



Annual Performance Report 2009



Picton Wastewater Treatment Plant



Annual Wastewater Performance Report

Corporation of the County of Prince Edward
Picton Wastewater Treatment Facility

MOE Identifier No. 120000667

Certificate of Approval No. 4123-7MCL2T

Summary of all monitoring data and analytical data collected relative to the works during the reporting period

Table 1: Effluent Quality: Compliance Parameters, 2009

CofA LIMITS	CBOD		Total Suspended Solids		Total Phosphorus		pH	
	25 mg/L 12-Consecutive Monthly Mean Concentration	136.3 kg/d 12-Consecutive Monthly Mean Loading	25 mg/L 12-Consecutive Monthly Mean Concentration	136.3 kg/d 12-Consecutive Monthly Mean Loading	1.0 mg/L Monthly Mean Concentration	5.4 kg/d Monthly Mean Loading	5.5	9.5
Month	Concentration mg/L	Waste Loading kg/d	Concentration mg/L	Waste Loading kg/d	Concentration mg/L	Waste Loading kg/d	min	max
January	3.5	10.2	12.3	35.7	0.21	0.6	7.1	7.4
February	4.0	15.6	19.5	76.1	0.36	1.4	6.8	7.2
March	3.3	13.2	7.8	31.1	0.17	0.7	6.8	7.1
April	7.1	33.9	17.7	84.0	0.29	1.4	6.1	7.1
May	4.3	15.1	22.4	78.0	0.53	6.4	6.4	7.1
June	5.0	14.3	35.7	102.4	0.76	2.2	6.5	7.1
July	2.0	5.1	8.0	20.4	0.22	0.6	6.5	7.2
August	3.0	6.9	7.5	17.3	0.20	0.5	6.7	7.1
September	2.0	4.2	8.0	17.0	0.18	0.4	6.6	7.6
October	2.8	6.7	7.8	18.8	0.17	0.4	6.7	7.0
November	2.0	5.8	5.8	16.8	0.14	0.4	6.5	7.4
December	2.5	10.6	7.0	29.7	0.19	0.8	6.7	7.4
Annual Averages	3.5	11.8	13.3	43.9	0.4	1.3	6.6	7.2

Table 1 illustrates all parameter values monitored for compliance purposes and tabulated for analysis over the 2009 operational year.



Table 2: Effluent Quality Monitoring Data, 2009

	E. Coli	Fecal Streptococcus	Nitrite + Nitrate	Temperature	Total Ammonia Nitrogen	Total Residual Chlorine	Total Kjeldahl Nitrogen
Month	counts/100 mL	counts/100 mL	mg/L	°C	mg/L	mg/L	mg/l
January	100	100	9.5	7.65	2.51	0.01	2.00
February	3750	6600	5.33	7.83	2.67	0.02	5.10
March	233	533	4.35	8.15	2.39	0.03	5.35
April	1255	2345	5.06	9.84	13.39	0.08	2.58
May	6733	2400	4.25	13.4	3.12	0.09	6.20
June	13400	3625	8.73	15.9	7.89	0.01	18.33
July	100	100	5.3	17.0	2.89	0.01	1.00
August	100	100	4.2	20.2	3.57	0.01	5.00
September	100	100	7	18.3	3.08	0.00	2.00
October	100	100	9.1	14.9	2.94	0.00	3.00
November	20	60	7.2	12.8	3.39	0.00	3.00
December	100	8300	4.85	10.2	3.85	0.04	6.60
Annual Averages	2166	2030	6.2	13.0	4.31	0.02	5.01

* Please note: Total Residual Chlorine values were obtained from plant process data sheets, not laboratory values to allow a representative value for daily values gathered.

Table 2 indicates additional sampling carried out for compliance (Total Chlorine Residual) and as quality assurance and operational controls on final effluent leaving the Picton Wastewater Treatment Facility.



Table 3: Influent Quality Monitoring Data, 2009

	BOD	pH	Total Kjeldahl Nitrogen	Total Phosphorus	Total Suspended Solids
Month	mg/L		mg/L	mg/L	mg/L
January	114	7.3	14	2.10	130
February	95	7.1	17	3.20	145
March	63	7.0	11	1.80	72
April	19	6.6	8	0.80	194
May	89	6.8	40	6.30	440
June	120	6.9	20	5.20	530
July	123	6.9	20	3.35	28
August	91	6.8	20	4.00	150
September	115	6.8	20	2.60	46
October	149	6.7	30	5.20	180
November	113	7.2	19	3.50	135
December	94	7.4	64	7.00	110
Annual Averages	99	7	24	4	180

Table 3 indicates the influent monitoring parameters for the purposes of operational controls and determination of percent removal from final effluent.



Effluent Quantity: Capacity Assessment

Due to the limited accuracy of the influent flow meter the effluent flow meter readings were used during 2007, and 2008 to verify compliance with capacity requirements as per the Certificate of Approval. In previous years, the influent flow meter was used to verify compliance with capacity requirements. Correspondence regarding the limited accuracy of the influent flow meter was sent to the Ministry of the Environment in 2007.

Based on the 2009 flow data, the Picton WWTP was able to maintain capacity approval requirements during normal weather conditions as per the applicable Certificate of Approval. For explanation of bypass events, please see the Reporting Summary for the 2009 operational year.

Table 4: Effluent Quantity; Flow Data 2009

	Approved Capacity Annual Average	Annual Cumulative Average	Monthly Average	Peak Flow	Total Flow
Month	m ³ /day	m ³ /day	m ³ /day	m ³ /day	m ³ /month
January	5,490	2918	2918	5797	90453
February	5,490	3411	3905	10668	109333
March	5,490	3597	3967	7817	122974
April	5,490	3883	4742	12585	142273
May	5,490	3804	3488	6731	108114
June	5,490	3648	2868	4330	86033
July	5,490	3491	2546	4222	78940
August	5,490	3342	2304	3129	71437
September	5,490	3207	2123	3366	63676
October	5,490	3128	2420	3733	75010
November	5,490	3109	2919	4590	87569
December	5,490	3204	4247	7940	131643

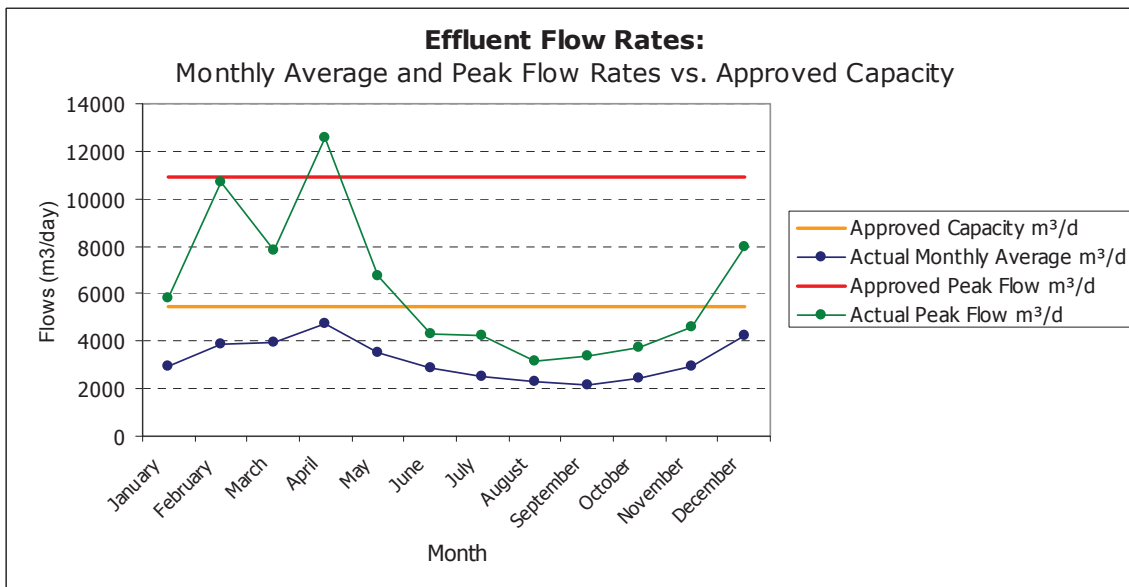
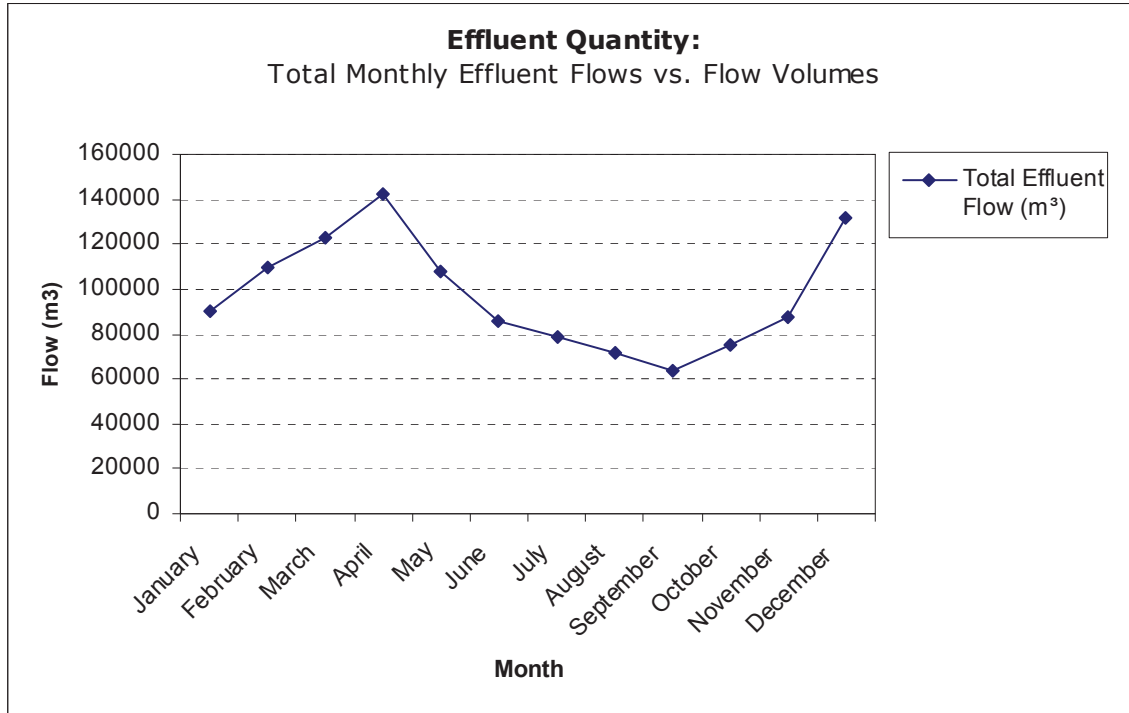
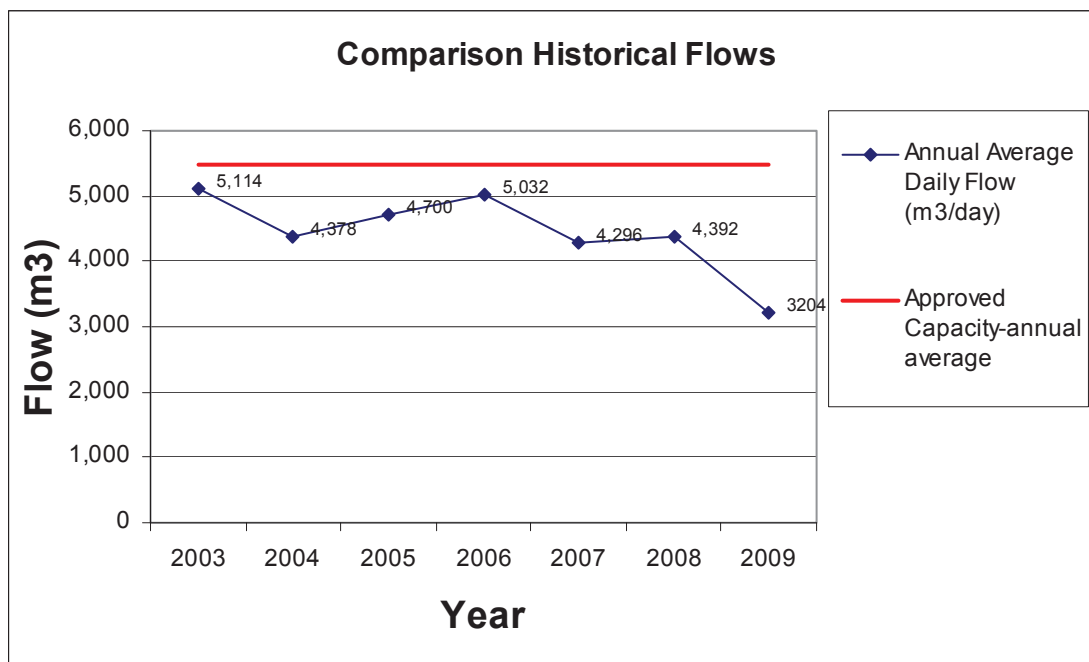




Table 5: Historical Effluent Flows, 2003-2009

	Total Effluent Flow	Annual Average Daily Flow	Approved Capacity Annual Average
Year	m3	m3/day	m3/day
2003	1,866,742	5,114	5,490
2004	1,597,938	4,378	5,490
2005	1,715,382	4,700	5,490
2006	1,836,780	5,032	5,490
2007	1,567,938	4,296	5,490
2008	1,608,702	4,392	5,490
2009	1,167,455	3,204	5,490

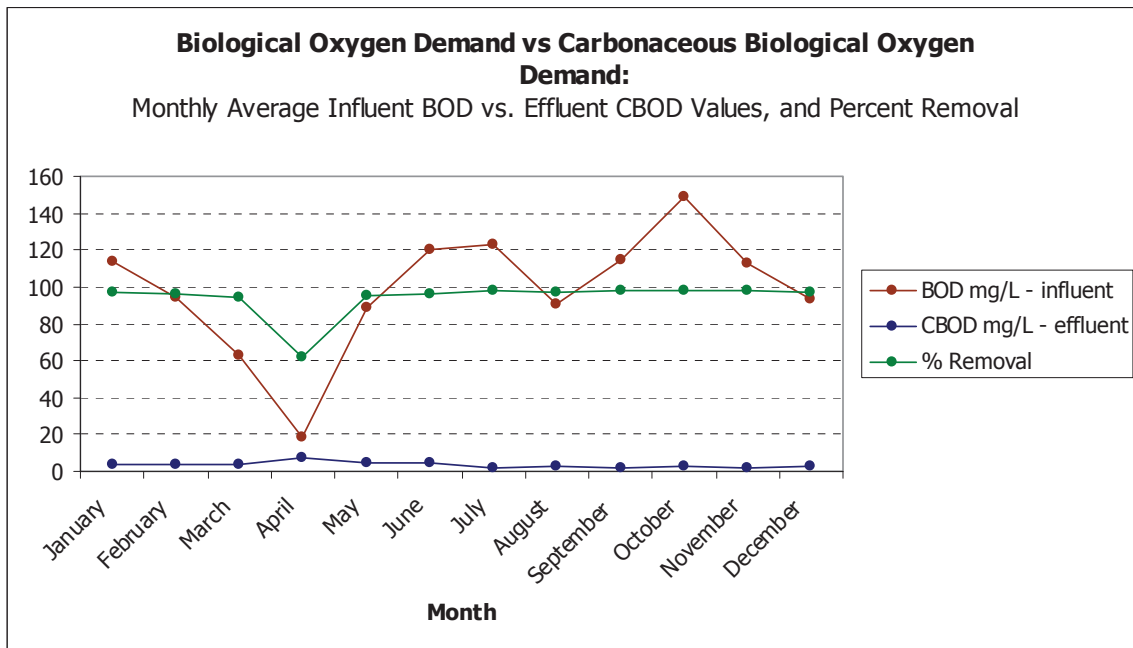


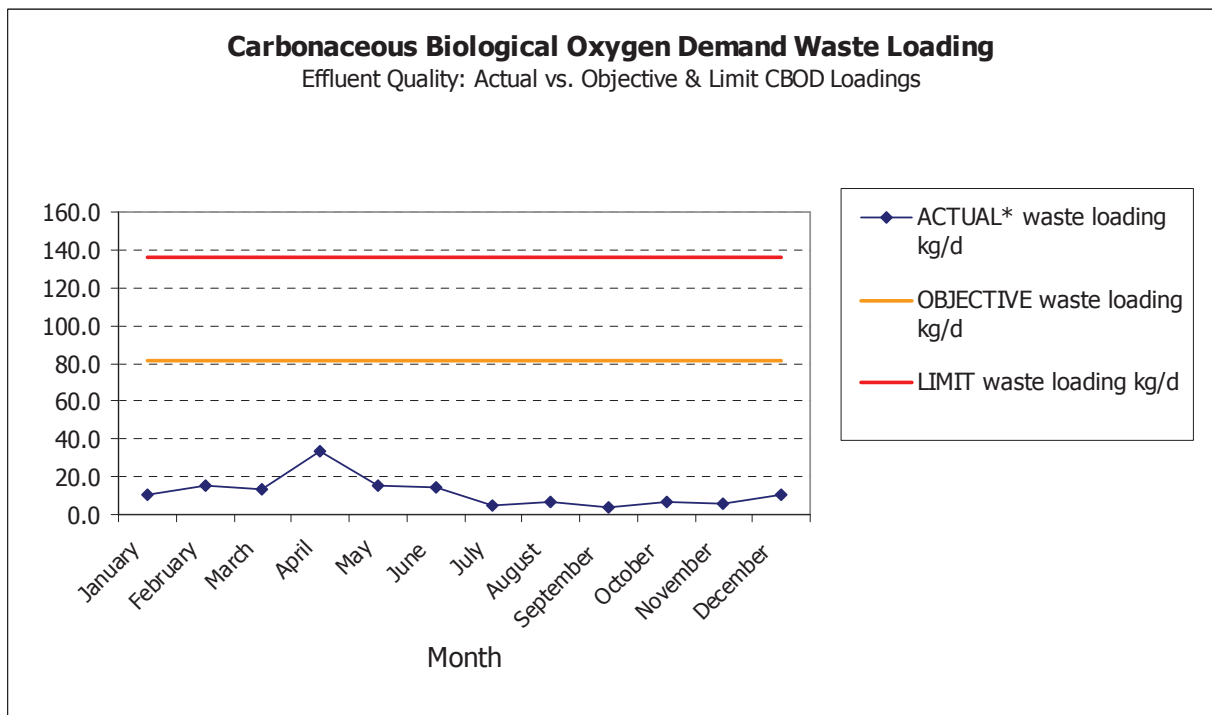
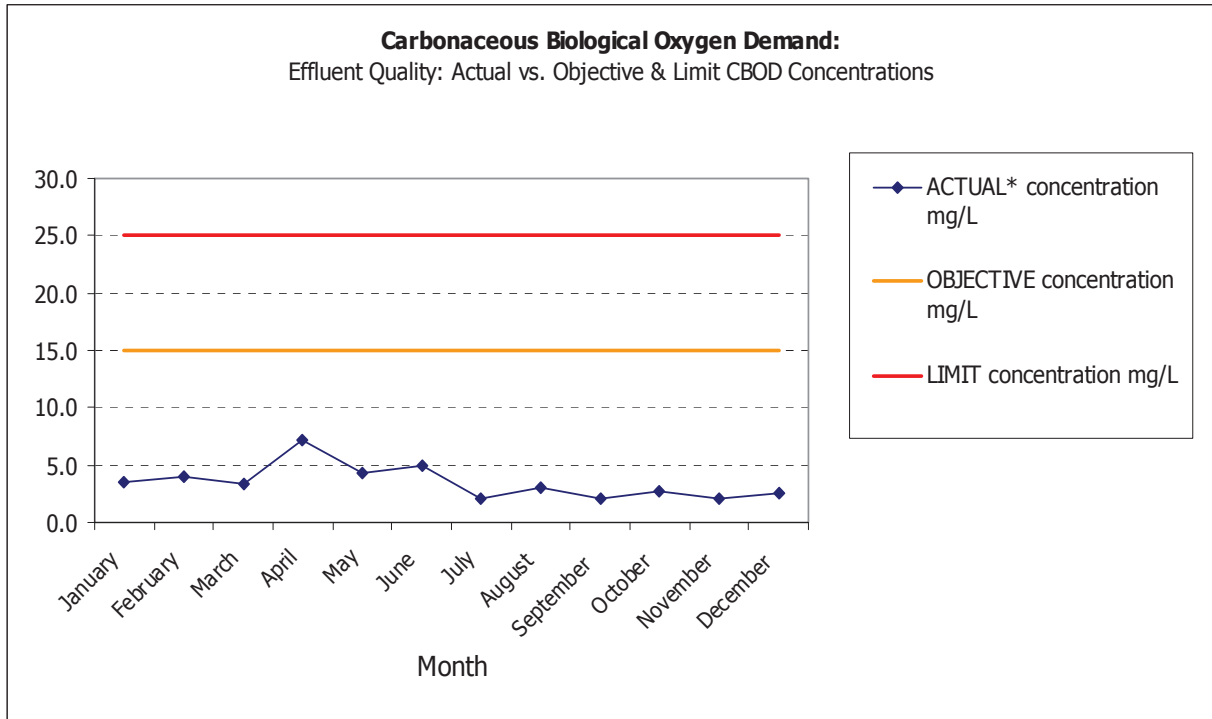
Effluent Quality – Carbonaceous Biological Oxygen Demand (CBOD)

The effluent for the Picton WWTP was monitored for CBOD on a weekly basis for 2009 – an increased frequency above what the Certificate of Approval requires. As well, the influent was monitored for Biological Oxygen Demand (BOD) on a weekly basis to enable better process control and analysis of the treatment process.



Although the CBOD concentrations in the effluent are being compared to the BOD concentrations in the influent, the average reduction rate of 93.9 % is a good indicator of the efficiency of the treatment process. As well, the CBOD concentrations and waste loadings are such that the Picton WWTP was consistently below the stated Effluent Objectives in the Certificate of Approval.

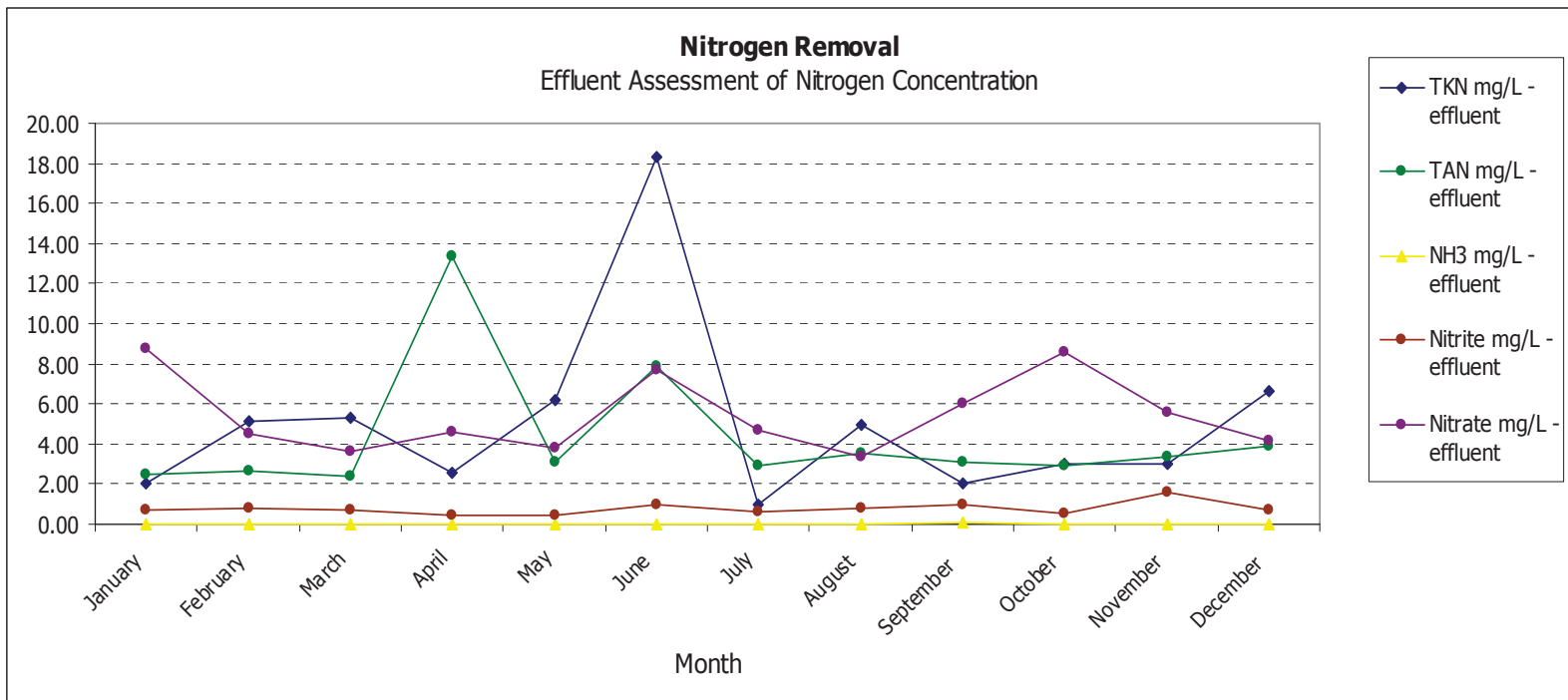






Effluent Quality - Nitrogen Removal

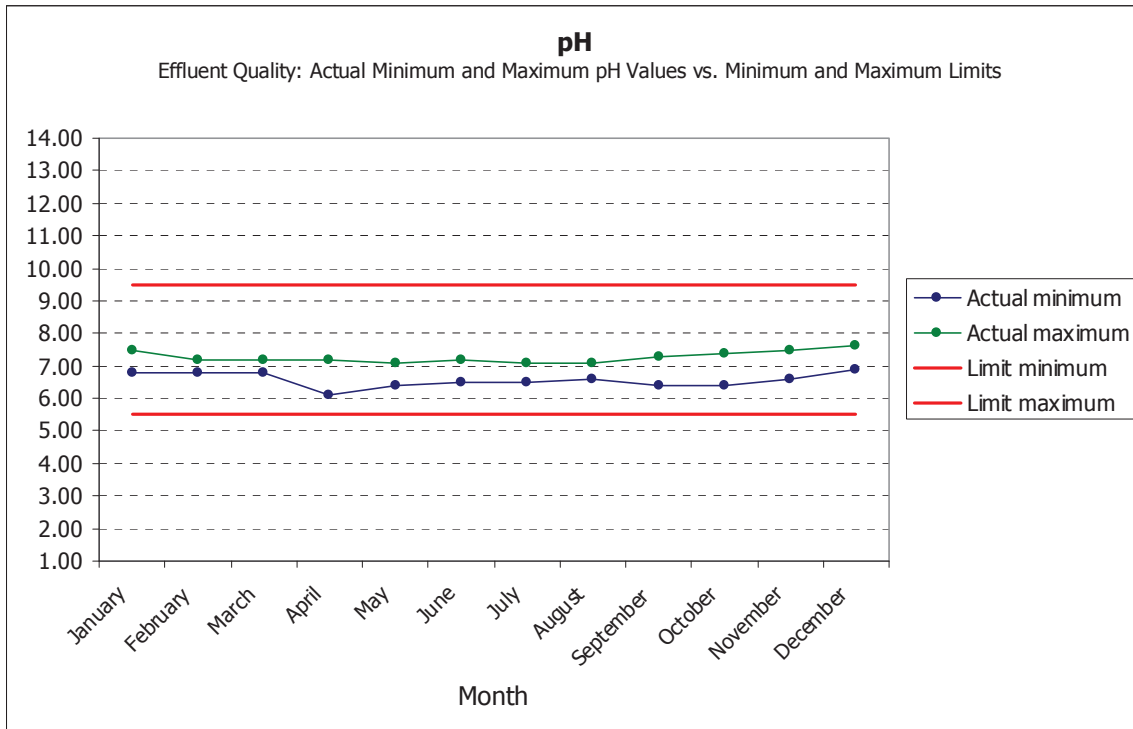
The effluent was monitored weekly for Total Ammonia Nitrogen (TAN), Nitrites, and Nitrates, and monitored monthly for Total Kjeldahl Nitrogen. This monitoring meets and exceeds the Certificate of Approval requirements. Additional monitoring was performed on the influent for Total Kjeldahl Nitrogen once per month to enable process control and analysis of the treatment process.





Effluent Quality – pH

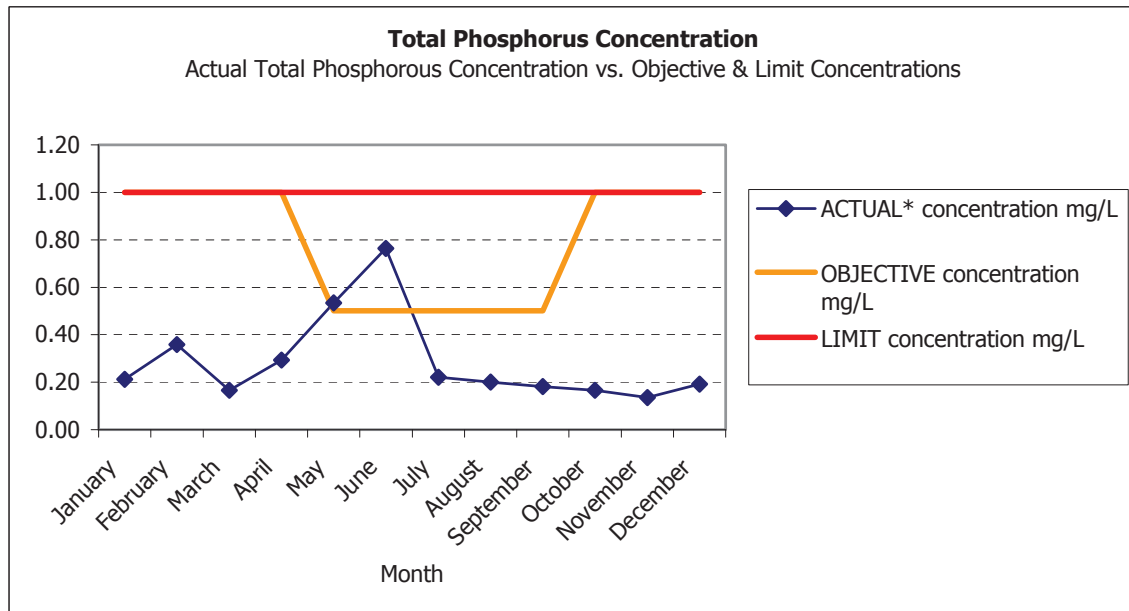
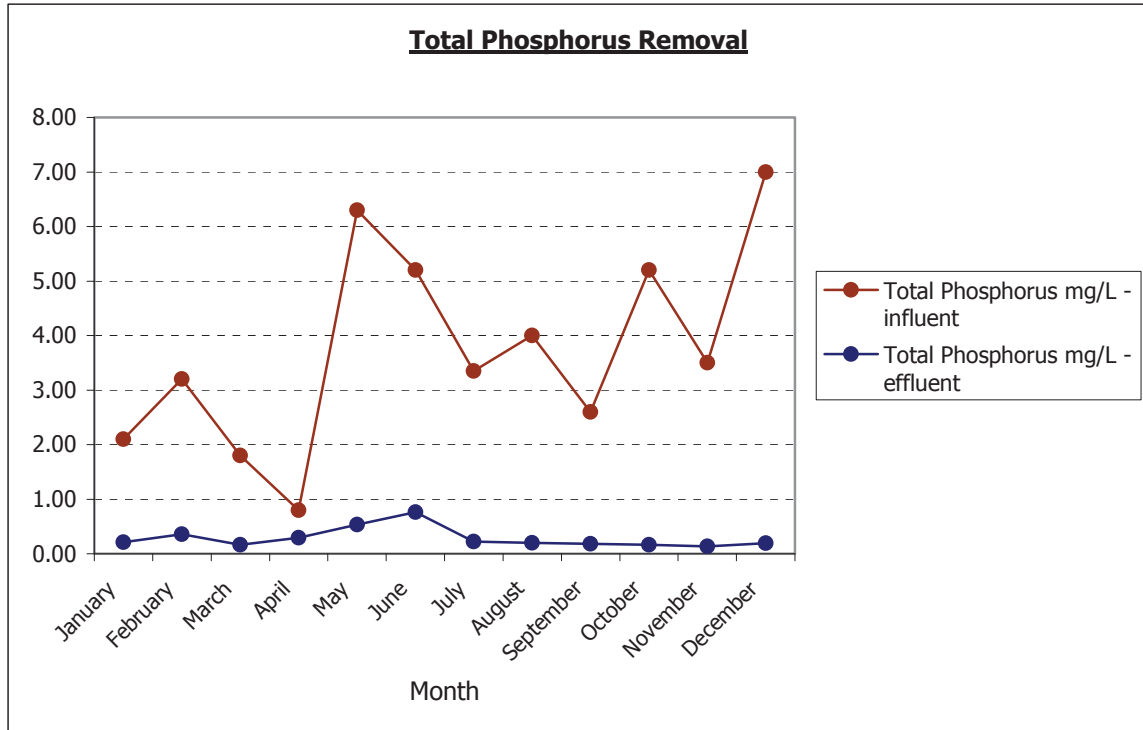
The pH of the effluent was monitored on a daily basis and maintained between the limits as stated in the Certificate of Approval. Data was obtained from plant process data sheets to generate the graph as indicated below.

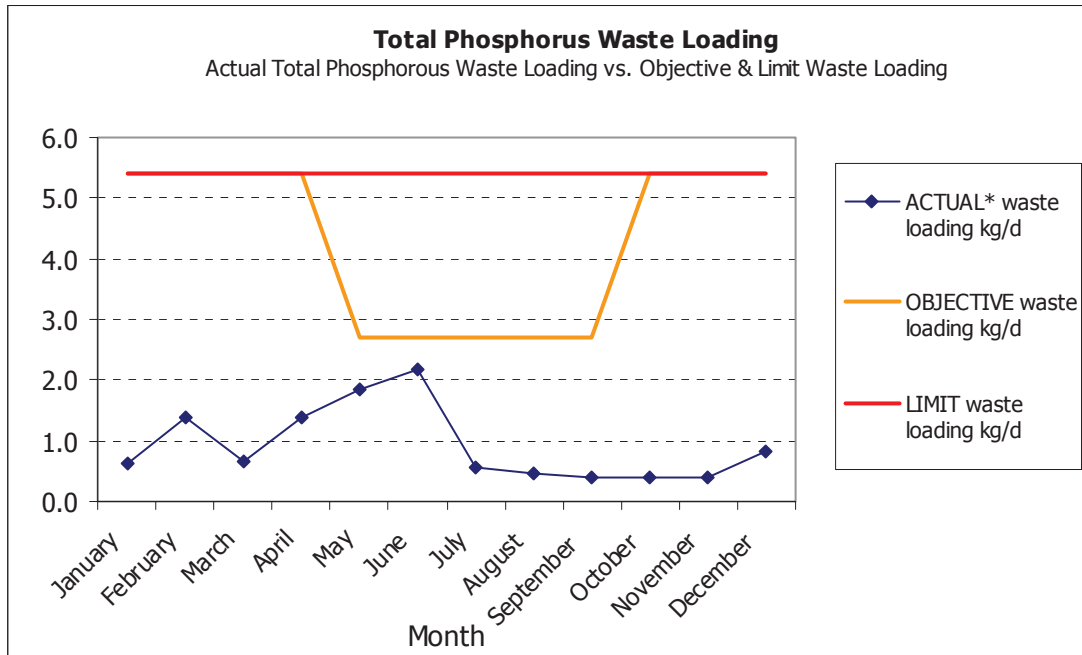


Effluent Quality – Total Phosphorus

The effluent was monitored for Total Phosphorus on a weekly basis meeting the requirements of the Certificate of Approval. Additional monitoring was performed on the influent weekly to enable process control and analysis of the treatment process.

Under normal operating conditions, the Total Phosphorus concentrations and waste loadings were consistently below the stated Effluent Objectives in the Certificate of Approval. The average Total Phosphorus removal for 2009 operational year was 88.4% which includes all bypass events throughout the year.

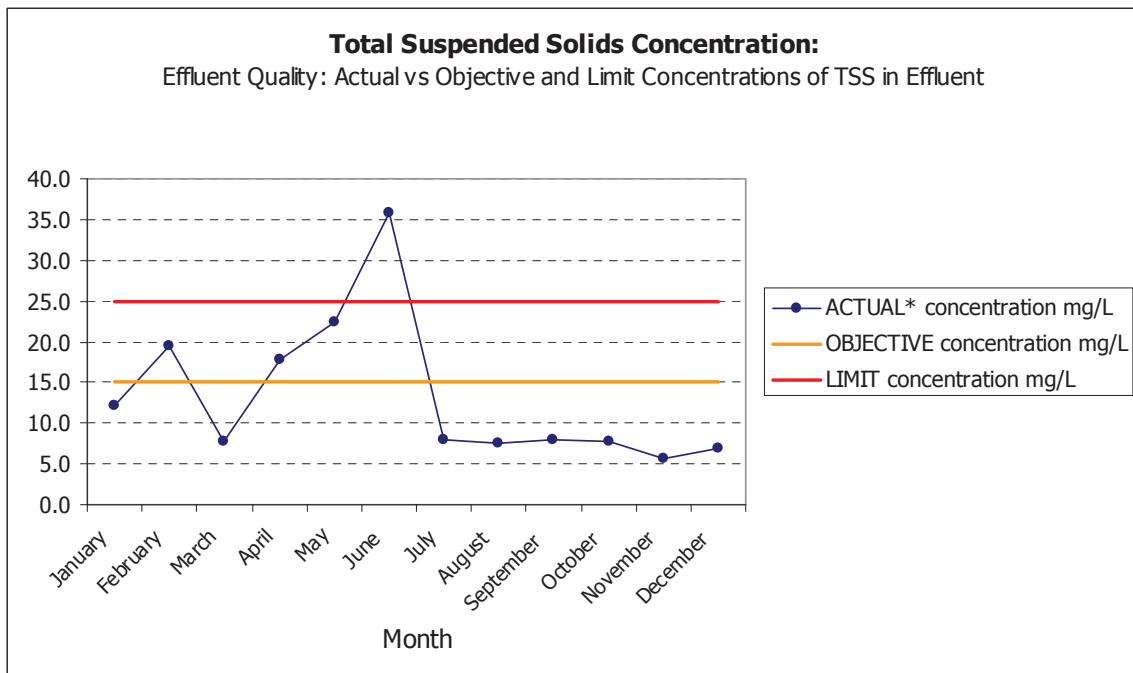
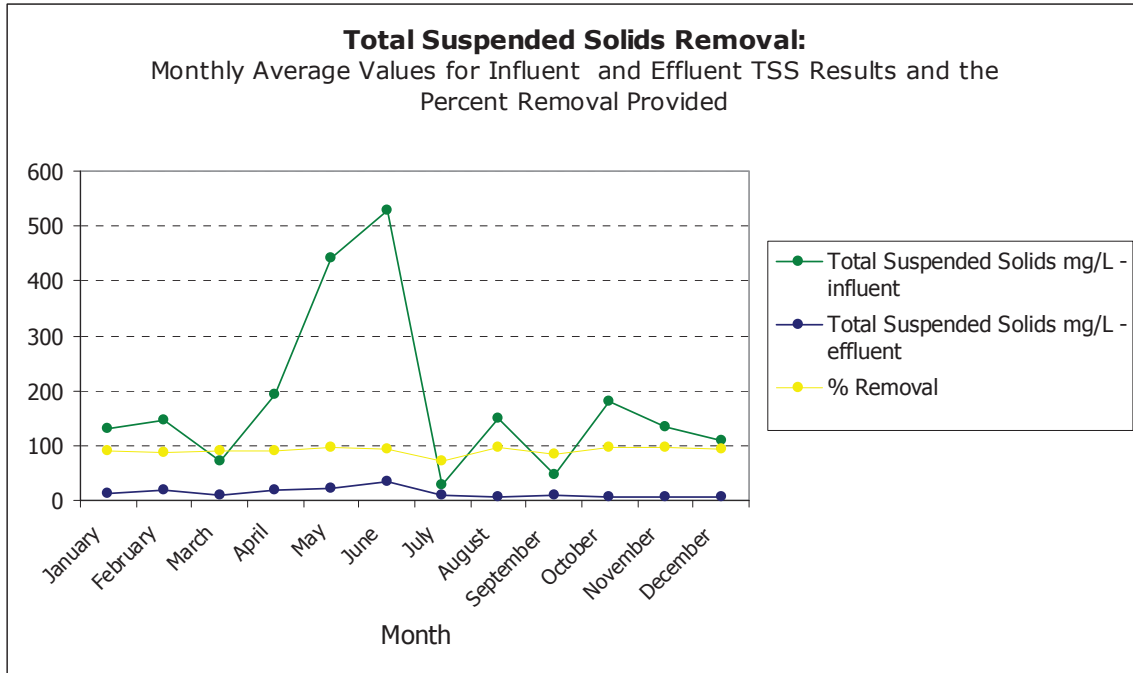


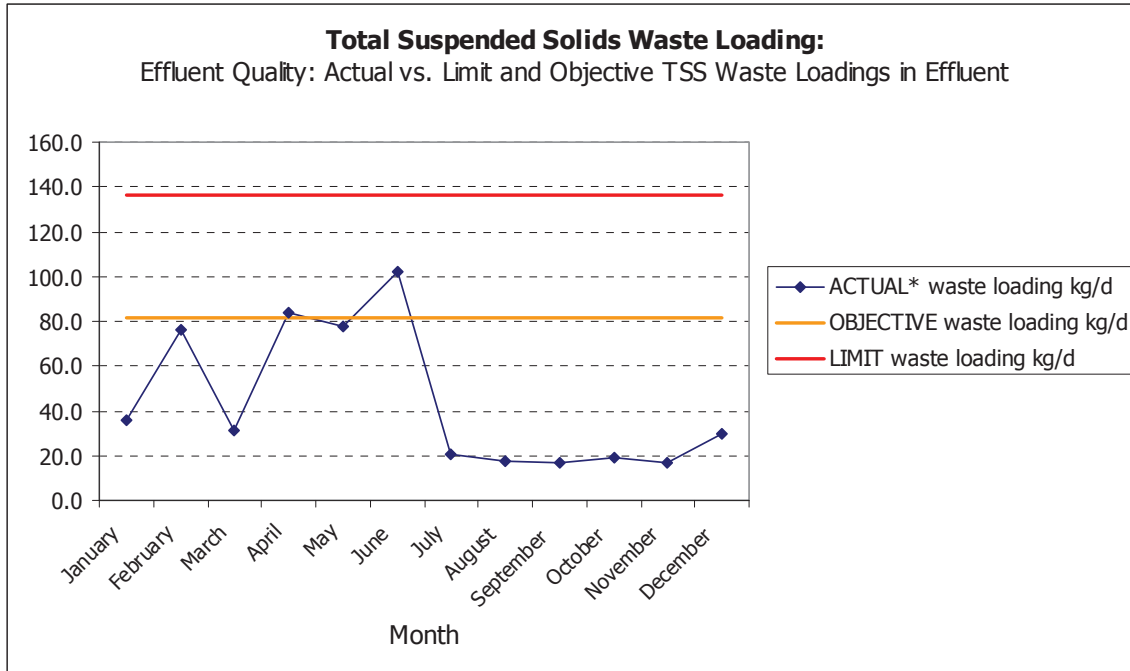


Effluent Quality – Total Suspended Solids

The effluent for the Picton WWTP was monitored for Total Suspended Solids on a weekly basis for 2009 – an increased frequency above what the Certificate of Approval requires. Additional monitoring was performed on the influent once per month to enable process control and analysis of the treatment process.

The Total Suspended Solids concentrations and waste loadings were consistently below the stated Effluent Objectives in the Certificate of Approval, except during abnormal conditions which can be specifically seen in June on account of a bypass and plant upset event. The average Total Suspended Solids removal was 90% for 2009.





Bypass and Upset condition Summary for all events that have occurred in the 2009 Operational year

Table 6: 2009 Bypass and Upset Condition Summary

Date	Description
January 21, 2009	Picton Wastewater Treatment Plant experienced an exceedance of the monthly average concentration of total phosphorus for the month of December 2008 at a concentration of 1.16 mg/L vs. the limit concentration of 1mg/L in final effluent.
February 11– February 16, 2009	Due to a rainfall event, plant experienced increased influent flows that continued for a period of four days, 17 hours. The storm pumps were put into operation and the additional influent flow was directed to the square clarifier for retention until it could be directed back into the treatment process. The square clarifier became full and overflowed the weir spilling into the contact chamber, resulting in a bypass of the activated sludge treatment process for 27.4 hours. A volume of 12693 m3 bypassed the activated sludge process, but received disinfection.
February 27 – 28, 2009	Due to a rainfall event, plant experienced increased influent flows that continued for a period of one day. The storm pumps were put into operation and the additional influent flow was directed to the square clarifier for retention until it could be directed back into the treatment process. The square clarifier became full and overflowed the weir spilling into the contact chamber, resulting in a bypass of the activated sludge treatment process. A volume of 284 m3 bypassed the activated sludge process, but received disinfection.



<p>March 11-13, 2009</p>	<p>Due to a rainfall event, plant experienced increased influent flows that continued for a period of several days. The storm pumps were put into operation and the additional influent flow was directed to the square clarifier for retention until it could be directed back into the treatment process. The storm clarifier became full and overflowed the weir spilling into the contact chamber, resulting in a bypass of the activated sludge treatment process. A volume of 993 m³ bypassed the activated sludge process, but received disinfection.</p>
<p>May 28 to June 4, 2009</p>	<p>Plant experienced increased influent flows that continued for a period of one day. The storm pumps were put into operation and the additional influent flow was directed to the square clarifier for retention until it could be directed back into the treatment process. The storm clarifier became full and overflowed the weir spilling into the contact chamber, resulting in a bypass of the activated sludge treatment process. A volume of 190 m³ bypassed the activated sludge process, but received disinfection.</p> <p>The sludge blanket in one of the clarifiers overflowed the final weir causing a plant upset condition. This was caused by higher than normal plant flows, along with trying to pump out the storm clarifier that had filled during a rain event.</p>
<p>June 3 – 4, 2009</p>	<p>On account of higher than normal flows and a partial block in the RAS valve, the sludge blanket in one of the clarifiers rose and overflow the final weir causing a plant upset condition. After this situation was remediated, on June 4, the opposite clarifier experienced an overflow of the sludge blanket over the final weir due to overcompensation of flow from the previous days upset event.</p>
<p>July 23, 2009</p>	<p>Picton Wastewater Treatment Plant experienced an exceedance of the monthly average concentration of total suspended solids for the month of June 2009 at a concentration of 36mg/L vs. the limit concentration of 25mg/L in final effluent. This is anticipated to be on account of the upset conditions experienced impacting the quality of the final effluent waters.</p>
<p>December 3-14, 2009</p>	<p>Due to precipitation and snowmelt, plant experienced increased influent flows that continued for a period of 13 days. The storm pumps were put into operation and the additional influent flow was directed to the square clarifier for retention until it could be directed back into the treatment process. The storm clarifier became full and overflowed the weir spilling into the contact chamber, resulting in a bypass of the activated sludge treatment process. A volume of 1603m³ bypassed the activated sludge process, but received disinfection.</p> <p>During this bypass event, a fault in the chlorinator was discovered resulting in an elevated chlorine residual in the final effluent at the outfall sampling location. The fault was repaired and chlorine residual was restored to zero (0) mg/L TC residual.</p>
<p>December 24, 2009</p>	<p>The outfall sampling location was found to have 1.15 mg/L total chlorine residual. The operator immediately repaired the dechlorination system and restored chlorine residual to zero (0) mg/L. Total volume discharged was estimated to be approximately 461m³.</p>

Summary of any effluent quality assurance or control measures undertaken in 2009

Effluent analyses on all parameters are performed by accredited laboratory; Caduceon Environmental Laboratories. CBOD, TKN, NH₄, NH₃, NO₂, NO₃, Total Phosphorus (TP), Total Suspended Solids (TSS), Volatile Suspended Solids (VSS) and microbiological analysis are conducted by the laboratory for compliance purposes and operational controls. In addition to



laboratory sampling, in house analysis for pH, Temperature, Total Chlorine Residual, Total Phosphorus, TSS and VSS are carried out by certified operators for the County of Prince Edward Water and Wastewater Services Department. Of the in house analysis conducted, Total Chlorine Residual and pH are conducted for compliance conformance, while the other parameters are utilized for operational controls.

It should be noted that samples are conducted in excess of the Certificate of Approval requirements as laid out by the Ministry of the Environment. Moving forward, the County of Prince Edward Water and Wastewater Services will continue to evaluate the adjust the frequency and variety of non-regulative samples conducted at the Picton Wastewater Treatment Facility to ensure that the control measures for assuring effluent quality are optimized for plant operational efficiency and success.

Summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the works

- The sludge digester, and storage tanks were cleaned out in 2009 during sludge dewatering and shipping process
- Routine Preventative Maintenance performed throughout year

Description of any operating problems encountered and corrective actions taken during 2009

Please review the summary of reporting for 2009 as laid out on page fourteen (14) with regard to the Picton Wastewater Treatment Facility.

Summary of any proposed alteration, extension or replacement in the process or operation of the works to be completed in 2010 which may require approval under the Ontario Water Resources Act

The Corporation of the County of Prince Edward is in the construction phase of the development of a new wastewater treatment facility for the town of Picton. The plant is expected to be complete during the 2010 year, and commissioned thereafter to begin operations.

Prior to the completion of the new plant, normal operations will continue at the existing Picton Wastewater Treatment Facility. There are no anticipated alterations, extensions or replacements in the process or operations of the work. Necessary works to maintain the efficient operation of the plant will be carried out as required.



Tabulation of the volume of sludge generated in 2009 and an outline of the anticipated volumes to be generated in 2010:

All sludge disposals to landfill sites were handled by Entech during the 2009 operational year. The sludge volumes can be assessed as listed below in Table 7: Biosolids Management Quantities.

Table 7: Biosolids Management Quantities

Invoicing Date	Hauled by Entech	
	Amount of Sludge (Wet)	Weight of Sludge (De-watered)
2009 Operational Year	m3	tonnes
Mar-15	1020	276.5
Jun-08	1700	337.36
Sep-30	1711	323.47
Total	4431	937.33

Outline of the proposed sludge handling methods in disposal areas to be utilized during 2010

Biosolids will be handled and disposed of by approved de-watering companies. Dewatering of biosolids will be performed by Entech Corporation, (formerly Salcin Haulage Inc.) and disposed at approved site(s). If the sludge handling services are required of another firm not listed, it will be ensured that the additional firm is an approved sludge handler. The Corporation of the County of Prince Edward does not participate in the application of biosolids to land.

Evaluation of the calibration and maintenance procedures conducted on all monitoring equipment

Calibration and maintenance procedures conducted on all monitoring equipment are performed according to the manufacturer’s recommendations. All work performed is scheduled through a preventative maintenance task scheduler database which indicates when the calibration/maintenance is to be performed and includes the procedure in the report generated. Upon task completion, the data is recorded in the database and logged.



In addition to regular maintenance carried out by certified operators, flow measuring devices at Picton Wastewater Treatment Facility are calibrated by a trained third party representative and performed on an annual basis.

Evaluation of the need for modifications to the works to improve performance and reliability and to minimize upsets and bypasses

A full evaluation has been conducted on the existing Picton Wastewater Treatment Facility resulting in the development, construction and implementation of a new wastewater treatment facility scheduled completion during the 2010 year. Aging infrastructure, technological standards and rated capacity of the existing plant were among the factors in pursuing the development of a new facility.