



**Ontario Clean Water Agency**  
**Agence Ontarienne Des Eaux**

Kirkland Lake Drinking Water System

# 2015 ANNUAL/SUMMARY REPORT

Prepared by the Ontario Clean Water Agency  
on behalf of the Town of Kirkland Lake



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## INTRODUCTION

Municipalities throughout Ontario have been required to comply with Ontario Regulation 170/03 made under the Safe Drinking Water Act (SDWA) since June 2003. The Act was enacted following recommendations made by Commissioner O'Connor after the Walkerton Inquiry. The Act's purpose is to protect human health through the control and regulation of drinking water systems. O. Reg. 170/03 regulates drinking water testing, use of licensed laboratories, treatment requirements and reporting requirements.

Section 11 of Regulation 170/03 requires the owner to produce an Annual Report. This report must include the following:

1. Description of system & chemical(s) used
2. Summary of any adverse water quality reports and corrective actions
3. Summary of all required testing
4. Description of any major expenses incurred to install, repair or replace equipment

This annual report must be completed by February 28th of each year.

Section 22 of the regulation also requires a Summary Report which must be presented & accepted by Council by March 31<sup>st</sup> of each year for the preceding calendar year.

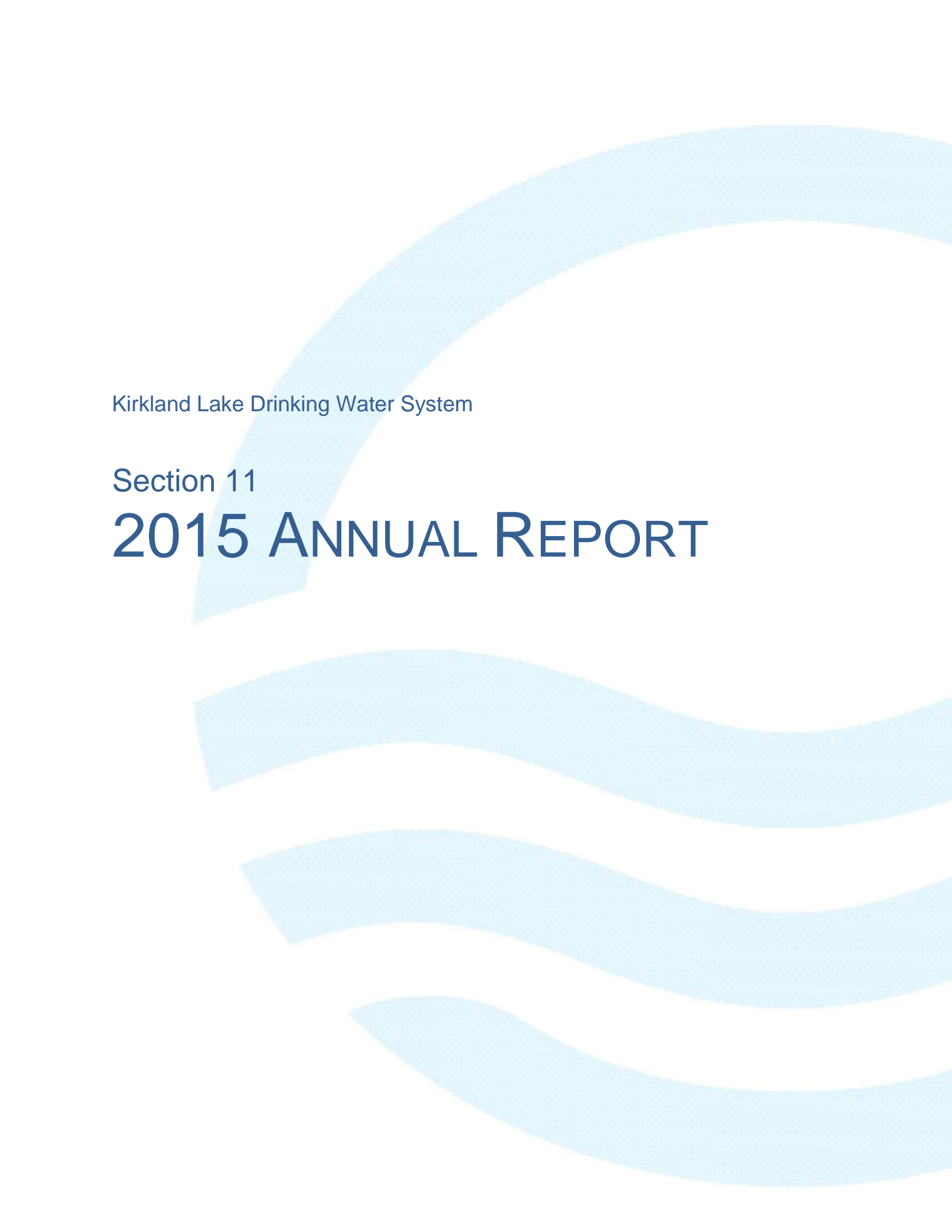
The report must list the requirements of the Act, its regulations, the system's Drinking Water Works Permit (DWWP), Municipal Drinking Water Licence (MDWL), Certificate of Approval (if applicable), and any Provincial Officer Order the system failed to meet during the reporting period. The report must also specify the duration of the failure, and for each failure referred to, describe the measures that were taken to correct the failure.

The Safe Drinking Water Act (2002) and the drinking water regulations can be viewed at the following website: <http://www.e-laws.gov.on.ca>.

To enable the Owner to assess the rated capacity of their system to meet existing and future planned water uses, the following information is also required in the report.

1. A summary of the quantities and flow rates of water supplied during the reporting period, including the monthly average and the maximum daily flows.
2. A comparison of the summary to the rated capacity and flow rates approved in the systems approval, drinking water works permit or municipal drinking water licence or a written agreement if the system is receiving all its water from another system under an agreement.

The reports have been prepared by the Ontario Clean Water Agency (OCWA) on behalf of the Owner and presented to council as the 2015 Annual/Summary Report.



Kirkland Lake Drinking Water System

Section 11

# 2015 ANNUAL REPORT



## ANNUAL REPORT

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### 1.0 INTRODUCTION

**Drinking-Water System Name:** KIRKLAND LAKE DRINKING WATER SYSTEM  
**Drinking-Water System No.:** 220000308  
**Drinking-Water System Owner:** The Corporation of the Town of Kirkland Lake  
**Drinking-Water System Category:** Large Municipal, Residential System  
**Period being reported:** January 1, 2015 to December 31, 2015

**Does your Drinking Water System serve more than 10,000 people?** No

**Is your annual report available to the public at no charge on a web site on the Internet?** Yes at [www.discoverkl.ca](http://www.discoverkl.ca)

**Location where Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.**

Town of Kirkland Lake, Department of Physical Services  
1 Dunfield Road,  
Kirkland Lake ON P2N 3P4

Town of Kirkland Lake Municipal Office  
3 Kirkland Street,  
Kirkland Lake ON P2N 3P4

### ***Drinking Water Systems that receive drinking water from the Kirkland Lake Drinking Water System:***

The Kirkland Lake Drinking Water System provides all drinking water to the communities of Kirkland Lake, Chaput Hughes and Swastika.

### ***The Annual Report was not provided to any other Drinking Water System owners.***

The Ontario Clean Water Agency prepared the 2015 Annual/Summary Report on behalf of the Town of Kirkland Lake and provided a copy to the system owner. The Kirkland Lake Drinking Water System is a stand-alone system that does not receive water from or send water to another system.

### ***Notification to system users that the Annual Report is available for viewing is accomplished through:***

- The local newspaper
- The Town of Kirkland Lake Municipal Office



- The Town of Kirkland Lake's Department of Physical Services

## 2.0 DESCRIPTION OF THE DRINKING WATER SYSTEM

The Kirkland Lake Drinking Water System is owned by the Corporation of the Town of Kirkland Lake and consists of a Class 3 conventional design water treatment plant (approved capacity of 22 500 m<sup>3</sup>/d) and a Class 2 water distribution system. The Ontario Clean Water Agency (OCWA) is designated as the Overall Responsible Operator for both the water treatment and water distribution facilities. Certified municipal operators assist OCWA by performing routine maintenance, checks and repairs of the distribution system.

### **Description of the Kirkland Lake Drinking Water System (DWS# 220000308)**

#### ***Raw Water Supply***

The Kirkland Lake filtration plant draws its water from Gull Lake on the eastern border of the town. Gull Lake is characteristic of most Northern Ontario lakes classified as eutrophic in nature with relatively high color content. Gull Lake's volume can be supplemented by pumping water from nearby McTavish Lake. In 2014, Gull Lake did not need to be supplemented. Leisure and recreational activity is limited in an attempt to ensure the cleanliness, quality and safety of the water source.

The water treatment plant (WTP) draws water through a 150 m long, 710 mm diameter intake pipe. The pipe terminates in an intake chamber located approximately 10 m from the lake shoreline. The intake system is complete with a screened intake bell structure submerged in approximately 5.8m water depth and elevated off the bottom approximately 1.7m. A 750 mm diameter, 17 m long pipe connects the intake chamber to the WTP. It includes an optional provision for zebra mussel control if needed in the future.

The water passes through a traveling water screen is installed immediately inside the plant. The screen removes large floating debris from the water prior to treatment. The provision for a manual screen immediately downstream from the traveling screen offers back up screening in the event the traveling screen is out of service. Following the screening, raw water is disinfected (pre-chlorination) prior to entering the wet well of the Low Lift Pumping Station (LLPS).

#### ***Water Treatment***

Water is pumped from the LLPS to the treatment processes via five (5) vertical turbine pumps providing a firm capacity of 260 L/s. A venture type flow meter is used to measure the raw water flow.

The treatment process involves the following stages:



## 1. Coagulation / Flocculation / Sedimentation

The first step of water treatment is coagulation -- a process of destabilization and initial aggregation of colloidal and finely divided suspended matter by the addition of a floc-forming chemical.

Just prior to entering the raw water inlet chamber, chemical coagulant, aluminum sulfate (alum), is injected into and is rapidly agitated with a flash mixer.

The mixture then overflows into three (3) contact compartments. In the compartments, the mixing weirs gently turn the mixture in order to promote coagulation.

Just prior to leaving the mixing chambers, a flocculant, activated silica -- an inorganic polymer, is added.

Flocculation in water treatment is agglomeration of colloidal and finely divided suspended matter after coagulation by gentle agitation by either mechanical or hydraulic means, sometimes with an aid of chemical flocculant.

The mixture enters the bottom distribution piping of each Degremont Ultra-Pulsator clarifier via vacuum chambers. The vacuum in the chambers is created by the vacuum pumps, one per chamber. The purpose of the vacuum chambers is to create gentle movement of the sludge blanket in the clarifier for both flocculation and sludge removal.

Sedimentation is the process of subsidence and deposition of suspended matter, carried by water or other liquids, by gravity. It is usually accomplished by reducing the velocity of the liquid to below the point at which it can transport the suspended material or floc.

The flow is distributed equally over the full area of the clarifiers through the distribution pipes in the bottom of the unit. The flow percolates through the sludge blanket. Upon exiting the sludge blanket, the water flows through a plate settler and then the tube settler. Clarified water is gathered by the collection pipes at the top of the units and transferred to channels that lead to the filters.

## 2. Filtration

Filtration is the process of passing a liquid through a filtering medium (for KLWTP this consists of granular material, sand and anthracite) for the removal of suspended or colloidal matter.

There are four (4) dual media filters at the plant. Each filter is approximately 6.4 m x 4.3 m x 3m deep and rated to operate at a max. rise rate of 9.0 m/hr or a max. flow rate of 65.0 L/sec. The filter media consists of 450 mm of anthracite underlain by a 300 mm layer of silica sand. A concrete underdrain slab outfitted with strainer nozzles supports the filter media. During normal operation, the water flows into the filter from the filter channel via an inlet sluice gate and travels through the media in a downward pattern. The filtered water is collected in the underdrain area and transported by pipes to the clearwell, located under the ground slab of the plant. The flow through each filter is measured by individual flow meters and is controlled by dedicated filter control valves. A headloss indicator monitors the filter media condition. The filtrate quality is continuously monitored by individual turbidimeters, and a particle analyzer.



### 3. Disinfection (Chlorination)

Filtered water is disinfected following filtration. Chlorine solution is diffused into the water stream in the clearwell of the treatment building. The diffuser and a series of baffles promote complete mixing of chlorine with water. The chlorine solution is prepared on-site by mixing chlorine gas with water. A chlorinator controls the chlorine gas feed rate. There are three (3) chlorinators installed at the plant - one serves, as a duty pre-chlorinator while the second is a duty post-chlorinator. The third chlorinator serves as a stand-by for either one of the duty chlorinators. Chlorine gas is mixed with water in the ejectors and is sent to diffusers as a chlorine solution. SCADA monitors the chlorinators which will generate alarms upon high and low vacuum levels or abnormal chlorine levels. Each chlorinator is rated to supply 67.0 kg per day of chlorine gas which, based on the plant rated capacity, equals to the maximum chlorine feed rate of up to 3.0 mg/L (3.0 ppm or parts per million) at each location. The gas is withdrawn at any given time from only one of the two one tonne cylinders that are located on the monitored weigh scale. The chlorine feed system will switch automatically to another cylinder when pressure in the duty cylinder drops below the pre-set value. If both cylinders approach low levels, SCADA will alarm the operator.

### 4. pH Adjustment

A pH adjustment process utilizing sodium hydroxide (NaOH) restores treated water to a neutral pH. NaOH is delivered in bulk to the plant at 93% strength and stored in a 12 000 litre tank. The NaOH is transferred to a day tank and diluted to a 40% solution. Two metering pumps (1 duty and 1 standby) feed the 40% NaOH to the clearwell of the treatment building at the point of exit to the pumping building.

### ***Waste Management***

Filter backwash water and withdrawn sludge from the sedimentation tanks are directed to two wastewater tanks. The capacity of each tank is approximately 900 m<sup>3</sup>. Wastewater is discharged to the sanitary sewer system.

### ***Emergency Power***

The plant has a standby power generator rated at 300 kW and equipped with an automatic transfer switch and an underground and in-plant fuel storage tanks.

### ***Distribution System and Elevated Storage Tank***

The Kirkland Lake Drinking Water System is classified as a Large Municipal Residential Drinking Water System and provides water to approximately 9000 residents. Treated water is provided to the distribution system by one (1) 75 hp, one (1) 125 hp and two (2) 200 hp vertical turbine high lift pumps.

Distribution piping typically ranges in size from 150 mm to 250 mm, and may consist of cast iron, ductile iron, or PVC, depending on the location and date of installation. Typical system pressure ranges from 60 psi to 70 psi. The Chaput Hughes standpipe provides for storage for approximately 7,115 m<sup>3</sup> of water, helps stabilize water pressure in the distribution system and provides extra water in the case of an emergency. To ensure optimum chlorine residual in the





distribution system there are two chlorine booster stations, one at the Standpipe and the other at the Swastika Valve Chamber.

### **3.0 LIST OF WATER TREATMENT CHEMICALS USED OVER THE REPORTING PERIOD**

The following chemicals were used in the treatment process at the Charlton Water Treatment Plant.

- Alum (Aluminum Sulphate) - Coagulation/Flocculation
- Sulfuric Acid – mixed with sodium silicate to make activated silica which is used as a flocculant
- Sodium Silicate – mixed with sulphuric acid to make activated silica which is used as a flocculant
- Sodium Hydroxide – pH adjustment
- Chlorine gas – primary disinfection
- Sodium Hypochlorite – booster chlorination at the Chaput Hughes standpipe and Swastika booster station.

### **4.0 SIGNIFICANT EXPENSES INCURRED IN THE DRINKING WATER SYSTEM**

OCWA is committed to maintaining the assets of the drinking water system and maintains a program of scheduled inspection and maintenance activities using a computerized Work Management System (WMS). All routine maintenance activities conducted at the water treatment plant were accomplished in 2015.

Significant expenses incurred in the drinking water system include:

- The replacement of the sodium silicate tank with two new units
- The commissioning of the new chlorination system
- The removal of the fluoride equipment
- The installation of a new free chlorine analyzer
- The installation of a new total chlorine analyzer
- The replacement of one high lift pump with a more efficient unit
- Generator testing under load and refurbishing of fuel
- The cleaning the water tower
- The replacement of the chemical transfer pumps
- The replacement of chemical lines, valves and appurtenances
- The installation of a new total chlorine water pump
- SCADA upgrades (CT calculation, automatic shutdown of a filter if turbidity above 1 NTU)
- The installation of new water mains on Woods Street from Queen to King Street, on Folger Street and on the South end of Woods Street.



## 5.0 DETAILS ON NOTICES OF ADVERSE TEST RESULTS AND OTHER PROBLEMS REPORTED TO & SUBMITTED TO THE SPILLS ACTION CENTER

Based on information kept on record by the Town of Kirkland Lake, Three (3) adverse water quality incident was reported to the MOE's Spills Action Centre in 2015.

<b>Parameter</b>	Total Coliforms and <i>E. coli</i> in treated water sample from the plant
<b>Date of Sample</b>	August 31, 2015
<b>AWQI #</b>	126065
<b>Result</b>	14 Total Coliforms and 1 <i>E. coli</i>
<b>Details</b>	OCWA received a call from Accuracy Laboratories on September 2, 2015 indicating that the treated water sample (POE) collected at the Kirkland Lake water treatment plant contained 14 Total Coliforms and 1 <i>E. coli</i> . After some investigation it was determined that the treated water bottle contained the raw water sample and the raw water bottle contained the treated water sample.
<b>Corrective Actions</b>	The local MOH and the MOECC water inspector were contacted with the information and the following instructions were provided: Immediately collect and analyze raw & treated water samples, increase chlorine residual, provide MOECC with trends for POE free chlorine residuals and provide a written summary from both the lab & OCWA. The chlorine at the plant was maintained above 1.5 mg/L and the raw and treated water were re-sampled. Results from the re-samples are: - zero total coliforms and <i>E. coli</i> in the treated water sample - 8 TC and 0 EC in the raw water sample. The MOECC Water Inspector and MOH were notified of the results and the issue was resolved.

<b>Parameter</b>	Turbidity of the Filters
<b>Date of Incident</b>	October 16, 2015
<b>AWQI #</b>	126929
<b>Result</b>	> 1 NTU turbidity
<b>Details</b>	High turbidity levels were detected on filters No. 1 and 4. These filters were reading above 1 NTU for greater than 15 minutes. Possible cause - lake turnover.
<b>Corrective Actions</b>	Chemical dosages were adjusted based on raw water temperature, filters were backwashed, clarifiers were de-sludged, the chlorine residual was increased in the clearwell and the process was restored. Samples were collected from the treated water clearwell and tested for turbidity and results were well within acceptable limits.  The incident was reported to the MOE's Spills Action Centre and the Timiskaming Health Unit on October 16 <sup>th</sup> and the issue was resolved on October 19, 2015.  The MOECC revoked this AWQI as the high turbid water was not being directed to the next phase of the treatment process and consumers



<b>Parameter</b>	Turbidity of the Filters
<b>Date of Incident</b>	November 9, 2015
<b>AWQI #</b>	127315
<b>Result</b>	> 1 NTU turbidity
<b>Details</b>	High turbidity levels were detected off the filters (above 1 NTU for greater than 15 minutes for approx. 30 minutes. This was caused by sodium silicate pump failure.
<b>Corrective Actions</b>	<p>Filter flows were shut down and low lift pumps turned off. The pump was repaired and a new batch of activated silica prepared. Once clarifiers settled, the low lifts were re-started and a backwash was performed on all filters. Plant began producing water with turbidity levels under 1.0 NTU.</p> <p>The incident was reported to the MOE's Spills Action Centre and the Timiskaming Health Unit on November 10<sup>th</sup> and the issue was also resolved on November 10, 2015.</p>

## 6.0 MICROBIOLOGICAL TESTING PERFORMED DURING THE REPORTING PERIOD

### *Summary of Microbiological Data*

Sample Type	# of Samples	Range of <i>E. coli</i> Results (min to max)	Range of Total Coliform Results (min to max)	# of HPC Samples	Range of HPC Results (min to max)
Raw (Gull Lake)	53	<2 to 10	2 to 88	0	N/A
Treated (POE)	53	0 to 0	0 to 0	53	<10 to 130
Distribution KL-3	52	0 to 0	0 to 0	21	<10 to 350
Distribution KL-4	53	0 to 0	0 to 0	21	<10 to 740
Distribution KL-5	52	0 to 0	0 to 0	22	<10 to <10
Distribution KL-6	52	0 to 0	0 to 0	23	<10 to 1500
Distribution KL-7	52	0 to 0	0 to 0	21	<10 to 80

Maximum Allowable Concentration (MAC) for *E. coli* = 0 Counts/100 mL

MAC for Total Coliforms = 0 Counts/100 mL

Refer to *Appendix A* for microbiological test results.

## 7.0 OPERATIONAL TESTING PERFORMED DURING THE REPORTING PERIOD

### *Continuous Monitoring in the Treatment Process*

Parameter	# of Samples	Range of Results (min to max)	Unit of Measure
<b>Turbidity</b> (Filter 1)	8760	0.02 to 2.26*	NTU
<b>Turbidity</b> (Filter 2)	8760	0.02 to 3.48*	NTU
<b>Turbidity</b> (Filter 3)	8760	0.01 to 3.98*	NTU
<b>Turbidity</b> (Filter 4)	8760	0.02 to 3.69*	NTU
<b>Free Chlorine</b>	8760	0.65 to 3.43	mg/L

**Note:** For continuous monitors use 8760 as the number of samples.



\* October 16 - High turbidity levels were detected off the filters. These filters were reading above 1 NTU for greater than 15 minutes. Possible cause - lake turnover. This was water was not directed to users (AWQI No. 126929 revoked)

\* November 9th - High turbidity levels were detected off the filters. The filters was reading above 1 NTU for greater than 15 minutes. This was caused by sodium silicate pump failure. (AWQI No. 127315)

Refer to *Appendix B* for a monthly summary of the above operational data.

### **Summary of Chlorine Residual Data in the Distribution System**

Parameter	# of Samples	Range of Results (min to max)	Unit of Measure	Standard
Free Chlorine (Location KL-3)	106	0.13 to 1.66	mg/L	<0.05
Free Chlorine (Location KL-4)	105	0.13 to 1.49		
Free Chlorine (Location KL-5)	104	0.14 to 1.40		
Free Chlorine (Location KL-6)	52	0.38 to 1.55		
Free Chlorine (Location KL-7)	52	0.28 to 1.33		
Free Chlorine (Chaput Hughes Station)	8760	0.10 to 2.02		
Free Chlorine (Swastika Station)	8760	0.09 to 2.85		

**\*Note:** A total of eight operational checks for chlorine residual in the distribution system were collected each week. Five (5) samples were tested one day and three (3) on a second day. The sample sets are collected at least 48-hours apart and samples collected on the same day are from different locations.

Refer to *Appendix C* for a summary of the distribution free chlorine residual results.

### **Summary of Nitrate & Nitrite Data (sampled at the water treatment plant)**

Date of Sample	Nitrate Result Value	Nitrite Result Value	Unit of Measure	Exceedance
February 4	<0.1	<0.05	mg/L	No
May 4	0.23	<0.03	mg/L	No
August 4	<0.1	<0.03	mg/L	No
November 2	<0.1	<0.03	mg/L	No

Maximum Allowable Concentration (MAC) for Nitrate = 10 mg/L

MAC for Nitrite = 1 mg/L

### **Summary of Total Trihalomethane Data (sampled in the distribution system)**

Date of Sample	Result Value	Unit of Measure	Running Average	Exceedance
February 4	41.8	ug/L	64.7	No
May 4	39.1	ug/L		
August 4	119	ug/L		
November 2	59	ug/L		

Maximum Allowable Concentration (MAC) for Total Trihalomethanes = 100 ug/L (Four Quarter Running Average)

### **Summary of Most Recent Lead Data**

(applicable to the following drinking water systems; large municipal residential systems, small, municipal residential systems, and non-municipal year-round residential systems)



The Kirkland Lake Drinking Water System was eligible to follow the “Exemption from Plumbing Sampling” as described in section 15.1-5(9) and 15.1-5(10) of Schedule 15.1 of Ontario Regulation 170/03. The exemption applies to a drinking water system if, in two consecutive periods at reduced sampling, not more than 10% of all samples from plumbing exceed the maximum allowable concentration (MAC) of 10 ug/L for lead. As such, the system was required to test for total alkalinity and pH in one distribution sample collected during the periods of December 15 to April 15 (winter period) and June 15 to October 15 (summer period). This testing is required in every 12-month period with lead testing in every third 12-month period.

Two rounds of alkalinity and pH testing were carried out on April 14<sup>th</sup> and October 13<sup>th</sup> of 2015. Results are summarized in the table below.

**Summary of pH & Alkalinity Data** (sampled in the distribution system)

Date of Sample	# of Samples	Field pH Results (min to max)	Field Temperature (°C) (min to max)	Alkalinity Results (mg/L) (min to max)
April 14	3	6.90 to 7.10	6.7 to 9.3	43.6 to 46.2
October 13	3	6.66 to 7.24	13.7 to 14.5	27.0 to 30.8

**Most Recent Schedule 23 Inorganic Data Tested at the Water Treatment Plant**

Parameter	Result (Feb. 25, 2015)	Result (Oct 5, 2015)	Unit of Measure	Standard	Exceedance
Antimony	< 0.5	< 0.5	ug/L	6	No
Arsenic	<1.0	< 1.0	ug/L	25	No
Barium	44.6	35.6	ug/L	1000	No
Boron	< 2.0	5.8	ug/L	5000	No
Cadmium	< 0.1	< 0.1	ug/L	5	No
Chromium	< 1.0	< 1.0	ug/L	50	No
Mercury	< 0.1	< 0.1	ug/L	1	No
Selenium	< 1.0	< 1.0	ug/L	10	No
Uranium	< 1.0	< 1.0	ug/L	20	No

**Note:** Sample required every 12 months

**Most Recent Schedule 24 Organic Data Tested at the Water Treatment Plant**

Parameter	Result (Feb 25, 2015)	Result (Oct 5, 2015)	Unit of Measure	Standard	Exceedance
Alachlor	< 0.4	< 0.4	ug/L	5	No
Aldicarb	< 0.9	< 0.6	ug/L	9	No
Aldrin + Dieldrin	< 0.004	< 0.004	ug/L	0.7	No
Atrazine + N-dealkylated metabolites	< 0.9	< 0.9	ug/L	5	No
Azinphos-methyl	< 0.3	< 0.3	ug/L	20	No
Bendiocarb	< 2.0	< 1.0	ug/L	40	No
Benzene	< 0.2	< 0.2	ug/L	5	No
Benzo(a)pyrene	< 0.005	< 0.005	ug/L	0.01	No

**Most Recent Schedule 24 Organic Data Tested at the Water Treatment Plant**

Parameter	Result (Feb 25, 2015)	Result (Oct 5, 2015)	Unit of Measure	Standard	Exceedance
Bromoxynil	< 0.09	< 0.09	ug/L	5	No
Carbaryl	< 2.0	< 1.0	ug/L	90	No
Carbofuran	< 2.0	< 1.0	ug/L	90	No
Carbon Tetrachloride	< 0.2	< 0.2	ug/L	5	No
Chlordane (Total)	< 0.004	< 0.004	ug/L	7	No
Chlorpyrifos	< 0.3	< 0.3	ug/L	90	No
Cyanazine	< 0.3	< 0.3	ug/L	10	No
Diazinon	< 0.3	< 0.3	ug/L	20	No
Dicamba	< 0.08	< 0.08	ug/L	120	No
1,2-Dichlorobenzene	< 0.2	< 0.2	ug/L	200	No
1,4-Dichlorobenzene	< 0.2	< 0.2	ug/L	5	No
Dichlorodiphenyl trichloroethane (DDT) + metabolites	< 0.005	< 0.005	ug/L	30	No
1,2-Dichloroethane	< 0.2	< 0.2	ug/L	5	No
1,1-Dichloroethylene (vinylidene chloride)	< 0.2	< 0.2	ug/L	14	No
Dichloromethane	< 1.0	< 1.0	ug/L	50	No
2,4-Dichlorophenol	< 0.6	< 0.2	ug/L	900	No
2,4-Dichlorophenoxy acetic acid (2,4-D)	< 0.08	< 0.08	ug/L	100	No
Diclofop-methyl	< 0.08	< 0.08	ug/L	9	No
Dimethoate	< 0.3	< 0.3	ug/L	20	No
Dinoseb	< 0.07	< 0.07	ug/L	10	No
Diquat	< 7.0	< 7.0	ug/L	70	No
Diuron	< 9.0	< 6.0	ug/L	150	No
Glyphosate	< 20	< 20	ug/L	280	No
Heptachlor + Heptachlor Epoxide	< 0.004	< 0.004	ug/L	3	No
Lindane (Total)	< 0.0005	< 0.0004	ug/L	4	No
Malathion	< 0.3	< 0.3	ug/L	190	No
Methoxychlor	< 0.001	< 0.001	ug/L	900	No
Metolachlor	< 0.2	< 0.2	ug/L	50	No
Metribuzin	< 0.2	< 0.2	ug/L	80	No
Monochlorobenzene	< 0.2	< 0.2	ug/L	80	No
Paraquat	< 1.0	< 1.0	ug/L	10	No
Parathion	< 0.2	< 0.2	ug/L	50	No
Polychlorinated Biphenyls (PCB)	< 0.04	< 0.07	ug/L	60	No
Pentachlorophenol	< 0.6	< 0.5			
Phorate	< 0.3	< 0.2	ug/L	2	No
Picloram	< 0.08	< 0.08	ug/L	190	No
Prometryne	< 0.2	< 0.1	ug/L	1	No
Simazine	< 0.3	< 0.3	ug/L	10	No
Temephos	< 20	< 20	ug/L	280	No

**Most Recent Schedule 24 Organic Data Tested at the Water Treatment Plant**

Parameter	Result (Feb 25, 2015)	Result (Oct 5, 2015)	Unit of Measure	Standard	Exceedance
Terbufos	< 0.2	< 0.1	ug/L	1	No
Tetrachloroethylene	< 0.2	< 0.2	ug/L	30	No
2,3,4,6-Tetrachlorophenol	< 0.6	< 0.5	ug/L	100	No
Triallate	< 0.2	< 0.2	ug/L	230	No
Trichloroethylene	< 0.2	< 0.2	ug/L	50	No
2,4,6-Trichlorophenol	< 0.5	< 0.5	ug/L	5	No
2,4,5-Trichlorophenoxy acetic acid (2,4,5-T)	< 0.09	< 0.09	ug/L	280	No
Trifluralin	< 0.2	< 0.2	ug/L	45	No
Vinyl Chloride	< 0.2	< 0.2	ug/L	2	No

**Note:** Sample required every 12 months (sample date = February 21, 2014).

**Inorganic or Organic Test Results that Exceeded Half the Standard Prescribed in Schedule 2 of the Ontario Drinking Water Quality Standards.**

No inorganic or organic parameter(s) listed in Schedule 23 and 24 of Ontario Regulation 170/03 exceeded half the standard found in Schedule 2 of the Ontario Drinking Water Standard (O. Reg. 169/03) during the reporting period.

**Most Recent Sodium Data Sampled at the Water Treatment Plant**

Date of Sample	# of Samples	Result Value	Unit of Measure	Standard	Exceedance
October 5, 2015	1	25.9	mg/L	20	Yes

**Note:** Sample required every 60 months.

The aesthetic objective for sodium in drinking water is 200 mg/L at which it can be detected by a salty taste. It is required that the local Medical Officer of Health be notified when the concentration exceeds 20 mg/L so that persons on sodium restricted diets can be notified by their physicians. Sodium exceedances are only reported every five years. The last reported exceedance occurred in February 2012. (AWQI# 105146).

**Most Recent Fluoride Data Sampled at the Water Treatment Plant**

Date of Sample	# of Samples	Result Value	Unit of Measure	Standard	Exceedance
October 5, 2015	1	<0.1	mg/L	1.5	No

**Note:** Sample required every 60 months.

**Summary of Additional Testing Performed in Accordance with a Legal Instrument.**

No additional sampling and testing was required for the Kirkland Lake Drinking Water System during the 2015 reporting period.



Kirkland Lake Drinking Water System

Schedule 22

# 2015 SUMMARY REPORT

## FOR MUNICIPALITIES





Schedule 22

## SUMMARY REPORTS FOR MUNICIPALITIES

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### 1.0 INTRODUCTION

<b>Drinking-Water System Name:</b>	<b>KIRKLAND LAKE DRINKING WATER SYSTEM</b>
<b>Municipal Drinking Water Licence (MDWL) No.:</b>	214-101 (issued July 29, 2011)
<b>Drinking Water Work Permit (DWWP) No.:</b>	214-201 (issued July 29, 2011)
<b>Permit to Take Water (PTTW) No.:</b>	3312-79FN3K (issued November 30, 2007)
<b>Period being reported:</b>	January 1, 2015 to December 31, 2015

### 2.0 REQUIREMENTS THE SYSTEM FAILED TO MEET

According to information kept on record by OCWA, the Kirkland Lake Drinking Water System failed to meet the following legislative and /or regulative requirements:

1. Section 3 (3.2) of Permit to Take Water (PTTW) #3312-79FN3K, allows a maximum flow rate of 15,625 L/minute to be taken from the source water each day.

The system failed to meet this limit on July 8<sup>th</sup> during a major water main break. The plant was operated slightly above the maximum limit (15,894 L/minute) to maintain the water supply.

2. Section 16-6 of Schedule 16 to Ontario Regulation 170/03 requires that an immediate verbal report must be given to the medical officer of health (MOH) and to the Ministry's Spills Action Center if an adverse result as described by section 16-3 of the regulation is detected or if improperly disinfected water has been provided to users.

The operating authority for the system failed to comply with this requirement during an incident on November 9<sup>th</sup>. Adversely high filter effluent turbidity was identified by an operator on November 9, 2015 at 21:35 hours, but verbal notifications to the MOH and the Ministry were not conducted until November 10, 2015 at 01:15 hours.

Training was conducted with all operational staff to reinforce the reporting requirements of the regulation.

Refer to Section 5.0 - DETAILS ON NOTICES OF ADVERSE TEST RESULTS AND OTHER PROBLEMS REPORTED TO & SUBMITTED TO THE SPILLS ACTION CENTER on page 8 of this report for additional details.



### 3.0 SUMMARY OF QUANTITIES & FLOW RATES

#### Water Usage

The following water usage tables summarize the quantities and flow rates of water taken and produced during the 2015 reporting period, including total monthly volumes, average monthly volumes, maximum monthly volumes, and maximum flow rates.

#### Raw Water

##### 2015 - Monthly Summary of Water Takings from the Source (Gull Lake)

Governed by Permit to Take Water (PTTW) #3312-79FN3K, issued November 30, 2007

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m <sup>3</sup> )	321912	347427	390653	375270	395284	379095	404526	343971	275240	286837	276251	279625	4076091
Average Volume (m <sup>3</sup> /d)	10384	12408	12602	12509	12751	12636	13049	11096	9175	9253	9208	9020	11174
Maximum Volume (m <sup>3</sup> /d)	13392	13657	13374	13538	14432	14167	16515	12677	11981	11157	11358	10484	16515
PTTW - Maximum Allowable Volume (m <sup>3</sup> /day)	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500
Maximum Flow Rate (L/min)	14238	14328	15096	14220	14448	14364	15894	14208	15000	13689	9618	9906	15894
PTTW - Maximum Allowable Flow Rate (L/min)	15625	15625	15625	15625	15625	15625	15625	15625	15625	15625	15625	15625	15625

Notes: Flow rate exceeded allowable limit on July 12th due to a major water main break. Plant was operated above maximum capacity for most of the day.

#### Treated Water

Governed by Municipal Drinking Water Licence (MDWL) #214-101, issued July 29, 2011

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year to Date
Total Volume (m <sup>3</sup> )	311182	333981	375272	360913	368266	354176	366632	303172	252303	271074	261426	269317	3827714
Average Volume (m <sup>3</sup> /d)	10038	11928	12106	12030	11880	11806	11827	9780	8410	8744	8714	8688	10496
Maximum Volume (m <sup>3</sup> /d)	12705	13320	12712	12902	13814	13245	15219	11101	10473	10511	10299	10056	15219
MDWL - Rated Capacity (m <sup>3</sup> /day)	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500

#### Flow Monitoring

MDWL No. 214-101 requires the owner to install a sufficient number of flow measuring devices to permit the continuous measurement and recording of:

- the flow rate and daily volume of treated water that flows from the treatment subsystem to the distribution system, and
- the flow rate and daily volume of water that flows into the treatment subsystem.

The flow monitoring equipment identified in the MDWL is present and operating as required.



These flow meters are calibrated on an annual basis as specified in the manufacturers' instructions.

***Comparison of the Flow Summary to the Rated Capacity & Flow Rates Allowed in the Systems Permit & Licence***

The system's Permit to Take Water #3312-79FN3K, allows the Municipality to withdraw a maximum volume of 22,500 cubic meters from Gull Lake per day. A review of the raw water flow data indicates that the maximum volume taken was 16,515 m<sup>3</sup> on July 12<sup>th</sup>. The Permit also allows a maximum flow rate of 15,625 L/minute. The system exceeded this rate having a maximum recorded flow of 15,894 L/minute on July 8, 2015 during a major water main break.

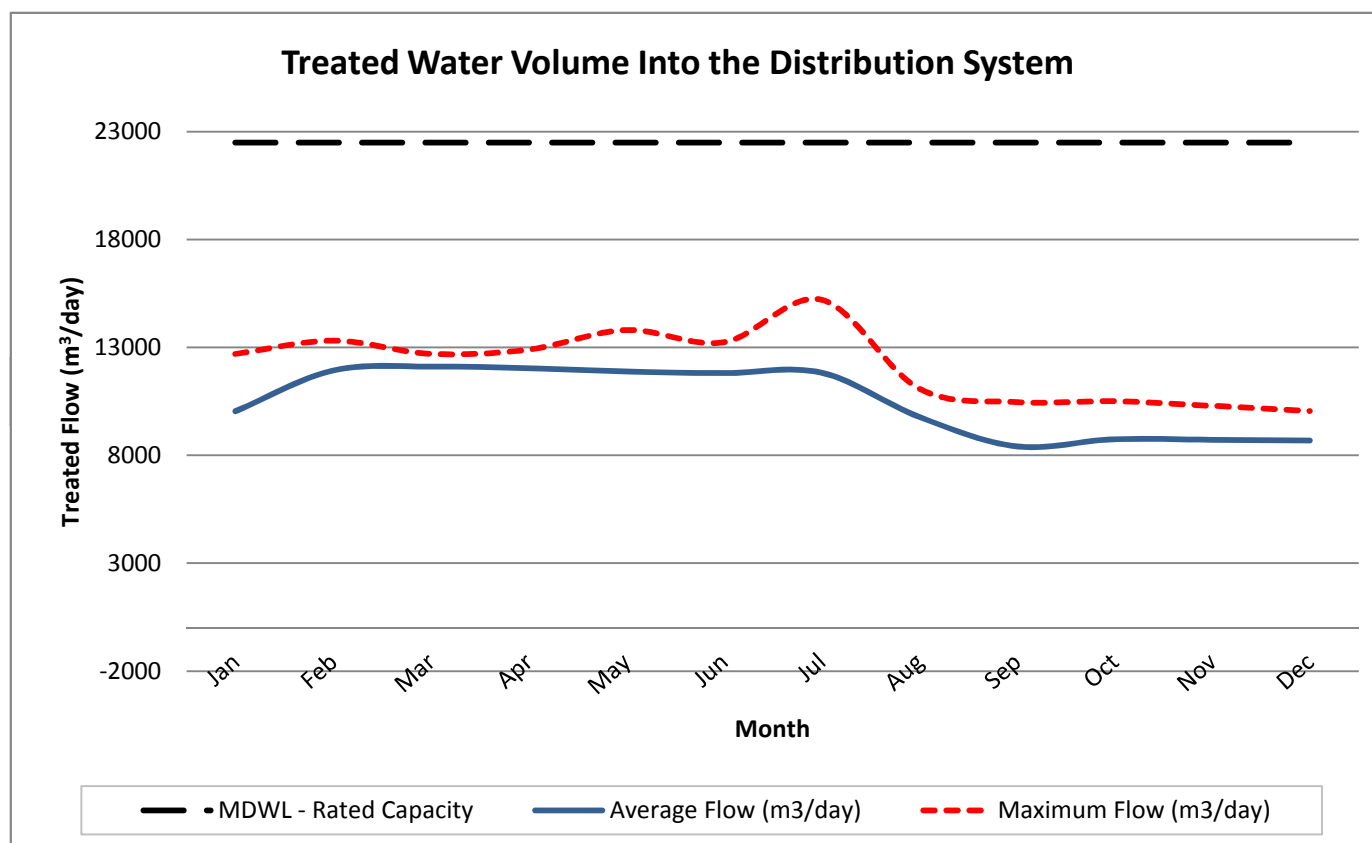
Schedule C, Section 1.1 of MDWL No. 214-101 states that the maximum daily volume of treated water that flows from the treatment subsystem to the distribution system shall not exceed a maximum flow rate of 22,500 m<sup>3</sup> on any calendar day. The Kirkland Lake DWS complied with this limit having a recorded maximum volume of 15,219 m<sup>3</sup>/day on July 12<sup>th</sup>.

Figure 1 compares the average and maximum treated flow rates to the rated capacity of the system identified in the MDWL. This information enables the Owner to assess the system's existing and future planned water usage needs.

Figure 2 provides water usage information for the community of Swastika.

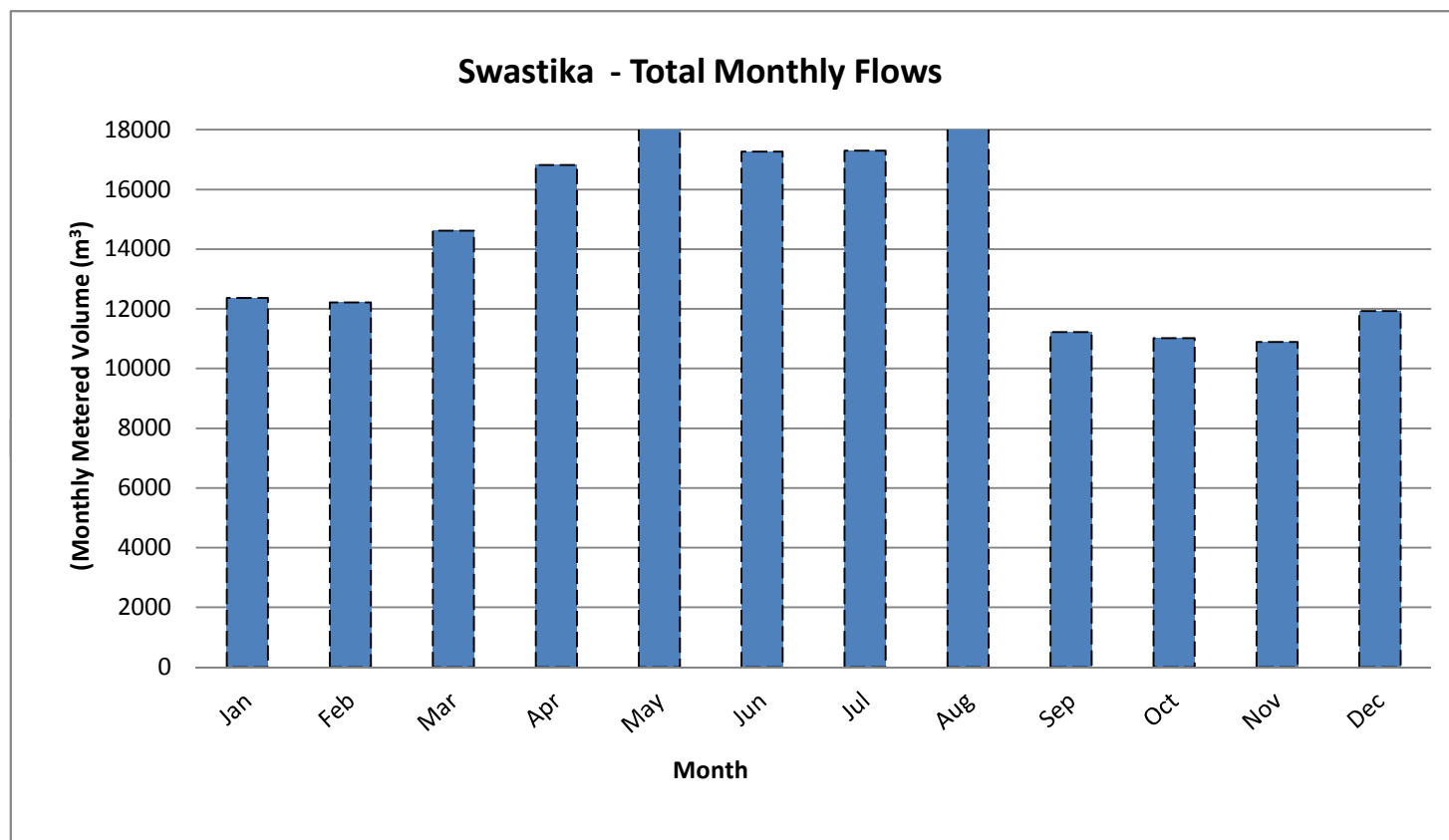
**Figure 1: 2015 - Daily Volume of Treated Water into the Distribution System**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Flow (m <sup>3</sup> /day)	10038	11928	12106	12030	11880	11806	11827	9780	8410	8744	8714	8688
Maximum Flow (m <sup>3</sup> /day)	12705	13320	12712	12902	13814	13245	15219	11101	10473	10511	10299	10056
MDWL - Rated Capacity	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500	22500
% Rated Capacity	56	59	56	57	61	59	68	49	47	47	46	45



**Figure 2: 2015 - Town of Swastika Water Usage**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Summary
<i>Average Flow (m<sup>3</sup>/day)</i>	399	436	472	560	619	576	558	599	374	355	363	385	<b>471</b>
<i>Maximum Flow (m<sup>3</sup>/day)</i>	431	501	496	664	843	651	614	631	618	370	584	432	<b>843</b>
<i>Monthly Volume (m3)</i>	12366	12217	14617	16814	19194	17268	17295	18561	11222	11016	10887	11923	<b>173380</b>





## 4.0 CONCLUSION

In 2015, the Kirkland Lake drinking water system (DWS) provided safe and reliable drinking water to the communities of Kirkland Lake, Chaput Hughes and Swastika while meeting the terms and conditions outlined in its site specific drinking water works permit and municipal drinking water licence.

The system was able to operate within the rated capacity of the licence while meeting the community's demand for water use, however it exceeded the maximum allowable flow rate specified in its permit on July 8<sup>th</sup> during a major water main break.

The system also failed to immediately report an adverse test result as required under Ontario Regulation 170-03. A verbal report was made to the local MOH and Ministry's Spills Action Center approximately four hours after the adverse result was detected. Training was provided to all operational staff to ensure adverse incidents are reported in a manner that meets the requirements of the regulation.



# **APPENDIX A**

## Monthly Summary of Microbiological Test Results

## MONTHLY MICROBIOLOGICAL REPORT

Facility Org Number:	1298
Facility Works Number:	220000308
Facility Name:	<b>KIRKLAND LAKE DRINKING WATER SYSTEM</b>
Facility Owner:	Municipality: Town of Kirkland Lake
Facility Classification:	Class 3 Water Treatment
Service Population:	9000
Total Design Capacity:	22500.0 m3/day
From:	01/01/2015 to 31/12/2015

	01/2015	02/2015	03/2015	04/2015	05/2015	06/2015	07/2015	08/2015	09/2015	10/2015	11/2015	12/2015	Total	Avg	Max	Min													
<b>Raw Water</b>																													
Gull Lake / Total Coliform: TC - cfu/100mL																													
Count Lab		4		4		5		4		5		5		4		53													
Max Lab		18		42		18		44		26		88				88													
Mean Lab		8	<	17.5		7.6		30		19.5		26.4	<	8	<	7.2	23.2	<	40.5		38		70.5		<	24.302			
Min Lab		4	<	2		2		10		12		6	<	2	<	2		2	<	2		22		54				<	2
Gull Lake / E. Coli: EC - cfu/100mL																													
Count Lab		4		4		5		4		5		5		4		5		4		5		4		53					
Max Lab	<	2	<	2	<	2	<	2	<	2	<	4		8		10	<	2		4	<	2				<	10		
Mean Lab	<	2	<	2	<	2	<	2	<	2	<	2.5	<	3.6	<	3.6	<	2	<	2.4	<	2		<	2.377				
Min Lab	<	2	<	2	<	2	<	2	<	2	<	2	<	2	<	2	<	2	<	2	<	2					<	2	

***Treated Water***

Treated Water (POE) / Total Coliform: TC - cfu/100mL																										
Count Lab		4		4		5		4		4		5		5		4		5		4		53				
Max Lab	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0				<	0	
Mean Lab	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0		<	0			
Min Lab	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0					<	0
Treated Water (POE) / E. Coli: EC - cfu/100mL																										
Count Lab		4		4		5		4		4		5		5		4		5		4		53				
Max Lab	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0				<	0	
Mean Lab	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0		<	0			
Min Lab	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0	<	0					<	0
Treated Water (POE) / HPC - cfu/mL																										
Count Lab		4		4		5		4		4		5		5		4		5		4		53				
Max Lab	<	10	<	10	<	10	<	10	<	10	<	130	<	10	<	10		20	<	10				<	130	
Mean Lab	<	10	<	10	<	10	<	10	<	10	<	34	<	10	<	10	<	12	<	10		<	12.453			
Min Lab	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10					<	10

### ***Distribution System Water***

[illegible]



Facility Org Number:	1298
Facility Works Number:	220000308
Facility Name:	KIRKLAND LAKE DRINKING WATER SYSTEM
Facility Owner:	Municipality: Town of Kirkland Lake
Facility Classification:	Class 3 Water Treatment
Service Population:	9000
Total Design Capacity:	22500.0 m3/day
From:	01/01/2015 to 31/12/2015

		01/2015	02/2015	03/2015	04/2015	05/2015	06/2015	07/2015	08/2015	09/2015	10/2015	11/2015	12/2015	Total	Avg	Max	Min
Distribution System Water																	
KL-3 / HPC - cfu/mL																	
Count Lab		2	2	2	1	2	1	1	3	1	2	3	1	21			
Max Lab		290	160	220	30	290	110	140	280	350	280	110	< 10			< 350	
Mean Lab		165	120	170	30	185	110	140	173.333	350	220	60	< 10		< 150.5		
Min Lab		40	80	120	30	80	110	140	50	350	160	20	< 10				< 10
KL-4 / Total Coliform: TC - cfu/100mL																	
Count Lab		4	4	5	4	4	5	4	5	4	4	6	4	53			
Max Lab	<	0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0			< 0	
Mean Lab	<	0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0		< 0		
Min Lab	<	0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0				< 0
KL-4 / E. Coli - cfu/100mL																	
Count Lab		4	4	5	4	4	5	4	5	4	4	6	4	53			
Max Lab	<	0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0			< 0	
Mean Lab	<	0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0		< 0		
Min Lab	<	0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0				< 0
KL-4 / HPC - cfu/mL																	
Count Lab		3	1	2	1	3	1	1	2	2	2	1	2	21			
Max Lab	<	10	60	< 10	< 10	< 10	< 10	50	< 10	50	740	70	< 10			< 740	
Mean Lab	<	10	60	< 10	< 10	< 10	< 10	50	< 10	< 30	< 375	70	< 10		< 53.81		
Min Lab	<	10	60	< 10	< 10	< 10	< 10	50	< 10	< 10	< 10	70	< 10				< 10
KL-5 / Total Coliform: TC - cfu/100mL																	
Count Lab		4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	<	0	< 1	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0			< 0	
Mean Lab	<	0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0		< 0		
Min Lab	<	0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0				< 0
KL-5 / E. Coli - cfu/100mL																	
Count Lab		4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	<	0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0			< 0	
Mean Lab	<	0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0		< 0		
Min Lab	<	0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0				< 0
KL-5 / HPC - cfu/mL																	
Count Lab		2	1	2	2	2	2	2	2	2	1	2	2	22			
Max Lab	<	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10			< 10	
Mean Lab	<	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		< 10		
Min Lab	<	10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10				< 10

MONTHLY MICROBIOLOGICAL REPORT

Facility Org Number:1298

Facility Works Number:220000308

Facility Name:KIRKLAND LAKE DRINKING WATER SYSTEM

Facility Owner:Municipality: Town of Kirkland Lake

Facility Classification:Class 3 Water Treatment

Service Population:9000

Total Design Capacity:22500.0 m3/day

From:01/01/2015 to 31/12/2015

	01/2015	02/2015	03/2015	04/2015	05/2015	06/2015	07/2015	08/2015	09/2015	10/2015	11/2015	12/2015	Total	Avg	Max	Min
Distribution System Water																
KL-6 / Total Coliform: TC - cfu/100mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0			< 0	
Mean Lab	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0		< 0		
Min Lab	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0				< 0
KL-6 / E. Coli - cfu/100mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0			< 0	
Mean Lab	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0		< 0		
Min Lab	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0				< 0
KL-6 / HPC - cfu/mL																
Count Lab	1	2	3	2	1	3	2	1	2	2	2	2	23			
Max Lab	< 10	< 10	> 1500	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10			? 1500	
Mean Lab	< 10	< 10	> 506.667	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		? 74.783		
Min Lab	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10				< 10
KL-7 / Total Coliform: TC - cfu/100mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0			< 0	
Mean Lab	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0		< 0		
Min Lab	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0				< 0
KL-7 / E. Coli - cfu/100mL																
Count Lab	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max Lab	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0			< 0	
Mean Lab	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0		< 0		
Min Lab	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0	< 0				< 0
KL-7 / HPC - cfu/mL																
Count Lab	1	2	2	2	0	3	2	2	1	2	3	1	21			
Max Lab	< 10	< 10	< 10	< 10		< 10	80	50	< 10	< 10	< 10	< 10			< 80	
Mean Lab	< 10	< 10	< 10	< 10		< 10	45	30	< 10	< 10	< 10	< 10		< 15.238		
Min Lab	< 10	< 10	< 10	< 10		< 10	< 10	< 10	< 10	< 10	< 10	< 10				< 10



# **APPENDIX B**

## Monthly Summary of Operational Data

MONTHLY SUMMARY OF OPERATIONAL DATA

Facility Org Number:

1298

Facility Works Number:

220000308

Facility Name:

KIRKLAND LAKE DRINKING WATER SYSTEM

Facility Owner:

Municipality: Town of Kirkland Lake

Facility Classification:

Class 3 Water Treatment

Service Population:

9000

Total Design Capacity:

22500.0 m3/day

From:

01/01/2015 to 31/12/2015

		01/2015	02/2015	03/2015	04/2015	05/2015	06/2015	07/2015	08/2015	09/2015	10/2015	11/2015	12/2015	Avg	Max	Min
Filter 1 / Turbidity - NTU																
Max OL		0.2	0.12	0.06	0.08	0.35	0.11	0.54	0.07	0.18	2.03	2.26	0.11		2.26	
Mean OL		0.028	0.024	0.027	0.031	0.033	0.021	0.023	0.021	0.04	0.065	0.077	0.033	0.035		
Min OL		0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.04	0.03			0.02
Filter 2 / Turbidity - NTU																
Max OL		0.44	0.11	0.07	0.07	0.35	0.13	0.34	0.11	0.13	1	3.48	0.2		3.48	
Mean OL		0.05	0.031	0.03	0.036	0.035	0.027	0.034	0.035	0.058	0.088	0.112	0.049	0.049		
Min OL		0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.03	0.04	0.04	0.05	0.03			0.02
Filter 3 / Turbidity - NTU																
Max OL		0.38	0.12	0.07	0.1	0.43	0.47	0.46	0.2	0.34	1.57	3.98	0.2		3.98	
Mean OL		0.052	0.031	0.035	0.037	0.039	0.03	0.035	0.037	0.063	0.09	0.11	0.055	0.051		
Min OL		0.02	0.02	0.01	0.03	0.02	0.02	0.03	0.03	0.04	0.04	0.05	0.03			0.01
Filter 4 / Turbidity - NTU																
Max OL		0.18	0.11	0.07	0.1	0.35	0.32	0.91	0.07	0.3	3.68	3.69	0.2		3.69	
Mean OL		0.044	0.031	0.032	0.035	0.034	0.025	0.035	0.033	0.06	0.083	0.116	0.052	0.048		
Min OL		0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.04	0.04	0.03	0.03			0.02
Treated Water (POE) / CI Residual: Free - mg/L																
Max OL		1.97	1.77	2.46	1.65	2.78	3.43	1.87	1.68	1.85	3.11	3.18	2.31		3.43	
Mean OL		1.131	1.313	1.383	1.378	1.579	1.409	1.455	1.325	1.307	1.469	1.395	1.175	1.36		
Min OL		0.78	0.65	0.83	1.01	0.85	0.9	0.98	0.82	0.83	1.06	1.08	0.74			0.65

MONTHLY SUMMARY OF OPERATIONAL DATA

Facility Org Number: 1298  
Facility Works Number: 220000308  
Facility Name: KIRKLAND LAKE DRINKING WATER SYSTEM  
Facility Owner: Municipality: Town of Kirkland Lake  
Facility Classification: Class 3 Water Treatment  
Service Population: 9000  
Total Design Capacity: 22500.0 m3/day  
From: 01/01/2015 to 31/12/2015

	01/2015	02/2015	03/2015	04/2015	05/2015	06/2015	07/2015	08/2015	09/2015	10/2015	11/2015	12/2015	Total	Avg	Max	Min
<b>Distribution System</b>																
KL-3 / CI Residual: Free - mg/L																
Count IH	9	8	9	9	8	9	10	9	8	9	9	9	106			
Max IH	1.23	1.49	1.32	1.02	1.66	0.88	1.42	1.44	1.28	0.84	1.33	1.25			1.66	
Mean IH	0.803	1.066	0.906	0.878	0.918	0.796	0.69	0.719	0.634	0.461	0.973	0.668		0.789		
Min IH	0.44	0.76	0.37	0.61	0.45	0.61	0.38	0.45	0.35	0.28	0.27	0.13				0.13
KL-4 / CI Residual: Free - mg/L																
Count IH	9	8	9	9	8	9	9	9	8	9	9	9	105			
Max IH	1.09	1.40	1.01	1.30	1.35	1.20	1.33	0.99	0.96	1.11	1.07	1.49			1.49	
Mean IH	0.818	0.954	0.81	0.961	0.986	0.973	0.933	0.788	0.658	0.79	0.732	0.727		0.844		
Min IH	0.52	0.52	0.57	0.66	0.63	0.64	0.62	0.61	0.34	0.44	0.34	0.13				0.13
KL-5 / CI Residual: Free - mg/L																
Count IH	9	8	9	9	8	9	8	9	8	9	9	9	104			
Max IH	1.35	1.40	1.25	1.21	1.21	1.23	1.28	0.89	0.87	1.23	1.29	1.12			1.40	
Mean IH	0.77	0.928	0.966	0.957	0.941	0.916	0.885	0.624	0.656	0.814	0.919	0.766		0.845		
Min IH	0.17	0.56	0.54	0.78	0.66	0.51	0.47	0.42	0.38	0.14	0.46	0.35				0.14
KL-6 / CI Residual: Free - mg/L																
Count IH	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max IH	0.88	1.55	1.28	1.28	1.23	0.92	1.02	0.88	0.67	1.01	0.9	0.84			1.55	
Mean IH	0.713	1.035	1.084	1.07	0.88	0.748	0.712	0.738	0.53	0.798	0.812	0.793		0.827		
Min IH	0.56	0.81	0.72	0.87	0.51	0.58	0.51	0.56	0.38	0.66	0.69	0.73				0.38
KL-7 / CI Residual: Free - mg/L																
Count IH	4	4	5	4	4	5	4	5	4	4	5	4	52			
Max IH	0.99	1.26	1.02	0.99	1.33	1.07	1.29	0.85	1.02	1.04	1.11	0.87			1.33	
Mean IH	0.920	1.070	0.930	0.925	0.935	0.808	1.000	0.672	0.710	0.943	0.698	0.763		0.858		
Min IH	0.87	0.78	0.8	0.86	0.5	0.55	0.87	0.51	0.28	0.83	0.39	0.66				0.28
Chaput Hughes Standpipe / CI Residual: Free - mg/L																
Max OL	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02	2.02			2.02	
Mean OL	1.113	1.153	1.208	1.139	1.175	1.01	1.107	1.172	1.254	1.431	1.382	1.285		1.202		
Min OL	0.42	0.46	0.6	0.53	0.5	0.33	0.15	0.1	0.36	0.43	0.79	0.55				0.10
Swastika Booster Station / CI Residual: Free - mg/L																
Max OL	2.43	1.77	1.83	1.69	1.94	2.85	2.59	1.51	2.16	2.43	2.33	1.97			2.85	
Mean OL	1.201	1.202	1.098	1.246	1.181	1.064	1.291	0.807	1.027	1.127	0.986	1.053		1.107		
Min OL	0.32	0.64	0.09	0.16	0.17	0.2	0.27	0.34	0.16	0.23	0.17	0.1				0.09