



**ENVIRONMENTAL IMPACT ASSESSMENT  
FOR THE PROPOSED CONSTRUCTION OF ESKOM GENERAL  
LANDFILL AND A HAZARDOUS WASTE STORAGE FACILITY  
IN LEPHALALE, LIMPOPO PROVINCE**

**ENVIRONMENTAL SCOPING REPORT & PLAN OF STUDY OF EIA**

**MARCH 2009**

**DEAT Reference Number: 12/12/20/1399**

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Appendix C<sup>10</sup>: Preliminary Visual Impact Assessment

Appendix C<sup>11</sup>: Engineering observations and Input

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**ABBREVIATIONS & ACRONYMS**

BID	Background Information Document
DEAT	Department of Environment and Tourism
DEDET (DEDET)	Limpopo Department of Economic Development, Environment & Tourism
DSR	Draft Environmental Scoping Report
DWAF	Department of Water Affairs and Forestry
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
IEM	Integrated Environment Management
EMP	Environmental Management Plan
FSR	Final Environmental Scoping Report
NEMA	National Environment Management Act
I & APs	Interested and Affected parties
PPP	Public Participation Process
PoS	Plan of Study of EIA
SR	Scoping Report
ToR	Terms of Reference

## **EXECUTIVE SUMMARY**

### **1 INTRODUCTION**

Envirolution Consulting (Pty) Ltd has been appointed by Eskom Holdings (Pty) Ltd (hereafter Eskom) to undertake the Environmental Impact Assessment process for the proposed construction of a general landfill site and a hazardous waste storage facility. The Project aims at accomodating the waste that is generated from the construction of the Medupi Power Station and the proposed coal 3 and 4 powerstations. It is envisaged that the proposed landfill site and the hazardous waste storage facility will reduce the costs associated with the transport of waste from Lephalale (Limpopo Province) for disposal in Johannesburg (Gauteng).

### **2 ENVIRONMENTAL IMPACT ASSESSMENT AND PUBLIC PARTICIPATION PROCESS**

In terms of the Environmental Impact Assessment (EIA) Regulations published in Government Notice No. R. 385 and No. R. 387 of 2006 and read with Section 24 (5) of the National Environmental Management Act (Act No 107 of 1998), the proposed development is subject to Scoping and EIA. An Environmental Impact Assessment was therefore conducted for the proposed landfill site and the hazardous waste storage facility. The findings of the Scoping phase process are included in this report. Interested and Affected Parties (I&APs) including surrounding and affected landowners, provincial, national and local governments departments, NGO's were involved during the Public Participation Process (PPP). The summary of the PPP that commenced on January 2009 is summarised as follows:

- » Publication of a media advertisement in the local and regional newspapers, Mogol and Star Newspaper of 30 January 2009
- » On-site notices advertising the EIA have been erected on site and at visible and accessible locations close to the site on 29<sup>th</sup> - 30<sup>th</sup> January 2009
- » Distribution of letters by fax/post/email to I&APs from 29 January - 13 February 2009
- » Distribution of Background Information Documents and Registration and Comment sheets by fax/post/email to I&APs from 29 January 2009 to todote
- » Placement of Draft Scoping Report for review by public from 20 February - 20 March 2009
- » Public and Focus group meetings to be held on 10 March 2009.

### **3 KEY IMPACTS**

Potential risks and key issues identified during the Scoping Phase of the project were based on consultation with the I&APs, through an internal process based on similar developments, preliminary specialist investigations, desktop studies and current state of the environment of the site. Preliminary Specialists' investigations that were undertaken include:

- » Ecological Assessment (Floral, Faunal and Avifaunal Assessment);
- » Avifaunal Assessment;
- » Wetland Delineation;
- » Geohydrological Assessment;
- » Geotechnical Assessment;
- » Visual Impact Assessment;
- » Traffic Impact Assessment;
- » Noise Impact Assessment
- » Heritage Impact Assessment; and
- » Social Impact Assessment.

DEAT will advise on further studies that may be required during the EIA phase. Specialist findings will be assessed and discussed in detail in the Environmental Impact Assessment Report (EIR) that will be provided during the EIA phase.

#### **4 ALTERNATIVES**

Five alternative study sites have been proposed for the location of the proposed development have been investigated during the scoping and screening phases. Four of these sites are located on farm Grootvallei and the fourth site is located within the boundaries of Matimba Power Station. These are named "Site1 - Kromdraai", "Site 2 - Grootvallei", "Site 3 - Hanglip", and "Site 4 - Matimba Power Station". These study sites were subject to a screening study and preliminary assessment by various specialists during the scoping phase with Site 4 (Matimba Power Station) being the least impacted and most preferred one. All four sites are described in Section 3 of the Scoping Report. It is the conclusion and the recommendation of this Scoping report that only Site 5 (farm Grootestryd) must be further investigated during the Scoping and EIA phases. This site will be evaluated based on 3 alternative localities or potential footprints within the site. These alternatives will be evaluated during the EIR phase to determine the most environmental and technical feasible alternative. Detailed findings of the specialist investigations will be included in the EIR.

#### **5 CONCLUSIONS AND RECOMMENDATIONS**

The Scoping Report provides a broader description of the preliminary biophysical and socio economic issues associated with the proposed construction of a general landfill and a hazardous waste storage facility. A detailed description of the surrounding land use is provided, ensuring that all environmental aspects are highlighted. Section 5 provides a description of the biophysical and social environment to ensure that all potential risks and issues are taken into consideration in all phases of the development. The potential risks and issues identified will be discussed in detail in the EIA report. A comprehensive public participation process was conducted and is discussed in **Chapter 4**.

The EIA Report will present an assessment of the impacts of each of the individual activities as well as ascertain the potential cumulative impacts of the development in its entirety. The EIA report will also outline mitigation measures so that positive impacts can



be optimised and negative impacts minimised in order for the project to be integrated into the environment in a sustainable manner.

# 1 CHAPTER 1

# INTRODUCTION

---

Eskom Holdings Limited is proposing to establish a waste disposal site and a temporary hazardous waste storage facility on a site located in the Limpopo Province. It is proposed to accommodate waste from the Matimba Power Station, the Medupi Power Station under construction and the two Waterberg Coal Fired Stations being proposed. In addition, it will also cater for the waste that will be generated by an Eskom Construction Village which will accommodate approximately 8000 contractor personnel. The nature and extent of this facility, as well as potential environmental impacts associated with the construction of a facility of this nature is explored in more detail in this Environmental Scoping Study.

## 1.1 Need for the project

Eskom is presently constructing a 6 x 800MW (4 800MW total capacity) coal fired power station. The power station is known as the Medupi Power Station, located 15km from the town of Lephalale in the Limpopo Province. The construction of the Medupi Power Station results in the generation of enormous amounts of waste (both general and hazardous). It should be noted that the waste disposal site which exists at the town of Lephalale is not licensed and therefore, in terms of Eskom's Safety Health and Environment (SHE) Policy and commitment to legal compliance, cannot currently be utilised for disposal of the waste generated. As a result Eskom is obliged to have all Medupi waste transported to the Johannesburg area to ensure disposal at a licensed site.

During the construction of the Medupi Power Station, it is anticipated that construction waste will be generated until 2014 after which the station will transition into an operational phase. Approximately half of the construction and operational waste will be hazardous waste, and half general waste. It is anticipated that the existing Matimba Power Station will generate the same amount of waste, with a 50% split between hazardous and general waste for the remainder of its operating life, whereas the two proposed Waterberg Coal Fired Power Stations are anticipated to generate waste volumes that are slightly higher than that for the Medupi Power Station. These power plants are anticipated to have a life span of approximately 50 years. The total anticipated waste generated from the four power stations over their total life i.e. 50 years, is expected to be approximately 1 200 000m<sup>3</sup> of waste split between general and hazardous waste.

Given the approximate waste volumes that will be generated from the four power stations and the construction village, the proposed development is a strategic response to address the following:

- » current waste management challenges facing Eskom in the Lephalale area,
- » adhere to the legal requirements, and
- » Combating current operating costs.

## 1.2 Background to the project

As a precursor to initiating an Environmental Impact Assessment (EIA) process, Eskom embarked on a site selection process. This site selection process was to undertake site identification and to determine areas suitable for the accommodation of a waste disposal facility. This site selection process considered the Department of Water and Forestry Affairs (DWAF) Guideline document requirements to ensure that the site was optimally placed.

It was acknowledged that a proactive identification of a location/site appropriate for the introduction of a waste disposal facility would enhance the viability of the project and inform the scope of the EIA.

## 1.3 Project overview

Through this site selection process Eskom owned land which falls within the Lephalale Local Municipality in the Limpopo Province (depicted on **Figure 1.1** and **Figure 1.2**) was identified by Eskom as potentially suitable for the waste site facility and put forward for consideration within an EIA (refer to Chapter 3 for details of the site identification process). The area (approximately 3000 ha in extent) comprises the farms.

- » Hanglip 508 LQ;
- » Kromdraai 513LQ; and ,
- » Grootvallei 515 LQ.

Eskom subsequently introduced an additional site that lies with the Matimba Power Station property *viz.* Grootestryd LQ 465. The site within the Matimba Power Station is located next to an existing landfill site that is no longer in use. The total area available for a waste disposal facility on Grootestryd LQ 465 is approximately 20 ha.

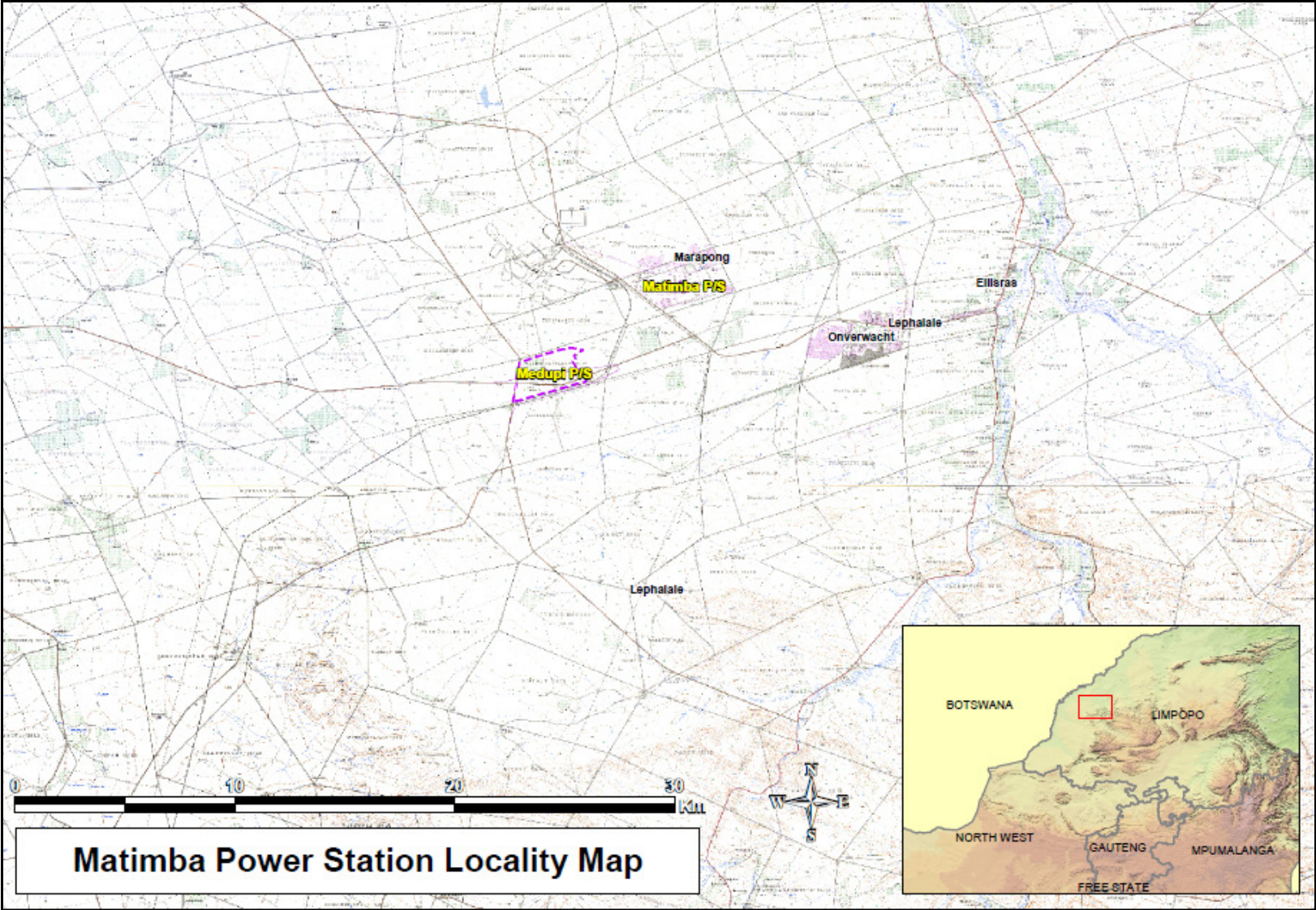
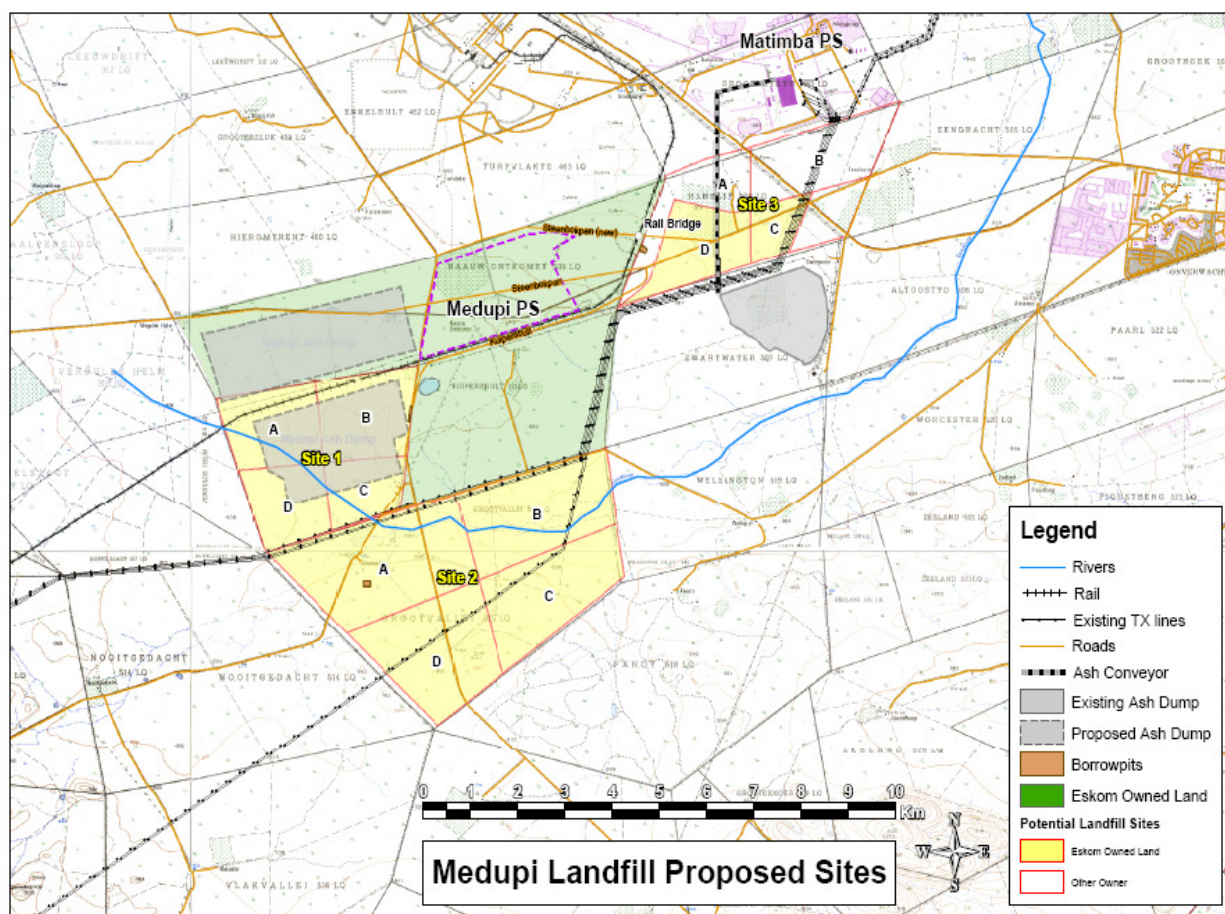


Figure1.1: Map showing the location of the waste disposal facility within Limpopo Province.





**Figure 1.2:** Farm Portions subdivided into quadrants the three portions of land highlighted on the map were originally provided by Eskom which were assessed to choose the preferred site.

The overarching objective of the site selection process is to ensure that the waste facility is appropriately sited based on the geo-technical and geo-hydrological requirements. The selection process was conducted in a manner that allowed for the minimisation of infrastructure, operation and maintenance costs, as well as **social and environmental impacts**. Local level environmental and planning issues were not assessed in sufficient detail through the site selection process.

The authorisation required will be for an area of 20 ha within which to accommodate a waste disposal site and its associated infrastructure. This waste disposal site will accommodate both general waste, hazardous waste and a temporary storage facility for hazardous waste. It is anticipated that the waste disposal site will have a footprint of approximately 4 hectares.

The infrastructure associated with the waste disposal site will include:

- » A landfill site to accommodate both general waste and hazardous waste;
- » A facility within which to temporary store hazardous waste for transfer before disposal;
- » Overhead electrical power lines;

- » An access/haul road to the site from the main roads;
- » Water supply;
- » Sewage and sanitation;
- » Internal access road to the waste disposal site, temporary hazardous waste storage facility and office; and
- » A small office building at the facility entrance.
- » a waste sorting facility or area for recyclables
- » Strict security control in order to keep jobless people out of the area (burning of tyres, plastics, etc is always a problem).

The exact design, footprint and sizes of the associated infrastructure will be confirmed during the EIA phase when the engineering design requirements are finalised. The scope of the waste disposal site, including details of all elements of the project (for the construction, operation and decommissioning phases) will be discussed in detail in the Environmental Impact Report that will be submitted during the EIA phase.

An engineering team forms part of this study to assist the developers in selecting the optimum site for the waste disposal site. This layout will then inform the positioning of other infrastructure such as access roads and substation/s.

#### **1.4 Requirements for an Environmental Impact assessment Process**

In terms of the National Environmental Management Act (NEMA) EIA Regulations of 2006, Government Notice No R 387 of 2006, the proposed construction of the landfill site and the hazardous waste storage facility are regarded as listed activities and therefore requires environmental assessment prior to authorisation. NEMA is national legislation that provides for the authorisation of certain controlled activities known as “listed activities”. The listed activities relevant for the project are highlighted in **Section 4** of this scoping report.

In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation. Since Eskom is a parastatal, the competent authority is the national Department of Environmental Affairs and Tourism (DEAT).

An application for authorisation has been accepted by DEAT. The Application Reference number is **12/12/20/1399**). This scoping report was conducted in accordance with Section 24 of the NEMA. The Act requires that an EIA be undertaken in order to inform the authorisation process for a listed activity. Government Notice R. 385, published in terms of Chapter 5 of NEMA, defines the manner in which the EIA is to be undertaken. Guideline documents have been published by the Department of Environmental Affairs and Tourism (DEAT) and the Gauteng Department of Agriculture, Conservation and Environment (GDACE) and these provide further guidance in implementing the EIA

Regulations, 2006. This guideline document will be used as reference documents as the Limpopo Province has not issued any provincial guidelines pertaining to Section 24 of NEMA.

## **1.5 Objectives of the Scoping Study**

The Scoping Phase of the EIA process refers to the process of identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA Phase. This is achieved through an evaluation of the proposed project, involving the project proponent, specialists with experience in EIAs for similar projects, and a public consultation process with key stakeholders that includes both government authorities and interested and affected parties (I&APs).

In accordance with the EIA Regulations, the main purpose of the Scoping Study is to focus the environmental assessment in order to ensure that only potentially significant issues and reasonable and feasible alternatives are examined in the EIA Phase. The Draft Environmental Scoping Report provided stakeholders with an opportunity to verify that the issues they have raised through the process to date have been captured and considered, and provides a further opportunity for additional key issues for consideration to be raised. The Final Scoping Report has incorporated all issues and responses raised during the public review of the draft Environmental Scoping Report prior to submission to DEAT.

The Scoping Report consists of the following ten sections:

- **Chapter 1: Introduction**

The section provides background to the proposed waste disposal site project and the EIA.

- **Chapter 2: Legislation and Policy Guideline**

This section outlines legislation, policies and guidelines applicable to the proposed development.

- **Chapter 3: Site Selection Process:**

The section identifies, describes, evaluates and compares all sites that were considered during the scoping phase for the location of the proposed landfill and the hazardous waste storage facility. The section also describes the methodology that was used during the site selection process.

- **Chapter 4: Scoping Phase Methodology**

This section describes the study approach used to gather all the information, assumptions, and limitations during the scoping phase. The chapter also includes the approach that will be considered during the EIA phase of the project.

- **Chapter 5: Description of the Affected Environment**

This chapter describes the key elements of the socio-economic and bio-physical environment. The chapter will also incorporate the findings of all specialist studies that were undertaken during the Scoping phase. Some of the issues and concerns that were raised during the public participation process will also be incorporated in this section.

- **Chapter 6: Project Scope**

The chapter describes the environmental planning and design aspects of the project. The chapter also addresses design options that were considered in order to ensure that the proposed project is technically feasible without significantly impacting on the bio-physical and socio-economic environment.

- **Chapter 7 Issues Trail (Final Scoping Report)**

The chapter provide a summary of the entire public participation process, which was undertaken throughout the scoping phase. The chapter explains the manner in which stakeholders and the Interested & Affected Parties were consulted and comments elicited. An Issues Trail Report addressing any comments received will form part of this Scoping Report.

- **Chapter 8: Scoping Evaluation**

This section is a description of the possible environmental impacts of the landfill based on the field assessment and specialist findings. A summary of the most important findings of the Scoping phase will be provided.

- **Chapter 9: Conclusion and Recommendations**

The Section highlights the key conclusions drawn from the scoping phase and further provides recommendations based on the investigations undertaken during the Scoping Phase.

- **Chapter 10: Plan of Study of EIA**

This Chapter has been compiled in accordance with Regulations 29 (l) (i) of Government Notice No R.385 of 2006. The Plan of Study for EIA sets out the proposed approach to be followed in the next phase of EIA. This will include the terms of reference for all specialists and the detailed description of the methodology that will be used to assess all identified impacts.



## 1.6 Details of Envirolution Environmental Expertise to conduct Scoping Processes

The project team comprises Envirolution Consulting as the lead consultants and various technical specialists and Social Impact Consultants, Technical, Peer and Legal Review advisors that will provide technical input and advice throughout the project.

### 1.6.1 Project Applicant

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Ms. Nkhensani Khandlhela heads the project team and acts as the Project Manager for all phases of the project. Nkhensani holds an MSc (Geographical Sciences). She is an Environmental Scientist with 5 years of experience. Nkhensani specialises in Integrated Environmental Management (IEM), Environmental Impact Assessments (EIAs), rural development, land use issues socio-economic surveys. Nkhensani has been the project scientist for various EIA's in KwaZulu Natal, Eastern Cape and Gauteng provinces of South Africa. Nkhensani is currently a Project Manager and Environmental Scientist at Envirolution Consulting.

### 1.6.3 Authority

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## **2 CHAPTER 2**

## **LEGAL REQUIREMENTS**

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The proposed development includes several activities that are listed in both Government Notices' (GN) GN R No 386 & 387 of 2006. As such, the proponent is obliged to conduct a full EIA (scoping and environmental impact assessment) for the proposed activity, in accordance with the procedures stipulated in GN R No 386 & 387 of 2006.

Waste Management in South Africa is regulated by national, provincial and local legislation. Various departments that administer waste legislation include the Department of Environmental and Tourism Affairs (DEAT), Department of Water Affairs and Forestry (DWAF), Department of Labour (DoL), South African National Roads Agency (SANRAL) and various environmental divisions with the provincial and local government. A Workshop draft document (an industry guide) compiled by Nancy Oosthuizen Consulting (2006) was used as a guideline identifying many of the relevant legislation and policies applicable to the proposed development.

### **2.1 Constitution of the Republic of South Africa, 1996**

The Constitution of the Republic of South Africa, 1996 has major implications for environmental management. The main effects are the protection of environmental and property rights, the drastic change brought about by the sections dealing with administrative law such as access to information, just administrative action and broadening of the locus stand of litigants. These aspects provide general and overarching support and are of major assistance in the effective implementation of the environmental management principles and structures of the Environment Conservation Act and NEMA. Section 24 in the Bill of Rights of the Constitution specifically states:

"Everyone has the right –

- » To an environment that is not harmful to their health or well-being; and
- » To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
- » Prevent pollution and ecological degradation;
- » Promote conservation; and
- » Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

This section of the Constitution obliges industries and organisations that are responsible for generating waste, to manage the waste in a way that will not cause pollution and thus negatively affect the health and well being of humans.

## **2.2 White Paper on Integrated Waste Management and Pollution Control of 2000**

The White paper describes government's new approach to the waste management and further identifies important issues that need addressing such as:

- » The lack of priority afforded to waste management;
- » Fragmented legislation and ineffective enforcement;
- » Unacceptable safety, health and environmental practices for pollution and waste management; and
- » The absence of integrated waste management options.

Seven strategic goals are identified within this policy:

- » Effective Institutional Framework and Legislation;
- » Pollution Prevention, Waste Minimisation, Impact Management and Remediation;
- » Holistic and Integrated Planning;
- » Participation and Partnership in Integrated Pollution and Waste Management Governance;
- » Empowerment and Education in Integrated Pollution and Waste Management;
- » Information Management; and
- » International Cooperation.

## **2.3 National Waste Management Strategy (1999)**

The National Waste Management Strategy presents a long term plan for addressing issues, needs and problems experienced with management in South Africa. It is also an action plan taking forward the goals of the White paper on Integrated Waste Management and Pollution Control. The priority initiatives that are identified and addressed by the strategy include:

- » Integrated Waste Planning;
- » Waste Information Systems;
- » Waste Minimisation;
- » Recycling;
- » Waste Collection and Transport; and

- » Waste Treatment and Disposal.

## **2.4 The Polokwane Declaration of 2001**

The Polokwane Declaration stemmed from the Waste Summit that was held in Polokwane during 2001. The declaration was signed by government, business and civil society. The introduction of the declaration recognises that Waste Management is a priority for all South Africans and that there is a need for urgent action to reduce, reuse and recycle waste to protect the environment.

## **2.5 Environment Conservation Act, (Act No 73 of 1989)**

### **Waste Management**

In terms of Section 20 (1) of the Environment Conservation Act, 1989, (Act 73 of 1989), waste can only be disposed of at a waste disposal facility that has a permit issued by the Minister of Water Affairs and Forestry. The facility must be sited, designed, operated and monitored strictly in accordance with the permit conditions. These conditions will include the requirements, standards and procedures set out in the Department of Water Affairs and Forestry ( DWAF)'s Waste Management series.

It should be noted that Section 20 (1) of the Environmental Conservation Act, 1989 has been amended in terms of the issuing of waste disposal site permits. The processing of the waste disposal permits and exemptions is now the responsibility of the Minister of Environmental Affairs and Tourism.

Section 24 of the Act allows the Minister to make regulation with respect to a number of waste management issues and include the following regulations:

- » Disposal Site Permit Application;
- » Directions for Control and management of general and small waste disposal sites;
- » Noise Control Regulations; and
- » Plastic Bag Regulations.

The waste site will thus be subject to a permit issued under section 20 of the ECA.

## **Noise management**

Noise pollution is managed under regulations issued under section 25 of the Environment Conservation Act (ECA) and read with the SANS codes of practice for measuring and rating environmental noise. Occupational exposure to noise is managed under the regulations to the Occupational Health and Safety Act 85 of 1993. The law of nuisance may also be used as a legal mechanism to manage noise nuisance.

## **2.6 National Environmental Management Act, 1998 (Act No. 107 of 1998)**

In terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the activities (Scoping and EIA) are identified in Government Notice No. R387 of 2006 as 1 (l) "the recycling, re-use, handling, temporary storage or treatment of general waste with a throughput capacity of 50 tons or more daily average measured over a period of 30 days" and the "construction of facilities or infrastructure including associated structures for the use, recycling, handling, treatment, storage or final disposal of hazardous waste".

Other listed activities associated with the proposed development are highlighted in **Section 4** of this report. As identified listed activities in GN 387 of 2006, the proposed development will require the submission of a Scoping Report and an Environmental Impact Assessment Report (EIR) to the relevant authorities as part of the environmental authorisation process.

Section 28 of the Act places a duty of care on all persons not to degrade and pollute the environment, and should any such pollution or degradation occur, remedial steps must be taken. The liability regime is such that employees,, companies and directors may accrue personal liability for cleanup and in some instances criminal prosecution should an environmental crime be committed.

Section 30 of NEMA prescribes the steps to be taken should an environmental emergency incident occur.

## **2.7 National Water Act 36 of 1998**

The National Water Act (NWA) administered by DWAF aims to manage and protect the national water resources to achieve sustainable use of water for the benefit of all water users. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, and managed in ways that take into account:

- » Meeting the basic human needs of present and future generations;

- » Promoting equitable access to water;
  - » Redressing the results of past racial discrimination;
  - » Promoting the efficient, sustainable and beneficial use of water in the public interest;
  - » Facilitating social and economic development;
  - » Providing for the growing demand for water use;
  - » Protecting aquatic and associated ecosystems and their biological diversity;
  - » Reducing and preventing pollution and degradation of water resources;
  - » Meeting international obligations;
  - » Promoting dam safety; and
  - » Managing floods and droughts.
- » **Section 19** of the act focuses on the prevention and remedying effects of pollution. This section requires that an owner of the land, a person in control of the land or a person who occupies or uses the land on which any activity or process is performed that causes or is likely to cause pollution of a water resource, to take all reasonable measures to prevent any such pollution from occurring, continuing and recurring. A prescribed regimen of groundwater monitoring will need to be implemented as part of the permit conditions of the waste disposal site. Compliance to the Minimum Requirements for water monitoring at Waste Disposal Sites, 2nd edition, 1998, DWAF must also be taken into consideration.
- » **Section 20** of the Act deals with the control of emergency accidents. Any incidents that causes pollution or may cause pollution of a water resource must be reported to DWAF and immediate remedial measures undertaken.
- » **Section 21 and 39** of the Act read with regulation R389 requires that certain activities are regarded as water uses and needs to be registered and in some instances licensed with DWAF. The following water uses are relevant:
- Section 21 (c) impeding or diverting the flow of water in a watercourse (Two of the proposed locations impact on a stream)
  - Section 21 (g) disposing of waste in a manner which may detrimentally impact on a water resource; (All waste disposal sites have the potential to impact on surface or groundwater)
  - Section 21(i) altering the bed, banks, course or characteristics of a watercourse (Two of the proposed locations impact on a stream). If DWAF is satisfied that the granting of e section 20 ECA permit is sufficient to achieve the objectives of the NWA, it may dispense with the requirement to separately issue a water use license.

## **2.8 The National Environmental Management: Air Quality Act 39 of 2004**

The National Environmental Management: Air Quality Act 39 of 2004 provides for the setting of national norms and standards for regulating air quality monitoring, management and control and describes specific air quality measures so as to protect the environment and human health or well-being by:

- » preventing pollution and ecological degradation; and
- » promoting sustainable development through reasonable resource use.

It also includes reference to the control of offensive odours whereby reasonable steps to prevent the emission of any offensive odours caused by activities on a premises are required. Also relevant is the establishment of national ambient dust fall out levels that may be relevant to the construction and operation of the facility.

## **2.9 The Conservation of Agricultural Resources Act 43 of 1983**

The Act and its Regulations provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.

## **2.10 The Hazardous Substances Act 15 of 1973**

The Hazardous Substances Act 15 of 1973 governs the control of substances that may cause ill health or death in humans by reason of their toxic, corrosive, irritant, flammability or pressure effects. The Act provides for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products; and to provide for matters connected therewith. A license is required for an operation that stores, handles and sells Group I substances. The Act also prescribed the disposal of certain hazardous substances and their containers.

## **2.11 Occupational Health and Safety Act 85 of 1993**

The Occupational Health and Safety Act 85 of 1993 is South Africa's principle legislation concerning health and safety of employees. It also aims to protect persons who are not at work against hazard to health and safety arising out of or in connection with the activities of persons at work.

The Act places the responsibility on the employer to ensure a safe and healthy working environment and to cause every employee to be made conversant with health and safety requirements relevant to their work. At the same time the Act places the responsibility on the employee to follow its employer's health and safety procedures and instructions. A number of Regulations have been promulgated under the Act that are relevant to development including the following:

- » General Administrative Regulations, 1994
- » Asbestos Regulations, 2001
- » Lead Regulations, 2003
- » Regulations for Hazardous Chemical Substances, 1995
- » Hazardous Biological Agents of 2001;
- » General Safety Regulations, 1986
- » Environmental regulations for workplaces (Department of Labour, 1994); and
- » Construction Regulations, 2003.

All waste management activities need to be carried out in accordance with the requirements of the OHS Act and must include the following activities:

- » Waste Management Practices must be safe and without risk;
- » Risk Assessments conducted should include waste related activities;
- » Waste management training should be provided to employees and contractors;
- » Written work instructions should be provided where necessary; and
- » Relevant personal protective equipment and respiratory protective equipment must be provided as last resort after all mitigatory measures have been reviewed.

## **2.12 Health Act 63 of 1977 and the National Health Act 61 of 2003**

The Health Act provides measures for the promotion of health of citizens of South Africa and is administered by the Department of Health (DoH). The Act has impact on waste management in that it obliges local authorities to prevent nuisances and offensive conditions within their areas.

The Act also provide for Municipal Health Services which include:

- » Water quality monitoring;
- » Waste management;
- » Health surveillance of premises;
- » Environmental pollution control; and



- » Chemical safety

### **2.13 National Road Traffic Act 93 of 1996**

According to this Act, dangerous goods (as defined in SANS 10228) cannot be transported unless you comply with the requirements of the Act and the Regulations. The dispatch of hazardous waste off-site therefore falls under these requirements. In short, driver training, hazardous chemical signage, vehicle operational requirements and documentation relating to the hazardous substances are prescribed. Certain obligations are also placed on the consignor and the consignee regarding the offloading of hazardous material that includes hazardous waste.

The United Nations recommendations on the transport of dangerous goods have been used to produce the 1996 act. In addition, and in terms of other regulations published under the National Road Traffic Act, 1996, certain South African Bureau of Standards (SABS) Codes of Practice have been incorporated as standard specifications into the National Road Traffic Regulation (GNR 1249 of 13 November 2001). These codes have been based on the UN recommendations, also known as “The Orange Book” and the associated European ADR regulations.

### **2.14 National Heritage Resources Act 25 of 1999**

The National Heritage Resources Act 25 of 1999 was introduced to ensure protection of South Africa’s important heritage features. The act covers the following areas of heritage value:

- » Archaeology
- » Palaeontology
- » Meteorites.
- » Old structures
- » Graves, both old and new
- » As well as areas of historic cultural significance.

Tools used to conserve and manage these resources are the formal regulated EIA processes as well as permits issued by the South African Heritage and Resources Agency (SAHRA) to restrict and/or regulate development within a heritage environment. No heritage item may be removed, damaged or destroyed without authorisation. If the heritage assessment is performed as part of the EIA process, the comment of the responsible heritage agency must be obtained prior to a decision being made by the environmental authority.

### **2.15 National Forest Act 84 of 1998**

This Act is relevant for managing protected trees. A list of protected trees has been identified and no tree on the list may be removed, destroyed or damaged prior to authorisation being obtained from DWAF.

### **2.16 Removal of Graves and Dead Bodies Ordinance 7 of 1925**

Authorization for exhumation and reinternment of human remains must be obtained from the relevant local authority here the grave is situated, as well as where the grave is being relocated to.

### **2.17 Fencing Act 31 of 1963**

Any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5 metres on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to the protection of flora.

### **2.18 Water Services Act 108 of 1997**

**Section 6:** Access to water services must be through a nominated water services provider, failing which approval should be obtained from the water services authority.

Section 7 Water for industrial use must be obtained through a nominated water services provider and no person may dispose of industrial effluent in any manner other than that approved by the water services provider nominated by the water services authority having jurisdiction in the area in question.

### **2.19 Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947) and regulations**

Control of the use of registered pesticides, herbicides (weed killers) and fertilisers. Special precautions must be taken to prevent workers from being exposed to chemical substances in this regard. Pest Control operators must be licensed with the department of Agriculture.

### **2.20 National Veld and Forest Fire Act 101 of 1998**

The purpose of the Act is to prevent and combat wildfires, veld, forest and mountain fires throughout the Republic. A duty is placed on land owners to maintain fire breaks.

## **2.21 Transvaal Town Planning and Townships Ordinance 15 of 1986**

The Act regulates township establishment and authorised land use and zoning.

## **2.22 Guideline Documents**

The following guideline documents were considered amongst others:

- » DEAT (2005) Guideline 3: General Guide to Environmental Impact assessment Regulations 2005, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.
- » DEAT (2005) Guideline 4: Public Participation, in support of the EIA Regulations 2005,
- » Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria; and
- » DEAT (2006) Guideline 5: Assessment of Alternatives and Impacts in support of the Environmental Impact Assessment Regulations 2005, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

## **2.23 Integrated Environmental Management (IEM)**

The general approach to this study has been guided by the principles of Integrated Environmental Management (IEM). In accordance with the IEM Guidelines (Department of Environmental Affairs and Tourism (DEAT), 1992), an open, transparent approach, which encourages decision-making, that has been accountable, has been adopted. IEM is a procedure for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development (DEAT, 1992). The IEM guidelines intend encouraging a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels.

Other relevant acts that may be significant and associated with the proposed development include the National Environmental Management: Biodiversity Act 2004 (Act No. 10, 2004).

Certain permits, licences, approvals or authorizations may be required in terms of the above mentioned Acts. The applicable permits and licences will only be determinable with reasonable certainty once the relevant activity has been approved by DEAT.

## **2.24 Applicable old Transvaal Ordinances**

- » Standard Drainage By-Laws (TVL) AN 665 8 June 1977. Adopted by admin notice 2233 26 Jun 1991;
- » Standard Water supply by-laws AN 21 5 January 1949. Adopted 5 Jan 1977 notice 21;
- » Standard Public Amenities By-Laws ON 60 14 September 1990;
- » Transvaal Local Government Ordinance 17 of 1939;
- » Transvaal Roads Ordinance 22 of 1957; and
- » Nature Conservation Ordinance of Transvaal No 12 of 1983.

## **2.25 Limpopo Environmental Management Act 7 of 2003**

"CITES" means the Conservation on International Trade in Endangered Species Wild of Fauna and Flora "MEC" means the Member of the Executive Council of the Province who is responsible for environmental affairs in the province.

### **Section 2**

The main objectives of the Act is-

- » to manage and protects the environment in the province,
- » to secure sustainable development.

### **Section 58 - Pollution of aquatic systems**

No person may deposit into an aquatic system any substance or thing which may injure, damage, kill or in any way be harmful to aquatic organisms. Persons conducting business which may lead to the deposition of such substance or thing into an aquatic system must take adequate precautions to prevent such deposition.

### **Section 64 - Protection of indigenous plants**

No person may pick, be in possession of, sell, purchase, donate, receive as a gift import into, export or remove from the province, or convey any protected plant without a permit to do so. No person may pick any indigenous plant-

- » on a public road,
- » on land within 100m from the centre of a public road,
- » on land within 50m of the high water mark of a natural water course,
- » in a Provincial Park, a Site of Ecological Importance or a Protected Natural Environment, without a permit to do so, or on land of which he is not the owner and does not have permission from the owner.

**Section 70** -Prohibited acts regarding caves and cave-formations

No person may-

- » deposit, dump or drain any substance or thing into a cave, near a cave or cave entrance or cause it to percolate into a cave,
- » leave any object in a cave.

**Section 74 and 76** -Limited development areas

The MEC may declare an area as a limited development area and no person may undertake any development in that area without written permission from the MEC or the Municipality in which the area falls.

**Section 89** -Prohibition of littering

No person may litter on any land to which the public has access except in a container specifically for that purpose.

**Section 112 and 117** - General offences and penalties

A person is guilty of an offence if he contravenes or fails to comply with any provision of this Act and will be liable to a fine or to imprisonment or both.

### **3 CHAPTER 3**

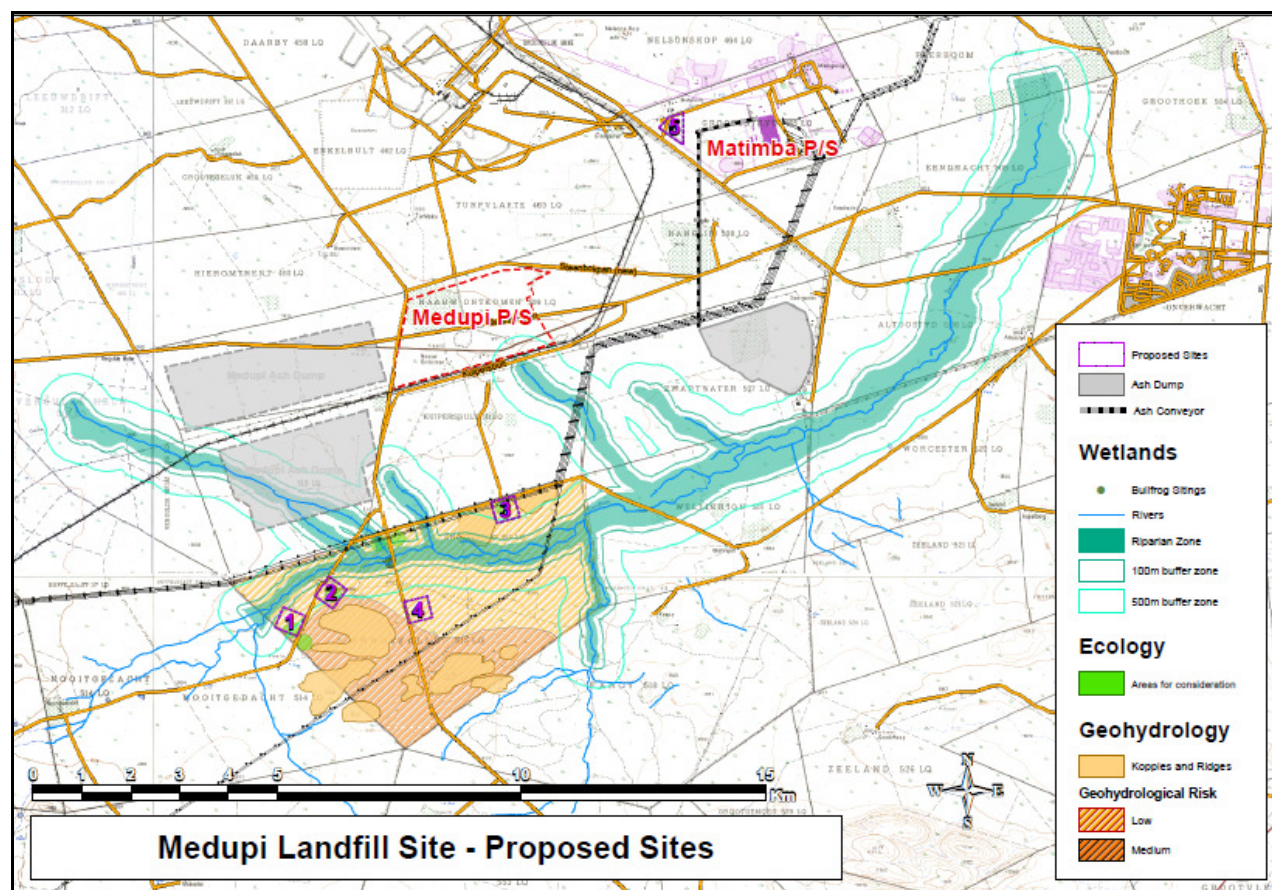
### **SITE SELECTION PROCESS**

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As part of the EIA process, the EIA team (including several specialists) undertook the screening of potential sites and the identification of a preferred site. Site screening and selection was conducted based on desk-top research, site visits and a workshop in which sites were assessed and scored on a number of biophysical, technical and social criteria. The purpose of the workshop was to ensure that a representative suite of relevant criteria were considered during site selection process and that further EIA investigations would continue on a site whose selection could be robustly and objectively defended.

Three potential sites (the farms Hanglip 508LQ; Kromdraai 513LQ, Grootvallei 515LQ) were provided by Eskom (within which the most preferred sites could be suggested) for the locations of the waste disposal site and hazardous waste storage facility. The initial criteria used in the selection of the three land portions were based on Eskom ownership of these properties and the fact that they are in close proximity to the Matimba and Medupi Power Stations. These sites are also conveniently located to service the proposed coal fired power stations in the Waterberg area. The process reduced these three farm portions down to 4 sites within the farm Grootvallei 515 LQ via the screening process. A fifth site within the boundaries of the existing Matimba Power Station was later added. Refer to **Figure 3.1** for the location of the sites under discussion.

The purpose of this chapter is to document the process that lead to the selection of a preferred site for further investigation during the EIA process.



**Figure 3.1:** A locality map illustrating the geographic position and the sensitivities of the proposed landfill site and the hazardous waste storage facility (MetroGIS: 2008).

### 3.1 Identification of potential sites

Three potential sites (the farms Hanglip 508LQ; Kromdraai 513LQ and Grootvallei 515 LQ) were provided by Eskom (within which the most preferred sites could be suggested) for the locations of the waste disposal site and hazardous waste storage facility. The criteria used in the selection of the three land portions were based on them being Eskom owned and that they were located in close proximity to the Matimba and Medupi Power Stations. They should also be able to service the proposed two proposed Waterberg Coal Fired Power Stations.

**Figure 3.2** indicates the three portions of land originally provided by Eskom which were assessed to determine the preferred site.



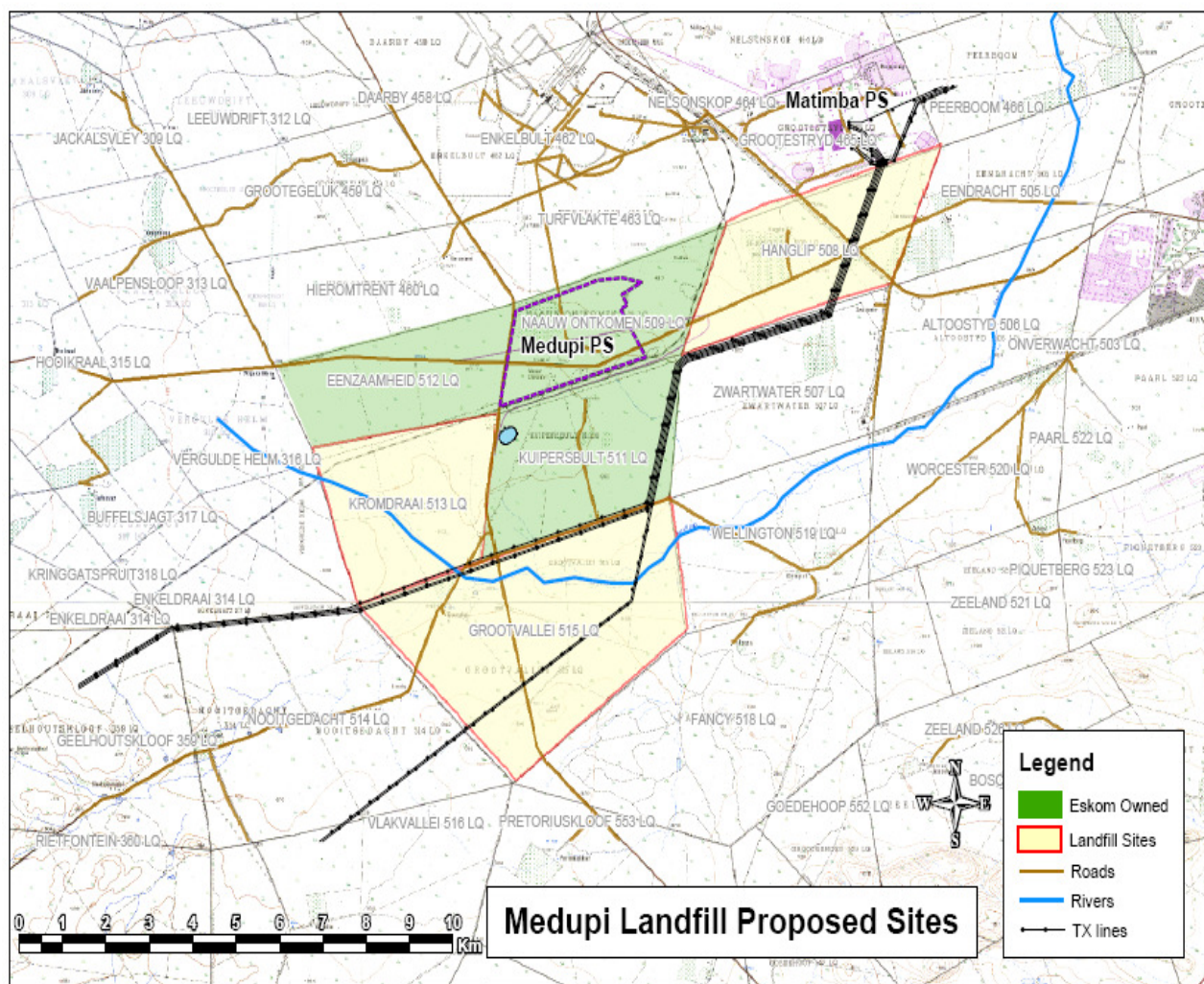


Figure 3.2: Farm Portions that were considered during the Site Selection Process

### 3.2 Site Screening Methodology

Each of the three farm portions indicated in **Figure 3.2** were then subdivided into 4 quadrants (**Figure 3.3**) and referred to as follows:

- » Kromdraai 513LQ – Site 1 (quadrant A; B; C and D)
- » Grootvallei 515LQ - Site 2 (quadrant A; B; C and D)
- » Hanglip 508LQ - Site 3 (quadrant A; B; C and D)



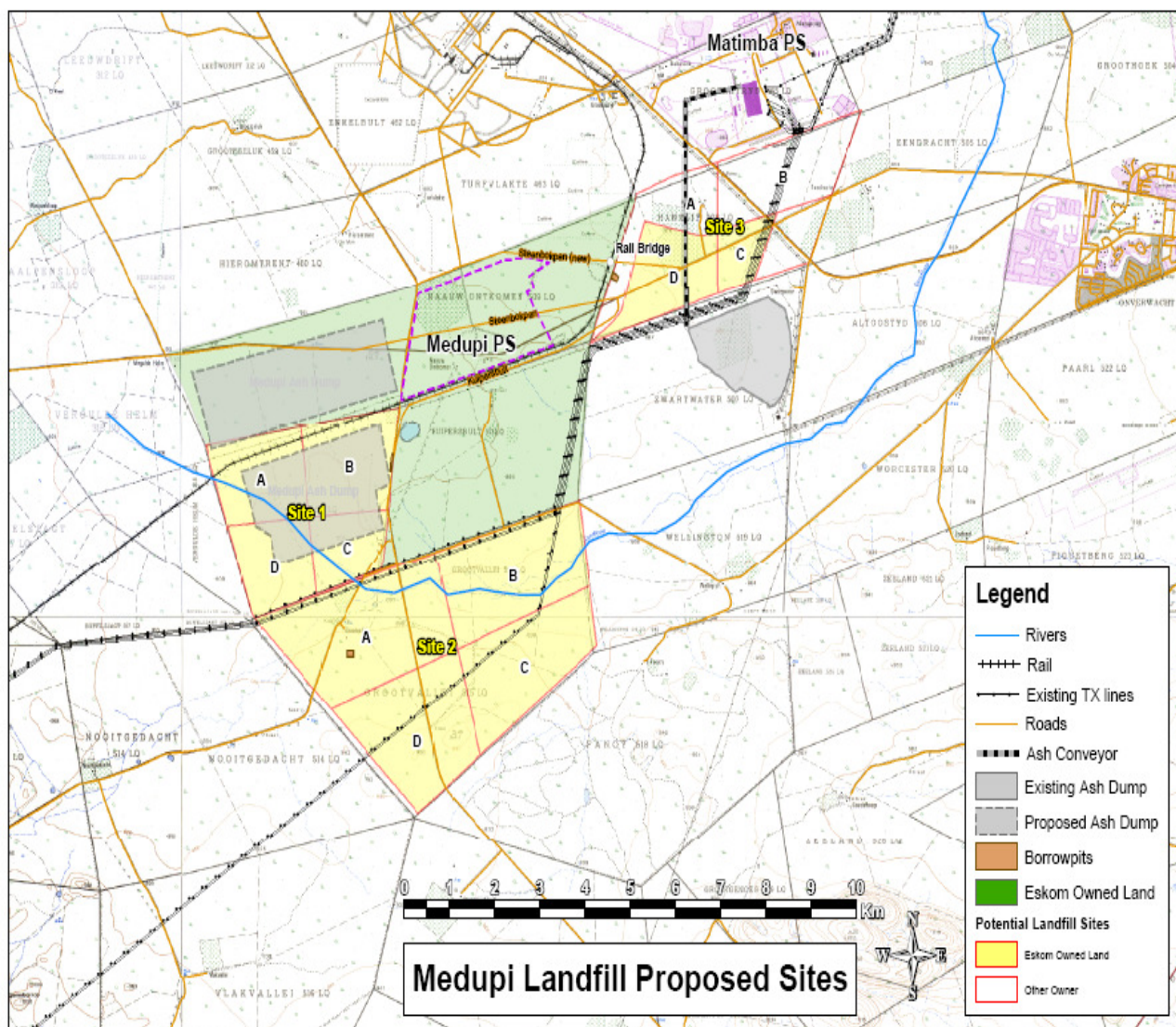


Figure 3.3: Farm Portions subdivided into quadrants

The properties were divided into quadrant for the ease of reference to the particular portion of a farm. For the purposes of screening, 10 potential areas were identified for investigation. Opportunities for creating common areas of reference for the specialists were thus created. Site 3 quadrants A and B were not considered for screening as the sites were confirmed as not being owned by Eskom.

### 3.3 Specialist Input

The following specialists were enlisted as part of this project, these specialists being crucial in determining the criteria to be used for the selection of the waste disposal site.

The specialists enlisted were:

- » Agricultural Potential;
- » Air Quality;
- » Avifauna (birds);
- » Engineering Design;
- » Geo-hydrological Impact Assessment;
- » Geotechnical Impact Assessment ;
- » Heritage Impact Assessment;
- » Land-Use;
- » Noise Impact Assessment;
- » Social Impact Assessment;
- » Surface Water and Wetlands Assessment;
- » Terrestrial Fauna and Flora;
- » Traffic & Transportation Impact Assessment; and
- » Visual Impact Assessment.

### 3.4 Integration Workshop and Site Visit

An integration workshop and site visit was conducted on 17 & 18 November 2008. The objectives of the integration workshop were present the site selection criteria proposed by Envirolution Consulting as well as to introduce the sites to the specialists so that they were able to start evaluating the sites in terms of the screening process. Desktop preparatory work was done by the specialists prior to the site visit.

The proposed site selection criteria presented at the integration workshop was a point ranking system (sliding scale) in terms of sensitivity/suitability of the 10 sites ( based on the quadrants) when evaluated by each specialist. The various specialists defined and expanded the site selection criteria as indicated in **Table 3.1**. The rankings were assigned point values as follows:

High	Most suitable sites	2 Points
Medium	Not immediately suitable (but can be mitigated)	1 Point
Low	Least suitable sites	0 Points

It should be noted that specialists, (Agricultural potential in particular) who were not available to attend the site visit and integration workshop sent their recommendations through by correspondence based on desktop evaluations. The site selection criteria are described in **Section 3.4.1**.

### 3.4.1 Site Selection Criteria

**Table 3.1:** Site Selection Criteria and Associated Rankings

Site Selection Criteria	Suitability		
	High (2)	Medium (1)	Low (0)
Terrestrial Fauna and Flora	Fragmented Habitat	Intact	Ecological Importance
Heritage	No heritage	Heritage impacts can be easily mitigated	Heritage site/ Expensive mitigation
Surface Water	Low risk	Possible risk to water resources, can be mitigated	No go
Geo-hydrological Constraints	Low risk	Moderate risk	High risk
Agricultural Potential	No potential	Potential for agriculture	High grazing/cropping potential
Current Land Use	No potential	Moderate Use	Intensive Use
Geology and Soils	Suitable	With constraints, but can be overcome	Not suitable / Difficult to engineer
Size of Site	Adequate		Inadequate
Access to cover material	Available	Limited	Not available
Access to construction material	Available	Limited	Not available
Access to services (water & power)	Nearby	Distant	Far
Topography (engineering)	Flat	Moderate	Steep
Topography	No constraints	With constraints, but can be overcome	Not suitable / Difficult to engineer
Avifauna	Suitable	Can be mitigated	Worthy of Conservation
Social Impacts	Suitable	Can be mitigated	Not suitable
Transportation costs	Low	Medium	High
Access	Easy	Moderate	Difficult
GIS	Suitable	Suitable but costly	Not Suitable

Site Selection Criteria	Suitability		
	High (2)	Medium (1)	Low (0)
Noise	Preferred	Neutral	Preferred
Visual Impact	Disturbed & well screened	Disturbed & visible/undisturbed & well screened	Undisturbed but highly visible
Air Quality- health risks/nuisance	Low health risks	Possible health risks	High health risks

### 3.4.2 Weighting of Site Selection Criteria

The weighting assigned to each of the site selection criteria represents the significance of that criterion to the decision-making process for site selection in this project. The significance was considered in terms of the question “*Would the identification of an aspect of these criteria alter the decision to construct a landfill and hazardous waste storage facility at a site?*” Criteria weightings were assigned at the workshop through debate and consensus.

A weighting of 2 was assigned to criteria with low significance;

A weighting of 1 was assigned to those criteria with a moderate significance; and

A weighting of 0 was assigned to criteria with a significant impact on the site selection decision.

(See **Table 3.1**).

#### Example:

Site Selection Criteria	Rank	Weight
Geohydrology	High Risk	0

#### 3.4.2.1 Fatal Flaws

It was decided by the workshop panel that a score of zero (0) for certain of the site selection criteria was in fact a fatal flaw that would result in the elimination of that site from the screening process. The presence of rock outcrops, faults and subsurface water were considered as criteria that would represent fatal flaws.

### 3.4.3 Scoring of the Sites against Criteria

Each site was examined by the panel of experts and project proponents in terms of the available information and given a score from 0 to 2 for each of the site selection criteria. A site scored low (0) when the placement of the waste disposal site was judged likely to result in a definite or significant impact on that criterion. Conversely a site scored high (2) if it was unlikely to result in an impact, or would result in an insignificant impact. Sites where the landfill site and waste storage facility would result in moderate impacts scored a one (1). Impacts were considered in terms of the effects, the risks, and the costs of mitigation.

#### Example:

Site Selection Criteria	Site Score		
	Site 1	Site 2	Site 3
Criteria X	0	2	1
Criteria Y	1	0	2

### 3.4.4 Scoring Matrix

A matrix was developed to compute the total score for each of the sites. All the weighted site scores for each site were summed to give a total site score.

#### Example:

Site Selection Criteria	Site Score		
	Site 1	Site 2	Site 3
Criteria X	1	0	1
Criteria Y	2	1	1
<b>Total Site Score</b>	<b>3</b>	<b>1</b>	<b>2</b>

Total site scores are relative numbers that can only be used to make comparisons between sites in order to determine the most favourable site for the project. In the scoring matrix a site with many negative features and significant risks or impacts will score low. A more favourable site will have a relatively higher total site score. The site with the highest Total Site Score is thus the preferred site for the landfill and waste storage facility.

#### Example:

Site 1, with a total site score of 3 is more favoured than site 3, which is in turn more favoured than Site 2. Site 1 is the preferred site.

### 3.5 Site Scoring

A site screening workshop was conducted by Envirolution Consulting on 21 November 2008, with representation from Eskom, the design engineers and specialists. The purpose of the workshop was to combine collective, expert judgement as well as rating the candidate sites in terms of the criteria defined in **Table 3.1**. Site screening provides a tool to assist with making an informed decision as to a preferred site which should be considered for further investigation during the EIA process.

The sites were assessed at a broad scale and on a strategic level during the workshop. This level of detail was considered sufficient for the purposes of eliminating flawed sites and identifying alternatives requiring further investigation during the EIA. Information available at the workshop included background documents, aerial photographs, the 1:50 000 topographical maps for the area, the desktop work done by the specialists as well as the work done based on the screening site visit. A summary description of each site, in terms of the criteria under consideration, was compiled and presented. Each of the experts contributed their opinions, site specific knowledge and understanding of the local and regional conditions to the screening process.

Workshop participants provided input regarding the site selection criteria that would be most useful in assessing a site in terms of the project requirements. The site selection criteria were assigned a weighting (as per **Table 3.1**) in terms of the significance of these criteria to the decision making process. A scoring system was defined, with specific reference to project conditions, to score each site against the site selection criteria. A matrix was created to calculate the total score for each site.

Additional criteria were added to the list while sites were eliminated as they were either not relevant to the project, were indefinable or were unlikely to allow for differentiation between sites. The accepted criteria were then described in terms of how they would be measured or assessed (**Table 3.1**). Criteria were selected from biophysical, technical and social categories to ensure that there was equity in terms of the criteria. The results of these scoring are recorded in **Table 3.2**.

It should be noted that Eskom eliminated Site 3A and B during the workshop as it emerged that the sites were not owned by Eskom. Site 3A and B were therefore not considered during the Screening process.

**Table 3.2: Summary scoring results as per specialists' assessments**

Site Selection Criteria	SITE 1				SITE 2				SITE 3	
	A	B	C	D	A	B	C	D	C	D
Terrestrial Fauna and Flora	1	2	0.5	0	0.5	0	0	0	2	2
Heritage	0	1	1	0	0	1	1	0	0	0
Surface Water	1	1	1	1	0	0	0	0	2	2
Geo-hydrological Constraints	1	1	1	2	1	1	2	1	0	0
Geology and Soils	2	2	0	2	0	0	2	0	2	2
Avifauna	0	0	0	0	0	0	0	0	2	2
Social Impacts	2	2	2	2	2	2	2	2	0	2
Transportation costs	0	2	2	0	0	0	0	0	1	1
Access	0	2	2	0	0	0	0	0	1	1
Noise	0	1	2	0	1	0	0	1	2	2
Visual Impact	0	0	0	0	0	0	0	0	2	2
Air Quality- health risks/nuisance	0	0	2	1	1	0	0	1	0	1
<b>TOTAL SCORING</b>	<b>7</b>	<b>14</b>	<b>13.5</b>	<b>8</b>	<b>5.5</b>	<b>4</b>	<b>7</b>	<b>5</b>	<b>14</b>	<b>17</b>

The following specialist was not able to assign a scoring at the time of the workshop:

- Agricultural Potential

It was agreed that the scorings should be interpreted without the input of the agricultural specialist as these were deemed to be of lower significance compared to the other more critical specialist inputs as use of the land for agriculture was not a feasible option. The agricultural potential assessment that was undertaken during the Scoping phase indicates that the Lephalale area in which all the sites are located have low rainfall and high temperature and therefore have a very low potential for cultivation.

Based on the scorings it was clear that Site 1B (14 points), 3C (14 points) and Site 3D (17 points) were favoured based on the cumulative points scored by all available specialists. Site 3C and 3D were not favoured (underlain by a fault) from a geohydrological perspective (both scored 0, respectively). Geohydrology represents a fatal flaw for these sites as this criteria takes precedence as the construction of a landfill can result in leaching and contamination of groundwater. **The entire site 3 was then eliminated on this basis.**

Site 1B received a score of 1 in terms of geohydrological suitability and a score of 2 in terms of geotechnical suitability. However, the entire Site 1 had to be excluded as it was found to be earmarked by Eskom for the construction of an ash-dump. **The entire site 1 was then eliminated on this basis.**

Since Site 2 (quadrant 2C) was favourable in terms of both geohydrology and geotechnical suitability, it was agreed that the geohydrological and geotechnical constraints be the deciding factor/most prioritised in terms of site selection. These criteria were to be supported by the input of the surface water and terrestrial ecologists.

Following the specialist geotechnical and geohydrological input, it was decided that site 2 be investigated in its entirety (removing the quadrants) for the site. Site 2 was subject to be evaluated by the key specialists in order to find suitable areas common to all. These common areas will be based on overlapping their respective site sensitivity maps, the key specialists included:

- Geohydrology;
- Geotechnical;
- Terrestrial Fauna and Flora;
- Avifauna; and
- Surface Water.

Four specific areas (20 hectares areas) were then chosen based on the above-mentioned specialist inputs. These areas are indicated in **Figure 3.4**.

These four areas were investigated during the Scoping Phase and evaluated in detail to choose the most suitable of the four, then in turn choosing the most suitable footprint area within that site for the waste disposal facility.



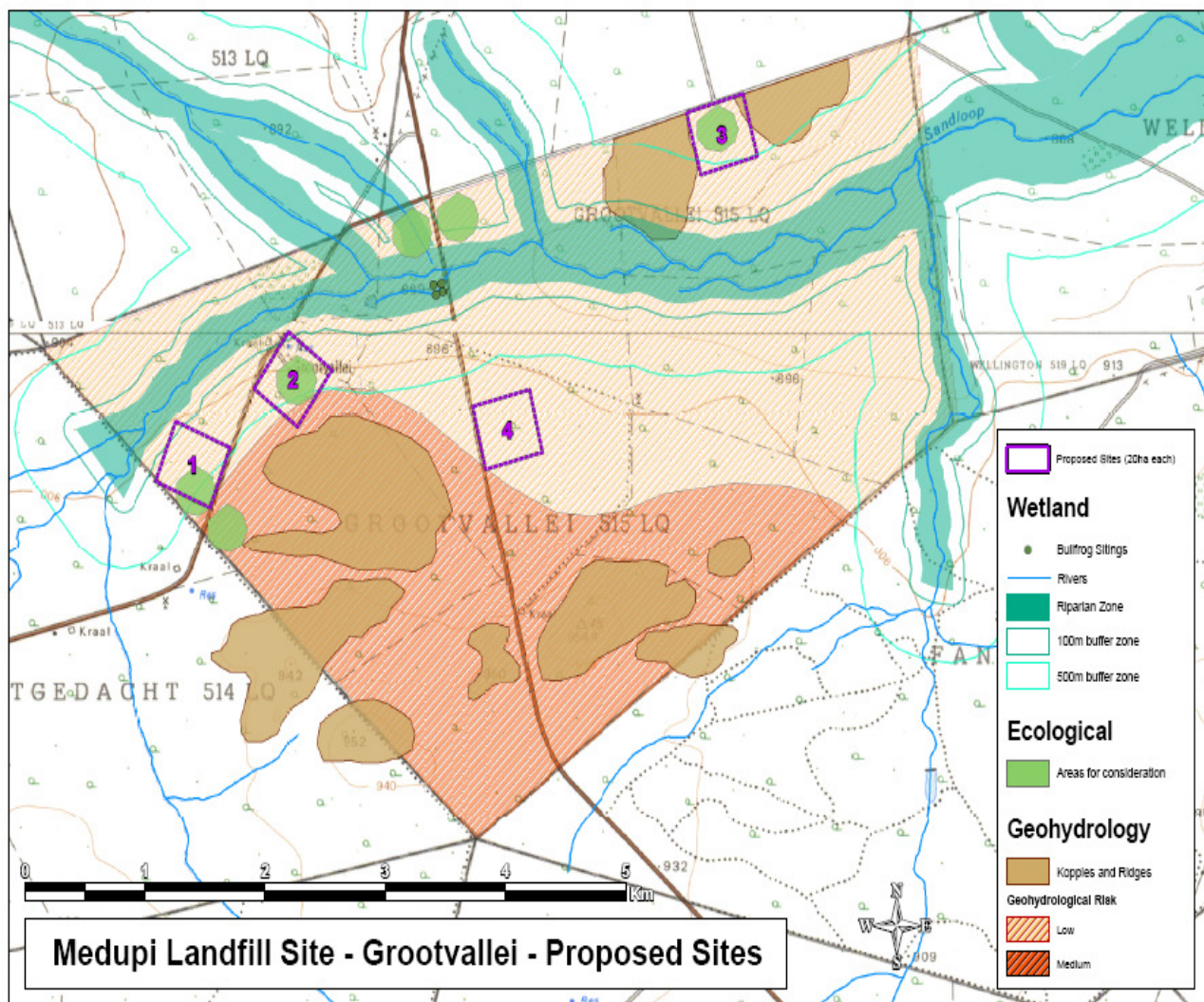


Figure 3.4: Sites proposed based on sensitivity analysis

### 3.6 Matimba Power Station Site

Following a screening of the three farms discussed previously, the site selection process was expanded to include one additional farm (Site 5 – see **Figure 3.1**). The site is also an Eskom-owned property located within the boundary of Matimba Power Station namely the Farm Grootestryd. The proposed site was previously used as a landfill site and has been abandoned several years ago. Although there were no permits and closure certificate issued by the Authorities, the site provides an added advantage because it was previously engineered as a landfill site. Similarly, the site was subject to investigation by the geohydrological, geotechnical and landfill engineers as well as the various specialists on the team. It was discovered during the investigations and through the review of available historical documentation that this existing waste disposal area on Site 5 was not a suitable footprint for use due to the uncertainty of contamination levels from the previous activities. Following this discovery, it was considered that the remaining open/vacant areas located within the boundaries of Farm Grootestryd be further investigated for the location of the landfill site and the associated infrastructure. Site 5 was scored (see **Table 3.3**) based on the input of all the specialists assigned to this project, it is evident that this site is the most preferred (scoring value of 24) for the positioning of the landfill and waste storage facility. Specialist’s reports confirming the suitability of the sites are attached in this Scoping Report.

**Table 3.3: Summary scoring results as per specialists’ assessments on Site 5**

Site Selection Criteria	SITE 5 (Grootestryd)
Terrestrial Fauna & Flora	2
Heritage	2
Surface Water	2
Geo-hydrological Constraints	2
Geology and Soils	2
Avifauna	2
Social Impacts	2
Transportation costs	2
Access	2
Noise	2
Visual Impact	2
Air Quality- health risks/nuisance	2
<b>TOTAL SCORING</b>	<b>24</b>

### 3.7 Conclusion

It is the conclusion and the recommendation of this Screening Report that only Site 5 (farm Grootestryd) must be further investigated during the Scoping and EIA phases for the proposed Eskom Landfill and the Hazardous Waste Storage Facility. This site will be evaluated based on 3 alternative localities or potential footprints within the site. This conclusion is based on the desktop assessment, data gathered during the site visit, specialist inputs and the associated weighting criteria as well as the fatal flaw analyses that were undertaken by the various specialists that were involved in the project. Of significance are the input by the specialist geotechnical, geohydrological, ecological (flora, fauna (including birds) & wetland Specialists) and the engineers involved in the project. Site 1 (farm Kromdraai) is located in an area that is targeted for the construction of the Ash dump and other associated activities (borrow pits and gypsum disposal site) by Eskom, the site was therefore ruled out. Site 3 (farm Hanglip) was the most suitable from the ecological, geotechnical, visual and heritage point of view, but it has been ruled out due to a fatal flaw from a geohydrological point of view.

The results of the specialist geohydrological input indicate that the northern section of the farm of Hanglip and the area to the north of the farms of Nuwe Uitkomen and Eenzaamheid are underlain by sequences of sandstone, gritstone, mudstone and coal as well as mudstone, carbonaceous shale and coal and form the Swartrand and Grootegeluk Formations of the Karoo Supergroup. The west-east striking Eenzaamheid Fault separates them. This fault and its subordinate branch faults is a regional source of groundwater. The farm Eensamheid is geohydrologically associated with minor faults which implies potential contamination of underground water. It is for reasons of potential contamination of ground water that Site 3 cannot be considered for the location of the proposed project.

Site 2 has areas that are considered to be of high ecological importance (koppies, ridges, wetlands and pristine bushveld); the ecological specialists highlighted required buffer zones for areas of ecological importance and further indicated portions/fragments that can potentially be utilised for the proposed project. It is for such reasons that the areas of considerations within Site 2 were also identified by the ecological specialists.

Taking into consideration the assessment of Site 2 by the key specialists, it is clear that site 2, more specifically the four areas indicated in **Figure 3.4** was most suitable for the placement of a the proposed waste disposal site.

The portion of the Farm Grootestryd (Site 5) was however favoured by the majority of the specialists and has consequently been recommended for this project in order to be investigated for its suitability in accommodating a land fill site and hazardous waste storage facility.

## **4 CHAPTER 4 SCOPING PHASE METHODOLOGY**

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The overarching environmental legislation for the management of the environment in South Africa is the National Environmental Management Act, 1998 (Act 107 of 1998 “NEMA”). Its preamble states that sustainable development requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of environmental decisions to ensure that development serves present and future generations.

Chapter 5 of NEMA makes provisions for regulations to be formulated and published. In April 2006, new EIA Regulations were promulgated and became effective from July 2006. The purpose of these Regulations is “to regulate procedures and criteria as contemplated in Chapter 5 of the National Environmental Management Act for the submission, processing, consideration and decision of applications for environmental authorisation of activities and for matters pertaining thereto.”

These EIA regulations replaced the Environmental Impact Assessment Regulations promulgated under the Environment Conservation Act, 1989 (Act 73 of 1989 “ECA”). One of the major differences between the old and new Regulations is the strict adherence to timeframes required under the new Regulations.

Section 24 (F) of the NEMA prohibits a listed activity from commencing prior to the authorisation thereof by the competent authority. A listed activity is defined in Government Notice No. R. 385 (NEMA Regulations 2006) as follows:

*“(a) an activity identified in Government Notice No. R. 386 and No. R. 387 of 2006 as a listed activity or (b) in any other notice published by the Minister or MEC in terms of section 24D of the Act as a listed activity or specified activity.”*

These activities are listed as a result of their potential to have a significant detrimental impact on the environment. The main listed activities for this project identified in Government Notice R.387 are summarised in **Table 4.1** as follows:

**Table 4.1:** Listed activity for the proposed development as identified in NEMA Regulations (2006)

No & date of relevant notice	Activity No (in terms of relevant Regulation/ notice)	Description of listed activity
Government Notice R386 (April 2006)	1(k)	The construction of facilities or infrastructure including associated structures for the bulk transportation of sewage and water, including storm water, in pipelines with an internal diameter of 0.36 metres or more; or a peak throughput of 120 litres per second or more;
Government Notice R386 (April 2006)	1(l)	The transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more"
Government Notice R386 (April 2006)	1(m)	Any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including canals; channels; bridges; dams; and weirs
Government Notice R386 (April 2006)	1(p)	The temporary storage of hazardous waste
Government Notice R386 (April 2006)	7	The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic meters but less than 1000 cubic meters at any one location or site;
Government Notice R386 (April 2006)	13	The abstraction of groundwater at a volume where any general authorisation issued in terms of the National Water Act, 1998 (Act No. 36 of 1998) will be exceeded;
Government Notice R386 (April 2006)	15	The construction of a road that is wider than 4 metres or that has a reserve wider than 6 metres, excluding roads that fall within the ambit of another listed activity (e.g. national roads) or which are access roads of less than 30 metres long
Government Notice R386 (April 2006)	16	The transformation of undeveloped, vacant or derelict land to residential, mixed, retail, commercial, industrial or institutional use where such development does not constitute infill and where the total area to be transformed is bigger than 1 hectare
Government Notice R387 (April 2006)	1(c)	The construction of facilities or infrastructure including associated structures, for the construction of facilities or infrastructure including associated structures for the above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of 1000 cubic meters or more at any one location or site including the storage of one or more dangerous goods, in a tank farm
Government Notice R387 (April 2006)	1(e)	The construction of facilities or infrastructure including associated structures for any process or activity which requires a permit or license in terms of legislation governing the generation or release of emissions, pollution, effluent or waste and which is not identified in Government Notice No. R. 386 of 2006;

No & date of relevant notice	Activity No (in terms of relevant Regulation/ notice)	Description of listed activity
Government Notice R387 (April 2006)	1(f)	The recycling, re-use, handling, temporary storage or treatment of general waste with a throughput capacity of 50 tons or more daily average measured over a period of 30 days.
Government Notice R387 (April 2006)	1(g)	The construction of facilities or infrastructure including associated structures for the use, recycling, handling, treatment, storage or final disposal of hazardous waste;
Government Notice R387 (April 2006)	1(l)	The construction of facilities or infrastructure including associated structures, for the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more;
Government Notice R387 ( April 2006)	1(o)	The final disposal of general waste covering an area of 100 square metres or more or 200 cubic metres or more of airspace;

Section 24 of the NEMA Amendment Act requires that an EIA be undertaken in order to inform the authorisation process for a listed activity. Government Notice No R. 385 of 2006, published in terms of Chapter 5 of NEMA, defines the manner in which the EIA is to be undertaken. Guideline documents have been published by the Department of Environmental Affairs and Tourism (DEAT) and the Gauteng Department of Agriculture, Conservation and Environment (GDACE) and these provide further guidance in implementing the EIA Regulations, 2006. The following national DEAT guideline documents have been considered in the preparation of this report:

- » Guideline 3: General guide to EIA regulations;
- » Guideline 5: Assessment of Alternatives and Impacts;
- » DEAT Public Participation Guidelines as published in Government Gazette No. 28854, 19 May 2006; and
- » Detailed Guide to Implementation of the Environmental Impact Assessment Regulations: 2006.

The EIA procedure required by the aforementioned regulations and published guideline documents has been followed in this project. **Figure 4.1** provides an indication of the process to be followed in this EIA.

The competent authority in respect of the activities listed in this part of the schedule is the provincial environmental authority, the Department of Economic Development, Environment & Tourism (DEDET) in Limpopo province. The national Department of Environment Affairs and Tourism (DEAT) will be the relevant decision-making authority as Eskom is a parastatal and the proposed project has a national significance. The EIA authorisation needs to be granted by the (DEAT).

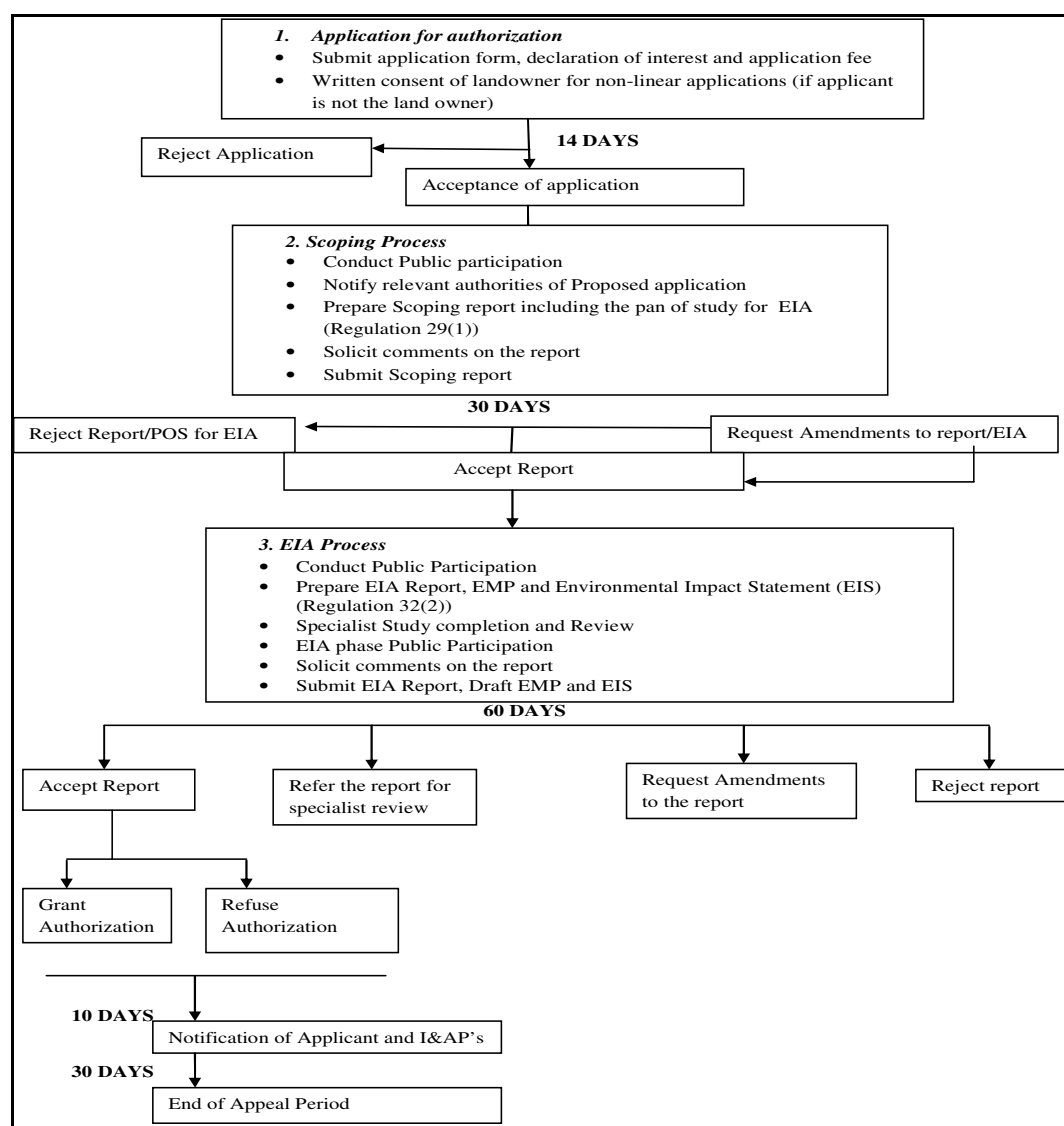


Figure 4.1: Diagram to indicate a description of the EIA process to be followed

#### 4.1 Legislation and Guidelines that have informed the preparation of this Scoping Report

The following legislation and guidelines have informed the scope and content of this Scoping Report:

- » National Environmental Management Act (Act No 107 of 1998)



- » EIA Regulations, published under Chapter 5 of the NEMA (GN R385, GN R386 and GN R387 in Government Gazette 28753 of 21 April 2006)
- » Guidelines published in terms of the NEMA EIA Regulations, in particular:
  - \* Guideline 3: General Guide to Environmental Impact Assessment Regulations, 2006 (DEAT, June 2006)
  - \* Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations, 2006 (DEAT, May 2006)
  - \* Guideline 5: Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations, 2006 (DEAT, June 2006)
  - \* The Environment Conservation Act, 2003 (Act 53 of 2003) - Section 20 (1or 5b), permit for closure and or operation of a waste disposal facility).

Several other Acts, standards or guidelines have also informed the project process and the scope of issues evaluated in the scoping report, and to be addressed in the EIA. A listing of relevant legislation is provided in **Table 4.2**. A more detailed review of legislative requirements applicable to the proposed project will be included in the EIA phase.

**Table 4.2:** Initial review of relevant policies, legislation, guidelines and standards applicable to the waste disposal facility

Legislation	Applicable Sections
<b>National Legislation</b>	
Constitution of the Republic of South Africa (Act No 108 of 1996)	<ul style="list-style-type: none"> <li>» Bill of Rights (S2)</li> <li>» Environmental Rights (S24) – i.e. the right to an environment which is not harmful to health and well-being</li> <li>» Rights to freedom of movement and residence (S22)</li> <li>» Property rights (S25)</li> <li>» Access to information (S32)</li> <li>» Right to just administrative action (S33)</li> </ul>
National Environmental Management Act (Act No 107 of 1998)	<ul style="list-style-type: none"> <li>» National environmental principles (S2), providing strategic environmental management goals and objectives of the government applicable throughout the Republic to the actions of all organs of state that may significantly affect the environment</li> <li>» NEMA EIA Regulations (GN R385, 386 &amp; 387 of 21 April 2006) (published in terms of Chapter 5), with effect from 3 July 2006</li> <li>» The requirement for potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority (S24 – Environmental Authorisations)</li> <li>» Duty of Care (S28) requiring that reasonable measures are taken to prevent pollution or degradation from occurring, continuing or recurring, or, where this is not</li> </ul>

<b>Legislation</b>	<b>Applicable Sections</b>
	<p>possible, to minimise &amp; rectify pollution or degradation of the environment</p> <ul style="list-style-type: none"> <li>» Procedures to be followed in the event of an emergency incident which may impact on the environment (S30)</li> </ul>
<p>Environment Conservation Act (No 73 of 1989)</p>	<ul style="list-style-type: none"> <li>» Waste disposal practices (S20)</li> <li>» National Noise Control Regulations (GN R154 dated 10 January 1992)</li> </ul>
<p>National Heritage Resources Act (Act No 25 of 1999)</p>	<ul style="list-style-type: none"> <li>» Stipulates assessment criteria and categories of heritage resources according to their significance (S7)</li> <li>» Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35)</li> <li>» Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36)</li> <li>» Lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development (S38)</li> <li>» Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction (S44)</li> </ul>
<p>National Environmental Management: Biodiversity Act (Act No 10 of 2004)</p>	<ul style="list-style-type: none"> <li>» Provides for the MEC/Minister to list ecosystems which are threatened and in need of protection (S52) – none have as yet been published</li> <li>» Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) - none have as yet been published</li> <li>» A list of threatened &amp; protected species has been published in terms of S 56(1) - Government Gazette 29657.</li> <li>» Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations).</li> </ul>
<p>Atmospheric Pollution Prevention Act (Act No 45 of 1965)</p>	<ul style="list-style-type: none"> <li>» Part IV: Dust control</li> <li>» Part V: Air pollution by fumes emitted by vehicle emissions</li> </ul>
<p>National Environmental Management: Air Quality Act (Act No 39 of 2004)</p>	<ul style="list-style-type: none"> <li>» Measures in respect of dust control (S32) – no regulations promulgated as yet</li> <li>» Measures to control noise (S34) - no regulations promulgated as yet</li> </ul>
<p>Conservation of Agricultural Resources Act (Act No 43 of 1983)</p>	<ul style="list-style-type: none"> <li>» Prohibition of the spreading of weeds (S5)</li> <li>» Classification of categories of weeds &amp; invader plants (Regulation 15 of GN R1048) &amp; restrictions in terms of where these species may occur</li> </ul>

Legislation	Applicable Sections
	<ul style="list-style-type: none"> <li>» Requirement &amp; methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048)</li> </ul>
National Water Act (Act No 36 of 1998)	<ul style="list-style-type: none"> <li>» National Government is the public trustee of the Nation's water resources (S3)</li> <li>» Entitlement to use water (S4) – entitles a person to use water in or from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, fire fighting and recreational use, as set out in Schedule 1</li> <li>» Duty of Care to prevent and remedy the effects of pollution to water resources (S19)</li> <li>» Procedures to be followed in the event of an emergency incident which may impact on a water resource (S20)</li> <li>» Definition of water use (S21)</li> <li>» Requirements for registration of water use (S26 and S34)</li> <li>» Definition of offences in terms of the Act (S151)</li> </ul>
<b>Provincial Legislation</b>	
Limpopo Environmental Management Act No 7 of 2004	<ul style="list-style-type: none"> <li>» Limpopo Environment Management Act provides a single, consolidated and complete set of rules for the governance of the environment throughout Limpopo. It forms a vital legal framework for the province's waste management programme. The Act ensures that environmental pollution (littering and waste management) is avoided in order to maintain a healthy environment thereby promote sustainable development.</li> <li>» Sections 89 - 92 of the Act addresses littering and waste management in Limpopo</li> </ul>
<b>Guideline Documents</b>	
<p>Nancy Oosthuizen Consulting cc and Judy Bell cc</p> <p>Workshop Draft Document (Nov 2007)</p>	<ul style="list-style-type: none"> <li>» Guide developed to assist managers in various industries to manage waste by <ul style="list-style-type: none"> <li>- Complying with legal requirements</li> <li>- Generating less wastes</li> <li>- Safety handling, transporting and storing of wastes</li> <li>- Effectively managing waste contractors'; and</li> <li>- Disposal of wastes to the correct landfill site</li> </ul> </li> </ul>

## 4.2 Determination of the EIA Process

The NEMA regulations 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 of a possible detrimental impact on the environment.

The Scoping and EIA process is required for this project as the construction of a landfill site and the storage of hazardous waste activities must, in terms of Government Notice R. 387 of 2006, undergo the following process.

#### **4.3 Pre-Application Meeting with DEAT**

A pre application meeting was held with Mr Reggie Nkosi of DEAT on 04 December 2008. The purpose of the meeting was to introduce the project to DEAT and to further determine specific requirements for the project. Please refer to **Appendix A** to the Minutes, Agenda and Attendance Register for the Pre-Application Meeting.

#### **4.4 Scoping Phase**

An application form (**Appendix A**) was completed by Envirolution Consulting and submitted to DEAT on the 18 December 2008. The form was submitted together with a Declaration of Interest.

DEAT responded to the application in a letter dated 15 January 2008 in which it was indicated that the application was accepted and had been issued with acceptance with the following reference number (**DEAT Reference Number: 12/12/20/1399**)

#### **4.5 Public Participation Process**

A Public Participation Process (PPP) consistent with Chapter 6 of Government Notice R. 385 was undertaken for the proposed development. This included identification of Interested and Affected Parties (I&APs) and the compilation of an I&AP database (**Appendix B<sup>1</sup>**), the placement of site notices at visible and accessible locations close to the site, (**Appendix B<sup>2</sup>**) and a newspaper advertisement in the local and national and regional newspapers (**Appendix B<sup>3</sup>**). Background Information Documents (BIDs) (**Appendix B<sup>4</sup>**) were also handed out to identified I&APs located in close proximity to the proposed development. The BID was also distributed on an on-going basis from Jan to March 2009. The public commenting period for this Scoping Report was 30 days. The purpose of the public review period was to identify any additional environmental issues and concerns for inclusion in the Scoping Report that the environmental practitioners may not have identified.

#### **4.6 Scoping Report (SR)**

This report documents the findings of the Scoping Phase. The report also documents the issues identified through the site visits, Public Participation Process (PPP) as well as through the professional input from Eskom and Envirolution Consulting team.

The findings of the PPP conducted to date are detailed in an Issues Response Report (**Appendix B<sup>5</sup>**) of this SR that will be submitted to DEAT. Correspondence will be sent to all I&APs registered on the I&AP database, informing them of the availability of the SR submitted to DEAT so that they can see how their comments have been addressed.

#### **4.7 Authority Review of the SR**

After the public review, the scoping report was submitted to DEAT for their review and consideration. DEAT as the competent authority for the listed activity, must within 30 days of receipt of the report, in writing, accept the report and Plan of Study for EIA if no amendments are required or shortcomings identified therein. Upon acceptance of the report, the Environmental Assessment Practitioner (EAP) may then proceed with the tasks contemplated in the Plan of Study for EIA.

The authority can also reject the SR for not addressing legislative procedures and requirements if any of the required EIA steps were not undertaken. In terms of regulation 31 (3) of GN R. 385 of 2006, the SR may be amended and resubmitted by the EAP should it be rejected. On receipt of the amended SR and Plan of Study for EIA, the competent authority will then reconsider the application. Should the SR be rejected, the amended SR will then be made available for public review and comment prior to submission to DEAT.

The authority may also advise the EAP of matters that may hinder the success of the EIA application or matters that may prejudice the success of the application.

#### **4.8 Public Participation Process (to date)**

Public participation is the involvement of all parties who potentially have an interest in a development or project, or may be affected by it. The principal objective of public participation in an Environmental Impact Assessment (EIA) process, in particular this Scoping process, is to inform and enrich decision-making.

The following terminology related to the PPP will be used interchangeably in this section and is briefly defined as follows:

- » *Interested and Affected Party (I&AP)* - refers to individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, customers, consumers, environmental interest groups and the *general public*.
- » *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.
- » *Key stakeholder* will refer to an individual or group of individuals who have a direct or vested interest in the particular development that is being proposed.
- » *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.
- » *Focus group meeting* refers to a group who have a significant common interest around a particular issue or geographic area, e.g. farmers associations, conservation/ecotourism associations, ratepayers associations, etc.
- » *Workshop* refers to a gathering, which involves exchange of information between stakeholders, which provides an opportunity for stakeholders to raise concerns and comment on the impacts and merits of a proposal or activity before a decision is made.

The following public participation process was undertaken for the project, which commenced on Thursday, 29 January 2009.

(a) Newspaper Advertisements

An advertisement notifying the public of the EIA process and requesting Interested and Affected Parties (I&APs) to register with, and submit their comments to Envirolution Consulting was placed in the Star Newspaper (regional) and Mogol Post newspaper (local) on Friday, 30 January 2009. Copies of the advertisement are included in **Appendix B<sup>3</sup>**.

(b) Site notices

To inform surrounding communities and immediately adjacent landowners of the proposed development, Envirolution Consulting erected twelve (12) site notices within the boundaries of the proposed development and in strategic positions (roadsides, entrances to main buildings) on 29 January 2009. Please refer to **Appendix B<sup>2</sup>** for examples of the site notice that was placed.

(c) I&APs database and notification of identified I&APs

An I&APs database was developed (see **Appendix B<sup>1</sup>**). This database included identified key stakeholders and the I&APs registered for the project. The database was expanded through networking as new I&APs responded to the advertisement placed in the newspaper for the project. The database totals approximately 525 I&APs Stakeholders. Identified I&APs representing the various sectors were directly informed of the proposed development by e-mail, post, fax and also through the distribution of the BID from 29 January 2009 to 15 March 2009. The key organisations and stakeholders in the public participation process are:

- » Limpopo Department of Economic Development, Environment & Tourism (DEDET);
- » Lephalale Municipality;
- » Department of Water Affairs and Forestry (Limpopo and Pretoria);
- » Department of Mineral and Energy Affairs;
- » Department of Agriculture;
- » Department of Transport;
- » Department of Health;
- » Department of Land Affairs;
- » Farmers Associations and Unions;
- » Affected property owners;
- » Ward Councillors;
- » Business Associations;
- » Residents Association; and
- » Non-governmental organizations.

The Background Information Document (BID) about the proposed development was compiled and forwarded to I&APs registered on the database; and was also distributed as knock and drops to affected property owners located in the vicinity of the proposed landfill site on Thursday, 29 January 2009 (Please refer **Appendix B<sup>6</sup>** for the Knock and Drop Register). The BID was also handed to the local councillors in Lephalale to distribute copies to their members, other organisations and I&APs they are aware of.

The BID introduces the proposed project and contains background information on the development proposal, the proponent, consultants and proposed process to be followed. Please refer to **Appendix B<sup>4</sup>** for Background Information Document and the comment sheet (translated in Sepedi, Afrikaans and English) which was sent to the identified I&APs. An example of an I&AP Notification letter that was sent and the correspondence with and from I&APs are attached in **Appendix B<sup>7</sup>**.

(d) Concerns raised by I&APs

I&AP's who completed registration forms and forwarded comments by email, fax, post and telephonically. I&APs will be given an opportunity to raise further concerns and queries in open public meetings that will be held during the EIR phase. Comments that were received from I&APs during the public review of the draft scoping report were captured on a stakeholder database, acknowledged by personal letters and responded to by Envirolution Consulting.

(e) Placement of Draft Environmental Scoping Report for public review

This draft scoping report was lodged at the Lephalale Municipality Library for public review. Envirolution Consulting has also placed other copies at the Matimba and Medupi power stations for review by many of the Eskom employees based at these places.

The draft scoping report was also placed on the Envirolution Consulting website ([www.envirolution.co.za](http://www.envirolution.co.za)). I&APs were informed about this placement through direct contact and are given an opportunity to review the documentation. I&APs were provided with 15 days Notification period and 30 days within which to submit written comment to Envirolution Consulting.

(f) Public and Focus group meetings

I&APs were invited to the Public and Focus group meetings held at Machauka Lodge, in Lephalale on the 10<sup>th</sup> March 2009. The objective of the meetings was to present a background to the project and allow I&APs to raise any initial issues and concerns prior the public comment period ending. Copies of the presentation and minutes and attendance registers for the focus group and public meetings that were held are attached in **Appendix B**<sup>8</sup>. The issues raised are reflected in an Issues Response Report that is attached in this Final Scoping Report. These meetings included a presentation by the Environmental Consultants in the presence of Eskom engineer and project manager.

The objective of the public meetings was to formally present the draft scoping report to the public in order to give I&APs an opportunity to provide feedback on the findings of the EIA. Stakeholders & I&APs were requested to provide comment on the documentation by the end of the Comments Period.



(g) Comments and Response Reports

Key issues of concern raised by I&APs during the project announcement, review of draft scoping report and the meetings held are listed along with the I&AP's name and means of communication in the Comment and Response Report in **Appendix B**<sup>5</sup>.

## 5 CHAPTER 5 DESCRIPTION OF AFFECTED ENVIRONMENT

### 5.1 Introduction

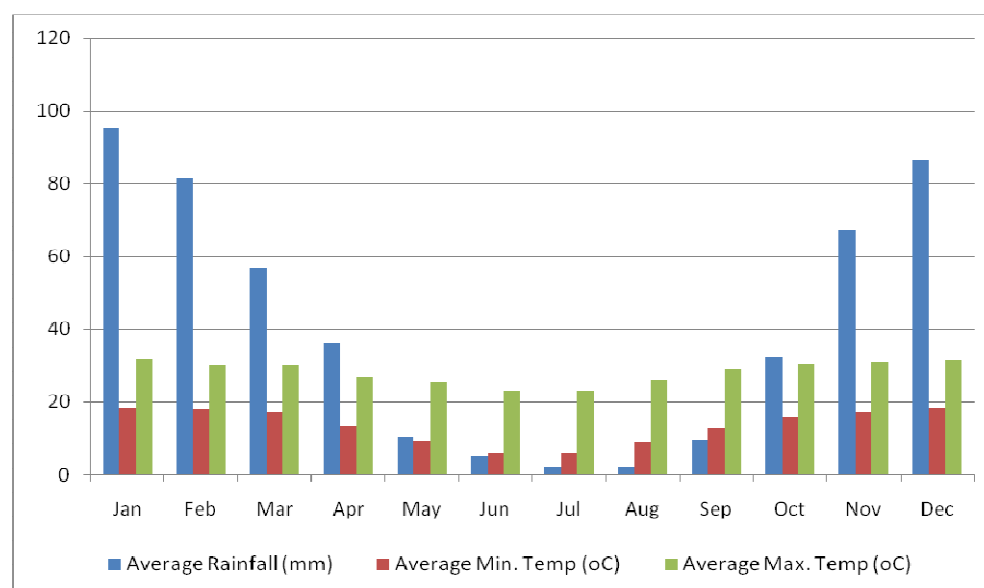
This section briefly outlines the existing biophysical, social and economic environment in the project area. The environmental setting for five selected candidate sites which were included during the screening phase (as discussed in **Chapter 3**) to determine their suitability for the location of the proposed development is also explained in this section. Four of these sites are located on the Farm Grootvallei whereas Site 5 is located on Grootestryd. Sites within Farm Grootvallei are greenfield sites and no previous development has taken place.

### 5.2 Biophysical Environment

In determining the environmental sensitivities on the sites that were identified for the location of the proposed development, various specialist studies were undertaken. The information pertaining to the Biophysical Environment (Geology, Geohydrological conditions, Soils and Drainage) presented in the section that follows has been supplemented with the results of the Preliminary Geotechnical, Geohydrological and Agricultural Assessments.

#### 5.2.1 Climate

The climatic regime of the study area (Koch, 2005) is characterized by hot, moist summers and mild, dry winters. The main climatic indicators are given in **Figure 5. 1**.



**Figure 5.1:** Climatic data of the study area (ARC: 2009)

The long-term annual average rainfall is 485.4mm, of which 420mm, or 86.5%, falls between October and March. Temperatures vary from an average monthly maximum and minimum of 37.2°C and 13.9°C for January to 27.8°C and 1.5°C for July respectively. The extreme high temperature that has been recorded is 44.5°C and the extreme low – 4.3°C. Frost is rare, but occurs occasionally in most years, though not severely.

### 5.2.2 Geology and Soils

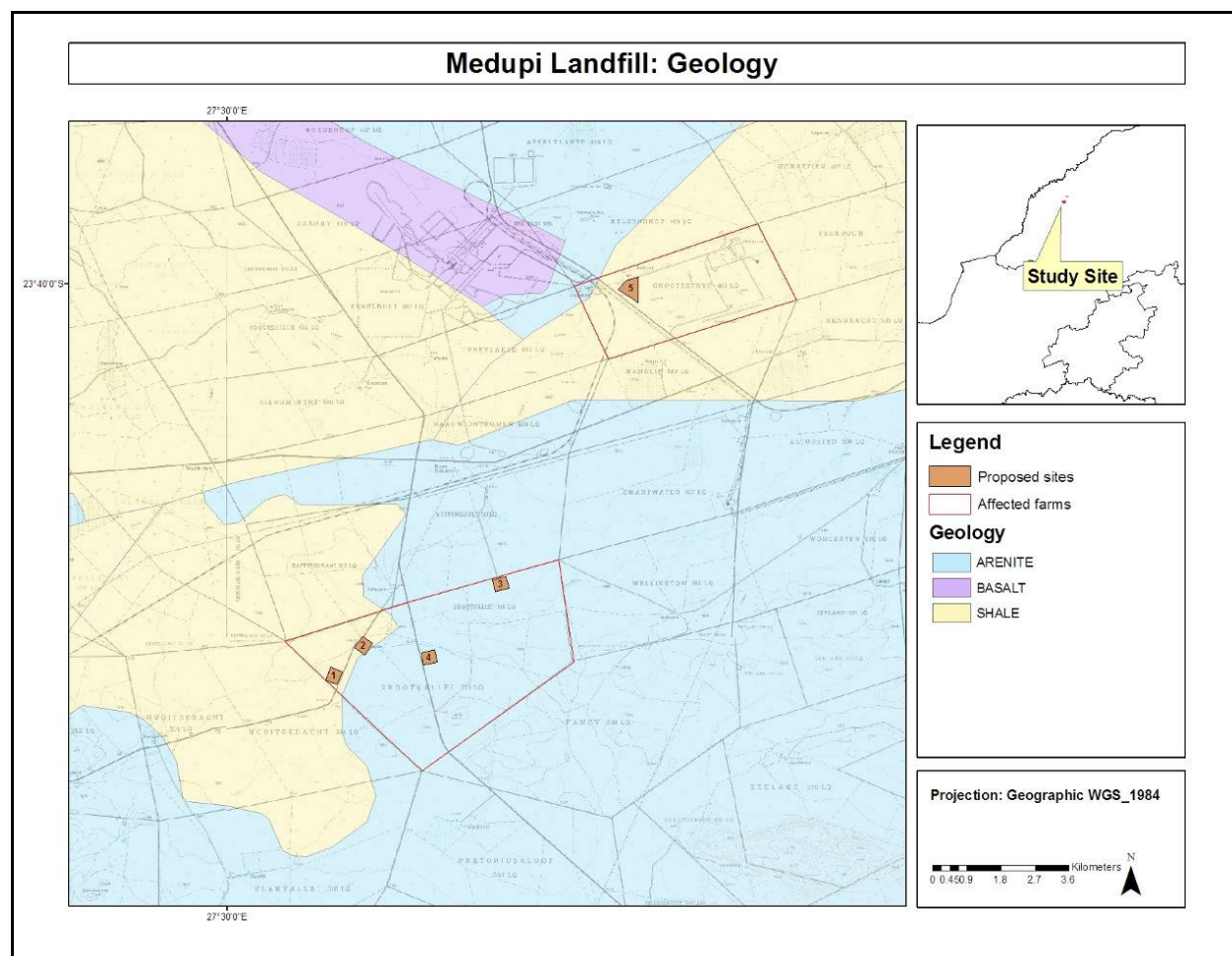
It has been highlighted in the Preliminary Ecological Assessment report (**Appendix C<sup>1</sup>**) that Geology and Soils are considered to be important factors contributing towards faunal community structure, and play a major role in segregating floral communities. Of even more importance is the relationship between certain geological formations and plant compositions in explaining areas with high floristic endemism and richness (so-called centres of endemism). Therefore, the arenite outcrops and clayey soils (on the Farm Grootvallei) are likely to be associated with different vegetational compositions than the surrounding sandy bushveld (e.g. the dominance of *Croton gratissimus* and *Diplorhynchus condylocarpon* on outcrops and *Spirostachys africana bush clumps* on clay).

According to the preliminary ecological assessment report that was undertaken for the area, the proposed sites are underlain by the following geological formations and lithologies:

- » Site 1 & 2: Shale, arenite, mudstone and coal of the Karoo Supergroup (Phanerozoic Erathem);
- » Site 3 & 4: Arenite and conglomerate of the Waterberg Group (Mokolian Erathem) and
- » Site 5: Shale, arenite, mudstone and coal of the Karoo Supergroup (Phanerozoic Erathem).

**Figure 5.2** is an indication of the geological lithologies of the study area.

Weathering of arenite and shale give rise to deep sandy, freely-drained soils (mainly Clovelly and Hutton forms), which is responsible for the formation of broad-leaved woodland associations. The arenite outcrops (mainly located on the central part of Grootvallei) support shallow soils of the Mispah and Glenrosa forms.



**Figure 5.2:** A map illustrating the regional geology and lithologies associated with the study sites (Pachnoda Consulting: 2009)

According to the preliminary agricultural potential assessment (**Appendix C<sup>2</sup>**) that was undertaken during the Scoping Phase, the area is very homogeneous in terms of texture, structure and soil depth. Two soil units occur in the vicinity, with the only difference between the two being colour. The larger part of the area consists of deep soils, comprising dark reddish brown, apedal, sandy topsoil on reddish brown to yellowish red, apedal loamy sand subsoil. The soils belong to the Hutton soil form.

The other portion of the area has soils with a dark brown, apedal, sandy topsoil on brown to dark brown, apedal loamy sand subsoil, belonging to the Clovelly form.

### 5.2.3 Agricultural Potential

#### (a) Dryland

The soils of the area are sandy and generally deep (> 1 200mm). They will therefore drain rapidly. Due to this tendency, along with the lack of fertility as shown by the low CEC values, they have a moderate agricultural potential.

However, coupled with the hot, dry nature of the climatic regime, it can be seen that this area is not suited to dryland arable agriculture, and most of the farming enterprises in the vicinity are either game farms or cattle ranches. This is the optimum land use option in this environment.

#### **(b) Irrigation**

The soils would have a moderate to high potential for irrigation, due to the lack of any restricting layer, but the sandy nature of the soils would necessitate very careful scheduling. The soils would require a substantial and reliable supply of water to ensure optimum soil moisture at all times.

#### **5.2.4 Geohydrological Conditions**

The description of the Geohydrological conditions for the four sites within the Grootvallei farm boundaries and the Geohydrological conditions for Site 5 is based on the preliminary Geohydrological assessment (**Appendix C<sup>3</sup>**) that was undertaken during the Screening and Scoping phases.

- **Regional Geology (Grootvallei sites)**

According to the preliminary Geohydrological studies undertaken for the sites, the farm Grootvallei is underlain by a sequence of yellowish to purple coloured sandstones and conglomeratic layers of the Waterberg Group that dip in a southerly to easterly direction at angles varying between 30 and 100. In general these rocks are hard, unweathered and tight and their potential as primary water bearing aquifers is low. The transported and residual soils covering these rocks tend to be sandy and thin (rarely more than 3m in thickness) and outcrops of sandstone occur frequently. Clayey and silty soils are relatively rare. Outcrops of Waterberg sandstones are however not very common at the four potential waste sites considered on the farm of Grootvallei. There are small vertical and sub-vertical faults and zones of open joints with a NE-SW and NW-SE trends that occur sporadically in the Waterberg rocks.

- **Geohydrology (Grootvallei)**

The preliminary Geohydrological assessment indicates that the joints and faults are pervious and contain ground water in places. Generally, these joints are often isolated from one another; the amount of water contained in them tends to be limited. Although some boreholes may have a high yield due to the high transmissivity of the fracture zone, the amount of water that can be extracted from them is limited due to a relatively low storativity.

The ash dump for Matimba Power Station is located on Waterberg sandstones and conglomerates identical to those described for the Grootvallei sites. Previous geohydrological investigations carried out at the ash dump for Matimba Power station indicate a regional groundwater flow to the south and east. These investigations also show that the material deposited there does pollute the groundwater, all be it in a fairly minor and localised way. Modelling exercises show the plume of polluted groundwater slowly moving in a southerly and easterly direction.

The four potential waste sites considered on the farm Grootvallei are located in areas where faults and joints in the rock are least prominent and the likelihood of encountering groundwater in these areas is low in comparison to areas where faults and fracture zones are more prominent and frequent. Any waste site located on any of the four alternative locations will have to be designed in a way that prevents polluted liquids or leachates from entering the *insitu* soil and rock profiles and therefore reaching the groundwater table. From a geohydrological point of view the risk of groundwater pollution occurring at any of the four potential sites on the Grootvallei farm is virtually identical and fairly low provided that contaminated liquids and leachates are prevented from entering the sandy soil and fractured rock profile. A summary of the Geohydrological conditions are detailed in the report attached in **Appendix C**<sup>3</sup>.

- **Geohydrological Conditions ( Site 5 on the farm Grootestryd)**

Site 5 to the west of Matimba Power Station on the farm Grootestryd is located on an old borrow pit area. **Figure 5.2** is an indication of the existing land uses surrounding site 5. A coal storage facility is located adjacent to this site and to the east of it. In the past it has been used for disposal of general household waste, building rubble and limited amounts of fly ash have also been dumped here at some stage. The deposition of waste appears to have been carried out in a controlled manner. The entire area where waste dumping has been carried out is surrounded by a berm composed of sandy transported and residual soils from the surrounding area. At present the site is not used for purposes of waste disposal. Four groundwater-monitoring boreholes numbered P4, P5 and P26 and P28 have been drilled to the north, west and south of the site (**Figure 5.3**). These holes are sampled on a regular basis to determine the groundwater quality.

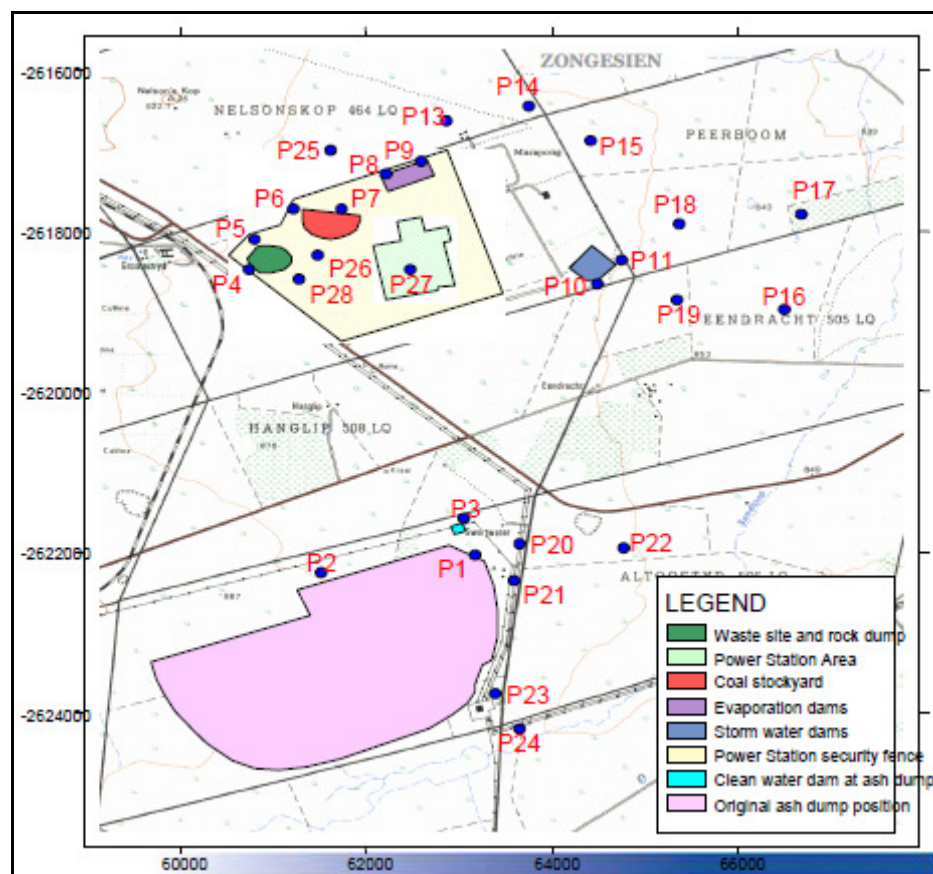


Figure 5.3: Land uses in Farm Grootestryd where Site 5 is located (Eskom: year unknown)

- **Regional Geology**

Sequences of sandstone, gritstone, mudstone and coal as well as mudstone, carbonaceous shale and coal form the Swartrand and Grootegeluk Formations of the Karoo Supergroup underlie the farm Grootestryd. The coal situated in these rocks is currently mined to fuel the Matimba Power station and will fuel the Medupi Power station in the future.

At Site 5 these rocks are overlain by dark brown sandy transported soils that extend to depths of 4m to 5m below the surface. There are no rock outcrops. Highly to completely weathered soft sandstone underlies the soils and extends to depths varying between 13m and 15m. Slightly to unweathered sandstone and shale occur at depths exceeding 15m.

- **Geohydrology**

In undisturbed and unweathered form these rocks are hard and tight and their potential as water bearing aquifers is low. Where affected by faulting and fracturing, they form secondary aquifers of limited storativity but high transmissivity particularly in the sandstones. Monitoring boreholes drilled in the vicinity of the site tended to have low yields and were often dry. In the boreholes where it occurred, water was generally intersected at the base of the weathered sandstone zone at depths between 13m and 20m.

According to the Geohydrological studies carried out at the site, the groundwater flow appears to be to the south. This is confirmed by the water quality encountered in the boreholes. Borehole P5 to the north of the site shows uncontaminated water. Signs of pollution have been encountered in Boreholes P4 to the south west of the site and in boreholes P26 and P28. The pollution in Borehole P4 is most likely attributable to the material dumped at Site 5. The pollution in boreholes P26 and P28 can originate from Site 5 or from the coal storage area. Further assessment to determine the origin of the pollution will be undertaken during the EIA phase. A borehole just east of the existing waste site should be considered for further investigations. Geophysical surveys (electrical resistivity surveys) will be carried out during the EIA phase to determine the most suitable drilling location for such a borehole.

An assessment of the geohydrological investigations carried out for Matimba Power Station in 2002 and 2006 respectively, indicates that the geohydrological conditions at Site 5 are similar to the conditions at Sites 1 to 4 on the farm Grootvallei. The soils covering the bedrock are sandy and permeable. At Site 5 these soils are considerably thicker though. The aquifers contained in the underlying sandstone rocks are of a secondary nature and low yielding. The reliance on these aquifers for water sources is small at present, particularly in the vicinity of Site 5. Unless adequate linings and collector drains prevent ingress of leachate and contaminated liquids into the underlying soil and rock profiles, the groundwater will be polluted.



### 5.2.5 Geotechnical Suitability

The geotechnical description in this section is based on the information obtained from the preliminary desk study and reconnaissance survey during the screening and scoping phases. The conclusion of these studies indicates that the candidate sites (Site 1 – 5) are unlikely to present any major geological or geotechnical problems which could obstruct development on them. However, in view of the proximity of sites 1 and 2 to the seasonal Sandloop Spruit, and the proximity of rock outcrops to sites 2 and 3, it is recommended that sites 4 and 5 be selected as preferred sites. Site 5 however may be underlain by more favourable mudstone which chemically weathers to plastic and thus less permeable soil than that of site 4 which is likely underlain by permeable sand. Refer to **Appendix C<sup>4</sup>** for further details on the geotechnical conditions encountered during the scoping and screening process.

According to these assessments, the nature of the host rock underlying sites 1 to 4, namely sandstone, together with the flat topography and Weinert's N value of about 4,5 together suggest that the soil profile developed from the host rock will be fairly shallow and comprise mainly sand. It is nevertheless very likely that a transported soil layer covers the residual material and this is clearly illustrated in the railway cutting near to the sites.

The proximity of rock near to Sites 2 and 3 further suggests that the residual soil profile will be fairly thin in these areas. Depending on the nature of the rock underlying Site 5 the weathered derivatives in the area could range from coarse sand, if the rock is sandstone or gritstone, to fine plastic sand or silt if the rock is mudstone. Again, the thickness of the residual soil formed from the rock is not likely to be very deep.

- **Founding conditions**

Good founding conditions for the structures are envisaged in all of the candidate sites, since they will very likely be constructed on competent sandstone, gritstone or mudstone.

- **Excavatability**

Under the rocky and relatively steep site conditions, levelling and preparations for terraces and foundations will be costly since hard excavation or blasting of rock and boulders will be required.

No excavation difficulties are envisaged to depths of the order of 2 to 3 m in the vicinity of Sites 1, 4 and 5. The close proximity of rock outcrops near to sites 2 and 3 suggest that rock may occur near to the surface.

- **Use of in-situ material**

The in-situ material from all of the sites may be suitable for use as cover material (during construction) but its extent and the quantity available is very likely to be limited at sites 2 and 3, and possibly site 1.

- **Slope stability**

The area is generally flat and where rock outcrops do occur, they appear stable and thus slope stability problems are unlikely within the sites. Based on the geological map of the area, no soluble dolomitic rock has been identified.

- **Seepage**

Bedrock is very likely to occur near to the ground surface and may well be closely to medium jointed providing potential seepage paths to the underlying regional groundwater, particularly in the vicinity of Sites 1 and 2, located near to the Sandloop Spruit. A more detailed investigation will have to be carried out during the EIA phase to investigate the geotechnical suitability of the area.

### **5.2.6 Topography, Landform and Slope**

Based on the 1:50 000 topographical map of the area the land surface for sites 1 to 4 is fairly flat and comprises mainly farmland with scattered scrub and bush and isolated koppies and ridges occurring in places. The Sandloop River flows through the farm Grootvallei near to its northern boundary.

According to the preliminary ecological assessment, Site 5 is situated adjacent to an existing waste disposal facility where the ground surface is fairly flat and covered with fairly dense bush. An analysis of the topography and landform revealed that the majority of the sites correspond to extensive plains. However, a number of arenite “koppies” and ridges occur in close proximity to some of the sites (especially Site 2 & 3) located on the farm Grootvallei. These ridges are especially important since they provide for high spatial heterogeneities, thereby likely to sustain populations of conservation important plant and faunal species.

From a functional point of view, these hills and ridges are important landscape features assisting winged invertebrates in locating potential mating partners. On a landscape scale, these outcrops facilitate animal dispersal to other areas of suitable habitat (so-called “stepping stones”) and thereby function as important ecological linkages. In addition, the faunal populations colonising these patches of outcrops provide a balance through recruitment of individuals (e.g. immigration-emigration) among these patches, thereby maintaining meta-populations dynamics.

### 5.2.7 Flora

The information presented in this section has been supplemented with results of the specialist ecological assessment (**Appendix C<sup>1</sup>**) undertaken during the Screening and Scoping Phases. Detailed findings of this assessment will be provided in the EIA phase. The following vegetation types have been identified:

#### (a) Limpopo Sweet Bushveld

This vegetation type extends from the lower reaches of the Crocodile and Marico Rivers down to the Limpopo River valley and into Botswana on the other side of the border. It is predominantly located on extensive plains that are irregularly interspersed by tributaries of the Limpopo River. It is short, open woodland dominated by *Acacia mellifera* and *Dichrostachys cinerea* as well as taller tree species such as *A. erioloba*, *A. nigrescens* and *Terminalia sericea*.

The high palatability of the graminoid composition makes this vegetation type very suitable for game farming practices. The Limpopo Sweet Bushveld is Least Threatened and extensive in geographic coverage. It is however poorly conserved (e.g. D’Nyala Nature Reserve) even though it straddles many privately owned game farms. It is transformed by cultivation, but future threats include the mining of coal.

#### (b) Western Sandy Bushveld

Based on Mucina & Rutherford (2006), it was evident that this ecological type did not physically correspond to the study area. However, preliminary field surveys have found that the floristic compositions observed on the study site conform to the Western Sandy Bushveld as evidenced by the dominance of *Combretum apiculatum*, *Terminalia sericea*, *Grewia flava*, *G. bicolor* and *Eragrostis pallens*, especially on the farm Grootvallei.

This vegetation type is typical of the sandy flats and undulating plains west of the Waterberg Mountains and north towards Steenbokpan. The vegetation structure varies from a tall, open canopy to low woodland dominated by broad-leaved and microphyllous species on soils underlain by arenite and sandstone. Noteworthy species include *Acacia erubescens* and *Combretum apiculatum*, with *Terminalia sericea* on areas comprising of deep sandy soils.

The Western Sandy Bushveld is also Least Threatened with about 6% statutorily conserved in the Marakele National Park.

#### **5.2.8 Conservation and Protected areas**

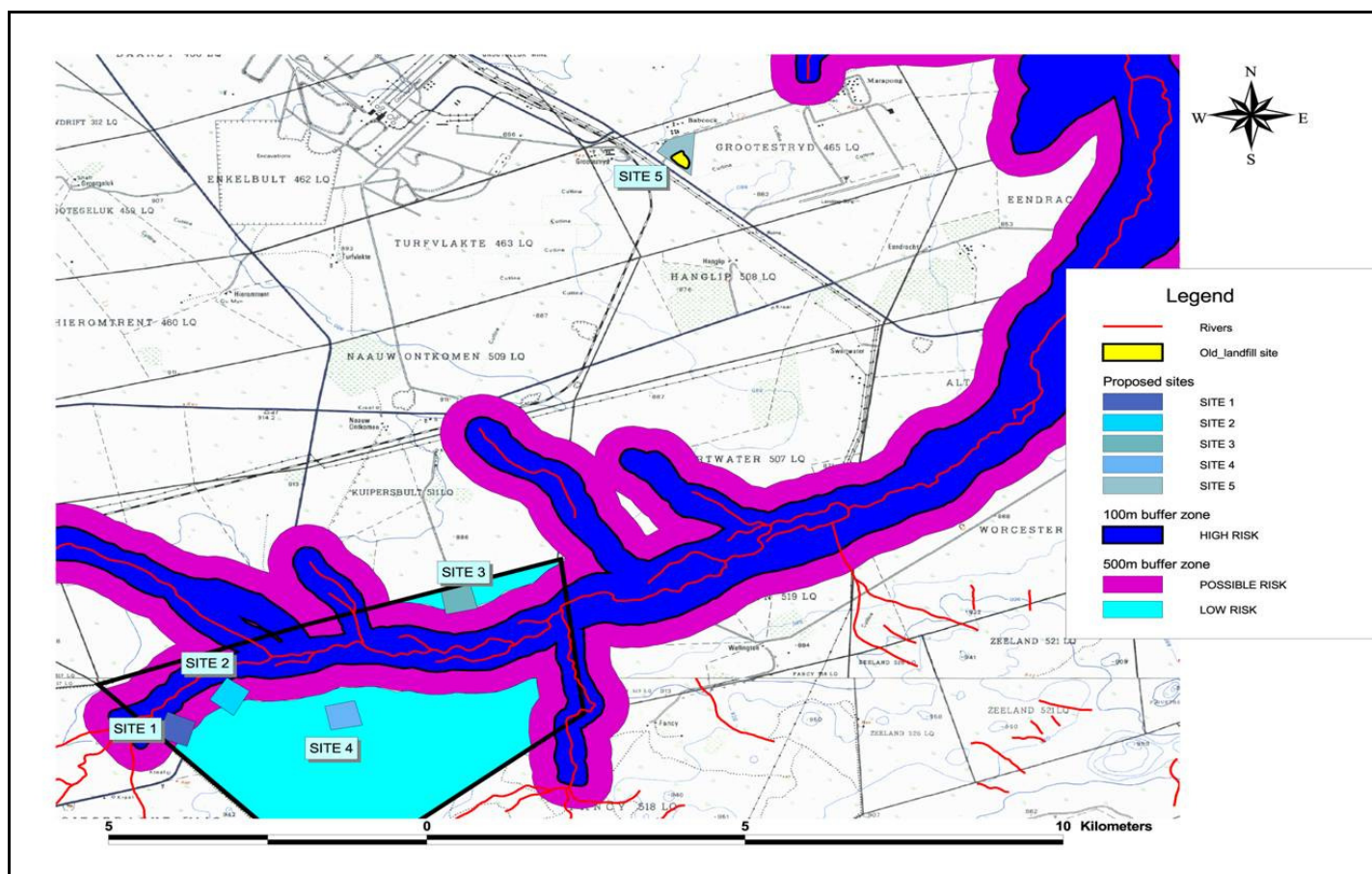
None of the sites will affect any conservation or protected area. The nearest conservation area, D’Nyala Nature Reserve, is approximately 12.5km east of the Matimba power station. However, many of the surrounding farms are utilised as game and hunting farms, including Grootvallei, and support high abundances of free-roaming game (e.g. Impala, Warthog and Kudu).

#### **5.2.9 Wetlands, Rivers, Drainage lines and Impoundments**

According to the Specialist Ecological Assessment, both Site 1 and 2 are located within the 500 m buffer zone of the seasonal Sandloop River (see Figure 1 of the report attached in **Appendix C<sup>1</sup>**). Of more importance is the sodic soil conditions pertaining to both sites as evidenced by the occurrence of a low basal cover of herbaceous vegetation and a predominance of microphyllous woody species (e.g. *Acacia grandicornuta*, *A. mellifera* and *A. tortilis*). In a number of cases, these sodic soils were responsible for the formation of near-homogenous stands of Tamboti trees (*Spirostachys africana*).

In addition, the sodic soils also provide essential focal congregation points for many game species. These soils are relatively high in mineral and clay content, which enhances the grazing capacity tremendously on these systems. Secondly, the *Acacia* thornveld and floodplain areas associated with the nearby drainage lines increase local faunal diversity through the provision of ephemeral foraging habitat (utilised by certain wader bird species) and surface water in an otherwise arid region.

A Surface Water Resource Assessment (**Appendix C<sup>5</sup>**) was also undertaken during the Screening and Scoping phases. Sensitive ecosystems in the study area have been identified as the wetland areas, river systems and ridges that are located in close proximity to the Site 1, 2, 3 & 4. Please refer to **Figure 5.4** for further details.



**Figure 5.4** Sensitivity analysis showing the relationship between the sites and the 100m (high risk), 500m (possible risk) and > 500m (low risk) buffer zones with respect to surface water resources (Wetland Consulting Services: 2009)

Based on the wetland assessment, sites 3, 4, and 5 fall within the areas marked as being of LOW RISK as in **Figure 5.4**, implying that these sites are most suitable (from a wetland perspective) for the location of the proposed landfill site especially sites 4 and 5 being the furthest from the watercourse. Study sites 1 and 2 are located in very close proximity (<100m from required buffer zones). It is also indicated in the report that these sites (Sites 1 & 2) are also possibly used by the observed population of bullfrogs for foraging. A herpetologist input will be required should this site be considered for further investigations during the Impact Assessment phase. The existence of the bullfrogs in these areas has also been highlighted in the Ecological Report. The Ecological specialists will undertake further assessment during the EIA phase to confirm the existence of the bullfrogs and other red data species.

### 5.2.10 Red Listed, Biogeographically Important Taxa, Endemic and Protected Plant Taxa

Most areas that constitute natural vegetation (in particular the arenite ridge and dolomite grasslands) are considered as suitable habitat for the presence of conservation important species. Also, the direct relationship between Red Data flora species and areas where slopes are relatively steep has been proven, and a subsequent high level of environmental significance is attributed to these particular areas.

#### (a) Red Data Species

No threatened, “near-threatened” or any “rare and declining” species as listed by the TSP are expected to occur on the proposed study sites. The PRECIS database of South African National Botanic Institute (SANBI) supported the absence of Red Data species on the quarter-degree grid squares corresponding to the study site.

#### (b) Protected Taxa

A number of plant taxa listed as protected (see Table 1) under Schedule 11 of the Nature Conservation Ordinance of Transvaal (No 12 of 1983) are likely to occur on the study site. Please note that this ordinance, although old, is still applicable.

**Table 5.1:** Protected plant species that could occur on the proposed study sites (Pachnoda Consulting: 2009).

Species	Status	Habitat
<i>Crinum cf. buphanoides</i> (Amaryllidaceae) - geophyte	Widespread, but localised – likely to occur on Sites 1-4.	Mainly on sandy soils
<i>Nerine laticoma</i> (Amaryllidaceae) – geophyte	Very localised; substrate specific (on calcrete) – peripheral to the study sites	<i>Acacia mellifera</i> – <i>Acacia tortilis</i> thornveld on calcrete
<i>Spirostachys africana</i> (Euphorbiaceae) – tree	Localised bush clumps – Confirmed from Sites 1, 2 & 3.	<i>Spirostachys africana</i> bush clumps on clay soils
<i>Stapelia getliffei</i> (Apocynaceae) – succulent herb	Localised – suitable habitat observed on Sites 3 & 4.	Mixed <i>Grewia flava</i> – <i>Aristida stipitata</i> woodland

A permit is required to remove or disturb a protected plant. It is recommended that protected plants in danger of becoming destroyed be removed prior to the commencement of construction activities and translocated to suitable habitat, or used during the rehabilitation phase.

### (c) Medicinal species

A number of plant species are highly prized for their traditional healing properties; especially for “muthi” (they have ethnomedicinal value). It is estimated that more than 28 million people in South Africa consume about 19 500 tonnes of plant material per annum (Mander, 1998). For example, certain popularly traded species have become over-exploited and are now rare or extinct in the wild. This has resulted in the forced use of alternative species and a geographical shift in the harvesting pressure of previously unexploited areas. Although most of these plant species are regionally widespread and abundant, some of the more sought-after plant resources are currently declining and should be envisaged as priority conservation entities. **Table 5.2** lists those species considered to be of economical or cultural value (according to Van Wyk *et al.*, 1997). Important (heavily utilised) species are highlighted in grey.

**Table 5.2:** Protected tree species recorded during the site visits or likely to occur on the study sites

Species	Parts used	Treatment
<i>Acacia karoo</i>	Bark, leaves & gum	Stomach ailments such as diarrhoea and dysentery. Bark, gum & leaves used as an astringent for colds and conjunctivitis.
<i>Crinum spp.</i> (e.g. <i>C. buphanoides</i> )	Bulb & leaves	Used as a remedy for various complaints such as scrofula and rheumatic fever.
<i>Elephantorrhiza elephantina</i>	Rhizomes	Treatment of a wide range of ailments including diarrhoea and dysentery.
<i>Euclea undulata</i>	Roots	Used as a remedy for headaches and toothaches.
<i>Gomphocarpus fruticosus</i>	Leaves	Treatment of headaches, tuberculosis and general body aches.
<i>Harpagophytum procumbens</i>	Secondary roots only	Used to treat rheumatism and arthritis.
<i>Jatropha zeyheri</i>	Rhizomes	Treatment of fever and wounds.
<i>Sclerocarya birrea</i> subsp. <i>caffra</i>	Bark and fruit	Treatment of various ailments, including malaria. Fruit rich in Vitamin C.
<i>Terminalia sericea</i>	Roots	An infusion is made to treat pneumonia and wounds.
<i>Ziziphus mucronata</i>	Roots, leaves and bark	Treatment of respiratory ailments.

### (d) Endemic or Near-endemic taxa

According to Mucina & Rutherford (2006), an important central bushveld endemic found within this region is *Piaranthus atosanguineus*, a succulent *stapeliad*. It is scantily distributed along the Limpopo River valley from Gaborone in Botswana eastwards to Zeerust and northwards to Lephalale, and into areas north of the Soutpansberg (Bruyns, 2005).

It has been located in Acacia-Grewia bushveld, growing specifically under heavily grazed Acacia tortillis individuals. It was not recorded during the preliminary investigations although areas of Acacia thornveld (on the farm Grootvallei) provided suitable habitat.

#### **5.2.11 Red Listed, Endemic and Conservation Important Faunal Taxa**

Most areas that constitute natural vegetation (in particular sites corresponding to the farm Grootvallei) are considered as suitable habitat for the presence of conservation important species. However, Site 5 is located within the Matimba power station complex, which is also secured by means of electric and razor-wire fencing. Therefore, Site 5 is unlikely to hold large mammal species or any diverse array of conservation important taxa. In addition, the sites corresponding to the farm Grootvallei are located in close proximity to ephemeral or seasonal rivers, as well as areas corresponding to topographical features, and thus likely to sustain faunal species with specialised life histories, in particular rupicolous or lithophile species (e.g. rock-associated species).

Most large mammal species are in general highly mobile and therefore able to vacate areas should adverse environmental conditions prevail. Therefore, direct impacts associated with the proposed landfill site on adult mortality are less likely to occur, although indirect impacts will have consequences on their "fitness" (e.g. the ability of a species to reproduce). However, persistent disturbances across extended temporal scales will eventually affect any population's ability to sustain itself, and will more than likely result in the total abandonment of a particular area.

Species most likely to be affected are either K-selected species or habitat specialists e.g. substrate specialists (e.g. certain invertebrate species). K-selected species are mostly long-lived species with slow reproductive rates, while habitat specialists are those restricted to a particular type of microhabitat or niche, be it structurally, altitudinal or floristic. Most of these species are therefore threatened, "near-threatened" or Red Listed.

However, it is believed that the densities of certain opportunistic species could increase tenfold due to the establishment of a landfill site. These taxa could easily out-compete other less resilient taxa in the area. For example, it is believed that the densities of Pied Crows (*Corvus albus*) are likely to increase in the region. These species are aggressive competitors, which will eventually compete with other raptors in the area, leading to an imbalance in the food chain.



**Table 2** of the attached Ecological report provides a list with geographic distribution ranges sympatric (overlapping) to the study area. The list of threatened, “near-threatened” and conservation important faunal species noted in the immediate surrounding areas within the vicinity are also included in the Ecological Assessment report attached in **Appendix C<sup>1</sup>**.

#### **5.2.12 Land Cover**

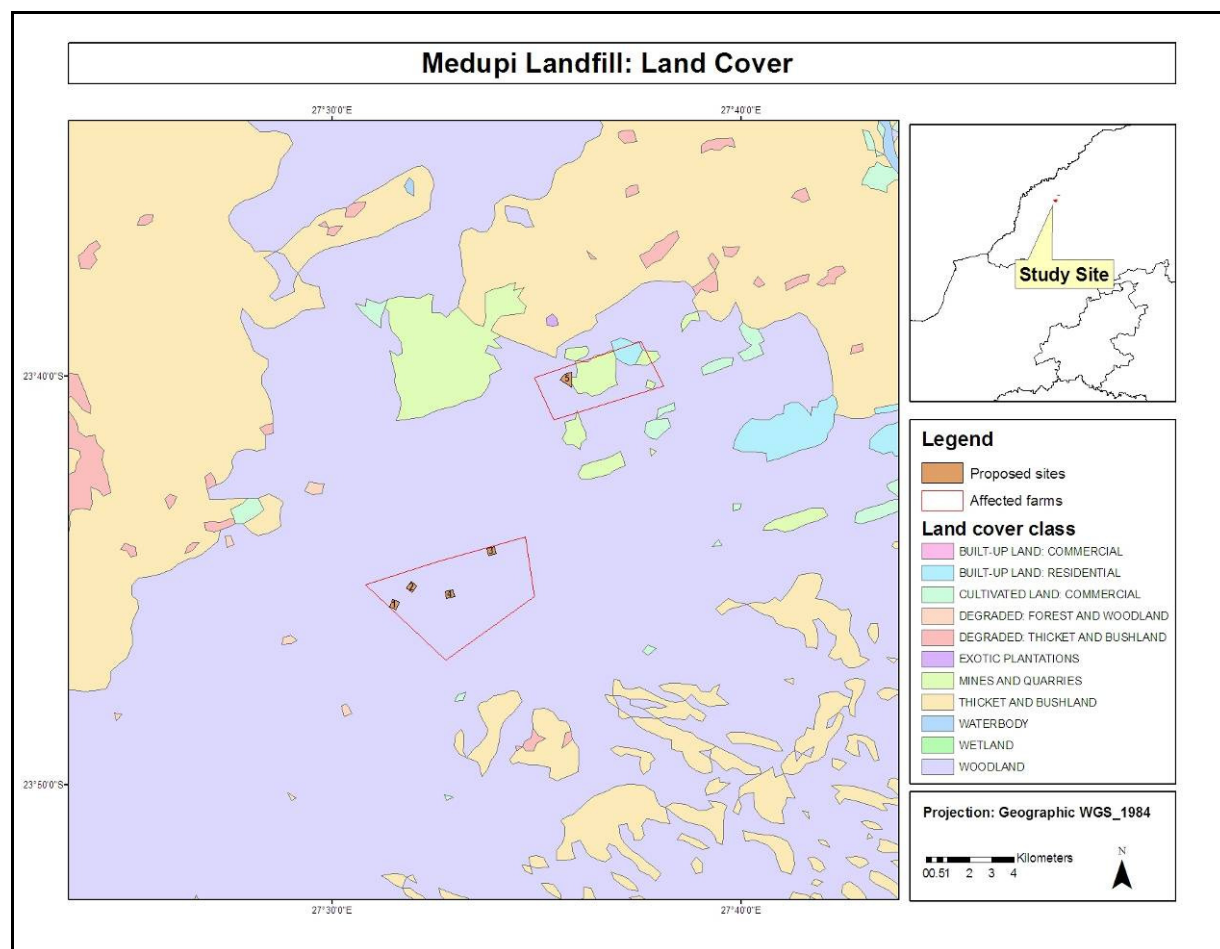
The various land cover classes (**Figure 5.5**) within the database of land cover classes were combined to represent the following:

##### **Natural areas:**

- Thicket and Bushland;
- Woodland;
- Water bodies and Wetlands; and
- Degraded Thicket and Bushland or Degraded Woodland.

##### **Transformed areas:**

- Cultivated land;
- Exotic plantations;
- Built-up land; and
- Mines and quarries.



**Figure 5.5.** Land cover classes corresponding to the proposed study sites (Pachnoda Consulting: Jan 2009).

From the land cover analysis, the Grootvallei farm (Sites 1 - 4) corresponds to woodland. Site 5 corresponds to woodland subjected to transformation by mines and quarries (e.g. Matimba power station).

### 5.3 Human Environment

The information pertaining to the socio economic and demographic profiles in the Lephalale areas provided in these sections is based on the information provided in the preliminary Social Impact Assessment report (**Appendix C<sup>6</sup>**) provided by Ms Ilse Aucamp of PTERSA. It should be noted that demographic, economic, socio cultural, geographic, institutional, legal, emancipatory and empowerment processes will be investigated in detail during the Impact Assessment phase.

### **5.3.1 Socio Economic and Population characteristics**

The Waterberg District Municipality is the largest district municipality in the province and consists of six local municipalities, namely Mogalakwena, Lephalale, Bela- Bela, Modimolle, Thabazimbi and Mookgopong. The district is located in the western side of the Limpopo province and borders the neighbouring country of Botswana, as well as the North West and Gauteng provinces. Waterberg district is rural in nature with urban areas that can mostly be described as dispersed and fragmented.

The key pillars of economic development in the Waterberg area are mining, agriculture and tourism. The area has significant mineral zones with the most important mining activities including granite, tin, platinum, iron and coal. About 45% of the total in situ coal reserves of South Africa are in the Waterberg area, although only a fraction of this coal could be considered recoverable because the bulk is too deep to mine economically. In terms of agriculture most of the district is suited for livestock production, but some major cropping is also taking place e.g. cotton, sunflower, tobacco, and soya bean production. Waterberg region has a competitive edge in terms of tourism because of its close proximity to the Gauteng province, its rich biodiversity, malaria-free areas and its hunting capital status. The area is home to the Macadam's Valley World Heritage Site as well as the provincial Nature Reserve Nylsvley which is internationally known for the wetlands research undertaken there as well as the Marakele National Park near Thabazimbi.

Lephalale is the largest municipality in the Waterberg district and accounts for 39% of the district. It came into being in December 2000 as a result of the amalgamation of the Ellisras/Marapong Transitional Local Council and the Ellisras/Tswelopele Transitional Local Council. The municipality is about 19 605 square kilometres in size and shares an international border with Botswana. The main town in the area is Lephalale (previously known as Ellisras). The area is a prime hunting mecca and prime eco-tourism area that draws thousands of tourists every year. Lephalale forms part of the world-renowned Waterberg Savannah Biosphere and is also well-known for its coal-mining industry which is, besides tourism, the mainstay of the area. Also in the area is the Kumba Grootegeeluk mine which is the largest mine of its kind in South Africa and the Matimba power station that is currently the largest dry-cooled power station in the world.

Although the Limpopo province showed a positive growth rate (based on the results of the Census 2001 and Community Survey 2007 data), it was still below the national average. The Waterberg district as well as the Lephalale municipal area both showed a decline in population which was more pronounced in the Lephalale area. As the town of Lephalale has expanded a lot over the past couple of years, it is possible that this phenomenon may relate more to the rural areas of the municipality as most of the people in the municipality live there. It must be mentioned that there is a discrepancy between the population Community Survey 2007 shows for Lephalale (80 141) and the population that Lephalale's website indicates (105 000 – [www.lephalale.com](http://www.lephalale.com), accessed 21/01/09). It is anticipated that the urban population will increase over the next years and that the town of Lephalale will expand even more due to the construction and operation of the Medupi power station, as well as the two new planned coal fired power stations and other associated industrial activities. It is important to note that Sasol is also busy with investigating industrial development in the area; therefore the potential cumulative impacts of all these developments may change the socio-economic characteristics of the area significantly in the near future.

(a) Population Characteristics

More than 90% of the people in the Lephalale area belong to the Black population (Community Survey 2007). The population in the area is very young, with more than 50% being younger than 24 years of age. About 20% of the population aged 20 years or older has completed Grade 12 or higher. Almost half of the people between the ages of 15 and 65 years have no income at all.

A quarter of the households in the Lephalale area has indicated that their refuse is removed at least once a week by a local authority or a private company, while the bulk of the remaining households have indicated that they have their own refuse dumps. About a third of households have piped water inside the dwelling, and just over 50% have piped water inside the yard or from an access point outside the yard. In terms of sanitation, about 50% of the households have pit toilets without ventilation and about 30% have flush toilets that are connected to a sewerage system.

The Community Survey 2007 did not release information on home language, but according to Census 2001, just over half the population in the Lephalale area has Sepedi as home language, followed by almost a third with Setswana as home language. The third most common home language was Afrikaans (9%). Not even a percentage of the population in the Lephalale area had English as home language. This suggests that in addition to English as language of communication, Afrikaans, Sepedi and Setswana should also be included in communication to ensure as wide an audience as possible is reached.

### **5.3.2 Historical and Cultural Features**

According to the Heritage Impact Assessment (**Appendix C<sup>7</sup>**) report that was undertaken during the Scoping and Screening phases, only a few sites of cultural significance are known to occur in the larger geographical area. This is due to the somewhat inhospitable environment of the area, being very flat with few sources of surface water, did not allow people to settle in large numbers in this region in the past.

In areas where there are outcrops, especially close to rivers, rock art sites and sites dating to the Late Iron Age have been documented. Further a-field, to the south, some Early and Late Iron Age sites are known to exist. The Waterberg, also located to the immediate south of the project area, is particularly rich in archaeological sites. Closer to the project area the town of Lephalale (Ellisras) contains a cemetery with the graves of some of the earliest white settlers in the area.

A cultural heritage survey of the Medupi proposed landfill sites, including Site 5, identified no heritage features adjacent to the proposed development.

## **5.4 Environmental Quality**

### **5.4.1 Roads and Traffic**

Due to the industrial activities (mining and power generation) that are taking place in the project area, an existing road network is readily available. Although new road will be constructed, access to the proposed development will be through the use of existing road networks in the area. Please refer to **Appendix C8** for the existing road networks in the area. A Detailed traffic impact analysis will be undertaken during the EIA phase. It is anticipated that additional roads will be constructed to allow for the transport of waste for disposal from Matimba and Medupi power stations. Specific details on the anticipated road network will be discussed in detail during the Impact Assessment Phase.

#### **5.4.2 Air Quality**

The proposed landfill site will obviously have impacts on the current odour levels. No ambient air quality information is available for the area, although there are no major emitters of air pollution in the area. A preliminary air quality assessment was undertaken during the Scoping phase (see **Appendix C9**). Detailed air quality monitoring assessment to assess the occupational health and safety implications of air quality (dust deposition, PM10 Landfill gas) on the site will be undertaken during the Impact Assessment Phase.

#### **5.4.3 Noise Environment**

The existing and proposed power stations are the only significant fixed noise sources in the area. They are also constant and continuous noise sources. Road traffic noise is significant within 200m of the tar roads in the area.

The trains are too infrequent and irregular to be a significant noise source, as are the dirt roads in the area, with traffic flows less than 5 vehicles per hour. Aircraft over-flights in the area are rare. Detailed investigations of noise associated with the proposed development will be undertaken during the Impact Assessment phase.

#### **5.4.4 Visual and Aesthetic Features**

All five sites are located in areas with slight topographic variation and dense vegetation cover. The low topographic relief and dense vegetation cover ensures that all the sites can accommodate a fair degree of surface disturbance without negatively affecting views.

The character of the region within which sites 1 - 4 are located is fairly monotonous. A continuous and uniform natural vegetation cover drapes the fairly level landscape with the exception of a grouping of small hills in the south-western corner of the farm Grootvallei 515 LQ. The farm appears to be in a visually pristine and natural condition with most of the indigenous vegetation still intact. The only obvious disturbances to the natural condition of the farm are the dirt roads and the power lines traversing the farm. Generally speaking, the character of the farm is predominantly natural and the man-made infrastructure can be considered as minor intrusions.

Four of the five sites selected for screening purposes will be excluded from further assessment during the EIA phase as these sites are located in closer proximity to sensitive natural environments. The exclusion of these sites is also based on the preliminary assessment by various specialists, suitability criteria (discussed in Chapter 3) and the recommendations from specialists.

Site 5 is located within the site boundaries of the existing Matimba Power Station in the north-western corner of the Matimba site, adjacent to the Stockpoort road. A section of the site was previously used as a waste dump which has since been rehabilitated. The remainder of the site portrays the typical dense vegetation cover that is found elsewhere. Site 5 is located amongst a number of man-made infrastructures such as roads, railway lines, power lines, conveyor belts and the Matimba Power Station. The region is subject to a visual clutter of overhead transmission lines and telecommunication services. The character of the region is dominated by service delivery infrastructure. Although large areas are still dominated by natural vegetation, it is highly fragmented and the natural character is fairly disturbed.

The presence of an existing man-made landform (existing landfill) on the site, further reduces the impact on the character of the site. The site is well screened from the road and motorists are expected to experience minimal exposure to the impact. The likely impacts associated with the project are listed in a preliminary visual impact assessment report attached in **Appendix C10** of this report.

The environment within the study area is largely affected by human activities. For this reason, it is expected that only limited areas of the undisturbed environment could potentially be affected.

## 6 CHAPTER 6

## PROJECT SCOPE

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Consideration of alternatives is a key element of the EIA process and is a requirement of the scoping process as defined in the EIA Regulations (DEAT, 1998). The goal of evaluating alternatives is to find the most effective way of meeting the need and purpose of the project either through enhancing the environmental benefits of the proposed activity, or through reducing or avoiding potentially significant negative impacts.

During the Scoping and Screening phases, a number of alternative sites were initially investigated, but some were rejected as being not feasible. Of the five sites investigated, one potential site has been found to be the most suitable for further investigation during the EIA phase. Refer to Section 3 for further information on the site selection process.

During the Impact Assessment phase, all feasible alternatives will be assessed in terms of both environmental acceptability as well as economic feasibility. The preferred alternative will be highlighted and presented to the authorities. The following alternatives will be discussed and highlighted in detail in the EIA Report, it should be noted that additional feasible alternatives may be identified during the next phase of the project and as and when the project unfolds.

### 6.1 *Status quo*/No go alternatives

The no-go option would entail maintaining the *status quo*. This is not considered a viable alternative, as Eskom do not want to use the unlicensed waste dump in Lephalale for the disposal of the waste. The proposed construction of the waste disposal site can be a cost saving option for Eskom as trips and loads for the transport waste generated from the existing Matimba and Medupi Power Stations will be significantly reduced.

### 6.2 Location alternatives

A number of properties which are currently owned by Eskom were subject to a screening process by various specialists. It emerged that not all these farm properties are available and suitable for location of the proposed landfill site. Although four sites within Grootvallei were considered for the location of the proposed development, the sites were not very suitable and ideal due to the sensitivities around them. Alternative that will be investigated during the Impact Assessment phase may include:



### **6.2.1 Siting Alternatives**

The proposed alternative favoured by the various specialists will be within the property of the existing Matimba Power Station. There are a number of advantages associated with this alternative. The property on which the waste disposal site is proposed to be built is associated with the power station and is already disturbed. The other four alternatives viz within the boundaries of Grootvallei would entail the clearing of more pristine woodlands and there may be impacts on other sensitive environments (e.g. crossing of streams and rivers, potential for underground contamination of water resources) that have already been identified during the screening process. These components of sensitivities within the aforementioned properties also present challenges in terms of establishment of infrastructure (roads, water pipelines) in these areas.

Due to the existing activities within Matimba Power Station property the proposed development lends itself to the existing environment. Locating the landfill elsewhere than the site identified by the specialists will require detailed environmental assessment and can result in increasing the potential environmental consequences on greenfield sites. This may further cause unnecessary delays in ensuring Eskom responsibility for the generation, transmission and distribution of commercial electricity in South Africa. Locations alternatives will be investigated in detail during the EIA phase.

### **6.3 Layout and Design Alternatives**

Various specialist investigations will be undertaken during the EIA phase to determine the specific favoured location of the proposed development on the Farm Grootestryd. Three alternatives within the Farm Grootestryd will be investigated for the location of the waste disposal site. The outcome of these studies will inform the layout alternatives/designs that will be best suitable to accommodate the infrastructure required for the proposed project. The appointed design engineers were involved during the screening and scoping phases. Refer to **Appendix C11** their input and observations made.

Eskom has considered the option of co-disposal of waste (without discarding the hazardous waste storage facility). In other words, Eskom wants to have a separate designated cell for low grade hazardous waste (e.g. oils, oily rags, cans etc.) and other cells for disposal of general waste. The options were considered solely for the reasons that Eskom wants to save costs by avoiding unnecessary transportation of waste to Gauteng.

The “Minimum Requirements for Waste Disposal by landfill” (DWAF: 1998) will be used a guideline document to inform the design of a landfill site and outline of the EIA and permitting requirements. The landfill design and the temporary hazardous waste storage facility designs will be based on the outcome of the site investigation and EIA. The general objective of landfill design is to provide a cost effective and an environmentally acceptable waste disposal facility. If the best available site identified during the site selection process is sub-optimal from an environmental or geohydrological point of view, the subsequent site design must compensate for these short comings by means of appropriate engineering.

The preliminary design and layout of the waste disposal site and the waste storage facility has not been finalised. These designs are subject to the findings of the environmental assessment and geohydrological investigations. The preliminary design drawings and plans will be available for Authority review during the EIA phase.

## 7 CHAPTER 7

## SCOPING EVALUATION

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An important element of scoping is to evaluate the issues that were raised during the PPP and technical processes and ensure that those identified as key issues are included within the scope of the EIA process. In addition, scoping allows for the identification of the anticipated environmental impacts, particularly those that will require detailed specialist investigations. The results of the PPP and issues identified will form the basis for the Terms of Reference for specialist studies and a full assessment of the impacts in the EIA Phase.

This section of the report also aims to predict the potential environmental impacts likely to occur from the undertaking of the proposed activities. The activities that are associated with the construction, maintenance and operation of the proposed waste disposal site, which could potentially have an impact on the environment, are also highlighted in this section. 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 it 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 will also be augmented by input from the I&APs during the public review of the Scoping Report.

In accordance with Regulation 32 (k) of Government Notice R. 385, Envirolution Consulting is required to further assess the significance of impacts according to *nature, probability, duration, extent and intensity* during the EIA Phase. It was evident during the preliminary investigation undertaken that the construction of a landfill and a hazardous waste storage facility has the potential to pose various risks to the environment as well as to the neighbouring properties and residents in the surrounding area. Therefore, it is important that these possible risks are taken into account during the scoping phase and that mitigation measures to ameliorate impacts are provided during the EIA phase.

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

- » Soil and groundwater contamination;
- » Loss of plants and habitats;
- » Destruction of sensitive environments (pristine and sensitive vegetation, Red Data faunal and floral species, protected species and habitats etc);
- » Heritage impacts;

- Change in traffic patterns;
- Increased noise levels;
- Atmospheric pollution and odours (Air Emissions);and
- Safety and security.

These potential impacts will be investigated in further detail by specialists during the EIA Phase.

A number of potential environmental impacts have been identified from the activities listed in the preceding sections. Potential cumulative impacts that may arise from the proposed development will be identified and discussed in greater detail in the Environmental Impact Report.

## **7.1 Biophysical Impacts**

### (a) Geohydrology

Potential impact of pollutants from the landfill on the groundwater is anticipated. A detailed specialist hydrological assessment will be undertaken to determine the potential impact of the landfill on groundwater, the associated risks to groundwater during the construction and operational phases of the project.

### (b) Geology and soils

Various construction activities i.e. excavation earth grading and will be undertaken. Depending on location, this may encourage soil erosion, soil compaction, chemical soil pollution and soil degradation. These impacts will be localized as the activities will occur on a footprint or on the development boundaries and also where access roads will be constructed. If in close enough proximity to streams and other water courses, erosion or poor management of stockpiles or materials may impact directly on the river in the form of siltation and pollution. This would be significant should it occur in the streams or other water bodies located in closer proximity to the development. Major impacts from these activities are anticipated to occur during construction only.

### (c) Ecological Systems

Much of the area within the surroundings of Site 5 in particular, is disturbed and the impacts are expected to be insignificant with mitigation. However, many of the site located within the Grootvallei farm boundaries is traversed by streams and water bodies which sustain patches of natural environments.

During the construction period, litter and construction waste could be introduced which could impact on the ecological integrity of the area particularly in the remaining natural environments. Of particular concern would be soil and water contamination that may result from irresponsible management substances such as oils, paints and general waste.

(d) Surface Water Resources and Wetland Ecosystems

The investigations undertaken by the Ecological and Wetlands and Surface Water resource specialists have highlighted some sensitivities within the boundaries of Grootvallei.

According to the ecological specialists, no drainage line traverses Site 5 and the site falls outside the 500m buffer zone within the area of Low risk. Further investigation must be undertaken on Site 5.

(e) Fauna and Flora

Some of the I&APs who registered during the project announcement phase have expressed their concern regarding the impact of the proposed development on the bullfrog habitats that are known to exist in Grootvallei and thus the biodiversity of flora and fauna it sustains. The proposed development, if not well managed could result in the loss of plant habitats if the design requirements does not take into account sensitive environments within the selected study sites.

The ecological investigations indicate that large mammal species or any diverse array of conservation important taxa are unlikely to exist within Site 5. The reports however indicate that certain red data invertebrate species in Site 5 may be impacted by the proposed development.

(f) Avi-fauna (Birds)

An input from the avifaunal specialist (Chris van Rooyen) and the Preliminary Ecological Assessment indicated probable increase in pied crows to the landfill site. According to the specialists, crows are highly adaptive and very aggressive towards other bird species, especially raptors. If the landfill sites are to be located away from other anthropogenic activities (in pristine woodlands such as Grootvallei) they are likely to have a tremendous impact on the top trophic levels (food chain) of the system.

The most important avifaunal issue that needs to be addressed during the EIA Phase would be to locate the landfill where larger birds of prey species are unlikely to occur on a regular basis. A detailed avifaunal assessment will be undertaken during the EIA Phase.

## **7.2 Human Environment**

### **7.2.1 Social Impacts**

#### **(1) Construction phase Impacts**

Impacts associated with the construction phase of the project are of a short duration, temporary in nature, but could have long term effects on the surrounding environment if not properly managed. The following impacts are anticipated during the construction of the landfill and the hazardous waste storage facility:

##### **(a) Impact on job opportunities**

The construction of the proposed landfill site is likely to create direct and indirect job opportunities (temporary and permanent) for the local people. It is imperative that the contractors consider the use of labour intensive methods where necessary for the construction of some works of the landfill site.

##### **(b) Influx of Jobseekers**

Due by high unemployment and poverty rates, a significant influx of jobseekers to the construction areas is foreseen. This impact might even materialise prior to construction. Cumulative impacts in this regard include conflict between outsiders and locals, additional pressure on infrastructure and services and in-migration of outsiders remaining in the area after the project has been completed. The potential jobseekers could already be residing in the local neighbourhoods, which could limit the negative impact.

(c) Construction camp impacts

Projects of this nature sometimes involve the development of a construction camp(s) where the temporary construction workers are accommodated. This in itself could impact on the daily living and movement patterns of those living in close proximity to such a facility. Cumulative impacts include misbehaviour of construction workers at the construction camp and mismanagement which could result in safety and security concerns, social conflict and other environmental problems.

(d) Impacts on daily living and movement patterns

Construction related activities could impact on the daily living and movement patterns of the locals e.g. increased construction vehicle activity on the local roads and possible construction of new access roads. This would especially be evident in areas where gravel roads connect to tarred roads and main roads.

Impacts on daily living and movement patterns also refer to the increased noise pollution during construction activities, especially where construction would take place in close proximity to dwellings/industries situated in low ambient noise areas (agricultural land). Right-of-way clearing and construction activities, however, will be short term. Noise will thus only be temporarily generated and if construction activities adhere to all relevant legislation in this regard and limit construction activities to normal working hours, the impact is anticipated to be minimal.

(e) Air Quality Impacts

Dust will be generated during construction activities. Other potential sources of air pollution would include exhaust fumes, and traffic on unpaved roads.

(f) Health related impacts

Health related impacts during the construction phase of the project refer to the spread of sexually transmitted diseases and HIV/AIDs between workers (usually outsiders) and the local population. The impact of HIV/AIDs on productivity in the South Africa is already a source of concern. Additional infections (even limited) with long-term possible regional consequences, therefore remain a cause of concern. Inadequate accommodation facilities for jobseekers and workers could also result in health risks due to environmental pollution.

(g) Safety and Security Impacts

Safety and security impacts include construction - related risks and accidents, vehicular accidents, the perceived increase in crime as a result of outsiders being in the area and the possible increased risks of veld fires. This impact would be more severe in the areas where the construction sites are in close proximity to residential neighbourhoods and in areas with high levels of pedestrian movement e.g. in the vicinity of schools.

**(2) Operational Phase Social impacts**

The operational phase of a landfill is a long term process. The impacts associated with this phase are usually perceived by affected parties to be severe, as vagrants or informal recyclers may want to access to site". Odour may also be perceived by the I&APs as an issue, however no residential areas are located in very close proximity to the site, in particular, Site 5. Maintenance undertaken during the operational phase is however also expected to have some short-term impacts.



The following impacts are anticipated to occur during the operational stages of the project:

(a) Impact on Job Opportunities

Limited job opportunities exist for local SMMEs or local labourers to source temporary employment e.g. general maintenance activities associated with the landfill.

(b) Inflow of Workers

An inflow of workers during the operational phase is expected to be extremely limited. This would only be during maintenance work undertaken on the landfill site.

(c) Impact on regional and local economy

Individual economic benefits are not expected. The construction of a landfill will be of significant benefit to current and future Eskom projects as they do not need to transport waste for disposal in Gauteng on a regular basis. The assessment of these cumulative impacts falls outside the ambit of the study although it should be noted as a positive impact, which could benefit the local Municipality as they do not need to accommodate any general waste from Matimba and Medupi Power stations.

(d) Property values

There are no residential and business properties located in close proximity to the proposed landfill site. Although an increase in odour levels is anticipated during the operational phase of the landfill, it is however not expected that the surrounding property owners would be significantly affected by the proposed development.

The detailed impact on the property values, however, can only be determined during the EIA Phase. It should be noted that the Social Impact Assessment does not include financial property evaluations, although the social issues associated with this impact are noted.

## 7.2.2 Environmental Quality

### (a) Roads and Traffic

Large quantities of construction material and waste may be moved by making use of existing road infrastructure in the neighbouring developments and the municipality. This could potentially result in damage, wear and tear on neighbouring infrastructure.

The preliminary traffic impact assessment indicates that minor roads in a very poor condition are available for sites 1, 2 and 3; the required road network to an acceptable standard for waste-truck movements is not available. It is further indicated in the report that the Kuipersbult Road Extension is of a higher quality than roads for sites 1 and 2 but still require upgrading to the required standard needed for waste-truck movements.

A detailed traffic impact assessment will be undertaken to assess the impacts of increased traffic flow, traffic safety and capacity of the existing road network as part of the engineering design phase.

### (b) Visual Impacts

A preliminary assessment of the visual impacts of the proposed development are summarised as follows:

- **Impact on Sense of Place:** Sites 1 – 4 are in a relatively pristine natural condition and have a tranquil and undisturbed sense of place. The operation of a landfill site and the associated increase in vehicular traffic will impact on the sense of place. Site 5 is located in an area that is more disturbed and the sense of place is already impacted upon. The location of the landfill site on site 5 is anticipated to have a limited impact on the prevailing sense of place.
- **Impact on the character of the landscape:** The character of the landscape on farm Grootvallei is largely determined by the natural elements such as the vegetation cover and the topography. The establishment of a landfill site will firstly remove some of the vegetation cover on the site and for the access road and secondly alter the topography with the addition of a man-made landform. Both activities will impact on the landscape character on a local scale.

Site 5 has a different landscape character due to its proximity to the Matimba Power Station and the relatively high concentration of other infrastructure such as railway lines, roads, overhead power lines and conveyor belt systems. In addition, Site 5 was previously used as a landfill site. The landscape character is therefore more tolerant to absorb a land use such as a landfill site due to the existing impacts. Site 5 has managed to retain most of its natural vegetation, but is visually fragmented from greater areas with a natural character. The impact on the landscape character is anticipated to be less than on sites 1 - 4. It is important to mention that the impact on the character of the landscape will be permanent even after closure of the site. The impact may be reduced after rehabilitation.

- **Impact on viewers:** All the sites have a well established vegetation cover on them that will screen most surface disturbances from sensitive viewpoints. It is assumed that a sufficient visual buffer will be retained between the site and sensitive viewpoints. As it is unknown what the height of the landfill will be, it is premature to identify all the visual receptors (viewers) that may be affected. The most obvious receptors will be motorists passing the sites. This impact can be mitigated.

Visual and aesthetic impacts will also result from the construction activities of excavation, terracing of the landfill and transporting of materials. Detailed visual assessment will be undertaken during the EIA phase.

(c) Heritage

Construction activities such as clearing, grading, excavation could expose or damage features of heritage and cultural value beneath the surface. Although no significant heritage features were identified by the heritage specialist or are known to exist in the study area, mitigation measures included in the preliminary heritage report must be adhered to.

(d) Noise

The movement of machinery and vehicles will constitute an additional source of noise to the study area. However, this will be limited to the period of construction and mitigation can involve the use of equipment fitted with noise abatement technology (where possible) and the restriction of construction to certain days and times. A detailed noise impact assessment will be undertaken during the EIA phase, the potential impacts and the methodology and approach that will be used during the EIA is summarised in **Appendix C12**.

(e) Air Quality

The operational phase of the landfill is likely to result in the generation of landfill gases and pollutants that are classified as green house gases including methane, carbon dioxide, and trace constituents of non methane organic compounds. Smell associated with waste management activities is a consequence of the biological and chemical processes that occur during the decomposition of wastes.

Key issues and general potential environmental impacts likely to be associated with the construction and operation of the waste disposal facility are summarised in **Table 7.1**. It should be noted that the impacts identified in these Tables (in the next pages) are to be evaluated in the impact assessment phase of the project. This is due to the fact that some of the impacts are interrelated and are likely to have similar impacts on the environment.

**Table 7.1:** Evaluation of potential impacts associated with the **construction phase** of the proposed land fill site

<b>Issue</b>	<b>Nature of Impact</b>	<b>Extent of Impact</b>	<b>Potential Significance</b>	<b>'No go' areas</b>
Impact on vegetation associated with the construction of the waste disposal site	Loss of natural vegetation within the footprint of the land fill site	Local	Medium, Negative	To be confirmed during EIA phase
Impact on vegetation associated with associated infrastructure	Loss of vegetation in any areas where new roads and other infrastructure are required	Likely to be local, but depends largely on the final routing of any roads and powerline infrastructure.	Cannot be determined at this stage. This will be done in the impact assessment phase.	Cannot be assessed at this stage.
<b>Gaps in knowledge &amp; recommendations for further study:</b>				
<p>» An assessment of ecological impacts depends entirely on knowing exact development footprints. The project should prepare detailed infrastructure layouts for the EIA phase in order to allow for an accurate assessment of direct botanical impacts to be undertaken.</p> <p>» The specialist study to be undertaken in the EIA phase should assess local and regional impacts (direct and indirect), assess the need for possible biodiversity offsets, and make detailed mitigation suggestions for the planning, construction and operational stages. These recommendations should be included within the construction and operational phase EMPs. Further ecological assessment is required at the EIA stage, except for those areas not previously surveyed.</p>				
Impact on fauna during excavation activities	Direct mortality of species that cannot effectively vacate the affected areas by themselves during the construction phase of the land fill site, e.g. invertebrates, tortoises, burrowing lizards and burrowing mammals.	Local as a relatively small area would be affected.	Medium, Negative	None identified
Impact on fauna	Destruction of threatened, protected and "near-threatened" flora and fauna species including habitat suitable for the occurrence of such taxa	Local as a relatively small area would be affected	Medium, Negative	To be confirmed during the EIA phase

**Gaps in knowledge & recommendations for further study:**

- » The absence of Red Data species on the proposed site needs to be confirmed.
- » Once the specific construction footprint for the establishment of the land fill site, access roads, substation and powerline have been delineated within the site, it will be important to conduct a ground survey of the terrestrial fauna present on the site, specifically to ascertain whether any of the Red Data species that potentially occur in the study area, are in fact present on the site. This information is needed to finalise the significance rating of potential impacts associated with the land fill site, in particular that of direct mortality and habitat loss. The survey also needs to identify areas within the proposed site that may be more sensitive than other parts in terms of animal occupation.
- » Detailed impact assessment on fauna to be undertaken in EIA phase.

Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
Impacts on birds by land fill site and associated infrastructure	Disturbance of birds potentially impacting on all species in the area, particularly if breeding in the area.	Local. Site itself and the surrounding area.	Medium, negative.	Birds species habitats will be confirmed during the EIA phase
Impacts on birds by land fill site and associated infrastructure	Destruction of habitat. Waste sites will attract birds on to the site, potentially impacting on all species in the area.	Local. Restricted to the affected site.	Medium, negative.	Birds species habitats will be confirmed during the EIA phase
<p><b>Gaps in knowledge &amp; recommendations for further study:</b></p> <ul style="list-style-type: none"> <li>» The presence/location of non-perennial pans (potential habitats for birds) on the site will need to be investigated further during the EIA phase, and the significance of these pans will be assessed. Where possible the landfill site and/or powerlines should be sited away from these pans (and any other sources of water), although these areas are not absolute "no go" areas.</li> <li>» Detailed impact assessment on avifauna to be undertaken in EIA phase.</li> </ul>				
Surface modification	Excavation of foundations for project related infrastructure (e.g. access roads, s underground cables & powerline towers)	Local. Restricted to sites selected for the construction & installation of infrastructure.	Low, negative	None identified

Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
Soil Erosion	Accelerated aeolian sediment transport possibly leading to the development of deflation hollows. Accelerated fluvial sediment transport and hence erosion associated with overland flow. A loss of vegetation (or other) cover will increase the susceptibility of sediments to wind erosion.	Local	Low, negative.	Unvegetated areas represent a high erosion risk and should be avoided for the siting of infrastructure wherever possible. Alternatively, strict mitigation will be required on site to address erosion concerns.
<b>Gaps in knowledge &amp; recommendations for further study:</b>				
<ul style="list-style-type: none"> <li>» Areas that may be classified as unvegetated will need to be assessed during the site visit for the specialist study, in the EIA phase of the assessment process.</li> <li>» Steep slopes susceptible to slope failure, rock fall or that represent a very high erosion risk do not appear to be present with the area selected for the siting of the land fill site. The absence of such areas within the all areas potentially affected by project related infrastructure will require confirmation during the site visit for the specialist study, in the EIA phase of the assessment process.</li> <li>» Site-specific information is required to establish the various on-site parameters associated with soil erosion in the study area. Data of interest in this regard includes the mechanisms of erosion taking place, the various soil environments within which the erosion takes place, the significance of erosion should it continue unabated and whether such erosion is natural or a function of anthropogenic disturbance.</li> </ul>				
Wetland loss	A reduction in the surface area of wetlands e.g. (pans) in the study area as a result of the construction of roads, tracks or other infrastructure in wetlands.	National	High, negative; since South Africa is a signatory to the Ramsar Convention, implying wise use of wetland resources should be encouraged. This would exclude the loss or degradation of wetland areas.	Detailed assessment to be undertaken during the EIA phase should such ecosystems be identified by the ecological specialists.
<b>Gaps in knowledge &amp; recommendations for further study:</b>				
<ul style="list-style-type: none"> <li>» No significant surface water resources have been observed in Site 5, should wetlands be noted during the ecological assessment on site 5, a wetland specialists will be appointed to investigate such ecological systems.</li> </ul>				
Impacts on pre-colonial archaeological sites	Physical disturbance of the material itself and its context affecting their significance.	Local. Footprint of the development is yet to be confirmed	Undetermined at this stage.	None identified at this stage.



Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
Impacts on colonial period heritage sites	Discovery of cultural and heritage artefacts beneath the earth surface	Local, development footprint is yet to be confirmed.	Low, Negative	None identified at this stage
Impacts on cultural landscape and sense of place				
<b>Gaps in knowledge &amp; recommendations for further study:</b>				
<ul style="list-style-type: none"> <li>» The EIA for the proposed activity will require a detailed physical survey of the study area so that the locations of visible generally protected heritage can be recorded and the layout of the development adjusted, where necessary.</li> <li>» Detailed heritage impact assessment to be undertaken in the EIA Phase.</li> <li>» The environmental management plan may need to include follow up heritage work such as monitoring of excavations or archaeological sampling.</li> </ul>				
<b>Gaps in knowledge &amp; recommendations for further study:</b>				
<ul style="list-style-type: none"> <li>» The power and ability of the transport vehicles to traverse various gradients with abnormal loads need to be determined prior to designing the alignment of the internal service roads.</li> </ul>				
Impact on road pavement structure	Roads must accommodate construction vehicles coming in and out of site during construction	Local	Low, Negative	None identified at this stage

<b>Gaps in knowledge &amp; recommendations for further study:</b>				
» Further investigation of the need for regular grading of gravel roads and the possibility of considering formalising the main local access to an asphalt surface, provided the existing pavement structure is adequate, will be required.				
» Detailed pavement design required to be undertaken by project proponent.				
<b>Issue</b>	<b>Nature of Impact</b>	<b>Extent of Impact</b>	<b>Potential Significance</b>	<b>'No go' areas</b>
Working platform	To achieve smooth 'flat' gradients may require significant cut & fill earthworks. A large area needs to be cleared, levelled & compacted resulting in localised disturbance.	Confined to the internal study area.	May result in extensive disturbance of the site.	Extent of the impact could be reduced if part of the laydown area lies over the new service road alignment.
External road works	Likely to be road widening & corners of intersections, removal of traffic islands & replaced with road pavement structure, relocation of street furniture, installation of temporary support to culverts & canal crossings, vertical re-alignment of existing road to accommodate clearance of low-bed trailers & horizontal re-alignment of tight bends to accommodate 45m blade trailers.	Likely to be localised	Very significant to comply with the likely Permit conditions requirements.	None identified
» Design Engineering design must design roads to accommodate anticipated traffic flow and cater for safety during construction phase				
<b>Issue</b>	<b>Nature of Impact</b>	<b>Extent of Impact</b>	<b>Potential Significance</b>	<b>'No go' areas</b>
Construction of bitumen-based hard surfaces and roads	Phenol contamination of groundwater resource.	Local	Low, negative.	To be identified
Storage of diesel fuel for construction equipment	Volatile organic compound and diesel contamination of groundwater resource.	Local	Low, negative.	To be identified
On-site sanitation facilities for construction personnel	Bacteriological contamination of groundwater resource.	Local	Low, negative.	To be identified

<b>Gaps in knowledge &amp; recommendations for further study:</b>				
» Design Engineers must take in cognisance the recommendations of the geohydrological specialists when designing layout and location of onsite facilities				
Noise impacts	On-site construction noise associated with the establishment of the land fill site.	Local Impact restricted to employers at Matimba Power Station and neighbouring industries.	Medium, negative. Land surrounding the proposed site largely uninhabited, other than Matimba Power Station workers therefore on-site construction noise would not impact on receptors other than at Matimba Power Station.	To be confirmed during EIA phase
Noise impacts	Upgrading of existing gravel road to the land fill site.	Local	Cannot be determined at this stage.	None identified

Issue	Nature of Impact	Extent of Impact	Potential Significance	'No go' areas
Noise impacts	Truck movement to the site during construction.	Local It is assumed that construction and transportation vehicles to the site will travel through the towns	Cannot be determined at this stage.	None identified
<b>Gaps in knowledge &amp; recommendations for further study:</b>				
» Potential impacts of noise associated with the construction activities must be considered in more detail within the EIA phase in accordance with procedures contained in SANS 10328.				
Impacts on the social environment	Potential up & down-stream economic opportunities for the local, regional and national economy.	Local, regional and national	Cannot be determined at this stage.	N/A
Impacts on the social environment	Job & business creation opportunities.	Local	Cannot be determined at this stage.	N/A
Impacts on the social environment	Influx of job seekers into the area. The influx of job seekers may result in an increase in sexually transmitted diseases, including HIV/AIDS; increase in prostitution; increase in alcohol & drug related incidents; increase in crime; & creation of tension & conflict in the community.	Local and regional	Cannot be determined at this stage.	N/A
Impacts on the social environment	Impacts on people residing in close proximity to the site	Local. Impact restricted to residents at Skaapvlei.	Cannot be determined at this stage.	N/A
Impacts on the social environment	Threat to farm safety due to increased number of people in the area and construction workers.	Local	Cannot be determined at this stage	N/A
<b>Gaps in knowledge &amp; recommendations for further study:</b>				
» Assessment of impacts such as safety and security issues, dust and noise; damage to roads caused by heavy vehicles.				
» A detailed public consultation process will be undertaken during the EIA phase of the project. The consultation process for the SIA will be separate to the consultation process for the EIA. In this regard the consultation process for the SIA will focus on one-on-one interviews with key stakeholders and, where necessary, workshops and meetings with community representatives.				

Tourism potential	Potential impacts on the strategic tourism direction of the area.	Regional	Low to none
<b>Gaps in knowledge &amp; recommendations for further study:</b>			
» The detailed tourism impacts during the construction phase of the project should be further investigated during the EIA stage.			
» Such site-specific potential negative impacts to be further investigated may include visual impacts, noise impacts, and physical impacts.			

Aspects identified which should inform project planning and designs associated with the conditions on site which may impact on construction are detailed in **Table 7.2** below.

**Table 7.2:** Aspects identified to inform project planning and design (associated with the conditions on site) which may impact on construction

Aspect	Potential Issue	Gaps in knowledge & recommendations for further study
Water Resources	Contamination of ground water and surface water by leachate generated from landfill site Contamination of downstream water resources by surface runoff	Potential sources of underground water resource contamination and the status of water balance yet to be determine during the EIA Phase

**Table 7.3:** Evaluation of potential impacts associated with the **operational phase** of the land fill site

<b>Issue</b>	<b>Nature of Impact</b>	<b>Extent of Impact</b>	<b>Potential Significance</b>
Visual impact	Impact on the sense of place, change character of landscape and impact on viewers	Localised, developments footprint and size (heights) are yet to be confirmed	Unightly construction practices can cause unnecessary visual impacts
<b>Gaps in knowledge &amp; recommendations for further study:</b>			
<p>» Additional spatial analyses must be undertaken in order to create a visual impact index that will further aid in determining potential areas of visual impact. This exercise should be undertaken for the core land fill site as well as the ancillary infrastructure, as these (access road, and distribution line) are envisaged to have varying levels of visual impact at a more localised scale. Site-specific issues and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact. Consider the visual impacts of the land fill site from all relevant viewing angles when considering locations of land fill site and infrastructure.</p> <p>»</p>			
<b>Issue</b>	<b>Nature of Impact</b>	<b>Extent of Impact</b>	<b>Potential Significance</b>
Impacts on fauna	Loss of animal habitat if the design does not take into accounts sensitive environments	Cannot be determined at this stage	To be confirmed during EIA phase
Impacts on fauna	Pollution of surface water resources/depression (leachate and storm water) which are important breeding spots for faunal community	Cannot be determined at this stage	To be confirmed during EIA phase

<b>Gaps in knowledge &amp; recommendations for further study:</b>			
» Keeping small to large mammals out of the land fill site after the construction phase is a question that needs to be addressed and will depend on the extent of remaining natural habitat present within the terrain. Small mammal predators may be necessary to keep rodent populations within the site under control.			
» Detailed impact assessment on fauna to be undertaken in EIA phase.			
<b>Issue</b>	<b>Nature of Impact</b>	<b>Extent of Impact</b>	<b>Potential Significance</b>
Impacts on birds	Disturbance of birds. Potentially impacting on all species in the area, particularly if breeding in the area.	Local Site itself and the surrounding area Powerline & access road servitude and the surrounding area.	Low to Medium, negative
Impacts on birds	Destruction of habitat. Potentially impacting on all species in the area.	Local Site itself Powerline and access road servitude.	Low to Medium, negative
Impacts on birds associated with the land fill site	Species such as the raptors and smaller ground dwelling species such as larks are likely to be affected, although extent is unknown.	Land fill sites	Medium, negative
Impacts on birds associated with powerline infrastructure	Collision of birds with 132kV powerline	Site of power line	Medium, negative
Impacts on birds associated with powerline infrastructure	Electrocution of birds on 132kV powerline	Site of power line	Dependant on tower structure
Impact on infrastructure associated with birds	Impact of birds on quality of supply of 132kV powerline	Site of power line	Low, negative
<b>Gaps in knowledge &amp; recommendations for further study:</b>			
» Issues identified will must investigated in more detail during the EIA phase in a detailed avifauna impact assessment. In particular the significance of bird collisions with the powerlines and other newly introduced infrastructures must be assessed in order to determine whether the risk warrants mitigation. The result of the EIA phase will be a more detailed assessment of all impacts, recommended mitigation where necessary, and a monitoring programme.			

Issue	Nature of Impact	Extent of Impact	Potential Significance
Electricity substation transformer oils	PCBs (Polychlorinated biphenyls) Volatile organic compound contamination of groundwater resources.	Site and immediate surroundings	Low, negative
Landscaping and gardening	Pesticide and nitrate contamination	Local	Low, negative
<b>Gaps in knowledge &amp; recommendations for further study:</b>			
» Impacts can be managed, and will be addressed in the EMP. No further hydro geological studies of the site are considered necessary.			
Agricultural potential	Impacts on agricultural potential/loss of agricultural land	Local, location of proposed development and footprint are yet to be confirmed	Low, negative Mainly due to low potential of area, as well as 'localised' nature of infrastructure.
<b>Gaps in knowledge &amp; recommendations for further study:</b>			
» From the point of view of soils and agricultural potential, there is little scope for arable agriculture or anything other than very extensive grazing. For this reason, it is not anticipated that a more detailed soil survey will be required for the EIA phase of the project.			
Issue	Nature of Impact	Extent of Impact	Potential Significance
Increased runoff	Increased surface runoff from sealed surfaces (e.g. tarred/concrete roads, roofs) relative to the undisturbed reference state.	Local	Low, negative
Sediment deposition	Deposition of sediment by aeolian processes adjacent to or within infrastructure (e.g. substation or visitor's centre building).	Local	Moderate, negative
Sediment transport	Preferential aeolian erosion of sediment adjacent to structures and subsequent subsidence. The winnowing affect associated with local flow modification caused by structures may lead to subsidence if these structures are undercut.	Local	Low, negative



Issue	Nature of Impact	Extent of Impact	Potential Significance
Weathering	Sandblasting of structures leading to increased maintenance requirements. Loss of cement integrity due to the presence of hazardous soils. Rapid corrosion of metal infrastructure and hence increased maintenance costs.	Local	Low to high <sup>1</sup> , negative
<p><b>Gaps in knowledge &amp; recommendations for further study:</b></p> <ul style="list-style-type: none"> <li>» Provide a description of the Regional Geomorphic Setting (e.g. climate, geology, topography) of the potentially affected environment (viz. the powerline corridor and area selected for the siting of the land fill site).</li> <li>» Provide a map to indicate the area covered by landforms sensitive to development (e.g. pans and drainage lines).</li> <li>» Describe and indicate on a map any geosites of significance that require management.</li> <li>» Assess the current state of the landscape in relation to geomorphological indicators of rangeland condition.</li> <li>» Assess potential projected related impacts listed in this report with a significance rating of low or greater. If applicable, identify other impacts that may not have been identified and assess them in the same way.</li> <li>» Propose means to avoid mitigate or offset potential project -related impacts.</li> <li>» Provide a description of assumptions, limitations and gaps in knowledge where applicable.</li> </ul>			
Noise impacts	Noise impacts associated with the operation of the land fill site (spreading and compacting of waste, placement of soil cover over the waste on daily basis, movement of vehicles on site).	Local	Low, negative
Noise impacts	Low-frequency noise impact. Impact might be considered intrusive.	Local	Low, negative

<sup>1</sup> Hazardous soils in this context refer to acid sulphate soils, gypsiferous soils and saline soils. It is assumed that these aspects will be investigated in a geotechnical study that will be undertaken outside of the EIA process.

<b>Gaps in knowledge &amp; recommendations for further study:</b>			
» Potential impacts of noise associated with the operation activities must be considered in more detail within the EIA phase in accordance with procedures contained in SANS 10328.			
<b>Issue</b>	<b>Nature of Impact</b>	<b>Extent of Impact</b>	<b>Potential Significance</b>
Tourism potential	Potential impacts on the strategic tourism direction of the area.	Regional	Low to none
Tourism potential	Potential impacts on tourism market demand.	Local	Low to none; or positive Once the land fill site has been completed, it may become a drawcard the municipality
Tourism potential	Potential positive tourism impacts. The proposed land fill site could become a major attraction in the area, should it be accompanied by high quality interpretation facilities.	Local	Not determined at this stage.
<b>Gaps in knowledge &amp; recommendations for further study:</b>			
» The detailed tourism impacts) during the construction phase and ii) during the operations phase of the project should be further investigated during the EIA stage.			
» Such site-specific potential negative impacts to be further investigated may include visual impacts, noise impacts, physical impacts, and positive impacts associated with economic growth and improvements in the site setting and surrounds.			
» More specifically tourism inputs during the detailed phase should include:			
<ul style="list-style-type: none"> <li>• A more detailed analyses of extent and significance of the potential tourism impacts of the facility and the related road and powerline infrastructures, taking into account the results of specialist studies pertaining to visual, noise and other potential impacts during the various phases of the project;</li> <li>• Analysis and investigation of the properties and potential mitigation measures to improve the site and surrounds from a tourism perspective and the extent and significance of such measures;</li> <li>• Further consultation with tourism role-players to ascertain their views and potential level of involvement in the project</li> </ul>			
Impacts on the social environment	Potential up & down-stream economic opportunities for the local, regional and national economy.	Local, regional and national	Cannot be determined at this stage
Impacts on the social environment	Job & business creation opportunities.	Local.	Cannot be determined at this stage
Impacts on the social environment	Creation of potential opportunities to support local communities, including education & raining, & community based projects and programmes.	Local and regional	Cannot be determined at this stage
Impacts on the social environment	Impact on property prices.	Local	Cannot be determined at this stage

Impacts on the social environment	Impact on rural sense of place (closely linked to the visual impacts).	Local	Cannot be determined at this stage
Impacts on the social environment	Impacts on people residing in close proximity to the site.	Local Impact restricted to residents in close proximity to the site.	Cannot be determined at this stage
Impacts on the social environment	Threat to farm safety due to increased number of people in the area and construction workers.	Local.	Cannot be determined at this stage
<b>Gaps in knowledge &amp; recommendations for further study:</b>			
» A detailed public consultation process will be undertaken during the EIA phase of the project. The consultation process for the SIA will be separate to the consultation process for the EIA. In this regard the consultation process for the SIA will focus on one-on-one interviews with key stakeholders and, where necessary, workshops and meetings with community representatives.			

Upon completion of the scoping phase, the preferred site was identified as being located within the boundaries of Matimba Power Station (Site 5). Although the screening and scoping processes and preliminary investigations by specialists focused on all five sites, it is the recommendation of this Scoping Report that further investigations be undertaken in Site 5 as this was the site that was chosen as the most suitable by all specialists. It should be noted that Site 5 is approximately 17 hectares and Eskom will require authorisation for the entire site. Three alternatives will be identified within this site and will be subject to investigation by various specialists during the EIA phase. Further detailed information and investigation in respect of Site 5 will be provided during the EIA phase.

### 7.3 Specialist Studies and Support Team for the EIA Phase

As already been mentioned, a number of preliminary investigations by specialists have already been undertaken during the site selection process. Issues and impacts identified during the Screening and Scoping Phases will be further assessed during the EIA Phase by the various specialists that have been appointed for the project. The full terms of reference for these specialist investigations to be undertaken are briefly included in the Specialists Scoping Reports (**Appendix C**) and the Plan of Study for EIA (**Chapter 8**). These studies include:

- **Agricultural Potential** – A study will be undertaken by Mr. Garry Patterson of Agricultural Research Council. The study will be based on an assessment of soil characteristics of the area.
- **Air Quality** – Gondwana Environmental Solutions will provide a detailed Air quality impacts during the EIA Phase.
- **Ecology (Flora, Fauna & Avifauna)** – This study will focus on assessing the potential impacts of the flora, fauna and avifauna habitats. Mr. Lukas Niemand of Pachnoda Consulting cc will undertake the study. Sensitivity mapping of areas that are likely to be affected will be provided.
- **Engineering Studies** – PD Naidoo and Associates has been appointed to provide the design work for the proposed development. Ms. Shenaz Moola and Mr. John McCall will be involved throughout the EIA to advise on issues pertaining project planning and design in order to reduce the risk of unexpected costs and delays later in the EIA process.
- **Geographic Information Systems** – Mr. Stephen Townshend of MetroGIS in consultation with specialists that are involved in the project will assist in the generation of maps, including sensitivity maps. He is also expected to update maps as per the specialists' findings.
- **Geotechnical Assessment** - A detailed geotechnical evaluation will be carried out by Mr. Brian Harrison of In Roads Consulting. Desktop analysis of the soils and geology of the area will also be provided.
- **Geohydrological Assessment** – Mr. Andy Schulze-Hulbe of Blue Rock Consulting will undertake the geohydrological assessment to assess the potential of ground water contamination from the landfill and the Hazardous Waste Storage Facility.
- **Heritage Impact Assessment** – A cultural and archaeological assessment has been undertaken by Mr. Frans Prins of Strategic Environmental Focus. SAHRA and the National Cultural History Museum requirements have been taken into account during the assessment.
- **Land use and Proclamation** – Envirolution Consulting has appointed Mr. Tinus Erasmus of CTE Consulting to undertake Rezoning Applications should these be required for the project.
- **Legal Reviewer** – Mr. Nicolai Massyn of Green Gain Consulting has been appointed to conduct a legal investigation of all other relevant legal requirements that fall outside of the EIA as well as provide legal opinion to the project.

- **Noise Impact Assessment** – Mr. John Hassall of JH Consulting will undertake the Noise Assessment for the area. Mr, Hassall will consider the baseline noise conditions in the area and model the potential cumulative impacts of noise associated with landfill during construction and operation.
- **Peer Reviewer** – Mr. Reuben Heydenrych and Ms Jaana-Maria Ball of Arcus GIBB will undertake a review of the quality, comprehensiveness and objectivity of the process and outputs of the environmental assessment. The reviewer will consider review criteria as deemed appropriate by the national and provincial environmental authorities.
- **Social Impact Assessment** – Ms Ilse Aucamp of PTERSA will undertake a detailed Social Impact Assessment for the proposed development. It has been highlighted in the preliminary social impact assessment report that *“the community in the Lephalale area are being bombarded with environmental authorisation processes, and symptoms of stakeholder fatigue have been reported by environmental consultants operating in the area”*. Taking this into consideration, Envirolution Consulting will attempt to align all the public consultation process with the social assessment public consultation.
- **Surface Water Resources and Wetland Assessment** – The assessment of the potential wetland environment was undertaken by Mr. Bhuti Dlamini of Wetland Consulting. No further studies are anticipated to be undertaken during the Impact Assessment phase as no sensitivities were identified in Site 5. Should sensitivities related to wetlands be identified by the ecological specialist during the Impact Assessment phase, a specialist wetland input will be sourced.
- **Transportation and Traffic Impact Assessment** –Mr. Brian Roberts and Mr. Naye Miya of PDNA will undertake the Traffic assessment associated with the development of the landfill site and the Hazardous Waste Storage Facility.
- **Visual Impact Assessment** – Mr. Mader van der Berg and Mr. Stefan Du Toit will undertake the Visual impact Assessment to determine the impacts of the proposed development on the surrounding environment.

All of these specialist studies will consist of an impact evaluation and assessment of the significance of impacts. The specialists will be required to use the same assessment methodology in order to ensure consistency in the assessment.

## 8 CHAPTER 8

## PLAN OF STUDY FOR EIA

The proposed construction of the landfill and hazardous waste storage facility requires an EIA in accordance with the EIA Regulations, 2006. The EIA follows the preparation of a Scoping Report; the purpose of which was to identify the range of environmental impacts that may be associated with the proposed activity, alternatives, and the focus of the EIA. This section presents the proposed approach to the EIA for the proposed construction of the landfill and the hazardous waste storage facility has been structured as per Section 28(1)(i) of the GNR No. 387 of 2006.

The specific objectives of the EIA Phase shall be to:

- » Continue to consult with and inform all relevant stakeholders and Interested and Affected Parties (I&APs);
- » Compare the various project alternatives;
- » Investigate salient environmental issues and their related impacts through specialist studies; and
- » Assess the identified impacts and recommend appropriate mitigation measures for proposed activity.

### 8.1 Key findings of the Scoping Phase

A number of potential positive and negative impacts of the project were identified in Site 5 during the Scoping Phase. **Table 8.1** summarises the environmental issues relating to the construction of the proposed landfill and temporary hazardous waste storage facility that have been identified as being important and were investigated in the Scoping Study. Detailed assessment and evaluation of the identified impacts will be undertaken during the Impact Assessment Phase.

**Table 8.1.** Potential positive and negative impacts of the project were identified

Impacted Environment		Significance	
		Without Mitigation	With Mitigation
Biophysical	Geology and soils	Moderate	Low
	Agric potential	Low	Low
	Surface water resources & Wetlands	Moderate	Low
	Flora	Moderate	Low
	Fauna	Moderate	Low
	Avifauna	Moderate	Low
Environmental Quality	Air quality	Moderate	Low
	Land use	Low	Low
	Visual	Low	Moderate
	Noise	Moderate	Low
	Employment	Positive	Positive
Social	Heritage	Moderate	Low
	Roads and Traffic	Moderate	Low

The identification of the impacts is based on the results and conclusions of the Scoping Report and following aspects:

- » The legislative requirements;
- » The nature of the proposed activity;
- » The nature of the receiving environment ; and
- » Issues and concerns raised during the PPP.

It is proposed that studies of the significant impacts which have been identified in this scoping study be further assessed according to nature, probability, duration, extent and intensity during the EIA Phase. Specialist studies that will be undertaken (other than those already identified) during the Impact Assessment phase are outlined in **Section 7** of this report. It is our understanding that the DEAT may advise on the studies that it deems necessary during the EIA phase in order to assist with the development of an understanding of further potential impacts of the proposed development on the environments. It is further understood that should the DEAT require a specialist study (that has not been included in Section 9 (Plan of Study of this report) to be undertaken, it will provide adequate reasoning for this additional study.

The results of the specialist studies will be analysed and interpreted in order to assess the potential impacts of the proposed development on the environment. The results will further assist in the determination of the mitigation measures in order to minimise negative impacts and optimise positive impacts. Specialists' recommendations will be incorporated in the Environmental Management Plan (EMP). Each of the specialist reports will be attached to the EIR produced during the EIA Phase.

## 8.2 EIA 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. The assessment endeavours to identify activities, which require certain environmental management actions to mitigate the impacts arising from them. The criteria against which the activities were assessed are given in the next section.

### **8.2.1 Assessment Criteria**

The assessment of the impacts has been conducted according to a synthesis of criteria required by the guideline documents in terms of the NEMA EIA regulations of 2006.

**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 proposed base.

**l) 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? These are 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 to the environment will be listed in a table similar to the example shown below. The assessment criteria used in the table 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 as prescribed in the example impact **Table 8.2**.

**8.2.2 Impact Table**

**Table 8.2:** An **example** of an Impact Assessment Table that will be used to evaluate impacts during the EIA phase

Development Phase	Impact: Pollution						
	Nature of Impact	Extent	Duration	Intensity	Probability	Significance	
						-Reversibility of impact (1) -Irreplaceable loss of resource (2) -Can impacts be mitigated (3)	
						WM	WOM
Pre-construction	Pro-active planning	Site	Medium	Positive high	Probable	Low	Medium-
Construction	Increased: Water pollution	Regional	Medium	Low	Probable	Low	Medium
	Air pollution	Site	Medium	Low	Probable	Low	Medium
	Noise pollution	Site	Medium	Low	Probable	Low	Medium
	Visual pollution	Site	Medium	Low	Probable	Low	Medium
Operation	Noise	Regional	Long	Medium High	Probable	Low	Medium High

**WM** = With mitigation **WOM** = Without mitigation

**8.3 Terms of Reference (ToR) for Specialists and requirements for the EIA Phase**

The General ToR discussed in this section may not apply equally to all specialists but are included to provide a comprehensive guideline.

**8.3.1 Approach to the Study**

Each specialist is to provide an outline of the approach used in the study. Assumptions, limitations and sources of information must also be clearly identified. The knowledge of local people should, where possible, be incorporated in the study. The description of the approach shall include a short discussion of the appropriateness of the methods used in the specialist study. The assessment of the data shall, where possible, be based on accepted scientific

techniques, failing which the specialist is to make judgments based on professional expertise and experience.

### **8.3.2 Description of the Affected Environment or Baseline Condition**

Each specialist is expected to provide a description of the affected environment, both at a site-specific level and for the wider region, and should be contextualised. The description must be relevant to the specialist's field of expertise. It is essential that the uniqueness or irreplaceability of the site be understood in the context of the surrounding region at a local, regional (and, if necessary, national) scale. This will largely be based on a comparison to existing data sources, where available.

The specialist must also provide an indication of the sensitivity of the affected environment. Sensitivity will refer to the 'ability' of an affected environment to tolerate disturbance (given existing cumulative impacts).

Each specialist must provide a clear description of the existing environment in the study area to ensure that a detailed assessment of the potential impacts of the landfill can be made. The baseline should include data collected through a thorough literature review as well as field surveys.

### **8.3.3 Impact Identification and Assessment**

Clear statements identifying the potential environmental impacts of the proposed project must be presented in all specialists report. This should include potential impacts for the construction, operation and closure phases of the project. The specialist shall clearly identify the suite of potential direct, indirect and cumulative environmental impacts in his/her study. Direct impacts require a quantitative assessment which must follow the impact assessment methodology laid out in **Section 8.2.1**. The significance of impacts must be assessed both without and with mitigation. Indirect and cumulative impacts should be described qualitatively.

The specialist shall assess environmental impacts and also indicate any fatal flaws, i.e. very significant adverse environmental impacts which cannot be mitigated and which will jeopardise the project and/or activities in a particular area (if appropriate). Note that all conclusions will need to be thoroughly backed up by scientific evidence (where available) or specialist opinion.

### **8.3.4 Mitigation Measures**

Specialists must recommend practicable mitigation measures or management actions that effectively minimise or eliminate negative impacts and enhance beneficial impacts. Should further studies be required before or after the conclusion of the EIA, specialists must provide a clear justification why the studies should be undertaken. Specialists are also required to recommend appropriate monitoring and review programmes to track the efficacy of mitigation measures (if appropriate).

### **8.3.5 Specialists studies**

The following specialist studies will be commissioned during the Impact Assessment phase:

#### **(a) Ecological Assessment**

Mr. Lukas Niemand of Pachnoda Consulting cc will undertake the ecological specialist study. The scope of work for the Specialist Ecological Assessment for proposed construction of landfill and the associated hazardous waste storage facility will include but not be limited to the following:

##### **Vegetation Assessment:**

- » Provide a description of the general floristic species diversity and community composition;
- » Evaluate the occurrence of potential Red Data taxa;
- » Map the occurrence of protected tree species on the site;
- » Demarcate physiognomic units based on floristic relevès; and
- » Provide an indication on the ecological condition (successional stage) of the predetermined physiognomic units.

##### **Fauna:**

- » Provide a description of the general faunal species diversity (including mammals, small mammals, birds, epigaeic invertebrates and herpetofauna) based on accepted scientific methods (e.g. trapping methods);
- » Evaluate the probability of occurrence of Red Data faunal species pertaining to the various habitat types; and
- » Provide a description of faunal assemblages, based on species composition and habitat characteristics.

##### **Ecology:**

- » Assess the nature and extent of the potential impacts on the ecological integrity of the study area;
- » Compile sensitivity maps, highlighting areas of particular concern; and
- » Propose mitigation measures, where possible, to mitigate potential adverse impacts.

On the basis of such a detailed assessment it would be possible to make pertinent and detailed recommendations in order to prevent impacts of an unacceptable nature on ecological attributes.

#### **(b) Geohydrological Assessment**

Mr. Andy Schulze-Hulbe of Blue Rock Consulting will undertake the geohydrological assessment to assess the potential of ground water contamination from the waste disposal site. The aim of the additional geohydrological work for this phase of the investigation will be three fold and will include the following tasks:

- » Clarify the groundwater flow and the likely migration of a pollution plume around Site 5 and determine the groundwater conditions to the north of the existing dump site.
- » Establish a more comprehensive groundwater monitoring system around the entire Site 5.
- » Determine the hydrological properties of the soils that cover the bedrock in the northern sector of Site 5.

The work will involve the following:

- » Detailed investigation of all geological and geohydrological information available for the area.
- » Geophysical survey (electrical resistivity and residual magnetic surveys) of the entire Site 5 to identify potential deep fracture zones and faults that will act as groundwater aquifers. Subcontractors will carry out the work.
- » Rotary percussion-drilling programme to verify the presence of any aquifers. Subcontractors will carry out the fieldwork.
- » Test the yield, storativity and transmissivity of these aquifers. Subcontractors will carry out the fieldwork.
- » Determine the groundwater quality of these aquifers.
- » Establish of a groundwater monitoring system for the site that is based on this information.
- » Determine the geohydrological properties of the soils (permeability etc.) in the area. This work will be carried out in conjunction with the geotechnical field investigation. Soil profiles exposed in test pits will be examined and insitu permeability tests will be carried out. Samples will be collected for laboratory testing.
- » Data analyses of information collected during the field investigations will be undertaken.
- » Discussion of preliminary findings with other relevant team members during progress meetings.
- » Presentation of data on maps and compilation a report on each of the three sites; and
- » Presentation of data at meeting and finalise report.

### **(c) Geotechnical Assessment**

Mr. Brian Harrison of In Roads Consulting will provide the Geotechnical Assessment of the area. The scope of work for the Specialist Geotechnical Assessment for proposed development will include but not limited to the following:

Investigation of impacts such as the geological setting in terms of the stratigraphy and lithology, depth to bedrock, quality and quantity of availability cover material, nature, extent and engineering properties of surface transported and residual soil. Excavation characteristics of near surface material and the founding conditions will be undertaken during the Impact Assessment phase.

A more detailed geotechnical evaluation will be carried out, entailing exploration. The principal objectives of this exploration phase will be to:

- » Determine the geological structure of the site, including the thickness, sequence and extent of the underlying strata.
- » Determine shallow groundwater conditions.
- » Obtain disturbed and undisturbed samples for identification and laboratory testing.
- » Carry out tests to determine the mechanical properties of the soil in-situ.

This investigation will be undertaken in two phases described below.

- Phase 1 (Geotechnical Assessment)

The extent and depth of the investigation will depend on both the nature and variability of the soil strata and the form and extent of the works. As a minimum, it is proposed that trial pits be excavated at between 100 and 200 m apart.

The trial pits will be put down by means of a TLB backactor excavator and they will be logged and sampled in accordance with standard methods and procedures. It is proposed that undisturbed block samples are recovered for laboratory testing purposes, from which settlement, permeability and bearing capacity analyses will be computed. Large disturbed samples will similarly be recovered from the trial pits for the purpose of providing design information for the subsurface services, capping material, terracing and road layer works.

Typical laboratory tests will include in-situ moisture content, dry density, particle size distribution, Atterberg limit determinations and linear shrinkage tests, modified AASHTO compaction, consolidometer, permeability and shear strength tests such as drained shear box.

Once excavated, profiled and sampled the test pits will be co-ordinated with a hand held GPS after which they will backfilled.

- Phase 2 (Geotechnical Assessment)

The assessment would entail carrying out a detailed subsurface exploration investigation at the selected site to supplement the information obtained during Phase 1, and for which detailed design is required. Ideally some firm indication as to the layout of the various components making up the development should be finalised at this stage of the investigation.

Unless encountered in the test pits, it is proposed that boreholes are drilled to depths sufficient to penetrate all relevant strata, including bedrock. It is proposed that the soil horizons are penetrated using the rotary coring technique in conjunction with Standard Penetration Tests (SPT), carried out at 1,5m intervals. Rock and very dense, or stiff, material will also be recovered by means of rotary core drilling, employing the triple tube core barrel for full core recovery.

Depending on site conditions, other exploration and in-situ testing techniques may be employed, such as falling head permeability tests. All boreholes will be logged in accordance with standard

methods and procedures and standpipe piezometers will be installed and monitored for groundwater level fluctuations.

Additional trial pits may also have to be excavated in some areas. However, depending on the outcome of Phase 1, it will not be possible to provide a detailed description of the extent of this Phase, but it is estimated that at least 3 boreholes will be drilled within the site.

Upon completing the investigation a report will be prepared providing the test results and logs of the boreholes and trial pits, together with recommendations for the landfill and hazardous waste sites and other facilities such as foundations to structures and infrastructure services.

#### **(d) Agricultural Potential**

Mr. Garry Paterson of Agricultural Research Council was appointed to undertake an agricultural assessment study. The scope of work for the Specialist Agricultural Assessment for proposed development will include but not limited to the following:

- » Undertake fieldwork which will include the collection of samples that will be taken for laboratory analysis (if necessary);
- » Undertake a desk top study using ARCGIS;
- » Identify of the land capability issues including potential agricultural areas for each proposed route;
- » Collect representative soil samples for analysis;
- » Produce map showing broad areas;
- » Produce report detailing all methodology, soil characteristics, agricultural potential, significance of impacts etc.
- » Identify the soils and to produce a soil map of the specified area as well as
- » Determine agricultural soil potential and soil characteristics.

#### **(e) Visual Impact Assessment**

The Specialist Visual Impact Assessment will be undertaken by Mr. Mader van der Berg (I-Scape) and Mr. Stefan du Toit (Green Contour). The scope of work for the Specialist Visual Impact Assessment for proposed development will include:

- » Delineate the study area through the use of GIS visibility mapping;
- » Discuss the proposed project's visible elements and divide the project into logical phases and development components;
- » Conduct a Visual Resource Assessment (VRA) in which the aesthetic value of the visual resource is assessed through the evaluation of quantitative and qualitative parameters;



- » Identify the affected observers through the use of GIS visibility mapping in order to delineate the Zone of Visual Influence (ZVI);
- » Identify key viewpoints from which to assess the potential visual impact during day and night time conditions;
- » Determine the sensitivity of the visual resource and its susceptibility to impacts on its character and sense of place;
- » Determine the sensitivity of the affected observers and their visual perception of the proposed project;
- » Assess the significance of the impacts on the visual resource on observers as a result of the proposed project for each of the different phases and alternative sites;
- » Recommend mitigation measures in order to alleviate the impacts on the visual resource and on the affected observers; and
- » Conclude with a comparative analysis between the different site locations and conclude with a preferred option based on the visual impacts.

#### **(f) Heritage Impact Assessment**

Mr. Frans Prins of Strategic Environmental Focus will undertake the Heritage Impact Assessment. The purpose of his study will be to provide a detailed Cultural, Heritage and Archaeological Specialist Report on the study area, which will inform the suitability of the proposed development.

The scope of work for a Heritage Impact Assessment for proposed development will include but not limited to the following:

- » Identify possible archaeological, cultural and historic sites within the proposed development areas;
- » Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historic resources; and
- » Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological importance.

#### **(g) Social Impact Assessment**

A social impact study will be commissioned to determine the impacts associated with the proposed development in terms of the social impact. Ms Ilse Aucamp will undertake a social impact assessment for the proposed development and the assessment will include but not be limited to the following:

- » Consult with Interested & Affected Parties;
- » Analysis of data compiled by parallel studies; and

- » Compile of Social Impact Assessment report.

It is believed that a participatory approach is the best way to approach social impact assessment in the South African context. The World Bank Social Standards, Equator Principles and International Principles for Social Impact Assessment will be applied in the study. It must be noted that international standards and principles will be adapted to ensure that it can be applied in the local social context. Apart from obtaining environmental permits as required by law, any proposed project would also require “social license to operate” from the community where it will be situated. This is seen to be a crucial element to ensure the successful implementation of any EMP. Without the buy-in of the affected public, the chance of successful implementing the plan will be slim. The methodology proposed will therefore focus on involving the affected public in the research and planning where it is realistically possible and executable. Different methodologies will be utilised to ensure the affected communities are consulted in the way that is most appropriate to the community. It is proposed that the following methodologies are followed:

- » The SIA will commence with a baseline study which will include an in-depth literature review of the available literature. This will include relevant legislation and existing provincial and municipal documents and studies, as well as any additional literature that is deemed to be applicable to the study. This study will focus on the local and regional level.
- » Necessary demographic data will be obtained from Statistics South Africa and Municipal Integrated Development Plans.
- » A scoping exercise consisting of an initial site visit and information search have been conducted to identify key stakeholders. Key stakeholders will be interviewed and asked to compile a questionnaire. Stakeholders will include town councils, community representatives, and political leaders, and tribal councils, representatives of industry, tourism groups, farmer’s unions and agricultural groups amongst others.
- » The initial site visit will be followed up with a longer period of field work to obtain additional information and communicate with key stakeholders. A preliminary report listing issues identified during this process will be submitted after the fieldwork is completed.
- » All public meetings arranged by the stakeholder engagement team will be attended by the social scientists.
- » Information will be obtained via focus groups, formal and informal interviews, participatory rural appraisal, observation, the internet and literature reviews. Minutes and notes will be kept of all interviews and focus groups.
- » An interview schedule might utilised instead of formal questionnaires. An interview schedule consists of a list of topics to be covered, but it is not as structured as an interview. It provides respondents with more freedom to elaborate on their views.
- » The final SIA report will focus on current conditions, providing baseline data. Each category will discuss the current state of affairs, but also investigate the possible impacts that might occur in future. Recommendations for mitigation will be made at the end of the report.
- » The SIA will have a participatory focus. This implies that the SIA will focus strongly on including the local community and key stakeholders.

The public consultation process needs to feed into the SIA. Information obtained through the public processes will inform the writing of the SIA and associated documents.

#### **(h) Legal Reviewer**

The main objective of the Legal Review is to determine special legal requirements, and assess whether the EIA Process, Environmental Scoping Report, Environmental Impact Assessment Report and the draft Environmental Management Plan are in compliance with the relevant legal requirements.

Mr. Nicolai Massyn of Green Gain Consulting was appointed to undertake the Legal Review of all the Relevant EIA documentation that will be produced throughout the EIA Process. The scope of work for a Legal Reviewer will include the following:

- » Review and discuss proposed overall process and to consider any issues raised by the relevant authorities;
- » Provide a legal review of the Draft Scoping Report with brief written comments on the legal process and public participation process that was completed in terms of Regulation 28 and 29 of GN R 385, including comments in tracked changes on the report itself. The draft Scoping Report included a plan of study for EIA in terms of Regulation 29;
- » Review of draft EIR in compliance with regulation 32 of GN R 385 of 2006 and brief written comments, including comments in tracked changes on the report itself. Review of the draft EMP in compliance with Regulation 34 of GN R 385 of 2006; and
- » Ad-hoc advice to project team queries including legal issues emerging from the public participation process.

#### **(i) GIS**

MetroGIS will provide GIS services for the duration of the project (during all phases) to Envirolution Consulting and the specialist consultants involved. The following tasks are envisaged:

- » Data source and extract;
- » Investigate existing data and collect all relevant and available spatial data for the study area;
- » Base map creation;
- » Create base maps for site visit and fieldwork by specialists;
- » Data capture, cleaning and editing;
- » Capture and manipulate data from inputs by specialists;
- » Spatial analyses and data overlay; and
- » Undertake specialist analyses (slope, data overlays, sensitivity assessment, etc.) in order to aid with environmental sensitivity ranking and site selection.

### **(j) Traffic Impact Assessment**

Mr. Brian Roberts and Naye Miya of PDNA will undertake the Traffic assessment associated with the development of the landfill site and the Hazardous Waste Storage Facility. The scope of work will include the following tasks:

- » Consider the study parameters applicable to the area including the study area, time horizon, critical peak periods, land use application details etc.
- » Traffic counts will be undertaken and a number of trips that will be generated during the operational phase of the landfill will be considered;
- » The location of number of accesses, operational and geometrical layout of access points to the proposed landfill development will be investigated fully during the EIA phase;
- » Determine the trips to and from a borrow pit sites, construction camp to site would be determined and assigned to the road network;
- » Consider the number of trips that will be generated during the construction and the operational phases of the project;
- » Undertake thorough analysis using TSS Aimsun transportation simulation software for the whole road network within the study area and upgrades will be recommended if necessary.

### **(k) Noise Impact Assessment**

Mr. John Hassall of JH Consulting will undertake the Noise Impact Assessment for the proposed project. He has outlined the following as the minimum activities required to perform the assessment of the noise impact on the immediate environment:

#### **Baseline Noise Measurements**

- » The baseline survey will be based on noise measurements in accordance with SANS 10103 and 10328 Guidelines. The survey will determine the existing noise levels on the perimeter of the selected site
- » Based on an initial assessment, the determination of the noise levels will be based on measurements at a maximum of 5 locations at or within the perimeter of the site or at probable sensitive locations.
- » Perform a 10-minute Sample Noise measurements during daytime, according to legislation and the SANS guidelines.
- » All measurements will be A-weighted equivalent sound pressure levels obtained with I-time weighting or as required by SANS standards. Abnormal disturbances, such as abnormal loud noise generation in close proximity or sudden noise bursts that affect the measurement, will be discarded.
- » Potential sensitive receptors will be identified.

### **Instrumentation**

- » All test equipment will comply with international standards such as (IEC 651 & 804 - Integrating sound level meters, and IEC 942 – Sound calibrators):
- » The following sound measuring instruments will be utilised for the measurements:
- » 01dB SdB01+ Precision Impulse Integrating Sound Level Meter
- » 01dB Cal01 Sound Level Calibrator
- » Bruel & Kjaer 2230 Precision Impulse Integrating Sound Level Meter
- » Bruel & Kjaer 4230 Sound Level Calibrator

### **Noise Prediction and Assessment**

The report that will be submitted will contain the following:

- » Baseline noise levels at the boundary of the site.
- » The date and time, locations and conditions at each test point.
- » The measurement methods and instrumentation utilised, including calibration
- » Extraneous factors that could influence the measurements.
- » Prediction of operation noise levels and impact on potential sensitive receptors.
- » Recommendations for mitigation methods should they be applicable.

## **8.4 Public Participation Process**

The public participation process for the EIA Phase will be based on the requirements of Section 56–58 of EIA Regulations, 2006. A public participation process will be undertaken by Envirolution Consulting.

Consultation with key stakeholders and I&APs will be on-going throughout the EIA process. Through this consultation process, stakeholders and I&APs will be encouraged to identify additional issues of concern or highlight positive aspects of the project and to comment on the findings of the EIA process.

In order to accommodate the varying needs of I&APs within the study area, as well as capture their inputs regarding the project, various opportunities will be provided for stakeholders and I&APs to be involved in the EIA phase of the process, as follows:

- » Focus group meetings (pre-arranged and stakeholders invited to attend).
- » One-on-one consultation meetings (for example with directly affected landowners).
- » Telephonic consultation sessions (consultation with various parties from the EIA project team, as well as specialist consultants).
- » Written, faxed or e-mail correspondence.

The draft EIA Report will be made available for public review for a 30-day period prior to finalisation and submission to DEAT for review and decision-making. In order to provide an

overview of the findings of the EIA process and facilitate comments, a public meeting and key stakeholder workshop will be held during this public review period.

A public commenting period will be held during the EIA Phase once the draft EIR is complete. The Draft EIR will include an Issues/Response Report listing all issues raised, together with an indication of how they were addressed. This is aimed at allowing I&APs an opportunity to verify that the issues they raised during scoping phase have been addressed. The public and the I&APs that are registered for the project will be informed of the availability of the EIR for comment. The EIR will be placed in public places and at the Envirovolution Consulting website at [www.envirovolution.co.za](http://www.envirovolution.co.za).

## 8.5 Contents of the Environmental Impact Assessment Report

The results of the specialist studies and other available information will be integrated and synthesised by the Envirovolution Environmental project team. An EIA report will be compiled, and will include:

- » **A detailed description** of the proposed activity
- » A description of the property(ies) on which the activity is to be undertaken and the location of the activity on the property(ies)
- » 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
- » Details of the **public participation process** conducted, including:
  - \* steps undertaken in accordance with the plan of study for EIA;
  - \* list of persons, organisations and organs of state that were registered as interested and affected parties;
  - \* 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 to those comments; and
  - \* copies of any representations, objections and comments received from registered interested and affected parties
- » A description of the **need and desirability** of the proposed project and 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
- » An indication of the methodology used in determining the **significance** of potential environmental impacts
- » A description and comparative **assessment of all alternatives** identified during the environmental impact assessment process
- » A summary of the findings and recommendations of **specialist reports**
- » 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

- » An assessment of each identified potentially significant impact
- » A description of any assumptions, uncertainties and gaps in knowledge
- » An environmental **impact statement** which contains:
  - \* a summary of the key findings of the environmental impact assessment; and
  - \* a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives; and
- » A draft **environmental management plan** (including construction phase and operational phases)
- » Copies of specialist reports

## 8.6 Key Milestones of the programme for the EIA

The envisaged key milestones of the programme for the Environmental Impact Assessment (EIA) phase of the project are outlined in the **Table 8.3**.

**Table 8.3:** Key milestones of the programme for the Environmental Impact Assessment Phase

Key Milestone Activities	Proposed completion date
Public review period for Draft Scoping report	February - March 2009
Finalisation of Environmental Scoping Report	March 2009
Authority acceptance of the Environmental Scoping Report and Plan of Study to undertake the EIA	May 2009
Undertake detailed specialist studies and public participation process	February – April 2009
Compile draft EIA Report and draft EMP	March 2009
Make draft EIA Report and draft EMP available to the public, stakeholders and authorities	May 2009
Finalisation of Environmental Impact Assessment Report	September 2009
Submit Final EIA Report to DEAT for review and decision-making	October 2009

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## 9 CHAPTER 9 CONCLUSIONS AND RECOMMENDATIONS

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This report details the findings of a Scoping Study undertaken as part of the EIA process for the activities for the proposed construction of a landfill and a Hazardous Waste Storage Facility in Lephalale. The Scoping Study included a technical investigation by various specialists and a public participation component to identify key issues associated with the project. These issues will need further assessment in the environmental impact assessment phase. The alternatives that were identified during the scoping phase will be evaluated in detail during the EIA phase.

The EIA phase of the study will involve a detailed assessment of the key issues. Specialist studies that will be undertaken as part of the detailed EIA phase have been highlighted in **Section 8** of this report.

The following key conclusions are drawn from the Scoping Study:

- » The proposed development is a strategic response to address current waste management challenges facing Eskom in the Lephalale area as the existing landfill site in Lephalale is not permitted and cannot be utilised for disposal of the waste that will be generated;
- » The proposed development is a response by Eskom to adhere to its Safety, Health and Environmental Policy and other legal requirements, as well as combating current operating costs;
- » The proposed project will also benefit the Municipality as they will cease to receive waste from the existing and future Eskom projects in the area;
- » I&APs raised no objections to the proposed development during the Scoping phase;
- » A site selection process undertaken during the Scoping Phase has concluded that the proposed location of the landfill in Site 5 is not in an environmentally sensitive area from a biophysical and socio-economic perspective as the development will occur in an already disturbed area located in close proximity to an area that was previously used as a landfill site; and
- » Implementation of adequate mitigation measures would probably reduce all potential impacts to a *low* significance. This would be confirmed during the EIA phase.

This report serves as a Final Scoping Report (FSR) for the proposed construction of a waste disposal facility at Lephalale. The Draft Scoping Report (DSR) has been made available for public comment. Comments from I&APs on the DSR were incorporated into the Final Scoping Report. The Final Scoping Report has been updated with comments from I&APs for submission to DEAT for their consideration.



Based on the findings of the Scoping Study it is recommended that an Environmental Impact Assessment should be undertaken to further investigate the potential impacts associated with the proposed development. The EIA should include the specialist investigations recommended in **Section 8**.

### **9.1 Way forward**

The report serves as a Final Scoping Report for the proposed construction of a landfill site and a Hazardous Waste Storage Facility, in Lephalale. Comments from I&APs during the scoping phase have been incorporated into this report. This report has been prepared for submission to DEAT for their consideration.

Should DEAT accept the report, the Envirolution Consulting will then proceed with the tasks contemplated in the Plan of Study for EIA. DEAT may reject the SR for not following legislative procedure if any of the required EIA steps were not undertaken. In terms of regulation 31 (3) of GN R. 385, the SR may be amended and resubmitted by the EAP should it be rejected. On receipt of the amended SR and Plan of Study for EIA, the competent authority will then reconsider the application. Should the SR be rejected, the amended SR will then be made available for public review and comment prior to submission to DEAT.

## 10 CHAPTER 10

## REFERENCES

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