



**2010 WASTEWATER POLLUTION CONTROL
PLANT ANNUAL REPORT**

Certificate of Approval No. 3560-8A8LEY
Sewage Works No. 110000953

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1.0 INTRODUCTION

The Municipality of Brighton is pleased to present its Annual Performance Report for wastewater treatment for the operating period of January 1 to December 31, 2010.

Brighton's Water Pollution Control Plant services a population of approximately 6,297 consisting of 2,800 residential and commercial accounts including Presqu'ile Park. The Ontario Water Wastewater Certification Office classifies the Water Pollution Control Plant as Wastewater Treatment Class 1 facility and Wastewater Collection Class 2 collection system.

In 2010, the Brighton Wastewater Pollution Control Plant operated under Certificate of Approval number 3-0521-99-006 until November 17, 2010, at which time Certificate of Approval number 3560-8A8LEY was issued by the Ministry of Environment in order to cover the Proposed Works of constructing a berm and all other appurtenances related to such.

CONTROL DOCUMENT INFORMATION

Type of Control Document	Number	Issue Date	Effluent Monitoring Requirements (Yes/No)	Effluent Reporting Requirements (Yes/No)
C of A Sewage Works	3560-8A8LEY	17/11/10	YES	YES
C of A Sludge Drying Beds	3-0381-96-006	8/01/96	N/A	N/A
C of A Composting Site	A710120	2/05/97	N/A	N/A

There were no biosolids pumped to the drying beds during this reporting period and no material was utilized or removed from the composting site.

2.0 CONTACT INFORMATION

For information or questions regarding this report please contact:

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3.0 WASTEWATER TREATMENT PLANT DESCRIPTION & TREATMENT PROCESS

The sewage works in Brighton consists of:

- a 0.7 hectare aerated lagoon (Lagoon #1) with two mechanical surface aerators. The effluent from the aeration lagoon passes through a chemical mixing chamber where alum is added before entering the waste stabilization pond;
- a 5.44 hectare waste stabilization pond (Lagoon #2) is a facultative lagoon where wastewater stabilization is carried out by a combination of aerobic, anaerobic and facultative bacteria.
- a constructed wetland having a surface area of 6.2 hectare, located south of the existing waste stabilization pond consisting of Wetland Cell #1 (north cell) and Wetland Cell #2 (south cell) with alternating deep zones and vegetative terraces. The effluent from the constructed wetlands is continuous and discharges to a natural wetland that borders Presqu'île Bay located off the northeast shore of Lake Ontario;
- a 2-cell drying bed to service the existing sewage treatment lagoons; sludge that accumulates in the lagoons may be periodically pumped to drying beds.

The hydraulic capacity of the sewage works has been re-rated at 4,600 m³/day since the constructed wetlands were incorporated to the treatment system in the summer of 2000. Approximately 40% of the sanitary sewage from the Brighton collection system flows by gravity to the aerated lagoon; the remainder of the flow (60%) was collected at the Harbour Street Sewage Pumping Station where it is pumped through a forcemain to the WPCP. The pumping station is equipped with three dry well centrifugal pumps that pump wastewater through a forcemain to the aerated lagoon. A standby diesel generator is on-site at the pumping station to provide electricity to the pumps during power outage events.

Brighton's wastewater treatment system is a low-tech approach based on purifying the wastewater through biological activity in a lagoon-based system. Raw wastewater enters the aerated lagoon (Lagoon #1) where it is mixed and oxygenated. The added oxygen from aeration allows aerobic microorganisms to reduce organic matter and nutrients, and reduces odour potential in the wastewater. The effluent from the aerated lagoon then passes through a mixing chamber where Alum (Aluminum Sulfate) is added. Alum is a flocculent used in wastewater ponds to precipitate soluble phosphorus and aids in the settling of many other substances. The effluent then flows to the waste stabilization pond (Lagoon #2) where the bound solids settle to the bottom and the organic portions are decomposed through microbial action. Dissolved materials such as nitrogen and phosphorous are used by green algae in the pond for cell growth. The effluent from the waste stabilization pond then enters the constructed wetland for final polishing where the water is further filtered and cleansed. The natural processes occurring in the lagoons and wetland system produce a good quality effluent that is monitored regularly by licensed operators. Treatment performance from lagoon-based systems is susceptible to low temperature conditions and associated negative effects on biological treatment performance. Ammonia removal rates and microbial growth typically decrease with lower temperatures. The Certificate of Approval provides changes in concentration limits for Ammonia in the waste stabilization pond and constructed wetlands from October to April to provide allowances for cold temperatures that result in lower nitrification rates.

Analyses are taken in both the influent (raw sewage) and the effluent at the lagoon and wetlands to determine the amount of treatment achieved. The results must comply with MOE guidelines and Certificate of Approval effluent concentration limits and objectives.

4.0 COMPLIANCE WITH TERMS AND CONDITIONS OF CERTIFICATE OF APPROVAL

4.1 Performance

4.1.1 *Wastewater Flow to the WPCP*

Certificate of Approval 2.(a) The Owner shall ensure that the flow of sewage into the sewage treatment works does not exceed the average daily flow of 4,600 m³/day for a period of any twelve (12) consecutive calendar months.

The average daily flow for 2010 was 3,072 m³/day, which represents 64.4% of the average day design capacity of 4,600 m³/day. The maximum annual daily flow for 2010 occurred on December 2, 2010 where heavy precipitation contributed to a peak flow of 12,500 m³/day. Peak monthly flow of 133,882 m³ occurred in December due to heavy precipitation that month. Annual flow of sewage to the WPCP was 1,123,106 m³ in 2010 with approximately 60% of the wastewater entered via the pumping station and 40% flowing by gravity from the remainder of the sanitary collection system.

Table I – Monthly Sewage In-flow to Treatment Plant

Date	Total Flow m3	Avg. Flow m3/day	Max. Day Flow m3	% Avg Day/Design Cap
January	110,373	3,560	9,860	77%
February	77,081	2,753	3,686	60%
March	120,468	3,886	7,379	84%
April	92,975	3,099	4,162	67%
May	85,164	2,747	3,390	60%
June	94,826	3,161	7,665	69%
July	94,649	3,053	4,167	66%
August	81,353	2,624	2,916	57%
September	70,871	2,362	2,066	51%
October	75,782	2,445	2,835	53%
November	85,682	2,856	4,381	62%
December	133,882	4,319	12,500	64%
Annual	1,123,106			

Volume of influent of wastewater to lagoon #2 measured 1,123,106 m³ See Table II.

Average per capita daily wastewater flow to Brighton WWTP was approximately 0.49 m³/capita in 2010, which includes domestic, industrial and commercial contributions as well as infiltration and inflow. (Based on a population of 6,297 and an average daily flow of 3,072 m³/day.) The population number includes an estimated 182 persons to account for the seasonal population of Presqu'île Provincial Park.

The total flow of wastewater to the treatment plant in 2009 was 1,335,923m³; flows in 2010 were approximately 16% lower

Table II- Annual Flows to the WPCP

Date	2010	2009	2008	2007	2006
January	110,373	99,491	112,038	140,264	135,919
February	77,081	111,628	103,034	78,345	116,375
March	120,468	147,025	149,246	120,276	108,727
April	92,975	160,693	186,347	148,787	123,600
May	85,164	132,309	125,367	113,879	107,899
June	94,826	93,962	91,382	84,874	92,457
July	94,649	91,162	88,538	78,451	96,755
August	81,353	83,029	89,577	72,287	78,674
September	70,871	76,566	76,298	67,372	85,449
October	75,782	103,296	77,068	70,893	145,412
November	85,682	102,340	84,512	73,350	143,914
December	133,882	134,422	136,290	86,621	153,616
Annual	1,123,106	1,335,923	1,319,697	1,135,399	1,388,797

4.1.2 Waste Stabilization Pond Effluent Quality

Certificate of Approval 2.(b) The owner shall design, construct and/or operate the sewage treatment works such that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent from the waste stabilization pond (Lagoon #2):

Table III – C of A Waste Stabilization Pond Effluent Parameters

Effluent Parameters	Concentration in Effluent	Loading in Effluent
CBOD ₅	30.0 mg/L	138.0 kg./day
Suspended Solids	40.0 mg/L	184.0 kg./day
Ammonia & Ammonium Nitrogen (May 1 to Oct. 30) ¹ (Nov. 1 to Apr. 30) ²	14.0 mg/L¹ 17.0 mg/L ²	64.4 kg./day¹ 78.2 kg./day ²
Total Phosphorus	1.0 mg/L	4.6 kg./day

Waste Stabilization Pond Effluent Summary:

- The Biological Oxygen Demand is the amount of oxygen used by micro-organisms as they decompose organic matter in the effluent sample for five days. High BOD in effluent means a large quantity of oxygen was needed to break down the organic matter and identifies a large amount of organic matter in the effluent indicating inadequate treatment. The CBOD₅ average concentration from the waste stabilization pond effluent in 2010 was 7.54 mg/L; the C of A limit is 30.0 mg/L CBOD₅ based on the average concentration of all samples taken.
- Total Suspended Solids in effluent are composed of settleable solids and nonsettleable solids depending on the size, shape and weight of the solid particles; large sized particles tend to settle more rapidly and are largely removed in the waste stabilization pond. Suspended Solids concentration limit from the waste stabilization pond effluent is 40.0 mg/L. The annual average of Total Suspended Solids was 17.85mg/l from the waste stabilization pond.
- Total Phosphorus (TP) refers to the amount of phosphorus in a sample. Excess TP stimulates algae and weed growth that may cause fluctuations in dissolved oxygen in the receiving waters. Total Phosphorus limits for the waste stabilization pond is based on the monthly average concentration of the parameter; the C of A limit is 1.0 mg/L TP. Monthly average concentration of Total Phosphorus in 2010 ranged from 0.16 – 0.77 mg/L.
- The C of A limits for Ammonia are 14.0 mg/L from May to October and 17.0 mg/L from November to April. Non-compliance with respect to concentrations of (Ammonia + Ammonium) Nitrogen in the effluent is deemed to have occurred when the '*monthly average*' concentration of the parameter listed in Table III is exceeded in any calendar month. Ammonia concentrations from May to October averaged 16.71 mg/L; and averaged 12.96 mg/L in November to April.

A summary of the Lagoon Loading is provided in Table VII.

A summary of the overall performance of the wastewater system is provided in Table IX. It is noted that there were exceedances of Ammonia in 2010.

4.1.3 *Wetland Effluent Quality*

Certificate of Approval 5.(a) the Owner shall use best effort to operate the sewage treatment works with the objective that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent from constructed wetland:

Table IV – C of A Constructed Wetland Effluent Objectives

Constructed Wetland Effluent Parameter	Concentration
CBOD ₅	15.0 mg/L
Suspended Solids	15.0 mg/L
Ammonia + Ammonium Nitrogen (May 1 to October 30) ¹	10.0 mg/L ¹
(November 1 to April 30) ²	15.0 mg/L ²
Total Phosphorus	0.80 mg/L

Table V lists the weekly lab results of the Waste Stabilization Pond.

Wetland Effluent Summary:

- The average concentration of CBOD₅ from the constructed wetland effluent in 2010 was 3.05 mg/L; the C of A objective is 15.0 mg/L CBOD₅ based on the average concentration of all samples taken.
- Suspended Solids concentration limit from the constructed wetland effluent is 15.0 mg/L. The annual average concentration of Total Suspended Solids was 6.28 mg/L from the constructed wetland based on the average concentration of all samples taken.
- Total Phosphorus limits for the constructed wetland is based on the monthly average concentration of the parameter; the C of A limit is 0.80 mg/L. Monthly average concentrations of Total Phosphorus in 2010 ranged from 0.13-0.22 mg/L.
- Limits for Ammonia from the constructed wetland are 10.0 mg/L from May to October and 15.0 mg/L from November to April. Non-compliance with respect to concentrations of (Ammonia + Ammonium) Nitrogen in the effluent is deemed to have occurred when the *'monthly average'* concentration of the parameter listed in Table IV is exceeded in any calendar month. Ammonia concentrations from May to October averaged 14.37 mg/L; and averaged 12.84 mg/L from November to April.
- There were exceedances as defined in the Certificate of Approval of any of the parameters with respect to concentration from the constructed wetland effluent.
- Lack of sunlight, plant production, decreased temperatures and ice cover in winter months directly affects treatment capability of a natural treatment process by limiting dissolved oxygen concentrations which may contribute to elevated food to microorganism ratio (F:M) conditions. Algae, coon tail weed and plants consume nitrogen and phosphorus in the wastewater; lack of this activity in winter months limits the reduction of Ammonia and Phosphorus in the final effluent.

Certificate of Approval (5.)(b) states that the geometric mean density of *E. Coli* should not exceed 200 organisms per 100 ml. for any calendar month. *E. coli* are sampled once a month from the waste stabilization pond basis as per C of A. See results. *E. Coli* levels were above 200 organisms per 100 ml on four occasions in the lagoon and six occasions in the wetland.

Table VI lists the weekly lab results of the Constructed Wetland Effluent including monthly *E. Coli*

4.2 Monitoring and Recording

Certificate of Approval 4.(a) Annual calibration of flow measuring devices was performed on August 25, 2010.

Certificate of Approval 4.(b)(c)(d) – Table VIII demonstrates compliance with frequency of sampling of raw sewage, waste stabilization pond effluent and wetland effluent.

4.3 **Operations and Maintenance**

Operations:

Operation now includes an inspection and flushing program at the Presqu'ile Park lift station. Regular inspection and flushing aids in preventing blockages, flooding, and any anaerobic activity that may occur in the forcemain. This ensures a far more consistent and stable influent from the park.

A new alarm system was installed at the Harbour St. lift station. This system continuously monitors various equipment and processes, and can provide notification to operators when something is not functioning correctly. Weekly Tests are performed by operators to ensure reliability of equipment.

Upgrades have also been carried out at the lagoon with the installation of a new Alum dosing system. This new system will permit better control over the feed rate which may equate to cost savings with respect to Alum conservation.

Maintenance:

A regular maintenance schedule is in place in order to service many components of the wastewater system. Scheduled maintenance is key to ensuring equipment is properly serviced in order to minimize breakdowns.

In 2010, flushing and camera inspection was conducted in various areas throughout the Municipality. This inspection work is a key component of the annual maintenance program, which allows Operators to accurately assess Brighton's wastewater infrastructure.

Table V

WASTE POND EFFLUENT-2010											
	CBOD ₅	TSS	T.P.	T.P.	Ammonia	Ammonia	TKN	Nitrite (N)	Nitrate (N)	E. Coli	Temperature
C of A	30 mg/L	40 mg/L	1.0 mg/L	1.0 mg/L	(May-Oct)14	Monthly	mg/L	mg/L	mg/L	200/100ml/mo	Celsius
CBOD results <2 recorded as 1.0	weekly	weekly	Monthly Avg.	Monthly Avg.	(Nov-Apr) 17	Average					
05-Jan	4.00	10.00	0.30		13.50		20.00	0.30	0.40	1400	
12-Jan	7.00	16.00	0.53		12.60		16.00	0.10	0.30		
19-Jan	6.00	10.00	0.35		15.50		17.00	0.10	0.20		
26-Jan	48.00	82.00	1.91		8.40		17.00	0.30	0.30		
	16.25	29.50		0.77		12.50	17.5	0.20	0.30	1400	4.6
02-Feb	12.00	52.00	0.80		11.70		18.00	0.50	0.70	1740	
09-Feb	13.00	26.00	0.51		13.00		18.00	0.40	0.60		
16-Feb	23.00	36.00	0.68		10.50		18.00	0.10	0.40		
23-Feb	31.00	54.00	1.10		14.40		20.00	0.10	0.20		
	19.75	42.00		0.77		12.40	18.50		0.48		2.8
02-Mar	16.00	30.00	1.13		20.50		19.00	0.10	0.10	8300	
09-Mar	2.00	24.00	0.76		11.10		12.00	0.40	0.30		
16-Mar	8.00	16.00	0.47		13.40		17.00	0.40	0.40		
23-Mar	5.00	15.00	0.23		10.30		13.00	0.40	0.70		
30-Mar	4.00	10.00	0.19		7.90		12.00	0.50	1.10		
	7.00	19.00		0.65		13.83	14.60		0.52		6.2
06-Apr	2.00	8.00	0.13		6.50		10.00	0.50	1.30	20	
13-Apr	3.00	2.00	0.22		11.00		12.30	0.10	0.20		
20-Apr	4.00	8.00	0.16		11.60		12.30	0.40	0.50		
27-Apr	2.00	4.00	0.11		5.83		8.17	0.80	2.50		
	2.75	5.50		0.16		8.73	10.69		1.13		13.2
04-May	13.00	40.00	0.25		6.00		7.00	0.60	1.50	60	
11-May	2.00	8.00	0.07		5.40		7.00	0.10	0.20		
18-May	15.00	10.00	0.35		16.00		16.00	0.10	0.20		
25-May	3.00	6.00	0.21		17.70		17.00	0.10	0.10		
	8.25	16.00		0.22		11.28	11.75		0.50		18.3
01-Jun	4.00	6.00	0.18		18.80		19.00	0.10	0.10	360	
08-Jun	2.00	2.00	0.13		16.80		17.00	0.10	0.10		
15-Jun	5.00	18.00	0.36		25.00		24.00	0.10	0.10		
22-Jun	7.00	10.00	0.40		28.20		30.00	1.00	0.10		
29-Jun	4.00	2.00	0.33		23.50		22.00	0.10	0.10		
	4.40	7.60		0.27		22.46	22.40		0.10		22.7
06-Jul	3.00	2.00	0.26		20.00		19.00	0.30	0.10	20	
13-Jul	4.00	12.00	0.29		17.80		18.00	0.30	0.10		
20-Jul	5.00	6.00	0.17		15.90		18.40	0.30	0.10		
27-Jul	2.00	6.00	0.16		18.40		18.00	0.50	0.10		
	3.50	6.50		0.22		16.55	18.35		0.10		26.5
03-Aug	4.00	20.00	0.27		13.00		13.70	0.80	0.10	20	
10-Aug	7.00	26.00	0.37		14.90		17.90	0.10	0.10		
17-Aug	5.00	16.00	0.43		15.90		17.80	0.40	0.10		
24-Aug	5.00	24.00	0.45		20.00		20.10	0.10	0.10		
31-Aug	8.00	40.00	0.32		14.60		17.70	1.90	0.20		
	5.80	25.20		0.38		15.95	17.44		0.12		24.2
07-Sep	8.00	48.00	0.46		15.90		18.70	0.50	0.20	20	
14-Sep	5.00	55.00	0.54		18.90		18.80	0.50	0.20		
21-Sep	5.00	10.00	0.43		15.10		19.80	0.10	0.10		
28-Sep	4.00	14.00	0.45		16.90		21.00	0.10	0.10		
	5.50	31.75		0.47		16.70	19.58		0.15		18.5
05-Oct	5.00	34.00	0.40		13.20		21.30	0.5	0.2	840	
12-Oct	2.00	24	0.27		16.90		23.00	0.10	0.30		
19-Oct	2.00	8.00	0.26		18.20		22.00	0.10	0.20		
26-Oct	2.00	2.00	0.38		21.00		21.50	0.10	0.10		
	2.75	17.00		0.33		17.33	21.95		0.20		12.9
02-Nov	2.00	6.00	0.37		24.50		21.50	0.10	0.10	20	
09-Nov	2.00	8.00	0.34		19.30		16.6	0.10	0.10		
16-Nov	2	8.00	0.22		18.80		17.50	0.10	0.20		
23-Nov	11.00	4.00	0.19		17.10		19.90	0.10	0.30		
30-Nov	2.00	12.00	0.31		19.40		20.30	0.10	0.30		
	3.80	7.60		0.28		19.82	19.16		0.20		7.5
07-Dec	4.00	4.00	0.58		10.30		15.90	0.50	1.20	2520	
14-Dec	30.0	8.0	0.5		8.5		13.8	0.4	1.0		
21-Dec	2.00	2.00	0.34		9.30		16.90	0.40	0.70		
28-Dec	7.00	12.00	0.64		13.90		16.30	0.10	0.10		
	10.75	6.50		0.51		10.50	15.73		0.75		
Average	7.54	17.84	0.41	0.4		14.84	17.40	0.31	0.36		3.1
Cof A Par.	30 mg/l	40 mg/l	1.0 mg/l		(May-Oct)14mg/l						
					(Nov-Apr)7mg/l						

Table VI

WETLAND FINAL EFFLUENT											
DATE	CBOD ₅	TSS	TP	TP Month	Ammonia(N)	NH ₃ Month	TKN	Nitrite	Nitrate	E. Coli	
ng/L recorded as 1.0			weekly	Average		Average		(N)	(N)		
05-Jan	2.00	5.00	0.22		13.10		16.00	0.10	0.30	40	
12-Jan	2.00	6.00	0.24		13.80		15.00	0.10	0.20		
19-Jan	3.00	6.00	0.26		14.30		16.00	0.10	0.20		
26-Jan	7.00	14.00	0.40		11.50		15.00	0.10	0.50		
	3.50	7.75	0.28	0.28		13.18	15.50	0.10	0.30		
02-Feb	4.00	26.00	0.42		11.70		15.00	0.10	0.80	400	
09-Feb	6.00	12.00	0.22		12.50		18.00	0.10	0.30		
16-Feb	11.00	20.00	0.33		12.20		17.00	0.10	0.20		
23-Feb	5.00	14.00	0.39		14.10		15.00	0.10	0.20		
	6.50	18.00	0.34	0.34		12.63	16.25	0.10	0.38		
02-Mar	8.00	16.00	0.66		17.70		17.00	0.10	0.20	380	
09-Mar	2.00	8.00	0.37		12.80		12.00	0.10	0.20		
16-Mar	3.00	6.00	0.18		15.00		15.00	0.10	0.30		
23-Mar	2.00	4.00	0.10		9.40		13.00	0.10	0.30		
30-Mar	2.00	3.00	0.09		7.70		12.00	0.40	0.80		
	3.40	7.40	0.28	0.28		12.52	13.80				
06-Apr	2.00	10.00	0.20		6.50		9.00	0.10	2.00	20	
13-Apr	2.00	2.00	0.19		7.90		9.20	0.10	0.20		
20-Apr	2.00	4.00	0.09		7.78		8.58	0.10	0.20		
27-Apr	2.00	10.00	0.23		10.80		13.70	0.10	0.30		
	2.00	6.50	0.18	0.18		8.25	10.12				
04-May	2.00	12.00	0.35		10.60		7.00	0.10	0.10	20	
11-May	2	8	0.08		5.60		6.00	0.10	0.20		
18-May	8.00	2.00	0.14		9.50		10.00	0.10	0.10		
25-May	2.00	6.00	0.35		12.20		13.00	0.10	0.20		
	3.50	7.00	0.23	0.23		9.48	9.00				
01-Jun	2.00	2.00	0.17		10.60		12.00	0.10	0.10	80	
08-Jun	2.00	2.00	0.10		15.80		15.00	0.10	0.10		
15-Jun	2.00	2.00	0.11		19.00		19.00	0.10	0.10		
22-Jun	4.00	4.00	0.13		20.80		21.00	1.10	0.10		
28-Jun	3.00	2.00	0.14		13.40		15.00	0.10	0.10		
	2.60	2.40	0.13	0.13		15.92	16.40				
06-Jul	4.00	2.00	0.12		18.70		18.00	0.30	0.10	140	
13-Jul	2.00	6.00	0.28		16.00		16.10	0.10	0.10		
20-Jul	2.00	8.00	0.19		13.70		0.10	0.10			
27-Jul	2.00	4.00	0.23		15.00		14.00	0.10	0.10		
	2.50	5.00	0.21	0.21		15.85	12.05				
03-Aug	2.00	2.00	0.15		11.00		10.60	0.10	0.10	700	
10-Aug	2.00	4.00	0.18		9.90		12.60	0.10	0.10		
17-Aug	3.00	6.00	0.20		14.4		13.70	0.10	0.10		
24-Aug	2.00	6.00	0.19		15.40		15.30	0.10	0.10		
31-Aug	4.00	6.00	0.14		15.40		15.40	0.10	0.10		
	2.60	4.80	0.17	0.17		13.22	13.52				
07-Sep	3.00	8.00	0.20		15.50		14.20	0.10	0.10	860	
14-Sep	2.00	4.00	0.20		15.00		13.70	0.10	0.10		
21-Sep	3.00	8.00	0.13		15.70		15.00	0.10	0.10		
28-Sep	2.00	2.00	0.20		13.50		18.00	0.10	0.10		
	2.50	5.50	0.18	0.18		14.93	15.23				
05-Oct	2.00	8.00	0.19		14.90		20.00	0.10	0.10	360	
12-Oct	6.00	4.00	0.16		15.10		19.50	0.10	0.20		
19-Oct	2.00	2.00	0.10		16.40		17.20	0.10	0.40		
26-Oct	2.00	4.00	0.16		20.90		19.30	0.10	0.30		
	3.00	4.50	0.15	0.15		16.83	19.00				
02-Nov	2.00	4.00	0.15		21.00		19.50	0.10	0.40	20	
09-Nov	2.00	3.00	0.15		19.70		15.60	0.10	0.40		
16-Nov	2.00	6.00	0.12		17.60		16.70	0.10	0.60		
23-Nov	2.00	2.00	0.21		15.30		20.00	0.10	0.80		
30-Nov	2.00	4.00	0.09		20.20		18.40	0.10	0.20		
	2.00	3.80	0.14	0.16		18.40	18.04				
07-Dec	2.00	2.00	0.29		13.50		17.60	0.10	1.10	20	
14-Dec	2.00	4.00	0.34		11.40		14.50	0.40	0.70		
21-Dec	2.00	2.00	0.32		9.60		14.30	0.40	0.70		
28-Dec	4.00	6.00	0.43		13.80		14.80	0.10	0.20		
	2.50	3.50	0.35	0.35	14.37	12.08	15.30				
	3.05	6.28	0.22	0.22	12.84						
CofA obj.	15.00	15.00	1.0		(May-Oct)14mg/l					200/100m/mo	200/100m/mo
					(Nov-Apr)17mg/l						

**Table VII
Lagoon Loading**

	Total	Average	Average	Loading	Average	Loading	Average	Loading	Average	Loading	Average	Loading
	Flow (m ³)	Flow m ³ /day	CBOD mg/L	BOD kg/day	S.S. mg/L	S.S. kg/day	NH ₃ mg/L	NH ₃ kg/day	TKN mg/L	TKN kg/day	T.Phos mg/L	T.Phos kg/day
JAN	110,373	3,560	16.25	57.86	29.50	105.03	12.50	44.51	17.50	62.31	0.77	2.75
FEB	77,081	2,753	19.75	54.37	42.00	115.62	12.40	34.14	18.50	50.93	0.77	2.13
MAR	120,468	3,886	7.00	27.20	19.00	73.84	13.83	53.72	14.60	56.74	0.65	2.52
APR	92,975	3,099	2.75	8.52	5.50	17.05	8.73	27.06	10.69	33.14	0.16	0.48
MAY	85,164	2,747	8.25	22.66	16.00	43.96	11.28	30.97	11.75	32.28	0.22	0.60
JUN	94,826	3,161	4.40	13.91	7.60	24.02	22.46	70.99	22.40	70.80	0.27	0.85
JUL	94,649	3,053	3.50	10.69	6.50	19.85	16.55	50.53	18.35	56.03	0.22	0.67
AUG	81,353	2,624	5.80	15.22	25.20	66.13	15.95	41.86	17.44	45.77	0.38	1.00
SEP	70,871	2,362	5.50	12.99	31.75	75.01	16.70	39.45	19.58	46.24	0.47	1.11
OCT	75,782	2,445	2.75	6.72	17.00	41.56	17.33	42.35	21.95	53.66	0.33	0.80
NOV	85,682	2,856	3.80	10.85	7.60	21.71	19.82	56.61	19.16	54.72	0.28	0.80
DEC	133,882	4,319	10.75	46.43	6.50	28.07	10.50	45.35	15.73	67.91	0.51	2.21
Total Annual	1,123,106											
Avg. Annual	93,592	3,072	7.54	23.95	17.85	52.65	16.71	46.03	17.30	52.54	0.42	1.33
Min	70,871						12.96	43.56				
Max	133,882											
CofA Limit		4,600	30.00	138.00	40.00	184.00	May-Oct. 14.0 ¹ Nov.-Apr. 17.0 ²	May-Oct. 64.4 ¹ Nov.-Apr. 78.2 ²			1.00	4.60

Table VIII

Certificate of Analysis 4.(b) Samples of raw sewage shall be collected at locations acceptable to the District Manager and analyzed for at least parameters 1 to 4 at the indicated minimum frequencies; parameters 5 to 8 are taken in order to analyze system performance.				
	Raw Sewage Parameter	Type of Sample	Minimum Frequency	Total # of Samples
1	CBOD ⁵	grab	monthly	12
2	Suspended Solids	grab	monthly	12
3	Total Phosphorus	grab	monthly	12
4	Total Kjeldahl Nitrogen	grab	monthly	12
5	Ammonia (N)	grab	monthly	12
6	Nitrite (N)	grab	monthly	12
7	Nitrate (N)	grab	monthly	12
Certificate of Analysis 4.(c) Samples of effluent from the waste stabilization pond shall be collected at locations acceptable to the District Manager and analyzed for at least the following parameters(1-10) at the indicated minimum frequencies.				
	Waste Stabilization Pond Effluent Parameter	Type of Sample	Minimum Frequency	Total # of Samples
1	CBOD ₅	grab	weekly	52
2	Suspended Solids	grab	weekly	52
3	Total Phosphorus	grab	weekly	52
4	Total Kjeldahl Nitrogen	grab	weekly	52
5	Ammonia (N)	grab	weekly	52
6	Nitrite (N)	grab	weekly	52
7	Nitrate (N)	grab	weekly	52
8	pH	grab	weekly	52
9	Temperature	grab	weekly	52
10	E. Coli	grab	monthly	12
Certificate of Analysis 4.(d) Samples of effluent from the constructed wetland shall be collected at locations acceptable to the District Manager and analyzed for at least the following parameters (1-9) at the indicated minimum frequencies. E. Coli is sampled to comply with C. of A. objective 5.(b).				
	Constructed Wetland Effluent Parameter	Type of Sample	Minimum Frequency	Total # of Samples
1	CBOD ₅	grab	weekly	52
2	Suspended Solids	grab	weekly	52
3	Total Phosphorus	grab	weekly	52
4	Total Kjeldahl Nitrogen	grab	weekly	52
5	Ammonia (N)	grab	weekly	52
6	Nitrite (N)	grab	weekly	52
7	Nitrate (N)	grab	weekly	52
8	pH	grab	weekly	52
9	Temperature	grab	weekly	52
10	E. Coli	grab	monthly	12

Certificate of Approval (5.)(c) Stipulates that the Owner shall endeavor to operate the sewage treatment works such that the effluent will not contain any oil or other substance in amounts sufficient to create a visible film or sheen on the surface of the receiving waters and shall be essentially free of any floating material.

Occasional foaming was present where wastewater cascades over weirs or from outfalls; this appears to occur on a seasonal basis.

Certificate of Approval 6.(a) refers to proper maintenance of related equipment and appurtenances to operate sewage works, including funding for operator training.

In December of 2009 upgrades to the warning (monitoring) at the Harbour Street Pumping Station, to include the pumps individually and compressors, generator (when on), high water levels in the wetwell, high water in the drywell, and pump overheating .

Computers are used to monitor the flows at both the liftstation and Lagoon, the lagoon computer is tied into the flow reader to provide up to date flows. At the lift station the operator inputs day to day information and flows.

An Operations and Maintenance Manual is in place at the Sewage Works. Continuing education for operators is promoted by the municipality for wastewater treatment and collection as well as health, safety, and technical related courses.

Certificate of Approval 7.(c) Flows through the Brighton Wastewater Treatment lagoons and wetlands are continuous.

Certificate of Approval 7.(d)(i) Summary of all monitoring data including an overview of the sewage treatment program.

Certificate of Approval 7.(d)(ii) Interpretation of all monitoring and analytical data and comparison to the final effluent quality and quantity.

Table IX Brighton WPCP Performance Summary details results and efficiency of the sewage treatment performance demonstrating pollutant removal rates from raw sewage concentrations through to final effluent for CBOD₅, Suspended Solids, Total Phosphorus, TKN and Ammonia.

Table IX also demonstrates the success of Brighton's WPCP natural treatment process, which includes:

- 88.4% CBOD₅ removal
- 93.9% removal of Suspended Solids
- 93.7% removal of Phosphorus
- 56.2% removal of Nitrogen
- 48.5% removal of Ammonia

Certificate of Approval 7.(d)(iii) Summary of any final effluent quality assurance or control measures undertaken during the reporting period.

Table IX

Month	Flows		CBOD5					Suspended Solids			
	Total Flow m ³	Average Day m ³ /D	Maximum Day m ³ /D	Raw Sewage (mg/L)	Lagoon #1 (mg/L)	Lagoon #2 (mg/L)	Wetland Effluent (mg/L)	Raw Sewage (mg/L)	Lagoon #1 (mg/L)	Lagoon #2 (mg/L)	Wetland Effluent (mg/L)
Jan.	110,373	3,560	9,860	21.00	33.00	16.25	3.50	54.00	92.00	29.50	7.75
Feb.	77,081	2,753	3,686	30.00	21.00	19.75	6.50	94.00	76.00	42.00	18.00
Mar.	120,468	3,886	7,379	33.00	15.00	7.00	3.40	56.00	70.00	19.00	7.40
Apr.	92,975	3,099	4,162	24.00	30.00	2.75	2.00	48.00	136.00	5.50	6.50
May	85,164	2,747	3,390	39.00	67.00	8.25	3.50	85.00	245.00	16.00	7.00
June	94,826	3,161	7,665	96.00	54.00	4.40	2.60	120.00	170.00	7.60	2.40
July	94,649	3,053	4,167	138.00	17.00	3.50	2.50	180.00	128.00	6.50	5.00
Aug.	81,353	2,624	2,916	42.00	20.00	5.80	2.60	84.00	124.00	25.20	4.80
Sept.	70,871	2,362	2,731	144.00	24.00	5.50	2.50	175.00	140.00	31.75	5.50
Oct.	75,782	2,445	2,835	42.00	6.00	2.75	3.00	98.00	110.00	17.00	4.50
Nov.	85,682	2,856	4,381	114.00	24.00	3.80	2.00	110.00	82.00	7.60	3.80
Dec.	133,882	4,319	12,500	60.00	19.00	10.75	2.50	140.00	56.00	6.50	3.50
Total	1,123,106										
Average	93,592	3,072		65.25	27.50	7.54	3.05	103.67	119.08	17.85	6.34
C. of A. Limits		4,600				30.0	15.0			40.0	15.0
% Efficient					57.9%	88.4%	95.3%		-14.9%	82.8%	93.9%
			*Lag2 =lagoon 2			*Wet=V/eland					

Month	Total Phosphorous				lag2	TKN				lag2	Ammonia				Temp
	Raw Sewage (mg/L)	Lagoon #1 (mg/L)	Lagoon #2 (mg/L)	Wetland Effluent (mg/L)		Raw Sewage (mg/L)	Lagoon #1 (mg/L)	Lagoon #2 (mg/L)	Wetland Effluent (mg/L)		Raw Sewage (mg/L)	Lagoon #1 (mg/L)	Lagoon #2 (mg/L)	Wetland Effluent (mg/L)	
Jan.	2.50	2.80	0.77	0.34	1.0	40.00	23.00	17.50	15.50	17.0	18.80	13.70	12.50	13.18	4.6
Feb.	2.90	2.00	0.77	0.34	1.0	40.00	19.00	18.50	18.00	17.0	16.30	11.60	12.40	12.63	2.8
Mar.	2.90	2.90	0.65	0.28	1.0	30.00	20.00	14.60	13.80	17.0	17.90	18.60	13.83	12.52	6.2
Apr.	2.00	3.30	0.16	0.28	1.0	17.00	20.00	10.69	6.50	17.0	13.10	15.80	8.73	8.25	13.2
May	2.40	4.80	0.22	0.23	1.0	20.00	30.00	11.75	9.00	14.0	23.00	21.30	11.28	9.48	18.3
June	6.30	6.30	0.27	0.13	1.0	43.00	40.00	22.40	16.40	14.0	49.00	29.00	22.46	15.92	22.7
July	5.50	3.50	0.22	0.21	1.0	40.00	19.00	18.35	18.35	14.0	39.00	13.80	16.55	15.85	26.5
Aug.	2.80	3.10	0.38	0.17	1.0	25.50	19.00	17.44	10.60	14.0	27.00	20.50	15.95	13.22	24.2
Sept.	6.90	3.70	0.47	0.18	1.0	62.00	28.00	19.58	15.23	14.0	53.00	26.40	16.70	14.93	24.2
Oct.	3.00	3.00	0.33	0.15	1.0	28.50	23.50	21.95	19.00	14.0	21.00	16.40	17.33	16.83	12.9
Nov.	3.50	3.25	0.28	0.16	1.0	29.00	25.00	18.16	18.04	17.0	25.00	23.20	19.82	18.40	7.5
Dec.	3.20	1.65	0.51	0.35	1.0	26.50	14.90	15.73	15.30	17.0	14.10	7.20	10.50	12.08	3.1
	3.66	3.36	0.42	0.23		33.46	23.45	17.30	14.64		26.43	18.13	14.84	13.60	
			1.00	0.80											
		8.2%	88.6%	93.7%			29.9%	48.3%	56.2%			31.4%	43.9%	22.46	18.40 max
													8.73	8.25 min	

Certificate of Approval 7.(d)(iv) Summary of maintenance carried out on major structure, equipment, apparatus, mechanism forming part of the works.

- Upgrades have also been carried out at the lagoon with the installation of a new Alum dosing system.
- This year water levels were dropped in the wetland to allow for new growth to naturally occur, with good success.
- Annual flushing and video inspection of the Municipality's Sanitary Sewer System has been initiated, to better determine if repairs or replacement is warranted.

Certificate of Approval 7.(d)(v) Summary of any environmental or operating problems encountered and mitigative measures taken.

- Although there are no combined sanitary and storm sewers in Brighton, the collection system is susceptible to higher flows with heavy precipitation events. This is a result of infiltration of storm water into the collection system and suspected illegal connections of sump pump discharges.
- Muskrat damage to the constructed wetlands has reduced plant growth in the vegetated zones. Seasonal trapping is being conducted to control muskrat population. This has become an annual situation due to the natural conditions for muskrats.

Certificate of Approval 7.(d)(vi) Summary of alterations, extensions or replacements in the process or operation of the works which are considered for implementation over the next reporting period.**Certificate of Approval 7.(d)(iv) Summary of calibration and maintenance procedures conducted on all monitoring equipment.**

Milltronics performed annual calibration of flow meters at the Brighton WPCP on October 19, 2010. Metcon performed calibration on mag meters for Park and Liftstation on October 4, 2010

4.4 Reporting – Non-Compliance

- **Certificate of Approval 7.(b)** There were non-compliance issues in this reporting period.

4.5 Future Action Plan

This year the Municipality in conjunction with CH2M Hill is investigating possible long-term solutions to correct the on-going ammonia exceedance issues; and more information will be presented for Council's consideration in 2011.

5.0 CONCLUSION

The Brighton Water Pollution Control Plant has been successful in treating the wastewater utilizing the lagoons and wetlands through natural treatment processes. The final quality of the effluent may be influenced by a variety of environmental factors such as climate or wildlife. Enhanced performance is exhibited during warmer months when nutrients are absorbed from the growth of vegetation and bacteria are most active. Wastewater effluent from the wastewater pollution control plant (WPCP) is tested at Caduceon Environmental Labs, a certified lab, on a weekly basis as per Certificate of Approval. Effluent quality from the lagoon and wetland site to Presqu'ile Bay has met and/or exceeded the contaminant limits and objectives set under the terms and conditions of the Certificate of Approval. Brighton is dedicated to achieving continuous improvement of its wastewater treatment system and being environmentally responsible to the quality of its receiving waters.