



Victoria Park

Beth Hoar



Treatment Plant



CHARLOTTETOWN

WATER & SEWER UTILITY 2009 ANNUAL REPORT

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In 1887, the Charlottetown Waterworks Act enabled Charlottetown to be provided with pure water for domestic, fire and other purposes. The initial operating budget was \$3,000. Today, that budget is \$10,221,811. (see Table 1)

There have been a lot of changes over the past 122 years. But one thing has not changed -- the Utility's commitment to provide safe drinking water to its customers.



2009 WATER QUALITY RESULTS: Under the *Environmental Protection Act Drinking Water and Wastewater Facility Operating Regulations*, The Charlottetown Water & Sewer Utility is required to report the results of water quality analyses to its customers at least once a year.

Provincial regulations require the Utility to collect one water quality sample per month per every 1,000 persons served and one sample per month from each source of supply. These samples are analyzed for the presence of coliform bacteria and E.coli. Based on this, sampling within the distribution system is done on a weekly basis with a minimum of 35 samples per month and each of the operating wells are tested once a month. (see Tables 2 & 3)

General chemical analysis is required, by regulation, annually from each supply source. To be extra cautious, the Utility does this sampling at least twice a year. Thirty-six (36) samples were taken from the wells and results were consistent with previous years. Nineteen (19) additional samples were taken within the distribution system. All results are lower than the maximum limits set out by Health

Canada's *Guidelines for Canadian Drinking Water Quality*. See Table 5 for a typical analysis of Charlottetown's water.

Every three years a sample is to be taken from each source of supply and analyzed for a detailed chemical analysis. The Utility samples City wellfields on a rotation basis. In 2009, no wells were included in the rotation.

PESTICIDE MONITORING: Each year, the Utility participates in Department of Environment, Energy and Forestry's *Pesticide Monitoring Program*.

This year's samples did not detect any of the selected pesticides. All pesticide parameters were reported at less than the lab's respective detection limits.

For more information:
www.gov.pe.ca/go/pesticidemonitoring

NATIONAL SURVEY: The City was pleased to be selected to participate in the *National Survey of Disinfection By-Products and Selected New and Emerging Contaminants in Canadian Drinking Water*.

The survey, started in 2008, is a three-year study to examine levels of disinfection by-products, both new and regulated, and other potentially harmful contaminants such as pharmaceutical products, bisphenol A, acrylamide, and perfluoroalkylated compounds in Canadian drinking water. Sixty Canadian water treatment plants and distribution systems are being sampled. More than 100 water quality parameters and contaminant concentrations are being determined for each location. The results will be used in the preparation/update of Health Canada's *Guidelines for Canadian Drinking Water Quality*.



Charlottetown's samples were taken in the winter and summer of 2009. Results indicate that samples do not exceed (or are even close to) the guideline values that exist and a large portion of the results is for parameters that do not have guidelines. Many of the parameters are not of a health concern, while others are just now being looked at, or may be looked at in the near future, to be assessed for health implications.

METERS: In 1944, the thought of one hundred per cent metering was out of the question. It was simply unaffordable. The initial purchase and installation of approximately 3,000 meters was costly and there would be additional cost for meter reading and maintenance. At that time, larger commercial businesses were metered and, after the war, all businesses were metered. It stayed this way until 2010.

After a 2009 study, the Utility standardized its rate structures to make them more predictable. The standardization is based on a base/connection charge and a consumption/effluent charge for all customers. There is also an extra fire protection charge for the City of Charlottetown.

In the community consultation portion of the City's *Integrated Community Sustainability Plan*, residents indicated their desire to conserve water and protect its source. The Utility also recognized a demand for metering of single-family homes. Residents want to measure their usage and reduce their costs and consumption. Residents repeatedly requested meters on their properties, but the bylaw did not allow for this until early 2010.

Water meters will be installed on all new connections and existing residential customers will be given the option to install a meter. Existing customers who want to become metered can now do so at no cost to them. It will, however, be their responsibility to arrange the installation of the meter.



Current customers who want to control their own water use and costs by becoming a metered customer can contact the Utility at 629-4014.

FREQUENTLY ASKED QUESTIONS:

How hard is the water? The water is quite hard but still falls below the maximum allowable concentration set by *Guidelines for Canadian Drinking Water Quality*.

Prince Edward Island is dependent on groundwater as its source of drinking water. Groundwater is almost always considerably harder than surface waters from lakes or rivers. Charlottetown's values are normal for PEI groundwater and for most groundwater in general.

Homeowners wanting to install a water softener or dishwasher are often asked to indicate how hard their water is in "grains" - - a unit used to measure water hardness. The water provided by the Utility is approximately 8.5 grains/US gallon or 10 grains/imperial gallon.

Why does boiled water sometimes have an oily look/feel? This is the hard water's reaction with the naturally occurring molecules. It does not pose a health risk.



It is most often noticed when boiled water is mixed with naturally occurring organic molecules in things like tea or coffee.

What is added to the water? Chlorine gas is a disinfection that is added to the source water to kill any harmful bacteria, viruses, and other pathogens. It is also used to provide a barrier to contamination all the way from the source to the customer's tap. Fluoride has been added to Charlottetown's water since a 1967 plebiscite. Both are checked on a daily basis to ensure that acceptable levels are maintained.

Why should I drink tap water when I can buy bottled water? Charlottetown's water is clear, clean and safe and exceeds the Health Canada's *Guidelines for Canadian Drinking Water Quality*. It is a personal choice based on taste and a person's willingness to pay. Based on 2009's rate, a person can buy 1,000 litre bottles of tap water for 26 cents.



2009 CAPITAL PROJECTS:

- Brighton & Beach Grove Lift Station Upgrading
- Meter Replacement & Upgrading
- Poplar Island Water and Sanitary Servicing

- Future Water Supply Land Purchase Option
- WWTP Ventilation, sludge Grinding, Scum Skimming
- Spring Park Sewer Separation - Planning (Survey and Design)
- WWTP Odour Control
- Waterfront Water & Sewer Extensions
- Future Water Supply Exploration (Completion)

TREATMENT PLANT:

The *Environmental Protection Act Drinking Water and Wastewater Facility Operating Regulations* also requires the owner of a wastewater treatment facility to collect samples of treated wastewater and have them analyzed by a "laboratory accredited by the Standards Council of Canada or by an equivalent accreditation body". Prince Edward Island is fortunate that the provincial government has an accredited laboratory and most samples can be analyzed locally. Table 4 is a summary of the results of wastewater analysis as required under the provincial regulations.

DID YOU KNOW???

The connection of roof drains and downspouts, sump pumps, sub-soil drainage, foundation drainage, and area drains to the house sanitary sewer system is illegal.

An eight-inch sanitary sewer can handle domestic wastewater flow from up to 465 homes; however, it takes only twelve sump pumps operating at full capacity to overload an eight inch sanitary sewer.



Table 1

The following statistics indicate the growth of the system over the past 122 years:

	1890	1986	2009*
Service Population	9,000	20,000	32,000
Safe Yield	600,000 Igpd	3,000,000 Igpd	5,075,011 Igpd (23,071 m ³ /day)
Annual Consumption	94,365,275 Igpy	1,020,490,680 Igpy	1,555,261,620 Igpy
Average Daily Consumption	258,535 Igpd	2,795,540 Igpd	4,249,344 Igpd
Miles of Mains	15.5 Miles	68 Miles	152.2 Miles
Service Connections	1,347	4,600	10,300 est
Number of Hydrants	88	449	1047
Number of Sprinkler Systems	0	142	334
Number of Meters	0	1,518	2,287
Assets	\$206,869	Water & Sewer \$25,000,000 Replace. \$16,000,000 Deprec.	\$38,235,070
Storage	1,000,000 Ig	3,000,000 Ig	3,000,000 Ig
Revenue	\$9,225	\$1,787,906	\$8,762,511
Expenses	\$3,171	\$1,728,722	\$8,456,985
Surplus	\$6,054	\$59,184	\$305,526

*Includes amalgamation

Table 2

Total Coliform Bacteria and Ecoli (Distribution System)				
	# of Samples	Positive TC Tests	# of Non-Compliant Samples (TC>10)	Ecoli
January	31			
February	35			
March	43	2		
April	36			
May	40	2		
June	36			
July	40		2	
August	74	7	9	
September	46			
October	37			
November	43	1		
December	40			
Total	501	12	11*	
Detection %		2.39	2.19	0%

* All re-tests reported negative

Total Background Growth (Distribution System)				
	# of Samples	Positive BG Tests	# of Non-Compliant Samples (BG>200)	
January	31			
February	35			
March	43	3		
April	36	2		
May	40			
June	36			
July	40			
August	74	8	4	
September	46	1		
October	37	1		
November	43	6		
December	40	1		
Total	501	22	4*	
Detection %		4.39	.80	

* All re-tests reported negative



Table 3

UNTREATED WATER (SAMPLES FROM WELLS)										
	Malpeque	Brackley	Union	Suffolk	Total	TC	>10 TC	Ecoli	BG	>200 BG
January		4	5	4	13	6			1	
February		4	5	4	13	2				
March		4	5	4	13	2			1	
April	1	5	5	4	14	3			2	
May	1	4	5	4	14	1			2	
June		4	5	4	13					
July	1	7	11	5	25	15	2		7	
August		14	17	12	43	20	11		22	3
September		20	25	4	49	10	36	21	33	11
October		4	5	4	13	6	3		6	2
November	1	4	10	4	19	11	2		12	
December		4	10	4	18	5			10	
TOTAL	4	78	108	57	247	81	54	21	96	16

TABLE 4

WASTEWATER TREATMENT REPORT									
	Treatment Plant Effluent						East Royalty Lagoon Effluent		
	CBOD (mg/L)	Suspended Solids (mg/L)	Faecal Coliform (MPN/100ml)	Ammonia- N	Nitrogen, Total	Phosphorus, Total	CBOD (mg/L)	Suspended Solids (mg/L)	Faecal Coliform (MPN/100ml)
January	10	9	5				14	2	
February	10	12	23						
March	10	8	1600				18	12	1600
April	10	10	2	0.1	21.82	1726			
May	10	4	240				10	11	130
June	10	6	2				10	10	8
July	10	4	2				10	7	330
August			1600				10	9	8
			2				10	5	350
			2				10	5	8
	10	2	1600						
September	10	8	2	0.12	21.1	3237	10	5	1600
October			17						
November	10	3	2				11	17	1600
December	21	6	2						



Table 5
Typical Chemical Analysis

Chemical Parameter	Units	Typical Distribution System	Maximum Acceptable Concentration (MAC) or Aesthetic Objective (AO) (Health Canada)	MAC or AO ¹
Alkalinity Total – the capacity of water to neutralize acids	mg/L	123.09	---	
Barium – occurs naturally and is produced by industry	mg/L	0.58	1.0	MAC
Cadmium – present in solder and as an impurity in galvanized pipe	mg/L	< 0.005	0.005	MAC
Calcium – this mineral helps produce “hard” water	mg/L	32.30	---	
Chloride – found in road salts and chemical industry effluents	mg/L	15.44	≤250	AO
Chromium – natural metallic element	mg/L	< 0.05	0.05	MAC
Copper – can stain laundry when level is above Health Advisory Limit	mg/L	<0.02	≤1.0	MAC
Iron – can cause staining in laundry and plumbing	mg/L	< 0.1	≤0.3	AO
Lead – can be found in older plumbing fixtures, and in solder	mg/L	<0.002	0.01	MAC
Magnesium – along with calcium, contributes to forming “hard” water	mg/L	20.45	---	
Manganese – metal; can cause laundry and plumbing to stain	mg/L	< 0.020	≤0.05	AO
Nickel – metallic element used in alloys, electroplated protective coatings and alkaline storage batteries	mg/L	< 0.05	---	
Nitrate-N – naturally occurring ions, used in inorganic fertilizers	mg/L	3.74	10.0	MAC
pH – measure of acidity or causticity	pH units	7.7	6.5-8.5	AO
Phosphorus – essential chemical element and nutrient for all life forms	mg/L	0.04	---	
Potassium – seventh most abundant element in the earth’s crust	mg/L	1.53	---	
Sodium – sixth most abundant element in the earth’s crust	mg/L	8.39	≤200 ²	AO
Sulfate – used extensively in the chemical industry; also occurs naturally	mg/L	8.78	≤500	AO
Zinc – found in some plumbing fixtures and galvanized metal	mg/L	<0.02	≤5.0	AO
Total Hardness – caused by dissolved minerals	mg/L	165	≤200 ³	

¹ MAC relates to a health-based guideline and AO is based on aesthetic considerations. The parameters without numeric guidelines indicate that current data indicates it does not pose a health risk or aesthetic problem at levels generally found in drinking water in Canada.

² The ≤200 mg/L for sodium is the aesthetic objective (AO) level and is below what would be considered a health hazard. According to the *Guidelines for Canadian Drinking Water Quality*, a sodium concentration of 175 to 185 mg/L would provide an offensive taste to drinking water. An acceptable limit for sodium depends on a person’s allowable daily intake. If you are on a low sodium diet, see your physician or appropriate health authority

³ Public acceptance of hardness varies considerably. Hardness levels between 80 and 100 mg/L (as CaCO₃) are generally considered acceptable; levels greater than 200 mg/L are considered poor, but can be tolerated; those in excess of 500 mg/L are normally considered unacceptable.

