Agenda Item # Page #

TO:	**CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON FEBRUARY 3, 2015**
FROM:	**JOHN LUCAS, P.ENG. DIRECTOR – WATER & WASTEWATER**
SUBJECT:	**2014 DRINKING WATER ANNUAL REPORT AND SUMMARY REPORT FOR THE CITY OF LONDON DISTRIBUTION SYSTEM**

RECOMMENDATION

That, on the recommendation of the Director, Water & Wastewater, the 2014 Drinking Water Annual Report and Summary Report for the City of London Distribution System **BE RECEIVED** for information.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

- Ministry of the Environment Inspection Report for the City of London Water Distribution System - 2013", presented to CWC on December 9, 2013, Agenda Item #7;
- "City of London 2013 Drinking Water Annual Report and Summary Report" presented to CWC on March 3, 2014. Agenda Item #4;

BACKGROUND

O. Reg. 170/03 (Drinking Water Systems) requires the owner of a municipal drinking water system to ensure that an Annual Report and a Summary Report be prepared, covering the period of January 1 through to December 31 of the previous year.

The Annual Report is to contain:

- A brief description of the drinking water system, including a list of water treatment chemicals used by the system;
- A summary of the results of required tests;
- A summary of any adverse test results reported and corrective actions taken; and
- A description of any major expenses incurred to install, repair or replace required equipment.

O. Reg. 170/03 further stipulates that:

a) The Owner shall ensure that a copy of the Annual Report is given without charge to every person who requests a copy;
b) Effective steps are taken to advise users of water from the system that copies of the Annual Report are available, without charge, and of how a copy may be obtained;
c) The Owner of a large municipal residential system serving more than 10,000 people is required to post a copy of the Annual Report to the municipality's web site; and,
d) A Summary Report is to be prepared and presented to the members of the Municipal Council by no later than March 31 of the following year.

The Summary Report is to contain:

- A list of any regulatory requirements applicable to the system that were not met at any time during the period covered by the report, the duration of the failure, and the measures that were taken to correct the failure; and,
- A summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average and maximum daily flows and compared to the rated capacity of the system.

Due to the large number of pages, the 2014 Drinking Water Summary Report for the City of London Distribution System has been provided to members of Council in electronic format, with

Agenda Item #	Page #

the 2014 Annual Report attached as an appendix. The Summary Report (without appendices) is attached as Appendix 'A' to this report.

The Elgin-Middlesex Pumping Station (EMPS - owned in part by the City of St. Thomas, the Town of Aylmer, and the City of London) was operated by the Ontario Clean Water Agency (OCWA) between January 1, 2014 and December 31, 2014. The Annual Report for the EMPS (London portion) was not yet available at the time of writing this report. Therefore, it will be provided to members of Council under separate memo prior to the reporting deadline of February 28.

SUMMARY

Receipt of Appendix 'A' of this report by members of Council fulfils the reporting requirements of O. Reg. 170/03, Schedule 22. The 2014 Drinking Water Summary Report is available to members of the public through the Water Engineering Division (8th Floor, City Hall), and will be posted on the City's web site.

Acknowledgements:

This report has been prepared with input from Scott Koshowski, P. Eng. - Environmental Services Engineer, and Dan Huggins - Water Quality Manager, both in Water Operations Division.

PREPARED BY:	**RECOMMENDED BY:**
JOHN SIMON, P.ENG. **DIVISION MANAGER, WATER OPERATIONS**	**JOHN LUCAS, P.ENG.** **DIRECTOR – WATER & WASTEWATER**
CONCURRED BY:	
JOHN BRAAM, P.ENG. **MANAGING DIRECTOR – ENVIRONMENTAL & ENGINEERING SERVICES & CITY ENGINEER**	

Appendix 'A' – City of London 2014 Drinking Water Summary Report

c.c. Cathy Saunders - City Clerk
John Simon – Division Manager – Water Operations
Roland Welker - Division Manager – Water Engineering
Andrew Henry - Division Manager – Regional Water Supply
Dan Huggins - Water Quality Manager
Dr. Christopher Mackie, Medical Officer of Health and Chief Executive Officer – Middlesex-London Health Unit

Agenda Item # Page #

APPENDIX 'A"

CITY OF LONDON
2014 DRINKING WATER SUMMARY REPORT

System Name: City of London Distribution System

Mailing Address: Corporation of the City of London
P.O. Box 5035, 300 Dufferin Ave.
London, ON N6A 4L9

System Rating: Water Distribution Subsystem Class IV
Water Treatment Subsystem Class II

Average Day Demand: 122.22 MLD
Peak Day Demand: 155.72 MLD (June 22, 2014)
Population Served: 370,000 (est.)
Source Water: Surface Water (Lake Huron, Lake Erie)
Drinking Water System Number: 260004917
Municipal Drinking Water Licence: 006-101

CONTACT INFO:
Owner:
Corporation of the City of London
300 Dufferin Avenue, London, Ontario N6A 4L9
Contact: Mr. John Simon, P.Eng. Division Manager Water Operations
519-661-2500 ext. 4938

London CANADA

Agenda Item # Page #

Table of Contents

Agenda Item # Page #

Reporting Requirements

Schedule 22-2 of O. Reg. 170/03 requires that the City of London prepare a Summary Report for its water works system for the preceding calendar year and submit it to the members of the Municipal Council by March 31 of each year. This report, presented to Municipal Council's Civic Works Committee on February 3, 2015 serves to fulfill that requirement.

On February 27, 2015, a copy of the 2014 Annual Report and Summary Report for the City of London's water works will be submitted to the local office of the Ministry of the Environment and Climate Change (MOECC) as a courtesy for information purposes.

The Elgin-Middlesex Pumping Station (EMPS - owned in part by the City of St. Thomas, the Town of Aylmer, and the City of London) was operated by the Ontario Clean Water Agency (OCWA) between January 1, 2014 and December 31, 2014. The Annual Report for the EMPS (London portion) was not yet available at the time of writing this report, and therefore will be provided to members of Council under separate memo prior to the reporting deadline of February 28.

Ministry of the Environment and Climate Change Annual Inspection (MOECC)

MOECC inspections can be in the form of comprehensive inspections, or focused inspections. The MOECC reported that London's Water Distribution System was chosen for a focused inspection in 2014 because:

"…inspection findings over the past three years were such that the number of violations were minimal or non-existent, there were few or no orders issued to you that were of significance in the maintenance of water potability and there were no deficiencies as defined in O. Reg. 172/03."

This year's MOECC inspection included staff interviews and facility inspections, as well as a review of operating procedures, water analysis reports, operational records, and staff certification and training records. The inspection covered all components of London's water system, including the London portion of the Elgin-Middlesex Pumping Station, which is operated by the Ontario Clean Water Agency under contract to the City of London.

On December 10, 2014, the MOECC issued the City of London Water Distribution System Inspection Report. The report summarizes all of the inspection findings, and lists any incidents of non-compliance with regulatory requirements. The City of London received a Final Inspection Rating of 98.98% for 2014.

A report on this MOECC Inspection is being made to the Civic Works Committee on February 3, 2015.

Water Operations Staff Complement and Training

In 2014, the distribution system was operated and maintained by four (4) Water Supply staff, thirty-one (31) Operations and Maintenance staff, three (3) Water Works Inspectors, nine (9) Meter Shop staff, five (5) Supervisors, two (2) Technologists, two (2) Administrative staff, and four (4) Management staff. This complement does not include senior administrative staff that work in the Water Service Area. The majority of the City of London's operational and maintenance staff are based at the A.J. Tyler Operations Centre, located at 663 Bathurst Street. Water Supply staff are based out of the London Hydro building at 111 Horton Street.

All employees with Drinking Water Operator Certificates receive a minimum of 14 hours of Director-approved training and an additional 36 hours of practical, on-the-job training each year, as mandated by Regulation.

Agenda Item # Page #

Water Budget

Water rate increases have been 8% (2013), 8% (2014), and 7% (2015). These increases position the Water Service Area to reach financial sustainability by 2016, 2 years earlier than previously anticipated. The target for future rate increases is inflation, assumed to be 3%.

The total Water budget for 2014 was $69.6 million, which includes long term infrastructure renewal and replacement plans. The Water Budget helps maintain *London's Advantage* of a safe, clean and secure water supply. The Water Service Area remains proactive in initiatives to ensure that this service continues to meet the demands and expectations of customers. Existing infrastructure requires significant renewal (replacement and rehabilitation) work to close the infrastructure gap ensuring future generations and businesses are not faced with a water system that is failing, unreliable, and expensive to maintain.

For information regarding the 2015 Water Budget, please refer to the 2015 Water Service Area Business Plan and 2015 budget.

Emerging Trends in Water Treatment & Regulations

Water Treatment: The City of London purchases its treated drinking water from the Joint Boards of Management (Lake Huron and Elgin Area Primary Water Supply Systems). The Joint Boards of Management, through the Regional Water Supply Division, stay abreast of emerging trends in water treatment and monitor upcoming Regulations. Current areas of interest include Microbiological (E. coli and Total Coliform), Disinfection By-Products (Trihalomethane -THM, Haloacetic Acids – HAA), Lead and Copper, and Emerging Pathogens and Chemicals).

Currently, there are no water quality concerns requiring process modification at the Regional Water Supply treatment facilities. The area of emerging contaminants including pharmaceuticals and personal care products (PPCP's) and endocrine disruptors (EDC's) will be the focus of much research in the coming decades. At this time, there is no evidence to suggest that the Joint Board of Management should conduct further investigations into the implementation of advanced or enhanced treatment processes at either the Lake Huron or Elgin Area Treatment Plants.

For further information on emerging trends in water treatment and Regulations, refer to the Lake Huron and Elgin Area Water Supply Systems Master Plans, which can be found at http://www.watersupply.london.ca/reports.html .

Standard of Care Provision in Ontario's Safe Drinking Water Act, 2002: On December 31, 2012, Section 19 of the *Safe Drinking Water Act, 2002* came into force. It imposed a statutory standard of care on the "owner of a municipal drinking water system, and every person who, on behalf of the municipality, oversees the accredited operating authority of the system or exercises decision-making authority over the system". This standard of care requires that such persons: (a) exercise the level of care, diligence and skill in respect of a municipal drinking water system that a reasonably prudent person would be expected to exercise in a similar situation; and, (b) act honestly, competently and with integrity, with a view to ensuring the protection and safety of the users of the municipal drinking water system.

Actions that can be taken to satisfy the standard of care requirement include: obtaining and following proper expert advice, and ensuring that the water system is operated by an accredited operating authority. As has been previously reported to Council, the City of London Water Operations and Water Engineering Divisions have been recognized as an accredited operating authority for the City of London Water System.

For more information regarding the Standard of Care provision, a full report was presented to Civic Works Committee on October 22, 2012. Standard of Care training for Councillors and managers was made available in early 2015.

Proposed Changes to O. Reg. 169/03: Ontario has established a comprehensive safety net for drinking water that starts at the source and continues until you turn on your tap. This multi-barrier approach includes an extensive network of safeguards to help prevent contamination, detect and solve water quality problems, enforce laws and regulations, and increase people's awareness of the importance of safe and high quality drinking water. The safety net for drinking water includes strong legislation, stringent standards, regular and reliable testing, highly trained

Agenda Item # Page #

operators, regular inspections, and the most comprehensive source protection program in the country, all working together to protect the safety of our drinking water.

The MOECC is proposing new regulatory amendments to Schedule 2 of Ontario Regulation 169/03 to adopt new Ontario Drinking Water Quality Standards for chlorate, chlorite, 2-methyl-4-chlorophenoxyacetic acid (MCPA), and haloacetic acids (HAAs), and to revise the existing Ontario Drinking Water Quality Standards for arsenic, benzene, carbon tetrachloride, and vinyl chloride.

The proposal includes four new Ontario Drinking Water Quality Standards based on new federal guidelines, as well as revisions to four existing standards. These changes are consistent with the purpose of Ontario's Drinking Water safety net and would ensure Ontario's drinking water quality standards are either in keeping with the national drinking water quality guidelines or are more stringent.

The proposal includes revising the current Ontario Drinking Water Quality Standard for Maximum Allowable Concentration (MAC) for:

- Arsenic from 0.025 mg/L to a more stringent value of 0.010 mg/L;
- Carbon tetrachloride from 0.005 mg/L to a more stringent value of 0.002 mg/;
- Benzene from 0.005 mg/L to a more stringent value of 0.001 mg/L;
- Vinyl Chloride from 0.002 mg/L to a more stringent value of 0.001 mg/L;

For London, these parameters, when sampled return results far less than the proposed levels. London's drinking water measures at, or very near, to the detectable limit capabilities of the Ministry certified laboratory equipment.

Adopting new Ontario Drinking Water Quality Standards for:

- Chlorite of 1 mg/L;
- Chlorate of 1 mg/L;
    - London has never tested for Chlorite or Chlorate. There is no reason to suspect that they would be present in any significant quantity in London's drinking water because these compounds are by-products of drinking water disinfection with chlorine dioxide, which isn't used by the Regional Water System or London.
- 2-Methyl-4-chlorophenoxyacetic acid (MCPA) of 0.1 mg/L;
    - MCPA is a common herbicide in the agricultural sector. London always has non-detects for the pesticides and herbicides that are already tested for – no reason to expect anything different for MCPA;
- Haloacetic acids of 0.080 mg/L (as an annual average of quarterly samples);
    - HAA's, like THM's, are a by-product of drinking water disinfection with chlorine. Quarterly sampling for THM's is already undertaken, sampling for HAA's will be at the same time.

The additional sampling for Chlorite, Chlorate, MCPA and HAAs will cost the London approximately $1,000 per year. It is not anticipated that these new and revised standards will have a significant impact on London's Water Service Area.

Algal Blooms in the Great Lakes: Algal blooms usually occur in the late summer and early fall. A bloom is a large mass of algae that is formed as a result of a number of ecosystem changes. These changes are brought about by an elevated presence of nutrients, invasive species such as quagga mussels, or light and temperature conditions that are favourable for the algae to multiply quickly.

There is more than one variety of algae. When alive they provide food for a variety of fish. When algae blooms die, some of the varieties release odorous chemicals into the water that can affect the taste and/or smell of our drinking water. Others, such as some types of blue-green algae (cyanobacteria), release toxins that can cause health issues for humans and animals. As such, algae blooms have the potential to negatively impact drinking water quality, recreational activities, tourism, commercial fisheries and lakeshore property values.

The MOECC has a protocol in place for responding to occurrences of blue-green algal blooms in Ontario lakes. Ministry staff work closely with the local Medical Officers of Health to ensure that timely, appropriate action is taken. Local Medical Officers of Health are responsible for managing public health concerns with respect to blue-green algal blooms, and communicate with consumers and drinking water system owners within their area.

Agenda Item # Page #

A survey conducted by Ministry staff for cyanobacterial toxins at 18 drinking water facilities from 2004 to 2010, suggests that water treatment plants have been effective at removing or inactivating these toxins in drinking water.

The recurrence of algal blooms in certain areas of the Great Lakes, such as Lake Erie, has prompted discussions with the International Joint Commission, federal, state and other Provincial governments as well as non-government bodies to improve the ecological conditions of our Great Lakes.

OnWARN: Ontario Water/Wastewater Agency Response Network: This initiative, based upon the principle of "*Utilities helping Utilities*", has gained momentum throughout the water utility sector in Ontario, Canada and the United States, as a means of providing voluntary mutual-aid to similar utilities within a region. The OnWARN program establishes a legal framework whereby any subscribing utility can call upon the assistance of other subscribing utilities, with the response being provided within the context of a blanket "mutual aid" type of agreement. The blanket agreement covers all aspects of legal liability, availability of response and the provision of services, and health and safety requirements, to name a few.

Participation in the OnWARN program does not specifically require a subscribing municipality to respond to any and all calls for assistance, nor does it obligate a subscribing municipality to call upon all subscribers for assistance in the event of an emergency. It also does not require a municipality to formally declare a state of emergency, only that the water or wastewater related circumstance is beyond the capabilities of the municipality.

Recognizing the significant benefit of joining OnWARN and improving emergency preparedness for the City's water and wastewater services, the City of London received its membership certificate on September 11, 2013. More information can be found from the February 25, 2013 Civic Works Committee Report (Item #14).

Sampling & Water Quality Monitoring

During 2014, the MOECC required large municipal drinking water systems to sample their water for 70 different organic, inorganic and chemical parameters. The City of London's water sampling regime consists of staff taking monthly samples from 57 standard locations across the City, testing for microbiological indicators and chlorine residuals. In addition, analysis is performed for up to 122 parameters, including organics, inorganics, chemicals, pesticides and metals at 13 standard locations around the City. This far exceeds the MOECC's minimum sampling requirements. 9,254 routine grab samples were taken from the distribution system, 736 samples taken from the stand-by wells, as well as nearly 2,800 chlorine residual tests conducted by London staff. London also has 10 locations throughout the City where continuous in-line sampling of chlorine residual is monitored. Staff also perform approximately 4,000 chlorine tests (on the Distribution System and for Construction Projects and Bacteriological sampling upon repairs undertaken) each year that are not included in the above numbers. All of these efforts help ensure that the water within the distribution system is always of high quality.

Parameter	ODWS[1] Maximum Acceptable Concentration (MAC)	Lab's Method Detection Limit (MDL)	Units	Measured Concentrations	MAC Exceedence in 2014 (Y/N)	Historical Measured Concentration Range[2]
		2014		2014		
REGULATED INORGANICS						
Antimony	6	0.003	mg/L	**0.003 - <MDL**	No	0.003 - 1.200
Arsenic	25	1	µg/L	**1.000 - 1.000**	No	0.001 - 2.000
Barium	1000	0.05	µg/L	**13.600 - 20.400**	No	0.015 - 25.000
Boron	5000	1	µg/L	**16.000 - 19.000**	No	0.020 - 40.000
Cadmium	5	0.2	µg/L	**0.200 - <MDL**	No	0.002 - 0.200
Chromium	50	0.5	µg/L	**2.000 - 2.000**	No	0.004 - 3.000
Fluoride	1.5	0.06	mg/L	**0.000 - 0.840**	No	0.030 - 1.390
Free Chlorine Residual	--	--	mg/L	**0.080 - 1.800**	No	0.000 - 2.200
Lead	10	0.02	µg/L	**0.500 - 0.690**	No	0.002 - 1.070
Mercury	1	0.02	µg/L	**0.020 - <MDL**	No	0.020 - 0.100
Selenium	10	1	µg/L	**1.000 - <MDL**	No	0.005 - 3.000
Sodium[3]	20	0.01	mg/L	**8.550 - 14.200**	No	1.000 - 20.300
Uranium	20	0.001	µg/L	**0.500 - 0.500**	No	0.001 - 9.700

Agenda Item # Page #

Parameter	ODWS[1] Maximum Acceptable Concentration (MAC)	Lab's Method Detection Limit (MDL) 2014	Units	Measured Concentrations 2014	MAC Exceedence in 2014 (Y/N)	Historical Measured Concentration Range[2]
REGULATED ORGANICS						
Alachlor	5	0.500	µg/L	**0.500 <MDL**	No	0.002 - 0.500
Aldicarb	9	2.000	µg/L	**2.000 <MDL**	No	0.005 - 5.000
Aldrin + Dieldrin	0.7	0.070	µg/L	**0.070 <MDL**	No	0.000 - 0.070
(Aldrin)	--	0.010	µg/L	**N/A - N/A**	N/A	0.010 - 0.060
(Dieldrin)	--	0.010	µg/L	**N/A - N/A**	N/A	0.001 - 0.067
Atrazine	--	0.020	µg/L	**N/A - N/A**	N/A	0.020 - 0.130
Atrazine + N-dealkylated metabolites	5	1.000	µg/L	**1.000 <MDL**	No	0.003 - 1.000
Azinphos-methyl	20	2.000	µg/L	**2.000 <MDL**	No	0.010 - 2.000
Bendiocarb	40	2.000	µg/L	**2.000 <MDL**	No	0.010 - 3.000
Benzene	5	0.200	µg/L	**0.200 <MDL**	No	0.005 - 0.500
Benzo(a)pyrene	0.01	0.010	µg/L	**0.010 <MDL**	No	0.000 - 0.010
Bromoxynil	5	0.500	µg/L	**0.500 <MDL**	No	0.003 - 0.500
Carbaryl	90	5.000	µg/L	**5.000 <MDL**	No	0.010 - 5.000
Carbofuran	90	5.000	µg/L	**5.000 <MDL**	No	0.005 - 5.000
Carbon tetrachloride	5	0.200	µg/L	**0.200 <MDL**	No	0.005 - 0.410
Chlordane (Total)	7	0.700	µg/L	**0.700 <MDL**	No	0.000 - 0.700
(a-chlordane)	--	0.010	µg/L	**N/A - N/A**	N/A	0.007 - 0.200
(g-chlordane)	--	0.010	µg/L	**N/A - N/A**	N/A	0.007 - 0.200
(oxychlordane)	--	0.010	µg/L	**N/A - N/A**	N/A	0.010 - 0.360
Chlorpyrifos	90	1.000	µg/L	**1.000 <MDL**	No	0.008 - 5.000
Cyanazine	10	1.000	µg/L	**1.000 <MDL**	No	0.008 - 1.000
Diazinon	20	1.000	µg/L	**1.000 <MDL**	No	0.002 - 2.000
Dicamba	120	1.000	µg/L	**1.000 <MDL**	No	0.050 - 10.000
1,2-Dichlorobenzene	200	0.500	µg/L	**0.500 <MDL**	No	0.003 - 1.000
1,4-Dichlorobenzene	5	0.500	µg/L	**0.500 <MDL**	No	0.001 - 0.500
DDT + Metabolites	30	3.000	µg/L	**3.000 <MDL**	No	0.005 - 3.000
(op-DDT)	--	0.010	µg/L	**N/A - N/A**	N/A	0.010 - 0.500
(pp-DDD)	--	0.010	µg/L	**N/A - N/A**	N/A	0.010 - 0.500
(pp-DDE)	--	0.010	µg/L	**N/A - N/A**	N/A	0.010 - 0.500
(pp-DDT)	--	0.010	µg/L	**N/A - N/A**	N/A	0.010 - 0.500
1,2-Dichloroethane	5	0.200	µg/L	**0.200 <MDL**	No	0.005 - 0.430
1,1-Dichloroethylene	14	0.100	µg/L	**N/A - N/A**	N/A	0.005 - 0.520
Dichloromethane	50	0.300	µg/L	**0.300 <MDL**	No	0.005 - 3.000
2,4-dichlorophenol	900	0.500	µg/L	**0.500 <MDL**	No	0.000 - 0.500
2,4-D	100	1.000	µg/L	**1.000 - 5.000**	No	0.044 - 5.000
Diclofop-methyl	9	0.900	µg/L	**0.900 <MDL**	No	0.005 - 0.900
Dimethoate	20	2.500	µg/L	**2.500 <MDL**	No	0.005 - 2.500
Dinoseb	10	1.000	µg/L	**1.000 <MDL**	No	0.005 - 1.000
Diquat	70	5.000	µg/L	**5.000 <MDL**	No	1.000 - 70.000
Diuron	150	10.000	µg/L	**10.000 <MDL**	No	0.030 - 10.000
Glyphosate	280	0.020	µg/L	**0.020 <MDL**	No	0.010 - 25.000
Heptachlor + Heptachlor Epoxide	3	0.300	µg/L	**0.300 <MDL**	No	0.001 - 0.300
(heptachlor)	--	0.010	µg/L	**N/A - N/A**	N/A	0.010 - 0.300
(heptachlor epoxide)	--	0.010	µg/L	**N/A - N/A**	N/A	0.010 - 0.300
Lindane (Total)	4	0.010	µg/L	**0.400 <MDL**	No	0.002 - 0.400
Malathion	190	5.000	µg/L	**5.000 <MDL**	No	0.020 - 5.000
Methoxychlor	900	90.000	µg/L	**90.000 <MDL**	No	0.010 - 90.000
Metolachlor	50	2.000	µg/L	**2.000 <MDL**	No	0.008 - 5.000
Metribuzin	80	2.000	µg/L	**2.000 <MDL**	No	0.020 - 5.000
Monochlorobenzene	80	0.200	µg/L	**N/A - N/A**	N/A	0.005 - 5.000
Paraquat	10	1	µg/L	**1.000 <MDL**	No	0.010 - 9.000
Parathion	50	1.000	µg/L	**1.000 <MDL**	No	0.020 - 3.000
Pentachlorophenol	60	0.500	µg/L	**0.500 <MDL**	No	0.001 - 1.000

Agenda Item # Page #

Parameter	ODWS[1] Maximum Acceptable Concentration (MAC)	Lab's Method Detection Limit (MDL) 2014	Units	Measured Concentrations 2014	MAC Exceedence in 2014 (Y/N)	Historical Measured Concentration Range[2]
REGULATED ORGANICS CONTINUED						
Phorate	2	0.500	µg/L	**0.500 <MDL**	No	0.001 - 0.730
Picloram	190	5.000	µg/L	**5.000 <MDL**	No	0.043 - 5.000
Polychlorinated Biphenyls (PCBs)	3	0.200	µg/L	**0.200 <MDL**	No	0.001 - 0.200
Prometryne	1	0.250	µg/L	**0.250 <MDL**	No	0.001 - 0.250
Simazine	10	1.000	µg/L	**1.000 <MDL**	No	0.005 - 1.000
Temephos	280	10.000	µg/L	**10.000 <MDL**	No	0.010 - 15.000
Terbufos	1	0.500	µg/L	**0.500 <MDL**	No	0.001 - 0.730
Tetrachloroethylene	30	0.200	µg/L	**N/A - N/A**	N/A	0.005 - 1.000
2,3,4,6-tetrachlorophenol	100	0.500	µg/L	**0.500 <MDL**	No	0.001 - 0.500
Triallate	230	1.000	µg/L	**1.000 <MDL**	No	0.010 - 10.000
Trichloroethylene	5.000	0.200	µg/L	**0.200 <MDL**	No	0.005 - 1.000
2,4,6-trichlorophenol	5	0.500	µg/L	**0.500 <MDL**	No	0.001 - 0.890
2,4,5-T	280	1.000	µg/L	**1.000 <MDL**	No	0.005 - 10.000
Trifluralin	45	2.000	µg/L	**2.000 <MDL**	No	0.020 - 2.000
Vinyl Chloride	2	0.200	µg/L	**0.200 <MDL**	No	0.002 - 0.200

Parameter	ODWS[1] Maximum Acceptable Concentration (MAC)	Lab's Method Detection Limit (MDL) 2014	Units	Measured Concentrations 2014	MAC Exceedence in 2014 (Y/N)	Historical Measured Concentration Range[2]
NITRATES						
Nitrate (as nitrogen)	10	0.013	mg/L	**0.142 - 0.495**	No	0.005 - 1.700
Nitrate + Nitrite (as nitrogen)	10	0.013	mg/L	**0.142 - 0.495**	No	0.005 - 1.700
Nitrite (as nitrogen)	1	0.003	mg/L	**0.003 - 0.100**	No	0.003 - 0.129

Parameter	ODWS[1] Maximum Acceptable Concentration (MAC)	Lab's Method Detection Limit (MDL) 2014	Units	Measured Concentrations 2014	MAC Exceedence in 2014 (Y/N)	Historical Measured Concentration Range[2]
TRIHALOMETHANES						
Trihalomethanes (total)	100	0.37	µg/L	**0.500 - 58.000**	No	0.010 - 58.000
Bromoform	--	0.100	µg/L	**0.300 - 0.340**	No	0.002 - 2.000
Chloroform	--	0.200	µg/L	**0.200 - 37.000**	No	0.002 - 39.000
Dibromochloromethane	--	0.200	µg/L	**0.200 - 6.500**	No	0.002 - 6.500
Bromodichloromethane	--	0.200	µg/L	**0.200 - 13.000**	No	0.002 - 13.000

Parameter	ODWS[1] Maximum Acceptable Concentration (MAC)	Lab's Method Detection Limit (MDL) 2014	Units	Measured Concentrations 2014	MAC Exceedence in 2014 (Y/N)	Historical Measured Concentration Range[2]
MICROBIOLOGICAL						
E. Coli	0	0	CFU/100mL	**0 - 1**	Yes	0 - 1
Total Coliform	0	0	CFU/100mL	**0 - 11**	Yes	0 - 41
Heterotrophic Plate Count	--	10	cfu/1mL	**0 - 1480**	No	10 - 2000

Agenda Item # Page #

Parameter	ODWS[1] Maximum Acceptable Concentration (MAC)	Lab's Method Detection Limit (MDL) 2014	Units	Measured Concentrations 2014	MAC Exceedence in 2014 (Y/N)	Historical Measured Concentration Range[2]
NON-REGULATED INORGANICS/ORGANICS[4]						
Alkalinity	--	5.000	mg/L	**75.0 - 93.0**	No	61 - 103
Aluminum	--	0.004	mg/L	**0.019 - 0.026**	No	0.019 - 436.0
Ammonia+Ammonium (N)	--	0.020	mg/L	**0.020 <MDL**	No	0.010 - 0.400
4-Bromofluorobenzene	--	N/A	N/A	**106.00 - 112.00**	No	106.00 - 112.00
Calcium	--	0.050	mg/L	**27.500 - 33.600**	No	25.600 - 38.000
Chloride	--	0.200	mg/L	**9.270 - 17.800**	No	7.200 - 36.100
Chlorobenzene	80		µg/L	**0.100 - <MDL**	No	0.100 - 0.100
Chrysene-d12	--	--	%	**64.0 - 72.0**	No	64.0 - 72.0
Cobalt	--	0.001	mg/L	**0.001 - <MDL**	No	0.001 - 0.300
Colour	--	5.000	TCU	**5.000 <MDL**	No	3.000 - 5.000
Conductivity	--	2.000	uS/cm	**241.00 - 302.00**	No	205.00 - 341.00
Copper	--	0.003	mg/L	**0.002 - 0.004**	No	0.002 - 64.000
Cyanide	0	0.002	mg/L	**0.002 <MDL**	No	0.002 - 0.010
DCAA (Herbicide Surrogate)	--	--	%	**58.00 - 120.00**	No	58.000 - 120.00
Decachlorobiphenyl (OC Pesticide Surrogate)	--	--	%	**100.00 - 122.00**	No	100.00 - 122.00
1,1 Dichloroethene	14	0.200	µg/L	**0.200 <MDL**	No	0.200 - 0.200
De-ethylated atrazine	--	1.000	µg/L	**1 <MDL**	No	0.010 - 1.0
Dissolved Organic Carbon	--	0.500	mg/L	**1.300 - 2.300**	No	0.400 - 2.300
Ethylbenzene	--	0.100	µg/L	**0.100 <MDL**	No	0.002 - 1.000
Field pH	--	--	pH units	**0.100 <MDL**	No	0.100 - 8.330
field temp	--	--	deg celcius	**N/A - N/A**	N/A	5.200 - 22.500
Gross Alpha	--	0.100	Bq/l	**N/A - N/A**	N/A	0.100 - 0.1
Gross Beta	--	0.100	Bq/l	**N/A - N/A**	N/A	0.10 - 0.1
Hardness	--	10.000	mg/L	**101.00 - 118.00**	No	95.000 - 133.00
Iron	--	0.010	mg/L	**0.005 - 0.010**	No	0.005 - 90.000
Langolier's Index	--	N/A	N/A	**-0.110 - 0.090**	No	-1.070 - 0.090
m/ p-xylene	--	0.200	µg/L	**0.200 <MDL**	No	0.200 - 5.000
Magnesium	--	0.050	mg/L	**7.790 - 8.380**	No	7.150 - 9.400
Manganese	--	0.002	mg/L	**0.002 <MDL**	No	0.001 - 168.0
Nickel	--	0.00300	mg/L	**0.003 <MDL**	No	0.003 - 1400.0
Nitrogen-Kjeldahl (N)	--	0.1	mg/L	**0.1 - 0.4**	No	0.050 - 0.5
Organic Nitrogen	--	0.100	mg/L	**0.110 - 0.400**	No	0.040 - 0.400
o-xylene	--	0.200	µg/L	**0.200 <MDL**	No	0.170 - 5.000
pH	--	--	pH units	**7.68 - 7.98**	No	7.05 - 8.07
Potassium	--	0.050	mg/L	**1.040 - 1.470**	No	0.800 - 1.910
Silica	--	0.050	mg/L	**0.520 - 1.130**	No	0.520 - 2100.0
Silver	--	0.002	mg/L	**0.002 <MDL**	No	0.000 - 0.100
Solids (Total Dissolved)	--	20.000	mg/L	**140.00 - 168.00**	No	1.460 - 208.00
Sulphate	--	0.200	mg/L	**28.800 - 33.000**	No	27.000 - 55.00
Sulphide	--	0.050	mg/L	**0.05 - <MDL**	No	0.004 - 4000.0
Surr 1,2-Dichloroethane-d4	--	--	mg/L	**N/A - N/A**	N/A	104.00 - 105.00
Surr 4-Bromofluorobenzene	--	--	Surr Rec %	**N/A - N/A**	N/A	97 - 99
Surr Decachlorobiphenyl	--	--	%	**N/A - N/A**	N/A	94.000 - 95.000
TCMX (OC Pesticide Surrogate)	--	--	%	**102.00 - 105.00**	No	102.00 - 105.00
Tetrachloroethene	30	0.200	µg/L	**0.200 <MDL**	No	0.200 - 0.2
Toluene	--	0.200	µg/L	**0.200 <MDL**	No	0.005 1.0
Total Chlorine	--	0.550	mg/L	**N/A N/A**	N/A	0.690 1.8
Total Phosphorus	--	0.050	mg/L	**0.050 <MDL**	No	0.010 0.1
Toxaphene	--	5.000	µg/L	**N/A N/A**	N/A	0.010 5.0
2,4,5-TP (Silvex)	--	1.000	µg/L	**1.000 <MDL**	No	0.010 5.0
Tritium	7000	15.000	Bq/l	**N/A N/A**	N/A	15.000 1000.0
Turbidity	1	0.130	NTU	**0.000 <MDL**	No	0.030 0.5
Xylene; total	300	0.100	µg/L	**0.100 <MDL**	No	0.005 5.0
Zinc	--	0.005	mg/L	**0.005 0.013**	No	0.005 100.0

There were nine (9) adverse microbiological results out of 2,757 samples taken; Eight (8) due to unacceptable levels of Total Coliform bacteria (ranging from 1 to 6 cfu/100 mL). One was due to unacceptable levels of E. coli (1 cfu/100 mL) and Total Coliforms (11 cfu/100 mL). The site with the unacceptable E. coli sample was a service stub connected to a backflow preventer which had not yet been put in service. In each case, standard response procedures were enacted. All sites were re-sampled immediately, and the re-sample results revealed no adverse indicators.

It is highly unlikely that there were 'actual' water quality issues at these sites, as the nine adverse samples were identified as having free chlorine residuals which were well above the minimum acceptable level at the time of the sampling (ranging between 0.08 to 0.88 mg/L). E. coli and Coliform bacteria cannot survive in chlorinated water; therefore, it is suspected that

Agenda Item # Page #

post-sampling contamination occurred. The re-sampling results support this conclusion. The microbiological testing procedure is extremely sensitive. Accidental sample contamination can occur through operator or laboratory error, despite the specific procedures and precautions being adhered to while processing samples.

System Statistics and Major Events

During the period from January 1, 2014 through to December 31, 2014 a total of 44,944,353,000 litres of water were purchased, at a cost of nearly $20,500,000, from the Joint Water Boards and subsequently pumped into London via the Arva Pumping Station and EMPS. Average day demand was 122,217,860 litres. Peak day pumpage of 155,715,000 litres occurred on June 22, 2014.

A summary of system pumpage can be found in Appendix 'B'. The data includes monthly average and maximum daily flows. These values are also compared to the rated flow rate capacities identified in London's Municipal Drinking Water Licence. There were no occurrences of flow rate exceedance during the specified time period.

Listed below are some 2014 statistics for the City of London Distribution System.

Approximate Replacement Value of Drinking Water System	**$2,600,000,000**
Number of Pumping Stations	**7**
Number of Fire Hydrants	**9,167**
Number of Watermain Valves	**12,761**
Total Number of Water Services	**113,627**
Length of Watermain	**1,565 km**
Number of Watermain Breaks	**164**

Municipalities Receiving London Water

In the Municipality of Middlesex Centre, the village of Arva, Ballymote, and Delaware continued to receive their drinking water under contract from the City of London during 2014. The Municipality of Middlesex Centre has been provided a copy of the Annual Report as per O. Reg 170/03.

Several residences within Central Elgin also continued to receive drinking water from the transmission watermain that supplies the City of London from the EMPS. For this reason, Central Elgin has also been provided a copy of the report.