

**TO: Secretary, Administration and Finance Committee**  
**FROM: General Manager, Utility Services Department**  
**DATE: May 16, 2011**  
**SUBJECT: Landfill Optimization**  
**FILE NO: WT-7834-2**

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**RECOMMENDATION:** that the Administration and Finance Committee make the following recommendations to City Council:

- 1) that the proposed changes in the design and operations of the Saskatoon Waste Management Facility (Spadina Landfill) be adopted as outlined in this report to protect the lifespan of the facility to forty (40) years and beyond;
- 2) that a post-budget capital project for Landfill Optimization of \$1.45 million be funded from the Landfill Replacement Reserve based on the sufficiency plan included in this report; and
- 3) that the operating implications outlined in this report, including the addition of 5.05 full-time equivalent (FTE) positions, be included in the proposed 2012 operating budget.

## **BACKGROUND**

City Council received a report from the Administration on Landfill Fees during its March 1, 2010 meeting, and resolved in part:

- 1) that Administration report back by December 2011, an updated capital cost forecast, reserve sufficiently and updated rate schedule if required; and,
- 2) that Administration make adjustments to the timing of projects funded from the Landfill Replacement Reserve to ensure that the reserve remains in a positive position and submit a report to the Administration and Finance Committee outlining any required changes.

Current landfilling practices at the Saskatoon Regional Waste Management Centre (Spadina Landfill), may mean the remaining lifespan of the facility is between ten (10) and fifteen (15) years. The Environmental Services Branch has been working for the last year with a consultant to develop an optimization plan for the facility.

## **REPORT**

The goals of landfill optimization are:

- to expand the expected life of the landfill to forty (40) years or more;
- to ensure operations comply with (or exceed) environmental protection regulatory requirements;
- to ensure the facility minimizes safety risk, litter, and nuisance pests and odours; and,
- to support good customer service.

XCG Consultants Ltd. was contracted in January 2010 following a public Request For Proposals issued in December of 2009. A Design and Operations report, *Saskatoon Waste Management Centre – Integrated Landfill Management Plan*, has been prepared in accordance with the Permit to Operate a Waste Disposal Ground PO-04-374 issued by the Saskatchewan Ministry of Environment. The proposed design and operational changes meet the goals of landfill optimization. The design also accommodates the development of the Green Energy Park, including construction of a wind turbine and landfill gas collection system. An Executive Summary of the *Saskatoon Waste Management Centre – Integrated Landfill Management Plan* is provided in Attachment 1, and a copy of the full document is available for viewing on the City of Saskatoon’s website ([www.saskatoon.ca](http://www.saskatoon.ca), click on “c” for City Council and look under Reports and Publications).

The proposed changes in the design and operations of the Saskatoon Waste Management Facility are included in Attachment 2. Highlights include:

- Significantly increasing compaction efforts when placing waste.
- Increasing side slopes from 4:1 to 3:1. Steeper side-slopes result in significantly more usable airspace.
- Improving daily covering practices.
- Reclaiming inefficiently filled areas.
- Expanding waste cells where possible.
- Maximizing landfill height.
- Minimizing leachate.
- Minimizing safety risks, litter, nuisance pests, and odours.
- Managing landfill gas emissions.
- Improved customer service.

If the above-noted changes can be realized, the new optimized capacity of the facility will be 10.25 million cubic meters. This means an additional 6.8 million tonnes of waste may be accepted at the facility.

The effect selected recommendations have on landfill lifespan have been studied. It is important to note the following calculations are not independent of each other, but rather are presented to illustrate the significance of the impact on the overall life of the landfill if any one of these recommendations is not adopted.

<b>Recommendation</b>	<b>Risk</b>	<b>Effect on Lifespan</b>
Achieve 3:1 slope	Existing equipment will only achieve 4:1 slope (at best).	Additional 4 million cubic meters of airspace or ~ 20 years
Expand waste cells	Existing reserves are facing competing pressures to fund waste diversion programs and waste cell development.	Additional 5.105 million cubic meters of airspace or ~ 26 years (based on achieving 3:1 slopes)
Reclaim inefficiently filled areas	Wind turbine is to be moved after ~20 years and lead containment cell requires a special plan.	Additional 2.933 million cubic meters or ~ 15 years (based on achieving 3:1 slopes)
Maximize opportunities for waste minimization. Waste received at the facility must remain at or below current rate of ~130,000 tonnes per year.	Waste diversion programs such as recycling, organics (composting), and construction and demolition waste re-use must grow faster than population growth.	10 to 15 years at 2% growth rate

If all recommended changes can be realized, the Saskatoon Regional Waste Management Centre can achieve a lifespan of at least 40+ years. With a concerted effort toward waste minimization, Administration is working toward extending the life of the facility indefinitely. The detailed drawings of the phased design are outlined in Attachment 3.

### **OPTIONS**

Council may choose to continue to operate based on the recommendations of the 2001 Spadina Landfill Masterplan. This document recommended filling to achieve a 5:1 slope. The landfill would reach design capacity within 10 to 15 years.

### **POLICY IMPLICATIONS**

The Saskatoon Regional Waste Management Centre, or Spadina Landfill, operates within a Ministry of Environment Permit To Operate. Comments on the proposed changes in design and operations have been received from the Ministry indicating this would meet the requirements of the Permit.

### **ENVIRONMENTAL IMPLICATIONS**

The Landfill Optimization Plan will facilitate construction of a landfill gas collection system which is estimated to reduce greenhouse gas emissions by 46,800 tonnes CO<sub>2</sub>e per year starting in 2012 and increasing to 93,600 tonnes CO<sub>2</sub>e per year by 2030 as the system expands. This is equivalent to removing approximately 9,176 to 18,352 passenger vehicles from the road every

year. The addition of more equipment and extended operating hours will have a slight moderating effect on the above-noted emissions reductions.

Improvements to daily cover practices and better management of the types of waste accepted at the landfill will reduce the amount and the concentration of leachate that is generated at the site thereby reducing the potential for negative impacts to groundwater and the nearby South Saskatchewan River. Improved daily cover practices will also reduce nuisances such as litter, odours and vectors.

Improvements to drainage ditches and storm water ponds will reduce the potential for impact on surface water.

Notably, by optimizing the life of the existing landfill, impacts to land and water will be limited to the existing site as opposed to disturbing a new location for development of a new landfill.

## **FINANCIAL IMPLICATIONS**

Landfill optimization is expected to generate both capital and operating cost impacts.

### **Capital Cost Estimate**

<b>Design Stage</b>	<b>Estimated Cost</b>	<b>Time-frame</b>
Optimize Operations	\$ 800,000	2011
Stage A: Cell H Expansion	6,000,000	2012
Stage B: West Side Closure	2,500,000	2013
Stage C: Expand Stormwater Management System	700,000	2016
Stage D: Eastern Lateral Expansion	6,000,000	2020
Stage E: Expand Leachate Collection System	4,000,000	2022
Stage F thru I: Install Incremental Final Cover Systems	4,000,000	Not yet projected
Stage J: Cell Closure	7,500,000	Not yet projected
Stage K: Expand Leachate Collection and Monitoring	600,000	Not yet projected
Stage L: Cell Closure	12,500,000	Not yet projected
Final Contouring	10,000,000	Not yet projected
<b>TOTAL Capital Cost Estimate</b>	<b>\$54,600,000</b>	

A ten-year projection for the Landfill Replacement Reserve, the source of funds for landfill optimization, has been developed (Attachment 4). This projection anticipates funding for all design stages to 2022 based on the following proposed landfill tipping fee and capital allocation rate schedule:

<b>Year</b>	<b>Tipping Fee</b>	<b>Allocation to Capital Projects</b>
2011	\$65	\$33
2012	\$85	\$45
2013	\$90	\$50
2014	\$100	\$60
2015	\$100	\$60
2016	\$105	\$60
2017	\$105	\$60
2018	\$105	\$60
2019	\$110	\$65
2020	\$110	\$65
2021	\$110	\$65

Tipping fees have been previously approved for 2011, 2012, and 2013, and the previously approved fees are adequate. What has changed is the allocation to capital projects. The Reserve is projected to carry a negative balance in the near term as substantial capital construction requirements to optimize the landfill are self-financed. By 2016, the Reserve will have sufficient balances to fund the remaining phases of the design and operations plan, including funding necessary waste minimization infrastructure, without creating a negative balance. To acknowledge the negative balance, the Landfill Optimization project (\$1,450,000) and the New Cell project (\$4,500,000) will be charged interest. This represents the carrying cost incurred by the City until such time as funds are available in 2016. The Landfill Optimization project is required in 2011 in order to proceed with the changes outlined in this report, and as such Administration is recommending post-budget approval of \$1.45 million for 2011.

### **Operating Impact**

The following are the current weaknesses in operating identified through optimization planning and the respective estimated annual cost to address these challenges.

<b>Activity</b>	<b>Estimated Annual Cost</b>
Increase number of trained operators 1.6FTE Utility A Operators	\$ 91,200
Extend hours of operation/Trained supervisor for EcoCentre 2.0FTE Supervisor II 1.0FTE Landfill Attendants (2 seasonal)	167,000
Improve site stormwater management (seasonal plan)	7,300
Expanded groundwater monitoring	7,500
Traffic-flow and navigation	12,000
Improve litter collection 0.45FTE Labourer (pooled)	15,000
Program for commercial waste haulers Radio-frequency identification (RFID) tag program	4,000
<b>TOTAL</b>	<b>\$304,000</b>

Projected changes to the landfill tipping fee provide the additional revenue necessary to address these operating costs.

### **COMMUNICATIONS PLAN**

An information open house will be held in the Montgomery neighbourhood to highlight the changes to the landfill facility operations and discuss measures to improve the environmental performance and aesthetics at each phase of the optimization plan. Information about the optimization will also be posted to the Environmental Services Branch web-page.

### **PUBLIC NOTICE**

Public notice pursuant to Section 3 of Policy C01-021, Public Notice Policy, is not required.

### **ATTACHMENTS**

1. Executive Summary of the Integrated Landfill Management Plan
2. Summary of the proposed changes in the design and operations of the Saskatoon Waste Management Facility
3. Phased Design Concept Drawings
4. Landfill Replacement Reserve Sufficiency

Written by: Brenda Wallace, Manager, Environmental Services Branch

Approved by: “Jeff Jorgenson”  
 Jeff Jorgenson, General Manager  
 Utility Services Department  
 Dated: “May 20, 2011”

Approved by: “Murray Totland”  
 Murray Totland, City Manager  
 Dated: “May 20, 2011”