



To: Public Works and Transportation Committee

Date: February 27, 2024

From: Milton Chan, P.Eng.
Director, Engineering

File: 10-6060-01/2024-Vol
01

Re: **Water Conservation Related to Single-Pass Cooling Systems**

Staff Recommendation

That, as outlined in the staff report titled "Water Conservation Related to Single-Pass Cooling Systems", dated February 27, 2024, from the Director, Engineering, the proposed resident and business engagement strategy for water conservation related to single-pass cooling systems be endorsed.

Milton Chan, P.Eng.
Director, Engineering
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REPORT CONCURRENCE		
ROUTED TO:	CONCURRENCE	CONCURRENCE OF GENERAL MANAGER
Community Bylaws	<input checked="" type="checkbox"/>	 <hr/>
Building Approvals	<input checked="" type="checkbox"/>	
Sustainability & District Energy	<input checked="" type="checkbox"/>	
Facilities & Project Development	<input checked="" type="checkbox"/>	
SENIOR STAFF REPORT REVIEW	INITIALS:	APPROVED BY CAO

Staff Report

Origin

The City has experienced significant population growth over the last few decades, which has placed increasing demands on the City's water supply system. To address this, the City has implemented a water conservation program to inform, educate, and encourage residents and businesses to conserve water and reduce water costs. The water conservation program includes water metering, water pressure management, and rain barrel and toilet rebate programs to encourage efficient water usage. Through the City's water conservation program, the City's total water consumption has decreased over the last fifteen years despite an overall increase in population.

The purpose of this report is to seek Council endorsement on the proposed assessment and public engagement for single-pass cooling systems to determine appropriate next steps for addressing single-pass cooling systems in Richmond.

This report supports Council's Strategic Plan 2022-2026 Focus Area #3 A Safe and Prepared Community:

Community safety and preparedness through effective planning, strategic partnerships and proactive programs.

3.4 Ensure civic infrastructure, assets and resources are effectively maintained and continue to meet the needs of the community as it grows.

This report supports Council's Strategic Plan 2022-2026 Focus Area #5 A Leader in Environmental Sustainability:

Leadership in environmental sustainability through innovative, sustainable and proactive solutions that mitigate climate change and other environmental impacts.

5.1 Continue to demonstrate leadership in proactive climate action and environmental sustainability.

5.3 Encourage waste reduction and sustainable choices in the City and community.

Analysis

Single-pass cooling systems provide cooling by having water flow directly through the system and subsequently drained to the City's sanitary sewer or drainage infrastructure. As such, these cooling systems do not efficiently use potable water. A typical medium-size unit uses approximately 1,600 cubic meters of water per year. Examples of these systems include certain coolers, freezers, ice-making machines, air conditioners, heat pumps, hydraulic equipment, welding equipment, and other industrial equipment. In addition, single-pass cooling systems place additional demands on the City's water supply infrastructure, particularly during periods of hot and dry weather when the need for cooling is the greatest.

Less water-intensive alternative cooling systems are available and provide a favourable payback period when compared to the average life cycle of a conventional single-pass system. These alternatives include air-cooled systems, which achieve cooling effects by passing air instead of water through the system, or connecting the equipment to a cooling loop that uses recirculating water. The overall capital and operating cost of these units is usually significantly lower than conventional single-pass systems. A typical medium-size unit can save about \$3,000 per year, achieving a simple payback of approximately 2 to 8 years.

Historically, the City has managed water usage for single-pass cooling systems through the Council-endorsed water metering program. Given the increasing level and duration of drought conditions that have been observed in recent years, additional water conservation initiatives beyond the water metering program are required to manage single-pass cooling systems.

Proposed Resident and Business Engagement Strategy

To better manage the water usage for single-pass cooling systems, staff propose to assess the existing inventory of single-pass cooling systems in the City and develop a public engagement strategy to educate residents and business on the City's water conservation initiatives. As part of the public engagement, staff would liaise with professional and industry associations, engineering firms, and suppliers and manufacturers of cooling systems to better understand the needs of residents and businesses. Should this be endorsed by Council, staff will conduct the single-pass cooling assessment and prepare engagement material for affected residents and businesses. Any potential bylaw amendments to address the use of single-pass cooling systems in Richmond would be presented for Council's consideration as part of a future report. Should additional funding be required to support the single-pass cooling assessment and engagement, staff would bring forward a capital project for Council's consideration as part of the 2025 Capital Budget.

Similar engagement strategies have been carried out by other jurisdictions that currently prohibit the use of single-pass cooling systems, such as the City of Vancouver and Capital Regional District. Vancouver began public engagement in 2012 and retained an engineering consultant in 2015 to proceed with further engagement of business owners, suppliers, manufacturers, service providers, and external government agencies. In 2017, Vancouver adopted bylaw amendments to prohibit non-recirculating water usage. The Capital Regional District began public engagement in 2017 and has since identified the number of existing single-pass cooling systems in the district, while working with residents and business owners to replace these systems. In 2023, the Capital Regional District adopted bylaw amendments to prohibit the use of single-pass cooling systems.

Financial Impact

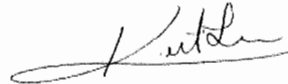
None.

Conclusion

Single-pass cooling systems consume significant amounts of water and the use of these systems does not align with the City's water conservation initiatives. Staff recommend that the existing single-pass cooling systems in the City be reviewed and that engagement material be prepared to inform residents and businesses of alternative cooling methods that are less water-intensive. This will allow the City to better manage water usage for cooling systems, thereby supporting the City's water conservation initiatives and ensuring that Richmond continues to provide a high level of water service to residents and businesses.



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