

6 December 2002  
Project No. 48227-011

Christchurch City Council  
163-173 Tuam St  
P O Box 237  
Christchurch

*received 19.2.03*

Attention: Simon Collin

Dear Simon,

**Subject: Burwood Landfill - Gas extraction Cost Estimates**

Please find attached the preliminary cost estimates for gas extraction options at the above site. We have priced three options, providing different levels of gas collection. Options are shown on the attached Figure 1 and are described below:

- Option A – Installation of a ground flare (as described below), 3 wells and 9 pressure probes on Stage 2B for the primary purpose of field testing of potential landfill gas extraction rates. The pressure probes will be dual level probes and used to monitor the radius of influence of each extraction well. The estimated cost for design and construction is **\$673,000**.
- Option B – Includes Option A plus two additional wells on Stage 2B to provide an increased level of odour control. The estimated cost for design and construction is **\$721,000**.
- Option C – Includes Options A and B plus five wells around Stage 2A and Stage 2C in order to reduce odour emissions from these areas. The estimated cost for design and construction is **\$802,000**.

It is assumed that the extraction wells will be constructed as permanent installations with temporary above ground pipework for conveyance of the gas to the flare station. If a full gas extraction system is constructed at the site, it is understood that the preference will be for underground pipework. Undergrounding of the pipework has not been included at this stage.

We have allowed for the installation of a landfill gas ground flare which is capable of treating up to 1500m<sup>3</sup>/hour of landfill gas. The flare capacity was selected to potentially provide treatment for an extraction system covering the entire Stage 2 area. The same flare size is included for all costings of options listed above, and would be designed with

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adequate turndown to enable operation with low flows. Flare costs allow for all necessary controls and equipment including a standby blower and a paramagnetic oxygen sensor (highly reliable and accurate sensor installed for safety reasons).

Should you have any questions regarding the above please contact either of the undersigned.

Yours sincerely,  
**URS NEW ZEALAND LIMITED**

Matthew Reed  
Civil and Environmental Engineer

Martin Evans  
Principal