



Jp2g No. 2106149C

February 06, 2015

North Renfrew Landfill Operations Board
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Deep River, ON
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nrlob@laurentianhills.ca

Attention: Mr. Jim Leon
Waste Management Coordinator

**Re: Baggs Road Landfill Site
Landfill Closure Costs**

Dear Sir:

We are pleased to provide you with the following information regarding future costs to close the Baggs Road Disposal Site. In preparing this submission, we have incorporated the updated volume data and recalculated the costs to reflect today's prices. We have also provided varied scenarios depending on the length of monitoring that is undertaken following the site closure.

Background

Typically, site closure activities involve the progressive capping or rehabilitation of landfill sites. Small sites may require only the application of final cover during one event and continued long term monitoring. Larger sites could undergo progressive capping, as portions of the site reach final grades and to ensure that there will be minimal impact on the environment (leachate, landfill gas).

A staged closure will offer certain advantages as listed below:

- The ability to progressively cap the site as the final contours are reached.
- The potential to obtain and stockpile materials from construction projects that in the future can be used as final cover material at a lower cost.
- The ability to establish vegetative cover.
- The ability to apportion closure costs over a long period of time as opposed to one lump sum.

Closure Plan

Prior to closure of the waste disposal site, the MOE will require a detailed closure plan that outlines among other things; final grading, end use, monitoring, landscaping, design of the final cover and a proposed timetable for closing the site.



Final Cover

Under Regulation 347, Section 11, once a fill area has reached the final design contours, final cover material is required to be placed over the waste. This in many instances is the largest expense of the closure project. As previously discussed, the final cover could be applied progressively as soon as is practical. The characteristics of the final cover material should be outlined in the closure report. The final cover should be designed such that the end use of the site is supported (ie. parkland, open field, pasture, etc), as well as the sensitivity of the site. A simple final cover would consist of a minimum of 750mm of soil cover that includes a 150mm layer of topsoil. More complex covers could consist of several layers that include provisions for lateral drainage, gas migration and vertical restrictions on water movement. Synthetic covers or geomembrances can also be used in place of soil where the vertical migration of water is to be prohibited.

Costing

We have attempted to provide a level of costing for the closure of the site. These costs are as follows:

Consideration for the final cover is based on the existing landfill footprint of approximately 2.8 ha.

Preparation of closure report	\$	7,500.00
Post closure monitoring (per year)	\$	19,600.00
Site reconnaissance and maintenance (per year)	\$	2,600.00
Cap with semi permeable material (600mm sandy soil, 150mm topsoil)	\$	58,200.00
Cap with geosynthetic clay liner (installed)	\$	217,300.00
Seeding	\$	109,200.00

The locally available sandy soil from the landfill excavation should be suitable for the semi permeable material. The topsoil from the site may also be stripped off and stockpiled and augmented with compost. The cost estimate presented in this letter assumes that the material is available locally on site and that a contractor will complete the spreading and grading of the final cover. In order to reduce costs, the spreading and grading could be completed by municipal or board staff over a period of time.

Depending on whether the site is capped with a synthetic cover or nearby native soils, the cost to close the site could vary significantly as indicated below.

Activity	Current Day Cost	Post Closure Say 4 Years	Post Closure Say 25 Years
Preparation of Closure Report	\$7,500.00	--	--
Post Closure Monitoring	\$19,600.00	\$78,400.00	\$490,000.00
Site Reconnaissance	\$2,600.00	\$10,400.00	\$65,000.00
Cap with Semi Permeable Material	\$58,200.00	--	--
Cap with Geosynthetic Clay Liner	\$217,300.00	--	--
Seeding	\$109,200.00	--	--

Note: Prices are based on a 3% increase from 2014 costs.



Summary

With Synthetic Cover

Post Closure Costs (report, cap and seeding)	\$334,000		
Add Monitoring for 4 Years	\$334,000	+ \$ 88,800 =	\$422,800
Add Monitoring for 25 Years	\$334,000	+ \$ 555,000 =	\$889,000

With Native Cover

Post Closure Costs (report, cap and seeding)	\$174,900		
Add Monitoring for 4 Years	\$174,900	+ \$ 88,800 =	\$263,700
Add Monitoring for 25 Years	\$174,900	+ \$555,000 =	\$729,900

We note that these costs are “ballpark figures” only to provide some order of magnitude. The costs also do not include the acquisition of any additional contaminant attenuation zone. These costs are in 2015 dollars and do not consider inflation over the next 4 to 25 years.

The following table outlines the estimated years to closure, the estimated remaining volume and percent that the site is filled.

Site	Estimated Volume m ³	Estimated Remaining Volume m ³	Estimated Years to Closure	Estimated Percent Filled
Pre-development	--	191,250	25	0
2002	4,350	186,900	20	2%
2003	9,473	177,427	19	7%
2004	5,406	172,021	23	10%
2005	7,000	165,021	26	14%
2006	6,600	158,421	24	17%
2007	6,115	152,306	23	20%
2008	6,000	146,306	23	24%
2009	4,900	141,406	24	26%
2010	5,000	136,406	25	29%
2011	6,209	130,197	23	32%
2012	6,779	123,418	20	35%
2013	5,176	118,242	20	38%
2014	5,550	112,692	20	41%
Total to Date	78,558	112,692	20	41%

5,743 Average from previous 5 years (2010 to 2014)

An average of the waste volumes from the past five years (2010 to 2014) was used to estimate the number of years to closure. Based on these calculations, it is estimated that there are 20 years remaining before the capacity of the landfill is reached.



We trust that the above information is satisfactory. Please do not hesitate to contact the undersigned should you have any questions.

Yours truly,

Jp2g Consultants Inc.
Engineers • Planners • Project Managers

A handwritten signature in black ink that reads 'Andrew Buzza'. The signature is written in a cursive, flowing style.

Andrew Buzza, P.Ge.
Project Manager

AB/jlp