



TOWN OF ARNPRIOR WATER POLLUTION CONTROL CENTER (WPCC)

2007 SUMMARY REPORT

January 1, 2007 – December 31, 2007

PRELIMINARY TREATMENT

Screen Units

There are two screening units, the automatic mechanical screen and the standby manual screen. Both screens have openings of 13 mm between bars. Both screens are enclosed with an odour enclosure where the air is discharged to the outside through a carbon filter. The screenings are then transferred onto a conveyer that empties into a container for disposal at the Arnprior landfill.

Grit Removal

Grit removal is achieved by a pair of rectangular aerated spiral roll 90 m³ tanks. Each tank has a grit screw conveyer which pushes settled grit into the grit hoppers. Grit is then pumped into a grit dewatering classifier unit where dense grit particles are separated from light organic solids.

PRIMARY TREATMENT

Primary Sedimentation

There are 3 rectangular primary clarifiers at this WPCC: two with a surface overflow area of 142 m² and one with an overflow area of 154 m². All units are equipped with chain and flight sludge collection and manual scum removal.

Raw sludge is pumped from the primary clarifiers into the sludge holding tanks using plunger type positive displacement pumps.

SECONDARY TREATMENT

Activated Sludge Treatment

The activated sludge treatment process includes the one rectangular aeration tank and two separate rectangular secondary clarifiers, each made up of two units in parallel.

The aeration tank has a volume of 1303 m³, and is equipped with four inlet gates and one outlet slide plate for isolation. The secondary clarifiers have a surface area of 310 m² each. They are equipped with longitudinal and cross chain and flight collector mechanisms, which collect the activated sludge into a sump where it is returned to the aeration tank.

Phosphorous Removal

The phosphorous control system consist of two 12,100 Litre indoor ferric chloride chemical storage tanks and two chemical feed pumps complete with calibration cylinders. The ferric chloride is added to either the aeration tank or preliminary discharge depending on operational requirements.

Chlorination System

Disinfection of the plant discharge is done through the addition of Sodium Hypochlorite (NaOCl). The NaOCl is stored in a pair of 12,100 Litre tanks, and a bank of three variable speed metering pumps are used to deliver the chlorine to the chlorine contact chamber.

De-chlorination System

The chlorinated water must be de-chlorinated before discharge into the Madawaska River. This is achieved through the addition of sodium bisulfate. The sodium bisulfate system is made up of one 1,336 Litre storage tank and a pair of feed pumps.

Sludge Dewatering

There are two sludge dewatering systems at the WPCC. The primary unit is a Polymer system and Centrifuge capable of processing 7 litres of sludge per second. The sludge from this unit is loaded onto a dump truck and delivered to the Arnprior landfill.

The backup system consists of a belt filter press unit, a flocculation tank, sludge screw conveyer and an automatic polymer delivery system. The dewatered sludge from this system is also delivered to the Arnprior landfill site.

Auxiliary Power

The Arnprior WPCCC is equipped with a 400 Kw diesel generator and automatic transfer switch. This generator will automatically start when a power outage occurs, and can supply power to run the entire plant.

Plant Performance Summary (4.3- a)

The Arnprior pollution control plant has a non-compliance parameter limit of an annual average concentration of 25 mg/l of BOD₅, 25 mg/l of suspended solids and a monthly average of 1 mg/l of total phosphorus. There is also a Monthly Geometric Mean Density (Geo-Mean) limit of 200 organisms per 100 ml. of E.Coli in the treatment plant effluent. The effluent results for 2007 were within these parameters.

COMPLIANCE DATA 2007							
MONTH	SUSPENDED SOLIDS		PHOSPHOROUS		B.O.D		E. COLI Geo-Mean
	INFLUENT mg/L	EFFLUENT mg/L	INFLUENT mg/L	EFFLUENT mg/L	INFLUENT mg/L	EFFLUENT mg/L	
JAN.	81.73	8.6	2.0	0.11	108.7	10.0	2.0
FEB.	109.4	11.6	2.9	0.20	179.7	16.3	3.0
MAR.	128.2	7.8	3.0	0.14	142.3	13.3	5.3
APR.	78.5	12.4	1.1	0.83	89.7	16.6	6.0
MAY	89.36	8.6	3.3	0.25	136.0	14.0	54.8
JUN.	116.2	5.8	2.2	0.11	112.3	9.8	2.5
JUL.	103.7	11.0	3.0	0.28	135.5	15.5	3.5
AUG.	97.0	8.1	2.4	0.34	134.8	20.4	2.8
SEPT.	93.6	14.5	2.5	0.37	131.3	17.3	10.0
OCT.	82.5	12.6	2.7	0.37	139.8	22.6	15.6
NOV.	120.6	10.6	2.4	0.30	122.0	16.3	8.0
DEC.	88.9	9.6	2.6	0.16	126.5	12.5	3.5
AVG	99.1	10.1	2.5	0.29	129.8	15.4	9.7
MAX	128.2	14.5	3.3	0.83	179.7	22.6	54.8
MIN	78.5	5.8	1.1	0.11	89.8	9.8	2.0

Monitoring Data Interpretation (4.3 b & c)

The Total Suspended Solids in the raw and effluent wastewater is usually measured 3 times per week from a composite sample. The Effluent reporting criteria is 25 mg/l and the plant target is 15 mg/l. The average monthly effluent TSS in 2007 was 10.1 mg/l and the monthly maximum average level was 14.5 mg/l in September. The TSS removal efficiency at the Arnprior plant was 89% in 2007. Non-compliance with respect to plant effluent loading of Suspended Solids is 197.5 kg/d. The Arnprior plant had an average daily effluent loading of 59.8 kg/d in 2007.

The Total Phosphorous (TP) in the raw and effluent wastewater is sampled and tested three times per week from composite samples. The reporting criteria is 1.0 mg/l and the plant target is 0.5 mg/l. The average monthly TP levels in 2007 was 0.29 mg/l with a monthly high average of 0.83 mg/l in April. The Total Phosphorous non-compliance loading rate is 7.9 kg/d and in 2007 the average daily TP loading rate was 1.7 kg/d.

Five day Biological Oxygen Demand (BOD₅) is sampled once per week from a composite sample. The effluent reporting criteria is 25 mg/l and the plant target is 15 mg/l. The average monthly BOD₅ in 2007 was 15.4 mg/l with a monthly average high of 22.6 mg/l in October. The BOD₅ removal efficiency at the Arnprior plant was 88 %. The BOD₅ non-compliance loading rate is 197.5 kg/d, and in 2007 the plant averaged an effluent loading rate of 91 kg/d.

Plant Flow Summary (4.3 b & c)

The Arnprior sewage treatment plant has a permit under the Certificate of Approval to discharge an effluent of 7,900 m³/d averaged over the year, and a peak hourly flow of 2,000 m³. The average daily flow in 2007 was 7,578 m³ per day, or 95% of the C of A permitted flow. As indicated in the table below the average daily flow exceeded 7,900 m³/d in March, April, November and December.

A summary of the 2007 plant flow is as follows:

ARNPRIOR WPCC FLOW									
Month	Maximum Daily Flow for Month m³	Total Monthly Influent Flow m³	Minimum Daily Flow for Month m³	Total Monthly Effluent Flow m³	Secondary Bypass m³	Number of Secondary Bypass Events	Plant Bypass m³	Number of Plant Bypass Events	Average Daily Flow m³
Jan	6,732	230,911	6,534	221,976	0	0	0	0	7,449
Feb	6,732	175,903	6,034	144,839	0	0	0	0	5,674
March	8,806	179,114	4,751	192,624	299	2	0	0	5,778
April	17,301	246,240	6,172	298,285	1,788	3	0	0	7,943
May	7,357	190,514	4,855	191,189	493	3	0	0	6,146
June	6,755	172,278	4,855	174,544	508	2	0	0	5,557
July	12,814	180,193	4,759	187,983	4,769	5	124	1	5,813
Aug	5,666	165,740	4,766	158,595	184	2	0	0	5,346
Sept	5,316	142,468	4,375	143,008	107	1	0	0	4,596
Oct	5,108	137,591	3,902	146,895	137	3	0	0	4,438
Nov	42,246	170,515	4,089	143,728	0	0	0	0	5,500
Dec	9,668	146,806	4,141	160,672	1,032	1		0	4,736
Avg	11,208	178,189	19,466	180,362	776		10		5,748
Max	42,246	246,240	6,534	298,285	4,769		124		7,943
Min	5,108	137,591		143,008	0				4,438
Total				2,164,338	9,317	22	124	1	

Plant Maintenance (4.3 d)

The plant maintenance carried out is scheduled and tracked using a computerized maintenance system. A weekly maintenance schedule is printed out and the maintenance personnel initials for maintenance done. If any major repairs are required on any equipment, the operator fills out a work order detailing work required and parts needed.

A summary of major repairs or maintenance carried out in 2007 is as follows:

- Rebuilt automatic bar screen
- Installed new grit pump blower
- Installed weather station to better control odour issues

Operational Problems (4.3 e)

There are many, day to day adjustments or repairs that the operators must carry out in addition to the major maintenance listed below.

Some operational problems that occurred in 2007 are as follows:

1. Due to occasional high levels of rain in 2007, and the infiltration of rain water in the sanitary sewer system, the secondary treatment system of the plant was occasionally hydraulically overloaded resulting secondary treatment bypassing. These sudden high flow events also make process control more difficult.
2. Odour problems arise during certain weather conditions and process problems, these problems are highlighted due to the very close proximity of neighboring residents.

Proposed Alteration (4.3 f)

The Town of Arnprior is carrying out an Environmental Assessment of the WPCC to potentially expand the treatment capacity of the plant.

Sludge Processing (4.3 g, h)

A combined primary and secondary waste activated sludge is collected from all three primary settling tanks, and pumped into the sludge holding tank. From the sludge holding tank it is conditioned and processed on the centrifuge or belt filter press. Sludge is dewatered to approximately 25% and loaded onto a truck and transferred to the Arnprior landfill and buried. There were 225 loads of sludge to the Arnprior landfill in 2007, with a total of approximately 363,823 kg dry weight of sludge. Sludge production in 2008 is expected to be slightly higher than 2007. A summary of the sludge processed is as follows:

SUMMARY OF SLUDGE MANAGEMENT							
			CENTRIFUGE OPERATION				
Month	Sludge To Storage m³	Sludge To Filter m³	Filter Hours	% Solids Avg.	Dry Solids (kg)	Avg. % Cake Solids Content	Sludge Hauled Loads
Jan	1,694	1,670	118	2.22	37,111	21.92	22
Feb	1,611	1,604	106	1.93	31,011	18.40	18
Mar	1,624	1,476	98	3.11	45,967	22.57	19
Apr	1,180	1,033	72	2.83	29,268	21.47	16
May	1,739	1,564	98	1.79	27,957	24.19	20
Jun	1,705	1,702	103	1.93	32,764	24.25	19
Jul	1,848	1,664	105	1.80	29,952	24.81	20
Aug	1,574	1,579	86	1.70	26,843	25.12	21
Sep	1,499	1,251	78	1.74	21,803	23.63	16
Oct	1,903	1,756	86	1.63	28,623	23.48	19
Nov	1,572	1,431	65	1.72	24,587	21.18	17
Dec	1,707	1,659	95	1.68	27,938	21.34	18
Avg	1,638	1,532	92	2.01	30,319	22.70	19
Max	1,903	1,756	118	3.11	45,967	25.12	22
Min	1,180	1,033	65	1.63	21,803	18.40	16
Total	19,656	18,389	1,109	24.09	363,823	272.34	225

Wastewater Profile

In addition to the above compliance sampling and analysis, the table below outlines the monthly average results of various characteristics of the raw and treated wastewater. These samples are taken with composite samplers and sent to a certified laboratory:

ARNPRIOR WATER POLLUTION CONTROL CENTER										
Month	Total Phosphorous		Ammonia		TKN		BOD		Nitrate	
	Raw	Effluent	Raw	Effluent	Raw	Effluent	Raw	Effluent	Raw	Effluent
Jan	2.04	0.11	9.01	10.74	19.74	13.71	108.40	10.00	0.62	0.42
Feb	2.91	0.20	11.83	17.15	26.23	19.38	179.75	16.25	0.38	0.20
Mar	3.06	0.14	12.97	14.14	25.23	16.24	142.25	13.25	0.50	0.45
Apr	1.17	0.83	6.09	8.03	14.60	10.62	89.75	16.50	0.70	1.10
May	3.34	0.25	10.91	13.12	23.36	15.46	136.00	14.00	0.20	0.54
Jun	2.22	0.11	9.79	12.55	21.08	13.60	112.25	9.75	0.20	0.80
Jul	3.07	0.28	15.03	9.08	26.80	11.36	135.50	15.50	0.13	1.95
Aug	2.47	0.34	11.55	5.83	22.98	7.64	134.80	20.40	0.10	3.72
Sep	2.52	0.37	11.93	10.01	24.53	12.44	131.25	17.25	0.10	1.45
Oct	2.70	0.37	13.40	13.26	26.24	15.48	139.80	22.60	0.14	1.08
Nov	2.44	0.30	13.38	15.28	25.88	18.00	122.00	16.25	0.10	1.23
Dec	2.62	0.16	14.58	16.70	25.90	18.73	126.50	12.50	0.10	0.60

Calibration (4.3 i)

All flow meters were calibrated on site by a service contract, given to Endress + Hauser Canada Ltd , the manufacturer of the meters. A company representative applied a number of performance checks to the meters and all meters were within +- 1% accurate.

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