

# FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

FOR

## THE PROPOSED MALUTI-A-PHOFUNG LANDFILL SITE

### Location

Portion 110 of the Farm Witsieshoek, 1903 at Phuthaditjhaba (QwaQwa), which falls under the Maluti-A-Phofung Local Municipality in the Free State Province.

### THE FREE STATE PROVINCE DEPARTMENT OF ECONOMIC DEVELOPMENT, TOURISM AND ENVIRONMENTAL AFFAIRS' APPLICATION REF

WML/EIA/10/2014

Client: Maluti-A-Phofung Local Municipality

Prepared by



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ENVIRONMENTAL PROTECTION &  
INFRASTRUCTURE PROGRAMMES



EXPANDED PUBLIC WORKS PROGRAMME



## **EXECUTIVE SUMMARY**

### **INTRODUCTION**

Tholoana Consulting was appointed by All Green Consultants (who were appointed by the DEA on behalf of MAP Local Municipality), to act as independent EAP's, thus managing the waste management license application for the proposed the Maluti-A-Phofung (MAP) landfill site.

The National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) regulations of 2010 identify two separate administrative processes for EIAs, depending on the nature of the activity. A Basic Assessment process is identified for those activities that have less of a possible detrimental impact to the environment. A Scoping and EIA process is necessary for those activities, which are identified as having more significant negative detrimental impact on the environment, A Scoping and EIA process is required for this project. The following sections summarise the scoping and the EIA activities that have been undertaken.

The proposed MAP landfill site Waste Management License application follows the Scoping/EIA process as per the National Environmental Management Act (No: 107 of 1998), EIA Regulations of 2010. The applicant for the proposed landfill site is the Maluti-A-Phofung Local Municipality.

### **PHASE 1: SCOPING PHASE/ENVIRONMENTAL IMPACT ASSESSMENT PROCESS**

In terms of applicable Environmental Legislation, the proposed Maluti-A-Phofung Landfill site triggers the following activities in line with National Environmental Management: Waste Act (59 of 2008), List of waste management activities that have or are likely to have, a detrimental effect in the environment.

- GN 921, 29 November 2013, Category B - Activity 8, 9 and 10.

The triggered activities require a Scoping/EIA approach to be followed in accordance with the National Environmental Management Act (107 of 1998), EIA regulations 2010 for the Waste Management License process. The relevant competent authority for the Waste Management License process is the Department Of Economic Development, Tourism And Environmental Affairs (DETEA), Free State province.

As part of the application that was submitted to the Competent Authority on the 19th September 2014, the proposed Landfill Site has been allocated the following reference number: WML/EIA/10/2014. Furthermore, the following processes, including the Public Participation Process were undertaken for the proposed landfill site:

- ❖ First Public Participation process aimed at identifying Interested or Affected parties. Invitations were done via, a newspaper advert in the Eastern Free State Issues (13th November 2014), Background Information Documents sent/delivered to the Local Authority (13th November 2014), notification Posters were placed on site and along the proposed access route (13th November 2014), and notification Posters were placed at Public facilities (Libraries – Phuthaditjhaba, Kestel, Harrismith and Clinics).
- ❖ The Background information Document was further sent to Department of Water and Sanitation and the Free State Heritage Agency.

The second Public Participation Process of the scoping phase for the availability of the Draft Scoping Report was done in the following manner

- ❖ The availability of the Draft Scoping Report was advertised on the Eastern Free State Issue (29th January 2015).
- ❖ Notifications (Poster), with hard copies of the report were delivered at Phuthaditjhaba, Kestel and Harrismith Library.
- ❖ Hard copies were delivered to the Free State Heritage Agency and DWA.
- ❖ Knock and drops of notifications (pamphlets) were delivered to households in close proximity of the proposed location.
- ❖ Notification emails including hard copy deliveries to the Local Authority were also done.
- ❖ Two meetings were held with the Department of Water and Sanitation officials on the following dates respectively (on 2<sup>nd</sup> December 2014 and 16<sup>th</sup> February 2015). Further to that a presentation was made to the Wilge Forum at a meeting held at Reitz on the 19<sup>th</sup> May 2015.

The comments received from I&APs and the Free State Heritage Agency are contained in the issues and response report that forms part of this assessment. Based on submissions done to DETEA Free State province, the Scoping Report was approved on 5<sup>th</sup> June 2015.

In light of the approval from the CA, this assessment is the EIA phase of the proposed landfill site which constitutes the EIA report and the Environmental Management Programme.

## **PHASE 2: ENVIRONMENTAL IMPACT REPORT (EIR)**

This report represents the EIR for the project and builds on the findings of the Scoping Phase. The EIR contains all information that is necessary for the competent authority to consider the application and to reach a decision. It details the process followed during the EIA Phase including details of the PPP and an assessment of each identified potentially significant impact. An Environmental Management Programme (EMPr) for the mitigation of impacts is provided within this EIR. The EMPr will attempt to mitigate the construction- and operational related impacts of the proposed waste disposal site.

The draft EIR was made available for public review from 02 July 2015 to 07 September 2015. No public meeting and focus group sessions were held, as Tholoana Consulting did not receive any comments that could trigger the meeting.

As a result of the additional studies conducted (Visual Impact Assessment and Palaeontological Impact Assessment), the findings and recommendations from the studies were incorporated in this Final EIR and EMPr.

## **IDENTIFIED IMPACTS**

The impacts identified during the Scoping Phase are based on interactions with the relevant stakeholders, the comments received during the Public Participation Process as well as the desktop and specialist studies conducted. The following studies have been undertaken:

- ❖ Ecological Scan.
- ❖ Geotechnical Assessment.
- ❖ Heritage Impact Assessment.

- ❖ Ornithological Assessment ( to determine the status of the White-Bellied Korhaan – *Eupodotis senegalensis* and South Bald Ibis – *Geronticus calvus* in the project area).
- ❖ Design Report.
- ❖ Visual Impact Assessment
- ❖ Palaeontological Impact Assessment

The findings and recommendations contained in the above assessments and reports of the studies done are discussed in detail within the EIA report.

## **RECOMMENDATIONS AND CONCLUSION**

Since there were no comments received on the draft EIR and draft EMPr that triggers the need to have focus group meetings and a public meeting, the only new information that was received from two specialist studies (Visual Impact Assessment and Palaeontological Impact Assessment) have been incorporated in this final EIR and EMPr. All other recommendation proposed in the final EIR and EMPr will empower the Competent Authority (DETEA) to make an informed decision on whether to grant or refuse Authorisation for the proposed landfill site.

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**LIST OF ABBREVIATIONS**

- BID - Background Information Document
- DEA - Department of Environmental Affairs (national)
- DETEA - Department of Economic, Tourism and Environmental Affairs (provincial)
- DWS - Department of Water and Sanitation
- EAP - Environmental Assessment Practitioner
- EIA - Environmental Impact Assessment
- EIR - Environmental Impact Report
- EMP - Environmental Management Plan
- EPIP - Environmental Protection and Infrastructure programme
- EPWP - Expanded Public Works Programme
- GNR - General Notice Regulation
- I&APs - Interested and/or Affected Parties
- IDP - Integrated Development Plan
- MAP - Maluti-A-Phofung Local Municipality
- NEMA - National Environmental Management Act (Act 107, 1998)
- PPP - Public Participation Process

## DEFINITIONS

"Alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to property, activity, design or technology.

"Applicant" means a person (including juristic person) who has submitted or intends to submit an application;

"Cumulative impact", in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

"Environmental impact assessment", in relation to an application to which scoping must be applied, means the process of collecting, organizing, analyzing, interpreting and communicating information that is relevant to the consideration of that application. A detailed study of the environmental consequences of a proposed course of the action, an environmental assessment or evaluation is a study of the environmental effects of a decision, project, undertaking or activity. It is most often used within an Integrated Environmental Management (IEM) planning process, as a decision support tool to compare different options" (DEAT, 1998)

"Environmental management plan" means an environmental management plan in relation to identified or specified activities envisaged in Chapter 5 of the Act and described in regulation 34;

"Guidelines" means any national guidelines and provincial guidelines issued in terms of Chapter 8 of these Regulations.

"hazardous waste" means any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological of that waste, have a detrimental impact on health and the environment.

"Interested and Affected Party" means an interested and affected party contemplated in section 24(4) (d) of the Act, and which in terms of that section includes -

- a) any person, group of persons or organization interested in or affected by an activity;  
and
- b) any organ of state that may have jurisdiction over any aspect of the activity;

"Public Participation Process" means a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters;

"Registered Interested and Affected Party", in relation to an application, means an interested and affected party whose name is recorded in the register opened for that application in terms of regulation 57.

"Significant impact" means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment;

"Stakeholder", refers to a group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities and all I&APs.

"The Act" means the National Environmental Management Act, 1998 (Act No. 107 of 1998).

"Authority", refers to the national, provincial or local authorities that have a decision-making role or interest in the proposal or activity. The term includes the lead authority, as well as other authorities.

"Waste treatment facility" means any site that is used to accumulate waste for the purpose of storage, recovery, treatment, reprocessing, recycling or sorting of that waste.

"Recycle" means processing used materials into new products to prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air pollution ( from incineration) water pollution from (Landfilling) by reducing the need

"Landfill" means a structure that is used for the inputting of waste, it is a site where waste materials are deposited for the purpose of final disposal and may be built on top of the ground or into the ground. It should be constructed in such a way that it minimizes contact between the environment and any water bodies that may be near the site, a landfill has many factors that may potentially harm the environment and care should be taken to ensure that little to no contact takes place between the landfill and the environment.

## DETAILS OF EAP WHO COMPILED THE REPORT

### EAP DETAILS

Tholoana Consulting brings together a team of dedicated professionals scientists, environmental managers and practitioners who have many years of combined experience in environmental services, including waste management licenses. Tholoana Consulting provide comprehensive Integrated Environmental Management services to a broad range of clients throughout the African continent and other international countries.

Mr Vusmuzi Hlatshwayo and Mr Junior Nkuna are both members of Tholoana Consulting and are project managers for the application.

### EXPERTISE OF EAP TO CARRY OUT AN ENVIRONMENTAL IMPACT ASSESSMENT

Tholoana Consulting has been involved in successful waste management facilities developments, one of which includes the waste management license acquired for the Msibi Bio-Plant located in Westonaria, Gauteng province. Tholoana Consulting is also a member of the Institute of Waste Management of Southern Africa.

#### i. Mr Vusmuzi Hlatshwayo

Mr Vusmuzi Hlatshwayo is the project manager responsible for this application. He has a National Diploma in Environmental Sciences obtained from Tshwane University of Technology in Pretoria. He is also a full member of the International Association for Impact Assessment (South Africa) and is an Environmental Assessment Practitioner within Tholoana Consulting. In addition, Mr Vusmuzi Hlatshwayo was involved in the following projects: Madiba Heights (mixed-use development), Msibi Bio-Plant (waste management application, and a BAR), and Refliwe Hostel Development (Environmental Management Programme Report). His details are as follows:

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**ii. Mr JD Nkuna**

Mr JD Nkuna is a co-project manager for this application and holds a Masters degree in Environmental Management. He was previously employed in the Department of Water Affairs for five years where he was dealing with EIA and mining EMPR applications. He recommended approval of hundreds of these applications and has interacted with a variety of clients and authorities, including the Provincial Department of Environmental Affairs and the then Department of Minerals and Energy. He later transferred to the Gauteng Department of Agriculture and Rural Development where he worked on Industrial Development applications for EIA and Mining EMPRs as a commenting authority. He dealt with thousands of mining EMPRs and EIAs.

He later joined Lungisa Consulting Engineers and Scientists where he was a consultant dealing with EIA applications. Mr Nkuna has acquired hands on experience in EIA processes and better understands the EIA processes from the Public and Private perspective. He was also responsible for air quality management in the Province of Gauteng and commented on a variety of atmospheric emission license applications as a commenting authority.

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## 1. INTRODUCTION

The Department of Environmental Affairs (DEA) appointed All Green Consultants CC, a (multi-disciplinary engineering consulting company) on behalf of the MAP Local Municipality to carry out project management services of the proposed MAP Landfill site.

The DEA's mandate is aligned with the Constitution of South Africa (No. 108 of 1996, Section 24). The proposed project is part of the DEA Environmental Protection and Infrastructure Programme (EPIP), specifically the working on waste project, which is implemented through the EPWP. The objectives of the EPIP are as follows:

- ❖ Better environmental management practices
- ❖ Job Creation
- ❖ SMME development &
- ❖ Skills development

The Working on Waste strategic objectives are outlined below.

- ❖ Create and support mechanisms for protection of environmental quality
- ❖ Create sustainable livelihoods through recycling of waste (minimising waste collection)
- ❖ Support the use of environmentally friendly waste disposal technology
- ❖ Promote environmental education and awareness to the communities especially as they are the main waste generators

These objectives are in line with the proposed development. A more detailed description of the proposed landfill site, associated infrastructures and its impacts thereof are discussed in this Environmental Impact Assessment Report.

### 1.1 PURPOSE OF STUDY

The EIA is a tool utilized to identify potential adverse impacts and positive impacts arising from various projects. The EIA is further used to provide information to the Competent Authority to assist them in reaching decisions on proposed activities for a

development. One important aspect that the EIA aims to achieve is ensuring that proposals and projects are carried out in a sustainable manner. The three sections that the EIA focuses on in relation to the project are the assessment of the Biophysical, Social and Economic environment.

The Scoping/EIA phases can be categorised into three sections being, the Scoping Phase; EIA phase and the Decision making phase. Included in the three sections are the Public Participation Process and the decision making process.

An EMPr is developed with the EIR to further manage and control potential adverse impacts of development on the environment. This is achieved by mitigation measures on potential impacts arising from the construction, operational and post-closure/closure or rehabilitation phases of the project development.

## **1.2 PURPOSE OF EIR REPORT**

The sole purpose of this EIR is to protect the environment by determining potential adverse impacts and positive impacts that may result from the proposed Maluti-A-Phofung Landfill Site activities. The public is further given the opportunity to give inputs, thus contributing to the decision making process of the proposed development.

The EMPr outlines measures that should be taken to avoid, eliminate and minimise impacts from the planned activities associated with the proposed landfill site establishment. The EIA is the final stage of the Scoping/EIA process, thus this EIR provides the following:

- ❖ Description of the proposed activity
- ❖ Description of environment that may be affected by the proposed activity
- ❖ Details on Public Participation process conducted, these are issues and concerns raised by Interested and Affected Parties (I&APs) during the public participation process.
- ❖ The need and desirability of the proposed activity
- ❖ Outline advantages and disadvantages of potential alternatives identified
- ❖ Impact assessment methodology for direct, indirect and cumulative impacts

- ❖ Summaries and recommendations of specialist studies conducted for the proposed activity.

### 1.3 EIA FORMAT

In order to ensure that the I&APs and the competent authority are able to go through the report without any hassles this report has been structured in accordance with Regulation 31 (2) of NEMA, EIA Regulations(2010), S 31(2) and contains the following:.

- (a) details of—
  - (i) the EAP who compiled the report; and
  - (ii) the expertise of the EAP to carry out an environmental impact assessment;
- (b) a detailed description of the proposed activity;
- (c) a description of the property on which the activity is to be undertaken and the location of the activity on the property,
- (d) a description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity;
- (e) details of the public participation process conducted in terms of sub regulation (1), including—
  - (i) steps undertaken in accordance with the plan of study;
  - (ii) a list of persons, organisations and organs of state that were registered as interested and affected parties;
  - (iii) a summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; and copies of any representations and comments received from registered interested and affected parties;
- (f) a description of the need and desirability of the proposed activity

- (g) a description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;
- (h) an indication of the methodology used in determining the significance of potential environmental impacts;
- (i) a description and comparative assessment of all alternatives identified during the environmental impact assessment process;
- (j) a summary of the findings and recommendations of any specialist report or report on a specialised process;
- (k) a description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- (l) an assessment of each identified potentially significant impact, including—
  - (i) cumulative impacts;
  - (ii) the nature of the impact;
  - (iii) the extent and duration of the impact;
  - (iv) the probability of the impact occurring;
  - (v) the degree to which the impact can be reversed;
  - (vi) the degree to which the impact may cause irreplaceable loss of resources; and
  - (vii) the degree to which the impact can be mitigated;
- (m) a description of any assumptions, uncertainties and gaps in knowledge;
- (n) a reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
- (o) an environmental impact statement which contains—
  - (i) a summary of the key findings of the environmental impact assessment; and

- (ii) a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives;
- (p) an environmental management programme containing the aspects contemplated in regulation 33;
- (q) copies of any specialist reports and reports on specialised processes complying with regulation 32;
- (r) any specific information that may be required by the competent authority; and
- (s) any other matters required in terms of sections 24(4)(a) and (b) of the Act.

#### 1.4 DETAILED DESCRIPTION OF THE PROPOSED ACTIVITY

The proposed development is the establishment of a landfill site to service the following three areas, Harrismith, Kestel and Phuthaditjhaba.

It is proposed that the new landfill site will have the following facilities:

- ❖ Recycling facility (and a Buy-Back center).
- ❖ Compost facility
- ❖ Inert waste disposal facility

The type of waste to be landfilled is general waste; no hazardous waste will be accepted at the landfill site. The proposed waste disposal site is classified as a General **(G)** Waste Landfill site. As per the design report conducted by All Green Consultants, the size of the landfill site is classified as large **(L)**. Furthermore there is a potential that the waste disposal site will generate leachate, which classifies the site as a B plus **(B+)** waste disposal facility. Therefore a leachate management system will be required for the landfill site.

The physical footprint of the proposed landfill site is estimated to be approximately 20 hectares. Subdivisions and rezoning processes will be done separately by the applicant. The design report calculates the life span for the landfill site facility to be approximately 20 years.

The proposed landfill site development requires the following engineering services infrastructure:

### **1.4.1 ELECTRICITY**

The proposed MAP landfill site requires electrical services for the following purposes:

- ❖ Lighting (internal & external).
- ❖ Power supply to buildings within the facility.
- ❖ Power supply to facility equipment's (weigh bridge etc.).

It is proposed that the MAP will supply the site with an 11Kv electrical supply. From the 11Kv electrical supply a 200kVA mini-substation will be installed on site, from which the energy will be supplied to the facilities within the landfill site.

### **1.4.2 WATER RETICULATION**

The water reticulation for the proposed MAP landfill site refers to the potable water supply, sewage system and storm-water management. The storm-water reticulation network will be placed along the verge of the road but the discharge will be further downstream. At the discharge point a headwall will be constructed together with gabion blocks and reno mattresses to assist in erosion prevention.

### **1.4.3 ACCESS ROAD**

Currently access to the site is via paved and gravel roads that goes through the Matsikeng suburb of Phuthaditjhaba. Internal roads will be built within the facility, with sufficient width for vehicular and pedestrian access. The specifications of the road are as follows:

- ❖ A 6m wide internal road.
- ❖ The access road covers a length of 30 metres outside the main gate and road leading to organic waste dumping (and composting) site, to the sorting facility and to the landfill cell.

### **1.4.4 BULK WATER AND SEWER**

A 200mm pipe is proposed for connecting into the existing bulk water supply network that supplies water to the nearby Tebang Township. In addition the design report determines

that there is a sewer line servicing the Tebang Township which will connect o with a 200mm pipe to the landfill site.

#### **1.4.5 OTHER INFRASTRUCTURE**

The proposed landfill site includes the following associated infrastructure and facilities:

- ❖ Perimeter fencing
- ❖ Remote-controlled gate
- ❖ Security guard house
- ❖ Administration block with ablution facilities, computers, and workshop
- ❖ Platform station
- ❖ Recycling facilities and sorting facilities
- ❖ Constructions of landfill cells and leachate management
- ❖ Un-surfaced access road, ring road and storm-water drainage management system.

The proposed infrastructure is described in details in the All Green Consultants' Design Report (Appendix D).

## **2. A DESCRIPTION AND LOCATION OF THE ACTIVITY ON THE PROPERTY**

The development site for the proposed Maluti-A-Phofung landfill site is located in the east of Phuthaditjhaba on Portion 110 of the Farm Witsieshoek, 1903 at Phuthaditjhaba (QwaQwa) which falls under the Maluti-A-Phofung Local Municipality in the Free State Province, South Africa. The area is located along the banks of the Elands River and a section of the Drakensburg Mountains. Phuthaditjhaba is bordered by the following areas:

- ❖ South East – KwaZulu-Natal
- ❖ South West – Lesotho

The registered size of the property is approximately 642 Ha; however the landfill site will occupy only 20 Ha of the total size. The property is owned by the MAP Local Municipality.

The proposed site is zoned for agricultural, although the land is not compatible for crop farming and has little value for animal grazing.



**FIGURE 1 - GOOGLE IMAGE OF LOCATION FOR PROPOSED MAP DISPOSAL SITE**





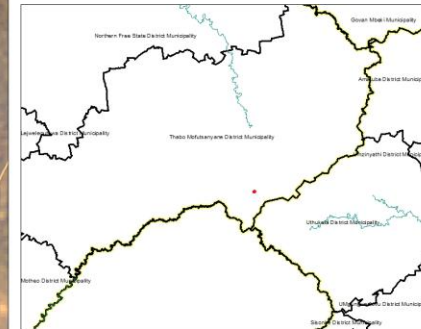
FIGURE 2 – LOCALITY MAP FOR THE PROPOSED MAP LANDFILL SITE

Locality Map for the PROPOSED LAND FILL SITE

PREPARED BY:



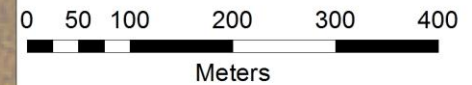
DATE: 23 FEBRUARY 2015



**Legend**

- 100 meter\_Buffer
- Farm portions
- Proposed Site
- Parent farms
- Contour Line

1 centimeter = 20 meters



### **3. A DESCRIPTION OF THE ENVIRONMENT THAT MAY BE AFFECTED**

Landfills and the surrounding areas are often heavily polluted. Landfill can pollute the water, the air, and also the soil. It is difficult to keep dangerous chemicals from leaching out into the surrounding land. Dangerous chemicals can spread into the water table or into waterways.

Landfill can attract animals and insects such as raccoons, rats, mosquitoes and cockroaches, Landfill can also cause sicknesses, illnesses, and diseases which might spread in communities. Landfill can increase the chances of global warming by releasing methane, a dangerous greenhouse gas. Landfills are taking up lots of our land and that can also take away habitats for other animals. Landfills contain a lot of kitchen scraps and organic material. As the landfill is constantly being covered with new garbage, the organic material decomposes anaerobically (that is, without air). Anaerobic decomposition produces methane, which is a 20 times more dangerous greenhouse gas than carbon dioxide. Landfills require large land space and may interfere with cultural and heritage sites of significance.

The EIA aims to adequately identify and mitigate these impacts so that landfills coexist with nature and the physical, biological, social, economic and cultural aspects of the environment.

This section focuses on the receiving environment where the proposed landfill site will be constructed and how the receiving environment will be affected by the proposed activity.

#### **3.1 GEOLOGY AND SOIL**

According to the geotechnical investigation conducted by JB Consult (Appendix G) the site is underlain by alternating bands of mudstone, siltstone and sandstone, very typical of the Ecca Group of the Karoo Super-group. The study further highlights that in most of the Karoo sedimentary rock there is presence of Dolerite intrusions as sills. However during the excavations of the test pits there was no sign of dolerite present on the proposed site. The potential negative impact in line with any intrusions on the proposed site is groundwater pollution.

In conclusion the investigation indicates perched water levels may result on the drainage area during rainy seasons. The potential impact as a result is soil erosion, thus eroded soil may be carried into storm water drains or water bodies.

Soil profiles for the proposed site are as follows:

**Table 1 - Soil profiles**

Depth (m)	Classification
0 - 0.3	Brown, medium dense, silty sand. Topsoil.
0.4-1.0	Brown, medium dense, silty sandy reworked Sandstone/Siltstone. Ferricrete Layer.
1.0- 1.8	Yellow/red, very dense silty sand. Residual Sandstone.
1.8 - 3.0	Olive Brown and purple, firm clayey silt. Residual Siltstone.

### 3.2 CLIMATE

According to the Maluti-A-Phofung Draft Spatial Development Framework (SDF) 2013, the study area normally receives about 653mm of rain per year, of which most of the rainfall occurs during mid-summer. The rainfall pattern indicates that the lowest rainfall is experienced in June and the highest rainfall in January. The average daily temperatures for the Phuthaditjhaba region indicate that the area is cold during July when temperatures could drop down to 0.10<sup>o</sup> C. Thus snowfalls are common within the MAP areas. During the summer period the average temperatures of the area vary from 14<sup>o</sup> to 32<sup>o</sup>.

The rainy seasons as per the geological investigation will result in perched water levels within the proposed site, which in turn may result in soil erosion. The disposing of waste by landfilling results in the generation of methane gas, which changes the climatic conditions of the area. Methane is regarded as being 20 times more dangerous compared carbon dioxide. In a nutshell the methane gas results in air pollution. The change in air quality is looked at from a

global perspective. This contributes to the climate change, which in turn influences rainfall patterns and temperature.

### **3.3 SURFACE AND GROUND WATER**

The proposed MAP landfill site area falls within the Upper Vaal Water Catchment area. The site is bordered by the Elands River to the West, North and Eastern with the distance from the river to the boundaries of the property measured to be approximately 700 metres. The river flows northwards passing Phuthaditjhaba from its uppermost section of the Fika-Patso dam to join the left bank of the Wilge River.

According to the Draft SDF 2013, the groundwater for Phuthaditjhaba has been determined to be limited due to the scattered dolerite dykes within the area.

The MAP disposal site is classified as a GLB+, thus has a potential of generating leachate, which poses a threat to the groundwater of the area. Possible groundwater pollution is a potential impact resulting from leachate generated at the disposal site. Other possible sources of surface water pollution would be fuel leaks and lubricants and surface water run-off, which may result in sedimentation.

### **3.4 ECOLOGICAL CHARACTERISTICS**

As per the MAP SDF 2013, the site is not located on any area marked as ecologically sensitive. Furthermore due to overgrazing activities around the MAP area, the general land cover for Phuthaditjhaba is classified as degraded unimproved grasslands. The potential impact on ecological characteristics of the site, relates to the loss of natural habitat. This in turn results in the loss of indigenous vegetation and/or a reduction in faunal species that are near threatened and endangered.

See Appendix E – Ecological Scan.

### **3.4.1 FAUNA**

Tholoana Consulting appointed Eco Assessments to conduct an ecological scan of the proposed developmental area (Appendix E). Two bird species, one classified as Vulnerable and the other as Threatened, may be found on the site. These species were identified as Blue Korhaan and the Southern Bald Ibis.

In order to investigate the bird species as identified by Eco Assessments, Tholoana Consulting appointed Delta Environmental Consultants to do an ornithological assessment for the proposed MAP landfill site. The assessment reveals that a group of four Southern Bald Ibis flew to the proposed landfill site during the early morning hours heading in an easterly direction. The population of the Southern Bald Ibis is known to be vulnerable. The other species that was spotted closer to the site is the Blue Korhaans species of bird. The species population is near-threatened.

Furthermore rocky outcrops are existent on site where reptile species may be found (Appendix H).

### **3.4.2 FLORA**

In terms of the Flora, the habitat was found to have a low biodiversity consisting mainly of grazed grassland on a small plateau between two streams (Appendix E). The habitat consists of natural grassland species, although it seems like the grassland may have previously been ploughed, as contour walls were visible all over the site. Furthermore there are signs of grazing activities, which may have altered the habitat further.

## **3.5 TOPOGRAPHY**

The MAP area is situated on the Drakensberg escarpment. The altitude for the proposed site is approximately 1780m above sea level. As per the MAP SDF 2013 the growth of towns within the Phuthaditjhaba area has been limited towards the southern side of the area due to steep slopes, as a result the proposed location is not within any area demarcated for developments. Looking

at the morphology of the area, the site is classified under low mountain areas. The gradient of the site is determined to be 4-6%.

The topography of an area influences the location and layouts of buildings. In areas where the topography is flat, it is unlikely to have an effect on the location and layouts of buildings, thus this feature is the most significant in terms of the design/layout of developments.

The excavation activities have a negative impact in increasing the risk of erosion, altering soil stability and water run-off patterns. The proposed landfill site will negatively impact the topography of the area as it will alter the landscape as a result of the nature of activities that will take place during the construction and operational phases.

### **3.6 CULTURAL HERITAGE RESOURCES**

Vhufa Hashu Heritage Consultants performed a Heritage Impact Assessment. The assessment revealed that no further studies or mitigations are recommended because there are no known archaeological remnants or artefacts of historical significance that appear on site (Appendix F – Heritage Impact Assessment). The findings of the survey did reveal that there are contemporary remnants of two brick and concrete livestock

These findings serves as evidence of previous surface disturbance such as cultivation rills, contouring, gravel roads that pass through the site and sand mining activities.

The Heritage Impact Assessment report recommends that in case any archaeological or other cultural resources are discovered during the phases of development, the heritage authorities should be informed. The potential impact with regards to Cultural Heritage Resources is the loss of Heritage artefacts, which may be of high cultural significance within Phuthaditjhaba.

According to the Palaeontological Impact Assessment (PIA) conducted by Dr H. Fourie, the proposed site for the disposal site development is underlain by siltstone, sandstone and mudstone of the Karoo Supergroup. The assessment further highlights that the Karoo Supergroup, specifically the Tarkastad Subgroup is renowned for its fossil wealth. The Tarkastad Subgroup of the Beaufort Group consists of a lower predominantly arenaceous Katberg Sandstone Formation and a predominantly upper argillaceous Burgersdorp Formation (Kent 1980, Cole et al. 2004) within which fossils are abundant. (Appendix J).



### **3.7 LAND USE ZONING**

The property for the proposed landfill site is currently zoned for agriculture. In order for the landfill site to be located at the identified site, its zoning rights will have to be changed. Therefore, a town planning application will have to be made to the relevant Competent Authority. This town planning process will run concurrently with the EIA phase. The change in the type of land use to suit the proposed landfill site may result in the loss of land to be used for agricultural activities, which further influences the Economy of Phuthaditjhaba, although the benefits of developing a waste disposal site outweighs the cost of not developing the site for that purpose

### **3.8 SURROUNDING LAND USES**

Within a 500m radius of the proposed site is a vacant land, which constitutes grazing land predominantly. There is an area of land where it seems current and past sand mining activities were undertaken. These impacts are located approximately seven kilometres from the proposed site. There is grazing that has been observed and it appears that the locals of the area use the site for grazing. The potential impact relating to the establishment of the landfill site would be the loss of grazing land. However, this impact may be mitigated by relocating grazing animals to another suitable land.

### **3.9 AGRICULTURAL POTENTIAL**

The site occurs to have been used historically for agricultural activities. Currently there are grazing activities taking place on the site. It is important to note that Phuthaditjhaba is well known for communal grazing. According to the land capability map in the MAP 2013 SDF the site is located in a non-arable land, and thus has no agricultural value.

### **3.10 SOCIO-ECONOMIC ENVIRONMENT**

#### **3.10.1 DEMOGRAPHICS**

##### **3.10.1.1 POPULATION SIZE AND GROWTH**



According to the MAP IDP (2013/14) the municipality has the highest population density of Thabo Mofutsanyana District. It also has the 3<sup>rd</sup> highest population density within the Free State province. The Maluti-A-Phofung population, according to the 2001 Census, the 2007 Community survey and the 2011 Census is as follows:

- ❖ The 2001 Census study estimated the population size as 360 787. In addition the 2007 Community survey estimated the population size as 385 413, whereas the 2011 Census estimated a number of 335 785.

There seems to be a decline in the population of the MAP area. The 2013/14 MAP IDP statistics indicate that there are more females within the MAP region as compared to males.

The population is also comprised of youth, predominantly. However the number has dropped from the 2001 Census due to the migration of youth to other provinces to look for jobs and/or death.

The population of an area is influenced by Job opportunities and security. The potential impact as a result of the disposal site would be a high influx of people seeking jobs, which in turn would increase risks relating to HIV/AIDS and crime.

### **3.10.1.2 ECONOMIC**

The MAP IDP (2013/14) indicates that unemployment sits at more than 50% of the community; and of those who are economically active (62%), 25% earn approximately R400 per month and about 12.5% earn approximately R 800 per month. Furthermore, the majority of the community within the area depends on subsistence farming and/or cultivating backyard gardens for a living. Other forms of income are: arts and craft, beadwork, sculpting, pottery, entertainment, cultural heritage projects, and Bed & Breakfasts.

The proposed disposal site will boost the local economy of the area by providing jobs to the qualified personnel. The proposed buy-back centre (Recycling facility) also increases the opportunity for locals to earn income from recycled waste.

### 3.10.1.3 EDUCATION

According to the MAP IDP (2013/14) the level of schooling and education within the MAP seems to be fairly balanced. The following 2011 Census statistics underscore this point: About 8.9% of individuals aged 20+ are not schooled, while, individuals of 20+ years who do have a higher education are estimated at 7.9% of the population.

### 3.10.1.4 HEALTH

The MAP IDP 2013/14 indicates that air quality hotspot areas have been identified and these have a potential to negatively impact on the health of the communities of surrounding areas. It is anticipated that the health impacts with regards to the landfill site will be limited only to personnel onsite. Health impacts due to the disposal site are in relation to the change in air quality of the area (Methane and Dust), which further results in respiratory illnesses. Outbreaks of vector-borne diseases can manifest in the receiving socio-ecological environment.

### 3.10.1.5 VISUAL AESTHETICS

Based on the VIA study conducted by Pregio Invest Landscape Consultants, the construction , operational activities and associated infrastructure will alter the landscape, topography, vegetation cover and land use characters of the site which will result in visual impacts to the receptors. The following residents are classified as visual receptors,i.e. Gabisi; Barendina;Delville; Matsikeng; Qholaqhwe; Slovo informal settlement; Lusaka; Portions of Blue-Gum Bush; Tebang; and Makwane. A 5 km radius was used as a buffer to determine visual receptors. In addition to the residents with the 5 km radius, two potential visual receptors were determined:

- **Recreational users (visual receptors of moderate sensitivity)**

Recreational users are mostly involved in outdoor recreational activities; in most cases this involves the use of landscapes for enjoyment purposes. There is a potential that such receptors are aware of the quality of the landscape, however during all phases of the project consultations, no comments were received from such receptors.

- **Motorists (visual receptors of low sensitivity)**

According to the VIA, no significant road users driving along the S20 road were identified as having visual exposure to the proposed project.

#### **4. PUBLIC PARTICIPATION PROCESS**

##### **(I) STEPS UNDERTAKEN IN ACCORDANCE WITH THE PLAN OF STUDY.**

The PPP was undertaken in accordance with the Plan of Study for EIA. The database of I&APs compiled during the Scoping phase was updated throughout the EIA Phase. A summary of comments received, issues raised by the registered I&APs, specialists' studies and recommendations and the date of their receipt and responses of the EAP to those comments are provided in the Issues and Response Report.

All copies of any representations and comments received have also been included in this report. The draft EIR was made available for public review from 02 July 2015 to 07 September 2015. No public meeting and focus group sessions were held, as Tholoana Consulting did not receive any comments that could trigger the meeting.

As a result of the additional studies conducted (Visual Impact Assessment and Palaeontological Impact Assessment), the findings and recommendations from the studies were incorporated in this Final EIR and EMPr.

##### **(II) A SUMMARY OF COMMENTS RECEIVED FROM I&APs**

The Public Participation Process plays a vital role in the decision making process, thus all received comments should be captured and responded to accordingly.

The following summary of comments was received during Scoping phase of the proposed MAP Landfill site.

- Ms Rethabile Moloji requested for more detailed information pertaining to the proposed recycling facility as she had an interest in the project.

- This was followed by a comment from Cllr. Betsie Mofokeng, which was in line with the proposed access roads to the site. The access roads are currently unpaved, thus as the result of increased use to the disposal site, these roads will generate dust which impacts on the houses along the access roads. The request was that an option of paving the roads should be looked at; however this was not raised in a manner to objecting the proposed landfill site.
- The other comment received from Mr Tefo Simon, was in line with interest in terms of business opportunities from the proposed landfill site establishment.
- Amendments were requested by the Free State Heritage Agency on the Heritage Impact Assessment, with a an indication that a Paleontological Impact Assessment needs to be carried out for the proposed landfill site as it is a standard requirement within the Free State Province.

In terms of the EIA phase, the following comments were received:

- Cllr Betsie Mofokeng requested the design layout of the proposed road, as per the Deign report page 2-12
- Ms Keagalaetsa Gobolawamang requested a soft copy of the Draft EIA and Draft EMPr.
- Mr Tefo Simon Mantje sent a letter requesting for funding their co-operative.

## **(II) COPIES OF ANY REPRESENTATIONS AND COMMENTS RECEIVED FROM I&APs.**

Copies of comments received are attached in Appendix K.

## **5. NEED AND DESIRABILITY OF IDENTIFIED POTENTIAL ALTERNATIVES FOR THE PROPOSED ACTIVITY**

### **4.1 NEED AND DESIRABILITY**

There are many illegal dumping sites in the Phuthaditjhaba area which present a lot of challenges in terms of water pollution, odours, air pollution and global warming. During the

pre-consultation meeting with the Department of Water and Sanitation officials on the 02<sup>nd</sup> December 2014, a strategy for managing these facilities was recommended. The proposal was to convert and regularise these illegal dumping sites to transfer stations as part of the broader strategy to manage solid waste in the area.

Daily human activities consume resources. This consumption of resources generates liquid, solid and gaseous waste material. As the population increases, waste generation increases and the disposal of the solid waste becomes more of an issue, often proliferating in our surroundings. The sole purpose of landfill sites establishments is to try and curb the level of proliferation around our surroundings, thus creating clean healthy living environments.

Solid waste management, which provides the services of collecting, treating and disposal of waste, is crucial in the environments we live in. If solid waste is not managed properly various problems, such as environmental pollution, and outbreaks of vector-borne diseases, can manifest in our receiving socio-ecological environment. Moreover, this could lead to administrative, economic and social problems within our communities.

Current waste management practices within the MAP (Harrismith, Kestell and Phuthaditjhaba) are far from satisfactory. This is evidenced by pollution caused by refuse dumps within the surrounding areas (according to the MAP IDP, 2013/14) and major dumps where waste is burnt. It is thus clear that an intervention is needed to improve the waste disposal facilities within this area.

It is anticipated that the proposed MAP landfill site will be a well-managed disposal facility, employing a more systematic and organized way of waste disposal, including weighing, recycling, compaction and cover with the objective to create healthy clean environments.

According the 2013/14 IDP, only 40 percent of the MAP population earn a permanent income, whereas the others depend on subsistence farming.

The proposed landfill site will contribute to job creation as it entails a recycling (Buy-Back centre), which in turn will create a stronger local economic development model.

In summary, the proposed landfill site aims to address the following:

- ❖ Unemployment (directly & indirectly)

- ❖ Illegal dumping
- ❖ Environmental degradation
- ❖ Encourage a healthy, clean environment through its recycling awareness programmes linked to its recycling facilities.
- ❖ Promote principles of sustainable development

## **5.2 POTENTIAL ALTERNATIVES, ADVANTAGES AND DISADVANTAGES**

In terms of alternatives the following may be considered:

- ❖ Alternative site on property, properties.
- ❖ Alternative activity
- ❖ Alternative design
- ❖ Alternative technology
- ❖ Alternative operational aspects of the activity

Below is the analysis of identified alternatives, which includes the No-Go alternative.

### **5.2.1 ALTERNATIVE SITE ON PROPERTY OF PROPERTIES**

The alternative site for the property or properties refers to the location of the proposed activity on another property or on a different site within the chosen property. Currently there are no alternative sites that have been considered for the proposed MAP landfill site.

### **5.2.2 ALTERNATIVE ACTIVITY**

The alternative for the activity in relation to the proposed project basically refers to the approach to be taken in the management of waste. The following alternatives were considered:

### 5.2.2.1 Waste landfilling

Landfilling is the disposal site where solid waste, such as paper, glass, and metal, is buried between layers of dirt and other materials in such a way as to reduce contamination of the surrounding land. Landfills are engineered waste disposal systems that have largely replaced rubbish tips or dumps. The modern landfill is engineered to prevent loss of leachate and gases to the environment. It features impermeable membranes under it to prevent liquid leachate, segregated areas for hazardous waste, and a comprehensive monitoring program.

#### Landfill Advantages

- A specific location for disposal that can be monitored. When a landfill is complete, it can be reclaimed, built on or used as parks or farming land. Waste going to a properly designed landfill can be processed to remove all recyclable materials before tipping.
- Waste going to a properly designed landfill can be processed to remove organic material and use it for compost or natural gas (methane) production.
- Properly managed landfills can capture the natural gas (methane) produced by the decomposing material underground.
- Properly managed landfills can minimize and/or capture the leachate produced by the decomposing material underground.

#### Landfill Disadvantages

- Landfills and the surrounding areas are often heavily polluted. Landfill can pollute the water, the air, and also the soil.
- It is difficult to keep dangerous chemicals from leaching out into the surrounding land. Dangerous chemicals can spread into the water table or into waterways.
- Landfill can attract animals and insects to come such as raccoons, rats, mosquitoes and cockroaches,

- Landfill can also cause sicknesses, illnesses, and diseases which might spread in communities. Landfill can increase the chances of global warming by releasing methane, a dangerous greenhouse gas.
- Landfills are taking up lots of our land and that can also take away habitats for other animals. Landfills contain a lot of kitchen scraps and organic material. As the landfill is constantly being covered with new garbage the organic material decomposes anaerobically (that is, without air). Anaerobic decomposition produces methane, which is a 20 times more dangerous greenhouse gas than carbon dioxide.

### **5.2.2.2 Thermal treatment or incineration**

In terms of waste treatment another method that can be used for the treatment of waste is incineration. An advantage of waste incineration is that it results in the reduction of waste that is disposed of in a landfill site, because the resultant product of the method is ash.

During the incineration process, a waste vehicle tips waste into a pit, normally referred to as a waste storage area, from where the waste is fed to the boilers for the incineration process. The techniques used for waste incineration is referred to as mass burn. The waste enters the combustion chamber from the feeder where it is heated at high temperatures. After combustion the chamber will only contain ash, which is referred to as incinerator bottom ash.

This ash is further treated for recycling purposes, and can be sold to the construction industry where it is utilized for road construction and other relevant activities. Besides the graded ash, there is also fly ash, which should be disposed of at a licensed hazardous waste landfill site.

### **Advantages of Incineration of Waste**

Incineration is a practical method of disposal that saves a lot of money on transport of waste to landfills and thus also the carbon footprint that such transport leaves behind. The sheer reduction in the space required to dispose of the 10 percent of waste that it does produce relieves pressure on land, which in urban areas can constitute a big saving. Landfills have never been a pretty site and also give rise to a lot of pests and insects. An incinerating plant will look like any other industrial structure. Waste to Energy (WTE) incinerating plants have a huge



advantage that they can produce electricity which in the long run can help to reduce costs. A 250 ton per day incinerator can produce 6.5 megawatts of electricity per day and this itself can save about \$3 million per year. Some cold countries also use the heat from incinerators for heating of offices and houses in locations near the plant.

### **Disadvantages of Incineration of Waste**

The high cost of incineration plant has been a turnoff of for municipal authorities and is only now being addressed with the introduction of WTE plants. The need for huge waste to incinerate has led to abandonment of other plans for recycling and reuse of waste. Dioxins are produced in the treatment and is a cancer forming chemical. These are produced in the smoke stack. The plants require skilled personnel for operation and continuous maintenance.

### **5.2.3 ALTERNATIVE DESIGN**

The layout of the landfill site has been designed by All Green Consultants. However, this design may be amended further during the application process, based on comments to be received from I&AP's and stakeholders.

### **5.2.4 ALTERNATIVE TECHNOLOGY**

An alternative in terms of technology refers to adopting a different method in order to achieve the same goal which is waste disposal (landfilling). In terms of the proposed MAP landfill site the use of technologies that can convert landfill biomass and gas to electricity should be considered, however this will be dependent on the financial aspects of the proposed development for adopting such technologies. The technologies referred to above include but not limited to the use of landfill site gas collection and monitoring systems.

## 5.2.5 ALTERNATIVE OPERATIONAL ASPECTS OF ACTIVITY

### No-Go Alternative

The no-go option would entail the MAP not receiving a Waste Management License. This would mean that the MAP would not improve its service infrastructure; thereby not improving service delivery and also losing the opportunity of reducing pollution and creating much needed direct and indirect job opportunities.

## 6. METHODOLOGY USED IN DETERMINING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS;

The following significance rating method will be used to rate impacts emanating from the proposed MAP landfill site activities:

### Significance of the Impact(s):

Each category will be assigned points. These points will be computed by using the equation below and each potential impact will be assigned a significance rating (S).

Therefore:  $S = (E+D+M) * P$

**Table 2 - The significance ratings:**

Rating	Description
(<30) low	The impact will not have a direct influence on the decision to develop in the area
(30-60) medium	The impact can influence the decision to develop in the area unless it is effectively mitigated
(>60) high	The impact should have an influence on the decision process to develop in the area

### Significance Method (Equation)

**Nature of the Impact** – Refers to the description of the activity impacting the environment.

Rating	Description
Positive	In most cases this would be a benefit
Negative	Could be a cost
Neutral	No implications on either cost or benefit

**Extent of The Impact (E)** – Refers to the area which the activity will have an impact on (Geographic area).

Rating	Description
1	Site – impact extends to site only
2	Local – impact extends as far as the boundary of site and immediate surroundings
3	Regional
4	Provincial
5	National

**Duration of the Impact (D)** (The length of time that the impact will last)

Rating	Description
1	Immediate – less than one year
2	Short term – between one year & five years
3	Medium Term – between five years & 15 years
4	Long term – impact ceases after operational life span of the project
5	Permanent

**Probability (P)** – Refers to the likelihood that the impact will occur.

Rating	Description
0	None – impact will not occur

Rating	Description
1	Improbable – probability very low due to design or experience
2	Low – unlikely to occur
3	Medium – distinct probability that the impact will occur
4	High – most likely to occur
5	Definite

**Severity/Magnitude (M)** - Refers to degree at which the impact will occur.

Rating	Description
10	Very High – an irreversible and permanent change that cannot be mitigated
8	High – impacts that could be mitigated, however this mitigation would be costly
6	Medium – medium term impacts that could be mitigated
4	Low – short term impacts with very easy mitigation
0	No effect – the proposed development would have no impact

For the purposes of this study, only two alternatives were considered during the impact assessment phase in addition to the no-go option. These alternatives include the technology and design alternatives.

**No go alternative:** The no-go option would entail maintaining the status quo. This is not considered a viable alternative as MAP Municipality does not want to continue using the unlicensed dumping areas for disposal of domestic waste as they create nuisance and pose health hazards due to waste burning, scattered litter and smells.

**Technology alternative:** Due to the proximity of the site to the residential area, incineration technology is not preferred due to health hazards associated with the burning of waste and also due to high costs of installations. The preferred option chosen for the management of waste is therefore landfilling of waste.

**Design alternative:** Various landfill designs exist. The alternative in terms of the design will take into consideration inputs from I&APs and specialists.

## **7. FINDINGS AND RECOMMENDATIONS OF ANY SPECIALIST REPORT OR REPORT ON A SPECIALISED PROCESS**

This section of the report focuses on specialist studies conducted during the Scoping phase of the project. Furthermore the findings and recommendations of each study conducted are summarised. Recommendations or mitigation measures will be incorporated into the EMPr. The following studies were completed for the Scoping

- ❖ Geotechnical Assessment
- ❖ Ecological Scan
- ❖ Ornithological Assessment
- ❖ Heritage Impact Assessment
- ❖ Visual Impact Assessment
- ❖ Palaeontological Impact Assessment

### **7.1 GEOTECHNICAL ASSESSMENT**

The Geotechnical Investigation for the proposed MAP landfill site was conducted by J.Bloem for JB Consult.

#### **METHOD**

The main objective for the Geotechnical investigation was to determine the Sub-soil conditions of the proposed Landfill site. In determining the sub-soil conditions, the report or

investigation further determines the viability to establish the proposed landfill site at the proposed site. The following method was used for the investigation (as per the Geotechnical Investigation):

- ❖ A Bell TLB was used to open 12 test pits in order to determine the subsurface conditions.
- ❖ Test pits were dug to their refusal or the maximum reach of the excavator.
- ❖ The test pits were profiled by a qualified engineering geologist according to the method described by Jennings et al (1973).
- ❖ Soil horizons were sampled to confirm the soil description.

## **FINDINGS**

According to the Geotechnical investigation conducted the site is underlain by sandstone and siltstone that consist mainly of silty sands and clayey silts. No perched water was present in any of the test pits; however a perched water level could be present on the drainage area during the rainy season. From the investigation the nature of the soil on site is the only major concern due to perched water that could occur during the rainy season, however this can be overcome by proper design of a storm water and groundwater control system. In general the site is suitable for the use as a general landfill site.

## **RECOMMENDATIONS**

The following recommendations are made as per the Geotechnical Investigation report:

- ❖ Liner material for the construction of the landfill liners is present on site, however additional volumes must be imported due to the low site volumes or a GCL could be used.
- ❖ Proper sub-soil drainage systems should be constructed due to the presence of a perch water level on site.

- ❖ Building foundations must be reinforced or earth mattresses should be used due to the swell potential of the soils on site. Allowable bearing pressure must be approximately 150 kPa.
- ❖ The foundation should also be protected from moisture ingress by constructing a concrete or paved apron around the buildings.
- ❖ More material will have to be imported for the building of the site roads.

## 7.2 ECOLOGICAL SCAN

The ecological scan for the proposed MAP landfill site was conducted by Christa Custers of ECO assessments.

### METHOD

The following approach for the assessment was adopted:

- ❖ A survey of the vegetation units found on the site;
- ❖ An indication of the presence of any Red Data flora and faunal species on the site or in the vicinity of the site;
- ❖ An assessment of the conservation status of the site as well as major habitat concerns should habitats of exceptional value be recorded.
- ❖ Compilation of a motivation report that includes a sensitivity map.

### FINDINGS

The habitat on site was found to have a low diversity consisting mainly of grazed grassland on a small plateau between two streams. The habitat consisted of natural species although it seems like the grassland may have previously been ploughed as contour walls were visible all over the site. In addition, cattle and goats were observed grazing the site and overgrazing may have

altered the habitat even further. The species richness recorded was found to be moderate to low based on plot samples done in Rocky Highveld grassland grasslands elsewhere.

## **RECOMMENDATIONS**

The proposed landfill site will not impact any habitat on site as the habitat is of low diversity, furthermore the rocky outcrops outside of the proposed site is the major concern. Indirect impacts such as leachate associated with the proposed landfill site should be looked at. The design should ensure the containment and management of leachate.

## **7.3 HERITAGE IMPACT ASSESSMENT**

The Heritage Impact Assessment was conducted by Eric Mathohoe of Vhufa Hashu Heritage Consultants.

### **METHOD**

The aims with the Phase1 Archaeological Impact Assessment (AIA) program were the following:

- ❖ To establish whether any of the type and ranges of heritage resources as outlined in section 3 of the National Heritage Resources Act (Act 25 of 1999) do occur in or near the proposed site, and if so, to establish the significance of these heritage resources.
- ❖ To establish whether such heritage resources will be affected by the proposed development activities, and if so, to determine possible mitigation measures that can be applied to these heritage resources.

### **FINDINGS**

The phase 1 Archaeological Impact Assessment (AIA) survey for the proposed landfill site revealed remnant remains of relatively recent past characterized by two brick and concrete livestock drinking and feeding troughs and sand stones fence at corner posts within the proposed site development footprint.



## RECOMMENDATIONS

Based on the study conducted it appears that the site has been previously subjected to cultivations as reflected by contouring and tilling rills. The surface disturbances observed during sites survey confirmed that no further studies / mitigations are recommended because there is no archaeological or place of historical significance that will be impacted by the proposed development activities within the proposed development footprint and its surrounding. However, if by any chance, archaeological or any other physical cultural resources are discovered during the development,, heritage authorities should be informed.

### 7.4 ORNITHOLOGICAL ASSESSMENT

The Ornithological Assessment was conducted by Geoff Lockwood of Delta Environmental Consultants. The purpose of this study was to further assess the concern on the presence of the White-bellied Korhaan *Eupodotis senegalensis* and Southern Bald Ibis *Geronticus calvus* on site by the Ecological Scan conducted by Eco Assessments.

#### METHOD

The method that was used to conduct the assessment was as follows:

- ❖ Site visit conducted in the early morning and late afternoon, involving the playing of sounds randomly on site with a hope of receiving a response.

#### FINDINGS

The findings of the site visits are that there were no Red Data birds observed during the afternoon survey but the remains (feathers) of a predated Blue Korhaan were discovered from just outside the northern boundary of the site. The early morning survey day confirmed the presence of the Southern Bald Ibis *Geronticus calvus* and Blue Korhaan *Eupodotis caerulescens* in the broader project area.

#### RECOMMENDATIONS

Given the disturbed nature of the site; the levels of human activity in the area, and the quality of the habitat observed, it is unlikely that the development of a landfill on the site will have any

significant impact on local populations of Blue Korhaans and Southern Bald Ibis. Furthermore windblown litter and the contamination of downslope catchments with toxic leachates potentially pose a significantly higher threat to local Red Data bird species and must be mitigated.

## 7.5 VISUAL IMPACT ASSESSMENT

The Visual Impact Assessment was conducted by Kingstone Matanda of Pregio Invest Landscape Consultants. The proposed MAP disposal site is located on a low lying hill, thus the purpose of the study was to determine the visual impact that will result due to the disposal site activities and further suggest mitigation measures that should be taken into account to either prevent or reduce the negative visual impact to any sensitive receptors closer to the proposed development site.

### METHOD

The approach employed during the VIA study involved a desktop study for information gathering and a field survey. Standard rating scales were used for assessing and quantifying the identified impacts. Five factors were considered when assessing the significance of impacts, namely:

- **Relationship of the impact to temporal scales** - the temporal scale defines the significance of the impact at various time scales, as an indication of the duration of the impact.
- **Relationship of the impact to spatial scales** - the spatial scale defines the physical extent of the impact.
- **The severity of the impact** - the severity/beneficial scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party.
- **With and without mitigation** - The severity of impacts can be evaluated with and without mitigation in order to demonstrate how serious the impact is when nothing is done about it. The word 'mitigation' means not just 'compensation', but also the ideas of

containment and remedy. For beneficial impacts, optimization means anything that can enhance the benefits. However, mitigation or optimization must be practical, technically feasible and economically viable.

- **The likelihood of the impact occurring** - the likelihood of impacts taking place as a result of project actions differs between potential impacts. There is no doubt that some impacts would occur (e.g. loss of vegetation), but other impacts are not as likely to occur (e.g. vehicle accident), and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance.

Each criterion was ranked with scores assigned to determine the overall significance of an activity. The criterion was then considered in two categories, viz. effect of the activity and the likelihood of the impact. The total scores recorded for the effect and likelihood were then read off the matrix to determine the overall significance of the impact, whether the overall significance is either negative or positive.

## **FINDINGS**

Based on information gathered during the desktop study and the field survey, three receptors were determined namely: Residents (referred to as visual receptors of high sensitivity), Recreational users (referred to as visual receptors of moderate sensitivity) and motorists (determined as receptors of low sensitivity).

The visual impacts on the residents within the 5 km radius was rated high due to the construction, operational activities and associated infrastructure of the proposed MAP landfill site. It was established that the change/disturbance on the landscape and aesthetics of the proposed site will be permanent in nature, resulting in a high impact on the determined visual receptors. It can be concluded that the severity of visual impact experienced by most residents from the immediate surroundings up to a 5-kilometre radius will be high. The landscape and visual impact will be permanent in nature resulting in a high impact to the above landscape and visual receptors.

The severity may diminish to a lesser degree when distance is considered, for those further than 5 kilometres. This is because of the reduction in visual severity over a 5 kilometre distance; therefore distant visual receptors will not be affected.

## **RECOMMENDATIONS**

The main objective of the recommendations is to ensure that any impacts determined during the investigations are mitigated. These are aligned to the design, construction and operational phases of the proposed disposal site. The recommended mitigation measures are explained in detail within the VIA study. The mitigation measures range from proposed mitigation measures in terms of the paint to be used for the buildings, type of material to be used for the buildings, practicing good housekeeping principles during the construction and operational phases, vegetating landscapes, determining the location of construction camps and stockyards and the use of dust suppression measures in areas where dust generation may increase as a result of increase traffic (Appendix I).

### **7.6 PALAEOLOGICAL IMPACT ASSESSMENT**

The Palaeontological Impact Assessment was conducted by Dr H Fourie. This assessment was conducted following the comments received from the Free State Heritage Agency that the Palaeontological Impact Assessment is a standard requirement within the Free State Province. The main purpose of the PIA is to provide comments and recommendations on the potential impacts including mitigation/conservation measures on the fossil heritage of the area where the proposed disposal site will be located.

#### **METHOD**

The following approach was taken for the PIA study:

- Desktop study for information gathering analyses.
- Site visit to ascertain any other information that may not have been attained during the desktop study.

#### **FINDINGS**

The PIA indicates the following findings:

- The formations present on site fall under the Karoo Supergroup more specifically the Tarkastad Subgroup of the Beaufort Group which is renowned for its fossil wealth. In a

nutshell this determines that the Palaeontological sensitivity of the proposed site is very high.

The major threats as determined by the study relate to earth moving activities during the construction phase of the proposed development, which have the potential of sealing in or destroying fossils.

## **RECOMMENDATIONS**

Based on the findings of the PIA assessment conducted there is one major recommendation that should be taken into account during the construction phase of the proposed disposal site in order to ensure conservation of any paleontological material. The competent authority (SAHRA) must be notified if any palaeontological material exposed during digging; excavating, drilling or blasting is discovered. All construction activities must be stopped and a palaeontologist should be called in immediately to determine proper mitigation measures.

No objections were received from the specialist regarding the proposed development; however, it was recommended that special care is taken during the construction phase activities as recommended in the study. (Appendix J)

## **8. A DESCRIPTION OF ALL ENVIRONMENTAL ISSUES, INCLUDING THEIR SIGNIFICANCE RATINGS AND MITIGATION MEASURES**

The main objective of this section is to provide independent and scientifically sound information on the impacts identified during the Scoping & EIA. Based on the requirements of the impact assessment, and the approved Plan of Study of EIA, Impacts identified and issues and concerns raised are assessed with regard to their significance.

The impact assessment is aimed at determining the impacts associated with the proposed development and the prescription of mitigatory measures. Other impacts associated with the proposed development are discussed in detail in this section. The significance of the potential impacts is described in terms of their nature, extent, duration, intensity and probability. In this report, impacts with a low significance are considered to have no influence on the decision to proceed with the proposed development. Impacts with a moderate significance will influence the decision unless they can be effectively mitigated to a low significance, whereas impacts

with a high significance despite mitigation would influence the decision to proceed with the proposed development. The impacts listed in this section were identified by the EIA Project Team (including specialists) and were augmented by input from the I&APs during the public review of the Environmental Impact Report.

## **8.1 IMPACT ASSESSMENT METHODOLOGY**

Activities within the framework of the proposed development and its construction and operational phases, give rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into phases from which impacting activities can be identified, namely:

### **A. Status Quo**

The site as it currently stands taking cognisance of the disturbance and the impacts remaining, while operating.

### **B. Pre-construction phase**

All activities on site up to the start of the construction, not including the transport of materials, but including the initial site preparations. This also includes the impacts, which would be associated with planning.

### **C. Construction phase**

All the construction and construction related activities on site, until the contractor leaves the site.

### **D. Operational phase**

All activities, including the operation and maintenance of the proposed development. The activities arising from each of the relevant phases have been included in the tables contained in this chapter. The assessment endeavours to identify activities that require certain environmental management actions to mitigate the impacts arising from them.

## 8.2 ASSESSMENT CRITERIA

### A. Nature of impact

This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. The description should include what is being affected, and how

### B. Extent

The physical and spatial size of the impact. This is classified as:

#### I) Site

The impact could affect the whole, or a measurable portion of the above-mentioned properties.

#### II) Local

The impacted area extends only as far as the activity, e.g. a footprint.

#### III) Regional

The impact could affect the area including the neighbouring farms the transport routes and the adjoining towns

### C. Duration

The lifetime of the impact. This is measured in the context of the lifetime of the propose landfill site.

#### I) Short term

The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the phases.

#### II) Medium term

The impact will last up to the end of the phases, where after it will be entirely negated.

#### III) Long term

The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter.

#### IV) Permanent

The only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.

### **D. Intensity**

Is the impact destructive or benign? Does it destroy the impacted environment alter its functioning, or slightly alter it? This is rated as:

#### I) Low

The impact alters the affected environment in such a way that the natural processes or functions are not affected.

#### II) Medium

The affected environment is altered, but function and process continue, albeit in a modified way.

#### III) High

Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases. This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

### **E. Probability**

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:

#### I) Improbable



The possibility of the impact occurring is very low, due either to the circumstances, design or experience.

II) Probable

There is a possibility that the impact will occur to the extent that provisions must be made therefore.

III) Highly probable

It is most likely that the impacts will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity.

IV) Definite

The impact will take place regardless of any prevention plans, and there can only be relied on mitigatory actions or contingency plans to contain the effect

## **F. Determination of significance**

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The classes are rated as follows:

I) No significance

The impact is not substantial and does not require any mitigatory action.

II) Low

The impact is of little importance, but may require limited mitigation.

III) Medium

The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.

IV) High

The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential. In order to maintain consistency, all potential impacts that have been identified during the EIA process will be listed in impact assessment tables. The assessment criteria used in the tables will be applied to all of the impacts and a brief descriptive review of the impacts and their significance provided in the text of the report. The overall significance of impacts will be determined by considering consequence and probability.

The potential impacts and key issues identified during the Scoping Phase as per the specialists investigations include:

❖ Soil and groundwater contamination;

The MAP disposal site is classified as a GLB+, thus has a potential of generating leachate, this poses a threat to the groundwater of the area. Possible groundwater pollution is a potential impact as the result of leachate generated from the disposal site. Possible surface water pollution would be the results of fuel leaks and lubricants and surface water run-off, which may result in sedimentation.

❖ Geotechnical suitability;

The geotechnical investigation indicates perched water levels may result on the drainage area during rainy seasons. The potential impact as a result is soil erosion, thus eroded soil been carried into storm water drains or water bodies. Further the report indicates that more material will have to be imported to site for construction of internal roads. The land is suitable for the establishment of a General landfill site.

❖ Disturbance of floral and faunal species;

The proposed disposal site will has a potential in to impact the habitat on site, which in turn affects the biodiversity within the area. Furthermore the rocky outcrops outside of the proposed site are the major concern as it may contain species of ecological importance as it may have scarcer plant species that survived the human activities that have been taking place around the site. Indirect impacts such as leachate associated with the proposed landfill site could impact on the surrounding habitats.

❖ Heritage impacts;

The proposed disposal site has a potential of causing damage or loss of artefacts that are of cultural heritage significance. The Heritage Impact Assessment conducted by Vhufa Hashu indicates that the proposed disposal site will not have any impact on heritage resources, however during excavations any object encountered or exposed should be reported to the Free State Heritage Resource Agency and all activities on site should stop.

### **8.3 ASSESSMENT OF IMPACTS**

In this EIR, mitigation measures will refer to the precautionary measures that can be implemented in the planning stage in order to avoid, reduce or remedy the impacts of activities from the proposed project. An EMP, specifying the methods and procedures for managing the environmental aspects of the proposed development, during the construction and operational phase is attached in Appendix L.

### 8.3.1 ENVIRONMENTAL IMPACT - BIOPHYSICAL ENVIRONMENT

CONSTRUCTION PHASE					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
<b>Loss of Flora</b>  Site clearance for the purpose of construction of the proposed landfill site and associated infrastructure; including construction camp may result in the loss of flora.	<b>Extent</b>	2	* According to the Ecological Scan, the habitat on site consist of natural species that seems to have been previously been ploughed. Thus has been altered.  * There is observed grazing currently on site which may have further altered the habitat.	<b>Extent</b>	2
	<b>Duration</b>	1		<b>Duration</b>	1
	<b>Magnitude</b>	4		<b>Magnitude</b>	4
	<b>x Probability</b>	4		<b>x Probability</b>	2
	<b>Calculation</b>	2+1+4 x 4		<b>Calculation</b>	2+1+4 x 2
	<b>= Score</b>	28		<b>= Score</b>	14
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>
<b>Significance</b>	<b>Low</b>	<b>Significance</b>	<b>Low</b>		
<b>Loss of Fauna</b>  Site clearance for the purpose of construction of the proposed landfill site and associated infrastructure; including construction camp may result in the loss of fauna habitats.	<b>Extent</b>	2	* Loss of vulnerable and near threatened species. Two species have been observed on site.  * Any Fauna encountered on site must not be killed, captured or injured, but must be relocated from site where possible.	<b>Extent</b>	2
	<b>Duration</b>	5		<b>Duration</b>	1
	<b>Magnitude</b>	6		<b>Magnitude</b>	4
	<b>x Probability</b>	3		<b>x Probability</b>	2
	<b>Calculation</b>	2+5+6 x 3		<b>Calculation</b>	2+1+0 x 2
	<b>= Score</b>	39		<b>=Score</b>	6
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>
<b>Significance</b>	<b>Medium</b>	<b>Significance</b>	<b>Low</b>		

## CONSTRUCTION PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
<p><b>Geology and Soil</b></p> <p>* The surface geology of the proposed site will be disturbed by earthworks and excavation activities required during the construction of the site.</p> <p>* Top soil reduction/loss</p>	<b>Extent</b>	2	<p>* The proposed landfill site has been classified as a B+, thus has a potential to generate leachate, which may contaminate the soil (and groundwater). The possibility of the soil contamination may be avoided or minimized through proper design, monitoring and management. An installation of a leachate management system has been proposed for the MAP</p> <p>* Proper sub-soil drainage systems should be constructed due to the presence of a perch water level on site.</p> <p>* Building foundations must be reinforced or earth mattresses should be used due to the swell potential of the soils on site. Allowable bearing pressure will be approximately 150 kPa</p> <p>* Topsoil removed must not be used for building or maintaining access roads. As</p>	<b>Extent</b>	2
	<b>Duration</b>	1		<b>Duration</b>	1
	<b>Magnitude</b>	8		<b>Magnitude</b>	6
	<b>x Probability</b>	3		<b>x Probability</b>	3
	<b>Calculation</b>	2+1+8 x 3		<b>Calculation</b>	2+1+6 x 3
	<b>= Score</b>	33		<b>= Score</b>	27
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>
<b>Significance</b>	<b>Medium</b>	<b>Significance</b>	<b>Low</b>		

## CONSTRUCTION PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
			per the Geotechnical Investigation Material will have to be imported for the building of the site roads.		
<b>Surface and Groundwater</b> Surface water pollution as a result of fuel leaks and lubricants. Riverine pollution as a result of surface water run-off.	<b>Extent</b>	3	* Construction vehicles must be serviced to avoid leakages of fuels and lubricants to the soil. No servicing of construction vehicles must take place within the site, to avoid soil contamination with hydrocarbons or oils.	<b>Extent</b>	2
	<b>Duration</b>	1		<b>Duration</b>	1
	<b>Magnitude</b>	8		<b>Magnitude</b>	4
	<b>x Probability</b>	2		<b>x Probability</b>	2
	<b>Calculation</b>	3+1+8 x 2	* Chemical portable toilets provided by contractors must be maintained for the duration of the construction phase.  * Mixing of cement must take place on impervious surfaces and the areas for mixing must be controlled by berms.	<b>Calculation</b>	2+1+4 x 2
	<b>Score</b>	24		<b>Score</b>	14
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>
<b>Significance</b>	<b>Low</b>		<b>Significance</b>	<b>Low</b>	
<b>Air Quality</b> The generation of dust due to construction activities, thus vehicular movements.	<b>Extent</b>	2	* All surfaces that are not paved and generate dust should be sprayed using a water tank continuously, or other dust suppressing agents can be used to limit	<b>Extent</b>	2
	<b>Duration</b>	4		<b>Duration</b>	1
	<b>Magnitude</b>	4		<b>Magnitude</b>	4
	<b>x Probability</b>	4		<b>x Probability</b>	2

## CONSTRUCTION PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
	Calculation	Score		Calculation	Score
Construction vehicles may generate vehicular emissions resulting in air pollution.	Calculation	2+4+4 x 4	<p>the generation of dust.</p> <p>* Vehicular speed to the construction site should be regulated, in order to limit the generation of dust on houses along the access route to site.</p> <p>* Dust monitoring process needs to be undertaken during the construction phase.</p>	Calculation	2+1+4 x 2
	Score	40		Score	14
	Nature	Negative		Nature	Negative
	Significance	Medium		Significance	Low
Wetlands	Extent	1	<p>* As per the Ecological Scan, there are no wetlands present on site.</p>	Extent	1
	Duration	1		Duration	1
	Magnitude	0		Magnitude	0
	x Probability	0		x Probability	0
	Calculation	1+1+0 x 0		Calculation	1+1+0 x 0
	Score	0		Score	0
	Nature	Neutral		Nature	Neutral
	Significance	Low		Significance	Low
Noise	Extent	1	<p>* Construction activities must be limited to working hours (from 7am to 5p.m) during</p>	Extent	1
	Duration	4		Duration	1

## CONSTRUCTION PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
Noise nuisance due to construction and operational activities.	<b>Magnitude</b>	4	<p>the week, not including public holidays.</p> <p>* Shall it happen that construction will take place after working hours the neighbors/IAPs need to be notified. The immediate surrounding areas of the proposed landfill site are vacant; however residents should be notified in terms of planned loud activities that may occur on site.</p> <p>* In terms of noise complaints, a complaints register must be maintained with the corrective action under taken.</p> <p>* Noise generated on site must be limited to a range as provided in the National and local laws and bylaws.</p> <p>* On site personnel's should be provided with PPE to assist in reducing noise levels that may be emanating from construction activities.</p>	<b>Magnitude</b>	4
	<b>x Probability</b>	2		<b>x Probability</b>	2
	<b>Calculation</b>	$1+4+4 \times 2$		<b>Calculation</b>	$1+1+4 \times 2$
	<b>Score</b>	18		<b>Score</b>	12
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>
	<b>Significance</b>	<b>Low</b>		<b>Significance</b>	<b>Low</b>



## CONSTRUCTION PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
<b>Generation of Waste</b>	<b>Extent</b>	1	* Some of the construction waste (Excavated material) can be used as fill material at other sites where required or disposed of the licensed landfill site. * Construction waste, for instance unused concrete must be disposed of at a licensed Waste disposal facility/Landfill site. * No construction phase waste to be stockpiled on site. * Litter bins must be provided at the site for waste generated by construction personnel.	<b>Extent</b>	1
	<b>Duration</b>	1		<b>Duration</b>	1
	<b>Magnitude</b>	6		<b>Magnitude</b>	4
	<b>x Probability</b>	4		<b>x Probability</b>	2
	<b>Calculation</b>	1+1+6 x 4		<b>Calculation</b>	1+1+4 x 2
	<b>= Score</b>	32		<b>= Score</b>	12
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>
<b>Significance</b>	<b>Medium</b>	<b>Significance</b>	<b>Low</b>		
<b>Visual</b> Change of visual and aesthetic aspects due to altered landscapes, landfill cells construction, and associated construction activities.	<b>Extent</b>	2	* Construction activities must observe good housekeeping principles and the site must be kept neat at all times. * The site must be fenced with walls or palisade to obscure the inside operations	<b>Extent</b>	2
	<b>Duration</b>	5		<b>Duration</b>	3
	<b>Magnitude</b>	8		<b>Magnitude</b>	6
	<b>x Probability</b>	4		<b>x Probability</b>	2
	<b>Calculation</b>	2+5+8 x 4		<b>Calculation</b>	2+3+6 x 2
	<b>Score</b>	60		<b>Score</b>	22
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>

## CONSTRUCTION PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
	Significance	High		Significance	Low
<b>Heritage Resources</b>  Loss of heritage resources/objects as a result of the landfill site development and its associated infrastructure.	<b>Extent</b>	5	* Vhufa Heritage Consultants conducted a Heritage Impact Assessment and no significant impacts were encountered during the study.  * The Heritage Impact Assessment report recommends that any heritage resources encountered during the construction phase of the proposed development should be reported to the relevant Heritage Agency..	<b>Extent</b>	2
	<b>Duration</b>	5		<b>Duration</b>	1
	<b>Magnitude</b>	8		<b>Magnitude</b>	8
	<b>x Probability</b>	3		<b>x Probability</b>	2
	<b>Calculation</b>	5+5+8 x 3		<b>Calculation</b>	2+1+8 x 2
	<b>= Score</b>	54		<b>= Score</b>	22
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>
	<b>Significance</b>	<b>Medium</b>		<b>Significance</b>	<b>Low</b>

## OPERATIONAL PHASE

POTENTIAL ENVIRONMENTAL IMPACT		SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
<b>Loss of Flora</b>  <b>Change of ecosystem by potential leakage of leachate.</b>	<b>Extent</b>	2	* Any landscaping implemented in the development must make use of indigenous vegetation in order to limit or eliminate the introduction of alien and/or invasive species.  * A leakage detection and collection layer of 150mm compacted clay liner, 150mm bases preparation layer and an in-situ layer will be installed for the proposed landfill site. The leachate collection and detection layers will tie into a perforated pipe network which drains into a leachate collection sump/tank and leachate detection tank respectively and treated accordingly.	<b>Extent</b>	2	
	<b>Duration</b>	4		<b>Duration</b>	4	
	<b>Magnitude</b>	6		<b>Magnitude</b>	0	
	<b>x Probability</b>	2		<b>x Probability</b>	0	
	<b>Calculation</b>	2+4+6 x 2		<b>Calculation</b>	2+4+0 x 0	
	<b>= Score</b>	24		<b>= Score</b>	0	
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>	
<b>Significance</b>	<b>Low</b>	<b>Significance</b>	<b>Low</b>			
<b>Loss of Fauna</b>  <b>Change of ecosystem by potential leakage of leachate</b>	<b>Extent</b>	2	* Recommendations as per the study conducted is that windblown litter and the contamination of downslope catchments with toxic leachates potentially would pose	<b>Extent</b>	2	
	<b>Duration</b>	5		<b>Duration</b>	1	
	<b>Magnitude</b>	6		<b>Magnitude</b>	4	
	<b>x Probability</b>	3		<b>x Probability</b>	2	

## OPERATIONAL PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
	Calculation			Calculation	
and windblown litter.	Calculation	2+5+6 x 3	<p>a significantly higher threat to local Red Data bird species however and it is essential to prevent such events from occurring by compacting waste on daily bases and installing the leachate collection system.</p> <p>* The proposed landfill site must be fenced off; and windbreakers in the form of trees and/or wall barrier where possible must be considered.</p> <p>* Daily compaction and cover of waste must be implemented.</p>	Calculation	2+1+0 x 2
	= Score	39		=Score	6
	Nature	Negative		Nature	Negative
	Significance	Medium		Significance	Low
Geology and Soil  Loss of soil and change in the geology of the area	Extent	2	* Storm water management plan must be implemented on site, so as to avoid erosion and sedimentation.	Extent	2
	Duration	4		Duration	4
	Magnitude	8	* The rehabilitation of the active cells must be implemented concurrent with operations during the operational phase.	Magnitude	6
	x Probability	3		x Probability	2
	Calculation	2+4+8 x 3	* Daily compaction and cover of waste must	Calculation	2+4+6 x 2
	= Score	42		= Score	24

## OPERATIONAL PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
	Nature	Significance		Nature	Significance
	Nature	Negative	be implemented.	Nature	Negative
	Significance	Medium	* The site must be lined with appropriate lining material as recommended in the Geotechnical report.	Significance	Low
<b>Topography</b> The proposed landfill site will negatively impact the topography of the area as it will alter the landscape during the operational phase.	Extent	2	The rehabilitation of the active cells must be implemented concurrent with operations during the operational phase	Extent	1
	Duration	4		Duration	2
	Magnitude	6		Magnitude	6
	x Probability	4		x Probability	3
	Calculation	2+4+6 x 4		Calculation	1+2+6 x 3
	= Score	48		= Score	27
	Nature	Negative		Nature	Negative
	Significance	Medium		Significance	Low
<b>Surface and Groundwater</b> Surface and ground water pollution as a result of leachate.	Extent	2	* A leachate detection and collection system must be installed on the proposed landfill site. Collected leachate must be treated in an environmentally sound manner. Any contaminated runoff and leachate generated must be separated and collected via a dirty water system, away from any clean-water system.	Extent	2
	Duration	8		Duration	4
	Magnitude	6		Magnitude	6
	x Probability	4		x Probability	1
	Calculation	2+8+6 x 4		Calculation	2+4+6 x 1
	Score	64		Score	12
	Nature	Negative		Nature	Negative
	Significance	Medium		Significance	Low

## OPERATIONAL PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
	Significance	High		Significance	Low
			* Discharge of effluents or polluted water into water resources must be prohibited.		
<b>Air Quality</b>  Gaseous emissions from the waste body (including Methane).  Increased traffic to the site on un-surfaced access routes will result in increased generation of dust.	<b>Extent</b>	2	* Measures to collect methane for further use or handling such as flaring must be investigated.	<b>Extent</b>	2
	<b>Duration</b>	4		<b>Duration</b>	1
	<b>Magnitude</b>	4		<b>Magnitude</b>	4
	<b>x Probability</b>	4	* All surfaces that are not paved and generate dust must be sprayed using a water tank continuously, or other dust suppressing agents can be used to limit the generation of dust.	<b>x Probability</b>	2
	<b>Calculation</b>	2+4+4 x 4		<b>Calculation</b>	2+1+4 x 2
	<b>Score</b>	40		<b>Score</b>	14
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>
	<b>Significance</b>	<b>Medium</b>	* Vehicular speed to the construction site must be regulated in order to limit the amount of dust generated by vehicular movement. The speed limit must also apply to the road passing the houses en route to the waste disposal site.  * Compaction and cover of waste must be maintained daily to control landfill odours.	<b>Significance</b>	<b>Low</b>

## OPERATIONAL PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
			<ul style="list-style-type: none"> <li>* Dust monitoring process must be undertaken during the operational phase.</li> <li>* All exposed areas must be either covered or grassed where possible.</li> <li>* The rehabilitation of the active cells must be implemented concurrent with operations during the operational phase and this requirement must form part of the rehabilitation plan. The grassing of rehabilitated slopes must also be considered. .</li> <li>* A register should be maintained for all complaints received as a result of dust.</li> </ul>		
<b>Wetlands</b>	<b>Extent</b>	1	* As per the Ecological Scan, there are no wetlands present on site.	<b>Extent</b>	1
	<b>Duration</b>	1		<b>Duration</b>	1
	<b>Magnitude</b>	0		<b>Magnitude</b>	0
	<b>x Probability</b>	0		<b>x Probability</b>	0
	<b>Calculation</b>	1+1+0 x 0		<b>Calculation</b>	1+1+0 x 0
	<b>Score</b>	0		<b>Score</b>	0

## OPERATIONAL PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
	Nature	Significance		Nature	Significance
	Nature	Neutral		Nature	Neutral
	Significance	Low		Significance	Low
Noise nuisance due to operation activities.	Extent	1	<p>* The operational times of the landfill site must be limited to 07h00- 18h00 working times.</p> <p>* All equipment's to be used must conform to the local authorities by-laws in terms of noise levels.</p> <p>* Any deviations from the conditions should be communicated to the competent authority and neighbours/I&amp;APs should be notified.</p>	Extent	1
	Duration	4		Duration	1
	Magnitude	4		Magnitude	4
	x Probability	2		x Probability	2
	Calculation	1+4+4 x 2		Calculation	1+1+4 x 2
	Score	18		Score	12
	Nature	Negative		Nature	Negative
	Significance	Low		Significance	Low
Visual Change of visual and aesthetic aspect as a result of landfilling activities.	Extent	2	<p>* The site must be fenced with walls or palisade to obscure the inside operations</p> <p>* Construction activities must observe good housekeeping principles and the site must be kept neat at all times.</p> <p>* Daily compaction of waste and cover must be maintained to prevent windblown litter</p>	Extent	2
	Duration	4		Duration	3
	Magnitude	6		Magnitude	6
	x Probability	4		x Probability	2
	Calculation	2+4+6 x 4		Calculation	2+3+6 x 2
	Score	48		Score	22
	Nature	Negative		Nature	Negative



## OPERATIONAL PHASE

POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
	Significance	Medium		Significance	Low
			leaving the site. * The landfill site area must be fenced, to try and contain any windblown litter.		

## 8.3.2 SOCIO-ECONOMIC

CONSTRUCTION AND OPERATIONAL PHASES					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
<b>Traffic</b> Movement of trucks may impact the road users and create traffic.	<b>Extent</b>	2	* During construction safe points for pedestrian and vehicular crossing at designated points must be erected and controlled.  * Orange safety fencing must be used in order to indicate to pedestrians about the construction work area.  * Signage must be erected by the Contractor at entrances to the construction site to warn visitors and pedestrians about the hazards around the construction site and the presence of heavy vehicles, where appropriate.  * Warning signs must be erected in instances where traffic disruption or diversion along access roads occurs.	<b>Extent</b>	2
	<b>Duration</b>	1		<b>Duration</b>	1
	<b>Magnitude</b>	4		<b>Magnitude</b>	4
	<b>x Probability</b>	3		<b>x Probability</b>	2
	<b>Calculation</b>	2+1+4 x 3		<b>Calculation</b>	2+1+4 x 2
	<b>= Score</b>	21		<b>= Score</b>	14
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>
<b>Significance</b>	<b>Low</b>	<b>Significance</b>	<b>Low</b>		
<b>Infrastructure</b>	<b>Extent</b>	2	* This development will improve infrastructure development.	<b>Extent</b>	2
	<b>Duration</b>	4		<b>Duration</b>	4

CONSTRUCTION AND OPERATIONAL PHASES						
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION		
	Magnitude	8	* The development will assist in improving waste removal services within the MAP.	Magnitude	8	
	x Probability	4		x Probability	4	
	Calculation	2+4+8 x 4		Calculation	2+4+8 x 4	
	= Score	56		= Score	56	
	Nature	Positive		Nature	Positive	
	Significance	Medium		Significance	Medium	
Employment	Extent	2	* The proposed landfill site will result in job creation during the construction and operational phase.	Extent	2	
	Duration	4		Duration	4	
	Magnitude	6		Magnitude	6	
	x Probability	4	* Indirect jobs will also be created at the proposed Buy-Back centre.	x Probability	4	
	Calculation	2+4+6 x 4		Calculation	2+4+6 x 4	
	= Score	48		= Score	48	
	Nature	Negative		Nature	Negative	
Significance	Low	Significance	Low			
Safety & Security During the construction phase the safety of employees must be taken to account.	Extent	2	* During construction, the area must be fenced off or demarcated, with a security personnel managing the access point(s).	Extent	2	
	Duration	4		Duration	4	
	Magnitude	6		Magnitude	6	
	x Probability	3	* Any unauthorised entry of the public to the	x Probability	2	

CONSTRUCTION AND OPERATIONAL PHASES					
POTENTIAL ENVIRONMENTAL IMPACT	SIGNIFICANCE RATING OF IMPACTS		PROPOSED MITIGATION	SIGNIFICANCE OF IMPACTS AFTER MITIGATION	
Safety of general public must be compromised during construction and operational phases.	<b>Calculation</b>	<b>2+4+6 x 3</b>	site must be restricted. * During construction and operational phase the fence must be inspected and its integrity maintained on daily basis. * The operational plan must be implemented. * Scavenging by unauthorized persons represents a security and health and safety risk and must not be permitted on site. * Controlled salvaging of waste must be encouraged.	<b>Calculation</b>	<b>2+4+6 x 2</b>
	<b>= Score</b>	<b>36</b>		<b>= Score</b>	<b>24</b>
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>
	<b>Significance</b>	<b>Medium</b>		<b>Significance</b>	<b>Low</b>
Health  Vermin and Disease vectors	<b>Extent</b>	<b>2</b>	* In order to control odour, flies, rodents, daily compaction of waste and cover must be maintained Dust generated from un-surfaced areas must be suppressed by watering. * Personnel on site must be provided with Personal Protection Equipment (PPE) for their health and safety..	<b>Extent</b>	<b>2</b>
	<b>Duration</b>	<b>4</b>		<b>Duration</b>	<b>4</b>
	<b>Magnitude</b>	<b>6</b>		<b>Magnitude</b>	<b>4</b>
	<b>x Probability</b>	<b>4</b>		<b>x Probability</b>	<b>2</b>
	<b>Calculation</b>	<b>2+4+6 x 4</b>		<b>Calculation</b>	<b>2+4+4 x 2</b>
	<b>= Score</b>	<b>48</b>		<b>= Score</b>	<b>20</b>
	<b>Nature</b>	<b>Negative</b>		<b>Nature</b>	<b>Negative</b>
	<b>Significance</b>	<b>Medium</b>		<b>Significance</b>	<b>Low</b>

#### 8.4 IMPACT SUMMARY

The potential impacts of the proposed landfill site are summarised below:

Aspect	CONSTRUCTION PHASE		OPERATIONAL PHASE		Overall
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
<b>Loss of Flora</b>	Low	Low	Low	Low	<b>Low</b>
<b>Loss of Fauna</b>	Medium	Low	Medium	Low	<b>Medium-Low</b>
<b>Geology and Soil</b>	Medium	Low	Medium	Low	<b>Medium-Low</b>
<b>Surface and Groundwater</b>	Low	Low	High	Low	<b>High-Low</b>
<b>Air Quality</b>	Medium	Low	Medium	Low	<b>Medium-Low</b>
<b>Noise</b>	Low	Low	Low	Low	<b>Low</b>
<b>Generation of Waste</b>	Medium	Low			<b>Medium - Low</b>
<b>Visual Aesthetics</b>	Medium	Low	Medium	Low	<b>Medium-Low</b>
<b>Heritage Resources</b>	Medium	Low			<b>Medium-Low</b>

Aspect	CONSTRUCTION PHASE		OPERATIONAL PHASE		Overall
	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation	
<b>Traffic</b>	Low	Low	Low	Low	<b>Low</b>
<b>Infrastructure</b>	Medium Positive	Medium Positive	Medium Positive	Medium Positive	<b>Medium</b>
<b>Employment</b>	Low Positive	Low Positive	Low Positive	Low Positive	<b>Low</b>
<b>Safety and Security</b>	Medium	Low	Medium	Low	<b>Medium-Low</b>
<b>Health</b>	Medium	Low	Medium	Low	<b>Medium-Low</b>

In summary the potential impacts associated with the proposed landfill site are rated from medium to low. Taking into consideration all the mitigation measures proposed, potential impacts will be reduced to be of low significance.

## **8.5 CUMULATIVE IMPACTS**

In brief cumulative impacts refer to impacts that may be of low significance on their own, but become of high significance when added to similar impacts emanating from various sources in the surrounding area where an activity is undertaken. The activities may be from identified and discussed. In line with the proposed MAP landfill site, possible cumulative impacts that may result are as follows:

- ❖ The release of methane gas into the atmosphere as a greenhouse gas will contribute to the ambient air quality of the Phuthaditjhaba area, thus contributing to climate change.
- ❖ Possible increased pressure or rather use of bulk services within the area. This will be further assessed during the EIA phase.
- ❖ Increased traffic on roads due to movement of trucks during operations.
- ❖ Other cumulative impacts that may be anticipated relate to water pollution.

The impacts mentioned above do not only affect the environment within the proposed site or surrounding area in terms of the Biophysical environment, but may also impact on the health of communities.

## **9. A DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE**

### **Assumptions**

Informal waste reclamation will become a major challenge due to lack of financial or technical support for waste recyclers.

### **Uncertainties**

Even though there is a will to reclaim and recycle waste, it is not clear whether the Municipality will put measures in place to facilitate waste segregation at the source as well as waste segregation before transportation.

## Gaps in knowledge

It is unknown whether the market to receive reclaimed waste material is within reach of waste reclaimers, and whether it is feasible to reclaim waste for economic benefit. A feasibility study is necessary to confirm this unknown variable.

## 10. EAP OPINION ON PROPOSED

Taking into consideration the findings and recommendations of the studies conducted, the EAP is of the view that the proposed Landfill Site will:

- Improve service delivery and enhance the quality of life within the study area.
- Create indirect job opportunities in the recycling, composting and buy-back centre facilities.
- Meet relevant legislative requirements as proposed in the preliminary design as well as the EMPr, if all the design specifications and mitigation measures are implemented.

It is prudent that an independent Environmental Control Officer is appointed to monitor compliance with the conditions of the Waste Management License together with the EMPr. Finally, the operational plan for the proposed disposal site must be developed and submitted for review and approval by the Competent Authority.

## 11. AN ENVIRONMENTAL IMPACT STATEMENT

The geotechnical investigation conducted reveals that the proposed location of the landfill site is suitable for the establishment of a general landfill site, as the impact are low if all the recommendations proposed are implemented.

In terms the flora on site, the proposed landfill site will not impact any habitat negatively, as the habitat is of low diversity. The rocky outcrops outside of the proposed site is of major concern as it poses indirect impacts during construction and should be looked at.



The design report for the proposed landfill site should serve as reference document and should ensure the containment and management of leachate. All mitigation measures proposed in the design report and the EMPr should be implemented.

The heritage impact assessment conducted indicates that the site has been previously subjected to cultivations as reflected by contouring and tilling rills. The surface disturbances observed during sites survey recommended no further studies or investigations. There were no archaeological features of significance identified in the study. However, should any archaeological or any other physical cultural resources be discovered by chance, heritage authorities should be informed.

The Ornithological Assessment to determine the status Blue Korhaans and Southern Bald Ibis species reveals that the nature of the site is disturbed by human activity in the area, and as a result of the quality of the habitat observed, it is unlikely that the development of a landfill on the site will have any significant impact on local populations of Blue Korhaans and Southern Bald Ibis. Thus the loss of fauna due to the proposed landfill site is rendered low. The recommendation as per the Ornithological assessment should be implemented to avoid indirect impacts.

Looking at other social aspects such as noise and health, the impact along the access roads due to increased movement of vehicles to and from the site is rated to be medium, and the impacts could be reduced low levels if mitigation measures as stipulated in the EMPr are implemented. These mitigation measures should also form part of the operational plan so as to reduce the odours and noise generated on site.

## **12. A COMPARATIVE ASSESSMENT IF THE POSITIVE AND NEGATIVE IMPLICATIONS OF THE PROPOSED ACTIVITY AND IDENTIFIED ALTERNATIVES**

A similar waste disposal site was developed in Lephalale, Limpopo Province, for Eskom. The proposed landfill is located on an industrial site where industrial activities are already causing several nuisances. According to the impact assessment conducted, additional traffic on the roads that is commonly used by the surrounding industries (including the proposed development) may cause some discomfort and inconveniences to employees working in other industries. Construction activities that will be on-going in both areas will have cumulative

impacts in terms of noise and dust generation. This has implications in terms of the deterioration of air quality and environmental quality from the construction activities. The impact of these nuisances on the environment during the construction and operational phases were assessed and were considered to be low with effective implementation of mitigation measures.

### **The positive impacts of the Lephale project.**

The majority of the impacts have a *low* significance, which implies that they will not influence the decision to proceed with the proposed development, provided they can be effectively mitigated. The proposed mitigating measures are considered to be sufficient to effectively mitigate the *low* and *moderate* significance impacts and thus the decision can be made to proceed with the construction of the landfill and the temporary hazardous waste storage facility.

The proposed development is a strategic response to address current waste management challenges facing Eskom in the Lephale area as the existing landfill site in Lephale is not permitted and cannot be utilised for disposal of the waste that is currently generated during the construction of the Medupi Power Station, as well as waste that will be generated during its operation;

The proposed development is a response by Eskom to adhere to its Safety, Health and Environmental policy and legal requirements, as well as combating current operating costs;

The project will benefit the local community through increased job creation both during the construction and operational phases; I&APs raised no objections to the proposed development during the Scoping or Environmental Impact Assessment phases;

## **The negative impacts of the Lephale project**

The following negative impacts were identified:

- ❖ Environmental nuisances (noise, dust, traffic and air quality)
- ❖ Visual; and
- ❖ Anticipated future developments.

### ➤ **Environmental nuisances (noise, dust, traffic and air quality)**

The proposed landfill is located on an industrial site where industrial activities are already causing several nuisances. The Medupi Power station that is under construction is located approximately 4km from the study site. It has been indicated that Eskom will consider initiating construction of the landfill by end of 2009 following the issuing of positive authorisation and relevant permits. Additional traffic on the roads that is commonly used by the surrounding industries (including the proposed development) may cause some discomfort and inconveniences to employees working in other industries. Construction activities that will be on-going in both areas will have cumulative impacts in terms of noise and dust generation. This has implications in terms of the deterioration of air quality and environmental quality from the construction activities. These impacts are however considered to be low with effective implementation of mitigation measures.

### ➤ **Visual and Landscape character**

The proposed site is located within the boundaries of Matimba power station and other industries. Similarly, cumulative visual impacts from the surrounding industrial developments in the area, when considered collectively are worth noting. In order to avoid any visual issues the mitigation measures proposed in this report and in the Environmental Management Plan must be implemented. The landfill and the associated infrastructure will not add much to the existing visual character of the area. The impact on the visual character is also considered to be insignificant.

### ➤ **Anticipated and future development**

It has been indicated in the report that the landfill will also accommodate waste from the two proposed Eskom coal fired power stations in the Waterberg development, Matimba Power Station and the Contractors Village. This on its own implies that the landfill must have capacity to accommodate waste for the life span of these proposed power stations. In addition, the municipality has during the public meeting indicated that they are in partnership with other industries to develop an alternate landfill site that will accommodate municipality waste and waste from the industries. This has implications in terms of development of an additional landfill site that may have similar impacts as those identified in the EIR. The cumulative impact from known and anticipated development is considered to be low as the Lephalale area has been targeted by various industries for future developments.

## **13. ENVIRONMENTAL MANAGEMENT PROGRAMME**

The EMPr forms part of the EIR process and is attached in Appendix L. The aim of the EMPr is to address the impacts and guide with the implementation of the mitigation measures, including monitoring measures to be undertaken for the proposed landfill site. The EMPr outlines the impacts and associated mitigation measures for the construction, operational and rehabilitation phases of the proposed landfill site. This includes the integration of the recommendations as per the specialist studies conducted.

## **14. RECOMMENDATIONS AND CONCLUSION**

It is recommended that the environmental authorities authorise the development subject to the following conditions:

- ❖ The majority of the impacts have a low significance, which implies that they will not influence the decision to proceed with the proposed development, provided they can be effectively mitigated. Mitigating measures to address these impacts have been described in this report. The proposed mitigating measures are considered to be

sufficient to effectively mitigate the low and moderate significance impacts and thus the decision can be made to proceed with the construction of the landfill site.

- ❖ The proposed landfill facility must be carefully designed to avoid significant ground water and visual impacts.
- ❖ It is recommended that leachate management systems and a water management plan are implemented to minimise impacts. The monitoring programmes and other conditions and requirements to ensure that risks associated with the project are kept to minimum levels are discussed in the EMPr. The approved EMPr for the proposed disposal site should be adhered to.
- ❖ It is essential that all applicable regulatory requirements are adhered to ensure that MAP meets all the necessary legal requirements for the construction and operation of such a facility. :
- ❖ The applicant must further ensure that a landfill operations plan is in place. The operational plan should stipulate measures to ensure that monitoring in terms of air quality, the health and safety of employees and personnel's entering the disposal are practised.
- ❖ Conditions as per the environmental authorisation should be complied with to the latter.
- ❖ Recommendations, including mitigation measures from the specialist reports; Ornithological Assessment, Ecological Scan, Heritage Impact Assessment, Palaeontological Impact Assessment, Visual Impact Assessment and Geotechnical investigations should be implemented.

## 15. WAY FORWARD

This report serves as the final Environmental Impact Report for the proposed construction of the landfill facility. The final Environmental Impact Report (EIR) will be submitted to DETEA for a decision whether to grant or refuse authorisation. The EIR has incorporated comments and recommendations from a variety of specialist studies. The EIR is considered to have sufficiently identified the potential impacts associated with the proposed development, of which the EAP believes to have adequately mitigated them in the EMPr. All questions and clarification requests should be addressed to:

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**LIST OF APPENDICES**

- APPENDIX A - LOCALITY MAP
- APPENDIX B - TOPOGRAPHICAL MAP
- APPENDIX C - APPROVED FACILITY ILLUSTRATIONS
- APPENDIX D - ALL GREEN CONSULTANTS DESIGN REPORT
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- APPENDIX F - HERITAGE IMPACT ASSESSMENT
- APPENDIX G - GEOTECHNICAL REPORT
- APPENDIX H - ORNITHOLOGICAL STUDY
- APPENDIX I - VISUAL IMPACT ASSESSMENT
- APPENDIX J - PALAEOLOGICAL IMPACT ASSESSMENT
- APPENDIX K - PUBLIC PARTICIPATION REPORT
- APPENDIX L - ENVIRONMENTAL MANAGEMENT PROGRAMME