

MANITOUWADGE
ONTARIO • CANADA

Manitouwadge Public Works

Presents:

Water Treatment

Subsystem Class I

and

Manitouwadge Water Distribution

Subsystem Class I

2012

ANNUAL REPORT

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Date: February 28, 2013

2012 ANNUAL REPORT
Township of Manitowadge
Public Works Department

Manitouwadge Water Treatment Plant
Water Treatment Subsystem Class 1 & Manitowadge Water Distribution
Water Distribution Subsystem Class 1

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**ANNUAL REPORT
2012
Township of Manitowadge
Public Works Department
Manitowadge Water Treatment Plant
Water Treatment Subsystem Class 1
and
Manitowadge Water Distribution
Water Distribution Subsystem Class 1**

1.0 INTRODUCTION

The Corporation of the Township of Manitowadge Public Works Department operates the Manitowadge Water Distribution System under a **Drinking Water Works Permit # 229-201** issued by the Ministry of the Environment.

The Corporation of the Township of Manitowadge is required to produce an annual compliance report for the benefit of the Ministry of the Environment and the residents of Manitowadge within ninety days of the end of the calendar year.

Contained in this report, you will find the water quality data and information that we are required to keep and publish, under the Ontario Drinking Water Protection Act, from January 1, 2012 to December 31, 2012 as well; we include some of our accomplishments during the year.

Appendices to this report are the summaries of the laboratory results mandated by Ontario Regulation 170/03. Parameters included are microbiological, chemical and operational, daily laboratory testing, daily on-line instrumentation readings, inorganics and organics. As well, we have attached a “Glossary of Terms” to aid you in interpreting the data presented.

While perusing these appendices please be sure to read any and all the attached footnotes remembering that not all **Maximum Acceptable Concentrations** or **Interim Maximum Acceptable Concentrations** are health related. In fact some are aesthetic or operational parameters. Remember also that the presence of any substance does “not necessarily make the water unsafe to drink”.

As of November 30, 2005 our facilities are classified as a Class I Water Treatment Subsystem and a Class I Water Distribution Subsystem.

Kirk Tourout is the operator in overall responsible charge. He is currently licensed as a Class I Water Treatment Subsystem and a Class II Water Distribution and Supply Subsystem operator. Kirk is assisted by Paul Richard who is currently licensed as a Class

I Water Treatment Subsystem and a Class I Water Distribution and Supply Subsystem operator.

Our system participates as part of the Ontario Drinking Water Surveillance Program which occurs twice annually.

Our Laboratory analysis for Ontario Regulation 170/03 sampling requirements are performed by Thunder Bay Analytical, a division of ALS Laboratory Group who are accredited by the Ministry of the Environment. Drinking Water Surveillance Program sampling is analyzed by the Ministry of the Environment's central laboratory.

For the purpose of this report our system supplies water for a population of 2,106. The number of households connected to our system is 1,292. Households are deemed to include residential, multiple unit residential, institutional and industrial locations.

2.0 MANITOUWADGE WATER WORKS

2.1 WATER SOURCE

Have you ever really thought about where your water comes from?

Contrary to majority public opinion, our water comes from five drilled wells and not from Manitouwadge Lake. This community is blessed with an ample supply of water from an enormous aquifer located deep under the town site bounded by hills surrounding the valley where we are situated.

Water quality does not change quickly due to the depth and the size of our aquifer. The water temperature varies from 7 °C to 8.7 °C year round. Like most drilled wells, our water is extremely hard and slightly aggressive. Allowing the well water to pass through induced draught aerators, the naturally occurring hydrogen sulfides is scrubbed off, yielding a fairly consistent pH in the 7.6 to 7.9 range.

The natural colour of our water is extremely clear and its turbidity is very low. Hence, the addition of a 12% sodium hypochlorite solution used for disinfection produces extremely low levels of trihalomethanes (THMs).

2.2 HISTORY

The Manitouwadge Distribution System was first constructed in 1954 and has gone through several upgrades since.

Initially, there was one drilled well that pumped directly into the water main with no treatment. Pressure and flow were controlled by a pressure reducing valve powered by a 50 horsepower motor. It was coupled to a four cylinder engine on a right angle drive to provide water during power outages. The system was not automatic, necessitating a workman to come to start the engine, engage the drive and disengage and stop the engine

before restoring it to main power. Capacity was 30.2 L/sec (400 IGPM). Increased demand necessitated a second drilled well. Capacity increased to 60.4 L/sec (800 IGPM). Duty was divided between these two pumps. A prolonged decrease in pressure would signal the second pump to run, meeting flow and pressure demands.

In 1962, numerous water breaks revealed that our water was corroding our water mains. The solution was to construct an induced draught aerator to raise the pH of the water. This necessitated the construction of an in-ground storage tank of 55 cubic meters (12,000 IG) to receive the aerated water. Two high lift service pumps pumped the water into the water mains controlled by pressure reducing valves. The motors on the existing well pumps were reduced to 25 horsepower. The high service pumps were 50 horsepower each. One of the high service pumps was coupled to a six cylinder engine on a right angle drive. It was later upgraded to automatic operation during a power outage. However, should the reservoir run low on water, the stand-by well motor had to be run manually.

The town continued to grow. The wells and reservoir could no longer maintain normal daily flows, forget fire flows. In 1975, a second in-ground reservoir, of 59 cubic meters (13,000 IG) capacity, was added. An additional induced draught aerator was supplied to handle the two new drilled wells, located adjacent to the Lion's Beach. A ten inch raw water main was constructed to supply the reservoirs located at the Shawinigan Place distribution centre. A 100 KW Diesel generator was installed to provide emergency power for well pumps #3 and #4. Emergency well capacity increased from 30.2 L/s (400 IGPM) to 120.6 L/sec (1,200 IGPM). A fifth drilled well was later added, in 1989. An upgrade to the sewage lift station, in 1984, saw the upgrading of diesel generator to 200 KW. However, this resulted in the emergency well pumping capacity dropping to 60.4 L/sec (800 IGPM).

Two additional high service pumps were added to bring our firm pumping capacity to 120.8 L/sec (1,600 IGPM). One of these pumps was connected to a motor driven right angle drive, boosting our emergency pumping capacity to 60.4 L/sec (800 IGPM).

By 1984, the inadequacy of our water supply became apparent. Consistent failure of the emergency pumping systems, and the age of the equipment and its operating systems, prompted a detailed study.

The Hemlo Gold find prompted the final 1990 expansion of our water distribution system. A 4,065 cubic meter (893, 000 IG) two-celled reservoir was constructed. Two dedicated fire pumps were added and the existing high service pumps were upgraded to 40.5 L/sec (525 IGPM). Firm pumping capacity was increased to 243 L/sec (3,200 IGPM).

A 400 KW generator was installed to provide emergency power for the entire Shawinigan Place facility. However, our assured well pumping capacity is only 60.4 L/sec (800 IGPM). A study on upgrading the well pumping station generator to 400 KW, to allow

for emergency power for wells #3, #4 and #5, plus power for the sewage lift station facilities, is being contemplated.

In the spring of 2004 the oil lubricated vertical turbines for Well Pumps #1, #2, #3 and #4 were replaced with submersible water lubricated units. The reasons for the upgrade were prompted by Ministry of the Environment Inspectors preference for water lubricated units to eliminate the need for oil. The oil used was of food grade quality; therefore meaning that there was no risk to human health should the well pump break suction. The decision was made on operational basis determined by the relative ease of servicing locally rather than contracting out maintenance services to a specialist well contractor.

Our Facilities can service the peak pumping hours, plus fire flows, for a population of 6,000 people.

As of May 10th, 2007 a secondary source of treatment was implemented for the Town Of Manitowadge consisting of 3 UV reactors which were installed in the pumping stations. The UV reactors are posing as an initial treatment used to inactivate pathogens using 254 nm spectrum of light before receiving a secondary treatment of disinfection as stated above. These reactors are designed to achieve maximum inactivation at a minimum dosage rate of 42 mJ/cm². This dosage rate will supply sufficient inactivation to specific micro-organisms passing through the light spectrum. Inactivation consists of a physical process which fuses the DNA of the microorganism rendering it incapable of replication.

Over the past three years Jon Nelson of Nelson Technical Services has been implementing a change in method of which the control of the water plant is conducted. As of the end of 2011 the water treatment plant is now controlled using SCADA (Supervisory Control And Data Acquisition) System. The SCADA System is a visual control system which allows operators to see changes made to the processes in real time. The SCADA system has various pages for viewing which include System overview, Service pumps, Well pumps, System settings, and Alarm History, Analog Inputs, and pump hour meters.

The System Overview is exactly that an overview of all the service pumps, well pumps, reservoir and UV system and what is running in real time. The Service pump page indicates what service pump is supplying the distribution system as well this page allows you to select service pumps and run them manually. The well pump page indicates which well pump is selected, and allows operators to run well pumps manually. System settings page is where all the settings are located and allows operators to view and change set points for the reservoir, selection for lead service pumps and lead well pumps. Also the system settings page allows operators to view alarm set points. Alarm History page is just accumulation of alarms that have previously happened. (i.e. Pump Failure or UV Failure). The Analog page is a visual indication of all the input readouts. (i.e., CL2, Turbidity, Temp, etc.). Pump hour meter page allows operators to visually see how many hours are on each pump indicates to operators which pump need to be ran to have even runtime and distribute the everyday wear and tear on the pumps. In the near future Jon Nelson will

commission the Daily Reporting page which will allow operators to print out daily reports on a regular basis.

The SCADA System also has trending pages which allow operators to visually look at graphs and see anomalies in the in the data, whether it be in five minute intervals up to weekly or monthly intervals. This feature is good as you can pinpoint the timeframe then go back to the actual data and identify the numbers associated with the anomalies.

2.3 OPERATIONS

System pressure controls the operation of six (6) high power pumps. The lead pump is controlled by a variable frequency driver. The VFD increases the lead pump's speed to maintain system pressure until the maximum motor speed is reached. As demand increases and as the system pressure drops to and remains 2.5 to 5.0 PSI below the system pressure set point (currently 80 PSI) for twenty (20) seconds, a second high service pump is called at constant (maximum speed, and then starts following a five (5) second time delay. The lead pump's speed is adjusted by the VFD to compensate and maintain the system pressure at its set point.

As system demand increases further, the lead pumps speed increases to maximum, and when the system pressure set point drops 2.5 to 5 PSI for a twenty (20) second period, a second high service pump at constant speed is called and then starts after a five (5) second time delay.

2.4 DECREASING DEMAND

The lead pump decreases its speed via the VFD to maintain system pressure until the minimum speed is attained. As demand decreases and the system pressure rises and remains 2.5 to 5 PSI above the set point for a period of ten (10) seconds, a high service pump at a constant speed is stopped. The VFD adjusts the lead pumps to compensate and maintain the system pressure set point.

2.5 WELL PUMPS

Reservoir levels control the operation of five (5) well pumps. When the reservoir level falls to the start level for duty one, the pump assigned to duty one will start and continue to run until the reservoir level rises to the stop level programmed for the duty one. In a similar manner, their remaining pumps will start or stop in accordance with their programmed start and stop levels when reached according to the well pump duty cycle for duties two (2) to five (5).

Up until the end of 2011 well pump Flow (Q) was controlled by throttling valves to achieve the desired flow on the flow meter. As of the end of December 2011 Automation Now and Nelson Technical Services installed five 25 hp VFD's on each of the well pumps, which allowed us to open up the valves and control the speed of the pump using

the VFD's to achieve the desired flow on the flow meters. The addition of the VFD control benefits the plant in a variety of ways, not only is the wear and tear on the pumps valves and piping minimized but we are also running the well pumps more efficiently. The installation of the VFD's on the well pumps boasted approximately a 45 % reduction in energy usage just by controlling the speed of the pump rather than throttling the valves.

2.6 PUMP SETUP

Within the system, there were two (2) variable frequency drivers, six (6) high service lift pumps and five (5) well pumps. As of the end of December, Automation Now and Nelson Technical Services installed an additional two (2) VFD's on the service pumps which supply the town's water through the Distribution System. The operator now selects which pump is going to be the lead pump with the option of selection two service pumps as the lead pumps. After pump selection is achieved automatically, the VFD that is hooked up to that service pump will run to maintain the desired pressure in the distribution system. Lead pumps are cycled to achieve an equal run time.

The operator selects from service pumps 1 to 4 the lead pump. High service pumps #5 and #6 can never be selected as lead pumps. Pump # 5 becomes the automatic selection when you select service pump #1 or #2 and Pump #6 becomes the automatic selection when service pump #3 or #4 is selected. Also another feature that was put in place is if the power fails and the PLC dumps and we loose control a service pump will run on minimum speed to insure that the pressure in the Distribution System doesn't drop until we can get the PLC repaired.

The operator selects from well pumps 1 to 5 the lead well pump. The balance of the pumps becomes duties 2 to 5. As with the VFD's and the high service pumps, care is taken to run each well pump on a regular basis to equally distribute the wear and tear of the regular operations.

3.0 WATER QUALITY

Some parameters may be present in source water before we treat it. The various groups of parameters are described as follows:

Microbiological Parameters, such as bacteria, may come from sewage plants, livestock operations, septic systems and wildlife. Microbiological quality is the most important aspect of the drinking water quality because of its association with dangerous water-borne disease which can strike quickly.

Inorganic Parameters, such as salts and metals, can be naturally occurring, or a result of urban storm runoff, industrial or domestic wastewater discharge, mining or agriculture. Some may be a result of treatment and distribution of water (for example, lead from old solder in pipes).

Organic Parameters can be naturally occurring, but most organics of concern are synthetic. They originate from industrial discharges, urban storm runoff and other sources. Included in this group are pesticides that originate from both, rural and urban areas. Some may originate from treatment of drinking water (for example, chlorination byproducts such as trihalomethanes).

4.0 SOME WATER FACTS

4.1 DATA

See Appendix A for the relevant flow data.

Appendix A-1 shows the sodium hypochlorite and chlorine usage and the average daily dosage rate.

Appendix A-2 summarizes the total monthly flows juxtaposed with the average, minimum and maximum for actual flows and peak daily flows.

Appendix A-3 features a summary of the minimum and maximum daily flows on a monthly basis highlighting the day that they occurred.

Appendix A-4 in accordance with our Certificate Of Approval features a summary of the minimum and the maximum daily flows on a monthly basis also highlighting the day that they occurred. Please note that these flows are calculated using the peak flow for that day extrapolated to a daily flow. They are **not** actual daily flows.

Appendix A-5 shows an annual overview of the actual daily flows.

Appendix A-6 is an annual summary of maximum instantaneous daily flows.

Appendix A-7 annually summarizes the minimum instantaneous daily flows.

Our Treatment Plant delivered 302,973,000 liters of potable water to its consumers 6,016 liters of 12% sodium hypochlorite solution yielding 786.76 kilograms of chlorine used for disinfection purposes. This translates to an annual dosage rate of 2.69 mg/L.

On a per capita basis this translated to 394 liters per person per day. Based on the 2011 figure of 331 liters per person per day this represents a 8 % increase in water consumption per person per day.

On a household basis this means that 642 liters per household per day were consumed. Based on the 2011 figure of 590 liters per household per day, this represents an 8 % increase in consumption levels.

4.2 Water Metering

Completion of the water meter installations in April 2005 prompted the creation of Figure 4.2. It shows the percentage decrease in water consumption commensurate with the billing for the water usage.

Fig 4.2					
Month	2011		2012		Reduction
	Total Flow	Average Daily Flow	Total Flow	Average Daily Flow	
	m ³	m ³	m ³	m ³	%
January	23598	761.23	30137	969.48	27.709975
February	22731	811.82	29730	1026.46	30.79055
March	28352	914.58	27026	869.32	-4.676919
April	26776	892.53	25312	839.03	-5.467583
May	20269	653.84	28643	919	41.314322
June	20232	674.4	32100	1062.57	58.659549
July	21456	692.13	28712	922.13	33.818046
August	22429	723.52	23567	759.06	5.0737884
September	20769	692.3	19856	657.43	-4.395975
October	24548	791.87	18354	592.06	-25.2322
November	21506	716.87	17736	632.7	-17.52999
December	26220	845.81	21800	701.35	-16.85736
Total/Average	328240	901.43	302973	829.2158	-7.697721

*** When there is a (-) % that is actually a decrease from previous year and when there is no (-) sign that indicates an increase from the previous year. Even though there were increases in some months the overall reduction is based on the annual comparison.

5.0 COMPLIANCE ISSUES

5.1 SAMPLING

Appendix B-1 gives a summary of the laboratory analysis for Ontario Regulation 170/03 annual sampling requirements for inorganics. There was one exceedence.

Appendix B-2 gives a summary of the laboratory analysis for Ontario Regulation 170/03 annual sampling requirements for organics. There were no exceedences.

Appendix B-3 gives a summary of the laboratory analysis for Ontario Regulation 170/03 quarterly sampling requirements for organics. There were no exceedences.

Appendix B-4 and B-5 gives a summary of the laboratory analysis performed under the auspices of the Ontario Drinking Water Surveillance Program. B4-a and B4-b deal with various chemical, physical and operational parameters. B4-a deals specifically with raw water and B4-b deals with treated water. There was one exceedence for Hardness. Please pay close attention to the footnotes provided.

B5-a and B5-b deal with various inorganic parameters. B5-a deals specifically with raw water and B5-b deals with treated water. There were some exceedences. Please pay careful attention to the footnotes.

Appendix C-1 details a summary of our weekly raw water bacteriological sampling requirements under Ontario Regulation 170/03. There were no exceedences.

Appendix C-2 details a summary of our weekly treated water bacteriological sampling requirements under Ontario Regulation 170/03. There were no exceedences.

Appendix C-3 summarizes our weekly bacteriological sampling requirements for the distribution system under Ontario Regulation 170/03. There were no exceedences.

5.2 Peak Flows

Under our Certificate of Approval we are required to monitor our instantaneous maximum daily flow and translate this into a daily flow also known as a “Peak Flow”. This figure should not exceed our Maximum Allowable Daily Flow of 10, 472 m³/day. Any flows in excess of this must be documented together with a reason for the exceedence.

For 2012 there were Four (4) such exceedences. Figure 5.2 represents this exceedence with a brief explanation for the occurrence.

Figure 5.2

Peak Flow Exceedences		
Day/Date	Flow (m³/day)	Probable Causes
Monday, July 16th, 2012	11,118.82	OCWA Annual Watermain Swabbing
Wednesday, Aug 29th, 2012	11,574.14	Water Service Repair 26 Oshweken
Thursday, Oct 30th, 2012	11,574.14	Water Service Repair 14 Warbler
Friday, Dec 21th, 2012	11,715.84	Watermain Repair Station Road and Caribou

6.0 CERTIFICATE OF APPROVAL

6.1 DAILY LABORATORY TESTING AND OPERATIONAL PARAMETERS

Appendix D-1 summarizes our Certificate of Approval mandated daily in-house laboratory testing for various operational parameters and distribution system zone sampling. To address a request by the Ministry Of Environment Inspector that our results mirror the M.O.E. Form III reporting this appendix goes from 1a to 1g. Included in these results as requested by the M.O.E. are the Raw Well Turbidity readings which are analyzed for once a month and recorded in a spread sheet.

Appendix D-2 summarizes our Certificate of Approval mandated On-Line Instrumentation as per M.O.E. request to mirror Form III reporting this appendix goes from 2a to 2d. There were no exceedences.

Our On-Line instrumentation and our Laboratory analyzers were re-calibrated by P. Andre Lemoine who is a Clear Tech Technician on July 25th, 2012.

6.2 FLOW METERING

Our Certificate of Approval mandates that our flow meters must be accurate within plus or minus five (5%) percent of the raw water and treated water flow meters.

Appendices E1 to E13 sets out the accumulated data for January through December. Appendix E1 is a summary of the monthly totals of Appendices E2 to E13. This shows that for the period represented by this data that is an average we were in compliance.

However, as you pursue this data you may notice that some daily and some monthly figures seem to be out of compliance. The explanation for this is as follows: The well flow meters are the most accurate and these flows are used to compute the daily flows. Each well is restricted to 30.3 liters per second and the corresponding meter is set accordingly. The raw water flow meter to achieve the maximum accuracy is programmed to accurately measure flows up to 91.2 liters per second which represents the combined flow of three wells. When more than three wells are running, such as during hot days or major water break or fire hydrant usage, the accuracy falls off. Similarly the treated water meter is programmed to be accurate with flows not exceeding 120 liters per second. This represents the maximum flow at 80 psi that three of our six high service pumps can produce. During high flow conditions such as hot weather demand, major water breaks or fire hydrant usage when more that three high service pumps are required, the accuracy again falls off.

Please realize that the accuracy of the flow metering equipment is monitored on a daily basis by our operations personnel. The well flow meter and hour meter, raw water meter and treated water meter are read daily. Hour meter readings are subtracted from the previous days reading and multiplied by the well meter flow usual 108 cubic meters per day and compared with difference in the flow meter reading to ensure that it is within

plus or minus five percent of each other. The results of the five wells are then added and then compared with the differences for the raw water and treated water flow meters.

Our flow meters were re-calibrated by Endress + Hauser on October 25, 2012.

6.3 LEAD SAMPLING PROGRAM

In spring 2008 M.O.E mandated that lead sampling be conducted in accordance with OR 170-03 Community Lead sampling. Lead Sampling was to commence twice annually during the spring and again in the fall. The number of samples collected was reduced due to the ratio of samples that were below the 10 ug/L and the samples that exceeded the 10 ug/L. This meant that Manitowadge needed to achieve 10 household samples, 2 distribution samples (i.e. Hydrants) and 1 non-residential sample over the 2012 period. Appendix F-1 and F-2 summarizes the results from the sampling periods. Appendix F-1 for the spring sampling program and Appendix F-2 for the fall sampling program yielded no exceedences.

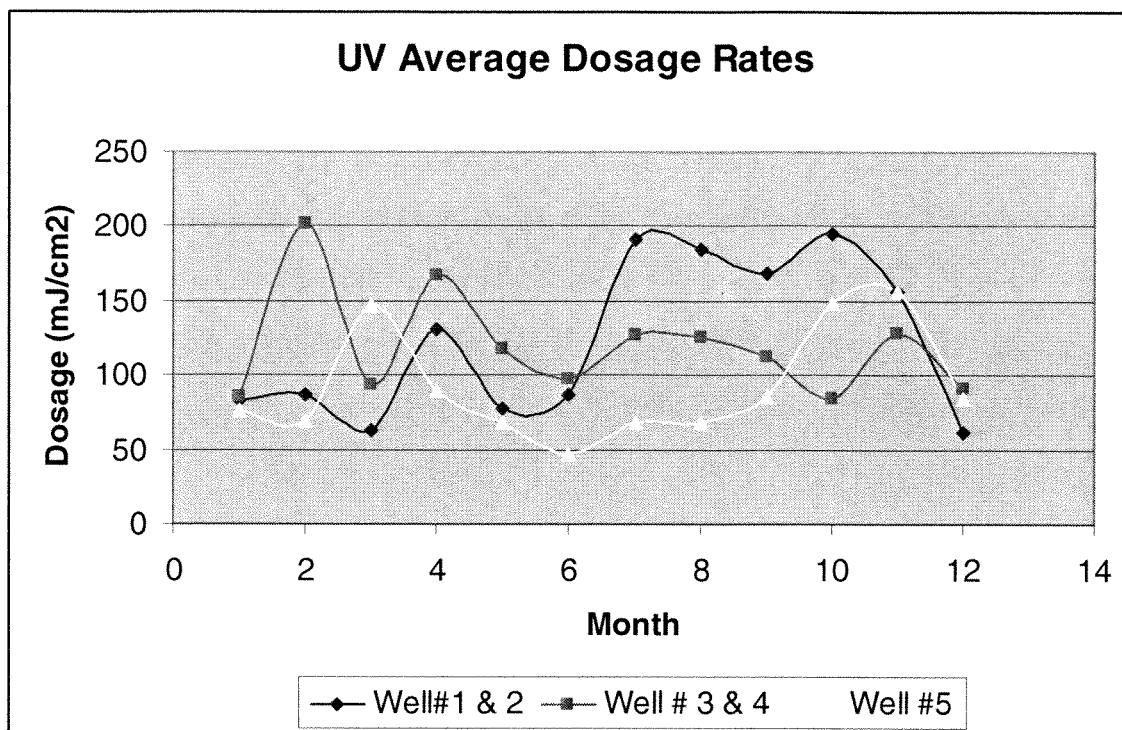
6.4 UV Treatment Operations & Data

This section was a result of the installation of the three (3) UV Reactors one for each of the pump houses. The data was averaged out on a monthly basis and the data was input into tabular format as well as a graph was plotted to show the average monthly comparison of each of the reactors. See below figure 6.4a and 6.4b.

Figure 6.4 a

2012	Well 1 & 2 Average Dosage	Well 3 & 4 Average Dosage	Well 5 Average Dosage
	mJ/cm²	mJ/cm²	mJ/cm²
January	83	85	76
February	87	202	69
March	63	94	147
April	131	167	90
May	78	118	69
June	87	98	47
July	191	126	68
August	184	126	68
September	169	113	85
October	195	84	148
November	156	128	157
December	62	91	84
Average	124	119	92

Figure 6.4 b



**Average dosage reading was calculated based on all the data provided. This means that even when the unit wasn't running it was logging a zero reading. Therefore the dosages that yielded a low average result is a result of all the zeros in the calculation as well as the frequency of well run time. Run time increases when the well is selected by the lead pump.

7.0 MINISTRY ORDERS

1. Review of the 2012 M.O.E Drinking water Inspection report revealed that no orders were issued.

8.0 CONCLUSION

The Township had an extremely busy 2012.

1. The Township had contracted out to the Ontario Clean Water Agency (O.C.W.A.) the second of a three year swabbing plan. O.C.W.A. in accordance with the Township of Manitowadge, swabbed pipes in Zone #1 which was completed over a three day process which consisted of 20 regular man hours and 7 overtime man hours.
2. During the Swabbing program, Water Operators also conducted the valve exercising program which insured smooth operation during the swabbing program. The valve exercising program allowed operators to identify and repair deficiencies in the Distribution System.

3. The Township Public Works Department spent 490.5 regular man hours repairing house services and 128.5 overtime hours.
4. The Township Public Works Department spent 3 regular man hours repairing standpipes.
5. The Township Public Works Department spent 18 regular man hours, 15.5 overtime hours and 3 double time man hours repairing water mains in 2012.
6. The Township Public Works Department spent one regular hour and 4 overtime hours on frozen water services.
7. The Township Public Works Department spent 29 regular hours and one overtime hour on water service disconnections.
8. The Township Public Works Department spent 22.5 regular hours and one overtime hour on water service reconnections.
9. The Township Public Works Department spent 97 regular hour and one overtime hour on water meters.
10. The Township Public Works Department spent 28.5 regular hours on fire hydrant repairs.
11. The Township contracted out the services of Lotowater Technical Services Inc. to conduct performance testing on wells 1, 2, 3, 4, and 5. The tests concluded that Well #1 undergo a mechanical and chemical well rehabilitation as well as a new submersible pump be installed. Well #2, 3, and 4 were recommended to be put on staggered well service schedule. Recommendations at Well #5 included the removal of the existing oil lubricated line shaft pump and replacing it with a submersible pump.

RECOMENDATIONS

1. The repair of the roof at the main pumphouse.
2. Data acquisition and daily report capabilities from SCADA system.
3. Completion of rehabilitation program on wells 1,2,3,4 and 5.

**ANNUAL REPORT
2012
SUMMARY OF
SODIUM HYPOCHLORITE USAGE**

Appendix A-1

Month	12% Sodium Hypochlorite Solution	Chlorine	Dosage Rate
	Liters (L)	Kilograms (kg)	mg/L
January	520	72.88	2.31
February	585	81.99	2.63
March	488	68.40	2.40
April	508	71.16	2.68
May	517	72.46	2.44
June	541	75.84	2.26
July	594	83.18	2.73
August	539	75.55	2.98
September	444	62.23	3.03
October	439	61.53	3.21
November	382	53.47	2.69
December	461	64.54	2.86
ANNUAL	6,016	843.24	2.68

**ANNUAL REPORT
2012
SUMMARY OF MONTHLY ACTUAL AND PEAK FLOWS**

APPENDIX A-2

Total Flow (m ³)	Actual Daily Flows (m ³ /Day)				Month	Peak Daily Flows (m ³ /Day)			Exceedence
	Average	Minimum	Maximum	Average		Minimum	Maximum		
31,603.78	1,019.48	880.92	1,220.73	1,125.88	370.66	2,257.63		N	
31,315.39	1,079.84	902.05	1,329.66	1,385.12	0.00	8,989.92		N	
29,222.02	942.65	796.98	1,452.04	1,188.23	0.00	5,596.13		N	
26,372.75	879.09	769.24	1,151.28	1,124.27	0.00	6,416.93		N	
29,823.46	962.05	833.40	1,145.90	1,089.40	0.00	4,449.60		N	
33,879.27	1,129.31	949.74	1,353.26	1,432.19	1.73	8,831.81		N	
30,663.56	989.15	726.77	1,624.16	1,418.71	1.73	11,118.82		Y	
26,145.53	843.40	668.98	2,242.75	1,406.90	0.00	11,574.14		Y	
20,835.65	694.52	475.84	1,321.12	1,081.15	1.73	7,893.50		N	
19,196.81	619.25	463.61	750.20	790.13	0.00	6,501.60		N	
19,992.75	666.43	573.08	808.71	708.25	3.46	1,959.55		N	
22,944.46	740.14	595.28	983.13	1,342.86	1.73	11,715.84		Y	
321,995.43	882.18	463.61	2,242.75	1,174.42	0.00	11,715.84		Y	

¹ Under our Certificate of Approval our Maximum Allowable Daily flow is 10,472 m³/Day. Any time the instantaneous Peak Flow exceeds 10,472 m³/Day a note must be made of the circumstances that created the flow.

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SUMMARY OF MONTHLY MAXIMUM AND MINIMUM DAILY PEAK FLOW EVENTS

Appendix A-3

Minimum Daily Flow m ³	Day	Date	Month	Day	Date	Maximum Daily Flow m ³
842.32	Sunday	1st	January	Saturday	28th	1,265.09
902.88	Wednesday	29th	February	Saturday	4th	1,293.60
775.31	Monday	12th	March	Sunday	18th	1,089.42
736.20	Wednesday	11th	April	Saturday	28th	1,087.55
762.36	Tuesday	1st	May	Wednesday	2nd	1,243.54
918.23	Saturday	30th	June	Thursday	30th	1,365.07
623.30	Monday	30th	July	Tuesday	31st	1,572.70
584.39	Sunday	5th	August	Friday	31st	1,339.79
501.24	Tuesday	25th	September	Monday	3rd	1,366.29
457.24	Friday	5th	October	Saturday	6th	728.57
547.18	Friday	30th	November	Sunday	25th	783.51
581.52	Wednesday	5th	December	Wednesday	19th	975.97
457.24			Annual			1,572.70

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2012
SUMMARY OF MONTHLY
MAXIMUM AND MINIMUM INSTANTANEOUS DAILY PEAK FLOW EVENTS

Minimum Daily Flow m ³	Day	Date	Month	Day	Date	Maximum Daily Flow m ³
370.66	Monday	16th	January	Thursday	5th	2,257.63
0.00	Thursday	23rd	February	Monday	27th	8,989.92
0.00	Sunday	18th	March	Monday	12th	5,596.13
0.00	Thursday	5th	April	Thursday	26th	6,416.93
0.00	Wednesday, Saturday	16th,26th	May	Thursday	24th	4,449.60
1.73	Sunday	24th	June	Sunday	10th	8,831.81
1.73	Monday, Tuesday	2nd, 3rd	July	Monday	16th	11,118.82
0.00	Friday	24th	August	Wed, Thur	29th,30th	11,574.14
1.73	Saturday, Friday	1st,7th	September	Friday	7th	7,893.50
0.00	Thursday,Wednesday, Thursday	11th,24th,25th	October	Monday	1st	6,501.60
3.46	Saturday, Thursday, Thursday	3rd,15th, 22nd	November	Tuesday	13th	1,959.55
1.73	Thursday, Friday	20th, 21st	December	Friday	21st	11,715.84
0.00			Annual			11,715.84

Appendix A-4

ANNUAL REPORT 2012

Ontario Regulation Annual Sampling Requirement

Appendix B-1

Summary of Inorganics Treated Water						
Parameter	M.A.C. or I.M.A.C.	Unit of Measure	Result	Unit of Measure	Exceedence	Action Required
Antimony	0.0001	mg/L	< 0.6	ug/L	No	No
Arsenic	0.025	mg/L	< 1	ug/L	No	No
Barium	1	mg/L	47	ug/L	No	No
Boron	5	mg/L	< 50	ug/L	No	No
Cadmium	0.005	mg/L	< 0.1	ug/L	No	No
Chromium	0.05	mg/L	< 1	ug/L	No	No
Flouride	1.5	mg/L	---	mg/L	No	No
Lead	0.01	mg/L	---	ug/L	No	No
Mercury	0.001	mg/L	< 0.1	ug/L	No	No
Nitrate	10	mg/L	1.34	mg/L	No	No
Nitrite	1	mg/L	< 0.02	mg/L	No	No
Selenium	0.01	mg/L	< 1	ug/L	No	No
Sodium ¹	20	mg/L	---	mg/L	Yes	Yes
Uranium	0.1	mg/L	< 2	ug/L	No	No

¹The Ontario Spills Action Center and the Thunder Bay District Health Unit, Medical Officer of Health have been notified. Warning notices have been posted and local doctors advised to alert persons on a sodium restricted diet to use an alternative potable water supply for cooking and drinking purposes. When sodium levels exceed 200 ug/L, corrective measures may be ordered.

**ANNUAL REPORT
2012
Ontario Regulation Annual Sampling Requirement**

Appendix B-2

Summary of Organics						
Treated Water						
Parameter	M.A.C. or I.M.A.C.	Units	Results	Exceedence	Action Required	
Alachlor	0.005	mg/L	< 0.1 ug/L	No	No	
Aldicarb	0.009	mg/L	< 1 ug/L	No	No	
Aldrin + Dieldrin	0.007	mg/L	< 0.04 ug/L	No	No	
Atrazine + N-dialkylated metabolites	0.005	mg/L	< 0.2 ug/L	No	No	
Azinphos-methyl	0.02	mg/L	< 0.1 ug/L	No	No	
Bendiocarb	0.04	mg/L	< 0.2 ug/L	No	No	
Benzene	0.005	mg/L	< 0.5 ug/L	No	No	
Benzo (a) pyrene	0.0001	mg/L	< 0.01 ug/L	No	No	
Bromoxynil	0.005	mg/L	< 0.2 ug/L	No	No	
Carbaryl	0.09	mg/L	< 0.2 ug/L	No	No	
Carbofuran	0.09	mg/L	< 0.2 ug/L	No	No	
Carbon Tetrachloride	0.005	mg/L	< 0.5 ug/L	No	No	
Chlordane (Total)	0.007	mg/L	< 0.3 ng/L	No	No	
Chlorpyrifos	0.08	mg/L	< 0.1 ug/L	No	No	
Cyanazine	0.01	mg/L	< 0.1 ug/L	No	No	
Diazinon	0.02	mg/L	< 0.1 ug/L	No	No	
Dicamba	0.12	mg/L	< 0.2 ug/L	No	No	
1,2-Dichlorobenzene	0.2	mg/L	< 0.5 ug/L	No	No	
1,4-Dichlorobenzene	0.005	mg/L	< 0.5 ug/L	No	No	
Dichlorodiphenyltrichloroethane (DDT) + metabolites	0.03	mg/L	< 0.4 ng/L	No	No	
1,2-Dichloroethane	0.005	mg/L	< 0.5 ug/L	No	No	
1,1-Dichloroethylene (vinylidene chloride)	0.014	mg/L	< 0.5 ug/L	No	No	
Dichloromethane	0.05	mg/L	< 0.5 ug/L	No	No	
2,4 Dichlorophenol	0.09	mg/L	< 0.3 ug/L	No	No	
2,4-Dichlorophenoxy acetic acid (2,4-D)	0.1	mg/L	< 0.2 ug/L	No	No	
Diclofop-methyl	0.009	mg/L	< 0.2 ug/L	No	No	
Dimethoate	0.02	mg/L	< 0.1 ug/L	No	No	
Dinoseb	0.01	mg/L	< 0.2 ug/L	No	No	
Diquat	0.07	mg/L	< 1 ug/L	No	No	

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Ontario Regulation Annual Sampling Requirement

Appendix B-2

Summary of Organics						
Treated Water						
Parameter	M.A.C. or I.M.A.C.	Units	Results	Exceedence	Action Required	
Diuron	0.15	mg/L	< 1 ug/L	No	No	
Glyphosate	0.28	mg/L	< 5 ug/L	No	No	
Heptachlor + Heptachlor Epoxide	0.003	mg/L	< 0.1 ug/L	No	No	
Linadane (Total)	0.004	mg/L	< 0.1 ug/L	No	No	
Malathion	0.19	mg/L	< 0.1 ug/L	No	No	
Methoxychlor	0.9	mg/L	< 0.1 ug/L	No	No	
Metolachlor	0.05	mg/L	< 0.1 ug/L	No	No	
Metribuzin	0.08	mg/L	< 0.1 ug/L	No	No	
Monochlorobenzene	0.02	mg/L	< 0.5 ug/L	No	No	
Paraquat	0.01	mg/L	< 1 ug/L	No	No	
Parathion	0.05	mg/L	< 0.1 ug/L	No	No	
Pentachlorophenol	0.05	mg/L	< 0.5 ug/L	No	No	
Phorate	0.002	mg/L	< 0.1 ug/L	No	No	
Picloram	0.19	mg/L	< 0.2 ug/L	No	No	
Polychlorinated Biphenyls (PCB)	0.003	mg/L	< 0.035 ug/L	No	No	
Prometryne	0.001	mg/L	< 0.1 ug/L	No	No	
Simazine	0.01	mg/L	< 0.1 ug/L	No	No	
Total Trihalomethanes	0.15	mg/L	27 ug/L	No	No	
Temephos	0.28	mg/L	< 0.1 ug/L	No	No	
Terbufos	0.001	mg/L	< 0.2 ug/L	No	No	
Tetrachloroethylene	0.03	mg/L	< 0.5 ug/L	No	No	
2,3,4,6-Tetrachlorophenol	0.1	mg/L	< 0.5 ug/L	No	No	
Triallate	0.23	mg/L	< 0.1 ug/L	No	No	
Trichloroethylene	0.05	mg/L	< 0.5 ug/L	No	No	
2,4,6-Trichlorophenol	0.1	mg/L	< 0.5 ug/L	No	No	
2,4,5-Trichlorophenoxy Acetic Acid (2,4,5-T)	0.28	mg/L	< 0.2 ug/L	No	No	
Trifluralin	0.045	mg/L	< 0.1 ug/L	No	No	
Vinyl Chloride	0.07	mg/L	< 0.5 ug/L	No	No	

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Ontario Regulation Quarterly Sampling Requirement**

Appendix B-3

Summary of Inorganics Treated Water							
Parameter	M.A.C. or I.M.A.C.	Unit of Measure	January 09 2012	April 24 2012	July 16 2012	October 22 2012	Action Required
Nitrate	10	mg/L	1.34	1.44	1.53	1.7	No
Nitrite	1	mg/L	< 0.02	< 0.02	< 0.02	< 0.02	No
THM	0.15	mg/L	27.0 ug/L	33.9 ug/L	32.3 ug/L	33.5 ug/L	No

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Appendix B4-A

Summary of chemical, Physical and Operational Parameters										
Raw Water										
Parameter	M.A.C. or I.M.A.C.	Units	Well #1 April 4, 2012	Well #4 April 4, 2012	Well #5 April 4, 2012	Well #2 Sept 5, 2012	Well #3 Sept 5, 2012	Well #5 Sept 5, 2012	Exceedence	Action Required
Alkalinity	30 - 500	mg/L	379	293	335	307	298	338	No	No
Ammonia & Ammonium	0.15	mg/L	0.01	0.004	0.002	0.032	0.035	0.034	No	No
Chloride	250	mg/L	59.4	63.4	77.2	61.7	63.5	60.4	No	No
Colour	5	TCU	4.7	1.2	2.3	2.1	2.1	2.5	No	No
Conductivity	?	uS/cm	888	793	899	795	821	869	?	?
Dissolved Organic Carbon	5	mg/L	2.9	1.3	2	1.5	1.2	1.6	No	No
Dissolved Inorganic Carbon	?	mg/L	88.4	69.5	80	71.3	70.6	81.5	?	?
Dissolved Solids	?	mg/L	---	---	---	437	461	488	?	?
Fluoride	1.5 - 2.4	mg/L	0.08	0.06	0.09	0.09	0.07	0.09	No	No
Hardness	80 - 100	mg/L	---	---	---	312	322	360	Yes ⁽¹⁾	No
Langliers Index	?	---	---	---	---	0.81	0.84	0.8	?	?
Nitrate	10	mg/L	0.787	2.41	1.02	1.62	1.49	0.296	No	No
Nitrite	1	mg/L	0.001	0.001	0.001	0.004	0.005	0.01	No	No
pH	6.5 - 8.5	---	7.47	7.68	7.56	7.76	7.81	7.67	No	No
pH Saturated	6.5 - 8.6	---	---	---	---	6.95	6.97	6.87	No	No
Phosphorus	?	mg/L	0.002	0.005	0.002	0.002	0.002	0.002	?	?
Silicon	?	mg/L	5.2	4.24	4.5	4.54	4.84	5.3	?	?
Sulphate	150 - 500	mg/L	20.2	33.7	37.2	17	38	38.8	No	No
Turbidity	1	FTU	---	---	---	---	---	---	No	No
Phosphate	?	mg/L	0.0023	0.0025	0.0021	0.0005	0.0011	0.0005	?	?
Total Kjeldahl Nitrogen (TKN)	?	mg/L	0.18	0.16	0.12	0.16	0.14	0.11	?	?

⁽¹⁾ The M.A.C. of 80 - 100 mg/L for Hardness is an Aesthetic Objective. If hardness Exceeds 500 mg/L further action may be ordered.

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Appendix B4-B

Summary of Chemical, Physical and Operational Parameters						
Treated						
Parameter	M.A.C. or I.M.A.C.	Units	Reservoir April 4, 2012	Reservoir Sept 5, 2012	Exceedence	Action Required
Alkalinity	30 - 500	mg/L	335	309	No	No
Ammonia & Ammonium (N)	0.15	mg/L	0.003	0.031	No	No
Chloride	250	mg/L	77.2	64.7	No	No
Colour	5	TCU	2.1	0.8	No	No
Conductivity	?	uS/cm	886	829	?	?
Dissolved Organic Carbon	5	mg/L	2	1.2	No	No
Dissolved Inorganic Carbon	?	mg/L	78.2	74.9	?	?
Dissolved Solids	?	mg/L	---	464	?	?
Fluoride	1.5 - 2.4	mg/L	0.09	0.06	No	No
Hardness	80 - 100	mg/L	---	324	Yes	No
Langliers Index	?	---	---	1.2	?	?
Nitrate	10	mg/L	1.33	1.47	No	No
Nitrite	1	mg/L	0.001	0.003	No	No
pH	6.5 - 8.5	---	7.9	8.1	No	No
pH Saturated	6.5 - 8.6	---	---	6.95	No	No
Phosphorus	?	mg/L	0.002	0.002	?	?
Silicon	?	mg/L	4.4	5.04	?	?
Sulphate	150 - 500	mg/L	32.2	32.3	No	No
Phosphate	?	mg/L	0.0022	0.0005	?	?
Total Kjeldahl Nitrogen (TKN)	?	mg/L	0.12	0.12	?	?

¹The M.A.C. of 80 - 100 mg/L for Hardness is an aesthetic objective. When Hardness exceeds 500 mg/L, corrective measures may be ordered.

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Appendix B5-A

Parameter	M.A.C. or I.M.A.C.	Units	INORGANICS Raw Water								Exceedence	Action Required	
			Well #1 April 4, 2012	Well #4 April 4, 2012	Well 5 April 4, 2012	Well #2 Sept 5, 2012	Well #3 Sept 5, 2012	Well #5 Sept 5, 2012					
Aluminum	0.1	mg/L	0.5	0.8	0.6	0.7	0.5	0.5	0.5	0.6	ug/L	No	No
Antimony	0.0001	mg/L	0.5	0.7	0.8	0.5	0.5	0.5	0.5	0.6	ug/L	No	No
Arsenic	0.025	mg/L	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	ug/L	No	No
Barium	?	mg/L	43.2	26.6	48.3	42.1	36.4	36.4	36.4	46.9	ug/L	No	No
Beryllium	?	mg/L	0	0	0	0	0	0	0	0	ug/L	No	No
Boron	5	mg/L	13.1	9.4	12.1	21.9	17.7	17.7	17.7	16.4	ug/L	No	No
Cadmium	0.005	mg/L	0	0	0	0	0	0	0	0	ug/L	No	No
Calcium	?	mg/L	---	---	---	102	101	101	101	112	mg/L	No	No
Chromium	0.05	mg/L	0.1	0.3	0.1	0.5	0.5	0.5	0.5	0.5	ug/L	No	No
Cobalt	?	mg/L	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.4	ug/L	No	No
Copper	1	mg/L	1.5	2	3.6	2.2	2.2	2.2	2.2	4.3	ug/L	No	No
Iron	0.3	mg/L	70	0	0	0	0	0	0	10	ug/L	No	No
Lead	0.01	mg/L	0	0.1	0	0.1	0.1	0.1	0.1	0.1	ug/L	No	No
Magnesium	?	mg/L	---	---	---	14	16.8	16.8	16.8	19.2	mg/L	No	No
Manganese	0.05	mg/L	29.1	0.5	17	21.1	12.2	12.2	12.2	27.1	ug/L	No	No
Molybdenum	?	mg/L	0.1	0.2	0.4	0.2	0.2	0.2	0.2	0.3	ug/L	No	No
Nickel	?	mg/L	0.4	0.4	1.5	0.5	0.6	0.6	0.6	1.9	ug/L	No	No
Potassium	?	mg/L	---	---	---	2.87	2.1	2.1	2.1	2.69	mg/L	No	No
Selenium	0.01	mg/L	0.3	0.5	1.5	0.3	0.5	0.5	0.5	0.8	ug/L	No	No
Silver	?	mg/L	0	0	0	0	0	0	0	0	ug/L	No	No
Sodium	20	mg/L	---	---	---	45 ⁽²⁾	51.3 ⁽²⁾	51.3 ⁽²⁾	51.3 ⁽²⁾	46.9 ⁽²⁾	mg/L	Yes ⁽²⁾	No
Strontium	?	mg/L	126	105	142	119	110	110	110	144	ug/L	No	No
Thallium	?	mg/L	0	0.1	0.1	0	0.1	0.1	0.1	0.1	ug/L	No	No
Titanium	?	mg/L	0.3	0.7	0.8	0.4	0.7	0.7	0.7	0.7	ug/L	No	No
Uranium	0.1	mg/L	0.6	0.6	3.3	0.9	1.4	1.4	1.4	3.7	ug/L	No	No
Vanadium	?	mg/L	0.2	0.4	0.7	0.2	0.4	0.4	0.4	0.5	ug/L	No	No
Zinc	5	mg/L	0.7	4.9	1.6	0.8	3.6	3.6	3.6	1.8	ug/L	No	No

¹The M.A.C. of 0.05 mg/L (50 ug/L) for manganese is a colour related aesthetic objective. Like Iron, Manganese may stain laundered items and plumbing fixtures and in excessive concentrations, may cause undesirable tastes in beverages and drinking water.

²The Ontario Spills Action Center and the Thunder Bay District Health Unit, Medical Officer of Health have been notified. Warning notices have been posted and local doctors advised to alert persons on a sodium restricted diet to use another potable water supply for cooking and drinking purposes. When sodium levels exceed 20000 ug/L, corrective measures may be ordered.

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Appendix B5-B

INORGANICS												
Treated Water												
Parameter	M.A.C. or I.M.A.C.	Units	Reservoir April 4, 2012		Reservoir Sept 5, 2012		Distribution April 4, 2012		Distribution Sept 5, 2012		Exceedence	Action Required
Aluminum	0.1	mg/L	1.6	ug/L	1.2	ug/L	1.2	ug/L	1.1	ug/L	No	No
Antimony	0.006	mg/L	0.7	ug/L	0.5	ug/L	0.8	ug/L	0.5	ug/L	No	No
Arsenic	0.025	mg/L	0.3	ug/L	0.3	ug/L	0.4	ug/L	0.3	ug/L	No	No
Barium	?	mg/L	45.3	ug/L	39.8	ug/L	46.5	ug/L	39.9	ug/L	?	?
Beryllium	?	mg/L	0	ug/L	0	ug/L	0	ug/L	0	ug/L	?	?
Boron	5	mg/L	13.6	ug/L	19.6	ug/L	12.5	ug/L	19.5	ug/L	No	No
Cadmium	0.005	mg/L	0	ug/L	0	ug/L	0	ug/L	0	ug/L	No	No
Calcium	?	mg/L	---	mg/L	102	mg/L	---	mg/L	102	mg/L	?	?
Chromium	0.05	mg/L	0.2	ug/L	0.7	ug/L	0.1	ug/L	0.5	ug/L	No	No
Cobolt	?	mg/L	0.2	ug/L	0.2	ug/L	0.2	ug/L	0.2	ug/L	?	?
Copper	1	mg/L	88.7	ug/L	97.4	ug/L	116	ug/L	226	ug/L	No	No
Iron	0.3	mg/L	0	ug/L	0	ug/L	0	ug/L	0	ug/L	No	No
Lead	0.01	mg/L	0.1	ug/L	0.1	ug/L	0.5	ug/L	0.4	ug/L	No	No
Magnesium	?	mg/L	---	mg/L	16.6	mg/L	---	mg/L	16.6	mg/L	?	?
Manganese	0.05	mg/L	15.4	ug/L	12.2	ug/L	6.2	ug/L	16.7	ug/L	No	No
Molybdenum	?	mg/L	0.3	ug/L	0.2	ug/L	0.3	ug/L	0.2	ug/L	?	?
Nickel	?	mg/L	1.3	ug/L	0.7	ug/L	1.4	ug/L	0.6	ug/L	?	?
Potassium	?	mg/L	---	mg/L	2.34	mg/L	---	mg/L	2.31	mg/L	?	?
Selenium	0.01	mg/L	1	ug/L	0.9	ug/L	1.4	ug/L	0.9	ug/L	No	No
Silver	?	mg/L	0	ug/L	0	ug/L	0	ug/L	0	ug/L	?	?
Sodium	20	mg/L	---	mg/L	51 ⁽²⁾	mg/L	---	mg/L	51 ⁽²⁾	mg/L	Yes ⁽²⁾	Yes
Strontium	?	mg/L	135	ug/L	116	ug/L	142	ug/L	117	ug/L	?	?
Thallium	?	mg/L	0.1	ug/L	0.1	ug/L	0.1	ug/L	0	ug/L	?	?
Titanium	?	mg/L	0.7	ug/L	0.7	ug/L	0.7	ug/L	0.6	ug/L	?	?
Uranium	0.1	mg/L	2.3	ug/L	1.3	ug/L	2.9	ug/L	1.3	ug/L	No	No
Vanadium	?	mg/L	0.6	ug/L	0.3	ug/L	0.7	ug/L	0.3	ug/L	?	?
Zinc	5	mg/L	3	ug/L	2.7	ug/L	2.2	ug/L	2.5	ug/L	No	No

²The Ontario Spills Action Center and the Thunder Bay District Health Unit, Medical Officer of Health have been notified. Warning notices have been posted and local doctors advised to alert persons on a sodium restricted diet to use another potable water supply for cooking and drinking purposes. When sodium levels exceed 20000 ug/L, corrective measures may be ordered.

T.N.P - Test Not Performed

**ANNUAL REPORT
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Summary of Weekly Bacteriological Sampling**

Appendix C-1

Raw Water						
# of Detectable Results						
Adverse Quality Indicator ⁽¹⁾						
Month	Number of Samples	Total ¹ Coliform	Fecal ¹ Coliform	E-Coli ¹	Exceedence	Action Required
January	20	A	A	A	No	No
February	20	A	A	A	No	No
March	20	A	A	A	No	No
April	25	A	A	A	No	No
May	20	A	A	A	No	No
June	20	A	A	A	No	No
July	25	A	A	A	No	No
August	20	A	A	A	No	No
September	20	A	A	A	No	No
October	25	A	A	A	No	No
November	20	A	A	A	No	No
December	20	A	A	A	No	No
Annual	255	A	A	A	No	No

¹ There are no maximum or interim maximum acceptable concentrations for Coliforms, Fecal Coliforms, or E-Coli. Rather, the presence of any of these parameters in a drinking water sample indicates deteriorating or adverse water quality. The detection of an adverse indicator in an unchlorinated raw water sample that will be subject to the treatment process poses no significant risk to human health.

A Absent
P Presence

**ANNUAL REPORT
2012
Summary of Weekly Bacteriological Sampling**

Appendix C-2

Treated Water Reservoir									
# of Detectable Results									
Adverse Quality Indicator ¹									
Month	Number of Samples	Total ¹ Coliforms	Fecal ¹ Coliforms	E-Coli ¹	H.P.C. Number of Tests	Range of Results		Exceedence	Action Required
						C.F.U. / 100 ml			
						Minimum	Maximum		
January	4	A	A	A	4	0	2	N	N
February	4	A	A	A	4	0	2	N	N
March	4	A	A	A	4	0	1	N	N
April	5	A	A	A	5	0	1	N	N
May	4	A	A	A	4	0	1	N	N
June	4	A	A	A	4	0	2	N	N
July	5	A	A	A	5	0	1	N	N
August	4	A	A	A	4	0	1	N	N
September	4	A	A	A	4	0	0	N	N
October	5	A	A	A	5	0	1	N	N
November	4	A	A	A	4	0	0	N	N
December	4	A	A	A	4	0	0	N	N
Annual	51	A	A	A	51	0	2	N	N

¹ There are no maximum or interim maximum acceptable concentrations for Coliforms, Fecal Coliforms, or E-Coli. Rather, the presence of any of these parameters in a drinking water sample indicates deteriorating or adverse water quality.

A Absent
P Present

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Summary of Weekly Bacteriological Sampling

Appendix C-3

Distribution System									
Number of Detectable Results									
Adverse Quality Indicators ⁽¹⁾									
Month	Number of Samples	Total ¹ Coliforms	Fecal ¹ Coliforms	E-Coli ¹	H.P.C. Number of Tests	Range of Results		Exceedence	Action Required
						C.F.U. / 100 ml Minimum	Maximum		
January	16	A	A	A	16	0	3	N	N
February	16	A	A	A	16	0	1	N	N
March	16	A	A	A	16	0	1	N	N
April	20	A	A	A	16	0	3	N	N
May	16	A	A	A	20	0	4	N	N
June	16	A	A	A	16	0	7	N	N
July	20	A	A	A	16	0	128	N	N
August	16	A	A	A	20	0	13	N	N
September	16	A	A	A	16	0	75	N	N
October	20	A	A	A	20	0	5	N	N
November	16	A	A	A	16	0	1	N	N
December	16	A	A	A	16	0	2	N	N
Annual	204	A	A	A	204	0	128	N	N

¹ There are no maximum or interim maximum acceptable concentrations for Coliforms, Fecal Coliforms, or E-Coli. Rather, the presence of any of these parameters in a drinking water sample indicates deteriorating or adverse water quality.

A Absent
P Present

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-a

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results			Exceedence	Action Required
				N.T.U				
				Average	Minimum	Maximum		
Turbidity	1 N.T.U	January	62	0.194	0.10	0.29	N	N
		February	56	0.202	0.12	0.30	N	N
		March	62	0.216	0.08	0.33	N	N
		April	60	0.222	0.09	0.32	N	N
		May	62	0.212	0.08	0.35	N	N
		June	60	0.235	0.13	0.31	N	N
		July	62	0.185	0.07	0.29	N	N
		August	62	0.218	0.13	0.28	N	N
		September	60	0.220	0.15	0.28	N	N
		October	62	0.195	0.13	0.28	N	N
		November	60	0.182	0.12	0.29	N	N
		December	62	0.205	0.12	0.32	N	N
Annual	730	0.207	0.07	0.35	N	N		

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-b

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results T.C.U.			Exceedence	Action Required
				Average	Minimum	Maximum		
Colour	5 T.C.U.	January	62	0.0	0.0	0.0	No	No
		February	56	0.0	0.0	0.0	No	No
		March	62	0.0	0.0	0.0	No	No
		April	60	0.0	0.0	0.0	No	No
		May	62	0.0	0.0	0.0	No	No
		June	60	0.0	0.0	0.0	No	No
		July	62	0.0	0.0	0.0	No	No
		August	62	0.0	0.0	0.0	No	No
		September	60	0.0	0.0	0.0	No	No
		October	62	0.0	0.0	0.0	No	No
		November	60	0.0	0.0	0.0	No	No
		December	62	0.0	0.0	0.0	No	No
		Annual	730	0.0	0.0	0.0	No	No

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-c

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Average °C	Exceedence	Action Required
Temperature	4°C to 15°C	January	62	6.8	No	No
		February	56	6.9	No	No
		March	62	7.0	No	No
		April	60	7.1	No	No
		May	62	7.3	No	No
		June	60	7.8	No	No
		July	62	8.0	No	No
		August	62	8.0	No	No
		September	60	7.9	No	No
		October	62	7.7	No	No
		November	60	7.3	No	No
		December	62	7.0	No	No
		Annual	730	7.4	No	No

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-d

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Average	Exceedence	Action Required
pH	6.5 to 8.5	January	62	7.6	No	No
		February	56	7.7	No	No
		March	62	7.7	No	No
		April	60	7.6	No	No
		May	62	7.6	No	No
		June	60	7.7	No	No
		July	62	7.8	No	No
		August	62	7.7	No	No
		September	60	7.8	No	No
		October	62	7.7	No	No
		November	60	7.7	No	No
		December	62	7.7	No	No
		Annual	730	7.7	No	No

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-e

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results mg/L			Exceedence	Action Required
				Average	Minimum	Maximum		
				Free Chlorine Residual	0.05 mg/L (minium) to 4.00 mg/L (maximum)	January		
		February	56	0.88	0.61	1.19	No	No
		March	62	0.91	0.67	1.15	No	No
		April	60	0.90	0.34	1.27	No	No
		May	62	0.86	0.72	1.00	No	No
		June	60	0.82	0.57	1.23	No	No
		July	62	0.85	0.67	1.27	No	No
		August	62	1.09	0.69	1.39	No	No
		September	60	0.91	0.61	1.27	No	No
		October	62	0.88	0.77	1.04	No	No
		November	60	0.96	0.48	1.19	No	No
		December	62	1.14	1.02	1.35	No	No
		Annual	730	0.92	0.34	1.39	No	No

(1) Ontario Spills Action Centre, Thunder Bay District Health Unit and Ministry of the Environment were informed. Sodium Hypochlorite dosage rate increased until Free Chlorine Residual leaving the pumphouse was above 0.20 mg/L. Distribution Samples taken to confirm that Free Chlorine Residual was 0.20 mg/L or greater.

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-f

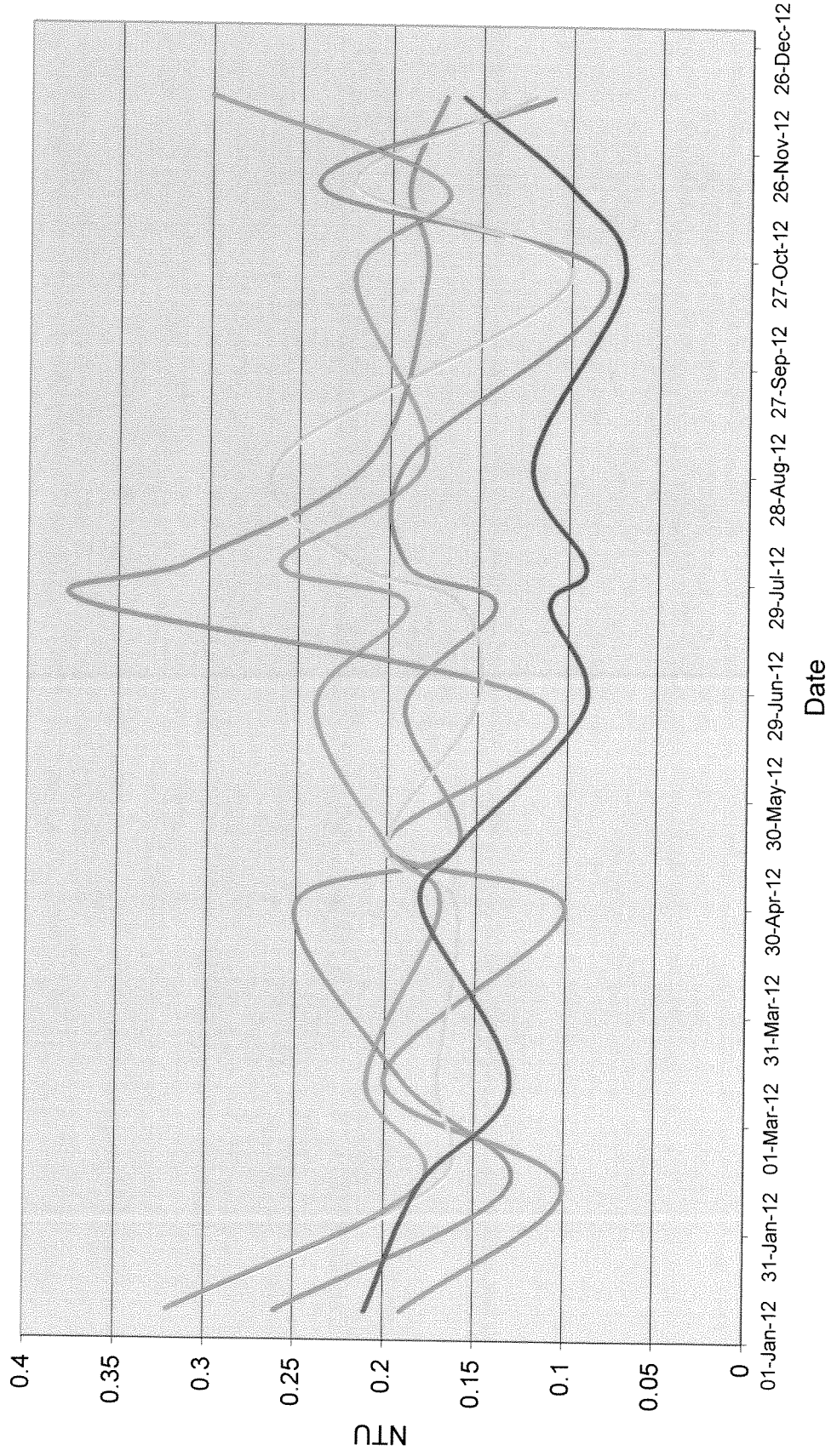
Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results mg/L			Exceedence	Action Required
				Average	Minimum	Maximum		
Total Chlorine Residual	0.05 mg/L (minium) to 4.00 mg/L (maximum)	January	62	1.06	0.82	1.36	No	No
		February	56	1.04	0.78	1.31	No	No
		March	62	1.07	0.81	1.40	No	No
		April	60	1.08	0.44	1.41	No	No
		May	62	1.02	0.86	1.16	No	No
		June	60	0.98	0.73	1.35	No	No
		July	62	1.02	0.82	1.46	No	No
		August	62	1.27	0.87	1.66	No	No
		September	60	1.09	0.71	1.44	No	No
		October	62	1.05	0.90	1.24	No	No
		November	60	1.13	0.60	1.39	No	No
		December	62	1.33	1.20	1.60	No	No
Annual	730	1.09	0.44	1.66	No	No		

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Annual Report
Monthly Turbidity Readings

Appendix D1-g

Date	Raw Well 1 NTU	Raw Well 2 NTU	Raw Well 3 NTU	Raw Well 4 NTU	Raw Well 5 NTU
09-Jan-12	0.19	0.26	0.32	0.32	0.21
13-Feb-12	0.1	0.13	0.17	0.18	0.18
13-Mar-12	0.2	0.19	0.17	0.21	0.13
30-Apr-12	0.1	0.25	0.16	0.17	0.18
17-May-12	0.2	0.16	0.2	0.2	0.16
25-Jun-12	0.11	0.19	0.15	0.24	0.09
23-Jul-12	0.37	0.14	0.16	0.19	0.11
03-Aug-12	0.31	0.19	0.22	0.26	0.09
01-Sep-12	0.21	0.19	0.26	0.18	0.12
22-Oct-12	0.18	0.08	0.1	0.22	0.07
16-Nov-12	0.19	0.24	0.22	0.17	0.1
11-Dec-12	0.17	0.11	0.12	0.3	0.16
Min	0.1	0.08	0.1	0.17	0.07
Max	0.37	0.26	0.32	0.32	0.21
Average	0.19	0.18	0.19	0.22	0.13

Raw Well Turbidities



Raw Well 1 Raw Well 2 Raw Well 3 Raw Well 4 Raw Well 5

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-g Zone 1 FC

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results			Exceedence	Action Required
				mg/L				
				Average	Minimum	Maximum		
Free Chlorine Residual	0.05 mg/L (minium) to 4.00 mg/L (maximum)	January	31	0.81	0.58	1.14	No	No
		February	29	0.80	0.57	1.05	No	No
		March	31	0.86	0.60	1.17	No	No
		April	30	0.80	0.59	1.00	No	No
		May	31	0.71	0.57	0.83	No	No
		June	30	0.71	0.41	1.07	No	No
		July	31	0.73	0.53	1.03	No	No
		August	31	0.95	0.64	1.27	No	No
		September	30	0.69	0.39	1.02	No	No
		October	31	0.74	0.53	0.92	No	No
		November	30	0.85	0.42	1.07	No	No
		December	31	1.04	0.84	1.25	No	No
Annual	366	0.81	0.39	1.27	No	No		

(1) Ontario Spills Action Centre, Thunder Bay District Health Unit and Ministry of the Environment were informed. Sodium Hypochlorite dosage rate increased until Free Chlorine Residual leaving the pumphouse was above 0.20 mg/L. Distribution Samples taken to confirm that Free Chlorine Residual was 0.20 mg/L or greater.

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-g Zone 1 pH

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Average	Exceedence	Action Required
Distribution Zone #1 pH	6.5 to 8.5	January	31	7.7	No	No
		February	29	7.7	No	No
		March	31	7.8	No	No
		April	30	7.7	No	No
		May	31	7.7	No	No
		June	30	7.8	No	No
		July	31	7.8	No	No
		August	31	7.7	No	No
		September	30	7.9	No	No
		October	31	7.7	No	No
		November	30	7.7	No	No
		December	31	7.7	No	No
		Annual	366	7.8	No	No

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-g Zone 1 TC

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results mg/L			Exceedence	Action Required
				Average	Minimum	Maximum		
				Total Chlorine Residual	0.05 mg/L (minium) to 4.00 mg/L (maximum)	January		
		February	29	0.96	0.70	1.21	No	No
		March	31	1.01	0.76	1.26	No	No
		April	30	0.98	0.98	1.23	No	No
		May	31	0.85	0.73	0.99	No	No
		June	30	0.84	0.53	1.22	No	No
		July	31	0.86	0.60	1.17	No	No
		August	31	1.09	0.78	1.39	No	No
		September	30	0.82	0.50	1.19	No	No
		October	31	0.89	0.65	1.09	No	No
		November	30	1.01	0.52	1.32	No	No
		December	31	1.22	0.99	1.44	No	No
		Annual	366	0.96	0.50	1.44	No	No

(1) Ontario Spills Action Centre, Thunder Bay District Health Unit and Ministry of the Environment were informed. Sodium Hypochlorite dosage rate increased until Free Chlorine Residual leaving the pumphouse was above 0.20 mg/L. Distribution Samples taken to confirm that Free Chlorine Residual was 0.20 mg/L or greater.

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-g Zone 2 FC

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results mg/L			Exceedence	Action Required
				Average	Minimum	Maximum		
				Distribution Zone 2 Free Chlorine Residual	0.05 mg/L (minium) to 4.00 mg/L (maximum)	January		
		February	29	0.72	0.47	0.97	No	No
		March	31	0.77	0.55	0.97	No	No
		April	30	0.77	0.59	0.97	No	No
		May	31	0.69	0.60	0.79	No	No
		June	30	0.66	0.35	1.02	No	No
		July	31	0.63	0.43	0.93	No	No
		August	31	0.80	0.48	0.98	No	No
		September	30	0.72	0.45	1.09	No	No
		October	31	0.68	0.51	0.93	No	No
		November	30	0.79	0.39	1.03	No	No
		December	31	0.99	0.83	1.19	No	No
		Annual	366	0.75	0.35	1.19	No	No

(1) Ontario Spills Action Centre, Thunder Bay District Health Unit and Ministry of the Environment were informed. Sodium Hypochlorite dosage rate increased until Free Chlorine Residual leaving the pumphouse was above 0.20 mg/L. Distribution Samples taken to confirm that Free Chlorine Residual was 0.20 mg/L or greater.

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-g Zone 2 TC

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results mg/L			Exceedence	Action Required
				Average	Minimum	Maximum		
Distribution Zone 2 Total Chlorine Residual	0.05 mg/L (minium) to 4.00 mg/L (maximum)	January	31	0.89	0.66	0.82	No	No
		February	29	0.88	0.61	1.22	No	No
		March	31	0.91	0.68	1.10	No	No
		April	30	0.93	0.72	1.16	No	No
		May	31	0.84	0.72	0.96	No	No
		June	30	0.78	0.45	1.14	No	No
		July	31	0.75	0.50	1.10	No	No
		August	31	0.94	0.61	1.12	No	No
		September	30	0.85	0.56	1.20	No	No
		October	31	0.83	0.66	1.06	No	No
		November	30	0.94	0.50	1.20	No	No
		December	31	1.16	0.99	1.40	No	No
Annual	366	0.89	0.45	1.40	No	No		

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-g Zone 2 pH

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Average	Exceedence	Action Required
Distribution Zone #2 pH	6.5 to 8.5	January	31	7.7	No	No
		February	29	7.7	No	No
		March	31	7.8	No	No
		April	30	7.7	No	No
		May	31	7.7	No	No
		June	30	7.8	No	No
		July	31	7.9	No	No
		August	31	7.8	No	No
		September	30	7.9	No	No
		October	31	7.7	No	No
		November	30	7.7	No	No
		December	31	7.8	No	No
		Annual	366	7.8	No	No

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-g Zone 3 FC

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results mg/L			Exceedence	Action Required
				Average	Minimum	Maximum		
Distribution Zone 3 Free Chlorine Residual	0.05 mg/L (minium) to 4.00 mg/L (maximum)	January	31	0.75	0.53	1.02	No	No
		February	29	0.73	0.50	1.00	No	No
		March	31	0.76	0.54	0.97	No	No
		April	30	0.72	0.42	0.94	No	No
		May	31	0.62	0.42	0.74	No	No
		June	30	0.55	0.26	0.85	No	No
		July	31	0.45	0.36	0.59	No	No
		August	31	0.66	0.36	0.84	No	No
		September	30	0.61	0.36	0.88	No	No
		October	31	0.52	0.36	0.76	No	No
		November	30	0.66	0.28	0.87	No	No
		December	31	0.84	0.65	1.09	No	No
Annual	366	0.66	0.26	1.09	No	No		

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-g Zone 3 TC

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results mg/L			Exceedence	Action Required
				Average	Minimum	Maximum		
Distribution Zone 3 Total Chlorine Residual	0.05 mg/L (minium) to 4.00 mg/L (maximum)	January	31	0.89	0.66	1.18	No	No
		February	29	0.88	0.63	1.15	No	No
		March	31	0.89	0.68	1.07	No	No
		April	30	0.87	0.55	1.14	No	No
		May	31	0.75	0.54	0.86	No	No
		June	30	0.65	0.35	1.00	No	No
		July	31	0.55	0.44	0.87	No	No
		August	31	0.78	0.48	0.96	No	No
		September	30	0.73	0.46	1.03	No	No
		October	31	0.64	0.46	0.90	No	No
		November	30	0.79	0.37	1.02	No	No
		December	31	0.99	0.79	1.29	No	No
Annual	366	0.63	0.35	1.29	No	No		

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-g Zone 3 pH

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Average	Exceedence	Action Required
Distribution Zone #3 pH	6.5 to 8.5	January	31	7.7	No	No
		February	29	7.8	No	No
		March	31	7.8	No	No
		April	30	7.7	No	No
		May	31	7.7	No	No
		June	30	7.8	No	No
		July	31	7.9	No	No
		August	31	7.8	No	No
		September	30	7.9	No	No
		October	31	7.7	No	No
		November	30	7.7	No	No
		December	31	7.8	No	No
		Annual	366	7.8	No	No

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-g Zone 4 FC

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results mg/L			Exceedence	Action Required
				Average	Minimum	Maximum		
Distribution Zone 4 Free Chlorine Residual	0.05 mg/L (minimum) to 4.00 mg/L (maximum)	January	31	0.74	0.50	1.07	No	No
		February	29	0.73	0.49	1.00	No	No
		March	31	0.75	0.48	0.96	No	No
		April	30	0.75	0.41	0.98	No	No
		May	31	0.68	0.51	0.95	No	No
		June	30	0.77	0.40	1.08	No	No
		July	31	0.69	0.37	0.92	No	No
		August	31	0.91	0.46	1.21	No	No
		September	30	0.78	0.32	1.11	No	No
		October	31	0.72	0.61	0.92	No	No
		November	30	0.77	0.39	1.03	No	No
		December	31	0.93	0.71	1.11	No	No
		Annual	366	0.77	0.32	1.21	No	No

(1) Ontario Spills Action Centre, Thunder Bay District Health Unit and Ministry of the Environment were informed. Sodium Hypochlorite dosage rate increased until Free Chlorine Residual leaving the pumphouse was above 0.20 mg/L. Distribution Samples taken to confirm that Free Chlorine Residual was 0.20 mg/L or greater.

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-g Zone 4 pH

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Average	Exceedence	Action Required
Distribution Zone #4 pH	6.5 to 8.5	January	31	7.7	No	No
		February	29	7.8	No	No
		March	31	7.8	No	No
		April	30	7.8	No	No
		May	31	7.7	No	No
		June	30	7.8	No	No
		July	31	7.9	No	No
		August	31	7.8	No	No
		September	30	7.9	No	No
		October	31	7.7	No	No
		November	30	7.7	No	No
		December	31	7.8	No	No
		Annual	366	7.8	No	No

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Summary of Laboratory Testing and Operational Parameters

Appendix D1-g Zone 4 TC

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results mg/L			Exceedence	Action Required
				Average	Minimum	Maximum		
Distribution Zone 4 Total Chlorine Residual	0.05 mg/L (minium) to 4.00 mg/L (maximum)	January	31	0.91	0.65	1.20	No	No
		February	29	0.88	0.60	1.08	No	No
		March	31	0.89	0.62	1.11	No	No
		April	30	0.90	0.48	1.20	No	No
		May	31	0.81	0.61	1.11	No	No
		June	30	0.77	0.40	1.08	No	No
		July	31	0.81	0.45	1.07	No	No
		August	31	1.04	0.58	1.34	No	No
		September	30	0.93	0.50	1.27	No	No
		October	31	0.86	0.72	1.09	No	No
		November	30	0.92	0.48	1.20	No	No
		December	31	1.10	0.84	1.28	No	No
Annual	366	0.63	0.40	1.34	No	No		

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Summary of Daily On-Line Instrumentation

Appendix D2-a

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results			Exceedence	Action Required
				N.T.U				
				Average	Minimum	Maximum		
Turbidity Hach 1720D Turbidimeter	1 N.T.U	January	62	0.092	0.06	0.134	No	No
		February	56	0.079	0.05	0.103	No	No
		March	62	0.092	0.066	0.136	No	No
		April	60	0.131	0.089	0.167	No	No
		May	62	0.123	0.079	0.347	No	No
		June	60	0.118	0.080	0.288	No	No
		July	62	0.137	0.093	0.217	No	No
		August	62	0.165	0.104	0.266	No	No
		September	60	0.149	0.118	0.179	No	No
		October	62	0.154	0.130	0.186	No	No
		November	60	0.139	0.088	0.215	No	No
		December	62	0.140	0.097	0.306	No	No
Annual	730	0.127	0.050	0.347	No	No		

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Summary of Daily On-Line Instrumentation

Appendix D2-b

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Range of Results			Exceedence	Action Required
				(mg/L)	(mg/L)	(mg/L)		
				Average	Minimum	Maximum		
Chlorine Residual Hach CL17 Free Chlorine Analyzer	0.05 mg/L (minimum) to 4.00 mg/L (maximum)	January	62	0.94	0.69	1.25	No	No
		February	56	0.88	0.59	1.19	No	No
		March	62	0.92	0.64	1.21	No	No
		April	60	0.93	0.32	1.33	No	No
		May	62	0.86	0.75	1.01	No	No
		June	60	0.81	0.52	1.26	No	No
		July	62	0.83	0.66	1.3	No	No
		August	62	1.07	0.65	1.42	No	No
		September	60	0.88	0.54	1.24	No	No
		October	62	0.83	0.72	1.30	No	No
		November	60	0.95	0.42	1.30	No	No
		December	62	1.22	1.10	1.43	No	No
Annual	730	0.93	0.32	1.43	No	No		

(1)The Ontario Spills Action Centre, Thunder Bay District Health Unit and the Ministry of Environment must be notified. Chlorine dosage rate is increased to return Free Chlorine Residual to 0.20 mg/L leaving the Treatment Plant. Distribution Samples are taken to confirm Free Chlorine is greater than 0.20 mg/L or higher.

ANNUAL REPORT 2012

Summary of Daily On-Line Instrumentation

Appendix D2-c

Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Average	Exceedence	Action Required
pH	6.5 to 8.5	January	62	7.61	No	No
		February	56	7.72	No	No
Hach EC 310		March	62	7.79	No	No
		April	60	7.73	No	No
		May	62	7.79	No	No
		June	60	7.83	No	No
		July	62	7.78	No	No
		August	62	7.87	No	No
		September	60	7.85	No	No
		October	62	7.80	No	No
		November	60	7.84	No	No
		December	62	7.80	No	No
		Annual	730	7.78	No	No

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Summary of Daily On-Line Instrumentation

Appendix D2-d

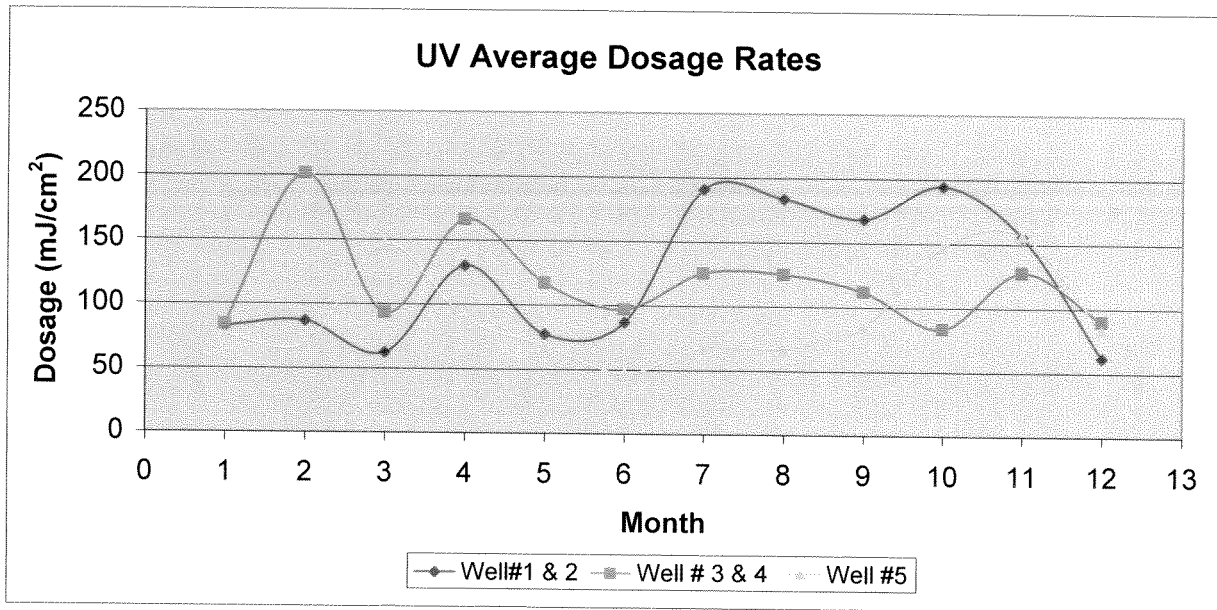
Parameter	M.A.C. or I.M.A.C.	Month	Number of Samples	Average		Exceedence	Action Required
					°C		
Temperature Hach EC 310	4 °C to 15 °C	January	62		7.1	No	No
		February	56		7.2	No	No
		March	62		7.3	No	No
		April	60		7.3	No	No
		May	62		7.5	No	No
		June	60		8.0	No	No
		July	62		8.2	No	No
		August	62		8.2	No	No
		September	60		8.1	No	No
		October	62		7.9	No	No
		November	60		7.5	No	No
		December	62		7.2	No	No
Annual	730		7.6	No	No		

**Annual UV Treatment
2012
Dosage**

Appendix D2E

Date	Well#1 & 2			Well # 3 & 4			Well #5		
	min	max	average	min	max	average	min	max	average
January	0	255	83	0	448	85	0	282	76
February	0	308	87	0	399	202	0	145	69
March	0	317	63	0	160	94	0	227	147
April	0	290	131	0	227	167	0	227	90
May	0	290	78	0	351	118	0	194	69
June	0	396	87	0	387	98	0	198	47
July	0	520	191	0	375	126	0	229	68
August	0	291	184	0	170	126	0	220	68
September	0	299	169	0	174	113	0	150	85
October	0	290	195	0	165	84	0	255	148
November	0	282	156	0	165	128	0	264	157
December	0	139	62	0	165	91	0	229	84
Annual (min, max, Average)	0	520	124	0	448	119	0	282	92

UV Dose are measured using mJ/cm² units. Zero reading are measured during well shut down and the average is based on up to 10 000 readings. These reactors are designed to achieve maximum inactivation at a minimum dosage rate of 42 mJ/cm²



ANNUAL REPORT

2012

SUMMARY OF MONTHLY FLOWS & COMPLIANCE SHEET - WATER

YEAR 2012 MONTH	WELL 1	WELL 2	WELL 3	WELL 4	WELL 5	WELL FIELD		RAW	TREATED	PERCENTAGE		PERCENTAGE	
	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW	FLOW	FLOW m3	FLOW m3	RAW WATER WELL FIELD	TREATED WATER WELL FIELD	RAW WATER	TREATED WATER
JANUARY	584.81	19718.60	3771.05	953.01	6576.31	31603.78	31603.78	30493.69	30136.82	-3.64	-4.64	-1.18	-1.18
FEBRUARY	603.89	9362.44	11344.27	407.16	9597.63	31315.39	31315.39	29865.39	29730.15	-4.86	-5.06	-0.45	-0.45
MARCH	385.30	5206.82	10529.92	494.29	12605.69	29222.02	29222.02	27841.90	27026.35	-4.96	-7.51	-3.02	-3.02
APRIL	207.65	15090.33	8159.23	622.23	2293.31	26372.75	26372.75	25460.72	26311.91	-3.58	-4.02	-0.59	-0.59
MAY	248.17	13533.10	5187.82	348.14	10506.23	29823.46	29823.46	28736.83	28642.99	-3.78	-3.96	-0.33	-0.33
JUNE	353.77	8568.90	12283.92	409.77	12262.91	33879.27	33879.27	32449.98	32099.87	-4.40	-5.25	-1.09	-1.09
JULY	744.81	10936.52	6596.70	1625.88	10759.65	30663.56	30663.56	30226.62	28712.07	-1.45	-6.36	-5.27	-5.27
AUGUST	3521.06	6089.53	8519.55	3114.31	4901.08	26145.53	26145.53	24624.92	23566.52	-6.18	-9.86	-4.49	-4.49
SEPTEMBER	2153.98	8883.57	5489.12	11.17	4297.81	20835.65	20835.65	21206.06	19855.60	1.75	-4.70	-6.80	-6.80
OCTOBER	3639.02	4520.94	1990.42	548.69	8497.74	19196.81	19196.81	18960.77	18384.04	-1.24	-4.23	-3.14	-3.14
NOVEMBER	437.61	5794.80	10801.41	566.27	911.63	18511.71	18511.71	18186.49	17736.04	-1.79	-4.19	-2.54	-2.54
DECEMBER	1202.25	4832.95	2955.15	6333.41	7620.70	22944.46	22944.46	23085.90	21799.89	0.61	-4.99	-5.90	-5.90
ANNUAL	14082.32	112538.50	87628.56	15434.33	90830.69	320514.39	320514.39	311139.27	303002.25	-3.01	-5.46	-2.69	-2.69

APPENDIX E-1

ANNUAL REPORT

2012

ACTUAL DAILY FLOWS & COMPLIANCE SHEET - WATER

APPENDIX E-2

Month January	Year 2012	DAY	WELL 1		WELL 2		WELL 3		WELL 4		WELL 5		WELL FIELD		RAW FLOW m3	TREATED FLOW m3	PERCENTAGE RAW WATER		PERCENTAGE TREATED WATER	
			FLOW m3	WELL 1 FLOW m3	FLOW m3	WELL 2 FLOW m3	FLOW m3	WELL 3 FLOW m3	FLOW m3	WELL 4 FLOW m3	FLOW m3	WELL 5 FLOW m3	WELL FIELD FLOW m3	WELL FIELD FLOW m3			WELL FIELD	RAW WATER	WELL FIELD	TREATED WATER
1		Sunday	52.08	95.81	34.74	98.57	635.01	916.21	905.36	886.52	-1.20	-3.24	-2.13							
2		Monday	13.49	0.16	34.92	0.00	919.41	967.98	939.10	926.54	-3.08	-4.28	-1.36							
3		Tuesday	10.40	865.49	41.62	12.29	48.90	978.70	953.87	919.02	-2.60	-6.10	-3.79							
4		Wednesday	17.37	817.97	48.21	20.82	54.29	958.66	925.19	910.59	-3.62	-5.01	-1.60							
5		Thursday	47.10	732.13	66.93	34.66	0.10	880.92	848.00	900.01	-3.88	2.17	5.78							
6		Friday	23.73	908.43	0.03	73.39	67.81	1073.39	1026.03	918.48	-4.62	-14.43	-11.71							
7		Saturday	0.03	953.67	0.00	64.95	0.00	1018.65	974.35	962.78	-4.55	-5.48	-1.20							
8		Sunday	27.00	811.05	0.03	17.48	78.68	934.24	907.64	962.09	-2.93	2.98	5.66							
9		Monday	29.01	748.31	81.03	24.57	73.82	956.74	931.16	899.24	-2.75	-6.01	-3.55							
10		Tuesday	0.01	895.87	0.02	23.68	60.35	979.93	949.89	912.54	-3.16	-6.88	-4.09							
11		Wednesday	27.38	786.57	0.01	0.00	81.77	895.73	858.20	900.92	-4.37	0.58	4.74							
12		Thursday	0.01	978.05	0.00	0.00	0.00	978.06	938.63	896.79	-4.20	-8.31	-4.67							
13		Friday	46.75	621.71	132.36	42.49	84.59	927.90	889.33	890.00	-4.34	-4.08	0.08							
14		Saturday	19.94	871.32	54.59	41.90	0.06	987.81	946.43	947.39	-4.37	-4.09	0.10							
15		Sunday	0.04	934.04	0.01	34.43	89.69	1058.21	1021.65	975.48	-3.58	-7.82	-4.73							
16		Monday	8.98	71.82	799.83	13.80	76.99	971.42	921.81	902.60	-5.38	-7.08	-2.13							
17		Tuesday	4.42	0.17	876.65	0.00	12.01	893.25	837.73	943.70	-6.63	5.65	11.23							
18		Wednesday	12.58	0.17	988.55	0.00	35.48	1036.78	979.45	924.54	-5.85	-10.83	-5.94							
19		Thursday	56.18	430.18	204.66	46.19	217.74	954.95	922.86	929.37	-3.48	-2.68	0.70							
20		Friday	19.73	946.97	34.90	9.56	0.03	1011.19	970.98	929.35	-4.14	-8.09	-4.48							
21		Saturday	0.01	1103.55	0.00	0.00	0.00	1103.56	1060.19	1005.28	-4.09	-8.91	-5.46							
22		Sunday	0.05	1043.69	0.00	0.00	0.00	1043.74	1002.84	1067.84	-4.08	2.31	6.09							
23		Monday	9.28	170.59	29.85	13.40	900.65	1123.77	1081.78	1036.33	-3.88	-7.78	-4.39							
24		Tuesday	14.92	46.19	40.01	19.36	945.35	1065.83	1039.67	1045.68	-2.52	-1.89	0.57							
25		Wednesday	0.07	76.03	0.04	47.08	932.49	1055.71	1025.65	1039.33	-2.93	-1.55	1.32							
26		Thursday	49.19	0.17	140.15	0.00	957.12	1146.63	1097.49	1059.73	-4.48	-7.58	-3.56							
27		Friday	0.05	795.09	60.34	176.53	96.25	1128.26	1120.56	1032.79	-0.69	-8.46	-8.50							
28		Saturday	18.04	1102.83	0.00	34.37	0.00	1155.24	1103.59	1129.65	-4.68	-2.22	2.31							
29		Sunday	37.83	885.99	0.06	60.71	98.28	1082.87	1065.34	1132.42	-1.65	4.58	5.92							
30		Monday	12.26	1145.07	25.29	8.41	29.70	1220.73	1172.08	1068.14	-4.15	-12.50	-9.73							
31		Tuesday	26.88	879.51	76.22	34.37	79.74	1096.72	1076.84	1081.68	-1.85	-1.37	0.45							
TOTALS			584.81	19718.60	3771.05	953.01	6576.31	31603.78	30493.69	30136.82	-3.64	-4.64	-1.18							

ANNUAL REPORT 2012

ACTUAL DAILY FLOWS & COMPLIANCE SHEET - WATER

APPENDIX E-4

Month March	Year 2012	DAY	WELL 1	WELL 2	WELL 3	WELL 4	WELL 5	WELL FIELD		RAW	TREATED	PERCENTAGE		PERCENTAGE	
			FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	RAW WATER WELL FIELD	TREATED WATER WELL FIELD	RAW WATER WELL FIELD	TREATED WATER WELL FIELD	RAW WATER TREATED WATER
1	Thursday	48.99	0.17	141.00	0.02	776.30	966.48	920.89	846.71	-4.95	-12.39	-8.76			
2	Friday	0.02	0.16	0.00	0.00	796.80	796.98	766.20	826.21	-4.02	3.67	7.26			
3	Saturday	27.03	0.17	0.03	38.98	842.41	908.62	876.45	906.84	-3.67	-0.20	3.35			
4	Sunday	0.00	0.17	0.00	0.00	1046.13	1046.30	1006.53	921.86	-3.95	-11.89	-9.18			
5	Monday	13.27	41.39	31.26	18.46	737.90	842.28	817.70	855.96	-3.01	1.62	4.47			
6	Tuesday	43.57	643.15	33.03	69.90	73.56	863.21	825.16	837.98	-4.61	-2.92	1.53			
7	Wednesday	35.16	773.25	101.78	0.00	0.05	910.24	867.14	865.90	-4.97	-4.87	-0.14			
8	Thursday	0.02	818.95	0.00	0.00	0.00	818.97	784.90	834.51	-4.34	1.90	5.94			
9	Friday	75.13	778.05	0.00	124.55	0.05	977.78	943.01	814.06	-3.69	-16.74	-15.84			
10	Saturday	17.41	864.33	0.00	26.99	0.00	908.75	875.61	879.02	-3.78	-3.27	0.39			
11	Sunday	0.04	838.42	0.00	0.00	0.00	838.46	804.01	847.99	-4.28	1.14	5.19			
12	Monday	35.79	213.35	539.09	76.59	27.68	892.50	868.04	842.29	-2.82	-5.63	-3.06			
13	Tuesday	10.48	32.98	854.14	17.74	29.10	944.44	894.24	855.69	-5.61	-9.40	-4.51			
14	Wednesday	21.20	50.15	758.95	37.02	57.98	925.30	879.66	838.28	-5.19	-9.40	-4.94			
15	Thursday	25.29	42.47	681.04	21.04	70.21	840.05	795.00	847.92	-5.67	0.94	6.24			
16	Friday	0.05	0.10	1451.80	0.00	0.09	1452.04	1361.58	868.81	-6.64	-40.17	-56.72			
17	Saturday	0.10	0.13	1181.41	0.00	0.08	1181.72	1054.93	875.05	-12.02	-25.95	-20.56			
18	Sunday	14.55	0.17	1000.97	0.00	37.99	1053.68	996.26	992.79	-5.76	-5.78	-0.35			
19	Monday	7.86	23.17	937.17	11.51	19.58	999.29	943.46	889.32	-5.92	-11.00	-6.09			
20	Tuesday	0.08	0.17	904.64	0.00	0.11	905.00	844.41	895.85	-7.18	-1.01	5.74			
21	Wednesday	0.06	0.17	1002.46	0.00	0.14	1002.83	936.70	856.41	-7.06	-14.60	-9.38			
22	Thursday	0.03	0.16	856.07	0.00	0.08	856.34	798.45	888.38	-7.25	3.74	10.12			
23	Friday	0.02	57.15	31.35	35.04	860.53	984.09	954.10	854.16	-3.14	-13.20	-11.70			
24	Saturday	0.02	0.16	0.00	0.00	923.03	923.21	886.80	929.98	-4.11	0.73	4.64			
25	Sunday	0.06	0.16	0.00	0.00	918.29	918.29	881.87	921.35	-4.13	0.33	4.29			
26	Monday	8.98	27.32	23.72	16.45	922.42	998.89	970.28	872.65	-2.95	-12.64	-11.19			
27	Tuesday	0.03	0.16	0.01	0.00	866.38	866.58	832.37	890.85	-4.11	1.65	5.50			
28	Wednesday	0.02	0.16	0.00	0.00	811.92	812.10	780.75	852.21	-4.02	4.94	8.39			
29	Thursday	0.01	0.16	0.00	0.00	973.08	973.25	933.52	859.78	-4.26	-11.66	-8.58			
30	Friday	0.01	0.16	0.00	0.00	912.32	912.49	876.80	854.77	-4.07	-6.33	-2.58			
31	Saturday	0.02	0.16	0.00	0.00	901.68	901.86	865.08	912.77	-4.25	1.21	5.22			
TOTALS			385.30	5206.82	10529.92	494.29	12605.69	29222.02	27841.90	-4.96	-7.51	-3.02			

ANNUAL REPORT

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ACTUAL DAILY FLOWS & COMPLIANCE SHEET - WATER

APPENDIX E-5

Month APRIL	Year 2012	DAY	WELL 1		WELL 2		WELL 3		WELL 4		WELL 5		WELL FIELD		RAW		TREATED		PERCENTAGE		PERCENTAGE	
			FLOW	m3	FLOW	m3	FLOW	m3	FLOW	m3	FLOW	m3	FLOW	m3	FLOW	m3	FLOW	m3	RAW WATER	WELL FIELD	TREATED WATER	WELL FIELD
1		Sunday	0.01	15.67	0.00	0.00	0.00	0.00	0.00	0.00	908.34	924.02	889.74	937.16	-3.85	1.42	-3.85	1.42	5.06			
2		Monday	8.87	54.35	28.76	21.15	0.00	0.00	0.00	0.00	859.47	972.60	938.23	866.29	-3.66	-10.93	-3.66	-10.93	-8.30			
3		Tuesday	0.03	799.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	799.99	774.80	829.53	829.53	-3.25	3.69	-3.25	3.69	6.60		
4		Wednesday	19.36	837.82	0.04	39.40	0.04	0.00	0.00	0.00	77.38	974.00	953.80	842.23	-2.12	-13.53	-2.12	-13.53	-13.25			
5		Thursday	11.40	632.13	0.03	72.33	0.03	0.00	0.00	0.00	141.82	857.71	839.06	803.92	-2.22	-6.27	-2.22	-6.27	-4.37			
6		Friday	21.71	748.69	39.51	31.41	0.00	0.00	0.00	0.00	0.00	841.32	812.71	864.50	864.50	-3.52	2.76	-3.52	2.76	5.99		
7		Saturday	18.75	751.67	54.13	14.84	0.00	0.00	0.00	0.00	28.91	868.30	851.58	846.73	-1.96	-2.48	-1.96	-2.48	-0.57			
8		Sunday	0.04	769.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	769.24	774.23	817.15	0.64	6.23	0.64	6.23	5.25			
9		Monday	0.04	882.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	882.43	856.01	849.49	849.49	-3.09	-3.73	-3.09	-3.73	-0.77		
10		Tuesday	7.98	767.19	21.19	13.72	0.00	0.00	0.00	0.00	22.78	832.86	806.79	800.16	-3.23	-3.93	-3.23	-3.93	-0.83			
11		Wednesday	0.04	865.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	865.17	837.35	802.38	802.38	-3.32	-7.26	-3.32	-7.26	-4.36		
12		Thursday	0.03	726.73	78.71	0.38	0.00	0.00	0.00	0.00	79.67	885.52	874.24	820.70	-1.29	-7.32	-1.29	-7.32	-6.52			
13		Friday	0.03	845.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	845.83	818.50	778.89	778.89	-3.34	-7.91	-3.34	-7.91	-5.09		
14		Saturday	0.03	811.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	811.99	785.50	831.74	831.74	-3.37	2.43	-3.37	2.43	5.56		
15		Sunday	0.03	794.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	794.31	769.14	830.93	830.93	-3.27	4.61	-3.27	4.61	7.44		
16		Monday	8.39	771.45	27.72	18.44	0.00	0.00	0.00	0.00	29.56	855.56	833.16	809.99	-2.69	-5.33	-2.69	-5.33	-2.86			
17		Tuesday	0.05	704.74	0.08	34.30	0.08	0.00	0.00	0.00	67.69	806.86	791.52	797.78	-1.94	-1.13	-1.94	-1.13	0.78			
18		Wednesday	20.73	763.85	55.60	0.02	0.00	0.00	0.00	0.04	0.04	840.24	811.44	815.23	815.23	-3.55	-2.98	-3.55	-2.98	0.46		
19		Thursday	0.08	868.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	868.45	841.31	818.39	818.39	-3.23	-5.76	-3.23	-5.76	-2.80		
20		Friday	0.08	863.00	0.00	14.17	0.00	0.00	0.00	0.00	0.00	877.25	847.64	808.55	808.55	-3.49	-7.83	-3.49	-7.83	-4.83		
21		Saturday	25.02	769.03	0.00	42.74	0.00	0.00	0.00	0.03	0.03	836.82	912.31	890.15	890.15	8.27	6.37	8.27	6.37	-2.49		
22		Sunday	0.11	0.16	904.67	0.07	0.00	0.00	0.00	0.12	0.12	905.13	843.21	946.88	946.88	-7.34	4.61	-7.34	4.61	10.95		
23		Monday	6.24	19.04	911.64	17.23	0.00	0.00	0.00	23.22	23.22	977.37	921.54	842.46	842.46	-6.06	-13.80	-6.06	-13.80	-9.39		
24		Tuesday	0.04	0.16	848.26	0.00	0.00	0.00	0.00	0.08	0.08	848.54	791.66	827.53	827.53	-7.18	-2.48	-7.18	-2.48	4.33		
25		Wednesday	49.55	0.16	916.22	24.85	0.00	0.00	0.00	0.10	0.10	990.88	926.28	849.13	849.13	-6.97	-14.31	-6.97	-14.31	-9.09		
26		Thursday	0.01	0.16	584.62	247.91	0.05	0.00	0.00	0.05	0.05	832.75	781.01	865.13	865.13	-6.62	3.89	-6.62	3.89	9.72		
27		Friday	0.01	0.16	959.00	0.01	0.00	0.00	0.00	0.10	0.10	959.28	896.77	829.69	829.69	-6.97	-13.51	-6.97	-13.51	-8.08		
28		Saturday	0.01	0.16	867.49	0.00	0.00	0.00	0.00	0.07	0.07	867.73	809.37	809.37	809.37	-7.21	5.03	-7.21	5.03	-11.19		
29		Sunday	0.02	0.16	1151.05	0.00	0.00	0.00	0.00	0.05	0.05	1151.28	1075.78	944.52	944.52	-7.02	-17.96	-7.02	-17.96	-13.90		
30		Monday	8.96	26.76	710.51	29.26	0.00	0.00	0.00	53.83	53.83	829.32	796.04	833.34	833.34	-4.18	0.48	-4.18	0.48	4.48		
TOTALS			207.65	15090.33	8159.23	622.23	0.00	0.00	0.00	0.00	2293.31	26372.75	25460.72	25311.91	-3.58	-4.02	-3.58	-4.02	-0.59			

ANNUAL REPORT

2012

ACTUAL DAILY FLOWS & COMPLIANCE SHEET - WATER

APPENDIX E-6

Month May	Year 2012	WELL 1		WELL 2		WELL 3		WELL 4		WELL 5		WELL FIELD		RAW FLOW		TREATED FLOW		PERCENTAGE RAW WATER		PERCENTAGE TREATED WATER	
		DATE	DAY	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	RAW WATER WELL FIELD	TREATED WATER WELL FIELD	RAW WATER WELL FIELD	TREATED WATER WELL FIELD	PERCENTAGE RAW WATER	PERCENTAGE TREATED WATER	PERCENTAGE RAW WATER	PERCENTAGE TREATED WATER	
1	Tuesday	0.02	0.16	894.51	0.00	894.87	837.70	849.43	-6.82	-5.08	1.38										
2	Wednesday	0.04	0.17	1106.45	0.00	1106.73	1034.25	1031.50	-7.01	-6.80	-0.27										
3	Thursday	0.03	0.17	904.92	0.00	905.22	845.52	861.63	-7.06	-4.82	1.87										
4	Friday	42.41	75.84	0.04	47.69	876.95	856.09	828.53	-2.44	-5.52	-3.33										
5	Saturday	3.84	0.16	9.88	0.00	905.00	868.05	902.74	-4.26	-0.25	3.84										
6	Sunday	47.42	31.13	103.45	0.00	1079.94	1038.14	937.58	-4.03	-13.18	-10.73										
7	Monday	2.70	8.34	35.30	20.30	849.56	827.31	853.79	-2.69	0.50	3.10										
8	Tuesday	0.03	0.16	0.00	0.00	833.21	802.40	851.36	-3.86	2.16	5.75										
9	Wednesday	10.46	0.17	0.00	0.16	930.94	907.20	910.96	-3.81	-3.27	0.41										
10	Thursday	25.58	0.17	0.00	0.00	850.37	845.20	867.78	-3.66	-0.95	2.60										
11	Friday	0.04	0.17	0.00	0.00	925.35	892.37	867.52	-3.72	-6.27	-2.86										
12	Saturday	0.05	0.17	0.00	0.00	988.97	953.29	955.44	-3.77	-3.41	0.23										
13	Sunday	0.06	0.17	0.00	0.00	996.22	971.17	971.17	-3.84	-2.54	1.19										
14	Monday	14.04	42.78	40.73	26.18	1022.17	1122.50	1021.04	-2.08	-10.90	-9.94										
15	Tuesday	0.05	541.37	0.01	0.00	338.95	850.86	888.74	-3.47	0.95	4.26										
16	Wednesday	0.04	876.60	0.01	106.91	983.56	949.40	898.63	-3.60	-8.63	-5.65										
17	Thursday	13.72	851.11	36.48	23.33	967.49	945.07	919.20	-2.37	-4.99	-2.81										
18	Friday	28.56	725.71	3.78	64.62	900.39	868.43	899.09	-3.68	-1.26	2.32										
19	Saturday	17.24	996.48	48.86	0.00	1062.62	1028.49	970.68	-3.32	-8.65	-5.96										
20	Sunday	0.05	932.68	0.00	0.00	932.73	903.77	903.53	-3.20	-3.13	-0.03										
21	Monday	0.04	978.74	0.00	0.00	978.78	947.95	1002.61	-3.25	2.43	5.45										
22	Tuesday	12.31	830.04	26.07	17.59	916.18	892.57	922.91	-2.65	0.73	3.29										
23	Wednesday	0.05	946.78	0.00	0.00	946.83	917.14	927.92	-3.24	-2.00	1.16										
24	Thursday	0.06	1003.58	0.00	0.00	1003.64	973.23	980.14	-3.12	-2.34	0.71										
25	Friday	0.04	929.15	0.00	0.00	929.19	901.04	907.42	-3.12	-2.34	0.70										
26	Saturday	0.04	849.25	92.44	0.16	1043.38	1024.69	957.38	-1.82	-8.24	-7.03										
27	Sunday	0.04	1076.41	0.00	0.00	1076.45	1041.86	1000.60	-3.32	-7.05	-4.12										
28	Monday	9.72	812.83	22.77	14.24	886.17	865.79	926.93	-2.35	4.60	6.60										
29	Tuesday	0.08	876.41	0.02	26.96	961.09	935.50	930.00	-2.74	-3.23	-0.59										
30	Wednesday	19.35	146.03	891.08	0.00	1056.59	995.72	938.62	-6.11	-11.17	-6.08										
31	Thursday	0.06	0.17	971.02	0.00	971.37	905.71	988.12	-7.25	-0.33	6.45										
TOTALS		248.17	13533.10	5187.82	348.14	29823.46	28736.83	28642.99	-3.78	-3.96	-0.33										

ANNUAL REPORT 2012

ACTUAL DAILY FLOWS & COMPLIANCE SHEET - WATER

APPENDIX E-7

Month June	Year 2012	WELL 1		WELL 2		WELL 3		WELL 4		WELL 5		WELL FIELD		RAW FLOW		TREATED FLOW		PERCENTAGE RAW WATER		PERCENTAGE TREATED WATER	
		DATE	DAY	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	PERCENTAGE WELL FIELD	PERCENTAGE WELL FIELD	PERCENTAGE WELL FIELD	PERCENTAGE WELL FIELD	PERCENTAGE WELL FIELD	PERCENTAGE WELL FIELD	PERCENTAGE WELL FIELD	PERCENTAGE WELL FIELD	PERCENTAGE WELL FIELD
1	Friday	0.02	0.17	1018.38	0.00	0.09	1018.66	949.83	902.78	-7.25	-11.38	-5.21									
2	Saturday	0.01	0.17	1048.96	0.00	0.08	1049.22	979.29	935.51	-7.14	-10.84	-4.68									
3	Sunday	0.03	0.17	1022.76	0.00	0.09	1023.05	954.60	1019.83	-7.17	-0.31	6.40									
4	Monday	8.82	26.78	1107.68	14.76	20.79	1178.83	1109.19	1018.68	-6.28	-13.59	-8.89									
5	Tuesday	35.23	0.17	986.74	56.70	0.10	1078.94	1009.12	1030.50	-6.92	-4.49	2.07									
6	Wednesday	0.05	0.17	1065.97	0.02	0.14	1066.35	995.19	1019.12	-7.15	-4.43	2.35									
7	Thursday	0.06	0.17	1040.09	0.00	0.06	1040.38	971.79	1010.51	-7.06	-2.87	3.83									
8	Friday	0.08	0.17	1010.52	0.00	0.05	1010.82	941.31	970.83	-7.38	-3.96	3.04									
9	Saturday	0.10	0.21	1168.27	0.00	0.08	1168.66	1090.75	1059.65	-7.14	-9.33	-2.93									
10	Sunday	0.13	0.23	1314.14	0.00	0.09	1314.59	1228.61	1230.73	-7.00	-6.38	0.17									
11	Monday	8.53	26.02	1052.71	18.04	28.99	1134.29	1070.69	995.49	-5.94	-12.24	-7.55									
12	Tuesday	0.07	982.70	0.10	0.03	22.83	1005.73	975.18	968.48	-3.13	-3.70	-0.69									
13	Wednesday	50.15	864.82	140.51	13.29	20.86	1089.63	1051.13	1116.10	-3.66	2.43	5.82									
14	Thursday	0.05	974.53	0.08	83.55	127.87	1186.08	1159.95	1117.30	-2.25	-5.80	-3.82									
15	Friday	0.05	1207.44	0.00	0.00	0.00	1207.49	1171.04	1120.22	-3.11	-7.23	-4.54									
16	Saturday	0.05	1237.31	0.00	17.05	25.97	1280.38	1241.04	1249.32	-3.17	-2.43	0.66									
17	Sunday	0.05	1230.55	0.04	13.58	20.73	1264.95	1228.02	1240.92	-3.01	-1.90	1.04									
18	Monday	41.10	837.55	25.22	15.72	136.43	1056.02	1030.99	1056.10	-2.43	0.01	2.38									
19	Tuesday	47.15	869.24	0.02	0.00	133.16	1049.57	1018.83	993.45	-3.02	-5.35	-2.55									
20	Wednesday	0.02	134.72	26.98	0.00	820.13	981.85	944.50	964.14	-3.95	-1.80	2.04									
21	Thursday	0.05	0.21	0.00	0.00	1089.19	1089.45	1051.35	996.70	-3.62	-8.51	-5.48									
22	Friday	0.09	0.18	0.00	0.00	1074.50	1074.77	1036.51	985.03	-3.69	-8.35	-5.23									
23	Saturday	9.53	43.44	10.80	0.00	987.37	1051.14	1018.79	1058.29	-3.18	0.68	3.73									
24	Sunday	0.09	0.17	0.00	0.00	1236.55	1236.81	1192.82	1227.35	-3.69	-0.76	2.81									
25	Monday	38.90	18.78	19.69	53.12	1039.49	1169.98	1137.26	1075.91	-2.88	-8.04	-5.70									
26	Tuesday	30.82	0.17	77.76	0.01	1090.92	1199.68	1172.42	1148.66	-2.33	-4.25	-2.07									
27	Wednesday	28.27	0.22	68.88	31.35	1209.73	1338.45	1314.12	1228.49	-1.85	-8.22	-6.97									
28	Thursday	0.08	56.27	0.05	32.07	1264.79	1353.26	1313.25	1296.10	-3.05	-4.22	-1.32									
29	Friday	45.79	0.20	77.52	22.95	1064.04	1210.50	1171.43	1172.28	-3.34	-3.16	0.07									
30	Saturday	8.40	55.97	0.05	37.53	847.79	949.74	920.98	891.40	-3.12	-6.14	-3.32									
TOTALS		353.77	8568.90	12283.92	409.77	12262.91	33879.27	32449.98	32099.87	-4.40	-5.25	-1.09									

ANNUAL REPORT

2012

ACTUAL DAILY FLOWS & COMPLIANCE SHEET - WATER

APPENDIX E-8

Month July	Year 2012	Day	WELL 1	WELL 2	WELL 3	WELL 4	WELL 5	WELL FIELD		RAW FLOW m3	TREATED FLOW m3	PERCENTAGE RAW WATER WELL FIELD	PERCENTAGE TREATED WATER WELL FIELD	PERCENTAGE RAW WATER TREATED WATER
			FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3						
1	Sunday	5.54	37.23	0.05	29.59	756.08	828.49	871.84	797.22	871.84	-3.92	5.23	8.56	
2	Monday	37.04	26.70	0.05	61.84	847.77	973.40	976.41	937.48	976.41	-3.83	0.31	3.99	
3	Tuesday	13.69	921.94	28.56	17.57	33.48	1015.24	920.56	993.89	920.56	-2.15	-9.33	-7.97	
4	Wednesday	0.06	769.38	0.00	91.42	140.62	1001.48	977.15	986.69	977.15	-1.50	-2.43	-0.98	
5	Thursday	0.04	924.15	0.02	29.56	63.55	1017.32	1032.36	992.51	1032.36	-2.50	1.48	3.86	
6	Friday	0.05	965.68	0.00	0.00	0.00	965.73	892.34	937.97	892.34	-2.96	-7.60	-5.11	
7	Saturday	0.05	871.61	50.27	0.00	64.59	986.52	963.79	962.14	963.79	-2.53	-2.30	0.17	
8	Sunday	0.05	1007.35	0.00	0.00	0.00	1007.40	991.31	977.31	991.31	-3.08	-1.60	1.41	
9	Monday	18.92	788.08	44.45	26.95	54.94	933.34	917.27	917.27	905.43	-1.75	-2.99	-1.31	
10	Tuesday	0.05	974.69	0.00	0.00	0.00	974.74	959.19	945.63	959.19	-3.08	-1.60	1.41	
11	Wednesday	5.81	1098.02	12.37	0.00	0.00	1116.20	1057.18	1080.27	1057.18	-3.33	-5.29	-2.18	
12	Thursday	26.64	961.64	9.51	0.02	0.04	997.85	971.84	971.59	971.84	-2.70	0.03	0.03	
13	Friday	0.07	75.56	906.81	0.00	200.83	1183.27	1042.53	1113.28	1042.53	-6.29	-11.89	-6.79	
14	Saturday	0.09	0.22	1116.55	0.00	0.16	1117.02	1039.74	1045.63	1039.74	-6.83	-6.92	-0.57	
15	Sunday	0.10	0.22	1069.10	0.00	0.11	1069.53	1076.92	1001.19	1076.92	-6.83	0.69	7.03	
16	Monday	10.87	278.48	1305.68	10.00	19.13	1624.16	1480.19	1568.00	1480.19	-3.58	-8.86	-5.93	
17	Tuesday	0.05	355.29	874.65	0.00	0.11	1230.10	1121.60	1223.25	1121.60	-0.56	-8.82	-9.06	
18	Wednesday	0.04	631.35	605.00	0.07	90.78	1327.24	1317.67	1393.20	1317.67	4.73	-0.72	-5.73	
19	Thursday	0.07	0.20	0.00	0.01	926.96	927.24	817.53	894.29	817.53	-3.68	-11.83	-9.39	
20	Friday	0.10	0.24	0.00	0.00	726.43	726.77	770.96	701.08	770.96	-3.66	6.08	9.06	
21	Saturday	0.11	0.25	0.00	0.00	929.66	930.02	837.85	896.22	837.85	-3.77	-9.91	-6.97	
22	Sunday	0.12	0.25	0.00	0.00	765.28	765.65	810.22	739.01	810.22	-3.60	5.82	8.79	
23	Monday	11.70	35.94	26.77	9.90	700.62	784.93	718.38	766.04	718.38	-2.47	-8.48	-6.63	
24	Tuesday	124.37	0.21	0.00	0.00	697.98	822.56	804.01	813.13	804.01	-1.16	-2.26	-1.13	
25	Wednesday	194.19	0.22	0.00	0.00	574.48	768.89	692.39	769.56	692.39	0.09	-9.95	-11.15	
26	Thursday	227.09	0.17	105.67	0.00	492.32	825.25	744.77	807.14	744.77	-2.24	-9.75	-8.37	
27	Friday	0.06	0.17	0.41	261.25	520.12	782.01	808.74	815.92	808.74	4.16	3.42	-0.89	
28	Saturday	0.10	0.23	0.40	280.46	558.67	839.86	839.59	875.39	839.59	4.06	-0.03	-4.26	
29	Sunday	0.09	0.25	0.44	299.06	594.69	894.53	790.78	935.13	790.78	4.34	-11.60	-18.25	
30	Monday	53.19	166.45	24.64	162.69	322.40	729.37	709.17	754.80	709.17	3.37	-2.77	-6.43	
31	Tuesday	14.46	44.35	415.30	345.49	677.85	1497.45	769.63	1614.39	769.63	7.24	-48.60	-109.76	
TOTALS			744.81	10936.52	6596.70	1625.88	10759.65	30663.56	30226.62	28712.07	-1.45	-6.36	-5.27	

ANNUAL REPORT

2012

ACTUAL DAILY FLOWS & COMPLIANCE SHEET - WATER

APPENDIX E-9

Month	Year	WELL 1		WELL 2		WELL 3		WELL 4		WELL 5		WELL FIELD		RAW FLOW	TREATED FLOW	PERCENTAGE RAW WATER		PERCENTAGE TREATED WATER	
		DATE	DAY	FLOW	m3	FLOW	m3	FLOW	m3	FLOW	m3	FLOW	m3			WELL FIELD	WELL FIELD	WELL FIELD	WELL FIELD
1	Wednesday	225.57	0.20	556.58	0.00	0.00	0.17	782.52	736.95	739.20	-6.18	-5.54	0.30						
2	Thursday	209.52	0.18	518.18	0.00	0.00	0.13	728.01	687.58	721.87	-5.88	-0.84	4.75						
3	Friday	45.17	1.71	741.22	0.00	0.00	0.11	788.21	737.84	743.44	-6.83	-5.68	0.75						
4	Saturday	0.05	0.21	800.60	0.00	0.00	0.08	800.94	747.39	727.77	-7.16	-9.14	-2.70						
5	Sunday	0.06	269.04	293.45	138.09	0.11	700.75	682.40	677.04	677.04	-2.69	-3.38	-0.79						
6	Monday	0.03	407.73	76.24	206.07	85.51	775.58	787.80	787.80	749.90	1.55	-3.31	-5.05						
7	Tuesday	0.03	501.66	0.00	252.76	0.16	754.61	760.42	760.42	733.03	0.76	-2.86	-3.74						
8	Wednesday	7.25	519.68	27.39	261.64	32.37	848.33	864.70	864.70	747.64	1.89	-11.87	-15.66						
9	Thursday	155.62	117.33	0.03	58.90	455.14	787.02	786.41	786.41	780.18	-0.08	-0.87	-0.80						
10	Friday	202.49	0.17	0.00	0.00	0.00	597.71	800.37	799.65	777.78	-0.09	-2.82	-2.81						
11	Saturday	215.64	0.17	0.00	0.00	0.00	636.17	851.98	850.91	847.75	-0.13	-0.50	-0.37						
12	Sunday	259.88	0.17	0.00	0.00	0.00	768.76	1028.81	1029.54	916.51	0.07	-10.92	-12.33						
13	Monday	9.10	444.38	21.76	222.78	25.62	723.64	728.27	728.27	785.06	0.64	8.49	7.23						
14	Tuesday	0.04	613.23	0.00	309.63	0.00	922.90	936.18	936.18	784.27	1.42	-15.02	-19.37						
15	Wednesday	0.04	527.09	0.00	266.83	0.01	793.97	804.67	804.67	784.87	1.33	-1.15	-2.52						
16	Thursday	0.01	352.05	0.00	0.00	354.19	706.25	778.22	778.22	706.41	9.25	0.02	-10.17						
17	Friday	0.04	352.21	0.00	0.00	354.14	706.39	779.23	779.23	698.06	9.35	-1.18	-11.63						
18	Saturday	0.04	420.72	0.00	0.00	422.27	843.03	930.74	930.74	740.28	9.42	-12.19	-25.73						
19	Sunday	0.03	337.03	38.10	0.01	337.94	713.11	765.62	765.62	763.46	6.86	7.06	-0.28						
20	Monday	6.97	416.24	20.49	1381.00	418.05	2242.75	949.68	949.68	769.48	-136.16	-65.69	-23.42						
21	Tuesday	0.03	354.05	0.00	0.00	356.33	710.41	784.15	784.15	728.27	9.40	2.51	-7.67						
22	Wednesday	235.26	0.19	580.50	0.00	0.08	816.03	768.80	768.80	713.26	-6.14	-12.59	-7.79						
23	Thursday	192.82	0.21	475.80	0.00	0.15	668.98	629.79	629.79	726.11	-6.22	8.54	13.27						
24	Friday	127.47	426.88	314.37	0.00	0.06	868.78	829.67	829.67	743.10	-4.71	-14.47	-11.65						
25	Saturday	247.01	0.22	610.22	0.00	0.09	857.54	807.40	807.40	805.14	-6.21	-6.11	-0.28						
26	Sunday	213.17	0.22	525.42	0.00	0.12	738.93	694.79	694.79	783.62	-6.35	6.05	11.34						
27	Monday	197.46	25.77	523.08	16.60	55.21	818.12	795.23	795.23	766.72	-2.88	-6.28	-3.72						
28	Tuesday	246.44	0.17	609.27	0.00	0.17	856.05	806.88	806.88	780.07	-6.09	-8.88	-3.44						
29	Wednesday	250.61	0.20	619.69	0.00	0.12	870.62	821.30	821.30	796.67	-6.01	-8.49	-3.09						
30	Thursday	246.30	0.22	607.92	0.00	0.06	854.50	803.51	803.51	772.53	-6.35	-9.59	-4.01						
31	Friday	226.91	0.20	559.24	0.00	0.05	786.40	739.20	739.20	757.03	-6.39	-3.73	2.36						
TOTALS		3521.06	6089.53	8519.55	3114.31	4901.08	26145.53	24624.92	23566.52		-6.18	-9.86	-4.49						

ANNUAL REPORT 2012

ACTUAL DAILY FLOWS & COMPLIANCE SHEET - WATER

APPENDIX E-10

Month September	Year 2012	WELL 1		WELL 2		WELL 3		WELL 4		WELL 5		WELL FIELD		RAW FLOW		TREATED FLOW		PERCENTAGE RAW WATER		PERCENTAGE TREATED WATER	
		DATE	DAY	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	FLOW m3	WELL FIELD	WELL FIELD	WELL FIELD	WELL FIELD	WELL FIELD	WELL FIELD	WELL FIELD	WELL FIELD	WELL FIELD
1	Saturday	267.47	0.19	662.91	0.00	0.08	930.65	878.61	853.78	-5.92	-8.26	-2.91	-2.91								
2	Sunday	370.21	0.18	917.45	0.00	0.07	1287.91	1215.86	1234.48	-5.93	-4.15	-1.51	-1.51								
3	Monday	380.92	0.22	939.95	0.00	0.03	1321.12	1243.34	1257.76	-6.26	-4.80	1.15	1.15								
4	Tuesday	201.70	17.55	505.99	1.23	21.48	747.95	726.80	723.99	-2.91	-3.20	-0.39	-0.39								
5	Wednesday	116.89	61.62	375.15	0.00	96.08	649.74	632.47	613.23	-2.73	-5.62	-3.14	-3.14								
6	Thursday	183.97	0.18	454.88	0.00	0.19	639.22	602.24	636.83	-6.14	-0.37	5.43	5.43								
7	Friday	178.55	0.17	440.80	0.00	0.12	619.64	582.94	559.46	-6.30	-9.71	-4.20	-4.20								
8	Saturday	0.04	354.41	0.06	4.25	342.25	701.01	771.55	631.56	9.14	-9.91	-22.17	-22.17								
9	Sunday	0.06	347.32	0.00	0.00	348.35	695.73	766.05	669.51	9.18	-3.77	-14.42	-14.42								
10	Monday	8.73	302.99	27.63	1.09	309.36	649.80	727.30	620.87	10.66	-4.45	-17.14	-17.14								
11	Tuesday	0.03	360.27	0.00	0.00	362.24	722.54	799.31	730.70	9.60	1.13	-9.39	-9.39								
12	Wednesday	0.03	366.99	0.00	0.00	368.04	735.06	809.54	754.67	9.20	2.67	-7.27	-7.27								
13	Thursday	0.04	416.29	0.00	0.00	417.80	834.13	920.33	713.27	9.37	-14.49	-29.03	-29.03								
14	Friday	0.05	345.26	0.00	0.00	346.99	692.30	762.54	675.17	9.21	-2.47	-12.94	-12.94								
15	Saturday	0.04	286.77	0.00	0.00	288.41	575.22	633.58	640.29	9.21	11.31	1.05	1.05								
16	Sunday	7.24	369.37	0.00	0.00	348.74	725.35	796.38	632.33	8.92	-12.82	-25.94	-25.94								
17	Monday	4.92	285.74	17.57	3.64	292.94	604.81	673.36	547.28	10.18	-9.51	-23.04	-23.04								
18	Tuesday	0.08	273.77	0.00	0.00	275.23	549.08	604.39	558.20	9.15	1.66	-8.27	-8.27								
19	Wednesday	0.09	271.86	0.00	0.00	273.49	545.44	598.26	555.58	8.83	1.86	-7.68	-7.68								
20	Thursday	87.12	137.33	214.67	0.00	138.06	577.18	589.26	566.73	2.05	-1.81	-3.98	-3.98								
21	Friday	179.63	0.17	441.82	0.00	0.10	621.72	583.13	538.42	-6.62	-13.40	-8.30	-8.30								
22	Saturday	152.63	110.22	333.13	0.63	0.17	596.78	602.25	600.86	0.91	0.68	-0.23	-0.23								
23	Sunday	0.08	502.33	108.23	0.00	17.18	627.82	603.43	622.93	-4.04	-0.78	3.13	3.13								
24	Monday	7.54	543.33	48.88	0.33	50.41	650.49	649.20	552.15	-0.20	-15.12	-17.58	-17.58								
25	Tuesday	0.08	475.76	0.00	0.00	0.00	475.84	461.49	563.42	-3.11	18.41	18.09	18.09								
26	Wednesday	0.08	623.71	0.00	0.00	623.79	623.79	607.02	559.60	-2.76	-10.29	-8.47	-8.47								
27	Thursday	0.09	570.48	0.00	0.00	0.00	570.57	553.93	525.91	-3.00	-7.83	-5.33	-5.33								
28	Friday	0.09	512.83	0.00	0.00	0.00	512.92	498.39	551.42	-2.92	7.51	9.62	9.62								
29	Saturday	0.08	660.99	0.00	0.00	0.00	661.07	642.41	622.60	-2.90	-5.82	-3.18	-3.18								
30	Sunday	5.50	685.27	0.00	0.00	0.00	690.77	670.70	542.60	-2.99	-21.45	-23.61	-23.61								
TOTALS		2153.98	8883.57	5489.12	11.17	4297.81	20835.65	21206.06	19855.60	1.75	-4.70	-6.80	-6.80								

ANNUAL REPORT

2012

ACTUAL DAILY FLOWS & COMPLIANCE SHEET - WATER

APPENDIX E-12

Month November	Year 2012	DAY	WELL 1		WELL 2		WELL 3		WELL 4		WELL 5		WELL FIELD		TREATED FLOW m3	PERCENTAGE RAW WATER WELL FIELD	PERCENTAGE TREATED WATER WELL FIELD	PERCENTAGE RAW WATER TREATED WATER	
			FLOW m3		FLOW m3		FLOW m3		FLOW m3		FLOW m3		FLOW m3						PERCENTAGE RAW WATER WELL FIELD
1	Monday		12.66		23.90		522.64		15.61		36.35		611.15		571.53		-1.94	-6.48	-4.90
2	Tuesday		67.85		0.00		335.50		0.00		135.77		539.12		562.07		-0.37	4.26	4.44
3	Wednesday		0.00		0.00		531.40		0.00		0.01		531.41		539.20		-2.07	1.47	3.44
4	Thursday		0.00		0.00		672.06		0.00		0.00		672.06		561.69		-2.53	-16.42	-16.69
5	Friday		0.00		61.80		443.15		33.25		0.00		538.21		543.57		-0.93	1.00	1.90
6	Saturday		0.00		0.00		368.67		42.27		88.61		499.55		561.70		1.53	12.44	9.68
7	Sunday		0.00		0.00		700.95		0.00		0.01		700.96		587.51		-2.69	-16.18	-16.18
8	Monday		10.04		19.15		563.82		10.99		21.53		625.53		569.10		-2.05	-9.02	-7.71
9	Tuesday		58.26		0.00		408.22		0.01		113.34		579.83		565.51		-1.76	-2.47	-0.76
10	Wednesday		0.00		0.00		538.85		0.00		0.01		538.85		568.77		-2.91	5.55	7.94
11	Thursday		0.00		134.84		372.19		68.14		0.00		575.17		565.96		11.33	-1.60	-14.61
12	Friday		0.00		0.00		643.96		0.00		0.00		643.96		572.19		-16.53	-11.15	3.42
13	Saturday		37.24		0.00		639.33		0.00		0.86		677.43		607.51		-2.06	-10.32	-9.26
14	Sunday		0.00		84.44		533.55		42.79		0.00		660.78		659.41		-0.70	-0.21	0.49
15	Monday		15.22		28.87		541.54		11.04		13.40		610.07		596.06		-1.46	-2.30	-0.88
16	Tuesday		0.00		0.00		533.16		0.00		0.01		533.17		578.10		-3.11	8.43	10.55
17	Wednesday		0.00		0.00		703.37		0.00		0.00		703.37		598.61		-4.53	-14.89	-12.41
18	Thursday		0.00		0.00		543.39		0.00		0.00		543.39		592.62		8.31	5.83	-3.05
19	Friday		0.00		0.00		675.55		43.09		1.21		719.85		620.10		-16.09	-21.62	-9.90
20	Saturday		64.59		183.16		202.20		50.40		0.74		501.08		591.20		-2.17	17.98	17.05
21	Sunday		0.00		517.91		101.05		45.12		85.36		749.44		628.44		-0.70	-16.15	-18.42
22	Monday		16.19		402.83		71.73		33.14		65.53		589.42		603.24		-0.60	2.35	2.87
23	Tuesday		0.00		635.77		0.00		0.00		0.00		635.77		587.33		-1.66	-7.62	-6.48
24	Wednesday		0.00		604.29		0.00		0.00		0.00		604.29		598.69		-1.32	-0.93	0.38
25	Thursday		42.43		336.07		91.12		50.62		100.79		621.03		619.31		0.18	-0.28	-0.45
26	Friday		23.49		523.61		44.89		21.58		43.48		657.04		616.20		-2.15	-6.22	-4.38
27	Saturday		0.00		721.60		0.00		0.00		0.00		721.60		642.48		-1.92	-10.96	-10.20
28	Sunday		0.00		489.10		0.00		61.67		123.71		674.49		653.76		-0.64	-3.07	-2.51
29	Monday		28.00		558.33		19.09		8.86		20.85		635.12		639.54		-1.07	0.70	1.74
30	Tuesday		61.65		469.15		0.00		27.69		60.07		618.56		608.04		-2.28	-1.70	0.54
TOTALS			437.61		5794.80		10801.41		566.27		911.63		18511.71		17736.04		-1.79	-4.19	-2.54

ANNUAL REPORT 2012

ACTUAL DAILY FLOWS & COMPLIANCE SHEET - WATER

APPENDIX E-13

Month December	Year 2012	DAY	WELL 1		WELL 2		WELL 3		WELL 4		WELL 5		WELL FIELD		RAW FLOW		TREATED FLOW		PERCENTAGE RAW WATER		PERCENTAGE TREATED WATER	
			FLOW m3	WELL 1 FLOW m3	FLOW m3	WELL 2 FLOW m3	FLOW m3	WELL 3 FLOW m3	FLOW m3	WELL 4 FLOW m3	FLOW m3	WELL 5 FLOW m3	WELL FIELD FLOW m3	WELL FIELD FLOW m3	RAW FLOW m3	TREATED FLOW m3	PERCENTAGE WELL FIELD	RAW WATER WELL FIELD	PERCENTAGE WELL FIELD	TREATED WATER WELL FIELD	PERCENTAGE RAW WATER	TREATED WATER
1	Saturday	0.07	456.07	0.05	230.08	55.59	741.86	675.67	746.40	0.61	-8.92	-10.47										
2	Sunday	0.07	452.01	0.00	228.31	0.08	680.47	694.68	679.23	-0.18	2.09	2.22										
3	Monday	7.85	438.05	31.28	241.23	28.27	746.68	652.55	753.83	0.95	-12.61	-15.52										
4	Tuesday	0.02	396.01	0.00	199.25	0.00	595.28	631.58	593.68	-0.27	6.10	6.00										
5	Wednesday	0.03	490.61	0.00	247.30	0.17	738.11	634.06	734.31	-0.52	-14.10	-15.81										
6	Thursday	0.03	397.70	0.00	200.26	0.09	598.08	637.23	603.19	0.85	6.55	5.34										
7	Friday	0.02	391.42	0.00	359.57	0.16	751.17	619.41	746.18	-0.67	-17.54	-20.47										
8	Saturday	0.02	466.53	0.00	235.38	0.07	702.00	682.45	702.44	0.06	-2.78	-2.93										
9	Sunday	0.01	483.82	0.00	243.96	0.01	727.80	715.22	726.47	-0.18	-1.73	-1.57										
10	Monday	3.96	377.18	39.89	204.73	43.15	668.91	657.24	671.73	0.42	-1.74	-2.20										
11	Tuesday	8.14	398.82	58.68	210.11	56.45	732.20	646.82	734.08	0.26	-11.66	-13.49										
12	Wednesday	23.50	33.58	6.39	217.18	398.69	679.34	709.36	695.79	2.36	4.42	1.91										
13	Thursday	0.03	0.17	0.46	238.15	474.13	712.94	663.80	741.62	3.87	-6.89	-11.72										
14	Friday	20.09	0.17	0.40	235.40	468.90	724.96	685.28	753.34	3.77	-5.47	-9.93										
15	Saturday	0.05	0.17	0.33	247.18	491.91	739.64	689.45	763.78	3.16	-6.79	-10.78										
16	Sunday	0.06	0.17	0.40	251.47	500.93	753.03	729.65	780.64	3.54	-3.10	-6.99										
17	Monday	9.95	29.88	18.40	204.17	442.14	704.54	683.55	721.99	2.42	-2.98	-5.62										
18	Tuesday	0.06	0.17	0.55	247.70	493.31	741.79	701.75	769.67	3.62	-5.40	-9.68										
19	Wednesday	0.06	0.17	0.51	328.27	654.12	983.13	961.31	1019.10	3.53	-2.22	-6.01										
20	Thursday	0.06	0.17	0.36	263.56	524.88	789.03	827.36	815.66	3.26	4.86	1.41										
21	Friday	0.04	0.17	0.39	246.14	490.52	737.26	709.17	767.53	3.94	-3.81	-8.23										
22	Saturday	0.02	0.17	0.42	251.17	500.09	751.87	724.14	777.72	3.32	-3.69	-7.40										
23	Sunday	0.03	0.17	0.42	252.22	501.95	754.79	715.89	778.89	3.09	-5.15	-8.80										
24	Monday	0.03	0.17	0.51	248.96	495.47	745.14	696.16	772.12	3.49	-6.57	-10.91										
25	Tuesday	0.02	0.17	0.44	243.75	485.08	729.46	679.25	754.71	3.35	-6.88	-11.11										
26	Wednesday	0.01	0.17	0.35	245.98	489.50	736.01	705.31	759.26	3.06	-4.17	-7.65										
27	Thursday	197.87	18.38	496.57	11.93	24.55	749.30	711.86	707.56	-5.90	-5.00	0.60										
28	Friday	239.36	0.17	590.11	0.00	0.18	829.82	712.47	774.32	-7.17	-14.14	-8.68										
29	Saturday	198.67	0.17	491.41	0.00	0.08	690.33	753.39	645.09	-7.01	9.13	14.38										
30	Sunday	247.55	0.17	612.16	0.00	0.10	859.98	754.00	801.88	-7.25	-12.32	-6.35										
31	Monday	244.57	0.17	604.67	0.00	0.13	849.54	739.83	793.69	-7.04	-12.91	-7.28										
TOTALS		1202.25	4832.95	2955.15	6333.41	7620.70	22944.46	21799.89	23085.90	0.61	-4.99	-5.90										

ANNUAL REPORT
 SPRING LEAD SAMPLING

Community Lead Testing - Sampling and Action log

Date Sampled (Community)	Sampling Location	511 Street Address for planning (City/Town)	Corresponding District/Service Area/Zone (Z)	Sample Type	Re-sampled (Z)	Possible Lead Source & Information available (Y)	Lead Results (µg/L)		Availability Based on Risk (S)	Date Lead Resulted (Community)	Date Lead Result (Community)	Corrective Action Initiated by Health Unit	Corrective Action Taken by Municipality (Y)	Additional Comments
							Top Line (µg/L)	Bottom Line (µg/L)						
18/05/2012	Wichem Mfg	5, Hocking	---	residential	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	
18/05/2012	Wichem Mfg	12, Mariner	---	residential	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	
18/05/2012	Wichem Mfg	12, Mariner	---	residential	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	
18/05/2012	Hyland	DL-5, 5, York	---	commercial	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	
18/05/2012	Wichem Mfg	11, Woodbine	---	residential	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	
18/05/2012	Wichem Mfg	20, Shoguenah	---	residential	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	
18/05/2012	Hyland	DL-30, Blythgarwick	---	commercial	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	
18/05/2012	Wichem Mfg	5, York	---	residential	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	
18/05/2012	Wichem Mfg	20, Hocking	---	residential	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	
18/05/2012	Hyland	public, Wexie	---	commercial	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	
18/05/2012	Wichem Mfg	13, Dyer	---	residential	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	
18/05/2012	Wichem Mfg	2, Parkview	---	residential	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	
18/05/2012	Wichem Mfg	18, 1, York	---	residential	no	other (specify in comments)	0.1	0.1	---	27/04/2012	27/04/2012	following standard response provided by health unit	One Sample location exceeded for lead in their planning	

2012
 ANNUAL REPORT
 FALL LEAD SAMPLING

Community Lead Testing - Sampling and Action log

Appendix F-2

Date Sampled (dd/mm/yyyy)	Sample Location	911 Street Address (or sampling number)	Composting Location ID & Applicable (2)	Sample Type	Re-sample? (1)	Priority Lead Source if identified (3)	Lead Source (mg/L) in (4)	At-Risk (mg/2.5) (5)	At-Risk (mg/2.5) (6)	Date Lead Sample Provided to Health Unit (dd/mm/yyyy)	Delivery Method (7)	Corrective Action Initiated by Health Unit	Corrective Action taken by Municipality (7)	Additional Comments
19/09/2012	Wichem Sp	5 Wishing	---	residential	no	other (specify in comments)	<1.0	---	7.98	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program
19/09/2012	Wichem Sp	13 Wishing	---	residential	no	other (specify in comments)	1.2	---	8.92	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program
19/09/2012	Wichem Sp	14 Parkside	---	residential	no	other (specify in comments)	<1.0	---	7.98	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program
19/09/2012	Wichem Sp	3 Parkside	---	residential	no	other (specify in comments)	1.6	---	7.76	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program
19/09/2012	Wichem Sp	05.5.5 West	---	other (specify in comments)	no	other (specify in comments)	<1.0	---	308	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program
19/09/2012	Wichem Sp	11 Booths	---	residential	no	other (specify in comments)	<1.0	---	7.98	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program
19/09/2012	Wichem Sp	28 Parkside	---	residential	no	other (specify in comments)	1.5	---	7.98	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program
19/09/2012	Wichem Sp	05.1.30 Birkdale	---	other (specify in comments)	no	other (specify in comments)	<1.0	---	235	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program
19/09/2012	Wichem Sp	5.47th	---	residential	no	other (specify in comments)	<1.0	---	7.98	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program
19/09/2012	Wichem Sp	35 Birkdale	---	residential	no	other (specify in comments)	<1.0	---	7.98	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program
19/09/2012	Wichem Sp	Public Works	---	non-residential	no	other (specify in comments)	<1.0	---	1.82	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program
19/09/2012	Wichem Sp	17 Other	---	residential	no	other (specify in comments)	1.8	---	7.98	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program
19/09/2012	Wichem Sp	18.47th	---	residential	no	other (specify in comments)	<1.0	---	7.98	01/10/2012	In person	Following standard response provided by health unit	Following standard response provided by health unit	No Exceedances were identified in the Fall Lead sampling program

GLOSSARY OF TERMS

APPENDIX F

Here are some terms that the reader should know about before reading the content of this report, and the laboratory results attached.

PARAMETER – A measurable or quantifiable characteristic or feature. These elements can be organic (Bacteria), or inorganic (metals or salts), and/or a variety of pesticides, herbicides and PCB's.

COLOUR - The aesthetic objective for colour in drinking water is 5 TCU (True Colour Units). Water can have a faint yellow/brown colour which is often caused by organic materials created by the decay of vegetation. Sometimes colour may be contributed to by Iron and Manganese compounds produced by processes occurring in natural sediments or in aquifers. The presence of organic material is the main cause of disinfection by-products when water is treated with chlorine.

I.M.A.C (Maximum Acceptable Concentration) – This is a health-related Ontario Drinking water standards established for contaminants when there are insufficient toxicological data to establish a M.A.C. with reasonable certainty, or when it is not practical to establish a M.A.C. at the desired level.

mg/L (Milligrams per Litre) – This is a unit of measure of the concentration of a parameter in water, sometimes called ppm (parts per million). Simply put, mg/L means one kilogram of a chemical, or contaminant, in one million kilograms (litres) of water.

ug/L (Micrograms per Litre) – This is a unit of measure of the concentration of a parameter in water, sometimes called ppb (parts per billion). Simply put, ug/L means one kilogram of a chemical, or contaminant, in one billion kilograms (litres) of water.
1000ug/L = 1 mg/L

ng/L (Nanograms per Litre) – This is a unit of measure of the concentration of a parameter in water, sometimes called ppt (parts per Trillion). Simply put, ng/L means one kilogram of a chemical, or contaminant, in one Trillion kilograms (litres) of water.
1000 ng/L = 1ug/L

pg/L (Picograms per Litre) – This is a unit of measure of the concentration of a parameter in water, sometimes called ppq (parts per quadrillion). Simply put, pg/L means one kilogram of a chemical, or contaminant, in one thousand trillion kilograms (litres) of water. 1000pg/L = 1 ng/L

pH – pH is a parameter that indicates the acidity of a water sample. The operational guideline recommended in drinking water is to maintain a pH between 6.5 and 8.5. The principal objective in controlling pH is to produce a water that is neither corrosive nor produces incrustation. At pH levels above 8.5, mineral incrustations and bitter tastes can occur. Corrosion is commonly associated with pH levels below 6.5 and elevated levels of certain undesirable chemical parameters. With pH levels above 8.5, there is a progressive decrease in the efficiency of chlorine disinfection and alum coagulation.

Temperature – An aesthetic objective is set for maximum water temperature to aid in selection of the best water source or the best placement for a water intake. It is desirable that the temperature of drinking water should not exceed 15 °C because of the palatability of water is enhanced by its coolness. Low water temperatures offer a number of other benefits. A temperature below 15 °C will tend to reduce the growth of nuisance organisms and minimize associated taste, colour, odour and corrosion problems. In the summer and fall, water temperatures may increase in the distributed water due to the warming of the soil. Low temperature facilitates maintenance of a free chlorine residual by reducing the rates of decay of the chlorine.

THMs (TRICHALOMETHANES) – The M.A.C. for THMs in drinking water is 0.10 mg/L based on a four quarter moving annual average of test results. THMs are the most widely occurring synthetic organics found in chlorinated drinking water. The four most commonly detected THMs in drinking water are chloroform, bromodichloromethane, chlorodibromomethane and bromoform. The principal source of the THMs in drinking water is the chemical reaction of chlorine with naturally occurring organics left in the water after filtration.

TURBIDITY - The M.A.C. for turbidity in drinking water is 1.0 FTU (Formazin Turbidity Unit) or 1.0 NTU (Nephelometric Turbidity Units) for water entering the distribution system but much lower turbidity around less than 0.1 are commonly continuously attained in well operated treatment plants. Turbidity measurements are made frequently to confirm the existence of good operating conditions at all surface water treatment plants and at some ground water plants.

An appearance related aesthetic objective of 5 FTU or NTU has been set for water consumers' Taps. Turbidity higher than 5 FTU or NTU taken at consumers' taps generally indicates severe local corrosion and/or poor bacteriological control due to loss of chlorine residual.

Turbidity in water is caused by the presence of suspended tiny particles that scatter light and make the water appear cloudy. These particles are made from matter such as clay, silt, spores, plankton and other microorganisms. The most important health related effect of turbidity is interference with disinfection and with the maintenance of chlorine residual. Viable coli form bacteria have been detected in waters with the turbidity higher than 3.8 NTU or FTU even in the presence of free chlorine residuals of up to 0.5 mg/L and after a contact time in excess of 30 minutes. Outbreaks of disease traced to chlorinated water supplies have been associated with high turbidity.