ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
FINAL SCOPING REPORT

PROPOSED UMBANI POWER PLANT AND ASSOCIATED INFRASTRUCTURE SITUATED ON A SITE NEAR KRIEL, MPUMALANGA PROVINCE

DEA Ref. No: 14/12/16/3/3/3/108

FINAL SCOPING REPORT

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PROJECT DETAILS

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PUBLIC REVIEW OF THE DRAFT SCOPING REPORT

This is the final Scoping Report. The Draft Scoping Report was made available for public review at the following public places from **3 April 2014 – 12 May 2014**:

» Kriel Library
» Tubelihle Clinic, Thubelihle
» www.savannahSA.com

PUBLIC MEETING

In order to facilitate comments on the Draft Scoping Report, a public meeting was held as follows:

» Date: 12 May 2014
» Venue: Thubelihle Community Hall
» Time: 18h00

EXECUTIVE SUMMARY

ISS Global Mining (Pty) Ltd, an Independent Power Producer (IPP), is proposing the construction of a coal-fired power plant on a site near Kriel in the Mpumalanga Province. The project is to be known as the Umbani Power Plant and will have a generating capacity of up to 600 megawatts (MW).

The electricity generated by the project is to be fed into the Eskom grid. With regard to the escalating demand for power supply, the proposed Umbani Power Plant aims to increase the output of power supply to minimise the reality of a potential energy deficit. The proposed power plant is intended to be developed in response to the targets to be set by the Department of Energy (DoE) under the IPP Baseload Programme.

The main infrastructure that is required for the proposed Umbani Power Plant includes the following:

» Access roads.
» Conveyor belts and coal handling areas.
» Coal storage areas and bunkers.
» Power plant production unit/s (boilers / furnaces, turbines, generator and associated equipment, control room).
» Ash disposal facility.
» Water infrastructure such as Raw-Water Storage Dam, purification works and reservoirs.
» Pollution control dams.
» An on-site substation or High Voltage Yard.
» Pipeline for supply of water to the facility.
» Office and maintenance area/s.
» Overhead power lines to connect into the Eskom grid. It is expected that the generated power can be evacuated into the electricity grid via a new 400 kV transmission line to either the Eskom Kriel or Matla power stations or via the existing 400 kV power line traversing the site.

The project will require the development of a power station and associated infrastructure over an area of between 120ha to 150ha. Coal discards which will be sourced from the Dorstfontein East Coal Mine as a fuel source for the power generation process will be transported to the power plant via a conveyor belt system. The plant will make use of Circulating Fluidised Bed (CFB) technology. Technology alternatives to be considered in the EIA phase are limited to the use of CFB boiler technology as it is the only technology with the capacity to simultaneously accept low-grade coal in the energy generation process while achieving emissions which are in line with South African emissions standards and even the more stringent International Finance Corporation (IFC) Standards

(considering air quality constraints within the Highveld Priority Area). The coal has an estimated ash content of 40% and will see the generation of ash in the region of approximately 1.1 million tonnes per annum which will require disposal to an ash disposal facility situated on the site. The dry-cooled power plant will have a water requirement of approximately 2 000m^3 per day. The sources of water could potentially include mining, municipal or natural resources, the feasibility of which will be determined during the EIA phase.

Technical feasibility: The proposed project is considered to be technically feasible based on the following:

- » Proximity to the Dorstfontein East Coal Mine which will supply the primary source of fuel (coal).
- » Abundance of low grade coal including coal discards of a quality below Eskom rejection limits or export requirements but which can be utilised in a Circulating Fluidised Bed boiler as proposed for the power plant
- » Coal can be supplied via overland conveyors from the Dorstfontein East Coal Mine to the power station, reducing the potential logistical cost associated with rail and truck transport.
- » The use of Circulating Fluidised Bed boiler technology is key to the use of low grade coal in the power generation process and the control of emissions considering the location of the proposed project within the Highveld Priority Area.
- » The proposed use of dry-cooling technology (as opposed to wet cooling technology) considering water constraints in the region.
- » The potential use of ash produced in the combustion process in the cement and construction industries serving to reduce the area required for ash disposal.

The main issues identified through this scoping study associated with the proposed coal-fired power plant are summarised below. It can be concluded that the majority of potential impacts identified to be associated with the **construction** of the proposed project are anticipated to be local in extent, apart from impacts on traffic and job creation and economic growth which are anticipated to be regional in extent. Impacts from the **operation** of the coal-fired power station and associated infrastructure will be determined by the siting of the power plant on the site and its relationship and potential operational impact on sensitive receptors as well as the extent of emissions to be generated and released into the environment.

Sensitive receptors: Potential sensitive environmental receptors / features identified through the Scoping process include:

- » The towns of Kriel situated within 5km and Thubelihle situated within 3.5km from the project site.
- » Two residences situated on the farm (to be confirmed).
- » A watercourse which is situated adjacent to the R544.

- » Wetland areas and seeps in the lower lying sections of the site.
- » High potential agricultural soils on the site currently under cultivation.

No-go areas: identified on the project area at this point include wetlands and other surface water features identified. Cultivated agricultural fields also have a higher sensitivity than non-cultivated fields due to their agricultural value. Presently a no-go buffer of 150m around surface water features and wetlands is recommended for the siting of ash disposal facilities. The extent to which the identified no-go areas and buffers must be observed will be refined during the EIA Phase.

Potential negative impacts: Issues of potential environmental concern have been identified through the scoping phase. The more significant environmental issues are anticipated to include the following:

- » Potential air quality impacts from the proposed power station due to emissions. This is partially mitigated through the proposed use of Circulating Fluidised Bed technology which will allow for reduced emissions due to the occurrence of the site within the Highveld Priority Area. The need for additional mitigation will be investigated during the detailed assessment within the EIA phase of the process.
- » Potential cumulative air quality impacts due to existing power stations and mining and industrial activities in the area.
- » Potential contaminated storm water run-off from the coal storage stockyard and contaminated runoff from the ash disposal facility polluting groundwater, watercourses and wetlands unless appropriately retained on the site.
- » Potential loss of high-potential agricultural land.
- » Potential visual impacts due to the power plant being visible from Kriel and Thubelihle. Overall, the high lying location of the site renders it highly visible within the receiving environment.

Impacts identified which are considered to be of potentially lesser significance as identified through the scoping phase include:

- » Potential impact on flora and fauna (including sensitive and listed species) given the relatively transformed ecological status due to existing land uses over the majority of the site.
- » Potential noise impacts of the proposed facility on Noise Sensitive Developments in the surrounding areas given the relatively low number of receptors identified during the scoping process.
- » The potential visual impact of the proposed power plant and associated infrastructure given the relatively low number of receptors identified during the scoping process.
- » Potential heritage and paleontological impacts.

» Potential impacts relating to the construction of an overhead power line from the on-site substation to the Kriel or Matla Power Stations due to the potential to align the power line with existing power lines.

Potential positive impacts: include a supply of energy into the Eskom grid at a time when the national grid is increasingly under pressure; the opportunity to utilise significant volumes of coal waste in the energy generation process, as well the associated socio-economic impacts relating to the project.

Technology alternatives: The use of Circulating Fluidised Bed is expected to result in improved emissions (over conventional pulverised coal fired boiler technology) in line with the standards of the IFC. Furthermore the following benefits from the use of CFB technology are anticipated:

» The sourcing of discard coal or waste coal for use in the energy generation process which could in turn lead to a reduction of coal discard dump at the Dorstfontein East Mine and other coal mines in the region (positive impact)
» The use of dry-cooling technology will reduce the water requirements of the plant
» In-bed capturing or neutralisation of sulphur through introduction of limestone directly into the bed of the CFB boiler leading to a significant reduction of SO_2 emissions.
» Low burning temperatures resulting in limited formation of NOx gases.
» Generation of gypsum as a by-product which can potentially be used in the construction and cement industries.

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DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Archaeological material: Remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

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

Drainage line: A drainage line is a lower category or order of watercourse that does not have a clearly defined bed or bank. It carries water only during or immediately after periods of heavy rainfall i.e. non-perennial, and riparian vegetation may or may not be present.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:

i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

Perennial and non-perennial: Perennial systems contain flow or standing water for all or a large proportion of any given year, while non-perennial systems are episodic or ephemeral and thus contains flows for short periods, such as a few hours or days in the case of drainage lines.

Photovoltaic effect: Electricity can be generated using photovoltaic panels (semiconductors) which are comprised of individual photovoltaic cells that absorb solar energy to produce electricity. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as the Photovoltaic Effect.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Riparian: the area of land adjacent to a stream or river that is influenced by stream-induced or related processes. Riparian areas which are saturated or flooded for prolonged periods would be considered wetlands and could be described as riparian wetlands. However, some riparian areas are not wetlands (e.g. an area where alluvium is periodically deposited by a stream during floods but which is well drained).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Wetland: land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil (Water Act 36 of 1998); land where an excess of water is the dominant factor determining the nature of the soil development and the types of plants and animals living at the soil surface (Cowardin et al., 1979).

Water course: as per the National Water Act means -
(a) a river or spring;
(b) a natural channel in which water flows regularly or intermittently;
(c) a wetland, lake or dam into which, or from which, water flows; and
(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks

ABBREVIATIONS AND ACRONYMS

BID	Background Information Document
CO_2	Carbon dioxide
DEA	National Department of Environmental Affairs
DEADP	Department of Environment Affairs and Development Planning
DoE	Department of Energy
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
GHG	Green House Gases
Ha	Hectare
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IPP	Independent Power Producer
km^2	Square kilometres
km/hr	Kilometres per hour
kV	Kilovolt
MAR	Mean Annual Rainfall
m^2	Square meters
m/s	Meters per second
MW	Mega Watt
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NGOs	Non-Governmental Organisations
NWA	National Water Act (Act No. 36 of 1998)
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SDF	Spatial Development Framework

INTRODUCTION CHAPTER 1

ISS Global Mining (Pty) Ltd, an Independent Power Producer (IPP), is proposing the construction of a coal-fired power plant on a site near Kriel in the Mpumalanga Province. The project is to be known as the Umbani[1] Power Plant and will have a generating capacity of up to 600 megawatts (MW). The electricity generated by the project is to be fed into the Eskom grid via a new overhead power line. With regard to the escalating demand for power supply, the proposed Umbani Power Plant aims to increase the output of power supply to minimise the reality of a potential energy deficit. The proposed power plant is intended to be developed in response to the targets set by the Department of Energy (DoE) under the IPP Baseload Programme, once released (Refer to Chapter 2).

This Scoping Report evaluates this proposed project and consists of eight chapters, which include:

» **Chapter 1** provides background to the proposed coal-fired power plant and the environmental impact assessment.
» **Chapter 2** describes the motivation and scope of the proposed project as well as the alternatives to be considered.
» **Chapter 3** outlines the process which was followed during the Scoping Phase of the process.
» **Chapter 4** describes the existing biophysical and socio-economic environment affected by the proposed project.
» **Chapter 5** provides an evaluation of the potential issues and impacts associated with the proposed project.
» **Chapter 6** presents the conclusions of the scoping evaluation.
» **Chapter 7** describes the Plan of Study for EIA.
» **Chapter 8** provides references used to compile the Scoping Report.

1.1. Project Overview

The site of the proposed Umbani Power Plant is situated approximately 5km east of the town of Kriel within the Emalahleni Local Municipality within the greater Nkangala District Municipality of the Mpumalanga Province. The site is approximately 620ha in extent and is comprised of Portions 1 and 9 of the Farm Dorstfontein 71 IS, both of which are situated either side of the R544 (refer to Figure 1.1). The site is situated adjacent to the southern boundary of the Dorstfontein East Coal Mine.

[1] Zulu word meaning electricity

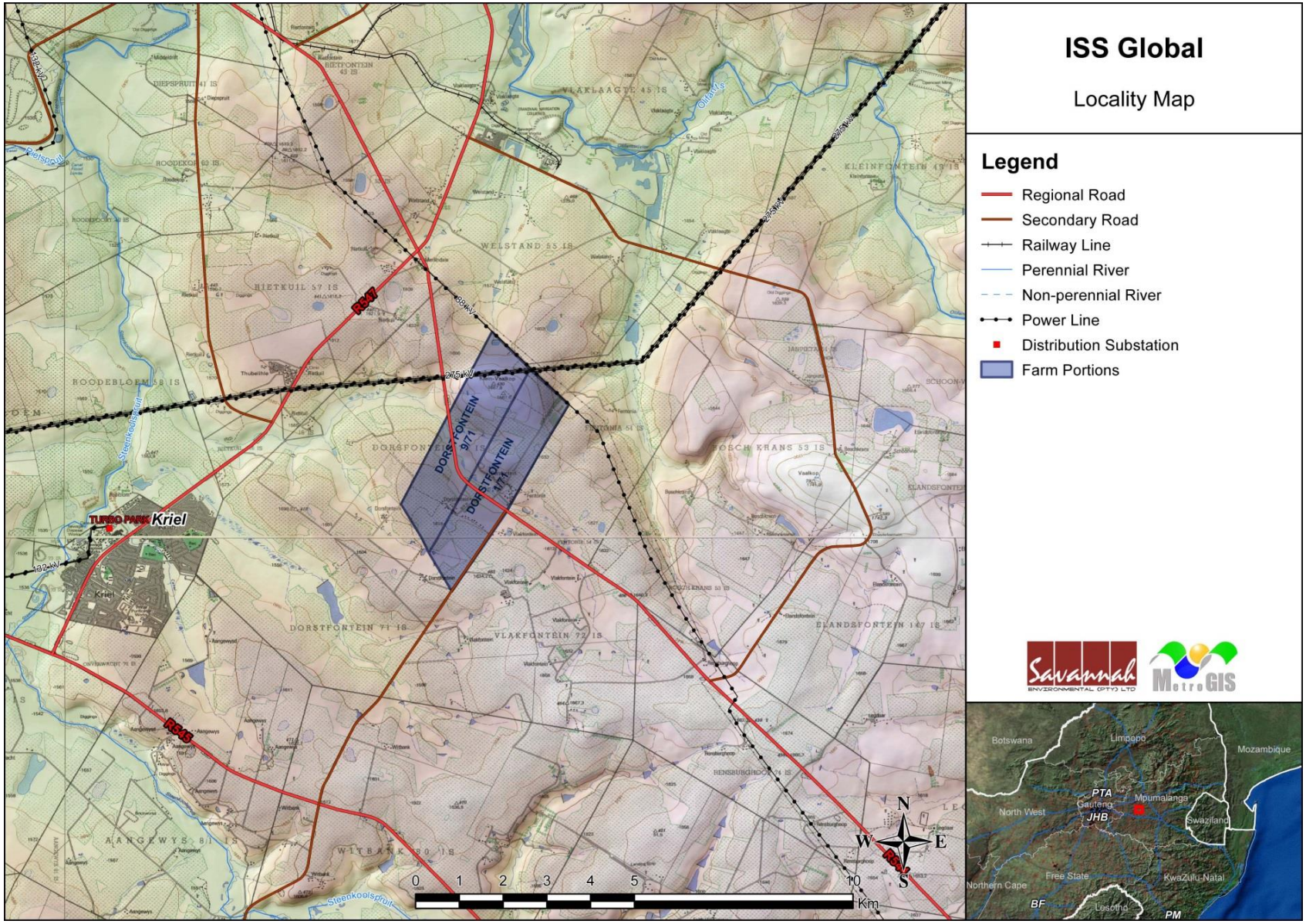

Figure 1.1: Locality map of the proposed Umbani Coal-Fired Power Plant study areas situated over Portions 1 and 9 of the Farm Dorstfontein 71, Mpumalanga Province

The main infrastructure that is required for the proposed Umbani Power Plant, which is anticipated to have a development footprint of between 120ha to 150ha, includes the following:

» Access roads.
» Conveyor belts and coal handling areas.
» Coal storage areas and bunkers.
» Power plant production unit/s (boilers / furnaces, turbines, generator and associated equipment, control room).
» Ash disposal facility.
» Water infrastructure such as Raw-Water Storage Dam, purification works and reservoirs.
» An on-site substation or High Voltage Yard.
» Pipeline for supply of raw water to the facility.
» Office and maintenance area/s.
» Overhead power lines to connect into the Eskom grid. The power generated is planned to evacuate into the electricity grid at a point to be determined in consultation with Eskom. It is expected that the generated power can be evacuated into the electricity grid via a new 400 kV transmission line to either the Eskom Kriel or Matla power stations or the existing 400 kV power line traversing the site.

1.2. Requirement for an Environmental Impact Assessment Process

The construction and operation of the proposed Umbani Power Plant and associated infrastructure is subject to the requirements of the Environmental Impact Assessment Regulations (EIA Regulations) of June 2010 published in terms of Section 24(5) of the National Environmental Management Act (NEMA, No 107 of 1998). In terms of Government Notice 921 published in terms of the NEM: Waste Act No. 59 of 2008, a waste licence is also required for waste management activities proposed to be undertaken. An EIA process is required to be undertaken in support of this application. Therefore, an integrated environmental authorisation process is being undertaken for the project. This section provides a brief overview of the EIA Regulations and their application to this project. In terms of the National Water Act No 36 of 1998 a Water Use Licence will also be applied for. In terms of the National Environmental Management: Air Quality Act (Act 39 of 2004) an Atmospheric Emissions License (AEL) is also required. The approach to undertaking this process is detailed in Chapter 3 of this report.

1.3. Objectives of the Scoping Phase

This report documents the scoping evaluation of the potential environmental impacts associated with the construction and operation of a coal-fired power

station and associated infrastructure proposed to be constructed by ISS Global Mining on Portion 1 and 9 of the Farm Dorstfontein 71 IS situated adjacent to the existing Dorstfontein East Coal Mine. This scoping study forms part of the EIA process and was conducted in accordance with the requirements of the EIA Regulations of June 2010 and in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998), in support of the NEMA and waste licence applications for the proposed project.

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

The Draft Scoping Report provides stakeholders with an opportunity to verify that the issues they have raised through the process to date have been captured and adequately considered, and provides a further opportunity for additional key issues for consideration to be raised. The Final Scoping Report will incorporate all issues and responses raised during the public review of the Draft Scoping Report prior to submission to DEA.

1.4. Details of Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA

Savannah Environmental was contracted by ISS Global Mining as an independent consultant to undertake an Environmental Impact Assessment (EIA) for the proposed project, as required by the NEMA EIA Regulations of June 2010. Neither Savannah Environmental, nor any of its specialist sub-consultants on this project are subsidiaries of / or affiliated to ISS Global Mining. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

The Savannah Environmental staff and sub-consultants have acquired considerable experience in environmental assessment and environmental management over the last 15 years, and have been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa. Strong competencies have been developed in project management of environmental EIA processes, as well as strategic environmental assessment and compliance advice, and the identification of environmental management solutions and mitigation/risk minimising measures. Savannah Environmental has successfully completed various EIAs for transmission power lines, as well as EIAs for several substations, distribution power lines and power generation projects for

Eskom Holdings Limited and Independent Power Producers such as Exxaro Resources.

The Environmental Assessment Practitioners (EAPs) responsible for the EIA process for this project from Savannah Environmental are:

Jo-Anne Thomas is the lead EAP on the project. She is a registered Professional Natural Scientist (in the practice of environmental science) with the South African Council for Natural Scientific Professions. She has gained extensive knowledge and experience on potential environmental impacts associated with electricity generation and transmission projects through her involvement in related EIA processes over the past fifteen (15) years. She has successfully managed and undertaken EIA processes for electricity generation projects throughout South Africa. She is supported by Steven Ingle (principle author of this Environmental Scoping Report), Sheila Muniongo and Gabriele Wood from Savannah Environmental. Curricula vitae for the Savannah Environmental project team consultants are included in Appendix A.

In order to adequately identify and assess potential environmental impacts as well as evaluate alternatives, Savannah Environmental has appointed several specialist consultants to conduct specialist studies, as required. Details of these specialist studies are included in Chapter 3. The curricula vitae for the EIA specialist consultants are also included in Appendix A.

PROJECT MOTIVATION, DESCRIPTION AND ALTERNATIVES CHAPTER 2

2.1 Project motivation and desirability

2.1.1 National Perspective - National Development Plan 2030

The need to expand electricity generation capacity in South Africa is based on national policy and informed by on-going strategic planning undertaken by the Department of Energy (DoE). In its introduction, the National Development Plan (NDP) states "The National Development Plan aims to eliminate poverty and reduce inequality by 2030".

Under the heading "The Energy Sector: Empowering South Africa", the NDP notes that the plan envisages that, by 2030, South Africa will have an energy sector that promotes: Economic growth and development through adequate investment in energy infrastructure. The section also notes that South Africa is very dependent on coal. It is the country's largest economically recoverable energy resource and among its three top mineral export earners. Internationally, South Africa ranks fifth as a coal producer and exporter. Domestically, coal is used to produce over 70% of primary energy, more than 90% of electricity and a third of liquid fuels. As a result, South Africa is a significant emitter of carbon dioxide, which contributes to climate change.

Approximately 90% (NDP, 2011) of South African electricity comes from coal-fired power stations, with Eskom being the dominant electricity producing company generating 95% of all electricity in South Africa (SA Yearbook 2009/2010). The SA Yearbook (2009/2010) additionally states that the increasing demand for electricity by industrial sectors and residencies has put pressure on Eskom's generation capacity. The promulgated Integrated Resource Plan (IRP 2010) states that electricity generation needs to increase to 80 000 MW in 2026 and that at least half of this will comprise of coal-fired power stations.

2.1.2 Strategic Infrastructure Projects and the IPP Programme

The proposed Umbani Power Plant has been identified as being a potential[2] Strategic Infrastructure Project (SIP) as described in the NDP, 2011: SIP 9 - Electricity generation to support socioeconomic development. Between 2010 and 2020, the IRP provides that 14.7% of the generation capacities of the envisioned

[2] Should the project be selected as a preferred bider project by the Department of Energy, it could be selected as a SIP.

coal-fired power stations to be developed are to be added by Independent Power Producers (IPPs).

ISS Global Mining, as an IPP, has therefore embarked on a process to obtain approval for a new coal-fired power station in the Kriel area, with a generating capacity of up to 600MW. With regard to the escalating demand for power supply, economic growth of South Africa and the ensuing development of the region that will further put pressure on power generation resources, the proposed Umbani Power Plant aims to provide a baseload power supply to the national grid in order to minimise the possibility of a potential energy deficit in the country.

2.1.3 Regional perspective

The Mpumalanga Province currently has the largest number of operational coal mines in the country which has resulted in the strategic positioning of power stations by Eskom within the province. Apart from the Majuba Power Station, the majority of operational power stations in the Province were commissioned in the 1970's and 1980's. Hendrina and Arnot, constructed in the early 1970s are likely to be decommissioned between 2020 and 2025, followed by Camden and Kriel (assuming approximately 50 year operational life).

The proposed site is situated in the Mpumalanga Highveld and is therefore situated within the boundaries of the Highveld Priority Area (HPA), which is an area that has been identified as having poor ambient air quality due to the presence of numerous mines, power stations and other industries. Eskom power stations in the region include the following:

- Arnot power station - 55km from site
- Kriel power station - 13km from site
- Camden Power station - 86km from site
- Duvha power station - 27km from site
- Grootvlei power station – 100km from site
- The Kusile Power Station is currently under construction – within 50km from the site.

As a result of the concerns over the poor ambient air quality within the HPA, the Minister of Environmental Affairs declared a portion of Mpumalanga and Gauteng provinces an Air Quality Priority Area in November 2007. Atmospheric pollution problems within the HPA are associated with high average concentrations of SO_2 and particulate matter (PM10) exceedances of the National Ambient Air Quality Standards. Power Generation activity in the Highveld Priority Area is the major source of SO_2 emissions (82%) and NOx emissions (73%), while it is only responsible for a relatively small contribution to the total PM10 load (12%).

2.1.4 Local perspective

The availability of existing land adjacent to the Dorstfontein East Coal Mine, combined with factors such as the proximity to a fuel source and proximity to the Eskom grid (refer below) served as justification to ISS Global Mining to conduct further feasibility investigations and pursue land negotiations with the landowner. The feasibility investigations were informed by (amongst other factors) a site selection process which tested the overall development suitability of the site from an environmental and planning perspective, buy-in from the mine as well as discussions with Eskom.

2.2 Components of the Power Plant

The proposed Umbani Power Plant will have a generating capacity of up to 600MW to be supplied by 2X300MW Circulating Fluidised Bed (CFB) units. The total development footprint of the proposed Umbani Power Plant is anticipated to be in the region of 120ha to 150ha (or approximately 20% of the total farm portion which is 620ha in extent). Approximately 23ha of the 120 to 150ha area will be required for the power plant with the remainder being allocated towards the associated infrastructure including the ash disposal facility. The main infrastructure that is required for the proposed Umbani Power Plant includes the following:

- Access roads.
- Conveyor belts and coal handling areas.
- Coal storage areas and bunkers.
- Power plant production unit/s (boilers / furnaces, turbines, generator and associated equipment, control room).
- Ash disposal facility.
- Water infrastructure such as Raw-Water Storage Dam, purification works and reservoirs.
- Pollution control dams.
- An on-site substation or High Voltage Yard.
- Pipeline for supply of water to the facility.
- Office and maintenance area/s.
- Overhead power lines to connect into the Eskom grid. The power generated is planned to evacuate into the electricity grid at a point to be determined in consultation with Eskom. It is expected that the generated power can be evacuated into the electricity grid via a new 400 kV transmission line to either the Eskom Kriel or Matla power stations or the existing 400 kV power line traversing the site.

2.3 Resource Requirements And Components of the Proposed Project

The proposed Umbani Power Station components and infrastructure presented in this Section are indicative at this stage and aimed at enabling the reader to obtain a basic understanding of the proposed project. Detailed technology and specifications for the power station will be determined with the involvement of a technical advisor, informed by the findings of the scoping study, and will be fully described and assessed in the EIA phase of the process.

2.3.1 Fuel supply, quality, conveyance and consumption

The result of the beneficiation of South African coals are the generation of approximately 60-million tonnes per annum of discard coal, which is estimated to have already accumulated to more than 1-billion tonnes. While these large amounts of carbonaceous material negatively affect the environment, they also contain significant amounts of usable coal. Discard coal is a major concern to the DMR regarding the potential environmental impact in the future. It should also be seen as a major resource that could provide economic opportunities[3].

Discard coal or off-specification coal which cannot be used by the gross majority of utility power stations or other industries is becoming increasingly marketable in South Africa, due to the following factors:

- The demand for the off-specification coal with a Gross Calorific Value (GCV) of 20Mg/kg and above. The slurry content within many discard dumps also has a high GCV.
- Opportunities by South African mines to export off-specification coal in high volumes to other countries in so called "unorganised" markets.
- Opportunities for management of land impacts and reduction of coal waste footprints at coal mines (potentially freeing up land for alternative uses).
- Reduction of the national carbon dioxide and sulphur dioxide footprint.

The proximity to a sustainable fuel resource is a major factor informing the feasibility and sustainability of the proposed Umbani Power Plant. By virtue of its proximity to a coal resource and the available Eskom grid connection options presented at the site, the opportunity for the minimisation of operational costs and impacts associated with the distribution of coal and transmission of power generated is greatly reduced.

a) Fuel supply and consumption

The adjacent Dorstfontein East Coal Mine (under the ownership of Total Coal) produces high grade coal for the Eskom and export markets. The mine also

[3] http://www.energy.gov.za/files/esources/coal/coal_discards.html

stores a significant amount of low quality coal and coal discards which is unsuitable for use by Eskom, but which is a suitable fuel source for the proposed Umbani Power Station due to the proposed coal-burning technology proposed for this project (as described above). Approximately 10 million tonnes of discard quality coal currently exists while an additional 6 million tonnes is produced per annum. Agreement between ISS Global Mining and Total Coal for the supply of coal is in place. The proposed power plant is therefore considered to be well situated in terms of the supply of fuel to the proposed power plant.

Conservative estimates suggest that the remaining life of mine is in the region of 30 years. The plant will require an estimated 2.8 million tonnes of coal per annum (or up to 50% of total discard coal produced by the mine per annum). Secondary sources of coal supply to the power station are required in order to mitigate any potential shortages or stoppages of coal supplied by the mine. Several other coal mines within a 15km to 20km distance from the proposed Umbani power plant exist. Any coal supplied by these sources will however have to be trucked to the power station. While no negotiations as to the availability or sourcing at alternative discard coal sources has been undertaken at this stage, it is anticipated that the alternative supplies would be readily available based on the extent of discard reserves within the Province and the emerging market of this off-specification coal.

b) Fuel quality

Coal discard dumps (comprising of coal which is unsuitable for use by Eskom or unsuitable for export purposes) are associated with coal mines in South Africa. The coal discard dumps at the Dorstfontein East Coal mine are below the Eskom rejection limit. Discard coal with high ash and high sulphur content is suitable for use in a fluidised bed boiler as proposed for this power station (refer below). The coal has been calculated to have a calorific value of 15Mg/kg and a Sulphur content of approximately 1,6%. The ash content of the coal has been calculated to be a maximum of 40%. The use of discard coal in the fluidised bed process was a primary consideration in the selection of the project site and energy generation technology.

c) Coal conveyance

Coal will be sourced primarily from the neighbouring Dorstfontein East Coal Mine (refer to Figure 2.1). Coal supplied by the mine will be transported to the power plant via an overland conveyor to a coal bunker for use by the power plant. Depending on the point of supply by the mine and the location of the coal bunker, the length of the overland conyeyor could be between 500m to 2 000m in length (to be determined during the detailed design phase). Coal supplied via conveyor over this short distance will significantly reduce the operational costs of the power

station. The design of the coal conveyor will be specified during the detailed design phase.

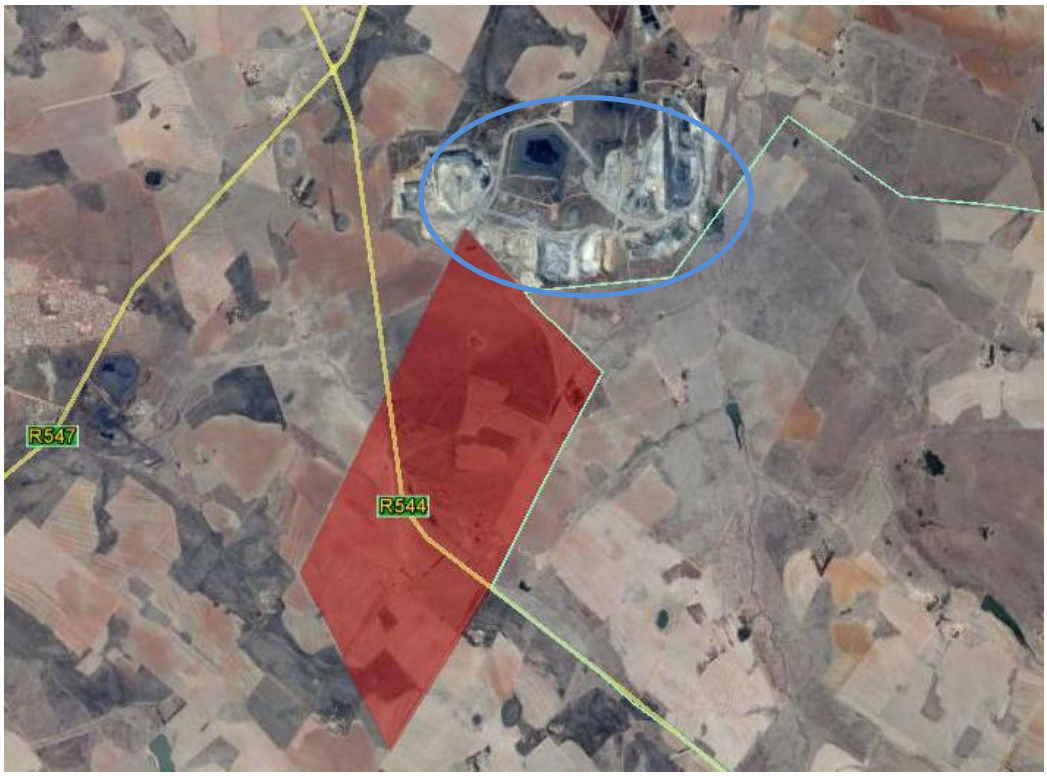

Figure 2.1: Umbani project site (red area) relative to the Dorstfontein East Coal Mine (blue oval) which will be the primary source of coal to the power plant

d) Coal storage

Coal will be stored in an in-plant and enclosed stockyard in preparation for use in the energy generation process.

2.3.2 Water requirements

Water is a limiting factor within the study area and the country. The proposed power plant will therefore be designed using dry cooling technology in order to significantly reduce the consumption of water. The alternative cooling technologies considered in the project feasibility are provided in Section 2.3.

a) Water demand

The Umbani Power Station, through the use of dry cooling technology in order to minimise the water requirements, will have a raw water demand of 2 000 m^3 per day. The water requirement is significantly more for wet cooling technology even though a wet cooling system will result in higher efficiencies. Following treatment

of the raw water supply at a raw water plant, the service water will further require demineralisation through a reverse osmosis plant. Process water will then be recycled back into the plant. Water use will also be determined by the ash management system to be used at the facility (as explained later).

b) Water supply

Water supply to the power station is expected to be via one, or a combination of the following sources (amongst others):

- » Municipal sources - the site is currently unserviced and no municipal supply pipeline crosses the site or nearby the site. The local municipality will be consulted to determine whether a municipal water allocation can be provided.
- » Water service providers – a Rand Water pipeline is situated in close proximity to the site (within 3km) and could potentially provide a supply of water to the proposed facility.
- » Mining sources - it is anticipated that mine waste water from the neighbouring Dorstfontein East Mine could be treated and supplied to the power station. The volume of water which can be provided from the mine will be confirmed with the mine by the client and through consultation within the EIA process.
- » Groundwater sources – It has not yet been determined whether there are registered boreholes on the project site. Should water be required to be abstracted from the boreholes, their registration for industrial use would be required and a water use license may be required to be obtained from DWA.

Due to the strategic nature of the project, it is anticipated that water allocations for the project can be realised through one or several of the above potential sources.

2.4 Project Alternatives

"Alternatives", in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives to:

- » The property on which, or location where, it is proposed to undertake the activity;
- » The type of activity to be undertaken;
- » The design or layout of the activity;
- » The technology to be used in the activity; and
- » The operational aspects of the activity.

These alternatives are briefly discussed below.

2.4.1 Site Alternatives

ISS Global Mining considered other sites adjacent to existing coal mines which were investigated for environmental suitability through a Regional Site Assessment / screening process undertaken by Savannah Environmental in 2011. The primary criterion for the pre-selection of the sites was the availability of land adjacent to coal mines under the ownership of Total Coal. The assessment was undertaken as a tool to assist in the identification of pre-selected sites (primarily from an environmental acceptability perspective) for the siting of the proposed power plant. The objectives of the study were to:

» Undertake a regional assessment process within a larger area in order to confirm the suitability of identified areas for the proposed development, and red flag any environmental risks.
» Identify site/s for the establishment of a coal-fired power plant/s (ensuring that technical and environmental constraints are minimised as far as possible).
» Define and understand the potential sites for development (in terms of the outcome of the Regional Assessment study).

Three pre-selected alternative sites were presented for assessment utilising a Criteria Based Analysis (including environmental, planning, infrastructure and technical criteria). The results of the study were consolidated in order to identify Preferred, Negotiable and Restricted Zones for proposed development. The Regional Assessment considered the following factors from various information sources:

Negative criteria
» Environmental Considerations (Irreplaceable Areas; Highly Significant Areas; Important & Necessary Areas mapped in terms of the Mpumalanga Conservation Plan)
» The proximity to protected areas
» The occurrence of wetlands, pans and waterbodies
» The occurrence of mountains, ridges and hills on the sites
» The proximity to residential areas
» Proximity to irrigated agricultural fields

Positive criteria
» The proximity to mining/industrial areas
» The proximity to transmission power lines and substations
» The proximity to railway lines
» The proximity to roads (having both negative and positive criteria)

From the findings of the Regional Assessment, the following conclusions were drawn:

» Site 1 (proposed Umbani Project Site) falls within an area rated as being highly preferred from an environmental and planning perspective. In terms of the underlying geology, there is the potential that coal is present within the southern portion of this site.
» Site 2 (area to the east of Dorstfontein Coal Mine) falls within an area rated as being restricted, with a small portion in the north of the site being preferred. In terms of underlying geology, there is no potential that coal is present below the site.
» Site 3 falls within an area rated as being highly preferred (northern portion) and restricted (southern portion). In terms of the underlying geology, there is the potential that coal is present within a small area in the north of the site.
» All three identified sites are located outside of the air quality hotspots but within the HPA.

Figure 2.2 indicates the sites included in the study (red circles) and further illustrates whether the sites (or sections of the sites) are restricted or preferred.

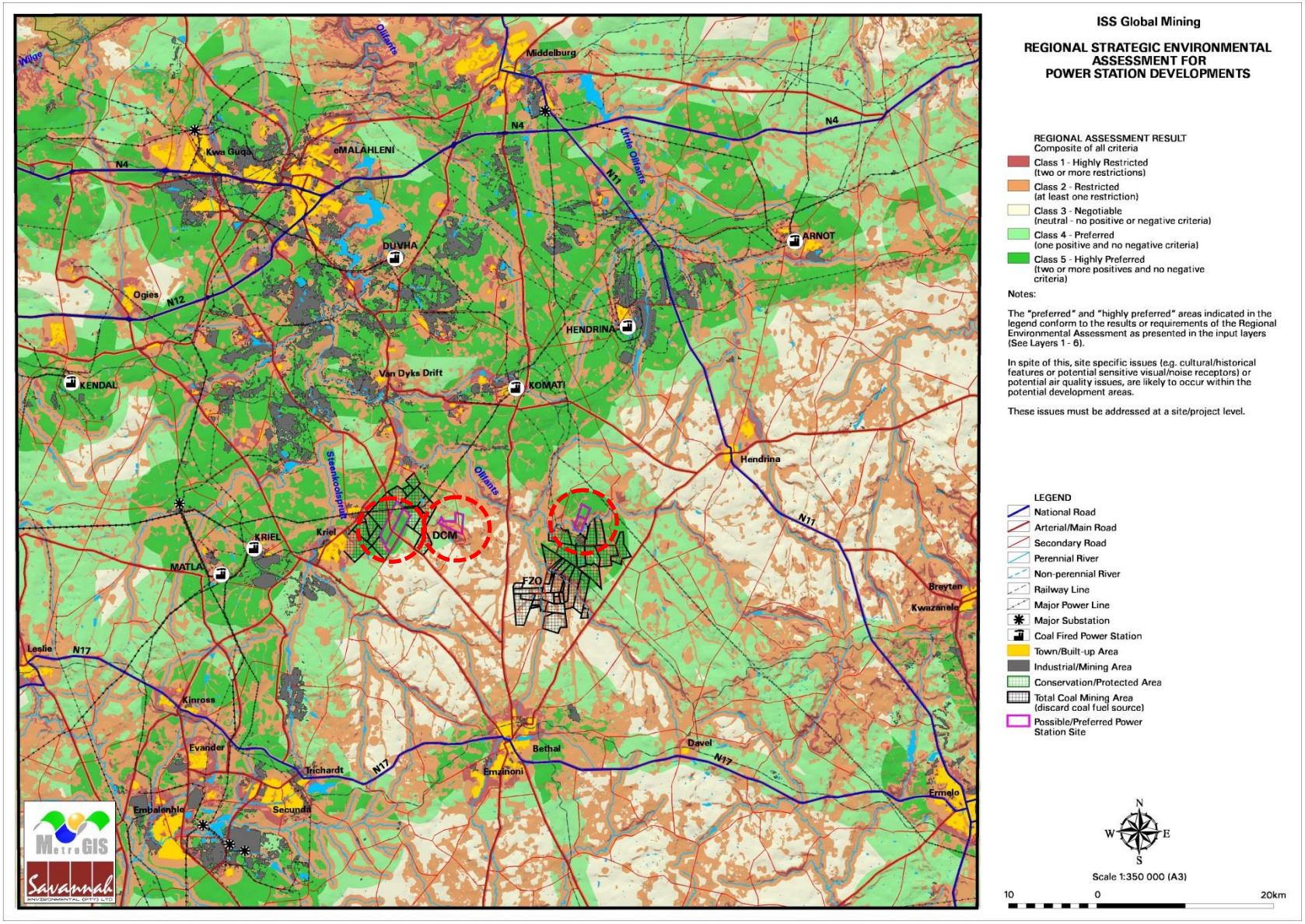

Figure 2.2: Composite result of Regional Assessment undertaken at three sites (red circles) for the siting of the proposed Umbani Power Plant

The Umbani project site was identified as the preferred site due to the site falling almost exclusively within an area identified to be highly preferred. The alternative sites considered were excluded from further study as they were considered to be less suitable for the development of a power station from an environmental and planning perspective.

Based on the above, alternative sites were therefore considered at a screening level, but only the preferred site was taken forward for further investigation, based on the results of the Regional Assessment. No site alternatives are therefore be considered during the Scoping and EIA Assessment.

2.4.2 Design or Layout Alternatives

Layout alternatives are not available at this stage in the process, and will be addressed in the EIA phase should any environmental sensitivies or constraints exist on the selected site which need to be accommodated or avoided. A layout of the power station and associated infrastructure (pipeline alignments, power line alignments, coal conveyor alignment, access roads etc.) will be provided by ISS Global with the involvement of a technical advisor / project engineer in the EIA phase such that a site-specific environmental assessment can be made as part of the detailed studies which form part of this phase of the EIA process. The purpose of considering layout alternatives as part of the EIA is to inform the design of the facility in relation to the best-practical environmental options (BPEO).

2.4.3 Technology Alternatives

a) Fuel combustion technology

The majority of South Africa's electricity is generated by thermal power stations, which use coal (a natural resource) as fuel for electricity production. The majority of these power stations are located within the Mpumalanga Province.

The Umbani project site is situated within an air quality hot spot within the Highveld Priority Area (HPA), declared a priority area due to elevated SO_2, PM_{10} and Ozone concentrations which are above ambient standards. As indicated earlier, the proposed power plant will make use of Circulating Fluidised Bed boiler (CFB) technology. The use of CFB technology in the proposed power plant is considered fundamental for the abatement of air emissions and overall success of the project due to ambient air quality concerns within the HPA, and is the only coal-fired technology proven to burn coals with a wide range of properties (such as low quality coal as proposed as the primary fuel source for this project).

The description of Conventional Pulverised Coal Boiler Technology below is for comparative purposes to CFB technology only and **is not considered to be a viable technology alternative** for the Umbani Power Plant on the basis of the fuel characteristics and the air quality limitations within the HPA. Similarly wet cooling technology is not considered to be a viable alternative due to the significantly higher water requirements than the dry cooling alternatives considered.

Conventional Pulverised Coal Boiler Technology

Eskom operates 11 power stations in the Highveld Priority Area (HPA) with a nominal generating capacity of 35 075 MW (*source: Highveld Priority Area Air Quality Management Plan*) and typically employs conventional Pulverised Coal (PC) boiler technology.

Figure 2.3 below illustrates how electricity is typically produced at a PC coal-fired power station[4]. Please note that the process illustrated below is representative of conventional power station technology employed in South Africa by Eskom which results in export of the generated capacity to the national grid.

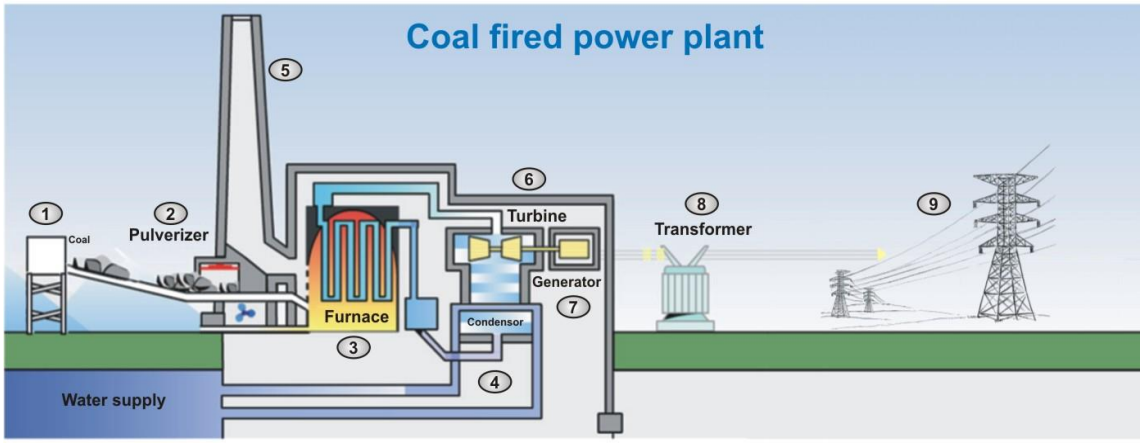

Figure 2.3: Illustration of a Pulverised Coal boiler technology coal-fired power station (sourced from http://qwickstep.com/search/coal-fire-power-plant.htm)

Based on Figure 2.3, the basic process for electricity generation at a conventional coal-fired power station can be described as follows (numbers relate to those indicated on Figure 2.3):

1. **Fuel**: Coal is sourced from a mine, and taken to the coal stockyard and then to the coal bunkers via conveyor belts.

[4] http://www.eskom.co.za/content/CO_0002CoalFirePSRev4.pdf

2. **Pulverizer:** The coal is then ground into a fine powder to facilitate ease of burning.
3. **Boiler and Furnace:** The powdered coal is blown into the furnace by air, where it ignites. Oil is used to ignite the boiler. An array of tubes forms the boiler walls. Demineralised (pure) water enters the boiler tubes via pipes. The heat which is released from the burning coal is absorbed by the tubes which convert the water into steam.
4. **Condensation and Cooling:** The spent steam goes into a condenser (brass tubes). The brass tubes are filled with water. The spent steam comes into contact with the cold outer surfaces of the condenser tubes and condensation of the steam to a liquid state (water) occurs. This water is then pumped back to the boiler for reheating. The water cooling method could be wet-cooling or indirect or direct dry-cooling. Wet-cooling (cooling towers) is the most efficient cooling method; however dry-cooling is designed to conserve water. In the event that wet-cooling will be used at the power station, warm water from the condensers is piped to cooling towers. The warm water releases its heat in the upward draught of cold air created by the shape of the cooling towers. The cooled water is re-circulated to the condensers.
5. **Smoke Stacks:** Gases that are released from combustion in the furnaces, are filtered and then released into the atmosphere through smoke stacks.
6. **Turbine**: The high pressure steam is piped to turbines. The steam passes through the turbine blades, causing the blades to turn. The movement of the steam through the turbines causes the thermal (heat) energy to be converted to mechanical energy.
7. **Generator:** The turbine is linked to the rotor of the generator. The rotor is an electromagnet which spins inside large coils of copper to generate electricity (alternating current (AC)), which is essentially what is produced by a power station.
8. **Transformer:** This is an electrical device by which AC current of one voltage is increased or stepped up (normally to 400 kV) and the current flow is reduced.
9. **Transmission:** The electricity is then fed into the Eskom integrated power grid for distribution and usage.

Circulating Fluidised Bed (CFB) Boiler Technology

Fluidised bed combustion (FBC) is a proven technology used for power plants with widespread application internationally but has very limited application in South Africa.

There are different designs of FBCs, namely two major groups, atmospheric systems (FBC) and pressurised systems (PFBC), and two minor subgroups,

bubbling (BFB) and circulating fluidised bed (CFB)[5]. The technology has proven to be well suited to burning fuels that are difficult to ignite, such as petroleum coke and anthracite, low quality fuels like high ash coals and coal mine wastes, and fuels with highly variable heat content, including biomass and mixtures of fuels. The technology therefore has the ability to utilise a wide range of fuels, which makes it the most suited technology to utilise low quality coal with high ash content found at various discard coal dumps in the broader study area (including the Dorstfontein East Coal Mine adjacent to the site).

Fluidised beds suspend solid fuel (such as coal / biomass) on upward-blowing jets of air during the combustion process. It results in a turbulent mixing of gas and solids. The tumbling action, much like a bubbling fluid, provides effective chemical reactions and heat transfer. The CFB has a cyclone filter to separate solid material from the hot flue gases which leave the exhaust of the furnace The solids from the filter are re-circulated into the bed. Limestone can be added to capture sulphur and prevent its release to the atmosphere as sulphur dioxide.

The technology burns fuel at temperatures of 760°C to 930°C, a range where nitrogen oxide formation is lower than in traditional pulverized coal units. CFB technology also reduces the amount of sulphur emitted in the form of sulphur dioxide emissions. Limestone is a necessary additive in order to capture sulphur and prevent its release to the atmosphere as sulphur dioxide.

The following is a basic description of the process flow for the generation of electricity from coal at the proposed power plant from the sourcing and conveyance of fuel to the distribution of electricity to the Umbani Power Station CFB boiler technology (refer to Figure 2.4):

1. **Fuel:** Coal is sourced from the Dorstfontein East Coal Mine and transported via conveyor to the power plant coal stockyard. When required by the boiler, a stacker reclaimer serves coal onto a conveyor system which transports the coal to the day silos next to the boiler. The coal is then drawn from the day silos directly into the furnace for combustion.

2. **CFB Boiler:** Fluidised beds consist of a bed of sand which is heated up and fluidised by passing streams of air through the sand. Solid fuel (such as coal or biomass) is introduced to the hot suspended sand on upward-blowing jets of air and the solid fuels starts to combust. The result is a turbulent mixing of gas and solids. The tumbling action provides effective chemical reactions and heat transfer. The CFB has a cyclone filter to separate the sand and coarse particles from the hot flue gases which leaves the exhaust of the furnace. Due to the design of the CFB,

[5] (http://en.wikipedia.org/wiki/Fluidized_bed_combustion).

limestone can be injected directly into the bed where it neutralises most of the sulphur which is released from the fuel during combustion leading to very low Sulphur Dioxide (SO_2) emissions.

3. **Smoke Stacks:** Gases that are released from combustion in the furnaces, are filtered and then released into the atmosphere through smoke stacks.

4. **Condensation and cooling:** The availability of water will have an impact on the choice of cooling technology. Firstly the turbine steam condensing system must be based on a dry system, either dry direct or dry indirect. The proposed project will be based on the dry indirect system including cooling tower as this is likely to bring a slight improvement in plant efficiency.

5. **Flue Gas Desulphurisation:** Any system to reduce the emissions of sulphur dioxide must be a dry system. The fuel has a sulphur content of up to 2% and therefore it is possible to reduce the sulphur emissions by injecting dry limestone directly into the CFB boiler. Further reduction of emissions can be obtained by using an external secondary Flue Gas Desulphurisation system, this time utilising lime as the reagent.

6. **Turbine:** The high pressure steam generated through the power generation process is piped to turbines. The steam passes through the turbine blades, causing the blades to turn. The movement of the steam through the turbines causes the thermal (heat) energy to be converted to mechanical energy.

7. **Generator:** The turbine is linked to the rotor of the generator. The rotor is an electromagnet which spins inside large coils of copper to generate electricity (alternating current (AC), which is essentially what is produced by a power station.

8. **Transformer:** This is an electrical device by which AC current of one voltage is increased or stepped up and the current flow is reduced.

9. **Transmission:** The electricity is then fed into the Eskom integrated power grid for distribution and usage.

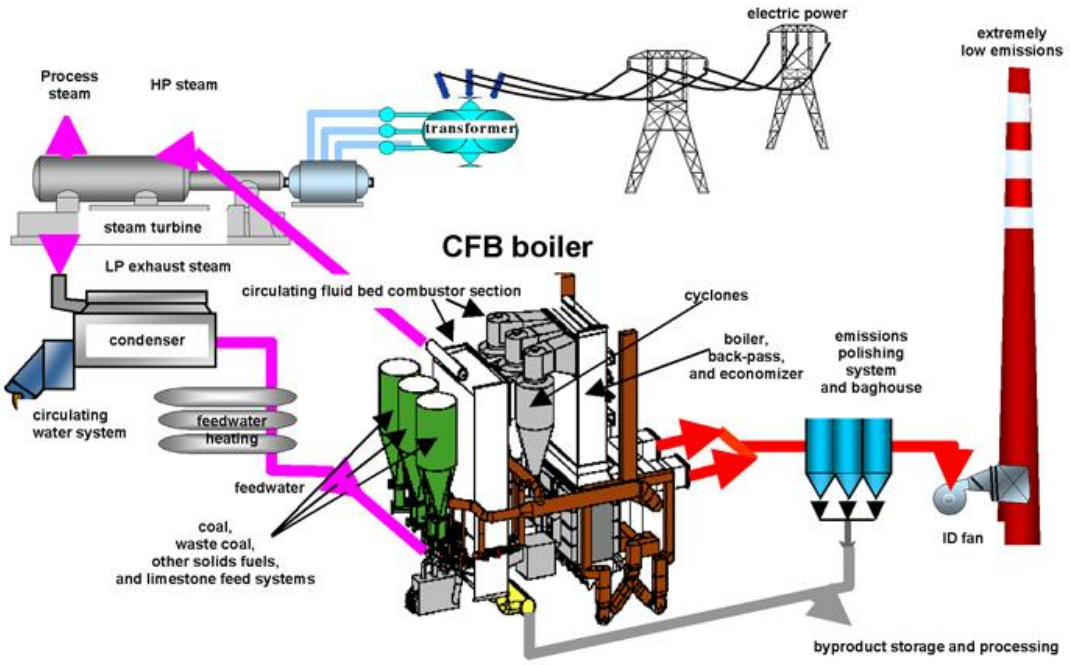

Figure 2.4: Illustration of CFB technology in the generation of electricity

Technology alternatives to be considered in the EIA phase are limited to the use of CFB boiler technology as it is the only technology with the capacity to simultaneously accept low-grade coal in the energy generation process while achieving emissions which are in line with South African emissions standards and even the more stringent International Finance Corporation (IFC) Standards (considering air quality constraints within the HPA).

b) Cooling technology

The steam that is produced and converted to mechanical energy at a power plant must be recovered through condensation (conversation of the steam (vapour) to water). Cooling systems for a coal-fired power station can be either wet-cooled, direct dry-cooled or indirect dry-cooled systems. Dry-cooling results in resource saving in terms of water conservation, and is generally utilised in water-stressed environments. The proposed plant will be designed as a dry cooling plant to minimise the water requirements of the proposed power plant. Two technologies are relevant in this regard:

Direct dry cooling system

In a direct dry cooling system, the steam from the turbines goes to dry-cooling element or a heat exchanger. Fans are used to blow air over the condenser causing water vapour to change into liquid. The liquid (water) is pumped back to the boiler for re-use. No cooling towers are needed for this system; therefore water loss by evaporation is prevented. Associated issues include increased noise

levels as a result of the additional fans required although the visual profile is lower due to the absence of cooling towers.

Indirect dry cooling system

For an indirect dry-cooling system, cooling towers and cooling water (from a water resource) are required (refer to Figure 2.5). Warm water from the condensers is pumped to cooling towers. Within the cooling tower, bundles of cooling elements are arranged in rings. Cooling water is sent into the elements and cooled water returns to the condenser for re-use. This system prevents water loss by evaporation, as it is a closed system. Associated issues include additional visual impacts associated with the large cooling towers required (such a system is used at the Kendal Power Station). A small improvement in cycle efficiency with the indirect system is anticipated. A final advantage of the indirect cooling system is that the flue gas outlet can be located within the cooling tower obviating the need for a separate stack.

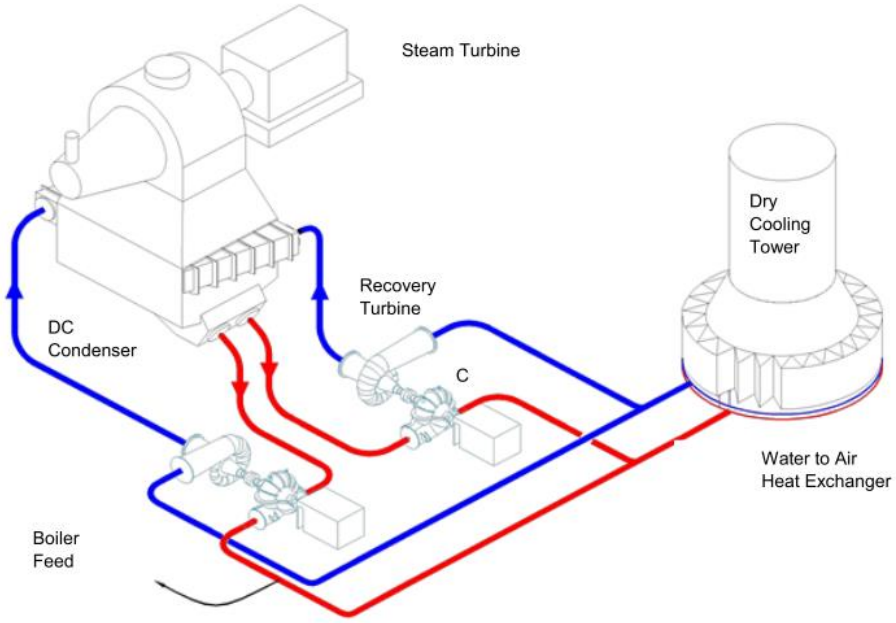

Figure 2.5: Illustration of the indirect dry cooling system

The selection of the preferred dry-cooling technology will be considered during the EIA phase considering the technical efficiencies and the differences in the associated noise and visual impacts and water requirements.

2.4.4 Power Line / Grid Connection Alternatives

The proposed development site is traversed by the Arnot - Kruispunt 275kV power line, the Komati – Kruispunt 1 power line and the Komati – Matla 1 power line in the northern section of the site (parallel to the boundary of the

Dorstforntein East Coal Mine). The above-mentioned lines are crossed by the Bethal – Middeldrift 88kV overhead power line which runs parallel to the northern boundary of the project site.

The power generated is planned to be evacuated into the electricity grid at a point which will be determined in consultation with Eskom. Electricity generated by the power plant will be fed directly into the Eskom grid by way of the following alternatives[6] (refer to Figure 2.6):

- From an on-site substation via a loop in / loop out configuration to the 400kV transmission line traversing the site and/or;
- From an on-site substation via a new overhead 400 kV transmission line to the Eskom Kriel power station (along a route adjacent to existing power lines approximately 20km in length), or;
- From an on-site substation via a new 400 kV transmission line to the Eskom Matla power station station (along a route adjacent to existing power lines or alternatively existing roads approximately 25km in length).

[6] Please note that it has been assumed that the power line corridor alternatives will be aligned with existing linear infrastructure such as roads or power lines. The actual alignments may differ due to technical requirements or constraints. These will be considered in more detail in the EIA phase of the process.

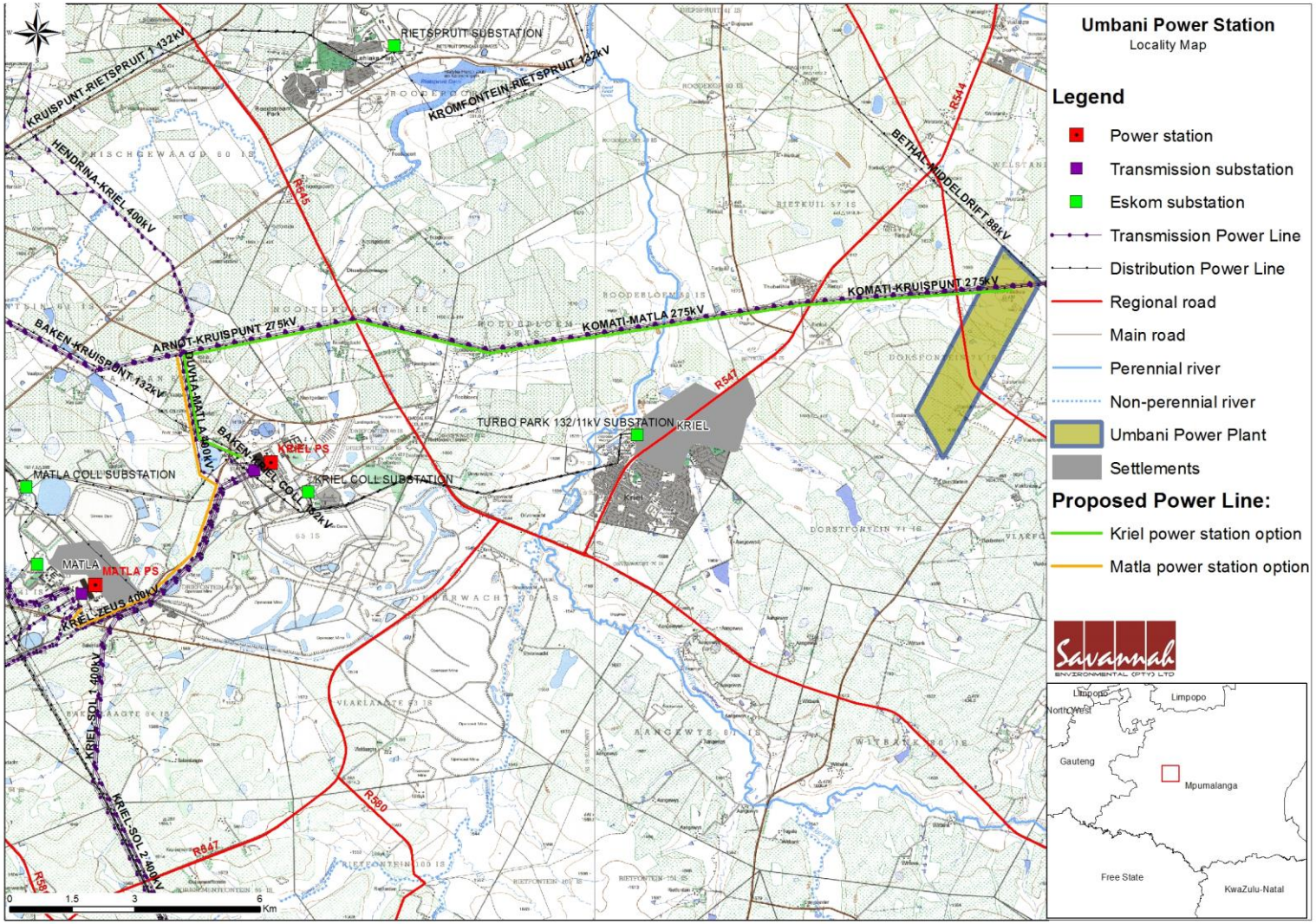

Figure 2.6: Topographic map indicating the position of the Umbani Power Plant and potential power line route alternatives to the Kriel and Matla power stations aligned with existing transmission network

2.4.5 Operational Alternatives – Pollution Control

Due to environmental and health impacts that could pose a risk during the operation of the coal-fired power station, methods are considered for ash (waste) management and the control of air emissions.

a) Ash management

The ash management system will either use wet-ashing (with water added) or dry-ashing (no water used). The impacts of these two different systems will be considered in the EIA phase with the involvement of the technical advisor and informed by the specialist studies. Wet ashing will use more water but will also reduce the potential impacts associated with dust.

Discard type coal generally has a high ash content and a maximum of 40% ash content is anticipated to be generated by the Umbani Power Plant. This has been calculated to be in the region of approximately 1.1 million tonnes per annum (or 33 million tonnes over the life of the plant). Above-ground ash dumping (where ash is stacked in an ash disposal facility within the power station area) will occur. The option to dispose of ash at the adjacent Dorstfontein East Mine will also be considered during the EIA Phase. The ash disposal facility footprint, volumes and height will be specified during the EIA phase. The EIA phase study will also consider the rehabilitation of the ash disposal facility.

b) Air Emission Control

A reagent is a "substance or compound that is added to a system in order to bring about a chemical reaction, or added to see if a reaction occurs". CFB technology burns fuel at temperatures of 760°C to 930°C, a range where nitrogen oxide formation is lower than in traditional pulverized coal unit and allows for the injection of limestone directly into the bed where it neutralises most of the sulphur which is released from the fuel during combustion, leading to very low Sulphur Dioxide (SO_2) emissions.

The estimated limestone consumption is dependent on the total sulphur present in the coal, but will be in the region of 125 kt per annum for a coal containing 2% sulphur. There are currently two sources of limestone being considered by ISS Global Mining, one from Pretoria and the other from Groblersdal area near to the Limpopo-Mpumalanga border. The limestone will be supplied as limestone powder in the requested grain size and transported to the facility by road.

Burning of coal releases CO_2, SO_x, NO_x, mercury and other pollutants into the atmosphere and air pollution abatement technologies must be explored further in the EIA study to minimize associated impacts. The use of other air emissions

control measures such as use of electrostatic precipitators / fabric filters, as well as abatement technologies such as Flue Gas Desulphurisation (FGD) will also be assessed in the EIA phase study.

2.4 Construction of a Coal-Fired Power Station

The pre-construction and construction phases of the proposed Umbani Power Plant could take between 24 - 36 months. It is anticipated that the construction crew will reside in nearby towns such as Kriel, Bethal or even Witbank.

The pre-construction activities include the following:

» Initiating a geotechnical investigation to determine whether suitable founding conditions exist and whether any stability mitigation is required;
» Undertaking a number of surveys including a survey of the power station site, survey of substation site, survey of the water supply pipeline route and survey of power line servitude.

The construction activities include the following:

» Constuction of access roads to the site;
» Site preparation activities will include clearance of vegetation and excavations for foundations. These activities will require the stripping of topsoil, which will need to be stockpiled, backfilled and/or spread on site;
» Thereafter civil works will take place which involves concrete works for structures such as foundation, the production unit (which houses the turbines, generator and so forth), stacks, substation and associated infrastructure;
» Mechanical and electrical work;
» Ancillary infrastructure such as office buildings, pipeline (to transfer water from the identified water source/s), conveyor belt, and a power line linking to the electricity transmission grid will be established; and
» As construction is completed in an area, and as all construction equipment is removed from the site, the site will be rehabilitated where practical and reasonable[7].

2.5 Operation of a Coal-Fired Power Station

Prior to the operation of the power station, testing and trials will need to be undertaken. It is not known at this stage exactly how many people will be responsible for monitoring and maintenance of the facility. It is anticipated that there will be full time security, maintenance and control room staff required at

[7] http://www.eskom.co.za/live/monster.php?URL=%2Fcontent%2FCO_0003BuildCoalPSRev4.pdf&Src=Item+28).

the facility. In order to operate a coal-fired power station, resources are required (input), and processes and outputs occur from the electricity generation process.

This concept is outlined in Figure 2.7.

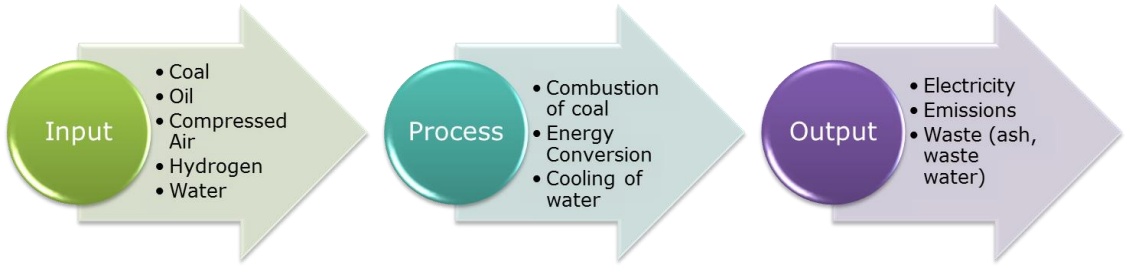

Figure 2.7: Resources (input), processes and outputs (waste) for a coal-fired power station

Figure 2.7 illustrates that in order to operate a coal-fired power station, natural resources such as coal and water will be required. For combustion of the coal, air and hydrogen are also required. Water is required in the power generation process – it is converted to steam (condensation) for energy conversion (from thermal energy (heat) to mechanical energy). The output of the process is electricity as well as waste and by-products. The power station will operate for 24 hours a day and 7 days a week.

2.5.1 Waste

The following waste products or by-products are expected to be generated by the operation of the power station:

Ash: Ash (coarse ash and fine ash) is a waste product from burning coal that requires constant disposal, and as such large volumes of ash are generated from a coal-fired power plant. A dedicated ash disposal site will form part of the power station complex. Ash to be stored in an ash disposal facility has been calculated to be in the region of approximately 1.1 million tonnes per annum (or 33 million tonnes over the life of the plant). The parameters (height and footprint) of the ash disposal facility will be specified during the EIA phase on investigation of the available disposal alternatives. Alternatives for the recycling and reduction of ash generated at the facility will also be investigated.

Gypsum: The CFB process allows for the introduction of limestone into the process for the abatement of SO_2. The capturing of SO_2 forms gypsum, which presents itself as a solid and is removed from the process along with the ash. Gypsum is removed as a by-product which can be used in the construction industry.

Emissions: The burning of coal results in air emissions (carbon dioxide, oxides of sulphur, oxides of nitrogen, mercury and other elements into the atmosphere via smoke / flue stacks).

Waste management infrastructure: The following waste management infrastructure will be required to be constructed, the specifications of which will be determined during the EIA Phase.

» The ash disposal facility;
» Ash dump runoff ponds / pollution control dams;
» Sewage treatment plant;
» Recycle pond; and

Estimated daily waste quantities (hazardous and non-hazardous) that are expected to be produced by the power plant have not been determined at this stage and further information will be provided during the EIA phase.

2.6 Decommisioning of a Coal-Fired Power Station

The lifespan of the proposed coal-fired power station is more than 30 years. Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the facility discussed in this EIA would comprise the disassembly and disposal of the infrastructure. Decommissioning activities will involve disassembly of the production units and ancillary infrastructure, demolishing of buildings, removal of hazardous waste and rehabilitation of the ash dumps and site.

APPROACH TO UNDERTAKING THE SCOPING PHASE AND LEGAL CONTEXT CHAPTER 3

An Environmental Impact Assessment (EIA) process is being undertaken in support of the application for Environmental Authorisation and Waste License for the proposed Umbani power plant and associated infrastructure. An EIA refers to that process (dictated by the EIA Regulations) which involves the identification of and assessment of direct, indirect and cumulative environmental impacts associated with a proposed project. The EIA process comprises two phases: i.e. **Scoping Phase** and **EIA Phase**. The EIA process culminates in the submission of an EIA Report (including an environmental management programme (EMPr)) to the competent authority for decision-making. The EIA process is illustrated below:

The need to comply with the requirements of the EIA Regulations ensures that decision-makers are provided the opportunity to consider the potential environmental impacts of a project early in the project development process, and assess if environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project. ISS Global Mining has appointed Savannah Environmental (Pty) Ltd, as independent Environmental Assessment Consultants, to conduct the required Environmental Impact Assessment (EIA) process for the proposed project.

An EIA is an effective planning and decision-making tool for the project proponent. It allows the environmental consequences resulting from a facility during its establishment, operation and decommissioning to be identified and appropriately managed. It provides the opportunity for the developer to be forewarned of potential environmental issues, and allows for resolution of the issue(s) reported on in the Scoping and EIA reports as well as dialogue with affected parties.

3.1 Application for Environmental Authorisation

NEMA is national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation. As this is a power generation project, the National Department of Environmental Affairs (DEA) is the competent authority. Therefore, ISS Global Mining requires authorisation from the National Department of Environmental Affairs (DEA), in consultation with the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) for the undertaking of the proposed project. In order to obtain this authorisation, ISS Global Mining acknowledges the need for comprehensive, independent environmental studies to be undertaken in accordance with the EIA Regulations of June 2010 (as amended). An integrated application for authorisation and waste licence has been submitted to DEA, and the project has been assigned Application Reference number **14/12/16/3/3/3/108**.

In terms of sections 24 and 24D of the National Environmental Management Act (Act No 107 of 1998), as read with Government Notices R543 (Regulations 20–25), R544 and R545 (as amended), environmental Authorisation is required for various activities associated with the proposed Project. The activities that will be applied for are summarised in Table 3.1.

Table 3.1: Summary of the GN R 544, 545 & 546, listed activities number and short description of the activities that require authorisation under NEMA

Notice and Activity no	Listed Activity description	Project relevance
GN R 544 (Listing Notice 1)		
Activity 2 of GN R 544	*The construction of facilities or infrastructure for the storage of ore or coal that requires an atmospheric emissions licence in terms of the National Environmental Management: Air Quality Act (Act No.39 of 2004).*	An in-plant coal stockyard will be required. The size and capacity of the coal stockyard will be determined during the detailed design phase and included in the EIA report.
Activity 9 of GN R 544	*The construction of facilities exceeding 1000 metres in length for the bulk transport of water, sewage or stormwater, with an internal diameter of 0,36m or more or with a peak throughput of 120 litres per second or more excluding where such facilities occur within a road reserve or further than 32m from a watercourse.*	Raw water to the power station may need to be supplied via a pipeline from an approved source/s to be identified during the EIA Phase.
Activity 10	*The construction of facilities or infrastructure for*	The evacuation or distribution of

Notice and Activity no	Listed Activity description	Project relevance
(a) of GN R 544	*the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33kV but less than 275kV*	the electricity from the on-site substation via a new overhead power line (greater than 33kV) or loop in – loop out of the existing power line traversing the site may be required.
Activity 11 (vi) (x) (xi) of GN R 544	*The construction of bulk stormwater outlet structures, buildings exceeding 50 square metres in size; or infrastructure or structures covering 50 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measures from the edge of a watercourse, excluding where such construction will occur behind the development setback line.*	A watercourse occurs on the site. The plant or associated infrastructure could potentially be located within 32m from this watercourse, to be confirmed during the detailed design phase and indicated in the EIA Report.
Activity 22 (ii) of GN R 544	*The construction of a road, outside urban areas, (i) with a reserve wider than 13.5 metres or, (ii) where no road reserve exists where the road is wider than 8 metres.*	Access roads wider than 8m may need to be constructed from the access point to the power station. Such routes are not yet defined and will be determined during the EIA phase.
GN R 545 (Listing Notice 2)		
Activity 1 of GN R 545	*The construction of facilities or infrastructure, for the generation of electricity where the electricity output is 20 megawatts or more.*	The power plant will have a generating capacity of up to 600 megawatts.
Activity 5 of GN R 545	*The construction of facilities or infrastructure for any process or activity which requires a permit or license in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent and which is not identified in Notice No. 544 of 2010 or included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case that Act will apply.*	Construction of combustion installations (Category 1) and solid fuel combustion installations (Subcategory 1.1) constitute listed activities identified in GN 248 of 31 March 2010, in terms of Section 21 of the National Environmental Management: Air Quality Act (NEMA: AQA, Act 39 of 2004) and require that an application for an Atmospheric Emissions License (AEL) be made to the licensing authority (Nkangala District Municipality).
Activity 12 of GN R 545	*The construction of facilities or infrastructure for the offstream storage of water, including dams and reservoirs, with a combined capacity of 50000 cubic metres or more, unless such storage falls within the ambit of activity 19 of Notice 545 of 2010.*	Water storage reservoirs and recycling ponds will be required which may exceed 50 000 cubic meters. This will be determined during the detailed design phase and assessed during the EIA Phase.

Notice and Activity no	Listed Activity description	Project relevance
Activity 15 of GN R 545	*Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more.*	The power station including associated infrastructure will be approximately 60 hectares in extent.
GN R 546 (Listing Notice 3)		
Activity 13 of GN R 546	The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation (iii) in an urban area (dd) on the watercourse side of the development setback line or within 100m from the edge of a watercourse where no such setback line has been determined.	The status of vegetation on the site will be determined during the EIA but may comprise of up to 75% indigenous vegetation within 100m from a watercourse.
Activity 14 of GN R 546	Clearing an area of 5 ha or more of 75% of indigenous vegetation in all areas outside urban areas.	The status of vegetation on the site will be determined during the EIA but may comprise of up to 75% indigenous vegetation outside urban areas (refer to Section 4).
Activity 27 of GN R 923 of 29 November 2013	The construction of facilities for the treatment of effluent, wastewater, or sewage with an annual throughput capacity of 15 000 cubic meters or more	A sewage treatment plant with the capacity to process more than 15000m^3 of wastewater could be required to be determined during the detailed design phase and assessed in the EIA report.

In terms of Government Notice 921 published in terms of the NEM: Waste Act, a waste license is required for waste management activities, as listed in Table 3.2.

Table 3.2: Summary of the GN 921 of 29 November 2013, listed activities number and short description of the waste activities that requires authorisations under the Waste Act

Activity in terms of GN 921	Activity description	Project relevance
Category B, Activity 1	The storage including temporary storage of hazardous waste in lagoons	Construction of wastewater/ pollution control dams for the storage / control of waste water will be require, to be confirmed during the detailed design phase and assessed in the EIA Report.
Category B, Activity 9	The disposal of any quantity of hazardous waste to land	A coal ash disposal facility will be required for the disposal of ash to land. The specifications and extent of the facility will be determined during the detailed design phase and assessed in the

		EIA report.
Category B, Activity 10	The construction of a facility for a waste management activity listed in Category B of this schedule (not in isolation to associated waste management activity)	A coal ash disposal facility will be required for the disposal of ash to land. The specifications and extent of the facility will be determined during the detailed design phase and assessed in the EIA report.

3.2 Objectives of the Scoping Phase

This Scoping Phase aimed to:

» Identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including design, construction, operation and decommissioning) within the broader study area through a desk-top review of existing baseline data and specialist studies;
» Define the scope of studies to be undertaken within the EIA process;
» Inform potentially interested and affected parties (I&APs) of the proposed project and elicit inputs and comments in this regard;
» Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA process, as well as regarding the scope and extent of specialist studies that will be required to be undertaken as part of the EIA Phase of the process; and
» Identify potentially sensitive environmental features and areas on the site to inform the preliminary design process of the power station and associated infrastructure.

Within this context, the objectives of this Scoping Phase are to:

» Describe the scope and nature of the proposed activities;
» Describe the reasonable and feasible project-specific alternatives to be considered through the EIA process, including the "no go" option;
» Identify and evaluate key environmental issues/impacts associated with the proposed project, and through a process of broad-based consultation with stakeholders, I&APs and desk-top specialist studies identify those issues to be addressed in more detail in the Impact Assessment Phase of the EIA process, as well as potentially sensitive environmental features and areas which should be considered in the preliminary design phase.
» Conduct an open, participatory and transparent public involvement process and facilitate the inclusion of I&AP and stakeholders' concerns regarding the proposed project into the decision-making process.

3.3 Overview of the Scoping Phase

Key tasks undertaken within the scoping phase which are in line with the requirements of the EIA Regulations of June 2010 are illustrated in Figure 3.1.

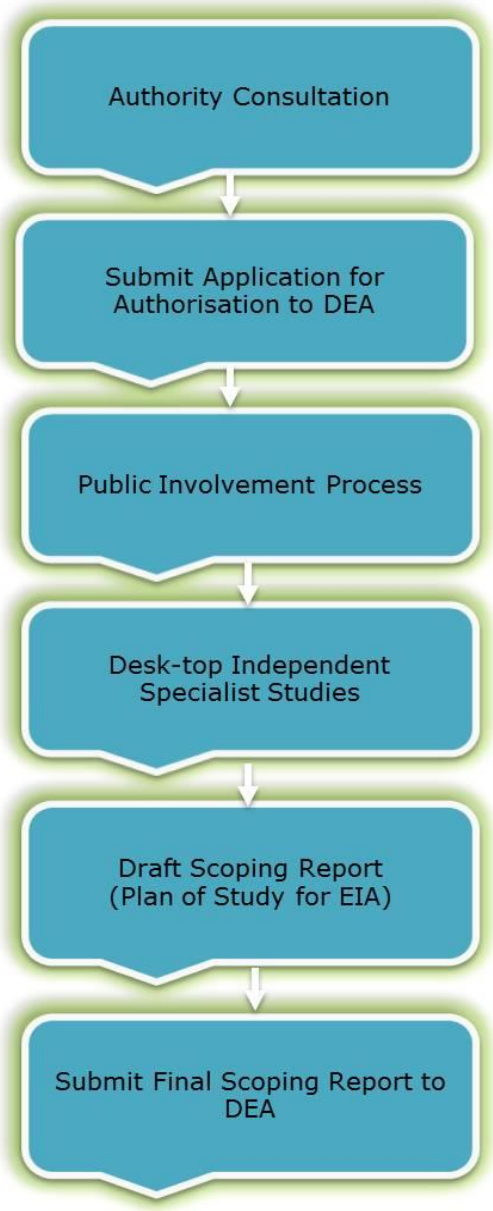

Figure 3.1: Key tasks in the Scoping Phase of the EIA process

The tasks are discussed in detail below.

3.3.1 Authority Consultation and Application for Authorisation in terms of NEMA and NEM:AQA

As this is an **energy generation** project, the National Department of Environmental Affairs (DEA) is the competent authority for this application. As

the project falls within Mpumalanga, the Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET) act as a commenting authority for the project. Consultation with these authorities has been undertaken throughout the Scoping process. This consultation has included the following:

» Consultation with DEA regarding the proposed project and the EIA process to be undertaken.
» Submission of an application for authorisation to DEA in terms of NEMA and the NEM: Waste Act. The integrated environmental authorisation reference number allocated to the project is **14/12/16/3/3/3/108**.
» Consultation with the Nkangala District Municipality who are mandated to consider the Atmospheric Emissions License (AEL) application for this project. This included a meeting at the pre-application stage with the Gert Sibande District Municipality to introduce the proposed project as the site falls on the border between these districts.
» Consultation with the Department of Water Affairs.

A record of all authority consultation undertaken prior to and within the Scoping Phase is included within **Appendix B**.

3.3.2 I&AP Identification, Registration and the Creation of an Electronic Database

The first step in the public involvement process was to identify relevant stakeholders and interested and affected parties (I&APs). This process was undertaken through existing contacts and databases, recording responses to site notices and newspaper advertisements, as well as through the process of networking. Stakeholder groups identified include:

» Provincial and local government departments (including Mpumalanga DEDET, South African Heritage Resources Agency (SAHRA), Mpumalanga Provincial Heritage Resources Authority (MPHRA), Department of Water Affairs (DWA), Department of Agriculture, Transnet, South African Roads Agency (SANRAL) etc.);
» Government Structures (including the Provincial Roads Authority, municipal planning departments, etc);
» Municipalities including Emalahleni Local Municipality and Nkangala District Municipality as well as the local Ward Councillor;
» Potentially affected and neighbouring landowners and tenants;
» Conservation authorities;
» Industry and business; and
» Community Based Organisations (CBOs) and other Non-governmental Organisations (NGOs).

All relevant stakeholder and I&AP information has been recorded within a database of affected parties (refer to Appendix C for a listing of recorded parties). While I&APs have been encouraged to register their interest in the project from the start of the process, the identification and registration of I&APs will be on-going for the duration of the EIA process. The project database will be updated on an on-going basis throughout the project process, and will act as a record of the parties involved in the public involvement process.

3.3.3 Notification of the EIA Process and draft Scoping Report

In order to notify and inform the public of the proposed project and invite members of the public to register as interested and affected parties (I&APs) newspaper advertisements were placed in the following newspapers:

» Witbank News (English advertisement published on 24 January 2014) – the purpose of the advertisement was to announce the commencement of the Scoping and EIA Process, provide a brief description of the proposed project and request the registration of I&APs on the project database.

In addition the following notifications were issued regarding the project:

» Site notices were placed on the project site boundary fence and in public places in Kriel in accordance with the requirements of the EIA Regulations.
» Background Information Documents (BIDs) were distributed to surrounding land owners and occupiers of land.
» BIDs were placed at the Kriel post-office; and
» Stakeholder letters were distributed to the project database notifying I&APs and stakeholders of the proposed project.

In addition to the above advertisements and notices, key stakeholders and registered I&APs were notified in writing of the commencement of the EIA process. These parties included, *inter alia*:

» Relevant parties from Municipalities potentially affected (directly or indirectly) by the proposed project;
» Communities and potentially affected landowners as well as adjacent landowners;
» Organs of state having jurisdiction in respect of any aspect of the activity, including:
  * Mpumalanga DEDET;
  * Department of Energy;
  * Department of Water Affairs;
  * Department of Agriculture;

- South African Heritage Resources Agency (SAHRA) and MPHRA;
- Conservation Authorities (SANBI etc.);
- Department of Transport and Public Works;
- South African National Roads Agency Limited (SANRAL);
- Transnet and Spoornet;
- Local and District Municipality; and
- Eskom.

Copies of all the advertisements placed and notices distributed are contained in **Appendix D** of this report.

3.3.4 Public Involvement and Consultation

The aim of the public participation process (PPP) conducted in the scoping phase of the process was primarily to ensure that:

» All potential stakeholders and I&APs are identified and consulted with;
» Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs;
» Participation by potential I&APs is facilitated in such a manner that all potential stakeholders and I&APs are provided with a reasonable opportunity to comment on the application and identify issues to be addressed in the EIA process; and
» Comments received from stakeholders and I&APs is recorded.

In order to provide information regarding the proposed project and the EIA process, a background information document (BID) for the project was compiled at the outset of the process (refer to Appendix D). The BID was distributed to identified stakeholders and I&APs, and additional copies were made available at public venues within the broader study area.

Through consultation with key stakeholders and I&APs, issues for inclusion within the issues-based scoping study were identified and confirmed. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and concerns regarding the project, various opportunities have been and will continue to be provided for I&APs to have their issues noted after the release of the Draft Scoping Report for public review, as follows:

» **Public meeting** in the study area (open meeting advertised in the local press);
» **Focus group meetings** (pre-arranged and stakeholders invited to attend);
» One-on-one **consultation meetings** (for example with directly affected or surrounding landowners);

» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the project participation consultant, lead EIA consultant as well as specialist consultants); and
» Written, faxed or e-mail **correspondence.**

Networking with I&APs will continue throughout the duration of the EIA process.

3.3.5 Identification and Recording of Issues and Concerns

Issues and concerns raised by I&APs during the scoping process will be consolidated in a Comments and Response Report (C&RR) (to be included in the final Scoping Report for submission to DEA). The Comments and Response Report will include responses from members of the EIA project team and/or the project developer to indicate how issues will be addressed in the EIA process, or provide clarification. Where issues are raised that the EIA team considers beyond the scope and purpose of this EIA process, clear reasoning for this view will be provided.

3.3.6 Evaluation of Issues Identified through the Scoping Process

Issues (both direct and indirect environmental impacts) associated with the proposed project identified within the scoping process have been evaluated through desk-top specialist studies. In evaluating potential impacts, Savannah Environmental has been assisted by the following specialist consultants:

Specialist	Area of Expertise	Refer Appendix
Gerhard Botha in association with Marianne Strohbach (Savannah Environmental)	Biodiversity (Flora & Fauna)	Appendix E
Johann Lanz	Soils and agricultural potential	Appendix F
Heritage Contracts and Archaeological Consulting CC	Archaeology and Heritage	Appendix G
Dr. B.D Milsteed	Paleontology	Appendix H
MetroGIS	Visual impacts	Appendix I
uMoya NILU Consulting (Pty) Ltd	Air Quality	Appendix J
Enviro Acoustic Research	Noise	Appendix K
Urban-Econ	Socio-economic impacts	Appendix L

In order to evaluate issues and assign an order of priority, it was necessary to identify the characteristics of each potential issue/impact:

» *the nature,* which includes a description of what causes the effect, what will be affected and how it will be affected; and
» *the extent,* wherein it is indicated whether the impact will be local (limited to the immediate area or site of development) or regional.

The evaluation of the issues resulted in a statement regarding the potential significance of the identified issues, as well as recommendations regarding further studies required within an EIA.

Specialist Scoping Reports are contained within Appendices E - L.

3.3.7 Public Review of Draft Scoping Report

The Draft Scoping Report was made available for public review from 3 April 2014 to 12 May 2014 at the following locations:

» Kriel Municipal Offices (Quentin Street, Kriel)
» Thubelihle Clinic
» www.savannahSA.com

All registered I&APs were notified of the availability of the Draft Scoping Report. Comments from the following parties were received during the allotted timeframes:
» The Mpumalanga Department of Agriculture, Rural Development and Land Administration;
» Eskom;
» South African Heritage Resources Agency.

3.3.7 Public and Stakeholder meetings

In order to provide background information on the proposed project and facilitate comments on the Draft Scoping Report, a public meeting was held on 12 May 2014 in the Thubelihle Hall, outside of Kriel. The meeting was advertised in the media and an invitation extended to stakeholders and registered I&APs. Attendees were required to sign an attendance register. Fifteen community members from Thubelihle attended the meeting. The primary concern was whether employment and economic opportunities generated by the project would extend to the Thubelihle community.

Meetings with adjacent landowners, the Emalahleni Local Municipality (Kriel Office) and Total Coal were held on 12 May 2014. The minutes of the meetings are attached in Appendix D.

No meetings could be secured with landowners situated along the proposed power line and these meetings will be scheduled within the EIA phase.

3.4 Regulatory and Legal Context

The South African energy industry is evolving rapidly, with regular changes to legislation and industry role-players. The regulatory hierarchy for an energy generation project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels.

3.4.1. Regulatory Hierarchy

At **National Level**, the main regulatory agencies are:

» *Department of Energy:* This department is responsible for policy relating to all energy forms, including renewable energy. This department is the controlling authority in terms of the Electricity Regulation Act (Act No 4 of 2006). The DoE Integrated Resource Plan (IRP) (2010 to 2030) also indicates that coal-fired power stations will still be required as part of the energy mix to 2030.
» *National Energy Regulator of South Africa (NERSA):* This body is responsible for regulating all aspects of the electricity sector, and will ultimately issue a energy generation license to ISS Global Mining to generate electricity from the coal-fired power station.
» *Department of Environmental Affairs (DEA):* This Department is responsible for environmental policy and is the controlling authority in terms of NEMA (Act No of 1998) and the EIA Regulations and the NEM: Waste Act (Act No 59 of 1998). The DEA is the competent authority for this project, and charged with granting the relevant environmental authorisation and waste license.
» *The South African Heritage Resources Agency (SAHRA):* The National Heritage Resources Act (Act No 25 of 1999) and the associated provincial regulations provides legislative protection for listed or proclaimed sites, such as graves or structures older than 60 years, urban conservation areas, nature reserves and proclaimed scenic routes;
» *South African National Roads Agency Limited (SANRAL):* This department is responsible for all National road routes and some provincial routes;
» *Department of Water Affairs (DWA):* This Department is responsible for effective and efficient water resources management according to the National Water Act (Act No 59 of 1998) to ensure sustainable economic and social development and for evaluating and issuing licenses pertaining to water use.
» *Department of Mineral Resources:* Approval from the Department of Mineral Resources (DMR) may be required to use land surface contrary to the objects of the Act in terms of Section 53 of the Mineral and Petroleum Resources

Development Act, (Act No 28 of 2002) (MPRDA): In terms of the MPRDA approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resources that might occur on site.

» *Department of Agriculture, Forestry and Fisheries:* This Department is the custodian of South Africa's agriculture, fisheries and forestry resources and is primarily responsible for the formulation and implementation of policies and legislation governing the Agriculture, Forestry and Fisheries Sector.
» *South African Civil Aviation Authority:* This Department is responsible for aircraft movements and radar. The power station stacks will require obstacle approvals from the CAA.

At **Provincial Level**, the main regulatory agencies are:

» *Provincial Government of the Mpumalanga Province – Mpumalanga DEDET.* This department is the commenting authority for this project.
» *Mpumalanga Department of Public Works, Roads and Transport* – This department is responsible for roads.
» *Mpumalanga Provincial Heritage Resources Authority (MPHRA):* who deal with heritage resources within the Mpumalanga Province.
» *Mpumalanga Department of Agriculture, Rural Development and Land Administration* – responsible for food security in the province and agricultural resource management and use.

At **Local Level** the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment.

» In terms of the Municipal Systems Act (Act No 32 of 2000) it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control;
» The proposed project is planned to be located in the Highveld Priority Area airshed (Government Notice 1123 of 2007). Due to the nature of the process and the resultant atmospheric emissions, combustion installations using solid fuels for steam raising of electricity generation are a listed activity in terms of Section 21 of the National Environmental Management: Air Quality Act (Act 39 of 2004) (Republic of South Africa, 2010). As a result an Atmospheric Emission License (AEL) is required as part of the environmental authorisation process in order to operate the power station. The AEL will be obtained from the Nkangala District Municipality, the competent authority in this regard.
» Bioregional planning involves the identification of priority areas for conservation and their placement within a planning framework of core, buffer and transition areas. These could include reference to visual and scenic

resources and the identification of areas of special significance, together with visual guidelines for the area covered by these plans; and

» By-laws and policies have been formulated by local authorities to protect visual and aesthetic resources relating to urban edge lines, scenic drives, special areas, signage, communication masts, etc.

There are also numerous non-statutory bodies such as environmental lobby groups that play a role in various aspects of planning and the environment that will influence coal energy development.

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

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

» National Environmental Management Act (Act No 107 of 1998)
» EIA Regulations, published under Chapter 5 of the NEMA (GN R543, GN R544, GN R545 and GN R546 of June 2010);
» Guidelines published in terms of the NEMA EIA Regulations, in particular:
  * Companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010 (Draft Guideline; DEA, 2010); and
  * Public Participation in the EIA Process (DEA, 2010);
» The Equator Principles; and
» International Finance Corporation (IFC) guidelines

Several other Acts, standards or guidelines have also informed the project process and the scope of issues evaluated in the scoping report, and to be addressed in the EIA. A listing of relevant legislation is provided in Table 3.3. A more detailed review of legislative requirements applicable to the proposed project will be included in the EIA phase.

Table 3.3: Initial review of relevant environmental policies, legislation, guidelines and standards applicable to the proposed coal-fired power station project EIA

Legislation	Applicable Sections
National Legislation	
Constitution of the Republic of South Africa (Act No 108 of 1996)	» Bill of Rights (S2) » Environmental Rights (S24) – i.e. the right to an environment which is not harmful to health and well-being » Rights to freedom of movement and residence (S22) » Property rights (S25) » Access to information (S32)

Legislation	Applicable Sections
	» Right to just administrative action (S33) » Recognition of international agreements (S231)
National Environmental Management Act (Act No 107 of 1998)	» National environmental principles (S2), providing strategic environmental management goals and objectives of the government applicable throughout the Republic to the actions of all organs of state that may significantly affect the environment » NEMA EIA Regulations (GN R543, GN R544, GN R545 and GN R546 of June 2010) » Public Participation (S2) » The requirement for potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority (S24 – Environmental Authorisations) » Duty of Care (S28) requiring that reasonable measures are taken to prevent pollution or degradation from occurring, continuing or recurring, or, where this is not possible, to minimise & rectify pollution or degradation of the environment » Procedures to be followed in the event of an emergency incident which may impact on the environment (S30) » Appeals against decisions made by authorities (S43)
Environment Conservation Act (Act No 73 of 1989)	» National Noise Control Regulations (GN R154 dated 10 January 1992)
National Heritage Resources Act (Act No 25 of 1999)	» Stipulates assessment criteria and categories of heritage resources according to their significance (S7) » Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35) » Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36) » Lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development (S38) » Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction (S44)
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	» Provides for the MEC/Minister to list ecosystems which are threatened and in need of protection (S52) – none have as yet been published » Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) - none have as yet been published » A list of threatened & protected species has been published in terms of S 56(1) - Government Gazette 29657. » Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and

Legislation	Applicable Sections
	Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations).
National Environmental Management: Air Quality Act (Act No 39 of 2004)	» National, provincial and local ambient air quality standards (S9 - 10 & S11) » Listed Activities (S21) » Atmospheric Emissions Licenses (S22) » Measures in respect of dust control (S32) – no regulations promulgated as yet » Measures to control noise (S34) - no regulations promulgated as yet
Conservation of Agricultural Resources Act (Act No 43 of 1983)	» Prohibition of the spreading of weeds (S5) » Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) & restrictions in terms of where these species may occur » Requirement & methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048)
National Water Act (Act No 36 of 1998)	» National Government is the public trustee of the Nation's water resources (S3) » Entitlement to use water (S4) – entitles a person to use water in or from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, fire fighting and recreational use, as set out in Schedule 1 » Duty of Care to prevent and remedy the effects of pollution to water resources (S19) » Procedures to be followed in the event of an emergency incident which may impact on a water resource (S20) » Definition of water use (S21) » Requirements for registration of water use (S26 and S34) » Definition of offences in terms of the Act (S151)
The National Environmental Management: Air Quality Act (Act no.39 of 2004) (AQA)	» This is the current air quality law (commenced in September 2005) in South Africa governing air quality management. This Act requires the IPP to seek an atmospheric emissions licence from the relevant provincial / national department. » The Atmospheric Pollution Prevention Act (APPA) of 1965 was repealed on 31 March 2010 when the National Environmental Management: Air Quality Act (Act No. 39 of 2004) (AQA) came into effect. APPA Registration Certificates that regulated industrial emissions were phased out with the introduction of Atmospheric Emission Licenses (AEL). The AEL function was delegated to District and Metropolitan Municipalities. The AEL function includes the review and conversion of existing APPA Registration Certificates to AEL's and the issuing of AEL's for new Listed Activities. » In terms of GN R893 of 22 November 2013, the

Legislation	Applicable Sections
	proposed power station is a listed activity requiring an AEL. » The proposed coal-fired plant is planned to be located in a declared Air Quality Priority Management Area (DEA, 2012). Due to the nature of the process and the resultant atmospheric emissions, combustion installations using solid fuels for steam raising in electricity generation is a listed activity in terms of Section 21 of the National Environmental Management: Air Quality Act (Act 39 of 2004) (DEA, 2010). » The project isrequired to comply with the requirements of the Dust Control Regulations promulgated in GN R827 of 01 November 2013.
NEMA: AQA: Ambient Air Quality standards of 24 December 2009 and NEMA: AQA Emission standards of 31 March 2010 (DEA 2010).	» The Emission standards triggered by the proposed coal fired power plant are those under section 10 sub-category 1.1 relating to solid fuel combustion installations.
Water Services Act (Act No 108 of 1997)	» No person may dispose of industrial effluent except in a manner approved by the water services provider (S7)
National Environmental Management: Waste Act (Act No 59 of 2008)	» Waste management measures » Regulations and schedules (Schedule A & B) » Listed activities requiring waste licenses – in terms of GN R921 of 29 November 2013, waste license is required for the proposed waste management activities associated with the power station » Waste disposal practices (S20) » Pollution control dams and waste disposal facililities are required to be designed and managed in terms of GN R634-636 of 23 August 2013) » Waste handling and storage is required to comply with the Norms and Standards for waste storage detailed in GN R926 of 29 November 2013.
National Forests Act (Act No 84 of 1998)	» Protected trees listed. Permits required to impact on these species prior to disturbance or destruction. » Conservation of forests » List of protected tree species published (GN 716 in *GG* 35648 of 7 September 2012)
National Veld and Forest Fire Act (Act 101 of 1998)	» Regulates the prevention and combating of veld ,forest and mountain fires throughout South Africa.
National noise-control regulations (of 10 January 1992)	» In terms of section 25 of the ECA, the national noise-control regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) were promulgated. The NCRs were revised under Government Notice Number R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. » Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996, legislative responsibility for administering the noise control regulations was devolved to provincial and local authorities. Provincial Noise Control Regulations exist

Legislation	Applicable Sections
	in the Free State, Western Cape and Gauteng provinces.
The Hazardous Substances Act No. 15 of 1973	» This Act was promulgated to provide for the control of » substances which may cause injury or ill-health to, or death of, humans by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature. » The Hazardous Substances Act also provides for matters concerning the division of such substances or products into groups in relation to the degree of danger, the prohibition and control of the importation, manufacture, sale, use, operation, application and disposal of such substances and products.
Occupational Health And Safety Act No. 85 of 1993	» This Act and its regulations provide for the control of hazardous chemical substances (HCS), such as asbestos, lead and major hazardous installations that may have adverse health and safety effects.
Provincial Legislation	
Mpumalanga Nature Conservation Act	» Regulates nature conservation in the Province
Mpumalanga Road Traffic Act	» Regulates roads in the province
Mpumalanga Land Administration Act	» Regulates land and land usage
Guideline Documents / Standards / Plans	
South African National Standard (SANS) 10328, Methods for environmental noise impact assessments in terms of NEMA No. 107 of 1998	» Prediction of impact that noise emanating from a proposed development would have on occupants of surrounding land by determining the rating level. » Noise limits are based on the acceptable rating levels of ambient noise contained in SANS 10103
South African Bureau of Standards (SABS)	» Four South African Bureau of Standards (SABS) scientific standards are considered relevant to noise from a Power Station. They are: * SANS 10103:2008. 'The measurement and rating of environmental noise with respect to annoyance and to speech communication'. * SANS 10210:2004. 'Calculating and predicting road traffic noise'. * SANS 10328:2008. 'Methods for environmental noise impact assessments'. * SANS 10357:2004. 'The calculation of sound propagation by the Concave method'. » The relevant standards use the equivalent continuous rating level as a basis for determining what is acceptable. The levels may take single event noise into account, but single event noise by itself does not determine whether noise levels are acceptable for land use purposes. The recommendations that the standards make are likely to inform decisions by authorities, but non-compliance with the standards will not necessarily render an activity unlawful per se.
Guidelines for Community Noise (WHO, 1999)	» The scope of WHO's effort to derive guidelines for community noise is to consolidate actual scientific knowledge on the health impacts of community noise and to provide guidance to environmental health authorities and professionals trying to protect people

Legislation	Applicable Sections
	from the harmful effects of noise in non-industrial environments.
SANS 69 - South African National Standard - Framework for setting & implementing national ambient air quality standards, SANS 1929 - South African National Standard - Ambient Air Quality - Limits for common pollutants.	» The South African Bureau of Standards (SABS), through a technical committee, developed ambient air quality limits, based on international best practice for particulate matter less than 10 µm in aerodynamic diameter (PM10), dust fallout, sulphur dioxide, nitrogen dioxide, ozone, carbon monoxide, lead and benzene. » These ambient limits were derived from international best practice and what was regarded to be achievable in the South African context, taking both the natural environment and socio-economic status into account. The SANS limits informed the newly promulgated SA Standards
World Bank Group Environmental, Health, and Safety Guidelines (known as the 'EHS Guidelines') (IFC, 2007).	» The EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). » When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.
IFC Air Emissions and Ambient Air Quality. Environmental, Health and Safety Guidelines. Washington DC, International Finance Corporation	» The World Bank group through the IFC has emission guidelines for thermal power plants. These guidelines are applicable to new facilities.
European Union Emission Guidelines	» The European Union has specific guidelines for the air pollutant emissions from large power plants. These limits are similar to those of the IFC.
The Equator Principles (June 2003)	» The Equator Principles (EPs) are a voluntary set of standards for determining, assessing and managing social and environmental risk in project financing. Equator Principles Financial Institutions (EPFIs) commit to not providing loans to projects where the borrower will not or is unable to comply with their respective social and environmental policies and procedures that implement the EPs. » The Equator Principles were developed by private sector banks. The banks chose to model the Equator Principles on the environmental standards of the World Bank and the social policies of the International Finance Corporation (IFC).
Planning Documents	
Mpumalanga Province Provincial Growth	The Mpumalanga Provincial Growth and Development

Legislation	Applicable Sections
and Development Strategy	Strategy (MPGDS) is a nine-year strategy (2004-2014) which aims to achieve the objectives of Vision 2014. As a provincial policy framework, it sets the tone and pace for shared growth and development in the Province. It addresses the key social, economic, environmental and spatial imperatives in the Province.
Emalahleni Municipality Integrated Development Plan	The IDP identifies a set of long term goals for the municipality aimed at increasing service delivery capacity, rehabilitating the current base at scale and growing the economic base. These are: » The development of long term strategies for the municipality: » Develop long-term financial strategy aligned with the operational and capital requirements over the next 3 to 5 years. » Develop a capital investment programme and mobilising funding to revitalise the infrastructure base and ensure sufficient capacity to deliver services » Development of a partnership programme with the private sector and community to promote the development of the economic base, and » Execution of long term strategies
Mpumalanga Biodiversity Conservation Plan.	» The Mpumalanga Biodiversity Conservation Plan contains various classes of environmental features of conservation value, such as protected areas; irreplaceable areas etc. » Mapping of critical biodiversity areas is also provided in this document.

3.5 Assumptions and Limitations of the EIA

In conducting this scoping process, the following general assumptions have been made:

- It is assumed that the identified alternative sites identified by ISS Global Mining represent technically suitable sites for the establishment of a coal-fired power station and associated infrastructure;
- The EIA will comparatively assess site alternatives for the power plant and suitable technology options; and
- This Scoping Report has been prepared based on information available at the time of undertaking the study, while further technical studies are being conducted by ISS Global Mining as part of the feasibility study. This information will be available for consideration in the EIA phase of the process.

Details of specific assumptions, limitations and/ gaps in knowledge for each of the specialist studies undertaken are discussed in each individual report and not repeated here (refer to specialist studies contained in Appendix F – N for more details).

DESCRIPTION OF THE AFFECTED ENVIRONMENT CHAPTER 4

This section of the Scoping Report provides a description of the environment that may be affected by the proposed Umbani Power Plant. Aspects of the physical, biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from both existing information available for the area as well as field data, and aims to provide the context within which this EIA is being conducted. A more detailed description of each aspect of the affected environment is included within the desktop specialist scoping reports contained within Appendices E - L.

4.1 Location description

The site of the proposed Umbani Power Plant is situated approximately 5km east of the town of Kriel within the Emalahleni Local Municipality within the greater Nkangala District Municipality of the Mpumalanga Province. The site is comprised of Portions 1 and 9 of the Farm Dorstfontein 71 IS, both of which are situated either side of the R544. The site is situated adjacent to the southern boundary of the operational Dorstfontein East Coal Mine.

4.2 Climate

The climate for the study area has been derived from climatic data summarised for Bethal weather station, the nearest station with a full record. The mean annual precipitation for the area is approximately 711mm, which occurs mainly from September to April as showers and thunderstorms. Dry winter months of June, July and August only comprise approximately 3.9% of the total annual precipitation. The average A-pan evaporation at Bethal is about 1730 mm, almost 2.5 times the annual rainfall. The climate of the area can be described as temperate, experiencing warm summers and cold winters with sharp frost. On average the area experiences 8.2 hours of sunshine per day, and on average only nine days a year without sunshine. The warmest month is January with a daily average temperature of 25.8°C. In July, the average temperature is 17.1 °C and may drop to an average minimum of 0.2°C (Lancaster, 2012). Frosts are common during winter, generally occurring from mid-April to late September, as shown in Table 1.

Table 1: Summary of climatic conditions recorded at Bethal weather station - 1920 – 2000 (Copied from Lancaster, 2012)

Month	Mean Monthly Temperatures (°C)	Average Daily Temperature (°C)		Average Monthly Rainfall (mm)	A-Pan Evaporation (mm)
		Max	Min		
January	19.5	25.8	12.2	146	180
February	19.2	25.4	13.0	75	153
March	18.0	24.5	11.4	61	150
April	15.2	22.1	8.1	48	111
May	11.7	19.6	3.8	14	94
June	8.4	16.9	0.0	7	81
July	8.5	17.1	0.2	6	90
August	11.5	20.1	2.9	13	135
September	14.8	23.1	6.5	28	176
October	17.2	24.5	9.9	78	191
November	18.8	24.5	11.4	129	170
December	19.0	25.4	12.7	106	198
Annual	15.1	22.5	7.7	711	1729

4.3 Air quality

The proposed Umbani project site is situated within the Highveld Priority Area (HPA) which is an area that has been identified as being characterised with poor air quality (refer to Figure 4.1). Power Generation activity in the HPA is the major source of SO_2 emissions (82%) and NOx emissions (73%) while it is only responsible for a relatively small contribution to the total PM_{10} load (12%). As a result of the concerns over the poor ambient air quality over the Highveld area, the Minister of Environmental Affairs declared a portion of Mpumalanga and Gauteng provinces an air quality priority area in November 2007 and a management plan for the HPA was published in September 2011.

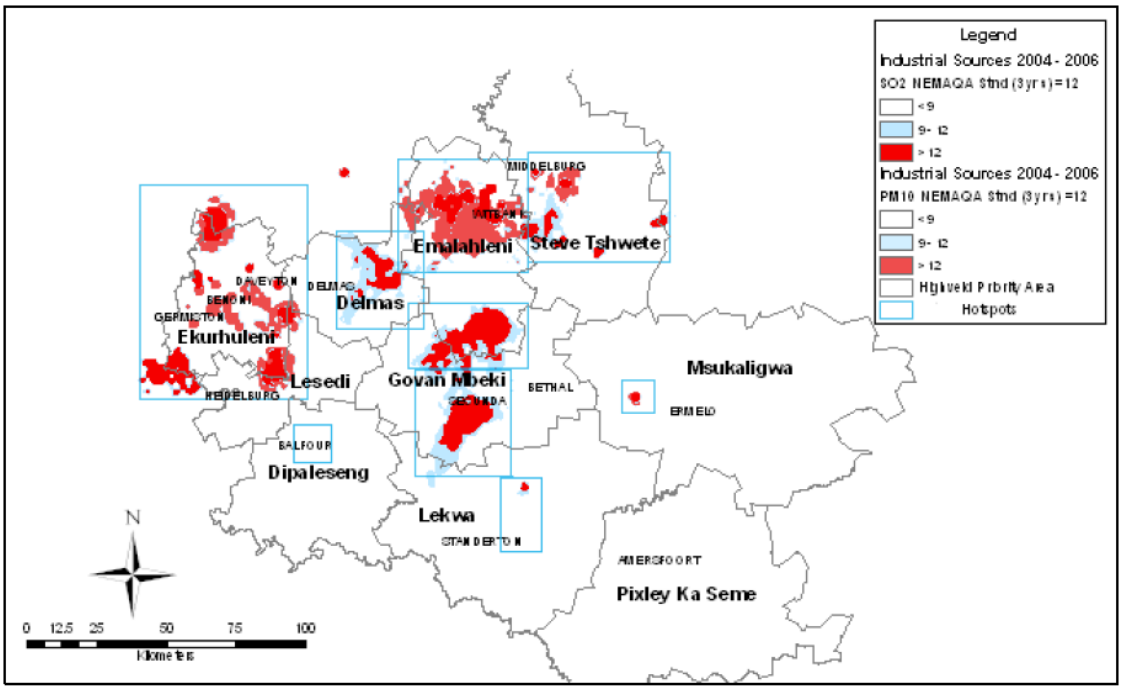

Figure 4.1: Extent of Highveld priority area indicating hotspot areas of PM_{10} and SO_2 exceedance (Zunckel, Naiker et al. 2010)

4.4 Topography

The topography or terrain morphology of the region is broadly described as *Moderately Undulating Plains and Pans* of the *Central Interior Plain*. The slope of the entire study area is generally even with very gradual drops towards the water courses and wetlands traversing the study area (hence the term *undulating*). The highest point above sea level within the region is located some 7km east of the site (1740m a.s.l.) and the lowest point is in the far north, near Van Dyks Drift (refer to Figure 4.2).

Prominent rivers systems include the *Steenkoolspruit* in the west, and the *Olifants River* in the east. Both systems flow to the north, and converge jiust north west of Van Dyks Drift. The site is located on the high-lying watershed separating these systems. These water courses and their tributaries (wetland) and the intact grassland account for much of the remaining scenic natural resources in an area, otherwise largely dominated by industrial and surface mining activities.

This area is considered sensitive from a visual resource perspective, especially in the south west, where mining and industry is not yet prominent. No formally protected or conservation areas or major tourist attractions/resorts are present within the study area.

Portion 1 and 9 of the Farm Dorstfontein are situated between 1 660m above sea level (highest point where the power plant is proposed to be constructed) and

1 600 metres above sea level (lowest points including the southern section of the Dorstfontein East Mine and the R544). The site can be described as moderately undulating plains, including some low to steep hills. Slope and aspect therefore vary across the site, with a maximum slope of approximately 10%.

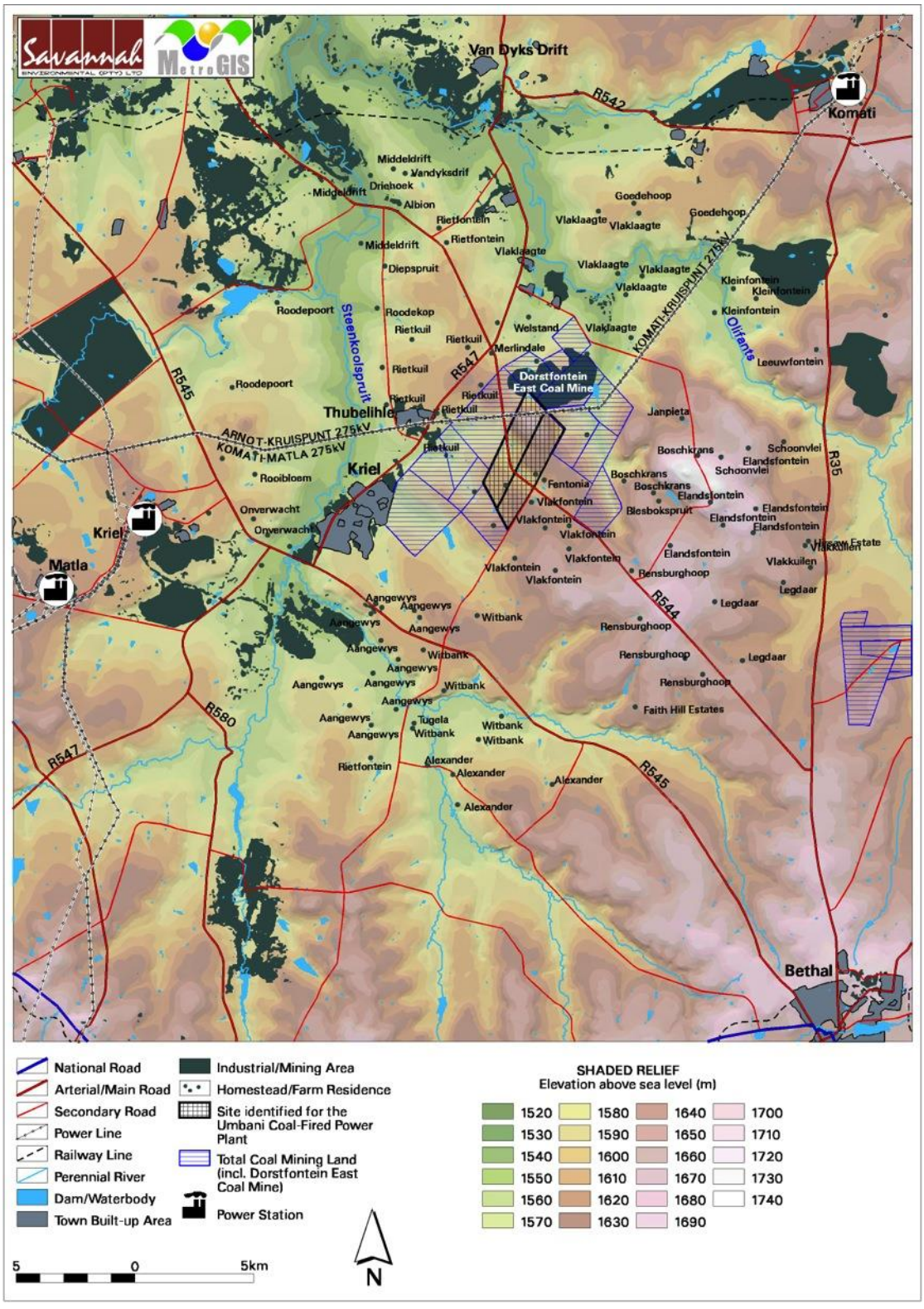

Figure 4.2: Shaded relief map of the broader study area

4.5 Land-use

The region has a strong mining and industrial character, interspersed with agricultural activities (maize crop production) and human settlements. The western parts of the study area near Kriel are characterised by a number of coal-fired power stations (Kriel and Matla) and several coal mines characterise the study area. These activities, especially the expansive mining and quarrying are rapidly changing the once rural and agricultural character to that of a predominantly industrial nature.

The population density of the region is indicated at approximately 100 people per km^2, predominantly concentrated within the built up areas and towns. These include the town of Komati in the north east, Thubelihle and Kriel centrally, Van Dyks Drift in the north and Bethal in the south east. Remaining settlements, which are not related to mining and infrastructure, are predominantly rural homesteads and farmsteads.

The project site is located within a grain farming agricultural region. Approximately half of the site comprises cultivated agricultural crops, which have included soya, maize and sorghum. The other half is uncultivated and used for grazing purposes. None of the cultivated areas of the farm are currently under irrigation. The neighbouring property, to the north-east of the study area, has been transformed by coal mining activities. Little of the original Eastern Highveld Grassland remains and the remaining natural vegetation exist as fractured "islands" surrounded by these transformed lands. Remaining natural veld is predominantly used as pastures for cattle. As a result certain areas of the project site are severely degraded due to overgrazing.

A host of power lines cross the study area, many of them originating at the power stations west of Kriel. These include the following:

- Arnot - Kruispunt 275kV power line;
- Komati – Kruispunt 1 275kV power line, and
- Komati – Matla 1 275kV power line.

Two farm settlements or residences are situated on Portion 1 of the Farm Dorstfontein, on either side of the R544 which traverses the site and separating it into two distinct sections. Other land use and infrastructure on the project site include a network of broader farm roads and narrow twin tracks, old quarries, a few kraals, housing infrastructure and office infrastructure, barns and other storage areas.

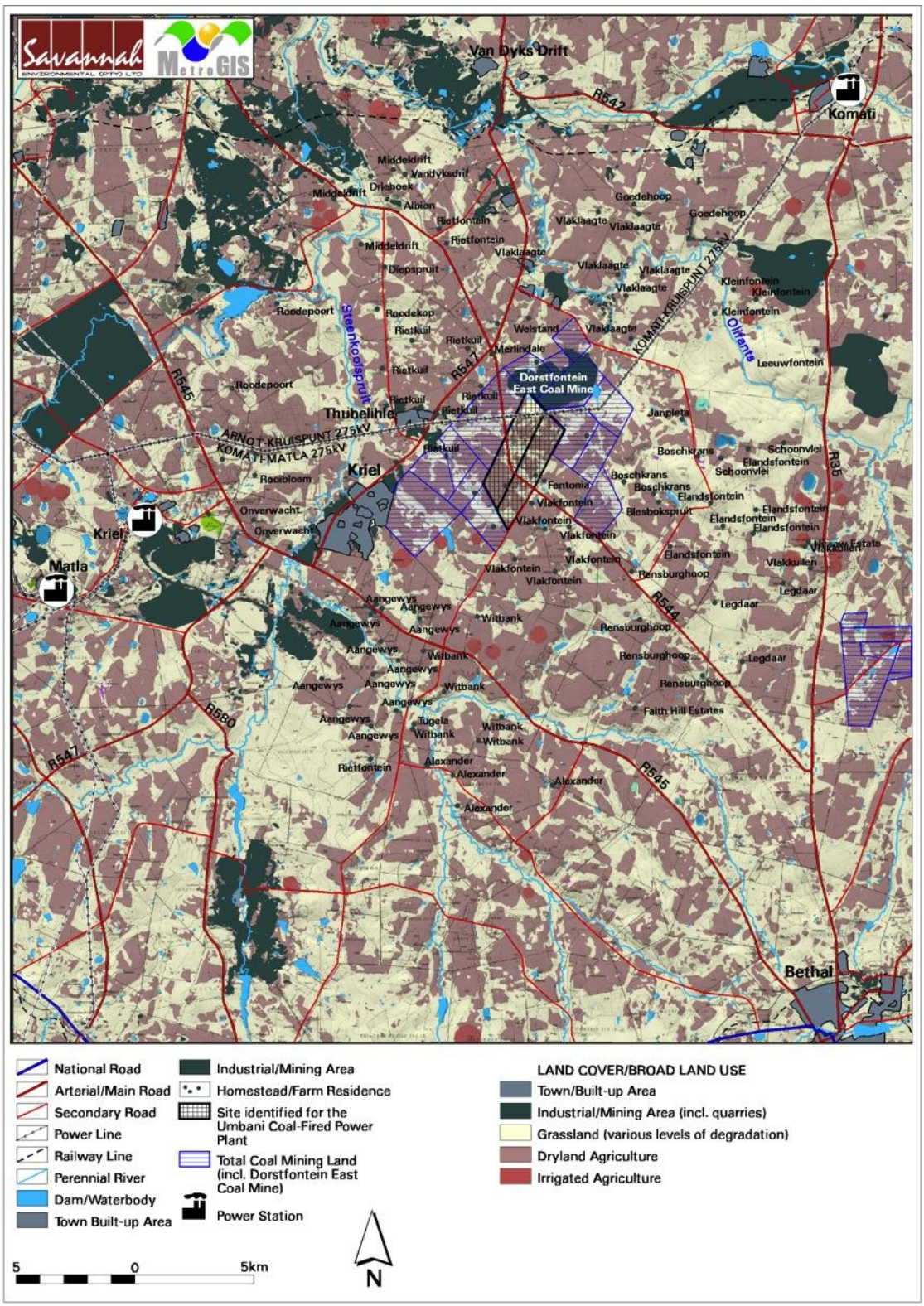

Figure 4.3: Map showing the land cover of the region

4.6 Geological and soil profile

4.6.1 Geological profile

The underlying geology of the region is defined as shale, sandstone, and conglomerate of the Ecca Group, Karoo Supergroup as well as dolerite. The project site is extensively underlain by Permian sedimentary rocks of the Vryheid Formation. Precambrian bedrocks of the Selons River Formation and the Lebowa Granite Suite crop out over much of the northern half of the project area.

4.6.2 Land Types (Soils) and Agricultural Potential

Land capability is the combination of soil suitability and climate factors. The site and immediate surroundings have a land capability classification, on the 8 category scale of Class 2 (high potential arable land). The potential maize yield (50%) is given on AGIS as varying from 0.6 to 3.4 tons per hectare across the site. The natural grazing capacity is high, varying from 4 to 7 hectares per large stock unit across the site.

The entire site and surrounding area falls into a single land type, namely Bb4. The soils are predominantly deep, reasonably drained, red and yellow, sandy loams to sandy clay loams. The soils would predominantly fall into the Plinthic soil group, followed by the Oxidic, according to the classification of Fey (2010). The Avalon soil form is the most predominant soil type.

The land has a low to moderate water and wind erosion hazard (class 2 and class 3 respectively).

4.7 Drainage and surface water

The study area falls within the Olifants River Catchment area (Primary Catchment B), Witbank Dam sub-catchment, which is part of the Loskop Dam catchment and within quaternary sub-catchments B11C and B11D of the Limpopo-Olifants primary drainage region. Across the study area, as well as within the greater surroundings, various wetland types including channelled valley bottom wetlands, unchannelled valley bottom wetlands, depressions and seeps have been observed and mapped as NFEPA wetlands (refer to Figure 4.4).

Figure 4.4: Relationship of NFEPA wetlands to the project site and surrounding areas indicating relationship of channelled valley bottom wetlands (blue) and depressions and seeps (brown) on the site (red boundary) - map adjusted from SANBI's BGIS database

The full extent of surface water resources and wetlands will be provided following the results of a wetland delineation study to be undertaken.

4.8 Biophysical Characteristics of the Study Area and Surrounds

4.8.1 Provincial conservation planning

The Mpumalanga Biodiversity Conservation Plan (C-Plan) contains various classes of environmental features of conservation value, such as protected areas, irreplaceable areas, etc. Areas of conservation value mapped in C-Plan are less significant in the Kriel area and around the project site and are more pronounced to the east of the site. A very small area in the western section of the site (east of the R544) has been mapped to be of importance in terms of C-Plan. It is very unlikely that this area of the site will be developed as the proposed power plant will be situated as close to the existing Dorstfontein East Mine to the east as possible.

4.8.2 Vegetation overview

The study area is situated within the original extent of the Eastern Highveld Grassland (refer to Figure 4.5). Within this vegetation type a number of wetland bodies occur, which resemble Eastern Temperate Freshwater Wetlands as classified by Mucina and Rutherford (2006).

Eastern Highveld Grassland is situated on slightly to moderately undulating plains, dominated by short dense grasses of the genera *Aristida, Brachiaria, Cynodon, Digitaria, Eragrostis, Setaria, Sporobolus, Themeda* and *Tristachya*. Smaller rocky outcrops provide a niche habitat for more wiry grasses and few woody species, including *Acacia caffra, Celtis africana, Diospyros lycioides* subsp. *lycioides, Protea caffra, Searsia magalismontanum* etc. Similar specialised habitats are provided by pan depressions and seepage areas (Mucina and Rutherford 2006). The diversity of the herbaceous layer may vary significantly from year to year depending on rainfall amount and timing, which influence the germination of annuals and resprouting of species with woody below-ground rootstocks. Common herbs include *Berkheya setifera, Haplocarpha scaposa, Acalypha angustata, Dicoma anomala* and several *Helichrysum* and *Ipomoea* species.

The wetlands on and around the study area can be generally described as Eastern Temperate Freshwater Wetlands, with most of the larger wetlands found within the study area identified and mapped as NFEPA (National Freshwater Ecosystem Priority Areas) wetlands (as indicated in Figure 4.4), although a few smaller wetlands (mainly hillslope seeps) may be present which have not been mapped at a national scale. Eastern Temperate Freshwater Wetlands generally include small pans, periodically flooded vleis and edges of calmly flowing streams and rivers. The topography and vegetation can be described as shallow depressions filled with seasonal or permanent water supporting hydrophyllous (water-loving) vegetation. Vegetation is usually dominated by *Cyperus* species, *Eragrostis plana, Eragrostis planiculmis, Imperata cylindrica*, *Paspalum* species and *Schoenoplectus* species. Specific species composition will depend on the level of inundation within the different zones of the wetland (Mucina & Rutherford, 2006).

Both the Eastern Highveld Grassland and Eastern Temperate Freshwater Wetlands vegetation types are listed as **Vulnerable** on the Gazetted National Threatened Ecosystems List.

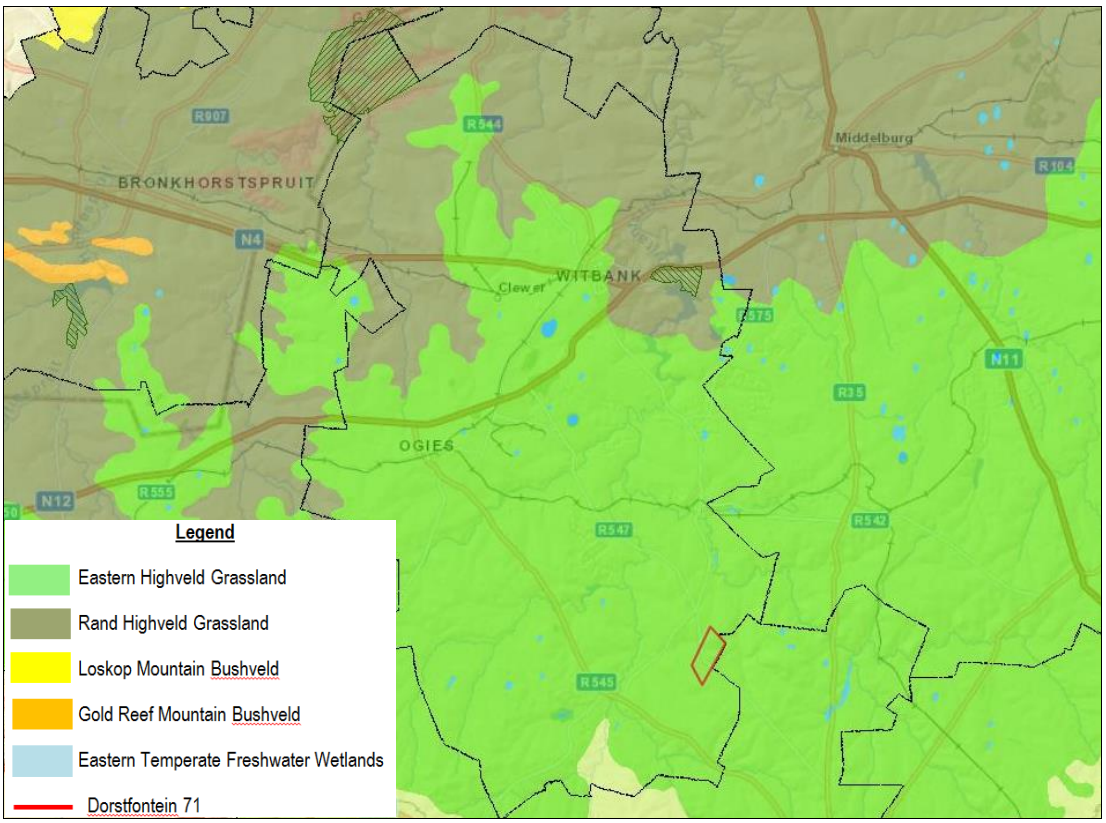

Figure 4.5: Vegetation types occurring within the study area (red boundary) and region

4.8.3 Plant species potentially occurring in the study area

To date, 95 plant species have been recorded in the Kriel area (Quarter Grid 2629AB), whilst up to 138 species are currently known to occur in the wider grid (Grid 2629) according to the South African National Biodiversity Institute (SANBI) database. It is unlikely that all of these species will occur within the project area, whilst species not previously recorded may be present.

Of the recorded species, none have a red-data status, while only two are protected species according to the Mpumalanga Nature Conservation Act (No. 10 of 1998), being *Disa woodii* and *Gladiolus elliotti*. The presence of these species on site will have to be verified during a detailed field study.

A full description of plant communities on the site and associated habitats will be provided after a field study conducted during the growing season.

4.8.4 Fauna and avifauna

Several faunal species have been recorded for the area, but these are not listed here as none of the species recorded are of any conservation concern. Whilst fauna species are mobile and the impact of new structures does not destroy

animals as it does plants, they do depend on specific habitats. For all species that are protected, the presence and suitable habitat of such species must be verified by a suitably qualified specialist to ensure that the habitat of such species will not be impacted on by the proposed development.

Within the South African Bird Atlas Project (2), 125 bird species have been noted to occur within the Kriel area. The Lesser flamingo (*Phoenicopterus minor*) and Blue korhaan (*Eupodotis caerulescens*) area are listed as near threatened, while the Grass owl (*Tyto capensis*) is listed as Vulnerable.

4.9 Paleontological and Archaeological Profile

4.9.1 Paleontological profile

The project area is extensively underlain by Permian sedimentary rocks of the Vryheid Formation, but a large portion of the northern half of the project area is dominated by outcrops of Palaeoproterozoic igneous rocks of the Rooiberg Group and the Lebowa Granite Suite which are considered to be unfossiliferous. Thus, the proposed project poses no probability of any negative impact upon the palaeontological heritage of these two units.

4.9.2 Archaeological profile

History of the study area: During the Anglo-Boer War the highveld areas saw much action consisting of various skirmishes between the Boers and British. It however is not possible to indicate how close these came to the farm Dorstfontein. An Anglo Boer war battle took place on the farm Donkerhoek. The battle lasted between 11 and 12 June 1900. One may therefore expect to find farm buildings and objects as well as artefacts related to the Anglo-Boer War during construction activities (Van Vollenhoven 2013). Van Vollenhoven recorded 2 sites on the farm Dorstfontein, an old homestead with little historical value and a cemetery with high social value (Van Vollenhoven 2009).

Heritage potential: There is a low to medium likelihood of finding Middle Stone Age sites scattered over the study area. Around Klein-Vaalkop in the north of the study area some ephemeral stone wall foundations might be found dating to the Later Iron Age. Some stone wall foundations were recorded by Pelser (2007) at the Kriel Colliery with numerous shallow burials. The existing farm structures on the site also have the potential to be heritage sites and further investigation is required to verify this.

4.10 Socio-Economic Characteristics of the Study Area and Surrounds

The proposed project is located in the Emalahleni Local Municipality (ELM) which forms part of the Nkangala District Municipality (NDM). The town of Witbank is the administrative seat of the ELM, with a satellite office in Kriel. The NDM is located to the North-West of the Mpumalanga Province and is the smallest district in land mass (21%) and has the second largest population concentration (35%) in the province.

4.10.1 Population and households

At 2 678km², the eMalahleni Local Municipality (LM) is the second largest Local Municipality in the Nkangala DM. The municipality has the highest population among the six local municipalities that form part of Nkangala with 395 464 people or 27% of the district's population (Quantec, 2013). There are 119 872 households in the eMalahleni LM, which equates to 33.6% or one third of the district's number of households. The population of the eMalahleni LM is predominantly concentrated in urban areas with Witbank (eMalahleni) and Middleburg being the largest towns in the municipality. The urbanised structure of the population is indicative of the labour concentrated around intense mining and manufacturing industries or other sources of employment.

Since 2007, the population growth rate in the municipality has been consistently slowing down but it was still higher than the average population growth rate observed in the country. The Council of Scientific and Industrial Research (CSIR) (2008) contends that there is a clear trend of in-migration to nodes such as eMalahleni and Middleburg that offer services and employment opportunities that rural areas do not possess. Furthermore, inconsistencies with regard to population growth may occur due to a dramatic trend of out-migration of people from rural areas to urban areas, Gauteng, and coastal regions being the dominant migratory areas (CSIR, 2008). The type of long-term, permanent employment offered by industries in the local municipality may be the cause of migration towards its urban nodes. This may be indicated by the fact that less than 5% of the population of the eMalahleni LM live in rural areas (Stats SA, 2011).

Considering the concentration of manufacturing and mining activities in the eMalahleni LM, one would expect the population growth rate of the local municipality to be rapidly increasing as people move into the area seeking employment opportunities. However, the population of the area is increasing at a slower rate than historically observed, which may be attributed to the declining number of employment opportunities available in the area supported by the increasing unemployment rate.

Given the above mentioned migratory trends identified by the CSIR (2008), the disparity of negative employment growth rate and positive population growth rate within the study area is guaranteed due to the out-migration of the population in rural areas outweighing the in-migration to urban centres of the eMalahleni Local Municipality. An improvement from a decelerating rate pre 2002 to an accelerated growth post 2002 can be identified.

4.10.2 Income, wealth and welfare

The greatest percentage (34.3%) of the eMalahleni LM population has an average household income between R19 201 – R76 800 (in 2011 current prices). On national level, this is 2.2% higher than the same income bracket. The weighted average household (HH) income is R132 823 per annum or approximately 11 069 per month (Quantec, 2013). This figure is higher than both the district (R97 279) and provincial averages (R84 164). This shows that on average, residents of the eMalahleni LM are better off than those residing in the rest of the district and the province. However, the municipality still faces large disparities in income levels and there is a great number of people who are reliant on social grants.

A total of 383 033 people or 29.2% of the district population are reliant on social grants (Nkangala IDP, 2013). Of the 383 033 people, 89 908 are from the eMalahleni LM representing 6.6% of the district population and 22.7% of the eMalahleni LM population. The Nkangala IDP (2013) has indicated that the number of social grant recipients is increasing in the district. The number of people receiving social grants can be used as an indicator of poverty levels as well as the need for employment. Therefore, it is clear that with almost one quarter of the population reliant on social grants, there is a need to accelerate job creation in the eMalahleni LM to improve the standard of living of the local people.

4.10.3 The economy and its structure

Analysis of the structure of the economy and the structure of its employment provide insight into the scale of reliance of an area on a specific sector(s) and thus the sensitivity of the area to changes in different sectors of global and regional markets. Understanding the size and composition of each sector in the economy in the area under analysis is important for studying the economic impacts that the proposed project may have. This helps to predict the changes that may occur because of the implementation of the project.

In nominal terms prices, the size of the eMalahleni LM in terms of Gross Domestic Product per Region (GDP-R) was estimated to be around R42 580 million in 2011. In 2011, the per capita GDP-R in the area was equal to R107 670 in current prices, which was almost three times higher than in Mpumalanga with a per capita GDP-R of R46 155 in current prices. The national per capita GDP-R was

R51 582 in current prices (Quantec, 2013). Comparably, the eMalahleni LM economy has a higher per capita GDP-R than both the national and the Mpumalanga economies. A higher GDP-R per capita signals a stronger economy in comparison to the other study areas. Additionally, a higher GDP-Rper capita is usually associated with a higher standard of living

Over the past eleven years, the Compounded Average Growth Rate (CAGR) of the eMalahleni LM economy was 3%, which means that it grew at a faster rate than the district (2.9%), and the province (2.7%) but lower than the country in general (3.5%) (Quantec Standardised Regional, 2013). Making up the majority of the municipality's economy are the mining and quarrying sectors (49.6%), followed by the manufacturing sector (11.1%) and the electricity sector (9.9%). This indicates that the proposed project will form part of and contribute to an industrial and mining cluster that comprises more than two thirds of the local economy. It has a reasonably developed tertiary sector, which make up more than a quarter of the local economy, where wholesale and trade are the biggest contributors (6.7% of local GDP-R).

Table 2.2: Structure of the economy in 2000 and 2011 in current prices (R'ml)

Sectors	Emalahleni LM		
	2000	**2011**	**CAGR 2000 - 2011**
Primary sector	4 887.9	21 419.2	1,2%
Agriculture, forestry & fishing	68.9	311.2	7,9%
Mining and quarrying	4819	21 107.9	1,1%
Secondary sector	3 222.9	9 785.9	3,9%
Manufacturing	1 360.4	4 720.2	6,9%
Electricity, gas & water	1 740.6	4 217.4	-1,0%
Construction	121.9	848.3	9,4%
Tertiary sector	3 278.1	11 374.7	4,5%
Wholesale and retail trade	856.4	2 855.4	4,0%
Transport & communication	674.8	2 549.9	6,8%
Finance & business	819.9	2 180.3	2,7%
Social & personal services	343.1	1 438.9	4,4%
General government	583.8	2 350.3	4,8%
TOTAL GDP-R	11 388.9	42 579.8	3%

Source: Quantec, Standardised Regional (2013)

4.10.4 Labour force and employment structure

Employment opportunities allow people to earn an income, which enables them to provide for their basic needs and contribute to improving their standards of living.

Thus, employment and unemployment rates are important means to determine socio-economic well-being of an area. The following paragraphs examine the study area's labour market from a number of angles, including the employment rate and sectoral employment patterns.

The composition of the labour force in the primary study areas, Mpumalanga, and the country are detailed in Table 2.3.

Table 2.3: Labour force statistics

Indicators	South Africa	Mpumalanga	Nkangala DM	EMalahleni LM
Working-age population	33 928 806	2 591 273	870 412	281 942
Non-economically active	15 087 353	1 164 724	360 555	90 869
Labour force	18 841 453	1426549	509 857	191 073
Employed	13 254 829	979391	358 440	139 030
Unemployed	5 586 624	447158	151 417	52 043
Unemployment rate	29.6%	31.3%	29.7%	27.2%
Labour participation rate	55.5%	55%	58.5%	67.8%

Source: Quantec (2011)

In 2011, almost 34 million people were within the working age in South Africa. Of these, 15.1 million was non-economically active and 18.8 million formed the labour force. Concurrently, the labour force participation rate was 55.5% meaning that in 2011 just over half of the working population in South Africa was either employed or unemployed. The number of employed people in South Africa amounted to just above 12 million people, leaving approximately 5.6 million people or 29.6% of the labour force unemployed.

In comparison, the local municipality of eMalahleni consisted of 281 942 people within a working age in 2011. This accounts for 77.1% of the total population, from which 139 030 was employed.

Compared to South Africa's labour participation rate of over 55%, the eMalahleni LM labour participation rate was higher and equal to 67.8%. Essentially, just under one third of the working age population in the eMalahleni LM was non-economically active, a significant portion of whom were discouraged job seekers (19.1%). Of the economically active population (19 1073), 27.2% was unemployed, which means that the unemployment rate in the municipality was lower than in the rest of the country. The number of unemployed people in the eMalahleni LM, though, has been increasing since 1995 with a sharp rise in 2005, 2007, and 2011. The labour force participation rate has remained steady between roughly 60% and 64% (Quantec, 2013). Considering that the labour force participation rate in the eMalahleni LM was greater than in South Africa, the lower

unemployment rate indicates that the population of the eMalahleni LM experiences better socio-economic conditions compared to the rest of the country.

The employment structure of the economy provides valuable insight into the dependency of an area's income and employment on specific sectors. Knowledge of the structure and the size of each sector relative to employment participation of the labour force in the study area are important when assessing potential economic impacts. This allows the assessment of the extent to which the proposed activity would change the structure of the economy and trends of specific sectors relative to employment.

The economy is made up of three sectors, each varying in degrees of impact on the local economy and employment structure. It is evident from Table 2.2 that the primary sector, more specifically the mining industry, creates half of the employment opportunities in the eMalahleni LM compared to the tertiary sector. The latter is the main employment sector nationally creating about two out of three employment opportunities in the country. One out of four jobs in the local area is created by the tertiary and secondary sectors, respectively.

Table 2.2: Structure of the study area's economies from an employment perspective

Sectors	South Africa	Mpumalanga	Nkangala DM	EMalahleni LM
Primary	**12.1%**	**31.2%**	**38.7%**	**50.3%**
Agriculture, forestry & fishing	2.4%	3.0%	1.4%	0.7%
Mining & quarrying	9.8%	28.2%	37.3%	49.6%
Secondary	**20.8%**	**24.0%**	**24.7%**	**23.0%**
Manufacturing	13.4%	15.0%	12.8%	11.1%
Electricity, gas & water	2.9%	6.1%	8.9%	9.9%
Construction	4.5%	2.9%	3.0%	2.0%
Tertiary	**67.0%**	**44.9%**	**36.7%**	**26.7%**
Wholesale and retail trade	14.5%	10.6%	7.2%	6.7%
Transport & communication	8.2%	7.6%	8.1%	6.0%
Finance & business services	21.2%	10.8%	9.0%	5.1%
Social and personal services	6.9%	5.9%	4.8%	3.4%
General government	16.3%	10.0%	7.6%	5.5%
TOTAL	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: Quantec (2013)

Because of the unpredictability of prices of commodity associated with the primary and secondary sectors and the dependency of the South Africa's

economy on these sectors, one of the goals outlined in the NDP (2011-2030) is to ensure development of a stable economy. The aim of the NDP is to create a more resilient economy by expanding the tertiary sector to limit the effects of global market fluctuations on the national economy. Therefore, an economy dominated by the tertiary or services sector is more desirable as it reduces the risks associated with fluctuations in demand for commodities from the primary and secondary sectors, as well as import centres.

The mining sector creates the largest number of employment opportunities in the area by providing jobs for almost half of all workers. It is followed by the manufacturing sector that contributes 11.1% to local employment. Agriculture, forestry and fishing contribute the smallest percentage to the local economy. Electricity generation creates 9.9% of employment positions in the eMalahleni LM; however, considering the development of new coal-powered power stations such as Kusile, the contribution of the electricity generation sector to the local economy's employment is expected to increase in the near future.

4.10.5 Status of infrastructure and basic service delivery

Access to shelter, water, electricity, sanitation, and other services are indicators that assist to determine the standard of living of the people in the area under investigation. Infrastructure and the state of local infrastructure is another indicator to contemplate when considering living standards. The availability of social and economic infrastructure including roads, educational facilities, and health facilities further indicates the nature of the study area, which is valuable in developing a complete profile of the circumstances in which communities are living. These measurements create a baseline against, which the potential impacts of the proposed project can be assessed.

Housing: Within the eMalahleni LM, 19.4% of the households live in informal settlements. Informal dwellers are those who live in tents or caravans, backyard shacks or a shack not in a back yard i.e. an informal settlement. Considering that 2.3% of the population live in traditional houses or huts and 1% of the population live in dwellings classified as "other," the eMalahleni LM has a high portion of the local population living in formal housing such as flats, complexes and other types of brick/concrete dwellings. This figure is higher than the district's average, which is 13.9%.

As the population grows, there will be an increase in demand for housing. The two main reasons for this trend, firstly, is the probability of residents within the municipality starting new households and secondly, is the rate of rural to urban migration. The trends observed in household growth/decline may be further altered should the development of the proposed power station and other

industrial developments proceed. Workers will require accommodation, thus increasing the demand for housing in the municipality.

Challenges that may be experienced with growing housing demands include increased pressure that may be experienced by infrastructure and bulk services. Additionally, informal settlements that are not formally recognised or approved may be located in high-risk areas, which could pose a threat to residents' lives. According to Stats SA (2011), there are 4 302 dwellings in Kriel and 4 423 dwellings in Thubelihle; the two closest settlements to the proposed site. Of the two, Thubelihle has the highest number of dwellings, which are considered informal (12.5%), while Kriel (Ga-Nala) has a lower proportion of informal dwellings (2.6%). Both settlements have a high percentage of the population living in brick/concrete houses, i.e. Kriel at 85.1% and Thubelihle at 82.3%.

Education: There are 573 schools in the Nkangala District municipality with 27 located in the eMalahleni LM. In 2013, 289 103 learners enrolled at schools across the district. The 2012 district municipality's matric pass rate was 70% while the Local Municipality had a pass rate of about 72%. According to the Department of Education, there are no mud schools in the DM and no education taking place under trees. The major challenges facing education in the district are, amongst others, poor physical infrastructure, the lack of higher education facilities and concerns regarding the quality of teaching. Out of the 573 schools, 59 schools are in need of upgrading and refurbishment while a further 33 schools are without water or sanitation (Nkangala IDP, 2013).

Health: There are 27 hospitals, clinics and community health centres in the eMalahleni LM. The leading cause of death in the area is AIDS related diseases such as pneumonia, tuberculosis and influenza (EMalahleni IDP, 2013). HIV prevalence amongst woman and pregnant woman remains high and despite treatment and awareness campaigns, the number of people with HIV is increasing. An additional important cause of death in the area is death by external causes of accidental injury (EMalahleni IDP, 2013).

Water and Sanitation: The eMalahleni LM IDP (2013) states that the Municipality faces a significant water loss from damaged and old infrastructure. Losses reach up to 42% per month resulting in approximately R43 million being lost every month. Considering that that 30.9% (Quantec, 2013) of households has access to piped water in their dwellings or in their yards, these losses affect a significant number of households. A further 8.5% of the eMalahleni LM residents have access to piped water within 200m of their dwelling and 5.2% has no access to piped water. Additionally, the eMalahleni dam, which is the main source of municipal water, is heavily polluted and the Municipality does not have a Water Management Plan in place to combat the pollution or facilitate future growth in demand (EMalahleni IDP, 2013). The current water treatment works is also

running over capacity, which is a threat to water supply and demand as well as a health and safety concern (EMalahleni IDP, 2013). Ga-Nala and Thubelihle, which are the closest settlements to the proposed development site, have their own water treatment works.

Waste removal: The latest data (Stats SA Census,2011) shows that approximately 68% of the eMalahleni Local Municipality population is serviced by municipal refuse removal services where 67% of refuses is removed at least once a week. The district municipality's IDP (2013) states that there is a shortage of vehicles and equipment for removing refuse i.e. garbage trucks. In some places, tractors and trailers are used to remove solid waste from businesses and homes. A refuse dump that is located southeast of Thubelihle is hampering development and expansion between the township and Kriel (Ga-Nala) (eMalahleni IDP, 2013).

Electricity: Statistics indicate the 73.5% of the local municipality's population uses electricity for lighting. This is below the national average of 84.8%. According to the eMalahleni IDP (2013), the municipality is facing an electricity problem resulting from an imbalance in supply and demand. This has been caused by overloading, illegal connections, old infrastructure and rapid growth in the municipality. The municipality aims to renovate and upgrade the distribution system and substations as well as electrify more homes and businesses.

This chapter served to provide a description of the receiving environment of the study area as a whole. The following chapter identifies the potential issues relating to the construction and operation of the proposed Umbani Power Plant and associated infrastructure in the context of the receiving environment described in this chapter.

SCOPING OF ISSUES ASSOCIATED WITH THE PROPOSED UMBANI POWER PLANT AND ASSOCIATED INFRASTRUCTURE CHAPTER 5

This chapter serves to describe and evaluate the identified potential environmental impacts associated with the proposed Umbani Coal-Fired Power Plant project, and to make recommendations for further studies required to be undertaken in the EIA phase. The scoping process has involved input from environmental specialists and consultants, the project proponent, stakeholders and the public. Environmental specialist scoping reports are included within Appendix E to L.

Impacts associated with the proposed coal-fired power plant and associated infrastructures are evaluated in the sections which follow, following which information gaps are identified and recommendations made regarding further studies / inputs required within the EIA phase of the process.

Impacts are expected to result from both the construction and operational phases of the power station and associated infrastructure (such as power lines, ash dam, wastewater treatment works, water supply pipeline, coal conveyor, etc.), and are expected to include:

» Impacts on air quality;
» Impacts on biodiversity (flora & fauna);
» Impacts on soil, land use and land capability;
» Impacts on groundwater;
» Impacts on surface water and wetlands;
» Impacts on heritage artefacts or sites;
» Noise impacts;
» Visual impacts;
» Socio-economic impacts;
» Traffic impacts.

The **cumulative impacts** associated with the proposed coal-fired power station and associated infrastructure are expected to be associated with the other coal-fired power stations and other industrial and mining activities located in the broader HPA. The potential direct cumulative impacts associated with the project are expected to be associated predominantly with air quality, impacts on biodiversity and the physical alteration of land use. Cumulative effects are identified and described in this scoping report and will be assessed in the detailed specialist studies to be undertaken in the EIA phase.

5.1 Scoping of Issues

The text and tables below provide an indication of the potential direct and indirect environmental issues and impacts which have been identified during the Scoping phase of the EIA and which may be relevant during the construction and operational phases of the project. Impacts associated with decommissioning of the project are expected to be similar to those associated with the construction phase and are therefore not evaluated separately.

5.1.1 Impacts on Air Quality

Environmental aspects influencing the dispersion and removal of air pollutants from the atmosphere include meteorological parameters, topography and land-use characteristics and location of sensitive receptors in relation to the source of pollution. Source parameters, on the other hand, determine the amount of, and the way in which pollution is released into the atmosphere.

From an air quality perspective, constraints with regards to the construction and operation of a coal-fired power station in the proposed area may include the proximity to sensitive receptors such as Kriel (Ga-Nala) located approximately 5km from the project site and Thubelihle situated approximately 3.5km from the project site.

Construction impacts: Air emissions during construction are expected to be related to those associated with dust generation and impacts from emissions from vehicles.

Operational impacts: The main pollutants of concern from the power station operations are particulate matter, specifically PM_{10} and $PM_{2.5}$, sulphur dioxide (SO_2) and oxides of nitrogen (NOx). With the proposed site being located within the HPA, which is an area that has been identified as one characterised with poor air quality, it is likely that the power station operations would add to the already elevated ambient concentrations of air pollutants.

The proposed Umbani coal-fired power plant falls within the HPA footprint and it will contribute to the pollution within the Highveld airshed. The management plan for the HPA must therefore be included in all management plans to be prepared for the proposed power project.

Table 5.1: Impacts on air quality

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction Phase			
Dust and air emissions due to construction vehicles and activities.	During construction, site clearing and excavations may result in dust, which could be a nuisance to people in and around the site. Dust is a nuisance that can be managed during construction through use of appropriate dust control measures.	Local	None identified at this stage
Operational Phase			
Emissions of gaseous and particulate pollutants during operations from coal handling and processing, stacks, vehicle entrainment on roads and ash storage facility.	Potential impact of ambient concentrations of SO_2, NOx and particulates (PM10 and PM2.5) resulting from emissions from Umbani Power Station on air quality and health.	Local and Regional (cumulative)	None identified at this stage
Potential impact increasing existing ambient concentrations of SO_2, NOx and particulates (PM10 and PM2.5) in the area and increasing the impact on air quality and health		Local and Regional (cumulative)	None identified at this stage
Potential increase in dust deposition resulting from emission of dust from the ash handling and storage.	Nuisance effect of dust depositing from surfaces such as the coal stockpiles and ash storage facility. The main concern is for impacts downwind of the facility.	Local and Regional (cumulative)	None identified at this stage
Potential increase in emissions of Green House Gas including carbon dioxide (CO_2), methane (CH_4) and nitrous oxides (NOx)	Indirect impacts relate to GHG emissions and the additive contribution to global warming and associated climate change effects.	Local and Regional (cumulative)	None identified at this stage

Gaps in knowledge & recommendations for further study:

Construction: An air quality specialist study will be undertaken during the EIA phase and will consider the impacts of dust during construction. The EMP will state measures for avoidance or reduction of dust during construction.

Operation: An air quality specialist study will be undertaken during the EIA phase and will consider the impacts of dust and gaseous pollutant during the operational phase of the proposed power plant. The following are to be assessed in the air quality specialist study:

- » Ambient concentrations of SO_2, NOx, and particulates (TSP and PM10) resulting from stack emissions as well as coal processing and ash disposal at the power plant for the following scenarios:
  - Construction (particulates only);
  - Operations, for the Umbani power plant in isolation and against the existing air pollution load of the area, i.e. cumulative effects;
  - Decommissioning (particulates only).
- » The health risk associated with the predicted ambient concentration in potentially affected communities; and
- » Relative contribution GHG emissions associated with the proposed facility to global warming.

The EMP will state measures for avoidance or reduction of dust and gaseous emissions during operations. Cumulative impacts would be addressed by including the measured background concentrations to determine the potential for cumulative impacts from the proposed power plant.

5.1.2 Impacts on Biodiversity (Flora and Fauna)

Vegetation profile: The project site falls within the original extent of the Eastern Highveld Grassland. This vegetation type is listed as Vulnerable on the Gazetted National Threatened Ecosystems List. Within the study area are Eastern Temperate Freshwater Wetlands, which are partially fed by drainage lines and seepage areas that occur within the study area. The azonal vegetation unit is also regarded as Vulnerable on the Gazetted National Threatened Ecosystems List.

Land use practices: The project site as well as the surrounding landscape is predominantly utilised for agricultural purposes and large areas have been transformed to cultivated lands, predominantly maize. Little of the original Eastern Highveld Grassland remains and the remaining natural vegetation exist as fractured "islands" surrounded by these transformed lands. Natural veld is predominantly used as pastures for cattle. Subsequently certain areas are severely degraded by overgrazing.

Slope and wetlands: The site can be described as moderately undulating plains, including some low to steep hills. The maximum slope of the farm is 11%, -9.1% whereas the average slope is 3.7%, -3.9%. The project site falls within the Olifants River Catchment area (Primary Catchment B), Witbank Dam sub-

catchment, which is part of the Loskop Dam catchment and within quaternary sub-catchments B11C and B11D of the Limpopo-Olifants primary drainage region. Across the study area, as well as within the greater surroundings, various wetland types including channelled valley bottom wetlands, unchannelled valley bottom wetlands, depressions, seepages etc. have been observed and mapped as NFEPA wetlands.

Wetlands present on the project site, as well as their catchment areas, it is suspected, have also been severely transformed and altered due to land use practices. A number of small gravel dams are present within these wetlands. The natural flow of the valley bottom wetlands (east of the R544) has furthermore been altered due to the presence of the lifted R544 and associated culverts. The wetlands are also extensively grazed and some of the cultivated lands extend into these wetlands. The valley bottom wetland located in the northern most corner of the farm is furthermore also impacted by the mining activities occurring on the adjacent property whist the valley bottom wetland located west of the R544 has been baled along with the surrounding veld.

Areas affected by the proposed power plant project therefore range from totally transformed areas to natural and semi-natural vegetation.

Of the recorded species on site, none have a red-data status and only two are protected species according to the Mpumalanga Nature Conservation Act (No. 10 of 1998) namely *Disa woodii* and *Gladiolus elliotti*.

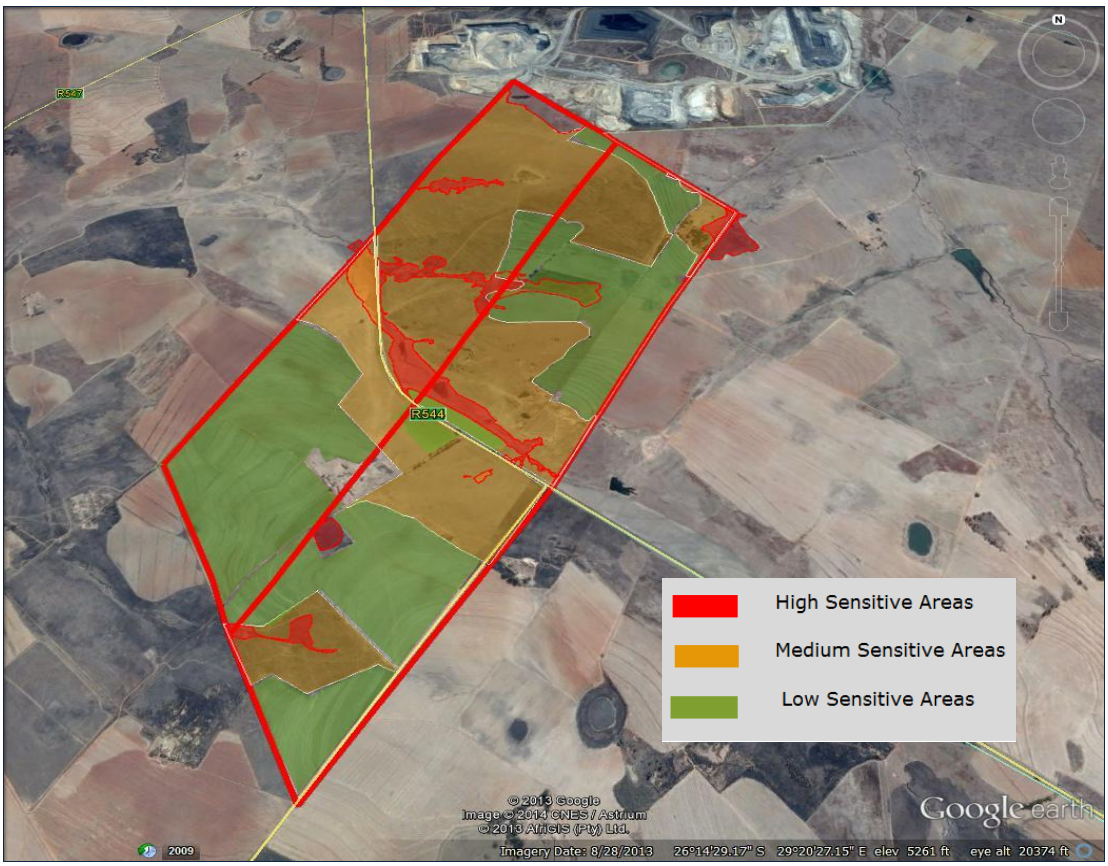

Figure 5.1: Preliminary Ecological Sensitivity Map

Table 5.2: Impacts on ecology

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction Phase			
Disturbance or loss of indigenous vegetation	Construction of infrastructure may lead to direct loss of natural and semi-natural vegetation, causing a reduction in the overall extent of specific species and vegetation cover. Consequences of the potential impact of loss of indigenous semi-natural vegetation occurring may include: » Increased vulnerability of remaining vegetation portions to future disturbance, including erosion; » General loss of habitat for sensitive species; » General reduction in biodiversity; » Disturbance to processes maintaining biodiversity and ecosystem goods and services; or » Direct loss of ecosystem goods and services.	Local	The only "no-go" areas identified to date are confirmed wetland areas; areas of potential high sensitivity relate only to the possible presence of additional wetlands and / or intact natural vegetation.

Issue	Nature of Impact	Extent of Impact	'No go' areas
Disturbance or loss of threatened / protected plants	Two protected plant species potentially occur on and adjacent to the proposed development site. Flora is affected by direct loss or change of habitat due to infrastructure development, or indirect effects of the development which may lead to a change of habitat quality. In the case of threatened plant species, a loss of a population or individuals could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations. Consequences of this may include: » Fragmentation of populations of affected species » Reduction in area of occupancy of affected species » Loss of genetic variation within affected species.	Local	The only "no-go" areas identified to date are confirmed wetland areas; areas of potential high sensitivity relate only to the possible presence of additional wetlands and / or intact natural vegetation.
Loss of habitat for protected terrestrial vertebrates	Terrestrial fauna species are affected primarily due to loss or alteration of habitat. Animals are generally mobile and, in most cases, can move away from a potential threat. Consequences of the development on fauna may include: » Reduction in area of occupancy of affected species; and » Loss of genetic variation within affected species. These may all lead to a negative change in conservation status of the affected species, which implies a reduction in the chances of the species' overall survival chances. To date no threatened terrestrial fauna species have been recorded from the project area. However, it can be expected that protected reptiles and amphibians may be present. Due to the	Local	The only "no-go" areas so far identified are confirmed wetland areas. It is not anticipated that these small wetlands constitute any critical habitat for any fauna species.

Issue	Nature of Impact	Extent of Impact	'No go' areas
	previous transformation of most of the proposed development area, the presence of critical habitats for any species is unlikely.		
Deterioration of surrounding habitats due to possible leaching or deposition of pollutants	The drainage characteristics of the soils as indicated by available data indicates a moderate to high risk that contamination affecting soil can be rapidly distributed into lower-lying landscapes and wetlands during a rainfall event. Contamination of soils through direct spills or deposition of wind-borne pollution will gradually change habitat characteristics and quality, leading to a gradual decline in species presence and persistence. Such contamination can arise from: » Accidental discharge of materials from construction machinery » Pollutants carried by wind, mostly arising from dust created by the construction process With adequate spill prevention, dust suppression and pollution containment measures in place, potential negative impacts can be avoided.	Local to regional	The only "no-go" areas identified to date are confirmed wetland areas; areas of potential high sensitivity relate only to the possible presence of more wetlands and / or intact natural vegetation.
Impacts on wetlands	The site is in a semi-arid to dry sub-humid area (BGIS 2007). The generally low slopes and soil conditions in the area have, over time, created many smaller wetlands – ranging from insignificant depressions to seepage areas, insignificant drainage lines, pans, and rivers. Construction of the Power plant and associated infrastructure, if it occurred within the immediate surroundings of any of these wetland areas, would lead to direct or indirect changes to the surface hydrology of these areas. This effect on the hydrology of the larger landscape or loss of habitat for species that depend on this habitat type needs to be kept as low as possible by	Local	The only "no-go" areas identified to date are confirmed wetland areas; areas of potential high sensitivity relate only to the possible presence of more wetlands.

Issue	Nature of Impact	Extent of Impact	'No go' areas
	maintaining a suitably wide buffer zone between the wetlands and the proposed development. Further recommendations will depend on the wetland study to be undertaken during the EIA phase.		
Establishment and spread of declared weeds and alien invader plants.	Major factors contributing to the invasion by alien invader plants includes high disturbance such as clearing for construction activities or past cultivation. Exotic species are often more prominent near infrastructural disturbances than within less disturbed natural vegetation. Consequences of these invasions may include: » Loss of indigenous vegetation; » Change in vegetation structure leading to change in various habitat characteristics; » Change in plant species composition; » Change in soil chemical properties; » Loss of sensitive habitats; » Loss or disturbance to individuals of rare, endangered, endemic and/or protected species; » Fragmentation of sensitive habitats; » Change in flammability of vegetation, depending on alien species; » Hydrological impacts due to increased transpiration and runoff; and » Impairment of wetland function.	Local	Several alien species have been recorded in the study area up to date. A full list of species and the extent of infestation will be provided in the EIA phase.
Operational Phase			
Disturbance or loss of indigenous natural vegetation due to possible indirect impacts (described under nature of impact) leading to a change in habitat	The drainage characteristics of the soils as indicated by available data indicates a moderate to high risk that contamination affecting soil can be rapidly distributed into lower-lying landscapes and wetlands during a rainfall event. Contamination of soils through direct spills or deposition of wind-borne pollution will gradually change habitat characteristics and quality, leading to a gradual decline in species presence and persistence.	Local to regional	The only "no-go" areas identified to date are confirmed wetland areas; areas of potential high sensitivity relate only to the possible presence of

Issue	Nature of Impact	Extent of Impact	'No go' areas
characteristics and quality	Such contamination can arise from: » Accidental discharge of materials from the sewage treatment pond, ash dump runoff, evaporation ponds and lime storage areas » Pollutants carried by wind, coming off the ash dumps, lime storage areas, coal conveying operations (conveyor or vehicle transport and loading operations) and emissions from the power station With adequate mitigation measures in place (as planned), these potential negative impacts can be avoided or minimised.		more wetlands and / or intact natural vegetation.
Reduction of surrounding low-grade coal stockpiles (Positive impact)	Stockpiles of low-grade coal discarded by surrounding mines contribute to: » methane gas production, » leaching of sulphur, » possible leaching of substances that can lead to the acidification of soils and wetlands, » increased dust loads containing harmful pollutants.	Local to regional	None
Reduction or increase of alien invasive species through implementation of alien plant management plan for the site	Extensive disturbances to natural vegetation as currently present in the study area and as will result from the construction process, create a window of opportunity for the establishment of more alien invasive species. The following scenarios will be possible: » construction across natural vegetation may lead to an increased presence of alien invasive species » construction on previously transformed areas may lead to a reduction of area of occupancy of alien invasive species and hence also a reduction in reproductive material being disbursed into the surrounding environments » this positive impact can only be maintained through a regular monitoring and clearing program on	Local and surroundings	The only "no-go" areas identified to date are confirmed wetland areas; areas of potential high sensitivity relate only to the possible presence of more wetlands and / or intact natural vegetation.

Issue	Nature of Impact	Extent of Impact	'No go' areas
	and around the development area for the duration of the operational phase of the development		
Altered runoff patterns due to rainfall interception by sealed and compacted areas	Sealed and compacted surfaces create large surfaces of rainfall interception, concentrating rainfall at the edges from where it flows in larger, concentrated quantities opposed to small drops being directly absorbed by the ground or intercepted by vegetation. This may lead to a localised increase in runoff during rainfall events, which may result in stormwater discharge and accelerated erosion. Likewise, access roads and areas where soils have been compacted during construction will have a low rainfall infiltration rate, hence creating an increase in runoff. Runoff will thus have to be monitored and channelled where necessary to prevent erosion or degradation of lower-lying drainage lines, seepage areas, and rivers beyond the development area.	Local and surrounds	The only "no-go" areas so far identified are confirmed wetland areas; areas of potential high sensitivity relate only to the possible presence of more wetlands and / or intact natural vegetation.

Gaps in knowledge & recommendations for further study:

Construction and operation:

» The presence, ecological state and delineation of all wetlands will need to be confirmed by a detailed wetland study.
» It must be noted that there is a possibility of species that have not been captured in the POSA SANBI species database for the area to date to be found within the study area.
» A detailed ecological survey and sensitivity assessment will be undertaken during the EIA phase between mid-November to April.
» The extent of alien invasive species on and around the study area needs to be determined.
» Once the final site for the power plant has been determined, possible routes of stormwater discharge need to be determined to ensure that such stormwater does not enter directly into wetlands in the area.

5.1.3 Impacts on soil, land use and land capability

The proposed development site is located within a grain farming agricultural region. Approximately half of the site comprises cultivated agricultural crops, which have included soya, maize and sorghum. The other half is uncultivated and used for grazing. The established cultivated fields have a greater agricultural value than the uncultivated land and are therefore more sensitive to being lost as agricultural land or impacted upon. From an agricultural impact point of view it will be preferable to site the development on the uncultivated parts of the site.

Table 5.3: Impacts on soil / agriculture

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction and Operational Phase			
Loss of agricultural land	Loss of agricultural land use due to direct occupation by the infrastructural footprint of the development for the duration of the project. This will take affected portions of land out of agricultural production for the lifetime of the facility.	Local	Cultivated fields are of higher sensitivity
Soil erosion	Soil erosion due to alteration of the land surface run-off characteristics. Alteration of run-off characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing areas, surfaces and roads. Erosion will cause loss and deterioration of soil resources and may occur during all phases of the project.	Local	None identified at this stage.
Loss of topsoil	Loss of topsoil due to poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (levelling, excavations, road surfacing etc.) and resultant decrease in that soil's agricultural suitability.	Local	None identified
Cumulative impacts	Cumulative impacts due to the regional loss of agricultural resources and production as a result of other developments on agricultural land in the region.	Regional	None identified

Gaps in knowledge & recommendations for further study:

The EIA phase assessment will include a field investigation of soils and agricultural conditions across the site. This field investigation will be aimed at ground proofing the existing land type information and understanding the specific soil conditions on site. It will not be based on a grid spacing of test pits but will comprise a reconnaissance type of soil mapping exercise based on an assessment of surface conditions, topography, and hand augered samples in strategic areas.

Such a soil investigation is considered adequate for the purposes of this study. A more detailed soil investigation is not considered likely to add anything significant to the assessment of agricultural soil suitability for the purposes of determining the impact of the development on agricultural resources and productivity. The field investigation will involve a visual assessment of erosion and erosion potential on site, taking into account the proposed development layout.

No off-site impacts on agriculture are anticipated due to the construction of an overhead power line if these are proposed to be aligned with existing power lines and/or roads.

5.1.4 Impacts on groundwater

Table 5.4: Impacts on groundwater

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction Phase			
Deterioration of groundwater quality.	Oil, diesel and chemical spills from machinery and construction vehicles during the construction phase.	Local (Site)	None identified at this stage.
Operational Phase			
Deterioration of groundwater quality down gradient of the power station	The proposed power station could have an impact on groundwater resources due to contamination as the result of various components of the power station, but most notably from the ash disposal facility, pollution control dams and the wastewater treatment works, if these are not managed appropriately. Seepage of liquid (leachate) from the ash dumps can be expected to artificially increase the underlying groundwater levels due to continuous seepage from the dumps. These increases will influence local groundwater flow patterns.	Local to Regional	Recommend exclusion zone of 150m from wetland areas. To be confirmed during the EIA phase.
Degradation of the groundwater quality.	Seepage from the ash dump will be of relatively poor quality. This poor quality leachate could mix with the groundwater contained within the underlying aquifers and negatively impact on the groundwater quality. Due to the locally increased groundwater levels potentially underlying the ash disposal facility, it can be expected that contaminated groundwater will migrate away from the facility, thereby causing contamination of the surrounding area.	Local to Regional	None identified at this stage.

Gaps in knowledge & recommendations for further study:

The hydrological and geohydrological characteristics of the project site will need to be determined during the EIA phase to determine the extent and significance of the potential impact, especially from the ash disposal facility on the identified water resources.

5.1.5 Impacts on Heritage Resources and palaeontological sites

No heritage sites were identified during the desktop investigation. However there is a low - medium likelihood of Middle Stone Age sites occurring over the study area similar to finds made to the north of the site. Existing farmhouse structures on the site could potentially have heritage value but this will require confirmation during the EIA phase.

Table 5.5: Impacts on heritage resources

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction Phase			
Loss / destruction of Archaeological finds	The construction phase of the project could directly impact on surface and subsurface archaeological sites.	Local	None identified at this stage.
Destruction / disturbance of historical finds and cultural landscape	The construction of the project could directly impact on Middle Stone Age sites.	Local	None identified at this stage.
Destruction / disturbance burials and cemeteries	The construction of the proposed project could directly impact on marked and unmarked graves.	Local	None identified at this stage.

Gaps in knowledge & recommendations for further study:

» In order to comply with the requirements of the National Heritage Resources Act (Act 25 of 1999), a Phase 1 Heritage Impact Assessment will be undertaken in the EIA phase.
» All identified heritage sites of significance could be mitigated either in the form of conservation of the site within the development or through a Phase 2 study where the sites will be recorded and sampled before the developer can apply for a destruction permit for these sites prior to development. It is not anticipated that the built environment will be severely impacted upon as very few structures occur within the study area and those which do occur are

probably younger than 60 years and not protected by legislation. This assumption will however be verified in the field.

» It is recommended that as part of the public consultation process the presence of additional grave sites, archaeological and historical sites should be determined.

5.1.6 Noise impacts

There are a number of potential noise sources in the area, including the R544 road and the Dorstfontein East Coal Mine. There are no residential community areas within 2 km from the boundary of the proposed development, however a number of existing potential noise sensitive developments occur in the area (refer to Figure 5.2). The site falls within the Themeda Veld and Bakenveld vegetation regions within the Grassland biome, although the natural vegetation has been significantly altered by agriculture and mining. There are significant cultivated dryland fields that would be cultivated during times of the year and ground conditions may assist in the attenuation of noise (fraction of sound waves hitting and being reflected from the ground).

Figure 5.2: Aerial Image indicating identified noise-sensitive developments relative to the Umbani project site

Table 5.7: Potential noise impacts

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction Phase			
Increase in noise levels due to various types of construction activities	**Construction activities:** Increased noise levels are directly linked with the various activities associated with the construction of the proposed facility and related infrastructure and include: » Development of access roads, water supply pipeline and coal conveyor; » Site establishment (contractors camp, equipment and material storage, security and access control, security fence); » Vegetation and topsoil removal; » Establishment of storage (coal stockpile footprints) facilities; and » Construction of infrastructure (foundations to completed structure). **Material supply:** Instead of transporting the required material for construction to the site using concrete trucks, portable concrete batching plants may be required to supply concrete on-site. Batching plant equipment may be relocated between the sites of construction within the development area as the works progresses to different areas of the site. **Blasting:** Blasting could be required as part of the civil works to clear obstacles or to prepare foundations **Traffic:** A significant source of noise during the construction phase is additional traffic to and from the site, as well as traffic on the site. This will include trucks transporting equipment and machinery, as well as contractors.	Local and regional	None identified at this stage.
Operational Phase			
Noise impact on Noise Sensitive Developments during operation	The main source of noise is associated with the intake and cooling fans as well as material handling activities at the coal stockpile. Boilers, steam turbines and generators are generally constructed within fixed structures that will attenuate the noise from this equipment. Noise from ancillary services and activities such as pumps (boiler feed, water, chemical, condensate, vacuum), air compressors and	Local and regional	None identified at this stage.

	onsite traffic generally is far less than the noise from the main sources.		

Gaps in knowledge & recommendations for further study:

Activities would be highly dependent on the location selected for the power station, choice of dry-cooling technology selected, final design and infrastructure layout. The potential noise impact could extend further than 1 000 m from the power plant.

The potential noise impact is required to be investigated in more detail during the EIA phase, including further ambient sound measurements. Additional information required for further assessment includes the following:

- » Exact location of the various activities (i.e. coal stockpile area, coal management, boilers, power generation turbines, cooling towers etc.). In the case of equipment installed on buildings, the height of this equipment will be required.
- » Project design (which equipment will be in buildings, what materials will be used to build these buildings).
- » A more accurate description of equipment to be used in and around the proposed facility (wet cooling vs. dry cooling, fans, turbines, etc.). This would include data such as the type and amount of equipment to be used, focusing specifically on the intake and cooling fans.
- » Layout of various roads and projected routes that equipment and material/coal will use.

5.1.7 Visual impacts

The study area for the visual assessment encompasses a geographical area of approximately 1500km^2 and includes a minimum 12km buffer zone from the proposed development area. It includes the towns (built-up areas) of Komati in the north east, Thubelihle and Kriel centrally, Van Dyks Drift in the north and Bethal in the south east. Main roads include the R544 and R545 running in a north westerly direction from Bethal, and the R35 running in a north south direction, linking Bethal and Komati.

The results of the preliminary viewshed analyses for the proposed power plant are shown in Figure 5.7 below. The initial viewshed analyses were undertaken from a number of vantage points within the proposed development areas at offsets of 25m (above ground level) for the power plant and 250m (worst case scenario) for the cooling towers. This was done in order to determine the general visual exposure (visibility) of the area under investigation, simulating the maximum height of the proposed structures associated with the facility.

It must be noted that the viewshed analyses do not include the effect of vegetation cover or existing structures on the exposure of the proposed power plant, therefore signifying a worst-case scenario. It is expected that the planted vegetation cover (primarily maize) as well as trees within the study area and in close proximity to the facility, may reduce the visual exposure to some extent.

The viewshed analyses will be refined once a preliminary and/or final layout of the power plant is completed and will be regenerated for the actual position of the infrastructure on the site, and per structure position (and actual proposed technology) during the EIA phase of the project.

Potential visual exposure for both the tower and the plant is highest in close proximity to the site, and within 6km thereof. Beyond this radius, selected low lying areas such as the larger river valleys enjoy some visual screening from both the towers and the plant. The extent of potential visual exposure of the plant decreases somewhat beyond the 6km radius, with visually exposed areas lying mainly to the north and west of the site.

Overall, the high lying location of the site renders it highly visible within the receiving environment.

In terms of visual receptors, both the towers and the plant will be visible to farmsteads and homesteads located in close proximity thereto (i.e. **within 3km**), especially to the south of the site. Other sensitive receptors within this radius include users of the R544, which traverses the site, users of local secondary roads, and observers viewing the site from the Dorstfontein Coal Mine. The latter is not considered a sensitive visual receptor, however.

Between 3km and 6km from the site, both the plant and the towers are likely to be visible from the towns of Kriel and Thubelihle, as well as a number of homesteads and farmsteads situated mainly in the east and northwest of the zone. The R544, various secondary roads and a short section of the R545 lie within this zone, and will also be visually exposed to both the towers and the plant. A mining or industrial area to the north of the Dorstfontein Coal Mine, and its associated residential settlements will also be visually exposed.

Between 6km and 12km from the site, visual receptors include the western parts of Kriel, the R544, the R545, various secondary roads and a relatively large number of farmsteads and homesteads located predominantly in the south west and north of the zone. Most of these receptors will be exposed to the towers, but those located in the north east and west will also be exposed to the plant. A number of mining / industrial areas are also located within the zone, but are not considered to be sensitive receptors.

Visibility **beyond 12km** from the proposed site is expected to be less likely due to the distance between the object (development) and the observer. The cooling towers may, however, still be visible although not likely to dominate the frame of view. Receptors at this distance include the towns of Komati, Van Dyk's Drift and the northern outskirts of Bethal. Various roads, large tracts of mining / industrial land and three power plants also fall within this zone.

The **general conclusion** is that the structures may constitute a high visual prominence, potentially resulting in a high visual impact, where visible from shorter distances (i.e. less than 3km or 6km).

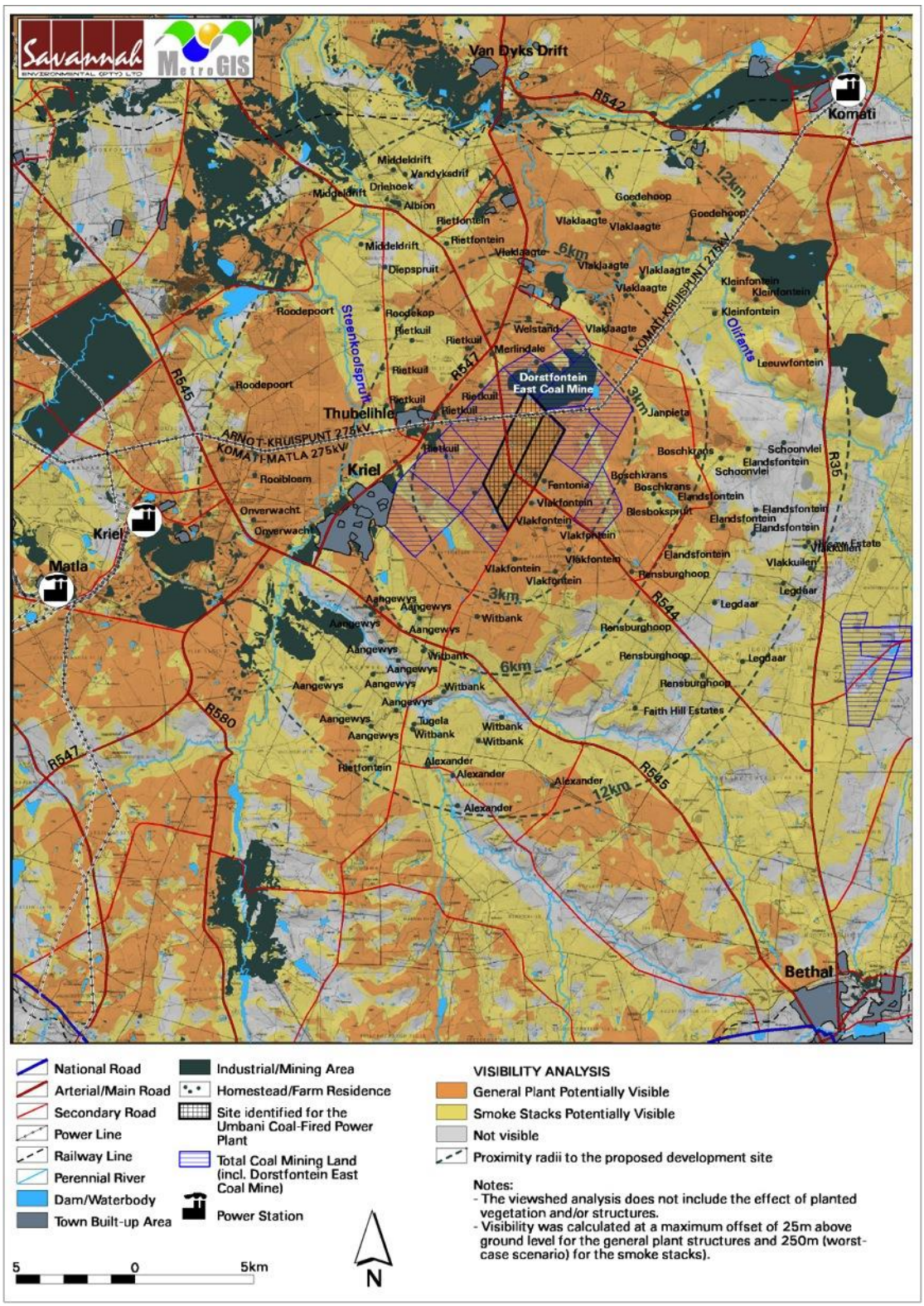

Figure 5.7: Map indicating the potential visual exposure of the proposed Umbani Power Plant

Table 5.7: Potential visual impacts

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction Phase			
The potential visual impact during construction.	The potential visual impact of the construction of ancillary infrastructure (i.e. the substation at the facility, overland coal conveyors, water pipeline, coal stockpile, ash dump, etc.) on observers in close proximity of these structures.	Local to regional	None identified at this stage
Operational Phase			
The potential visual impact during operation.	» The visibility of the facility to, and potential visual impact on, observers travelling along the main roads (i.e. the R544, the R545, the R35, the R580 and the R547) as well as secondary roads within the study area. » The visibility of the facility to, and potential visual impact on observers residing in towns and built up areas (i.e. Komati, Thubelihle, Kriel, Van Dyks Drift and Bethal) within the study area. » The visibility of the facility to, and potential visual impact on observers residing at rural homesteads and farmsteads within the study area. » Potential cumulative visual impacts with specific reference to the existing industrial land use, mining, quarrying and other power plants within the study area. » The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in close proximity. » The potential visual impact of the construction of the plant and ancillary infrastructure on observers in close proximity. » The influence of the visual absorption capacity of natural/planted vegetation or built structures on the visual exposure of the power plant. » The potential to mitigate visual impacts. » It is envisaged that the issues listed above may constitute a significant visual impact at a local and/or regional scale.	Local to regional	None identified at this stage
Cumulative	» Potential cumulative visual impacts (or		

impacts	alternately, consolidation of visual impacts) are anticipated due to the extent of industrial infrastructure in the Kriel area.		

Gaps in knowledge & recommendations for further study:

The fact that the proposed power plant may be visible within the receiving environment does not necessarily imply a high visual impact. Sensitive visual receptors within (but not restricted to) a 12km buffer zone from the facility need to be identified and the severity of the visual impact assessed within the EIA phase of the project.

It is recommended that additional spatial analyses be undertaken in order to create a visual impact index that will further aid in determining potential areas of visual impact. This exercise should be undertaken for the entire facility (i.e. core power plant and cooling towers) as well as for the ancillary infrastructure, as these structures (e.g. the coal conveyers, coal stock pile, pipe line, etc.) are envisaged to have varying levels of visual impact at a more localised scale.

5.1.8 Socio-economic impacts

The eMalahleni LM has sustained a reasonable growth rate between 2000 and 2011 indicating that the economy is relatively stable. The growth rate at 3% was slightly lower than the national average but higher than both provincial and district figures. The majority of the employment opportunities in the economy comes from the mining sector (49.6%), which also contributes 49.6% of the GDP-R. This could be detrimental to the local economy because of the susceptibility of the economy to global market forces. However, in terms of employment, the mining sector, in conjunction with the energy and manufacturing sectors provides a stable platform for growth and job creation. The economy of the eMalahleni LM, though, requires diversification, towards which the proposed project is expected to contribute.

Basic services and infrastructure within the primary study area are under significant pressure and in many instances require further upgrade or development. This is largely attributed to an increase in urban areas' population, lack of appropriate planning, aging infrastructure, and absence or lack of investment in respective infrastructure. Currently, both water and sanitation infrastructure is over 50 years old and in disrepair. In terms of electricity distribution infrastructure, the majority of the distribution system is 50 years old. The age of the infrastructure contributes to energy loss in inefficient distribution. Additionally, cable theft and vandalisation of infrastructure lead to frequent power disruptions and unanticipated cost. Plans are in pace to expand sanitation, water

and electrical infrastructure in the eMalahleni LM to replace old infrastructure and increase local capacity.

With the construction of the Umbani Power Station some of the infrastructural and developmental challenges facing the area could expect to be aggravated. However, the project will also have positive spin offs for the area especially with regard to employment, economy's diversification, and improved living standards for households directly and indirectly benefiting from the project.

Table 5.9: Potential socio-economic impacts

Nature of Impact	Extent of Impact
Construction Phase	
Increase in production and GDP-R of the national and local economies due to project capital expenditure	Local and National
Creation of employment in local and national economies though direct and multiplier effects as a result of capital expenditure and construction activities	Local and National
Skills development due to the creation of new employment opportunities	Local and National
Increase in government revenue due to investment	Local and National
Improved standard of living of households directly or indirectly benefiting from created employment opportunities	Local and National
Change in demographics of the areas due to influx of workers and job seekers	Local economies
Disruption of daily movement patterns and lives of people due to increased traffic on local roads	Local economies
Increase in social pathologies associated with influx of migrant labourers and job seekers to the area (health, crime, prostitution, xenophobia, etc.)	Surrounding area
Change in the land use on the site and associated opportunity costs	Site
Impact on property and land values in the surrounding area	Surrounding area
Added pressure on basic services and social and economic infrastructure	Local economies
Operational Phase	
Sustainable increase in production and GDP-R of the national and local economies through operation and maintenance activities	Local and National
Creation of long term employment in local and national economies through operation and maintenance activities	Local and National
Increase in government revenue stream	Local and National
Improved standard of living of households benefiting from the operations and maintenance activities directly or indirectly	Local and National
Altered sense of place	Surrounding area
Investment in the local community and economic development projects as part of Corporate Social Investment Programme	Local economies

Nature of Impact	Extent of Impact
Increased demand for housing and added pressure on basic services	Local economies

Gaps in knowledge & recommendations for further study:

Social change is recognised as a natural and on-going process. However, it is important to recognise and understand that projects of this scale and nature have the potential to influence and alter both the rate and direction of specific social change both positive and negative. Social impacts can be defined as the consequences (both positive and negative) to human populations through any public or private actions (these include policies, programs, plans and or projects) that alter the way in which people function as members of society. The following typical, generic project information is required in order to inform the Social Impact Assessment to be undertaken during the EIA Phase:

Construction phase:

- » Comments received from I&APs during the public participation process, including comments reflected in the Final Scoping Report;
- » A plan of the proposed location of the coal fired power plant in relation to the site;
- » Duration of the construction phase (months);
- » Number of people employed during the construction phase;
- » Breakdown of number of people employed in terms of skills categories (low skilled, semi-skilled and skilled);
- » Estimate of the total wage bill for the construction phase and breakdown in % as per skills categories;
- » Estimate of total capital expenditure for the construction phase;
- » Indication of where construction workers will be housed (on site or in nearest town?);
- » Opportunities for on-site skills development and training;
- » Description of the typical activities associated with the construction phase, specifically on-site construction activities. This includes a description of how the components associated with the facility will be transported to and assembled on site;
- » The size of the vehicles needed to transport the components and the routes that will be used to transport the large components to the site, and an estimate of the number of vehicle trips required.

Operational phase:

- » Estimate of operating budget per annum;
- » Estimate of total number of people employed;
- » Breakdown in terms of skills levels;
- » Estimate of annual wage bill;

» Typical activities associated with the operational phase;
» Information on opportunities for skills development and training;
» Typical lifespan of proposed power plant.

5.1.9 Traffic impacts

Traffic impacts are anticipated to arise during the construction phase due to the transport of components to the site as well as due to the movement of construction phase employees to and from the site. During the operational phase the traffic impact is expected to manifest as the movement of permanent employees to and from the site and as a result of the movement of inputs and outputs in trucks. Traffic impacts are likely to be felt at the local and regional level and as such the potential traffic impact will be determined during the EIA Phase.

5.2 Cumulative Impacts

Cumulative impacts, in relation to an activity, refer to the impact of an activity that in-itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. For cumulative effects analysis to help the decision-maker and inform interested parties, it must be limited to effects that can be evaluated meaningfully (DEAT, 2004). Boundaries must be set so analysts are not attempting to measure effects on everything. Therefore, the cumulative impacts associated with the proposed Umbani Power Plant have been viewed from two perspectives within this Scoping Study being:

» Cumulative impacts associated with the scale of the project; and,
» Cumulative impacts associated with other relevant and existing power stations and/ industrial plants in region and / or other major proposed development projects in the area.

Based on the information available at the time of undertaking this study, there are no other new proposed coal-fired power stations in the area. The potential cumulative impacts will be assessed taking into account existing Eskom power stations (the closest being Kriel and Matla) and other emissions sources in the region.

Cumulative effects are commonly understood as the impacts which combine from different projects and which result in significant change, which is larger than the sum of all the impacts (DEAT, 2004). The complicating factor is that the projects that need to be considered are from past, present and reasonably foreseeable future development. Cumulative effects can be characterised according to the pathway they follow. One pathway could be the persistent additions from one

process. Another pathway could be the compounding effect from one or more processes. Cumulative effects can therefore occur when impacts are:

» Additive (incremental);
» Interactive;
» Sequential; or
» Synergistic.

Canter and Sadler (1997) describe a four step process for addressing cumulative effects in an EIA:

» Delineating potential sources of cumulative change (i.e. GIS to map the relevant coal-fired power stations energy facilities in close proximity to one another);
» Identifying the pathways of possible change (direct impacts);
» Indirect, non-linear or synergistic processes; and
» Classification of resultant cumulative changes.

Potential Cumulative Impacts:

The cumulative impacts associated with the proposed coal fired power station and associated infrastructure at a site level are expected to be associated with the scale of the project. The potential direct cumulative impacts associated with the project are expected to be associated predominantly with the potential effects on biodiversity, soil, surface and groundwater, air quality, traffic, noise, visual quality, land-use and social impacts. These cumulative effects will be assessed in the EIA phase.

It is important to describe the potential cumulative impacts which may be expected in order to obtain a better understanding of these impacts and the possible mitigation that may be required. The cumulative impacts in this regard are expected to be associated with those impacts associated with biodiversity, soil, surface and groundwater, air quality (and human health), visual and social impacts.

Potential cumulative negative and positive impacts associated with numerous coal fired power stations and mines within the study area will occur and are listed below.

Table 5.9: Cumulative impacts

Issue	Nature of Impact	Extent of Impact
Air Quality and associated human health effects.	Cumulative decline in air quality in the Highveld Priority Area Air Quality Management Area.	Regional and Transboundary

Issue	Nature of Impact	Extent of Impact
Ecology / Biodiversity: Cumulative ecosystem loss, fragmentation and / degradation	Natural vegetation within the study area is largely impacted by industrial activities, and is formally conserved only to a limited extent. Cumulative ecological impacts associated with this type of development include direct loss of vegetation and indirect impacts associated with pollution. Indirect impacts could lead to initial, incremental or augmentation of existing types of environmental degradation, including impacts on the air, soil and water present within available habitat. Pollution of these elements might not always be immediately visible or readily quantifiable, but incremental or fractional increases might rise to levels where biological attributes could be affected adversely on a local or regional scale.	Local to Regional
Ground Water Contamination	The proposed power station together with other developments in the area could have a cumulative negative impact on groundwater resources. Run-off from ash disposal facility and leachate generated through infiltration of water has the potential to contaminate the ground water resource.	Regional
Surface Water Contamination and Availability	The proposed development could result in a cumulative increase in aquatic impacts due to additional industrial infrastructure (including ash dumps) etc. adding to a decrease in water quality in the surface water resources of the study area.	Regional
Cumulative Socio-Economic impacts	Contribution to energy security in the country	National
	Diversification of the local economy	Local economies
	Improved standard of living of the directly and indirectly affected households	Local and National
	Urban sprawl and or/ expansion of informal settlements	Local economies
	Added pressure on local service delivery and infrastructure	Local economies
	Possible increase in poverty in the area due to greater influx of job seekers and inability of the economy to absorb these jobs	Local economies

CONCLUSIONS CHAPTER 6

6.1. Overview of the Proposed Project

ISS Global Mining (Pty) Ltd, an Independent Power Producer (IPP), is proposing the construction of a coal-fired power plant on a site near Kriel in the Mpumalanga Province. The project is to be known as the Umbani Power Plant and will have a generating capacity of up to 600 megawatts (MW).

The electricity generated by the project is to be fed into the Eskom grid. With regard to the escalating demand for power supply, the proposed Umbani Power Plant aims to increase the output of power supply to minimise the reality of a potential energy deficit. The proposed power plant is intended to be developed in response to the targets to be set by the Department of Energy (DoE) under the IPP Baseload Programme.

The main infrastructure that is required for the proposed Umbani Power Plant includes the following:

» Access roads.
» Conveyor belts and coal handling areas.
» Coal storage areas and bunkers.
» Power plant production unit/s (boilers / furnaces, turbines, generator and associated equipment, control room).
» Ash disposal facility.
» Water infrastructure such as Raw-Water Storage Dam, purification works and reservoirs.
» Pollution control dams.
» An on-site substation or High Voltage Yard.
» Pipeline for supply of water to the facility.
» Office and maintenance area/s.
» Overhead power lines to connect into the Eskom grid. It is expected that the generated power can be evacuated into the electricity grid via a new 400 kV transmission line to either the Eskom Kriel or Matla power stations or via the existing 400 kV power line traversing the site.

The project will require the development of a power station and associated infrastructure over an area of between 120ha to 150ha. Coal discards which will be sourced from the Dorstfontein East Coal Mine as a fuel source for the power generation process will be transported to the power plant via a conveyor belt system. The plant will make use of Circulating Fluidised Bed (CFB) technology. Technology alternatives to be considered in the EIA phase are limited to the use

of CFB boiler technology as it is the only technology with the capacity to simultaneously accept low-grade coal in the energy generation process while achieving emissions which are in line with South African emissions standards and even the more stringent International Finance Corporation (IFC) Standards (considering air quality constraints within the Highveld Priority Area). The coal has an estimated ash content of 40% and will see the generation of ash in the region of approximately 1.1 million tonnes per annum which will require disposal to an ash disposal facility situated on the site. The dry-cooled power plant will have a water requirement of approximately 2 000m^3 per day. The sources of water could potentially include mining, municipal or natural resources, the feasibility of which will be determined during the EIA phase.

Technical feasibility: The proposed project is considered to be technically feasible based on the following:

- Proximity to the Dorstfontein East Coal Mine which will supply the primary source of fuel (coal).
- Abundance of low grade coal including coal discards of a quality below Eskom rejection limits or export requirements but which can be utilised in a Circulating Fluidised Bed boiler as proposed for the power plant
- Coal can be supplied via overland conveyors from the Dorstfontein East Coal Mine to the power station, reducing the potential logistical cost associated with rail and truck transport.
- The use of Circulating Fluidised Bed boiler technology is key to the use of low grade coal in the power generation process and the control of emissions considering the location of the proposed project within the Highveld Priority Area.
- The proposed use of dry-cooling technology (as opposed to wet cooling technology) considering water constraints in the region.
- The potential use of ash produced in the combustion process in the cement and construction industries serving to reduce the area required for ash disposal.

6.2. Overview of the Scoping Process

The Scoping process for the proposed Umbani coal-fired power plant and associated infrastructure has been undertaken in accordance with the EIA Regulations published in Government Notice 33306 of 18 June 2010, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

This Scoping Report is aimed at detailing the nature and extent of this proposed power plant and associated infrastructure, identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project, involving

the project proponent, specialist consultants, and a consultation process with key stakeholders, relevant government authorities and interested and affected parties (I&APs). In accordance with the requirements of the EIA Regulations, feasible project-specific alternatives (including the "do nothing" option) have been identified for consideration within the EIA process (refer to Chapter 7).

The conclusions and recommendations of this Scoping Report are the result of desktop evaluations of impacts identified by the different environmental specialists, review of existing information, limited on-site inspections, and the parallel public participation process. The public consultation process is extensive and every effort is being made to include representatives of all stakeholder groupings in the study area and the Mpumalanga Province. This process is on-going through the entire EIA process.

A summary of the conclusions of the scoping evaluation of the proposed coal-fired power plant and associated infrastructure is provided below. Recommendations regarding investigations required to be undertaken within the EIA are provided within the Plan of Study for EIA, contained within Chapter 7 of this report.

6.3. Conclusions drawn from the Evaluation of the Proposed Site for Development of a Coal-Fired Power Plant

The main issues identified through this scoping study associated with the proposed coal-fired power plant are summarised below. It can be concluded that the majority of potential impacts identified to be associated with the **construction** of the proposed project are anticipated to be local in extent, apart from impacts on traffic and job creation and economic growth which are anticipated to be regional in extent. Impacts from the **operation** of the coal-fired power station and associated infrastructure will be determined by the siting of the power plant on the site and its relationship and potential operational impact on sensitive receptors as well as the extent of emissions to be generated and released into the environment.

Sensitive receptors: Potential sensitive environmental receptors / features identified through the Scoping process include:

- The towns of Kriel situated within 5km and Thubelihle situated within 3.5km from the project site.
- Two residences situated on the farm (to be confirmed).
- A watercourse which is situated adjacent to the R544.
- Wetland areas and seeps in the lower lying sections of the site.
- High potential agricultural soils on the site currently under cultivation.

No-go areas: identified on the project area at this point include wetlands and other surface water features identified. Cultivated agricultural fields also have a

higher sensitivity than non-cultivated fields due to their agricultural value. Presently a no-go buffer of 150m around surface water features and wetlands is recommended for the siting of ash disposal facilities. The extent to which the identified no-go areas and buffers must be observed will be refined during the EIA Phase.

Potential negative impacts: Issues of potential environmental concern have been identified through the scoping phase. The more significant environmental issues are anticipated to include the following:

» Potential air quality impacts from the proposed power station due to emissions. This is partially mitigated through the proposed use of Circulating Fluidised Bed technology which will allow for reduced emissions due to the occurrence of the site within the Highveld Priority Area. The need for additional mitigation will be investigated during the detailed assessment within the EIA phase of the process.
» Potential cumulative air quality impacts due to existing power stations and mining and industrial activities in the area.
» Potential contaminated storm water run-off from the coal storage stockyard and contaminated runoff from the ash disposal facility polluting groundwater, watercourses and wetlands unless appropriately retained on the site.
» Potential loss of high-potential agricultural land.
» Potential visual impacts due to the power plant being visible from Kriel and Thubelihle. Overall, the high lying location of the site renders it highly visible within the receiving environment.

Impacts identified which are considered to be of potentially lesser significance as identified through the scoping phase include:
» Potential impact on flora and fauna (including sensitive and listed species) given the relatively transformed ecological status due to existing land uses over the majority of the site.
» Potential noise impacts of the proposed facility on Noise Sensitive Developments in the surrounding areas given the relatively low number of receptors identified during the scoping process.
» Potential heritage and paleontological impacts.
» Potential impacts relating to the construction of an overhead power line from the on-site substation to the Kriel or Matla Power Stations due to the potential to align the power line with existing power lines.

Potential positive impacts: include a supply of energy into the Eskom grid at a time when the national grid is increasingly under pressure; the opportunity to utilise significant volumes of coal waste in the energy generation process, as well the associated socio-economic impacts relating to the project.

Technology alternatives: The use of Circulating Fluidised Bed is expected to result in improved emissions (over conventional pulverised coal fired boiler technology) in line with the standards of the IFC. Furthermore the following benefits from the use of CFB technology are anticipated:

» The sourcing of discard coal or waste coal for use in the energy generation process which could in turn lead to a reduction of coal discard dump at the Dorstfontein East Mine and other coal mines in the region (positive impact)
» The use of dry-cooling technology will reduce the water requirements of the plant
» In-bed capturing or neutralisation of sulphur through introduction of limestone directly into the bed of the CFB boiler leading to a significant reduction of SO_2 emissions.
» Low burning temperatures resulting in limited formation of NOx gases.
» Generation of gypsum as a by-product which can potentially be used in the construction and cement industries.

6.2. Evaluation of the Potential Issues of Associated Linear Infrastructure

Potential issues identified to be associated with the proposed associated linear infrastructure (including the power line, water pipeline and conveyor route), include impacts on flora, fauna and ecological processes, impacts on watercourses and wetlands, impacts on land use, potential avifaunal impacts, potential impacts on heritage sites and visual impacts. The potential impacts associated with all related infrastructure will be considered in detail within the EIA phase. Recommendations regarding a preferred alignment and appropriate mitigation measures (if required) will be made for the proposed power line, water pipeline and coal conveyor. The location of this infrastructure will be informed by the point(s) of water supply to the power plant, point of coal supply as well as the point of connection to the Eskom grid. These aspects will be fully described and assessed during the EIA Phase.

Table 6.1: Summary of potential impacts associated with the proposed coal-fired power plant

Construction / Decommissioning Impacts	**Extent**
Direct impacts on threatened and protected flora species, threatened fauna species, Loss or Degradation of Natural Vegetation/ Sensitive Habitat, surrounding habitat/ species & ecosystem functioning.	L-R
Loss /destruction of Archaeological finds, destruction / disturbance of burials and historical finds and cultural landscape.	L
Deterioration of groundwater quality.	L
Increase in traffic and damage to roads.	L-R
Loss of agricultural potential.	L
Construction noise.	L
Job creation and economic growth.	R
Dust and air emissions due to construction vehicles and activities.	L
Operational Impacts	**Extent**
Decrease in air quality due to emissions (such as NO_2, SO_2 and particulates) from combustion process and vehicles.	R - N
Human health effects from harmful emissions into the air.	R
Change in groundwater levels and decrease in water quality.	R
Contamination of surface water.	L - R
Increase in noise levels within a 2km radius of the site.	L - R
Visual (visibility) of the power station and associated infrastructure to observers who reside in the area / use roads.	L - R
Increase in road traffic.	R
Release of greenhouse gases that contributes to global climate change.	I-T
Permanent employment opportunities at the power station.	L
Growth in GDP.	R

KEY	L	**Local**	R	**Regional**	N	**National**	I	**International**	T	**Transboundary**

PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT CHAPTER 7

A detailed description of the nature and extent of the proposed Umbani coal-fired power plant and associated infrastructure, details regarding the Scoping process followed, as well as the issues identified and evaluated through the Scoping phase (to date) have been included in this Scoping Report. This provides the context for a Plan of Study for Environmental Impact Assessment (EIA).

The Plan of Study for EIA presented in this chapter describes how the EIA Phase for the proposed coal-fired power plant project will proceed. The EIA Phase of the study includes detailed specialist studies for those impacts recorded to be of potential significance as well as a public consultation process. The key findings of the Scoping Phase (which includes inputs from authorities, the public, the proponent and the EIA specialist team) are used to inform the Plan of Study for EIA, together with the requirements of the NEMA EIA Regulations of June 2010 and applicable guidelines.

7.1. Aims of the EIA Phase

The EIA Phase will aim to achieve the following:

» Provide an overall assessment of the social and biophysical environments affected by the proposed project;
» Comparatively assess technically feasible alternatives and recommend a preferred option for implementation;
» Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with the proposed power plant and associated infrastructure;
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts; and
» Undertake a fully inclusive public involvement process to ensure that I&AP are afforded the opportunity to participate, and that their issues and concerns are recorded.

The EIA will address potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with all phases of the project including design, construction, operation and decommissioning, and will aim to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project. All feasible alternatives (including the 'No go Option / do nothing' alternative) will be assessed.

7.2. Authority Consultation

Consultation with the regulating authorities (i.e. National DEA and Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET)) will be undertaken and will continue throughout the EIA process. On-going consultation will include the following:

» Submission of a Final Scoping Report following a 40-day public review period (and consideration of comments received);
» A consultation meeting with the DEA and MDEDET in order to discuss the findings of the Scoping Report and the issues identified for consideration in the EIA process, if requested and required by the authorities;
» An opportunity to visit and inspect the site;
» Submission of a Draft EIA Report to organs of state;
» Submission of a Final Environmental Impact Assessment Report following a 40-day public review period;
» A consultation meeting with the DEA and MDEDET in order to discuss the findings and conclusions of the EIA Report, if requested and required by the authorities.
» An opportunity for DEA and MDEDET and any other organs of state to visit the site.

7.3. Consideration of Alternatives

The following project alternatives will be investigated in the EIA:

» **Design or layout alternatives –** A preliminary layout of the power plant and associated infrastructure (coal stockpile, ash dump, dams, pipeline alignments, conveyor route alignments, access roads etc.) will be provided by ISS Global Mining with the involvement of the technical advisor in the EIA phase such that site-specific environmental evaluations can be made as part of the detailed studies which form part of this phase of the EIA process. The preliminary environmental sensitivity map of the study area will be utilised to inform the siting and layout of the plant and further surveying during the EIA Phase will serve to confirm the layout design.
» **Technology alternatives** - Technology alternatives to be considered in the EIA are limited to the evaluation of indirect and direct dry-cooling. It has been demonstrated in this Scoping report that the fuel combustion technology (i.e. circulating fluidised bed) is the only combustion technology proposed for the power plant as it directly addresses the fuel and emissions requirements.
» **Operational alternatives** – will include an evaluation and assessment of the following:
    - Alternative fuel supply options to ensure the sustainability of the plant.

  - Alternative sources of water for use in the power plant and consideration of the infrastructure alternatives associated with the conveyance, treatment etc. of water.
  - Sourcing and supply of limestone for use in the boiler.

» **Linear alternatives –** a 500m corridor around the power line (to Kriel and Matla power stations) will be evaluated for the power line servitude which is anticipated to be 55m in width. This will allow for undertaking deviations from the main route if required. The routing and siting of other linear infrastructure (and the alternatives) required for the supply of water and coal to the site will also be evaluated.

7.4. Methodology for the Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

A summary of the issues which require further investigation within the EIA phase, as well as the proposed activities to be undertaken in order to assess the significance of these potential impacts is provided within Table 7.1. The specialists involved in the EIA Phase are also reflected in Table 7.1. These specialist studies will consider the proposed site for the development of the coal-fired power plant and all associated infrastructure (including alternatives with regards to design, layout and technology), as well as the alternative alignments of the proposed power line, conveyor belt routes, access roads and water supply pipeline.

Table 7.1: Summary of the issues which require further investigation within the EIA phase and activities to be undertaken in order to assess the significance of the potential impacts

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Air Quality Impact Assessment	The following will be undertaken in order to assess the identified air quality issues: » The compilation of a detailed emission inventory for the proposed Umbani power plant, for the construction, operations and decommissioning phases. The inventory will be based on activity data such as the proposed generation technology; air pollution abatement technology, coal quality and consumption, as well as coal processing technology and will use default emission factors from the US-EPA. » Air dispersion modelling using the CALPUFF model will be undertaken as recommended in the dispersion modelling regulation (DEA, 2012b) by the DEA to predict ambient concentrations of air pollutants resulting from the IPP plant emissions during construction, operations and decommissioning phases. The modelling will use at least one year of representative meteorological data. Model results will be presented as isopleth maps of the study region and compared with the National Ambient Standards. Existing ambient concentrations will be used to assess the cumulative effect. The significance of potential impacts will be assessed by comparing predicted ambient concentrations with the relevant National Ambient Air Quality Standards (DEA, 2010 and 2012) » The Air Quality Specialist Study report will include a description of the methodology, the data used and the assumptions made, as well as the results of the dispersion modelling and the health risk assessment. The significance of the impacts will be based on standard EIA impact descriptors of extent, duration, frequency of occurrence and severity.	uMoya-NILU Consulting (Pty) Ltd
Biodiversity Impacts	As part of the EIA process, a detailed field survey of the vegetation and fauna will be undertaken and results will include:	Gerhard Botha and Marianne

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» A phytosociological classification of the vegetation found on the study area according to vegetation survey data and its TWINSPAN analysis » A corresponding description of all defined plant communities and their typical habitats, including a full species list for each plant community and a representative photographic record taken on site of each community » A map of all plant communities within the boundaries of the study area » A description of the sensitivity of each plant community, based on sensitivity accepted sensitivity criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). » A full assessment of impacts including an assessment of the significant direct, indirect, and cumulative impacts.	Strohbach of Savannah Environmental
Avifaunal impacts	» A survey of the project site and power line route will be undertaken. » The identified impacts will be assessed and final recommendations will be made regarding the significance of each identified impact as well as the layout and power line alignment to be provided by the developer. » Where necessary and possible recommended mitigation measures for the management of the identified impacts will be developed and described.	Blair Zoghby of Savannah Environmental
Impact on Soils and Agricultural Potential	The above requirements together with requirements for an EIA specialist report may be summarised as: » Identify and assess all potential impacts (direct, indirect and cumulative) and economic consequences of the proposed development on soils and agricultural potential. » Describe and map soil types (soil forms) and characteristics (soil depth, soil colour, limiting factors, and clay content of the top and sub soil layers). » Map soil survey points. » Describe the topography of the site. » Do basic climate analysis and identify suitable crops and their water requirements. » Summarise available water sources for agriculture.	Johann Lanz – Soil Scientist

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Describe historical and current land use, agricultural infrastructure, as well as possible alternative land use options. » Describe the erosion, vegetation and degradation status of the land. » Determine and map the agricultural potential across the site. » Determine and map the agricultural sensitivity to development across the site. » Provide recommended mitigation measures, monitoring requirements, and rehabilitation guidelines for all identified impacts.	
Impacts on water resources and determination of water supply	**Geohydrology** The impact of the power station will be investigated through desk studies, field investigations and data analyses. No boreholes will be drilled during this phase of the investigation, but positions of monitoring boreholes and a groundwater monitoring plan will be recommended in the specialist groundwater report. A few selected existing boreholes will be sampled to determine current groundwater quality to serve as baseline for future reference. The following methodology is proposed: » Desktop study and detailed mapping of relevant geohydrological features and gathering of existing information from topographical maps, ortho-photos, geological maps, hydrological information, meteorological information, discussions with relevant personnel, etc. » Perform a borehole/spring census in the area to assess the current groundwater levels, quality and water utilisation. » Selected boreholes will be sampled for chemical analyses to establish the baseline with which influences of the power station on groundwater quality could be compared to. » Based on the information, gathered during the hydrocensus, a conceptual groundwater model will be created to assist in qualitative decisions of groundwater impact in the area. » The data gathered during this phase will also be used for the development of a groundwater monitoring program. If suitable boreholes exist in the study area they will be incorporated into the monitoring program. » The data gathered will be interpretation for the prediction of the possible environmental impact	J. Maré of M2 Environmental Connections

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	that the power station could have on the surrounding groundwater environment, and to propose mitigation measures, if needed. **Water demand reconciliation study** The availability of water or lack thereof constitutes a potential fatal flaw in the Water Use License Application Process. In order to reduce the risk to the project in this regard, the following approach will be followed: » Consideration of water use sector activities in accordance with the specifications as contained in the National Water Resource Strategy and the Interim Strategic Perspective for the Upper Olifants Water Management Area » Consultation to be established with Directorate: Abstraction and Storage to enquire about administrative processes to be followed to apply for bulk water supply. The Power Generation sector is considered a strategic water user. » Liaison and consultation with the WARMS office in order to establish the section 21(a) licenses issued in the catchment as well as the Permits and Exemptions still effective as Existing Lawful Use (as part of Water Use Licensing process). **Surface water study** The specialist surface water report will include the following: » Surface water / drainage lines occurrence » Surface water characteristics (e.g. perennial – ephemeral, effluent – influent – disconnected) » Rainfall pattern, frequency, storm events » Risk of flooding » Water quality » Storm water run off » Flow direction » Sediment transport, potential for erosion	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Importance of streams in regional context and as water supply source » Possible use of surface water for water supply during construction and operation » Risks of pollution » Storm water catchment hydrology » Catchment areas » Slope categories » Average slope of rivers » Land use categories percentage distribution per sub catchment **Wetland assessment** A wetland delineation and Present Ecological State (PES) analysis will be undertaken in terms of the requirements of the Department of Water Affairs.	
Heritage Impact Assessment	The heritage specialist study to be undertaken in the EIA phase will include: » A Phase One - Heritage Impact Assessment (HIA) will be undertaken. During this study sites of archaeological, historical significance or places of cultural interest must be located, identified, recorded, photographed and described. During this study the levels of significance of recorded heritage resources must be determined and mitigation proposed should any significant sites be impacted upon, ensuring that all the requirements of SAHRA are met. » Should a permit be required for activities involving the damaging or removal of specific heritage resources, a separate application would have to be submitted to SAHRA and-or the relevant provincial heritage agency for the approval of such. These agencies will also review the final EIA reports and provide comments to DEA.	Jaco van der Walt of Heritage Contracts and Archaeological Consulting
Noise Impact Assessment	The Environmental Noise Impact Report will cover the following points: » the purpose of the investigation; » a brief description of the planned development or the changes that are being considered; » a brief description of the existing environment including, where relevant, the topography, surface conditions and meteorological conditions during measurements;	Morné de Jager of Enviro Acoustic Research

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» the identified noise sources together with their respective sound pressure levels or sound power levels (or both) and, where applicable, the operating cycles, the nature of sound emission, the spectral composition and the directional characteristics; » the identified noise sources that were not taken into account and the reasons as to why they were not investigated; » the identified Potentially Sensitive Receptors and the noise impact on them; » where applicable, any assumptions, with references, made with regard to any calculations or determination of source and propagation characteristics; » an explanation, either by a brief description or by reference, of all measuring and calculation procedures that were followed, as well as any possible adjustments to existing measuring methods that had to be made, together with the results of calculations; » an explanation, either by description or by reference, of all measuring or calculation methods (or both) that were used to determine existing and predicted rating levels, as well as other relevant information, including a statement of how the data were obtained and applied to determine the rating level for the area in question; » the location of measuring or calculating points in a sketch or on a map; » quantification of the noise impact with, where relevant, reference to the literature consulted and the assumptions made; » alternatives that were considered and the results of those that were investigated; » a list of all the interested or affected parties that offered any comments with respect to the environmental noise impact investigation (if comments are received); » a detailed summary of all the comments received from interested or affected parties as well as the procedures and discussions followed to deal with them (if comments are received); » conclusions that were reached; » proposed recommendations including potential mitigation measures; » any follow-up investigation which should be conducted at completion of the project as well as at regular intervals after the commissioning of the project so as to ensure that the recommendations	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	of this report will be maintained in the future.	
Visual Impact Assessment	It is recommended that additional spatial analyses be undertaken in order to create a visual impact index that will further aid in determining potential areas of visual impact. This exercise should be undertaken for the entire facility (i.e. core power plant) as well as for the ancillary infrastructure, as these structures (e.g. the coal conveyers, coal stock pile, pipeline, etc.) are envisaged to have varying levels of visual impact at a more localised scale. The site-specific issues (as identified in the scoping study) and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact. In this respect, the Plan of Study for EIA is as follows: **Determine Visual Distance/Observer Proximity to the facility** » In order to refine the visual exposure of the facility on surrounding areas / receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for the power plant structures. » Proximity radii for the proposed development site are created in order to indicate the scale and viewing distance of the facility and to determine the prominence of the structures in relation to their environment. » MetroGIS determined the proximity radii based on the anticipated visual experience of the observer over varying distances. The distances are adjusted upwards for larger facilities and downwards for smaller facilities (i.e. depending on the size and nature of the proposed infrastructure). MetroGIS developed this methodology in the absence of any known and/or acceptable standards for South African power station facilities. » The proximity radii (calculated from the boundary lines of the power plant) are as follows: » 0 – 2.5km. Short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence.	Lourens du Plessis of MetroGIS

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» 2.5 - 5km. Medium distance view where the structures would be easily and comfortably visible and constitute a high visual prominence. » 5 - 10km. Longer distance view where the facility would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence. » Greater than 10km. Very long distance view of the facility where the facility could potentially still be visible, though not as easily recognisable. This zone constitutes a low visual prominence for the facility. **Determine Viewer Incidence/Viewer Perception** » The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers, there would be no visual impact. If the visual perception of the structure is favourable to all the observers, then the visual impact would be positive. » It is therefore necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed facility and its related infrastructure. » It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer; regularity of sighting, cultural background, state of mind, and purpose of sighting which would create a myriad of options. **Determine the Visual Absorption Capacity of the landscape** » This is the capacity of the receiving environment to absorb or screen the potential visual impact of the proposed facility. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC. » The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	for a structure contrasting markedly with one or more of the characteristics of the environment would be low. » The VAC also generally increases with distance, where discernable detail in visual characteristics of both environment and structure decreases. » The digital terrain model utilised in the calculation of the visual exposure of the facility does not incorporate the potential visual absorption capacity (VAC) of the region. It is therefore necessary to determine the VAC by means of the interpretation of the natural visual characteristics, supplemented with field observations. **Determine the Visual Impact Index** » The results of the above analyses are merged in order to determine where the areas of likely visual impact would occur. These areas are further analysed in terms of the previously mentioned issues (related to the visual impact) and in order to judge the severity of each impact. » The above exercise should be undertaken for the core power plant as well as the ancillary infrastructure, as these structures (e.g. the substation at the facility, overland coal conveyors, water pipeline, coal stockpile, ash disposal facility, etc.) are envisaged to have varying levels of visual impact at a more localised scale. » The site-specific issues (as mentioned earlier in the report) and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact, as well as suggested mitigation measures.	
Socio-Economic Impact Assessment	The purpose of this step is to provide a concise description and interpretation of the proposed project in terms of economic quantities for modelling purposes. Information on the project details will be obtained from the client. Data gathering for the proposed project need to include: 1. Description of components of the project, whether of a short or long-term, direct or related nature 2. Interpret project in terms of economic variables for modeling purposes 3. Cost estimates for the establishment of the project and expenditure during its operational stages	Urban-Econ Development Economists

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	will be obtained from the client 4. The project will be interpreted in terms of economic elements such as: i. Construction phase: » Duration of construction period » Construction activities and its supply value chain » Cost of construction and break down of these costs in terms of key expenditure items » Number of construction workers to be on site during the phase » Labour costs of construction workers » Housing provision other logistical matters ii. Operational phase: » Duration of the operational period » Operating activities and its supply value chain » Number of workers to be employed at the proposed development during operations » Labour costs of employees during operations iii. Rehabilitation phase: (if required) » Duration of the rehabilitation period » Rehabilitation activities planned and their value chain » Rehabilitation costs and their breakdown » Labour costs and estimated number of works to be involved in rehabilitation. Of specific importance is to ensure that all potential activities, spin-offs and issues are taken into consideration. The interpretation of this project in economic terms and phasing for inclusion in the modelling will be done. Distinction will be made between the various components, whether of a short or long-term, direct or related nature. The project team's in-depth understanding and unequalled knowledge of the study area economy, implies that the issues can be interpreted in a wider context. These will be presented as different scenarios, based on the influence of potential developmental initiatives in the larger region.	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Traffic Impact Study	» Determine existing traffic flows on adjacent road network in order to quantify the regional traffic assessment » Identify current routes ability to handle super and abnormal loads » Determine trip generation by the mine » Investigation regarding any required road upgrading in the area » Determine public transport and pedestrian activities and requirements » Determine access arrangements » Provide mitigation measures, where necessary, to mitigate the assessed impacts and for inclusion in an EMP	ITS Engineers
Cumulative Impact Assessment	Results of all cumulative assessment of the specialist studies will be considered in assessing the overall cumulative impact of the facility and associated infrastructure.	Savannah Environmental

7.5 Methodology for the Assessment of Potential Impacts

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified will be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected;
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
  - Local extending only as far as the development site area – assigned a score of 1;
  - Limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
  - Will have an impact on the region – assigned a score of 3;
  - Will have an impact on a national scale – assigned a score of 4; or
  - Will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
  - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - Medium-term (5–15 years) – assigned a score of 3;
  - Long term (> 15 years) - assigned a score of 4; or
  - Permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment;
  - 2 is minor and will not result in an impact on processes;
  - 4 is low and will cause a slight impact on processes;
  - 6 is moderate and will result in processes continuing but in a modified way;
  - 8 is high (processes are altered to the extent that they temporarily cease); and
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - Assigned a score of 3 is probable (distinct possibility);
  - Assigned a score of 4 is highly probable (most likely); and
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

» The **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high;
» The **status**, which will be described as either positive, negative or neutral;
» The degree to which the impact can be reversed;
» The degree to which the impact may cause irreplaceable loss of resources; and.
» The *degree* to which the impact can be *mitigated.*

The **significance** is determined by combining the criteria in the following formula:

S = (E+D+M)P; where

S = Significance weighting;
E = Extent;
D = Duration;
M = Magnitude; and
P = Probability.

The **significance weightings** for each potential impact are as follows:

» < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area);
» 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated); and
» > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

As ISS Global Mining has the responsibility to avoid or minimise impacts, and plan for their management (in terms of the EIA Regulations). The mitigation of significant impacts will be discussed. Assessment of impacts with mitigation will be made in order to demonstrate the effectiveness of the proposed mitigation measures.

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

» **Details and expertise** of the EAP who compiled the report;
» **Detailed description** of the proposed activity;
» A description of the property(ies) on which the activity is to be undertaken and the location of the activity on the property(ies);

- A description of the **environment that may be affected by the activity** and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity;
- Details of the **public participation process** conducted, including:
  - Steps undertaken in accordance with the plan of study for EIA;
  - A list of persons, organisations and organs of state that were registered as interested and affected parties;
  - A summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response to those comments; and
  - Copies of any representations, objections and comments received from registered interested and affected parties.
- A description of the **need and desirability** of the proposed project and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity;
- An indication of the methodology used in determining the **significance** of potential environmental impacts;
- A description and comparative **assessment of all alternatives** identified during the environmental impact assessment process;
- A summary of the findings and recommendations of **specialist reports;**
- A description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- An assessment of each identified potentially significant impact;
- A description of any assumptions, uncertainties and gaps in knowledge;
- An environmental **impact statement** which contains:
  - A summary of the key findings of the environmental impact assessment; and
  - A comparative assessment of the positive and negative implications of the proposed activity and identified alternatives;
- A draft **environmental management programme;** and
- Copies of specialist reports.

The draft EIA Report will be released for a 40-day public review period. The comments received from I&APs will be captured within a Comments and Response Report, which will be included within the final EIA Report, for submission to the authorities for decision-making.

7.6. Public Participation Process (PPP)

A public participation process will be undertaken by Savannah Environmental in accordance with the requirements of Chapter 6 of the EIA Regulations. Consultation with key stakeholders and I&APs will be on-going throughout the EIA process. Through this consultation process, stakeholders and I&APs will be encouraged to identify additional issues of concern or highlight positive aspects of the project, and to comment on the findings of the EIA process.

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

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

The draft EIA report will be made available for public review for a 40-day period prior to finalisation and submission to the DEA for review and decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, a public meeting and key stakeholder meetings will be held during this public review period.

7.7. Key Milestones of the programme for the EIA

The envisaged key milestones of the programme for the EIA phase of the project are outlined in Table 7.1.

Table 7.1: Envisaged key milestones of the programme for the EIA phase of the project

Key Milestone Activities	Proposed completion date[15]
Public review period for Draft Scoping report	3 May 2014 – 12 May 2014
Authority acceptance of the Scoping Report and Plan of Study to undertake the EIA	June 2014
Undertake detailed specialist studies and public participation process	July – August 2014

[15] Indicative dates only

Key Milestone Activities	Proposed completion date[15]
Make draft EIA Report and draft EMP available to the public, stakeholders and authorities	August – September 2014
Finalisation of Environmental Impact Assessment Report	October 2014
Submit Final EIA Report to DEA for review and decision-making	October 2014

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