

**Kendal Power Station - 30  
Year Ash Disposal Facility**

Proponent:

Eskom Holdings SOC Limited  
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Johannesburg  
2000

**DEA Reference Number: 14/12/16/3/3/3/68**

**NEAS Reference Number: DEA/EIA/0001624/2013**

**June 2013**

**Project: 12935**

**DRAFT SCOPING REPORT**

## YOUR COMMENT ON THE DRAFT SCOPING REPORT

The Draft SR is available for comment from **6 June to 18 July 2013**. This Draft SR has been distributed to the authorities, and copies thereof are available at strategic public places in the project area (see below).

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PLACE	Address / Contact details
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Ogies Public Library, 61 Main Street, Ogies	013 643 1150
Delmas Public Library	013 665 2425
Emalahleni Public Library – 28 Hofmeyer Street	013 653 3116
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Kendal power station – Security Reception	013 647 6002

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### You may comment on the Draft Scoping Report by:

- Completing the comment sheet;
- Writing a letter, or producing additional written submissions; and
- Emailing or telephoning the public participation office.

## DUE DATE FOR COMMENT ON THE DRAFT SCOPING REPORT IS 18 JULY 2013

### SEND YOUR COMMENTS TO THE PUBLIC PARTICIPATION OFFICE:

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### AN EIA AND WMLA CONSISTS OF SEVERAL PHASES



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## ABBREVIATIONS

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CO <sub>2</sub> .....	Carbon Dioxide
DMR .....	Department of Mineral Resources
DEA .....	Department of Environmental Affairs
DEIR.....	Draft Environmental Impact Report
DSR.....	Draft Scoping Report
DWA .....	Department of Water Affairs
DWEA.....	Department of Water and Environmental Affairs (Ministry)
FEIR.....	Final Environmental Impact Report
FSR.....	Final Scoping Report
EIA.....	Environmental Impact Assessment
IEA.....	Integrated Environmental Authorisation
EAP .....	Environmental Assessment Practitioner
ECA .....	Environment Conservation Act
EIA.....	Environmental Impact Assessment
EIR.....	Environmental Impact Report
EMPr.....	Environmental Management Programme
GNR.....	Government Notice Regulation
I&APs.....	Interested and Affected Parties
IEM .....	Integrated Environmental Management
NEMA .....	National Environmental Management Act
NEM:WA.....	National Environmental Management: Waste Act
NIRP .....	National Integrated Resource Plan
NWA.....	National Water Act
SIA.....	Social Impact Assessment
SR.....	Scoping Report
TIA.....	Traffic Impact Assessment
ToR.....	Terms of Reference
WMLA.....	Waste Management License Application



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## **1 INTRODUCTION**

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### **1.1 CONTEXT AND OBJECTIVES OF THIS REPORT**

This Draft Scoping Report (Draft SR) is a key component of the EIA and WML authorisation process and is compiled for stakeholder consumption; for the purposes of review and comment; and to address the requirements for Scoping and the Plan of Study (PoS) for the EIA as outlined in the NEMA EIA regulations. The aim of this Draft SR is to:

- Indicate the methodology followed to identify and evaluate alternatives;
- Provide information to the authorities as well as Interested and Affected Parties (I&APs) on the proposed project as well as a description of the baseline environment;
- Indicate how I&APs have been afforded the opportunity: to contribute to the project; to verify that their issues, raised to date, have been considered; and to comment on the findings of the impact assessments;
- Define the Terms of Reference (ToR) for specialist studies to be undertaken in the EIA; and
- Present the findings of the Scoping Phase in a manner that facilitates decision-making by the relevant authorities.

This report will be subjected to a public review for 40 days, and once completed, comments received will be incorporated into the Final Scoping Report (FSR), which will then be submitted to the competent authority for decision making.

### **1.2 PROJECT LOCATION**

Kendal Power Station is a coal-fired power station situated south west of the town of Ogies in Mpumalanga Province, and became operational in 1993 (see **Figure 1-1**).

### **1.3 KENDAL POWER STATION**

Kendal Power Station uses an indirect dry-cooling through a condenser, cooling water and cooling tower system to effectively cool the cooling water to required temperatures.

The process of electricity generation is such that coal is used as a fuel source to heat pure demineralised water to produce steam. The steam produced, in turn, drives an electrical turbine producing electricity, which is fed into the electricity grid as it is produced. Waste steam exiting the turbine enters the condenser where it condensates for reuse. In the condenser cooling water flows through thousands of condenser tubes, in an enclosed unit surrounded by the waste steam. As a result of the temperature difference between the water and steam, condensation is achieved through transferral of waste heat to the cooling water. Kendal Power Station utilises indirect dry-cooling method for the cooling water. The

warmed cooling water flows to a cooling tower from where the heat is conducted from the water by means of A-Frame bundles of cooling elements. Cooling water flowing through these elements cools down as an upward draft of cool air removes the heat from the water. After cooling, this water returns to the condenser.

This cooling system is a closed system as there is no loss of water due to evaporation. This closed system uses significantly less water in its cooling processes than conventional wet cooled power stations. Kendal has six (6) 686 megawatt (MW) electricity generating units, with a combined installed capacity of 4116 MW. The station's cooling towers are the largest structures of their kind in the world with a height and base diameter of 165 m.

#### **1.4 PROJECT BACKGROUND**

The current ash disposal facility of the Kendal Power Station is running out of space due to poor quality coal accessible for combustion, which is producing more ash than was anticipated in station planning processes. In addition the life span of Kendal has also been extended from 2043 to 2053, which would render the available ash disposal space inadequate to accommodate the continuation of disposal. Concurrently with this EIA process for the authorisation of the Kendal 30 year ash disposal facility, another EIA process is underway to apply for authorisation of the continuation of the existing ash disposal facility at Kendal Power Station in order to extend the life of the existing facility sufficiently into the future up to the point that the second ash disposal facility can be authorised, constructed and become operational. These two EIA processes are being undertaken independently but parallel to one another.

The options that are being considered in the Kendal Continuous Ash Disposal project (EIA) can potentially accommodate between 7 years (minimum disposal option) to 17 years (maximum disposal option) of ash, from a benchmark period of September 2012, in the event that the continuation of the existing facility is authorised by the Competent Authority (CA). Assuming the worst case scenario whereby only the minimum disposal option is authorised by the CA for the Kendal Continuous Ash Disposal project, the additional new ash disposal facility would need to accommodate a maximum ash disposal capacity equivalent to 34 years.

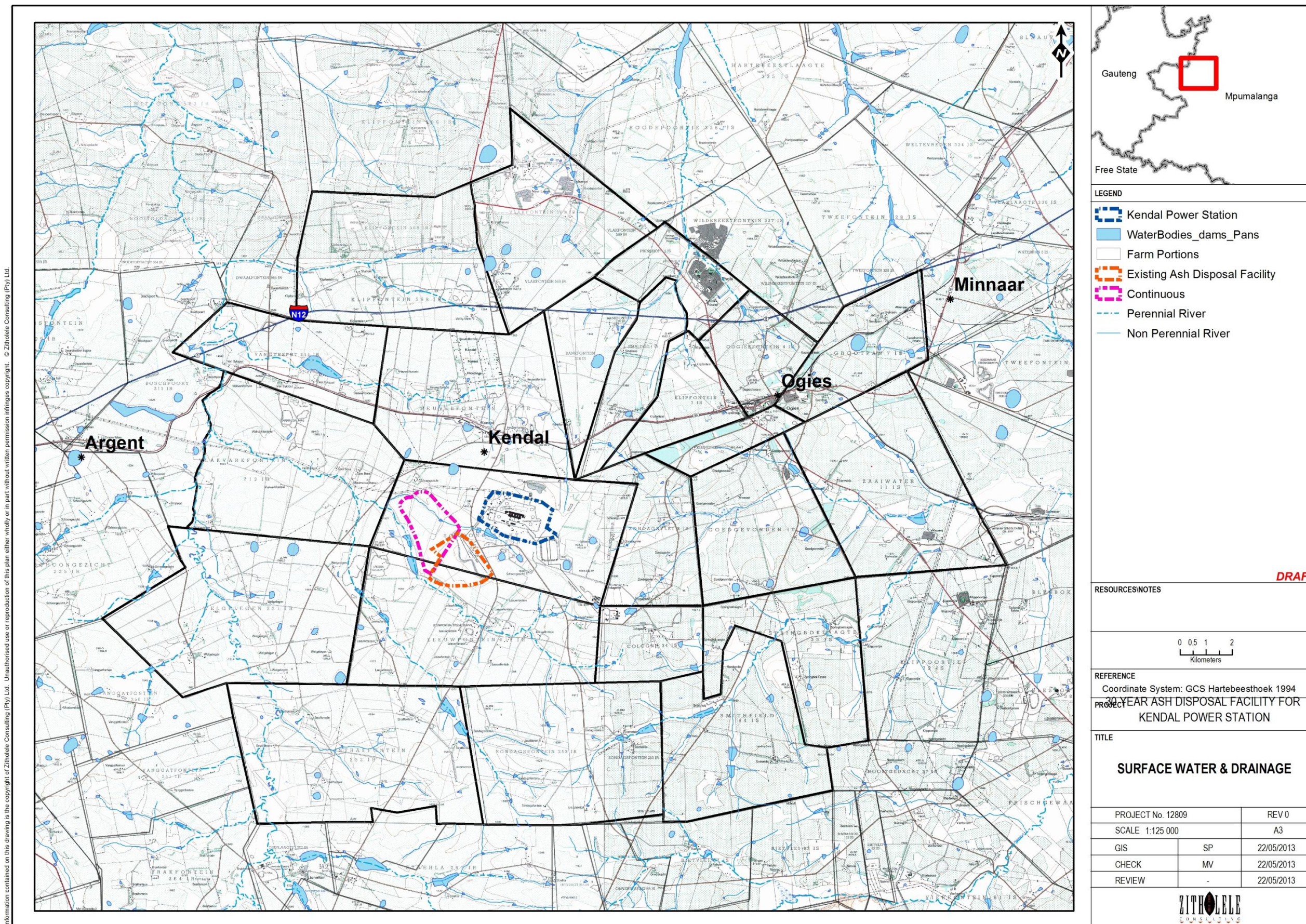
Alternatives for the Kendal 30 Year Ash Disposal Facility have been considered (and are discussed in detail in Chapter 5), and it is envisaged that the project will include the following components (discussed in more detail in Chapter 4):

- Development of an ash disposal facility within a 7 km radius of the Kendal Power Station that can accommodate 37 years of ash. A maximum radius of 10 km could be investigated if enough feasible alternatives for further investigation were not forthcoming;
- Design and construction of the conveyance system from the power station to the ash disposal facility;

- Ash Pollution Control Dams;
- Clean and dirty water cut-off and management systems / trenches;
- Design and construction of new and/or expansion of existing storm water management infrastructure;
- Provision of support services including electricity and water supply in the form of power lines, pipelines, and associated infrastructure;
- Design and construction of access and maintenance roads to and from the site, and associated infrastructures such as culverts and channels; and
- Water Use License Application (WULA).

Zitholele has been appointed to undertake the following activities for the project;

- Environmental Impact Assessment (EIA) – According to the National Environmental Management Act ([NEMA] Act No 107 of 1998, as amended 2010)
- Waste Management License (WML) - According to the National Environmental Management: Waste Act ([NEM:WA] Act No 59 of 2008)
- Water Use License Amendment (WUL) – According to the National Water Act (Act No. 36 of 1998).



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Figure 1-1 - Location of the Project

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## 2 KEY ROLE PLAYERS

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### 2.1 WHO IS THE PROPONENT?

Eskom Holdings SOC Limited (Eskom) is the main South African utility that generates, transmits and distributes electricity. Eskom was established in 1923 by the South African government and today supplies ~95 % of the country's electricity. The utility is the largest producer of electricity in Africa, is among the top seven utilities in the world in terms of generation capacity and among the top nine in terms of sales. Eskom plays a major role in accelerating growth in the South African economy by providing a high-quality and reliable supply of electricity.

Details of the applicant are as follow:

Name of Applicant:	Eskom Holding SOC Limited
Contact person:	Deidre Herbst
Address:	P O Box 1091, Johannesburg, 2000
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Fax:	086 660 6092
E-mail:	<a href="mailto:deidre.herbst@eskom.co.za">deidre.herbst@eskom.co.za</a>

Details of the land owner (Kendal Power Station)

Name of Landowner:	Eskom Kendal Power Station
Contact person:	Christopher Nani
Address:	Private Bag X7272, Emalahleni, 1035
Telephone:	013 295 9119
Cell:	082 805 3392
Fax:	013 647 6904

### 2.2 ENVIRONMENTAL IMPACT ASSESSMENT PRACTITIONER (EAP) DETAILS

Waste related activities requiring an EIA are listed in terms of the NEM:WA and associated listings. Furthermore, the NEM:WA requires that EIA's for listed waste activities be undertaken in terms of the NEMA EIA Regulations. In terms of the NEMA EIA Regulations, the proponent must appoint an independent Environmental Assessment Practitioner (EAP) to undertake an environmental assessment for an activity regulated in terms of NEMA. In this regard, Eskom appointed Zitholele Consulting to undertake the EIA for the proposed project, in accordance with the aforementioned regulations.

Zitholele Consulting is an empowerment company formed to provide specialist consulting services primarily to the public sector in the fields of Water Engineering, Integrated Water Resource Management, Environmental and Waste Services, Communication (public participation and awareness creation) and Livelihoods and Economic Development.

Zitholele Consulting has no vested interest in the proposed project and hereby declares its independence as required by the EIA Regulations. The details of the EAP representatives are listed below.

Mathys Vosloo, Project Manager

Name: Mathys Vosloo  
Company Represented: Zitholele Consulting (Pty) Ltd.  
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Telephone: 011 207 2079  
Fax: 086 545 8835  
E-mail: [mathysv@zitholele.co.za](mailto:mathysv@zitholele.co.za)

**Dr. Mathys Vosloo** graduated from the Nelson Mandela Metropolitan University with a PhD in Zoology in 2012. Over the past few years Mathys has been involved in a variety of projects and has undertaken environmental authorisations for ranging from the construction of roads, rehabilitation of dam wall infrastructure, development of low cost housing, and electrical generation and transmission projects. Mathys has also been involved in the development of strategic environmental assessments and state of the environment reporting, and has developed numerous environmental management programmes during the course of his career. With more than 10 years of environmental and scientific field and more than 6 years in environmental consulting Mathys has gained an advanced and holistic understanding of environmental management in the built environment.

Warren Kok, as Project Director and Reviewer

Name: Warren Kok  
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**Warren Kok** is the designated Project Director on behalf of Zitholele. Warren will ensure regulatory compliance, quality assurance and overseeing the Public Participation and Technical Environmental Team. Warren will hold final responsibility for the compilation of the EIA / EMP Reports. Warren holds a B.Hon degree in Geography and Environmental Management from Rand Afrikaans University (2000) and a Higher Certificate in Project Management from Damelin. He is a certified Environmental Assessment Practitioner (EAP) who is registered with EAPASA. Warren has in excess of 10 years' experience in environmental consulting in South Africa. His experience spans both the public and private sector. The majority of his work experience has been gained in the mining sector in South Africa, where he has been responsible for undertaking and managing Integrated EIA Processes. Warren has successfully undertaken countless integrated EIA processes that require integration of the MPRDA, NEM:WA, WULA and NEMA regulatory processes. Many of these projects are considered landmark projects in South Africa's environmental mining

sector and included several hazardous waste facilities. He is ideally skilled and experienced to manage this project to its conclusion. He is currently a Senior Environmental Practitioner for Zitholele Consulting, responsible for overseeing and managing project teams in the Environmental Division, mentoring staff, liaising with clients and public stakeholders at all levels.

### **2.3 COMPETENT AND RELEVANT AUTHORITIES**

The National Department of Environmental Affairs (DEA) is the Competent Authority. The mandate and core business of DEA is underpinned by the Constitution and all other relevant legislation and policies applicable to the government.

#### Details of the DEA case officer undertaking the assessment of the project are:

Name: Pumeza Skepe  
Company Represented: National Department of Environmental Affairs  
Address: Private Bag X 447, Pretoria, 0001  
Telephone: 012 310 3061  
Fax: 012 320 7539  
E-mail: [PSkepe@environment.gov.za](mailto:PSkepe@environment.gov.za)

The Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) and the Department of Water Affairs (DWA) are commenting authorities for this application.

#### Details of the contact person at MDEDET are as follow:

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Fax: 012 320 7539  
E-mail: [bemndawe@mpg.gov.za](mailto:bemndawe@mpg.gov.za)

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Fax: 086 661 7621  
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#### Details of the Emalahleni Local Municipality

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E-mail: [nkabindeej@emalahleni.co.za](mailto:nkabindeej@emalahleni.co.za)

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### **3 LEGAL REQUIREMENTS**

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Environmental legislation in South Africa was promulgated with the aim of, at the very least, minimising and at the most preventing environmental degradation. The following Acts and Regulations are applicable to this Project:

#### **3.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA ACT (NO 108 OF 1996)**

Section 24 of the Constitution states that:

*Everyone has the right*

- ii) to an environment that is not harmful to their health or well-being; and*
- iii) 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*

The current environmental laws in South Africa concentrate on protecting, promoting, and fulfilling the Nation's social, economic and environmental rights; while encouraging public participation, implementing cultural and traditional knowledge and benefiting previously disadvantaged communities.

#### **3.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NO 107 OF 1998)**

NEMA provides a framework for environmental law reform in South Africa and covers three areas, namely:

- Land, planning and development;
- Natural and cultural resources, use and conservation; and
- Pollution control and waste management.

This law is based on the concept of sustainable development. The objective of NEMA is to provide for co-operative environmental governance through a series of principles relating to:

- The procedures for state decision-making on the environment; and
- The institutions of state which make those decisions.



The NEMA principles serve as:

- A general framework for environmental planning;
- Guidelines according to which the state must exercise its environmental functions; and
- A guide to the interpretation of NEMA itself and of any other law relating to the environment.

### **3.2.1 What are the NEMA principles?**

Some of the most important principles contained in NEMA are that:

- Environmental management must put people and their needs first;
- Development must be socially, environmentally and economically sustainable;
- There should be equal access to environmental resources, benefits and services to meet basic human needs;
- Government should promote public participation when making decisions about the environment;
- Communities must be given environmental education;
- Workers have the right to refuse to do work that is harmful to their health or to the environment;
- Decisions must be taken in an open and transparent manner and there must be access to information;
- The role of youth and women in environmental management must be recognised;
- The person or company who pollutes the environment must pay to clean it up;
- The environment is held in trust by the state for the benefit of all South Africans; and
- The utmost caution should be used when permission for new developments is granted.

### **3.2.2 Environmental Impact Assessment Regulations: 543 of 18 June 2010**

In June 2010, an amended set of NEMA Environmental Impact Assessment Regulations was promulgated, GNR.543. These regulations govern, amongst others, the listing of activities that require Environmental Authorisation (EA), the authorisation procedures themselves, and the public participation process for authorisation procedures.

It should be noted that although the main activity of the project triggers the need for a waste management license in terms of NEM:WA, certain activities that will be undertaken as part of the project are also listed activities in terms of NEMA, and therefore also require an EA prior to proceeding with the project. All potential listed activities that may be triggered as a result of this project are listed in

Table 3-1, although, some of these activities may not be undertaken dependent on the preferred alternative selected during the impact assessment phase of the project.

**Table 3-1: Relevant NEMA Listed Activities**

NOTICE NUMBER AND DATE:	ACTIVITY NUMBER (to the relevant or notice) :	DESCRIPTION OF THE LISTED ACTIVITY
<b>Construction of the waste disposal facility and associated infrastructure</b>		
GN R. 545 of 2010	Activity 15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, industrial or institutional use where the total area to be transformed is 20 hectares or more.
GN R. 544 of 2010	Activity 24	The transformation of land bigger than 1000 square metres in size, to residential, retail commercial, industrial or institutional use, where at the time of coming into effect of this Schedule such land was zoned as open space, conservation or has an equivalent zoning.
GN R. 544 of 2010	Activity 18	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from: (i) a watercourse;
GN R. 544 of 2010	Activity 26	Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
<b>Construction of a conveyor belt for the transportation of waste to the proposed disposal facility.</b>		
GN R. 545 of 2010	Activity 6	The construction of facilities or infrastructure for the bulk transportation of dangerous goods – in solid form, outside an industrial complex, using funiculars or conveyors with a throughput capacity of more than 50 tons per day;
<b>Construction of power lines and substations to service the project and/or realignment of existing infrastructure.</b>		
GN R. 544 of 2010	Activity 29	Regardless the increased output of the facility, the development footprint will be increased by 1 hectare or more.
<b>Construction of a return water dam and/or alteration of existing dams for the management of storm water.</b>		
GN R. 544 of 2010	Activity 12	The construction of facilities for the off-stream storage of water, including dams and reservoirs, with a combined capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of Activity 19 of GNR 545.
<b>The construction of access roads for the construction and or long term servicing of all planned infrastructure for the project and/or the realignment and expansion of existing roads.</b>		
GN R. 544 of 2010	Activity 22	The construction of a road outside urban areas: With a reserve wider than 13,5 metres; Where no reserve exists where the road is wider than 8 metres, or For which an EA was obtained for the route determination in terms of Activity 5 of GN 387 of 2006 or Activity 18 of GN 545 of 2010.
GN R. 544 of 2010	Activity 47	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre With a reserve wider than 13,5 metres; Where no reserve exists where the road is wider than 8 metres, Excluding widening or lengthening inside urban areas.
<b>The crossing of rivers by road, conveyor or storm water structures, potential storm water outlets.</b>		
GN R. 544 of 2010	Activity 11	The construction of: Canals; Channels; Bridges; Dams; Bulk storm water outlet structures; Buildings > 50 m <sup>2</sup> ; Infrastructure or structures > 50 m <sup>2</sup>

Based on the aforementioned list of activities that may be triggered by the project a full Scoping and Environmental Impact Reporting authorisation procedure is required in terms of the NEMA Regulations as amended (June 2010) and published in GNR 543.

### 3.3 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (NO 59 OF 2008)

In July 2009 the NEM:WA was promulgated, and amongst others makes provision for licensing and management of waste disposal facilities. The Minister of the Department of Water and Environmental Affairs, under Section 19 (1) of the NEM:WA, has published a list of waste management activities, which has or is likely to have, a detrimental effect on the environment in GNR 718 of 3 July 2009. Amendments to the list were proposed by the Minister in 2012 by the publication of GNR 779 of 28 September 2012, which called for comment on the proposed changes. However, this amended list has not been promulgated as yet. GNR 718 of 3 July 2009 listed activities in two different categories:

For **Category “A”** activities: a person who wishes to commence, undertake or conduct an activity listed under this Category, must conduct a Basic Assessment, as stipulated in the EIA regulations under section 24 (5) of the NEMA as part of a Waste Management Licence Application.

For **Category “B”** activities: a person who wishes to commence, undertake or conduct an activity listed under this Category, must conduct a S&EIR process, as stipulated in the EIA regulations under section 24(5) of the NEMA as part of a Waste Management Licence Application.

*Proposed inclusion under the proposed amended list of waste management activities, which has or is likely to have, a detrimental effect on the environment are:*

*For **Category “C”** activities: a person who wishes to commence, undertake or conduct an activity listed under this Category, must comply with the requirements or standards determined by the Minister in terms of the NEM:WA.*

The activities of the project that require a waste management license in terms of these regulations are listed in **Table 3-2**. It should be noted that the activities listed for the project fall within Category B and will therefore require a full Scoping and EIA process be undertaken for the licensing of the proposed project.

**Table 3-2: Relevant GNR 718 (3 July 2009) Listed Activities.**

NOTICE NUMBER, CATEGORY AND DATE	ACTIVITY NUMBER (as listed in the waste management activity list) :	Description of Listed Activity
GNR 718, Category B	7	The disposal of any quantity of hazardous waste to land.
	9	The construction of facilities for the activities listed in Category B of this Schedule.

### 3.4 ENVIRONMENT CONSERVATION ACT (NO 73 OF 1989)

The Environment Conservation Act (ECA) is a law that relates specifically to the environment. Although most of this Act has been replaced by the NEMA there are still some important sections that remain in operation. These sections relate to:

- Protected natural environments;
- Special nature reserves;
- Limited development areas; and
- Regulations on noise, vibration and shock.

### 3.5 THE NATIONAL WATER ACT (NO. 36 OF 1998)

The identified study area contains a large number of rivers and streams (including the Wilge River), wetlands and pans. Some of these water resources is likely to be affected by the development of the ash disposal facility. As a consequence, this project is likely to require a water use license in terms of Section 21 of the NWA. A full list of water uses to be licensed will be identified during the early stages of the EIA phase. The list of potential water uses that will require licensing is given in the table below.

**Table 3-3: Potential applicable Section 21 Water Use Licenses**

Water Use	Description	Potential Section 21 Water Uses
Section 21 (a)	Taking of water from a water resource.	Using water for dust suppression on roads or waste disposal facility; and Borehole water abstraction.
Section 21 (b)	Storing of water.	Raw water storage (clean, untreated water) / reservoirs. Storing of water in return water dams, pollution control dams, and or stormwater control dams.
Section 21 (c)	Impeding or diverting the flow of water in a water course.	Activities within or near wetlands, or activities affecting wetlands. Stream diversion.
Section 21 (d)	Engaging in a stream flow reduction activity contemplated in Section 36 of the Act.	To be confirmed.
Section 21 (e)	Engaging in a controlled activity: S37(1)(a) irrigation of any land with waste, or water containing waste generated through any industrial activity or by a water work.	Water used for dust suppression (to be confirmed).
Section 21 (f)	Discharging waste or water containing waste into a water resource.	To be confirmed.
Section 21 (g)	Disposing of waste in a manner which may impact on a water resource.	Construction of a ~1000 ha waste disposal facility. Storage of contaminated water in a pollution control dam / balancing dam / evaporation dam.
Section 21 (h)	Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.	To be confirmed.
Section 21 (i)	Altering the bed, banks, course, or characteristics of a watercourse. This includes altering the course of a watercourse (previously referred to as a river diversion).	Stream diversion.
Section 21 (j)	Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity, or for the safety of people.	To be confirmed.
Section 21 (k)	Using water for recreational purposes.	To be confirmed.

### **3.6 THE NATIONAL HERITAGE RESOURCES ACT (NO. 25 OF 1999)**

The objectives of the National Heritage Resources Act ([NHR] No 25 of 1999) are to:

- Introduce an integrated and interactive system for the management of the national heritage resources; to promote good government at all levels, and empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations;
- Lay down general principles for governing heritage resources management throughout the Republic;
- Introduce an integrated system for the identification, assessment and management of the heritage resources of South Africa;
- Establish the South African Heritage Resources Agency (SAHRA) together with its Council to co-ordinate and promote the management of heritage resources at national level;
- Set norms and maintain essential national standards for the management of heritage resources in the Republic and to protect heritage resources of national significance;
- Control the export of nationally significant heritage objects and the import into the Republic of cultural property illegally exported from foreign countries;
- Enable the provinces to establish heritage authorities which must adopt powers to protect and manage certain categories of heritage resources; and
- Provide for the protection and management of conservation-worthy places and areas by local authorities; and to provide for matters connected therewith.

The proposed construction of this project comprises certain activities (e.g. changing the nature of a site of ~ 1000 ha and linear developments in excess of 300 m) that require authorisation in terms of Section 38 (1) of the NHR. Section 38 (8) of the NHR states that, if heritage considerations are taken into account as part of an application process undertaken in terms of the environmental impact assessment process, there is no need to undertake a separate application in terms of the National Heritage Resources Act. The requirements of the National Heritage Resources Act have thus been addressed as an element of this EIA process, specifically by the inclusion of a Heritage Impact Assessment.

### **3.7 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT 10 OF 2004**

The Act, amongst others, provides the framework for biodiversity management and planning. Section 52 provides for the listing of threatened (critically endangered, endangered or vulnerable) and protected ecosystems (of high conservation value or of high national or provincial importance although not listed as threatened) and for activities or processes within those ecosystems to be listed as 'threatening processes', thus triggering the need to comply with the NEMA EIA regulations. The Act establishes the South African National Biodiversity Institute (SANBI), with a range of functions and powers (Chapter 2 Part 1). It also provides for the listing, control and eradication of invasive species (currently the responsibility of the Conservation of Agricultural Resources Act, 1983).

The development of the ash disposal facility will impact on the riparian and wetland areas next to existing streams and rivers. This may trigger requirements and regulations of the National Environmental management: Biodiversity Act.

Other acts that will be taken cognisance of are included in the Table 3-4 below

**Table 3-4: List of relevant acts that will be considered**

<b>Act name</b>	<b>Act no</b>	<b>Notes/remarks</b>
National Environmental Management: protected Areas Act	57 of 2003	Provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes.
Conservation of Agricultural Resources Act	43 of 1983	Control of utilisation and protection of wetlands; soil conservation; control and prevention of veld fires; control of weeds and invader plants.
Atmospheric Pollution Prevention Act	45 of 1964	Provides for control of dust control and air pollution.
National Environmental Management: Air Quality Act	39 of 2004	Control of dust, noise and offensive odours.
Fencing Act	31 of 1963	Prohibition of damage to a property owner's gates and fences <ul style="list-style-type: none"> <li>☞ <i>Climbing or crawling over or through fences without permission</i></li> <li>☞ <i>Closing gates</i></li> </ul> 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 protection of flora.
National Forest Act	84 of 1998	No person may cut, disturb, damage or destroy any indigenous, living tree in a natural forest, except in terms of a licence issued under section 7(4) or section 23.
Veld and Forest Fires Act	101 of 1998	Prevention of unauthorised veld and forest fires
Hazard substances Act, and regulations	15 of 1973 of	Provides for the definition, classification, use, operation, modification, disposal or ing of hazardous substances.
Occupational Health and Safety Act	85 of 1993	Prescribes health and safety measures necessary to adhere to for all construction workers
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act	36 of 1947	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.
All relevant Provincial and Municipal bylaws		

### **3.8 ADDITIONAL RELEVANT POLICY DOCUMENTATION AND GUIDELINES**

The policy and waste regulations pertinent to the ash facilities are in the process of being revised by government, and the most recent draft regulations have not yet been promulgated. Cognisance will be taken of these requirements.

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## **4 PROJECT DESCRIPTION**

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### **4.1 PROJECT MOTIVATION**

The following project motivations are relevant:

- The expansion of South Africa's power generation capacity has become a national strategy and focus areas. Eskom has been mandated to expand and develop new power generation facilities to meet the growing demand for electricity.
- The Kendal Power Station has been in operation since 1993, and as a by-product ash is being produced that must be disposed of on a continuous basis.
- Kendal Power Station is running out of space due to poor quality coal utilised for combustion. This results in higher quantities of ash being produced than the existing facility can receive.
- The life span of Kendal has also been extended from 2043 to 2053, and a new disposal facility must thus be developed to receive the ash generated through the combustion process.

### **4.2 DESCRIPTION OF THE WASTE STREAM**

#### **4.2.1 Sources of Waste to be disposed**

This project will address the following waste stream produced at Kendal Power Station:

- Fly and coarse ash from coal burning operations;

#### **4.2.2 Waste Classification**

The waste classification regulations pertinent to the ash facility are in the process of being revised by government and the most recent regulations (DEA's draft waste regulations, 2011) have not yet been promulgated.

In terms of the Minimum Requirements methodology the coal derived ash at Kendal Power Station is classified as a Hazard Group 1 waste or an Extreme Hazard waste. This was due to the leachable concentration of chromium VI detected in the leach solution. In terms of the Minimum Requirements, a Hazard Group 1 waste should be disposed of on a landfill with a type H:H barrier system.

#### **4.2.3 Waste Volumes and Densities**

The following waste volumes and densities are anticipated for the proposed Kendal 30 year ash disposal facility. These will be used as design parameters for the facility.



**Table 4-1: Estimated tonnages and volumes used in the design of the 30 year ash facility**

Tonnages per year (tonnes per 6 units per year):	5.9 mill tons/y
Density (tonnes per m <sup>3</sup> ):	0.85
Volume per year (m <sup>3</sup> per 6 units per year):	6.9 mill m <sup>3</sup> /y
Desired lifespan (years):	37 (2016 – 2053)
Desired total volume (m <sup>3</sup> per 6 units per year):	235 Mill m <sup>3</sup>

### 4.3 DESCRIPTION OF THE PROPOSED 30 YEAR ASH DISPOSAL FACILITY

#### 4.3.1 Location

The location of the proposed study site is within a maximum of 10 km around Kendal Power Station. After a rigorous site selection process (detailed in Appendix F) four developable areas were identified as feasible alternatives. Site areas B and C are located to the west of the Kendal Power Station, while site areas D and F are located to the east and north of the power station, respectively. These four site areas (B, C, D, and F) are shown in Figure 4-1. A comparative assessment of these four alternatives will be undertaken during the impact assessment phase to inform the selection of a preferred alternative.

#### 4.3.2 Footprint, High and Lifespan

It was calculated that for a maximum facility life of 37 years, an ash volume of 256 Million m<sup>3</sup> would require a stack with an approximate maximum footprint of 1 000 ha and a height between 50 and 100 m high. Side slopes of 1[v]:5[h] were used with an approach slope of 1[v]:20[h].

A minimum and maximum facility footprint scenario was developed by the technical team. Assuming a facility height of 50 m, which has proven feasible at other dry ash disposal facilities in the region, the maximum footprint scenario would require a facility footprint of approximately **770 ha**. For the minimum footprint scenario a maximum height of 100 m would require a facility footprint of approximately **520 ha**. The viability of the minimum footprint scenario is however dependant of the underlying geotechnical conditions in the study area. In both these scenarios the calculated facility footprints did include 15% additional area to allow for topography variability, and additional 50 ha to house return water dams, ash water treatment channels, roads, conveyor alignment, and site camp.

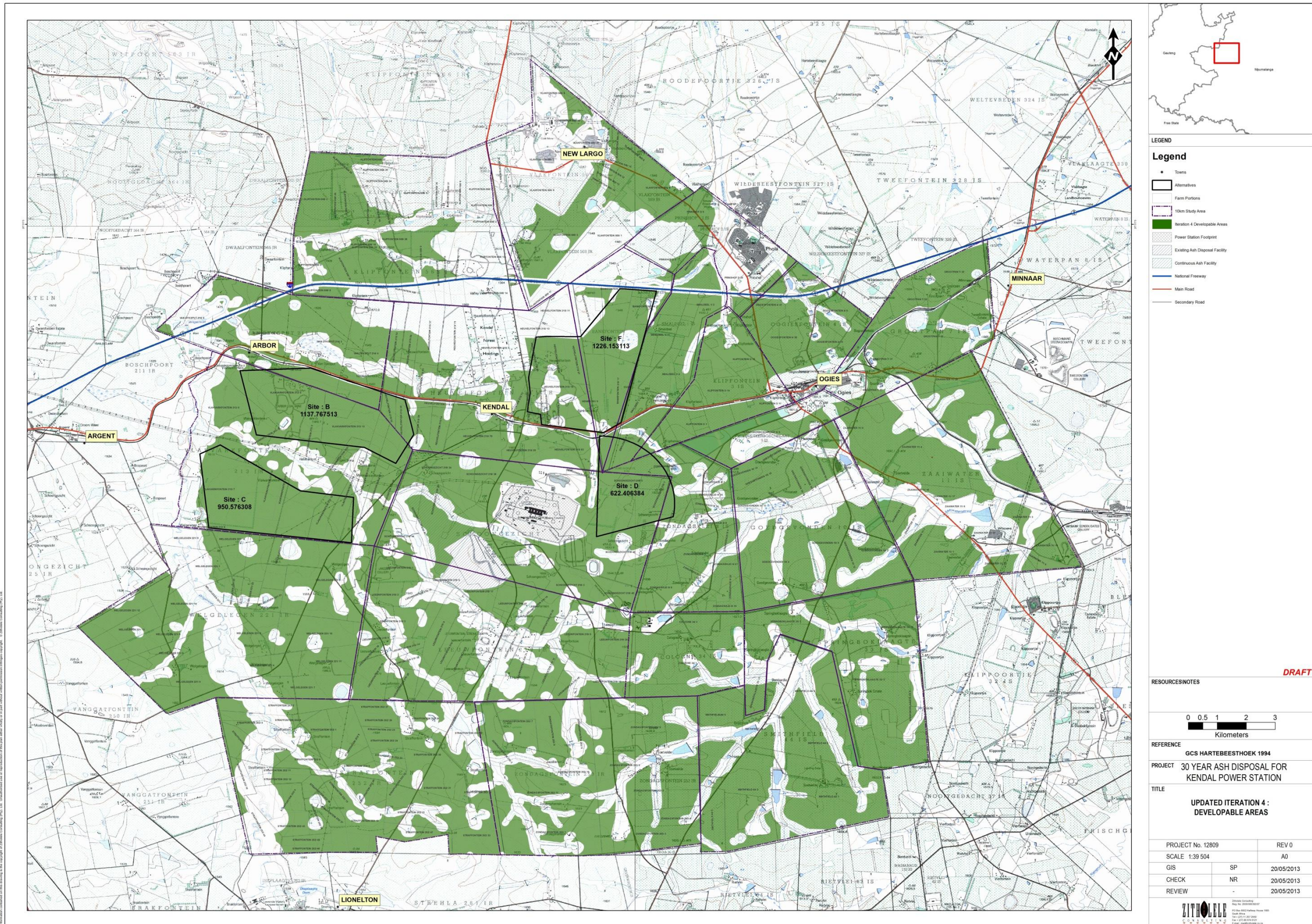


Figure 4-1: Identified feasible sites for the placement of an ash disposal facility

### **4.3.3 Geotechnical Conditions and Foundation Design**

Geological stability and properties were considered during the technical evaluation that informed the site identification process. Due to the underlying geology not offering sufficient strength to support a front stack of more than 15 m [Kusile 10 year Ash Stability Report, August 2009], it was assumed that a multi-level stacker setup, similar to the one at Majuba power station (another Eskom power station in Mpumalanga), would be used.

More detailed geotechnical studies are proposed for the sites identified during the Scoping and EIR phase in order to inform the foundation design and the selection of the preferred site.

## **4.4 PROPOSED ASSOCIATED INFRASTRUCTURE**

The following associated infrastructure is envisaged for the Kendal 30 year ash disposal facility.

### **4.4.1 Clean and Dirty Water Separation (return water dams and trenches / drains)**

A clean and dirty water separation system will be designed for the facility dependant on the slope. Dirty storm water from the facility will be collected and channelled to a return water dam. The capacity requirements will be determined by an engineering investigation that will be undertaken during the EIA phase. Clean water cut-off canals/trenches/drains will be established to divert clean water back into the natural environment.

### **4.4.2 Pipelines or canals**

A network of pipelines or canals, design dependant, will be installed to, amongst others, transport water to and from the return water dams, transport water for dust suppression and to transport water collected from the waste facility to the return water dam.

### **4.4.3 Internal and external Access Roads**

Access roads will be established, initially to allow for construction vehicles, but some of these roads may be retained post construction to allow for maintenance of the facility. The location of these access roads has not yet been determined, and will form part of the next phase of assessment.

### **4.4.4 Fencing and Access Control**

It is envisaged that the access roads and disposal site will be fenced off for safety and security reasons.

#### 4.4.5 Storm Water Drainage and Monitoring Boreholes

As part of the site design, on-going monitoring of the site storm water drainage features will be undertaken, and additional monitoring boreholes to be installed for monitoring, if required. Monitoring will be conducted with reference to applicable standards. As part of the conceptual designs a storm water management plan will be developed to ensure that storm water is adequately managed.

#### 4.4.6 Relocation of existing Service Infrastructure

Any services on the proposed property shall be identified as part of the impact assessment phase and the rerouting of any of these services will be investigated and potential corridors identified. It is envisaged that wherever possible the rerouting of services will be addressed as a component of this EIA and not as a separate study undertaken at a later date.

#### 4.4.7 Construction area

The construction area for the ash disposal site will include the footprint of the disposal site, as well as any additional features required as part of the construction i.e. an access road, conveyors, new pipelines/canals, and areas to be rehabilitated. At this stage the full size of the site and associated infrastructure is estimated to be in the order of 1000 ha. The exact surface area is still to be determined during the design of the facility. Construction activities will be limited to the areas mentioned above.

### 4.5 MAJOR ACTIVITIES OF THE PROJECT EXECUTION

The major phases for the proposed project (including the EIA), prior to and after construction, are explained in the table below.

**Table 4-2: Major phases for the proposed project.**

NO	PHASE	ACTIVITY DETAILS
<b>PRECONSTRUCTION PHASE</b>		
1	Application and Scoping	The Scoping Phase, as its name implies, determines the scope of the project appropriately (i.e. alternatives, consultation requirements, extent of specialist studies, impact assessment methodology and approach, issues / concerns to be addressed, and reporting for decision-making). This is undertaken through an inclusive stakeholder engagement process, which allows for all sectors of society to be involved, including the proponent, the various spheres of government, the regulator, the immediately affected parties, interest groups or individuals, the consulting team, and the public at large. This phase of the project is structured and minimum requirements are regulated through legislation.
2	EIA	An EIA is being undertaken to ensure that all environmental, social and cultural impacts are identified. During this phase the specialist studies as identified during the Scoping Phase are undertaken, and issues / concerns identified are addressed. This phase of the project is also undertaken in consultation with all stakeholder groups as identified during the Scoping Phase. This phase of the project is a necessary precursor to obtaining EA from the CA, without which the project cannot proceed any further.
3	Approval from authorities.	
4	Appeal	Once authorities have issued their decision an appeal process will commence. During

NO	PHASE	ACTIVITY DETAILS
		this phase both the proponent and other stakeholders have the opportunity to appeal the decisions, or conditions thereof.
5	Property acquisition (if required)	Purchase of property if the chosen site is not on existing Eskom property.
6	Structure foundation investigation	Investigations will be undertaken to ensure that the foundation specifications are in line with the underlying geology.
<b>CONSTRUCTION PHASE</b>		
7	Site establishment	The first stage of the construction phase is the establishment of contractors on site. This must be undertaken in line with the conditions of EA.
8	Relocation of services	The relocation of services is imperative, and will be undertaken during the initial phases of the project to ensure that the supply of services is not interrupted.
9	Structures	<b>Fencing</b> - Provide a safe and secured waste disposal area to restrict access and prevent injuries to livestock.
		<b>Formation and lining</b> - Provide a ground formation/lining compacted to the correct standard on which to build the ash disposal site.
		<b>Drainage</b> - Provide water drainage channels within the site.
10	Rehabilitate facilities made redundant.	Rehabilitation of facilities that are made redundant, such as pipelines / pump stations that will no longer be required, due to the implementation of this project.
11	Rehabilitate the construction area	The area where construction activities have taken place must be rehabilitated to minimise environmental degradation by following the Environmental Management Programme that is compiled in conjunction to the EIA.
<b>OPERATIONAL PHASE</b>		
12	Operations for continuation of ash disposal	Current operations to be continued onto the proposed new portion by means of adjusting the spreader and stacker.
13	Rehabilitation and closure of existing ash dam.	The current and continuous ash disposal facility shall be rehabilitated as required.
<b>DECOMMISSIONING AND CLOSURE PHASE</b>		
14	Decommissioning of the ash site and its infrastructure	Once the ash disposal site is no longer in use and is no longer required a decommissioning process may commence.

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## 5 CONSIDERATION OF ALTERNATIVES

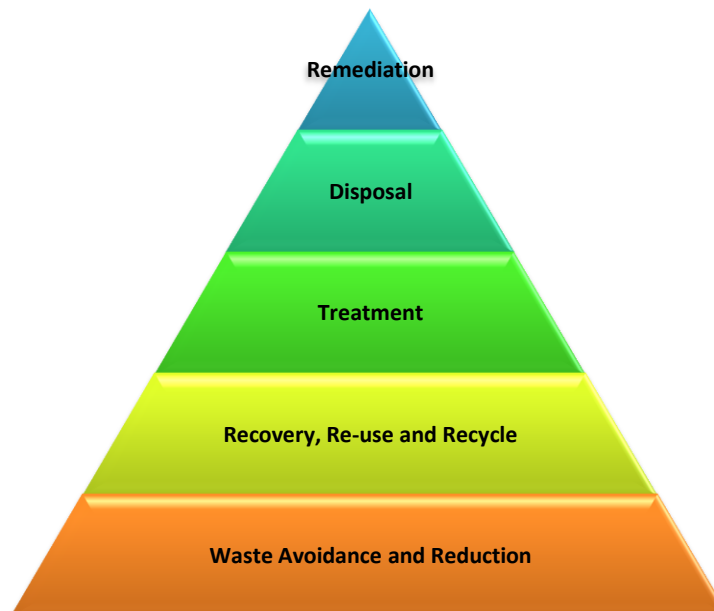
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The optimal goal in establishment of a waste disposal facility and associated infrastructure (such as conveyors, pipelines and return water dams) is to effectively minimise the negative environmental and social impact while ensuring safety, reliability, and cost savings for the facility.

A structured approach was utilised to ensure that a defensible approach was utilised in the consideration of alternatives. Initially, the project team determined the need and motivation for the proposed project (NEMA, 1998). Once the need was established, potential solutions that can fulfil that need were identified; at this point no alternative solutions had been excluded. When dealing with waste related projects, this discussion typically is structured around the waste hierarchy (National Management Waste Strategy [NMWS], 2010) as shown in Figure 5.1.

The essence of the approach is to group waste management measures across the entire value chain in a series of steps, which are applied in a descending order of priority. The foundation of the hierarchy, and the first choice of measures in the management of waste, is waste avoidance and reduction. Where waste cannot be avoided, it should be recovered, reused, recycled and treated (NMWS, 2010). Waste should only be disposed of as a last resort. Remediation on the other hand is part of the rehabilitation process and is on-going until the decommissioning of the power station.

In working through these systematic hierarchical steps alternative solutions are generated. Waste management could be a single solution best suited to the type of waste, or a combination of several solutions. In each of these steps alternatives can be evaluated and excluded as being not feasible. Once feasible solutions are identified a process of evaluation can commence to evaluate the environmental, social, and technical acceptability of these solutions for the site may be considered to improve the positive aspects or reduce the negative aspects of each solution. A graphical representation of the approach utilised is shown in Figure 5-2.



**Figure 5-1: Waste hierarchy (NMWS, 2010)**

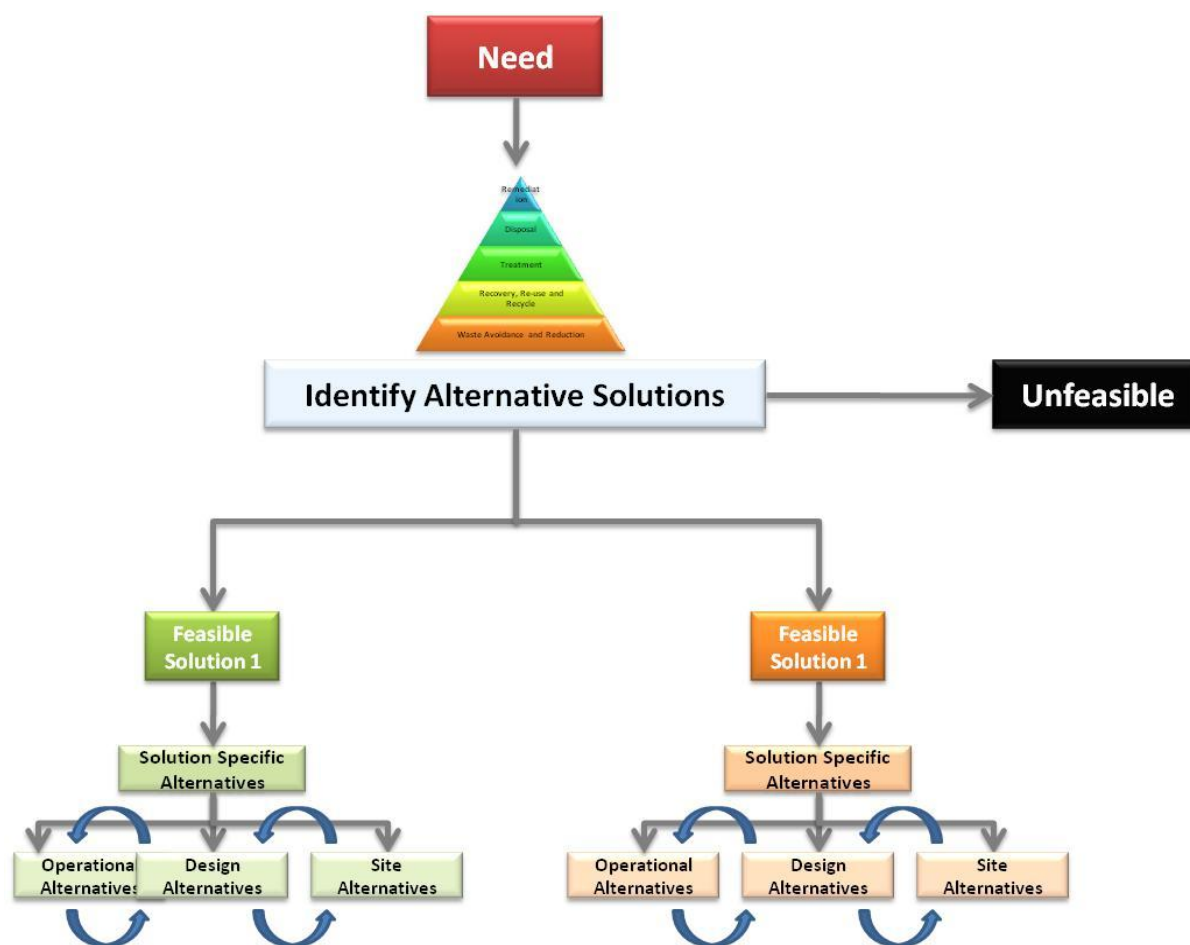


Figure 5-2: Alternatives identification and evaluation process.

## 5.1 ALTERNATIVE WASTE MANAGEMENT SOLUTIONS

The current status, available information, and further studies required based on the implementation of the Waste Hierarchy is summarised in Figure 5-1. Based on the information available to date the following alternative solutions to the ash waste stream exists:

- **Avoidance and Minimisation:**
  - None. Kendal Power Station has been in operation since 1993, therefore the generation of the ash waste stream is unavoidable.
- **Recovery / Recycling / Re-use:**
  - Use of ash in construction activities i.e. as aggregate in road construction, or as a cement extender;
  - Other applications include cosmetics, toothpaste, kitchen counter tops, floor and ceiling tiles.
- **Treatment**
  - No feasible alternatives are currently available to treat the ash waste.

- 
- **Disposal**
    - Disposal to a suitably designed ash disposal facility.
  - **Remediation**
    - Capping of the new facility at the end of life.

Due to the large volumes of ash that will be generated it has been concluded that a dry ash disposal facility will be required, even with the implementation of all the other alternatives.

## **5.2 ALTERNATIVES SPECIFIC TO THE ASH DISPOSAL FACILITY**

### **5.2.1 Introduction**

A number of alternative types are generally associated with EIAs. In terms of the EIA Regulations published in Government Notice R543 of 2 August 2010 in terms of Section 24 (5) of the National Environmental Management Act (Act No. 107 of 1998), the definition of “alternatives” in relation to a proposed activity, refers to different means of meeting the general purpose and requirements of the activity, and may include alternatives to:

1. The property on which or location where it is proposed to undertake the activity;
2. The type of activity to be undertaken;
3. The design or layout of the activity;
4. The technology to be used in the activity;
5. The operational aspects of the activity; and
6. The option of not implementing the activity.

Further, in terms of NEMA and the EIA Regulations, feasible and reasonable alternatives have to be considered within the Environmental Scoping Study, including the ‘No Go’ option. All identified, feasible and reasonable alternatives are required to be identified in terms of social, biophysical, economic and technical factors. Feasible and reasonable alternatives identified during the Scoping Phase are discussed in more detail below.

### **5.2.1 Location Alternatives**

A detailed site screening and identification process was undertaken to identify the most feasible site areas within a maximum radius of 10 km around Kendal Power Station. This report is attached in Appendix F.

A four phased approach was used to attain the most feasible sites within the study area. This included:

1. Identification of the study area;
2. Defining the developable areas;



3. Undertaking an environmental, social and technical site screening exercise; and
4. Rating and ranking of the identified site areas according to the identified site sensitivities (Overlay analysis).

#### Identification of the study area

The study area was determined by identifying all farm and erf portions potentially affected within a 7 km radius from the Kendal Power Station. A maximum distance of 10 km was additionally investigated after realisation that the constraints in the study area of 7 km may not provide a feasible number of potential sites.

#### Defining the developable area (Negative mapping)

The next step in the process was to define the developable areas. This was done by using negative mapping in such a way as to exclude all areas within the study area that conflict with the proposed development. A draft list of “Limiting Factors” was drawn up and is shown in Table 5-1 below.

The preliminary desktop assessment of the study site from existing high-level environmental, social and cultural GIS layers, and Google Earth Imagery and 1:50000 topographical maps indicated that the following features were not detected within the study area:

- Cemeteries
- Churches
- Military Facilities
- Known Archaeological sites
- Monuments, and heritage and culturally significant areas
- Protected Areas and Parks

The following No-Go areas where no ash s may be placed were identified from the outset of the exercise:

- New Largo footprint, including a 100 m buffer;
- N12 National Road, including a 100 m buffer;
- Rail reserve across the study area, including a 50 m buffer;
- Wilge River, including a 500 m buffer; and
- High density residential areas – Wilge settlement, Phola settlement, Ogies and New Largo settlement, including a 100 m buffer.

After exclusion of the No-Go areas above, the remaining area was subjected to a negative mapping exercise. The objective of the negative mapping exercise was to identify important features (environmental, social and technical) in the landscape that should not be impacted by the proposed disposal facility. The GIS layers containing these features are shown in Table 5-1.

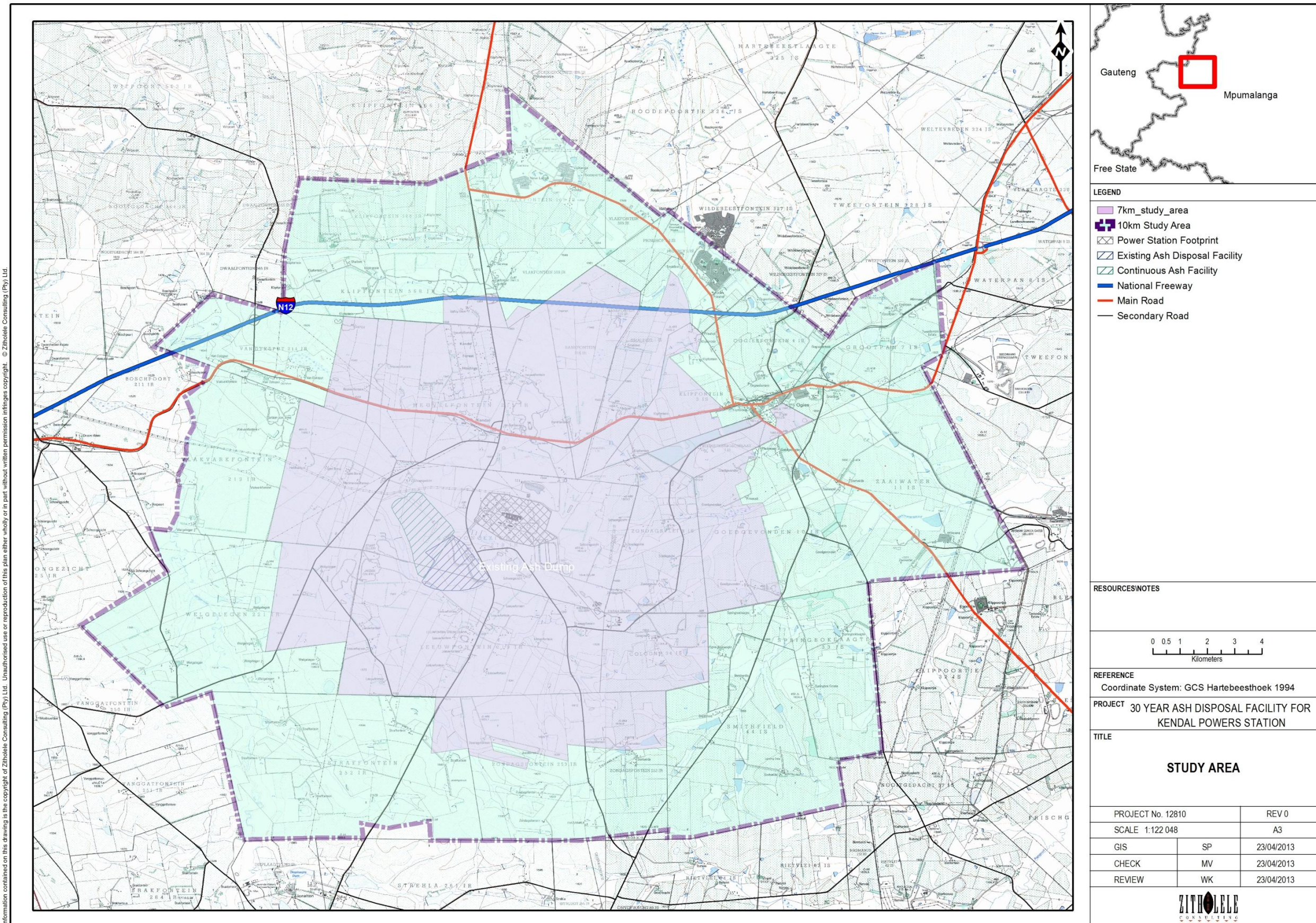


Figure 5-3: Study area for the Kendal 30 year ash disposal facility

In the first instance the feature footprint and substantial buffer for each feature were excluded from the developable area layer in the negative mapping exercise. The buffer width was informed either by legislation, for example the 500 m buffers around wetlands and rivers as stipulated by the National Water Act, or stipulated by existing guidelines and documentation for example pertaining to servitude widths for roads and transmission lines, or dictated by best practice and experience of the environmental assessment practitioner.

The philosophy in this first iteration was thus that if sufficient areas of suitable sizes could be identified, most of the sensitivities and important features in the landscape would already have been avoided. If no areas could be identified, then the buffers of selected features would be reduced and potential areas again investigated. With each iteration the buffers around the landscape feature would be reduced until an assigned minimum value for each feature is reached. For some features such as minor roads and transmission lines, it was assumed that these could be relocated if no other alternatives existed, however for rivers and wetlands it was assumed that they cannot be relocated. Four iterations were investigated before sufficient number and size developable areas were identified.

The following iterations of the negative mapping took place:

- Iteration 1 – Buffers as per Table 5-1, no suitable areas were identified;
- Iteration 2 – Farmsteads, schools, powerline and roads buffers removed, no suitable areas identified;
- Iteration 3 – Built buffers reduced to 100 m, 1 potential site, 1 combination site (2 smaller areas) were identified; and
- Iteration 4 – Wetland and river buffers reduced to 100 m, several potential areas.

**Table 5-1: Areas of avoidance. Red items indicate the identified No-Go areas.**

Natural Environment				
Layer	Iteration 1	Iteration 2	Iteration 3	Iteration 4
<b>Wilge River</b>	<b>500 m buffer</b>			
Rivers / Streams	500 m	500 m	500 m	100 m
Wetlands / Dams	500 m	500 m	500 m	100 m
Red Data Species	100 m	100 m	100 m	100 m
Protected areas and parks	None in study area			
Social Environment				
<b>High density residential areas</b>	<b>500 m buffer</b>			
Farmsteads	1 km	☒	☒	☒
Schools	1 km	☒	☒	☒
Cemeteries, Churches, Monuments, and heritage and culturally significant areas	Not identified in study area from high level scan			
Built Environment / Engineering Requirements				
<b>New Largo footprint</b>	<b>100 m buffer</b>			
Open Pits	100 m	100 m	☒	☒

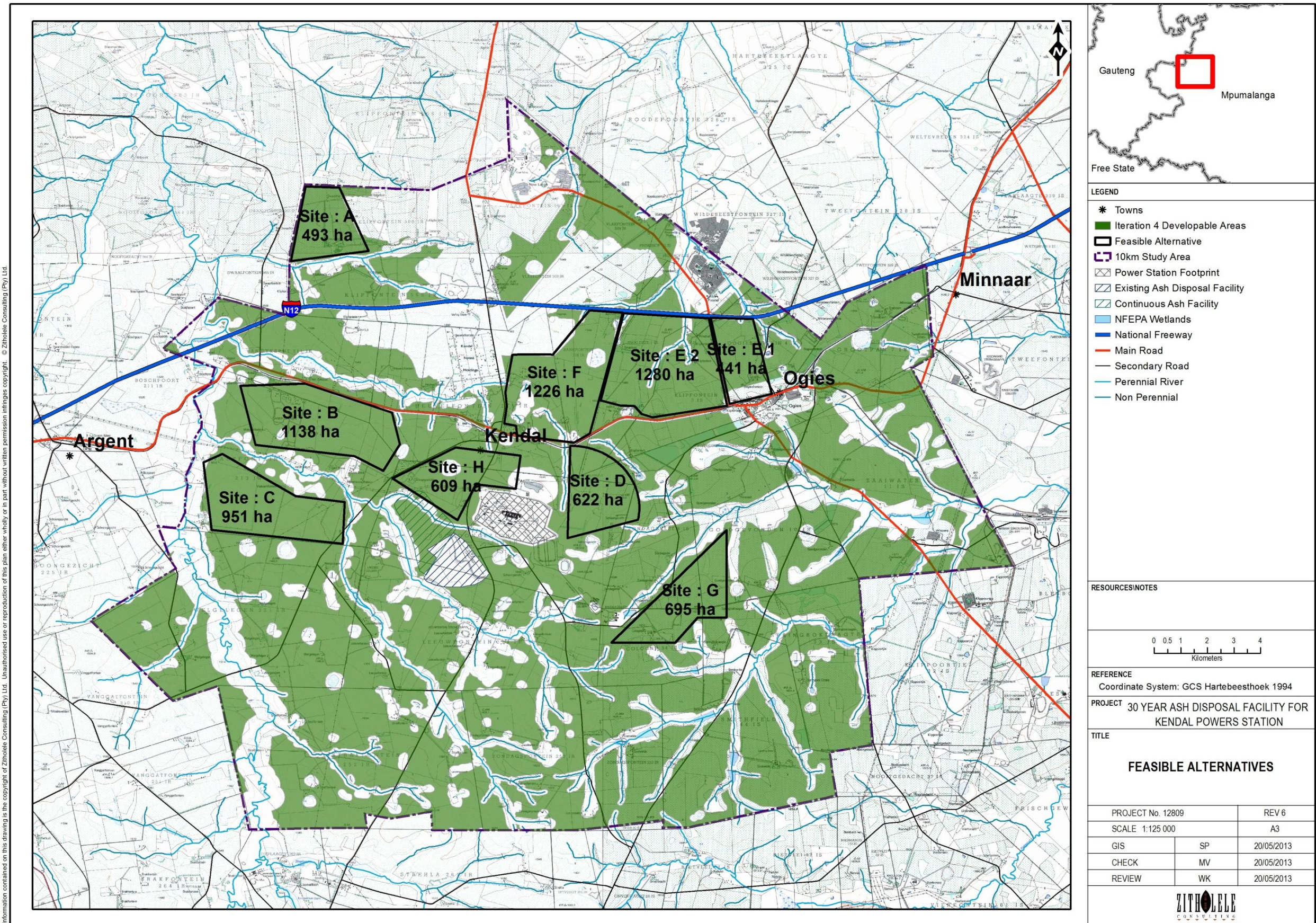
Natural Environment				
Layer	Iteration 1	Iteration 2	Iteration 3	Iteration 4
Undermined Areas	100 m	100 m	☒	☒
<b><i>Richards Bay Rail</i></b>	<b><i>50 m buffer</i></b>			
Other Railway Lines	50 m	50 m	☒	☒
<b><i>N12 National Road</i></b>	<b><i>100 m buffer</i></b>			
Tarred Roads	100 m	☒	☒	☒
Farm Roads	100 m	☒	☒	☒
Overhead Power lines	Serv	☒	☒	☒
Gas Pipeline	Serv	☒	☒	☒
Water Pipeline	Serv	☒	☒	☒
Conveyor Belt	50 m	☒	☒	☒

In order to determine the potential footprint requirements of a potential ash disposal site, the following technical specifications were assumed:

- Ash production would continue in the range of 576 223 m<sup>3</sup> per month;
- Total ash produced over the life of the ash disposal facility would be in the order of 256 million m<sup>3</sup>;
- The maximum design life of the facility would be 37 years;
- The facility side slopes should be 1:5.

Using the technical specifications above, a minimum and maximum facility footprint scenario was developed by the technical team. Assuming a facility height of 50 m, which has proven feasible at other dry ash disposal facilities in the region, the maximum footprint scenario would require a facility footprint of approximately 770 ha. For the minimum footprint scenario a maximum height of 100 m would require a facility footprint of approximately 520 ha. The viability of the minimum footprint scenario is however dependant of the underlying geotechnical conditions in the study area. In both these scenarios the calculated facility footprints did include 15 % additional area to allow for topography variability, and additional 50 ha to house return water dams, roads, conveyor alignment, site camp, etc.

The negative mapping exercise identified 9 potential developable areas within the study area as shown in Figure 5-4. Site area A was fatally flawed at this stage due to the insufficient size of the area.



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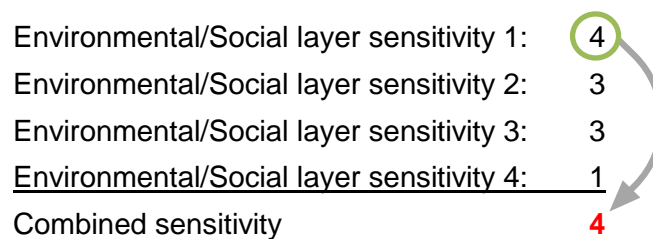
Environmental, Social and Technical Sensitivity Analysis

Each of the developable areas identified were rated according to their environmental and social sensitivity, and their technical / geotechnical suitability. Several environmental and social layers were used to calculate the environmental and social sensitivity of the proposed developable areas. These layers can be viewed in the full site identification report included in Appendix F. The sensitivity of the features in each layer was rated according to a rating scale ranging from 1 to a maximum of 5. The rating scale is provided in Figure 5-2 below.

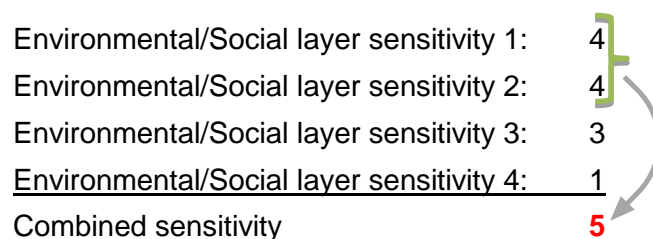
**Table 5-2: Sensitivity rating scale used for rating of the site elements**

Rating	Description
1	Very Low sensitivity
2	Low sensitivity
3	Moderate sensitivity
4	High sensitivity
5	Very High sensitivity

In the next step of the sensitivity analysis, the rated layers were overlaid on top of one another in a Geographical Information System package (ArcGIS 10.1). Where several components overlaid the same geographical area, the highest sensitivity rating of all of these layers was assigned to the particular area (or polygon). In instances where the highest rating was shared between 2 or more layers, the overall sensitivity rating of the area (or polygon) was bumped to the next level to ensure that the individual sensitivities in each layer translated into a cumulative higher sensitivity. This is described in a simplified manner below.



However, with 2 or more sensitivity layers with the same rating the combined rating is as follow:



The result of the sensitivity analysis includes a separate sensitivity layer for the environmental and social components. The environmental and social sensitivity layer was

subsequently “clipped” with the developable areas layers to exclude all the No-Go areas identified at the start of the exercise.

### Overlay analysis

During the overlay analysis the sensitivities within the identified areas was considered. The environmental and social sensitivity layers were “clipped” with the identified areas and the highest sensitivity per site element was determined for each site element.

The ratings per site element were summarised in a table format where the un-weighted score represented the sum of all the sensitivity ratings and the weighted scores represented the sum of all the sensitivity ratings after a weighting per element had been factored into each rating.

Based on the combined ratings for the environmental, social and technical elements, and further discussion with the specialist and Eskom technical teams the following site areas was identified (in order of feasibility) as the most feasible site alternatives to be investigated further during the impact assessment phase:

1. Site area C;
2. Site area F;
3. Site area D; and
4. Site area B.

### **5.2.2 Operational Alternatives**

#### Footprint optimisation and multi-stacking

Operational alternatives include the potential optimisation of the ash facility footprint through detailed engineering of the ash facility. If the geotechnical conditions at the sites allow the footprint of the proposed ash facility can be reduced by increasing the height of the facility. This strategy is however further dependant on other factors such as to topography, visual and air quality impacts. These factors will be investigated further in the EIR phase of the project where more clarity will be gained on the feasibility of footprint optimisation and multi-stacking arrangements.

### **5.2.3 Design Alternatives of the Ash Facility**

#### Single facility vs. Multiple facilities

A single facility is more desirable because it ultimately reduces the footprint requirement for the entire waste stream. In addition it is more cost effective. However, multiple facilities were considered in the event that a single facility of sufficient size could not be found.

#### Minimum standards

The design requirements for the ash facility are in the process of being revised by government (Minimum Requirements to Waste Regulations), and the most recent design requirements (DEA's draft waste regulations, 2011) have not yet been promulgated. Appropriate and approved design standards will be utilised when designing the facility.

#### Footprint of the facility

It is desirable from an environmental perspective that the footprint of the facility be reduced from the outset to the smallest possible footprint and as such supports the implementation of the multi-stacking option as the preferred alternative.

#### Expansion of the current facility

The application for environmental authorisation for expansion of the current facility is being undertaken as a separate application to the DEA. The application currently has identified three options that would result in the increase of approximately 10, 14 and 17 years (from a benchmarked date in September 2012) in the operating capacity of the existing ash facility. It is thus more desirable to maximise the disposal of ash on the existing capacity (i.e. extension of 17 years) where there is already a resultant impact and to confine the impacts to a close proximity around Kendal Power Station, than sterilising a large footprint away from the power station with a maximum disposal option on the new disposal facility.

The feasibility of the proposed "piggybacking" options is currently being evaluated, however detailed investigation of the maximum disposal facility option including "piggybacking" Continuous ash disposal option 2C) will be further investigated in this study as an optimisation strategy to maximise the existing disposal facility's life span, thereby minimising the footprint of a second disposal facility (Kendal 30 year ash project) elsewhere within the study area identified for the Kendal 30 year ash disposal project.

### **5.3 THE "NO GO" PROJECT ALTERNATIVE**

The No Project or "No-Go" alternative will also be assessed further in the EIA process. This alternative presents that the power station will not have an authorisation for ashing to end of



station life. This means that the station would have to stop generating electricity, and ash, since ash is waste generated from electricity generation.

Should the “No-Go” alternative be the preferred alternative, Eskom will have to shut-down the Kendal Power Station. The environmental and social impacts will be assessed and compared to the aforementioned alternatives.

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## **6 SCOPING PROCESS**

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### **6.1 PROJECT INCEPTION PHASE**

On appointment, Zitholele arranged a project meeting between Eskom and the Zitholele project team. During the inception meeting the following was discussed:

- Project Scope and Requirements;
- Project Schedule;
- Identification of key stakeholders and role players; and
- Discussion of the identification of ash disposal site.

### **6.2 COMPILATION, SUBMISSION AND ACKNOWLEDGEMENT OF APPLICATION FORMS**

The Integrated EIA and WML application form (attached as Appendix B) for the proposed project was submitted to the DEA on 3 January 2013 and accepted on 31 January 2013. In DEA's acknowledgement of receipt an updated project schedule was requested. An updated project schedule was sent to the department on 4 April 2013, and receipt of the updated project schedule from DEA received on 19 April 2013. This correspondence is also included in Appendix B.

### **6.3 PRE-APPLICATION CONSULTATION WITH RELEVANT AUTHORITIES**

Initial consultation with the Department of Environmental Affairs was undertaken through email correspondence. In this manner it was established that:

- This application will be considered by the Integrated Permitting System sub-directorate of the DEA; and
- An integrated EA and WML process must be undertaken.

Pre-consultation with the Department of Water Affairs (Regional) in Bronkhorstspuit, Mpumalanga was undertaken to introduce the project and to present the site identification process that was followed and subsequent sites that was identified. Feedback from the DWA include:

- The department is in agreement with the site identification process followed; and
- The department is in agreement with the four alternative site areas identified at conclusion of the site identification process.

#### **6.4 SITE SCREENING, IDENTIFICATION AND CONSIDERATION OF ALTERNATIVES**

This phase consisted of:

- The assessment of the receiving environment based on high level information, data and GIS layers;
- The identification of developable areas within the study site that avoids major environmental, social and technical sensitivities on site;
- The identification of alternative solutions to meeting the project need; and
- Identification of the most feasible site solutions.

The results of this phase have been discussed extensively in Chapter 5.

#### **6.5 IDENTIFICATION OF STAKEHOLDERS**

The identification of key stakeholders was done in collaboration with Eskom, the local municipalities and other organisations in the area. Having undertaken work previously in the area, Zitholele already have a stakeholder database that was used as a departure point for this project. The identification of stakeholders is on-going and is refined throughout the process. As the “on-the-ground” understanding of affected stakeholders improves through interaction with various stakeholders in the area the database is updated.

The stakeholders’ details are captured in an electronic database management software programme that automatically categorises every mailing to stakeholders, thus providing an on-going record of communications - an important requirement by the authorities for public participation. In addition, comments and contributions received from stakeholders are recorded, linking each comment to the name of the person who made it.

According to the NEMA EIA Regulations, a register of I&APs (Regulation 55 of GNR 543) must be kept by the public participation practitioner. Such a register has been compiled and will be updated with the details of involved I&APs throughout the process (See Appendix D).

#### **6.6 INITIATION OF PUBLIC PARTICIPATION**

The opportunity to participate in the EIA and the availability of the draft scoping report for comment was announced between 23 and 30 November 2012 as follows:

- Advertisements were placed in the following newspapers (Appendix C):

**Table 6-1: Advertisements placed during the announcement phase**

NEWSPAPER	DATE
Streeknuus	30 November 2012
Witbank News	30 November 2012
The Echo	30 November 2012
Springs Advertiser	29 November 2012
Citizen	28 November 2012
Beeld	28 November 2012

- Registered mail and emails to identified potentially affected stakeholders – these include adjacent and surrounding landowners. A notification letter, map of the site, description of the proposed site and a comment sheet. Please refer to Appendix D for proof of notification)
- A Background Information Document (BID) containing details of the proposed project, including a map of the project area, a registration / comment sheet and a letter of invitation to stakeholders to become involved was distributed via mail and email to all potential interested and affected stakeholders. See Appendix E.

**Figure 6-1: BID documents placed on site**

- Site notice boards were positioned at prominent localities on 23 November 2012 on all roads surrounding the site area. These notice boards were placed at conspicuous places and at various public places (Figure 6-2). See Appendix C which provides a detailed register of where the site notices were placed (photos included) and a map indicating the placement of the notices.



Kendal Power Station Ash Plant



Road Outside Leeufontein



Ogies Public Library



**Figure 6-2: Site notice boards were put up in the area.**

- Stakeholders were also invited to visit the Zitholele/Eskom websites where all documents for public review are available – <http://www.zitholele.co.za/>, [www.eskom.co.za/eia](http://www.eskom.co.za/eia).

## 6.7 NOTIFICATION OF LAND-OWNERS

During the announcement phase of the Kendal 30 Year Ash Disposal Facility EIA the details of land owners within a 10 km radius that could possibly be affected by the project were notified, based on contact details obtained from the deeds registry. Personalised emails and letters, to those land owners without email addresses, were sent to land owners.

## 6.8 COMMENTS AND RESPONSES REPORT

The issues raised in the announcement phase and draft scoping report comment period shall be captured in an Comments and Responses Report (CRR). The CRR will be updated to include additional I&AP contributions that may be received as the Scoping Phase proceeds, and as the findings of the EIA become available. The following versions of the CRR shall be compiled (every version is an update of the previous version):

- Version 1 appended to the Final Scoping Report and will include all comments received during the notification and draft scoping period;
- Version 2 appended to the Draft Environmental Impact Assessment Report; and
- Version 3 appended to the Final Environmental Impact Assessment Report.

## 6.9 SCOPING OF SPECIALIST STUDIES

During the Scoping Phase it is the responsibility of the EAP to determine the scope of specialist studies that are to be undertaken with input from stakeholder during the subsequent EIA phase of the project. Zitholele have compiled Terms of Reference (ToR) for identified specialist studies, based on the availability of published materials; the size and magnitude of the project; anticipated impacts associated with the project; comments

received to date, and experience with other related projects. These ToRs for specialist studies are documented in Chapter 10.

## 6.10 DRAFT SCOPING REPORT - OBTAINING COMMENT AND CONTRIBUTIONS

The Draft SR is available for public review from **Thursday, 6 June 2013 to Thursday, 18 July 2013**. The availability of the Draft SR for public review was announced in the following manner:

- Advertisements were placed in the following newspapers (Appendix C):

**Table 6-2: Advertisements placed during the Scoping Phase**

NEWSPAPER	DATE
Streeknuus	5 June 2013
Witbank News	5 June 2013
The Echo	6 June 2013
Springs Advertiser	5 June 2013
Citizen	5 June 2013
Beeld	5 June 2013

- Registered mail and emails to identified potentially affected stakeholders – these include adjacent and surrounding landowners. A notification letter, map of the site, description of the proposed site and a comment sheet. Please refer to Appendix D for proof of notification).

The following opportunities are available during the Scoping Phase for comment and contribution by registered I&APs:

- Completing and returning the registration/comment sheets on which space was provided for comment:
- Providing comments telephonically, by email or per letter to the public participation office; and
- Attending public meeting that has been widely advertised (see table below) and raise comments there.

**Table 6-3: Two community public meetings have been advertised and will be held as part of the public review period of the Draft Scoping Report**

INTEREST GROUP	DATE	TIME	VENUE AND ADDRESS
Phola Community	Thursday, 20 June 2013	16:00	Venue for the meetings shall be at the Phola Community Hall in Phola.
Community of Ogies, Heuwelfontein smallholdings, Kendal Power Station employees, and any other residents and land owners within the 10 km radius of the Kendal Power Station	To be announced	To be announced	To be announced

The above mentioned meetings shall be held separately but will contain and address the same information. The reason is to accommodate the needs, perceptions and availability of the different interest groups.

Issues relevant to the project will be considered and where necessary will be carried forward into the Impact Assessment phase. The minutes of the public meeting will be attached to the Final Scoping Report in the form of a Comments and Response Report.

The DSR will be updated based on comments received from all stakeholders (i.e authorities, land owners, community organisations, and registered I&APs).

This DSR was made available and distributed for comment as follows:

- Placed in public venues within the vicinity of the project area (these are listed in Table 6-4 below);
- Published on the Eskom and Zitholele websites;
- Mailed to I&APs who requested a copy of the report; and
- Copies will be made available at the stakeholder meetings.

I&APs can comment on the report in various ways, such as completing the comment sheet accompanying the report, and submitting individual comments in writing or by email.

**Table 6-4: List of public places where the Draft Scoping Report is available**

Contact	Location	Contact
<b>Printed Copies</b>		
Phola Public Library		013 645 0094
Ogies Public Library, 61 Main Street, Ogies		013 643 1150
Delmas Public Library		013 665 2425
Emalahleni Public Library – 19 OR Thambo Street		013 653 3116
Kungwini Public Library		013 932 6305
Kendal Power Station – Security Reception		013 647 6002
<b>Electronic Copies</b>		
Emmy Molepo	<a href="http://www.eskom.co.za/eia">www.eskom.co.za/eia</a> Kendal 30-year ash	011 800 4211
Patiswa Mnqokoyi	<a href="http://www.zitholele.co.za">www.zitholele.co.za</a>	011 207 2077
Patiswa Mnqokoyi	CD available on request via email from Zitholele Consulting.	Phone 011 207 2074 or send email request to <a href="mailto:patiswam@zitholele.co.za">patiswam@zitholele.co.za</a>

## 6.11 FINAL SCOPING REPORT

Using the comments received from stakeholders the Draft SR will be updated and finalised. All comments received will be added to the CRR and attached to the Final SR as an appendix.

The Final SR once updated with additional issues raised by I&APs may contain new information. The Final SR will be submitted to the DEA for consideration and decision with regards to acceptance of the Plan of Study. The Final SR will be distributed to those I&APs who specifically request a copy, but will be available at the same public venues as the Draft Report.



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**7 ISSUES IDENTIFIED DURING THE SCOPING PHASE**

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No issues or comments have been raised till date. All comments and issues raised by key stakeholders and Interested and Affected Parties shall be included in the Final Scoping Report.

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## **8 RECEIVING ENVIRONMENT**

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The site environment is described in the section below.

### **8.1 CLIMATE**

#### **8.1.1 Data Collection**

Climate information was attained using the climate of South Africa database. Due to the close vicinity of the Kusile Power Station, the Air Quality Impact Assessment report which was done by Airshed Planning Professionals<sup>1</sup> for the Phola-Kusile overland conveyor system was used. The weather related information extracted from the weather report was obtained from the Kendal 2 monitoring station, which is in close proximity to Kendal Power station.

#### **8.1.2 Regional Description**

The site area displays warm summers and cold winters typical of the Highveld climate. The region falls within the summer rainfall region of South Africa, rainfall occurs mainly as thunderstorms (Mean Annual Precipitation - 662 mm) and drought conditions occur in approximately 12 % of all years. The mean annual potential evaporation of 2 060 mm indicates a loss of water out of the system.

The area experiences frequent frosts, with mean frost days of 41 days. In addition to frost the area is prone to hail storms during the summer time. Winds are usually light to moderate, with the prevailing wind direction north-westerly during summer and easterly during winter.

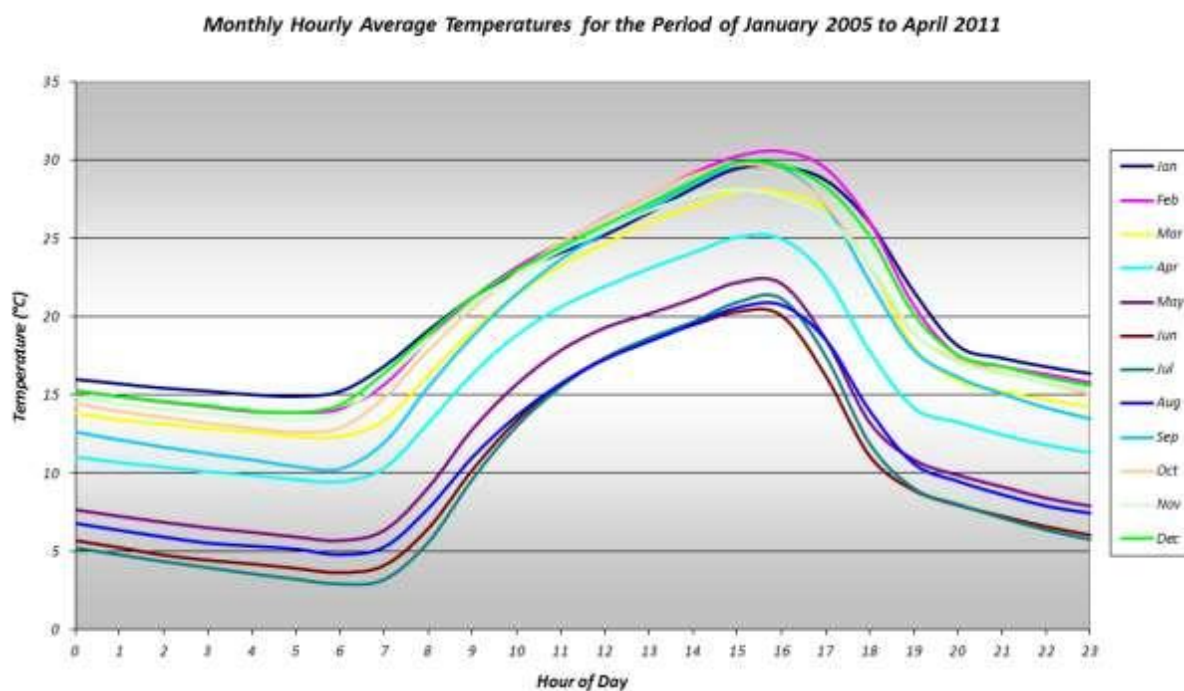
#### Ambient Temperature

Air temperature is important, both for determining the effect of plume buoyancy (the larger the temperature difference between the plume and the ambient air, the higher the plume is able to rise), and determining the development of the mixing and inversion layers. Minimum, mean and maximum temperatures for Kendal 2 for the period January 2005 – April 2011 are illustrated in Figure 8-1 below.

Annual average maximum, minimum and mean temperatures for Kendal 2 are given as 27°C, 10°C and 16°C, respectively, based on the January 2005 to April 2011 record. Average daily maximum temperatures range from 31°C in December to 20°C in June, with daily minima ranging from 15°C in January to 3°C in July.

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<sup>1</sup> Air Quality Impact Assessment for the 'AIR QUALITY SPECIALIST IMPACT ASSESSMENT FOR THE PROPOSED NEW PHOLA-KUSILE COAL CONVEYOR, NKANGALA DISTRICT MUNICIPALITY, MPUMALANGA'. Report No.: APP/09/SYN-03B Rev 0.2, 2011.

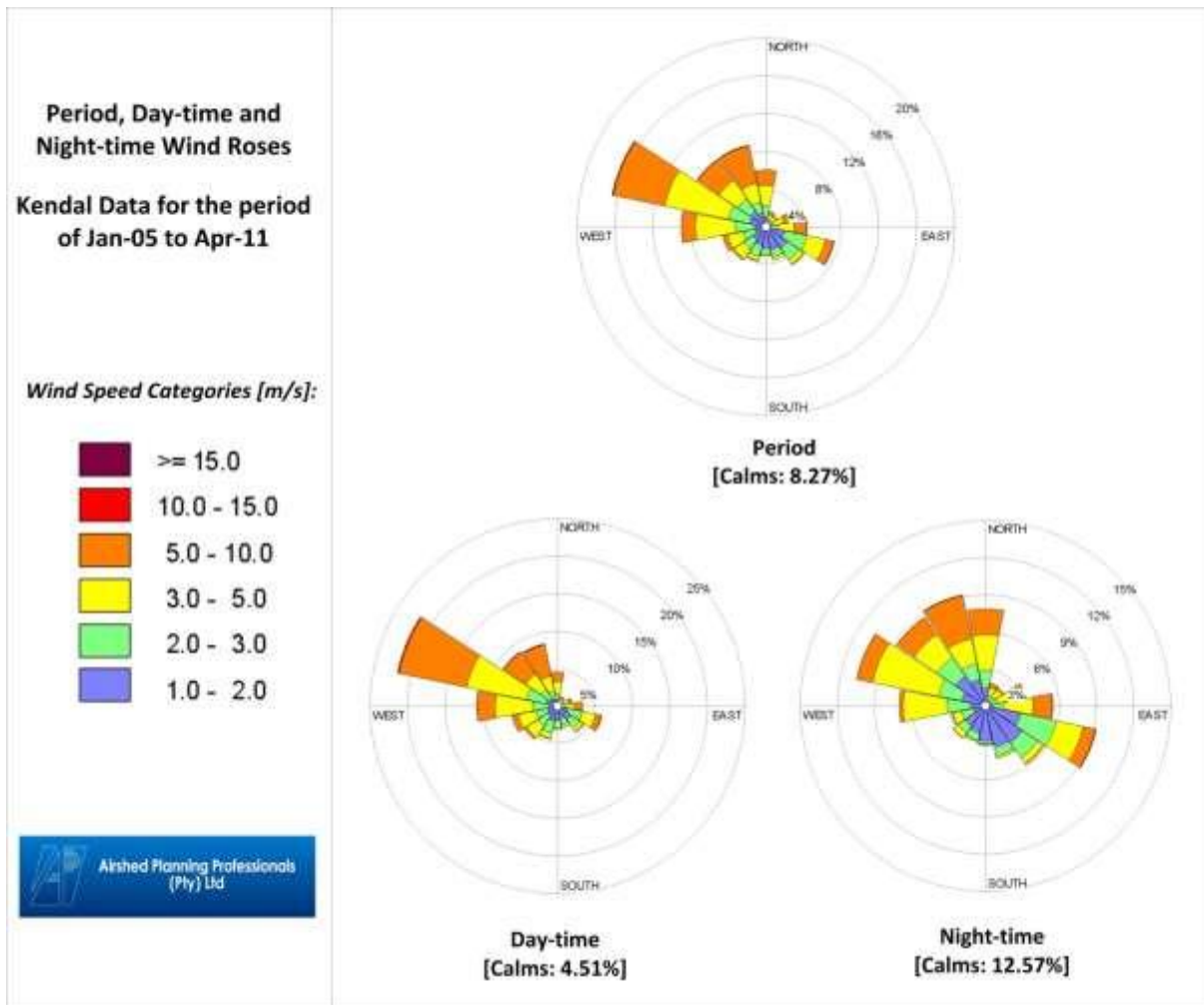


**Figure 8-1 - Diurnal temperature profile at Kendal 2 monitoring station for the period**

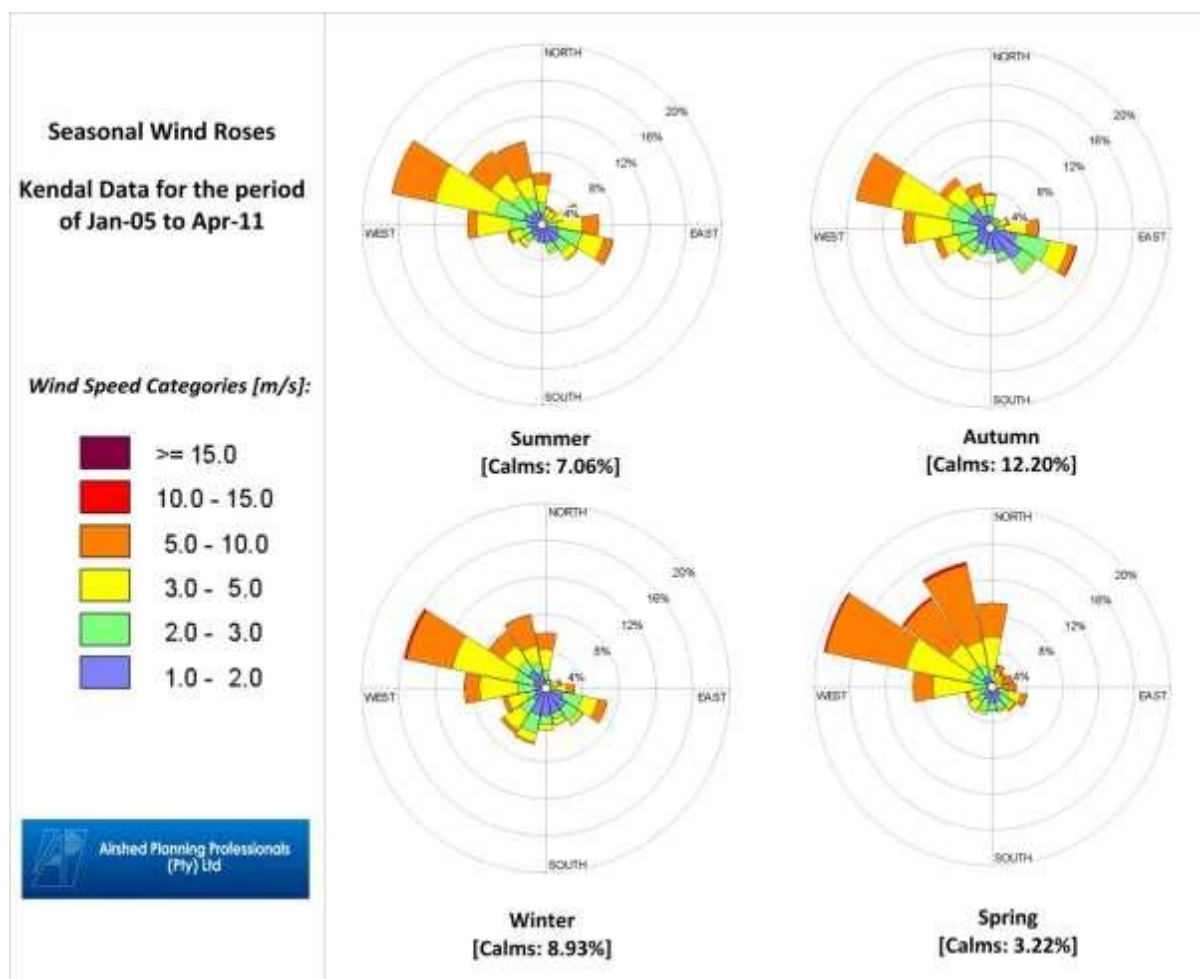
### Wind

The predominant wind direction at Kendal 2 for the period January 2005 to April 2011 is from the west-northwest (~16 % frequency of occurrence). Calm periods and low wind speeds are more prevalent during the night-time, as is to be expected (Figure 8-2). The gentle slope of the terrain may account for the increased frequency of occurrence of west-north westerly winds during the day-time and increased east-south easterly winds during the night-time.

During winter months (July to August), the enhanced influence of westerly wave disturbances is evident in the increased frequency of south westerly winds at Kendal 2 (Figure 8-3). An increase in the frequency of easterly and east-south easterly winds during summer months (December to February) reflects the influence of easterly wave systems. Autumn months are associated with a greater frequency of calm wind conditions, with the smallest number of calms occurring during spring months.



**Figure 8-2: Period, day- and night-time wind roses for the Kendal 2 monitoring station (January 2005 to April 2011)**



**Figure 8-3: Seasonal wind roses for the Kendal 2 monitoring station (January 2005 to April 2011)**

## 8.2 GEOLOGY

### 8.2.1 Methodology and Data Sources

The geological analysis was undertaken through the desktop evaluation using a Geographic Information System (GIS) and relevant data sources. The geological data was taken from the Department of Water Affairs Geology data.

### 8.2.2 Regional Description

The geology in the areas mainly consists of the following geological groups as per Figure 8-4 below.

**Table 8-1 - Site Geology**

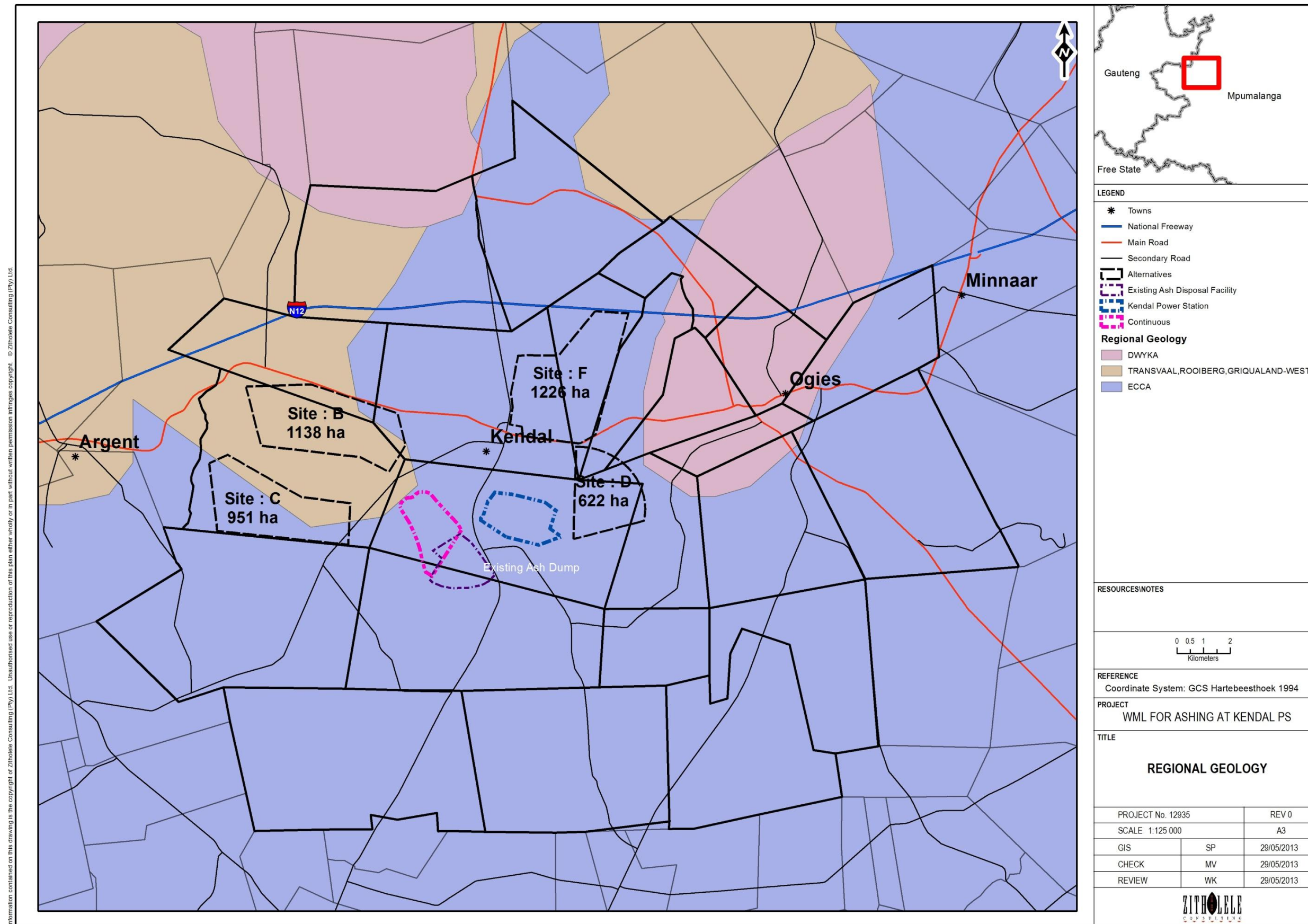
Group	Main rock types
Karoo Super group/Ecca Group	Arenite, Shale, Coal
Bushveld complex	Granite
Transvaal Super group/Rooiberg Group	Rhyolite

The above table will be updated once the Geotechnical assessment is available.

### **8.2.3 Sensitivities**

With regards to the construction of an ash disposal facility geological sensitivities to consider include:

- 1) Areas of unstable geology, which in this instance refer to the areas of deep clay layers. The clay deposits tend to shrink and swell and can slip under the foundation of the ash disposal facility. Special foundation designs will need to be made to accommodate this type of geological founding conditions.
- 2) Areas of shallow soils or rock outcrops also present problematic founding conditions and are also deemed to constitute sensitive geology. In such areas cut to fill operations may be required to create suitable ash storage areas / capacity, resulting in permanent damage to in-situ geology.



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Figure 8-4: Site Geology of the area

## **8.3 SOILS AND LAND CAPABILITY**

### **8.3.1 Data Collection**

### **8.3.2 Regional Description**

The soils in the region are mostly derived from the geology of the region (as described above). The harder geologies (such as granite and quartzite) weather into rocky and sandy soils, while the softer geologies have weathered into deeper red or brown sandy soils (sandstone and dolerite). The soils in the region form a typical Highveld plinthic catena with shallow soils on the crests of slopes, deeper sandy apedal soils on the slopes and soils with some plinthic clay layers in the foot slopes. In the valleys the clays accumulate and in some cases harden into ferricrete (hardpan / oukclip). The study site for the Kendal 30 year ash disposal project is classified as having moderate to high potential arable land as per Figure 8-5 below which provides an illustration of the soils within the region.

### **8.3.3 Sensitivities**

The sandy apedal soils as well as the deeper plinthic soils mentioned above result in the wide spread occurrence of high potential arable soils in the region. These soils are considered to be sensitive because:

- 1) Arable soils in South Africa are considered to be valuable because it constitute such a small percentage of the total soil distribution in the country;
- 2) The arable soils in the region underpin the basis of agricultural activities in the area;
- 3) The ash disposal facility will result in the sterilisation of a large area of soil;

## **8.4 TOPOGRAPHY**

### **8.4.1 Data Collection**

The topography data was obtained from the Surveyor General's 1:50 000 toposheet data for the region, namely 2628 and 2629. Using the latest aerial photography of the area a digital elevation model (DEM) was developed of the region as shown in Figure 8-6 below.

### **8.4.2 Regional Description**

The topography of the region is a gently undulating to moderately undulating landscape of the Highveld plateau. Scattered wetlands and pans occur in the area, with a higher concentration of wetlands and streams occurring in the southern portion of the study area. Rocky outcrops and ridges also form part of significant landscape features in the wider area. The altitude ranges



between 1 400 – 1 645 metres above mean sea level (mamsl). Figure 8-6 below provides an illustration of the topography of the region as well as the ridges.

#### **8.4.3 Sensitivities**

Ridges on the Highveld typically constitute areas of high biodiversity. In Mpumalanga these areas have also been significantly transformed over the years. Once transformed, restoration and rehabilitation are difficult or impossible. Thus ridges are deemed to be sensitive features.

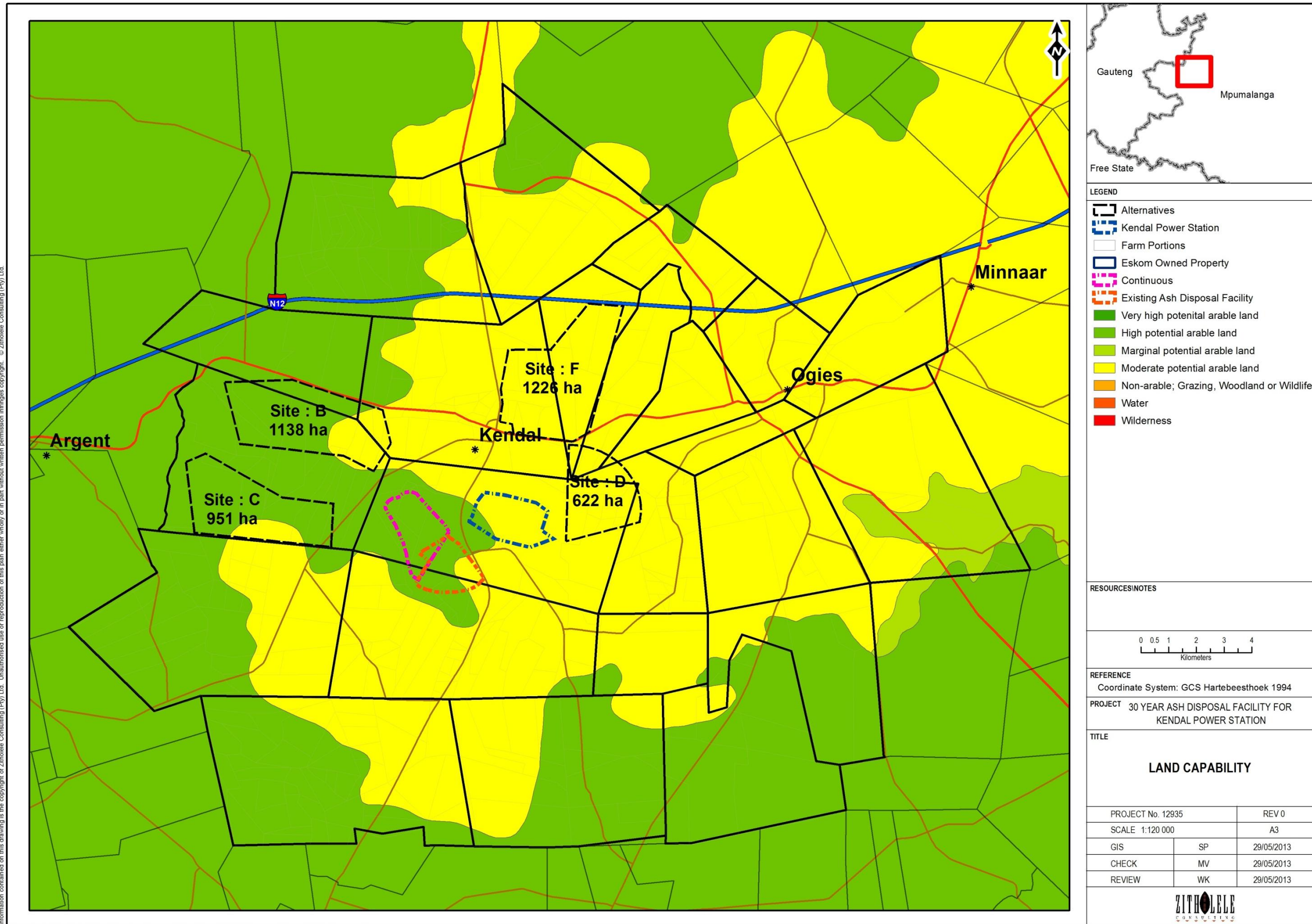


Figure 8-5 – Land Capability of the soils within the study site

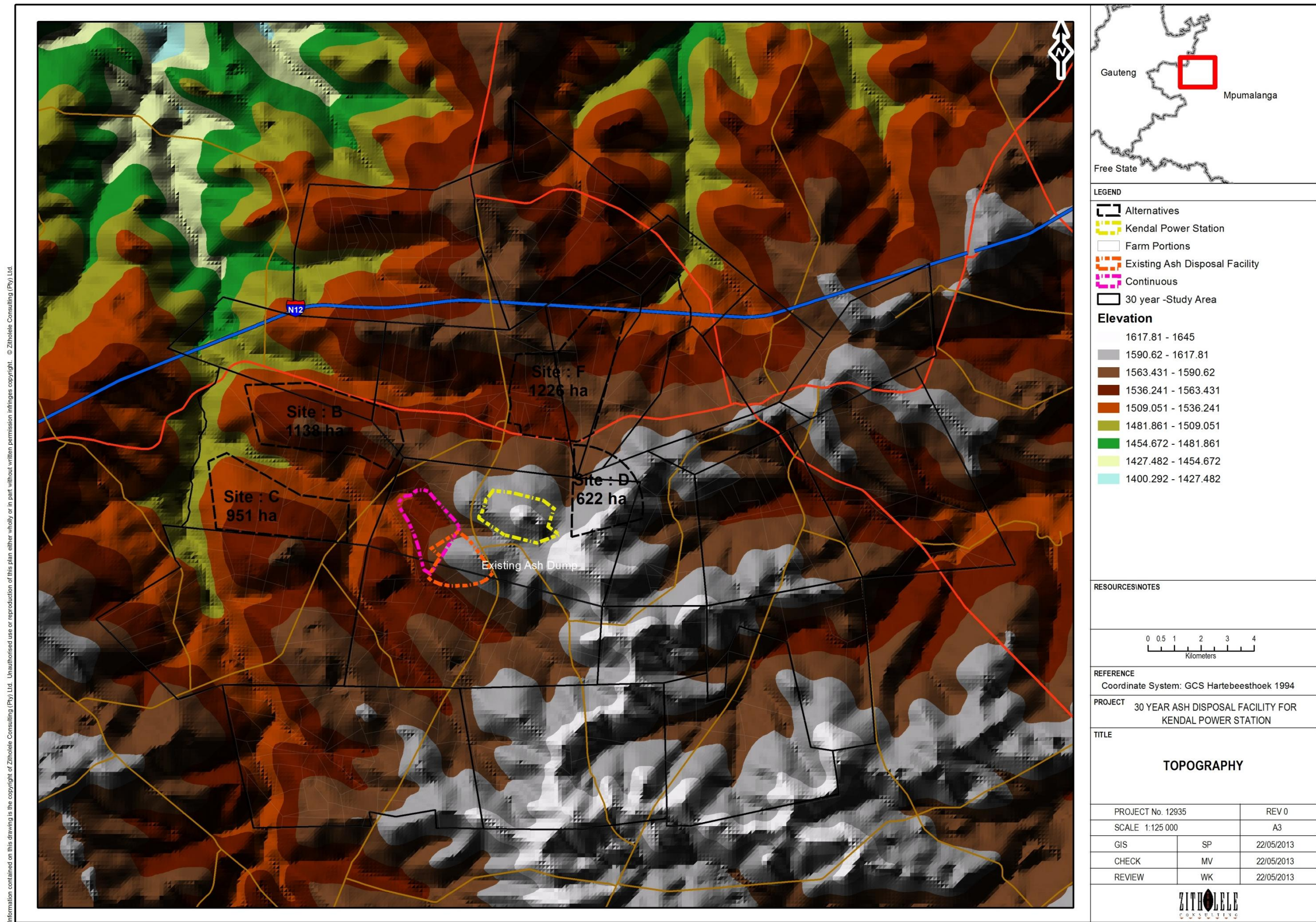


Figure 8-6: Topography of the area.

## **8.5 SURFACE WATER**

### **8.5.1 *Data Collection***

The surface water data was obtained from the WR90 database from the Water Research Council and the National Freshwater Ecosystem Priority Area (NFEPA) database from DWA. The data used includes pans, dams, wetlands, catchments, river alignments and river names.

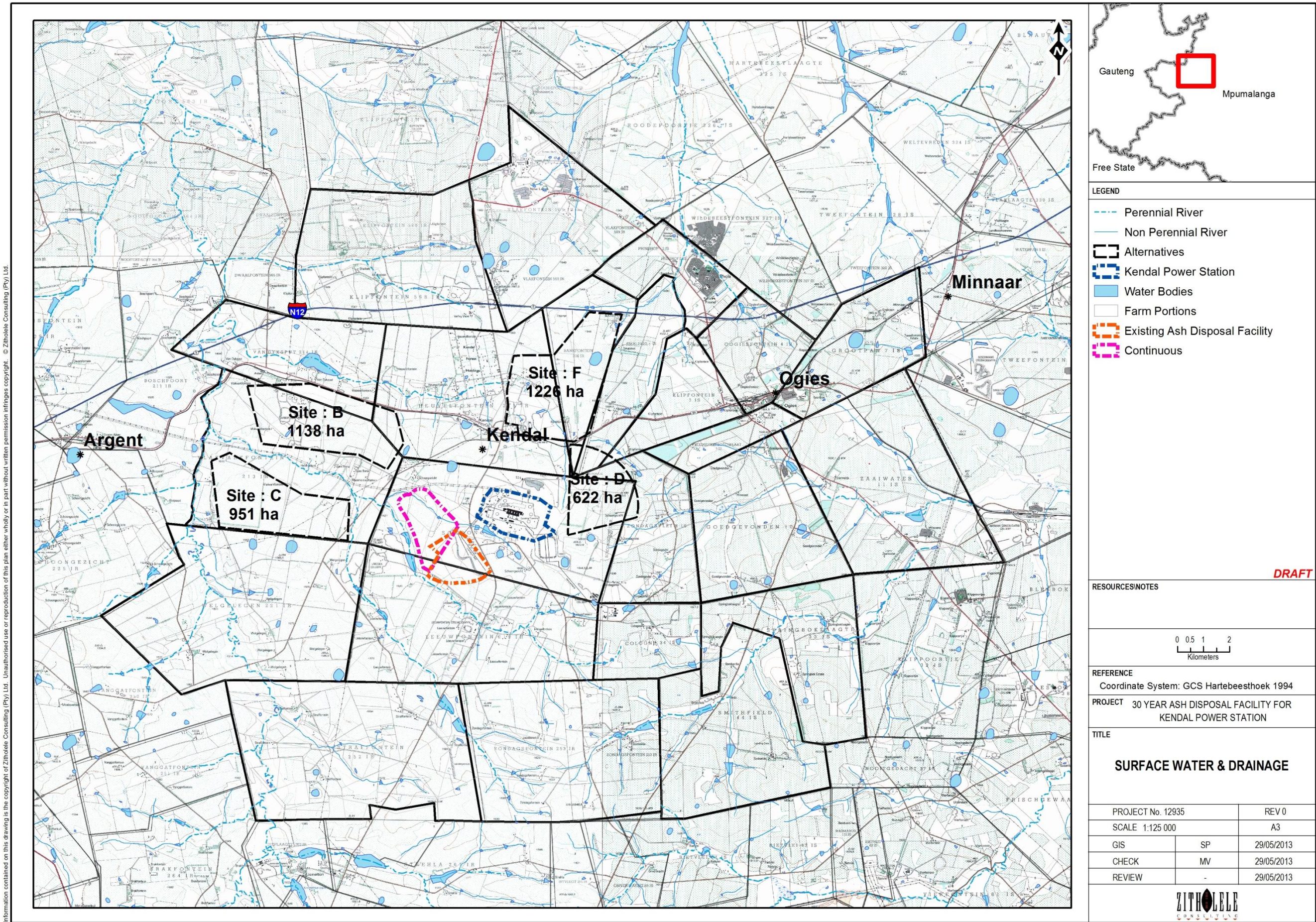
### **8.5.2 *Regional Description***

The study area falls partly in the B20E, B20F, B20G and B11F quaternary catchments. The main drainage feature of the area is the Wilge River which traverses the study area along the western boundary and drains northwards, including several tributaries to the Wilge River situated in the western portion of the study area. The study area falls entirely within the Olifants Water Management Area.

### **8.5.3 *Sensitivities***

One of the most sensitive features of the study area is the Wilge River that drains through the area. The Wilge River and tributaries largely constitute the upper catchment area of the Olifants Water Management Area (WMA) and is still in a relatively good condition compared to the rest of the rivers and streams in the Olifants WMA, which are considered to be in a poor state. As a result the Wilge River and tributaries has enjoyed a high level of conservation effort by the Department of Water Affairs in recent years. The streams, unnamed drainage lines and wetlands, and pans supports a number of faunal and floral species uniquely adapted to these aquatic ecosystems and therefore all surface water bodies are earmarked as sensitive features.

The sensitivity of wetlands is typically determined by its structure, function and composition (which are discussed in more detail in Section 8.7 and 8.8 of this report).



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Figure 8-7: Surface water and drainage features of the study site.

## **8.6 LAND USE**

### **8.6.1 Data Collection**

The land use data was obtained from the CSIR Land Cover database (2006) and supplemented with visual observations from aerial photography.

### **8.6.2 Regional Description**

From Figure 8-8 below it can be seen that a large portion of the study area, which belongs to Kendal Power Station, is located on cultivated land. The land use in the area is dominated by maize cultivation and grazed fields (mostly cattle).

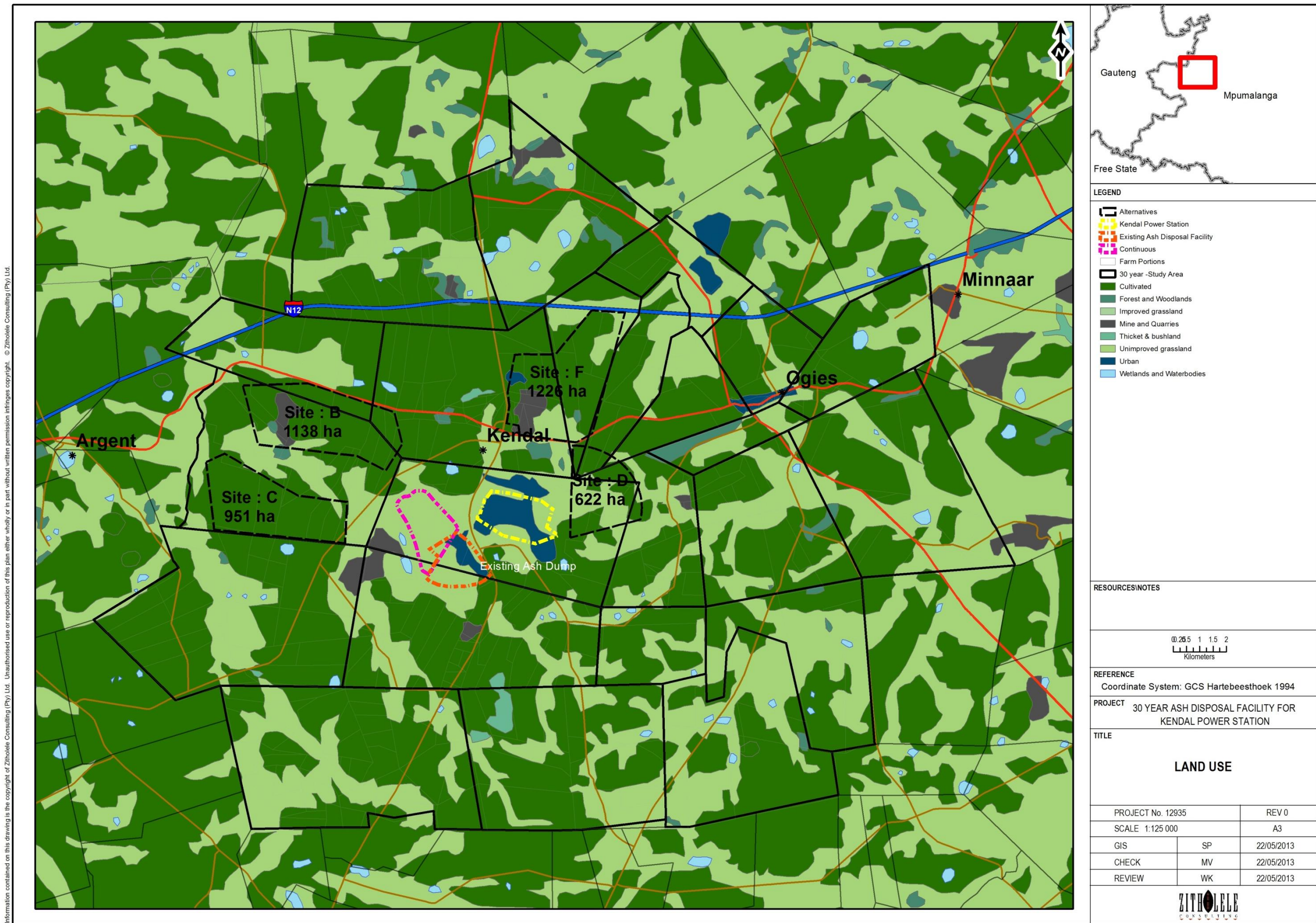
A portion of the western half of the study area is leased to a farmer for agricultural use by means of centre pivots, however the lease contract will come to an end in due course. The farmer has been informed of the intention of Eskom to develop a potential ash disposal facility in the area. The rest of the site is undeveloped and natural ground.

Although not indicated on the map in Figure 8-8, mining is another important and sensitive land use that is present in the study area. Large portions of the study area are either currently being mined, or are earmarked for mining or have mineral rights registered on properties. Open pit or strip mining is currently occurring in the area between the N12 and R545 (Site areas E1, E2, and F), while underground mining is occurring east and south east of Kendal Power Station. Determining the extent and scheduling of the mining activity is required in order to determine the feasibility of the identified and recommended site alternatives in the EIR phase of the EIA.

### **8.6.3 Sensitivities**

Sensitive land use features include:

- Intensive and specialised agricultural activities;
- Open cast and underground mining activities, and existing registered mineral rights on a number of the properties in the study area.



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Figure 8-8: Land Use Map of the study site.

## **8.7 FAUNAL BIODIVERSITY**

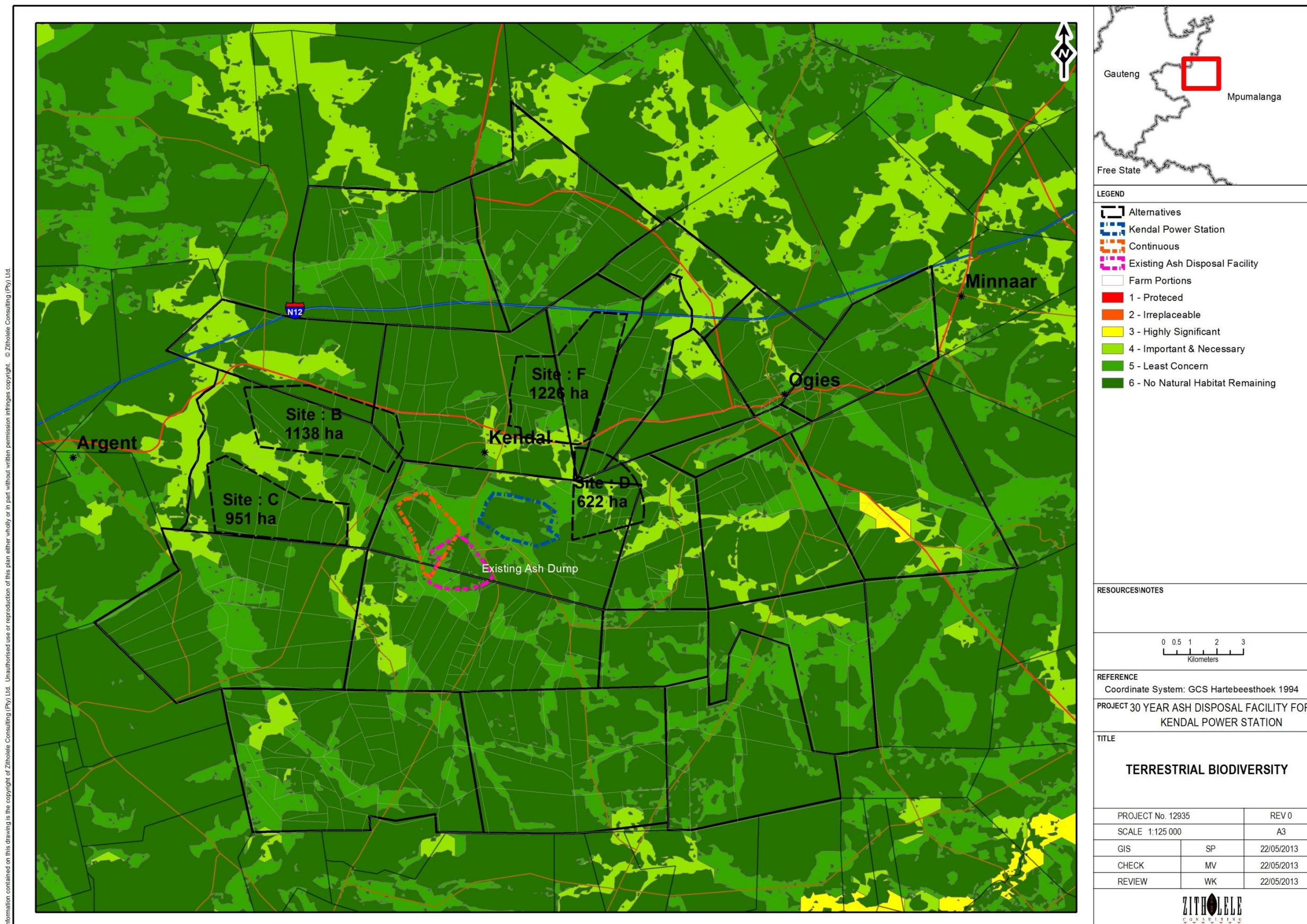
### **8.7.1 *Data Collection***

A literature review of the faunal species that could occur in the area was conducted. C-Plan data provided from the Mpumalanga provincial department was used to conduct a desktop study of the area. This data consists of terrestrial components; ratings provide an indication as to the importance of the area with respect to biodiversity.

### **8.7.2 *Regional Description and Sensitivities***

The biodiversity rating for the study area (Figure 8-9) is rated from largely least concern to Important and Necessary habitat remaining. One patch of area in the south eastern section of the study area is regarded as a highly significant vegetation type or biodiversity unit. Protected species may occur in the area and the report will be updated once the specialist studies are completed.





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Figure 8-9: Biodiversity of the study area.

## 8.8 FLORAL BIODIVERSITY

### 8.8.1 *Methodology and Data Sources*

The floral data below is taken from The Vegetation of South Africa, Lesotho and Swaziland (Mucina and Rutherford 2006).

### 8.8.2 *Regional Description*

According to the South African National Biodiversity Institute, the study area falls within the Grassland Biome, where most of the country's maize production occurs. The vegetation of the area is classified as Rand Highveld Grassland and Eastern Highveld grassland as classified by Mucina and Rutherford<sup>2</sup>.

#### Rand Highveld Grassland

Rand Highveld Grassland is found in the highly variable landscape with extensive sloping plains and ridges in the Gauteng, North-West, Free State and Mpumalanga Provinces. The vegetation type is found in areas between rocky ridges from Pretoria to Witbank, extending onto ridges in the Stoffberg and Roosenekal regions as well as in the vicinity of Derby and Potchefstroom, extending southwards and north-eastwards from there. The vegetation is species rich, sour grassland alternating with low shrubland on rocky outcrops. The most common grasses on the plains belong to the genera *Themeda*, *Eragrostis*, *Heteropogon* and *Elionurus*. High numbers of herbs, especially *Asteraceae* are also found. In rocky areas shrubs and trees prevail and are mostly *Protea caffra*, *Acacia caffra*, *Celtis africana* and *Rhus* spp.

#### Eastern Highveld Grassland

Eastern Highveld Grassland is found in the Mpumalanga and Gauteng Provinces. This vegetation type is found in plains between Belfast in the east and the eastern side of Johannesburg in the west and extending southwards to Bethal, Ermelo and west of Piet Retief.

### 8.8.3 *Sensitivities*

#### Rand Highveld Grassland

This vegetation type is poorly conserved (~1 %) and has a target of 24 % of the vegetation type to be conserved. Due to the low conservation status this vegetation type is classified as endangered. Almost half of the vegetation type has been transformed by cultivation,

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<sup>2</sup> The Vegetation of South Africa, Lesotho and Swaziland, Mucina and Rutherford 2006.

plantations, urbanisation or dam-building. Scattered aliens (most prominently *Acacia mearnsii*) are present in the unit.

#### Eastern Highveld Grassland

This vegetation type is poorly conserved (only about 0.3 %) and has a target of 24 % of the vegetation type to be conserved. Due to the low conservation status this vegetation type is classified as endangered. Approximately 44 % of the vegetation type has been transformed by cultivation, mining, plantations, urbanisation or dam-building.

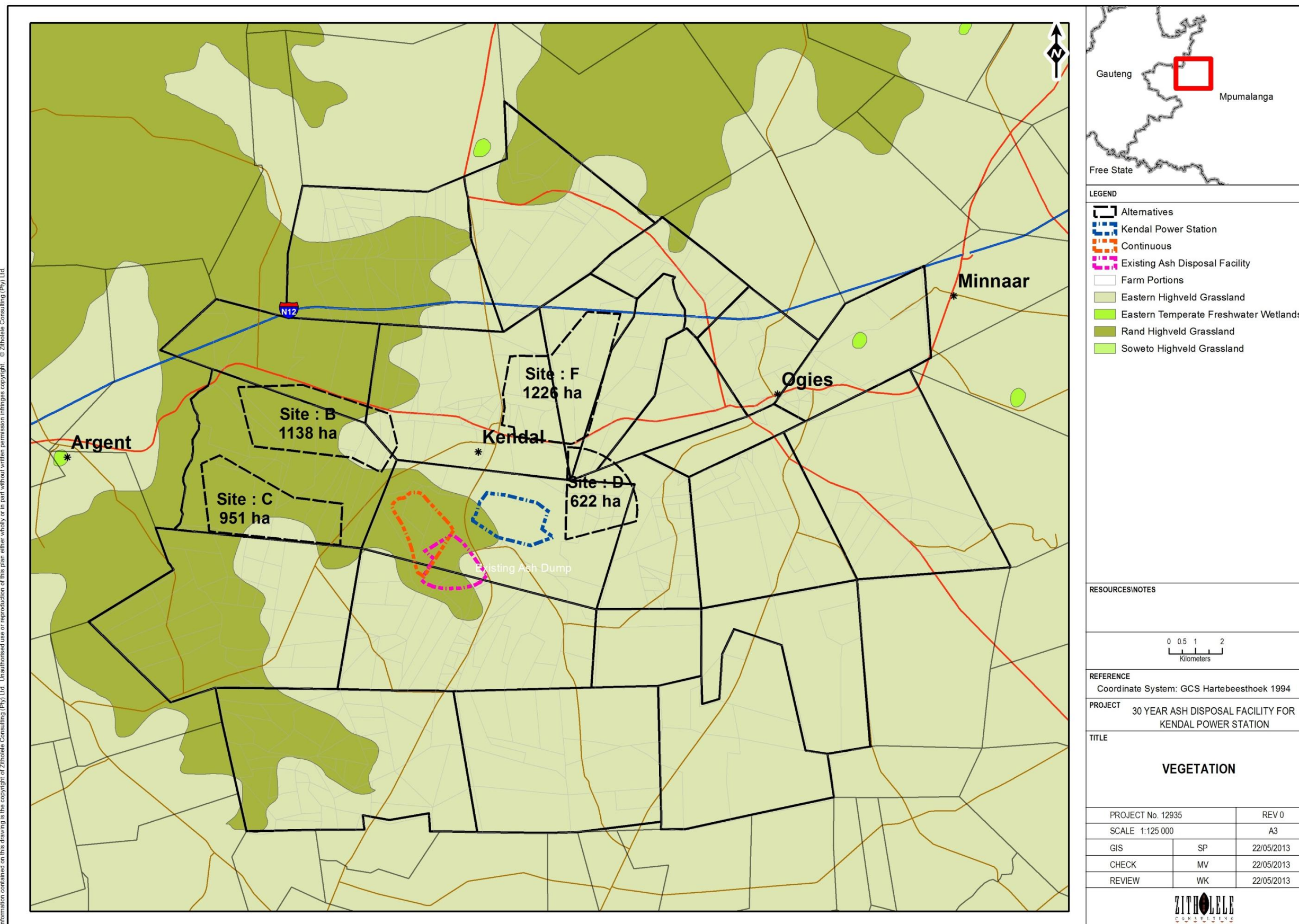


Figure 8-10: Vegetation of the study site.

## **8.9 INFRASTRUCTURE**

### **8.9.1 *Methodology and Data Sources***

Infrastructure was identified using the 1:50 000 topocadastral maps of the area, and information provided by Eskom regarding existing services.

### **8.9.2 *Regional Description***

The following infrastructure are found in the study area:

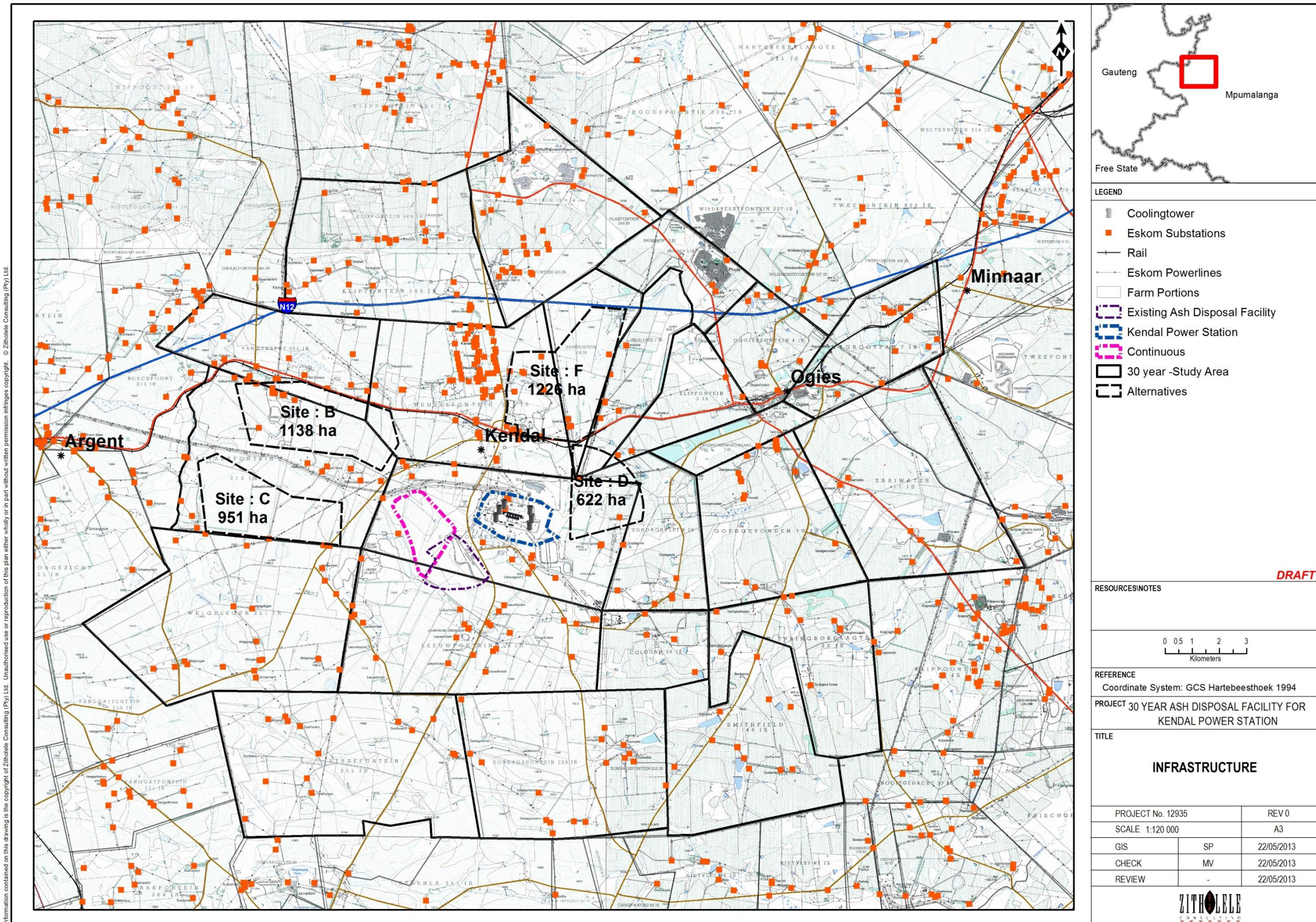
- Kendal Power Station;
- Agricultural centre pivot and electrical cabling;
- Power lines and associated infrastructure;
- The Kendal - Kusile pipeline and Transnet pipeline;
- National, Regional and Local Roads;
- Rails roads and associated infrastructure;
- Grain silos;
- Low, medium and high residential housing;
- Mining related infrastructure such as conveyor belts, and immovable plant.

### **8.9.3 *Sensitivities***

All identified infrastructure is considered sensitive and the feasibility of possible relocation thereof to be investigated should it be required.

## **8.10 CULTURAL AND HISTORICAL RESOURCES**

The regional area has several small cultural sites including graveyards, old buildings and some old battlefields and will be further investigated as part of the EIA and specialist studies.



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Figure 8-11: Infrastructure of the Study Site

## 9 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

The proposed project is anticipated to have a range of impacts to the biophysical and socio-economic environment. The main purpose of the EIA process is to identify and evaluate potential impacts and to determine possible mitigation measures and management plans to address such impacts that may arise.

The potential environmental impacts identified during the Scoping Phase, which will be investigated further in the EIA phase of the project, are summarised in **Table 9-1** below.

**Table 9-1: Potential Environmental Impacts to be investigated in the EIA Phase.**

Environmental Element	Potential Impact
Geology	Permanent destruction of geological strata caused by: <ul style="list-style-type: none"> <li>• Cut and fill operations;</li> </ul>
Soils and Land Capability	Soil resources will be sterilised by: <ul style="list-style-type: none"> <li>• The establishment of the ash disposal facility over a large area (~ 1000 ha);</li> <li>• The construction of roads that will be permanent for the construction and maintenance of the proposed project.</li> </ul> Some soil may be lost through: <ul style="list-style-type: none"> <li>• Erosion during the construction phase over exposed areas;</li> <li>• Pollution of soils (i.e. hydro-carbons from construction / maintenance vehicles);</li> </ul> Some soils will only be temporarily impacted through compaction during the construction phase and will be rehabilitated.
Topography	Altered topography caused by: <ul style="list-style-type: none"> <li>• Deposition of ash on surface over a large area;</li> <li>• The construction of cut off drains and berms; and</li> <li>• Profiling for the construction of surface infrastructure.</li> </ul>
Surface and Ground Water	Reduction in surface water flow caused by: <ul style="list-style-type: none"> <li>• Alteration of surface water drainage patterns causing runoff to be impeded or entrained.</li> </ul> Pollution of surface / ground water resources caused by: <ul style="list-style-type: none"> <li>• Surface water runoff over exposed soils may result in the sedimentation or increased turbidity of surface water features.</li> <li>• Surface water features may become contaminated by hydro-carbons from construction / maintenance vehicles, dust, or ash.</li> <li>• Leachate from the facility may percolate into, and contaminate, ground / surface water features.</li> <li>• Pollutants could have a human / animal health impact if groundwater is contaminated, and is being used.</li> </ul>

Environmental Element	Potential Impact
Terrestrial Ecology	<p>Vegetation and habitat will be lost or the quality reduced because of the:</p> <ul style="list-style-type: none"> <li>• Establishment of the waste facility of approximately 1000 ha;</li> <li>• Establishment of associated infrastructure (i.e. roads, and dams);</li> <li>• Possible displacement of species;</li> <li>• Propagation of alien invasive species;</li> <li>• Health implications due to pollution/ash deposition; and</li> <li>• Impact on sensitive species / habitats.</li> </ul>
Avifauna	<p>Avifauna may be negatively impacted in the following way:</p> <ul style="list-style-type: none"> <li>• Disturbance of breeding birds, particularly the Red Listed species through the construction and operational activities.</li> <li>• Habitat destruction through the construction of associated infrastructure during the construction phase of the project e.g. roads and the clearing of footprint.</li> </ul>
Air Quality	<p>Decrease in air quality as a result of increased airborne dust particulates caused by:</p> <ul style="list-style-type: none"> <li>• Vehicles traversing dirt roads during construction and operation;</li> <li>• Dust from the exposed surfaces of the ash facility during operations;</li> <li>• Dust blown from the conveyor belt during operations.</li> </ul>
Social	<p>Impacts to human health may be caused by:</p> <ul style="list-style-type: none"> <li>• Increased airborne particulates.</li> </ul> <p>Individuals, families, or small communities, may need to be relocated because:</p> <ul style="list-style-type: none"> <li>• There is no area large enough to accommodate the facility that is unpopulated.</li> <li>• People may be located too close to the proposed boundary of the facility.</li> </ul> <p>Social perceptions may be altered because:</p> <ul style="list-style-type: none"> <li>• The sense of place may be altered;</li> <li>• They may have a positive / negative attitude to Eskom;</li> <li>• Safety and security perceptions are inclined to be dependent on the influx of people to and from an area.</li> </ul>
Land Use	<p>Property values may decrease as a result of:</p> <ul style="list-style-type: none"> <li>• The change in land use of land affected by the project;</li> <li>• The visual impact created by the project; and</li> <li>• Perceived security risks introduced by the proposed project.</li> </ul> <p>Spatial planning may be negatively affected because:</p> <ul style="list-style-type: none"> <li>• The proposed project may conflict with existing / future planned uses.</li> <li>• The land use of the site selected for the disposal facility will be altered, mostly agricultural uses at present (including grazing and crop farming is practiced).</li> </ul>



Environmental Element	Potential Impact
Infrastructure	Infrastructure may need to be relocated including roads, power lines, pipelines and buildings, possibly causing the interruption of these services, because: <ul style="list-style-type: none"><li data-bbox="651 353 1396 421">• It is not possible to avoid the infrastructure due to the size of the project.</li></ul>
Heritage and Paleontological Resources	This is dependent upon the receiving environment and will be investigated further in greater detail in the EIR phase.

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## **10 PLAN OF STUDY FOR EIA**

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### **10.1 INTRODUCTION**

In terms of Chapter 5 of the NEMA EIA regulations, EIA refers to the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application. This includes an assessment of the nature, extent, duration, probability and significance of the identified potential environmental, social and cultural impacts of the proposed development as well as the cumulative impacts thereof. Mitigatory measures for each significant impact are to be determined. Alternative land uses or developments, their impacts and their cumulative impacts will also be considered and compared with those of the proposed development. Details of the Public Participation Process (PPP) followed during the course of the assessment will be given and it will be indicated how issues raised by stakeholders have been addressed. Knowledge gaps will be identified and descriptions of the arrangements for monitoring and management of the environmental impacts will be given.

### **10.2 TERMS OF REFERENCE FOR SPECIALIST STUDIES**

Based on the available data and the sensitivities identified the following specialist studies will be conducted in the EIA phase:

- Ecology (Terrestrial flora and fauna and Avifauna assessment);
- Heritage Impact Assessment;
- Social Impact Assessment;
- Surface water resources (hydrology and aquatic ecology) and wetlands (including wetlands delineation);
- Groundwater resources (Geohydrology);
- Geology and Geotechnical investigations (Phase 1 geotechnical investigations);
- Traffic impact studies;
- Air quality;
- Noise pollution;
- Soils, land capability and agricultural potential;
- Visual Impact Assessment;
- Resource economics and sustainability investigations;
- Ash classification
- Conceptual designs of the ash disposal facility; and

- Topographical Survey.

The findings of these studies will be reflected in the Environmental Impact Report (EIR). The proposed Terms of Reference (ToR) for each of these specialist investigations is indicated below.

#### **10.2.1 ToR: Terrestrial Ecology**

An ecological investigation will be conducted on the site and associated infrastructure. The objectives of these studies will be to:

- Review existing ecological information available;
- Conduct a site visit during the summer and winter seasons to determine the general ecological state of the proposed sites;
- Determine the occurrence of any red data and/or vulnerable species, or any sensitive species requiring special attention;
- Compile a detailed description of the baseline environment;
- Provide a ranking assessment of the suitability of the proposed site;
- Undertake a comparative assessment of the various alternatives;
- Provide mitigation measures to prevent and/or mitigate any environmental impacts that may occur due to the proposed project;
- Compile an ecological report, indicating findings, preferred site recommendations and maps indicating sensitive and/or no-go areas; and
- An indication of the confidence levels will be given.

#### **10.2.2 ToR: Avifauna**

The following methodology is proposed:

- Review existing ecological information available;
- Conduct a site visit during the summer seasons to determine the general ecological state of the proposed site;
- Determine the occurrence of any red data and/or vulnerable species, or any sensitive species requiring special attention;
- Describe the existing environment and the bird communities currently existing within the zone of influence of the proposed ash facility and associated infrastructure (including the roads) will be identified and described.

- Describe different bird micro-habitats as well as the species associated with those habitats.
- Gaps in baseline data will be highlighted and discussed and an indication of the confidence levels will be given. The best available data sources (both published and unpublished literature) will be used to establish the baseline conditions, and extensive use will be made of local knowledge if available (e.g. local bird clubs/amateur ornithologists/landowners) who are familiar with the study area.
- Map bird sensitive areas in a sensitivity map for easy reference, and particular emphasis will be placed on habitat for Red Data and endemic species.
- A full description of potential impacts (direct and indirect) will be provided, relative to these specific developments.
- Assess the potential impact on the birds and evaluated according to the criteria that are required by the EAP.
- Provide a ranking assessment of the suitability of the proposed sites;
- Undertake a comparative assessment of the various alternatives;
- Practical mitigation measures will be recommended and discussed.
- If a need for the implementation of a monitoring programme in the EMPr phase is evident, it will be highlighted and a programme proposed.

### **10.2.3 ToR: Heritage (Archaeological and Palaeontological)**

A Heritage Impact Assessment will be conducted to comply with Section 38 of the National Heritage Resources Act (No 25 of 1999). Specific objectives of this study will be:

- Desktop study (consulting heritage data banks and appropriate literature);
- Site visit of the project area;
- Determine whether any of the types and ranges of heritage resources as outlined in Section 3 of the Act (No 25 of 1999) do occur in the project area;
- Determine what the nature, the extent and the significance of these remains are;
- Determine whether any heritage resources (including graves) will be affected by the development project;
- If any heritage resources are to be affected by the development project mitigation measures has to be undertaken and management proposals have to be set for heritage resources which may continue to exist unaffected in or near the project area.
- Compile a report which would:
  - Clearly identify possible archaeological, cultural and historical sites within the study site;

- Identify the potential impacts of construction and operation of the proposed development on such resources, with and without mitigation;
- Offer an opinion on a preferred site in terms of this specialist field;
- Provide mitigation measures to ameliorate any negative impacts on areas of heritage significance; and
- Include a map illustrating the salient aspects of the report.
- Provide a ranking assessment of the suitability of the proposed sites;
- Undertake a comparative assessment of the various alternatives; and
- Provide suitable mitigation measures and implementation actions.

#### **10.2.4 Social Impact Assessment**

The objective of the Social Impact Assessment is to assess possible positive and negative social impacts associated with the projects, to ensure social license to operate for Eskom and to incorporate the voice of the community in environmental processes which affects their lives on a day-to-day basis. The following are included in the Social Impact Assessment:

- Social Baseline study;
- Scoping report;
- Social Impact Assessment report identifying social impacts and suggesting mitigation measures.

It is proposed that the following methodologies are followed:

- The SIA will commence with a baseline study of the study area and site which will include an in-depth literature review of 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 will be conducted. Stakeholders will include town councils, tribal councils, land owners, the relevant farmer's associations, community representatives and political leaders, 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. At this stage it is foreseen that four to five focus groups as well as a number of individual interviews will be conducted in each phase of the project, but more detailed planning regarding this can only be done once more detailed information is given, and key stakeholders have been identified.
- An interview schedule might be 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.

#### **10.2.5 ToR: *Surface Water and Hydrology***

The surface water data will be obtained from the WR90 database from the Water Research Council. The data that will be used includes catchments, river alignments and river names. In addition water body data will be obtained from the CSIR land cover database (1990) to show water bodies and wetlands. This information will be ground-truthed during a site visit.

A surface hydrology assessment will be undertaken and will consist of the following:

- A desktop assessment;
- Site investigation;
- Water sampling and analysis;
- Compilation of a baseline environmental description;
- Interaction with the design team during design interactions;
- Provide a ranking assessment of the suitability of the proposed sites;
- Undertake a comparative assessment of the various alternatives;

- Assess impacts and identify mitigation measures; and
- Compile a management and monitoring programme for the site.

The purpose of the surface hydrology study will be to address the following:

- Description of the surface hydrology:
  - Occurrence of drainage lines, springs, pans, dams, wetlands etc;
  - Characteristics of surface water features;
  - Precipitation patterns;
  - Determination of Floodlines for the 1:50 and 1:100 year flood events;
  - Surface water runoff patterns;
  - Water quality;
  - Sediment transport potential; and
  - Regional context of surface water resources.
- Description of impacts to surface water resources (quality and quantity):
  - Potential impacts in light of the vision for the area;
  - Potential impact on baseline conditions;
  - Possible use of surface water during construction and operation and the impacts thereof;
  - Trace the likely source path receptor pathways to determine all potentially significant, direct, indirect, and cumulative impacts;
  - Identify inter-connectedness of impacts to other environmental elements i.e. wetlands, groundwater, and aquatics; and
  - Assess pollution risk.
- Identify management measures to reduce negative impacts and exacerbate positive impacts. Compile a management plan appropriate to the requirements of the EIA process documenting such measures.

#### **10.2.6 ToR: Wetland Delineation**

The objectives of this study will be to:

- Review existing information available for the area;
- The riparian zone and wetlands will be delineated according to the guidelines and procedures developed by the Department of Water Affairs (DWA);
- During the site investigation the following indicators of potential wetlands will be identified:

- Terrain unit indicator;
  - Soil form indicator;
  - Soil wetness indicator; and
  - Vegetation indicator.
- Assess the status of each of the wetlands identified and assess the potential impacts on the wetlands;
  - Provide a ranking assessment of the suitability of the proposed sites;
  - Undertake a comparative assessment of the various alternatives;
  - Compilation of a wetland delineation report that is sufficient to address the requirements of a water and waste license applications, the EIR and management practices including mitigation measures; and
  - Recommendations toward study site.

#### **10.2.7 ToR: *Geohydrology***

The geohydrological assessment will consist of:

- A review of all existing groundwater information available from the power station and formulate a baseline status;
- A hydrocensus compiled by a specialist;
- A geophysical investigation (electromagnetic and magnetic);
- The drilling of monitoring boreholes;
- Infiltration tests;
- Aquifer tests;
- Hydrochemical sampling and analysis;
- The development of a flow and mass transport models;
- Provide a ranking assessment of the suitability of the proposed sites;
- Undertake a comparative assessment of the various alternatives; and
- Pollution plume simulation.

A report will be compiled that includes:

- A description of the groundwater flow regimes and the depth of the water table;
- A description of the aquifer parameters, classification and vulnerability;
- A description possible groundwater contamination or flooding;



- Assess possible pollution risks;
- A review of the current groundwater monitoring regime and make recommendations on any amendments required;
- Suggest mitigation measures to prevent any impacts to the groundwater;
- Highlight the current trends in the groundwater regime that could influence the design of the new ash disposal site; and
- Be of a sufficient standard to address the requirements of a water and waste license application, the EIR and management practices.

#### **10.2.8 ToR: Geotechnical assessment**

Geotechnical assessment undertaken on will consist of:

- Review of existing and available geological and geotechnical information;
- A site visit to verify available aerial photographs and to investigate the depth and properties of regolith by excavations and soil sampling;
- Test pits, if required, will be excavated on the site to characterise land forms or terrain units and anomalies identified during the API. Samples of representative soils will be collected for laboratory testing;
- Dynamic penetration tests (DCP) will be carried out at the site of each test pit to determine the variation in in-situ stiffness over the upper 1 m of the profile; and
- Soil samples from the test pits will be tested for classification, compaction characteristics and strength/stiffness properties. Problem soils, if presents, will be tested to quantify the degree of the problem condition (e.g. collapse potential).
- Compiling a map will be compiled indicating features observed;
- Identifying and assessing significance of potential geotechnical constraints to the proposed development;
- Provide a ranking assessment of the suitability of the proposed sites;
- Undertake a comparative assessment of the various alternatives;
- Proposing mitigation measures that could reduce or eliminate the identified constraints; and
- Compiling a report that will be compiled based on the findings of the study.

#### **10.2.9 ToR: Traffic**

The traffic study will include the following:

- Undertake a site visit, taking cognisance of the traffic in the area;
- Undertake a review of existing information and conceptual plans of the study area;
- Provide an opinion on the existing and predicted traffic impact during and after construction of the ash site and assess the general impact of the project on traffic.
- Provide a ranking assessment of the suitability of the proposed sites;
- Undertake a comparative assessment of the various alternatives;
- Provide mitigation measures to prevent and/or mitigate any environmental impacts that may occur due to the proposed project; and
- Compilation of a Traffic Impact Opinion Report.

#### **10.2.10 Air Quality Assessment**

The Air Quality Assessment will include a Baseline Characterisation and an Impact Assessment that will include the following:

The baseline assessment will include the following:

- The regional climate and site-specific atmospheric dispersion potential;
- Preparation of hourly average meteorological data;
- Identification of existing sources of emission and characterisation of ambient air quality within the region based on observational data recorded to date (if available).

The Air Quality Impact Assessment will include the following:

- Identification and quantification of all sources of atmospheric emissions associated with the new ash disposal facility.
- Use a 1<sup>st</sup> tier screening model to provide some guidance on the potential impacts from the proposed ash disposal facility.
- Provide a professional opinion on the proposed air quality impacts from the proposed ash facility and recommendations on air quality monitoring.

Other tasks will include:

- A desktop literature review and information gathering exercise will be conducted.
- Identification of expected air emissions sources and likely air quality parameters of potential concern on-site, based on potential health effects to identified sensitive receptors.
- Identification of applicable air quality standards, legislation and guidelines which would constitute project adherence / compliance requirements, including those specified by the World Bank.

- Provide a ranking assessment of the suitability of the proposed sites;
- Undertake a comparative assessment of the various alternatives;
- Incorporation of air quality criteria into the Environmental Impact Report (EIR) and Environmental Management Programme (EMPr) documents.
- Management interventions to control and/or mitigate the identified project air quality impacts.

#### **10.2.11 Noise Assessment**

Based on the terms of reference typically included in a noise assessment, the noise assessment will include the following tasks:

A baseline noise survey, including:

- A site visit which will be conducted in order to familiarise the consultant with the environment of the proposed development. Possible noise issues and the nearest noise sensitive receptors will be identified;
- Measurement and assessment of existing environmental noise levels at sensitive receptors in vicinity of the Kendal Power Station and surrounds;
- Measurement and calculation of existing noise emissions from the existing ash disposal;
- A survey of ground characteristics and other site specific features that may influence the propagation of noise; and
- The identification of existing sources of environmental noise in the area.

A noise impact assessment including:

- A review of local and international legislation and guidelines pertaining to environmental noise impacts;
- The identification and quantification of potential sources of environmental noise associated with the proposed project;
- The preparation of meteorological data and site specific acoustic parameters for use in the calculation of noise propagation;
- The calculation of noise propagation from through the application of a suitable noise propagation model to be compared with noise from existing air pollution control equipment;
- Provide a ranking assessment of the suitability of the proposed sites;
- Undertake a comparative assessment of the various alternatives;

- A qualitative discussion on the potential for cumulative noise impacts and the evaluation of estimated noise impacts based on legislation and guidelines; and
- A review of mitigation measures pertaining to environmental noise management.

#### **10.2.12 ToR: Aquatic Ecology**

A surface water aquatic ecological assessment in accordance with the River Health Programme (RHP) will focus primarily on the biological responses as an indicator of ecosystem health, with only a vague cause-and-effect relationship between the drivers and the biological responses. The minimum tools required for this assessment include:

- Drivers: Habitat and in situ Water Quality; and
- Responses: Fish, Aquatic Invertebrates and Riparian Vegetation.

The methodologies that will be adopted for the assessments are based on methodologies widely accepted by and utilized in the RHP of South Africa. The RHP is a national monitoring program used to monitor and assess South Africa's freshwater resources. An integrated ecological state assessment report will include:

- Habitat: Integrated Habitat Assessment System (IHAS) and the Index of Habitat Integrity (IHI);
- Water quality: pH, Dissolved oxygen concentration and saturation, temperature and conductivity (TDS);
- Fish: Fish Assessment Integrity Index (FAII);
- Aquatic invertebrates: South African Scoring System (SASS, version 5); and
- Riparian vegetation: Riparian Vegetation Index (RVI).

Other tasks will include:

- Providing a ranking assessment of the suitability of the proposed sites;
- Undertaking a comparative assessment of the various alternatives;
- Providing mitigation measures to prevent and/or mitigate any environmental impacts that may occur due to the proposed project; and
- Compilation of a draft report for Zitholele and client review and approval, before compiling the final assessment report.

#### **10.2.13 ToR: Soils and Land Capability/Agricultural Potential**

The objectives of this study will be:

- Review existing information available from land type maps, previous reports and GIS information;
- A field visit to verify the aerial photographic study observations. Additionally, during the visit, the depth and properties of regolith will be judged from natural exposure (dongas) and hand augering where applicable. The following soil characteristics will be documented:
  - Soil horizons;
  - Soil colour;
  - Soil depth;
  - Soil texture (Field determination)
  - Wetness;
  - Occurrence of concretions or rocks; and
  - Underlying material (if possible).
- Assess the potential impacts and their significance on the agricultural potential of the site;
- Provide a ranking assessment of the suitability of the proposed sites;
- Undertake a comparative assessment of the various alternatives;
- Propose mitigation measures to reduce or mitigate potential impacts;
- Compile a report detailing the findings of the assessment; and
- Recommendation pertaining to proposed site.

#### **10.2.14 ToR: Visual Assessment**

The proposed methodology to be adopted for the visual assessment includes the following tasks:

- Examine the baseline information (contours, facility, dimensions, vegetation, inter alia);
- Determine the area from which any part of the facility may be visible (viewshed);
- Identify the locations from which views of the facility may be visible (observation sites), which include buildings and roads;
- Determine the visual landscape quality and character;
- Analyse the observation sites to determine the potential level of visual impact that may result from the facility;
- Provide a ranking assessment of the suitability of the proposed sites;

- Undertake a comparative assessment of the various alternatives;
- Identify measures available to mitigate the potential impacts; and
- Compile a draft report for Zitholele and client review and approval, before compiling the final assessment report.

#### **10.2.15     *Resource economics and sustainability investigations;***

The proposed methodology to be adopted for the sustainability assessment includes the following tasks:

- Conduct a resource economics-based trade-off study on the socio-economic and the natural environment;
- Undertake a social-economic cost benefit analysis in compliance with the requirements of the Department of Environmental Affairs;
- Prioritise sites based on inputs received from the other specialist studies;
- Practical mitigation measures will be recommended and discussed;
- Sustainability assessment for each alternative;
- Impact statement on the preferred alternative;
- Opinion of the specialist on the preferred alternative;
- The no-go alternative will be assessed in terms of the NEMA Regulations.
- Facilitation / streamlining of trade-off assessment processes with relevant authorities, the proponent, and consulting team;
- Provide a ranking assessment of the suitability of the proposed sites;
- Undertake a comparative assessment of the various alternatives;
- Identify measures available to mitigate the potential impacts; and
- Compile a draft report for Zitholele and client review and approval, before compiling the final assessment report.

#### **10.2.16     *ToR: Ash Classification***

The objectives of this study will be:

- Collect ash samples;
- Classify the ash according to the authorised and correct waste regulations (Minimum requirements);
- Determine if the ash from the site is classified as Hazardous or General Waste; and

- Based on classification, recommend appropriate mitigation measures

#### **10.2.17     *ToR: Ash Disposal Facility Site Design and Operating Manual***

A specialist disposal facilities design engineer must complete the conceptual design of the ash disposal site. Included in this scope is:

- Site visit of the project area;
- Oversee the Topographical Survey of the site;
- Generate conceptual layout drawings for each of the four identified sites (C, F, D, and B);
- Compile design drawings for the preferred Kendal 30 year ash disposal facility;
- Submit drawings to DEA and DWA for review and make any alternations required;
- Include any mitigation measures prescribed by specialist into the design for example storm water drainage; and
- Review and amend current site operating manual to be relevant for the new site.

#### **10.2.18     *ToR: Topographic Survey***

A specialist surveyor will be required to undertake a topographic survey, included in this scope is:

- Survey of the site at 0.5 m contours;
- Produce a digital elevation model (DTM) to inform engineering designs;
- Identify all features and structures on site; and
- Submit surveyed information in an electronic CAD and ECW format.

### **10.3     IMPACT ASSESSMENT METHODOLOGY**

The impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;

- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology was used to describe impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria is given in **Table 10-1**.

**Table 10-1: Quantitative rating and equivalent descriptors for the impact assessment criteria**

Rating	Significance	Extent Scale	Temporal Scale
1	VERY LOW	<i>Proposed site</i>	<u>Incidental</u>
2	LOW	<i>Study area</i>	<u>Short-term</u>
3	MODERATE	<i>Local</i>	<u>Medium-term</u>
4	HIGH	<i>Regional / Provincial</i>	<u>Long-term</u>
5	VERY HIGH	<i>Global / National</i>	<u>Permanent</u>

A more detailed description of each of the assessment criteria is given in the following sections.

### 10.3.1 Significance Assessment

Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude, but does not always clearly define these since their importance in the rating scale is very relative. For example, the magnitude (i.e. the size) of area affected by atmospheric pollution may be extremely large (1 000 km<sup>2</sup>) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in **Table 10-2** below.

**Table 10-2: Description of the significance rating scale**

Rating	Description
5 Very high	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4 High	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3 Moderate	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the



Rating		Description
		case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	Low	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	Very low	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity are needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale, and if used, will replace the scale.
0	No impact	There is no impact at all - not even a very low impact on a party or system.

### 10.3.2 Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table 10-3**.

**Table 10-3: Description of the significance rating scale**

Rating		Description
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible, and will be felt at a regional scale (District Municipality to Provincial Level).
3	Local	The impact will affect an area up to 10 km from the proposed site.
2	Study Site	The impact will affect an area not exceeding the Eskom property.
1	Proposed site	The impact will affect an area no bigger than the ash disposal site.

### 10.3.3 Duration Scale

In order to accurately describe the impact it is necessary to understand the duration and persistence of an impact in the environment. The temporal scale is rated according to criteria set out in **Table 10-4**.

**Table 10-4: Description of the temporal rating scale**

Rating		Description
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of

		the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium term	The environmental impact identified will operate for the duration of life of facility.
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

#### 10.3.4 Degree of Probability

Probability or likelihood of an impact occurring will be described as shown in **Table 10-5** below.

**Table 10-5: Description of the degree of probability of an impact occurring**

Rating	Description
1	Practically impossible
2	Unlikely
3	Could happen
4	Very Likely
5	It's going to happen / has occurred

#### 10.3.5 Degree of Certainty

As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard "degree of certainty" scale is used as discussed in **Table 10-6**. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.

**Table 10-6: Description of the degree of certainty rating scale**

Rating	Description
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.
Don't know	The consultant cannot, or is unwilling, to make an assessment given available information.

### 10.3.6 Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, spatial and temporal scale as described below:

$$\text{Impact Risk} = \frac{(\text{SIGNIFICANCE} + \text{Spatial} + \text{Temporal})}{3} \times \frac{\text{Probability}}{5}$$

An example of how this rating scale is applied is shown below:

**Table 10-7: Example of Rating Scale**

Impact	Significance	Spatial Scale	Temporal Scale	Probability	Rating
	LOW	<i>Local</i>	<u>Medium-term</u>	<i>Could Happen</i>	
Impact to air	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1.6</b>

Note: The significance, spatial and temporal scales are added to give a total of 8, that is divided by 3 to give a criteria rating of 2,67. The probability (3) is divided by 5 to give a probability rating of 0,6. The criteria rating of 2,67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.

The impact risk is classified according to five classes as described in the **Table 10-8** below.

**Table 10-8: Impact Risk Classes**

Rating	Impact Class	Description
0.1 – 1.0	<b>1</b>	<b>Very Low</b>
1.1 – 2.0	<b>2</b>	<b>Low</b>
2.1 – 3.0	<b>3</b>	<b>Moderate</b>
3.1 – 4.0	<b>4</b>	<b>High</b>
4.1 – 5.0	<b>5</b>	<b>Very High</b>

Therefore with reference to the example used for air quality above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.

### 10.3.7 Cumulative Impacts

It is a requirement that the impact assessments take cognisance of cumulative impacts. In fulfilment of this requirement the impact assessment will take cognisance of any existing impact sustained by the operations, any mitigation measures already in place, any additional impact to environment through continued and proposed future activities, and the residual impact after mitigation measures.

It is important to note that cumulative impacts at the national or provincial level will not be considered in this assessment, as the total quantification of external companies on resources is not possible at the project level due to the lack of information and research documenting the effects of existing activities. Such cumulative impacts that may occur

across industry boundaries can also only be effectively addressed at Provincial and National Government levels.

Using the criteria as described above an example of how the cumulative impact assessment will be done is shown below:

**Table 10-9 - Example of cumulative impact assessment**

<b>Impact</b>	<b>Significance</b>	<b>Spatial Scale</b>	<b>Temporal Scale</b>	<b>Probability</b>	<b>Rating</b>
Initial / Existing Impact (I-IA)	<b>2</b>	<b>2</b>	<b>2</b>	<u>1</u>	0.4
Additional Impact (A-IA)	<b>1</b>	<b>2</b>	<u>1</u>	<u>1</u>	0.3
Cumulative Impact (C-IA)	<b>3</b>	<b>4</b>	<u>2</u>	<u>1</u>	0.6
Residual Impact after mitigation (R-IA)	<b>2</b>	<b>1</b>	<u>2</u>	<u>1</u>	0.3

As indicated in the example above the Additional Impact Assessment (A-IA) is the amount that the impact assessment for each criterion will increase. Thus if the initial impact will not increase, as shown for temporal scale in the example above the A-IA will be 0, however, where the impact will increase by two orders of magnitude from 2 to 4 as in the spatial scale the A-IA is 2. The Cumulative Impact Assessment (C-IA) is thus the sum of the Initial Impact Assessment (I-IA) and the A-IA for each of the assessment criteria.

In both cases the I-IA and A-IA are assessed without taking into account any form of mitigation measures. As such the C-IA is also a worst case scenario assessment where no mitigation measures have been implemented. Thus a Residual Impact Assessment (R-IA) is also made which takes into account the C-IA with mitigation measures. The latter is the most probable case scenario, and for the purpose of this report is considered to be the final state Impact Assessment.

### **10.3.8 Notation of Impacts**

In order to make the report easier to read the following notation format is used to highlight the various components of the assessment:

- Significance or magnitude- IN CAPITALS
- Temporal Scale – in underline
- Probability – in *italics and underlined*
- Degree of certainty - in **bold**
- Spatial Extent Scale – in *italics*

#### **10.4 ENVIRONMENTAL IMPACT REPORT**

Once the Scoping Report and the Plan of Study for the EIA is accepted by the DEA, Zitholele will begin the Environmental Impact Report.

The Environmental Impact Report will include the activity description; site / area and corridor assessments; public participation; a description of the issues and assessment of the site. The specialist studies results will be summarised and integrated into the Environmental Impact Report.

The WMLA Report will include all the technical information generated by the Design of the Facility, the Site Survey and the Operating Plan. In addition all the documents required by DEA for the waste license will also be included. These include the emergency and response plan, the closure and rehabilitation plan and the waste hierarchy implementation plan.

#### **10.5 ENVIRONMENTAL MANAGEMENT PROGRAMME**

An Environmental Management Programme (EMPr), in the context of the Regulations, is a tool that takes a project from a high level consideration of issues down to detailed workable mitigation measures that can be implemented in a cohesive and controlled manner. The objectives of an EMPr are to minimise disturbance to the environment, present mitigation measures for identified impacts, maximise potential environmental benefits, assign responsibility for actions to ensure that the pre-determined aims are met, and to act as a “cradle to grave” document. The EMPr will be drafted according to the findings in the Scoping Report and EIR.

#### **10.6 PUBLIC PARTICIPATION DURING THE EIA PHASE**

The purpose of public participation during the Impact Assessment Phase is to present the findings of the EIA phase and to avail the Draft EIR to the public for comments. I&APs will be afforded an opportunity to verify that their issues have been considered either by the EIA specialist studies, or elsewhere. Also, I&APs will comment on the findings of the Draft EIR, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones. Once the review is completed, the authority may decide to request additional information on matters that may not be clear from the report, authorise the application with certain conditions to be complied with by the applicant or reject the application. An EA reflecting the decision of the authority as well as any conditions that may apply will be issued to the applicant.

I&APs will be advised in good time of the availability of these reports, how to obtain them, and the dates and venues of public and other meetings where the contents of the reports will be presented for comment.

The public participation process for the EIAs will involve the following proposed steps:

- Announcement of the availability and public review of the Draft EIR;
- Host a public meeting for the stakeholders to review the Draft EIR;
- Announcement of the availability of the Final EIR; and
- Notification of the authorities' decision with regard to EAs.

Below information is provided about each step.

#### **10.6.1 *Announcing the availability of the Draft EIR and the EMPr***

A letter will be circulated to all I&APs, informing them in terms of progress made with the study and that the Draft EIR and EMPr are available for comment. The report will be distributed to public places and also presented at a stakeholder meeting. Advertisements will be placed in the same newspapers used in the scoping phase to announce the public review period of the Draft EIR.

#### **10.6.2 *Public review of Draft EIR and EMPr***

The EIA Guidelines specify that stakeholders must have the opportunity to verify that their issues have been captured and assessed before the EIA Report will be approved. The findings of the specialist assessment will be integrated into the Draft EIR. The report will be written in a way accessible to stakeholders in terms of language level and general coherence. The Draft EIR will have a comprehensive project description, motivation and also the findings of the assessment and recommended mitigation measures. It will further include the Issues and Responses Report, which will list every issue raised with an indication of where the issue was dealt with in the EIR. The findings of the assessment and recommended mitigation measures will also be incorporated into the EIR.

As part of the process to review the Draft EIR and EMPr, one stakeholder workshop with an open house component will be arranged to afford stakeholders the opportunity to obtain first-hand information from the project team members and also to discuss their issues and concerns. Contributions at this meeting will be considered in the Final EIR.

#### **10.6.3 *Announcing the availability of the Final EIR and EMPr***

A letter will be circulated to all I&APs, informing them in terms of progress made with the study and that the Final EIR and EMPr are available for comment. The reports will be distributed to the same public places (See Chapter 5 with the venues) as the previous reports for I&APs to review.

#### **10.6.4 *Progress feedback***

After comments from I&APs have been incorporated, all stakeholders on the database will receive a personalised letter to report on the status of the process, to thank those who

commented to date and to inform them that the Final EIR and EMPr have been submitted to the lead authority for consideration. I&APs will be advised on the next steps in the process.

#### **10.6.5 Announce authorities decision**

Registered I&APs will be notified by individual letters of the decision made by the authorities. Should it be a requirement from the authorities an advertisement will be placed in the same newspapers which were used during the scoping and impact assessment phases.

### **10.7 SUBMISSION OF FINAL EIR AND DECISION MAKING**

Using the comments generated during the PPP the Draft EIR will be updated and finalised. All comments received will be added to the CRR and attached to the Final EIR as an appendix.

The Final EIR once updated with additional issues raised by I&APs may contain new information. The Final EIR will be submitted to the DEA for decision making, and will be distributed to those I&APs who specifically request a copy. I&APs will be notified of the availability of the report by letters, advertisements and emails. Copies of the Final EIR will also be made available in the same public places as was used during the Scoping Phase.

### **10.8 OVERALL EIA PROJECT SCHEDULE**

**Table 10-10: Primary milestones of the Project**

<b>Milestones</b>	<b>Date</b>
Final Scoping Report	July 2013
Undertake Specialist Studies	August to October 2013
Draft EIR and EMP	October 2013
Stakeholder Engagement on EIR / EMP	November 2013 to January 2014
Finalise EIR and Draft EMP	January 2014
Submission to Relevant Authorities	January 2014
Environmental Authorisation	January to April 2014
Appeal Period	To be confirmed in the Impact Assessment Phase
Negotiations with landowners and Site specific EMP	To be confirmed in the Impact Assessment Phase
Construction (including EMP Auditing)	To be confirmed in the Impact Assessment Phase

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## 11 CONCLUSION AND WAY FORWARD

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Eskom appointed Zitholele Consulting to undertake the EIA, WML and WUL application for the proposed 30 year ash disposal facility at Kendal Power Station, which also includes associated infrastructure such as road infrastructure, return water dams, etc. This Scoping study is being undertaken with the aim of identifying potential aspects of concern (both positive and negative) on the biophysical environment and identifying issues, concerns and queries from I&APs. This Draft SR documents the process followed, the findings and recommendations of the Scoping study, and the proposed Plan of Study for the EIA Phase to follow.

The way forward recommended by this study is as follows:

- Upon completion of the public review of the Draft SR all additional comments and issues received will be incorporated into the Final SR;
- The Final SR is then to be submitted to authorities for review and approval of the Plan of Study;
- Upon approval of the Plan of Study of the Final SR, execute the Plan of Study for the EIA phase of the project, including amendment required by conditions recommended by the competent authority; and
- Commence with engineering design and WML application.

### ZITHOLELE CONSULTING (PTY) LTD



Dr. Mathys Vosloo

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Warren Kok



## **Appendix A: EAP CV**

**Appendix B: Integrated EIA Application Form, EAP  
Declaration and DEA acceptance letter**

## **Appendix C: Newspaper Advertisements and Site Notices**

## **Appendix D: I&AP Database and Proof of Notification**

## **Appendix E: Background Information Document**

**Appendix F: Kendal 30 Year Site Identification Report**