




CITY OF HAMILTON
PUBLIC WORKS DEPARTMENT
Energy, Fleet and Facilities Management Division

TO:	Chair and Members Public Works Committee
COMMITTEE DATE:	May 31, 2021
SUBJECT/REPORT NO:	Capital Lifecycle Renewal – Westoby Ice Plant (Emergency) (PW21035) (Ward 13)
WARD(S) AFFECTED:	Ward 13
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SUBMITTED BY:	Rom D'Angelo, C.E.T.; CFM Director, Energy, Fleet and Facilities Management Public Works Department
SIGNATURE:	

RECOMMENDATION

That the design, supply, installation and warranty of the Westoby Arena Ice Plant replacement, located at 70 Olympic Drive, Dundas be funded from the Unallocated Capital Levy Reserve #108020 at an amount not to exceed \$700K.

EXECUTIVE SUMMARY

In early 2021, while performing the annual scheduled maintenance shutdown of the ammonia refrigeration system at Westoby Arena, the City's refrigeration maintenance contractor, Black and McDonald detected an ammonia leak. The purpose of the annual inspection is to identify any maintenance issues and rectify them in advance of the upcoming winter season. Unable to pinpoint the exact tube which was leaking due to location, Black and McDonald proceeded to isolate the ammonia from the condenser into the chiller closing off the necessary valves. The Ministry of the Environment (MOE) was contacted to report the leak as per legislative procedures and Black and McDonald received MOE # 1-D55LR as part of the spill report.

Due to the age of the condenser and location of this leak, it has been confirmed to be unrepairable. Technical Safety Standards Association (TSSA) only approves 'absolute'

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OUR Mission: To provide high quality cost conscious public services that contribute to a healthy, safe and prosperous community, in a sustainable manner.

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emergency repairs when deemed necessary and safe. Along with the condenser, existing key components (including the chiller, compressors, brine pumps and associated piping) of the ice plant are at the end of their service life, the replacement of these components is critical to ensure the Arena can operate for the upcoming season (September 2021). Furthermore, given the age of all the mechanical components as outlined in Table 2 on page 6 staff are recommending that a complete replacement of the entire ice plant as being fiscally responsible and prudent.

Alternatives for Consideration – See Page 6

FINANCIAL – STAFFING – LEGAL IMPLICATIONS

Financial:

That the design, supply, installation and warranty of the Westoby Arena Ice Plant replacement, located at 70 Olympic Drive, Dundas be funded from the Unallocated Capital Levy Reserve #108020 at an amount not to exceed \$700K.

The City of Hamilton has an approved Corporate Energy and Sustainability Policy regarding capital investment related to energy. Westoby Arena will be designed to satisfy the requirements of this policy. Facilities will conduct a cost benefit analysis for selecting the appropriate energy efficient design elements to be incorporated to reduce GHG, Natural Gas, Electricity and Water consumption. Energy benefits of this replacement program will be incorporated into the Annual Energy Report.

Staffing: Not applicable.

Legal: Not applicable.

HISTORICAL BACKGROUND

Westoby Arena was built in 1982 (39 years old) and is located at 70 Olympic Drive in Dundas. The arena is 27,084 square feet and sits on 4.76 acres of land. The ice plant and most of the major components in the plant have already been replaced once between 1992-1995. Today's ice plant is approximately 26 years old and is due for renewal (refer to Table 2 on page 6).

At the July 12, 2018 Public Works Committee, staff presented Information Report PW18065, Capital Lifecycle Renewal – Strategic Renewal of Facilities. As stated in the Report there are significant gaps in the current levels of annual capital funding required to sustain the condition of the City's Facilities infrastructure over time. As reported, there was a total deferred capital backlog in Facilities of approximately \$216M (in 2018) and

growing. The Facilities portfolios included but not limited to the Recreation Facilities, Corporate Facilities, Entertainment Facilities and Long-Term Care Facilities.

In 2015 the City commissioned Stantec Engineering to review and assess the condition of several facilities within the city's stock of buildings. The Westoby Arena is an aging facility that requires significant investment, based on the 2015 Building Condition Assessment Report there were building components that have exceeded and/or reached their life expectancy. Consequently, the following investments were made along the way:

2011 – 2016	HVAC Upgrades
2016	Roof Replacement
2018	Lighting Retrofit (upgraded all lighting to LED that provides enhanced light levels, lower energy costs, lower operating costs)
2018	Condenser float header for Refrigeration efficiencies
2019	Parking Lot Rehabilitation
2019 - 2020	Mechanical items; such as: relief valve & emergency release system

Further to these investments in the arena, general maintenance such as painting, replacing hockey boards, doors & glass replacement, HVAC/Mechanical updates, etc. are conducted in-house using talented and skilled trades. These in-house activities are typically funded through the annual operating budget which has contributed to maintaining backlog capital building components to ensure the arena is optimally functional and safe to use.

POLICY IMPLICATIONS AND LEGISLATED REQUIREMENTS

The procurement of the services of a general contractor for the design, supply, installation and warranty of the Westoby Arena Ice Plant replacement will be in accordance with By-Law 20-205, the City's Procurement Policy.

The process will include energy analysis that will ensure this project meets the City's target for energy and emission reductions outlined in the Corporate Energy and Sustainability Policy. This will further align to the City's overarching effort and activities related to climate change.

City's Code of Conduct Policy - On Wednesday February 12, 2020 City Council (GIC - January 30, 2020) approved Report HUR20002 that inclusive within the City's Code of Conduct Policy city staff are obligated to share consultant reports with identified imminent risk to human health or safety policy.

RELEVANT CONSULTATION

Internal Consultation:

- Procurement, Corporate Services Department
- Recreation, Healthy and Safe Communities Department
- Finance and Administration, Corporate Services Department
- Office of Energy Initiatives, Public Works Department

External Consultation:

- Technical Standards and Safety Authority (TSSA)
- Ministry of the Environment (MOE)
- City's Approved Mechanical/Refrigeration Vendor – Black & MacDonald

ANALYSIS AND RATIONALE FOR RECOMMENDATION

Westoby Arena is a 39-year-old facility that requires significant investment if the building is to fall within a Good-Fair state of repair. In 2015 Stantec Engineering provided the city a Building Condition Assessment (BCA) of the arena and based on its findings the facilities condition is at 35% in a state of 'critical' investments (>30% is deemed critical-refer to Table 1 below). The term 'critical' does not mean there's an immediate impact to the functionality of the building nor does it mean there is a health and safety risk to the users, visitors or staff of the arena. The term 'critical' is used from a funding and investment perspective.

Table 1:

Facility Condition Index (FCI)			
0-5%	5-10%	10-30%	>30%
Good	Fair	Poor	Critical

The refrigeration plant at Westoby Arena contains multiple critical components that have exceeded its life expectancy and, in some instances, have failed requiring emergency repairs to ensure ice was maintained during community programming. Black and McDonald, the City's refrigeration service provider, submits annual reports as part of their maintenance program, including recommendations for various maintenance and capital budget items. The following recommendations have been identified as issues required to be performed should Westoby Arena reopen for the 2021 season:

- The flooded-chiller, the plant's cooling vessel, which is past its life cycle expectancy needs to be replaced. Black & McDonald, TSSA (Ontario's refrigeration plant governing agency) and industry standards suggest its replacement;
- The evaporative condenser is 26 years old and has failed with ruptured and deteriorated lines. The City's history for life cycle of these units is approximately

12 years and industry standards recommend replacement between 12-15 years. It is recommended this item be replaced;

- The compressors are 26 years old and are also at end of life and is recommended for replacement.

Based on the above, for Westoby Arena to remain operational in 2021, a full replacement of the Refrigeration Plant is required and should be scheduled prior to the summer of 2021. This would include the above components, plus piping and electrical service panel but does not include the replacement of the refrigerated slab as the sand floor would remain as is. Approximate budget cost for this work is estimated at \$700,000.

Public Works staff uses software called Asset Planner to proactively manage the lifespan of all building components and track their replacement costs. Since the backlog of unfunded end-of-life facility assets across the portfolio exceeds \$216M (as stated in 2018) and growing annually, it is not practical to show most end-of-life items within the 10-year capital budget.

The following are considerations for approval of redirecting previous years' Operating surplus into Westoby Ice plant renewal:

1. End-of-life assets;
2. Funding gap in Arena Program;
3. Public perception, reliability and Health & Safety;
4. Replacement of the system is also required to meet the current Technical Safety Standards Regulations for refrigeration plant systems;
5. Replacing the current refrigeration system with a new and more efficient, would significantly reduce the facility's greenhouse gas emissions;
6. A new refrigeration plant would reduce annual water consumption;
7. The Modern Low charge ammonia plants with heat recovery can cut the facility's natural gas consumption by roughly 60 per cent.

The ice plant is currently overdue for replacement. The Ice plant is made of several components that work in unison to produce ice for the arena. The life cycle of each component varies in life expectancy. As existing key components of the ice plant at Westoby Arena are beyond and nearing the end of their service life, consequently, immediate (priority) work within the arena is required, otherwise the 2021/2022 hockey season and ice programming will be cancelled.

Table 2 - Ice Rink Components to be replaced are as follows:

Components	Year Installed	Life Cycle (Range)	Component Age
Brine Pumps (1)	1992	20 years	29
Evaporators – Chiller (1)	1995	20-25 years	26
Refrigerant Compressors (2)	1995	30 years	26
Condensers/Cooling Towers (1)	1995	12-15 years	26
Pumps (2)	1995	10-15 years	26
Heat Exchange/Recovery Units (1)	1992	30 years	29

Advances in refrigeration made within the past 10 years can translate into higher-quality ice for rink users and more cost-effective operation for both the Recreation and Facilities/Energy Divisions. Upgrading an antiquated refrigeration system/plant allows staff to enhance their basic understanding of refrigeration before making decisions that will affect the safety and efficiency of the facility.

Without the full replacement of the ice plant at Westoby Arena, the City will be unable to obtain TSSA approval in regard to operations and programming start up for Fall 2021.

ALTERNATIVES FOR CONSIDERATION

The only alternative if the ice plant isn't replaced would be to use the facility for other indoor sports other than ice hockey or figure skating or close the facility until funding becomes available. Without immediate replacement, the facility cannot operate or program the ice at Westoby Arena.

ALIGNMENT TO THE 2016 – 2025 STRATEGIC PLAN

Healthy and Safe Communities

Hamilton is a safe and supportive City where people are active, healthy, and have a high quality of life.

Clean and Green

Hamilton is environmentally sustainable with a healthy balance of natural and urban spaces.

Built Environment and Infrastructure

Hamilton is supported by state-of-the-art infrastructure, transportation options, buildings and public spaces that create a dynamic City.

APPENDICES AND SCHEDULES ATTACHED

Not applicable.