	414
Total Kjeldahl Nitrogen	1110	1090	973	1060
Total Phosphorus	373	410	440	370
Total Solids	14700	1440	17200	13700
Volatile Acids	<40	>40	557	<40
Nitrite	<0.2	<0.2	<0.2	<0.2

Certification of Reports

I certify that the information in this document and all attachments are correct, accurate, and complete to the best of my knowledge

Marcus Firman, C.E.T.
Director, Water and Wastewater Services

Michael Currie
Manager of Water and Wastewater Operations