

EXECUTIVE SUMMARY OF THE FINAL ASSESSMENT REPORT

PROJECT BACKGROUND

The Stellenbosch Landfill Site (the site) is classified as a General: Medium: leachate positive (G:M:B+) and has been operational since 1966.

The landfill site comprises three cells. Cells 1 and 2 are the oldest cells and have reached maximum capacity. Waste disposal to these cells ceased during 2013, with no rehabilitation undertaken to date. Cell 3 is a fairly new cell and has been operational since April 2013. It will remain operational until its capacity of 600 000 cubic metres is reached which is anticipated late 2018, at current disposal rates with minimal diversion from landfill.

Stellenbosch Municipality (SM) intends to decommission and rehabilitate the licensed Stellenbosch Landfill Site in terms of Regulations pursuant to the National Environmental Management: Waste Act (Act No. 59 of 2008) (NEM:WA), the National Environmental Management: Waste Amendment Act (No. 26 of 2014) (NEM:WAA) and National Environmental Management Act (Act No. 107 of 1998), as amended (NEMA), as the site is reaching maximum capacity.

At the time of preparing the Draft BAR, the following Listed Activities in terms of the 2010 Environmental Impact Assessment (EIA) Regulations, were relevant to this application - GN.R 544: 11, 18 and GN.R 546: 16. In terms of NEM:WA, the proposed decommissioning and rehabilitation would trigger Activity 14 of Category A of Government Notice Number 921. Aurecon South Africa (Pty) Ltd (Aurecon) was appointed in 2014 to conduct the Integrated Basic Assessment and Waste Management Licence Application process to obtain Environmental Authorisation (EA) to decommission and rehabilitate the site. Subsequent to the release of the Draft BAR, a number of additional designs and feasibility studies for the gas extraction to power facility were required which necessitated a series of extensions on the submission of the Final BAR. The last of these extensions was granted by DEA&DP until 31 May 2017.

PROPOSED CLOSURE AND REHABILITATION MEASURES

At the Draft BAR stage, the proposed closure and rehabilitation activities of the site complied with the waste permit and the *Minimum Requirements for Waste Disposal by Landfill, 2nd Edition (DWAF, 1998)* (hereafter referred to as the *Minimum Requirements*). The following activities were proposed:

1. Shaping and landscaping of the waste body;
2. The construction of storm water infrastructure;
3. Capping of the waste body in accordance with the *Minimum Requirements*;
4. Concrete palisade fencing;
5. The construction of gravel service / maintenance roads;
6. Vegetative cover of the final landform;
7. The construction of the required end-use infrastructure; and
8. The establishment of a post closure monitoring programme, particularly groundwater monitoring and post-closure gas monitoring.

Five end-use options were initially proposed and potential Interested and Affected Parties (I&APs), were provided with an opportunity to comment on them or recommend additional end-use options. Based on the comments received from I&APs and the feasibility of the proposed end-uses, the list of end-uses was narrowed down to the three most feasible options:

Option 1: Open space Open space green landscaping, preferably using indigenous vegetation, coupled with a community upliftment project.

Option 2: Methane gas extraction for generation of electricity (Figure 1).

Option 3: No-go (i.e. no closure, rehabilitation or monitoring, and no authorised end-use) as required in terms of NEMA.

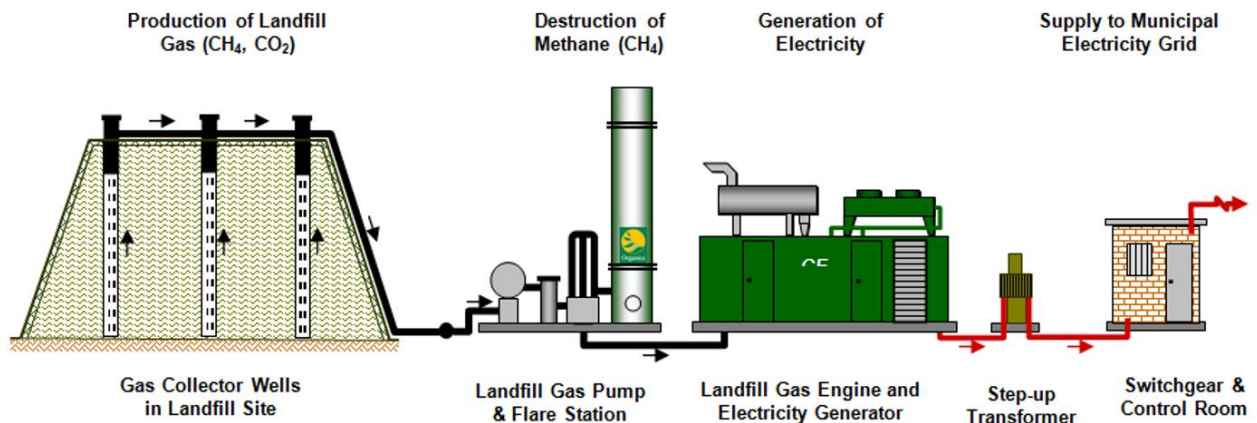


Figure 1 | Representation of the typical landfill gas to power infrastructure (Source: Royal HaskoningDHV)

PUBLIC PARTICIPATION PROCESS (PPP)

The PPP to date included the distribution of a Background Information Document (BID) requesting feedback and input on the proposed end-use options. The identified I&APs included landowners and occupiers of the site and adjacent to the site, ward councillors, local and district municipalities, organs of state, local ratepayers, local heritage associations, interest groups and relevant State departments. Advertisement of the availability of the BID was placed in two local newspapers (*Die Eikastad Nuus* and *Stellenbosch Gazette*) as well as one provincial newspaper (*Die Burger*). Site notices were placed at the existing access road to the site off Devon Valley Road, and at the proposed access road off the R310. A3 notices were also erected at the office building at the landfill and at the Stellenbosch Public Library notice boards.

All I&APs were notified of the availability of the Draft Basic Assessment Report (BAR) providing opportunity to comment. The Draft BAR was made available for comment until 9 January 2015 at the Stellenbosch municipal office, the Stellenbosch Public Library, and the Stellenbosch University Library. In addition a digital version was uploaded onto the Aurecon website (<http://www.aurecongroup.co.za/en/public-participation.aspx>) and Stellenbosch Municipality website (www.stellenbosch.gov.za click on Have your Say) for perusal and download.

Following this a public meeting was held on 11 November 2014 during which the findings of the Draft BAR were presented. All comments received during the comment period were recorded in a Comments and Responses Report 2 (CRR2), along with responses from the project team and Stellenbosch Municipality. A copy of the CRR2 was circulated to I&APs who submitted comments and a copy is attached to the Final BAR.

SUMMARY OF IMPACT ASSESSMENT

Potential environmental and social impacts associated with the proposed decommissioning and

rehabilitation was assessed and a summary of the potential impacts are provided below.

Construction phase impacts

The majority of impacts associated with both Options 1 and 2 during construction could be reduced to between **very-low** and **low (-)**.

For both options, the water quality impairment, loss of aquatic habitat and flow modification impacts could change from a negative to a positive impact by re-establishing a 30 m riparian zone along the Veldwagters River.

An additional positive impact associated with Options 1 and 2 would be employment opportunities (**medium (+)**). Option 1 would result in the improvement to the cultural landscape (**low (+)**). Option 2 would result in the utilisation of the methane instead of venting it into the atmosphere and would assist in reducing demand on the national grid to power the Waste Water Treatment Works (WWTW) (**low (+)**).

Operational phase impacts

During the operational phase, the majority of impacts associated with both Options 1 and 2 could be reduced to between **very low (-)** and **low (-)**. The positive impacts anticipated for the operational phase are employment opportunities, the visual impacts associated with the rehabilitated vegetation on site and public amenity, and ongoing improvement to cultural landscape (solely Option 1).

Decommissioning phase impacts

Option 2 might require infrastructure to be removed from site once the landfill gas resource is depleted. The significance of anticipated impacts could all be reduced to between **low (-)** and **very low (-)** with mitigation. The impact on cultural landscape is expected to improve to **high (+)** during the decommissioning phase. The visual impacts associated with construction machinery, dust, lighting at night vehicles is expected to be **low (-)**, depending on the scale of the infrastructure to be removed. Moreover, visual impacts associated with vehicles entering and leaving the site during the decommissioning phase is expected to be **medium (-)**.

No-go option

The majority of the potential impacts associated with the No-go alternative are expected to be of **high (-)** significance and cannot be mitigated if this alternative is implemented. The geotechnical impacts are expected to be of lower significance.

FINAL BAR END-USE ALTERNATIVES

The three options mentioned above have subsequently been refined and has be considered as design alternatives in the final BAR stage. These are:

Alternative 1: Open space green landscaping, preferably using indigenous vegetation, coupled with a community upliftment project.

Alternative 2: Methane gas extraction to energy to be supplied to the WWTW.

Alternative 3: No-go (i.e. no closure, rehabilitation or monitoring, and no authorised end-use) as required in terms of NEMA.

The Stellenbosch Municipality has made a decision on the final end use for the site. Taking into consideration comments from the public, commenting authorities as well as specialist

recommendations, Alternative 2 (methane gas extraction to energy to be supplied to the WWTW) coupled with Alternative 1 (greening of the site) was chosen as the final end use. As such, the combination of Alternatives 1 and 2 is the preferred Alternative. Therefore the Preferred Alternative has been assessed against Alternative 3 (No-go).

Alternative 1 + 2 = Preferred Alternative

Royal HaskoningDHV (RHDHV) was appointed in April 2017 by SM to conduct a due diligence study and develop a design for the landfill gas generation facility. Three (3) location options for the proposed generation compound were investigated. Option 1 and 2 are located within the existing Waste Water Treatment Works (WWTW) situated adjacent to the landfill site. Option 3 is to be located on the Stellenbosch Landfill site near to the main entrance gate which allows for the shortest length for the piping of the landfill gas. The transmission line options were further split into two options, Option 3a and Option 3b. Option 3a is to connect to the WWTW network via Medium Voltage (MV) overhead or underground line/s. Option 3b is to connect to the nearest Municipal connection point near the entrance of the landfill approximately 50m away. The study recommended (which has subsequently been approved by SM) that Option 3 - power compound to be developed on the landfill site, and Option 3b the transmission line to connect to the nearest Municipal connection point. Therefore only these preferred options have been assessed in this report. More detail is explained below in Section A: Activity Information.

A series of extensions on the submission of the FBAR has been granted by DEA&DP until 31 May 2017. During this time, the NEMA EIA regulations have changed, and the NEMA 2014 EIA regulations and 2017 amendment regulations are currently in effect. However 52 (1) of the NEMA EIA regulations regarding transitional arrangement allows an application submitted under the 2010 EIA regulations, to continue applying for the same listed activities i.e 2010 Listing Notices GN. R544 and GN R.546. Furthermore both the 2010 and 2014 listing notices, as amended have been considered.

Table 1 | Summary of significance of potential impacts with and without mitigation

Potential Construction Phase Impacts		Significance without mitigation	Significance with mitigation
1.	Slope stability		
	Open space green landscaping	Low (-)	Low (-)
	Methane gas extraction to energy	Low (-)	Low (-)
2.	Soil Erosion		
	Open space green landscaping	Very low (-)	Very low (-)
	Methane gas extraction to energy	Very low (-)	Very low (-)
3.	Settlement of Waste		
	Open space green landscaping	Very low (-)	Very low (-)
	Methane gas extraction to energy	Very low (-)	Very low (-)
4.	Groundwater contamination		
	Open space green landscaping	Medium (-)	Low (-)
	Methane gas extraction to energy	Medium (-)	Low (-)
5.	Water quality impairment		
	Open space green landscaping	Low (-)	Low (+)
	Methane gas extraction to energy	Low (-)	Low (+)
6.	Loss of aquatic habitat		
	Open space green landscaping	Very low (-)	Low (+)
	Methane gas extraction to energy	Very low (-)	Low (+)
7.	Flow modification		
	Open space green landscaping	Very low (-)	Low (+)

	Methane gas extraction to energy	Very low (-)	Low (+)
8.	Creation of employment opportunities		
	Open space green landscaping	Medium (+)	Medium (+)
	Methane gas extraction to energy	Medium (+)	Medium (+)
9.	Loss of income for waste pickers		
	Open space green landscaping	High (-)	Low (-)
	Methane gas extraction to energy	High (-)	Low (-)
10.	Cultural landscape		
	Open space green landscaping	Low (-)	Low (+)
	Methane gas extraction to energy	Low (-)	Low (-)
11.	Nuisance impacts		
	Open space green landscaping	Low (-)	Low (-)
	Methane gas extraction to energy	Low (-)	Low (-)
12.	Visual Impacts		
	Open space green landscaping	Medium (-)	Low (-)
	Methane gas extraction to energy	Medium (-)	Low (-)
13.	Air quality impacts		
	Open space green landscaping	N/A – not modelled	N/A – not modelled
	Methane gas extraction to energy	N/A – not modelled	N/A – not modelled
Potential Operational Phase Impacts		Significance without mitigation	Significance with mitigation
1.	Slope stability		
	Open space green landscaping	Medium (-)	Low (-)
	Methane gas extraction to energy	Medium (-)	Low (-)
2.	Soil Erosion		
	Open space green landscaping	Low (-)	Very low (-)
	Methane gas extraction to energy	Very low (-)	Very low (-)
3.	Settlement of Waste		
	Open space green landscaping	Low (-)	Very low (-)
	Methane gas extraction to energy	Medium (-)	Low (-)
4.	Groundwater contamination		
	Open space green landscaping	Medium (-)	Low (-)
	Methane gas extraction to energy	Medium (-)	Low (-)
5.	Employment opportunities		
	Open space green landscaping	Low (+)	Medium (+)
	Methane gas extraction to energy	Low (+)	Medium (+)
6.	Cultural landscape		
	Open space green landscaping	Medium (+)	High (+)
	Methane gas extraction to energy	Low (+)	Medium (-)
7.	Visual Impacts – rehabilitated vegetation and public amenity		
	Open space green landscaping	High (+)	High (+)
	Methane gas extraction to energy	High (+)	High (+)
8.	Visitors parking and increased traffic		
	Open space green landscaping	Low (-)	Very low (-)
	Methane gas extraction to energy	N/A	N/A
9.	Visual impacts – gas flaring at night		
	Open space green landscaping	N/A	N/A
	Methane gas extraction to energy	Medium (-)	Low (-)
10.	Visual impacts – maintenance vehicles entering and leaving site		
	Open space green landscaping	N/A	N/A
	Methane gas extraction to energy	Low (-)	Low (-)
11.	Ambient PM10 and benzene air quality impacts		
	Open space green landscaping	Low (-)	N/A

	Methane gas extraction to energy	Low (-)	N/A
12.	Ambient NO₂ air quality impacts		
	Methane gas extraction to energy	Medium (-)	Low (-)
Potential Decommissioning Phase Impacts		Significance without mitigation	Significance with mitigation
1.	Slope stability		
	Methane gas extraction to energy	Medium (-)	Low (-)
2.	Soil Erosion		
	Methane gas extraction to energy	Low (-)	Very low (-)
3.	Settlement of Waste		
	Methane gas extraction to energy	Neutral	Neutral
4.	Groundwater contamination		
	Methane gas extraction to energy	Medium (-)	Low (-)
5.	Cultural landscape		
	Methane gas extraction to energy	Medium (+)	High (+)
6.	Visual Impacts		
	Methane gas extraction to energy - Vehicles entering and leaving the site	Medium (-)	Medium (-)
	Methane gas extraction to energy - Construction machinery, dust and lighting at night	Medium (-)	Low (-)
Potential No-go Impacts		Significance without mitigation	Significance with mitigation
1.	Slope stability		
	No-go alternative	Medium (-)	N/A
2.	Soil Erosion		
	No-go alternative	Medium (-)	N/A
3.	Settlement of Waste		
	No-go alternative	Very low (-)	N/A
4.	Freshwater impacts		
	No-go alternative	High (-)	N/A
5.	Groundwater contamination		
	No-go alternative	High (-)	N/A
6.	Socio-economic impacts		
	No-go alternative	High (-)	N/A
7.	Cultural landscape		
	No-go alternative	High (-)	N/A
8.	Visual impacts		
	No-go alternative	High (-)	N/A

CONCLUSIONS AND EAP RECOMMENDATION

The EAP is of the opinion that both Alternatives 1 and 2 (**Preferred Alternative**) do not result in significant impacts post mitigation. Therefore the Preferred Alternative (a combination of both alternatives) could be implemented as the proposed end-uses. This conclusion is based on the assumption that the Stellenbosch Municipality would implement the mitigation measures included in the Environmental Management Plan (EMP).

Way forward

The Final BAR will be available from **30 May 2017 until 30 June 2017** for a 30-day review period at the Stellenbosch Municipal Offices (71 Plein Street), the Stellenbosch Public Library (Plein Street), and the JS Gericke Stellenbosch University Library (Victoria Street). The Final BAR is also accessible from the

Aurecon website (<http://www.aurecongroup.co.za/en/public-participation.aspx>) and from the Stellenbosch Municipality website (www.stellenbosch.gov.za click on Have your Say).

If you would like to obtain more information, submit any comments or register as an Interested and Affected Party, please contact **Tamryn Johnson** on or before 30 June 2017.

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