

## CITY OF FORT SASKATCHEWAN

### **Dow Centennial Centre Heating / Cooling System Upgrades**

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#### **Motion:**

That Council approve funding in the amount of \$800,000 for upgrades to the Dow Centennial Centre mechanical system, with funds to be allocated from the Municipal Sustainability Initiative grant.

#### **Purpose:**

The purpose of this report is to get Council direction on the future of the Dow Centennial Centre (DCC) mechanical system as it relates to the current functionality and the ability to provide a year-round ice surface for the community.

#### **Background:**

When the DCC was constructed it was originally given a state of the art heat recovery system. This system was designed to use wasted heat from the ice plant to help heat the rest of the building. While the heat recovery side of the system works, the heat that is recovered is considered low grade and must still be supplemented by gas fired air units and boilers.

#### **How the system is designed to work:**

One of the by-products of the system is that the heating system is fully integrated with the ice plant. This means that when the ice plant runs it must dump heat into the building to properly cool the refrigerant before it is compressed and used to cool the brine in the ice floor. As well, when the building needs heat, it must run the ice plant to generate enough heat within the heating system. These by-products are by design, as the cooling system on the ice plant is smaller due to the heat loads of the building, and the heating units in the building are smaller due to the heat generated from the ice plant.

The system works reasonably well within a small window of mild winter temperatures. This occurs when the building needs heat and the plant needs to run to make ice. The issues with the system arise during periods of colder and warmer external temperatures.

#### **Issues during the warmer seasons:**

While maintaining ice in the spring and making ice in late summer, the ice plant must work at full capacity to maintain the ice surface. This means that it must dump heat back into the building because the cooling tower for the plant is not sized to dump enough heat on its own. The only place the heat can be dumped is into the theatre space and the soccer pitch. This makes both areas uncomfortably warm. Even with the dumping of excess heat into the building, the cooling tower cannot keep up, which results in the ice plant running at higher than optimal pressures. This risks damaging the plant and reducing its expected life. The excess heat is also causing issues with theatre equipment, as it cannot cool itself adequately.

#### **Issues during cooler seasons:**

During colder external temperatures, the ice plant does not need to run often to maintain ice. However, the building may still need the heat from the plant to heat the rest of the building. This means that the building controls turn on the plant in order to generate heat. Ice plants are not an efficient way to generate building heat when they are not required.

**Looking ahead:**

These issues have been compounded by the increased demand for ice rental availability in the months before and after the regular ice user season. In addition, requests for year-round ice availability have been denied, given that there is no assurances the flawed system could operate during periods of high external temperatures.

In the summer of 2014, an engineering report was commissioned to look at the issues, and a plan was developed to address the problems. This report was reviewed and confirmed by the engineering firm that evaluated the DCC, as part of the Recreation Facility evaluations prior to the kick-off of the Recreation and Parks Master Plan. The report recommends decoupling the ice plant from the building systems and letting the two systems run independent of each other. This will require the installation of a high efficiency boiler, an upgrade to the cooling tower, additional cooling capacity in the building, the replacement of controls, and programming.

Work completed to solve the heating and cooling systems will be designed to be compatible with future building expansions. This includes increasing the cooling tower size to accommodate a second sheet of ice.

Much of the work must be completed while the ice is out. In order to have the problems solved for the fall Theatre programs, and to offer the community ice rental opportunities for summer ice in 2016, the work must be completed in the summer of 2015.

**Plans/Standards/Legislation:**

Strategic Plan Goal 3.2 – Develop new and expand existing recreation facilities and programs.

**Financial Implications:**

It is recommended that funding for this project will be through the Municipal Sustainability Initiative (MSI) grant. There is approximately \$7,000,000 available in the City's MSI funding.

**Internal Impacts:**

The Shell Theatre will be able to provide a comfortable atmosphere for its performers and patrons on a more consistent basis. The facility will be capable of hosting spring / summer ice without adversely affecting the other users of the building.

**Alternatives:**

1. That Council approve funding in the amount of \$800,000 for upgrades to the Dow Centennial Centre mechanical system, with funds to be allocated from the Municipal Sustainability Initiative grant.
2. That Council not approve funding in the amount of \$800,000 for upgrades to the Dow Centennial Centre mechanical system, with funds to be allocated from the Municipal Sustainability Initiative grant, and advise how they wish to proceed.

**Attachment:**

Appendix A - Dow Centennial Centre Equipment Assessment – March 2015, Reinbold Engineering Group

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File No.:

Prepared by:	Grant Schaffer Director Project Management	Date: April 7, 2015
Approved by:	Troy Fleming General Manager, Infrastructure and Community Services	Date: April 8, 2015
Reviewed by:	Brenda Rauckman Acting City Manager	Date: April 8, 2015
Submitted to:	City Council	Date: April 14, 2015