ESKOM HOLDINGS LIMITED

DEVELOPMENT OF A NEW ASH DAM FACILITY AT KOMATI POWER STATION, MPUMALANGA

ENVIRONMENTAL SCOPING REPORT

Synergistics
Environmental Services

PO Box 1822
Rivonia, 2128
Tel: +27 (0)11 807 8225
Fax: +27 (0)11 807 8226
synergy@synergistics.co.za

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Prepared By:	**Matthew Hemming**
Authorised By:	**Kerry Fairley**

PROJECT INFORMATION SHEET

RESPONSIBLE AUTHORITY:

National Department of Environmental Affairs and Tourism

APPLICANT:

Eskom Holdings (Pty) Limited

Head Office

Contact Person:	Mr Kubentheran Nair, Senior Environmental Advisor, Eskom Generation
Tel:	(011) 800 2100
Fax:	(011) 800 5140
Email:	Kubentheran.nair@eskom.co.za
Postal Address:	PO Box 1091, Johannesburg, 2000.

Komati Power Station

Contact Person:	Mr Anilkumar Bhawanideen, Komati Power Station Manager
Tel:	(013) 295 8119
Fax:	(013) 295 8101
Email:	Anil.Bhawanideen@eskom.co.za
Postal Address:	Private Bag X, Blinkpan2250

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INDEPENDENT ENVIRONMENTAL CONSULTANT:

Synergistics Environmental Services (Pty) Ltd *(Synergistics)*

Contact Person:	Matthew Hemming
Tel:	011 807 8225
Fax:	011 807 8226
Email:	matthew@synergistics.co.za
Postal Address:	PO Box 1822, Rivonia, JHB, 2128

Environmental Assessment Practitioners Detail's

Name:	Kerry Fairley	Matthew Hemming
Responsibility:	Report Approval, Quality Control	Report Writing, Project Management, Public Consultation
Qualifications:	B.Sc (Hons) Botany, Wits	M.Sc Conservation Biology, UCT
Experience:	9 years environmental consulting	1.5 years environmental consulting
Affiliations:	PrSciNat, CEAPSA	none

ESKOM HOLDINGS LIMITED

Development of a New Ash Dam Facility at Komati Power Station, Mpumalanga Province

ENVIRONMENTAL SCOPING REPORT

Executive Summary

Introduction

Eskom Holdings Limited is re-commissioning the Komati Power Station, located between Middelburg and Bethal in Mpumalanga Province. The first unit at Komati Power Station is expected to be re-commissioned in 2008 and it is anticipated that the station will have an operational life of 20 years from commissioning. The combustion of coal at a coal-fired power station produces ash that is disposed of in specially designed ash facilities. At Komati Power Station a wet-ashing system is used whereby ash is deposited as slurry in engineered ash dams. The existing ash dam facilities at Komati do not have sufficient capacity for the planned life of the station and it is therefore necessary to investigate the development of an additional ash dam facility.

While the re-commissioning of Komati Power Station has been granted environmental authorisation (Ref: 17/2/1 NK 40) by the Mpumalanga Department of Agriculture and Land Administration, the authorisation only included the refurbishment and return to service of the Komati Power Station and did not permit any capacity increases. Thus a further application for environmental authorisation of the new ash facility is required.

In terms of Chapter 5 of the National Environmental Management Act (No. 107 of 1998) and the EIA Regulations published there under a scoping and an environmental impact assessment are required for the proposed development. Synergistics Environmental Services (Pty) Ltd has been appointed as independent environmental consultants responsible for undertaking the environmental impact assessment (EIA) process for the proposed ash dam extension. An application for authorisation has been submitted to the Department of Environmental Affairs and Tourism (Ref: 12/12/20/1007). This scoping report forms the first report of the EIA process and presents environmental issues and concerns regarding identified and the plan of study for further work to be undertaken in the impact assessment phase of the project. The reports will be submitted to the Department of Environmental Affairs and Tourism for approval.

Project Description

A number of site alternatives for a new ash dam facility were considered during a screening process and a preferred site, adjacent to the existing ash dams, has been selected for the development of the new ash dam. The preferred site will be subjected to detailed investigations during the EIA phase.

The proposed new ash dam, named Extension 3, will cover an area of 42 ha and rise to a maximum height of 47 m above natural ground level at full utilisation. The dam will be constructed using the daywall method whereby an outer wall is constructed of ash on the perimeter of the site. The outer daywall will form the dam walls into which further ash is deposited. The ash dam will be operated in the same manner as the existing dams whereby ash is delivered from the power station as slurry via a series of pumps and pipelines. Ash delivery pipes used for the existing dams will be extended to allow for ash deposition on Extension 3. The dam will be under drained with a herring-bone system and sub-soil drains will be installed to collect seepage water. All water drained off the ash dam will be collected in ash water return dams and recycled to the power station. Trenches to divert clean storm water will be extended to include Extension 3.

In order to utilise the preferred ash dam site, two Eskom powerlines, a 275kv transmission and an 88kv distribution line from Komati Power Station will have to be deviated. Engineering investigations have identified a preferred route for the powerlines that runs parallel to the R35 provincial road from the existing lines and enters Komati Power Station from the east.

Public Issues and Concerns

Landowners and the general public were consulted during the scoping assessment by means of press advertisements, posters, background information documents, a public meeting and direct consultation. The public participation elicited minimal response from the general public and potentially affected landowners. The only concern raised by IAPs during the scoping assessment are summarised below:

- *Risk to residents of Komati Village should the ash dam fail;*

Anticipated Environmental Impacts

Key environmental issues associated with the development of the proposed ash dam facility and the deviation of the two powerlines were identified during the scoping assessment. These are summarised below:

- *Air quality impacts, including health and nuisance impacts, as a result of the ash dam extension;*

- *Pollution of groundwater resources, including local boreholes, as a result of the additional ash dam;*
- *Pollution of, and the reduction in run-off to, the Koringspruit river catchment as a result of the additional ash dam;*
- *Disturbance or destruction of archaeological or heritage resources due to the new ash dam and powerline tower construction; and*
- *The change in land use and loss of land capability as a result of the powerline servitude.*

Further Work

It is recommended that the following specialist studies be undertaken in the EIA phase of the project in order to assess the significance of impacts on the social, economic and biophysical environment:

- *A geohydrological and surface water investigation in order to understand the existing conditions, assess the impacts of the proposed ash dam extension and recommend management measures;*
- *An air quality impact assessment in order to quantify existing conditions, identify emissions sources, predict the impacts of the proposed ash dam extension and develop an air quality management plan.*
- *Ecological investigations to determine the location of sensitive habitats and the occurrence of species of conservation value;*
- *A cultural heritage survey to determine the location of sites of historical importance; and*
- *Further public consultation to provide feedback on the studies completed.*

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TERMS AND ABBREVIATIONS

DEAT	Department of Environmental Affairs and Tourism
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
Eskom	Eskom Holdings Limited
GN	Government Notice, as published in the Government Gazette
ha	hectare
IAP	Interested and Affected Party
ISEP	Integrated Strategic Electricity Planning
m	metre
m^3	cubic metre
masl	metres above sea level
MDALA	Mpumalanga Department of Agriculture and Land Affairs
Mm^3	Million cubic metres
Mt	Million tonnes
NEMA	National Environmental Management Act No. 107 of 1998
NERSA	Energy National Energy Regulator of South Africa
PM_{10}	Particulate matter with a diameter smaller than 10 micro metres
RTS	Return to Service
Synergistics	Synergistics Environmental Services (Pty)
WULA	Water Use License Application
y	year

ESKOM HOLDINGS LIMITED

Development of a New Ash Dam Facility at Komati Power Station, Mpumalanga Province

ENVIRONMENTAL SCOPING REPORT

1. INTRODUCTION

Eskom Holdings Limited is in the process of re-commissioning the Komati Power Station, located between Middelburg and Bethal in Mpumalanga Province (Figure 1). Komati Power Station is equipped with a wet ashing system and the ash is disposed of in engineered ash dams. The existing ash dam facilities at Komati Power Station do not have sufficient deposition capacity and it is therefore necessary to develop a new ash dam facility. The development will involve the construction and operation of an ash dam facility at Komati Power Station as well as the deviation of two powerlines from the preferred site.

A number of alternative sites for the new ash facility were considered during a screening process. A preferred site, located within the Komati Power Station property and adjacent to the existing ash dams, has been selected for the development of the new ash dam (Figure 1). The preferred ash dam site is crossed by two Eskom powerlines which will have to be deviated in order for the ash dam to be constructed. The powerlines, a 275kv transmission line and an 88kv distribution line are active lines and will have to be deviated. Engineering investigations have identified a preferred route for the deviation of the powerlines (Figure 1). The preferred ash dam site and the proposed powerline route will be subjected to detailed investigations during the Environmental Impact Assessment (EIA) process. The project and the EIA process are discussed in more detail in this Scoping Report.

1.1 Project Motivation

Eskom Holdings Limited has commenced with the Return-To-Service (RTS) project in which existing, mothballed power stations, are re-commissioned in order to increase electricity generation capacity in South Africa. The RTS project includes the Camden, Grootvlei and Komati Power Stations which will be re-commissioned between 2006 and 2009 and provide an additional 2 964 MW of generating capacity. The decision to re-commission these power stations was informed through the strategic energy planning that takes place in the South African electricity

industry (see Section 1.2).

The operation of a coal fired power station, such as Komati, produces ash that is disposed of in specially designed ashing facilities. Komati Power Station is fitted with wet-ashing equipment and the ash is deposited as slurry in engineered ash dams. The existing ash dam facilities at Komati, which are also being re-commissioned, only have an estimated capacity for a further 18 months of ash deposition. It is therefore necessary to investigate the development of a new ash dam facility for future ash deposition at Komati Power Station.

1.2 Strategic Energy Planning

Eskom's core business is the generation, transmission and distribution of electricity and they currently generate approximately 95% of the electricity used in South Africa. Electricity, by its nature, cannot be stored and must be used as it is generated. Therefore electricity is generated in accordance with supply-demand requirements, and must be efficiently transmitted from the point of generation to the end-users. The reliable provision of electricity by Eskom is critical for industrial development and employment creation in the region and Eskom's performance is therefore a contributing factor to the overall challenge of poverty alleviation and sustainable development in South Africa. Eskom's capacity generation expansion supports government's drive to boost economic growth by 6% per annum (as per Government's Accelerated and Shared Growth Initiative) by 2010. It is estimated that this will translate to an average growth in electricity demand of 4% per year.

If Eskom is to meet its mandate and commitment to supply the ever-increasing needs of end-users in South Africa, it has to continually expand its infrastructure of generation capacity and transmission powerlines. Current energy and electricity demands within the country are projected to continue increasing. The decision to expand Eskom's electricity generation capacity is based on national policy and informed by on-going strategic planning. The planning process is briefly described and illustrated below.

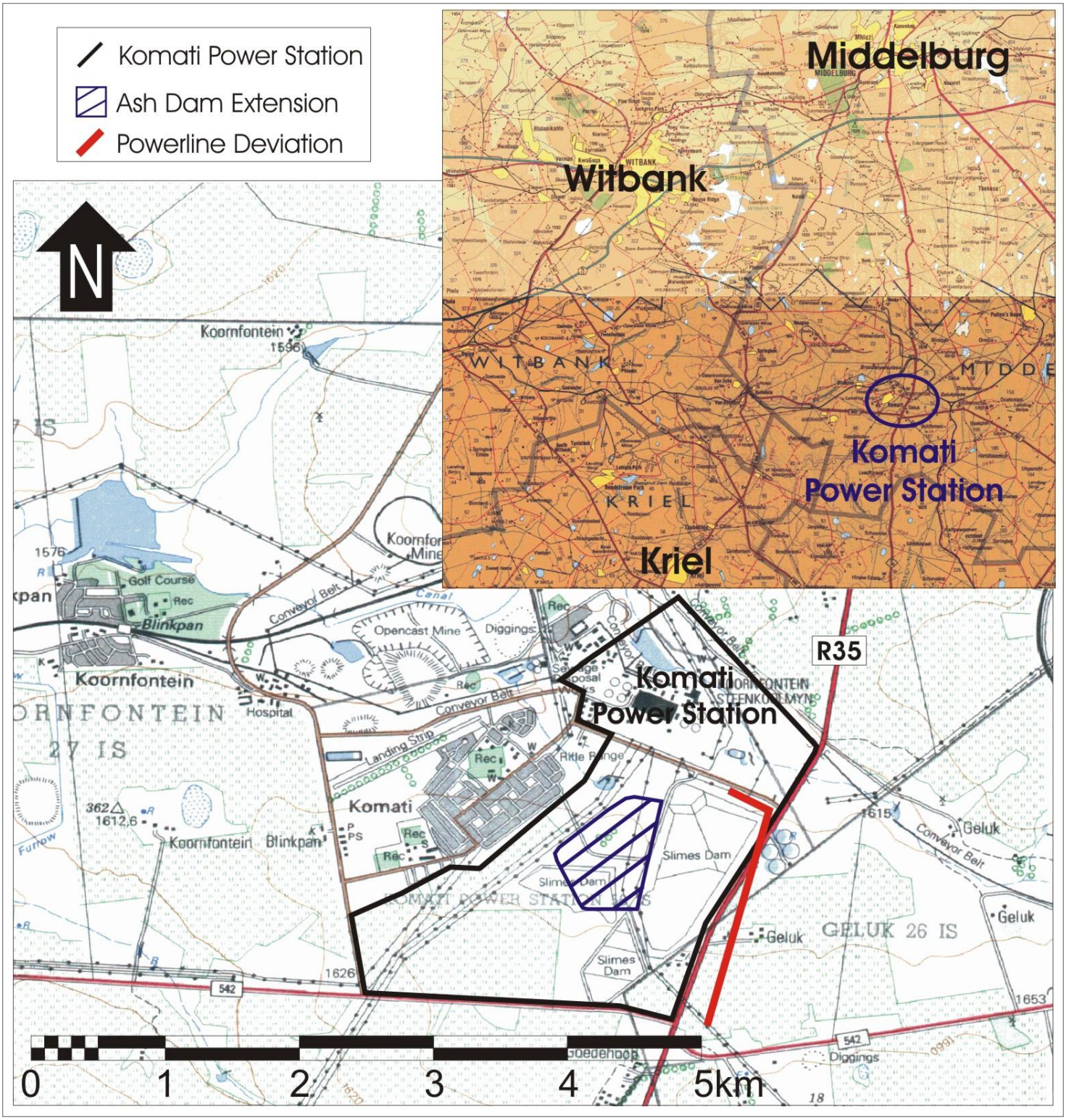


Figure 1: **Location of Komati Power Station**

Energy planning, including electricity demand and supply, in South Eskom is done by the Department of Minerals and Energy (DME), the National Energy Regulator of South Africa (NERSA) and Eskom. The DME and NERSA produce the national integrated energy plan and the national integrated resource plan respectively. These plans give a long term view of electricity demand and provide the framework for investigations into electricity supply and demand options. Eskom applies an Integrated Strategic Electricity Planning (ISEP) process to provide strategic projections of supply-side and demand-side options to be implemented to meet long-term load forecasts. It provides the framework for Eskom to investigate a wide range of new supply-side and demand-side technologies with a view to optimising investments and returns.

South Africa's economy, and hence the demand for electricity, has been increasing and this is placing growing pressure on South Africa's existing power generation capacity. The ISEP has identified that South Africa is expected to require additional base load capacity by 2010. NERSA has determined that although various alternative and renewable energy generation options should be investigated, coal will continue to provide the main fuel source in South Africa for the next 20 years. Eskom have considered and are considering numerous options and technologies to employ for power generation.

1.3 Background to the Project

Komati Power Station was originally commissioned in 1961 and operated until 1990 when it was completely mothballed. Eskom has decided to re-commission the power station in order to meet the growing demand for base-load electricity generation capacity. Upgrading and refurbishment of the power station is currently in progress. It is expected that the first unit will be re-commissioned in 2008 and that the anticipated operational life of the power station will be 20 years from commissioning.

As part of RTS operations the existing ash dams are being upgraded and re-commissioned. This activity is allowed in terms of the Record of Decision that was issued in December 2005. The consulting engineers have recommended that the ash dams be restructured. Ash Dam 1 will operate as a compartment and its Extensions, 1 and 2, will operate as a second compartment. The northern compartment of Extension 2 will be converted to an ash water return dam. Ash Dams 2 and 3 will be closed as it is not financially viable to re-commission them (J&W, 2007a). Ash dam 1 and its extensions only have approximately 18 months of ash deposition capacity and a new ash dam facility must be identified, designed and constructed prior to July 2009.

This scoping report forms part of the EIA investigations to get the new ash dam facility authorised.

1.4 Project Overview

The project requires the construction of a new ash dam facility for ash deposition at Komati Power Station. Following a screening process a preferred site, located within the Komati Power Station property was selected for the development of the new ash dam. The preferred site is crossed by two Eskom powerlines which will have to be removed in order for the ash dam to be constructed. The powerlines, a 275kv transmission line and an 88kv distribution line are active and will have to be deviated along a new route. Engineering investigations have identified a preferred route for the powerline deviation.

It is proposed that the new ash dam, named Extension 3, will cover an area of 42 ha and rise to a maximum height of 47 m above natural ground level at full utilisation. The dam will be constructed using the daywall method whereby an outer wall is constructed of ash on the perimeter of the site. The outer daywall will form the dam walls into which further ash is deposited. The outer walls are constructed during the day, hence the term 'daywall', while the dam is filled with ash at night. The ash dam will be operated in the same manner as the existing dams whereby ash is delivered from the power station as slurry via a series of pumps and pipelines. Ash delivery pipes used for the existing dams will be extended to allow for ash deposition on Extension 3. The dam will be under drained with a herring-bone system and sub-soil drains will be installed to collect seepage water. All water drained off the ash dam will be collected in ash water return dams and recycled to the power station. Trenches to divert clean storm water will be upgraded or constructed to include Extension 3.

The proposed new routes for the 275 kv transmission line and the 88 kv distribution line will run parallel to and on the east side of the R35 provincial road. Both lines will be deviated from their existing routes prior to crossing the R35 and will extend northwards along the R35 before crossing the road and entering the power station from the east. The servitudes for the two powerlines will run adjacent to each other and will be approximately 83 m wide (TAP, 2007).

1.5 Requirement for an Environmental Impact Assessment

The re-commissioning of the Komati Power Station was granted environmental authorisation (Ref: 17/2/1 NK 40) in 2005 by the Mpumalanga Department of Agriculture and Land Administration in terms of Section 22 of the Environment Conservation Act (No. 73 of 1989). The authorisation included the return to service of the Komati Power Station and the refurbishment of the existing plant without any capacity increase. A condition of the decision was that separate applications for authorisation must be lodged for any other development or activity at or near Komati Power Station.

Since the original authorisation was granted in 2005, new EIA regulations (Government Notice R 385, 386 and 387, April 2006) have been made in terms of Chapter 5 of the National Environmental Management Act (No. 107 of 1998) (NEMA). The NEMA EIA Regulations have replaced the Environment Conservation Act regulations regarding the EIA process and thus further applications for environmental authorisation at Komati Power Station must be made in terms of the NEMA EIA regulations.

The National Environmental Management Act makes provision for the authorisation of certain controlled activities by a competent authority. In terms of Section 24 (1) of NEMA the potential environmental impact associated with these controlled (or 'listed activities') must be considered, investigated, assessed and reported on to the competent authority for the granting of a relevant environmental authorisation.

The need to comply with the requirements of the EIA Regulations ensures that decision makers are provided with the opportunity to consider the potential environmental impacts of the project early in the project development and design phase. An assessment can then be made whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. For an informed decision regarding the project to be taken, comprehensive, independent environmental investigations must be completed in accordance with the EIA Regulations and this information provided to the competent authority. Synergistics Environmental Services (Pty) Ltd has been appointed to conduct the studies required for the environmental authorisation of the proposed project.

In terms of Section 24 and 24D of NEMA, as read with the EIA Regulations (Government Notices R385 – 387, Regulations 27- 36) The following activities, listed in terms of GN R386 and R387 (GG 28753 of 21 April 2006), are applicable to the ash dam development and the re-alignment of the two powerlines:

Number and date of the notice:	Activity No (s) :	Describe each listed activity:
No. R387, 21 April 2006	**1a**	**'The construction of facilities or infrastructure, including associated structures or infrastructure, for –** **(a) the generation of electricity where -** **(i) the electricity output is 20 megawatts or more; or** **(ii) the elements of the facility cover a combined area in excess of 1 hectare;'**
No. R387, 21 April 2006	**1f**	**'The construction of facilities or infrastructure, including associated structures or infrastructure, for –** **(f) the recycling, re-use, handling, temporary storage or treatment of general waste with a throughput capacity of 50 tons or more daily measured average over a period of 30 days;'**
No. R387, 21 April 2006	**1l**	**The construction of facilities or infrastructure, including associated structures or infrastructure, for –** **(l) the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more;**

No. R387, 21 April 2006	**2**	**'Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.'**
No. R386, 21 April 2006	**1l**	**The construction of facilities or infrastructure, including associated structures or infrastructure, for –** **(l) the transmission and distribution of above ground electricity with a capacity of more than 33 kilovolts and less than 120 kilovolts;**

Thus a scoping and EIA are required to be undertaken for the proposed development of the ash dam facility and its associated infrastructure at Komati Power Station. The construction of the 88 kv distribution line requires a basic assessment, while a scoping and EIA are required for the 275 kv transmission line. As the two powerlines will be constructed in adjacent servitudes, along the same route, a scoping and EIA will be completed for both lines. The decision was taken to combine the ash dam and powerline re-alignment projects into a single application as the projects are linked and cannot proceed independently.

As Eskom is a statutory body, the competent authority for this project is the National Department of Environmental Affairs and Tourism (DEAT), and an application for authorisation has been submitted (Ref: 12/12/20/1007) to DEAT.

1.6 Exemption from Alternatives

In addition to the application for authorisation an application for exemption, in terms of Regulation 51(2), has been submitted to the DEAT for the ash dam extension project at Komati Power Station. The application is for exemption from the consideration of alternatives during the EIA phase as required by Regulation 32 (2)(h). Motivation for the exemption application was based on the site screening process that has been completed for the selection of a preferred site for the new ash dam facility (see Chapter 3 of this report).

1.7 Objectives of the Scoping Phase

The scoping study forms part of the EIA process and was conducted in terms of Regulation 29 (GN 385) in terms of NEMA. The scoping evaluation forms the first phase of the EIA process and refers to the process of identifying potential issues and impacts associated with the proposed project, and defining the extent of the studies required in the EIA to assess these impacts. The identification of impacts is achieved by involving the project proponent, independent environmental assessment practitioners with relevant experience and a public consultation process in the evaluation of the project. The public consultation process should include all governmental authorities with jurisdiction in the area and interested and affected parties (IAPs).

This report documents the scoping evaluation of the potential environmental impacts associated

with the proposed ash dam facility and powerline realignment at Komati Power Station. The draft scoping report will be made available for public review to provide stakeholders with the opportunity to verify that the issues raised have been documented and will be adequately assessed by the proposed specialist studies. The final scoping report will incorporate any additional issues raised during the draft review. The scoping report will be submitted to the DEAT, as the competent authority, for approval, and to MDALA for comments. The scoping report consists of 9 Chapters and is set out as follows:

Chapter 1: an introduction to the proposed project and the environmental impact assessment;
Chapter 2: details of the enviro-legal process applicable to the project;
Chapter 3: a description of the screening process to select a preferred site;
Chapter 4: details of the study approach and methodology used in the scoping assessment;
Chapter 5: the project description;
Chapter 6: describes the existing social and biophysical environment;
Chapter 7: provides the results of the public consultation process;
Chapter 8: documents the potential impacts that may arise from the project; and
Chapter 9: presents the plan of study for the EIA phase.

1.8 Terms of Reference

Synergistics Environmental Services (Pty) Ltd has been appointed as independent environmental consultant to undertake the necessary work to meet the requirements of informing an environmental authorisation for the proposed new ash dam facility and powerline re-alignment at Komati Power Station. Synergistics will facilitate the environmental impact assessment process, including the public participation process and develop the construction environmental management programme (CEMP) for the project.

In order to adequately identify and asses the environmental impacts of the proposed project Synergistics has appointed several experts to complete specialist studies as required. The details of the proposed studies and the respective specialists are included in Chapter 9.

Synergistics will also be responsible for the water use licence application that will be made for the new ash dam facility. The application will be submitted to the Department of Water Affairs and Forestry for approval.

2. LEGAL REQUIREMENTS

2.1 Legislation and Guidelines Considered

The proposed new ash dam facility and powerline route has been assessed in terms of the applicable South African legislation. Legislative requirements for the project were identified during the scoping and actions have been taken to ensure that the required approvals are obtained. If necessary, exemptions will be sought in order to ensure legal compliance. A more detailed review of the legislative requirements, provincial legislation and guidelines relevant to the proposed ash dam project will be included in the EIA report.

2.1.1 National Environmental Management Act, No. 107 of 1998

EIA Regulations were promulgated in terms of Section 24(5) of NEMA on 21 April 2006 in Government Notice R 385. The regulations define the requirements in terms of Chapter 5 of NEMA for the submission, processing, consideration and decision of applications for environmental authorisation of listed activities. Two lists, defining activities that require either basic assessment or scoping in terms of Sections 24 and 24D of NEMA were published in Government Notice R 386 and R 387 respectively. Any activity that is captured under either of these lists requires environmental authorisation from the competent authority

2.1.1.1 Ash Dam

The proposed ash dam facility is captured under a number of the listed activities in the Schedule of activities requiring scoping (GN R 387). Listed activities that may be triggered by the ash dam facility include:

- 1 'The construction of facilities or infrastructure, including associated structures or infrastructure, for –
    - (a) the generation of electricity where -
        - (ii) the elements of the facility cover a combined area in excess of 1 hectare;'

- 1 'The construction of facilities or infrastructure, including associated structures or infrastructure, for –
    - (f) the recycling, re-use, handling, temporary storage or treatment of general waste with a throughput capacity of 50 tons or more daily measured average over a period of 30 days;'

- 2 ‘Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.’

2.1.1.2 Powerlines

The proposed deviation of the two powerlines is captured under activities listed in both the Schedule of activities requiring basic assessment (GN R 386) and those requiring scoping (GN R 387). Listed activities, requiring basic assessment, that may be triggered by the 88 kv powerline include:

- 1 ‘The construction of facilities or infrastructure, including associated structures or infrastructure, for –
    - (l) the transmission and distribution of above ground electricity with a capacity of 33 kilovolts or more but less than 120 kilovolts;

While listed activities, requiring scoping, that may be triggered by the 275 kv powerline include:

- 1 ‘The construction of facilities or infrastructure, including associated structures or infrastructure, for –
    - (l) the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more;

In order to obtain environmental approval the larger transmission line requires a scoping assessment while the smaller distribution line requires only a basic assessment. As the two re-aligned powerlines will follow the same route in adjacent servitudes, the decision was taken to assess the combined footprint of both powerlines through the more comprehensive scoping assessment.

2.1.2 EIA Guidelines

The EIA Regulations provide clear instructions on the required content of a scoping report and this report has been prepared in accordance with these regulations. In addition a number of guidelines to NEMA and the EIA Regulations have been published to assist in the Scoping and EIA process. Guidelines that have been considered include:

- Guideline 3: General Guideline to the Environmental Impact Assessment Regulations (DEAT, 2006);
- Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations (DEAT, 2006);
- Guideline 5: Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations (DEAT, 2006); and

- Guideline 6: Environmental Management Frameworks in support of the Environmental Impact Assessment Regulations (DEAT 2006).

2.1.3 National Water Act (No 36 of 1998)

An Integrated Water Use Licence Application (IWULA) for water uses listed in Section 21 of the National Water Act (No.. 36 of 1998) was compiled for Komati Power Station and submitted to the Department of Water Affairs and Forestry for approval, but does not include the proposed ash dam. The IWULA is currently under review by the DWAF and additional information has been requested from Eskom. The proposed ash dam facility was not included in the original application and water uses associated with the new ash dam will be identified and licensed. Clarity on the issue cannot be obtained from the DWAF until a number of the issues with the original IWULA have been dealt with. It is however anticipated that the following water uses may be required for the proposed ash dam facility:

- Section 21 g: disposing of waste in a manner that may detrimentally impact on a water resource (ash disposal on the ash dam);
- Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process.

2.1.4 National Heritage Resources Act (No. 25 of 1999)

The National Heritage Resources Act provides for the protection of all archaeological and palaeontological sites and meteorites. Section 38 of the Act defines the categories of development for which the responsible heritage resources authority must be notified. In terms of Section 38 [(c) 'any development or other activity which will change the character of a site-'(i) exceeding 5000m^{2}'] the responsible heritage authority must be informed of the proposed ash dam development. It is assumed that the responsible authority will require a phase 1 heritage impact assessment for the new ash dam. The heritage assessment will be completed during the EIA phase and the report submitted to SAHRA for comment.

2.1.5 National Environmental Management: Biodiversity Act (No 10 of 2004)

The Act provides for the Minister or MEC to list species and ecosystems which are threatened and in need of protection as well as to identify threatening processes within these ecosystems. No ecosystems or processes have as yet been listed. A list of threatened and protected species and regulations pertaining thereto has been published (GN R 150, 151 & 152, February 2007). Should any of these protected species be identified on site then the appropriate mitigation or permits must be implemented.

2.1.6 National Environmental Management: Air Quality Act (No 39 of 2004)

This Act has been promulgated with the intent to reform the law regulating air quality in order to protect the environment. The intent with the act is to establish a National Management Framework to set standards with regards to dust and noise emissions. No framework or standards have been promulgated as yet.

2.1.7 Conservation of Agricultural Resources (No 43 of 1983)

The Act defines a list of registered weeds and invader plants, categorises them into different classes and introduces restrictions where these plants may occur. The act prohibits the spread of weeds and requires that listed weeds be controlled. An alien and invasive plant control programme in terms of the Act will have to be implemented for the ash dam facility.

2.1.8 Mpumalanga Nature Conservation Act (No. 10 of 1998)

The Act provides schedules of provincially protected fauna and flora for which permits will be required should the construction of the ash dam facility require their relocation or destruction.

3. SITE SELECTION

3.1 Ash Dam Site Selection

3.1.1 Background

Surface deposition will be the preferred means of ash disposal at Komati Power Station for future operations. The existing ash dams do not have sufficient capacity for ash disposal over the planned life of the station and a new ashing facility is therefore required. During the EIA it is essential to identify and examine alternatives for the proposed activity. An investigation, conducted prior to mothballing (Eskom, 1990), identified six potential sites for the establishment of a new ash dams for Komati Power Station. These sites were compared and assessed in terms of the Komati Power Station requirements at the time, but no decision was taken to utilise any of these sites.

As explained in the introduction, in Chapter 1 above, Eskom is currently re-commissioning the mothballed Komati Power Station in order to provide additional base-load electricity generation capacity. Ash disposal is an essential activity at a coal-fired power station. A decision must therefore be made on the preferred location of a new ash disposal facility and the necessary permits and authorisations are to be obtained. Environmental authorisation of a new ash dam facility will be required from DEAT in terms of the EIA Regulations.

As part of the EIA process, the EIA team undertook the screening of the seven identified potential ash dam sites for selection of a preferred site. Site screening and selection was conducted through a workshop in which all sites were assessed and scored on a number of biophysical, technical and social criteria (as provided in Section 3.1.3.2). The objective of the site selection process was to ensure that a representative suite of relevant criteria were considered during site selection and that further EIA investigations would continue on a site whose selection could be robustly and objectively defended.

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

3.1.2 Identification of Potential Sites

Potential sites for the location of a new ash dam facility were identified by Eskom in 1990. Suitable sites were identified within 3 km of the power station. 3km was set as a limiting distance as beyond this ash transport costs would render a site not economically feasible. Other technical criteria included the absence of infrastructure (in the area being investigated as a possible site) and the sizes of the sites (i.e. availability of adequate land) were used as basic selection criteria. This process resulted in six sites being identified. The power station was subsequently mothballed and no further progress was made in this process.

As part of the re-commissioning of Komati Power Station these original sites have all been re-assessed through the current site selection process. Investigations, conducted by Jones & Wagener (J&W, 2007) for the re-commissioning of the existing ash dams, also identified a seventh site near the existing ash dams as an alternative for a medium-term ash deposition facility.

Six greenfield sites and the brownfield site at the existing ash dams were considered during the site selection process. See Figure 2 for the location of the seven alternative sites. The locations of the sites are described below.

3.1.2.1 Description of Site Alternatives

Site 1 – Situated north east of the power station on the Broodsnyersplaas, adjacent to the Blinkpan Magazine and shooting range. The site borders the shooting range and the bank of the Koornspruit River.

Site 2 – Located to the east of Site 1 across the R35 provincial road from the power station. The site borders on the upper Koornspruit River.

Site 3 – Situated in the north western corner of the farm Broodsnyersplaas, on the far side of the Koornspruit River and the Richard's Bay Railway line.

Site 4 – Located on a slope east of the Blinkpan dam. It is just to the north of the Blinkpan golf course, on the far side of the Koornspruit River and the Richard's Bay Railway line.

Site 5 – Located south of the power station on Eskom property. The site is immediately west and adjacent to the existing ash dam area.

Site 6 – Situated on the farm Gluck, to the south east of the existing ash reservoirs. It is across the R35 provincial road from the power station.

Site 7 – Found at the existing ash dams, immediately to the west of ash dam 1. It will be known as Extension 3. The site is bound to the west by power lines, to the south by areas of under mining and to the north by an ash water return dam.

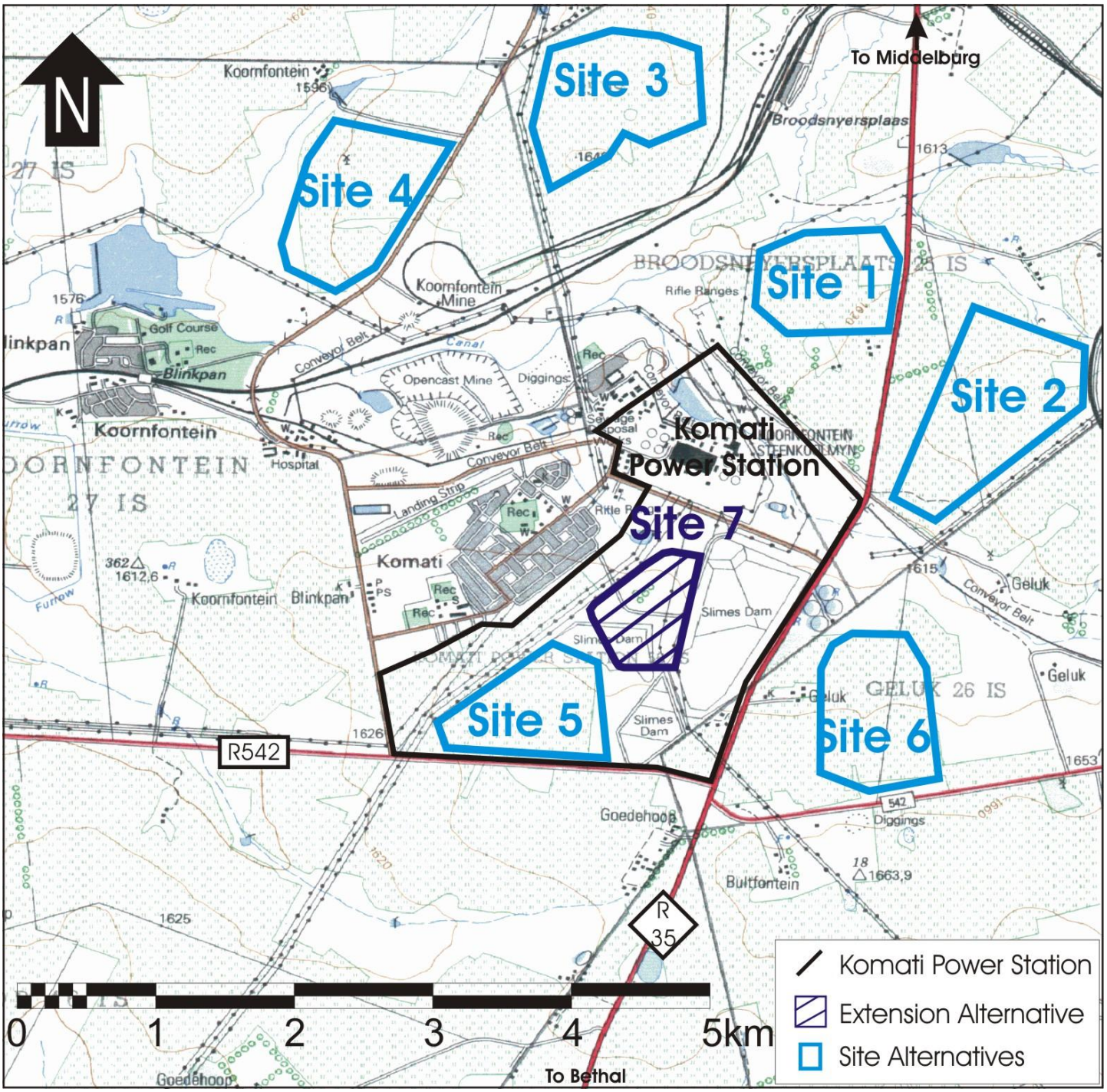


Figure 2: **Location of Site Alternatives for a New Ash Dam Facility at Komati Power Station**

3.1.3 Site Screening Methodology

3.1.3.1 Site Screening Workshop

A site screening workshop was held on 31 July 2007, with representation from Eskom (design engineers, the air quality specialists) and the environmental consultants. The groundwater specialist was unable to attend and contributed his expert opinion at a later date. The purpose of the workshop was to combine collective, expert judgement to rate the candidate sites in terms of the criteria defined below. Site screening provides a tool to assist with making an informed decision as to a preferred site(s) which should be considered for further investigation during the EIA process.

The sites were assessed at a broad scale and on a strategic level during the workshop. This level of detail was considered sufficient for the purposes of eliminating flawed sites and identifying alternatives requiring further investigation during the EIA. Information available at the workshop included past site selection reports (Eskom 1990), the Jones & Wagener feasibility report (J&W, 2007), aerial photographs and the 1:50 000 topographical map for the area. A summary description of each site, in terms of the criteria under consideration, was compiled from the reports. Each of the experts contributed their opinions, site specific knowledge and understanding of the local and regional conditions to the screening process.

Workshop participants provided input as to the Site Selection Criteria (Section3.1.3.2) that would be most useful in assessing a site in terms of the project requirements. The site selection criteria were assigned a weighting (Section 3.1.3.3) in terms of the significance of that criteria to the decision making process. A scoring system was defined, with specific reference to project conditions, to score each site against the site selection criteria (Section 3.1.3.5). A matrix was created to calculate the total score for each site (3.1.3.6).

3.1.3.2 Description of Site Selection Criteria

The site selection criteria that were selected at the workshop for use during the site selection process are given in Table 1. Criteria were initially identified by the environmental consultants and then critically examined at the workshop. Additional criteria were added to the list while a number were eliminated as they were deemed either not relevant to the project, were indefinable or were unlikely to allow for differentiation between sites. The accepted criteria were then described in terms of how they would be measured or assessed (Table 1). Criteria were selected from biophysical, technical and social categories to ensure that there was relatively equal representation from the different project proponents.

Table 1: Criteria used in the screening of potential sites

Site Selection Criteria	Site Scoring Against Criteria			Weight
	Low (1)	**Medium (2)**	**High (3)**	
Biodiversity	Impacted area	Area of low sensitivity	Area of conservation importance	2
Heritage	No heritage	Heritage impacts can be easily mitigated	Heritage site/ Expensive mitigation	2
Surface Water	Low risk	Possible risk to water resources	Close proximity to surface water (<500m)/high risk	3
Ground Water	Low risk	Moderate risk	High risk	3
Land Capability	No potential	Potential for agriculture	High grazing/cropping potential	2
Current Site Use	No use	Moderate Use	Intensive Use	2
River Crossing	No		Yes	3
Ash Deposition Infrastructure	Use existing	Require limited new	Extensive new	1
Geology and Soils	Suitable for an ash dam	With constraints, but can be overcome	Not suitable / Difficult to engineer	2
Size of Site	Adequate for life of station		Inadequate for life of station	3
Topography	No constraints	With constraints, but can be overcome	Not suitable / Difficult to engineer	2
Undermining	No issues		Undermined- not suitable	3

Site Selection Criteria	Site Scoring Against Criteria			Weight
	Low (1)	Medium (2)	High (3)	
Mineral Resource	No resource		Mineral Resource- not suitable	3
Distance from Power Station	0-1000m	1000- 2500m	> 2500m	2
Current Ownership	Eskom		Private	1
Proximity to Receptors	Within 3000 - 1500m	within 1500 - 500m	< 500m	3
Number of Receptors	Farmlands	Transitional	Residential	2
Neighbouring Activities	No conflict	Potential conflict	Likely conflict	1
Noise	Low impacts	Nuisance noise	Above legal requirements	1
Visibility	Low visibility in impacted area	High visibility in impacted area/ low visibility in natural area	Highly visibility in natural area	2
Air Quality- health risks	Low health risks	Possible health risks	High health risks	3
Air Quality- nuisance	Minimal nuisance	Possible nuisance	High nuisance	2

3.1.3.3 Weighting of Site Selection Criteria

The weighting assigned to each of the site selection criteria represents the significance of that criterion to the decision-making process for site selection in this project. The significance was thought of in terms of "Would the identification of an aspect of this criterion alter the decision to construct an ash dam at a site?" Criteria weightings were assigned at the workshop through debate and consensus. A weighting of 1 was assigned to criteria with little significance, a weighting of 2 to those criteria with a moderate significance and a weighting of 3 to criteria with a significant impact on the site selection decision (see Table 1).

Example:

Site Selection Criteria	Weight
Noise	1
River Crossing	3

Further description, the motivation for inclusion and any discussion from the workshop around any of the criteria are described below.

Biophysical Criteria

Biodiversity– The presence of recognised, natural biodiversity features such as red data species or habitat of conservation concern on the site that would be lost under an ash dam. Biodiversity was considered unlikely to provide any differentiating information as all sites have been intensively used or disturbed in the past.

Heritage – Cultural or heritage resources that may require mitigation or stop the project. This criterion was included, but considered unlikely to be a differentiating factor as the available information suggests that all the sites have been used for intensive agriculture in the past.

Surface Water – Surface water pollution resulting from runoff, seepage and storm water from the ash dam. It was assumed that all sites would be constructed outside of any recognised water course floodline. The sites were scored in terms of the approximate distance to a water course or tributary, with consideration for the current pollution status of the water course. Weighted of high significance as pollution events could result in legal contraventions.

Ground Water – Ground water pollution from seepage coming from the ash dam, considered in terms of the features of the site that may contribute to groundwater seepage. Consideration was given to the current status of the site and any neighbouring activities that may already impact on the groundwater. This criterion was given a high significance rating as pollution impacts could result in legal contraventions and be difficult to rectify or mitigate.

Land Capability – The agricultural potential of the soils on site. This was considered in the context of agricultural potential that would be lost due to the construction of the ash dam. This was given a low weighting.

Current Site Use – The intensity of current site use and the associated value of that use. This was described largely in an agricultural context as the majority of the sites are rural with no infrastructure. This was included to give an indication of possible economic losses and likelihood of owner/occupier objections should the site become an ash dump. This was given a moderate weighting.

River Crossings – The need, or not, for ash delivery pipelines to cross a river en route to the site. The crossing of a river or water course with an ash pipeline has significant environmental risks and liabilities and thus sites not requiring a river crossing were preferred. Weighted of high significance as pollution events could result in legal contraventions.

Technical Criteria

Ash Deposition Infrastructure – The presence or absence of ash deposition infrastructure for delivering ash to a site. These impacts were considered in terms of the cost and area of disturbance of installing new infrastructure. This was given a low weighting.

Geology and Soils – The relative suitability of the site for an ash dam facility in terms of the local geology and soils. Geotechnical items were considered. These included features such as dykes and faults, as well as founding conditions such as the nature of the soils and water table that may impact on the feasibility, safety or cost of an ash dam. This was given a moderate weighting as most issues could be engineered.

Size of the Site - The adequacy of the site to provide ash deposition capacity for the life of the power station. Any site with insufficient capacity to receive the ash volumes expected over the life of power station could ultimately result in an additional ash dam site being required in the future. This was given a high weighting as an undersized site could result in an additional site being required in the future.

Topography – The relative suitability of the site for an ash dam facility in terms of the local topography. The slope, as well as any features (ridges, drainage lines, floodplains) that could impact on the feasibility, design, cost or operations of an ash dam were considered. This was considered to be of moderate significance as engineering technology is available to deal with most situations.

Undermining – Whether the site is undermined or not. The presence of undermining could seriously affect the stability of the site and the seepage impacts on groundwater of an ash facility. It was identified as a fatal flaw. This was given a high weighting as serious stability and groundwater contamination issues could result from undermining.

Mineral Resources – Whether the site overlies an identified mineral resource or not. This would impact on costs as the value of the resource would have to be considered. It is Eskom policy not to sterilise a known coal resource and the presence of a resource is therefore a fatal flaw. This was given a high rating as it is Eskom policy not to sterilise known mineral reserves.

Distance from Power Station – The distance of the proposed site from the power station. This was assessed as the approximate distance from the power station to the centre of the site. Longer distances imply greater capital and operating expense, larger areas of surface disturbance and a greater likelihood of road and rail crossings. Given a moderate rating as it related largely to cost rather than expected impacts.

Social Criteria

Current ownership – Whether the site is owned privately or by Eskom. Eskom property was preferred as the legal requirements, time and costs associated with purchasing private land add considerable risk to the project. This was given a low weighting as the impacts of non-Eskom ownership relate to time and costs, not environmental issues.

Proximity to Receptors – The proximity of the site to the nearest receptor population, defined in terms of the likely extent of impacts such as noise, visual and air quality impacts. Expert opinion has indicated that impacts from an ash dam would be most significant to receptors closer than 500m and almost insignificant to receptors further than 1500 m. The proximity also represented the risk to receptors in terms of health, safety and hazard factors. The proximity was estimated as the approximate distance to the closest, average receptor group. A single house/structure was not considered as an average receptor. This criterion was given a high weighting as close proximity to receptors would exacerbate any potential impact.

Number of Receptors – The density of receptors at the nearest identified location(s). This was categorised in terms of the relative density of the nearest significant receptors for a site. This was used as measure of the number of people likely to be within the zone of highest impact. This was given a moderate weighting.

Neighbouring Activities – The land use activities practiced on the surrounding land as they would relate to an ash dam facility. This was a measure of the likely conflict that may arise between an ash dump and the land use of the neighbouring areas. This was given a low weighting as power station activities dominate the area and conflict was therefore not anticipated.

Noise – Noise from ash dam operations impacting on local receptors. During construction the noise may at various times produce audible noise, however this was not expected to be above the SANS limits. This criterion was thus given a low weighting.

Visibility – The visibility of an ash dam facility on the site to local receptors. This was considered in the context of the current visual environment and in relation to the receptors. This criterion was weighted as being of moderate significance as the general areas is already heavily impacted by a number of industrial/mining installations.

Air Quality: health risks – Human health risks to local receptors resulting from an ash dam being located on this site. This aspect was assessed in terms of the direct and cumulative health impacts of an ash dam on all local receptors. Any differences between sites would relate to the differences in receptor proximity, number of receptors and the position of the site/receptors in terms of wind pattern and event frequency. The pending air quality regulations must be considered. The criterion was given a weighting of high significance as health impacts may be difficult or expensive to mitigate.

Air Quality: nuisance – Dust pollution and nuisance resulting from an ash dam located at this site. This was scored as a separate criterion from health risks as the nuisance component of air quality impacts will most likely receive comment from IAPs, but does not constitute a health risk. It also represents a different component of any potential dust. It was weighted lower than the health risks as nuisance impacts are likely to be less significant.

3.1.3.4 Fatal Flaws

It was decided by the workshop panel that a high score (i.e. 3) for certain of the site selection criteria was in fact a fatal flaw that would result in the elimination of that site from the screening process. The presence of a **mineral resource** and **undermining** of a site were considered as criteria that would represent a fatal flaw.

3.1.3.5 Scoring of Site Against Criteria

Each site was examined by the panel of experts and project proponents in terms of the available information and given a score from 1 to 3 for each of the site selection criteria. A site scored high (3) when the placement of an ash dam was judged likely to result in a definite or significant impact on that criterion. Conversely a site scored low (1) if it was unlikely to result in an impact, or would result in an insignificant impact for that criterion. Sites where an ash dam would result in moderate impacts scored a two. Impacts were considered in terms of the effects, the risks, and the costs of mitigation. An explanation of the qualifying factors for scoring a site in terms of each criteria is given in Table 1.

Example:

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

3.1.3.6 Scoring Matrix

A matrix was developed to compute the total score for each of the sites. The site score for each of the site selection criteria was multiplied by the criteria weighting to give a weighted site score. All the weighted site scores for a site were summed to give a total site score.

Example:

		Site Score					
Site Selection Criteria	**Weight**	**Site A**		**Site B**		**Site C**	
Criteria X	1	1	1	2	2	1	1
Criteria Y	3	1	3	3	9	3	9
Total Site Score			4		11		10

Total site scores are relative numbers that can only be used to make comparisons between sites to determine the most favourable site for the project. In the scoring matrix a site with many negative features and significant risks or impacts will score high. A more favourable site will have a relatively lower total site score. The site with the lowest Total Site Score is thus the preferred site for the new ash dam site.

Example:

Site A, with a total site score of 4 is more favoured than site C, which is in turn more favoured than Site B. Site A is the preferred site.

Sites 3, 5 and 6 scored 103, 100 and 87 respectively. These sites were all identified as having been undermined or with mineral resources present. These two criteria were declared to be fatal flaws and these sites cannot be considered further (Table 2 and Figure 3).

Sites 1, 2 and 4 scored 107, 103 and 108 respectively. The major risks associated with all of these sites included the risks to surface water as a result of the sites being located adjacent to a water course, the risks to groundwater as a result of these being uninvestigated greenfields sites and the need for a river crossing. Site 1 had high risks associated with the proximity to receptors and air quality health impacts as it is located near to the power station and mine houses. Site 4 was associated with a high air quality health risk as a result of it being located upwind and adjacent to Blinkpan Village and Golf Course. Site 2 is not sufficiently large to provide for all future ash deposition and therefore, as a greenfields site, is not considered as a feasible site.

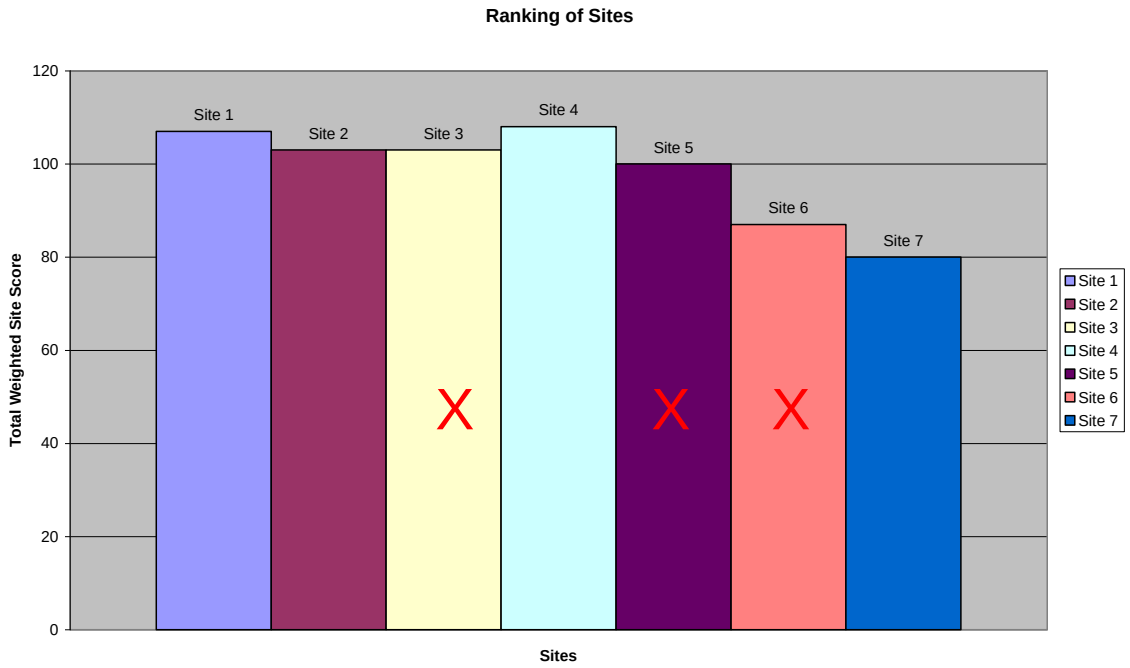


Figure 3: **Total Weighted Site Scores**
X sites with fatal flaws

Site 7 had the lowest total weighted site score, which at 80 was more than 22% lower than the scores of any of the other feasible sites. It was ranked as the best site in terms of environmental and technical criteria, but ranked moderately in terms of the social criteria. The site is associated with high risks in terms of the proximity to receptors and air quality health impacts. The site does not have any fatal flaws and is located in a heavily impacted brownfields area. Site 7 is therefore considered as the preferred alternative for the new ash dam facility.

Table 2: Site Matrix

Criteria	Description	Weight	Site 1		Site 2		Site 3		Site 4		Site 5		Site 6		Site 7	
			Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score	Score	Weighted Score
Biophysical	Biodiversity	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	Heritage	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
	Surface Water	3	3	9	3	9	1	3	3	9	1	3	2	6	2	6
	Ground Water	3	3	9	3	9	3	9	3	9	2	6	2	6	1	3
	Land Capability	2	3	6	3	6	3	6	3	6	2	4	3	6	1	2
	Current Site Use	2	3	6	3	6	3	6	3	6	3	6	3	6	1	2
	River Crossing	3	3	9	3	9	3	9	3	9	1	3	1	3	1	3
Subtotal			**17**	**43**	**17**	**43**	**15**	**37**	**17**	**43**	**11**	**26**	**13**	**31**	**8**	**20**
Technical	Ash Dam Infrastructure	1	3	3	3	3	3	3	3	3	2	2	3	3	1	1
	Geology and Soils	2	3	6	1	2	3	6	1	2	1	2	1	2	1	2
	Size of Site	3	1	3	3	9	1	3	1	3	3	9	1	3	3	9
	Topography	2	1	2	3	6	3	6	2	4	1	2	1	2	1	2
	Undermining	3	1	3	1	3	1	3	1	3	3	9	3	9	1	3
	Mineral Resource	3	1	3	1	3	3	9	1	3	3	9	3	9	1	3
	Distance From Power Station	2	2	4	2	4	3	6	3	6	2	4	2	4	1	2
Subtotal			**12**	**24**	**14**	**30**	**17**	**36**	**12**	**24**	**15**	**37**	**14**	**32**	**9**	**22**
Social	Current Ownership	1	3	3	3	3	3	3	3	3	1	1	3	3	1	1
	Proximity to Receptors	3	3	9	2	6	2	6	2	6	3	9	2	6	3	9
	Number of Receptors	2	2	4	1	2	1	2	3	6	3	6	1	2	3	6
	Neighbouring Activities	1	2	2	2	2	2	2	3	3	3	3	1	1	3	3
	Noise	1	1	1	1	1	1	1	2	2	2	2	1	1	2	2
	Visibility	2	3	6	3	6	3	6	3	6	3	6	3	6	1	2
	Air Quality- health risks	3	3	9	2	6	2	6	3	9	2	6	1	3	3	9
	Air Quality- nuisance	2	3	6	2	4	2	4	3	6	2	4	1	2	3	6
Subtotal			**20**	**40**	**16**	**30**	**16**	**30**	**22**	**41**	**19**	**37**	13	**24**	**19**	**38**
TOTAL				**107**		**103**		**103**		**108**		**100**		**87**		**80**
Site Ranking				6		4		4		7		3		2		1

3.1.4 Sensitivity analysis

To test how sensitive the site scoring is to the weighting of the criteria a number of different scenarios were tested. In each of these scenarios the criteria weightings were altered and the subsequent site rankings recorded.

In the initial scenario of the sensitivity analysis all criteria were assigned an equal weighting, to represent a scenario where all criteria are of equal importance to the project decisions (Figure 4). The total weighted site scores for each of the sites were again compared and ranked. Site 7 remained the best site and its score was 23% better than any of the feasible sites.

A second test scenario was run where the technical criteria were discounted by giving them a weighting of 0 and only the environmental and social criteria considered as per their original weightings (Figure 5). In this scenario site 7 ranked second behind site 6, but was more favourable than the rest of the sites. The next most favourable sites were 3 and 5. However sites 3, 5 and 6 have fatal flaws and could not be considered further. Site 7's score was more than 20 % lower than any of the 3 other feasible sites despite the relative greater importance of social and environmental factors in the matrix.

A third scenario was tested where the social criteria were weighted 0 and only the biophysical and technical criteria considered (Figure 6). Site 7 improved in the relative scoring of the sites and scored more than 37% lower than any other feasible sites. Site 1 and 4 were the second ranked sites.

The final test scenario was conducted where the biophysical criteria were 0 weighted and the social and biophysical criteria considered as per their original ratings (Figure 7). In this scenario site 6 scored the lowest, although it is fatally flawed, with site 2 and site 7 ranking tied second by a small margin. Both site 2 and 7 potentially have insufficient capacity, however site 7 is a brownfields and could serve as an interim site and ultimately result in a smaller greenfields development, should one be required. Use of site 2 would not reduce the area of greenfields sites required for ash deposition.

It can thus be concluded that, despite any influence of the criteria weightings, site 7 consistently emerges as the ash dam site preferable to any of the other candidate sites.

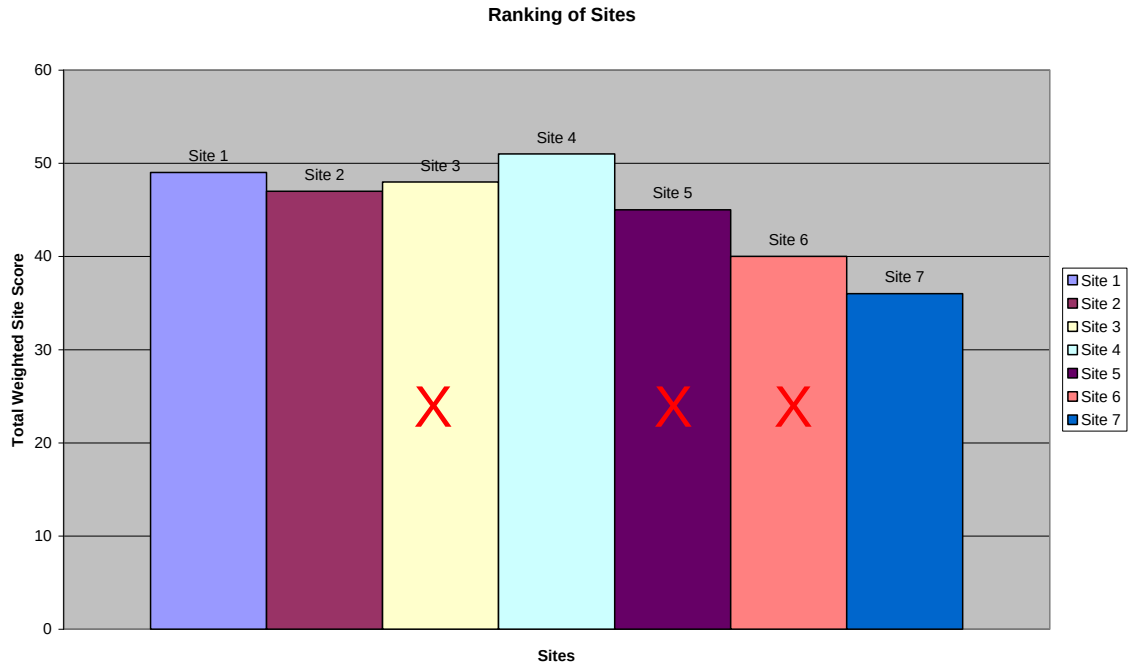


Figure 4: **Total Weighted Site Scores with Equal Criteria Weighting**
X sites with fatal flaws

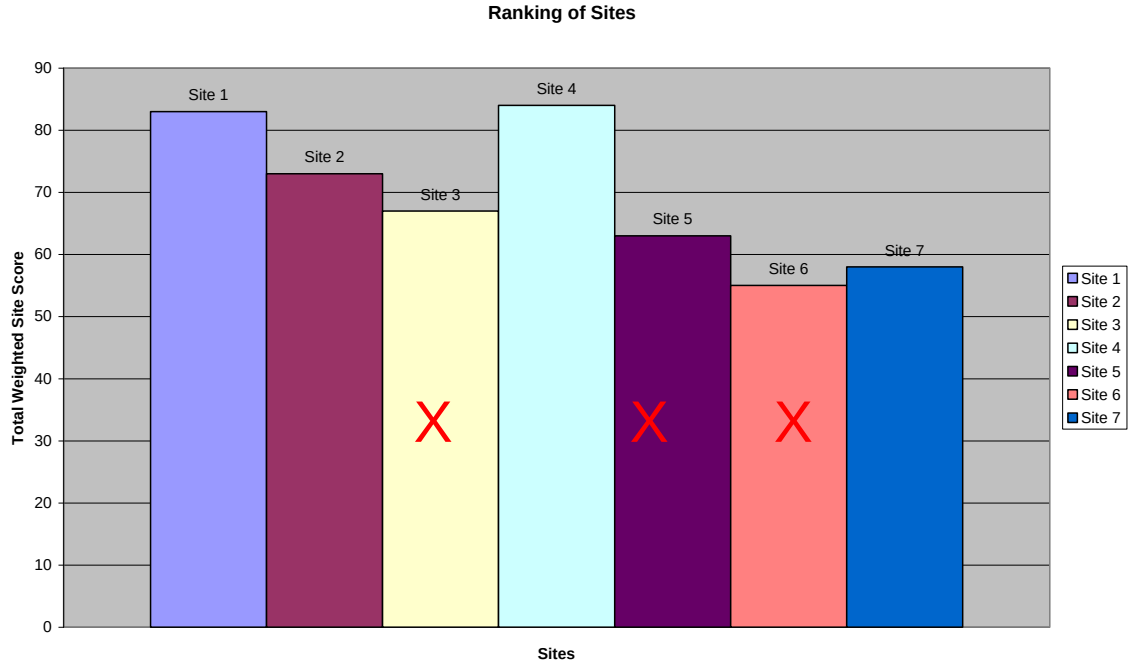


Figure 5: **Total Weighted Site Scores without Technical Criteria**
X sites with fatal flaws

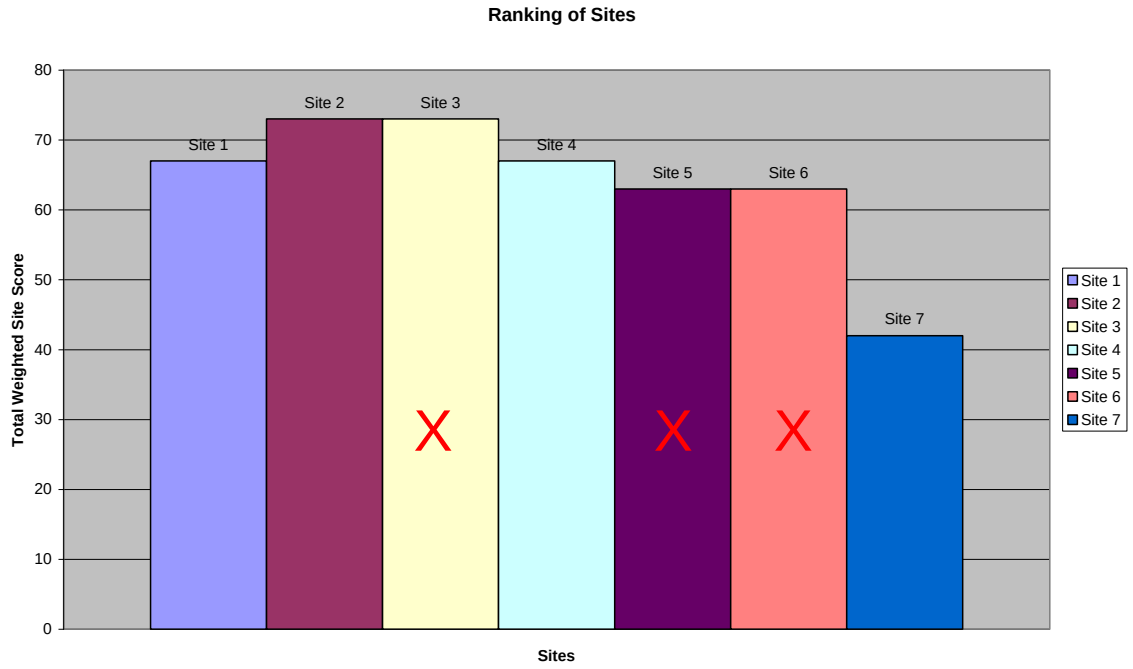


Figure 6: **Total Weighted Site Scores without Social Criteria**
X sites with fatal flaws

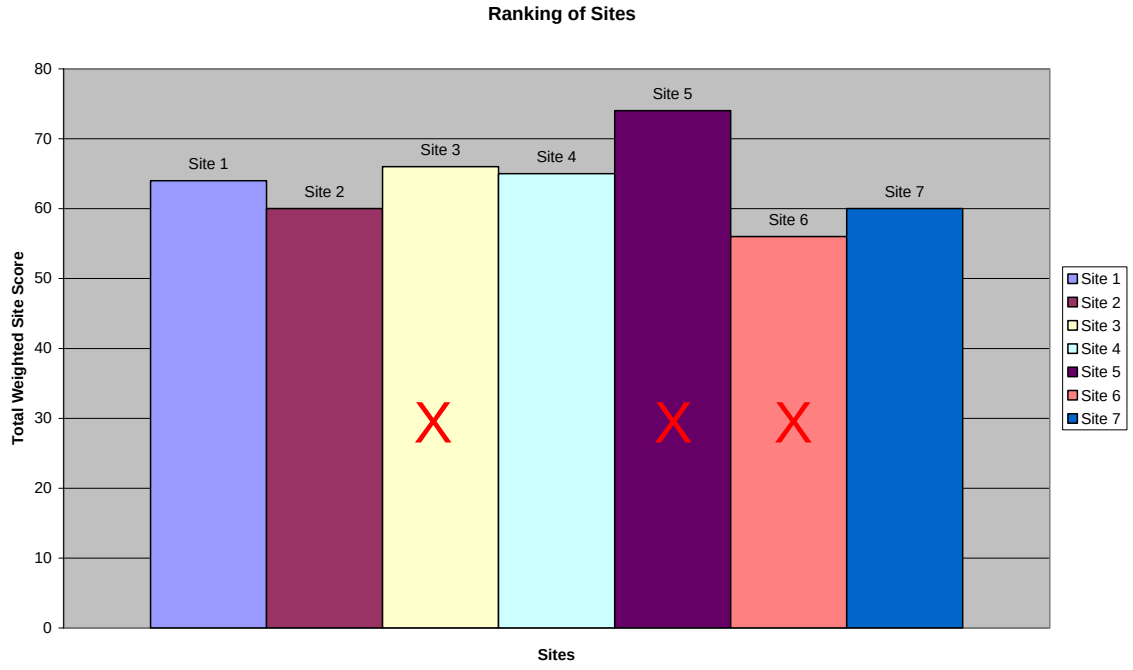


Figure 7: **Total Weighted Site Scores without Biophysical Criteria**
X sites with fatal flaws

3.1.5 Site Screening Conclusions

Sites 3, 5 and 6 cannot be considered as possible ash dam sites as they are either undermined, resulting in high stability and groundwater seepage risks, or overlie mineable coal reserves, which Eskom will not consider sterilizing.

Of the 4 feasible sites, site 7 was consistently the most favoured by total weighted site score. The other 3 sites regularly had site scores with very small differentiation from the others. Site 2 was consistently the second most favoured of the remaining sites, although only by a small margin.

Site 7 emerged as the most favourable site from the workshop proceedings and was consistently among the most favoured sites through the sensitivity analysis. Depending on the load factors realised by the power station and the quality of the coal that would be used, the ash dam at site 7 may not last for the duration of life of plant. However the site is a brownfields site that is adjacent to the existing ash dams for Komati Power Station. Use of the site will provide interim ash deposition capacity that would reduce the size of any future greenfields site that may be required in the future. All of the technical, biophysical and social criteria of the site and its immediate receptors are already impacted by the current installation and thus establishment of an additional ash dam on site 7 will have reduced impacts when compared to any of the other sites which are greenfields sites.

Although site 7 may have insufficient capacity for all ash deposition from the power station, should the station operate for the full extent of its planned life, the use of site 7 in the interim will result in a smaller greenfields facility being required in the future. The benefits of utilising site 7 are thus twofold: firstly ash dam impacts are contained to a zone that is already impacted on by an existing ash dam; and secondly should this facility not have capacity the size of any future greenfields facility would be significantly reduced.

3.1.6 Application for Exemption from Consideration of Alternatives

As a result of the site selection process that has been undertaken, an application for exemption, in terms of the EIA Regulations, has been submitted to the DEAT, as the competent authority.

The application was made for exemption from a provision of the EIA Regulations (GN R 385) as permitted by Sub-regulation 51 of the Regulations. Sub- regulation 32 (2) prescribes the information that an environmental impact assessment report must contain in order for the competent authority to consider the application and reach a decision. Section 32 (2)(h) of the EIA Regulations (GN R 385) reads “a description and comparative assessment of all alternatives identified during the environmental impact assessment process; (i) a summary report of the findings and recommendations of any specialist report or report on a specialised process;”.

The consideration of site alternatives has already occurred and a preferred site selected through a robust and defendable process. It is considered, that further examination of the various site alternatives during the EIA would be very unlikely to result in information that would contribute to the alteration of this selection. The application was therefore for exemption from the consideration of alternatives during the EIA for the new ash dam facility at the Komati Power Station as required by sub-regulation 32 (2)(h).

3.2 Powerline Route Selection

Engineering investigations were conducted to identify a suitable route for the realignment of the two powerlines affected by the ash dam. The investigations aimed to identify the shortest, available servitude that could be investigated and selected as a preferred route. The investigations concluded that there was no servitude available for the powerlines with the Komati Power Station property. The shortest available route outside the Eskom property was thus selected as the preferred route for further investigations. The shortest available servitude is along a route adjacent to the existing ash dams on the eastern side of the R35 provincial road. The powerlines will enter Komati Power Station from the east.

4. STUDY APPROACH AND METHODOLOGY

4.1 Study Objectives

The objectives of the scoping study were to:

- Collate project and baseline environmental information;
- Identify alternatives for the proposed development;
- Identify landowners, Interested and Affected Parties (IAPs), local authorities and environmental authorities as well as other stakeholders that may have an interest in the project.
- Inform landowners, authorities, stakeholders, interested and affected parties of the proposed project;
- Engage stakeholders and identify their issues and concerns;
- Engage environmental authorities and confirm legal and administrative requirements;
- Identify and describe potential environmental issues associated with the proposed project;
- Identify feasible alternatives for further consideration in the EIA; and
- Identify the nature and extent of further investigations and specialist input required for the EIA.

4.2 Existing Information Review

Several studies, both technical and environmental, have been undertaken in the past at the Komati Power Station to investigate potential sites for ash deposition. As part of the scoping assessment, environmental considerations in these reports were reviewed. The design documents for the powerline deviations were also consulted. This has included the following reports:

- Komati Power Station, Ash Disposal System, Feasibility Study for the Future Operating Philosophy and Site Selection of a Surface Ash Disposal Facility, Report K120, June 1990.
- Jones & Wagener, Komati Power Station, Re-commissioning of Ash Dams, Feasibility Study, Report JW44/06/A542, January 2007.
- Jones & Wagener, Komati Power Station, Re-commissioning of Ash Dams, Report JW49/07/A784 – Rev A, April 2007.
- Komati Ash Dam Deviation: Final Design Document. Trans-Africa Projects, October 2007.

The above-mentioned studies together with the proposed project description were used to identify potential environmental issues related to the proposed ash dam project. Information gaps have been recognised as well as the need for additional work required to align the existing information with the proposed project as well as current legislative requirements.

4.3 Authority Consultation

Authority consultation for the Komati Power Station Ash Dam Extension Project commenced in June 2007. Regulatory authorities, including MDALA and DWAF were consulted on the status quo at the power station and on the proposed way forward. A meeting was held with DEAT, the lead regulatory authority, on the 8 August 2007. The purpose of the meeting was to inform the DEAT authorities of the proposed project and establish the enviro-legal and administrative requirements. The minutes are included in Appendix 1.

An application for environmental authorisation of the ash dam extension at Komati Power Station was submitted to the DEAT on 8 August 2007 (Appendix 2). The application was registered under the DEAT reference number 12/12/20/1007. Subsequent to the initial submission a motivation for exemption from the consideration of alternatives during the EIA phase was submitted to the DEAT on 23 August 2007.

An amendment to the initial application for environmental authorisation will be submitted to the DEAT to include the deviation of the two powerlines with the ash dam development. The two projects have been included under a single application as the powerline re-alignment is required as a result of the ash dam project.

4.4 Consultation with landowners, lawful occupiers and any other affected parties

Synergistics is undertaking a full public participation process as part of the EIA for the new ash dam and powerline deviation at Komati Power Station. The public participation process has been conducted in terms of the EIA Regulations 56 – 59 and Guideline 4: Public Participation in support of the Environmental Impact Regulations (DEAT, 2006) published in terms of the EIA Regulations.

4.4.1.1 Advertisements and Posters

Press advertisements, informing the public of the project and requesting participation, were placed on 17 August 2007 in the following regional and local newspapers:

- Die Beeld; and
- The Middelburg Observer.

Copies of these advertisements are provided in Appendix 3.

Following the addition of the powerline deviation to the project, additional press adverts, providing notification of the altered project scope, were published in both the Middelburg Observer and the Beeld on October 19 (See Appendix 3)

“A3-sized” posters, providing notification of the ash dam project, requesting public participation and informing the public about a public meeting were placed on site at the main entrance to the Komati Ash Dam complex and on the boundary fence along the R542 provincial road on 23 August 2007. Additional A2 posters were placed in Komati Village at the Igwababa Shop, the Igwababa Recreation Club, the Municipal Offices and at the general dealer shop in Blinkpan. A copy of the poster is included in Appendix 4.

4.4.2 Identification of Stakeholders

As per the requirements of the NEMA, Synergistics has undertaken to notify and consult with land owners and affected parties. Eskom is the only land owner affected by the ash dam project. The route deviation of the powerlines will cross the farms Geluk 26 IS and Komati Power Station. The

portion of the farm Geluk 26 IS which will be affected is owned by Mr M Dippenaar who has been consulted. Proof of consultation is included in Appendix 5.

The names and contact details of potentially interested and affected parties (IAPs) were obtained from the interested and affected party register compiled for the Public Participation Process of the Komati Return to Service Project. Additional measures to contact IAPs included the placement of posters, newspaper advertisements and telephonic communications. Networking and referral by informed IAPs has assisted in the registration of additional IAPs.

4.4.3 Background Information Document

A background information document (BID) was compiled in English and Afrikaans for circulation to all interested and affected parties. The document included a response sheet, which provided persons with the opportunity to register as IAPs, list additional persons that would be interested in and/or affected by the project, provide comment and raise issues and concerns. The BID gave notice of the public meeting to be held for the project and requested written response from IAPs on or before 21 September 2007. The BID is given in Appendix 6.

The BID was delivered to 150 of the residences in Komati Village closest to the Komati Power Station Ash Dam complex. In addition, a further 80 potential IAPs, who live in Komati or on neighbouring farms, were selected from the Public Participation Register from the Komati Return To Service Project and sent the BID (see Appendix 5). The BID was also posted to the relevant municipal officials at the Steve Tshwete Local Municipality. The BID was further circulated to any additional persons who registered as an IAP or made enquiries with the public participation office.

4.4.4 Registration of IAPs

Persons who have returned the response form, contacted the public participation office or attended the public meeting have been registered as IAPs and will receive further information regarding the project. The database of registered IAPs is included in Appendix 7.

4.5 Stakeholder Meeting

A public scoping meeting was called for on 13 September 2007 at the Igwababa Hall to inform interested and affected parties of the proposed new ash dam facility for Komati Power Station. The meeting was advertised in the press adverts, posters and BIDs. The purpose of the meeting was to introduce the project, provide an overview of potential ecological sensitivities and to receive questions and comments from the interested and affected parties.

Apart from the Eskom project team members, no interested or affected parties or public members attended the meeting. The attendance register and presentations prepared for the meeting are included in Appendix 8.

4.6 Follow-up Consultation

As a result of the few responses received and lack of attendance at the public meeting a number of potential key stakeholders, identified from the Public Participation Register from the Komati Return To Service Project, were called telephonically by the EAP and given the opportunity to respond. None of the persons engaged in these consultations had any issues or comments.

4.7 Public Review of Scoping Report

The draft scoping report was made available to the public and interested and affected parties for review. The report was left at the Komati Power Station, the municipal office in Komati Village and on the internet at www.synergistics.co.za from 26 October until 23 November 2007. Registered IAPs were informed of the reports availability and asked to submit comments.

4.8 Baseline Data

Environmental baseline information was collated from a number of reports, national and regional databases, literature and a site visit to the Komati Power Station ash dam complex. The baseline environmental description given here (see Chapter 6) provides a concise description of the site's environmental status. More detailed descriptions of the environmental baseline will be drawn from the specialist reports and included in the EIA Report.

4.9 Environmental Assessment

4.9.1 Scoping of All Potential Impacts

Scoping is widely regarded as a critical step in the environmental assessment. Scoping is conducted to ensure that the environmental assessment, planned for the EIA phase, is focussed and only considers potentially significant impacts and feasible alternatives.

Scoping of all potential environmental impacts is reported on in Chapter 8 of this report and was conducted using the following factors as a framework:

- the nature of the proposed new ash dam facility, powerline route and the receiving environment (Komati Village and surrounds);
- the legal, policy and planning context of the proposed new ash dam facility; and
- the environmental priorities of the IAPs (see Chapter 7).

5. PROJECT DESCRIPTION

5.1 Ash Dam

5.1.1 Project Scope

The proposed ash dam facility will be a brownfields expansion project located within the Komati Power Station, on a portion of the farm Komati Power Station 56 IS (Figure 2). The proposed ash dam facility, named Extension 3, is an extension to the existing ash dams and will increase the ash deposition capacity at Komati Power Station with an additional 13.5 Mm^3. It is proposed that the new ash dam will cover an area of 42 ha and rise to a maximum height of 47 m above natural ground level at full utilisation. A description of ash dam facility is provided below (J&W, 2007a).

5.1.2 Project Motivation

Eskom are re-commissioning Komati Power Station to increase the base-load electricity generation capacity to meet the growing demand in South Africa. Their decision was informed through various strategic energy planning processes carried out by the DME, NERSA and Eskom (see Section 1.2). The operation of a coal-fired power station, such as Komati, generates large quantities of ash as a by-product and this ash is deposited to an ashing facility (Figure 8). The existing ash dam facilities at Komati Power Station are being re-commissioned and upgraded, however their deposition capacity is insufficient for the planned deposition rate and can sustain deposition for only 18 months. As a result a new ash dam must be identified, engineered and developed to enable electricity generation at Komati Power Station to continue. The existing dams and the new dam will be used together to provide the required deposition capacity.

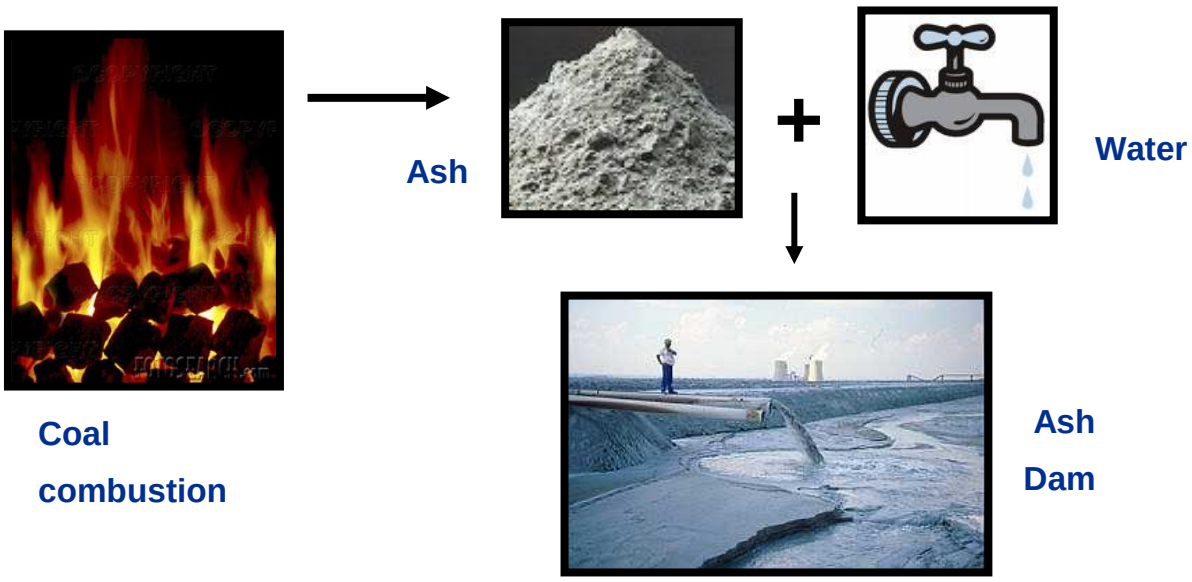


Figure 8: A Simplified Depiction of the Ash Creation and Deposition Process

In order to prepare the preferred site for the development of the new ash dam, two powerlines, a 275 kv transmission and an 88 kv distribution line, that enter Komati Power Station will have to be re-aligned. A new route for the two powerlines has been identified that runs parallel to the R35 provincial road. The powerlines will enter Komati Power Station from the east. Environmental authorisation, in terms of the EIA Regulations, will be sought from DEAT for the construction of the replacement powerlines.

5.1.3 Construction Process

Preparation of the ash dam site and initial construction work will take approximately 6 months. All infrastructure and vegetation will be cleared from the site and the topsoil will be stripped and stockpiled. An under-drain system, in a herring-bone configuration, will be excavated within the ash dam footprint (Figure 9). These drains will intercept and drain vertical seepage through the ash dam to a sump. Toe and blanket drains will be provided on the perimeter of the dam to improve stability. The subsoil drains on the downstream flanks of the existing dams will be extended to include Extension 3. This natural filter drain intercepts groundwater seepage from the basin of the ash dams. Water collected in these drains will be pumped to the ash water return dam. The clean storm water cut-off trenches up-stream of the existing ash dams will be extended to include the Extension 3 area.

A starter wall will then be constructed of available in situ soil on the outer perimeter of the ash dam footprint. The ash dam will be constructed using the daywall method whereby an outer wall is constructed of ash on the perimeter of the site, but inside the starter wall. The outer daywall will form the dam walls into which further ash is deposited. The outer walls are constructed during the day, hence the term ‘daywall’, while the dam is filled with ash at night. A 20 m wide daywall is to be constructed inside of the starter wall and will enclose the entire ash dam footprint. The daywall will be formed by constructing 1m high compacted bund walls on either edge of the daywall and filling the centre with the initial ash slurry. Only fine ash is to be used in the daywalls.

The ash dam will be operated in the same manner as the existing dams whereby ash is delivered from the power station as slurry via a series of pumps and pipelines. Ash delivery pipes will be installed in a ring feed around the ash dam footprint. The ash delivery pipes will connect to the existing ash delivery infrastructure at the north western corner of ash dam Extension 1. Two pairs of 250 mm steel pipelines will be installed, the first will be the fine ash pipeline and the second the coarse ash pipeline. One pipe from each pair will be an operational line and the other a standby line.

The ash dam will be under drained with a herring-bone system and sub-soil drains will be installed to collect seepage water. All water drained off the ash dam will be collected in ash water return dams and recycled to the power station.

5.1.4 Operations and Life of Facility

Ash dam Extension 3 is designed with a footprint of 42 ha, a maximum rise of 47 m from the natural topographical low and an ash deposition capacity of 13.5 Mm^3 (Figure 9). The design has maximised the capacity and hence operational life of the ash dam facility within the available space (J&W, 2007b)

The dam will be operated as a traditional ring dyke using the daywall method. Daywalls will be constructed on the dam perimeter using fine ash. The daywall then form the outer ash dam wall. The centre of the dam created by the daywalls is then filled with both coarse and fine ash slurry, with deposition taking place largely at night. The ash slurry is disposed of in the dam where the ash settles and the water is recovered. As a portion of the dam gets filled from disposing of the ash for a specific period at one location the disposal point is shifted to a new location. Once the initial dam is filled to the appropriate level then a new daywall, covering a slightly smaller footprint will be constructed on the filled dam and the process repeated. The width of the daywall will be adjusted by the operator as necessitated by the gradual increase in deposition rate over time. The completed outer walls of the ash dam are rehabilitated by covering them with a layer of topsoil and vegetating them.

Seepage water from ash dam Extension 3 intercepted by the sub-soil drain and under-drains will be collected in a sump and pumped to the ash water return dam. This water is then recycled to the power station for reuse.

5.1.5 Stormwater Management

Provisions are in place for stormwater diversion around the existing ash dam area. The up-stream cut off drains will be extended to include the area above ash dam Extension 3. Storm water is diverted around the ash dam complex to the Gras Dam. Storm water is decanted off the ash dam to a sump from where it is pumped to the ash water return dam. This water then decants to the power station for re-use. The ash water return dam has a capacity of 120 000 m^3 whilst allowing for a dry free board of 800 mm.

5.1.6 Employment

No changes in the on-site construction or operational workforce are anticipated for the new ash dam. The same personnel as utilised for the existing ash dams will be employed on the new ash dams.

5.1.7 Infrastructure and Services

The ash dam will be accessed via a road around the perimeter of the ash dam footprint. Two pairs of 250 mm steel pipelines will be installed around Extension 3 as operational and standby ash delivery pipes. These pipes will connect to the existing ash delivery pipe and pump systems used for ash dam 1 and its extensions.

A3 Drawing

Figure 9: Conceptual Layout of the New Ash Dam at Komati Power Station

5.1.8 Consideration of Ash Dam Alternatives

5.1.8.1 Site Alternatives

Seven alternative sites were considered for the location of a new ash dam for Komati Power Station. A site screening process was completed in which all sites were assessed in terms of their suitability for an ash disposal site. The assessment of site alternatives is described in Chapter 3 of the scoping report.

5.1.8.2 Deposition Method

Ash is an inherent constituent of coal and when the coal is burnt in the furnaces of a power station the residue that remains behind is called ash. The ash needs to be removed from the furnace chambers to maintain the efficiency of the combustion process. Komati Power Station uses a wet ashing system as opposed to a dry ashing process to remove the ash.

There are two ash collection points in the ash removal plant at Komati Power Station:
1. Course ash falls out of the draught to the bottom of the combustion chamber and into the ash hoppers.
2. The lighter fly ash is extracted from the boiler from the top and then falls into the precipitator ash hoppers.
The ash handling plant collects all this ash and it is then transported to the ash sumps, using water, where it is crushed. The ash is then pumped in a series of pipelines to the ash dams in the form of slurry (Figure 8).

Wet ashing produces less dust but uses more water than dry ashing. However a large proportion of this water is recovered and recycled to the power station. Wet ashing is currently employed at Komati Power Station. The costs to retrofit a dry ashing plant at Komati Power Station would be three times that of the wet ashing process and it is thus economical for Komati to continue with a wet ashing system.

5.1.8.3 No-Go Alternative

Without the new ash dam Komati Power Station will not be able to operate beyond the remaining life of the existing ash dams. The life of the existing ash deposition facility is estimated at approximately 18 months following start up of the first unit at Komati Power Station. The subsequent shut down of Komati Power Station would result in the loss of approximately 1000 MW of base-load electricity generation capacity, thus Eskom would not be able to meet the continuously increasing electricity demand, and the loss of 217 jobs at Komati Power Station.

5.2 Powerlines

5.2.1 Project Scope

The two powerlines affected by the proposed ash dam facility will be deviated from their current location to an alternative route that follows the R35 provincial road and enters Komati Power Station from the east (see Figure 10). The two powerlines will be constructed in adjacent servitudes that deviate from the existing route at the towers immediately prior to the point where the lines cross the R35. The new lines will run adjacent to the existing ash dam facility on the eastern side of the R35, pass between the ash dams and the Komati water reservoirs, cross the R35 provincial road and enter the Komati Power Station from the east.

The 275 kv Camden Komati line deviation will be constructed with 9 new towers over a distance of approximately 2400 m. The 434 series of self-supporting towers, which are approximately 24 m high and 16 m wide at the apex, will be used in order to maintain similar criteria as the existing line. The base of the tower is approximately 8 m wide and the tower is supported on four feet (see Figure 11).The deviation will commence from tower number 250 of the existing line and enter the power station through an alteration to the Arnot Kruispunt line which is currently inactive. The 275 kv line will require a servitude of 47 m wide (TAP, 2007).

The 88 kv Halfgewonnen North-Kudu Traction line deviation will be constructed with 12 towers of the 131 series of self-supporting towers over a distance of approximately 2700 m. The deviation will connect to the existing line at tower nearest to the adjacent 275kv line deviation tower and enter the power station via the existing towers. The 88kv line will require a servitude of 36 m wide (TAP, 2007).

5.2.2 Project Motivation

The two powerlines currently cross an area that has been identified as the preferred site for the proposed new ash dam facility and cannot remain where they are. The powerlines are both required for the transmission and distribution of electricity to and from Komati Power Station and thus cannot be taken down without alternative lines being constructed.

Figure 10: Preferred Route for the Deviation of the 275 kv and 88kv Powerlines at Komati Power Station (TAP, 2007).

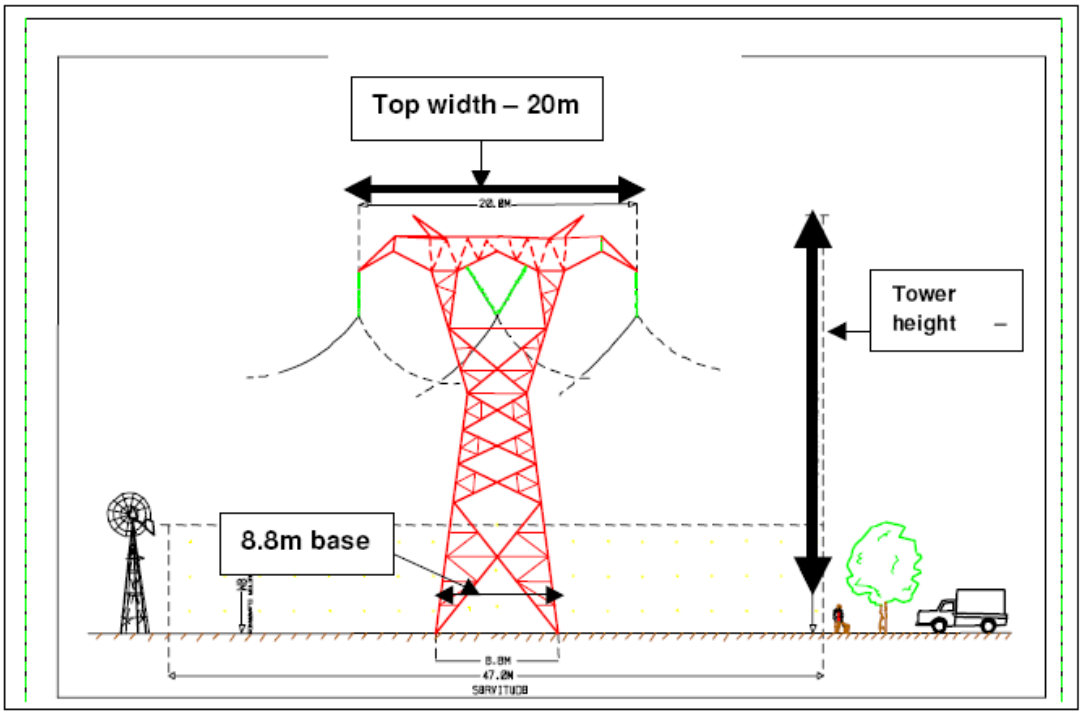


Figure 11: Diagrammatic Representation of the Self-Supporting Strain Configuration Tower.

5.2.3 Construction Process

The servitude rights for the preferred route will be acquired by Eskom and certain constraints would be imposed on the types of activities that could be permitted within the servitude. The towers required for each of the two deviations, as identified by the design engineers, will be erected along the routes at the appropriate spacing. Each of the towers will be built using standard materials according to the SANS 10280:2001 standards. The towers and conductors will be configured to ensure suitable wind spans, weight spans, ground clearances and earthing. Each tower will be mounted on four foundation blocks. The foundation system for each tower will be determined following geotechnical investigations of the servitude route. Both of lines have been engineered to ensure that the required phase to ground and phase to phase clearances are maintained.

5.2.4 Operations

The two powerlines will be operated and maintained in terms of standard Eskom protocols. This will include the maintenance of a servitude along the powerline route.

6. BRIEF DESCRIPTION OF THE AFFECTED ENVIRONMENT

6.1 Regional Setting

Komati Power Station is located midway between Middelburg and Bethal in Mpumalanga (Figure 1) on the farm Komati Power Station 56 IS. The power station lies west of the R 35 provincial road and is adjacent to the Komati Village. The existing ash dam facilities are located south of the power station, north of the R542 provincial road and between the R35 and Komati Village. The Koornfontein Coal Mine is located west of the power station while the adjacent surrounds are comprised of agricultural farms.

The proposed powerline route will run on the east side of the R35 provincial road in land that is currently used for agriculture, largely dryland cropping.

6.2 Climate

Komati Power Station occurs in an area with typical Highveld conditions. The summers are moderate and wet while the winters are harsh, cold and dry. Average daily temperatures are in the middle 20°C range in summer (October to March) and are lower than 15°C in winter (April to September). Winter minima fall below 0°C in June, July and August. Annual rainfall ranges between 550 mm and 750 mm. The prevailing wind direction is from the northwest at an average speed of less than 5 m/s. The windiest months are September, October and November.

6.3 Topography

Surface topography of the ash dam area is gently undulating to flat with the majority of the area sloping toward the north west. The topographical high of the ash dam area lies near the junction of the R35 and R542 provincial roads at approximately 1655 masl. The site slopes gently and consistently down to a natural topographical low near the Gras Dam (1610 masl). A small drainage line runs through the centre of the ash dam complex.

The topography of the powerline route is gently undulating with no distinct topographical features. The deviation commences near to the crest of the slope and enters the power station prior to the valley bottom.

6.4 Geology

Komati Power Station is situated within the Springs-Witbank Coalfield. The sediments of the coalfield were deposited on an undulating pre-Karoo floor and consequently the distribution and thickness of the Karoo Sequence sediments vary significantly. Dolerite dyke intrusions are ubiquitous throughout the area and in the southern sections of the coalfield the dykes are typically up to 5m thick with an east-west orientation. The sediments of the Karoo basin were deposited in fluvial floodplains and shallow shelves over a period of more than one hundred million years extending from the late Carboniferous (290million years ago) to the early Jurassic (190million years ago). Locally, siltstones and sandstones of the Vryheid Formation, Ecca Group are encountered. These rock types weather to fine grained sands, silts and clays. In the lower terrain units a transported, wet, clayey sand with occasional gravels overlies the residual profile.

6.5 Soils and Land Capability

During geotechnical investigations of the site a number of test pits were excavated and the soil profiles recorded. The typical profile comprised:

0 – 1 m	Hillwash: moist, brown, loose, slightly clayey silty, fine and medium sand.
1- 1.7 m	Ferruginised Hillwash: moist, red brown mottled orange brown and grey, dense to very dense, moderately ferrunginised, slightly clayey silty fine sand with ferricrete nodules and concretions.
1.7 – 4.1 m	Ferruginised Transition: Moist, mottled orange brown red brown and grey, dense, moderately cemented and ferrunginised, clayey fine and medium sand with ferricrete nodules and concretions
4.1 – 4.9 m	Reworked Residual Siltstone/Sandstone: Moist, yellow brown mottled grey, firm to stiff, poorly ferrunginised, slightly micaceous, clayey fine and medium sand to sandy clay.

The reworked horizon grades into a residual siltstone of very stiff, sandy silt that extends to depths of 10 m. In the southern areas of the site very dense residual sandstone is encountered from depths of 2.5 m.

Land capability of the majority of the local region is classed as arable and agriculture is extensively practiced.

6.6 Groundwater

No detail on the geohydrology of the site was available in the reports that were reviewed. It is also understood that no geohydrological modelling has been undertaken for the site. A total of nine monitoring boreholes have been drilled at Komati Power Station. Monitoring has been undertaken at various stages by different consulting firms.

During the engineering investigations a number of tests pits were excavated and seepage was recorded in all the holes. The depth of seepage ranged from approximately 1,6m to 2,9m. This seepage is considered to represent a perched water table or preferential flow that is recharged either seasonally by rainwater or by contaminant seepage.

Monitoring results have detected a number of contaminants in seepage and surface water in the ash dam area. This includes elevated sulphate and iron levels and acidic conditions. These contaminants are not typical of ash dam water and it is postulated that other wastes may have been disposed off in the ash dam area. The main potential point source for seepage is expected to be the ash dams and the zone of impact is likely to be confined to the area downstream of the ash dams. It is possible that the zone of impact may extend toward the historically mined opencast section of the Koornfontein mine.

There are no known groundwater users on the ash dam site or between the ash dam and the mined out areas of the Koornfontein mine.

6.7 Surface Water

The Koornfontein River runs to the north of the ash dam area, which falls in the Olifants River catchment. This river flows from east to west past the Komati Power Station and the Koornfontein and Goedehoop Coal Mines. The ash dam area drains in a north westerly direction towards the Gras Dam and via an unnamed tributary to the Koornfontein River. The ash dam area lies very close to the head of a small catchment area. The majority of this catchment area is occupied by the dirty water area of existing ash dams. Currently there is a seepage area/drainage line within the dirty water area of the existing ash dams that holds water. It is expected that this water results largely from seepage off the ash dams, which have been used as water storage facilities during Komati Power Station's inactivity. The area of the powerline route drains north toward the Koornfontein River.

6.8 Land Use

The predominant land uses in the area are electricity generation and transmission facilities, coal mining operations, and agricultural activities with pockets of residential areas supporting these activities. The area proposed for the new ash dam is between the existing ash dams, the power station and Komati Village. The proposed site is currently unutilised except for two powerlines, a 275kv and an 88kv, that cross the area. The area of the powerline route is active agricultural land, currently used for dryland agriculture.

6.9 Ecology

The Komati area falls in the Highveld grasslands region which is considered ecologically sensitive due to the high diversity of bulb and other plant species, the potential occurrence of red data bird and mammal species and the poor conservation status of the habitat. The proposed ash dam site is located within the Eastern Highveld Grassland type as defined by Mucina, Rutherford and Powrie, 2005. The area is crossed by a small drainage line with reeds, sedges and hydrophilic grasses.

Natural vegetation within the ash dam area has largely been disturbed as a result of operational activities and is invaded by a number of alien plant species. The drainage/ wetland areas, although largely artificial, may still support species of conservation importance.

The powerline route consists largely of agricultural lands that have been ploughed, interspersed with small patches of remnant or secondary grassland.

6.10 Air Quality

The air quality in the vicinity of Komati Power Station is likely to be affected by both regional contributions as well as those of local operations. Regionally, coal mining, electricity generation, agriculture, veld fires and industrial activities on the Mpumalanga Highveld contribute to poor air quality. Locally, mining operations at Koornfontein and Goedehoop, the ploughing of agricultural lands, emissions from Komati Power Station following re-commissioning and dust from the existing ash dams are likely to contribute to reduced air quality.

Particulate matter from veld fires, mining activities, mine dumps, ash dams, ploughing activities and exposed agricultural lands potentially contributes to increased dust levels in the area. The various industries operating in Mpumalanga produce various chemicals and pollutants that contribute to reduced air quality. Common pollutants include sulphur dioxide, hydrocarbons,

carbon monoxide and nitrogen oxides. During the winter months an atmospheric high prevails and there is little dispersion of pollutants, resulting in poor air quality.

6.11 Noise

Currently, the main source of noise in the area emanates from Komati Power Station and re-commissioning operations there.

6.12 Cultural Heritage

The area is a farming district and there are known burial sites associated with many of the homesteads. A heritage survey of the site and powerline route will be conducted in the EIA phase.

6.13 Visual Environment

The Komati Power Station, local coal mines (Koornfontein and Goedehoop) and associated infrastructure dominate the visual environment in this otherwise rural area. The mines and power station are large scale installations that dwarf other visual attributes in the area. The existing ash dams are large structures with a regular profile, but are vegetated and therefore less visually obtrusive than much of the other power station infrastructure. Numerous powerlines depart from the power station and have a strong impact on the character of the area.

6.14 Social and Economic Environment

Komati Power Station lies within the Steve Tshwete Local Municipality and adjacent to the Komati and Blinkpan Villages. Municipal administration takes place in Middelburg, about 40 km to the north. Middelburg is a large, growing town and is an important agricultural and industrial centre in the region. Middelburg is the seat of local government and hosts a number of industries including stainless steel, coal mining, agriculture and electricity generation. The economic situation in the municipality is generally good with a number of large industries providing significant employment. Unemployment is around 30%.

The Steve Tshwete municipal area has a population of approximately 145 000 people. Water provision and sanitation services in the urban areas is generally very good with all residents having access to IDP standard water and sanitation, however in the rural areas the situation is poor. Rural households, including most of the informal settlements have access to electricity, but only 27% of rural households have access to electricity. Coal, paraffin and candles are thus still extensively used in the rural and informal settlements as sources of energy.

Approximately 398 persons, including Eskom personnel and contractors are currently employed at Komati Power Station during the re-commissioning phase. It is expected that there will be a permanent force of 217 employees at the power station during operation. 8 people will be involved in the management and maintenance of the ash dam facilities.

Komati Village was owned by Eskom prior to the mothballing of Komati Power Station, but nearly all of the houses are now privately owned. There are approximately 440 residential stands in Komati Village and a large proportion of the employed people work at the power station or associated services. A large number of people working at the power station live and commute from Middelburg, Witbank or Bethal. Service provision in Komati Village is of a high standard with all houses having water, electricity and sewerage facilities.

7. RESULTS OF CONSULTATION WITH AFFECTED PARTIES

7.1 Collation of Issues and Concerns

It was proposed to capture issues and concerns relating to the proposed new ash dam facility at Komati Power Station have been by means of:

- response sheets, circulated within the background information document (BIDs);
- meeting minutes;
- letters;
- e-mail correspondence; and
- telephonic conversations.

A total of 240 BIDs were hand delivered or mailed to potential IAPs between 20 and 31 August 2007. No interested or affected parties attended the public meeting and to date only 2 formal responses have been received.

7.2 Synthesis of Issues Raised

The issues, concerns and questions raised by the IAP are documented in Table 3 below. The responses are included in Appendix 7.

Table 3: Summary of Public Issues and Concerns

COMMENT / ISSUE RAISED	NUMBER OF RESPONSES	PROJECT RESPONSE
Can it be guaranteed that the ash dam will never break its wall under heavy rain conditions and kill half of the residents Komati Village	2	The ash dam is to be constructed, operated and monitored in accordance with the latest legal requirements and industry standards. This will ensure that the dam cannot overtop during extreme rainfall. In addition, the dam infrastructure, including the gravity decant penstock, sump, pumps and return water dam have been designed such that neither storm nor ash water will be stored on the dam at any time. This will prevent the phreatic level (water table) within the outer wall from rising thereby ensuring the stability of the outer wall
Why is the ash not disposed of into the closed mine workings	1	In the past ash was disposed of in the underground workings but this practice was discontinued. The underground disposal of ash from Komati Power Station has not been considered because there is the potential that the underground disposal of ash may result in impacts on groundwater resources that would be difficult to manage.

8. ANTICIPATED ENVIRONMENTAL, SOCIAL AND CULTURAL IMPACTS

Potential impacts associated with the new ash dam facility and powerline deviation at Komati Power Station are summarised in Table 4. Comment on how the impact is to be mitigated and the requirements for further investigation during the EIA phase are also given.

Table 4: Summary of Potential Impacts Associated with the New Ash Dam Facility at Komati Power Station

IMPACT	IMPACT SOURCE	COMMENT / EIA INVESTIGATIONS
Topography		
Change in the natural topography	Development of ash dam facility	The topography will be permanently altered. Ash dam design, operation and rehabilitation planning are to ensure that the slopes are stable. No investigation required.
Soils		
Loss of available topsoil	Loss of soil from the development of ash dam facility	Project planning to include provision for topsoil stripping. Topsoil to be appropriately stock-piled and effectively used for re-vegetation of the ash dam and surface disturbances at the ash dam facility.
Erosion of ash dam surface	Loss of soil and ash material from erosion of steep slopes	Ash dam design, operation and rehabilitation planning to ensure that the slopes are stable. Re-vegetation to be included as part of rehabilitation to minimise erosion. Monitoring and management of erosion to be continuously undertaken. No EIA work required.

IMPACT	IMPACT SOURCE	COMMENT / EIA INVESTIGATIONS
Land Capability		
Loss of land with arable/ grazing potential	Loss of land as result of development of ash dam. Loss of land as result of development of powerline servitude.	There will be a definite and irreversible loss in land and the land capability. The site is however already disturbed and unavailable as it is within the ash dam complex. Use of land within powerline servitude to be negotiated with land owner. No EIA action. End-uses will need to be considered in the EMP to maximise final, long-term land capability.
Groundwater		
Change in groundwater quality	Recharge of groundwater from the ash dam. Contaminants in ash may mobilise and infiltrate groundwater.	Drainage and seepage from the ash dam could impact on groundwater. Geohydrological impact assessment to assess potential impacts (direct and cumulative) on groundwater quality due to ash deposition. Recommendation to be made on mitigation and management.
Surface Water		
Change in natural surface water flow parameters	Diversion of stormwater around ash dam facility. Loss of catchment area to ash dam and dirty water area.	There will be loss of runoff from the ash dam area, however the new ash dam is within the dirty water area of the existing ash dams. Furthermore, Eskom subscribes to the philosophy of Zero Effluent Discharge (ZLED), which requires that no run-off from the station complex occurs beyond the

IMPACT	IMPACT SOURCE	COMMENT / EIA INVESTIGATIONS
		station boundaries. Ash dam designs to comply with this requirement. Surface water assessment to determine loss of resource in the catchment will be undertaken. Recommendation to be made on location of drains and cut-off trenches, monitoring and mitigation.
Change in surface water quality	Increased sediment loads in run-off from ash dam area. Contaminants in seepage and run-off from ash dam area.	Eskom subscribes to the philosophy of Zero Effluent Discharge (ZLED), which requires that no run-off from the station complex occurs beyond the station boundaries. Surface water assessment to recommend monitoring and mitigation measures. Seepage and run-off are to be captured and prevented from entering any surface water system. Stormwater management planning aimed at compliance with Regulation 704.
Land Use		
Change of land use	Development of an ash dam facility. Development of the powerline servitude.	The land will be permanently occupied by an ash dam, however the site is within the existing ash dam complex and is not utilised for other activities (except electricity distribution) as a result. Use of land within powerline servitude to be negotiated with land owner. No EIA actions. Appropriate long-term end-use to be determined in the EMP.

IMPACT	IMPACT SOURCE	COMMENT / EIA INVESTIGATIONS
Ecology		
Loss of biodiversity	Loss of terrestrial fauna and flora in ash dam area. Loss of terrestrial fauna and flora on the powerline route. Loss of aquatic fauna and flora in ash dam area.	The land is within the existing ash dam complex and is impacted on by the ash dams, access roads, dams and other activities such as electricity distribution. The vegetation is disturbed and invaded to some degree. A basic ecological survey will assess the conservation status of the site and recommend mitigation measures. Control of alien invasive plants to be included.
Disturbance to species of conservation importance	Loss of habitat and individuals of conservation importance in the ash dam area. Bird collisions and electrocutions with the powerlines.	The site is already disturbed and impacted on by the existing ash dam facilities and it is unlikely that species of conservation importance occur. A basic ecological survey will assess the conservation status of the site and recommend mitigation measures.
Air Quality		
Increase in ambient and fallout dust levels.	Construction and operation of an ash dam facility. Exposed soil surfaces and increased ash dam surface area.	Construction activities may generate dust, however the wet ashing employed at Komati means that there is unlikely to be significant dust generation. An air quality impact assessment is to be undertaken to predict impacts on air quality. Should the impact on air quality be regarded as significant, additional mitigation measures will be

IMPACT	IMPACT SOURCE	COMMENT / EIA INVESTIGATIONS
		sought.
Noise		
Increase in ambient noise levels	Construction and operation of the ash dam facility.	Construction of the ash dam will involve heavy earth-moving machinery. Much of this machinery is currently on-site for the re-commissioning of the existing ash dams and will continue during the construction of this proposed new ash dam. The ash dam is more than 300 m away from the nearest house and thus noise is unlikely to be an impact. No noise assessment is planned.
Cultural Heritage		
Disturbance of historical sites	Development of ash dam facility.	Archaeological sites are not known to occur on the ash dam site, although graves have been unearthed in the area. A heritage impact assessment is to be undertaken to identify sites. Disturbance of sites is to be avoided where practicable or appropriate permits obtained.

IMPACT	IMPACT SOURCE	COMMENT / EIA INVESTIGATIONS
Visual Environment		
Disturbance of natural views	Ash dam close to residential areas that intrudes into visual skyline. Additional powerlines intruding into the skyline/	The ash dam is an extension of existing facilities. The ash dams do alter the profile of the skyline but are dwarfed by the scale of the power station infrastructure. No assessment is planned. Re- vegetation to be included in EMP as part of rehabilitation to minimise visual impact.
Social & Economic Environment		
Economic benefits	Job creation and employment through operation of Komati Power Station	The re-commissioning of Komati Power Station has revitalised the economy of Komati Village. 20 persons will be employed on the construction and 8 persons for the operation of he ash dams. Development of the ash dam will enable Komati Power Station to operate for a further 20 years or more thereby ensuring continued employment for at least 217 people.
Increase in safety risk to local communities	Operational ash dam. Increased access to private property along powerline servitude.	Ensure that the ash dam complex is securely fenced and marked with the appropriate signage. Powerline servitude road to be kept locked and only accessed by Eskom personnel on official business. Should be included as EMP conditions.
Increase in health risk to local communities	Ash dam dust.	The air quality impact study to include an

IMPACT	IMPACT SOURCE	COMMENT / EIA INVESTIGATIONS
		assessment of the direct and cumulative human health risks. Identify mitigation to ensure that impacts related to health are minimised.
	Groundwater contamination	The groundwater study to include a hydrocensus of boreholes and groundwater users in the area. The study should include an assessment of the direct and cumulative health risks. Identify mitigation to ensure that impacts related to health are minimised.

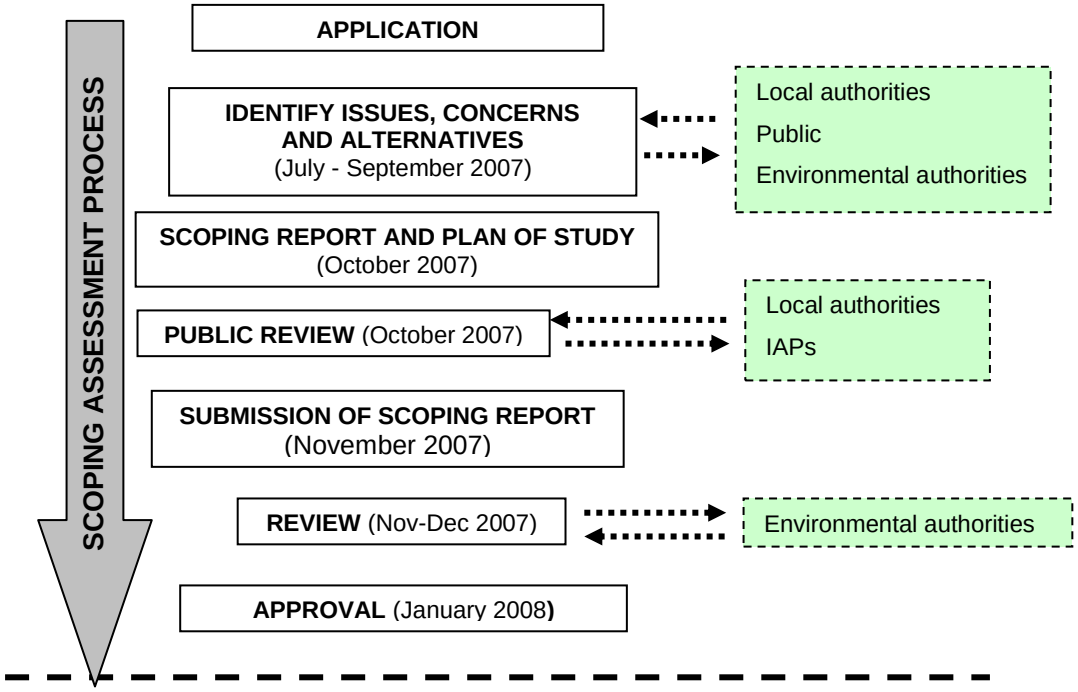
9. PLAN OF STUDY FOR EIA

The plan of study describes how the EIA phase of the ash dam extension project will proceed. The nature and extent of the specialist environmental studies required during the EIA phase have been identified through consultation with the authorities, input from relevant specialists and the responses received from interested and affected parties.

The EIA will address potential impacts and benefits of the proposed ash dam extension at Komati Power Station on the social and bio-physical environment. Impacts, direct, indirect and cumulative, associated with the project and all its phases will be assessed. The EIA aims to provide an assessment of the local environment affected by the project, to assess the potentially significant impacts of the project and to identify appropriate mitigation and management measures for the significant impacts.

9.1 Process and Schedule

The proposed EIA process, public consultation activities and the associated timeline are shown in Figure 12. The assessment process has been developed to ensure that it complies with the EIA regulations and the associated guidelines (see Chapter 2).



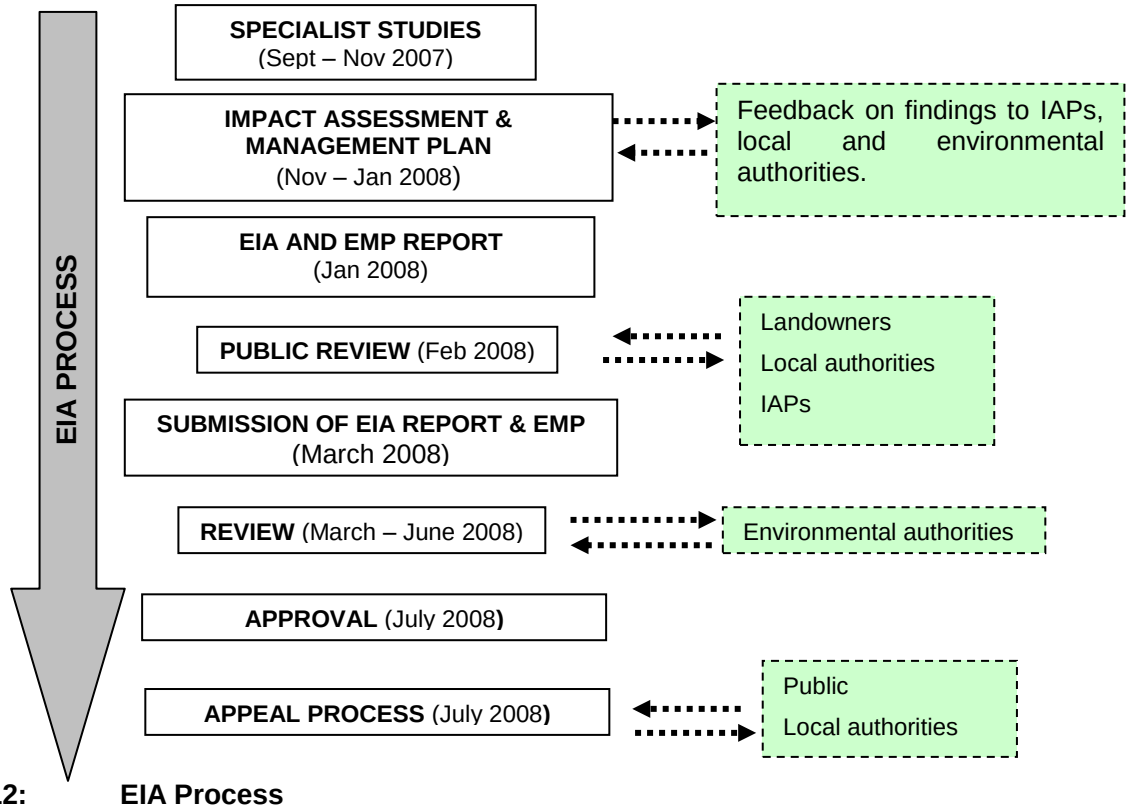


Figure 12: EIA Process

9.2 Alternatives

Komati Power station is equipped with a wet ashing plant and it is thus not considered feasible from an engineering or cost perspective to retrofit the power station with alternative ashing technology. A number of site alternatives were considered during a site screening process completed during the scoping phase (see Chapter 3). As a result of this screening process a preferred alternative was selected for consideration during the EIA study and an application for exemption from further consideration of alternatives was submitted to the DEAT.

9.3 Impact Assessment Method

9.3.1 Impact Ranking Criteria

The criteria used for assessing the significance of the impacts are given in Table 1 to Table 3. The impact assessment method will take into account the current environment, the details of the proposed project and the findings of the specialist studies. Cognisance will be given to both positive and negative impacts that may result from the development. The significance of the impact is calculated as follows:

impact significance = consequence (intensity + frequency + extent + duration) x probability

Although the criteria used for the assessment of impacts attempts to quantify the significance, it is important to note that the assessment is generally a qualitative process and therefore the application of these criteria is open to interpretation. The process adopted will involve the application of scientific measurements and professional judgment to determine the significance of environmental impacts associated with the project. The assessment thus largely relies on experience of the environmental assessment practitioner (EAP) and the information provided by the specialists appointed to undertake studies for the EIA.

Where the consequence of an event is not known or cannot be determined, the "precautionary principle" is adhered to and the worst-case scenario assumed. Where possible, mitigation measures to reduce the significance of negative impacts and enhance positive impacts will be recommended. The detailed actions, which are required to ensure that mitigation is successful, will be given in the EMP which will form part of the EIA report.

Consideration will be given to the phase of the project during which the impact occurs. This identification of the phase is provided to assist with the schedule for the implementation of the management measures.

Table 5: Criteria for assessing significance of impacts

INTENSITY = MAGNITUDE OF IMPACT	**RATING**
Insignificant: impact is of a very low magnitude	1
Low: impact is of low magnitude	2
Medium: impact is of medium magnitude	3
High: impact is of high magnitude	4
Very high: impact is of highest order possible	5

FREQUENCY = HOW OFTEN THE IMPACT CAUSE OCCURS	**RATING**
Seldom: impact cause occurs once or twice	1
Occasional: impact cause occurs every now and then	2
Regular: impact cause is intermittent but does not occur often	3
Often: impact cause is intermittent but occurs often	4
Continuous: the cause of the impact occurs all the time	5

EXTENT = SPATIAL SCOPE OF IMPACT	**RATING**
Site: limited to the impact site	1
Local area: impact affects neighbouring properties with 300m	3
Regional: impact extends beyond the neighbouring properties	4
Provincial: impact affects the Northern Cape Province	5

DURATION = HOW LONG THE IMPACT LASTS	**RATING**
Very short-term: impact lasts for a very short time (days or less)	1
Short-term: impact lasts for a short time (weeks or months)	2

Medium-term: impact lasts for the first few years of as dam operation	3
Long-term: impact occurs over the operational life of the ash dam	4
Residual: impact is permanent (remains after closure of ash dam)	5

PROBABILITY = LIKELIHOOD THAT THE IMPACT WILL OCCUR	RATING
Highly unlikely: the impact is highly unlikely to occur	1
Unlikely: the impact is unlikely to occur	2
Possible: the impact could possibly occur	3
Probable: the impact will probably occur	4
Definite: the impact will occur	5

Table 6: Significance rating matrix

	Consequence (intensity+ frequency + extent + duration)																			
Probability	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

Table 7: Positive and negative impact significance ratings

	Very high	81-100	impact is of the highest order possible /potential fatal flaw
	High	61-80	impact is substantial
	Medium	41-60	impact is real but not substantial in relation to other impacts
	Low	21-40	Impact is of a low order
	Very low	1-20	Impact is negligible

9.3.2 Project Phases

Impacts during the planning, construction, operation and decommissioning phases of the project will be assessed. There will however be a limitation in considering impacts of decommissioning as it is estimated that the facility will be in operation for at least 20 years. The status of the environment may have changed significantly at that stage. The aim of the assessment would thus be to provide an initial input into the project in terms of measures that could be implemented during the initial phases to facilitate rehabilitation in the future.

9.3.3 Cumulative Impacts

A detailed assessment of the baseline environment to determine existing status of the environment will be undertaken in order to determine the cumulative impact of the proposed development. Cognisance will also be given to other proposed developments which may result in an accumulation of impacts on the various components of the environment.

9.3.4 Mitigation Measures

Mitigation measures will be identified for significant impacts identified. The impact will be ranked before and after the implementation of the mitigation measures. Consideration will be given to the confidence level that can be placed on the successful implementation of the mitigation level as follows:

- **High Confidence:** mitigation measure easy and inexpensive to implement.
- **Medium Confidence:** mitigation measure expensive or difficult to implement.
- **Low Confidence:** mitigation measure expensive and difficult to implement.

9.4 Specialist Studies

Where the EAP does not have sufficient expertise or information in a particular field to adequately assess the impacts, specialists in those fields will be appointed to provide the necessary information required to facilitate the EIA. Based on the outcomes of the scoping assessment the following specialist reports will be undertaken and compiled in order to provide input into the EIA.

9.4.1 Groundwater

Rison Groundwater Consulting has been contracted to complete a detailed groundwater impact assessment study for the ash dam site at Komati Power Station. The scope of work includes:

- Completion a hydrological census of all boreholes and springs within a 2km radius of the pit extension area;
- An assessment of all existing geohydrological and surface hydrological data;
- The development of a conceptual groundwater model for the aquifers of the area;
- Characterisation of baseline groundwater conditions;
- Construct and calibrate a detailed numerical model to assist with aquifer management;
- Prediction of the magnitude and extent of impacts of the ash dam development; and
- Recommendations on future groundwater management.

9.4.2 Air Quality

Airshed Planning Professionals has been requested to carry out an air quality impact assessment for the new ash dam facility at Komati Power Station and to prepare an air quality management plan for the ash dam. Airshed was involved with the assessment of air quality impacts during the Return to Service assessments for Komati Power Station and are thus well informed to complete the current assessment. The scope of work includes:

- Characterisation of baseline air quality conditions;

- Identification and quantification all sources of atmospheric emissions at the site;
- Dispersion modelling of the potential PM10 concentrations and dust fallout from the site;
- An analysis of the dispersion model to determine maximum zones of impact for each source and the cumulative impacts from all sources;
- An assessment of the potential human health and environmental impacts due to dust fallout;
- Development of a dust management plan for the ash dam extension; and
- Identification additional mitigation measures to further reduce impacts.

9.4.3 Cultural Heritage

Dr J van Schalkwyk will complete a heritage impact assessment of the area to be impacted by the proposed ash dam and the powerline route. The scope of work for the assessment includes:

- An assessment of the area in order to identify cultural and historical sites;
- Documentation of the location of such sites; and
- Identification of mitigation measures and permit requirements.

The heritage impact assessment report for the ash dam area will be submitted to the responsible office of the South African Heritage Resources Agency for comment.

9.4.4 Surface Water

Jones and Wagner Consulting Engineers, the design engineers for the new ash dam facility, will complete an assessment of the catchment area and surface water impacts. The scope of work will include:

- Delineation of the catchment in which the ash dam will be located;
- Calculation of the annual run-off from the catchment;
- Quantification of the loss of surface water run-off as a result of the new ash dam.
- An assessment of the impacts of the loss on the catchment;
- Recommendations for the location of clean and dirty water management systems; and
- Identification of additional mitigation measures to further reduce impacts

9.4.5 Ecology

As the preferred ash dam and powerline routes are already disturbed sites it is not considered necessary to complete a detailed ecological assessment. Synergistics will complete a basic assessment of the ecology at the site of the proposed ash dam and powerline routes based on a site walk-about and desktop study. The scope of work includes:

- A general assessment of the overall biodiversity and conservation status of the terrestrial fauna and flora;
- The development of an alien plant management programme;
- Assessment of potential bird flight paths; and
- Identification of further mitigation requirements.

9.5 Public Participation Process

Further public consultation is to include:

- Feedback to registered IAPs of the findings of the specialists studies and EIA;
- Public review of EIA and EMP report (including specialist studies);
  - Notification of registered IAPs of availability of document in public library, internet or CD (on request)
  - Circulation of summary document
- Collation of comments and inclusion in EIA and EMP report for submission to DEAT.

CONCLUSIONS

The extension of the ash dam facility at Komati Power Station and the deviation of the two powerlines will facilitate the continued operation of the power station. Potential environmental impacts associated with the project are expected to largely be related to impacts on the ground and surface water environments. Of importance is the potential contamination of the groundwater, the resulting impacts on local boreholes and the impacts on surface water resulting from run-off from the ash dam. The only concern raised during the public consultation process was the safety of persons residing in close proximity to the ash dam. The EIA studies aim to investigate the relevant project issues and ensure that appropriate management and mitigation measures are implemented.

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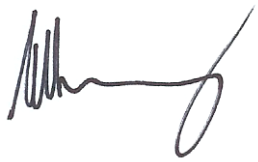

Matthew Hemming
Environmental Scientist
Synergistics Environmental Services (Pty) Ltd

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Appendix 1: Minutes of Authority Meeting

Appendix 2: DEAT Application Form

Appendix 3: Copies of the Press Advertisements (Project Notifications)

Appendix 4: Copy of Poster

Appendix 5: Proof of Notification and Consultation with Land Owners and Local Authorities

Appendix 6: Background Information Document

Appendix 7: Database of Registered, Interested and Affected Parties

Appendix 8: Minutes, Presentations and Attendance Register from Public Information Meeting