DRAFT SCOPING REPORT

SEKOKO WATERBERG COLLIERY, LIMPOPO PROVINCE

Submitted in support of an Application for Authroisation in terms of Chapter 5 of NEMA

LDEDET Ref No: 2/1/9/2-W59

DRAFT REPORT FOR PUBLIC REVIEW

JULY 2014

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PROJECT DETAILS

LDEDET Ref No.	:	2/1/9/2-W59
Title	:	Draft Scoping Report: Sekoko Waterberg Colliery, Limpopo Province
Authors	:	Savannah Environmental (Pty) Ltd Jo-Anne Thomas Tambudzani Mulaudzi
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Client	:	Sekoko Coal (Pty) Ltd
Report Status	:	Draft Scoping Report for Public Review
Review period	:	28 July 2014 – 05 September 2014

When used as a reference this report should be cited as: Savannah Environmental (2013) Draft Scoping Report: Sekoko Waterberg Colliery, Limpopo Province

PURPOSE OF THE DRAFT SCOPING REPORT

Sekoko Coal (Pty) Ltd obtained a Mining Right and Environmental Authorisation for the Sekoko Waterberg Colliery in August 2011 and March 2012 respectively (Mining Right Ref No: LP30/5/1/2/2/184 MR; Authorisation reference: 12/1/9-7/2-W11). In terms of these authorisations, the mining area comprises the following properties: Minnasvlakte 258 LQ, Smitspan 306 LQ, Massenberg 305 LQ and Remainder of Hooikraal 315 LQ. In terms of this Mining Right, the mine would produce up to 5 Million tons per annum (Mtpa) of coal. Following discussions with Eskom regarding requirements for coal supply to various power stations, it has been determined that the annual output of coal from the mine can be increased from 5 Million tonnes per annum (Mtpa) to 10Mtpa. In order to accommodate this requirement, Sekoko Coal is proposing to include the farms Swanepoel Pan 262 LQ, Olieboomsfontein 220 LQ, Duikerfontein 263 LQ and Vetleegte 304 LQ within the Mining Right area, and is also proposing an amendment to their approved Mine Work Programme and infrastructure layout. Sekoko holds valid new order Prospecting Rights on all the above-mentioned properties.

In support of the above-mentioned expansion of the Mining Right area and amendment to the Mine Work Programme, an amendment to Sekoko Coal's existing Environmental Management Programme (EMPr) must be compiled and approved by the Department of Mineral Resources (DMR) in accordance with the requirements of the Mineral and Petroleum Resources Development Act 2002 (Act 28 of 2002) (MPRDA). In order to amend the existing EMPr, Sekoko Coal is required, in terms of the National Environmental Management Act 1998 (Act 107 of 1998) (NEMA), to undertake an EIA for the project in order for Sekoko Coal to obtain the following:

- An Environmental Authorisation from Limpopo Department of Economic Development, Environment and Tourism (LDEDET) for all intended activities listed in EIA Regulations GN R.544, GN R.545 and GN R.546 that are not included in the current Authorisation. **This is the subject of this report**.
- Approval from the DMR for an amendment to the existing EMPr, which will be supported by the EIA. This is considered within a separate report and process.
- A water use licence for the water uses associated with the proposed mining activities on the project site/s not already authorised in terms of the existing permits. This is being applied for through a separate process.

Sekoko Coal has appointed Savannah Environmental, as independent environmental consultants, to undertake the EIA process for the above-mentioned permitting processes. The EIA process is being undertaken in accordance with the requirements of the National Environmental Management Act

(NEMA; Act No. 107 of 1998) and the EIA Regulations of June 2010 (i.e. comprising of a scoping phase and EIA phase), and the MPRDA, and will aim to support all required permitting processes for the proposed project.

This draft Scoping Report has been prepared in support of the Application for Authorisation in terms of the National Environmental Management Act (NEMA). Due to delays in the EIA process due to various factors, the NEMA EIA process has been restarted under a new reference number (LDEDET Ref No.: 2/1/9/2-W59). This report is therefore an updated report to that issued for public comment in February 2013.

This draft Scoping Report intends to provide sufficient background information to statutory and non-statutory parties, affected and surrounding landowners, the general public, organisations and local communities in order to obtain their commentary and input on the proposed development. This Scoping Study aims at identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This is achieved through an evaluation of the proposed project, involving a) the project proponent, b) specialists with experience in EIAs for similar projects, and c) a consultation process with key stakeholders that included both relevant government authorities and interested and affected parties (I&APs).

The EIA Phase will assess those identified potential environmental impacts and benefits associated with all phases of the project including design, construction, operation and decommissioning, and will recommend appropriate mitigation measures for potentially significant environmental impacts.

The nature and extent of the proposed Sekoko Waterberg Colliery is explored in more detail in this Draft Scoping Report.

The Draft Scoping Report consists of ten sections:

» **Chapter 1** provides background to the proposed expansion to the Sekoko Waterberg Colliery and the environmental impact assessment process.
» **Chapter 2** contains a description of the proposed project.
» **Chapter 3** contains the environmental legal and policy framework.
» **Chapter 4** outlines the process which was followed during the Scoping Phase of the EIA process (including public participation).
» **Chapter 5** contains information on the consideration of project and land-use alternatives.
» **Chapter 6** provides a description of the environment which may be potentially affected by the proposed project.
» **Chapter 7** provides an identification of the potential issues associated with the proposed expansion to the Sekoko Waterberg Colliery.

» **Chapter 8** presents the conclusions and recommendations of the Scoping Report.
» **Chapter 9** describes the plan of study for EIA and EMPr.
» **Chapter 10** provides a list of references and information sources used in undertaking this Scoping Report.

The release of a Draft Scoping Report provides stakeholders and the public with an opportunity to consider the proposed Sekoko Waterberg Colliery to include the farms Swanepoel Pan 262 LQ, Olieboomsfontein 220 LQ, Duikerfontein 263 LQ and Vetleegte 304 LQ within the Mining Right area, and the proposed rail loop associated with the mine, and provide comment and input into the EIA process. The Final Scoping Report will incorporate all comments received prior to submission to the LDEDET

PUBLIC REVIEW PERIOD FOR THE DRAFT SCOPING REPORT

Members of the public, local communities and stakeholders are invited to comment on the Draft Scoping Report which has been made available for public review and comment at the following locations from **28 July 2014 to 05 September 2014**:

» Lephalale Local Municipality Public Library (Address: Cnr Joe Slovo Street and Douwater Avenue, Lephalale);
» Marapong Community Library (Address: 1456 Setlhora Street, Marapong); and
» AgriSA: Lephalale (Address; Albert Street, Lephalale).

The Draft Scoping Report was also available for download from the website: www.savannahSA.com. Comments could be made as written submission via fax, post or e-mail. I&APs were also informed via letter that this Draft Scoping Report has been prepared and submitted to DEA and is available for comment and for download from the website: www.savannahSA.com. Copies of the Draft EIA report can be requested, if desired or required by I&APs from the contact person below.

Comments can be made as written submission via fax, post or e-mail to
Gabriele Wood of Savannah Environmental (Pty) Ltd Post: PO Box 148, Sunninghill Johannesburg 2157 Tel: 011 656-3237 Fax: 086 684 0547 E-mail: gabriele@savannahsa.com
The due date for comment is 05 September 2014

SUMMARY

Background

Sekoko Coal (Pty) Ltd obtained a Mining Right and Environmental Authorisation for the Sekoko Waterberg Colliery in August 2011 and March 2012 respectively (Mining Right Ref No: LP30/5/1/2/2/184 MR; Authorisation reference: 12/1/9-7/2-W11). In terms of these authorisations, the mining area comprises the following properties: Minnasvlakte 258 LQ, Smitspan 306 LQ, Massenberg 305 LQ and Remainder of Hooikraal 315 LQ. In terms of this Mining Right, the mine would produce up to 5 Million tons per annum (Mtpa) of coal. Following discussions with Eskom regarding requirements for coal supply to various power stations, it has been determined that the annual output of coal from the mine can be increased from 5 Million tonnes per annum (Mtpa) to 10Mtpa. In order to accommodate this requirement, Sekoko Coal is proposing to include the farms Swanepoel Pan 262 LQ, Olieboomsfontein 220 LQ; Duikerfontein 263 LQ and Vetleegte 304 LQ within the Mining Right area, and is also proposing an amendment to their approved Mine Work Programme and infrastructure layout. Sekoko holds valid new order Prospecting Rights on all the above-mentioned properties. Figure 1 provides an overview of the properties included in the current Mining Right and those proposed to be included in the expanded Mining Right area.

In support of the above-mentioned expansion of the Mining Right area and amendment to the Mine Work Programme, an amendment to Sekoko Coal's existing Environmental Management Programme (EMPr) must be compiled and approved by the Department of Mineral Resources (DMR) in accordance with the requirements of the Mineral and Petroleum Resources Development Act 2002 (Act 28 of 2002) (MPRDA). In order to amend the existing EMPr, Sekoko Coal is required, in terms of the National Environmental Management Act 1998 (Act 107 of 1998) (NEMA), to undertake an EIA for the project in order for Sekoko Coal to obtain the following:

- An Environmental Authorisation from Limpopo Department of Environment (LDEDET) for all intended activities listed in EIA Regulations GN R.544, GN R.545 and GN R.546 that are not included in the current Authorisation. **This is the subject of this report.**
- Approval from the DMR for an amendment to the existing EMPr, which will be supported by the EIA. This is considered within a separate report and process.; and
- A water use licence for the water uses associated with the proposed mining activities on the project site/s not already authorised in terms of the existing permits. This is being applied for through a separate process.

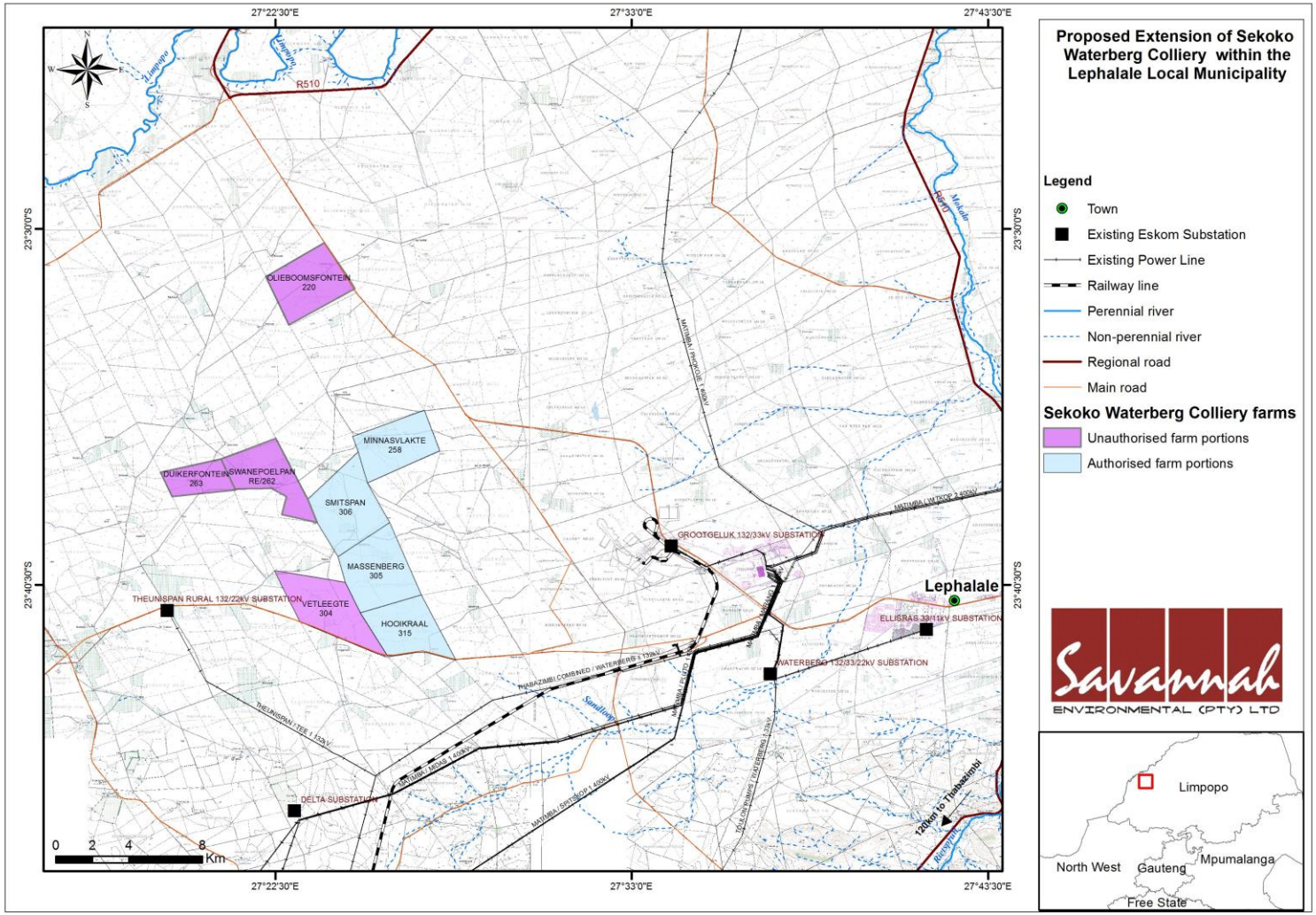

Figure 1.1: Locality Map showing the proposed farm portions which make up with Sekoko Waterberg Colliery, near Lephalale, Limpopo (Farm portions within existing Mining Right area shown in blue; additional farm portions to be included in Mining Right area shown in purple)

In accordance with the MPRDA and EIA Regulations, this Scoping process aims to:

» identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including mine design, establishment, operation and closure) through a desk-top review of existing baseline data and specialist studies,
» identify and consult with affected and surrounding landowners and other stakeholders and interested and affected parties regarding the project, and
» 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.

Overview of the Proposed Mining Activities

Opencast mining will initiate on the Farm Smitspan and expand southwards on to Massenberg. An opencast mine with a mine life of 30 years is proposed, ramping up progressively over six years to produce 10Mtpa of washed coal for Eskom. A modular coal processing plant will be constructed, which at full capacity will comprise 4 modules. During this period it is likely that Sekoko Coal will evaluate opportunities for opencast and possibly underground mining on other authorised areas within the mining right boundary as well as on the three new farm portions (farm 220 (Olieboomsfontein), farm 263 (Duikerfontein); and farm 262 (Swanepoelpan). The mine work programme (MWP) will be amended to reflect the larger scale of operations on Smitspan and Massenberg and submitted to DMR for approval in due course. In the event there are any further changes in the main coal mining and processing activities within the Mining Right area, suitable amendments to the MWP will be submitted.

At this stage, the main coal mining infrastructure within the Mining Right area will include:

» Coal storage areas and stockpiles.
» Two wash plants with a production capacity of 400t/h and 3600 t/h and associated infrastructure.
» Water storage and reticulation infrastructure.
» Office and maintenance area/s.
» Power supply infrastructure including on surface substations and power lines (<11kV in capacity).
» Access roads.
» Railway line.
» Pipeline for water supply. Water is expected to be available from the Mokolo-Crocodile Water Augmentation Project (MCWAP) Phase 2.
» Pollution control dams.

» Coal discard dumps.
» Topsoil and spoil stockpiles.

Sekoko Coal holds a mining authorisation for the above-listed activities on the already authorised properties, i.e. Minnasvlakte 258 LQ, Smitspan 306 LQ, Massenberg 305 LQ and Remainder of Hooikraal 315 LQ, via a new order mining right reference LP 30/5/1/1/2/184MR issued to Sekoko Coal on 17 August 2011.

Conclusions and Recommendations

The Scoping Study for the proposed expansion of the Sekoko Waterberg Colliery to include the farms Swanepoel Pan 262 LQ, Olieboomsfontein 220 LQ and Duikerfontein 263 LQ within the Mining Right area, and to amend the approved Mine Work Programme and infrastructure layout has been undertaken in accordance with the requirements of the Minerals and Petroleum Resources Development Act (MPRDA; Act No 28 of 2002) and the EIA Regulations of June 2010, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

This Scoping Study aimed at identifying potential issues associated with the proposed expansion of the coal mine, and defining the extent of any additional work or studies required within the EIA phase. This was achieved through an evaluation of the proposed project, involving the project proponent, specialists with relevant experience, and a consultation process with key stakeholders. In terms of the requirements of the MPRDA and EIA Regulations, feasible alternatives (including the 'do nothing' option) have been considered within the Scoping Study (and discussed in detail in Chapter 5).

The conclusions & recommendations of this Scoping Study are the result of review of existing information, limited on-site inspections, desk-top identification and evaluation of impacts identified by specialists, and the parallel process of public participation. The public consultation process has been extensive and every effort has been made to include representatives of all stakeholders in the study area.

A summary of the conclusions of the evaluation of the proposed Sekoko Waterberg Colliery, as well as an initial indication of mitigation and management measures for potentially significant impacts is provided below.

a) Topography

Activities which will impact on local topography include levelling of areas for infrastructure, excavation of the boxcut on Smitspan, opencast mining, and soil, overburden and coal stockpiling. Only the discard dump will be a permanent change in the surface topography of the site and is therefore of local extent, especially due to the fact that the area comprises of fairly flat plains

which would potentially make discard dumps more visible.

During decommissioning and closure of the mine, the impact on topography will be largely positive due to the rehabilitation of the area. This will involve the filling of voids, the contouring of disturbed areas to fit in with the surrounding area and also allow for free surface water drainage and the replacement of soil and vegetation to the disturbed area.

b) Geology

The impacts on geology during construction will be due to excavations of the initial box cut. The geological layers will be permanently disturbed and displaced. This impact will carry on during the operation phase but be further exacerbated by the removal of the coal seams. Further impacts are expected during the operations phase from blasting activities which may crack and disturb adjacent geological features in the area.

Mitigation and management measures in terms of erosion associated with the establishment and operation of the mining development and associated infrastructure will be recommended through detailed studies to be undertaken in the EIA and EMPr phase.

c) Soils, Land Capability and Land Use

The main impact on soil will be the stripping and stockpiling of soils which will commence in the construction phase and continue into the operation phase. The impact is of medium to high significance. Other impacts to soil quantity are related mostly to erosion, and include the operation of diversion berms and channels and soil stockpiles. Increase in erosion potential as a result of loss in vegetation cover for extended periods and/or changes to water flows is expected to occur. The most significant impact during the operation phase is the potential contamination of soil by coal dust, which could inadvertently alter soil pH and change soil chemical and physical characteristics. It may also impact on the potential of the soil to support vegetative growth.

Good soil management and mitigation and management measures in terms of erosion associated with the establishment and operation of the mining development and associated infrastructure, and management of hazardous substances must be recommended through detailed studies to be undertaken in the EIA and EMPr phase.

d) Surface Water Resources

Surface water contamination during the operation of the coal mine is an impact of potentially high

significance. Containment of dirty water from the mine area is essential to minimise this impact. Despite the fact that there are no water resources on the site, water will be required for operation of the coal mine and coal-washing.

The potential significance of impacts identified must be confirmed, and detailed management and rehabilitation measures must be investigated and detailed as part of the EIA and EMPr phase of the process. Long-term planning and sustainability should be considered and, therefore, predictions on water quality and quantity in the future should also be incorporated in studies to be undertaken in the EIA and EMP phases.

All necessary water use licenses as required in terms of Section 21 of the National Water Act (Act No 36 of 1998) must be obtained from DWA prior to commencing with mining operations.

e) Groundwater Resources

Impacts from the proposed Sekoko mining operations on groundwater were evaluated and include:

» Mine dewatering and the associated drawdown in groundwater level due to the boxcut and underground mine dewatering.
» Impacts on Sekoko water supply boreholes, and impacts on neighbouring privately owned boreholes due to potential lowering of the groundwater levels surrounding the mining area.
» Groundwater inflow volumes into the mine area over the life of mine.
» Contamination of aquifers from the pit and surface storage areas (discard etc.).
» Recovery of groundwater levels in the post-mining environment.
» Decant potential, quality, and volumes.

Underground mining has less impact on underground water resources than open cast methods since the upper aquifer stays intact without being influenced. The groundwater model needs to be completed to make predictions on the extent of dewatering and how drastically local groundwater levels will change. Dewatering will result in an inflow of groundwater from the surrounding areas and therefore contamination plumes will develop during mining.

Initial recommendations are made in terms of mitigation and management of potential impacts. The potential significance of impacts identified must be confirmed, and detailed management and rehabilitation measures must be investigated and detailed as part of the EIA and EMP phase of the process.

f) Vegetation and Ecology

The floristic sensitivity of the natural woodland habitat of the region is regarded as being medium-high. This is in spite of a Least Threatened conservation status that is ascribed

to the regional vegetation (Limpopo Sweet Bushveld). The known presence of several protected tree species, the likely presence of plants of conservation importance, as well as the untransformed nature of the region as a whole, renders the sensitivity of the proposed project site relatively high. The development of the coal mine will lead to biodiversity loss in the long term within the footprint of the development. The potential significance of impacts identified must be confirmed, and detailed management and rehabilitation measures must be investigated and detailed as part of the EIA and EMP phase of the process.

g) Fauna and Ecology

Most of the study area is estimated to have a medium-high faunal sensitivity. Potential and likely impacts of this type of development on fauna include:

» Loss of biodiversity as a result of direct impacts on fauna species of conservation importance and direct impacts on common fauna species / faunal assemblages (including migration patterns, corridors, etc.);
» Human - Animal conflicts;
» Loss or degradation of natural pristine habitat (including ecosystem functioning);
» Impacts on South Africa's conservation obligations & targets;
» Increase in local and regional fragmentation/ isolation of habitat; and
» Increase in environmental degradation, pollution (air, soils, surface water).

As part of the detailed assessment phase, potential impacts on the various faunal groups identified through this scoping study must be described, their duration and extent determined, their significance assessed, and possible mitigatory and management measures identified.

h) Air Quality Impacts

The air quality monitoring results showed that concentrations of gaseous pollutants (sulphur dioxide, nitrogen dioxide and ozone) were within the South African standards. Particulate matter equal to or smaller than 10 micrometre also complied with current national standards but not with proposed (from 2015) standards. The emissions of particulates from the Sekoko Mine will add to the existing particulate concentrations. The potential exists to increase the frequency of exceedance of the ambient standards for particulates around the proposed coal mine and in the surrounding environment. Indirect impacts may result from the emission of Greenhouse Gases such as methane (CH4) and carbon dioxide (CO2) from spontaneous combustion, should this occur.

In order to quantify the potential impacts associated with these air emission sources, detailed studies (including modelling) are required to be undertaken in the EIA and EMP phase of the process.

i) Noise Impacts

Potentially sensitive receptors within the study area were identified through the scoping process. Excluding farm dwellings, there are no residential areas within 5,000 m of the coal mine site. There are people residing on the affected on surrounding farm portions. Noise and vibration associated with the establishment and operation of the proposed mine could impact on the surrounding landowners. In order to quantify the potential impacts associated with the noise sources, detailed studies (including noise modelling) are required to be undertaken in the EIA and EMP phase of the process.

j) Heritage Sites

Various cultural, historical and archaeological resources are known to exist or are expected to exist in the study area. The main impacts to archaeological and cultural site will occur during construction and the roll-over progression of opencast mining. The main significant impact is the potential disruption to grave sites. A Phase 1 heritage impact assessment (HIA) will be undertaken in the EIA phase.

There is no doubt that well-preserved plant fossils, and possible rare insect fossils could be encountered during mining activities. It is imperative that the operational (mining) staff be aware of the potential for encountering productive fossil horizons and individual specimens. If any well-preserved fossils are encountered this should be reported to an appropriately qualified palaeontologist such that the site can be appropriately excavated and recorded.

k) Traffic and Infrastructural Impacts

Increased traffic is expected during the construction and operation of the mine. Truck traffic will affect road surfaces and a road maintenance plan will need to be implemented to ensure the roads remain safe for other road users. The trucks will need to avoid the town of Lephalale or any communities in the area in order to ensure that any safety issues to pedestrians remain low.

During operation, the mine and wash plant will require activity of trucks and vehicles resulting in increased traffic in the area. Impacts include a potential increase in road incidences, and the high probability of road degradation which will make the road unsafe for road users.

The preferred access road alternatives (if any) will be considered during the EIA phase in order to assess the potebtial impacts associated with the proposed project.

l) Visual Impacts associated with the Proposed Mine Development

The proposed coal mine is situated in an area with existing coal mining and power generation plants. Therefore the existing viewshed is degraded to some extent. Important issues that need to be addressed in the detailed visual impact assessment are the effect of night-time activities and lighting on the landscape, as well as the potential impact of an increase in the number of large vehicles on the road between the site and the main arterial routes and the town on Lephalale. As a preliminary mitigation measure it is noted that the minimisation of bush clearance will assist in dramatically reducing any visual impacts due to the high absorption capacity of the vegetation. This can be further improved by the planting of indigenous trees on the perimeter of the mine area.

m) Socio-Economic Impacts

Impacts on the socio-economic environment relate to the creation of job and business opportunities (positive), as well as impacts on surrounding landowners who utilise their farms for various agricultural activities from which they source their income and maintain their livelihoods (negative).

The socio-economic assessment will assess the social and economic impact on the current population including quality of life of the current population, potential local and national economic impacts (considering the local municipality, the Limpopo province and South Africa as an entity) and impacts on surrounding landowners.

CONTENT OF SCOPING REPORT IN TERMS OF NEMA AND NEMA EIA REGULATIONS AND CROSS REFERENCE IN THIS REPORT

Table 1: Content of this Scoping Report in terms of NEMA and Regulation 28 of the EIA Regulations of June 2010

NEMA Regulation 544, Section 28 – Content of Scoping Reports	
A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, ad must include -	
(a) details of— (i) the EAP who prepared the report; and (ii) the expertise of the EAP to carry out scoping procedures	Chapter 1
(b) a description of the proposed activity	Chapter 2
(c) a description of any feasible and reasonable alternatives that have been identified	Chapter 2 and Chapter 5
(d) a description of the property on which the activity is to be undertaken and the location of the activity on the property, or if it is— (i) a linear activity, a description of the route of the activity; or (ii) an ocean-based activity, the coordinates where the activity is to be undertaken	Chapter 1 and Chapter 2
(e) a description of the environment that may be affected by the activity and the manner in which activity may be affected by the environment	Chapter 6
(f) an identification of all legislation and guidelines that have been considered in the preparation of the scoping report	Chapter 3
(g) a description of environmental issues and potential impacts, including cumulative impacts, that have been identified	Chapter 7
(h) details of the public participation process conducted in terms of regulation 27(a), including—	
(i) the steps that were taken to notify potentially interested and affected parties of the application	Chapter 4 & Appendix E
(ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the application have been displayed, placed or given	Appendix D
(iii) a list of all persons or organisations that were identified and registered in terms of regulation 55 as interested and affected parties in relation to the application	Appendix E
(iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues	To be included in the Final Scoping Report as

	a Comments Responses Report
(i) a description of the need and desirability of the proposed activity	Chapter 4
(j) a description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity	Chapter 5
(k) copies of any representations, and comments received in connection with the application or the scoping report from interested and affected parties	Public Participation Underway – to be included in Final Scoping Report
(l) copies of the minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants	Public Participation Underway – to be included in Final Scoping Report
(m) any responses by the EAP to those representations and comments and views;	Public Participation Underway – to be included in Final Scoping Report
(n) a plan of study for environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, which must include—	Chapter 9
(i) a description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken	
(ii) an indication of the stages at which the competent authority will be consulted	
(iii) a description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity; and	
(iv) particulars of the public participation process that will be conducted during the environmental impact assessment process	
(o) any specific information required by the competent authority	
(p) any other matters required in terms of sections 24(4)(a) and (b) of the Act.	
(2) In addition, a scoping report must take into account any guidelines applicable to the kind of activity which is the subject of the application.	Chapter 3
(3) The EAP managing the application must provide the	Chapter 2 and Chapter

competent authority with detailed, written proof of an investigation as required by section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation (1)(c), exist.	5

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APPENDICES

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.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

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.

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.

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).

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.

ABBREVIATIONS AND ACRONYMS

BID	Background Information Document
CBOs	Community Based Organisations
CO_2	Carbon dioxide
DEA	National Department of Environmental Affairs
DMR	Department of Mineral Resources
DOT	Department of Transport
DWA	Department of Water Affairs
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
km^2	Square kilometres
kV	Kilovolt
LDEDET	Limpopo Department of Economic Development, Environment and Tourism
LIHRA	Limpopo Heritage Resources Agency
m^2	Square meters
MPRDA	Minerals and Petroleum Resources Development Act (Act No 28 of 2002)
MW	Mega Watt
NEMA	National Environmental Management Act (Act No 107 of 1998)
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

Sekoko Coal (Pty) Ltd obtained a Mining Right and Environmental Authorisation for the Sekoko Waterberg Colliery in August 2011 and March 2012 respectively (Mining Right Ref No: LP30/5/1/2/2/184 MR; Authorisation reference: 12/1/9-7/2-W111). In terms of these authorisations, the mining area comprises the following properties: Minnasvlakte 258 LQ, Smitspan 306 LQ, Massenberg 305 LQ and Remainder of Hooikraal 315 LQ. In terms of this Mining Right, the mine would produce up to 5 Million tons per annum (Mtpa) of coal. Following discussions with Eskom regarding requirements for coal supply to various power stations, it has been determined that the annual output of coal from the mine can be increased from 5 Million tonnes per annum (Mtpa) to 10Mtpa. In order to accommodate this requirement, Sekoko Coal is proposing to include the farms Swanepoel Pan 262 LQ, Olieboomsfontein 220 LQ, Duikerfontein 263 LQ and Vetleegte 304 LQ within the Mining Right area, and is also proposing an amendment to their approved Mine Work Programme and infrastructure layout. Sekoko holds valid new order Prospecting Rights on all the above-mentioned properties. Figure 1.1 provides an overview of the properties included in the current Mining Right and those proposed to be included in the expanded Mining Right area.

In support of the above-mentioned expansion of the Mining Right area and amendment to the Mine Work Programme, an amendment to Sekoko Coal's existing Environmental Management Programme (EMPr) must be compiled and approved by the Department of Mineral Resources (DMR) in accordance with the requirements of the Mineral and Petroleum Resources Development Act 2002 (Act 28 of 2002) (MPRDA). In order to amend the existing EMPr, Sekoko Coal is required, in terms of the National Environmental Management Act 1998 (Act 107 of 1998) (NEMA), to undertake an EIA for the project in order for Sekoko Coal to obtain the following:

- An Environmental Authorisation from Limpopo Department of Economic Development, Environment and Tourism (LDEDET) for all intended activities listed in EIA Regulations GN R.544, GN R.545 and GN R.546 that are not included in the current Authorisation. This is the subject of this report
- Approval from the DMR for an amendment to the existing EMPr, which will be supported by the EIA. This is considered within a separate report and process
- A water use licence for the water uses associated with the proposed mining activities on the project site/s not already authorised in terms of the existing permits. This is being applied for through a separate process.

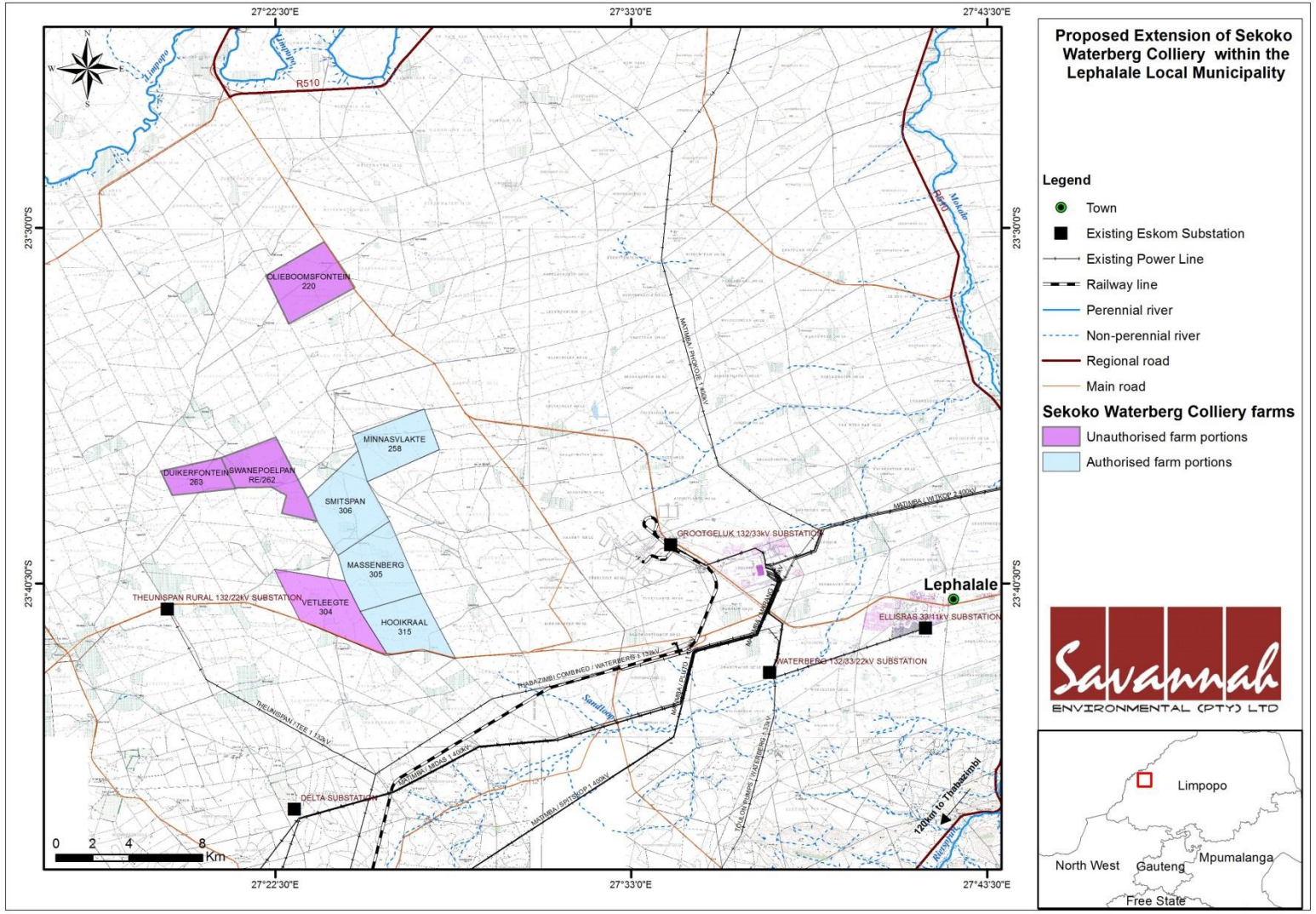

Figure 1.1: Locality Map showing the proposed farm portions which make up with Sekoko Waterberg Colliery, near Lephalale, Limpopo (Farm portions within existing Mining Right area shown in blue; additional farm portions to be included in Mining Right area shown in purple)

Sekoko Coal has appointed Savannah Environmental, as independent environmental consultants, to undertake the EIA process for the above-mentioned permitting processes. The EIA process is being undertaken in accordance with the requirements of the National Environmental Management Act (NEMA; Act No. 107 of 1998) and the EIA Regulations of June 2010 (i.e. comprising of a scoping phase and EIA phase), and will aim to support all required permitting processes for the proposed project.

This draft Scoping Report has been prepared in support of the Application for Authorisation in terms of the National Environmental Management Act (NEMA). Due to delays in the EIA process due to various factors, the NEMA EIA process has been restarted under a new reference number (LDEDET Ref No.: 2/1/9/2-W59). This report is therefore an updated report to that issued for public comment in February 2013.

The scope of this EIA process will include the farm portions already included within the Mining Right area as well as the additional properties to be added to this area, due to the required increase in output of coal that is planned to be mined as well as the amendment to the approved Mine Work Programme (MWP) and infrastructure layout. In addition, the location of the railway line and rail loop on Remainder of Hooikraal 315 LQ as considered in a previous application to LDEDET (LDEDET Ref.: 12/1/9/2-W5) will now be included within the scope of this application as an alternative location to that on the Farm Minnasvlakte 258 LQ for this infrastructure. The purpose of the Waterberg Colliery will be to mine coal for both the local power stations within the Waterberg area as well as for the export markets. A processing plant and various mine related infrastructure will be erected within an appropriate location within the mining area, depending on the Draft mining plan. Opencast mining will initiate on the Farm Smitspan and expand southwards on to Massenberg. An opencast mine with a mine life of 30 years is proposed, ramping up progressively over six years to produce 10Mtpa of washed coal for Eskom. A modular coal processing plant will be constructed, which at full capacity will comprise 4 modules. During this period it is likely that Sekoko Coal will evaluate opportunities for opencast and possibly underground mining on other authorised areas within the mining right boundary.

The main infrastructure associated with the mine includes*:*

» Coal storage areas and stockpiles.
» Two wash plants with a production capacity of 400t/h and 3600 t/h and associated infrastructure.
» Wastewater treatment package plant with capacity of 240Kl/d
» Water treatment package plant with capacity of 500Kl/d
» Water storage and reticulation infrastructure.
» Office and maintenance area/s.

- Power supply infrastructure including on surface substations and power lines (<11kV in capacity).
- Access roads.
- A railway line with rail loops located on either Minaarsvlakte or Hooikraal.
- Pipeline for water supply. Water is expected to be available from the Mokolo-Crocodile Water Augmentation Project (MCWAP) Phase 2.
- Pollution control dams.
- Coal discard dumps.
- Topsoil and spoil stockpiles.

A bankable feasibility study (BFS) was undertaken for the project to demonstrate the feasibility of the 10Mtpa coal mine. Through this BFS process, feasible alternatives project alternatives behave been developed for further investigation.

1.1. Location of the Site

The Sekoko Waterberg Coal Mine is situated approximately 15 km west of Lephalale (formerly known as Ellisras) in the Limpopo Province of South Africa. The proposed mine is situated in the Lephalale Local Municipality which falls under the jurisdiction of the Waterberg District Municipality. The proposed coal-mining area will involve opencast coal mining (refer to Figure 1.1). The nearest local community and town is Lephalale.

1.2. Requirement for an Environmental Impact Assessment

Before the proposed project may proceed, an amendment to the mine's existing Environmental Management Programme (EMPr) must be compiled and approved by the DMR in accordance with the requirements of the MPRDA (Act No. 28 of 2002), in support of the amendment of the existing Mining Right. In addition, any activities associated with the mine which are not already authorised in terms of the current Environmental Authorisation must be authorised by LDEDET in terms of NEMA (Act 107 of 1998). In order to amend the EMPr and obtain the required Environmental Authorisation for any additional activities, a full EIA process (including Scoping and Impact Assessment) is required to be undertaken. In addition, the EIA is required to support the Water Use License application for the project. This section provides a brief overview of the EIA requirements of this legislation and their application to this project.

1.2.1. Mineral and Petroleum Resources Development Act

In terms of the **Mineral and Petroleum Resources Development Act** (MPRDA; Act No. 28 of 2002), mining operations on the three additional farm portions (namely: Swanepoel Pan 262 LQ, Olieboomsfontein 220 LQ, and Duikerfontein 263 LQ) at the Sekoko Waterberg Colliery can only commence once

Sekoko Coal has received authorisation from the the DMR. In addition, Sekoko Coal requires authorisation from LDEDET in terms of NEMA for any listed activities in terms of the EIA regulations. In support of these applications, an **EIA and EMPr** must be compiled for the proposed project. The EMPr has two parts, i.e. an **EIA** and an **Environmental Management Programme (EMP)**. Both parts must be submitted to the DMR for review and decision-making.

The environmental impacts associated with the establishment and operation of the proposed expansion of the proposed Sekoko Waterberg coal mine and amendment to the approved Mine Work Programme (MWP) and infrastructure layout must be assessed within the EIA, and appropriate management measures must be identified and detailed within the EMP. This process must be informed by a public consultation process where Interested and Affected Parties (I&APs) are provided the opportunity to raise any issues and comments regarding the proposed project. This process is underway with the DMR (Project Ref: LP30/5/1/2/3/2/1/184EM) through a separate process to the NEMA application process which is the subject of ths report.

1.2.2. National Environment Management Act

The **National Environmntal Management Act** (NEMA; Act No 107 of 1998) is the overarching environmental legislation for South Africa. There are a number of activities associated with the proposed coal mine project which are listed activities in terms of the EIA Regulations of June 2012 published under NEMA; Act No 107 of 1998. 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 (that is LDEDET in this case). In terms of sections 24 and 24D of NEMA, as read with Government Notices R543 –R546, a **Scoping and EIA** are required to be undertaken for this proposed project as it includes the following activities listed in terms of GN R544 and R545 (GG No 33306 of June 2010):

Table 1.2: Listed Activites in terms of NEMA which require environmental authorisation

Relevant notice:	Activity No (s)	Activity description in terms of the regulation	Describe each listed activity as per project description:
R. 544, 18 June 2010	9	The construction of facilities or infrastructure exceeding 1000 metres in length for the bulk transportation of water, sewage or storm water - (i) with an internal diameter of 0,36 metres or more; or	A water supply pipeline will be required for the transportation of water between the point of supply and the mine.

Relevant notice:	Activity No (s)	Activity description in terms of the regulation	Describe each listed activity as per project description:
		(ii) with a peak throughput of 120 litres per second or more	
R. 544, 18 June 2010	20	Any activity requiring a mining permit in terms of section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) or renewal thereof.	Subsurface coal mining in planned on the additional farm portions; this requires an amendment to the existing mining permit in terms of the MPRDA.
R. 544, 18 June 2010	22	The construction of a road, outside urban areas (ii) where no reserve exists where the road is wider than 8 metres.	Access roads will be required for mining activities.
R. 544, 18 June 2010	26	Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).	The NEM: BA contains lists of species that are protected. The site may contain protected plant/ animal/ ecosystems to be confirmed during the EIA process.
R. 544, 18 June 2010	28	The expansion of or changes to existing facilities for any process or activity where such expansion or changes to will result in the need for a [new, or amendment of, an existing] permit or license in terms of national or provincial legislation governing the release of emissions or pollution, excluding where the facility, process or activity is 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).	• IWULA application through Department of Water Affairs • Waste licence through the National Department of Environmental Affairs for the storage and processing of sewage and general waste on site.
R 545, 18 June 2010	3	The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined	Infrastructure to store and process sewage and other hazardous and dangerous materials pertaining to construction, opencast mining, Storage of hydrocarbon more than *100m^3. Requested by LDEDET*

Relevant notice:	Activity No (s)	Activity description in terms of the regulation	Describe each listed activity as per project description:
		capacity of more than 500 cubic metres.	*official to be included as activity*.
R 545, 18 June 2010	6	The construction of facilities or infrastructure for the bulk transportation of dangerous goods - (iii) in solid form, outside an industrial complex, using funiculars or conveyors with a throughput capacity of more than 50 tons day.	Transportation of coal to the train yard to transport the coal to the power station.
R 545, 18 June 2010	11	The construction of railway lines, stations or shunting yards, excluding - (i) railway lines, shunting yards and railway stations in industrial complexes or zones; (ii) underground railway lines in a mining area; and (iii) additional railway lines within the reserve of an existing railway line;	Railway lines will be required to connect to the existing railway network in the area in order to transport the coal from the coal mine to the coal-users (such as power stations in the Lephalale area).
R 545, 18 June 2010	15	Physical alteration of undeveloped, vacant land or derelict land for industrial use where the total area to be transformed is 20 hectares or more.	The development footprint for the coal mining area will be greater than 20ha in extent.
R 545, 18 June 2010	20	Any activity which requires a mining right or renewal thereof as contemplated in sections 22 and 24 respectively of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).	The farm portions included in the NEMA EIA application to LDEDET will require an amendment of the existing mining permit issued by the DMR for the Sekoko Waterberg Colliery.
R 546, 18 June 2010	14	The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation (i) All areas outside urban	The opencast mining will require the clearance of vegetation, which is largely indigenous in nature.

Relevant notice:	Activity No (s)	Activity description in terms of the regulation	Describe each listed activity as per project description:
		areas.	
GN 544, 18 June 2010 (as amended on 29 November 2013 in terms of GNR 922)	55A	The construction of facilities for the treatment of effluent wastewater or sewage with a daily throughput capacity of more than 2000 cubic metres but less than 15000 cubic metres.	Waste water treatment package plant and a water treatment package plant to the capacity of 240Kl/d and 500Kl/day respectively.

This NEMA EIA process must be informed by a public consultation process where Interested and Affected Parties (I&APs) are provided the opportunity to raise any issues and comments regarding the proposed project.

1.4.3. Regulating Authorities

As the MPRDA and NEMA require similar environmental processes to be undertaken in order to identify and assess potential environmental impacts, these two legislated processes are being undertaken in parallel for the proposed expansion of the Sekoko Waterberg Colliery. In this regard, an application for an amendment to the Mining Right in terms of Section 22 of the MPRDA has been submitted to the DMR to amend the Mine Works Programme (Mining Right No: LP30/5/1/2/2/184 MR), and an application for authorisation in terms of NEMA has been submitted to LDEDET. The environmental reports compiled through the EIA process will be submitted to both the DMR and LDEDET, as decision-making authorities. These authorities will review the environmental reports and will make a considered decision based on all factors associated with the proposed project.

In the ambit of co-operative governance, the competent authorities will consult with other commenting authorities before making a decision. These could include, amongst others:

» Department of Water Affairs (DWA)
» Department of Land Affairs
» Department of Agriculture
» Limpopo Heritage Resources Authority (LIHRA)
» Lephalale Local Municipality
» Waterberg District Municipality

1.3. Details of Savannah Environmental's Expertise to carry out the EIA Process

Savannah Environmental was contracted by Sekoko Coal (Pty) Ltd as an **independent consultant** to undertake an EIA for the proposed project, as required by the MPRDA and NEMA EIA Regulations. Neither Savannah Environmental, nor any of its specialist sub-consultants are subsidiaries of or affiliated to Sekoko Coal (Pty) Ltd. 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 has acquired considerable experience in environmental assessment and environmental management over the last 10 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.

Jo-Anne Thomas, Tambudzani Mulaudzi and Mwansa Lukesa (the principle authors of this Scoping Report) have diverse experience in the environmental management field. They have gained extensive knowledge and experience in the assessment of environmental impacts of a large variety of projects through their involvement in EIA processes across South Africa over the past years. Savannah Environmental has undertaken various environmental impact assessments in compliance with the requirements of NEMA and the MPRDA. Brief CVs of the principal authors are attached as Appendix A

In order to adequately identify and assess potential environmental impacts, Savannah Environmental has appointed several specialist consultants to conduct specialist studies, as required. Details of these specialist studies are included in Chapter 3.

1.4. Overview of the Scoping Study

Scoping is the first phase of the EIA process (to inform the EIAR and EMPr). The Scoping Phase of the EIA process refers to the process of **identifying and describing potential issues** associated with the proposed project, and defining the extent of studies required within the EIA. The main purpose of the Scoping Study is to:

» engage interested and affected parties (I&APs) and relevant stakeholders in the process;

» describe the most appropriate procedure to plan and develop the proposed mining operation; and
» focus the environmental assessment in order to ensure that only significant issues, and reasonable and feasible alternatives are examined.

This report documents the scoping evaluation of the potential environmental impacts of the proposed Sekoko Waterberg coal mine's establishment and operation. This scoping study forms part of the EIA process and has been conducted in accordance with the requirements of the MPRDA and the EIA Regulations in terms of Section 24(5) of NEMA.

In accordance with the EIA Regulations of June 2010, the aim of this Scoping Report is to:

» Describe the scoping process undertaken for the proposed project.
» Provide information on the proposed coal mine to the authorities and stakeholders.
» Provide information regarding alternatives that have been considered.
» Show how authorities and I&APs will be afforded the opportunity to contribute to the project, and to allow them to verify that the issues they have raised to date were considered.
» Describe the baseline receiving environment.
» Describe the potential environmental consequences of the proposed project.
» Describe the most appropriate procedure to plan and develop the proposed expansion of the mining operation.
» Indicate the draft terms of reference of specialist studies that will be initiated during the impact assessment phase.

The Scoping Report is intended to provide sufficient background information to statutory and non-statutory parties, the general public, organisations and local communities in order to obtain their commentary and input on the proposed development. The Scoping Phase of the EIA process identifies and describes potential issues associated with the proposed project, and defines the extent of the studies required within the EIA Phase of the process. The EIA Phase will assess those identified potential environmental impacts and benefits associated with all phases of the project including design, construction, operation and decommissioning, and will recommend appropriate mitigation measures for potentially significant environmental impacts. The nature and extent of the expansion to the Sekoko Waterberg Colliery is explored in more detail in this Scoping Report.

This Scoping Report consists of the following ten sections:

» **Chapter 1** provides background to the proposed expansion to the Sekoko Waterberg Colliery and the environmental impact assessment process.
» **Chapter 2** contains a description of the proposed project.
» **Chapter 3** contains the environmental legal and policy framework.
» **Chapter 4** outlines the process which was followed during the Scoping Phase of the EIA process (including public participation).
» **Chapter 5** contains information on the consideration of project and land-use alternatives.
» **Chapter 6** provides a description of the environment which may be potentially affected by the proposed project.
» **Chapter 7** provides an identification of the potential issues associated with the proposed expansion to the Sekoko Waterberg Colliery.
» **Chapter 8** presents the conclusions and recommendations of the Scoping Report.
» **Chapter 9** describes the plan of study for EIA and EMPr.
» **Chapter 10** provides a list of references and information sources used in undertaking this Scoping Report.

DESCRIPTION OF THE SEKOKO WATERBERG COAL MINE CHAPTER 2

This chapter provides details regarding the scope of the proposed Waterberg Coal Mine, including all required elements of the project and necessary steps for the project to proceed. The scope of the project includes site and mine establishment, mine operation and closure activities. The project description given below entails a full description of operations for the full life of coal mine.

This chapter also explores alternative options with regards to the proposed mining activities, including the 'do nothing' option.

2.1. The Need for the Proposed Project

Increasing demand for electricity by industrial and residential sectors is putting pressure on Eskom's 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 come from coal resources. In order to meet the demand for electricity within the country, additional coal resources are therefore required to be mined. The proposed Sekoko Waterberg Colliery project will provide 10 Mtpa of coal for supply to various Eskom power stations and for the export markets.

From a fossil fuel resource utilisation point of view, the proposed project will make a significant contribution to the inland coal market in Africa as well as South Africa's Gross Domestic Product (GDP) earnings through export of coal. Sekoko also intends on investing in social capital by implementing a Social and Labour Plan, and promoting sustainable local economic development within the area.

2.2. Overview of the Proposed Mining Activities

Opencast mining will initiate on the Farm Smitspan and expand southwards on to Massenberg. An opencast mine with a mine life of 30 years is proposed, ramping up progressively over six years to produce 10Mtpa of washed coal for Eskom. A modular coal processing plant will be constructed, which at full capacity will comprise 4 modules. During this period it is likely that Sekoko Coal will evaluate opportunities for opencast and possibly underground mining on other authorised areas within the mining right boundary as well as on the four additional farm portions, i.e. Olieboomsfontein 220 LQ, Duikerfontein 263 LQ; Swanepoelpan 262 LQ and Vetleegte 304 LQ. The mine work programme (MWP) will be amended to reflect the larger scale of operations on Smitspan and Massenberg and submitted to DMR for approval in due course. In the event there are any further changes in

the main coal mining and processing activities within the Mining Right area, suitable amendments to the MWP will be submitted.

At this stage, the main coal mining infrastructure within the Mining Right area will include:

» Coal storage areas and stockpiles.
» Two wash plants with a production capacity of 400t/h and 3600 t/h and associated infrastructure.
» Wastewater treatment package plant with capacity of 240Kl/d
» Water treatment package plant with capacity of 500Kl/d
» Water storage and reticulation infrastructure.
» Office and maintenance area/s.
» Power supply infrastructure including on surface substations and power lines (<11kV in capacity).
» Access roads.
» Railway line.
» Pipeline for water supply. Water is expected to be available from the Mokolo-Crocodile Water Augmentation Project (MCWAP) Phase 2.
» Pollution control dams.
» Coal discard dumps.
» Topsoil and spoil stockpiles.

Sekoko Coal holds a mining authorisation for the above-listed activities on the already authorised properties, i.e. Minnasvlakte 258 LQ, Smitspan 306 LQ, Massenberg 305 LQ and Remainder of Hooikraal 315 LQ, via a new order mining right reference LP 30/5/1/1/2/184MR issued to Sekoko Coal on 17 August 2011.

2.3. Details of the Applicant and Mining Rights Holder

» Name of Company: Sekoko Coal (Pty) Ltd
» Name of Mine: Sekoko Waterberg Colliery
» Postal Address: Postnet Suite 339
Private Bag X75
Bryanston
2021
» Telephone: +27 (0)11 706 3542
» Fax Number: +27 (0)11 706 3573
» Responsible Persons: Moss Radingoana
» E-mail address: mossr@sekoko.co.za

Sekoko Coal (Pty) Ltd is a South African black-owned and broad-based empowerment junior exploration company. In terms of the Minerals and Petroleum Resources Development Act (MPRDA), Sekoko Coal (Pty) Ltd hold valid

New Order Prospecting and Mining Rights on eight farms in the Waterberg, totalling approximately 7,979 hectares (ha). These farms are as follows (refer to Figure 1.1):

1. Mining Right LP 30/5/1/1/2/184MR (90/2012MR):
    - Minnasvlakte 258 LQ
    - Smitspan 306 LQ
    - Massenberg 305 LQ
    - Remainder of Hooikraal 315 LQ
2. Prospecting Right LP 30/5/1/1/2/137PR (681/2007PR):
    - Swanepoel Pan 262 LQ
    - Olieboomsfontein 220 LQ
    - Duikerfontein 263 LQ
3. Prospecting Right LP 30/5/1/1/2/504PR (651/2006PR):
    - Vetleegte 304 LQ

Sekoko Coal has submitted an application to the DMR to amend the mining right 90/2012MR by incorporating the three farms covered by the prospecting right 681/2007PR.

2.3.1. Formation of the Waterberg Coal Project Joint Venture

Sekoko Coal and Firestone Energy Limited ("Firestone Energy"), an independent Australian exploration company, listed both in Johannesburg Stock Exchange (JSE) and Australian Stock Exchange (ASX) have formed a joint venture in the exploration and development of the Waterberg coal project and completion of necessary feasibility studies to enable both the development and construction of a coal mining operation. Under the terms of the various Joint Venture agreements and related transactions, Firestone Energy acquires a specified percentage (%) interest in the project's eight farms ("properties"); and, Sekoko Resources acquires significant shares in Firestone Energy, which effectively makes Sekoko Resources a 44% shareholder in Firestone Energy.

2.3.2. The Company

The Joint Venture Company ("JV Company") is in the process of being established and/or incorporated for the purpose of holding the assets and managing the economic activities of the Project. The overall supervision of the Joint Venture's project development activities will vest in a Management Board; and, the members of the Management Board will discharge their functions and responsibilities towards the Joint Venture in the same manner and with the same fiduciary duty to act with care and skill, as could be expected of a director of a company incorporated under the Companies Act 61 of 1973.

2.3.3. Ownership of the Coal Mine

Sekoko Coal and Firestone Energy will use the MPRDA, Mining Charter, Mining Scorecard and Codes of Good Practice as guidelines to ensure that the JV Company adopts a holistic approach to transformational issues and challenges. The result will be a proactive strategy designed to ensure that genuine transformation is achieved at the various tiers of the organisation, notably in terms of ownership, management, skills development, employment equity, procurement, housing and rural development. The Company will establish an in-house 'Advisory Committee' to drive the process, comprising board members and operations management. The committee will, initially, meet quarterly, with a clearly defined and board approved mandate to:

- Develop an ownership/shareholding structure that is reflective of South African society;
- Identify and address issues that create barriers to transformation and ensure that appropriate structures have been established throughout the organisation for dealing with such issues as affirmative action, Black Economic Empowerment (BEE), affirmative procurement, and housing;
- Ensure that the board is kept up to date on issues of transformation;
- Brief the Department of Mineral Resources (DMR) on all activities relating to transformation on a regular basis; and
- Assist line management to achieve targets through appropriate action plans.

In anticipation and recognition that the biggest challenge to transformation will lie at the Company's coal mining operation in Lephalale (where some 914 employees will be located) a dedicated Transformation / Social and Labour Plan Management unit will be established with the specific mandate to manage the issues relating to the Mining Charter and to ensure that the proposed coal mining operations meet and adhere to the specifications as set out in the Mining Charter.

2.4. Ownership of the Land

Table 2.1 provides details of the surface right ownership of the properties relating to the Mining Right Amendment Application.

Table 2.1: Surface Right Ownership of the Proposed Farm Portions for the Sekoko Colliery

Description	Area (ha)	Title deed number	Surface owner	GPS Co-Ordinate Centre Point of the farm Portion	Authorised in terms of the MRPDA	Authorised in terms of NEMA
Smitspan 306 LQ	1 165.7	T10342/2010	Utafutaji Trading 75 (Pty) Ltd	23°38'20.34"S 27°24'35.39"E	Yes	Yes
Minnasvlakte 258 LQ	1 002.8	T76885/1995	Minnasvlakte Eiendom cc	23°36'24.78"S 27°26'2.09"E	Yes	Yes
Massenberg 305 LQ	1 216.7	T59217/1981	Grobler Zacharias Christian	23°40'9.49"S 27°25'33.47"E	Yes	Yes
Hooikraal 315 LQ	955.3	Deed of Transfer: T06623110	Utafutaji Trading 75 (Pty) Ltd	23°41'44.56"S 27°26'9.09"E	Yes	Yes
Olieboomsfontein 220 LQ	1092.4	T102334/2001	Onschuld Beleggings (Pty) Ltd	23°31'37.04"S 27°23'28.74"E	No (under this current amendment to the EMPr & EA application)	
Duikerfontein 263 LQ	501.1	T86768/1994	Steenliza cc	23°37'25.11"S 27°20'16.98"E	No (under this current amendment to the EMPr & EA application)	
Swanepoelpan 262 LQ	910.8	T22387/2005	Inyati Boerdery cc	23°37'7.95"S 27°22'2.57"E	No (under this current amendment to the EMPr & EA application)	
Vetleegte 304 LQ	1 136	T45693/1980	Mr Piet Sauer	23°41'11.49"S 27°23'57.29"E	This property relates to a different Prospecting Right: 504PR	

2.5. Project Alternatives

The following project alternatives have been identified for investigation within the EIA process, in accordance with the requirements NEMA.

2.5.1. Land Use Alternatives

The alternative land use for the proposed mining area is agricultural grazing activities and/or game farming and hunting, as is currently the case. Intensive dry land agricultural activities in the area are unlikely due to low rainfall in the region. Crop production might occur under irrigation with enough groundwater available for irrigation.

2.5.2. Layout alternatives

Alternative locations for the placement of site infrastructure include the Minnasvlakte 258 LQ or the Remainder of Hooikraal 315 LQ, although Minnasvlakte is the technically preferred site at this stage. These alternatives will be investigated through the EIA process. Recommendations regarding a preferred site for the establishment of infrastructure will be informed by technical considerations, environmental sensitivities and public comments.

2.5.3. 'Do-nothing' Alternative

The 'do-nothing' alternative is the option of not mining the coal from the area. If this option is adopted, the coal reserve would not be mined.

With a proven coal reserve in the Waterberg area, should this mining operation not proceed, the country would forego the opportunity to develop its proven coal resources optimally, and any local economic benefits would not be realised.

2.6. Mineral Deposit and Resource Reserve

The mineral to be mined is coal. The Goedgedacht/Swartrand, Endragtpan and Greenwich Formations form part of the Karoo Sequence and consist of shales, sandstones, mudstones and coal occurrences (Venmyn, 2008). Coal in the Waterberg occurs in the Vryheid and Volksrust Formations. Coal reserves within the Mining Right area are currently being confirmed through detailed studies.

2.7. Mining Activities

The coal will be extracted using opencast mining methods incorporating a roll-over method of concurrent backfilling of the void left behind by mining. Selective mining of various zones will be conducted where possible to ensure

improved quality of the run-of-mine coal delivered to the plant. Blasting will be used to assist excavation where necessary and will be used in conjunction with selective mining. Explosives will be stored in a magazine located in an appropriate location within the Mining Right area.

For study purposes, Sekoko Coal plans to conduct all mining for the life of the mine by independent contractors who will be managed by an in house management team. Sekoko Coal is investigating the option to take over all mining activities from year 6, or another appropriate start date.

As drilling proceeds on other farms within the Mining Right boundary, updated mine plans will be submitted to the DMR to advise regarding the planned advancement of mining activities.

2.7.1. Opencast mining

Mining will commence on Smitspan, where most accurate geological information is available. A 36m reserve on the eastern boundary of Smitspan, Massenberg and Hooikraal will be used for the rail access, a service road for rail maintenance and the primary water supply pipeline. The initial soft overburden will be stockpiled above ground, east of the initial cut, potentially on the farm Swanepoelpan RE/262, while the harder overburden will be stockpiled on Minnasvlakte for use as a starter wall for the coal discard generated by the coal plant. The long-term overburden stockpile will be sloped and vegetated to reduce visual impacts.

The design of the boxcut and successive mine cuts will take local geotechnical data into account to ensure a safe working environment within the pits. The Draft design will incorporate shallower slopes for the subsoil and weathered rock areas which will result in a greater surface disturbance to mine the same area of coal lying beneath these layers. Where necessary, overburden will be prepared for removal by ripping or blasting.

After the first 5 to 7 years, it is proposed that backfilling of the void created by the opencast activities will commence. Sekoko Coal is applying for an exemption from GN704 to backfill the pit with discard. Should this be granted then backfilling of the void with layers of coal discard and overburden will be conducted. The benefits will be a reduced discard dump and reduced Draft void. The backfilling strategy will be carefully designed to minimise the incidence of spontaneous combustion in the coal discard placed in the worked out areas.

Should exemption not be granted then all discard will be placed on a discard dump to be located within the Mining Right area. The only benefit of not using the discard for backfilling is reduced risk to groundwater. However, the discard

dump itself will still pose a risk to the groundwater environment unless appropriately lined.

Opencast mining will be undertaken using large, high productivity hydraulic excavators combined with appropriately sized rigid mining dump trucks and ancillary mining equipment. The extracted coal will be crushed to a top size of 500 mm. From here the coal will be trucked /conveyed to the wash plant, depending on the location of mining in relation to the plant area.

Selective mining of various zones will be conducted to ensure improved quality of the run-of-mine product taken to the plant.

Similar opencast methods will then extend to the other farms held by Sekoko Coal, although the potential for opencast areas will only be determined on completion of drilling. Where warranted by further study, the Draft void may be used to provide access to coal seams that can be mined by underground methods, or continue with opencast mining into adjacent farms that form part of the mining rights boundary. Draft voids may remain in designated areas to manage decant and these will be profiled and rehabilitated on closure. Mine plans will be submitted to the DMR annually to inform the DMR of mine face positions.

Initially a production tonnage of 2Mtpa of saleable coal is required, which matches the present perceived market potential, increasing to 3 Mtpa, 5 Mtpa, 7 Mtpa, 9Mtpa and Draftly 10 Mtpa over the life of production. A single thermal coal product is planned although the potential for multi-product production exists.

2.8. Infrastructure associated with the mine

The preferred location for the establishment of site infrastructure is on the farm Minnasvlakte 258 LQ, as the coal underlying the property is very deep and should not be sterilised by the surface infrastructure. The infrastructure could be located on the Remainder of Hooikraal 315 LQ, but this creates logistics problems of transporting the mined coal. The main infrastructure associated with the mine includes*:*

» Coal storage areas and stockpiles.
» A 400t/h and a 3600t/h wash plants and associated infrastructure.
» Wastewater treatment package plant with capacity of 240Kl/d
» Water treatment package plant with capacity of 500Kl/d
» Water storage and reticulation infrastructure.
» Office and maintenance area/s.
» Buildings such as workshops, stores, change house, clinic and laboratory.
» Fuel bays, service and wash bays for mine vehicles.

» Power supply infrastructure including on surface substations and power lines (<11kV in capacity).
» Access roads.
» Railway line.
» Pipeline for water supply. Water is expected to be available from the Mokolo-Crocodile Water Augmentation Project (MCWAP) Phase 2.
» Telecommunication tower/s.
» Coal discard dumps.
» Topsoil and spoil stockpiles.

The mining operational complex, plant, discard dump, processing plant, etc must be constructed on level (minimal slope) areas (platforms). These terraces will be designed to ensure that the total bulk earthworks will be kept to a minimum, and to reduce dirty water run-off and associated pollution control costs. The side slopes of the terraces will be covered with topsoil and hydro-seeding, as well as earth channels to reduce erosion. The terraces will be designed to eliminate storm water infiltration into the buildings.

Details regarding selected infrastructure listed above are provided below.

2.8.1. Road Infrastructure

The proposed site for the infrastructure on Minnasvlakte is located about 8km North of Steenbokpan Road (provincial road D1675). Access to the mine area will be from the provincial road D2001, shortly after the junction with the D2816 road. The D2001 and D1675 Roads currently serve as access roads for construction as well as for operational purposes of the Medupi Power Station, Grootegeluk Coal mine and Matimba power station, and will maintain the present course to service other farms further north and west of the Sekoko Waterberg Coal Mine. The D2001 Road is currently surfaced from Lephalale to approximately 4km after the D2001 / D2816 intersection after which the gravel road starts. This portion of the existing D2001 provincial road is also currently under construction and will include an additional lane between Tamboti Drive and the D2001/D1675 intersection.

The D2001 Road, a north-south road and the D1675, an east-west road carries relatively high volumes of traffic during the morning and afternoon peak hours. The traffic volumes on the D2001 / D1675 Road are mainly traffic from Lephalale to the Medupi Power Station and Grootegeluk Coal Mine.

The layout of the proposed Coal Handling and Preparation Plant (CHPP) will be positioned in such a way to ensure that heavy vehicles can move in and out of the facility with ease and without any disruptions to the operations of the mine. A dedicated haul road some 55m wide is planned, which will comprise two haul

sections for the haul trucks with a small service road for other vehicular access. Internal access roads within the plant and infrastructure area of up to 10m in width will be required to enable movement of vehicles around the surface infrastructure.

2.8.2. Rail Infrastructure

In order for the mine to mobilise coal to the target market (i.e. Eskom Power Stations), alternative transportation options for transporting coal between the mine and the power stations were considered. An EIA process was initiated by Sekoko Resources in this regard as part of the initial project development studies. This study concluded that the railway transportation of coal to Eskom's power station and associated siding is the most economically viable and least environmentally degrading option (Cabanga, 2011). This process culminated in the submission of a Draft EIA Report to LDEDET, as the decision-making authority. However, this application is still pending and the developer has been advised by LDEDET that this infrastructure should be considered within the current EIA process being undertaken in order to ensure the holistic consideration of all components of the project within a single process.

The EIA process referred to above considered alternative options for the railway line and siding, including options for the placement of a rail loop on Hooikraal. A revised rail link alignment is however required for the amended mine layout and work programme. The route of the railway line is proposed along the eastern fence lines of the farms Hooikraal, Massenberg and Smitspan with a rail loop proposed on Minaarsvlakte. An alternative is for the rail loop to be located on Hooikraal, should this be selected as the preferred site for the location of the mine infrastructure. The options on Hooikraal correspond to those considered within the previous EIA process.

A servitude of approximately 36m would be required for the railway line. This servitude would fall fully within the boundary of the Sekoko Mining Right area, with the rail line being located 15m from the farm boundary.

2.8.3. Water requirements and water infrastructure

Initially potable water will be supplied from boreholes in the vicinity of the mine. A 24-48 hour capacity reservoir will be provided in an elevated storage tank. Bulk water will be obtained from the new proposed MCWAP Phase 2. The water will be delivered to site via a water supply pipeline (proposed to follow the same route as the railway line) and stored in a raw water dam. It is expected that water from this scheme will be available from 2018. Other water sources (such as groundwater sources) are being considered for the supply of bulk water in the interim.

Process water requirements will increase from approximately 21 500m^3 per annum in year one when construction commences to of the order of 5 000 000 m^3 per annum in year 10. Thereafter water volume requirements are expected to be maintained at this volume for the life of the mine. These values represent the base requirement projection at normal (preferred) capacity. Due to the scarcity of water and stress on water resources in the Lephalale area, all efforts will be taken to conserve the water used at the new Waterberg Colliery and to maintain an optimized close water use system with water treatment and re-cycling.

The estimated potable water requirements per month would therefore be in the region of 3 700 m^3/month at each site and a total of 15 000 m^3/month for the mine.

» ***Process and Fire Water Reticulation System***
The water from the mine pit will be pumped to the pollution control dam (PCD). The water from this dam will overflow to the balancing dam, which will be constructed using an impervious clay lining to limit water loss. The water from the balancing dam will then be pumped to the plant area as process water and to a fire storage reservoir at the office area for fire water as well as wash water. The fire water will be pumped from the fire storage reservoir via the fire water reticulation to the particular fire hydrant/s required at any one time. The pressure in the system will be kept constant via a jockey pump. As soon as a hydrant is opened, the pressure will drop and the fire booster pump will start.

2.8.4. Sewage Infrastructure

There are a number of ablution facilities proposed for the operation of the mine, including toilet facilities in the administrative buildings, workshops and change houses. Each ablution facility will contain water closets, urinals, wash hand basins and showers (for the change house). The sewage (brown and grey) water will be collected from the ablution facilities and will gravitate to the connection manholes via the internal and external sewer network at the various buildings. Trade-off studies are in progress to assess whether it is better to use distributed modular sewage treatment facilities closer to the ablution facilities or change houses, or to gravitate the sewage to a to a centralised sewage treatment works.

The treatment works will be an activated sludge treatment plant. The size of the plant will be determined using the flow demand from the mine. The effluent will be treated to General Limits according to the National Water Act, Act No. 36 of 1998. The treated effluent will be pumped to the pollution control dam from where it will re-enter the system as process and fire water.

A waste license application for this wastewater treatment works has been submitted to the relevant competent authority, and is currently under review. This application is currently being amended and the updated application will be lodged with the DEA in due course.

2.8.5. Electricity Infrastructure

Electrical supply must be provided to the mine facilities (i.e. wash plant and associated infrastructure, change house, contractor's camp, laboratory, service bay, offices, clinic, store, guard house and weighbridge). The electrical supply will make provision for security lighting at the complex at times of poor visibility and during the night as the colliery will be a 24-hour facility. The major power demand at the mine will be provided to operate the CHPP.

There is an existing Eskom 11 kV rural network in the area which runs across parts of Smitspan and Massenberg. This line will need to be rerouted to allow opencast mining on these farms to occur. Power to the mine will be supplied by Eskom via a new 32kV line that will terminate on Minnasvlakte. This capacity line will be sufficient for the early production from the mine, but may need to be upgraded once steady state production levels are reached. Total power required by the mine at steady state is expected to be around 25MW. The long term power requirements have been provided to Eskom to allow them to plan for the required provision.

Power reticulation for the surface infrastructure a the Waterberg Coal Project is expected to be a combination of high, medium and low voltage cables via overhead and underground cables, from the Eskom point of supply. This reticulation network will be part of the on-site infrastructure planning, design and procurement.

2.9. Waste Management

2.9.1. Discard handling

The discards from the coarse and smalls section passes directly to the discards belt for discard handling. The combined discard from the CHPP will be up to 15 Mtpa (around 2 344 tonnes per hour) at peak production. The discard will be disposed of on a discard dump just north of the proposed mining area, and will have a maximum height of 70 m. The discard dump will be designed with adequate water management features and a return water dam, with water captured from the area being recycled on site. Once adequate space is available in the mined out parts of the open cast mine, the coal discard will be transported to the opencast working to be co-disposed with mined waste.

2.9.2. Storm water management

All storm water drainage infrastructures will accommodate 1:50 year storm event as required by legislation. Clean and dirty water will be separated and all dirty water will be channelled into the PCD. All water falling within the footprint in vicinity of the surface infrastructure and CHPP will be deemed to be dirty water and will be directed to the PCD. The dirty footprint area (process plant, office, Laboratory, change house, etc) will be "bunded". The storm water in this "bunded" area will be collected and allowed to drain to the PCD. Any storm water outside the "bunded" area will be considered to be clean water and directed away from this area by means of earth channels. These channels will be protected against erosion and siltation. Bunds and embankments will on average have slopes around 1:2.

The process water from the wash bay facilities at the mining workshop will be "cleaned" via an oil-water separator and pumped to the PCD which may have to be lined with an HDPE liner of a minimum 2mm thick. The effluent from the sewage package plant as well as the Mine Pit water will also be pumped to the PCD. The Pollution Control Dam will overflow into a Balancing Dam. The overflow mechanism will consist of a concrete pipe as well as a reinforced concrete emergency overflow channel. The Balancing Dam will only be lined with a clay layer.

The water from the Balancing Dam will be pumped to the process plant and fire reservoir for re-use. The Balancing Dam will be fitted with an overflow away from the facility. The Pollution Control and Balancing Dam will be designed to comply with Regulation 704 of the National Water Act.

2.9.3. Gaseous Emission

No scheduled gaseous emissions will take place on site. Vehicles and machinery will emit fumes, but will be serviced and maintained regularly to keep these emissions within the relevant vehicle/machine's specifications. Dust and PM10 will be monitored and managed on site to ensure these are within the standards set by DEA.

2.9.4. Solid and Liquid Waste Management

Waste types and treatment are listed in Table 2.3.

Table 2.3: Waste Streams and Treatment

Waste type	Waste treatment
CONSTRUCTION	
Construction waste	Will be removed from site by contractors.
Domestic waste	Locally collected in bins and transferred to skips for disposal at the municipal waste site. Recycling will be done as far as possible with regards to paper, glass, tins/cans, plastics, batteries and computer equipment, and inflorescent lights.
Sewage	Portable toilets will initially be utilised and maintained by a reputable contractor. During construction phase, toilet facilities will be erected with sewage reticulation to the sewage treatment facility/facilities. Sewage will therefore be contained and treated on site. Water from the sewage treatment plant will be recycled on site.
Used hydrocarbon waste	These will be collected in drums and stored within an adequately sized bunded area, constructed to SABS standards. The waste will be collected and removed from site by a reputable contractor.
OPERATIONS	
Mine discard	Will be discarded onto the proposed discard dump with associated water management features. Contaminated water collected from the discard dump area will be recycled on site as far as possible. Once the void in the opencast mine is large enough, mine waste will be co-disposed with plant discard into the mined-out areas of the open pit.
Mine slurry	Will be treated in filter press and slurry beds for separation of water from solids. Solids will be incorporated into power station product and water will be reticulated to settling dams.
Domestic and office waste	Locally collected in bins and transferred to skips for disposal at the municipal waste site. Recycling will be done as far as possible with regards to paper, glass, tins/cans, plastics, batteries and computer equipment, and inflorescent lights.
Sewage	Sewage will be contained and treated on site. Water from the sewage treatment plant will be recycled on site.
Used hydrocarbon waste	These will be collected in drums and stored within an adequately sized bunded area, constructed to SABS standards. The waste will be collected and removed from site by a reputable contractor.
Old tyres	These will be collected and temporarily stored in an allotted area in the scrap yard for recycling by a reputable contractor.
Scrap metal	This will be collected and temporarily stored in an allotted area in the scrap yard for recycling by a reputable contractor.
Old machinery & conveyor belts	This will be collected and temporarily stored in an allotted area in the scrap yard for recycling by a reputable contractor.
Used wood	This will be collected and temporarily stored in an allotted area in the scrap yard for recycling by a reputable contractor.

Waste type	Waste treatment
DECOMMISIONING AND CLOSURE	
Building rubble	All building rubble will be removed from site and disposed of by the contractor. Where the material is safe to use for filling of Draft voids, then this will be done.
Domestic waste	Locally collected in bins and transferred to skips for disposal at the municipal waste site. Recycling will be done as far as possible with regards to paper, glass, tins/cans, plastics, batteries and computer equipment, and inflorescent lights.
Sewage	Portable toilets will again be utilised as facilities get dismantled and maintained by a reputable contractor.
Used hydrocarbon waste	These will be collected in drums and stored within an adequately sized bunded area, constructed to SABS standards. The waste will be collected and removed from site by a reputable contractor.

2.10. Labour

It is intended that the mine would work on a daily pattern of either three eight hour shifts or two eleven hour shifts for seven days per week over a 50 week year. This would provide yearly effective working hours for the mine and the process plant of approximately 5000 hours per year.

This takes into account planned and unplanned stoppages, national, religious and other public holidays, planned maintenance, daily breaks and planned downtime, weather and breakdown stoppages, potential industrial action and other non-operational time. A revolving employment roster pattern to achieve this work schedule and allow a pattern of a seven day working period followed by a three day "weekend" break would require a "4-team" type system.

As far as possible, employees will be sourced from local communities. No employees will be housed on site.

3.1. Regulatory Hierarchy

At National and Provincial Level, the main regulatory agencies are:

» *Limpopo Department of Economic Development, Environmental and Tourism (LDEDET):* In terms of the NEMA Se 24C, LDEDET is the competent decision-making authority for the proposed Waterberg Colliery. In the spirit of co-operative governance, the LDEDET will consult with other authorities that have jurisdiction on the proposed development before making a decision. These could include:
» Department of Mineral Resources (DMR) for the amendment fo the EMPr in terms of the MPRDA
» Department of Agriculture, Forestry and Fisheries for the potention disturbance of tree protected in terms of the National Forests Act of 1998
» *Department of Water Affairs (DWA):* In terms of the National Water Act (Act No 36 of 1998), this Department is responsible for the issuing of **Water Use Licenses** (in terms of Section 21) for all water uses associated with the proposed mining activities.
» *The South African Heritage Resources Agency (SAHRA):* The National Heritage Resources Act (Act No 25 of 1999) provides legislative protection for listed or proclaimed heritage sites, such as archaeological sites, heritage sites and cultural sites (including graves). A permit may be required to be obtained from SAHRA for the disturbance or destruction of any such site.
» *Limpopo Heritage Resources Authority (LIHRA)*: The provincial heritage authority. Depending on the significance of any heritage sites identified in the study area, a permit may be required to be obtained from SAHRA for the disturbance or destruction of any such site.
» *At* Local Level the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. Both Local Municipalities and District Municipalities play a role. 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 IDP of the Lephalale Local Municipality describes the current workings of the municipality and offers development objectives for the future.

Provincial and Local policy documents such as the Limpopo Employment, Growth and Development Plan (2009 – 2014); Lephalale Local Municipality Integrated Development Plan (IDP) (2011/2012) and the draft Environmental Management

Framework (EMF) (2010) for the Waterberg DM; and the Local Economic Development (LED) Plan (2008), Integrated Development Plan (IDP) (2011/2012) and the Spatial Development Framework (SDF) (2009) for the Lephalale Local Municipality, all recognise that the municipality is on the verge of major economic development in view of the government's plans to proclaim the Limpopo Coal, Energy and Petrochemical Cluster as a means of utilising the potential of the Waterberg Coalfield to produce energy for the national economy.

3.2. Legislation and Guidelines that have informed the preparation of this EIA and EMProgramme Report

The scope and content of this Scoping report has primarily been informed by the following legislation and guidelines:

- Minerals and Petroleum Resources Development Act (MPRDA), Act No 28 of 2002)
- National Environmental Management Act (NEMA), Act No 107 of 1998
- EIA Regulations, published under Chapter 5 of NEMA (GN R543, GN R 544 and GN R545 in Government Gazette 33306 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);
- MPRDA Regulations of April 2004
- Guidelines in terms of the MPRDA Regulations of April 2004
- International Guidelines: IFC Performance Indicators for Sustainability and Equator Principles

3.2.1. The Minerals and Petroleum Resources Development Act

The MPRDA identifies the state as the official custodian of South Africa's Mineral and Petroleum Resources. Therefore all activities relating to reconnaissance, prospecting rights, mining rights, mining permits and retention permits are regulated by the State.

In terms of Section 102 of the MPRDA, the amendment to the approved EMPr will require an EIA process to be undertaken in terms of NEMA. In addition, Section 49 and 50 of Regulation 527 of the MPRDA outlines specific information requirements for the Scoping and EIA Reports, inter alia, are as follows:

- Stakeholder engagement process;
- Assessment of impacts;
- Assessment of feasible alternatives;

» Development of an environmental management and monitoring plan;
» Provision of maintenance and emergency procedures; and
» Environmental awareness plan.

The amended EMPr will also need to include a revised Social and Labour Plan (SLP), Mine Works Programme (MWP), Closure Plan and Financial Provision for the Rehabilitation of Land Disturbed by Mining Activities.

3.2.2. The National Environmental Management Act

In addition to the MPRDA, the EIA Regulations published in terms of the National Environmental Management Act (No. 107 of 1998 – NEMA) sets out the requirements for the environmental assessment of a range of activities, including mining. Table 1.2 provides a list of activities listed in terms of GN R544 and R545 (GG No 33306 of June 2010) relevant to the Mining Right amendment application process.

3.2.3. National Water Act

The NWA provides for the sustainable and equitable use and protection of water resources. It is founded on the principle that the National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, and that a person can only be entitled to use water if the use is permissible under the NWA. The Department of Water Affairs (DWA) is the delegated custodian of water resources in South Africa.

In terms of Section 21 (i.e. Chapter 4), the NWA identifies a suite of water uses that either require Registration or Licensing before proceeding. Activities which may be associated with the mine which would require a water use license include:

» Taking water from a water resource (S21a), including a dam, river or groundwater resource.
» Storing water (S21b), including from natural runoff or river water, or water containing waste.
» Engaging in a controlled activity identified as such in section 37(1) or declared in section 36 (S21e), including irrigating with waste water such as could be the case if water from the pollution control dam were to be used for dust suppression.
» Altering the bed, banks, course or characteristics of a water course (S21i), including wetlands.
» Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of

people (S21j), such as may be required to ensure safety in underground mining.

A water use licence application has been submitted according to the requirements of the National Water Act (Act 36 of 1998) and its associated Best Practice Guidelines for the project. The DWA has requested Sekoko to conduct further assessment of potential sources of water in support of their Water Use License Application.

3.2.4. National EnvironmentalManagement: Waste Act

The National Environmental Management: Waste Act (No. 59 of 2008) came into operation on the 1 July 2009. It addresses waste generation, classification and management issues, including recycling of waste. The waste generated from the mining activities will be predominantly mine-related, which currently is still within the ambit of the MPRDA. As the various transitional periods of the Acts above come into effect and expire, the relevant applications under this Act will be made by Sekoko should the need arise.

Based on the infrastructure requirements for the proposed mine, the project would result in the storage of hazardous waste on the project area. In addition, the proposed project would also undertake the treatment of wastewater resulting in the generation of effluent. However, in terms of GNR 921 of November 2013, no relevant listed activities requiring a waste license would be applicable to the mine. Therefore, a waste license is not required.

3.2.5. National Environmental Management: Air Quality Act

The aim of the National Environment Management: Air Quality Act (No 39 of 2008) is to govern the release of pollutants in order to manage air quality parameters, norms and standards within South Africa. Opencast mining, coal processing and the storage of coal on a mine site is not classified as a Listed Activity in terms of the AQA (DEA, 2010). An Atmospheric Emission License is therefore not required to be obtained by Sekoko Resources as part of their environmental permitting process.

However, the declaration of the Waterberg Bojanala National Priority Area (DEA, 2012a) has implication for air quality management at existing and future operations in the Waterberg and in Bojanala area.

Ambient air quality standards and guidelines

The effects of air pollutants on human health occur in a number of ways with short-term, acute, chronic, or long-term effects. Different groups of people are

affected differently, depending on their level of sensitivity, with the elderly and young children being more susceptible. Factors that link the concentration of an air pollutant to an observed health effect are the level and the duration of the exposure to that particular air pollutant.

The National Ambient Air Quality Standard (DEA, 2009 and 2012) criteria pollutants consist of a limit value and a permitted frequency of exceedance. The limit value is the fixed concentration level aimed at reducing the harmful effects of a pollutant. The permitted frequency of exceedance represents the tolerated exceedance of the limit value and accounts for high concentrations as a result of process upsets and meteorological variation. Compliance with the ambient standard therefore implies that ambient concentrations are below the limit value and the frequency of exceedance does not exceed the permitted tolerance. Being a health-based standard, ambient concentrations below the standard imply that air quality is acceptable and poses little or no risk to human health; while exposure to ambient concentrations above the standard implies that there is a risk to human health, particularly for sensitive individuals. The National Ambient Air Quality Standards for pollutants typically associated with and from mining are listed in Table 3.1.

Table 3.1: Ambient standard for SO_2 (DEA, 2009 and 2012*)

	Exposure period	**Limit value ($\mu g/m^3$)**	**Number of permissible exceedances per annum**
SO_2	Hourly	350	88
	Daily	125	4
	Annual	50	0
NO_2	Hourly	200	88
	Annual	40	0
PM_{10}	Daily	120 (75)[1]	4
	Annual	50 (40)[1]	0
$PM_{2.5}$*	Daily	65 (40)[2] (25)[3]	0
	Annual	25 (20)[2] (15)[3]	0

1: 1 Jan 2015
2: 1 Jan 2016 – 31 Dec 2029
3: 1 Jan 2030

The Minister published her intention to make National Dust Control Regulation, inviting public comment on the draft regulations (DEA, 2012b). This regulation applies to the proposed Sekoko Mine and states that no person may conduct any activity in such a way as to give rise to dust in such qualities and concentrations that:

i) The dust, or dust fall, has a detrimental effect on the environment, including health, social conditions, economic conditions, ecological conditions or cultural heritage, or has contributed to the degradation of ambient air quality beyond the premises where it originates; or

a. The dust remains visible in the ambient air beyond the premises where it originates; or
b. The dust fall at the boundary and beyond the boundary of the premises where it originates exceeds:

ii) 600 mg/m^2/day averaged over 30 days in residential or light commercial areas measured using reference method ASTM D1739; or
iii) 1200 mg/m^2/day averaged over 30 days in areas other than residential and light commercial areas measured using reference method ASTM D1739.

3.2.6. National Heritage Resources Act

The protection and management of South Africa's heritage resources is controlled by the National Heritage Resources Act (NHRA), 1999 (Act No. 25 of 1999). The objective of the NHRA is to introduce an integrated system for the management of national heritage resources.

Section 38 of the NHRA states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including any development or other activity which will change the character of a site exceeding 5 000 m^2 in extent. The relevant Heritage Resources Authority must be notified of any such developments in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided. Stand-alone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of Section 38. In such cases only those components not addressed by the EIA should be covered by the heritage component. A heritage impact assessment will form part of the EIA phase and EMPr as required by Section 38 of the National Heritage Resources Act, No. 25 of 1999 and will be submitted to the South African Heritage Resources Agency (SAHRA).

3.2.7. Other Legislation

Several other Acts, standards or guidelines also informed the scope of issues to be addressed in the EIA (particularly in terms of the scope and methodology of specialist studies). These are summarised in Table 3.2.

Table 3.2: List of other applicable legislation and compliance requirements required Sekoko Waterberg Colliery

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
National Legislation			
Environment Conservation Act (Act No 73 of 1989)	National Noise Control Regulations (GN R154 dated 10 January 1992).	National Department of Environmental Affairs Limpopo DEDET Local authorities, i.e. Lephalale Local Municipality	There is **no requirement for a noise permit** in terms of the legislation. A **Noise Impact Assessment** is required to be undertaken in accordance with SANS 10328. This has been undertaken as part of the EIA process (refer to Appendix J).
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	In terms of Section 57, the Minister of Environmental Affairs and Tourism has published a list of critically endangered, endangered, vulnerable and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007. In terms of GNR 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA phase of the project to incorporate the legal provisions as well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA phase.	National Department of Environmental Affairs	As Sekoko Coal would not conduct any restricted activity, as is defined in Section 1 of the Act, **no permit** is required to be obtained in this regard. **Specialist flora and fauna studies** are required to be undertaken as part of the EIA process. These specialist studies have been undertaken for the proposed project (refer to Appendix F). One Red Data species (*Acacia eriobola*) was identified on the authorised farm portions and are likely to occur on the 4 additional farm portions site. A *Crinum* species was also identified adjacent to the authorised site, but was not in flower at the time of the survey. **Permits** may be required to be obtained should these plants be **disturbed or destroyed** by the proposed mining

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
			activities.
Conservation of Agricultural Resources Act (Act No 43 of 1983)	Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048. Weeds are described as Category 1 plants, while invader plants are described as Category 2 and Category 3 plants. These regulations provide that Category 1, 2 and 3 plants must not occur on land and that such plants must be controlled by the methods set out in Regulation 15E.	Department of Agriculture, Forestry and Fisheries	While **no permitting or licensing requirements** arise from this legislation, this Act will find application during the EIA phase and will continue to apply throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies would need to be developed and implemented. In addition, a weed control and management plan would need to be implemented for the mining area.
National Veld and Forest Fire Act (Act No 101 of 1998)	In terms of Section 12, Sekoko Coal would be obliged to burn firebreaks to ensure that should a veld fire occur on the property, that same does not spread to adjoining land. In terms of Section 13 Sekoko Coal must ensure that the firebreak is wide enough and long enough to have a reasonable chance of preventing a veld fire from spreading; not causing erosion; and is reasonably free of inflammable material. In terms of Section 17, Sekoko Coal must have such equipment, protective clothing and trained personnel for extinguishing fires as are prescribed or in the absence of prescribed requirements, reasonably required in the	Department of Water Affairs	While **no permitting or licensing requirements** arise from this legislation, this Act would find application during the operational phase of the project.

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	circumstances.		
Hazardous Substances Act (Act No 15 of 1973)	This Act regulates the control of substances that may cause injury, or ill health, or death by reason of their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared to be Group I or Group II hazardous substance; » Group IV: any electronic product; » Group V: any radioactive material. The use, conveyance or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.	Department of Health	It is necessary to identify and list all the Group I, II, III and IV hazardous substances that may be on the site by the activity and in what operational context they are used, stored or handled. If applicable, a **license** would be required to be obtained from the Department of Health.

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
National Road Traffic Act (Act No 93 of 1996)	The Technical Recommendations for Highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges and culverts. The general conditions, limitations and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.	Eastern Cape Department of Roads and Transport (provincial roads) South African National Roads Agency (national roads)	An **abnormal load/vehicle permit** may be required to transport the mining infrastructure components and/or equipment to site for construction. These include: » Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. » Transport vehicles exceeding the dimensional limitations (length) of 22m. » Depending on the trailer configuration and height when loaded, some of the mine infrastructure components may not meet specified dimensional limitations (height).
Occupation 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	Department of Health	No permit requirements, however mine health and safety regulations do apply to the proposed coal mine.

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
	hazardous installations that may have adverse health and safety effects.		
Provincial Legislation			
Limpopo Environmental Management Act, 2003	» Regulates the management and protection of the environment in Limpopo. » Secures ecologically sustainable development and responsible use of natural resources in Limpopo.	LDEDET	Medicinal plant species were identified on the authorised farm portions and have been assigned protected status and may occur on the for new farm portions. A permit may be required for the destruction or removal of protected plants. Protected trees also occur in the vicinity of the proposed farm portions which may require a permit for their removal or destruction.
Planning Documents			
Lephalale Local Economic Development Framework (LED) (2008).	The Municipal Local Economic Development Framework was compiled at regional scale and is intended to provide a strategic regional perspective for the Lephalale Local Municipality area as a functional entity.	Lephalale Local Municipality	No permit requirements, however new development in the municipality, must consider economic development in line with what is identified by the local municipality the LED framework.
Lephalale Local Municipality (2009) Integrated Development Plan (IDP) 2001/2012	This is a strategic document that links, integrates and co-ordinates all plans and takes into account proposals for the development of the Lephalale Municipality with the implementation of the plan, forms the policy framework and general basis on which annual budgets are based, and which will guide development within the communities.	Lephalale Local Municipality	No permit requirements. However new development in the municipality, must consider development in line with what is identified by the LED plan.

Legislation	Applicable Requirements	Relevant Authority	Compliance requirements
Limpopo Biodiversity Conservation Plan.	The Limpopo 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.	LDEDET	Siting of new developments must consider the conservation planning contained in the C-Plan.
Waterberg Environmental Management Framework (EMF) (2010 – Draft	» The purpose of the EMF is to guide decision making in the Waterberg District Municipality area in order to facilitate appropriate and sustainable development » The EMF integrates policies and frameworks and aligns government mandates to streamline decision-making and to improve cooperative governance. » The EMF has a number of specific objectives, which include identifying the status quo, development pressures and trends in the area and development of a decision support system for development in the area to ensure that environmental attributes, issues and priorities are taken into account. » The EMF report defines 11 different Environmental Management Zones, illustrated in Figure 3.1, according to its environmental sensitivity and the priority needs of the area.	Waterberg District Municipality LDEDET DEA	» Siting of new developments must be in line with the environmental management planning contained in the EMF. » The proposed project is located within Zone 4: Mining Focus Areas. This zone represents areas of significant mineral resources that are of strategic national importance.

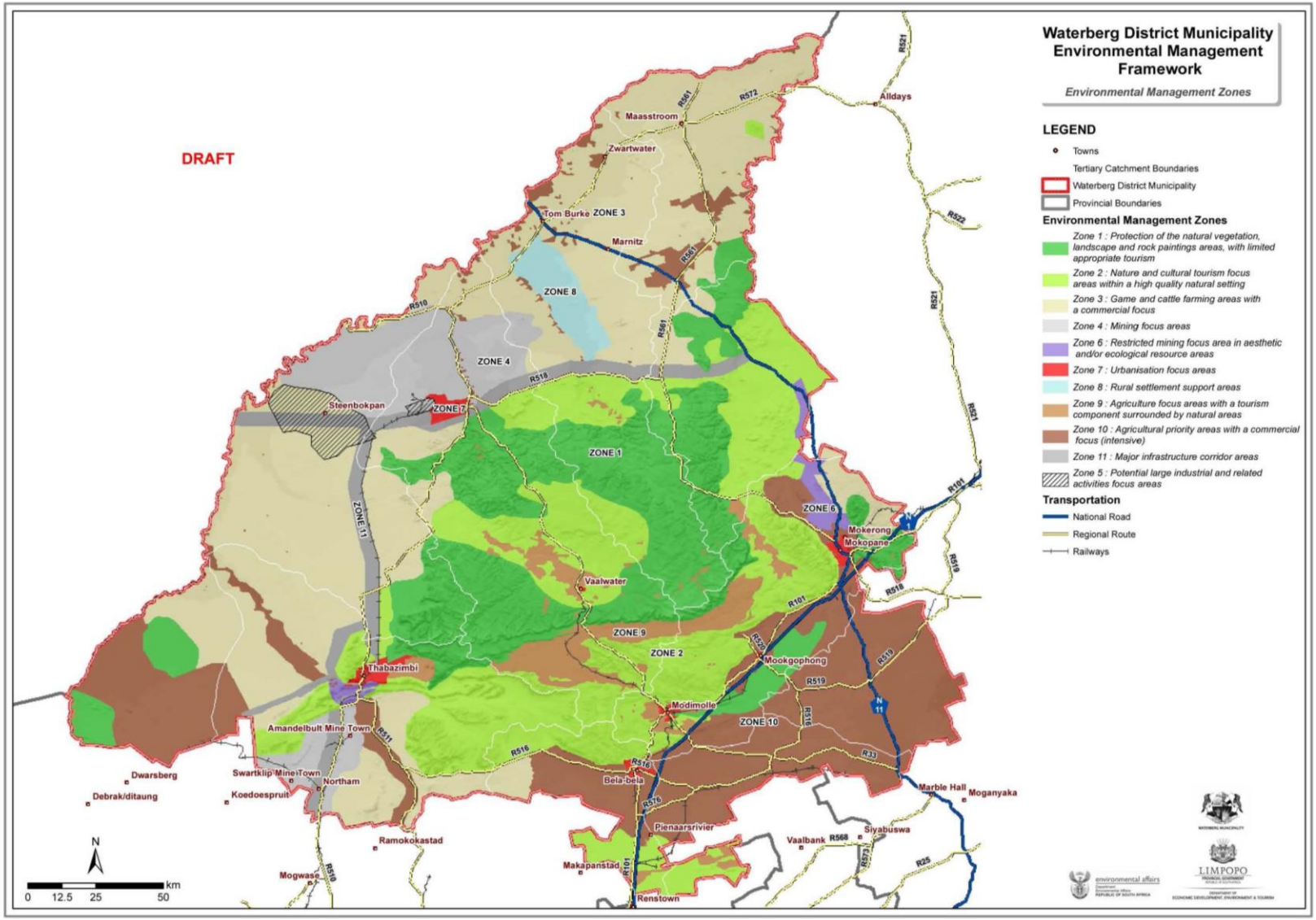

Figure 3.1: Environmental Management Zones (Source: Waterberg EMF, 2010)

SCOPING PROCESS CHAPTER 4

An Environmental Impact Assessment (EIA) process for the proposed Sekoko Waterberg Colliery is being undertaken in accordance with the requirements of the EIA Regulations of June 2010, published in terms of Section 24(5) of the National Environmental Management Act (NEMA; No 107 of 1998). An EIA process refers to that process 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: a **Scoping Phase** and an **EIA Phase**. The MPRDA and NEMA require similar environmental processes to be undertaken in order to identify and assess potential environmental impacts. Therefore, these two legislated processes are being undertaken in parallel but within separate reports for the proposed expansion of the Sekoko Waterberg Colliery to include the additional farm portions and amendment to their approved Mine Work Programme and infrastructure layout. The environmental reports compiled through the EIA process will be submitted to both the DMR and LDEDET as the decision-making authorities following a public review period. These authorities will review the environmental reports and, together with input from other relevant commenting authorities (such as the Department of Water Affairs and Forestry (DWAF) and the South African Heritage Resources Agency (SAHRA)) and the public, will make a considered decision based on all factors associated with the proposed project.

This draft Scoping Report has been prepared in support of the Application for Authorisation in terms of the National Environmental Management Act (NEMA). Due to delays in the EIA process due to various factors, the NEMA EIA process has been restarted under a new reference number (LDEDET Ref No.: 2/1/9/2-W59). This report is therefore an updated report to that issued for public comment in February 2013.

This Scoping Study aims at identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This is achieved through an evaluation of the proposed project, involving a) the project proponent, b) specialists with experience in EIAs for similar projects, and c) a consultation process with key stakeholders that included both relevant government authorities and interested and affected parties (I&APs). This chapter serves to outline the process which was followed during the Scoping Phase of the EIA process.

4.1. Objectives of the Scoping Process

In accordance with the EIA Regulations, this Scoping process aims to:

» identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including mine design, establishment, operation and closure) through a desk-top review of existing baseline data and specialist studies,
» identify and consult with affected and surrounding landowners and other stakeholders and interested and affected parties regarding the project, and
» 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.

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

» Describe the scope and nature of the proposed activities and any identified feasible alternatives;
» Ensure due consideration of alternative options with regard to the proposed development, including the 'do nothing' option.
» Identify and evaluate key issues associated with the proposed project and identify issues to be addressed in the EIA Phase, through a process of broad-based consultation with stakeholders and desk-top specialist studies; and
» Conduct an open, participatory and transparent public participation process and facilitate the inclusion of stakeholders' concerns regarding the proposed project in the decision-making process.

4.2. Overview of the Scoping Process in support of the NEMA Application

Key tasks undertaken within the Scoping Process included:

» Consultation with relevant decision-making and regulating authorities.
» Submission of an application for authorisation in terms of NEMA and the EIA Regulations of June 2010 to LDEDET.
» Undertaking of a public participation process throughout the Scoping process in accordance with the EIA Regulations in order to identify issues and concerns associated with the proposed project.
» Preparation of a Scoping Report and Plan of Study for EIA in accordance with the requirements of the EIA Regulations.
» Preparation of a Comments and Response Report detailing key issues raised by I&APs as part of the Scoping Process.

These tasks are discussed in detail below.

4.2.1. Consultation with relevant decision-making and regulating authorities

Consultation regarding the EIA process has been undertaken with LDEDET, as regulating authority in terms of the NEMA EIA Regulations. This consultation has included the following:

» Pre-application consultation regarding the proposed project and the EIA process to be undertaken
» Submission of an application for authorisation in terms of NEMA to LDEDET.

4.2.2. Public Involvement and Consultation

The public involvement and consultation process was designed to provide sufficient and accessible information to I&APs in an objective manner to assist them to:

» raise issues of concern and suggestions for enhanced benefits and alternatives;
» assist the environmental specialist in identifying issues that need to be evaluated during the scoping phase; and
» verify that their issues have been captured.

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

The first step in the public participation process included the identification of key stakeholders and interested and/or affected parties (I&APs). This process was undertaken through existing contacts and databases, responses to site notices and newspaper advertisements, and networking. Stakeholder groups identified include:

» Provincial and local government departments (including LDEDET, SAHRA, LIHRA, DWA, Department of Rural Development and Land Reform, Department of Agriculture, District and Local Municipalities etc.);
» Potentially affected and neighbouring landowners;
» Traditional authorities;
» CBOs and other NGOs.

All I&AP information (including contact details), has been recorded within a comprehensive database of affected parties (refer to Appendix C). While I&APs have been encouraged to register their interest in the project from the start of the process following the public announcements (refer to 3.3.2), the identification

and registration of I&APs will be on-going for the duration of the EIA process. The project database will, therefore, be updated on an on-going basis throughout the project process, and will act as a record of the communication and involvement process.

b) Notification of the EIA Process

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), the project and EIA process was advertised in the Star Newspaper on 26 June 2014, the Mogol Pos on 27 June 2014, and the Ntshebele Rural Rhythm on 04 July 2014.

In addition, site notices were placed in the study area on 26 June 2014 at the following locations:

» The entrance to Hooikraal (23°42'29.92"S; 27°27'9.2"E)
» Dividing gate between Swanepoel Pan and Duikerfontein (23°36'27"S; 27°22'22.05"E)
» D2007 Road Junction (23°41'4.9"S; 27°21'7.5"E)
» The enterance gate of Vetleegte (23°41'50.78"S; 27°23'55.11E")

In addition to the above advertisements and notices, key stakeholders were notified in writing of the commencement of the EIA process, including:

» Municipalities which have jurisdiction in the area.
» Organs of state having jurisdiction in respect of any aspect of the activity (including DWA, SAHRA, LIHRA, Department of Land Affairs, Department of Agriculture).
» Affected and neighbouring landowners on 25 June 2014

Copies of the advertisements placed and notifications sent are contained in Appendix D of this report.

c) Consultation

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 were provided for I&APs to have their issues noted prior to the release of the Draft Scoping Report for public review, as follows:

» Focus group meetings

» Telephonic consultation sessions
» Written, faxed or email correspondence

Various consultation meetings were undertaken with stakeholders during the scoping process which was undertaken for the project at the beginning of 2013. As the project scope has not changed, it is considered that the issues rased at these meetings are valid to the project under consideration within this current process, and these have thereore been included as existing information collected regarding the project. The competent authority has agreed that these issues can be considered within the current process. Table 4.1 below provides details of the focus group meetings held in January and February 2013.

Table 4.1: Details of the focus group meetings held during the scoping phase of the public consultation process

Organisation	Date
Introductory Meeting: Mr Hardus Steenekamp Minnasvlakte 258 LQ; Duikerfontein 1/263 LQ	16 January 2013
Introductory Meetings: Mr Zacharias Grobler Massenberg 305 LQ	16 January 2013 28 January 2013
Introductory Meeting: Mr Petrus Sauer Vetleegte RE/304 LQ	28 January 2013
Public Meeting:	6 March 2013
Focus Group Meeting: Mrs Bettie Pistorius Olieboomsfontein 220 LQ	7/8 March 2013
Focus Group Meeting: Mr Hardus Steenekamp Minnasvlakte 258 LQ; Duikerfontein 1/263 LQ	7/8 March 2013
Focus Group Meeting: Mr Zacharias Grobler Massenberg 305 LQ	7/8 March 2013
Focus Group Meeting: Mr P. Pieterse Swanepoelpan RE/262 LQ	7/8 March 2013
Focus Group Meeting: Tenant on Hooikraal 315 LQ	7/8 March 2013

An opportunity to meet with I&APs and stakeholders will be provided during the review period of this Draft Scoping Report should this be requested. Networking with I&APs will continue throughout the duration of the EIA process. Records of all consultation undertaken, including those listed in the table above, are included within Appendix E.

d) Identification and Recording of Issues and Concerns

Issues and concerns raised by I&APs during the scoping process have been synthesised into the Comments and Response Report (refer to Appendix E).

Further issues raised subsequent to this report will will be synthesised into the Final Scoping Report.

4.2.3. Evaluation of Issues Identified through the Scoping Process

Potential direct, indirect and cumulative impacts associated with the proposed project identified within the scoping process have been evaluated through desk-top studies. In evaluating potential impacts, Savannah Environmental has been assisted by the following specialist team members:

Specialist	Area of Expertise
Riaan Robbeson & Dewald Kamffer of Bathusi Environmental Consultants	Flora & Fauna (Biodiversity)
Chris Viljoen of Viljoen and Associates	Soil, Land Use Land Capability Study & Wetlands
Mark Zunkel and team of uMoya-NILU Consulting	Air Quality
Reitha Oosthuisen of the CSIR	Human Health Impact Assessment
Morne De Jager of MENCO	Noise Scoping Study
Conningarth Economists	Socio-Economics
ITS Engineers	Traffic
Jaco van der Walt & Liesl du Preez of Heritage Contracts and Archaeological Consulting	Heritage

Information from the existing ground water and surface water studies undertaken as part of the previous EIA process and the Bankable Feasibility Study were also uitlised in this scoping report. Impact assessment methods were developed to: (1) identify the potential impacts of a proposed development on the social and natural environment; (2) predict the probability of these impacts and (3) evaluate the significance of the potential impacts. 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 F – N.

4.2.4. Review of Scoping Report

Copies of this report have been provided to LDEDET for distribution to the relevant commenting authorities (including DWA, Department of Land Affairs, and Department of Agriculture) for review and comment.

This Scoping Report has been made available for review by all stakeholders from **28 July 2014 – 05 September 2014** at the following locations:

» Lephalale Local Municipality Public Library (Address: Cnr Joe Slovo Street and Douwater Avenue, Lephalale) ;
» Marapong Community Library (Address: 1456 Setlhora Street, Marapong); and
» AgriSA: Lephalale (Address; Albert Street, Lephalale).

The report is also available for download from the website: www.savannahSA.com/projects.

The availability and duration of the public review process were advertised in the Star Newspaper, The Ntshebele Rural Rythm and Mogol Pos on 17 July 2014. In addition, all registered I&APs were notified of the availability of the report in writing.

Copies of the advertisements placed and notifications distributed are contained in Appendix D of this report.

4.2.5. Final Scoping Report

All issues from stakeholders and commenting authorities received during the review period and responses provided by the EAP and project proponent will be included within final Scoping Report.

PROJECT AND LAND USE ALTERNATIVES IN TERMS NEMA REG 28 (C) CHAPTER 5

The proposed Sekoko Waterberg Colliery will exploit coal reserves in the Waterberg area and provide coal to existing and future power stations. As such it will assist with meeting the electricity demand in South Africa. The mine will also provide employment both directly through hiring of staff for the colliery and indirectly to service providers, suppliers and contractors. As per the Social and Labour Plan (SLP), this will be sourced locally as far as possible. The colliery will therefore contribute to the local economy. Through the SLP the colliery has also committed to certain social upliftment projects in the area, further contributing to improved socio-economics in the area. Draftly, some coal product will be exported and thereby the colliery will also contribute to the national economy and the national gross product.

This chapter of the report explores the feasible and reasonable project and land use alternatives in terms of the requirements of the MPRDA and NEMA. These alternatives are to be considered within the EIA process which is being undertaken in support of the EMP amendment.

5.1. No go alternative

As much as the no-go option will result in the protection of the environment *in situ* and the continued use of the land for stock and game farming, it will result in the sterilisation of the coal resources should no other company mine the area. This would reduce the available coal resources for power generation, which is currently a major issue in South Africa. The no-go option would also result in the lost opportunity for new employment opportunities and improvement in the socio-economics of the area nor will it assist in meeting the country's electricity demand.

5.2. Project site and Activity Alternatives

The location of the main coal processing plant and associated infrastructure on the Farm Minnesvlakte is technically suitable and viable for use. This position is central to mining operations and will reduce coal transportation costs. Remainder of Hooikraal 315 LQ is being considered as an alternative location for the placement of mine infrastructure. This option however creates logistics problems of transporting the mined coal.

These alternatives will be investigated through the EIA process. Recommendations regarding a preferred site for the establishment of

infrastructure will be informed by technical considerations, environmental sensitivities and public comments.

5.3. Land Use Alternatives

The alternative land use for the proposed mining area is agricultural grazing activities and/or game farming and hunting, as is currently the case. Intensive dry land agricultural activities in the area are unlikely due to low rainfall in the region. Crop production might occur under irrigation with enough groundwater available for irrigation.

Table 5.1 lists four alternative land uses which are relevant and to be considered in the EIA study. This table provides an indication of the impacts associated with these land uses in comparison with that of mining. The comparative scoping assessment indicates that opencast mining will have the greatest environmental impacts followed by residential development and crop agriculture. Grazing followed by game farming and tourism will have the least impact to the environment. This is the predominant current land use. Should underground mining be pursued, this will have minimal impact on land use as other land uses can continue on the surface together with underground mining which requires minimal surface disturbance.

Mining will have the greatest impact on the environment and is the least sustainable. However, upon completion of mining and with proper rehabilitation other land uses can again be considered for the area. For this reason, and the large positive economic impact, mining should be considered a viable land use for the area. Crop agriculture is the least likely land use pre/post-mining as crop agriculture in the area would be very intensive, even on pristine lands due to the non-arable land capability dominating the area and the lack of surface water bodies in the area.

Table 5.1: Comparative impact assessment for alternative land uses

Aspect	Residential	Agriculture - crops	Agriculture - Stock	Game Farming/Tourism	Mining
Topography	Status: Negative Duration: Permanent Extent: Site specific Probability: Definite Severity: Slight Significance: Low	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Slight Significance: Low	Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: -	Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: -	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Slight to moderate Significance: Moderate to low
Soils	Status: Negative Duration: Permanent Extent: Site specific Probability: Definite Severity: Slight to moderate Significance: Moderate to low	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Moderate Significance: Moderate	Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: -	Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: -	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Moderate to high Significance: Moderate to high
Land Capability	Status: Negative Duration: Permanent Extent: Site specific Probability: Definite Severity: Moderate Significance: Moderate	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Slight to moderate Significance: Moderate to low	Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: -	Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: -	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Moderate Significance: Moderate
Surface water	Status: Negative Duration: Permanent Extent: Local Probability: Definite	Status: Negative Duration: Long term Extent: Local Probability: Definite	Status: Negative Duration: Long term Extent: Site	Status: Negative Duration: Long term Extent: Site specific Probability: Definite	Status: Negative Duration: Long term Extent: Local Probability: Definite

Aspect	Residential	Agriculture - crops	Agriculture - Stock	Game Farming/Tourism	Mining
	Severity: Moderate to high Significance: Moderate to high	Severity: Moderate to high Significance: Moderate to high	specific Probability: Definite Severity: Slight Significance: Low	Severity: Slight Significance: Low	Severity: Moderate to high Significance: Moderate to high
Groundwater	Status: Negative Duration: Permanent Extent: Local Probability: Definite Severity: Moderate Significance: Moderate	Status: Negative Duration: Long term Extent: Local Probability: Definite Severity: Slight to moderate Significance: Moderate to low	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Slight Significance: Low	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Slight Significance: Low	Status: Negative Duration: Long term Extent: Local Probability: Definite Severity: High Significance: High
Air quality	Status: Negative Duration: Permanent Extent: Local Probability: Definite Severity: Slight Significance: Low	Status: Negative Duration: Long term Extent: Local Probability: Definite Severity: Slight to moderate Significance: Moderate to low	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Slight Significance: Low	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Slight Significance: Low	Status: Negative Duration: Long term Extent: Local Probability: Definite Severity: Moderate to high Significance: High
Noise	Status: Negative Duration: Permanent Extent: Local Probability: Definite Severity: Slight to moderate	Status: Negative Duration: Long term Extent: Local Probability: Definite Severity: Slight to moderate Significance: Moderate to	Status: Negative Duration: Long term Extent: Site specific Probability:	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Slight Significance: Low	Status: Negative Duration: Long term Extent: Local Probability: Definite Severity: Moderate to high Significance: Moderate to

Aspect	Residential	Agriculture - crops	Agriculture - Stock	Game Farming/Tourism	Mining
	Significance: Moderate to low	low	Definite Severity: Slight Significance: Low		high
Flora and Fauna	Status: Negative Duration: Permanent Extent: Site specific Probability: Definite Severity: Slight to moderate Significance: Moderate	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Moderate to high Significance: Moderate to high	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Slight Significance: Low	Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: -	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: High Significance: High
Archaeology and heritage	Status: Negative Duration: Permanent Extent: Site specific Probability: Definite Severity: Moderate Significance: Moderate	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Moderate Significance: Moderate	Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: -	Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: -	Status: Negative Duration: Long term Extent: Site specific Probability: Definite Severity: Moderate Significance: Moderate
Visual aspect	Status: Negative Duration: Permanent Extent: Local Probability: Definite Severity: Moderate Significance: Moderate	Status: Negative Duration: Long term Extent: Local Probability: Definite Severity: Slight to moderate Significance: Moderate to low	Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: -	Status: Neutral Duration: - Extent: - Probability: - Severity: - Significance: -	Status: Negative Duration: Long term Extent: Local Probability: Definite Severity: Moderate to high Significance: Moderate to high
Traffic and safety	Status: Negative Duration: Permanent Extent: Local	Status: Negative Duration: Long term Extent: Local	Status: Neutral Duration: - Extent: -	Status: Negative Duration: Long term Extent: Local	Status: Negative Duration: Long term Extent: Local

Aspect	Residential	Agriculture - crops	Agriculture - Stock	Game Farming/Tourism	Mining
	Probability: Definite Severity: Moderate to high Significance: Moderate to high	Probability: Definite Severity: Slight Significance: Low	Probability: - Severity: - Significance: -	Probability: Definite Severity: Slight Significance: Low	Probability: Definite Severity: Slight to moderate Significance: Moderate to low
Regional socio-economics	Status: Positive Duration: Permanent Extent: Site specific Probability: Definite Severity: Slight Significance: Low	Status: Positive Duration: Long term Extent: Local Probability: Definite Severity: Moderate Significance: Moderate to high	Status: Positive Duration: Long term Extent: Local Probability: Definite Severity: Slight Significance: Low	Status: Positive Duration: Long term Extent: Local Probability: Definite Severity: Moderate Significance: Moderate	Status: Positive Duration: Long term Extent: Local Probability: Definite Severity: Moderate Significance: Moderate to high

This section of the Scoping Report provides a description of the environment that may be affected by the proposed Sekoko Waterberg Colliery. This information is provided in order to assist the reader in understanding the possible effects of the proposed project on the environment. Aspects of the biophysical, social and economic environment that could be affected by, or could affect, the proposed development have been described. This information has been sourced largely from existing information available for the area and field work, and aims to provide the overall context within which this EIA is being conducted. A more detailed description of each aspect of the affected environment is included within the specialist scoping reports contained within Appendices F-N.

6.1. Location

The Waterberg Coal Mine is situated approximately 34 km west of Lephalale (formerly known as Ellisras) in the Limpopo Province of South Africa. The mine is situated in the Lephalale Local Municipality, which falls under the jurisdiction of the Waterberg District Municipality. In terms of the MPRDA, Sekoko Coal holds valid new order Prospecting Rights on eight farms in the Waterberg totalling 7,979 hectares (ha) adjacent to Exxaro Resources Limited's Grootegeluk Colliery. These farms are as follows:

4. Mining Right LP 30/5/1/1/2/184MR (90/2012MR):
    - Minnasvlakte 258 LQ
    - Smitspan 306 LQ
    - Massenberg 305 LQ
    - Remainder of Hooikraal 315 LQ
5. Prospecting Right LP 30/5/1/1/2/137PR (681/2007PR):
    - Swanepoel Pan 262 LQ
    - Olieboomsfontein 220 LQ
    - Duikerfontein 263 LQ
6. Prospecting Right LP 30/5/1/1/2/504PR (651/2006PR):
    - Vetleegte 304 LQ

6.2. Industrial Character of the Surrounding Region

The site is located in close proximity to the Grootegeluk mine, two coal-fired power stations – Medupi Power Station (soon-to-be-commissioned) and Matimba Power Station, and the proposed new coal mine development (Thabametsi). In addition, other mining and power generation projects are proposed within the broader area. The project site is located within the Limpopo Coal, Energy and Petrochemical cluster, the Lephalale Local Municipality Industrial Corridor and the

Waterberg coalfields. Extensive mineral resources (coal) are located within the Lephalale Local Municipality. The Lephalale Local Municipality is acknowledged to be on the verge of major economic development within the mining and power production industries as government policy stated that the Limpopo Coal, Energy and Petrochemical Cluster is a means of utilising the potential of the Waterberg Coal Field to produce energy for the national economy (Lephalale LED, 2008).

6.3. Topography, Relief and Slopes

The area lies south of the Waterberg Mountain range which forms part of the escarpment along the south-western border. Despite the mine's proximity to the mountain range, the site can be classified as flat. The study area is situated in a topographically homogenous region, described by the ENPAT (2003) database as Plains. Slopes are flat; generally less than 2% in a north-western direction, and altitude is approximately 900m above sea level. The properties to the south have small hills with minimal rocky ridges and can be described as gently undulating.

6.4. Climate

Maximum temperatures during summer exceed 30°C and maximum winter temperature averages 23°C. Figure 6.1 indicates that the proposed site is located in an area that receives summer rainfall. Precipitation usually occurs in the form of convectional thunderstorms. The average annual rainfall is approx. 600 mm, with the high rainfall experienced in the months between October and March.

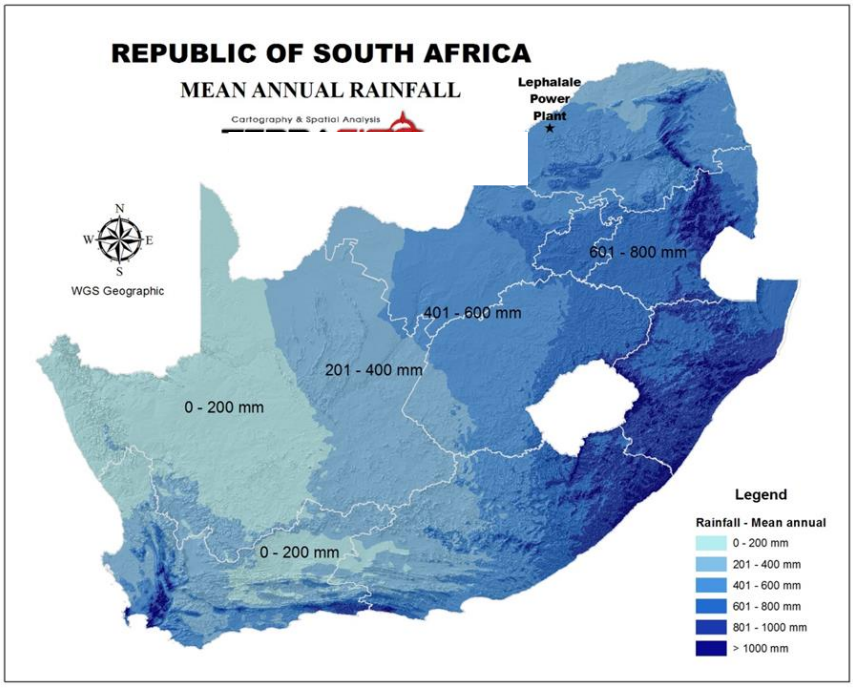

Figure 6.1: Rainfall map of South Africa indicating the survey site

6.4.1. Mean monthly and annual rainfall

The rainy season is generally from November to April (summer), with the peak rainfall measured in January. The winter months are usually very dry; however periodic thundershowers may occur. The average annual rainfall recorded at Matimba Power Station is approximately 460mm. Rainfall is however slightly unreliable and rather severe drought conditions tend to occur about 12% annually.

6.4.2. Mean monthly maximum and minimum temperatures

Table 6.2 and Table 6.3 summarises the mean monthly maximum and minimum temperatures for the region, respectively. In general, the summers are hot and humid, whereas the winters have cool to cold nights but may warm up significantly by midday.

6.4.3. Wind Direction and Speed

According to the average wind speed data provided by the South African Weather Bureau, 2009, the speed of the wind tends to pick up during the morning and reaches its peak just after midday. Table 6.4 below summarises the mean monthly wind speed; the strongest winds recorded from August to November, with speeds reaching up to 2.71m/s (10km/h) in September. The strongest winds are in a north or north-easterly direction, and may be strong enough to cause dust problems in areas that are highly exposed.

6.4.4. Mean monthly evaporation

Only three evaporation stations were available in the sub-quaternary catchment selected for this study. These were however, insufficient to extrapolate to the entire upper catchment and lower catchment. It was, therefore, decided to use the A-pan evaporation records obtained from the database of the CCWR. Monthly evaporation is given in Table 6.5. Average annual evaporation is around 2 281 mm.

Table 6.1: Monthly Daily Rain Data (Ellisras – South African Weather Bureau

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1999	24.4	57	32	12	20	0	0.6	0	1.6	21.2	90.6	65.3	324.7
2000	86	64.4	104.8	102.4	9.4	9	0.2	0	0.2	0	25.8	62.6	464.8
2001	21.4	74.4	16.8	11.2	7.2	21.4	0	0.2	0.2	18.2	142	104.6	417.6
2002	26	9	8.6	107.2	43	5.6	0.8	0.6	3	47	0.4	57.2	308.4
2003	83.6	31	9.2	0.4	0	22.8	0	0	1.6	21	20.2	48	237.8
2004	98.4	94.8	121.4	41	9	0	0	0	0	9	14.4	107.4	495.4
2005	9.8	17.4	3.2	35.2	0	0	0	0	0	0	73.4	42.4	181.4
2006	143.6	68.8	52.2	12.4	11	0	0	2	1.6	3.2	42	81.4	418.2
2007	11.8	24.2	47.4	36.6	0	0.2	1.4	0	30.2	90.2	113.4	74.6	430
2008	142.4	0	60.8	1.2	11	0	1	0	0	15.2	166.2	80.8	478.6
Total	647.4	441	456.4	359.6	110.6	59	4	2.8	38.4	225	688.4	724.3	
Ave	**64.74**	**44.1**	**45.64**	**35.96**	**11.06**	**5.9**	**0.4**	**0.28**	**3.84**	**22.5**	**68.84**	**72.43**	

Table 6.2: Mean Monthly Maximum Temperature (Ellisras – South African Weather Bureau)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1999	31.7	33	31.5	30.1	26.8	24.7	23.7	27.1	28	30.4	31.7	34.6
2000	29.9	32.4	28.1	26	24.3	22.7	22.9	26.6	29.7	31.5	31.5	33.4
2001	34.8	30.9	29.8	28.2	26.4	24.5	23.2	28.2	30	30.3	27.7	31.3
2002	34.7	34	33.9	31	27.7	23.1	25.1	27.7	29.3	32.5	34.7	35.1
2003	36.6	36.4	35	32.2	27.7	22.9	24.5	26.5	30.8	32.7	33.5	35.3
2004	32.6	30.5	28.1	27.7	25.9	23.1	23.7	28.1	29.5	32.2	35	31.3
2005	33.6	34.7	32.1	28.7	28	26.3	24.9	28.4	32.4	33.4	32.8	30.5
2006	31.1	30.9	27.2	27.6	24.5	23.9	25.3	25.2	29.4	33	31.9	34.1
2007	32.6	35.3	33.2	28.5	26.1	24	23.2	27.3	31.9	28.8	30.3	28.8

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2008	29.7	33.4	30.6	29.2	27.4	25.3	24.1	28.4	31.5	33.9	31.5	32.4
Ave	**32.73**	**33.15**	**30.95**	**28.92**	**26.48**	**24.05**	**24.06**	**27.35**	**30.25**	**31.87**	**32.06**	**32.68**

Table 6.3: Mean Monthly Minimum Temperature (Ellisras – South African Weather Bureau)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1999	20	19.5	18.9	15	11.3	6.3	7.3	9	12.6	15.2	19.6	19.6
2000	19.4	21	19.1	14.6	8.1	8.8	4.7	7.8	13.3	16.9	17.9	19.5
2001	20	20	18.3	15.3	9.5	6.5	6	10.4	13.5	16.1	17.5	20.1
2002	21.2	20.6	19.1	15.5	10	7.1	4.2	11.6	12.9	17.9	19.2	22.2
2003	22.4	23.3	19.9	16.6	10.4	9.4	5.6	8.4	13.5	17.9	20.7	21.3
2004	21.2	20	19.3	15.6	10.1	6.4	3.7	9.1	11.8	16.7	20.2	19.8
2005	21.1	20.4	18.3	15.9	10.7	7.6	5.4	11.5	14.4	17.4	19.4	18.3
2006	20.3	20	17.2	13.1	6.9	5.4	5.7	7.1	11.5	17.1	18.1	19.8
2007	18.6	19	17.6	13.4	6.1	4.4	2.7	6.4	13.6	15.2	15.8	17.3
2008	19.2	18.7	17.9	11.8	10.4	6.4	5.8	8.9	12	17.6	19.3	19.9
Average	**20.34**	**20.25**	**18.56**	**14.68**	**9.35**	**6.83**	**5.11**	**9.02**	**12.91**	**16.8**	**18.77**	**17.82**

Table 6.4: Average Wind Speed (m/s) Data Measured at 14h00 (Ellisras – South African Weather Bureau)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1999	2.1	2.1	2.4	2.5	2.2	2.2	2.5	2.6	3.7	3.2	2.7	***
2000	2.5	2.2	1.7	1.8	1.4	***	***	***	***	***	2.4	2.2
2001	1.9	2.5	2.1	2.1	2.1	2.2	2.5	2.3	3.4	2.7	2.4	2.3
2002	2.2	2.1	2.2	2.3	2.2	2.2	2.1	2.7	2.8	2.7	2.6	2.2
2003	2.1	2.3	2.4	2.1	2.5	2	2.2	2.8	3.2	3.1	2.7	2.5
2004	2.3	2.1	1.9	2	1.4	2	2.1	2.6	3	2.8	2.2	2
2005	2.1	2.1	2.2	2.2	2.2	2.1	2.1	2.8	2.8	3.2	2.9	2.3
2006	2.3	2.2	1.7	2	2.1	1.8	2	3	2.9	2.6	2.5	2.5
2007	2.2	2.4	2.1	1.8	1.9	2.4	2.2	2.3	2.7	2.7	2.3	2
2008	2.2	2.1	1.8	2	2.5	2.1	2.1	2.6	2.6	3.1	2.7	1.9
Ave	**2.19**	**2.21**	**2.05**	**2.08**	**2.05**	**1.9**	**1.98**	**2.37**	**2.71**	**2.61**	**2.54**	**1.99**

*** Not available

Table 6.5: Monthly evaporation records

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.80	0.80	0.80

6.5. Geology

6.5.1. Regional Geological Description of Area

Figure 6.2 shows the regional geology of the broader study area. The Goedgedacht/Swartrand, Endragtpan and Greenwich Formations form part of the Karoo Sequence and consist of shales, sandstones, mudstones and coal occurrences (Venmyn, 2008). Coal in the Waterberg occurs in the Vryheid and Volksrust Formations. The coal lies within the Waterberg Coalfield which extends ~85 km west of Lephalale, ~40 km north and ~40 km south (Venmyn, 2008). It extends to the Botswana border where it becomes the Mmamabula Coalfield (P&B, 2009). Two major east-west faults bound the coalfield, with the Zoetfontein to the north and the Eenzaamheid to the South with the uplifted block itself intersected by the Daarby Fault (P&B, 2009). The Daarby fault divides the coalfield into shallower opencastable coalfield in the west and the deeper coalfield (200-400 m deep) in the Northern area (Venmyn, 2008).

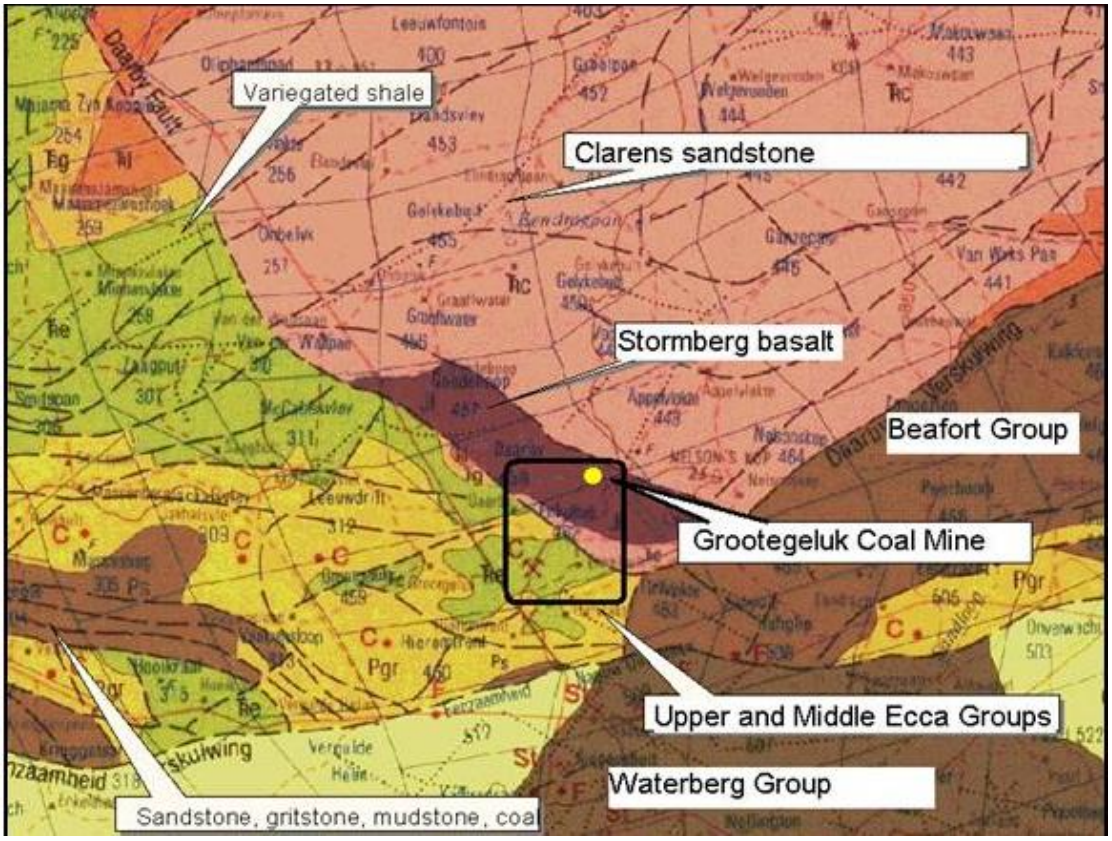

Figure 6.2: Map showing regional geology of the investigation area (source: Cabanga Concepts, 2010)

6.5.2. Local Geology

The Goedgedacht/Swartrand, Endragtpan and Greenwich Formations form part of the Karoo Sequence and consist of shales, sandstones, mudstones and coal occurrences (Venmyn, 2008). Coal in the Waterberg occurs in the Vryheid and Volksrust Formations. The coal lies within the Waterberg Coalfield which extends about 85 km west of Lephalale and about 40 km north and 40 km south (Venmyn, 2008). In the area of the Sekoko's contributing properties the geology appears to be significantly faulted, generally in an east-west orientation (Venmyn, 2008). Only a few dolerite dykes outcrop in the south-eastern portion of the Waterberg Coalfield and no sill features have, to-date, been encountered in any exploration borehole (Venmyn, 2008).

The Volksrust Formation (consisting of 55m of intercalated mudstones and coal) and the Vryheid Formation (with four major discrete seams of approximately 1.5m, 3m, 9m and 4m, thickness) are the major coal bearing horizons of the Ecca Group in the Waterberg (Venmyn, 2008). The Volksrust Formation is dominated by carbonaceous coal, represented by intercalated carbonaceous shale and mudstone, and bright coal (Venmyn, 2008). The Vryheid formation consists of dull coal seams which are well-defined and separated by shale and sandstone (Venmyn, 2008). The Volksrust Formation coals are thick interbedded seam

deposit types and the Vryheid Formation are multiple seam deposit types (Venmyn).

6.5.3. Description of Coal Seams

The lower coal sequence of the Vryheid Formation is comprised of zones 1-4 (zone 1 being deeper than zone 4) with each zone having a thickness varying from 1.5 – 9 m and the formation having an average thickness of around 40 m (Venmyn, 2008). The zones consist mainly of dull coal or inertinite-rich coal, with some bright coal at the base of zones 2, 3 and 4, but large variation in thickness and quality does occur in the formation in the area (Venmyn, 2008).

Zone 3 of the Vryheid formation is the best-developed dull coal zone with a maximum thickness of 9 m (Venmyn, 2008). Zone 2 is on average 4m thick reaching a maximum thickness of 6m in the Grootegeluk mine lease area (Venmyn, 2008). Zone 1 has an average thickness of 1.5 m (Venmyn, 2008). Table 6.6 provides a general Description of the various coal zones.

The Volksrust Formation consists of layers overlying Zone 4 of the Vryheid Formation through to zone 11 and are characterised by an increasing ratio of bright coal. The vitrinite reflection and palynological evidence indicates that the Volksrust Formation was subjected to post-depositional temperatures of ±100°C (Venmyn, 2008). The best quality coal is found in zones 11 to 8, where the highest yields for bright coals or vitrinite-rich coals are obtained (Venmyn, 2008). The ash content of these seams increases upwards from approximately 20% to 45% (Venmyn, 2008).

Table 6.6: General Description of the Various Coal Zones

Formation	General description of coal	Zones	Farms	General description	Thickness
		Over-burden	All farms		About 22 m
Volksrust Formation	Intercalated bright coal and carbonaceous shale	Zone 11	Minnasvlakte, Smitspan, Swanepoelpan, Duikerfontein	Bright coal or Vitrinite-rich coal.	5-10 m over most of the area. Thins out in south-west corner of Smitspan, Southern and northern boundaries of Swanepoelpan and the whole of Duikerfontein.
		Zone 10	Minnasvlakte, Smitspan, Swanepoelpan, Duikerfontein	Bright coal or Vitrinite-rich coal.	10-20 m over most of the area. Thins out in southern parts of Smitspan, Northern parts of Swanepoelpan and Duikerfontein.
		Zone 9	Minnasvlakte, Smitspan, Swanepoelpan, Duikerfontein	Bright coal or Vitrinite-rich coal.	5-10 m over most of the area.
		Zone 8	Minnasvlakte, Smitspan, Swanepoelpan, Duikerfontein	Bright coal or Vitrinite-rich coal.	10-20 m over most of the area. 4-10 m in southern parts of Smitspan.
		Zone 7	Minnasvlakte, Smitspan, Swanepoelpan, Duikerfontein	Increasing bright coal	Varies from 5-20 m.
		Zone 6	Minnasvlakte, Smitspan, Swanepoelpan, Duikerfontein	Increasing bright coal	5-10 m over most of the area. Thins out over Duikerfontein and southern Swanepoelpan.
		Zone 5	Minnasvlakte, Smitspan, Swanepoelpan, Duikerfontein, central area of Hooikraal	Bright coal with some dull coal	More than 10 m over most of the area. Thins out in southern parts of Duikerfontein and Swanepoelpan
Vryheid Formation	Well defined dull coal seams separated by shale and sandstone	Zone 4A	Minnasvlakte, Smitspan, Swanepoelpan, Duikerfontein	Dull coal or inertinite-rich coal	4-10 m over most of the area. Sporadic thin seam areas varying from 1-4 m.
		Zone 4	All farms	Dull coal or inertinite-rich coal with bright coal at base	On Smitspan and Minnasvlakte varies from 5-20 m. Remaining farms varies from 3-10 m.
		Zone 3	All farms	Dull coal or inertinite-rich coal	On Minnasvlakte varies from 1-2 m. On Smitspan varies from 2-3 m. On Massenberg varies from 0.5 to 2 m. On Hooikraal the North west varies from 1-4 m and the south east and east varies from 4 to 10 m. 1.5-4m on Swanepoelpan and Duikerfontein.
		Zone 2	All farms	Dull coal or inertinite-rich coal with bright coal at base	On Swanepoelpan and Duikerfontein seam thickness from 5-10m. On Smitspan and Minnasvlakte varies from 4-5 m. Hooikraal and Massenberg varies from 3-4 m with sporadic thinner areas.
		Zone 1	All farms	Dull coal or inertinite-rich coal	Thickness generally varies from 0.5-2 m. In northern parts of Smitspan, Swanepoelpan and Duikerfontein, increases to between 2-3m.

6.6. Soils

The study areas are situated within the Ah85 and Ah86 land type units (Figure 6.3) (Land Type Survey Staff, 1987). Map units Aa to Ai refer to yellow and red soils without water tables and belonging in one or more of the following soil forms: Inanda, Kranskop, Magwa, Hutton, Griffin and Clovelly. The map units refer to land that does not qualify as a plinthic catena and in which one or more of the above soil forms occupy at least 40% of the area. Ah (red and yellow soils, high base status) indicates land with red and yellow soils, each of which covers more than 10% of the area while dystrophic and/or mesotrophic soils occupy a larger area than high base status redyellow apedal soils (Land Type Survey Staff, 1987).

6.6.1. Soil Forms

The major soil types encountered include those of the orthic phase Hutton, Clovelly, Fernwood, Askham, Etosha Glencoe Forms. Table 6.7 summarises the soil forms and their coverage and Figure 6.4 indicates the anticipated soil types. Table 6.8 provides a description of the soils.

Table 6.7: Soil Coverage

Soil Code	Soil Name	Soil Depth	Area (Ha)	% of Area
10-12 Hu	Hutton	10-12	147.83	3.40%
10-12 Hu/Cv	Hutton	10-12	84.73	1.95%
10-15 Hu	Hutton	10-15	301.96	6.95%
12-15 Hu	Hutton	12-15	148.63	3.42%
8-10 Hu	Hutton	8-10	19.85	0.46%
10-12 Cv	Clovelly	10-12	70.94	1.63%
12-15 Cv	Clovelly	12-15	214.95	4.95%
12-15 Fw/Cv	Fernwood/Clovelly	12-15	976.41	22.48%
15 Cv	Clovelly	12-15	478.12	11.01%
15 Fw	Fernwood	12-15	1662.74	38.27%
2-4 Gc/Dr	Glencoe/Dresden	2-4	51.66	1.19%
10-12 Ak	Askham	10-12	13.52	0.31%
4 Et	Etosha	2-4	20.70	0.48%
4-6 Ak	Askham	4-6	19.76	0.45%
4-6 Et	Etosha	4-6	7.37	0.17%
6 Ak	Askham	4-6	12.28	0.28%
6-8 Ak	Askham	6-8	18.70	0.43%
6-8 Gc/Cv	Glencoe/Clovelly	6-8	90.85	2.09%
Pan	Pan		3.21	0.07%
Total Area (Ha)	4344.19	100.00%		

6.6.2. Soil Erodibility

The erosion potential of a soil is expressed by an erodibility factor ("K"), which is determined from soil texture, permeability, and organic matter content and soil

structure. An index of erosion (I.O.E.) for soils is determined by multiplying the "K" value by the slope percentage. Erosion problems may be experienced with I.O.E. greater than 2.

The "K" value can also be used to determine the erodibility of a particular soil form, a function of both the physical characteristics of that soil and the treatment of the soil.

Erodibility ratings are:

» Resistant "K" factor = <0.15
» Moderate "K" factor = 0.15-0.35
» Erodible "K" factor = 0.35-0.45
» Highly erodible "K" factor = >0.45

The average "Erosion Indices" for the dominant soil forms on the study site are shown in Table 6.8, where moderate to high erodibility indices are observed. This is largely due to low to very low clay content of the "A" horizons and low organic carbon content of many of the soils.

Table 6.8: Erodibility of Differing Soil Forms

Soil Form	Erodibility	Index of Erosion (I.O.E.)
Hutton/Clovelly/Fernwood	Low to Moderate	0.75
Etosha/Askham	Moderate	1.05-1.10
Glencoe	Moderate to High	1.25
Dresden/Glenrosa	High	1.40

The wet based and more structured soils are more susceptible to compaction, and generally have a moderate to high erosion index. These soils will need to be managed extremely well, both during stripping operation, or during the stockpiling stage, and at the time of rehabilitation.

6.7. Land Cover & Land Use of the Region

The Lephalale Local Municipality comprises approximately 1 960 140ha of which approximately 94.4% is regarded as being untransformed. Land use in the region varies between game farming and cattle farming that utilises the natural savanna habitat (refer to Figure 6.5). Grazing is the predominant land use, comprising more than 96% of the area.

Extremely little arable agriculture is practiced, mainly because of relatively low rainfall and poor soils that predominate in the region. Crop yield statistics for this area are considered to be below the national average. Evidence of old

agricultural fields is visible in some parts of the study area. All of the farms are characterised by natural woodland habitat with little transformation.

The area in the vicinity of the proposed development is currently classified as Vacant or Unspecified. The previous site visit revealed that the area is mainly wilderness with game ranches forming a large part of the agricultural activities. The land use east of the development is mining. Excluding farm dwellings, there are no residential areas within 5,000 m of the proposed coal mine site. Infrastructure on the properties is limited to farm and lodge related infrastructure including farm dwellings and related infrastructure, watering points and kraal facilities.

The land use in the immediate area of the mine is dominated by three main livestock agricultural activities, including cattle farming, with various breeds of cattle, game farming including associated hunting, both local and international clientele, and breeding wild life such as buffalo, nyala and sable. Most of the farmers generate their income and livelihoods from such activities.

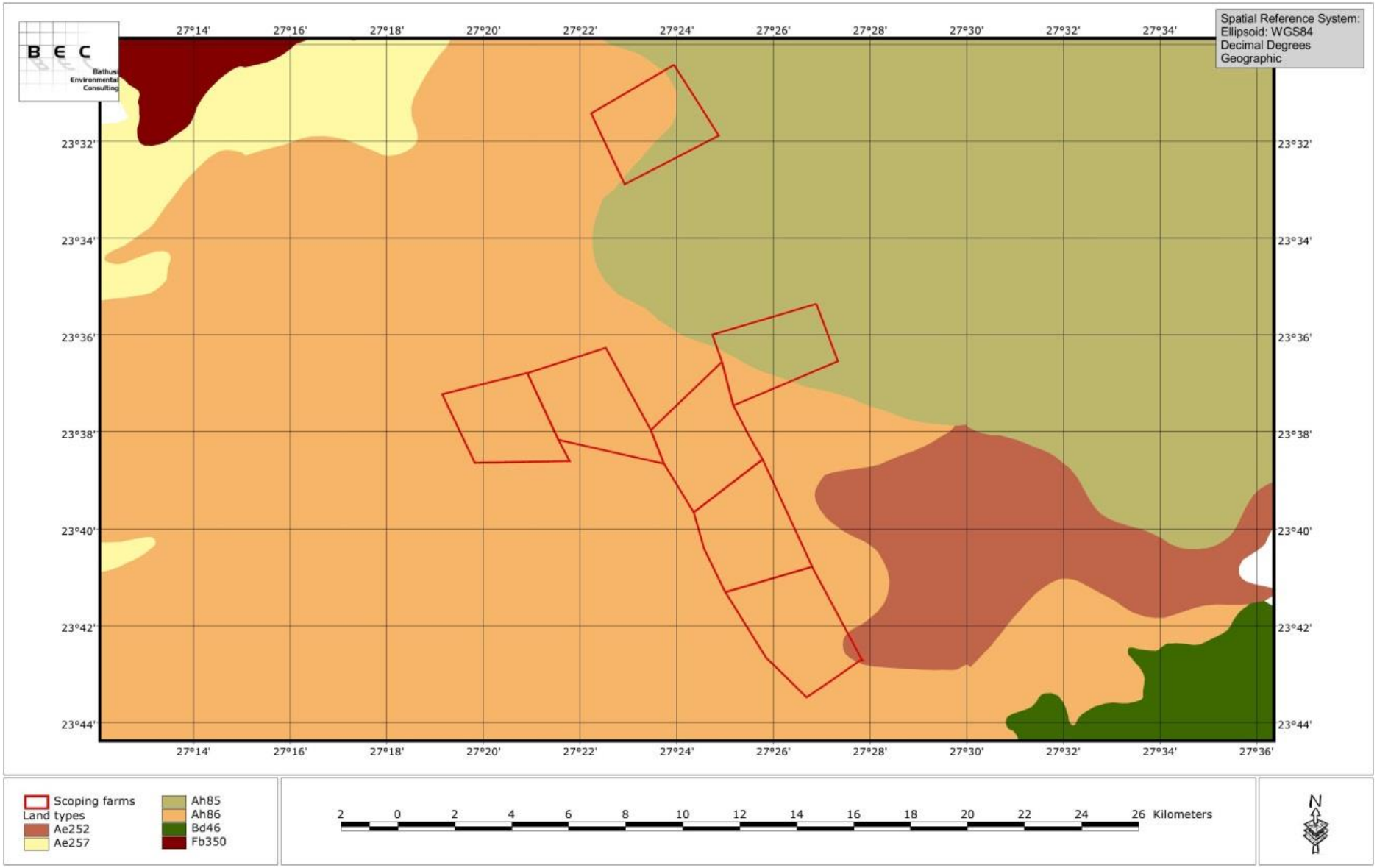

Figure 6.3: Land Type Map

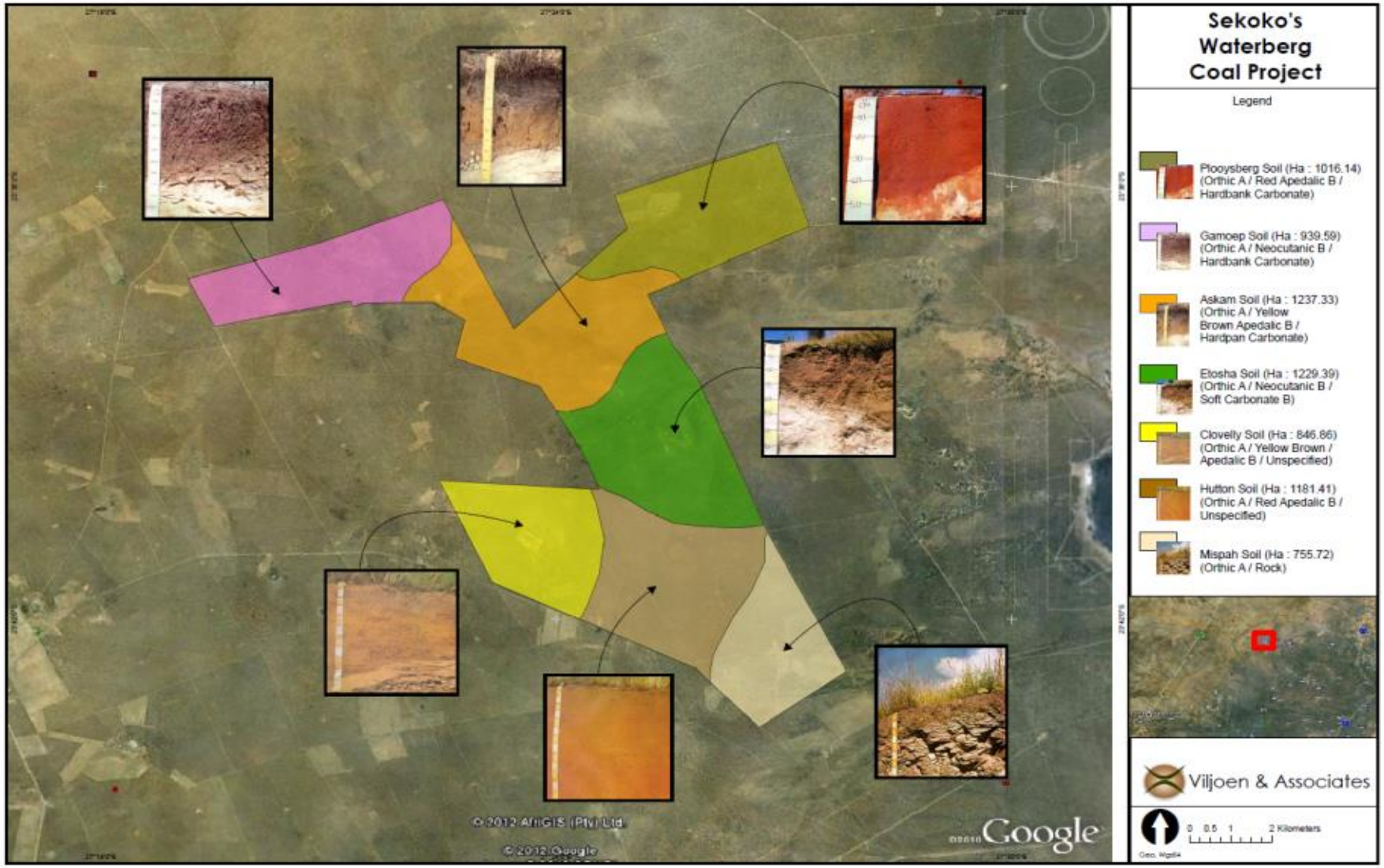

Figure 6.4: Anticipated Soil Types for the Sekoko Coal Mine Site

Table 6.8: General Soil Description

Soil Name	Physical Description	Rooting depth	Chemical description	Mining related issues
Hutton	• Light textured soils largely characterised by an orthic "A" horizon overlying a red or yellow-brown apedal (structure less) "B", on a shallow or thin saprolitic horizon or hard rock ("C" or "R") calcsilicate or hardpan calcrete. • Predominantly fine to very fine grained sandy, to silty loams or fine to medium grained sandy clay loams, varying from single grained structure, to apedal structure. • Pale red brown to yellow red colours in the topsoils. Fine to medium grained sandy and silty clay textures, with dark orange reds and dark red coloured fine to medium textured sub soil horizons. • Clay contents: 4% to 10% in the sandy topsoils. In lower lying areas, the high clay contents are associated with the colluvial derived material, generally associated with the moist grassland and wetland areas. Subsoil clay percentages: 12% to 18% depending on the position that they occupy in the topographic sequence. • Soils classify as having a mesotrophic or eutrophic leaching status (moderately to slightly leached), and are generally luvic in character. Soils are only moderately leached and have formed in-situ. • Erodibility of soil is low to moderate.	700mm to greater than 1,500mm.	Relatively high magnesium and iron content of the parent rocks impart the strong red colours noted. Dominant nutrients returning moderate reserves of Ca and Mg, with lower than required reserves of Na and K for most economical agricultural activities. Additions of fertilizers are required if economically sustainable farming is to be undertaken on a long-term basis. Dry land production potential of the Hutton Form soils is moderate to high under normal rainfall conditions.	During normal mining process can be worked at a wide range of moisture contents without structural damage. Working in the wet state, the storage/stockpiling will need to be well managed. Moderately easily rehabilitated if well managed.
Clovelly & Fernwood	Light textured soils largely characterised by an orthic "A" horizon overlying a red or yellow-brown apedal (structure less) "B", on a shallow or thin saprolitic horizon or hard rock ("C" or "R") calcsilicate or hardpan calcrete. Similar to Hutton soils. Generally derived from the same parent materials within the same lithological sequence. Vary from very fine to medium grained sandy and/or silty loam texture, with pale grey brown to yellow brown colours and a single grained orthic topsoil ("A" horizon), on yellow to yellow/red dystrophic "B" horizons, to a more clay rich sandy clay loam texture, displaying much darker yellow reds and less leached colours. Exhibit dystrophic leaching status & luvic characteristics. Generally interface directly on a hard rock or calcrete contact with only a thin saprolitic layer. Often associated and noted to exhibit a thin plough pan (compaction) layer at approximately 300mm.	600mm to greater than 1,500m	Clovelly and Fernwood Form have very similar chemical characteristics to the Hutton Form described above. Dryland production potential is moderate.	During normal mining process can be worked at a wide range of moisture contents without structural damage. Compaction & erosion must be catered for when working with these soil types. Moderately easily rehabilitated if managed properly.
Glencoe	Characterised by a hard plinthic (ouklip) layer at the base of the profile.	200-	Dryland production potential of the	Impeded drainage caused by

Soil Name	Physical Description	Rooting depth	Chemical description	Mining related issues
	Classified as wet soil types. It should be noted however that these soil forms are often found in mid, and in some cases, upper midslope positions, as residual or old land forms. Soils are fine to medium grained, pale red to brown, apedal structure in the topsoils ("A" horizon), with moderate to low clay contents (4% – 10%) and moderate to low water holding capabilities (40 – 60 mm/m). The subsoil is generally pale yellow/red to pale red in colour, returning moderate clays (12% – 18%), fine to very fine-grained sand fractions, with a concretionary layer at the interface between the "B" horizon and the hard plinthic "C" horizon. Erodibility of soil is moderate to high.	1200mm	shallower soils is poor to very poor.	the hard plinthic layer, compaction in the wet state, and erosion need to be managed. Working in the wet state or stockpiling will need to be well managed to achieve sustainable rehabilitation.
Glenrosa (Gs) Dresden (Ds) and Mispah (Ms)	Light textured soils largely characterised by an orthic "A" horizon overlying a red or yellow-brown apedal (structure less) "B", on a shallow or thin saprolitic horizon or hard rock ("C" or "R") calcsilicate or hardpan calcrete. Restrictive layer associated with these soils is a hard lithocutanic layer in the form of weathered parent material, or rock. Soil depth is restricted, resulting in reduced soil volumes and as a result, depletion in the water holding capacity as well as nutrient availability. Moderate clay percentages (12% to 18%), moderate internal drainage and low water holding capabilities. Poorer land capability units mapped. Erodibility of soil is high.	150mm and 400mm.	Soil depth is restricted, resulting in reduced soil volumes and as a result, depletion in the water holding capacity as well as nutrient availability.	Tillage, sub surface hindrance and erosion need to be managed. Good management to be implemented, both from the erosion as well as the compaction perspective to allow for effective rehabilitation.
Etosha	Erodibility of soil is moderate.	200mm and 600mm	Dryland production potential of the shallower soils is poor to very poor.	
Askham	Erodibility of soil is moderate.	200mm and 600mm	Dryland production potential of the shallower soils is poor to very poor.	

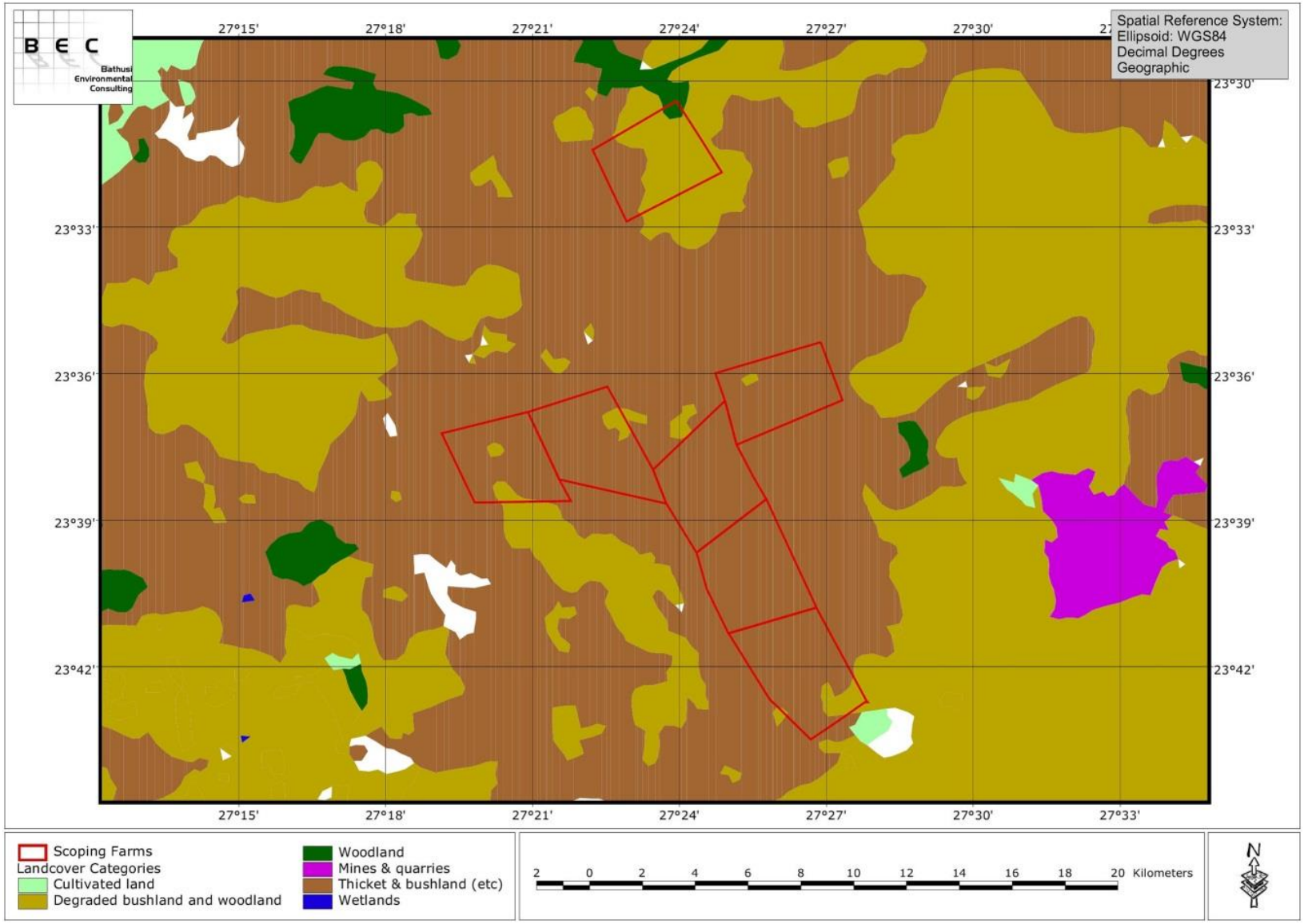

Figure 6.5: Land Cover / Land Use Map for the Study Area

6.8. Declared Areas of Conservation

No biosphere, conservancy or other declared area of conservation are present in the immediate surroundings of the study area. The closest area of conservation is the D'Njala Nature Reserve, situated approximately 30km to the east of the study area.

6.9. Surface Water

The study area is situated within the Limpopo Catchment area (See Figure 6.6), a water scare area. Major rivers of the surrounds include the Mogol River (approximately 14km to the east) and the Limpopo River (10 km away towards north-west of the Olieboomsfontein 220 LQ). Other water resources within the vicinity of the project area include Sandloop, Mokolo River, Matlabas River, and Riet Spruit. These rivers had been classified by the Department of Water Affairs as being perennial (apart from Sandloop that is non-perennial river) having a Present Ecological Status (PES) of Class C, implying a moderately impacted river system.

No large rivers or drainage lines are present in any of the farms and surface water is mostly restricted to temporary pans, which only contain water for short periods subsequent to raining events. However, a few small and ill-defined non-perennial drainage lines are present, but only flow for short periods after severe raining events. Because of the flat topography of the region, no significant drainage is evident and available water is more likely to disappear into the sandy soils that prevail in the region.

6.9.1. Catchment Areas and Affected Areas

The proposed mining area falls under A41E quaternary catchment in the Mokolo/Matlabas Key Area in the Limpopo Water Management Area (WMA). The town which is situated in the vicinity of the proposed mine is Lephalale. The total area of A41E is 1940 km^2, with zero irrigation area. According to the Water Situation Assessment Model the catchment has only a requirement for bulk water use (both mining and strategic requirements). Figure 6.5 indicates the relationship of the mine area to its own catchment area and nearest adjacent catchment.

6.9.2. Mean Annual Runoff

The proposed mining right area borders on the watershed in the quaternary catchment A41E.ts. Quaternary catchment A41E has a Mean Annual Precipitation (MAP) of 438 mm and a Mean Annual Run-off (MAR) of 5.9 mm. (Midgley et. al.1994).

6.9.3. Normal and Dry Weather Flow

There are no streams originating within the proposed mining right area or in close proximity. The closest stream originates approximately 15 km away from the proposed mining area. This stream flows only during heavy rainfall, and receives water directly from rainfall.

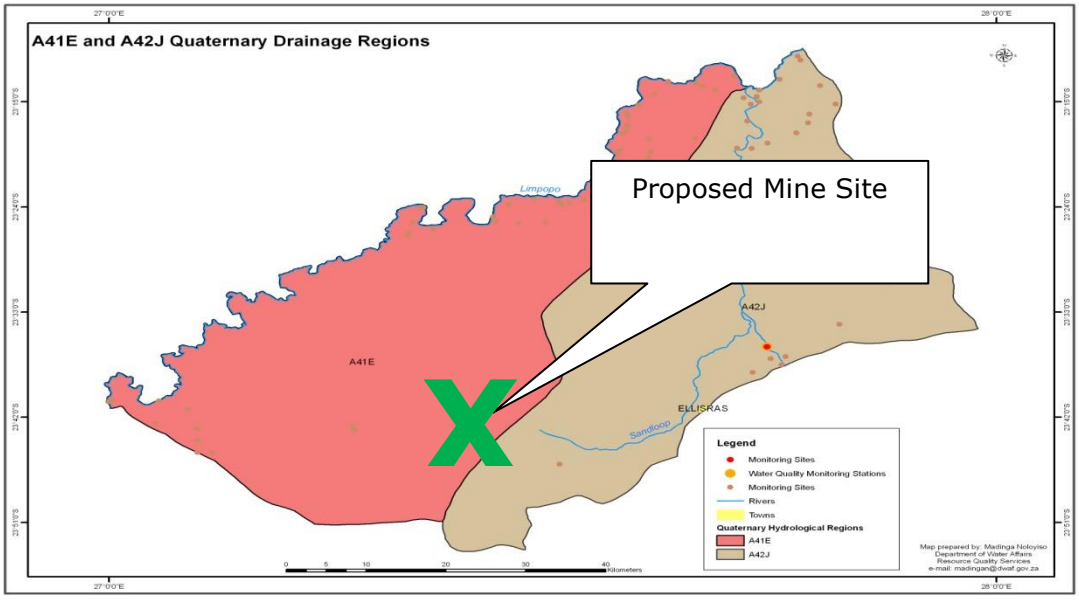

Figure 6.6: Location of the Mine on the Quaternary Catchment and Rivers

6.9.4. Surface Water Quality

As there are no flowing streams, no samples could be taken. Information from previous studies conducted in the area and in the water management Area (WMA) as a whole, was used to describe the water quality. Water quality is generally good. Issues may arise from the growing number of hotels and game lodges in the town of Lephalale and the effluent from these establishments, especially during winter (DWA, 2004). There is also a risk that the use of fertilizers will lead to deterioration in the water quality over time.

6.9.5. Surface Water Use

The largest water use in the area is irrigation, a use of around 39 million m^3/a. The only other significant water use is the rural water use, probably sourced from groundwater.

6.10. Ground Water

According to the 1:500 000 General hydrogeological Map (Pietersburg 2326) the area beneath the site is characterised by weathered and fractured aquifers with borehole yields generally of 0.3 – 3.0 l/s. Depth to groundwater level in the study area ranges between 20 and 40 mbgl. The groundwater quality generally conforms to the Class 0 and Class 1 standards, acceptable for human consumption, but some chemical parameters are classified as Class 2 which could result in either aesthetic or health problems.

6.10.1. Aquifer Description

» *Upper weathered material aquifer*
The upper aquifer forms due to the vertical infiltration of recharging rainfall through the weathered material and the lower permeability of the underlying competent rock material. Groundwater collecting in this aquifer migrates to lower lying areas along the contact area. The upper aquifer has an average maximum depth of around 15 m and effectively 1 to 3 % of the mean annual rainfall eventually reaches the groundwater table. The groundwater quality in undisturbed areas is good due to the dynamic recharge from rainfall, but this aquifer is more sensitive to contaminant sources situated on surface. The borehole yields are generally low.

» *Lower fractured rock aquifer*
Around 10 to 30 % of the water in the upper aquifer will recharge the lower aquifer. Groundwater flow in the lower aquifer is associated with the secondary fracturing in the competent rock and as such will be along discrete pathways associated with the fractures. Major faults can be a major source of groundwater, depending on whether the fractures have been filled with subsequent crystallisation of quartz or other minerals. The general transmissivity of this aquifer is expected to be approximately $0.1m^2$/day; however variations can be observed as high as $1m^2$/day for minor faults and up to 20 or $50m^2$/day for major faults.

6.10.2. Ground Water Use

Groundwater forms the sole source of water supply to the local landowners and is abstracted through boreholes for domestic use and also piped to various stock (game) watering points. The aquifer is therefore considered an important resource that needs to be protected. An estimated 100 people make use of groundwater in the area. Total groundwater use for domestic consumption for the properties and immediately surrounding area is estimated at approximately 6 000 to 7 000l/day.

6.11. Air Quality

The rich coal reserves in the Lephalale area have led to the establishment of a coal fired power station (Matimba) and the construction of a second power plant (Medupi). Amongst other, development plans for the area include a new coal mine by Exxaro Resources Ltd and a proposed coal-fired power plant close to the Grootegeluk coal mine in the Lephalale Local Municipality, Limpopo, South Africa. Mining and coal-fired power stations in Botswana are within 100 km of the Lephalale area.

The combination of the existing sources of air pollution have a negative impact on air quality, and the potential exists for further impact in the light of the current development projects and proposed projects. As a result, the Minister recently declared the Waterberg Priority Area for air quality management (DEA, 2012), which includes the Lephalale LM. Although relatively limited ambient air quality monitoring has been conducted in the area, this declaration implies that air quality currently, or in the future, may not meet ambient air quality standards.

A 3-month dust fallout monitoring campaign was conducted by Asande Project (2009) on four fames in the proposed mining area from mid-March to mid-July 2009. At Farm Smitspan, Massenberg, Minnasvlakte and Hooikraal Farm the average monthly dust fallout was well below the proposed standard in residential or light commercial areas.

The air quality status quo assessment for the Waterberg District Municipality Air Quality Management Plan (GES, 2009) was based on the available ambient air quality monitoring data for Lephalale. The key findings for measurements between November 2006 and December 2009 at the Marapong station near Lephalale were:

» Ambient 24-hour PM_{10} concentrations were generally in compliance with the national ambient standard of 120 µg/m^3, with four exceedances over the period.
» Ambient 24-hour PM_{10} concentrations frequently exceed the 2015 ambient standard of 75 µg/m^3 particularly in the winter from May to September, attributed largely to domestic fuel burning.
» Ambient SO_2 concentrations currently were below the National 24-hour ambient standard, but are regarded as potentially problematic for shorter averaging periods.
» Ambient NO_2 and O_3 concentrations were well below their respective ambient standards.

6.12. Noise

The current activities which contribute to elevated noise levels in the area include traffic on the secondary road traversing Hooikraal, farming activities, residential activities near farm houses, animal noises in farm yards and insects and birds in the area in general. Baseline noise surveys were conducted at the same locations as the air quality survey above. Night-time ambient sound levels ranged between 18 ($L_{A,min}$) and 45 ($L_{A,max}$) dBA (no traffic). $L_{Aeq,10min(i)}$ levels were less than 31 dBA with sound levels being less than 26 dBA for 90% of the time. Daytime ambient sound levels ranged between 25 ($L_{A,min}$) and 85 ($L_{A,max}$) dBA. $L_{Aeq,10min(i)}$ levels were more than 45 dBA although sound levels in the area were still less than 33 dBA for 90% of the time (L_{A90}).

Potentially sensitive receptors were identified using GoogleEarth® as well as during a site visit. Potentially sensitive receptors identified are illustrated in Figure 6.7. Excluding farm dwellings, there are no residential areas within 5 000 m of the coal mine site. It should be noted that all farms are active farms with residents in the farm houses and farm activities occur during the daytime hours around the house. Noise levels are therefore expected to be slightly higher than one would expect in strictly rural areas. Indigenous, naturally occurring animals such as birds and insects will also contribute to elevated noise levels. Secondly, due to the bushveld vegetation, nuisance noise is not likely to travel as far as one may expect in open plains. This coupled with the low population density on the respective farms means that elevated noise levels are not likely to cause nuisance to other occupants.

6.13. Flora

6.13.1. Regional Vegetation

Vegetation of the region is defined by Mucina and Rutherford (2006) as the Limpopo Sweet Bushveld. This vegetation type extends from the lower reaches of the Crocodile and Marico Rivers down into the Limpopo River valley. It comprehends short, open woodland dominated by *Acacia mellifera* and *Dichrostachys cinerea* as well as taller tree species such as *A. robusta*, *A. burkei* and *Terminalia sericea*. The high palatability of the graminoid stratum makes this vegetation type highly suitable for game and cattle farming land uses.

This vegetation type is not threatened (Least Threatened) and although only 1% is formally conserved, much is contained within private nature reserves and game farms. Approximately 5% is transformed by cultivation. Though limited by low rainfall, this is a good area for game and cattle farming due to the relatively high grazing capacity of sweet veld, but overgrazing frequently occurs. The Central Bushveld endemic herb *Piaranthus atrosanguinalis* occurs in this vegetation type.

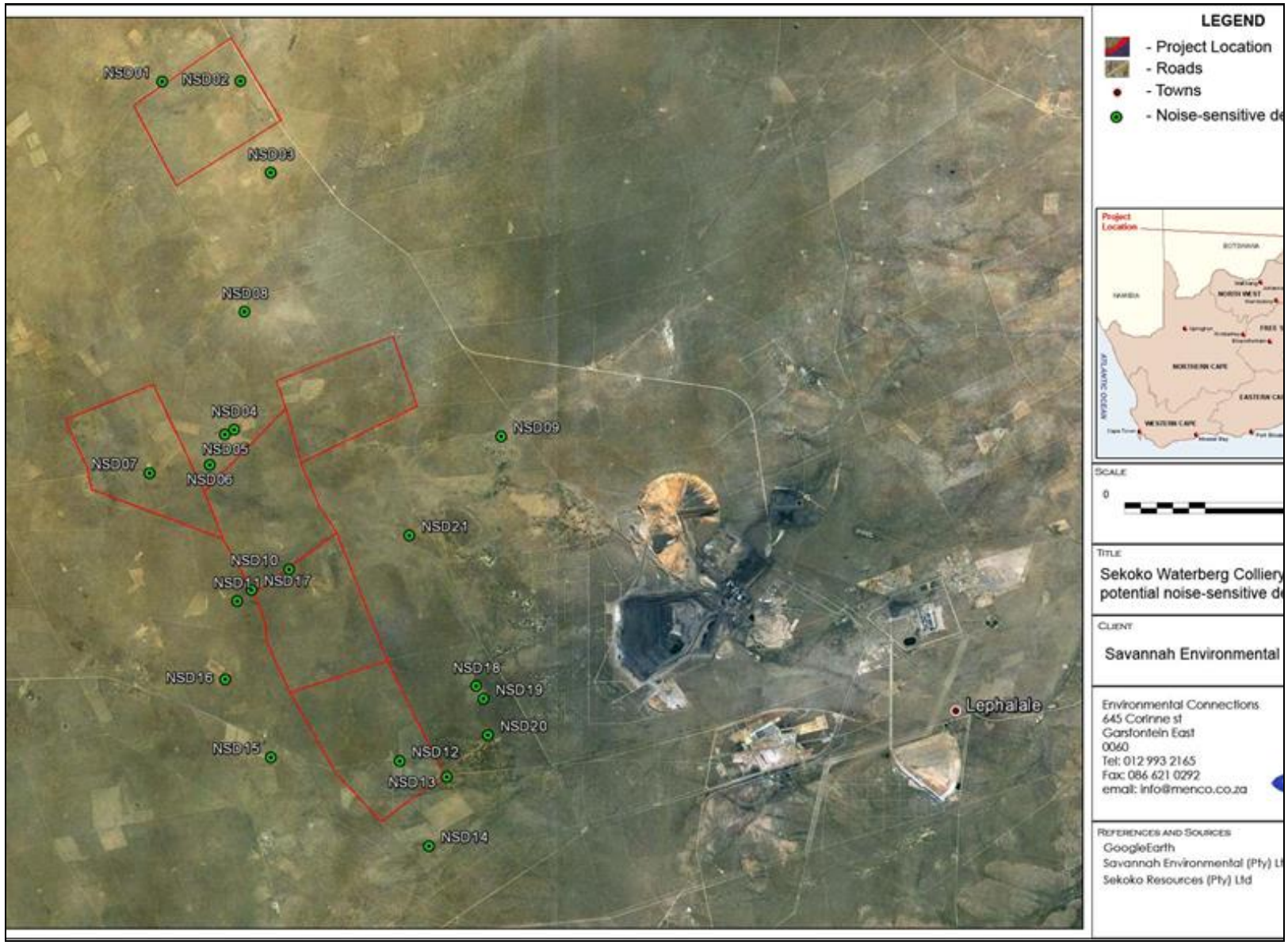

Figure 6.7: Potential Noise Sensitive Receptors and Areas

Important taxa include the following.

» **Trees**
Acacia robusta, A. burkei, Acacia erubescens, A. fleckii, A. nilotica, A. senegal var*. rostrata, Albizia anthelmintica, Boscia albitrunca, Combretum apiculatum* and *Terminalia sericea.*

» **Tall Shrubs**
Catophractes alexandri, Dichrostachys cinerea, Phaeoptilum spinosum, Rhigozum obovatum, Cadaba aphylla, Combretum hereroense, Commiphora pyracanthoides, Ehretia rigida subsp*. rigida, Euclea undulata, Grewia flava* and *Gymnosporia senegalensis.*

» **Low Shrubs**
Acacia tenuispina, Commiphora africana, Felicia muricata, Gossypium herbaceum subsp*. africanum* and *Leucosphaera bainesii.*

» **Graminoids**
Digitaria eriantha subsp*. eriantha, Enneapogon cenchroides, Eragrostis lehmanniana, Panicum coloratum, Schmidtia pappophoroides, Aristida congesta, Cymbopogon nardus, Eragrostis pallens, E. rigidior, E. trichophora, Ischaemum afrum, Panicum maximum, Setaria verticillata, Stipagrostis uniplumis* and *Urochloa mosambicensis.*

» **Herbs**
Acanthosicyos naudinianus, Commelina benghalensis, Harpagophytum procumbens subsp*. transvaalense, Hemizygia elliottii, Hermbstaedtia odorata, Indigofera daleoides, Kleinia fulgens* and *Plectranthus neochilus.*

6.13.2. Flora species of Conservation Importance of the Region

South Africa's Red List system is based on the IUCN Red List Categories and Criteria Version 3.1 (Draftised in 2001), amended to include additional categories to indicate species that are of local conservation concern. The IUCN Red List system is designed to detect risk of extinction. Species that are at risk of extinction, also known as threatened or endangered species are those that are classified in the categories Critically Endangered (CR), Endangered (EN) and Vulnerable (VU). No such species is known to occur in the ¼-degree grids in which the study areas are located.

A species is Threatened when it is included in one of the Critically Endangered (Possibly Extinct), Critically Endangered, Endangered or Vulnerable categories A total of 194 Red Data (Threatened) plant taxa are known to occur in Limpopo Province. Data records indicate only one plant species of conservation

importance occurring in the region, i.e. *Corchorus psammophilus* (Threatened). However, considering the poor floristic knowledge of the region, it is reasonable to assume that other plant taxa of conservation importance will be present.

The following species provincially protected species were also observed during the brief site investigations, or are known to occur in the region: *Acacia erioloba* (Declining, Protected tree), *Adansonia digitata* (Protected tree), *Adenium oleifolium* (Protected species), *Aloe littoralis* (Protected species), *Ammocharis coranica* (Protected species), *Boscia albitrunca* (protected tree), *Combretum imberbe* (protected tree), *Securidaca longipedunculata* (protected tree), *Sclerocarya birrea* subsp. Africana (protected tree), *Spirostachys Africana* (protected tree). The presence of a community of Manketti tree to the east of the study areas is known. Based on international distribution data, this species is currently not afforded a national or provincial conservation status. However, because of a high scarcity factor within South Africa (confined to only a small area in the Lephalale region), this species is regarded highly for the purpose of this (and subsequent) investigations. This species is regarded more important than other protected trees that occur widespread in the region and preference ratings for respective sites will take cognisance of the presence/ absence of this species.

The following (visually apparent) macro-habitat types were recorded in the study areas also shown in Figure 6.8):

» *Acacia mellifera* floodplains & small drainage lines – situated in lowland areas, typified by slightly clayey soils, a predominance of *Acacia mellifera* as a result of severe utilisation and species specific exclusion. These areas are temporarily inundated subsequent to raining events. Protected trees, including *Boscia, Combretum,* etc., occur frequently in this habitat type.
» Degraded woodland – historic cultivated lands that have reverted through natural succession, dominated by *Acacia* and *Dichrostachys* species. Typically low phytodiversity and habitat variation, embedded occurrences within the natural woodland.
» Historic agricultural fields – recent disturbances of the woodland vegetation, typically dominated by grass sward with woody component absent or as low shrubs, comprising *Acacia* and *Dichrostachys* species.
» Linear infrastructure – roads, railways, etc..
» Natural woodland – dominant habitat type of the region, exhibiting low habitat variances and subtle changes that result mostly from substrate variations. Various protected tree species persist, *Sclerocarya birrea* and *Acacia erioloba* becomes dominant in some localities. This woodland type is representative of the regional Limpopo Sweet Bushveld ecological type. Extremely low fragmentation and isolation factors noted on a local and regional scale; a medium high sensitivity is ascribed to these parts.

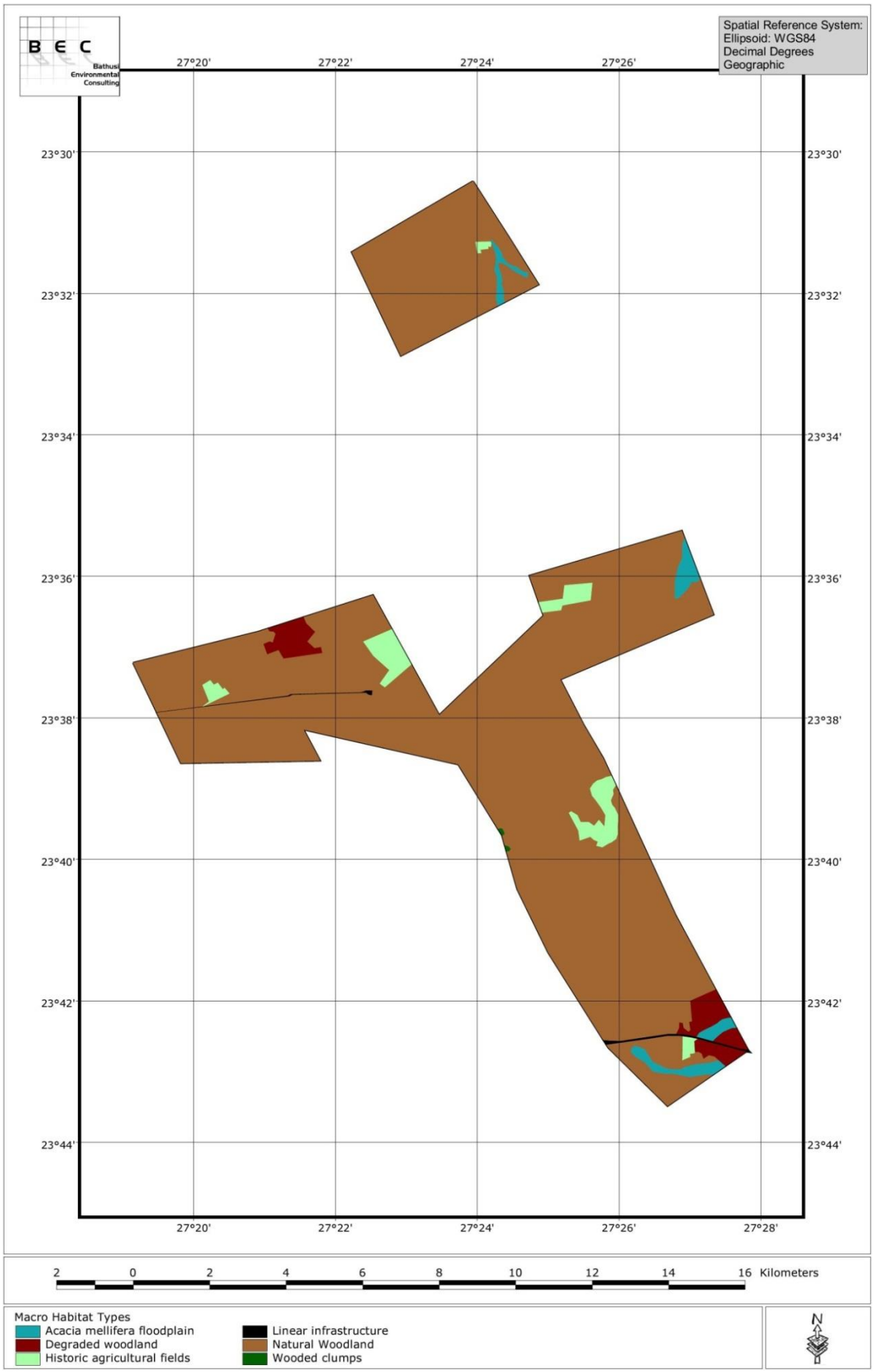

Figure 6.8: Macro Habitat types of the site

» Wooded clumps – localised areas of dense wooded stands were recorded. These areas are typically situated near drainage areas and are frequently dominated by *Spirostachys africana*.

The floristic sensitivity of the natural woodland habitat of the region is regarded medium-high. This is in spite of a Least Threatened conservation status that is ascribed to the regionalvegetation (Limpopo Sweet Bushveld). The known presence of several protected tree species, the likely presence of plants of conservation importance, as well as the untransformed nature of the region as a whole, renders the sensitivity to the proposed project relative high. Extremely limited areas of transformation are present within the various study sites and land use is consistent with high biodiversity levels and biodiversity conservation efforts on a regional scale.

6.14. Terrestrial Fauna

A total of 125 Red Data species from five categories (IUCN) are known to occur in the Limpopo Province (Invertebrates, Reptiles, Frogs and Mammals) and the ¼-degree grids 2327CB and 2327DA (birds), included in the following conservation categories:

» 27 species are listed as Data Deficient (DD);
» 43 species are listed as Near Threatened (NT);
» 40 species are listed as Vulnerable (VU);
» 8 species are listed as Endangered (EN);
» 4 species are listed as Critically Endangered (CR); and
» 1 species is classified as Extinct (EX).

Estimations for the probability of occurrence for Red Data fauna taxa for the study area yielded the following results:

» 80 species have a low probability of occurrence;
» 7 species have a moderate-low probability of occurrence;
» 11 species have a moderate probability of occurrence;
» 6 species have a moderate-high probability of occurrence; and
» 4 species have a high probability of occurrence.

Eighteen Red Data species have been recorded, or are known to occur, in the study area. It must however be noted that some species were reintroduced to the area as game farming stock (i.e. they are not considered free roaming on the farms investigated).

6.14.1. Mammals

Approximately 190 mammal species are expected to occur in the Northern Province; approximately 108 being small mammals (insectivores, rodents, mongooses and bats). Around 80 could occur in the study area. Due to the secretive and nocturnal nature of the majority of mammals only 14 species were confirmed during the summer survey (Table 6.9) (Cabanga Concepts, 2010). The Tsessebe (a conservation important species) was sighted adjacent to the study area. Additional mammal species identified during the winter surveys include the Common Duiker, Chacma Baboon, Tree Squirrel and Waterbuck (Table 6.9). Waterbuck were not expected to be found within the study area but were found to be stocked by farmers. Farmers were consulted regarding what mammal species they stock on their farms.

Table 6.9: Mammal species observed within the study area (SEF, 2009/2010)

Scientific Name	Common Name	Indicators	Distribution in Limpopo	IUCN (2008) Conservation Status
Aepyceros melampus	Impala	Sighting, Spoor	Wide	LC
Alcelaphus buselaphus	Red Hartebeest	Sighting, Spoor	Limited	LC
Calerella sanguinea	Slender mongoose	Sighting	Wide	LC
Canis mesomelas	Black-backed jackal	Scat	Wide	LC
Cryptomys hottentotus	Common Mole-Rat	Sand Mounds	Wide	LC
Cynictis penicillata	Yellow Mongoose	Sighting	Narrow	LC
Damaliscus pygargus phillipsi	Blesbok	Sighting, Spoor	Limited	LC
Genetta tigrina	Large-spotted Genet	Spoor	Wide	LC
Genetta genetta	Small-spotted Genet	Scat and spoor		
Hystrix africaeaustralis	Porcupine	Quills	Wide	LC
Lepussaxatalis	Scrub hare	Scat		
Orycteropus afer	Aardvark	Excavated termite mounds		
Oryx gazella	Gemsbok	Sighting	Very Narrow	LC
Phacochoerus aethiopicus	Warthog	Sighting, Spoor	Wide	LC
Raphicerus campestris	Steenbok	Sighting, Spoor	Wide	LC
Taurotragus oryx	Eland	Sighting	Wide	LC
Tragelaphus strepsiceros	Kudu	Spoor	Wide	LC
Sylvicapra grimmia	Common duiker	Sighting	Wide	LC
Papio ursinus	Chacma Baboon	Sighting	Wide	LC
Paraxerus cepapi	Tree squirrel	Sighting	Wide	LC
Kobus ellipsiprymnus	Waterbuck	Sighting	Patchy	LC

6.14.2. Reptiles

Around 128 reptile species can be found in the Limpopo area of which 68 could occur in the study area. It was expected that the common and cosmopolitan species (which do not have specific requirements for rocky terrain) to be the most likely to be present within the area, including skinks and common snakes.

6.14.3. Amphibians

Around 37 amphibian species are expected to occur within the Limpopo Province of which 25 could occur in the study area. No amphibian species have been confirmed to occur in the study area.

6.14.4. Provincially listed protected species

The Limpopo Province includes six provincially listed protected species. These include: African Clawless Otter, South African Hedgehog, Southern Ground-Hornbill, White Rhinoceros, African Marsh Harrier and Black Wildebeest.

It is estimated that four of the six species listed in Table 7 are unlikely to occur in the study area. Two species are considered at least moderately likely to occur in the study area. Importantly, protected baboon spiders have recently been confirmed for the surrounding area. At least four protected baboon spider species are known from the Limpopo Province (Araneae: Theraphosidae), including the following:

» *Ceratogyrus bechuanicus* (Starbust Horned Baboon Spider);
» *Ceratogyrus brachycephalus* (Rhino-horned Baboon Spider);
» *Ceratogyrus darlingi* (horned baboon spiders); and
» ***Augacephalus junodi* (Pterinochilus junodi) (golden baboon spiders), confirmed during the scoping investigation, farm Massenberg**.

6.15. Birds

Approximately 158 avifaunal species are expected to occur in the study area of which 21 were confirmed during the survey period for summer (Cabanga Concepts, 2010). The low number of confirmations could be due to unfavourable weather conditions. During the survey the Kori Bustard, a Red Data species and is of conservation concern, was identified on the farm Minnasvlakte.

During the winter survey an additional 13 species were identified (Cabanga Concepts, 2010). During the survey, a Secretary Bird, Kori Bustards, and an unidentified vulture species possibly a White-headed Vulture (*Trigonoceps*

occipitalis) were identified on the farm Minnasvlakte. These bird species are Red Data species and of conservation concern.

There were three species of conservation concern that have a high likelihood of occurring on the specific Smitspan site namely: *Sagittarius serpentarius* (Secretarybird), *Aquila rapax* (Tawny Eagle) and *Ardeotis kori* (Kori Bustard). The Kori Bustard, listed as Vulnerable, was observed twice within historically cultivated land and adjacent disturbed natural habitat.

6.16. Site of Archaeological and Cultural Interest

6.16.1. Palaeontology

There are no visible fossil-bearing strata in the study area. A study to the west of the study area (Huffman & vd Walt 2008a, 2011) found that shale lenses that lay in between coal seams might be of interest to palaeontologists. Their date and type of plant remains in particular need to be determined. It is not known if coal seams occur within the current study area. Furthermore a fossilised elephant tooth has been found at an unnamed pan (Site 2327 CA 33a) containing MSA artefacts (Huffman & vd Walt 2011).

6.16.2. Earlier Stone Age

Hominids began to make stone tools about 2.6 million years ago. Known as the Oldowan industry, most of the earliest tools were rough cobble cores and simple flakes. The flakes were used for such activities as skinning and cutting meat from scavenged animals. These early artefacts are difficult to recognize and have so far only been found in rock shelters such as the Sterkfontein Caves (Kuman, 1998); they are unlikely to occur in the study area.

At about 1.4 million years ago hominids started producing more recognizable stone artefacts such as hand axes, cleavers and core tools (Deacon & Deacon, 1999). Among other things these Acheulian tools were probably used to butcher large animals such as elephants, rhinoceros and hippopotamus that had died from natural causes. Acheulian artefacts are usually found near the raw material from where they were quarried, at butchering sites, or as isolated finds.

No Acheulian sites are on record near the project area, but isolated finds are possible. However, isolated finds have little value. Therefore, the project is unlikely to disturb a significant site. The presence and significance of finds can be determined by a field investigation.

No stone tools dating to any phase of the Stone Age were noticed during the site visit. It is highly unlikely that sites, features or objects dating to this period would be found in the study area (van Schalkwyk, 2009).

6.16.3. Middle Stone Age

By the beginning of the Middle Stone Age (MSA), tool kits included prepared cores, parallel-sided blades and triangular points hafted to make spears (Volman, 1984). MSA people had become accomplished hunters by this time, especially of large grazing animals such as wildebeest, hartebeest and eland.

These hunters are classified as early humans, but by 100,000 years ago, they were anatomically fully modern. The oldest evidence for this change has been found in South Africa, and it is an important point in debates about the origins of modern humanity. In particular, the degree to which behaviour was fully modern is still a matter of debate. The repeated use of caves indicates that MSA people had developed the concept of a home base and that they could make fire. These were two important steps in cultural evolution (Deacon & Deacon, 1999). Accordingly, if there are caves in the study, they may be sites of archaeological significance.

MSA artefacts have been found in the Oliboompoort Cave to the south of Lephalale (Mason, 1962; M. van der Ryst, 2006) and in the river gravels of the Limpopo, northwest of the project area (Pistorius, 2007). A large scale survey of almost 9000ha in 2011 by Huffman and vd Walt found that Middle Stone Age sites were associated with pans and ancient drainage systems throughout the project area. It is assumed that same scenario will repeat itself in the current study area especially around large and prominent pans.

Some MSA sites on record are:

» Artefacts scattered around half of pan on Swanepoelpan (S23.63131 E27.35722);
» Artefact scatter around pan on Swanepoelpan (S23.63189 E27.35892)

These sites are of low significance. More sites are expected around pans like on the farm Olieboomsfontein:

» S23 31 43.2 E27 24 41.2;
» S23 31 34.1 E27 24 25.7;
» S23 31 23.1 E27 24 18.8.

6.16.4. Later Stone Age

By the beginning of the Later Stone Age (LSA), human behaviour was undoubtedly modern. Uniquely human traits, such as rock art and purposeful burials with ornaments, became a regular practice. These people were the ancestors of the San (or Bushmen).

San rock art has a well-earned reputation for aesthetic appeal and symbolic complexity (Lewis-Williams, 1981). There is a single known rock art site to the east of the project area, on Nelsonskop 464 LQ (Pistorius, 2007, van Schalkwyk 2011).

In addition to art, LSA sites contain diagnostic artefacts, including microlithic scrapers and segments made from very fine-grained rock (Wadley, 1987). Spear hunting probably continued, but LSA people also hunted small game with bows and poisoned arrows. Important LSA deposits have been excavated in Oliboompoort Cave (Mason, 1962) and other sites in the Waterberg to the south (Van der Ryst, 1998). Sites in the open are usually poorly preserved and therefore have less value than sites in caves or rock shelters. If there are rock shelters or caves in the study area, they may contain LSA sites of significance.

No stone tools dating to any phase of the Stone Age were noticed during the site visit. It is highly unlikely that sites, features or objects dating to this period would be found in the study area (van Schalkwyk, 2009).

6.16.5. The Iron Age (AD 400 to 1840).

Bantu-speaking people moved into Eastern and Southern Africa about 2,000 years ago (Mitchell, 2002). These people cultivated sorghum and millets, herded cattle and small stock and manufactured iron tools and copper ornaments. Because metalworking represents a new technology, archaeologists call this period the Iron Age. Characteristic ceramic styles help archaeologists to separate the sites into different groups and time periods. The first 1,000 years is called the Early Iron Age.

As mixed farmers, Iron Age people usually lived in semi-permanent settlements consisting of pole-and-daga (mud mixed with dung) houses and grain bins arranged around a central area for cattle (Huffman, 1982). Usually, these settlements with the 'Central Cattle Pattern' (CCP) were sited near water and good soils that could be cultivated with an iron hoe. For the project area, archaeological sites such as these are unlikely to occur except along river terraces.

Archaeologists have not yet resolved the role of a special pottery, known as Bambata, in the spread of pastoralism and mixed farming (Huffman, 2007). Some believe that Bambata pottery represents the vanguard of the Early Iron Age, or alternatively, Khoe pastoralists, while others believe it was acquired by LSA people through trade. This pottery has been found at Oliboompoort in LSA deposits (Mason, 1962; Van der Ryst, 2006) and is thus believed to exist in the general region.

Some Iron Age settlements are on record for the general area, for instance alongside the Matlabas River (Aukema in Huffman, 1990) and in Botswana (Biemond, 2005) and south of the Limpopo close to Steenbokpan (Huffman & vd Walt 2011). These sites are recognized by distinctive pottery known as the Letsibogo facies of Moloko (Huffman, 2007). Although unlikely due to the distance from the Limpopo it is possible that some Moloko sites could lie within the project area.

The Little Ice Age began at about AD 1300, and its impact on farming societies was particularly severe. Another major drought occurred at about AD 1650, and it is unlikely that Iron Age people lived in the project area at these times.

No sites, features or objects dating to the Iron Age were identified during the site visit. Iron Age sites in the region are characterised by Decorated pottery belonging to a stylistic facies known as *Letsibogo*. This style dates to between 1550 AD and 1750 AD and was made by Sotho-Tswana people (Huffman 2007: 186-189). There is a low to medium likelihood of finding sites of this period close to pans and are associated with cattle posts.

6.16.6. Cultural and Historic

Voortrekkers crossed the Vaal River in 1836, and within a few years, began to spread north. Much of the Limpopo Province contained tsetse fly, and so early Boer farmers didn't settle immediately in the area. European settlement of the region began at the beginning of the last century. Some of the first settlers, D.P. van der Westhuizen and C. Ricks, both arrived in about 1901. The study area is close to the ox-cart route to Botswana that crossed the Limpopo a few kilometres upstream from the modern border post. Some of pans were used as outspans along the route. Because the area was not suitable for grain agriculture, African farmers did not live in the area, and labour had to come from far afield. Rather the area was used primarily for hunting. Even now, the general region is a big-game area (Huffman & vd Walt 2011).

In the town of Lephalale (Ellisras) there is a cemetery containing the graves of some of the earliest white settlers in the area. The town of Ellisras was only laid out in December 1960, and was named after two of the pioneer families in the

area, Ellis and Erasmus. In 2002, the name was changed to Lephalale. This latter name is taken from the Phalala River, which is derived from the Tswana verb 'to flow' or 'one which overflows' (van Schalkwyk 2009).

With reference to the study area itself, some information has been obtained about the different farms. It seems as if they were state owned until the early part of the 20th century. Drilling activities undertaken by the "Irrigation Department" in 1920, revealed more than water and the presence of coal and oil bearing shale was established on the farms Grootegeluk and Hooikraal. This prompted an individual by the name of F.F. Pienaar to peg 50 claims on each of the farms Kringatspruit, Hooikraal, Grootegeluk and Enkelbult (Reference MM1713/20, 1920; Reference MM2827/20, 1920). What became of all of this is unknown (Van Schalkwyk 2009).

The area under discussion was largely used for farming activities during the recent past. This implied a low occupation by humans. What can be expected are farmsteads, farming related structures and informal cemeteries (van Schalkwyk, 2009). Although none were identified, it is expected that some forgotten informal cemeteries or graves could be located on the various farms (van Schalkwyk, 2009). Potential sites were later observed and assessed on Smitspan where the development would commence (van Vollenhoven, 2010).

6.16.7. Grave sites on Smitspan

Dr. A. C. Van Vollenhoven (2010) conducted a detailed assessment to identify the proposed grave site on the farm Smitspan. The site has been confirmed as a grave yard consisting of at least four graves, and a possible two more graves, making the minimum number of graves six. The graves are stone packed (few stones remaining); with least four stone headstones, with no inscriptions to indicate age (date of death) or surnames. Evidence of a wire fence around the site was observed. Graves are always regarded as having a high cultural significance and graves older than 60 years and those with an unknown date (such as these) are regarded as heritage graves. With the existing nature of the reserve at Smitspan it will not be possible to preserve the site in situ and the only course of action is to have it exhumed and relocated.

A nearby site was also visited to determine contextual information and a possible association with the graves. It is a farm yard from the recent past most likely associated with the farmer whereas the graves are most likely those of farm workers. The farm yard dates to before 1960 as indicated by various artefacts found on site. Therefore it is likely that the graves are most likely of a similar age (pre 1960), belonging to farm workers. There is also a slight possibility that it may be much older belonging to some of the first white settlers in the area and predating 1900.

6.17. Road infrastructure and Access

Access to the mine could be via the D2001 and/or D1675 roads. These roads currently serves as access roads for construction as well as for operational purposes of the Medupi Power Station, Grootegeluk Coal mine and Matimba power station, and will maintain the present course to service other farms further north of the Sekoko Waterberg Coal Mine. The existing D1675 / D2001 Roads are surfaced two lane rural roads and provide access to the Exxaro Grootegeluk Coal Mine as well as the Medupi power station. The D2001 Road is currently surfaced from Lephalale to approximately 4km after the D2001 / D2816 intersection after which the gravel road starts. This portion of the existing D2001 provincial road is also currently under construction and will include an additional lane between Tamboti Drive and the D2001 / D1675 intersection.

The D2001 Road, a north-south road and the D1675, an east-west road carries relatively high volumes of traffic during the morning and afternoon peak hours. The traffic volumes on the D2001 / D1675 Road are mainly traffic from Lephalale to the Medupi Power Station and Grootegeluk Coal Mine with approximately 1400vph and 1100vph in both directions respectively. During the afternoon peak hour the main direction is eastbound towards Lephalale with approximately 700vph and 1750vph respectively.

The R510 Road is an existing two lane surfaced road and form part of the major road network from Lephalale to the rest of the road network in the Limpopo Province. The traffic volumes on R510 Road are less than 200vph in both directions during the peak hours. Traffic on the R510 is mainly traffic to- and from Lephalale between Thabazimbi and other towns in the province.

The roads in the immediate area are currently used predominantly by farmers to access their farms and by staff at the various power plants and mines. The traffic in the immediate area will increase as haulage trucks from the mine transport coal to the power plants and sidings in the area. The power plants and sidings are within the immediate area, and trucks will not have to travel far to deliver their products. The effect on traffic should therefore be low, due to the short distances travelled by trucks. Truck traffic will affect road surfaces and a road maintenance plan will need to be implemented to ensure the roads remain safe for other road users. The trucks will not need to go through the town of Lephalale or any communities in the area.

6.18. Regional Socio- Economic Structure

The Lephalale Local Municipality is the largest local municipality within the Limpopo Province. It falls within the Waterberg District Municipality (DM), which is largely characterised by dispersed and fragmented urban areas. The

Municipality is located in the north-western part of the Waterberg DM and is part of the international border between South Africa and Botswana, being a recognised gateway to other Southern African countries. The proposed project is located ~17km from the town of Lephalale (Ellisras/Onverwacht/Marapong). The urban areas are predominantly located alongside the N1, N11 and R33 and within the Limpopo catchment area and industrial hubs. Low rainfall within the primary study area is the cause for land-use conflict between low-intensity uses (game farming, agronomy and conservation) and high-intensity uses (urban development and mining) (Waterberg EMF, 2010).

Lephalale is a predominantly rural municipality consisting of 38 villages, 49 proclaimed townships, three informal settlements adjacent to urban nodes, specifically mining activities, and one town (Lephalale). All the townships are located around the Lephalale town with the exception of Thabo-Mbeki, which is about 85km away (Lephalale IDP, 2011/2012). There are 51 recognised towns within the Waterberg DM (Quantec, 2010).

6.18.1. Demographic profile

Spatially, Lephalale is the largest Municipality within the Waterberg District Municipality, yet the total population of 87 689 accounts for 14% of the District's population and 15.7% of its household numbers. A decline in population growth with an average rate of 1.2% from 2005 onwards illustrates an out-migration trend observed in the Lephalale LM. One would assume that population and employment growth within Lephalale LM for the past decade would have a positive growth rate, specifically upon the commencement of the Medupi Power Station and the proclamation of Lephalale as the Limpopo Coal, Energy and Petrochemical Cluster.

The Computer Science Research Institute (CSRI) (2008) contends that there is a clear trend of in-migration to nodes such as the Lephalale town 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 (five hours from the Lephalale town), and coastal regions being the dominant migratory areas (CSRI, 2008). This could mean that the out-migration from rural area in Lephalale exceeded the in-migration trends to the town of Lephalale and its surrounds. Furthermore, much of the development in the Lephalale area was so far attributed to construction activities that imply temporary influx of workers and employment that is most likely captured in other parts of the country. Furthermore, since the latest census results are not yet known and the previous census was undertaken in 2001, it is possible that statistics have not been able to capture the temporary increases in local population trends in the area.

Given the above migratory trend delineated by the CSRI (2008), the disparity of negative employment and population growth within the study area is guaranteed due to the out-migration of the population in rural areas outweighing the in-migration into the Lephalale town and surrounds. Regardless of the negative growth rate for both employment and population; between the period 2008 – 2010, an improvement from a negative 8.1% to a negative 1.8% growth, and negative 2% to positive 0.7% respectively is evident.

6.18.2. Economic profile

Within the Lephalale LM, 646 jobs within the agriculture and forestry sector were lost during 2010. Job losses within this sector with regard to Lephalale would be significant as agriculture provided 26% (Quantec, 2010) of employment opportunities in 2005. The loss of one out of three jobs in the sector between 2005 and 2010 would be a prominent reason that would force households to relocate from rural areas.

The average household income in the Lephalale LM is about R13 086 (2011 current prices), which is bigger than the average household income for the entire country. Between 2005 and 2010, the average household income in Lephalale grew at a Compounded Average Growth Rate (CAGR) of 10.7% in real terms. This clearly illustrates the increase in welfare of the local households, which could be attributed to the creation of employment opportunities in specific sectors stimulated by the development in the area and at the same time the outmigration of people with lower income levels.

6.18.3. The economy and its Structure

The structure of the economy and the composition of its employment provide valuable insight into the dependency of an area on specific sectors and its sensitivity to fluctuations of global and regional markets. Knowledge of the structure and the size of each sector are also important for the economic impact results' interpretation, as it allows the assessment of the extent to which the proposed activity would change the economy, its structure and trends of specific sectors.

The size of the Lephalale Municipality in terms of Gross Value Added (GVA) was estimated to be around R7 232 million in 2010. In 2010, the per capita GVA in the area was equal to R82 485 in current prices, which was almost three times higher than in Limpopo with a per capita GVA of R33 057 (current prices). The national per capita GVA was R48 146 in current prices (Quantec, 2010). Relative to both the national and the Limpopo economies, the Lephalale economy has a higher per capita GVA, thus signalling a stronger economy in comparison to the

other study areas. Higher living standards on average would be expected for the Municipality.

Over the past five years, the Compounded Average Growth Rate (CAGR) of the Lephalale economy was 20.9% which means that it grew at a faster rate than the District (15.3%), Provincial (14.1%) and national (15.3%) economies (Quantec, 2010).

The growth of the Lephalale economy in the past few years was largely stimulated by the primary sector, particularly mining. The mining and quarrying sector grew about three times in the five years between 2005 and 2010 growing at a CAGR of 23.4%. The propelled growth rate is highly probable due to the advance in development of the Limpopo Coal, Energy and Petrochemical Cluster. Based on the statistics provided by Quantec (2012), the mining sector was the only industry that increased in real size between 2005 and 2010. More than 70% of the local economy is derived from the mining activities, and specifically coal mining. These activities are directly dependent on the demand for coal created by the local energy generating sector, thus it can be suggested that the sustainability of the existing local employment opportunities are indirectly reliant on the future growth of the local electricity generating industry and other industries that use coal production inputs.

6.18.4. Labour force and Employment Structure

Employment is the primary means by which individuals who are of working age may earn an income that will enable them to provide for their basic needs and improve their standard of living. As such, employment and unemployment rates are important indicators of socio-economic well-being. The following paragraphs examine the study area's labour market from a number of angles, including the employment rate and sectoral employment patterns.

In 2010, 32 million people were within the working age in South Africa. Of these, 15.7 million were non-economically active and 16.2 million formed the labour force. Concurrently, the labour force participation rate was 50.8% meaning that in 2010 just over half of the working population in South Africa were either employed or unemployed. The number of employed people in South Africa amounted to just above 12 million people, leaving 4.2 million people or 25.9% of the labour force unemployed.

In comparison, the local municipality of Lephalale consisted of 55 544 people of a working age in 2010. This accounts for 63% of the total population, from which 16 341 was employed (29.4%). Of the working-age population, 52% were male.

Unlike South Africa with a labour participation rate of over 50%, Lephalale labour participation rate was 38.5%. Essentially, just under two thirds of the working age population in Lephalale were non-economically active, a significant portion of whom were discouraged job seekers. Of the economically active population (21 371), 23% were unemployed, which means that it was lower than in the rest of the country. Considering that the labour force participation rate in Lephalale was smaller than in South Africa, the lower unemployment rate does not necessarily reflect better socio-economic conditions in the municipality compared to the rest of the country. The number of unemployed people in Lephalale increased slightly from 2009 to 2010. A steady drop in labour participation is also evident from 2005 onwards with an average decline of 5.7% per annum (Quantec, 2010). This shows that a greater number of people in the municipality become discouraged job seekers over the years, which also means that the dependency ratio in the area grew.

The employment structure of the economy provides valuable insight into the dependency of an area's income and employment in 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, as it 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 6 that the tertiary sector creates one out of two employment opportunities in Lephalale compared to about three out of four employment opportunities in the country. Four out of ten jobs in the local area are created by the primary sector. One of the goals outlined in the NDP (2011-2030) is to ensure development of a stable economy. Essentially, a stable economy is less reliant in the primary and secondary sectors than the tertiary sector, as an economy easily affected by trade and global economic spin-offs is unstable. 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.

The mining sector creates the largest number of employment opportunities in the area by providing jobs for more than a quarter of workers. It is followed by the agricultural sector that contributes 14% to the local employment. The electricity generating industry is the smallest sector in the area.

According to Quantec (2011), the Lephalale economy lost 7 280 employment opportunities between 2005 and 2010, which represented a 30.8% decline during the analysed period. This means that almost a third of the people employed in 2005 lost their jobs, which again explains the high net out-migration rate

observed in the Municipality. Of all three sectors, the secondary sector had the lowest total loss of employment of 957, with the primary and tertiary sectors grossing at over 3 000 each. With regard to the reduction of employment opportunities, the secondary sector saw a 41% loss, followed by the primary sector with 32% and the tertiary sector with a 27.6% drop in employment (Quantec, 2010).

Over the period between 2005 and 2010, the mining and transport sectors were the only sectors that showed a growth in employment. Together, they created 806 jobs of which most of them were created in the mining sector.

The sector showing the largest loss of employment within the period was the agricultural sector. Between 2005 and 2010 its employment opportunities declined by 3 932, or 63%. Agricultural activities are labour intensive; therefore, a small decline in the size of that sector would generally lead to greater losses of jobs. This is evident when comparing the growth rate for the GVA of the agriculture sector in current prices at 5.7% relative to a colossal loss of employment equating to 63%. Agriculture is historically one of the building blocks of the Lephalale economy. A decline in this sector would most definitely worsen the quality of lives and welfare of the affected households, which would force them to move to areas that offer greater potential to find employment.

Aside from the agricultural sector, industries that experienced a sharp decline in employment were trade and community services. Both of these sectors are reliant on the purchasing power of the local population. Since population in the area has been declining, it also means that the demand for trade and community services was dropping leading to the closure of businesses and subsequently job shedding.

It is envisaged that the development of the Limpopo Coal, Energy and Petrochemical cluster (Lephalale LED, 2008) in the Lephalale LM is expected to reverse the trends observed in the area in the past few years. With the expected development of the mining industry in the area and establishment of new industries, employment opportunities within both the mining and secondary industry are expected to grow. These developments are expected to maximise local economic spin-offs leading to the creation of new employment opportunities in the services sector.

6.18.5. Status of infrastructure and basic service delivery

Access to basic service delivery and infrastructure such as shelter and transport are indicators that assist in understanding the standard of living of the households residing in the study areas. Comprehension of the extent to which households in the area have access to water, sanitation, and electricity assists in the understanding of communities' living standards and their needs. The

availability of service infrastructure such as roads, educational and health facilities etc. further indicates the nature of the study area, which is valuable in developing a complete profile of the circumstances in which communities are living.

6.18.6. Local Socio-Economics

The affected landowners are those residing on farms directly affected by the proposed mining activities as well as on neighbouring farms. The farmers in the area utilise their farms for various agricultural activities, game farming and hunting activities from which they source their income and maintain their livelihoods. An indication of some of the activities occurring on the various farms is summarised below.

» The adjacent farms Minnasvlakte, Elandsbosch, Wolwepan, Majamazynkopie and Duikerfontein (referred to as "the Steenkamp Properties") are used for farming (livestock and game) and for tourism activities. The Farm Elandsbosch has tourism- orientated accommodation facilities. These accommodation facilities are adjacent to the Farm Smitspan. The Farm Minnesvlakte (affected farm portion) is used for hunting purposes.
» The Pieterse family residing on Swanepoelpan. They have a 50% partnership in the company Inyati and the father and son, together with the partner control activities associated with Inyati. They also have a combination of activities, including cattle farming and safaris for hunting and photography. They also provide hunting to international and local clientele. Their income appears not to be limited to the immediate areas as the son does conduct safaris in Africa as well as locally.
» Mr. G. Erasmus resides on Zaagput with his wife and border Smitspan's eastern boundary. He is also economically reliant on his property where he does some farming with cattle and provides for hunting facilities to hunting organizations.

The socio-economic study will further consider the land-uses on each affected and relevant adjacent property. An affected and adjacent landowner map has been compiled and is included in Appendix E.

SCOPING OF ISSUES ASSOCIATED WITH THE PROPOSED COAL MINE

CHAPTER 7

This Scoping Study identifies the potential environmental (biophysical and social) impacts associated with the proposed expansion of the Sekoko Waterberg Colliery to increase the mining capacity and include additional farm portions within the Mining Right area (i.e. Swanepoel Pan 262 LQ, Olieboomsfontein 220 LQ; and Duikerfontein 263 LQ), and amend the approved Mine Work Programme and infrastructure layout. This section of the Scoping Report presents a summary of the potential environmental issues relating to the proposed coal mine project which have been identified to date through review of existing information, desk-top specialist investigations and stakeholder consultation. Aspect based impacts have been extracted from the activity based impact assessment tables presented in this Chapter of the Scoping Report. Potential impacts are also detailed within the specialist scoping study reports contained within Appendices F – N.

The majority of impacts will be associated with the mining activities which are proposed within the already authorised Mining Right area, i.e. on the farms Minnasvlakte 258 LQ, Smitspan 306 LQ, Massenberg 305 LQ and Remainder of Hooikraal 315 LQ. The potential impacts in this regard were assessed within the EIA process undertaken by Cabanga Concepts, and which was completed in 2010 (Cabanga Concepts, 2010). Details of the impacts identified to be associated with activities on these already authorised properties are included within this section of the Scoping Report so as to present a holistic view of the potential impacts associated with the proposed mine.

7.1. Impacts on Topography

The area lies south of the Waterberg Mountain range which forms part of the escarpment along the south-western border. Despite the mine's proximity to the mountain range, the site can be classified as flat. The properties to the south have small hills with minimal rocky ridges and can be described as gently undulating. The farm portions that make up the coal mine site are situated in a topographically homogenous region, described by the ENPAT (2003) database as Plains. Slopes are flat; generally less than 2% in a north-western direct on.

Activities which will impact on local topography include levelling of areas for infrastructure, excavation of the boxcut on Smitspan, opencast mining, and soil, overburden and coal stockpiling. Only the discard dump will be a permanent change in the surface topography of the site and is therefore of local extent, especially due to the fact that the area comprises of fairly flat plains which would potentially make discard dumps more visible.

During decommissioning and closure of the mine, the impact on topography will be largely positive due to the rehabilitation of the area. This will involve the filling of voids, the contouring of disturbed areas to fit in with the surrounding area and also allow for free surface water drainage and the replacement of soil and vegetation to the disturbed area.

Potential impacts on local topography are summarised in the table overleaf. These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with the potential establishment of an overburden stockpile on the farm Swanepoel Pan 262 LQ, the construction of a railway line and access roads, and underground mining activities (if considered as an option in future).

Table 7.1: Table Summarising Impacts on Topography

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Construction phase				
Erection of water management features and Pollution Control Dam (PCD)	Berm and channel construction PCD Construction	Alteration of topography	Local	Medium
Upgrade of roads & Construction of new roads and servitudes associated with conveyor belts, pipelines, railway lines and power lines	Soil stockpiling &/or berm construction			
Preparation of mine infrastructure and wash plant area	Soil stockpiling &/or berm construction			
Preparation of mine infrastructure and wash plant area	Levelling and compacting of areas for infrastructure			
Processing facility and associated infrastructure	Preparation of slurry treatment beds			
	Preparation of discard dump area			
Preparation of opencast mining areas	Soil stockpiling and/or berm construction			
Blasting of rock for the opencast pits & box cut area	Excavation of box cut and associated blasting			
Creating a hard park for vehicle safety	Levelling of areas, soil stockpiling, berm erection			
Operation Phase				
Creation of new opencast cuts	Blasting of overburden	Alteration of topography	Local	Medium
	Temporary soil and overburden mobilisation and stockpiling			
Underground mining (if considered as an option in future)	Removal of coal seams	Potential subsidence of surface layers	Local	Medium
Raw coal handling	Coal stockpiling	Alteration of topography	Local	Medium
Coal processing	Product coal stockpiling	Alteration of topography	Local	Medium
Discard handling	Continued development of the discard	Alteration of topography	Local	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
	dump			
Decommissioning Phase				
Dismantling, removal and rehabilitation of unnecessary servitudes (conveyers, pipelines, railway line, power lines)	Rehabilitation	Re-contouring of area for free surface water drainage could cause alteration of topography	Local	Medium
Dismantling & removal of all unnecessary mine and plant infrastructure and rehabilitation of relevant areas	Rehabilitation	Re-contouring of area for free surface water drainage	Local	Medium
Filling the Draft opencast voids	Filling of Draft voids	Eradication of voids can cause changes to topography	Local	Medium
Discard Dump	Rehabilitation	Re-contouring of area for free surface water drainage	Local	Medium
Slurry dams	Rehabilitation	Re-contouring of area for free surface water drainage	Local	Medium
Coal stockpiles	Draft removal of coal product	Eradication of voids	Local	Medium
	Rehabilitation	Re-contouring of area for free surface water drainage	Local	Medium
Overall rehabilitation activities	Profiling of all areas	Re-contouring of area for free surface water drainage	Local	Medium
Draft rehabilitation and closure	Rehabilitation	Re-contouring of area for free surface water drainage	Local	Medium

7.2. Impacts on Geology

The geology of the study area comprises the Karoo Shales. Shales in the Waterberg coalfields are situated in a fault trough. The basal part is composed of yellowish and reddish shale and reddish-brown mudstone that was apparently deposited in a valley in the pre-Karoo landscape. The middle part consists of white, cross-bedded, feldspathic grit and sandstone, with locally developed bands of conglomerate, and interbeds of shale sandstone, sandy and carbonaceous shale, with four seams of coal developed in the topmost portion. The upper part consists of dark grey to black, carbonaceous shale, in which some seven seams of coal and a few lighter-coloured interbeds of sandy shale are present (Geological Survey, 1989).

The impacts on geology during construction will be due to excavations of the initial box cut. The geological layers will be permanently disturbed and displaced. This impact will carry on during the operation phase but be further exacerbated by the removal of the coal seams. Further impacts are expected during the operations phase from blasting activities which may crack and disturb adjacent geological features in the area. Potential impacts on geology are summarised below. These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with underground mining activities (if considered as an option in future).

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation))
Construction Phase				
Blasting of rock for the opencast pits & box cut area	Excavation of box cut and associated blasting	Disturbance of geological strata	Local	High
Operation Phase				
Opencast mining	Blasting activities	Cracking of geological strata	Local – Regional	Medium
Opencast mining	Removal of coal seams	Removal of coal seam and alteration of geological strata	Local	High
Creation of new opencast cuts	Blasting of overburden	Disturbance of geological strata	Local	Medium
Underground mining (if considered as an option in future)	Removal of coal seams	Removal of coal seam and alteration of geological strata	Local	High

7.3. Impacts on Soils, Land Capability and Land Use

The major soil types encountered include those of the orthic phase Hutton, Clovelly, Fernwood, Askham, Etosha Glencoe Forms. Soils and land capability have been considered together as the impact to the soil will directly affect land capability. Land use will change from grazing/wilderness to mining. Impacts are summarised below and include:

» Loss of topsoil
» Change to soil's physical, chemical and biological properties
» Cumulative effects on soil as a result of the change in natural surface topography due to reprofiling of surface after stripping

7.3.1 Loss of Topsoil

The soil erodibility of the main soil types on the site are as follows:

» Hutton – Moderate to Low
» Clovelly & Fernwood – Moderate
» Glencoe - moderate to high
» Glenrosa (Gs) Dresden (Ds) and Mispah (Ms) - High
» Etosha - Moderate
» Askham - Moderate

The main impact on soil will be the stripping, handling and placement of soil associated with pre construction land clearing which will commence in the construction phase and continue into the operation phase with the roll-over mining method. The impact is expected to be of medium significance. Other impacts to soil quantity are related mostly to erosion, and include the operation of diversion berms and channels and soil stockpiles. Soil stockpiles may be exposed to erosion by surface water and wind. Inadequate water management facilities may result in soils being washed away. During decommissioning and closure of the mine, the impact on soil will be largely positive due to the rehabilitation of the area, which will involve the replacement of soil to previously disturbed areas and the re-vegetation of the area with natural, indigenous plants to reduce risk of erosion.

7.3.2 Change to soil's physical, chemical and biological properties

Topsoil may be contaminated during the construction. Soil contamination is the result of surface runoff and seepage. Contamination of stockpiled soil may occur due to seepage or contact with dirty surface water.

The most significant impact during the operation phase is the potential contamination of soil by coal dust, which could inadvertently alter soil pH and change soil chemical and physical characteristics. It may also impact on the potential of the soil to support vegetative growth. This will impair soil quality and impact on land capability and future land use, are related to potential contamination of soil due to various mining activities, including potential hydrocarbon contamination, sewage leaks, dirty water leaks and inappropriate storage of waste, and littering. Stockpiling and general activities in the mine area could also alter soil physical characteristics through compaction. Depending on the content of the dust pollution, soil adjacent to construction areas may be contaminated.

During decommissioning and closure the impact on soil will be largely positive due to the rehabilitation of the area, which will involve the amelioration of soil through discing and addition of fertilisers.

Potential impacts on soils and land capability are summarised in the table overleaf. These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with the potential establishment of an overburden stockpile on the farm Swanepoel Pan 262 LQ, the construction of a railway line and access roads, and underground mining activities (if considered as an option in future).

Table 7.2: Table Summarising Impacts on Soils

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Construction Phase				
Erection of water management features and PCD	Truck and heavy machinery operation	» Potential compaction of soils in neighbouring areas » Potential hydrocarbon contamination to soils	Local	Low
	Removal of woody vegetation	Increased risk of soil erosion	Local	Medium
	Removal of herbaceous material with soil stripping	Potential for loss of soil & damage to soil characteristics	Local	Low
	Berm and channel construction	Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling	Local	Low
	PCD Construction	Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling	Local	Medium
Upgrade of roads & Construction of new roads and servitudes associated with conveyor belts, railway line, pipelines and power lines	Truck and heavy machinery operation	» Potential compaction of soils in neighbouring areas » Potential hydrocarbon contamination to areas	Local	Low
	Removal of woody vegetation	Increased risk of soil erosion	Local	Low
	Removal of herbaceous material with soil stripping	Potential for loss of soil & damage to soil characteristics	Local	Low
	Soil stockpiling and/or berm construction	Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling	Local	Low

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Preparation of mine infrastructure and wash plant area	Truck and heavy machinery operation	» Potential compaction of soils in neighbouring areas » Potential hydrocarbon contamination to soils	Local	Low
	Removal of woody vegetation	Increased risk of soil erosion	Local	Low
	Removal of herbaceous material with soil stripping	Potential for loss of soil & damage to soil characteristics	Local	Low
	Soil stockpiling &/or berm construction	Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling	Local	Medium
	Levelling and compacting of areas for infrastructure	Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling	Local	Medium
Construction of foundations and erection of infrastructure	Truck and heavy machinery operation	» Potential compaction of soils in neighbouring areas » Potential hydrocarbon contamination to soils	Local	Medium
Drilling of boreholes for potable water supply	Drilling	» Potential compaction of soils in neighbouring areas » Potential hydrocarbon contamination to soils	Local	Low
Erection and utilisation of toilets and change houses	Utilisation of change houses and bathrooms	Potential harm through sewage leaks	Local	Medium
Sewage handling and treatment facility	Sewage handling and treatment	Potential harm through sewage leaks	Local	Medium
Diesel and hydrocarbon storage	Initial storage of diesel	Potential hydrocarbon contamination to soils	Local	Medium
Fitting of laboratory and chemical	Initial storage of hazardous	Potential hydrocarbon contamination to soils	Local	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
storage area and magazine storage	chemicals			
Preparation of opencast mining areas	Truck and heavy machinery operation	Potential compaction of soils in neighbouring areas	Local	Low
		Potential hydrocarbon contamination to soils	Local	Low
	Removal of woody vegetation	Increased risk of soil erosion	Local	Low
	Removal of herbaceous material with soil stripping	Potential for loss of soil & damage to soil characteristics	Local	Low
	Soil stockpiling &/or berm construction	Potential for erosion, loss of soil characteristics, compaction of soil and soil degradation through stockpiling	Local	Medium
Creating a hard surface for vehicle safety	Levelling of areas, soil stockpiling, berm erection	Potential for loss of soil characteristics through compaction and stockpiling	Local	Low
Waste generation	Domestic and industrial waste generation	Potential contamination of soil through littering	Local	Low
Operational Phase				
Operation water management facilities	Operation of berms and trenches	Containment of dirty water within dirty footprint area	Local	High
		Potential contamination of soils if dirty water escapes into environment	Regional	High
		Erosion	Local	High
	Operation of Pollution Control Dam	Potential contamination of soils if dirty water escapes into environment	Local	Medium
	Operation of associated pipelines and pumps	Potential contamination of soils if dirty water escapes into environment	Local	Low
Utilisation of roads	Truck and heavy machinery operation	» Potential compaction of soils in neighbouring areas » Potential hydrocarbon contamination to soils	Local	Low

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
	Coal Transportation	Potential contamination of surrounding areas with coal dust	Local - Regional	Low
Operation and maintenance of servitudes	Utilisation of conveyor belts (if required)	Potential contamination of surrounding areas with coal dust	Local	Low
	Operation of pipelines	Potential harm through leaks	Local	Low
	Maintenance of servitudes	Potential compaction of soils in neighbouring areas	Local	Low
Provision of electricity	Operation of generators if and when required	Potential hydrocarbon contamination to soils	Local	Low
Water treatment facility	Conveyance and pumping of water to and from mine area	Potential contamination if dirty water leaks and spills occur	Local	Low
Utilisation of change houses and bathrooms	Utilisation of change houses and bathrooms	Potential harm through sewage leaks	Local	Low
Sewage handling and treatment facility	Sewage handling and treatment	Potential harm through sewage leaks and/or inadequate treatment of effluent	Local	Low
Diesel and hydrocarbon storage and handling	Storage of diesel	Potential hydrocarbon contamination to soils	Local	Low
Chemical storage area and magazine storage	Storage and handling of hazardous chemicals	Potential hydrocarbon contamination to soils	Local	Medium
Opencast mining	Blasting & temporary stockpiling of raw coal	Potential contamination by coal dust	Local – Regional	Medium
Creation of new opencast cuts	Truck and heavy machinery operation	Potential compaction of soils in neighbouring areas	Local	Medium
	Truck and heavy machinery operation	Potential hydrocarbon contamination to soils	Local	Low
	Removal of woody vegetation	Increased risk of soil erosion	Local	Medium
	Removal of herbaceous material with soil stripping	Potential for loss of soil & damage to soil characteristics	Local	High

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
	Temporary soil and overburden mobilisation and stockpiling	Potential for erosion, loss of soil characteristics, compaction of soil & soil degradation through stockpiling	Local	Medium
Raw coal handling	Preliminary crushing of coal	Potential contamination by coal dust	Local – Regional	High
	Coal stockpiling	Potential contamination by coal dust	Local – Regional	High
Coal processing	Crushing of coal	Potential contamination by coal dust	Local – Regional	Medium
	Product coal stockpiling	Potential contamination by coal dust	Local – Regional	High
Washing at service station, wash bays, hard park and workshop	Truck and heavy machinery activity	Potential hydrocarbon contamination of neighbouring soils	Local	Low
Waste generation	Waste generation	Potential contamination through littering	Local	Low
Operation water management facilities	Operation of berms and trenches	Containment of dirty water within dirty footprint area	Local	Low
Decommissioning Phase				
Operation water management facilities	Operation of berms and trenches	Potential contamination of soils if dirty water escapes into environment and erosion	Local	Low
	Operation of PCD	Potential contamination of soils if dirty water escapes into environment	Local	Low
	Operation of associated pipelines and pumps	Potential contamination of soils if dirty water escapes into environment	Local	Low
Dismantling, removal and rehabilitation of unnecessary servitudes (conveyers, pipelines, railway line, power lines)	Truck and heavy machinery operation	Potential compaction of soils in neighbouring areas	Local	Low
	Truck and heavy machinery operation	Potential hydrocarbon contamination to soils	Local	Low
	Rehabilitation	Soils replaced and ameliorated	Local	Low

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Hazardous substances handling (hydrocarbons and chemicals)	Removal of chemicals from site	Potential for contamination removed	Local	Low
	Initial removal of bulk hydrocarbons from site and Draft removal on completion of decommissioning.	Potential for contamination removed	Local	Low
Dismantling & removal of all unnecessary mine and plant infrastructure and rehabilitation of relevant areas	Truck and heavy machinery operation	Potential compaction of soils in neighbouring areas	Local	Low
	Truck and heavy machinery operation	Potential hydrocarbon contamination to soils	Local	Low
	Rehabilitation	Soils replaced and ameliorated	Local	Low
Change houses and bathrooms	Initial utilisation of change houses and bathrooms	Potential harm through sewage leaks	Local	Low
	Rehabilitation	Soils replaced and ameliorated	Local	Low
Sewage handling and treatment facility	Initial sewage handling and treatment	Potential harm through sewage leaks	Local	Low
	Rehabilitation	Soils replaced and ameliorated	Local	Low
Discard Dump	Rehabilitation	Soils replaced and ameliorated	Local	Low
Slurry dams	Rehabilitation	Soils replaced and ameliorated	Local	Low
Coal stockpiles	Rehabilitation	Soils replaced and ameliorated	Local	Low
Waste generation	Waste generation	Potential contamination through littering	Local	Low
Rehabilitation of unnecessary water management facilities	Rehabilitation	Soils replaced and ameliorated	Local	Low
Roads	Rehabilitation	Soils replaced and ameliorated	Local	Low
Overall rehabilitation activities	Placement of sub-soils and topsoil,	Potential for loss of soil and soil erosion	Local	Low
	Placement of sub-soils and topsoil,	Soils replaced and ameliorated	Local	Low
Closure And Post Closure Phases				
Draft rehabilitation and closure	Rehabilitation	Soils replaced and ameliorated	Local	Low

7.4. Impacts on Surface Water

The site is situated in a water scare area. The proposed coal mining area falls under A41E quaternary catchment in the Mokolo/Matlabas Key Area in the Limpopo Water Management Area (WMA). Due to the flat topography of the region, no significant drainage lines/ watercourses are evident on the site. The Limpopo River is the most significant river of the region and is situated approximately 10km towards the north-west of the farm Olieboomsfontein 220 LQ. Potential surface water impacts are summarised below.

7.4.1 Surface Water Quantity

The main impacts during construction will be the reduced flow of water from the catchment to receiving rivers. The construction of pollution control dams and diversion channels around the mining area to contain all contaminated water will result in the rainfall falling on this area being restricted to the area and removed from the total catchment runoff. This will reduce surface water runoff reaching streams and rivers in the area. The impact is expected to be of medium significance as the areas are quite small. This impact will continue through to the operation phase and throughout the life of the mine. Irresponsible water use on site will also impact negatively on surface water quantity, although this is not expected to be significant. During decommissioning, the above will still be an issue as infrastructure is removed from site. As rehabilitation progresses and the area is re-contoured, topsoil is applied and then re-vegetated with natural indigenous vegetation, free surface water drainage into the natural drainage systems can be restored and surface water quantity to catchment will increase.

7.4.2 Surface Water Quality

As there are no flowing streams on the site for the proposed coal mine, no water samples could be taken on the mine site. Information from previous studies conducted in the area and in the water management Area (WMA) as a whole were used to describe the water quality. Water quality is generally good. During construction, the main impact on surface water will be the potential of silt loading of surface water bodies as soils are exposed and mobilised. There also exists the potential for surface water contamination from potential hydrocarbon leaks from vehicles and equipment and from illegal dumping of waste. The impacts described above will continue during the operation phase of mining and processing. The risk for silt loading of the surrounding surface water bodies will be further exacerbated by the operation of diversion berms and channels and on-going mobilisation of soil during roll-over mining. Further impacts that can be expected during the operation phase include potential for surface water contamination through stockpiling of raw and processed coal, failure of dirty water management facilities or leaks, coal dust settling in surface water bodies,

accidental spillages and leaks of dangerous and hazardous materials and waste generation and illegal littering or dumping of potentially harmful waste.

Many of the above impacts will continue briefly during decommissioning as the infrastructure is removed and as the area is rehabilitated. However, during closure the area will be rehabilitated and re-vegetated and free surface water drainage into the natural drainage systems will be largely restored. The potential contaminants in the area would have been removed.

Potential impacts on surface water are summarised in the table overleaf. These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with the potential establishment of an overburden stockpile on the farm Swanepoel Pan 262 LQ, the construction of a railway line and access roads, and underground mining activities (if considered as an option in future).

Table 7.3: Impact Table Summarising Impacts on Surface Water

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Construction				
Erection of water management features and the Pollution Control Dam (PCD)	Truck and heavy machinery operation	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local to Regional	Low
	Removal of woody vegetation	Increased risk of siltation of surface water bodies	Local to Regional	Low
	» Removal of herbaceous material with soil stripping » Berm and channel construction	Potential silt-loading of drainage lines and downstream water bodies	Local to Regional	Low
	Pollution Control Dam Construction	» Potential silt-loading of drainage lines and downstream water bodies » Downstream water quantity of catchment reduced » Containment of contaminated water	Local to Regional	Medium
Upgrade of roads & Construction of new roads and servitudes associated with conveyor belts, pipelines and power lines	Truck and heavy machinery operation	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Low
	Removal of woody vegetation	Increased risk of siltation of surface water bodies	Local	Low
	Removal of herbaceous material with soil stripping	Potential silt-loading of drainage lines and downstream water bodies	Local	Low
	Soil stockpiling &/or berm construction	Potential silt-loading of drainage lines and downstream water bodies	Local	Low
Preparation of mine infrastructure and wash plant area	Truck and heavy machinery operation	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Low
	» Removal of woody vegetation » Removal of herbaceous	» Increased risk of siltation of surface water bodies	Local	Low

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
	material with soil stripping » Soil stockpiling &/or berm construction » Leveling and compacting of areas for infrastructure	» Potential silt-loading of drainage lines and downstream water bodies		
Construction of foundations and erection of infrastructure	Truck and heavy machinery operation	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Low
Drilling of boreholes for potable water supply	Drilling	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Low
Erection and utilisation of toilets and change houses	Utilisation of change bathrooms	Potential harm through sewage leaks	Local	Low
Sewage handling and treatment facility	Sewage handling and treatment	Potential harm through sewage leaks	Local	Medium
Diesel and hydrocarbon storage	Initial storage of diesel	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Medium
Fitting of laboratory and chemical storage area and magazine storage	Initial storage of hazardous chemicals	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Medium
Preparation of opencast mining areas	Truck and heavy machinery operation	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Low
Preparation of opencast mining areas	» Removal of woody vegetation » Removal of herbaceous material with soil stripping » Soil stockpiling &/or berm construction	» Increased risk of siltation of surface water bodies » Potential silt-loading of drainage lines and downstream water bodies	Local	Low
Waste generation	Domestic and industrial waste	Potential contamination through littering	Local	Low

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
	generation			
Operations				
Operation water management facilities	Operation of berms and trenches	Containment of dirty water within dirty footprint area	Local	High
		Potential surface water contamination if leaks escape into the environment	Local	High
		Potential silt-loading of drainage lines and downstream water bodies	Local	Low
Operation water management facilities	Operation of berms and trenches	Downstream water quantity of catchment reduced	Local	High
	Operation of Pollution Control Dam	Potential surface water contamination if leaks escape into the environment	Local	Low
		Downstream water quantity of catchment reduced	Local	High
	Operation of associated pipelines and pumps	Potential surface water contamination if leaks escape into the environment	Local	Low
	Operation of associated pipelines and pumps	Downstream water quantity of catchment reduced	Local	High
Utilisation of roads	Truck and heavy machinery operation	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Medium
Utilisation of roads	Coal Transportation	Potential contamination of surrounding surface water bodies with coal dust and transported coal spillage	Local	Low
Operation and maintenance of servitudes	Utilisation of conveyor belts	Potential contamination of surrounding surface water bodies with coal dust and transported coal spillage	Local	Low
	Operation of pipelines	Irresponsible use of water during mining activities will impact on surface water	Local	Low

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
		quantity		
		Potential harm through leaks	Local	Low
		Irresponsible use of water during mining activities will impact on surface water quantity	Local	Low
		Potential harm through leaks	Local	Low
Provision of electricity	Operation of generators if and when required	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Low
Water treatment facility	Conveyance and pumping of water	Potential contamination of surrounding surface water bodies if dirty water leaks and spills occur	Local	Medium
Utilisation of change houses and bathrooms	Utilisation of change bathrooms	Potential harm through sewage leaks	Local	Low
Sewage handling and treatment facility	Sewage handling and treatment	Potential harm through sewage leaks	Local	Low
Diesel and hydrocarbon storage and handling	Storage of diesel	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Medium
Chemical storage area and magazine storage	Storage and handling of hazardous chemicals	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Medium
Creation of new opencast cuts	Truck and heavy machinery operation	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Low
	Removal of woody vegetation	Increased risk of siltation of surface water bodies	Local	Low
	Removal of herbaceous material with soil stripping	Potential silt-loading of drainage lines and downstream water bodies	Local	Low
	Temporary soil and overburden	Potential silt-loading of drainage lines	Local	Low

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
	mobilisation and stockpiling	and downstream water bodies		
Rehabilitation from roll-over mining	Rehabilitation from roll-over mining	Revegetation of areas mined out reduces risk of silt loading on downstream water bodies	Local to Regional	Medium
Raw coal handling	Preliminary crushing of coal	Potential contamination of surface water runoff which may reach downstream surface water bodies	Local	Low
	Coal stockpiling	Potential contamination of surface water runoff which may reach downstream surface water bodies	Local	High
Coal processing	Crushing of coal	Potential contamination of surface water runoff which may reach downstream surface water bodies	Local	High
	Coal Washing and beneficiation	Water wastage with irresponsible use or if leaks occur	Local	High
	Coal Washing and beneficiation	Contamination of surrounding water bodies should leaks occur	Local	High
	Product coal stockpiling	Potential contamination of surface water runoff which may reach downstream surface water bodies	Local	Low
Discard handling	Operation of discard facility	Potential contamination by surface water runoff from area escaping into surrounding environment	Local	Medium
Slurry handling	Pumping of slurry to slurry dams	Potential contamination by surface water runoff from area escaping into surrounding environment should leaks occur	Local	High
	Drying of slurry in slurry beds	Potential contamination by surface water runoff from area escaping into	Local	High

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
		surrounding environment should leaks occur		
Washing at service station, wash bays, hard park and workshop	Truck and heavy machinery activity	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Low
Washing at service station, wash bays, hard park and workshop	Water use	Irresponsible use of water during mining activities will impact on surface water quantity	Local	Low
Waste generation	Waste generation	Potential contamination by through littering through surface water runoff	Local	Low
General activities	General activities	Irresponsible use of water during mining activities will impact on surface water quantity	Local	Low
Decommissioning Phase				
Operation water management facilities	Operation of berms and trenches	» Containment of dirty water within dirty footprint area » Potential surface water contamination if leaks escape into the environment » Potential silt-loading of drainage lines and downstream water bodies » Downstream water quantity of catchment reduced	Local	Medium
	Operation of Pollution Control dam	Potential surface water contamination if leaks escape into the environment	Local	Medium
	Operation of PCD	Downstream water quantity of catchment reduced	Local	High
	Operation of associated pipelines and pumps	Potential surface water contamination if leaks escape into the environment	Local	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Dismantling, removal and rehabilitation of unnecessary servitudes (conveyers, railway line, pipelines, power lines)	Truck and heavy machinery operation	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Low
	Rehabilitation	Reduced potential of contamination to surface water bodies	Local	High
Hazardous substances handling (hydrocarbons and chemicals)	Removal of chemicals from site	Potential for contamination removed	Local	Low
	Initial removal of bulk hydrocarbons from site and Draft removal on completion of decommissioning.	Potential for contamination removed	Local	Low
Dismantling & removal of all unnecessary mine and plant infrastructure and rehabilitation of relevant areas	Truck and heavy machinery operation	Potential hydrocarbon contamination which may reach downstream surface water bodies	Local	Low
	Rehabilitation	Reduced potential of contamination to surface water bodies	Local	Medium
Sewage handling and treatment facility	Initial sewage handling and treatment	Potential harm through sewage leaks	Local	Low
	Rehabilitation	Reduced potential of contamination to surface water bodies	Local	Medium
Underground mining areas (if considered as an option in future)	Sealing and closure of underground mining sections	Potential contamination plume from mining areas surfaces into surface water areas	Local	High
Filling the Draft opencast voids	Filling of access voids	Potential contaminated groundwater plume surfaces into surface water areas	Local	Medium
Discard Dump	Rehabilitation	Reduced potential of contamination to surface water bodies	Local	Medium
Slurry dams	Draft drying and removal of slurry	Potential contamination by surface water runoff from area escaping into surrounding environment should leaks	Local	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
		occur		
Slurry dams	Rehabilitation	Reduced potential of contamination to surface water bodies	Local	Medium
Coal stockpiles	Rehabilitation	Reduced potential of contamination to surface water bodies	Local	Medium
Waste generation	Waste generation	Potential contamination by through littering through surface water runoff	Local	Low
Rehabilitation of unnecessary water management facilities	Rehabilitation	Reduced potential of contamination to surface water bodies and return of water to catchment	Local	Medium
Roads	Rehabilitation	Reduced potential of contamination to surface water bodies	Local	Medium
Overall rehabilitation activities	Placement of sub-soils and topsoil,	Potential for silt loading of surrounding surface water bodies	Local	Low
	Profiling of all areas	Free drainage restored to area	Local	High
	Profiling of all areas	Large areas of surface water runoff return to catchment	Local	High

7.5. Impacts on Ground Water

Two aquifers occur in the area and are associated with a) weathered material, and b) underlying fractured rock material.

Impacts from the proposed Sekoko mining operations on groundwater were evaluated and include:

» Mine dewatering and the associated drawdown in groundwater level due to the boxcut and underground mine dewatering.
» Impacts on Sekoko water supply boreholes, and impacts on neighbouring privately owned boreholes due to potential lowering of the groundwater levels surrounding the mining area.
» Groundwater inflow volumes into the mine area over the life of mine.
» Contamination of aquifers from the pit and surface storage areas (discard etc.).
» Recovery of groundwater levels in the post-mining environment.
» Decant potential, quality, and volumes.

The mine floor elevation is below the general groundwater level thus causing groundwater inflows into the opencast mining area from the surrounding aquifers during operations. The mining area will have to be actively dewatered to ensure a safe working environment. Pumping water that seeps into the opencast mine area to surface will cause dewatering of the surrounding aquifers and an associated decrease in groundwater level within the zone of influence of the dewatering cone. A number of private groundwater users are likely to be impacted by the dewatering and associated drawdown cone. The calculated zone of influence of the drawdown cone extends to a maximum of around 3 to 4 km to the north and south of the Sekoko mining area. East of the Sekoko mining area the extent of the drawdown cone is limited by the Daarby Fault that acts as a groundwater flow barrier. Towards the west the zone of influence extends approximately 5 km from the mining area.

The exposed coal seams will be subject to oxidation, and the possible formation of Acid Mine Drainage (AMD) conditions. However, active dewatering of the box-cut will cause groundwater flow directions to be centred on the pit, therefore not allowing any contamination to migrate away from the box-cut area. This, combined with the relatively short time period of the construction phase will limit contamination of the aquifers adjacent to the box-cut. The water balancing dam and pollution control dams will be lined, thereby helping to prevent contamination of the underlying aquifers. Potential for contamination during operation is however associated with spillages and degradation of liner systems.

Surface construction of the waste dumps, discard dump, overburden dump, top soil dump, pollution control dams, raw water and storm water control dams, haul roads, railway line and offices will not breach the groundwater level and is therefore not expected to have any impact on the groundwater levels. It is assumed that adherence to general good housekeeping rules with regard to diesel, oil and other potential contaminants will prevent contamination of the aquifers.

The impacts on groundwater during operation are expected to be of medium to high significance.

During decommissioning water levels will be largely restored which is a positive impact on local groundwater levels of moderate significance. This will however also potentially result in the development of a contamination plume from the mine areas which will be a negative impact on groundwater quality. The groundwater model needs to be completed to make a prediction on the extent of the contamination plumes.

Long term post-closure phase impacts include the potential for the creation of AMD conditions due to oxidation of the exposed coal seams of the rehabilitated opencast area and the discard material used for rehabilitation and the potential for continued development of a contamination plume from the mine areas which will be a negative impact on groundwater quality.

Potential impacts on groundwater are summarised in the table overleaf. These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with underground mining activities (if considered as an option in future).

Table 7.4: Impact Table Summarising Impacts on Ground Water

Activity	Sub-activity	Impact	Extent	Significance (Without Mitigation)
Construction Phase				
Erection of water management features and PCD	Truck and heavy machinery activity	Potential hydrocarbon contamination leeching into the water table	Local	Low
Upgrade of roads & Construction of new roads and servitudes associated with conveyor belts, pipelines and power lines	Truck and heavy machinery activity	Potential hydrocarbon contamination leeching into the water table	Local	Low
Preparation of mine infrastructure and wash plant area	Truck and heavy machinery activity	Potential hydrocarbon contamination leeching into the water table	Local	Low
Construction of foundations and erection of infrastructure	Truck and heavy machinery activity	Potential hydrocarbon contamination leeching into the water table	Local	Low
Drilling of boreholes for potable water supply	Drilling	Potential hydrocarbon contamination leeching into the water table	Local	Low
	Fitting of and operation of pumps	Reduction of local groundwater	Local	High
Erection and utilisation of toilets and change houses	Utilisation of change houses and bathrooms	Irresponsible use of water will impact on groundwater quantity	Local	Low
	Utilisation of change houses and bathrooms	Potential harm through sewage leaks	Local	Low
Sewage handling and treatment facility	Sewage handling and treatment	Potential harm through sewage leaks	Local	Low
Diesel and hydrocarbon storage	Initial storage of diesel	Potential hydrocarbon contamination leeching into the water table	Local	Low
Fitting of laboratory and chemical storage area and magazine storage	Initial storage of hazardous chemicals	Potential hydrocarbon contamination leeching into the water table	Local	Low
Preparation of opencast mining areas	Truck and heavy machinery activity	Potential hydrocarbon contamination leeching into the water table	Local	Low
Blasting of rock for the opencast pits & box cut area	Excavation of box cut and associated blasting	Generation of poor quality leachate which may contaminate aquifers	Local	High
Blasting of rock for the opencast pits &	Excavation of box cut and	Potential damage to groundwater aquifers	Local	High

Activity	Sub-activity	Impact	Extent	Significance (Without Mitigation)
box cut area	associated blasting	and alteration of groundwater flow		
Erection of in-pit infrastructure	Pumping of in-pit water	Reduction of local groundwater	Local	High
		Alteration of groundwater flow	Local	High
Operation Phase				
Waste generation	Domestic and industrial waste generation	Potential contamination through littering	Local	Low
Operation water management facilities	Operation of berms and trenches	Potential infiltration of contaminated water into groundwater table if leaks occur	Local	Medium
	Operation of PCD	Potential infiltration of contaminated water into groundwater table if leaks occur	Local	Medium
	Operation of associated pipelines and pumps	Potential infiltration of contaminated water into groundwater table if leaks occur	Local	Medium
Utilisation of roads and railway line	Truck and heavy machinery activity	Potential hydrocarbon contamination leeching into the water table	Local	Low
	Coal Transportation	Potential contamination leeching into the water table if coal dust and spillage not cleared from road and/or rail servitude	Local	Low
Operation and maintenance of servitudes	Utilisation of conveyor belts	Potential contamination leeching into the water table if coal dust and spillage not cleared from road	Local	Low
	Operation of pipelines	Irresponsible use of water during mining activities will impact on groundwater quantity	Local	Low
		Potential harm through leaks	Local	Low
		Irresponsible use of water during mining activities will impact on groundwater quantity	Local	Low
		Potential harm through leaks	Local	Low
Provision of electricity	Operation of generators if and when	Potential hydrocarbon contamination	Local	Low

Activity	Sub-activity	Impact	Extent	Significance (Without Mitigation)
	required	leeching into the water table should leaks occur		
Pumping and conveyance of groundwater for potable use	Operation of pumps	Reduction of local groundwater	Local	High
	Groundwater conveyance and temporary storage	Water wastage should leaks occur	Local to Regional	High
	Groundwater consumption	Water wastage with irresponsible use	Local to Regional	High
		Reduction of local groundwater	Local to Regional	High
Water treatment facility	Conveyance and pumping of water to and from	Water wastage should leaks occur	Local to Regional	High
	Conveyance and pumping of water to and from	Potential contamination leeching into the water table if dirty water leaks and spills occur	Local to Regional	Medium
	Water treatment and recycling	Conservation of water	Local to Regional	Medium
Utilisation of change houses and bathrooms	Utilisation of change houses and bathrooms	Irresponsible use of water will impact on groundwater quantity	Local to Regional	Low
	Utilisation of change houses and bathrooms	Potential harm through sewage leaks	Local	Low
Sewage handling and treatment facility	Sewage handling and treatment	Potential harm through sewage leaks	Local	Low
Diesel and hydrocarbon storage and handling	Storage of diesel	Potential hydrocarbon contamination leeching into the water table	Local to Regional	Low
Chemical storage area and magazine storage	Storage and handling of hazardous chemicals	Potential hydrocarbon contamination leeching into the water table	Local to Regional	Low
Opencast mining	Blasting activities	Potential damage to groundwater aquifers and alteration of groundwater flow	Local to Regional	High
Opencast mining	Removal of coal seams	Potential damage to groundwater aquifers and alteration of groundwater flow	Local to Regional	High

Activity	Sub-activity	Impact	Extent	Significance (Without Mitigation)
		Potential contamination plume of groundwater	Local to Regional	High
	Pumping of in-pit water	Reduction of local groundwater	Local to Regional	High
		Alteration of groundwater flow	Local to Regional	High
Creation of new opencast cuts	Truck and heavy machinery activity	Potential hydrocarbon contamination leeching into the water table	Local to Regional	Medium
	Blasting of overburden	Generation of poor quality leachate which may contaminate aquifers	Local to Regional	High
		Potential damage to groundwater aquifers and alteration of groundwater flow	Local to Regional	High
Underground mining (if considered as an option in future)	Removal of coal seams	Potential damage to groundwater aquifers and alteration of groundwater flow	Local to Regional	High
		The groundwater flow will be directed towards the mine which will contain pollution within the area	Local to Regional	High
Raw coal handling	Coal stockpiling	Ingression of poor quality, low pH leachate into water table	Local to Regional	High
Coal processing	Coal Washing and beneficiation	Water wastage with irresponsible use or if leaks occur	Local to Regional	High
		Contamination of groundwater table should leaks occur	Local to Regional	High
	Product coal stockpiling	Ingression of poor quality, low pH leachate into water table	Local to Regional	High
Discard handling	Operation of discard facility	Ingression of poor quality, low pH leachate into water table	Local to Regional	High
Slurry handling	Pumping of slurry to slurry dams	Ingression of poor quality, low pH leachate	Local to	High

Activity	Sub-activity	Impact	Extent	Significance (Without Mitigation)
		into water table should leaks occur	Regional	
	Drying of slurry in slurry beds	Ingression of poor quality, low pH leachate into water table should leaks occur	Local to Regional	High
Washing at service station, wash bays, hard park and workshop	Truck and heavy machinery activity	Potential hydrocarbon contamination leeching into the water table	Local to Regional	Low
	Water use	Irresponsible use of water during mining activities will impact on groundwater quantity	Local to Regional	Low
Waste generation	Waste generation	Potential contamination through littering leeching into the groundwater table	Local	Low
General activities	General activities	Irresponsible use of water during mining activities will impact on groundwater quantity	Local to Regional	Low
Decommissioning Phase				
Operation water management facilities	Operation of berms and trenches	Potential infiltration of contaminated water into groundwater table if leaks occur	Local to Regional	Medium
	Operation of PCD	Potential infiltration of contaminated water into groundwater table if leaks occur	Local to Regional	Medium
	Operation of associated pipelines and pumps	Potential infiltration of contaminated water into groundwater table if leaks occur	Local to Regional	Medium
Dismantling, removal and rehabilitation of unnecessary servitudes (conveyers, pipelines, railway line, power lines)	Truck and heavy machinery activity	Potential hydrocarbon contamination leeching into the water table	Local to Regional	Low
Hazardous substances handling (hydrocarbons and chemicals)	Removal of chemicals from site	Potential for contamination removed	Local to Regional	Low
	Initial removal of bulk hydrocarbons from site and Draft removal on completion of decommissioning.	Potential for contamination removed	Local to Regional	Low

Activity	Sub-activity	Impact	Extent	Significance (Without Mitigation)
Dismantling & removal of all unnecessary mine and plant infrastructure and rehabilitation of relevant areas	Truck and heavy machinery activity	Potential hydrocarbon contamination leeching into the water table	Local to Regional	Low
Borehole water provision	Continued operation of pumps	Reduction of local groundwater	Local to Regional	Low
	Continued groundwater conveyance and temporary storage	Water wastage should leaks occur	Local to Regional	Low
	Continued groundwater conveyance and temporary storage	Water wastage with irresponsible use	Local to Regional	Medium
	Continued groundwater conveyance and temporary storage	Reduction of local groundwater	Local to Regional	Medium
	Sealing and closure of boreholes as borehole water requirements cease	Groundwater levels rebound	Local to Regional	Medium
Change houses and bathrooms	Initial utilisation of change houses and bathrooms	Irresponsible use of water will impact on groundwater quantity	Local to Regional	Low
	Initial utilisation of change houses and bathrooms	Potential harm through sewage leaks	Local to Regional	Low
Sewage handling and treatment facility	Initial sewage handling and treatment	Potential harm through sewage leaks	Local	Low
Underground mining areas (if considered as an option in future)	Sealing and closure of underground mining sections	Rebound of groundwater levels	Local to Regional	Medium
	Sealing and closure of underground mining sections	Reduced risk of contaminated decant	Local to Regional	Medium
Underground mining areas (if considered as an option in future)	Sealing and closure of underground mining sections	Potential contamination plume from mining areas	Local to Regional	Medium
Filling the Draft opencast voids	Filling of access voids	Potential contamination plume from mining areas	Local to Regional	Medium
Slurry dams	Draft drying and removal of slurry	Ingression of poor quality, low pH leachate	Local to	High

Activity	Sub-activity	Impact	Extent	Significance (Without Mitigation)
		into water table should leaks occur	Regional	
Waste generation	Waste generation	Potential contamination through littering leeching into the groundwater table	Local to Regional	Low
General activities	General activities	Irresponsible use of water will impact on groundwater quantity	Local to Regional	Low
General activities	General activities	Rebound of water levels	Regional	High
		Flow of contaminated groundwater away from mine into neighbouring areas	Regional	High
Closure and Post Closure Phases				
Draft rehabilitation and closure	Rehabilitation	Potential threats to groundwater will be significantly removed. Water ingress into groundwater table will be restored to some extent	Local to Regional	High
		Water decant into the mine will lead to further water quality impairment	Local to Regional	High
		Rebound of water levels	Local to Regional	High
		Flow of contaminated groundwater away from mine	Local to Regional	High

7.6. Impacts on Vegetation

Vegetation of the region is defined by Mucina and Rutherford (2006) as the Limpopo Sweet Bushveld. It comprises short, open woodland dominated by *Acacia mellifera* and *Dichrostachys cinerea* as well as taller tree species such as *A. robusta, A. burkei* and *Terminalia sericea*. It is not threatened (Least Threatened) and although only 1% is formally conserved, much is contained within private nature reserves and game farms.

The lack of floristic knowledge of the region is emphasised by the paucity of data records for this area (38 recorded species). An estimation of approximately 90 plant taxa per farm is considered reasonable, based on results of recent surveys in the general region. A total of 194 Red Data (Threatened) plant taxa are known to occur in Limpopo Province. Data records indicate only one plant species of conservation importance occurring in the region. However, considering the poor floristic knowledge of the region, it is reasonable to assume that more plant taxa of conservation importance will be present. However, 10 provincially protected species are known to persist in the general region. The vegetation found on the site is largely undisturbed with some limited areas disturbed through cultivation. These areas are of medium to low ecological importance. All natural vegetation should be considered as sensitive.

A floristic sensitivity map is provided in Figure 7.1. The floristic sensitivity of the natural woodland habitat of the region is regarded as being medium-high. This is in spite of a Least Threatened conservation status that is ascribed to the regional vegetation (Limpopo Sweet Bushveld). The known presence of several protected tree species, the likely presence of plants of conservation importance, as well as the untransformed nature of the region as a whole, renders the sensitivity of the proposed project site relatively high. Extremely limited areas of transformation are present within the various study sites and land use is consistent with high biodiversity levels and biodiversity conservation efforts on a regional scale. The floristic sensitivity of the natural woodland habitat of the region is regarded medium-high. This is in spite of a Least Threatened conservation status that is ascribed to the regional vegetation (Limpopo Sweet Bushveld). The known presence of several protected tree species, the likely presence of plants of conservation importance, as well as the untransformed nature of the region as a whole, renders the sensitivity to the proposed project relative high. Extremely limited areas of transformation are present within the various study sites and land use is consistent with high biodiversity levels and biodiversity conservation efforts on a regional scale.

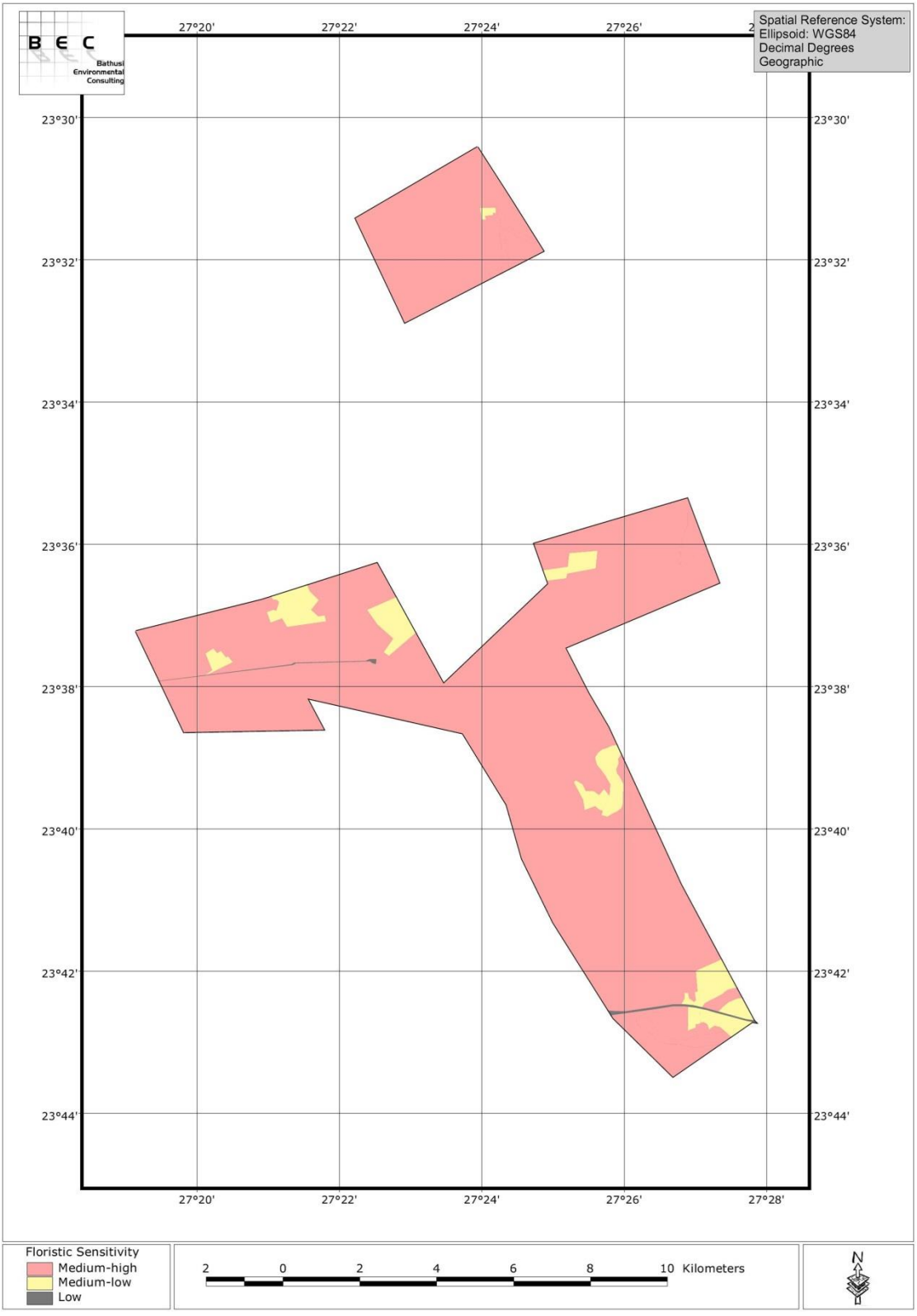

Figure 7.1: Floristic / Vegetation Sensitivity Map for the Sekoko Coal Mine Site

Potential and likely impacts of this type of development on vegetation include:

» Loss of biodiversity as a result of direct impacts on flora species of conservation importance and direct impacts on protected flora species;
» Alien invasive encroachment;
» Loss or degradation of natural vegetation (including ecosystem functioning);
» Loss / degradation of surrounding habitat;
» Impacts on South Africa's conservation obligations & targets; and
» Increase in environmental degradation, pollution (air, soils, surface water).

The impacts on vegetation in relation to mining activities throughout the life cycle stages of the mine are summarised in Table 7.7. The main impacts expected during the construction phase will be the stripping and removal of the vegetation in areas of surface infrastructure and the box cut area. The removal of vegetation will affect biodiversity; the area is quite pristine and has protected species and therefore the impact is of moderate significance. The impacts above will continue through operation of the mine as roll-over opencast mining progresses. Activity on site and the rehabilitation of previously mined areas will increase the risk of alien invasive species introduction to the area. During decommissioning and closure, all disturbed areas will be rehabilitated and re-vegetated with natural indigenous species. The potential for alien invasive introduction, establishment and spread will continue to be a moderately significant impact on site, during closure and post closure of the mine.

These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with the potential establishment of an overburden stockpile on the farm Swanepoel Pan 262 LQ, the construction of a railway line and access roads.

Table 7.5: Impact Table Summarising Impacts on Flora

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Construction Phase				
Erection of water management features and Pollution Control Dam	» Removal of woody vegetation » Removal of herbaceous material with soil stripping	Loss of biodiversity; loss or degradation of natural vegetation (including ecosystem functioning) and habitats	Local	Medium
Upgrade of roads & Construction of new roads and servitudes associated with conveyor belts, railway line, pipelines and power lines	Removal of woody vegetation	Loss of biodiversity; loss or degradation of natural vegetation (including ecosystem functioning) and habitats	Local	Medium
	Removal of herbaceous material with soil stripping	Loss of biodiversity; loss or degradation of natural vegetation (including ecosystem functioning) and habitats	Local	Medium
Preparation of mine infrastructure and wash plant area	Removal of woody vegetation	Loss of biodiversity; loss or degradation of natural vegetation (including ecosystem functioning) and habitats	Local	Medium
	Removal of herbaceous material with soil stripping	Loss of biodiversity; loss or degradation of natural vegetation (including ecosystem functioning) and habitats	Local	Medium
Operation Phase				
Operation and maintenance of servitudes	Maintenance of power line, railway line and access road servitudes	Alien invasive encroachment as activity may assist with spreading of seeds	Local to Regional	Medium
		Trimming of vegetation	Local	Medium
Creation of new opencast cuts	Removal of woody vegetation	Loss of biodiversity; loss or degradation of natural vegetation	Local	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
		(including ecosystem functioning) and habitats		
	Removal of herbaceous material with soil stripping	Loss of biodiversity; loss or degradation of natural vegetation (including ecosystem functioning) and habitats	Local	Medium
Rehabilitation from roll-over mining	Rehabilitation of mined out areas	Reintroduction of vegetation in rehabilitated areas	Local	Medium
General activities	General activities	Alien invasive encroachment	Local to Regional	Medium
		Damage to species in neighbouring areas	Local	Low
Decommissioning Phase				
Rehabilitation	Dismantling, removal and rehabilitation of unnecessary servitudes (conveyers, pipelines, power lines),	Area re-vegetated with indigenous plants	Local	Medium
	Change houses and bathrooms	Area re-vegetated with indigenous plants	Local	Medium
	Sewage handling and treatment facility	Area re-vegetated with indigenous plants	Local	Medium
	Discard Dump	Area re-vegetated with indigenous plants	Local	Medium
	Slurry dams	Area re-vegetated with indigenous plants	Local	Medium
	Coal stockpiles	Area re-vegetated with indigenous plants	Local	Medium
	Overall rehabilitation activities	Area re-vegetated with indigenous plants	Local	Medium
		Alien invasive encroachment	Local	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Closure And Post Closure Phases				
Rehabilitation	Draft rehabilitation and closure	Re-vegetated area with indigenous plants	Local	Medium
		Alien invasive encroachment	Local	Medium

7.7. Impacts on Fauna

Natural woodland, which comprises most of the study area, is estimated to have a medium-high faunal sensitivity. Habitat diversity is a particularly important attribute pertaining to faunal sensitivity. Variable habitat types, such as the *Acacia mellifera* floodplains, are often host to a variety of Red Data taxa; for example, the presence of the Giant Bullfrog has been confirmed for seasonal pans that contain surface water during the rainy season in the region. Other Red Data species are considered potential inhabitants of farms with wetland habitat because of the presence of seasonal surface water, and wetland related habitat is therefore regarded important on a local and regional scale. 18 Red Data species have been recorded or are known to occur, in the study area. It must however be noted that some species were reintroduced to the area as game farming stock (i.e. they are not considered free roaming on the farms investigated). Most of the study area is estimated to have a medium-high faunal sensitivity – natural woodland (refer to Figure 7.2).

Potential and likely impacts of this type of development on fauna include:

» Loss of biodiversity as a result of direct impacts on fauna species of conservation importance and direct impacts on common fauna species / faunal assemblages (including migration patterns, corridors, etc.);
» Human - Animal conflicts;
» Loss or degradation of natural pristine habitat (including ecosystem functioning);
» Impacts on South Africa's conservation obligations & targets;
» Increase in local and regional fragmentation/ isolation of habitat; and
» Increase in environmental degradation, pollution (air, soils, surface water).

The most severe impacts on fauna will be during construction when activities commence and most disruption occurs. The impact will be of moderate to low significance. Main impacts include the loss of habitat and refuge offered by vegetation which will be removed from site and the alienation of fauna from the area due to increased activity in the area. During the operation phase the above activities will continue, however the impacts are expected to be lower as there is reasonable expectation that many sensitive animal species would have dispersed from the area into quieter surroundings. Once the area is rehabilitated, fauna should return to the area. This is due to the re-vegetation of the area as well as the decrease in activity.

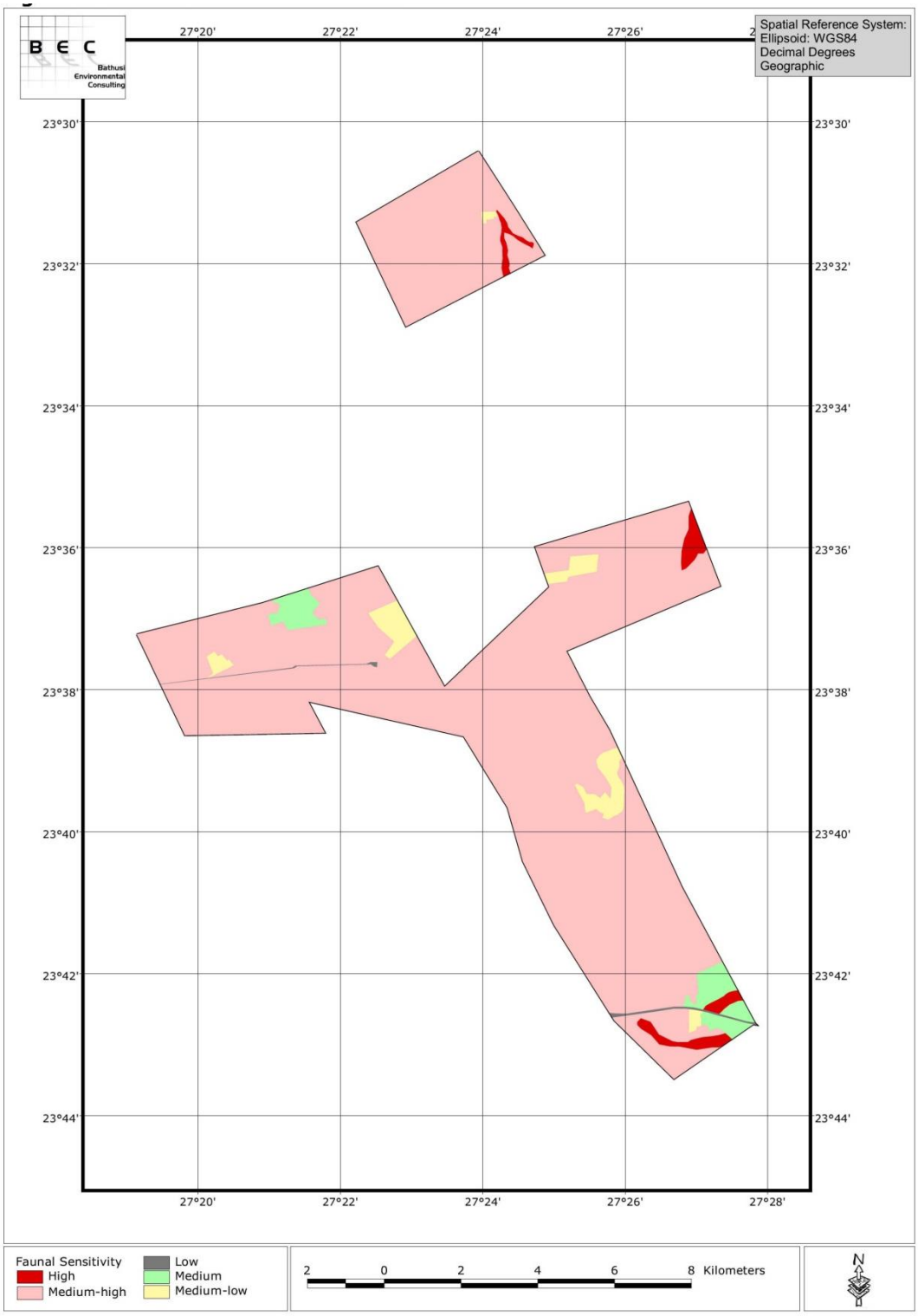

Figure 7.2: Faunal Sensitivity Map for the Sekoko Coal Mine Site

Impacts on fauna are summarised in the table overleaf. These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with the potential establishment of an overburden stockpile on the farm Swanepoel Pan 262 LQ, the construction of a railway line and access roads.

Table 7.6: Impact Tables Summarising Impacts on Fauna

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Construction Phase				
Erection of water management features and PCD	Removal of woody vegetation	Loss/degradation of habitat	Local	Medium
	Removal of herbaceous material with soil stripping	Loss/degradation of habitat	Local	Medium
Upgrade of roads & Construction of new roads and servitudes associated with conveyor belts, railway line, pipelines and power lines	Removal of woody vegetation	Loss/degradation of habitat	Local	Medium
	Removal of herbaceous material with soil stripping	Loss/degradation of habitat	Local	Medium
Preparation of mine infrastructure and wash plant area	Removal of woody vegetation	Loss/degradation of habitat	Local	Medium
	Removal of herbaceous material with soil stripping	Loss/degradation of habitat	Local	Medium
Provision of electricity	Erection of power lines	Potential risk to avifauna	Local	Medium
Operation				
Preparation of opencast mining areas	Removal of woody vegetation	Loss/degradation of habitat	Local	Medium
	Removal of herbaceous material with soil stripping	Loss/degradation of habitat	Local	Medium
Waste generation	Domestic and industrial waste generation	Potential harm through littering	Local	Low
General activities	General activities	Alienation of animals from the area	Local	Medium
Provision of electricity	Power supply	Potential risk to avifauna	Local	Low
Creation of new opencast cuts	Removal of woody vegetation	Loss/degradation of habitat	Local	High
	Removal of herbaceous material with soil stripping	Loss/degradation of habitat	Local	Medium
Rehabilitation from roll-over mining	Rehabilitation of mined out areas	Reintroduction of flora (and habitats) to the area	Local	Low
Operation of floodlights	Operation of floodlights	Hindrance to nocturnal animals	Local	Medium
Waste generation	Waste generation	Potential harm to animals who	Local	Low

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
		encounter hazardous or toxic waste		
Decommissioning Phase				
Dismantling, removal and rehabilitation of unnecessary servitudes (conveyers, pipelines, railway line, power lines), removal of all unnecessary mine and plant infrastructure and rehabilitation of relevant areas	Rehabilitation	Additional habitat created for fauna as floral cover increases in rehabilitated areas	Local	Low
Change houses and bathrooms	Rehabilitation	Additional habitat created for fauna as floral cover increases in rehabilitated areas	Local	Low
Sewage handling and treatment facility	Rehabilitation	Additional habitat created for fauna as floral cover increases in rehabilitated areas	Local	Low
Discard Dump	Rehabilitation	Additional habitat created for fauna as floral cover increases in rehabilitated areas	Local	Low
Slurry dams	Rehabilitation	Additional habitat created for fauna as floral cover increases in rehabilitated areas	Local	Low
Coal stockpiles	Rehabilitation	Additional habitat created for fauna as floral cover increases in rehabilitated areas	Local	Low
Waste generation	Waste generation	Potential harm to animals who encounter hazardous or toxic waste	Local	Low
Overall rehabilitation activities	Rehabilitation	New habitat available to fauna in the area and reduced activity should result in influx of animals to the	Local	Low

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
		area		
Closure And Post Closure Phases				
Draft rehabilitation and closure	Rehabilitation	New habitat available to fauna in the area and reduced activity should result in influx of animals to the area	Local	Medium

7.8. Impacts on Air Quality and Human Health

The air quality status quo assessment for the Waterberg District Municipality Air Quality Management Plan (GES, 2009) was based on the available ambient air quality monitoring data for Lephalale. The key findings for measurements between November 2006 and December 2009 at the Marapong station near Lephalale were:

» Ambient 24-hour PM_{10} concentrations were generally in compliance with the national ambient standard of 120 µg/m^3, with four exceedances over the period.
» Ambient 24-hour PM_{10} concentrations frequently exceed the 2015 ambient standard of 75 µg/m^3 particularly in the winter from May to September, attributed largely to domestic fuel burning.
» Ambient SO_2 concentrations currently were below the National 24-hour ambient standard, but are regarded as potentially problematic for shorter averaging periods.
» Ambient NO_2 and O_3 concentrations were well below their respective ambient standards.

These air quality monitoring results showed that concentrations of gaseous pollutants (sulphur dioxide, nitrogen dioxide and ozone) were within the South African standards. Particulate matter equal to or smaller than 10 micrometre also complied with current national standards but not with proposed (from 2015) standards. Dust fall-out rates monitored at the proposed Sekoko site showed values well below residential guidelines. The Waterberg area has however, been declared as a National Priority Area in terms of the Air Quality Act (Act 39 of 2004) on 15 June 2012, which implies that ambient air quality in the area may exceed national ambient standards in the near future and therefore requires specific national air quality management action. In addition, there may be trans-boundary air pollution between the Waterberg District Municipality and Botswana (DEA, 2012).

The emissions of particulates from the Sekoko Mine will add to the existing particulate concentrations. The potential exists to increase the frequency of exceedance of the ambient standards for particulates around the proposed coal mine and in the surrounding environment. Indirect impacts may result from the emission of Greenhouse Gases such as methane (CH4) and carbon dioxide (CO2) from spontaneous combustion, should this occur.

During the construction phase impacts will be limited to dust generation by traffic on dirt roads, blasting and excavation of the box cut and the stripping and stockpiling of soil. These impacts are expected to be of a moderately low significance. Additionally, all vehicles, heavy machinery and equipment which are

powered by fuels will contribute to emissions which will impact on air quality. These impacts are expected to be of low significance. These impacts will continue through operations and into the early phases of decommissioning and closure.

There are direct and cumulative impacts on human health associated with the operational phase of the Sekoko Mine. The impacts result primarily from the emission of dust and other pollutants from mining activities such as blasting during mining and coal mobilisation, processing and stockpiling. The impact is expected to be of medium moderate significance. Through rehabilitation and closure air quality in the area should improve with reduced sources of dust generation.

Impacts on air quality and human health are summarised in the table overleaf. These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with the potential establishment of an overburden stockpile on the farm Swanepoel Pan 262 LQ and underground mining activities (if considered as an option in future).

Table 7.7: Impact Tables Summarising Impacts on Air Quality and Human Health

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Construction Phase				
Erection of water management features and PCD	Truck and heavy machinery operation	Dust generation; Health impacts	Local to Regional	Medium
		Emissions	Local	Low
	Removal of herbaceous material with soil stripping	Dust generation; Health impacts	Local to Regional	Medium
	Berm and channel construction	Dust generation; Health impacts	Local to Regional	Medium
	PCD Construction	Dust generation; Health impacts	Local to Regional	Medium
Upgrade of roads & Construction of new roads and servitudes associated with conveyor belts, railway line, pipelines and power lines	Truck and heavy machinery operation	Dust generation; Health impacts	Local to Regional	Medium
		Emissions	Local	Medium
	Removal of herbaceous material with soil stripping	Dust generation; Health impacts	Local to Regional	Medium
	Soil stockpiling &/or berm construction	Dust generation; Health impacts	Local to Regional	Medium
Preparation of mine infrastructure and wash plant area	Truck and heavy machinery operation	Dust generation; Health impacts	Local to Regional	Medium
		Emissions	Local	Medium
	Removal of herbaceous material with soil stripping	Dust generation; Health impacts	Local to Regional	Medium
	Soil stockpiling &/or berm construction	Dust generation; Health impacts	Local to Regional	Medium
	Levelling and compacting of areas for infrastructure	Dust generation; Health impacts	Local to Regional	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Construction of foundations and erection of infrastructure	Truck and heavy machinery operation	Dust generation; Health impacts	Local to Regional	Medium
		Emissions	Local	Low
Processing facility and associated infrastructure	Preparation of ROM & coal product stockpile areas	Dust generation; Health impacts	Local to Regional	Medium
Preparation of opencast mining areas	Truck and heavy machinery operation	Dust generation; Health impacts	Local to Regional	Medium
		Emissions	Local to Regional	Medium
	Removal of herbaceous material with soil stripping	Dust generation; Health impacts	Local to Regional	Medium
	Soil stockpiling &/or berm construction	Dust generation; Health impacts	Local to Regional	Medium
Blasting of rock for the opencast pits & box cut area	Excavation of box cut and associated blasting	Dust generation; Health impacts	Local to Regional	Medium
Operation Phase				
Utilisation of roads	Truck and heavy machinery operation	Dust generation; Health impacts	Local to Regional	High
	Coal Transportation	Dust generation; Health impacts	Local to Regional	High
		Emissions	Local	Medium
Operation and maintenance of servitudes	Utilisation of conveyor belts and/or railway line	Dust generation; Health impacts	Local to Regional	Medium
		Emissions	Local	Medium
	Maintenance of servitudes	Dust generation; Health impacts	Local to Regional	Medium
Opencast mining	Blasting activities	Dust generation; Health impacts	Local to Regional	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Creation of new opencast cuts	Truck and heavy machinery operation	Dust generation; Health impacts	Local to Regional	Medium
		Emissions	Local	Medium
	Removal of herbaceous material with soil stripping	Dust generation; Health impacts	Local to Regional	Medium
	Blasting of overburden	Dust generation; Health impacts	Local to Regional	Medium
	Stockpiling of overburden	Dust generation; Health impacts	Local to Regional	Medium
	Temporary soil and overburden mobilisation and stockpiling	Dust generation; Health impacts	Local to Regional	Medium
Raw coal handling	Preliminary crushing of coal	Dust generation; Health impacts	Local to Regional	High
	Coal stockpiling	Dust generation; Health impacts	Local to Regional	Medium
Coal processing	Crushing of coal	Dust generation; Health impacts	Local to Regional	Medium
	Coal Washing and beneficiation	Dust generation; Health impacts	Local to Regional	Medium
	Product coal stockpiling	Dust generation; Health impacts	Local to Regional	High
Discard handling	Continued development of the discard dump	Dust generation; Health impacts	Local to Regional	High
Decommissioning Phase				
Dismantling, removal and rehabilitation of unnecessary servitudes (conveyers, pipelines, power lines)	Truck and heavy machinery operation	Dust generation	Local to Regional	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Dismantling, removal and rehabilitation of unnecessary servitudes (conveyers, pipelines, railway line, power lines)	Truck and heavy machinery operation	Emissions	Local	Low
	Removal of infrastructure	Dust generation	Local to Regional	Medium
	Truck and heavy machinery operation	Dust generation	Local to Regional	Medium
		Emissions	Local to Regional	Low
	Removal of infrastructure	Dust generation	Local to Regional	Medium
Change houses and bathrooms	Removal of infrastructure	Dust generation	Local to Regional	Medium
Sewage handling and treatment facility	Removal of infrastructure	Dust generation	Local to Regional	Medium
Filling the Draft opencast voids	Filling of access voids	Dust generation	Local to Regional	Medium
Discard Dump	Draft profiling and capping	Dust generation	Local to Regional	Medium
Coal stockpiles	Draft removal of coal product	Dust generation	Local to Regional	Medium
Rehabilitation of unnecessary water management facilities	Draft removal of all berms, trenches and any dams no longer required	Dust generation	Local to Regional	Medium
Roads	Draft rehabilitation of roads no longer required	Dust generation	Local to Regional	Medium
Closure And Post Closure Phases				
Draft rehabilitation and closure	Rehabilitation	Reduced potential of dust generation and emissions	Local to Regional	Medium

7.9. Noise

Baseline noise surveys were conducted in the study area. Night-time ambient sound levels ranged between 18 ($L_{A,min}$) and 45 ($L_{A,max}$) dBA (no traffic). $L_{Aeq,10min(i)}$ levels were less than 31 dBA with sound levels being less than 26 dBA for 90% of the time. Daytime ambient sound levels ranged between 25 ($L_{A,min}$) and 85 ($L_{A,max}$) dBA. $L_{Aeq,10min(i)}$ levels were more than 45 dBA although sound levels in the area were still less than 33 dBA for 90% of the time (L_{A90}). The current activities which contribute to elevated noise levels in the area include traffic on the secondary road traversing Hooikraal, farming activities, residential activities near farm houses, animal noises in farm yards and insects and birds in the area in general.

Potentially sensitive receptors were identified using GoogleEarth® as well as during a site visit (refer to Figure 7.3). Excluding farm dwellings, there are no residential areas within 5,000 m of the coal mine site.

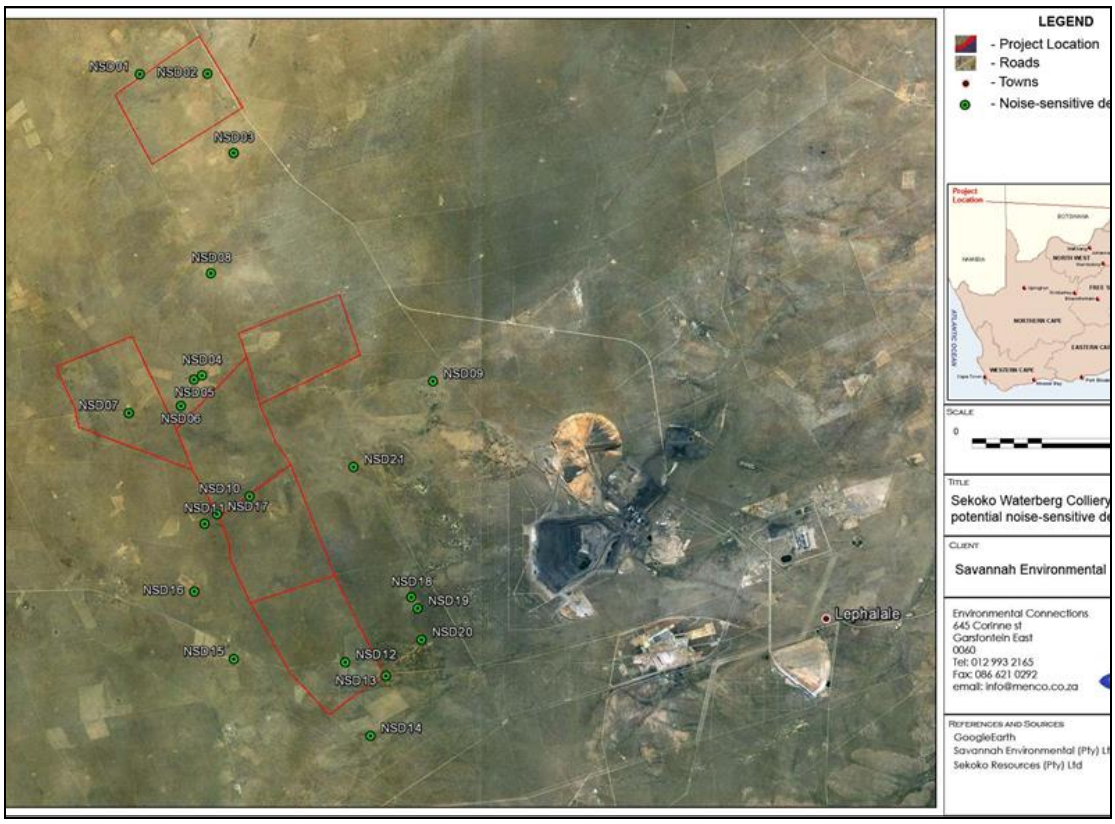

Figure 7.3: Potential Noise Sensitive Receptors and Areas

Throughout the construction and operation phases of the mine, noise levels will be elevated compared to the baseline / ambient noise levels.

The following are potentially the main construction related sources of noise for a coal mine and its infrastructure:

i. Vegetation removal and the stripping of topsoil;
ii. Construction camp establishment;
iii. Development of the internal and access roads;
iv. Activities related to the deployment and implementation of services;
v. Excavation of building foundations and service trenches. Blasting may be required but in general pneumatic breakers will be used where rock is encountered;
vi. Development of initial boxcut (excavation of soft overburden, drilling and blasting of hard overburden, loading of blasted hard overburden as well as material transport);
vii. Blasting required as part of the civil works to clear obstacles or to prepare foundations;
viii. Piling operations for large buildings and structures;
ix. Construction of offices and other structures;
x. Installation of crushing and screening plant;
xi. Laying of railway lines and the installation of the siding ancillary equipment;
xii. General movement of heavy vehicles around the site; and,
xiii. Construction material and equipment delivery vehicles.

The level and character of the construction noise will be highly variable as different activities with different equipment take place at different times, for different periods of time (operating cycles), in different combinations, in different sequences and on different parts of the construction site. 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.

While the process is not yet defined, the following typical noise-generation activities are associated with coal mining operational activities:

» Surface preparation activities in front of the opencast pit(s) (vegetation removal and stripping of topsoil);
» Opencast activities;
  * Excavation of soft overburden,
  * Drilling and blasting of hard overburden,
  * Coal excavation and loading,
  * Hauling of overburden and coal,
  * Plant activities (crushing, screening, stockpiling and material movement).
» Plant activities near the Run of Mine (ROM) stockpile;
» Underground mining activities (if considered as an option in future);
» Coal product management (stockpiling, siding activities); and,
» Railway activities.

Of these listed activities significant noise is associated with the opencast and coal-mine processing plant and adjacent facilities.

During decommissioning, the noise levels will tend to decrease back to baseline levels, depending on activities that may establish in neighbouring areas.

Due to the bushveld vegetation, nuisance noise is not likely to travel as far as one may expect in open plains. This coupled with the low population density on the respective farms means that elevated noise levels are not likely to cause nuisance to other occupants.

Noise impacts are summarised in the table overleaf. These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with the construction of a railway line and access roads, and underground mining activities (if considered as an option in future).

Table 7.8: Impact Tables Summarising Noise Impacts

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Construction Phase				
Erection of water management features and Pollution Control Dame	Truck and heavy machinery operation	Increased noise levels	Regional	Medium
	Removal of herbaceous material with soil stripping	Increased noise levels	Regional	Medium
	Berm and channel construction	Increased noise levels	Regional	Medium
	PCD Construction	Increased noise levels	Regional	Medium
Upgrade of roads & Construction of new roads and servitudes associated with conveyor belts, railway lines, pipelines and power lines	Truck and heavy machinery operation	Increased noise levels	Regional	Medium
	Removal of herbaceous material with soil stripping	Increased noise levels	Regional	Medium
	Soil stockpiling &/or berm construction	Increased noise levels	Regional	Medium
Preparation of mine infrastructure and wash plant area	Truck and heavy machinery operation	Increased noise levels	Regional	Medium
	Removal of herbaceous material with soil stripping	Increased noise levels	Regional	Medium
	Soil stockpiling &/or berm construction	Increased noise levels	Regional	Medium
	Levelling and compacting of areas for infrastructure	Increased noise levels	Regional	Medium
Construction of foundations and erection of infrastructure	Truck and heavy machinery operation	Increased noise levels	Regional	Medium
	Erection of various buildings required for administrative and security duties	Increased noise levels	Local	Low
	Construction of helipad	Increased noise levels	Local	Low
Provision of electricity	Erection of generators and substations	Increased noise levels	Local	Low
Drilling of boreholes for potable water supply	Drilling	Increased noise levels	Regional	Medium
	Fitting of and operation of pumps	Increased noise levels	Local	Low
Water treatment facility	Erection of water treatment plant	Increased noise levels	Local	Low
Erection and utilisation of toilets and change houses	Erection of bathrooms and change houses	Increased noise levels	Local	Low
Sewage handling and treatment facility	Erection of sewage treatment plant	Increased noise levels	Local	Low

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Diesel and hydrocarbon storage	Erection of bunded areas for hydrocarbon storage	Increased noise levels	Local	Low
Fitting of laboratory and chemical storage area and magazine storage	Erection of laboratory and storage area	Increased noise levels	Local	Low
Processing facility and associated infrastructure	Erection of wash plant and associated infrastructure	Increased noise levels	Regional	Medium
	Preparation of ROM & coal product stockpile areas	Increased noise levels	Regional	Medium
	Preparation of slurry treatment beds	Increased noise levels	Regional	Medium
	Preparation of discard dump area	Increased noise levels	Regional	Medium
Preparation of opencast mining areas	Truck and heavy machinery operation	Increased noise levels	Regional	Medium
	Removal of herbaceous material with soil stripping	Increased noise levels	Regional	Medium
	Soil stockpiling &/or berm construction	Increased noise levels	Regional	Medium
Blasting of rock for the opencast pits & box cut area	Excavation of box cut and associated blasting	Increased noise levels	Regional	Medium
Erection of in-pit infrastructure	Construction and installation of sump and pump	Increased noise levels	Regional	Medium
	Pumping of in-pit water	Increased noise levels	Regional	Medium
Operation Phase				
Operation water management facilities	Operation of associated pipelines and pumps	Increased noise levels	Local	Medium
Utilisation of roads	Truck and heavy machinery operation	Increased noise levels	Regional	High
	Coal Transportation	Increased noise levels	Regional	High
Operation and maintenance of servitudes	Utilisation of conveyor belts	Increased noise levels	Regional	Medium
	Maintenance of servitudes	Increased noise levels	Local	Medium
Utilisation of helipad area	Helicopter landing and take-off	Increased noise levels	Regional	High
Provision of electricity	Operation of generators if and when required	Increased noise levels	Regional	High
Pumping and conveyance of groundwater for potable use	Operation of pumps	Increased noise levels	Regional	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Water treatment facility	Conveyance and pumping of water to and from	Increased noise levels	Regional	Medium
Sewage handling and treatment facility	Sewage handling and treatment	Increased noise levels	Regional	Medium
Opencast mining	Blasting activities and opencast mining	Increased noise levels	Regional	High
	Pumping of in-pit water	Increased noise levels	Local	Medium
	Truck and heavy machinery operation	Increased noise levels	Regional	High
Creation of new opencast cuts	Truck and heavy machinery operation	Increased noise levels	Regional	High
	Removal of herbaceous material with soil stripping	Increased noise levels	Regional	Medium
	Blasting of overburden	Increased noise levels	Regional	High
	Temporary soil and overburden mobilisation and stockpiling	Increased noise levels	Regional	High
Underground mining (if considered as an option in future)	Construction of underground Adits from opencast pits	Increased noise levels	Regional	High
	Installation of underground mine infrastructure	Increased noise levels	Local	Medium
Raw coal handling	Preliminary crushing of coal	Increased noise levels	Regional	High
	Coal stockpiling	Increased noise levels	Regional	High
Coal processing	Crushing of coal	Increased noise levels	Regional	High
	Coal Washing and beneficiation	Increased noise levels	Regional	High
	Product coal stockpiling	Increased noise levels	Regional	High
Discard handling	Continued development of the discard dump	Increased noise levels	Regional	High
Slurry handling	Pumping of slurry to slurry dams	Increased noise levels	Local	Medium
	Mobilisation and reclamation of dried slurry	Increased noise levels	Local	Medium
Washing at service station, wash bays, hard park and workshop	Truck and heavy machinery activity	Increased noise levels	Regional	High
Decommissioning Phase				
Dismantling, removal and rehabilitation of	Truck and heavy machinery operation	Increased noise levels	Regional	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
unnecessary servitudes (conveyers, pipelines, railway line, power lines)	Removal of infrastructure	Increased noise levels	Regional	Medium
Hazardous substances handling (hydrocarbons and chemicals)	Removal of chemicals from site	Increased noise levels	Local	Low
	Initial removal of bulk hydrocarbons from site and Draft removal on completion of decommissioning.	Increased noise levels	Local	Low
Dismantling & removal of all unnecessary mine and plant infrastructure and rehabilitation of relevant areas	Truck and heavy machinery operation	Increased noise levels	Regional	Medium
	Removal of infrastructure	Increased noise levels	Regional	Medium
Borehole water provision	Continued operation of pumps	Increased noise levels	Local	Medium
Change houses and bathrooms	Removal of infrastructure	Increased noise levels	Local	Medium
Sewage handling and treatment facility	Initial sewage handling and treatment	Increased noise levels	Local	Medium
	Removal of infrastructure	Increased noise levels	Regional	Medium
Filling the Draft opencast voids	Filling of access voids	Increased noise levels	Regional	Medium
Discard Dump	Draft profiling and capping	Increased noise levels	Regional	Medium
Slurry dams	Draft drying and removal of slurry	Increased noise levels	Regional	Medium
Coal stockpiles	Draft removal of coal product	Increased noise levels	Regional	Medium
Rehabilitation of unnecessary water management facilities	Draft removal of all berms, trenches and any dams no longer required	Increased noise levels	Regional	Medium
Roads	Draft rehabilitation of roads no longer required	Increased noise levels	Regional	Medium
Closure And Post Closure Phases				
Draft rehabilitation and closure	Rehabilitation	Noise levels should return to normal	Regional	Medium

7.10. Impacts on the Cultural Environment / Heritage Resources

Various cultural, historical and archaeological resources are known to exist or are expected to exist in the study area. Pans with exposed calcrete (such as those found on the farm Swanepoelpan) could contain Middle Stone Age sites within the study area. Late Iron Age cattle posts belonging to the Letsibogo ceramic facies dating to between 1550 AD and 1750 AD have been found in the area. It is however unlikely that sites belonging to this period will be found as the area is located far away from the Limpopo River to the north where these sites are concentrated. Furthermore some rock engravings at Nelsonskop have been recorded to the south east of the study area on the farm Grootfontein 501 LQ. The possibility of finding rock engravings in the study area is not excluded. Every site is relevant to the Heritage Landscape, and based on current knowledge no site has conservation value.

The construction and operation phases of the project could directly impact on surface and subsurface archaeological sites. In addition, the construction of the project can directly impact on both the visual context and sense of place of historical sites. There are however few structures identified in the study area.

Graves and informal cemeteries can be expected anywhere on the landscape and one site is on record on the farm Smitspan (part of scoping study by van Schalkwyk 2009) at S23 38 45.1 E27 25 01.8. It is unclear if the site was relocated after a previous assessment undertaken, and needs to be verified. The construction and operation of the proposed project could directly impact on marked and unmarked graves.

Impacts on heritage sites are summarised in the table overleaf. These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with the potential establishment of an overburden stockpile on the farm Swanepoel Pan 262 LQ and the construction of a railway line and access roads, and underground mining activities (if considered as an option in future).

Table 7.9: Impact Table Summarising Impacts on Heritage Resources

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Construction Phase				
Erection of water management features and Pollution Control Dam	Removal of herbaceous material with soil stripping	Loss of and disturbance to surface archaeological sites; disruption to grave sites; impact on both the visual context and sense of place of historical sites	Local	Low
Upgrade of roads & Construction of new roads and servitudes associated with conveyor belts, pipelines, railway line and power lines	Removal of herbaceous material with soil stripping	Loss of and disturbance to surface archaeological sites; disruption to grave sites; impact on both the visual context and sense of place of historical sites	Local	Low
	Excavation of trenches for pipeline	Loss of and disturbance to surface archaeological sites; disruption to grave sites; loss or find of fossils	Local	High
Preparation of mine infrastructure and wash plant area	Removal of herbaceous material with soil stripping	Loss of and disturbance to surface archaeological sites; disruption to grave sites; impact on both the visual context and sense of place of historical sites	Local	Low
	Excavation of foundations	Loss of and disturbance to surface archaeological sites; disruption to grave sites; loss or find of fossils	Local	High
Preparation of opencast mining areas	Removal of herbaceous material with soil stripping	Loss of and disturbance to surface archaeological sites; disruption to grave sites; impact	Local	Low

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
		on both the visual context and sense of place of historical sites		
	Excavations	Loss of and disturbance to surface archaeological sites; disruption to grave sites; loss or find of fossils	Local	Medium
Blasting of rock for the opencast pits & box cut area	Excavation of box cut and associated blasting	Loss of and disturbance to surface archaeological sites; disruption to grave sites; loss or find of fossils	Local	High
Operation Phase				
Opencast mining	Blasting	Potential damage of historical sites	Local	Low
Creation of new opencast cuts	Removal of herbaceous material with soil stripping	Loss of and disturbance to surface archaeological sites; disruption to grave sites; loss or find of fossils; impact on both the visual context and sense of place of historical sites	Local	Low
	Blasting of overburden	Loss of and disturbance to surface archaeological sites; disruption to grave sites; impact on both the visual context and sense of place of historical sites	Local	Low

7.11. Traffic and Road Safety Impacts

The preferred access road alternatives (if any) will be considered at a later stage of the project during the EIA phase. At this stage of the project it is expected that the following roads and intersections might possibly be affected by the proposed development and will therefore be investigated:

» D1675 Road;
» D2001 Road;
» D2816 Road; and
» R1665 Road.

Most of the intersections are currently operating at acceptable levels of service except for the D2001/D1675 intersection.

The D2001 and D1675 Roads currently serve as access roads for construction as well as for operational purposes of the Medupi Power Station, Grootegeluk Coal mine and Matimba power station, and will maintain the present course to service other farms further north of the Sekoko Waterberg Coal Mine.

The D2001 Road, a north-south road and the D1675, an east-west road carries relatively high volumes of traffic during the morning and afternoon peak hours. The traffic volumes on the D2001 / D1675 Road are mainly traffic from Lephalale to the Medupi Power Station and Grootegeluk Coal Mine with approximately 1400vph and 1100vph in both directions respectively. During the afternoon peak hour the main direction is eastbound towards Lephalale with approximately 700vph and 1750vph respectively.

Increased traffic is expected during the construction and operation of the mine. Truck traffic will affect road surfaces and a road maintenance plan will need to be implemented to ensure the roads remain safe for other road users. The trucks will need to avoid the town of Lephalale or any communities in the area in order to ensure that any safety issues to pedestrians remain low.

During operation, the mine and wash plant will require activity of trucks and vehicles resulting in increased traffic in the area. Impacts include a potential increase in road incidences, and the high probability of road degradation which will make the road unsafe for road users. Both these impacts are expected to be of moderate to moderately low significance and will continue from construction through to the early stages of decommissioning. Mitigation and management measures need to be established where possible in order to ensure roads are safe for all road users. During closure, the traffic in the area should be reduced as mine-related traffic will no longer be present on the roads.

Impacts on traffic and road safety are summarised in the table overleaf. These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with the potential establishment of an overburden stockpile on the farm Swanepoel Pan 262 LQ and the construction of a railway line, water supply pipeline and access roads, and underground mining activities (if considered as an option in future).

Table 7.10: Impact Table Summarising Impacts Related to Traffic and Road Safety

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Construction Phase				
Erection of water management features and PCD	Truck and heavy machinery activity	Increased potential for road incidences	Regional	Medium
		Road degradation	Regional	Medium
Upgrade of roads & Construction of new roads and servitudes associated with conveyor belts, railway line, pipelines and power lines	Truck and heavy machinery activity	Increased potential for road incidences	Regional	Medium
	Truck and heavy machinery activity	Road degradation	Regional	Medium
Preparation of mine infrastructure and wash plant area	Truck and heavy machinery activity	Increased potential for road incidences	Regional	Medium
		Road degradation	Regional	Medium
Construction of foundations and erection of infrastructure	Truck and heavy machinery activity	Increased potential for road incidences	Regional	Medium
		Road degradation	Regional	Medium
Preparation of opencast mining areas	Truck and heavy machinery activity	Increased potential for road incidences	Regional	Medium
		Road degradation	Regional	Medium
Operation Phase				
Utilisation of roads	Truck and heavy machinery activity	Increased potential for road incidents	Regional	Medium
		Road degradation	Regional	Medium
Creation of new opencast cuts	Truck and heavy machinery activity	Increased potential for road incidences	Regional	Medium
		Road degradation	Regional	Medium
Underground mining activities (if considered as an option in future)	Truck and heavy machinery activity	Increased potential for road incidences	Regional	Medium
		Road degradation	Regional	Medium
Operation of floodlights	Operation of floodlights	Potential distraction to road users	Regional	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Decommissioning Phase				
Dismantling, removal and rehabilitation of unnecessary servitudes (conveyers, pipelines, railway line power lines)	Truck and heavy machinery activity	Increased potential for road incidences	Regional	Medium
		Road degradation	Regional	Medium
Dismantling & removal of all unnecessary mine and plant infrastructure and rehabilitation of relevant areas	Truck and heavy machinery activity	Increased potential for road incidences	Regional	Medium
		Road degradation	Regional	Medium
Closure And Post Closure Phases				
Draft rehabilitation and closure	Rehabilitation	Reduced traffic on roads and reduced potential for road incidences	Regional	Medium

7.12. Visual Impacts

The mine and wash plant will negatively impact on the visual aesthetics of the area during construction and operation. Other activities which may also impact negatively on the visual aesthetics of the area include illegal littering or dumping of waste in the area, as well as the operation of floodlights and erection of power lines. During closure the impact on the visual aesthetics of the area should be positive as the area is re-contoured, and re-vegetated to blend into the surrounding environment. The impact is of moderate significance.

As the topography of the area is fairly flat and dominated by game farming, the access to generate a photographic record of the line of sight around the mine was impractical. The main aspect that was regarded to assess whether an object can be seen is that of the topography. Although the majority of viewers (farm houses) would not see the structures, the largest effect would be the lighting from the light masts on the mine during the evenings. This would result in all the areas to the north-west and west being affected by light pollution whereas the areas to the south and west will not be affected over a distance of more than 13km. The settlement to the south-west will not be affected visually by the mining structure but may be affected by the light masts.

It is therefore critical to mask the lighting and thereby reduce or eliminate any potential light pollution and impact on the surrounding communities. The lower-lying structures will not be visible over this area of impact and tall thin masts will not necessarily be visible at the stated distances, and this should be seen as an extreme case over which the visual impact will be observed.

The minimisation of bush clearance will assist in dramatically reducing any visual impacts due to the high absorption capacity of the vegetation. This can be further improved by the planting of indigenous trees on the perimeter of the mine area.

Visual impacts are summarised in the table overleaf. These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with the potential establishment of an overburden stockpile on the farm Swanepoel Pan 262 LQ and the construction of a railway line and access roads.

Table 7.11: Impact Table Summarising Visual Impacts

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Construction Phase				
Construction of foundations and erection of mine infrastructure	Erection of various buildings required for administrative and security duties, bathrooms and change houses, sewage treatment plant, laboratory and storage areas	Deterioration in visual aesthetics of the area	Local	Low
Upgrade of roads & Construction of new roads and servitudes associated with conveyor belts, railway line, pipelines and power lines	Removal of infrastructure	Altered aesthetics	Local	High
Main coal processing facility and associated infrastructure	Erection of wash plant and associated infrastructure	Deterioration in visual aesthetics of the area	Local	Low
General Construction activities	General activities	Deterioration in visual aesthetics of the area	Local	Low
Operation Phase				
Operation of floodlights	Operation of floodlights	Increased visibility of the site; increased sky glow at night	Regional	Medium
Creation of new opencast cuts	Creation of open cast void	Loss of aesthetics	Local	Low
Discard handling and storage	Discard dump (up to 70m in height)	Loss of aesthetics	Regional	Low
Decommissioning Phase				
Dismantling, removal and rehabilitation of unnecessary servitudes (conveyers, pipelines, railway line, power lines)	Removal of infrastructure	Altered aesthetics	Regional	High
	Rehabilitation	Improved aesthetics through rehabilitation	Local	Medium
Dismantling & removal of all unnecessary mine and plant infrastructure and rehabilitation of relevant areas	Removal of infrastructure	Altered aesthetics	Regional	High
	Rehabilitation	Improved aesthetics through rehabilitation	Local	Medium

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Filling the Draft opencast voids	Filling of access voids	Improved aesthetics through rehabilitation	Local	High
Discard Dump	Draft profiling and capping	Altered aesthetics	Regional	High
	Rehabilitation	Improved aesthetics through rehabilitation	Local	Medium
Coal stockpiles	Draft removal of coal product	Improved aesthetics through rehabilitation	Local	Medium
	Rehabilitation		Local	Low
Roads	Draft rehabilitation of roads no longer required	Improved aesthetics through rehabilitation	Local	Low
Closure And Post Closure Phases				
Draft rehabilitation and closure	Rehabilitation	Improved aesthetics through rehabilitation	Regional	Medium

7.13. Socio- Economic Impacts

Unlike South Africa with a labour participation rate of over 50%, Lephalale labour participation rate was 38.5%. Essentially, just under two thirds of the working age population in Lephalale were non-economically active, a significant portion of whom were discouraged job seekers. Of the economically active population (21 371), 23% were unemployed.

The farmers in the area utilise their farms for various agricultural activities from which they source their income and maintain their livelihoods.

Positive social and economic impacts are expected to be experienced by the local communities during the construction and operation of the coal mine as people, suppliers and contractors are utilised and employed for the construction and operation. With the multiplier effect, the benefit will spread to people in the area not directly associated with the mine. The blasting activities could potentially negatively impact on surrounding residents should vibrations cause damage to their property, if blasting activities are not executed properly. In addition, impacts on surrounding landowners could be associated with intrusion impacts (noise, dust, visual impacts), health impacts (related to dust generation) and loss of income due to impacts on businesses dependent on the sense of place of the area (i.e. tourism and hunting game farms). During decommissioning and closure the impact on socio-economics will be negative as employment is lost. The table below summarising the socio-economic impacts (positive and negative associated with the project.

Socio-economic impacts are summarised in the table overleaf. These impacts are largely associated with activities planned for the already authorised properties. Impacts associated with the planned expansion are expected to be associated with the potential establishment of an overburden stockpile on the farm Swanepoel Pan 262 LQ, the construction of a railway line and access roads and underground mining activities (if considered as an option in future).

Table 7.12: Impact Table Summarising Socio-Economic Impacts

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Construction Phase				
General activities	General activities	Potential for local employment – Positive Impact	Regional	High
		Multiplier effect - improved livelihoods – Positive Impact	Regional	High
		Influx of unsuccessful job seekers which may informally settle in area	Regional - National	High
		Intrusion impacts to surrounding landowners	Local	High
Operation Phase				
Mining activities	Coal supply to power plants	Supply of coal for electricity generation	National	Medium
Provision of electricity	Power supply	Potential danger to surrounding communities	Regional	Low
Sewage handling and treatment facility	Sewage handling and treatment	Potential nuisance due to odours	Local	Medium
		Potential biological hazards	Regional	Medium
Opencast mining	Blasting	Potential damage to property through blast vibration	Regional	Medium
General activities	General activities	Potential for local employment	Regional	High
		Multiplier effect - improved livelihoods	Regional	High
		Impacts on adjacent landowners – dust, noise, visual impacts	Local	Moderate - high
		Impacts on adjacent landowners – impacts on businesses	Local - regional	High
Decommissioning Phase				
General activities	General activities	Slow reduction in employment	Regional	High

Activity	Sub-activity	Nature of Impact	Extent	Significance (Without Mitigation)
Closure And Post Closure Phases				
Draft rehabilitation and closure	Rehabilitation	Loss of employment	Regional	Medium

7.14. Cumulative Impacts

7.14.1. Approach to Cumulative Effects Assessment

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 Sekoko Waterberg Colliery and its expansion has been viewed from two perspectives within this Scoping Study:

I. Cumulative impacts associated with the scale of the project; and
II. Cumulative impacts associated with a) other relevant and existing coal mines/ power stations and/or industrial plants in the Lephalale area and b) proposed projects in the area

Based on the information available at the time of undertaking this study, developments that may contribute towards the cumulative effects of the receiving environment include:

» Independent Power Producer (IPP) Power Station
» Thabametsi Coal Mine (located immediately east of the Sekoko mine site)
» Grootegeluk Colliery (existing)
» Char Plant
» Matimba Power Station (existing)
» Boikarabelo Coal Mine and Power Station (Resource Generation)
» Ledjadja Coal (Pty) Ltd
» Mafutha Project (Sasol Mining)
» Sekoko Waterberg Colliery (Sekoko Coal)
» Medupi Power Station (Eskom)
» Eskom proposed site for development of another coal-fired power station
» Mmamabula Energy Complex in Botswana (CIC Energy Corp)
» Rezoning of properties in the project area for the development of a residential area and an industrial park.

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 wind 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.

7.14.2. Potential Cumulative Impacts

The cumulative impacts associated with the proposed Sekoko Waterberg Colliery 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, visual, land-use and social impacts. These cumulative effects will be assessed in the EIA phase.

In addition to cumulative impacts at a site level, cumulative impacts could be associated with this proposed development and other similar developments in the area as listed above. 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), traffic, visual and social impacts. Potential cumulative negative and positive impacts associated with numerous mine and power station projects within the Lephalale Local Municipality will occur and are discussed below.

a) Topography

Coal mining and power generation are the main activities in the immediate area and the topography has already been impacted to some extent through these activities. The cumulative effect of the stockpiling at the wash plant and the impact of the opencast voids and temporary stockpiling associated with the opencast mining will add to this impact. The stockpiles and the opencast mining

voids will however be temporary in nature and the topography will be largely restored after mining. The impact is negative, site specific, definite and of low significance. The discard dump will however be a permanent feature in the relatively flat area and will result in a potentially significant cumulative impact. All dumps from other mining and power generation activities will also be permanent which will result in several 'hills' in the immediate area which will not easily blend into the surrounding environment, where the topography is very flat.

b) Geology

The removal of the coal reserves results in a reduction of the overall coal resources. The cumulative effect is of moderate to high significance, as coal reserves in South Africa are diminishing and are non-renewable.

c) Soils and Land Capability

The opencast mining activities will impact on both the soils and the land capability. Opencast mining does impact on soil structure and soil chemical properties. Mining and power generation in the immediate area of the proposed development and urban development in Lephalale (located approximately 20 km east of the site) and limited ploughing of lands for crops have impacted on the soil in the greater area to some extent. Soils have therefore been impacted in the area, although these are very limited areas in a very vast region. The cumulative impacts on soils in the area are therefore expected to be moderate.

Soils which are correctly stripped and stockpiled and then re-applied and ameliorated correctly in rehabilitated areas can result in lands that can be utilised for grazing post-mining. The cumulative effect on land capability is moderate to low due to the fact that rehabilitation can restore the land to grazing/wilderness which is the baseline classification of the land capability in the area.

d) Land Use

The area in its natural state is classified as wilderness/grazing land capability and is used predominantly for stock farming and game farming with limited farming with crops. Mining activities and power generation land uses in the area are increasing and, therefore, there is a cumulative impact on land use in the area. Other dominant land uses in the area include town development and to a very limited extent ploughing of lands for crops. The proposed project will convert grazing/wilderness land to mining land, but only for the limited period of the project, where the land can then be rehabilitated back to grazing/wilderness capability and utilised for stock/game farming (although this will probably be at lower densities initially).

e) Surface water quantity

The colliery will make use of recycled water as far as possible with make-up water expected to come from the Mokolo and Crocodile (West) Water Augmentation Project, possibly boreholes and storm water runoff. The predicted water requirements in the area exceed the actual water quantity in the catchment resulting in great pressure on water utilisation in the area. The mine's water needs will have a drastic effect on water quantity, although the requirements will still be lower than most power plants. The mine expects to ameliorate their requirements by obtaining water through Mokolo and Crocodile (West) Water Augmentation Project, which will provide water from other less stressed catchments. The water needs and use by the mine could impact negatively on water quantity at a regional level.

A further impact on surface water quantity will be the loss of water from the catchment due to confinement of the dirty footprint area. Other plants and mines in the area should all have dirty footprint areas managed as contained systems. As the number of these in the area increases, the surface water runoff into the affected catchments will decrease proportionally, decreasing water quantity to other users. Due to the currently small area affected the cumulative effect on surface water quantity in this regard is expected to be limited.

f) Surface water quality

The wash plant and the mining will impact on surface water quality. However, all water within the dirty water footprint will be diverted to and contained in the pollution control dam. Contamination of water quality to the surrounding areas will therefore be minimal. Should any contaminated water escape, intervention and rehabilitation is possible due to the great distance of streams/rivers from the proposed area. Many other activities in the area including other mining activities, power generation, town development and minimal agriculture all impact on water quality and therefore any contribution to surface water contamination will result in cumulative impacts.

g) Groundwater quantity

The proposed mining operation is expected to utilise minimal groundwater, as groundwater availability in the area is low. Groundwater infiltrating the mine workings will be pumped out and diverted to the process flow dam, which will impact on groundwater quantity in the area. Mining activities and domestic use in the area contribute to reductions and alteration in groundwater flow and therefore the potential for cumulative impacts on groundwater quantity exist.

h) Groundwater quality

The proposed mining operation could impact on groundwater quality, as contaminated water may ingress into the groundwater table. The water falling within the dirty footprint will be diverted to the pollution control and process flow dams. The areas will be contoured to ensure adequate surface water flow and reduce ingression of contaminated water and therefore the impact is to some extent mitigated. Many other activities in the area including mining activities, power generation, town development and the minimal agriculture, all contribute to impacts on groundwater quality and therefore any contribution to groundwater contamination will result in cumulative impacts.

i) Air Quality

Many activities in the area including other mining activities, power generation, town development and agriculture contribute to atmospheric pollution in the area. Coal mining contributes predominantly to elevated dust levels. Dust levels are currently below target levels set for rural areas and any dust elevation will be noticeable. The cumulative effect will increase with increased mining activities in the area.

j) Noise

Many activities in the area including mining activities, power generation, town development and agriculture contribute to the increase in ambient noise levels. Studies on noise indicated that noise levels are acceptable but above targets. The immediate area has a low population density and therefore few sensitive receptors, and the area is well vegetated and relatively flat and noise is not likely to travel as far as one might expect in grassy plains. There is however the potential for cumulative impacts regarding noise as a result of numerous similar activities within the area. This could result in a significant impact on the ambient noise levels in the area.

k) Vegetation and Fauna

The conservation status of vegetation within the study area is currently classified as least threatened (Mucina & Rutherford, 2006) but all good condition natural vegetation must be designated as sensitive. Numerous flora and fauna species of conservation concern are known to occur within the study area which increases the sensitivity of the natural vegetation. Impacts to flora will result in impacts on the fauna dependent on that flora for food and shelter and therefore the impacts extend to fauna.

Due to the sensitivity and lack of active conservation of the habitat and the presence of protected species, the cumulative impacts on flora and fauna can be considered to be potentially significant. The fact that so little of the vegetation has been transformed and that currently activities in the area are limited to the coal reserve areas the cumulative effect is reduced, as large areas where reserves do not occur will largely remain unaffected by mining and power generation activities.

l) Heritage Sites

Numerous heritage sites (including graves) are known to exist in the study area. Many activities in the area including other mining activities, power generation, town development and crop agriculture contribute to loss of cultural and archaeological sites, and impacts on the cultural landscape and sense of place which often defines historical sites. Therefore the cumulative impacts on sites of archaeological, historical and cultural interest are potentially significant.

m) Visual aspects

Many activities in the area including mining activities, power generation, town development and limited agriculture contribute to alteration of the visual aesthetics of the area. The proposed mining operation in the relatively pristine area will impact on the visual aesthetics of the area. The flat nature of the area will increase visibility of structures, although due to the dense bushveld vegetation, only taller structures will be highly visible. The cumulative impact is potentially significant.

n) Traffic and Safety

The roads in the area are accommodating more and more traffic as mining and power plants are constructed and becoming operational. The proposed mine will result in increased traffic on the roads. This will result in traffic and safety issues to other road users and increase the risk of road degradation. The cumulative impact on traffic and safety is therefore potentially significant.

o) Regional Socio- Economic structure

The high unemployment and the high multiplier effect in the region mean that the financial input of the mining activities has a huge, positive impact on the socio-economic aspect of the area. This will be through direct employment of staff and contractors and indirectly through the use of local suppliers. This will feed through to other sectors and other people in the area through the multiplier effect. With the implementation of the Social & Labour Plan (SLP), there will also be a direct positive impact on communities in the area with regards to

infrastructure, training and small businesses. Many activities in the area including mining activities, power generation, town development and limited agriculture contribute to this positive impact.

With the increase in employment opportunities in the area with increased coal mining and power plant operation, there may be an influx of people to the area looking for work. The impact has already been felt in the town of Lephalale. This could result in increased potential for unsuccessful candidates squatting in the area and potentially resorting to stock theft and other crime for survival. The cumulative impact is negative, regional, highly probable and of moderate to high significance.

The farmers in the area utilise their farms for various agricultural activities from which they source their income and maintain their livelihoods. Cumulative impacts on landowners affected by numerous activities are potentially significant and relate to intrusion impacts (i.e. dust, noise, visual impacts) during both construction and operation, and potential impacts on their businesses.

CONCLUSIONS AND RECOMMENDATIONS CHAPTER 8

The Scoping Study for the proposed expansion of the Sekoko Waterberg Colliery to include the farms Swanepoel Pan 262 LQ, Olieboomsfontein 220 LQ; and Duikerfontein 263 LQ within the Mining Right area, and to amend the approved Mine Work Programme and infrastructure layout has been undertaken in accordance with the requirements of the EIA Regulations of June 2010, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998). Since this is a mining activity, the requirements of the Minerals and Petroleum Resources Development Act (MPRDA; Act No 28 of 2002) are being considered in a separate parallel application with DMR, though not completely disregarded here.

This Scoping Study aimed at identifying potential issues associated with the proposed expansion of the coal mine, and defining the extent of any additional work or studies required within the EIA phase. This was achieved through an evaluation of the proposed project, involving the project proponent, specialists with relevant experience, and a consultation process with key stakeholders. In terms of the requirements of the MPRDA and EIA Regulations, feasible alternatives (including the 'do nothing' option) have been considered within the Scoping Study (and discussed in detail in Chapter 5).

The conclusions and recommendations of this Scoping Study are the result of review of existing information, limited on-site inspections, desk-top identification and evaluation of impacts identified by specialists, and the parallel process of public participation. The public consultation process has been extensive and every effort has been made to include representatives of all stakeholders in the study area.

A summary of the conclusions of the evaluation of the proposed Sekoko Waterberg Colliery, as well as an initial indication of mitigation and management measures for potentially significant impacts is provided in Table 8.1. Recommendations regarding investigations required to be undertaken within the EIA and EMP are provided within the Plan of Study for EIA/EMP (refer to Chapter 9).

8.1 Topography

Activities which will impact on local topography include levelling of areas for infrastructure, excavation of the boxcut on Smitspan, opencast mining, and soil, overburden and coal stockpiling. Only the discard dump will be a permanent change in the surface topography of the site and is therefore of local extent,

especially due to the fact that the area comprises of fairly flat plains which would potentially make discard dumps more visible.
During decommissioning and closure of the mine, the impact on topography will be largely positive due to the rehabilitation of the area. This will involve the filling of voids, the contouring of disturbed areas to fit in with the surrounding area and also allow for free surface water drainage and the replacement of soil and vegetation to the disturbed area.

8.2 Geology

The impacts on geology during construction will be due to excavations of the initial box cut. The geological layers will be permanently disturbed and displaced. This impact will carry on during the operation phase but be further exacerbated by the removal of the coal seams. Further impacts are expected during the operations phase from blasting activities which may crack and disturb adjacent geological features in the area.

Mitigation and management measures in terms of erosion associated with the establishment and operation of the mining development and associated infrastructure will be recommended through detailed studies to be undertaken in the EIA and EMP phase.

8.3 Soils, Land Capability and Land Use

The main impact on soil will be the stripping and stockpiling of soils which will commence in the construction phase and continue into the operation phase. The impact is of medium to high significance. Other impacts to soil quantity are related mostly to erosion, and include the operation of diversion berms and channels and soil stockpiles. Increase in erosion potential as a result of loss in vegetation cover for extended periods and/or changes to water flows is expected to occur. The most significant impact during the operation phase is the potential contamination of soil by coal dust, which could inadvertently alter soil pH and change soil chemical and physical characteristics. It may also impact on the potential of the soil to support vegetative growth.

Good soil management and mitigation and management measures in terms of erosion associated with the establishment and operation of the mining development and associated infrastructure, and management of hazardous substances must be recommended through detailed studies to be undertaken in the EIA and EMP phase.

8.4 Surface Water Resources

Surface water contamination during the operation of the coal mine is an impact of potentially high significance. Containment of dirty water from the mine area is essential to minimise this impact. Despite the fact that there are no water resources on the site, water will be required for operation of the coal mine and coal-washing.

The potential significance of impacts identified must be confirmed, and detailed management and rehabilitation measures must be investigated and detailed as part of the EIA and EMP phase of the process. Long-term planning and sustainability should be considered and, therefore, predictions on water quality and quantity in the future should also be incorporated in studies to be undertaken in the EIA and EMP phases.

All necessary water use licenses as required in terms of Section 21 of the National Water Act (Act No 36 of 1998) must be obtained from DWA prior to commencing with mining operations. Water use licenses which may be required include:

» taking water from a water resource (S21a)
» storing water (S21b)
» discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit (S21f)
» removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people (S21j)

8.5 Groundwater Resources

Impacts from the proposed Sekoko mining operations on groundwater were evaluated and include:

» Mine dewatering and the associated drawdown in groundwater level due to the boxcut and underground mine dewatering.
» Impacts on Sekoko water supply boreholes, and impacts on neighbouring privately owned boreholes due to potential lowering of the groundwater levels surrounding the mining area.
» Groundwater inflow volumes into the mine area over the life of mine.
» Contamination of aquifers from the pit and surface storage areas (discard etc.).
» Recovery of groundwater levels in the post-mining environment.
» Decant potential, quality, and volumes.

Underground mining has less impact on underground water resources than open cast methods since the upper aquifer stays intact without being influenced. The groundwater model needs to be completed to make predictions on the extent of dewatering and how drastically local groundwater levels will change. Dewatering will result in an inflow of groundwater from the surrounding areas and therefore contamination plumes will develop during mining.

The following initial recommendations are made in terms of mitigation and management of potential impacts:

» *Potential contamination from the coal stockpiles to the underlying aquifer:* The coal stockpiles at the mine entrance should be kept as small as possible. This will reduce the volume of potentially poor quality leachate infiltrating the aquifer. The base of the coal stockpile should be compacted to reduce the permeability and, therefore, the infiltration. After mine closure the area where the coal stockpile was situated should be rehabilitated, thereby eliminating a long-term source of contamination to the underlying aquifers.
» *Potential contamination of groundwater from poor quality leachate originating from mined-out areas:* Little can be done to mitigate oxidation of poor quality leachate-forming minerals and the formation of poor quality leachate. The mined-out areas should be allowed to be submerged as soon as practically possible, this will displace oxygen and stop oxidation of the minerals.
» *Dewatering of the aquifers:* It is impossible to mitigate this impact. The groundwater levels will recover to near pre-excavation levels once activities move away from an area and rehabilitation has taken place.
» *Decant from the mine areas:* This impact is difficult to effectively mitigate and is dependent on the natural rock characteristics. Ideally a sufficient barrier should be left along the outside ridge of the ore body to stop seepage along the coal / sediment contact to daylight. However, in practice this will prove to be near impossible.
» *Contamination of the aquifer through sewage:* The septic tank/french drain system must be managed properly to prevent spillage.

The potential significance of impacts identified must be confirmed, and detailed management and rehabilitation measures must be investigated and detailed as part of the EIA and EMP phase of the process.

8.6 Vegetation and Ecology

The floristic sensitivity of the natural woodland habitat of the region is regarded as being medium-high. This is in spite of a Least Threatened conservation status that is ascribed to the regional vegetation (Limpopo Sweet Bushveld). The known presence of several protected tree species, the likely presence of plants of conservation importance, as well as the untransformed nature of the region as a whole, renders the sensitivity of the proposed project site relatively high. The

development of the coal mine will lead to biodiversity loss in the long term within the footprint of the development. The potential significance of impacts identified must be confirmed, and detailed management and rehabilitation measures must be investigated and detailed as part of the EIA and EMP phase of the process.

8.7 Fauna and Ecology

Most of the study area is estimated to have a medium-high faunal sensitivity. Potential and likely impacts of this type of development on fauna include:

» Loss of biodiversity as a result of direct impacts on fauna species of conservation importance and direct impacts on common fauna species / faunal assemblages (including migration patterns, corridors, etc.);
» Human - Animal conflicts;
» Loss or degradation of natural pristine habitat (including ecosystem functioning);
» Impacts on South Africa's conservation obligations & targets;
» Increase in local and regional fragmentation/ isolation of habitat; and
» Increase in environmental degradation, pollution (air, soils, surface water).

As part of the detailed assessment phase, potential impacts on the various faunal groups identified through this scoping study must be described, their duration and extent determined, their significance assessed, and possible mitigatory and management measures identified.

8.8 Air Quality Impacts

The air quality monitoring results showed that concentrations of gaseous pollutants (sulphur dioxide, nitrogen dioxide and ozone) were within the South African standards. Particulate matter equal to or smaller than 10 micrometre also complied with current national standards but not with proposed (from 2015) standards. The emissions of particulates from the Sekoko Mine will add to the existing particulate concentrations. The potential exists to increase the frequency of exceedance of the ambient standards for particulates around the proposed coal mine and in the surrounding environment. Indirect impacts may result from the emission of Greenhouse Gases such as methane (CH4) and carbon dioxide (CO2) from spontaneous combustion, should this occur.

In order to quantify the potential impacts associated with these air emission sources, detailed studies (including modelling) are required to be undertaken in the EIA and EMP phase of the process.

8.9 Noise Impacts

Potentially sensitive receptors within the study area were identified through the scoping process. Excluding farm dwellings, there are no residential areas within 5,000 m of the coal mine site. There are people residing on the affected on surrounding farm portions. Noise and vibration associated with the establishment and operation of the proposed mine could impact on the surrounding landowners. In order to quantify the potential impacts associated with the noise sources, detailed studies (including noise modelling) are required to be undertaken in the EIA and EMP phase of the process.

8.10 Heritage Sites

Various cultural, historical and archaeological resources are known to exist or are expected to exist in the study area. The main impacts to archaeological and cultural site will occur during construction and the roll-over progression of opencast mining. The main significant impact is the potential disruption to grave sites. A Phase 1 heritage impact assessment (HIA) will be undertaken in the EIA phase.

There is no doubt that well-preserved plant fossils, and possible rare insect fossils could be encountered during mining activities. It is imperative that the operational (mining) staff be aware of the potential for encountering productive fossil horizons and individual specimens. If any well-preserved fossils are encountered this should be reported to an appropriately qualified palaeontologist such that the site can be appropriately excavated and recorded.

8.11 Traffic and Infrastructural Impacts

Increased traffic is expected during the construction and operation of the mine. Truck traffic will affect road surfaces and a road maintenance plan will need to be implemented to ensure the roads remain safe for other road users. The trucks will need to avoid the town of Lephalale or any communities in the area in order to ensure that any safety issues to pedestrians remain low.

During operation, the mine and wash plant will require activity of trucks and vehicles resulting in increased traffic in the area. Impacts include a potential increase in road incidences, and the high probability of road degradation which will make the road unsafe for road users.

The preferred access road alternatives (if any) will be considered during the EIA phase in order to assess the potebtial impacts associated with the proposed project.

8.12 Visual Impacts associated with the Proposed Mine Development

The proposed coal mine is situated in an area with existing coal mining and power generation plants. Therefore the existing viewshed is degraded to some extent. Important issues that need to be addressed in the detailed visual impact assessment are the effect of night-time activities and lighting on the landscape, as well as the potential impact of an increase in the number of large vehicles on the road between the site and the main arterial routes and the town on Lephalale. As a preliminary mitigation measure it is noted that the minimisation of bush clearance will assist in dramatically reducing any visual impacts due to the high absorption capacity of the vegetation. This can be further improved by the planting of indigenous trees on the perimeter of the mine area.

8.13 Socio-Economic Impacts

Impacts on the socio-economic environment relate to the creation of job and business opportunities (positive), as well as impacts on surrounding landowners who utilise their farms for various agricultural activities from which they source their income and maintain their livelihoods (negative).

The socio-economic assessment will assess the social and economic impact on the current population including quality of life of the current population, potential local and national economic impacts (considering the local municipality, the Limpopo province and South Africa as an entity) and impacts on surrounding landowners.

At this stage most of the required environmental studies have been completed for Farms Smitspan, Massenberg, Minnasvlakte and Hooikraal in the EIA undertaken for the Mining Right application by Cabanga Concepts. The remaining detailed studies for the four additional farm portions (Swanepoel Pan 262 LQ, Olieboomsfontein 220 LQ; Duikerfontein 263 LQ and Vetleegte 304 LQ) will be conducted during the EIA phase of this EIA process being undertaken by Savannah Environmental. A detailed description of the proposed expansion of the Sekoko Waterberg Colliery, the Scoping process, as well as the issues identified and evaluated through the scoping phase have been included in the Scoping Report and provide the context for this Plan of Study for the EIA phase and EMPr amendment.

This Plan of Study describes how the EIA phase for the expansion of the Sekoko Waterberg Colliery will proceed. The EIA phase of the study includes detailed specialist studies and fieldwork for the four additional farm portions and associated impacts of the expansion of the coal mine and amendment to the approved Mine Work Programme and infrastructure layout. The major findings of the scoping process (which includes inputs from authorities, key stakeholders, the proponent and the EIA specialist team) were used to inform this Plan of Study for EIA, together with the requirements of the NEMA EIA Regulations and associated guidelines. The EMP phase will incorporate these findings and the recommendations for mitigation and management of potentially significant impacts into an Environmental Management Programme for the project.

9.1 Aims of the EIA

The EIA will aim to achieve the following:

» Provide an overall assessment of the social and biophysical environments affected by the expansion of the Sekoko Waterberg Colliery.
» Assess potentially significant impacts associated with the proposed mining development.
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts for inclusion in the EMPr.
» Undertake a fully inclusive public involvement process to ensure that I&APs 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, establishment, operation and closure, and will aim to provide the decision-making authorities (LDEDET) with sufficient information in order to make an informed decision regarding the project.

9.2 Authority Consultation

Consultation with the decision-making authorities (i.e. LDEDET) and other organs of state has been undertaken throughout the scoping process and will continue throughout the EIA process. On-going consultation will include the following:

» Submission of the Draft Scoping Report to LDEDET and other relevant Organs of State.
» Submission of a Final Scoping Report to LDEDET following a 40-day public review period (and consideration of comments received).
» A consultation meeting with LDEDET 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.
» Submission of a Draft EIA Report to LDEDET and other relevant Organs of State.
» Submission of a Draft Environmental Impact Assessment Report following a 40-day public review period.
» An opportunity to visit and inspect the site.
» A consultation meeting with LDEDET in order to discuss the findings and conclusions of the EIA Report, if requested and required by the authorities.

9.3 Specialist Project Team

In assessing potential direct, indirect and cumulative impacts associated with the proposed project, Savannah Environmental will be assisted by the following specialist team members:

Specialist	Area of Expertise
Simon Todd of Simon Todd Consulting cc	Flora & Fauna (Biodiversity)
Chris Viljoen of Viljoen and Associates	Soil, Land Use Land Capability Study & Wetlands
Mark Zunkel and team of uMoya-NILU Consulting	Air Quality
Reitha Oosthuisen of the CSIR	Human Health Impact Assessment
Morne De Jager of Enviro-Acaustic Reserch	Noise impact Assessment
Conningarth Economists	Socio-Economic Impact Assessment
ITS Engineers	Traffic Impact Assessment
Jaco van der Walt & Liesl du Preez of Heritage Contracts and Archaeological Consulting	Heritage Impact Assessment

Specialist	Area of Expertise
Lourens du Plessis of MetroGIS	Visual Impact Assessment
Martiens Prinsloo of Future Flow Ground Water & Project Management Solutions	Update of Existing Ground Water Assessment
Brett Coutts of Digby Wells	Rehabilitation and Monitoring Plan

In addition to the above specialist studies, information from existing studies undertaken within the previous environmental processes will be utilised in the assessment of potential impacts. This will include a socio-economic study already completed by Sekoko Resources for the area, as well as technical information from the studies completed as part of the Bankable Feasibility Study. Technical studies to be considered will include the detailed geotechnical studies which have been completed on the site (to inform the soils and geology impact assessment), as well as the surface water studies (to provide details on the water balance of the mine and to inform management measures such as stormwater management).

9.4 Terms of Reference for Specialist Studies to be undertaken within the EIA and EMP Phase

The Terms of Reference for specialist studies required to be undertaken in the EIA phase of the process are summarised in Table 9.1. The rationale for the different levels of study for the various environmental components is taken from the conclusions and recommendations of the desk-top scoping study, issues raised by stakeholders and I&APs, the expected severity of impacts and the level of confidence required in their prediction. The level of information required to develop adequate, practical management and mitigation measures was also a consideration in determining the Terms of Reference of the studies. Specialist studies will consider direct, indirect and cumulative impacts associated with all phases of the project life cycle.

Table 9.1: Summary of the issues which require further investigation within the EIA phase and activities to be undertaken in order to assess the significance of these potential impacts

Study	Activities to be undertaken in order to assess significance of impacts	Specialist
Flora & Fauna (Biodiversity)	» The approach to this study based on separate austral winter and summer surveys during which a scientific approach to data assimilation will be followed. Botanical and faunal data will ultimately be captured in point samples (releveès) placed in a stratified random mean across the entire study area. Acquired data will be holistically analysed to illustrate the ecological interaction of plants and animals. Data analysis will be performed by PC-ORD for Windows, Version 6.07 (2011), allowing for an analysis through TWINSPAN, DECORANA, etc. » **Botanical Impact Assessment** Sampling Approach: * The number of sample plots to be distributed in a given area depends on various factors, such as the scale of the classification, environmental heterogeneity and the accuracy required for the classification (Bredenkamp 1982). * Stratification of sample plots will be based on visual observations made during the initial site investigation as well as aerial imagery. The Zurich-Montpellier approach of phytosociology (Braun-Blanquet 1964) will be followed, which is a standardised and widely used sampling technique for general vegetation surveying in South Africa. During the surveys, all plant species in the sample plots and the cover and / or abundance of each species will be estimated according to the following Braun-Blanquet cover abundance scale: ▪ **+** infrequent, with less than 1% cover of total sample plot area; ▪ **1** frequent, with low cover, or infrequent but with higher cover, 1-5% cover of the total sample plot area; ▪ **2** abundant, with 5-25% cover of total sample plot area: ▪ **2A** - >5-12%; ▪ **2B** - >12-25%; ▪ **3** >25-50% cover of the total sample plot area, irrespective of the number of individuals; ▪ **4** >50- 75% cover of the total sample plot area, irrespective of the number of individuals; or ▪ **5** >75% cover of the total sample plot area, irrespective of the number of individuals. * In addition, a relevant selection of the following biophysical attributes will be recorded within each relevè: * Altitude- and longitude positions for each relevè - obtained from a GPS;	Simon Todd of Simon Todd Consulting cc

Study	Activities to be undertaken in order to assess significance of impacts	Specialist
	∗ Soil characteristics, including colour, clay content, etc; ∗ Topography (crests, scarps, midslopes, footslopes, valley bottoms, floodplains or drainage lines); ∗ Altitude, slope and aspect; ∗ Rockiness, estimated as a percentage; ∗ Rock size; and ∗ General observations (including the extent of erosion, utilisation, disturbances of the vegetation management practices, etc). ∗ In addition to species captured within the sample plots, general observations will be made in order to compile a comprehensive species list that will include taxa that, because of low abundance levels, are unlikely to be captured within the sample areas. Particular reference is made to Red Data plants, which normally do not occur at great densities. » ***Data Processing:*** ∗ The combined floristic and faunal data sets will be subjected to the Two- Way Indicator Species Analysis technique (TWINSPAN) (Hill 1979) and subsequently refined by Braun-Blanquet procedures. TWINSPAN will be applied to derive a first approximation of the vegetation units. These classifications will be further refined by the application of Braun-Blanquet procedures to determine the plant communities. ∗ A phytosociological table showing the vegetation lines will be used to compile a synoptic table of the datasets. A synoptic table summarises and confirm the vegetation types/ habitat types and variations. Relevant descriptions will follow from the data analysis, based on the presence/ absence and abundance of taxa. » **Faunal Impact Assessment:** ∗ Field investigations commonly employed for EIA studies are normally limited by time and budget and scientific approaches generally have to be adapted to allow for these limitations. Ecology and biodiversity are growing fields of science and much is still unknown. While lists of mammals and birds for the study area exist, these could not be sourced before completion of this document. As always, information on the herpetofauna and invertebrates of the region and farms is lacking in detail and significant information gaps exist in this regard. ∗ ***Invertebrates:*** ∗ Invertebrates are by far the most important animals present anywhere. They are very useful bio-indicators and include meaningful surrogates, flagships and diversity indicators. The invertebrate studies will be	

Study	Activities to be undertaken in order to assess significance of impacts	Specialist
	twofold: ▪ Firstly, sweep samples and/ or beating and pitfall samples of invertebrates would be used to compare sample plots in terms of species richness (number of species) and species diversity (relative abundances between species groups). Species found in these samples will also be included in the species inventory; and ▪ Secondly, a species inventory of the study area/s will be compiled using above-mentioned methods as well as active searches for scorpions (under rocks and using UV-lights), for butterflies (using a hand-held net) and beetles (under rocks, bark hand-netting etc.) * ***Herpetofauna:*** * Frogs will be sampled using species-specific calls of males as identification; also, active searches for active adults during early evenings. Snakes, lizards and other reptiles will be sampled by active searches in likely habitats (under rocks, in inactive termitaria, etc.) » ***Birds:*** * Assessing avifaunal diversity of an area includes three components: * Suitable visual observations * Audio observations; and * Habitat assessments. * A large number of bird species are highly visible and easily identifiable using visual observations. Binoculars are used to assist the observer in identifying smaller and more cryptic species. Many bird species are cryptically coloured and can only be identified using sound; calls of many cryptic bird species are species-specific and very useful in compiling a species inventory list of the area under investigation. ▪ Ideally, various field assessments during all seasons of the year are needed to start to create an "avifauna image" of the study area that supports the reality of bird communities in the area. Since this is never accomplished in reality, habitat assessments are used to create a "model" of the bird communities likely to be found in the area investigated. Fortunately, much data is available on the birds of Southern Africa; distribution records, habitat requirements etc. By assessing the available habitat within the study area (with focus on habitat characteristics available and diversity and quality of habitats present), all bird species (including Red Data birds) are assessed in terms of likelihood of occurring within the study area. The Draft stage of the avifaunal study is using the image created of the avifaunal communities of the study area in assessing the impacts of the proposed project on the	

Study	Activities to be undertaken in order to assess significance of impacts	Specialist
	avifauna of the study area. Impacts are weighed and mitigations measures proposed where possible. » ***Mammals:*** * Visual sightings as well as ecological indicators such as tracks, dung, calls and diggings will be used to compile a species inventory of the mammals of the study area. Additionally, small mammal live traps, motion detection cameras and night surveys will be used to sample for rodents and insectivores. » ***Ecology:*** * Species inventory lists and indications of species richness and -diversity recorded with the aid of above-mentioned methods will be used to interpret the relative ecological status of the study area/s and to compare areas and variations in faunal habitats present. These comparisons are done in liaison with the vegetation characteristic in order to gain an ecological understanding of the study area and the potential impacts of the study area/s.	
Soil, Land Use Land Capability Study & Wetlands	A detailed soil study has already been done in the previous EIA for the coal mine and will be updated to include the three additional farm portions and will include: » Compilation of a soils map in the investigation area (1:10 000 scale), with descriptions based on the Taxonomical Soil Classification System of South Africa. » Description of the chemical, physical and mineralogical properties of the soil types. » Description of the effective depth and agricultural potential of the soils. » Compilation of a soil utilization and topsoil stripping plan. » Description of land use of the investigation area. » Assessment of the land capability of the investigation area. » Impact assessment of the proposed mining activities on the soils. » Interpretation of analytical data and field observations. » Reporting.	Chris Viljoen of Viljoen and Associates
Air Quality	» Key information sources are the air quality assessment conducted by Asande Project (2009) for Sekoko Coal (Pty) Ltd and the Air Quality Management Plan for the Waterberg District Municipality (GES, 2009). » The compilation of an emission inventory for the Sekoko Mine will be based on the methodology described by the US-EPA for mining activities, which uses information on mine layout, mining activities, vehicle movement and material volumes, with information on air pollution control measures, hourly meteorological data and appropriate emission factors.	Mark Zunkel and team of uMoya-NILU Consulting

Study	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Air dispersion modelling will be used to estimate the resultant ambient concentrations of pollutants in the surrounding environment, using either the DEA recommended AERMOD or SCREEN 3 models. Added or cumulative effects will be assessed by considering the existing ambient concentrations. » Results will be compared with National Ambient Standards to assess the significance of the potential impacts. » The potential contribution of Greenhouses Gas emissions to global warming will be assessed by estimating the emissions and comparing these with national figures.	
Human Health Impact Assessment	This report will evaluate the different types of evidence from the various specialist studies, as well as that from other readily available information, in order to assess the combined contribution of the determinants of health and well-being associated with the proposed coal mine on the health of the population of concern. These determinants will be assessed during the impact assessment which will include a risk assessment, as well as an assessment of cumulative risks. The project will adhere to the relevant provisions contained in the Equator Principles, the International Finance Corporation (IFC)'s Performance Standards. The outcomes of the Impact Assessment will inform the development of a health action plan (HAP). The HAP will include a description of the risks, assessment of impact significance and prioritisation or risk ranking. The factors of concern may then be used to determine required mitigation options. The methodology is as follows: » ***Baseline data*** The community profiling step will develop an understanding of the communities potentially affected by the project. This will be followed by a desk-top profiling process to do a baseline health assessment and to identify the potential impacts of the proposed development on health and well-being. This will include the review of relevant literature, collecting information from different stakeholders such as relevant government departments (Environmental Health and Population) and other specialist studies. The results which includes potential health determinants and impacts will then be tabulated. Evidence on health impacts will be gathered iteratively throughout the process, including identification of actual effects or outcomes by means of health data (if readily available), or other known factors that may affect the health, well-being and quality of life of the population of concern (WHO, 2011) » ***Risk assessment*** The results of the risk assessment process undertaken as part of the EIA, will be a description of the risks, assessment of impact significance and prioritisation or risk ranking. The factors of concern can be used to determine required mitigation options.	Reitha Oosthuisen of the CSIR

Study	Activities to be undertaken in order to assess significance of impacts	Specialist
	If quantitative data (predicted concentrations in water and air) and reliable associated reference values are available, an evaluation of the cancer and or non-cancer risks to human health from exposure to compounds of concern will be undertaken according to the United States Environmental Protection Agency (USEPA) human health risk assessment approach. This approach provides for maximum community protection when making assumptions on human exposure. The results of this quantitative human health risk assessment informs the HHIA. » ***Health Action Plan*** A Health Action Plan (HAP), based on identified risks, their public health significance, and priorities will be developed and used to provide input to the overall mitigation strategy of the company. Identification of potential mitigation options will be based on analysis of the significance of the potential health impacts. Indicators for monitoring and evaluation will be recommended as part of this step. » ***Monitoring and Evaluation*** The HAP provides inputs to the overall monitoring and evaluation programme and will include a plan for monitoring and evaluation, using a realistic suite of key performance indicators which takes data availability into consideration. This process will consider impacts on both the project and the community. A verification system, allowing for review of the progress of mitigation efforts will be established as part of this process.	
Noise	The following will be included in the noise study: » Data (location of equipment/activities, type of equipment/noise-generation activities, number of equipment or activities that simultaneously could generate noise) as received from the developer will be used to model the potential noise impact. » The potential impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected) as well as the extent of the impact. » The potential significance of the identified issues will be calculated based on the evaluation of the issues/impacts. » The development of an Environmental Management Plan and a proposal of potential mitigation measures (if required). » Recommendations.	Morne De Jager of MENCO

Study	Activities to be undertaken in order to assess significance of impacts	Specialist
	» **Sound emission from the identified noise sources** Sound emission data of equipment as provided by the developer would be used to calculate the potential noise emissions. In the instance that this data is unavailable, worst-case sound emission data as measured or available from databases will be used. The operating cycle and nature of the sound emission (impulsiveness, tonal character or potential low frequencies) would, where relevant, be considered when the expected rating level in the target area is calculated. » **Determination of Rating levels** The Concawe noise- propagation model defined in SANS 10357:2004 will be used to model the noise levels for both the construction and operational phases. » **Assessment of the noise impact: No mitigation** The significance will be determined considering the defined magnitude of the noise level, the extent as well as the duration of the projected noise impact, as well as the probability that this impact may take place. The magnitude of the noise impact will be assessed by considering: * The total projected cumulative noise level compared to the appropriate acceptable rating levels as defined in table 2 of SANS 10103:2008. * The potential community response from table 5 of SANS 10103:2008. In addition, other relevant and suitable literature may be consulted as defined in the scoping report. In particular the likely ambient sound levels due to wind induced noises will be estimated at the wind speed under investigation and considered. * Projected noise levels considering the likely and projected ambient sound levels. » **Assessment of the noise impact: Implementation of mitigation measures** Should the significance of the impact be high, the potential significance will be recalculated considering that the developer would be implementing reasonable mitigation measures.	
Socio-Economics	The socio- and macro-economic report compiled for the original Mining Right application will need to be amended and supplemented for the new envisaged expansion and at the area of investigation be defined and possible impacts are defined. Issues to be investigated include possible impacts on:	Conningarth Economists

Study	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Social and Economic impact on the Current Population including quality of life of the current population, » Impacts on the Natural Environment and associated costs and the cost of possible mitigation measures, » Potential Local and National Economic Impacts, the local municipality, the Limpopo province and South Africa as a entity. Approach The economic impact assessment will be performed on three levels, namely: » The possible impact on current economic activities, population and the environment, by first establishing a baseline of current activities to measure possible deviations from the baseline. This will be performed in current monetary units and converted to macro – economic parameter like GDP, employment and Payments to Households. » Determination if the project is economically viable, this is necessary to determine if the benefits associated with the project actually outweigh the possible negative impacts. » If economically viable, estimate the positive economic parameters. » An Economic Cost Benefit Analysis (ECBA) will be performed to determine the economic viability of the project by calculating: ∗ Net Present Value (NPV), ∗ Internal Rate of Return (IRR), ∗ Benefit Cost Ratio (BCR) » The projected macro – economic benefits will be calculated using a Social Accounting Matrix (SAM) based on an econometric model, in this case the Limpopo Provincial SAM. The economic benefits will be expressed in terms of: ∗ Gross Domestic Product (GDP) – direct, indirect and induced; ∗ Employment – direct, indirect and induced, ∗ Household Income – low, medium and high, ∗ Impact on Balance of Payments; ∗ Impact on the Fiscus. It will be calculated for the provincial and national economies. » Conningarth will research the following: ∗ Projected coal prices over time,	

Study	Activities to be undertaken in order to assess significance of impacts	Specialist
	* Possible negative impacts on current economic activities. * Possible negative impacts on current farming activities.	
Traffic	The Traffic Impact Assessment will address the projection of the future traffic demand (background and development traffic), the re-evaluation of the road network to accommodate the future traffic demand and mitigation measures will be proposed to minimise the impact on the external road network. Direct, indirect and cumulative impacts of the issues identified through the scoping study, as well as all other issues identified in the EIA phase will be assessed in terms of the nature, extent, duration, magnitude, probability and significance as well as the status. The following will be included: » Collection of background information and undertake traffic counts at each of the sites to establish a baseline and peaks of traffic in the area. » Superimpose the generated traffic on the current and future road and traffic system and determine the current operating Levels of Service of the affected roads. Assess how these would be impacted by the proposed Sekoko Waterberg Coal mine. » Analyse the temporary as well as long term effects of access roads, loading and storage and commuting. » Comment on access configurations, site layout and circulation, freight and public transport facilities, control and road infrastructure improvements. » Discuss the outcomes of the study with the relevant road authorities, where required. » Propose mitigation measures, where necessary, to mitigate the assessed impacts of the proposed Sekoko Waterberg Coal mine.	ITS Engineers
Heritage	In order to comply with the National Heritage Resources Act (Act 25 of 1999) a Phase 1 Archaeological Impact Assessment must be undertaken. During this study sites of palaeontological, archaeological, historical 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	Jaco van der Walt & Liesl du Preez of Heritage Contracts and Archaeological Consulting

Study	Activities to be undertaken in order to assess significance of impacts	Specialist
Visual	» Undertake a survey of the site and surrounding areas to identify potential visual sensitive receptors. » Prepare a specialist report detailing the environmental issues and potential impacts. » Assess the potential direct and indirect impacts using a weighting system that assigns a value to the categories (extent, duration, magnitude, probability) and arrives at a total which depicts the significance of the particular impact. » Assess the contribution of the proposed activity to the cumulative impact of the development in the area.	MetroGIS
Rehabilitation and Monitoring Plan	» The existing Environmental Impact Assessment and Environmental Management Plan (EIA/EMP) Report for the project area as well as any specialist studies that have been conducted on the site will be considered. The information review will enable the setting of objectives for rehabilitation and environmental monitoring. » Rehabilitation Plan Compilation: The information gathered during the site visit as well as existing data will be utilised to complete the conceptual rehabilitation plan. The rehabilitation plan will detail the following: * Specific actions to be undertaken during construction, operation, decommissioning and closure phases of the mining operation; * Soil and overburden materials handling, to ensure that materials favourable to vegetation establishment, as well as potential problem materials (such as acid generating, high metal level, saline soils or potentially dispersive material), are placed in the correct sequence; * Topsoil and subsoil handling procedures, especially those designed to conserve plant, nutrients and soil biota; * Soil amelioration techniques to create conditions favourable for growth, such as the application of lime or gypsum; * Any techniques for conserving and reusing vegetation, including mulch, brush matting for erosion protection and introduction of seed and log piles for fauna habitat; * Landscaping procedures, including the construction of erosion control and water management structures; * Post mining topography plan; * Vegetation establishment techniques; * Weed control measures prior to and following rehabilitation; * Fertilizer application; and * Follow-up planting and maintenance programs. * The plan provisions will be time-bound and will take into account opportunities for progressive rehabilitation and closure. From a biodiversity conservation and re-establishment perspective, it is particularly important	Digby Wells

Study	Activities to be undertaken in order to assess significance of impacts	Specialist
	that the extent of planned disturbed areas is minimised at any point in time. The rehabilitation plan should be reviewed periodically as further information on site conditions becomes available and as new rehabilitation procedures are developed. * The plan will also detail a re-vegetation program, which will include details of topsoil sources, stripping depths, volumes, handling methods, placement and scheduling. Areas where soil amelioration is needed will be mapped, and details of what is required described. It will describe what plant species and vegetation communities should be established, so that the most appropriate species are used. * From the topography assessment details in terms of the construction of stable landforms will be compiled. Landform stability is essential for the long-term sustainability of rehabilitation. Poorly constructed landforms can result in erosion that severely affects both the re-vegetation and downstream biodiversity. * The rehabilitation plan will also address soil handling, including the volumes and handling equipment needed, re-spreading depth and any follow-up treatment (such as scarifying prior to seeding). The types and methods of application of nutrients will be based on the soil characterisation studies. » An environmental monitoring programme will be compiled taking the following environmental aspects into consideration: * Surface water; * Groundwater; * Aquatic ecology; * Fauna; * Flora; * Dust fall out; and * Noise. The findings from the specialist studies undertaken during the EIA/EMP phase and other information available for the project area will be used to compile the monitoring programme and propose the locations of the relevant monitoring points. The various monitoring programmes will consider relevant legislative requirements, Best Practise Guidelines and the proximity of water resources and sensitive receptors to the mine.	
Update to the existing Ground Water	» The existing ground water study conducted as part of the bankable feasibility study will be included in the EIA report.	Future Flow Ground Water & Project

Study	Activities to be undertaken in order to assess significance of impacts	Specialist
Assessment		Management Solutions

9.5 Other specialist investigations

A number of other specialist investigations have been undertaken for the project as part of the Bankable Feasibility Study currently underway. Relevant information from these studies will be included in the EIA/EMPr in order to fully assess potential impacts and recommend appropriate mitigation and management measures. These will include the detailed geotechnical studies which have been completed on the site (to inform the soils and geology impact assessment), as well as the surface water studies (to provide details on the water balance of the mine and to inform management measures such as stormwater management).

In addition, information from the assessment undertaken by Cabanga Concepts for the initial Mining Right application process will be drawn on for the current EIA/EMPr amendment process. In particular, this will include studies associated with surface water impacts.

Other issues may come to light through the on-going public participation process, either through I&APs or through the authorities. These will be addressed as they arise if found to be relevant to the area of interest.

9.6 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 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.
» 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
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),
» > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

9.7 Environmental Impact Assessment Report

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 in accordance with the requirements of the NEMA EIA Regulations, and will include:

» 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 I&APs, the date of receipt of these comments and the response to those comments;
  * copies of any representations, objections and comments received from registered I&APs; and
  * an indication of how the issues raised by I&APs have been addressed
» 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 environment likely to be affected by the proposed mining operation (and any identified land use or development alternatives), including cumulative environmental impacts

- an assessment of the nature, extent, duration, probability and significance of the identified potential environmental, social and cultural impacts of the proposed mining operation, including the cumulative environmental impacts
- 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
- description of appropriate mitigatory measures recommended for each significant impact of the proposed mining operation
- description of the arrangements for monitoring and management of environmental impacts
- copies of specialist reports as appendices
- inclusion of technical and supporting information as appendices, if any

9.8 Preparation of the Environmental Management Programme

Mitigation, management and monitoring recommendations from the specialist studies will be integrated and synthesised by the Savannah Environmental project team. An Environmental Management Programme (EMPr) will be compiled in terms of NEMA EIA Regulations and will include:

- details of the person who prepared the environmental management plan and the expertise of that person to prepare an environmental management plan
- a detailed description of the aspects of the activity that are covered by the environmental management plan
- a description of the environment likely to be affected by the proposed mining operation
- an assessment of the potential impacts of the proposed mining operation on the environment, socio-economic conditions and cultural heritage, if any
- a summary of the assessment of the significance of the potential impacts, and the proposed mitigation and management measures to minimise adverse impacts and benefits
- information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of:
  - planning and design;
  - mine establishment activities;
  - operation
  - rehabilitation of the environment; and
  - closure
- planned monitoring and performance assessment of the environmental management plan and reporting thereon

» an identification of the persons who will be responsible for the implementation of the management and monitoring measures detailed in the environmental management plan
» where appropriate, time periods within which the measures contemplated in the environmental management plan must be implemented
» closure and environmental objectives
» a record of the public participation undertaken and the results thereof
» an undertaking by the applicant regarding the execution of the environmental management plan.

9.9 Public Participation Process

A public participation process will be undertaken by Savannah Environmental in line with Chapter 6 of the EIA Regulations of June 2010. 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);
» 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 Draftisation and submission to the LDEDET for review and decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, a public meeting and key stakeholder workshop will be held during this public review period.

9.10 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 9.2.

Table 9.2: Envisaged key milestones of the programme for the EIA phase of the project

Key Milestone Activities	Proposed completion date[1]
Public review period for Draft Scoping report	September 2014
Authority acceptance of the Scoping Report and Plan of Study to undertake the EIA	October 2014
Undertake detailed specialist studies and public participation process	June-October 2014
Make draft EIA Report and draft EMPr available to the public, stakeholders and authorities	November 2014
Submit Draft EIA Report to LDEDET and Amended EMPr to DMR for review and decision-making	January 2015

[1] Indicative dates only

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