

NO: R133

COUNCIL DATE: June 26, 2017

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## REGULAR COUNCIL

TO: **Mayor & Council**

DATE: **June 21, 2017**

FROM: **General Manager, Engineering**

FILE: **5600-43**

SUBJECT: **City of Surrey Water System Annual Report for 2016**

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## RECOMMENDATION

The Engineering Department recommends that Council:

1. Receive this report as information; and
2. Authorize staff to forward to the Medical Health Officer in accordance with the requirements of the *Drinking Water Protection Act* a copy of this report and the related report titled "City of Surrey Water System Annual Report for 2016", a summary of which is attached to this report as Appendix "I".

## INTENT

This report represents the 2016 Annual Report of the City of Surrey Water System, which has been prepared in accordance with the requirements of the *British Columbia Drinking Water Protection Act*.

## DISCUSSION

As a water system operator, the City monitors on an on-going regular basis the quality of the water it delivers to its customers. Section 15(b) of the *British Columbia Drinking Water Protection Act* (provincial regulation) requires a water supplier to report the results of water quality monitoring in accordance with the requirements described in Section 11 of the *Act*. The City satisfies this requirement through the preparation of an annual written report that is made available to water consumers and is forwarded to the Medical Health Officer as information. The City, in cooperation with the Fraser Health Authority and Metro Vancouver, has developed a water quality monitoring and reporting plan for the City's water distribution system. A protocol document sets out monitoring parameters, the reporting structure and response plans to emergency situations such as incidents of high bacteria counts or other types of contamination, should they occur.

A Summary of the City of Surrey Water System Annual Report for 2016 is attached to this report as Appendix "I". The full report will be available for viewing on the City's website and forwarded to the Medical Health Officer, subject to consideration of and approval by Council of the recommendations contained in this report.

The City of Surrey purchased all of its water in 2016 from Metro Vancouver (i.e., the Greater Vancouver Water District). Metro Vancouver monitored all of the parameters of the City's source water within the Metro Vancouver system from the alpine reservoirs of the North Shore Mountains through the Metro Vancouver distribution system to the delivery points in Surrey.

Within the City distribution system, samples are taken on a regular basis and tests are conducted on those samples which include bacteria and turbidity (cloudiness), as well as chemical and physical parameters unique to distribution systems. Weekly samples are obtained at 51 water sampling sites located strategically across the City's water distribution system. These samples are collected by Metro Vancouver staff and are forwarded to the Metro Vancouver testing laboratory in Burnaby.

In 2016, two thousand nine hundred and fifty (2,950) water samples were analyzed with none of the samples indicating the presence of E-coli bacteria, as per the B.C. Drinking Water Protection Regulation (the "BCDWPR") and the Guidelines for Canadian Drinking Water Quality (the "GCDWQ"). Of the 2,950 drinking water samples, 99.99% of the samples met the total coliform bacteria criteria as per the BCDWPR. These bacteria occur naturally in water, soil and vegetation. When total coliform bacteria are present in a water sample, it may indicate a change in water quality or sampling error. Out of the 2,950 water samples taken, one sample resulted in positive total coliform bacteria; however, when a second sample was taken from the same location, total coliform bacteria were not detected.

### **Chlorine Levels**

As in previous years, portions of the City's distribution system have experienced from time to time lower than desirable chlorine residual values. The lower than desirable chlorine residual values may be attributed to mainline segments which are "dead ended"; that is, they are not looped or interconnected with other segments of mainlines. The City, where possible, is requiring looping of existing dead-ended mains either as new development occurs or through Capital Projects. Where it is not possible to loop, blow offs are installed at main ends. Further, the City institutes a flushing and maintenance program to improve water quality in affected areas. To this end, the City has measured a positive increase of chlorine residual in these areas by 7% in 2016 (compared to 2015) where chlorine residual values of 0.2 mg/l or higher have been achieved and sustained.

### **Cross Connection Control Program**

As part of the City's effort to provide high quality water, the City maintains a Cross Connection Control ("CCC") program. This program is a joint effort between the City and water customers to protect the municipal water system from contamination originating on private property. Contaminants may enter the City's water system through cross connections during a backflow event when the pressure in the City's water system is low or negative. Such low or negative pressure conditions exist when there is a water main breakage or extraordinary demand, such as during a major firefighting event. The risk that private plumbing systems pose to the City's water distribution system can be reduced by the installation, testing and regular maintenance of backflow preventers. In addition, all new construction that introduces a potential cross connection hazard requires the installation of a backflow preventer, as regulated by the British Columbia Building Code and the Surrey Waterworks Cross Connection Control Bylaw.

In 2016, 11,100 testable backflow preventers were registered with the City compared to 10,335 in 2015, representing a 7.4% increase. Among them, 508 assemblies were from new developments or renovations, while 323 assemblies were from CCC survey requirements. In addition, the City achieved 97% compliance of annual testing requirements, compared to 95% compliance in 2015. Customers that were found not to be following requirements were notified to comply or face fines, as per City Bylaws.

## CONCLUSION

The City remains diligent and proactive in monitoring, operating and maintaining the City's water distribution system to ensure that the City's water customers continue to receive safe and clean drinking water.

Based on the above discussion, it is recommended that Council authorize staff to forward to the Medical Health Officer in accordance with the requirements of the *Drinking Water Protection Act* a copy of this report and the related report titled "City of Surrey Water System Annual Report for 2016", a summary of which is attached to this report as Appendix "I".

Fraser Smith, P.Eng., MBA  
General Manager, Engineering

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Appendix "I" - Summary of the City of Surrey Water System Annual Report for 2016

### Summary of the City of Surrey Water System Annual Report for 2016

In 2016, the City of Surrey purchased all the water that it supplied to City of Surrey residents from Metro Vancouver (i.e., the Greater Vancouver Water District).

The City of Surrey’s water distribution system is connected to the Metro Vancouver distribution system at the discharge points for six (6) Metro Vancouver water reservoirs and at eleven (11) Metro Vancouver connection chambers located throughout the City.

The City’s water distribution mains are approximately 1,850 km in length, making it the longest distribution network in British Columbia. Main length increased by 0.22% in 2016 due to growth and development.

Surrey’s geography and development pattern is serviced with eight (8) different water pressure zones and ten (10) pumping stations.

The City’s maintenance program for its water system components includes a regular program of unidirectional water main flushing of all mains in the system at least once every five (5) years. This unidirectional approach to flushing ensures that water from non-flushed mains does not flow into recently flushed mains. The City’s maintenance program, combined with an ongoing program of pipe size upgrades and water supply controls by Metro Vancouver, has minimized the need for any abrasive, mechanical cleaning of the City’s water mains.

Monitoring of the quality of the water within the City’s water system is undertaken at fifty-one (51) water sampling sites located strategically across the City. Weekly samples are collected by Metro Vancouver staff. These samples are tested at the Metro Vancouver Water Laboratory in Burnaby for bacteria, turbidity and chlorine residual. Water temperature is taken at the time of the sample collection.

In 2016, 16% of the City’s water operating and maintenance budget was spent on water quality-related work. Two thousand nine hundred and fifty (2,950) water samples were analyzed, with none of the samples indicating the presence of E-coli bacteria as per the B.C. Drinking Water Protection Regulation (the “BCDWPR”). Of the 2,950 drinking water samples, 99.99% of the samples met the total coliform bacteria criteria as per the BCDWPR. These bacteria occur naturally in water, soil and vegetation. When total coliform bacteria are present in a water sample, it may indicate a change in water quality or sampling error. Out of the 2,950 water samples taken, one sample resulted in positive total coliform bacteria; however, when a second sample was taken from the same location, total coliform bacteria were not detected.

The City has established response procedures to deal with water quality issues and infrastructure failure such as water main breaks. The procedures incorporate both agency notification and steps for physical repair. Integral to the response procedures are well-defined communication links between the City, Metro Vancouver and Fraser Health Authority staff.

Chlorine residuals are monitored throughout the distribution system. In 2016, 74% of the 2,950 samples taken were greater than 0.2 mg/L (increase of 7% from 2015). The remaining 26% of the samples were less than 0.2 mg/L. Low chlorine residuals are attributed to low water demand and/or stagnation. Where there are increased Heterotrophic Plate Counts (“HPC”), as the result of low chlorine residual and circulation issues, staff flush the affected section to replace water in the mains, thus increasing chlorine residuals. HPC is not mandatory under the 2014 Guidelines for Canadian Drinking Water Quality; however, the City of Surrey continues to use this methodology to ensure the quality of the water is maintained. The City continues to improve these low flow areas by looping of mains and increased water usage through service connections to new residences and businesses.

Metro Vancouver Water Laboratory technicians perform quarterly tests on water within the City’s system for disinfection by-products (Haloacetic Acids and Trihalomethanes), and semi-annual tests for pH and select metal concentrations. Sampling sites for these tests were selected in accordance with a monitoring and reporting plan established between the City and Metro Vancouver staff. The results of these tests demonstrated that water quality remained within acceptable levels, as recommended in the 2014 Guidelines for Canadian Drinking Water Quality.

Except for a few circumstances where fire hydrants were opened without authorization or were damaged in accidents, there were no incidences of tampering or vandalism with the City’s water system in 2016. System security includes lighting, locks and alarms at pump stations, as well as back flow prevention check valves on service connections. The City also has a cross connection program to guard against contaminants entering the system due to faulty connections. The program includes enforcement of annual testing of backflow preventers, and installation of backflow preventers for all new construction (plumbing permit requirement) and existing industrial, commercial and institutional properties by a cross connection survey requirement.

In 2016, the number of testable backflow preventers registered with the City increased by 831 (7.4% for a total of 11,096 devices). Among them, 508 assemblies were from new developments/renovations, and 323 assemblies were from cross connection control survey requirements. In 2016, the City achieved 97% compliance of annual testing requirement which is a 2% increase from 2015. The relatively lower number of owners that were found to be in non-compliance were notified to comply or face Bylaw enforcement.

The City of Surrey remains diligent in maintaining its water distribution system to high quality standards and in ensuring the delivery of high quality water to the City’s residents and businesses.