LEGISLATION	RELEVANT SECTIONS	RELATES TO
		invasive species and duty of care relating to listed invasive species.
Occupational Health and Safety Act (No 85 of 1993) and Regulations	Section 8 Section 9	General duties of employers to their employees. General duties of employers and self employed persons to person other than their employees.
Hazardous Substance Act (No 15 of 1973) and Regulations		Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.
Mine Health and Safety Act (No 29 of 1996)	Chapter 2 Chapter 8	Health and safety at mines. General provisions.

6. PUBLIC PARTICIPATION PROCESS

6.1. Overview of the Public Participation Process undertaken during the Scoping Phase

The primary aims of the public participation process are:

- to inform interested and affected parties (I&APs) and key stakeholders of the proposed development.
- to initiate meaningful and timeous participation of I&APs.
- to identify issues and concerns of key stakeholders and I&APs with regards to the proposed development (i.e. focus on important issues).
- to promote transparency and an understanding of the proposed project and its potential environmental (social and biophysical) impacts (both positive and negative).
- to provide information used for decision-making.
- to provide a structure for liaison and communication with I&APs and key stakeholders.
- to ensure inclusivity (the needs, interests and values of I&APs must be considered in the decision-making process).
- to focus on issues relevant to the project, and issues considered important by I&APs and key stakeholders.
- to provide responses to I&AP queries.

6.2. Authority Consultation

6.2.1. Consultation with Decision-making Authorities

The relevant authorities required to review the proposed project and provide Environmental Authorisation were consulted from the outset of this study, and have been engaged throughout the project process. These authorities included the Department of Water and Environmental Affairs (DW&EA), who are the lead decision making authority for this project, and the Mpumalanga Department of Agriculture and Land Administration (MDALA) who are acting as the commenting authority.

6.2.2. Consultation with other Relevant Authorities

Consultation with non-DW&EA authorities has been undertaken through telephone calls, written correspondence and meetings in order to actively engage these authorities and provide background information to the proposed project during the Environmental Scoping Phase. The representatives from these Departments were requested to formally provide input into the EIA process. The other Authorities consulted include *inter alia*:

- Department of Minerals
- Pixley ka Seme Local Municipality;
- Gert Sibande District Municipality;
- South African Heritage Resources Agency (SAHRA) – Mpumalanga office;
- South African National Roads Agency Limited (SANRAL);
- Department of Transport; and

- Department of Health
- Mpumalanga Tourism and Parks Agency

6.3. Application for Authorisation

An application for authorisation in terms of the National Environmental Management Act No 107 of 1998 (as amended), in respect of the activities identified in terms of Section 24 and 24D of the said Act was submitted to DW&EA on 07 August 2009. This application included information regarding the proponent, as well as the proposed project and was submitted together with a declaration of independence from the independent environmental assessment practitioner. See Appendix A for the acceptance of application letter from DW&EA.

A separate application for a waste licence will be lodged with the DW&EA (Directorate: Authorisation and Waste Disposal Management) in terms of section 45 of the National Environmental Management: Waste Act (No 59 of 2008).

The application for an Integrated Water Use Licence (IWUL) will be lodged in accordance with Section 40 of the National Water Act, 1998 (Act No 36 of 1998) with the DW&EA. More information regarding this application process will be contained in the EIA phase of the study.

In terms of the National Environmental Management: Air Quality Act No. 39 of 2004, Eskom will have to apply for an air quality permit as carbonisation and coal gasification is a scheduled process in terms of the Act.

6.4. Advertising

In compliance to the EIA Regulations, notification of the commencement of the EIA process for the project was advertised in a local newspaper, namely the *Volksrust Recorder* on 02 October 2009 and in a national newspaper, namely the *City Press* on 04 October 2009 (refer to Appendix B). Interested and affected parties were requested to register their interest in the project, and become involved in the EIA process. The primary aim of these advertisements was to ensure that the widest group of I&APs possible was informed and invited to provide input and questions and comments on the project.

In addition to advertisements, site notices will be placed at the following public places advertising the EIA process for the proposed project

- Offices of the Pixley ka Seme Municipality
- Security check-in office at the Majuba Power Station
- UCG Pilot Plant
- Entrance to the Old Mine (Bergvliet Colliery)
- Offices of the Amersfoort Municipality

6.5. Identification of Key Stakeholders and Interested and Affected Parties

An important step in the public participation process entailed the identification of key stakeholders and I&APs, including:

- National and Provincial government;
- Local (Pixley ka Seme Local Municipality) and District Municipality (Gert Sibande District Municipality);
- Affected and neighbouring landowners;
- Farmers Associations; and
- Environmental NGOs.

The existing I&AP database from the 2100MW CCGT project was utilised as a starting point. The identification of additional I&APs was undertaken through existing contacts, responses to newspaper advertisements, and networking to identify key I&APs within the nominated study area.

All I&AP information (including contact details), together with dates and details of consultations and a record of all issues raised is recorded within a comprehensive database of I&APs. This database is updated on an on-going basis throughout the project process (refer to Appendix C).

Consultations, in the form of telephone calls and letters have been undertaken with individuals, businesses, institutions and organisations, including the following:

- South African Heritage Resource Association (SAHRA) – Mpumalanga office;
- Pixley ka Seme Local Municipality;
- Gert Sibande District Municipality;
- Mpumalanga Tourism and Parks Agency
- Neighbouring property owners/landowners;
- Local residents/Residents Associations/Community Organisations from the surrounding area;
- Local businesses surrounding the area;
- Environmental interest groups and Environmental NGOs; and
- Other parties interested in the proposed project including those from a business point of view.

Examples of letters sent to I&APs and key stakeholders are included in Appendix D.

6.6. Briefing Paper

A briefing paper for the project has been compiled in English (refer to Appendix E). A summary of the proposed project has also been compiled in Afrikaans and Zulu. The aim of this document is to provide a brief outline of the new proposed project, provide preliminary details regarding the Scoping and EIA process, and explain how I&APs could become involved in the project. The briefing paper has been distributed to all identified stakeholders, together with a registration/comment sheet, inviting I&APs to submit details of any issues and concerns.

6.7. Consultation and Public Involvement

Through consultations, issues for inclusion within the EIA will be identified and confirmed. Telephonic consultation, a public meeting as well as focus group meetings (FGMs) with I&APs and key stakeholders will be undertaken in order to identify additional key issues, needs and priorities for input into the EIA for the proposed project. Copies of minutes of all meetings held during both the original and revised Scoping Study for all formal public involvement meetings held during the process will be included in the final Environmental Scoping Report.

Networking with I&APs will continue throughout the duration of the project until the completion of the EIA phase. This process will be undertaken through a public meeting, FGM and one-on-one meetings (if necessary).

6.7.1. Public Meeting

The primary aim of this meeting will be to:

- provide I&APs and stakeholders with information regarding the proposed 40MW OCGT plant and associated infrastructure;
- provide I&APs and stakeholders with information regarding the EIA process;
- provide an opportunity for I&APs and stakeholders to seek clarity on the project;
- record issues and concerns raised; and
- provide a forum for interaction with the project team.

This meeting was advertised in the *City Press* and *Volksrust Recorder* newspapers (refer to Appendix B). Registered I&APs and stakeholders were invited to attend the public meeting by individualised letters. Copies of the minutes of meeting will be included in the final Environmental Scoping Report.

6.7.2. Focus Group Meetings

These meetings will be held with groups that have similar interests in the project, such as environmental NGOs, local authorities, landowner's associations, etc. The main aims of these meetings will be to provide stakeholders with information regarding the proposed project and provide them with the opportunity to raise any comments, issues or concerns regarding the proposed project.

6.8. Issues Trail

All issues, comments and concerns raised during the public participation process to date will be compiled into an Issues Trail. The Issues Trail will be updated on an on-going basis.

6.9. Review of the Revised Draft Environmental Scoping Report and Plan of Study for EIA

6.9.1. Public Review of Revised Draft Scoping Report and Plan of Study for EIA

The revised draft Environmental Scoping Report and Plan of Study (PoS) for EIA will be made available for public review for a 30-day review period from **12 October 2009** until **12 November 2009**. Hard copies of the report will be made available for inspection at the following public venues:

- Volksrust Public Library
- Daggakraal Library
- Amersfoort Library
- Offices of the Pixley ka Seme Local Municipality
- Offices of the Gert Sibande District Municipality
- Offices of Bohlweki Environment (Building 5, Country Club Estate, Woodmead)
- Bohlweki Environmental website (www.bohlweki.co.za/library.php)
- Eskom website (www.eskom.co.za/eia) – *EIA for the proposed 40MW OCGT power plant and associated infrsaturcture in the Amersfoort area, Mpumalanga*

The availability of this draft report was advertised in the *Volksrust Recorder* (02 October 2009) and *City Press* (04 October 2009) (refer to Appendix B) I&APs registered on the project database were notified of the availability of this report as well as FGMs by individualised letters (refer to Appendix D).

All issues and comments received during the review period of the revised Scoping Report will be included in the final Environmental Scoping Report.

6.9.2. Authority Review of Revised Draft Environmental Scoping Report and Plan of Study for EIA

The revised draft Environmental Scoping Report will be made available to the Pixley ka Seme Local Municipality; Gert Sibande District Municipality as well as the Mpumalanga SAHRA simultaneously for review and comment.

6.10. Submission of Final Environmental Scoping Report

The submission of the final Environmental Scoping Report and Plan of Study for EIA is the last stage of the Environmental Scoping Phase for the proposed project. The Final Environmental Scoping Report will be submitted to DW&EA and MDALA for review and decision-making.

7. GENERAL DESCRIPTION OF THE STUDY AREA

7.1. Biophysical Environment

7.1.1. Locality

The proposed project is located on the farm Roodekopjes 67HS (27°4'45.66"S; 29°48'1.152"E). The proposed project falls in the Mpumalanga Province in Ward 7 of the Pixley ka Seme Local Municipality (MP304) within the Gert Sibande District Municipality (DC30). The Pixley ka Seme Local Municipality is situated on the eastern border between Mpumalanga and KwaZulu-Natal. Furthermore, the municipal area is framed by the Mkhondo Municipality in the east, Msukaligwa Municipality to the north and Lekwa Municipality to the west (refer to Figure 7.1). The Pixley ka Seme Local Municipality comprises an area of approximately 5227,98 km² which includes the following major urban areas or towns: Amersfoort; Ezamokuhle; Perdekop; Siyazenzela; Volksrust; Vukuzakhe; Wakkerstroom and eSizameleni. Other residential areas include Daggakraal Ext 1, 2 and 3 as well as Sinqobile A, B, C, and D.

Figure 7.1: Map indicating the Pixley ka Seme Local Municipality and surrounding municipalities

7.1.2. Climate and Rainfall

The study area is characterised by daily summer temperatures that range between ~2 ℃ and ~32 ℃ with an average of ~17 ℃. Winter temperatures range between ~8 ℃ and ~23 ℃ with an average of ~7 ℃. Figure 7.2 illustrates the average monthly maximum and minimum temperatures recorded in the Majuba area, respectively.

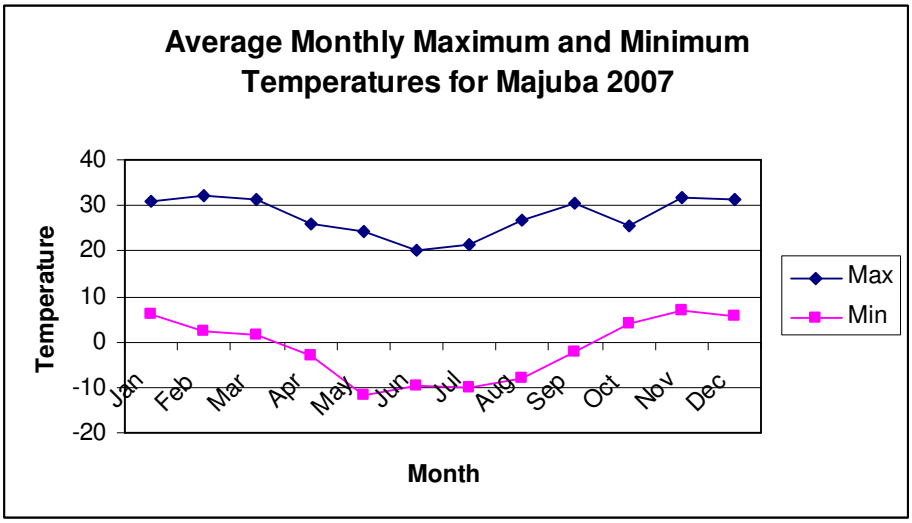

Figure 7.2: Average monthly maximum and minimum temperatures recorded in the Majuba area (Weather Services Station, 2007)

The study area can be characterised as being a summer rainfall area with the warmer months being October to April. The mean annual rainfall for the Majuba area is 1008 m. Total monthly rainfall figures for modelled South African Weather Services (SAWS) data are illustrated in Figure 7.3.

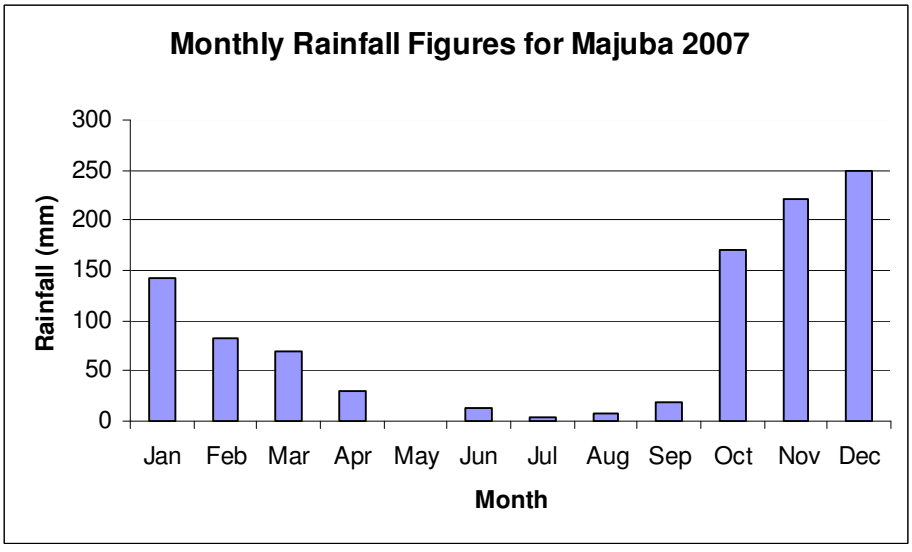

Figure 7.3: Monthly rainfall figures for Majuba area (Weather Services Station, 2007)

7.1.3. Wind

The UCG pilot plant has its own meteorological station, however data from the SAWS has been included to ensure that the data from the UCG pilot plant station is correct. Comparison was made between data sourced from the UCG pilot plant and data taken from the South African Weather Services. The period wind rose and frequency distribution for the UCG site is presented in Figure 7.4 and Figure 7.5 and the period wind rose and frequency distribution for the data sourced from the South African Weather Services is presented in Figure 7.6 and Figure 7.7. Wind roses comprise of 16 spokes which represent the directions from which winds blew during the period. The colours reflect the different categories of wind speeds. The dotted circles provide information regarding the frequency of occurrence of wind speed and direction categories.

For the period assessed, winds predominated from the western and eastern sectors. The wind rose profile is typical of that experienced by low lying areas surrounded by an escarpment. From the eastern vector wind speeds of between 5.7-8.8m/s occurred most of the time. The same wind speeds occurred but were less common from the south easterly and north eastern sectors. Stronger winds of greater than 8.8m/s were also experienced from the west. Smaller contributions of strong winds were also experienced from the west-southwest and west-northwest directions.

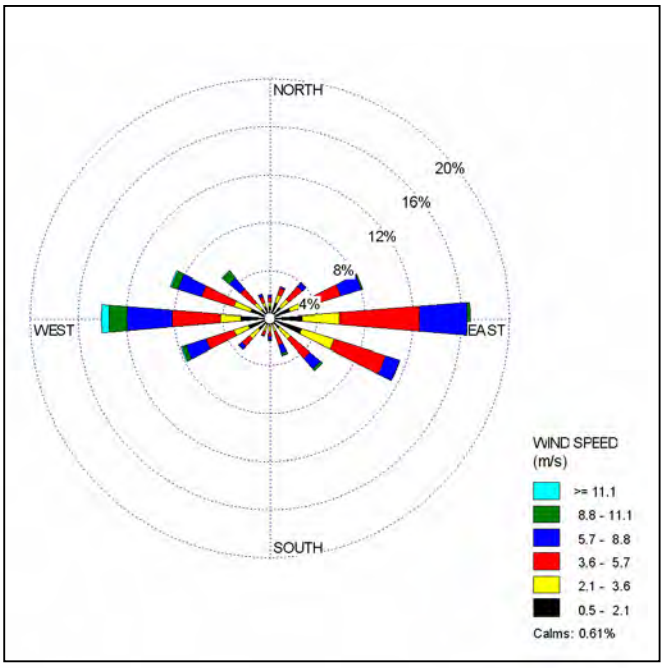

Figure 7.4: Period wind rose derived from monitored data from the UCG pilot plant (2006 to 2007)

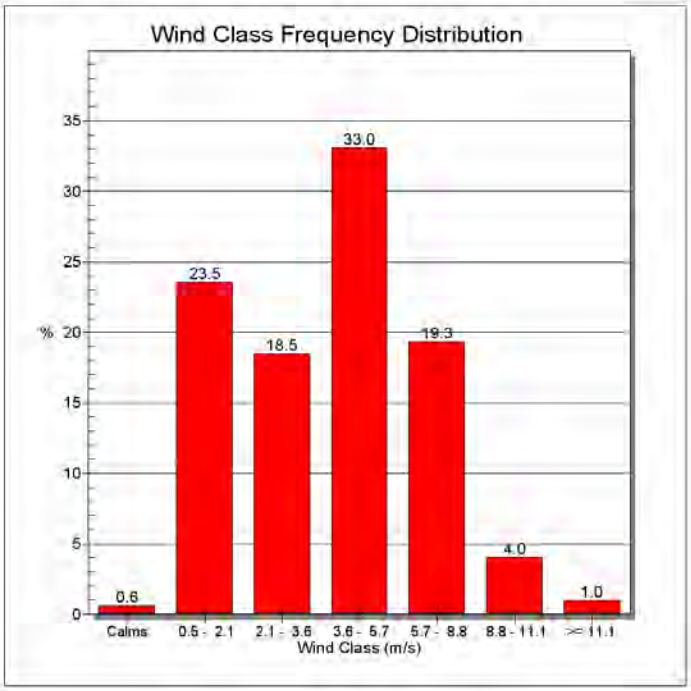

Figure 7.5: Frequency distribution derived from monitored data (UCG Pilot Plant: 2006 to 2007)

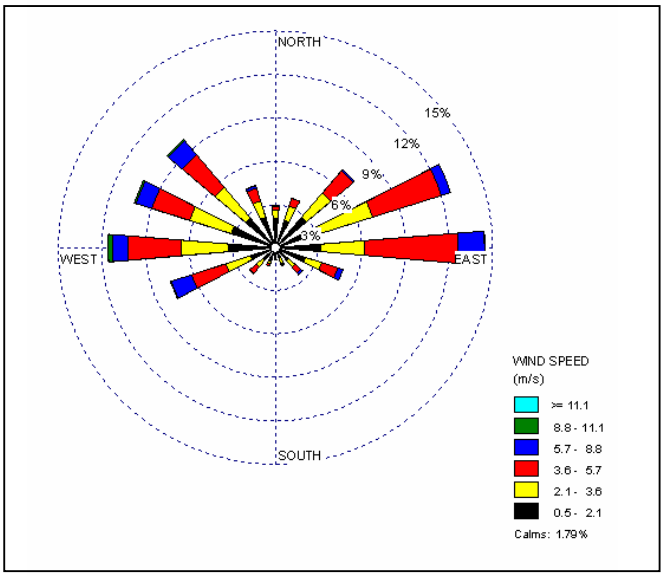

Figure 7.6: Period wind rose derived from modeled data sourced from the South African Weather Services (2006 to 2007)

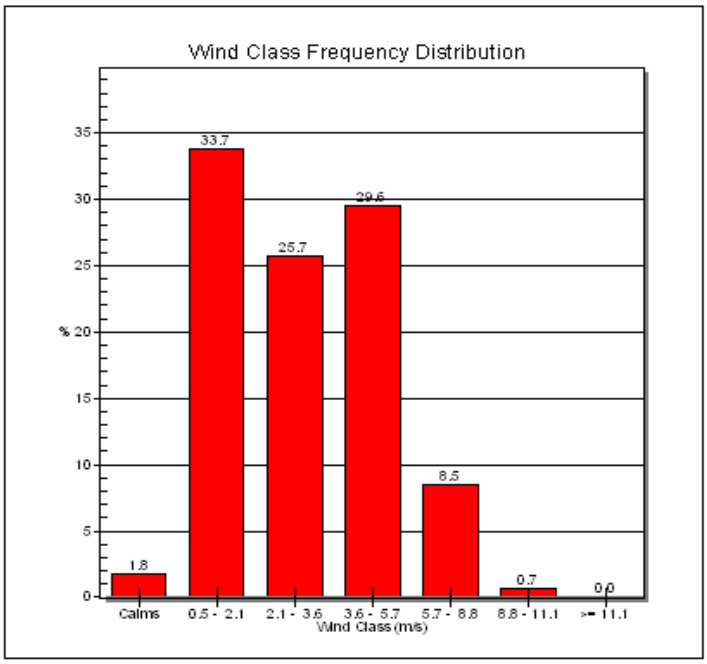

Figure 7.7: Frequency distribution derived from modelled data (South African Weather Services: 2006 to 2007)

The average wind speed for the Amersfoort area is 3.24 m/s, with the highest recorded wind speeds (between 8 and 11 m/s) coming from the west. Of the annual modelled hourly data from the weather services, approximately 1.79% of that hourly data is recorded as calm winds, representing periods of little dispersion. Information pertaining to calm periods, average wind speeds and wind direction all play a significant role with regards to dispersion effects and will play a fundamental role during the modelling undertaken in the EIA phase of the project.

7.1.3.1. Atmospheric Stability

Atmospheric stability is commonly categorised into one of six stability classes. These are briefly described in Table 7.1. The atmospheric boundary layer is usually unstable during the day due to turbulence caused by the sun's heating effect on the earth's surface. The depth of this mixing layer depends mainly on the amount of solar radiation, increasing in size gradually from sunrise to reach a maximum at about 5-6 hours after sunrise. The degree of thermal turbulence is increased on clear warm days with light winds. During the night a stable layer, with limited vertical mixing, exists. During windy and/or cloudy conditions, the atmosphere is normally neutral.

Within the study area, very unstable to stable conditions predominates within most sectors. The highest frequencies of such winds occurring were mainly from the east-north-east and east sectors, and the next highest from the west-south-west and west-north-west sectors.

Table 7.1: Atmospheric stability classes

A	Very unstable	calm wind, clear skies, hot daytime conditions
B	Moderately unstable	clear skies, daytime conditions
C	Unstable	moderate wind, slightly overcast daytime conditions
D	Neutral	high winds or cloudy days and nights
E	Stable	moderate wind, slightly overcast night-time conditions
F	Very stable	low winds, clear skies, cold night-time conditions

7.1.4. Topography and Landscape

The region is known for its rolling grass landscapes and the study area is a typical example thereof (Photograph 7.1). A basic analysis of topography and landforms revealed that the study area does not comprise sites where significant slopes are present. It should however be noted that the ENPAT database slope classes is based on a high contour interval. With the use of more detailed data, the identification of smaller areas of significant slopes will be made possible.

The topography of the general region varies between 'Slightly irregular undulating plains and hills' and 'Strongly undulating plains'.

Photograph 7.1: Study area showing the rolling grass landscape

7.1.5. Geology

7.1.5.1. Regional Geology

The majority of the study area is underlain by Karoo Supergroup sedimentary rocks of the Vryheid and Volksrust Formations of the Ecca Group. These are largely comprised of sandstone, mudstone, shale, siltstone, and coal seams.

The available geological maps covering the study area did not indicate any major structural features such as faults or fractures. Limited tectonic activity is recognised within the study area, and the only evidence of secondary processes is outcrops of intrusive younger dolerite sills mapped in the Karoo sediments.

Four generations of dolerite intrusions are recognised within the study area, based on olivine or plagioclase content, alteration, and texture. The intrusive dolerite has produced large-scale devolatilisation and structural displacement of the coal. These adverse geological conditions caused the closure of the Majuba Colliery in 1993. The lithostratigraphy of the study area is presented in Table 7.2 below.

Table 7.2: Lithostratigraphy of the study area

Age	Supergroup	Group	Subgroup	Formation	Lithology
Jurassic					Dolerite
Permian	Karoo	Ecca		Volksrust	Mudstone, siltstone, shale
Permian	Karoo	Ecca		Vryheid	Sandstone, siltstone, shale, coal

7.1.5.2. Geology of the farm Roodekopjes 67HS

The general geology of the farm Roodekopjes 67HS from surface downwards is illustrated in Figure 7.8. The B8 dolerite sill outcrops at surface on the site and averages in the order of 30m thick. A sandstone and siltstone interval of between 5 and 25m is followed by two to three stages of sill intrusion of the B4 dolerite totalling approximately 120m in thickness. Below this composite dolerite sill are sequences of sandstones, siltstones and mudstones containing minor coal seams. The main coal seams namely the Alfred and Gus seams are at an average depth of 280m below surface. They total about 5m in thickness with a small parting between them that thickens and becomes more prominent towards the east.

Below this is a sequence of bioturbated siltstones, sandstone and mudstone with minor coal seams. The B6 dolerite sill underlies the whole farm. This dolerite has indurated the coal and the coal seams volatile content is well below the required average for Majuba. The seam elevation and attitude for farm Roodekopjes is flat and consistent.

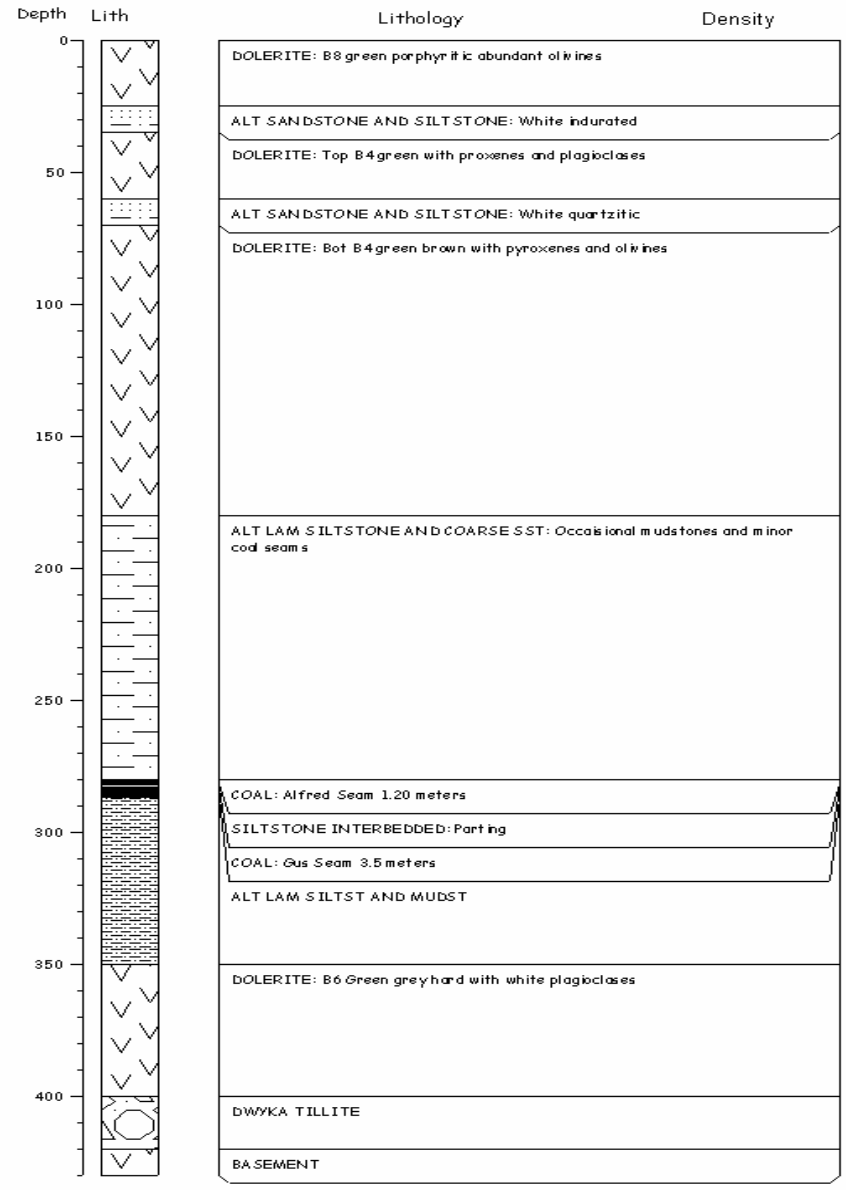

Figure 7.8: Typical geological profile of the farm Roodekopjes 67HS

7.1.5.3. Coal Seams

The two main coal seams on the farm Roodekopjes 67HS are the Alfred and Gus seams. The Alfred seam varies between 1 and 1.5m in thickness. It often has contaminated coal and sandstone near the top. The coal is a dull bituminous coal, high in ash with some shaly coal bands. The coal is slightly devolatilised as shown by the range of dry ash free volatiles. The Gus seam is separated from the overlying

Alfred seam by a parting of coaly shale that becomes thicker and more arenaceous to the east. The Gus seam averages over 3.0m in thickness and is divided into a poor shaly top half and a high quality bottom half. Again the coal shows signs of devolatilisation.

7.1.6. Geohydrology

The groundwater potential of the Karoo formations located in the study area is limited in their pristine state due to low permeability and storage capacity. Secondary processes, such as weathering, fracturing, etc., are required to enhance the groundwater potential. Based on regional data and the resource maps, the following geohydrological information is available for the formations within the study area:

- Volksrust Formation
  - Upper and middle Ecca
  - Predominantly argillaceous rocks
  - Fractured aquifers
  - Borehole yields 0.5 to 2.0 l/s
- Vryheid Formation
  - Lower Ecca
  - Intergranular and fractured aquifers
  - Borehole yields 0.1 to 0.5 l/s

Groundwater hydrochemistry associated with the sediments is variable; the groundwater salinity associated with the formations in the study area can have electrical conductivity concentrations of < 250 up to 1000 mS/m.

The sandstones of the Vryheid Formation of the Ecca Group can be massive and dense and have limited permeability and storage. It thus offers only moderate groundwater yield, especially in the absence of dolerite intrusions. Contacts between different rock lithologies and bedding planes within the sediments often yield groundwater. The contact zone between the dolerites and the sandstone lithologies can be high yielding. Fractured fault zones, especially if related to tensional stresses, are potentially rich targets for groundwater development. Groundwater occurs within the joints, bedding planes, and along dolerite contacts within the sediments (as recognised across the study area).

7.1.7. Drainage and Hydrology

The site straddles two quaternary catchments, both of which form part of the Upper Vaal River Catchment. The western part of the site is located within catchment C11J, part of which is drained by the Witbankspruit, a stream that forms a tributary of the Upper Vaal River to the north of the site (the Witbankspruit flows from north to south across the site). The eastern third of the site falls within the quartenary catchment C11E. The Skulpspruit which flows through the eastern part of the site forms a tributary of the Rietspruit, itself a tributary of the Upper Vaal River. This factor is relatively important in a catchment management context as the Vaal River is critical in the supply of water to South Africa's most densely populated area and economic hub.

7.1.8. Wetlands

Wetlands occur predominantly in a number of valley bottom systems that traverse the site in a north-south direction. In some of the upper parts of these valley bottom systems, the wetlands are thought to become hillslope seepage wetlands (on the footslopes and midslopes surrounding the valley bottoms). Wetlands occupy an area of 10,243ha, 47.6% of the total area of the study site. The spatial distribution of wetlands is indicated in Figure 7.9 below:

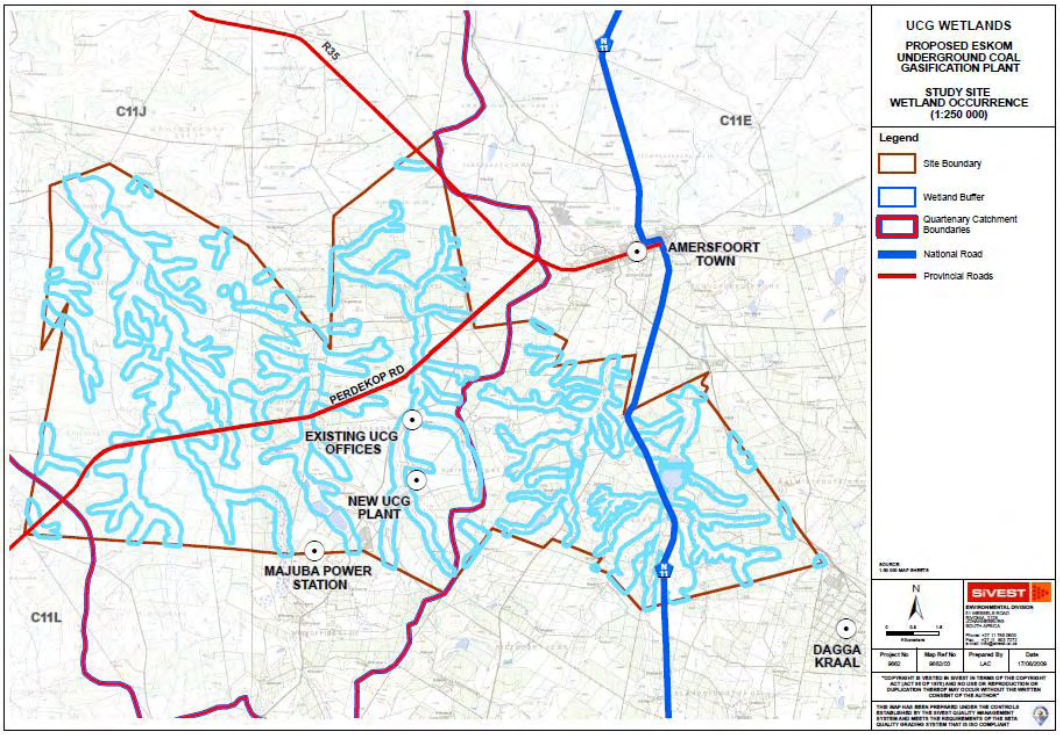

Figure 7.9: Map indicating wetland occurrence across the study area

7.1.9. Soils and Agricultural Potential

7.1.9.1. Land type data

The proposed study area falls into the **Ea20**, **Ea22**, **Ea24** and **Ca2** land types (refer to the land type map of the study area - Appendix F). A brief description of each of the land types that occur on the site is provided in Table 7.3.

Table 7.3: Land types

SOILS	LAND CAPABILITY AND LAND USE	AGRICULTURAL POTENTIAL
Land type: Ea20		
▪ Higher lying landscape positions dominated by rock outcrops and shallow swelling soils ▪ Midslope positions dominated by variable depth structured soils, often with swelling properties ▪ Valley bottom positions dominated by poorly drained non-swelling soils and exposed streambeds	Mainly dryland agriculture and extensive grazing	Medium to low except for lower lying areas that constitute wetlands
Land type: Ea22		
▪ Higher lying landscape positions dominated by rock outcrops and shallow structured soils ▪ Midslope positions dominated by variable depth structured soils, often with swelling properties ▪ Valley bottom positions dominated by poorly drained swelling soils and exposed streambeds	Mainly dryland agriculture and extensive grazing	Medium to low except for lower lying areas that constitute wetlands
Land type: Ea24		
▪ Higher lying landscape positions dominated by rock outcrops and shallow swelling soils ▪ Midslope positions dominated by variable depth structured soils, often with swelling properties ▪ Valley bottom positions dominated by poorly drained non-swelling soils and exposed streambeds	Mainly dryland agriculture and extensive grazing	Medium to low except for lower lying areas that constitute wetlands

SOILS	LAND CAPABILITY AND LAND USE	AGRICULTURAL POTENTIAL
Land type: Ca2		
▪ Landscape dominated by shallow yellow-brown apedal, distrophic soils in higher lying areas, variable depth bleached apedal soils in midslope positions and poorly drained structured soils of variable depth in low lying areas	Mainly dryland agriculture and extensive grazing	Medium to low except for lower lying areas that constitute wetlands

7.1.9.2. Aerial Photograph Interpretation and Land Use/Capability Mapping

The interpretation of aerial photographs yielded eight land use categories. These categories, as well as the areas and percentages they cover, are presented in Table 7.4. The spatial results of the aerial photograph interpretation are presented in Appendix F – Land use map). The land capability mimics the current land use and as such is included in Table 7.4.

Table 7.4: Land use and capability of the study area

Land use	Land Capability	Area (ha)	Percentage (%)
Grasslands	Grazing	8759.9	70.8
Dryland Agriculture	Arable	3155.9	25.5
Woodland	Grazing/Arable	46.8	0.4
Dam	Wetland	143.0	1.2
Pan	Wetland	8.9	0.1
Rural Infrastructure	-	19.3	0.2
Urban Infrastructure	-	218.5	1.8
Mining Infrastructure	-	28.8	0.2
Total		12381.1	100.2

7.1.10. Regional Vegetation

The study area is situated within the Amersfoort Highveld Clay Grassland and Soweto Highveld Grassland vegetation types (refer to Appendix G).

7.1.10.1. Amersfoort Highveld Clay Grassland

This vegetation type comprises undulating grassland plains, with small scattered patches of dolerite outcrops in areas. The vegetation is comprised of a short closed grassland cover, largely dominated by a dense *Themeda triandra* (Red Grass) sward, often severely grazed to form a short lawn. The conservation status is

regarded as Vulnerable[2], with a planned conservation target of 27%. None is however formally protected. Some 25% of this unit (Amersfoort Highveld Clay Grassland) is transformed, predominantly by cultivation (22%). The area is not suited to forestation. Silver and black wattle and *Salix babylonica* invade drainage areas. Erosion potential is low.

Overgrazing leads to invasion of *Stoebe vulgaris* (Bankrupt Bush). Parts of this unit (Amersfoort Highveld Clay Grassland) were once cultivated and now lie fallow and have been left to re-vegetate with pioneer grass species. These transformed areas are not picked up by satellite for transformation coverage and the percentage of grasslands still in a natural state may be underestimated.

The study area is situated within the African Grasslands/Ekengela Initiative Transition Zone, rendering all areas of natural grassland sensitive[3].

7.1.10.2. Soweto Highveld Grassland

This vegetation type comprises a gently to moderately undulating landscape on the Highveld plateau supporting short to medium-high, dense, tufted grassland dominated almost entirely by *Themeda triandra* and accompanied by a variety of other grasses such as *Elionurus muticus, Eragrostis racemosa, Heteropogon contortus* and *Tristachya leucothrix*. Only scattered small wetlands, narrow stream alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover.

This vegetation type is regarded Endangered with a planned conservation target of 24%. Erosion is generally very low.

7.2. The Social Environment

7.2.1. Social

As mentioned earlier, the study area falls within the Pixley ka Seme Local Municipality (PSLM). According to the Spatial Development Framework (SDF)[4] of the PSLM, the current spatial pattern within the municipal area can be divided into 7 broad categories of land use, namely: Urban land use, rural land use, mines and quarries, conservation areas, agriculture, tourism areas, and the transport network.

- **Urban land use**: The towns of Volksrust and Vukuzakhe are classified as major urban areas whereas Wakkerstroom, Daggakraal and Amersfoort are regarded as minor urban areas. An area such as Perdekop is regarded as a declining urban area.

[2] Vegetation types that have lost up to 20% of their original extent, which could result in some ecosystem function being altered.

[3] **Department of Environmental Affairs and Tourism; 2001.** Environmental Potential Atlas. Pretoria.

[4] **Pixley ka Seme Local Municipality, 2001.** Pixley ka Seme Local Municipality IDP. Available at URL http://pixleykaseme.local.gov.za.

- **Rural land use**: Agricultural activities seem to be dominating rural land use in the area, but most of these activities are regarded as subsistence farming.
- **Mines and quarries**: Operational mines are scattered throughout the PSLM and include sand, dolerite and coal mining. Areas of coal mining are often also associated with energy generation activities.
- **Conservation areas**: The PSLM is home to a number of important conservation and biodiversity areas, but it would appear if these areas are mostly confined to the southern parts of the municipal area, notably around Wakkerstroom. In addition to the conservation areas, the SDF also states that there are a number of natural heritage sites located around Wakkerstroom and Warburton.
- **Agriculture**: The SDF describes the majority of land within the PSLM as "unimproved grassland" that is mostly used for stock grazing. Other land within the PSLM is described as cultivated dry land used for crop cultivation (mostly maize).
- **Tourism**: The PSLM falls within the Grass and Wetlands Tourism Region, which forms, what is called, a "birding paradise".
- **Transportation network**: The national road N11 traverses the municipal area and serves as an important north-south transportation link. In addition, several provincial roads also traverse the local area, including the R23, and portions of the R543. Apart from the road network, two railway lines pass through the PSLM, one being the main Johannesburg-Durban rail connection, the other a north-south rail passing through the towns of Amersfoort, Wakkerstroom and Volksrust.

Amersfoort is classified as a small urban centre. The town was initially established as a result of the coal mining in the area and has since, to a large extent, become dependent on the Majuba Power Station. Approximately 12.8km to the southeast of Amersfoort lies the town of Daggakraal, which is considered a very large urban settlement. It is believed that up to a third of the total population of the PSLM resides in Daggakraal. Furthermore, Daggakraal (and most probably neighbouring Vlakplaats) is expanding at a rapid rate which is evident in the fact that the population increased from approximately 6 500 in 2001 to an estimated 38 000 people in 2009. Even though the town has a range of social services, there is still a dire need for a range of diversified services to address the needs of Daggakraal's residents, including physical upgrades such as sanitation services, water reticulation and waste removal. The town is economically unsustainable as it has a very limited economic base which showed little to no growth during the past years – probably owing to the fact that the area is very inaccessible.

7.2.2. Air Quality

7.2.2.1. Identified Sensitive Receptors

A sensitive receptor for the purposes of the current investigation can be defined as a person or place where involuntary exposure to pollutants released by the proposed plant, can be expected to take place. For the purposes of this study, areas of development are identified as sensitive receptors. Those receptors identified during the current study are listed as follows:

- Approximately 5km south west are Rietfontein and eZamokuhle Towns;

- Approximately 6km west are the Vlakplaats and Daggakraal communities; and
- Adjacent to surrounding livestock farms and associated farm houses.

7.2.2.2. Sources of Air Pollution

- The following sources of air pollution have been identified in the study area:
- Stack, vent and fugitive emissions from the existing Majuba Power Station operations and well as from the proposed 40MW OCGT;
- Agricultural activities on the surrounding farms;
- Vehicle entrained dust and exhaust emissions;
- Domestic fuel burning; and
- Veld fires.

7.2.3. Visual

The landscape character is formed by primary environmental attributes and human activity, which in the case of this study area are the following:

- Grassland;
- Undulating topography with isolated koppies and ridges;
- Perennial and non-perennial streams and isolated dams;
- Cultivated land;
- Majuba Power Station (being a visually dominant feature in the area);
- Dispersed farmsteads, townships and agricultural holdings.

As indicated on the map in Figure 7.10, natural grassland and cultivated land are the main environmental attributes in the study. The intrinsic value of these landforms in terms of visual quality is medium – high. Driving through the area leaves one with a pleasant feeling of the natural environment in general. Sense of place is important in this study because sprawl development tends to eliminate unique features of the landscape.

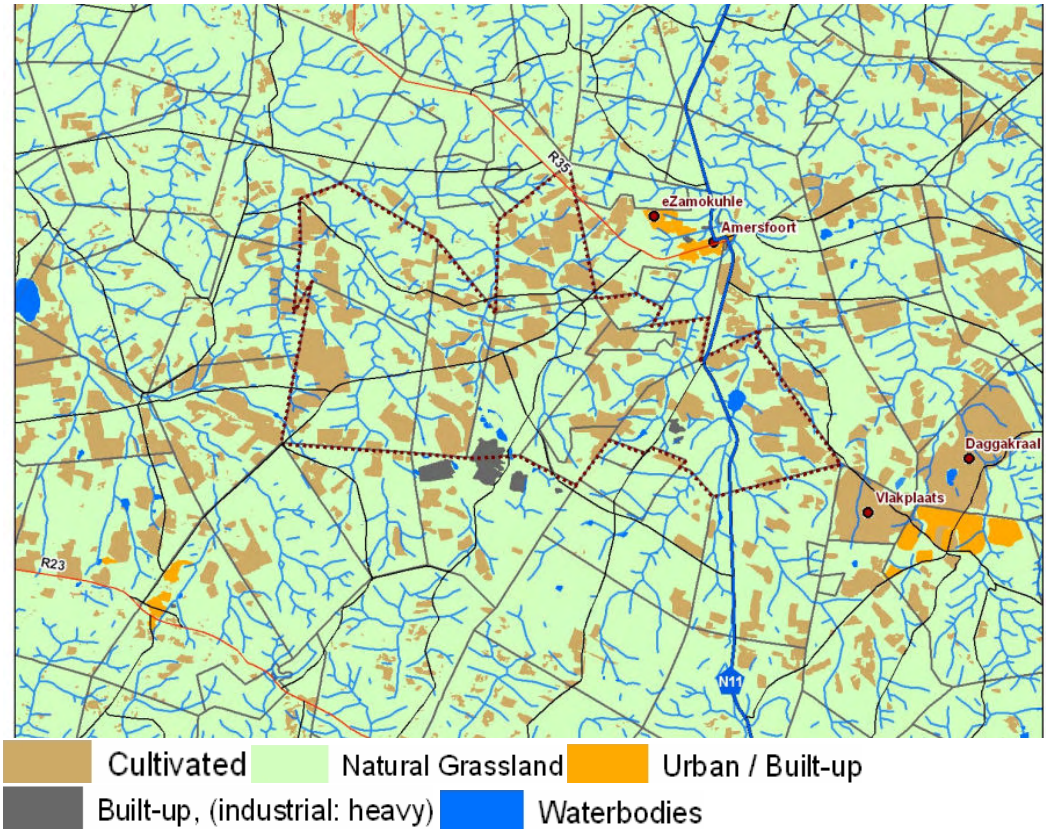

Figure 7.10: Land use in the study area

7.2.4. Micro-economic Status Quo

The current regional economic environment seems to be dominated by agriculture, and power generation, with towns in the area providing services and products to these industries and local residents providing labour to the industries or running related businesses. This is supported by information contained in the Pixley ka Seme Local Municipality IDP[5] which indicated that agriculture and electricity provision both represented significant sectors in the local economy together with trade and manufacturing.

Skills level in the region remains a problem with less than 18% of pupils achieving grade 12 or above[6]. This is likely to limit the amount of local benefit from the project by increasing the need for outside employees. There seems to be a strong need for organisations to provide skills development and training, and thus providing job mobility to more skilled opportunities. Any large local economic injection could have dramatic effects on local suppliers and employees.

[5] **Pixley ka Seme Local Municipality, 2001.** Pixley ka Seme Local Municipality IDP. Available at URL http://pixleykaseme.local.gov.za.

[6] **Statistics SA; 2007.** Community Survey Interactive Results. Available at http://www.statssa.org.za

Farming on or near the project site is characterised by both dryland crop farming, and animal husbandry (mostly cattle farming). There are several small communities of workers living in the area in addition to landowners or tenants. The new plant will occupy a small footprint but the gas cleaning and distribution facilities will be spread over a large area. This may increase the negative economic impact of the project.

7.2.5. Heritage

- ***Stone Age***
  No information about Stone Age habitation of the area is available. There might be two reasons for this. Firstly, it is unlikely that Stone Age people would have occupied the area specific, as it would have been to cold and no shelters or caves exists locally that could be used to shelter in. Secondly, no systematic survey of the area has been done and, as a result, no sites have been reported.
- ***Iron Age***
  Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Silver Leaves, south east of Tzaneen dating to AD 270. However, Iron Age occupation of the eastern highveld area (including the study area) did not start much before the 1500s. Some sites dating to the Late Iron Age is known to exist to the north west of the study area.
- ***Historic period***
  The historical period in this area starts with the arrival of early missionaries, hunters and traders, followed later by the Voortrekkers, who settled permanently and started to farm in the area and developed a number of towns. The town of Amersfoort was founded in 1876 and proclaimed in 1888. During the Anglo Boer War (1899-1902), some skirmishes took place in the region[7].

7.2.6. Noise

The *noise climate* (ambient noise condition) in the Amersfoort area is quiet and is representative of a rural (farming) noise district (SANS 10103). There are a number of major noise sources in the area namely the existing Majuba Power Station, the traffic on the main roads, coal trucks transporting coal to Majuba Power Station and the coal supply railway line to the power station. The noise sensitive sites/areas are Amersfoort town (approximately 12 km from the Majuba Power Station) and various farm houses and farm labourer residences in the surrounding area (on farms Palmietspruit; Strydkraal; Tweedepoort, Koppieskraal, Rietfontein; Weiland and Bergvliet).

7.2.7. Traffic

There are a number of major roads and secondary roads servicing the study area. These include:

i) National Road N11, which links Amersfoort to Volksrust is aligned in a north-south direction through the eastern sector of the study area.

[7] **Cloete, P.G, 2000**. The Anglo-Boer War: A Chronology. Pretoria: JP van der Walt. Pp. 243.

ii) Road P48/2 (Route R35), which links Amersfoort to Morgenzon, is aligned in an east-west direction through the north-eastern sector of the study area.

iii) Road P97/1 which links Amersfoort to Perdekop, is aligned in a north-east to south-west direction through the western sector of the study area. It passes 4 kilometres to the north-west of the Majuba Power Station.

iv) Road D2514, which links from Road P97/1 to National Road N11, is aligned in a north-west to south-east direction through the central portion of the study area. It is the main access road to Majuba Power Station.

v) Road D284, which links from Road D2514 to National Road N11, is aligned in a south-west to north-east direction through the central portion of the study area. It is the main access road to Majuba Colliery (no longer in operation).

8. POTENTIAL ENVIRONMENTAL IMPACTS – BIOPHYSICAL ENVIRONMENT

8.1. Construction Phase Impacts

These are impacts on the bio-physical and socio-economic environment that would occur during the construction phase of the proposed project. They are inherently temporary in duration, but may have longer lasting effects e.g. pollution of a wetland during construction could have effects that may last long after construction is over. Construction phase impacts could potentially include:

- Disturbance of flora and fauna;
- Impacts on water resources;
- Increase in traffic volumes in the vicinity of the construction site;
- Windblown dust;
- Noise pollution; and
- Litter/waste pollution.

Based on the temporary duration of the construction phase and the fact that negative impacts of construction can be readily predicted and mitigated, generally speaking, more attention will be given to the operational phase impacts of the proposed power station than to the construction phase impacts. However, wherever relevant, specialist studies would consider construction phase impacts, and in certain cases, would be focused on construction phase impacts e.g. impacts on terrestrial flora and fauna are mainly construction phase impacts.

It should be noted that a comprehensive construction phase Environmental Management Plan (EMP) would be developed and implemented to regulate and minimise the impacts during the construction phase.

8.2. Operational Phase Impacts

Given their long term nature, operational phase impacts will come under close scrutiny in the EIA Phase. The specialist studies will identify and assess the implications of these impacts and include measures to minimise predicted impacts. The assessment of potential impacts will help to inform Eskom's selection of preferred alternatives to be submitted to the Department of Water and Environmental Affairs (DW&EA) for consideration and approval. In turn, DW&EA's decision on the environmental acceptability of the proposed project and the setting of any conditions will be informed by the specialist studies, amongst other information to be contained in the EIR.

It is normal practice that, should the proposed OCGT and associated infrastructure be authorised, the development and implementation of an operational EMP is required. The operational EMP is designed to mitigate negative impacts associated with the operational phase of the project and will be informed by the mitigation measures proposed by the specialists and their feasibility.

8.3. Specialist Studies

As required by the Call for Proposals put out by Eskom when embarking on the EIA process, Bohlweki-SSI Environmental formed a team with a suite of specialist consultants in various disciplines. As part of the Scoping exercise, the team of specialists attended a site visit and workshop to determine if, on the basis of a literature review and the site inspection, the scope of their work as originally envisaged could be reduced, or whether it needed to be expanded or amended. The outcome of the workshop was that, while some impacts might have been considered to be relatively benign, best practice and a need to fully understand the implications of the proposed project, warrant that further investigation of all identified issues be undertaken in the EIA Phase. Accordingly, the following specialist studies and specialists are proposed to be undertaken in the EIA Phase (see Table 8.1 below):

Table 8.1: Specialist studies to be undertaken in the EIA phase

SPECIALIST FIELD	ORGANISATION
Peer review of Geohydrology Study	R Meyer (Private)
Peer review of Hydrology Study	Jones and Wagner
Wetlands	SiVEST
Soils and Agricultural Potential	Terra Soil Science
Biodiversity	Bathusi Environmental Consulting
Baseline Social Study and Micro-economic study	MasterQ Research
Air Quality	Bohlweki-SSI Environmental
Visual aspects and aesthetics	MetroGIS
Heritage	J van Schalkwyk

Each of the specialists has the relevant experience and expertise to undertake the proposed studies.

A description of each of the proposed specialist studies follows. The Terms of Reference for each of the specialist studies for the EIA phase is provided in Chapter 11 (Plan of Study for EIA - PoS for EIA). As a critical step in the EIA process, it is important that the public has the opportunity to comment on, and the authorities approve of, the proposed approach to the EIA Phase.

Commenting on the PoS for EIA by the public ensures that the proposed approach, including the scope of work for the specialists, is informed by public and the authority feedback in order to ensure that the work produced addresses the issues of concern at the requisite level of confidence. A robust basis for informed debate and decision making is thus provided.

Key outcomes of the specialist studies would be information which will allow I&APs to engage in informed debate on the implications of the proposed project and will allow Eskom to make an informed decision on the location of the gas treatment plants and various other alternatives (water and gas pipeline). Eskom will also gain an understanding of the range and benefits of implementing possible mitigation measures.

8.4. Geohydrology

The possible sources of contamination or infrastructure that may impact on the groundwater resources include:

- The raw water storage tanks - source of artificial recharge to the groundwater.
- Potable water storage tanks - source of artificial recharge to the groundwater.
- The wastewater treatment plant.
- The sewage plant and dams – seepage or irrigation of effluent may impact on groundwater.
- Treated (demineralised) water system – resultant wet waste brine may impact on groundwater.
- Recovery (dirty water) dams – overflow, seepage, or irrigation may impact on groundwater.
- Fuel oil and stored chemicals - oil/chemicals enters water and requires treatment
- Solid waste site - source of leachate or poor quality water.
- Some sections of the operations plants, e.g. workshops, batching plants, etc.
- Ash from the gasification process.
- The UCG process itself.

The impacts are thus related to potential artificial recharge, causing increased groundwater levels, changes in groundwater flow patterns, and the potential to cause deterioration of groundwater quality with time.

Based on the available data and envisaged impacts on the groundwater resources, the following issues should be taken into consideration:

- The 40MW OCGT power plant and auxiliary infrastructure can potentially impact negatively on the groundwater.
- Where there are groundwater resources, the study will advise on extraction of this water and its impact on the receiving environment, including any wetlands in the area;
- Artificial recharge can increase groundwater levels directly adjacent to the water impoundments associated with power generation. Groundwater levels can become elevated because of infiltration;
- Persistent sources of contaminants can alter the hydrochemistry, causing an increase in dissolved solids and metals. The sources must, therefore, be located within areas where groundwater usage or potential for use is reduced.

8.5. Hydrology

The potential impacts on hydrology include:

- possible flooding;
- possible pollution from station activities;
- increased runoff from disturbed areas and infrastructure;
- generation and transport of domestic and industrial waste;
- water supply demands of environment and other water;

- The volume of groundwater lost during the mining process (in terms of a water use);
- The likely chemistry of the water [void] post mining as it may be contentious to assume it can be leached until equivalent to the pre-mining water quality.
- The possible impacts associated with ground/overburden collapse should this occur, both in terms of yield impacts and future decant points, time to decant and quality of decant. Possible post mining water treatment may need to be considered and budgeted for.
- If the surface is to contain waste (liquid or solid) during or post mining through related activities, then detail on water management of these structures will be required.

8.6. Wetlands

It should be noted that any wetland occurring within the boundaries of the study site is a sensitive feature of the natural environment. This sensitivity must be equally applied to all wetlands, irrespective of their state or functionality. This 'blanket' sensitivity rating applied to all wetlands is based on a number of factors:

- The National Water Act (No 36 of 1998) affords protection to all types of surface water resources, including wetlands. The Act does not discriminate between different types of wetlands or between wetlands in a differing state of degradation.
- In the context of the biological (especially vegetative) assemblages within the study area, wetlands are typically characterised by relatively high levels of biodiversity.
- Watercourses and wetlands are often utilised as movement corridors for biota and as such are very important for the maintenance of ecosystem processes and functioning.

As all wetlands have been characterised as being sensitive, there is a basic distinction that can be made between parts of the study area in which wetlands are located, and those in which no wetlands are located. It should be noted however that areas located outside of the wetland boundaries will form part of the catchment of the wetland. In reality there is typically no distinctive boundary between the wetland and the surrounding non-wetland grassland, and the maintenance of this transition zone is critical for maintaining ecosystem processes that occur within this area. Many types of biota which inhabit wetlands utilise the surrounding areas for foraging, and are not spatially restricted to the wetland.

As such it is critical to maintain a buffer surrounding the wetlands in which no development should be allowed other than linear infrastructure, where necessary). In the case of the proposed project, a buffer of 150m is proposed, to allow sufficient area beyond the boundary of the wetland to be preserved, and taking into account the relatively low degree of transformation associated with the gas field. Figure 7.9 (Chapter 7) indicates the presence of buffers around wetlands in the study area but it must be noted that these wetland delineations are preliminary and will need to be refined during the EIA phase.

8.6.1. Generic Potential Impacts

If the plant and associated infrastructure is located within a wetland, then the assumption has been made that the wetland is likely to be completely transformed, resulting in the complete loss of wetland habitat as well as functionality of the affected part of the wetland (and possibly the functionality of the downstream portion of the wetland). Wetland functionality can be divided up into a number of components including ecological value, hydrological functioning, water quality enhancement and socio-economic functionality, amongst others. All of these functions are intrinsically related to, and are dependent upon the physical components of the wetland, including the soils and vegetation contained within the wetland as well as other biotic components that are adapted to life within wetlands. The presence of these biotic components is in turn closely related to the nature of the hydrology of the wetland, which in the hydro-geomorphic forms found in the study area is characterised by the retention of, and diffuse flow of water through the wetland in the case of valley bottom wetlands, or the interface with groundwater (discharge) in the case of hillslope seepage wetlands.

The combination of the hydrology, hydromorphology and biota (especially vegetation) within the wetland allow certain chemical and ecological processes to occur that provide much of the wetland's functionality. If the physical characteristics of the wetland are transformed, or destroyed, the hydrology, hydromorphology and ecological assemblages within the wetland will typically be altered. The resulting impact is the loss/destruction of functionality and value of the wetland. If a development is built upon a wetland, the loss and destruction of the wetland and associated impact on functionality is often complete and irreversible. It has been assumed that this level of impact will result in the case of the proposed development if plant infrastructure is located within wetlands. However Eskom has indicated that mining infrastructure will not be located within wetlands, and it appears likely that the same consideration for the locating of the plant and infrastructure will be applied; in this event the plant and associated infrastructure would not physically impact wetlands.

Eskom Generation has indicated that there would be no discharges of water or wastewater from the plant and associated infrastructure. For this reason the plant would be highly unlikely to cause the pollution of any surface water resource through direct discharge of wastewater. In the event of the accidental discharge of polluted water from the plant into the surrounding environment, the proximity of the plant/infrastructure to a potential surface water receptor is proportionate to the risk of the pollution of the surface water resource.

8.6.2. Site-specific Impacts

It is understood that the proposed 40MW electrical open cycle gas turbine (OCGT) plant is planned to be constructed in an area on the site already cleared under the auspices of a prospecting license issued by the former Department of Minerals and Energy for the UCG project, which included consent for the construction of a 28MW plant.

During the scoping-phase site visit conducted early in 2009, this area was visited. There did not appear to be any wetlands in the immediate vicinity of the cleared area, although this has not been confirmed through in-field wetland delineation.

The cleared area exists in fairly close proximity to a number of wetlands as identified by the desktop delineation, including a valley bottom wetland to the west and two hillslope seepage wetlands to the north and south respectively. At the closest point, the 'cleared area' is estimated to be located no more than 200m away from these wetlands, especially those to the south and the west. Should the footprint of the plant increase in size beyond the cleared area, the plant and associated infrastructure would be likely to be located closer to the surrounding wetlands. This aspect will need to be further investigated during the EIA phase of the study through investigation of the proposed layout.

The impacts of linear associated infrastructure, such as roads, the proposed 88kV power lines, and the water pipeline, will need to be further assessed in the EIA phase study once the alignments of these are made available.

8.6.3. Construction-related Impacts

- ***General construction related impacts***
  The construction of the proposed plant and associated infrastructure would be a large construction operation and a number of potential impacts of surface water resources typically associated with construction of large infrastructure may result. The most important of these potential impacts relate to:
  - A lack of poor stormwater controls being put in place on the construction site. This may result in the creation of runoff containing pollutants such as cement and oils being transported by stormwater runoff into nearby drainage systems.
  - The dumping of construction material, including fill or excavated material into, or close to surface water features that may then be washed into these features.
  - Spills of hazardous materials, especially oils and other hydrocarbons that may be washed into, or infiltrate nearby surface water features.
  - The conducting of certain construction-related activities (such as cement batching) too close to surface water features or without the implementation of certain controls that may lead to the direct or indirect pollution of the surface water feature.
  - The lack of provision of ablutions that may lead to the conducting of 'informal ablutions' within or close to a surface water feature that may lead to its pollution by faecal contaminants.

  Most of these and other potential construction-related impacts can be minimised or adequately mitigated by controlling construction activities on the basis of an appropriately designed Environmental Management Plan (EMP). As mentioned above, the relative proximity of the construction activities to surface water features is an important factor in the degree of risk of these construction-related impacts occurring.

These construction-related impacts apply to all associated infrastructure discussed below.

- ***Impacts related to mining areas***
  The impacts related to the setting-up of mining areas are similar to the general construction impacts discussed above. As stated above, mining areas will not be located within wetlands or their buffers and as such should have a minimal impact on wetlands, with the buffer acting to protect the wetland against any discharges or sedimentation from erosion that may develop. Access roads may need to be constructed through wetlands to link new mining areas with the exiting road infrastructure.

- ***Impacts related to pipelines***
  It is not known whether the gas and water pipelines as proposed in the project scope will be buried or located above ground. If these pipelines are buried, it is likely that they will have to be routed through wetlands. If the pipelines are placed above ground, they may still affect wetlands, as they would need to cross the wetlands and the support structures for the pipeline may need to be placed within the wetland. The potential impacts discussed below relate mainly to underground pipelines.

  Owing to the nature of construction of pipelines, which normally would involve the excavation of a trench in order for the pipeline to be placed underground, the most important potential impact of the proposed pipelines if buried on wetlands, relates to the disturbance and erosion of wetland soils. The laying of the pipeline (through the trenching method, if used) would entail the disturbance and removal of wetland vegetation, and the excavation of soils within the wetland. Water is an erosive force, and the exposed soils could be eroded, especially in the permanently wet parts of the wetlands where above ground or underground flow/seepage of water through the wetland would naturally occur. If the flow of water and seepage out of the wetland soils was not controlled, this could initiate a 'knickpoint' which may lead to development of gulley (donga) erosion into the upstream part of the wetland. Any eroded material would be deposited in the downstream portion, potentially causing sedimentation in that part of the wetland which may smother the existing vegetation, and leading to further impacts on this part of the wetland.

  Other potential impacts relating to the construction of pipelines through wetlands include:
  - the pollution of water within the wetland, through construction activities;
  - the incorrect re-instatement of wetland vegetation that may result in the exposing and erosion of wetland soils; and
  - the compaction of wetland soils through the use of machinery in the wetland.

  All wetland/river crossings would need to be licensed under Section 21 of the National Water Act (36 of 1998).

- ***Impacts related to access roads***
  Access roads, like pipelines may also need to cross wetlands, especially those roads that may need to be built to link new mining areas with the existing road infrastructure. The potential impacts of access roads on wetlands are similar to the impacts associated with pipelines, but the primary potential impacts on wetlands are the physical disturbance of wetland soils and vegetation by construction activities that may lead to erosion of wetland soils.

- ***Impacts related to power lines***
  Power lines are not typically associated with impacts on surface water resources, as the lines would not have a physical footprint over the length of the line other than the footprint of the each tower position. As the lines are strung above the ground and the towers spaced at a certain distance apart, most wetlands and rivers are able to be 'spanned' by the lines and thus avoid being physically affected. Power lines can however be associated with impacts on surface water resources if the towers are placed within a river or wetland. The process of constructing the power lines can also cause impacts on surface water resources, especially if certain mitigation measures and procedures are not followed.

  Towers or electricity pylons are typically large structures with strong foundations. The process of excavating to construct the foundations would disturb the substrate and entail the removal of soil and vegetation from parts of the footprint, as well as the potential damage to vegetation due to the movement of construction machinery. If towers are constructed within a wetland or other surface water feature, this activity could potentially adversely affect the soil and vegetation through the compaction of soils, the trampling/smothering of vegetation and the resultant exposure of soils that could result in their desiccation. The presence of concrete, as well as machinery which may leak fuel into the surface water body could result in the introduction of pollutants into the surface water resource. The movement of heavy construction machinery into and through the surface water feature could result in the compaction of soils and the alteration of the sub-surface hydrology by creating conduits for the movement of water in the wetland. The placing and construction of a tower in a wetland would also require a licence under one of the specified water uses under Section 21 of the National Water Act: (i) altering the bed, banks, course or characteristics of a watercourse.

  Even if towers are not placed in a surface water resource, the process of constructing the power lines could potentially impact surface water resources. A number of activities, especially those relating to the access of construction vehicles along the alignment of the power lines being constructed can result in damage to and impacts on surface water resources. Construction vehicles and machinery that move along the alignment of a power line during construction would need to cross wetlands. Access across these surface water resources may need to be constructed should existing access for vehicles not exist.

The potential impacts related to power line construction on surface water features are similar to the generic construction-related impacts discussed above as well as the following impacts relating to road construction:

- Inadequate stormwater management and soil stabilisation measures in cleared areas could lead to erosion that may lead to siltation of nearby wetlands.
- The placing and use of access roads for construction traffic across wetlands may lead to the erosion of banks and disturbance of wetland vegetation that may trigger the further development of gulley (donga) erosion.
- Construction of access across wetlands may impede the natural flow of water (especially if access is required across running water). This would alter the hydrology of the wetland and potentially act as a barrier to the movement of aquatic biota. Uncontrolled access of vehicles through wetlands can cause a significant adverse impact on the hydrology and soil structure of these areas through rutting which can act as flow conduits and through the compaction of soils.

8.6.4. Operation-related Impacts

- ***Impacts related to mining areas***

  As discussed above, mining areas will not be located within wetlands or their buffers and as such should have a minimal impact on wetlands, with the buffer acting to protect the wetland against any potential pollutants that may emanate from the above-ground mining operations.

  It must be noted that without surface access to underground coal resources, the coal cannot be mined with UCG. The imposition of surface restriction zones therefore, by implication, eliminates risk of subsidence under these areas.

- ***Impacts related to pipelines***

  As discussed above, impacts related to pipelines in the operational phase of the project could be manifested as a result of poor construction techniques, or poor pipeline design that may result in permanent impacts on the wetland through which the pipeline runs. Poor rehabilitation of wetland vegetation may result in an impact on the vegetative composition of the wetland post-construction. The creation of preferential drainage through the pipeline trench, thus affecting the hydrology of the wetland, may also result if the pipeline trench is filled with more easily draining material than the wetland substrate.

- ***Impacts related to access roads***

  The primary potential impacts on wetlands related to roads in the operational phase of the life of the proposed development are:

  - The alteration of the hydrology and hydromorphology of the wetland due to the placing of the road in the wetland; if too few culverts are placed under the road, the road will act as an impoundment.
  - The introduction of pollutants and other toxicants into the wetland from stormwater off the road that carries fuel/oil spilt onto the road surface.

- The poor maintenance of the road, both in the catchment of the wetland, which could introduce sediments into the wetland through stormwater wash-off of eroded material, or within the wetland, which could lead to erosion of the wetland in the vicinity of the road.

- ***Impacts associated with polluted runoff water***
  Runoff water, including stormwater that may be polluted could run off the site and into nearby drainage lines. This applies especially to runoff water from any areas in which fuel or hydrocarbons are stored, other wastewater storage areas, or from sewage treatment areas. If this polluted runoff were to reach and infiltrate any nearby wetland it could result in a degradation of water quality and the pollution of downstream parts of the drainage system and even groundwater. This scenario would apply especially in the case of an accidental spillage or failure of lined storage dams causing seepage into the ground from the dam.

  The level of potential risk would be dependent upon the proximity of the plant to surface water resources, the interaction between groundwater and surface water features (i.e. whether there were any areas of groundwater discharge) and the nature and level of mitigation measures instituted at the plant. It is however expected that design and maintenance controls that could be implemented at the plant would be able to significantly limit the risk of this type of impact from occurring.

- ***Water treatment infrastructure***
  The water treatment infrastructure associated with the plant may result in the discharge of 'grey' water into nearby drainage systems. Should treated water need to be discharged into nearby drainage systems, this may alter the hydrology and hydromorpholgy of the drainage line if the discharge was permanent. However in line with Eskom's no discharge policy, no water is expected to be discharged from the plant and associated infrastructure into the adjacent environment from water treatment infrastructure.

- ***Impacts related to power lines***
  Impacts on water resources may result during the operational phase of the power line through poor operational and servitude management practices. These would relate mainly to residual impacts that arose during the construction phase, as well as due to the incorrect rehabilitation of construction-related access. Certain operational activities such as the clearing of the servitude through the use of herbicides may also pollute nearby watercourses if not properly undertaken. Operational access for vehicles to inspect the servitude and lines may impact watercourses and other wetlands if existing access roads/routes are not utilised.

8.6.5. Decommissioning Impacts

The potential impacts on wetlands related to the decommissioning of the plant and proposed infrastructure are similar in many aspects to construction-related impacts, if infrastructure such as buildings is physically removed.

As the plant would contain materials which could potentially act as pollutants to surface water resources, the proper post-operation rehabilitation and removal of any material that could cause pollution of water resources through seepage or stormwater runoff is important. Should this not be undertaken, or improperly undertaken, a residual impact related to the plant and its infrastructure such as fuel/hydrocarbon storage tanks or wastewater storage dams on surface water resources could result. The risk of this impact depends on the proximity of infrastructure to surface water receptors, and to links between groundwater and surface water resources in the case of seepage of pollutants into the ground that may pollute groundwater.

Decommissioning of mining areas after the 5-year operational life of the particular mining area could result in 'knock-on' impacts on wetlands, if the decommissioning of these mining areas is not properly undertaken. These mining areas would not be located within wetlands or their associated buffers; however any residual impacts of mining activities such as development of soil erosion or improperly maintained roads may result in secondary impacts on nearby wetlands through the extension of erosion into the wetland or deposition of silt into the wetlands. Similarly any potential pollutants such as fuels/hydrocarbons left within the mining footprint may cause pollution of surface water resources through stormwater runoff. The risk of decommissioning residual impacts on wetlands is minimised the further away mining areas are located from wetlands.

8.7. Soils and Agricultural Potential

The interpretation of the land use, land capability and reconnaissance soil survey results yielded a number of aspects that are of importance to the project.

8.7.1. Agricultural Potential

The agricultural potential of the site varies due to soils conditions. Large areas are covered by shallow soils that are of low potential. The higher potential soils have to a large extent already been tilled and are currently being used for dryland agriculture. The potential of the areas under crop production varies from low to high due to a range of soil conditions. In many cases these soils are structured and of high clay content but of limited depth. The main land use is grazing and it is also this land use that is considered to be the most viable for the bulk of the area.

8.7.2. Overall Soil Impacts

The overall impacts on the soil of the site due to the proposed project are not significant; however, impacts associated with the mining activities on the core farms are significant.

Due to the dominantly low agricultural potential of the site, the broader significance of these impacts is not considered to be significant and impacts will therefore be localised to the immediate site.

8.8. Biodiversity

The following impacts/issues were identified that could affect the biodiversity of the study area adversely:

- Potential impacts on the local and regional biodiversity;
- Potential impacts on sensitive/pristine habitat types;
- Potential impacts on threatened/protected species and habitat;
- Potential impacts on surrounding habitat and species; and
- Potential impacts on fauna species.

Impacts of a cumulative nature include:

- Potential increase in habitat transformation (e.g. loss of habitat);
- Potential increase in habitat fragmentation (e.g. loss of migratory routes); and
- Potential increase in environmental degradation (e.g. loss of habitat quality).

Direct impacts, such as physical habitat destruction and modifications, are regarded immediate, long-term and of high significance. These are the impacts that will be addressed in this scoping assessment as well as the subsequent EIA studies, since they are measurable and the immediate impact thereof can be determined to an acceptable level of certainty.

However, more subtle impacts on biological components, such as effects of aerial pollutants on flora and fauna species, increase in aerial borne dust, changes in local, regional and global climate, effects of noise pollution on fauna species, effects of electro- magnetic fields (EMF) on fauna species, acid rain and groundwater deterioration are impacts that cannot be quantified to an acceptable level of certainty and is mostly subjective in nature, as very little applicable literature is available. However, these impacts are interrelated to abovementioned impacts.

8.8.1. Direct Impact - Potential Impacts on Local and Regional Biodiversity

The transformation of grassland habitat during the construction process will inevitably result in the establishment of habitat types that are not considered representative of the region. As a result of the severity of transformation, surrounding areas are frequently invaded by species not normally associated with the region.

If left unmitigated, this risk will result in decreased habitat, increased competition and lower numbers of endemic biota, the genetic pool of species might eventually be influenced by the introduction of non-endemic species. Different faunal assemblages have developed separate gene structures as a result of habitat selection and geographical separation and the introduction of animals of the same species that might be genetically dissimilar to the endemic species might lead to different genetic selection structures, eventually affecting the genetic structure of current populations.

8.8.2. Direct Impact - Potential Impacts on Sensitive/Pristine Habitat Types

Large portions of the study area comprise natural grassland habitat that is regarded moderately pristine, representing the Soweto Highveld Grassland. The conservation

status is regarded as Endangered. Extensive parts of this vegetation type were once cultivated and now lie fallow and have been left to re-vegetate with pioneer grass species. These transformed areas are not picked up by satellite for transformation coverage and the percentage of grasslands still in a natural state may be underestimated. The loss of pristine natural regional habitat represents loss of habitat and biodiversity on a regional scale. This impact is regarded permanent.

Sensitive habitat types include ridges, koppies, wetlands, rivers, streams and localised habitat types of significant physiognomic variation and unique species composition. These areas represent centres of atypical habitat and contain biological attributes that are not frequently encountered in the greater surrounds. A high conservation value is attributed to the floristic communities and faunal assemblages of these areas as they contribute significantly to the biodiversity of a region. Furthermore, these habitat types are generally isolated and are frequently linear in nature, such as rivers and ridges. Any impact that disrupts this continuous linear nature will risk fragmentation and isolation of existing ecological units, affecting the migration potential of some fauna species adversely, pollinator species in particular.

8.8.3. Direct Impact - Potential Destruction of Threatened and Protected Species Habitat

The loss of Red Data or Threatened species or areas that are suitable for these species is a significant impact on the biodiversity of a region. Threatened species, in most cases, do not contribute significantly to the biodiversity of an area in terms of sheer numbers as there are generally few of them, but they are extremely important in terms of the biodiversity of an area and high ecological value is placed on the presence of such species in an area. Threatened species are particularly sensitive to changes in their environment, having adapted to specific habitat requirements. Habitat changes, mostly a result of human interferences and activities, are one of the greatest reasons for these species having a threatened status.

The level of transformation on a local and regional scale is not clearly understood at this stage and areas where similar activities are practiced will be investigated during the EIA phase of the project in order to assess the levels of changes to particularly the floristic component and structure. At this stage it will suffice to state that any level of surface transformation within all habitat types of medium or higher ecological sensitivity is significant. Habitat types of particular importance include natural grasslands (Soweto Highveld Grassland), ridges and wetland related habitat types. Effects of this impact are usually permanent and recovery or mitigation is generally not perceived as possible.

It should be noted that the estimated presence of Red Data flora and fauna species for the area is regarded highly likely, particularly in the wetland habitat types. Impacts on potential communities of Red Data species are therefore regarded likely to happen.

8.8.4. Direct Impact - Impacts on Surrounding Natural Habitat and Species

Surrounding areas and species present in the direct vicinity of the study area could be affected by impacts resulting from construction and maintenance activities. These impacts could include all of the above impacts, depending on the sensitivity and status of surrounding habitat and species as well as the extent of impact activities.

8.8.5. Direct Impact - Impacts on Fauna Species

It should be noted that animals generally avoid contact with human structures, but do grow accustomed to structures after a period. However, the interaction of animals with the construction and operational areas cannot be avoided entirely and due care must be taken to avoid accidental injuries and death.

Of greater concern is the contact between wild animals and personnel that will be employed for the proposed development. Contact between animals, particularly reptiles and scorpions might lead to injuries and death of personnel, while human activities such as littering, poaching, vehicular accidents, illegal collection, etc. will have an adverse impact on some of the smaller fauna species. Some impacts of this nature are expected to occur, but can be avoided through mitigation.

8.8.6. Cumulative Impact - Potential increase in habitat transformation

The development of any industry in a natural environment that is largely characterised by habitat of untransformed status can generally be described as ‘the thin end of the wedge’, implying that subsequent developments will not be viewed as similarly important since areas of existing transformation already exists in the region.

The loss of natural habitat, even small areas, implies that biological attributes have permanently lost that ability of occupying that space, effectively meaning that a higher premium is placed on available food, water and habitat resources. This, in some instances might mean that the viable population of plants or animals in a region will decrease proportionally with the loss of habitat, eventually decreasing beyond a viable population size.

The danger in cumulative impacts is that effects are not known, or is not visible; with immediate effect and normally, when these effects become visible they are beyond repair.

8.8.7. Cumulative Impact - Potential increase in habitat fragmentation

Uninterrupted habitat is a precious commodity for biological attributes in modern times, particularly in areas that are characterised by moderate and high levels of transformation. Similar to the regional loss due to habitat transformation, a new development of this nature in a largely untransformed area can be seen as the ‘thin end of the wedge’.

However, nodal developments do not have the same effect on fragmentation of habitat as linear structures that are associated with developments. These types of developments generally include roads, pipelines, conveyor belts, transmission and distribution lines, etc., affecting the migratory success of animals in particular.

8.8.8. Potential increase in environmental degradation

Impacts associated with this type of development that will lead to initial, incremental or augmentation of existing types of environmental degradation, include impacts on the air, soil and water present within available habitat. Pollution of these elements might not always be immediately visible or readily quantifiable, but incremental or fractional increases might rise to levels where biological attributes could be affected adversely on a local or regional scale. In most cases these effects are not bound and is dispersed, or diluted over an area that is much larger than the actual footprint of the causal factor.

Similarly, developments in untransformed and pristine areas are usually not characterised by visibly significant environmental degradation and these impacts are usually most prevalent in areas where continuous and long-term impacts have been experienced.

9. POTENTIAL ENVIRONMENTAL IMPACT – SOCIAL ENVIRONMENT

9.1. Baseline Social Assessment

For the purposes of this Scoping study, the impact variables were categorised in terms of change processes as described below. A change process can be defined as change that takes place within the receiving environment as a result of a direct or indirect intervention. A potential impact follows as a result of the change process. However, a change process can only result in an impact once it is experienced as such by an individual/community on a physical and/or cognitive level.

The categories of processes are as follows:

- Geographical Processes: the land use pattern within the (affected) area;
- Demographical Processes: the number and composition of the local population;
- Empowerment and Institutional Processes: people's ability to become actively involved and influence the decision-making process, and also the efficiency and operation of local authorities and other significant organisations; and
- Socio-Cultural Processes: the way in which humans interact and relate to each other within the context of their environment, and how this interaction is guided by value systems.

9.1.1. Geographical Change Processes

The construction and maintenance of the proposed OCGT demonstration plant and associated infrastructure might lead to a change in the land use within the local area. The assessment of a land use change process from a social perspective takes into account how the proposed OCGT plant and associated infrastructure, such as pipelines, might affect the behaviour/lives of land owners and/or land users.

Figure 9.1 below depicts the landownership within the study area. Eskom owns the majority of the farm Roodekopjes 67 HS, which is the area that has been earmarked for the proposed OCGT demonstration plant. The Majuba Power Station is also to a large extent located on this farm (and on the neighbouring Witkoppies 81 HS farm). Households, together with their livestock, who resided on Roodekopjes have either already been relocated or are in the process of being relocated. Land use change has therefore already been taking place on the farm Roodekopjes and other Eskom property (Portion 7 of the Farm Palmietspruit 68 HS and Portion 11 of the farm Rietfontein 66 HS). It is therefore not foreseen that the land use change on these properties would bear any significant impact on land users as far as these farm portions are concerned. Land use change would have an effect where associated infrastructure (e.g. the gas treatment plant and pipelines) would either be located on or cross privately owned neighbouring land.

At the time of printing Bohlweki-SSI Environmental was notified that the farm Klein Rietfontein 117HS has also been bought by Eskom.

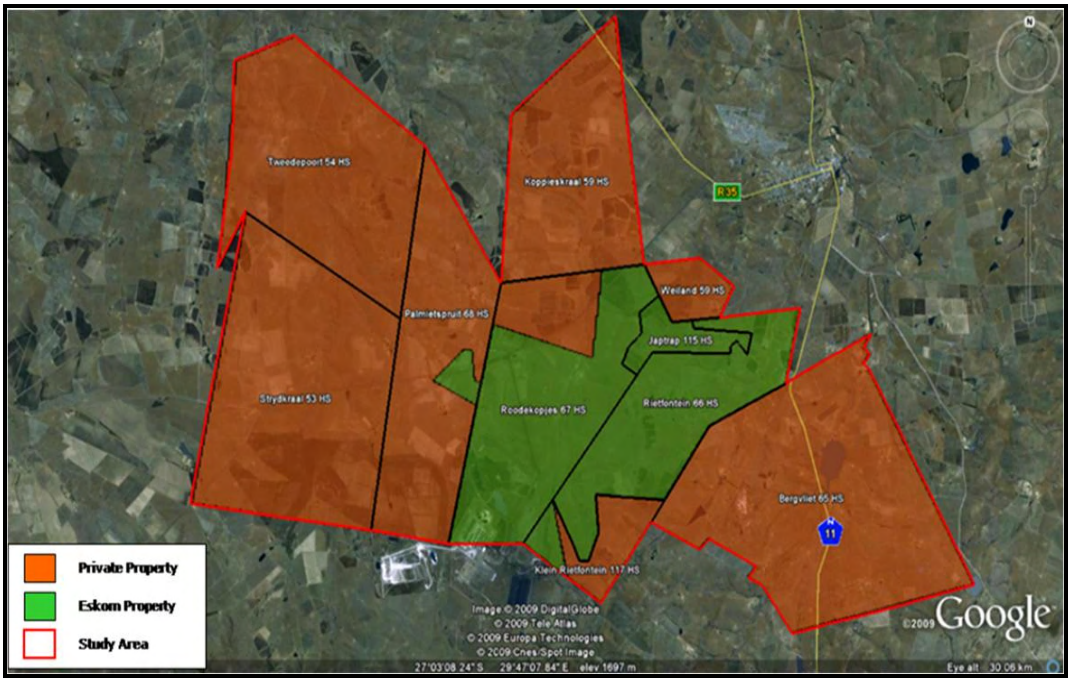

Figure 9.1: Land ownership within the study area

Table 9.1 below provides an overview of the expected change process as well as the expected impacts that might occur as a result of the change process taking place. These potential impacts will be assessed in detail during the Impact Assessment phase.

Table 9.1: Overview of expected geographical change processes and potential impacts

GEOGRAPHICAL CHANGE PROCESSES						
Expected Change Process		**Yes**	**No**	**Expected Impact**	**Project Phase**	**Status**
Access to environmental resources	Will the development impact on people's access to environmental resources, such as water, wood, medicinal plants etc?		X	No impact foreseen.	n/a	n/a
Change in access to resources that sustain livelihoods	Will the development impact on people's (legal or illegal, formal or informal) access to environmental resources that help to sustain their livelihoods, e.g. grazing land for their cattle; wood for heat/cooking/selling, etc.?	X		No impact foreseen on the farm Roodekopjes (Eskom property). A temporary loss of cultivated and grazing land due to construction activities can be expected on neighbouring farms if associated infrastructure such as pipelines cross these farms. Also permanent loss of cultivated and grazing land through the land acquisition process for pipeline servitude.	Construction and Operation	Negative
Land acquisition and disposal, including availability of land	Will the development contribute to or directly impact on the ability of local residents to keep or acquire property/land?		X	No impact foreseen – the majority of the farm Roodekopjes belongs to Eskom.	n/a	n/a
	Will the development set a precedent	X		Eskom will extend the programme to develop a fully operational plant	Operation	Negative to

GEOGRAPHICAL CHANGE PROCESSES						
Expected Change Process		**Yes**	**No**	**Expected Impact**	**Project Phase**	**Status**
	for change in land use in the area?			(2100MW CCGT). In such a case, the presence of an OCGT plant and its associated infrastructure might prohibit future developments encroaching upon the plant footprint or pipeline servitudes, which means that land is lost for development and mining will be extended over these areas.		Neutral

9.1.2. Demographical Change Processes

The construction and maintenance of the proposed OCGT demonstration plant and associated infrastructure could lead to a change in the number and composition of the population within the affected local areas, which in turn could lead to economic, land use, and socio-cultural change processes.

Table 9.2 provides an overview of the expected demographical change processes to occur as well as the expected impacts that might occur as a result of these change processes taking place. The potential impact(s) that follow from a particular change process taking place will be assessed in detail during the Impact Assessment phase.

9.1.3. Empowerment and Institutional Change Processes

The EIA process is an opportunity for stakeholders to give input into the process and project. However, stakeholders would have to offer up their time to become actively involved in the process and they should clearly understand their rights in terms of the process to enable them to use these rights to influence the process. Furthermore, most notably during construction, the proposed project would most probably utilise local municipal services such as electricity, sanitation, water and refuse services. If these services are not available, or not sufficient, this in turn could impact on communities in terms of health and safety.

Table 9.3 below provides an overview of the expected institutional and empowerment change processes as well as the expected impacts that might occur as a result of the change processes taking place. These potential impacts will be assessed in detail during the Impact Assessment phase.

Table 9.2: Overview of expected demographic change processes and potential impacts

DEMOGRAPHICAL CHANGE PROCESSES						
Expected Change Process		**Yes**	**No**	**Expected Impact**	**Project Phase**	**Status**
Population change	Will the development lead to an increase in numbers of a certain section of the population, e.g. migratory workers?	X		Influx of construction workers that could lead to a change in the number and composition of the local community, and impact on economy, health, safety and social well-being.	Construction	Negative to Neutral
In-migration of unemployed work seekers	Will the development intentionally or unintentionally contribute to the in-migration of work seekers into the area?	X		Influx of job seekers that will lead to a change in the number and composition of the local community, and impact on economy, health, safety and social well-being.	Construction and possibly Operation	Negative
Relocation or displacement of individuals or families	Will the development at this or future stages lead to the relocation of residents?	X		Residents who are affected have already been relocated or are in the process of being relocated.	Pre-construction	Mitigated

Table 9.3: Overview of expected empowerment and institutional change processes and potential impacts

INSTITUTIONAL AND EMPOWERMENT CHANGE PROCESSES						
Expected Change Process		**Yes**	**No**	**Expected Impact**	**Project Phase**	**Status**
Change in/disruption of power relationships	Will the development impact on the levels of power, opportunity and access of individuals or sections of the community, e.g. during the negotiation process?		X	No impact foreseen.	n/a	n/a
	Is the development being used for the political gain of a section of the community, and what are the implications for the larger social environment?		X	No impact foreseen.	n/a	n/a
Exclusivity	Will the development contribute to the culture of exclusivity?		X	No impact foreseen.	n/a	n/a
Inequality	Will the development increase unequal access to opportunities or resources?		X	No impact foreseen.	n/a	n/a
Change in community infrastructure	Will the development change any aspect of community infrastructure, such as crèches, clinics, schools, churches, formal or informal sports fields, open areas, dumping grounds etc?		X	No impact foreseen.	n/a	n/a
	Will the development create increased demand for basic services, e.g. water, electricity,	X		Additional demand on municipal services, such as water, electricity, and sewerage could impact on health	Construction	Negative

INSTITUTIONAL AND EMPOWERMENT CHANGE PROCESSES						
Expected Change Process		**Yes**	**No**	**Expected Impact**	**Project Phase**	**Status**
	sewerage, roads?			and safety if such services are not available.		
	Will the existing access of the community to free basic services be impacted by the development?		X	No impact foreseen.	n/a	n/a
Change in housing needs/demands	Will the development create a housing need, e.g. due to the in-migration of construction workers?	X		It is possible that the majority of the construction workforce would be sourced from within the area due to the skills levels required. The specialised workforce would likely be sourced from outside the area and would most probably be housed within neighbouring towns or a construction village.	Construction	Negative to neutral
	Has the need for more housing been addressed by the development and or the authorities?					

9.1.4. Socio-cultural Change Processes

Socio-cultural change processes that are associated with the construction and operation of the proposed project include changes such as health and safety aspects and sense of place. The concept of 'health' is not only limited to physical health (i.e. the absence of ailments or illness), but also includes mental and social health. The expected changes that can occur in relation to health and safety aspects can be as a result of the presence of the proposed OCGT demonstration plant and associated infrastructure (such as elevated, above ground pipelines) during operation, as well as the presence of construction workers and/or job seekers during construction.

Table 9.4 below provides an overview of the expected change process as well as the expected impacts that might occur as a result of the change process taking place. These potential impacts will be assessed in detail during the Impact Assessment phase.

Table 9.4: Overview of expected socio-cultural change processes and potential impacts

SOCIO-CULTURAL CHANGE PROCESSES						
Expected Change Process		**Yes**	**No**	**Expected Impact**	**Project Phase**	**Status**
Disruption of social networks	Will the development impact on existing social networks?		X	No impact foreseen.	n/a	n/a
Disruption in daily living and movement patterns	Will the development change the lifestyle of residents?		X	No impact foreseen.	n/a	n/a
	Will the development impact on access to facilities and resources, such as schools, hospitals, fields, forests, etc?		X	No impact foreseen.	n/a	n/a
	Will it impact on movement patterns, such as pedestrians crossing roads?		X	No impact foreseen.	n/a	n/a
	Will it divide communities physically (e.g. through the building of a highway)?		X	No impact foreseen.	n/a	n/a
Dissimilarity in social practices	Do new residents have dissimilar social practices to current residents?	Unsure		If construction workers have dissimilar social practices than local residents, conflict can be expected.	Construction	Negative
	Do the new residents have different values, religious practices, social standard, etc?					
Alteration in family structure	Could the development threaten family cohesiveness?	X		Socially acceptable integration, including the risk of spreading STIs and HIV/AIDS with an impact on	Construction	Negative
	Could it impact on immediate or extended family networks?	X				

SOCIO-CULTURAL CHANGE PROCESSES						
Expected Change Process		**Yes**	**No**	**Expected Impact**	**Project Phase**	**Status**
	Could it impact on the traditional roles played by members of the family?	X		health. Apart from the obvious health implications, HIV infection in particular also has an economic impact as well as impacts on family structures in terms of roles and responsibilities.		
Conflict	Will the development lead to conflict between sectors of the social environment?	Unsure		If social integration between newcomers and residents is hindered, it can lead to conflict, which in turn delays the construction process and has economic implications for the developer.	Construction	Negative
	Is there conflict between the developer and the public?	Unsure		Where conflict exists, it increases the risk for social mobilisation, with resultant delays on the project and an economic impact on both the project proponent and project opponent.	Pre-construction and construction	Negative
	Is this conflict being addressed?					
Safety and crime impacts	Will the development impact on existing crime and safety patterns?	X		Presence of construction workers and job seekers leads people to believe that	Construction	Negative

SOCIO-CULTURAL CHANGE PROCESSES						
Expected Change Process		**Yes**	**No**	**Expected Impact**	**Project Phase**	**Status**
				there will be an increase in crime, which impacts on surrounding landowners' sense of safety and security.		
Change in sense of place	Will the development impact on people's "sense of place", e.g. through the large scale development of a rural community?	Possible		Although the demonstration plant will be located on Eskom property and within an area with similar developments, it is surrounded by farmlands and different land uses.	Construction and Operation	Negative
	Will the change "in sense of place" impact on people's relationship to the environment?					
Implications for social history	Does the development have any implications for the social history of affected communities?		X	No impact foreseen.	n/a	n/a

9.2. Air Quality

9.2.1. Construction Phase

Construction is usually temporary in nature and consists of a series of actions of known duration and extent. Thus dust emissions generated at a construction site have a definite beginning and end and will vary substantially over the period of construction. The quantity of dust emissions from construction activities is proportional to the area of land being worked, the level of construction activity and the prevailing meteorological conditions[8].

The following possible sources of fugitive dust and particulate emissions were identified as activities which could potentially generate air pollution during construction operations:

1. Demolition and debris removal
    a. Demolition of obstacles such as boulders, trees, etc.
    b. Loading of debris into trucks
    c. Truck transport of debris
    d. Truck unloading of debris
2. Site preparation (earthworks)
    a. Bulldozing
    b. Scrapers unloading topsoil
    c. Scrapers in travel
    d. Scrapers removing topsoil
    e. Loading of excavated material into trucks
    f. Truck dumping of fill material, road base, or other materials
    g. Compacting
    h. Motor grading
    i. Excavating
3. General Construction
    a. Vehicular traffic
    b. Portable plants – aggregate processing and
    c. Concrete Mixing

The following components of the environment may be impacted upon during the construction phase:

1. ambient air quality;
2. local residents and neighbouring communities;
3. the aesthetic environment; and
4. fauna and flora

[8] **U.S Environmental Protection Agency, (1996).** Compilation of Air Pollution Emission Factors (AP-42), 6th Edition, Volume 1, as contained in the *AirCHIEF (AIR Clearinghouse for Inventories and Emission Factors) CD-ROM (compact disk read only memory)*, US Environmental Protection Agency, Research Triangle Park, North Carolina. Also available at URL: http://www.epa.gov/ttn/chief/ap42/.

The impact on air quality by fugitive dust is dependent on the quantity and drift potential of the dust particles[9]. Large particles settle out near the source causing a local nuisance problem. Fine particles can be dispersed over much greater distances. Fugitive dust may have significant adverse impacts such as reduced visibility, soiling of buildings and materials, reduced growth and production in vegetation and may affect sensitive industries and aesthetics. The inhalable particulate fraction could however adversely affect human health.

Short-term impacts on the local air quality of a negative nature will occur as a result of construction activities at the proposed Eskom Underground Coal Gasification Plant and associated infrastructure. Impacts are however expected to be more of a nuisance value than a potential health risk. Construction traffic, excavation, earthmoving, and aggregate processing facilities will generate dust. Short-term increases in sulphur oxides, nitrogen oxides, and hydrocarbons from vehicle exhaust will occur, but air quality is not expected to deteriorate significantly over the long-term as a result of construction activities. It is expected that air quality will be poorer during the winter months as a result of temperature inversions common over the region in the colder months and the cumulative effects of pollution caused by the burning of coal and wood in households, and from veld fires common in winter.

Sensitive receptors were identified in close proximity to the site. Considering the prevailing winds has a strong easterly and westerly component, it is predicted that construction activities could potentially impact predominantly on farms and farm houses lying to the east and west of the construction site. Amersfoort and eZamokuhle towns are located approximately 4.7 km north east from the proposed study area and impacts due to construction are therefore anticipated to be low. The communities Vlakplaats and Daggakraal lie approximately 6 km east of the proposed study area, and impacts as a result of construction will vary depending on varying wind speeds experienced during the construction period.

9.2.2. Operational Phase

This section aims to deal with the estimated air quality impacts which result due to the proposed OCGT plant operations. Details regarding the source characteristics were provided from a site layout plan provided

- Gas released from potential storage tanks;
- Gas released from the stacks of the 40MW OCGT as well as from the flare of the UCG pilot plant and safety valves during regular or upset conditions;
- Release of condensate from the processing plant;
- Material transfer operations;
- Wind erosion from exposed storage piles (sand for construction); and
- Vehicle entrained dust from both paved and unpaved road surfaces.

[9] **U.S Environmental Protection Agency, (1996).** Compilation of Air Pollution Emission Factors (AP-42), 6th Edition, Volume 1, as contained in the *AirCHIEF (AIR Clearinghouse for Inventories and Emission Factors) CD-ROM (compact disk read only memory)*, US Environmental Protection Agency, Research Triangle Park, North Carolina. Also available at URL: http://www.epa.gov/ttn/chief/ap42/.

9.2.2.1. Operational Losses from Storage Tanks

Operational and breathing losses are often experienced from storage tanks, particularly when used as buffer tanks, or tanks which are refilled regularly. These emissions are often as a result of refilling when excess air and gas is vented from the tanks.

9.2.2.2. Pressure Release and Upset Conditions

Temperature and pressure changes within the tanks and pipeline can result in gases being vented in order to ensure the safety and integrity of the equipment. This venting is usually during upset or emergency conditions and will not be present under normal operating periods.

9.2.2.3. Condensate Release

Condensate is a classification of all impurities removed from the gas at the initial processing plant. This product contains a wide and varying array of chemicals, many of which are oil and sulphur based, which give a very noticeable odour when released. Condensate, while a waste from the gas purification plant, can be sold as a by-product to companies who can extract various other products.

9.2.2.4. Material Transfer Operation

Materials handling operations refers to the transfer of various raw materials and waste products by means of tipping, loading and off-loading of trucks and conveyor transfer operations. Emission rates calculated using the United States Environmental Protection Agency (USEPA) emission factors for these source types, are dependent on the material moisture content and the wind speed at the time.

9.2.2.5. Wind Erosion from Exposed Storage Piles

Windblown dust (wind erosion) from exposed storage piles can be a significant contributor to particulate emissions on-site, especially when large quantities of material are stored at any given point.

9.2.2.6. Vehicle Entrained Dust from Road Surfaces

The force of the wheels of vehicles travelling on unpaved roadways causes the pulverisation of surface material. Particles are lifted and dropped from the rotating wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface.

The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed. The quantity of dust emissions from unpaved roads varies linearly with the volume of traffic[10].

Also emitted from vehicles are various gaseous emissions from vehicle tailpipes. Exhaust fumes contain nitrogen, oxygen, carbon monoxide, water vapour, sulphur dioxide, nitrogen oxide, volatile hydrocarbons and polyaromatic hydrocarbons (PAHs) and their derivatives, acetylaldehyde, benzene and formaldehyde, carbon particles, sulphates, aldehydes, alkanes, and alkenes.

9.2.3. Decommissioning Phase

The decommissioning phase is associated with activities related to the demolition of infrastructure and the rehabilitation of disturbed areas. The following activities are associated with the decommissioning phase:

- Existing buildings and structures demolished, rubble removed and the area levelled;
- Remaining exposed excavated areas filled and levelled using overburden;
- Topsoil replaced using topsoil recovered from stockpiles; and
- Land and permanent waste piles prepared for re-vegetation.

Possible sources of fugitive dust emission during the closure and post-closure phase include:

- Grading of sites;
- Infrastructure demolition;
- Infrastructure rubble piles;
- Transport and dumping of building rubble;
- Transport and dumping of topsoil; and
- Preparation of soil for re-vegetation – ploughing and addition of fertiliser, compost etc.

Exposed soil is often prone to erosion by water. The erodability of soil depends on the amount of rainfall and its intensity, soil type and structure, slope of the terrain and the amount of vegetation cover[11]. Re-vegetation of exposed areas for long-term dust and water erosion control is commonly used and is the most cost-effective option. Plant roots bind the soil, and vegetation cover breaks the impact of falling raindrops, thus preventing wind and water erosion. Plants used for re-vegetation should be indigenous to the area, hardy, fast-growing, nitrogen-fixing, provide high plant cover, be adapted to growing on exposed and disturbed soil (pioneer plants) and should easily be propagated by seed or cuttings.

[10] **U.S Environmental Protection Agency, (1996).** Compilation of Air Pollution Emission Factors (AP-42), 6th Edition, Volume 1, as contained in the *AirCHIEF (AIR Clearinghouse for Inventories and Emission Factors) CD-ROM (compact disk read only memory)*, US Environmental Protection Agency, Research Triangle Park, North Carolina. Also available at URL: http://www.epa.gov/ttn/chief/ap42/.

[11] **Brady, N.C, (1974).** The Nature and Properties of Soils, Macmillan Publishing Company, New York. p639.

9.3. Visual

9.3.1. Viewshed Analysis

For the purpose of this study photographs of existing and similar developments are included to visualise the nature and the extent of the plant. This is done as a background study to understand possible visual impacts.

A viewshed analysis of the highest structures (35m above ground level) is undertaken by placing two randomly selected points on the plant area. This will indicate the possible extent of visibility from the surrounding area (Figure 9.2).

According to the viewshed analysis interrupted views of the site can be expected along the roads. This might change as the gas field is moved to different locations during the operational phase. This will be studied in more detail in the EIA report.

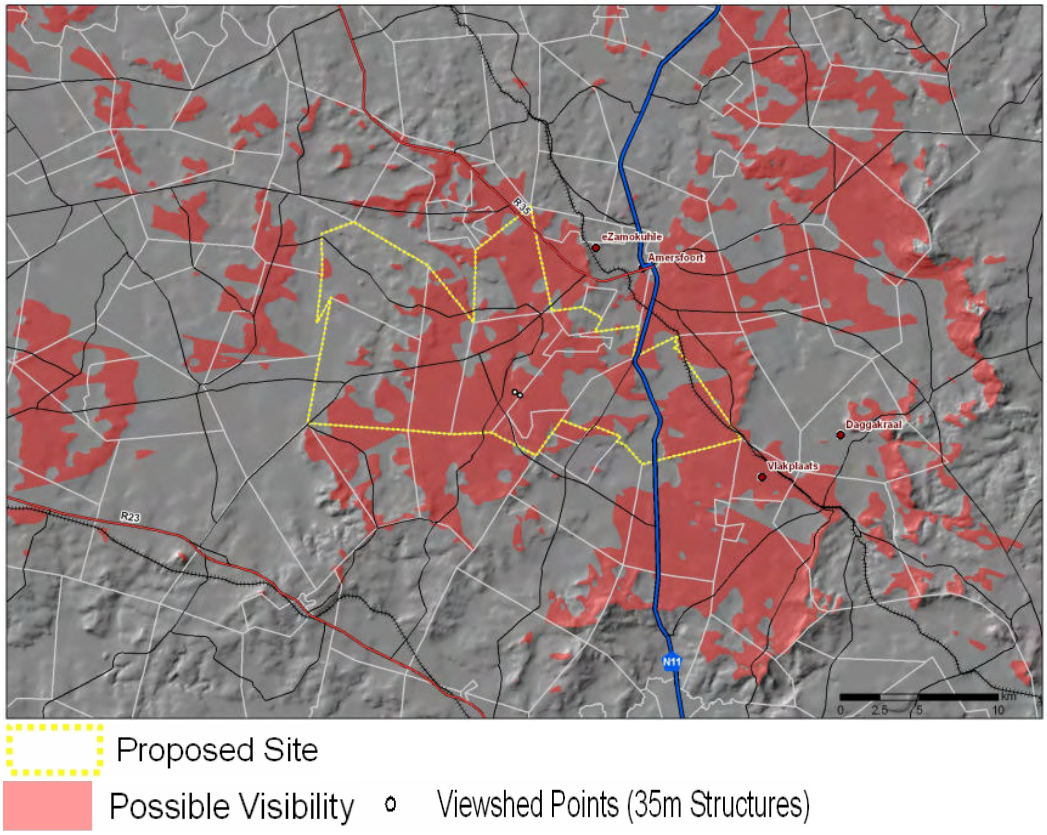

Figure 9.2: Viewshed analysis of two 35m high structures

9.3.2. Gas Fields

The gas field will consist of a network of surface pipes connected to the production wells. As the mining operation moves after fresh coal, these pipes will be moved on surface, while already gasified areas will be stripped of all surface pipe work. This type of operation will uniquely alter the visual appearance of the plant in relation to the surrounding environment with a consequent change of visual impact. This should

be further investigated in the EIA report and more details with regard to the spatial layout and dimensions should be made available for inclusion in the study.
Photograph 9.1 gives an indication of the visual appearance and the spatial extent of a UCG pilot gas field. The low vertical dimensions of the pipes are noted. Vertical intrusion of the horizon is a major factor in creating visual impacts, and in this instance the visual impact is minimised by the low density and relative small dimensions of the pipe work.

According to Photograph 9.1 the gas field displays a relative small footprint. The impact on the surrounding area can be minimised, as is illustrated in the case of Majuba showing that the grass fields are fairly undisturbed.

Photograph 9.1: UCG pilot plant on the farm Roodekopjes

9.3.3. OCGT Demonstration Plant

The 40MW demonstration plant will consist of a single production unit, similar to the example in Photograph 9.2.

The following observations are noted from the Figure 9.3 and the photographs below:

- Total transformation of the OCGT plant area is evident from the aerial view in Figure 9.3. This is to be expected, given all the related infrastructure involved. The level of transformation of the moving gas field and the possible cumulative effects need to be further investigated in the EIA report.
- Where the visual absorption capacity of the area in terms of trees and shrubs is limited, vegetated berms can be effective to screen views of the site, especially at close range (Photograph 9.2). It must be noted that the natural topography of the site is very hilly, and serves as a natural visual screen from many angles.

Figure 9.3: Aerial view of Atlantis OCGT (footprint 56 ha)

Photograph 9.2: Close views of the OCGT plant in Atlantis

9.3.4. Night Lighting

The effect of night lighting has not been addressed during this phase of the project. More detailed information with regard to lighting sources needs to be obtained for further analysis.

9.4. Micro-economic Assessment

9.4.1. Possible Economic Change Processes (as a result of the project)

- ***Local or regional production gain and/or loss***
  There is likely to be a loss in agricultural production in the long-term due to the project as land use changes are involved. However, the value of agricultural production will be offset (the extent to be determined) by energy production. If

rehabilitation is carried out correctly, agricultural production may be initiated again after project closure.

- ***Local or regional employment gain and/or loss***
  There is also likely to be a loss in agricultural employment in the long-term due to the project as land use changes are involved. This will be offset (the extent to be determined) by the number of jobs created by the project. If rehabilitation is carried out correctly, agricultural related employment may be initiated again after project closure.

- ***Multiplier effects of the above impacts that can be modelled at a regional or local level***
  As certain suppliers production activities and consumer spending are indirectly dependent on production activities associated with the baseline and the project, those that produce and spend as a result of production activities (with our without the project) will also experience either a gain or a loss. Calculation of regional or local multipliers may not be possible, depending on information availability.

- ***Possible economic opportunity costs, indirect costs and indirect benefits***
  Project development decisions often mean that other projects cannot be pursued. Also, there may be other indirect benefits and losses which may not be production and employment related, which must be considered from an economic perspective. These may include positive or negative impacts on property values due to a project, and costs, hassle and job implications associated with relocation.

- ***Possible long term fixed capital and human capital investments that would contribute to economic growth***
  There is a strong possibility that fixed capital of importance will be installed for this project, however, this will require further investigation as to whether significant economic benefits can be realised from this.

- ***Possible Government revenues***
  The project development also has implications in terms of the revenue implications of local and national governments. This depends on the company structure and revenue expectations of the project and must be investigated further.

Table 9.5 overleaf provides an overview of the expected economic change processes to occur as well as the expected impacts that might occur as a result of the change process taking place. These potential impacts will be assessed in detail during the Impact Assessment phase.

Table 9.5: Overview of expected economic change processes and potential impacts

ECONOMIC CHANGE PROCESSES				
Expected Change Process	**Potential Impact**	**Farms Potentially affected**	**Project Phase**	**Status**
Decrease in agricultural production and dependent indirect production in other industries	Loss in crop and livestock production	All	Pre-construction and construction	Negative
Increase in energy production and construction, and dependent indirect production in other industries	Increases in construction and energy available for sale.	All	Construction and operation	Positive
Decrease in direct employment opportunities in agriculture	Retrenchment of existing farm employees	All	Pre-construction and construction	Negative
Possible increase in direct employment opportunities in construction and energy	Hiring of new employees in the construction and power generation sectors	All	Construction and operation	Positive
Costs, inconvenience and job related implications of relocation	Moving costs, costs related with finding new work and a residence	All	Pre- construction	Negative
Loss of property value due to presence of project activities	Inability to sell surrounding properties at market rates	All	Pre-construction, construction and operation	Negative
Fixed investment in durable capital goods that may enable the economy	Enable further economic growth and created economic dependencies	All	Operation	Positive
Local and national government tax revenue	Net increased funds for public service spending in the area	All	Construction and operation	Positive

9.5. Heritage

A Heritage Impact Assessment is focused on two phases of a proposed development: the construction and operation phases. However, from a cultural heritage perspective, this distinction does not apply. Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the proposed development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted can be written into the management plan, whence they can be avoided or cared for in the future.

According to the NHR Act, Section 2(vi), the significance of heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential.

It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these. Sites regarded as having low significance are viewed as been recorded in full after identification and would require no further mitigation. Impact from the development would therefore be judged to be low. Sites with a medium to high significance would require mitigation. Mitigation, in most cases involves the excavation of a site, which is in essence destructive and therefore the impact can be viewed as high and as permanent.

Based on published sources, unpublished archival information, as well as prior experience in the region, no sites, features or objects of cultural significance are currently known from the study area. However, there is a high likelihood that some will be identified during an intensive Phase 1 heritage survey. These would mostly relate to historic times and can include old farmsteads and informal cemeteries. These are generally viewed to have a medium significance on a region level, to a high significance on a local level.

9.6. Noise

9.6.1. The Residual (Existing) Noise Climate

In overview, the existing situation with respect to the existing *noise climate* in the study area was found to be as follows:

i) The main sources of noise in the area are from:
   a) Traffic on National Road N11, Road P48/1, Road P97/1, Road D2514 and Road D284.
   b) The existing Majuba Power Station. The noise from the power station operations has a significant influence for up to about 4000 metres from the facility.

ii) The existing *noise climate* alongside the main roads is degraded with regard to suburban residential living. In some areas residences are negatively

impacted from traffic noise (particularly at night) for up to the following distances from these roads:

a) National Road N11 - 350m
b) Road P48/1 - 180m
c) Road P97/1 (N) - 400m
d) Road P97/1 (S) - 180m
e) Road D2514 (W) - 200m
f) Road D2514 (E) - Road reserve boundary (no impact)
g) Road D284 - Road reserve boundary (no impact)

iii) The residual (existing background) noise levels are relatively low (quiet) in the sections of the study area that are not close to and that are relatively shielded by the terrain from the main roads. Daytime ambient conditions range from about 37dBA to 45dBA. The late evening and night-time conditions fall to between 30dBA and 35dBA. These are typical of the ambient noise conditions in a rural (farming) area (SANS 10103).

9.6.2. The Predicted Noise Climate (Pre-construction Phase)

Activities during the planning and design phase that normally have possible noise impact implications are those related to field surveys (such seismic testing and geological test borehole drilling for large building foundations). As these activities are usually of short duration and take place during the day, they are unlikely to cause any noise disturbance or nuisance in adjacent areas.

9.6.3. The Predicted Noise Climate (Construction Phase)

Construction will likely be carried out during the daytime only (06h00 to 18h00 or 20h00). It should however be noted that certain activities may occasionally extend into the late evening (till 20h00) period, while others such as de-watering operations may need to take place over a 24-hour period. Some of the activities such as the construction of the chimney stacks could take place continuously (24-hours a day) over a number of weeks if a continuous sliding shutter concreting operation is used. It is estimated that the development of the project will take place over a period of 3 to 4 years.

The nature of the noise impact from the construction sites is likely to be as follows:

i) Source noise levels from many of the construction activities will be high. Noise levels from all work areas will vary constantly and in many instances significantly over short periods during any day working period.
ii) Ideally the daytime outdoor ambient noise levels should not exceed 45dBA for rural residential areas or 55dBA for urban residential areas (as specified in SANS 10103). The night-time outdoor ambient noise levels should not exceed 35dBA for rural residential areas or 45dBA for urban residential areas.
iii) Exact daytime period and night-time period continuous equivalent sound pressure levels are not possible to calculate with certainty at this stage as the final construction site layout, work programme, work *modus operandi* and type of equipment have not been finalised. Working on a worst case scenario basis, it is estimated that short term maximum noise levels from general construction

operations should not exceed 62dBA at a distance of 1500 metres from the boundary of the activity site.

iv) For general construction, the ambient noise levels generated should not exceed 56dBA at 250 metres offset.

v) There are likely to be noise disturbance and noise nuisance effects on people living in close proximity to the construction sites.

vi) It should be noted that for residential areas, higher ambient noise levels than recommended in SANS 10103 are normally accepted as being reasonable during the construction period, provided that the very noisy construction activities are limited to the daytime and during the week, and that the contractor takes reasonable measures to limit noise at the work site. Note that it has been assumed that surface facility construction will generally take place from 07h00 to 18h00 or 20h00 with no activities (or at least no noisy construction activities) at night and so there should not be a problem.

vii) For all construction work, the construction workers working with or in close proximity to equipment will be exposed to high levels of noise.

9.6.4. The Predicted Noise Climate (Operational Phase)

- **OCGT Power Plant**
  The potential noise that will be generated by the proposed plant will be assessed in more detail in the EIA phase once the results of a Feasibility Study conducted by independent consultants are available.

- **OCGT Power Plant Generated Traffic**
  It is estimated at this stage that the total daily traffic that will be generated by the new facility will be relatively small in comparison to the total volume of traffic servicing the Majuba Power Station, on the adjacent main roads.

10. CONCLUSIONS AND RECOMMENDATIONS

This Environmental Scoping Study (ESS) for the proposed establishment of a 40 MW open cycle gas turbine (OCGT) power plant has been undertaken in accordance with the Environmental Impact Assessment Regulations (2006) published in Government Notice R385 to R387 of 21 April 2006 in terms of Section 24(5), read with Section 44, of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

In line with Regulation 29 (Chapter 3) of the EIA Regulations, this issues-based ESS aimed to identify and provide:

- A description of the proposed activity and of any feasible and reasonable alternatives that have been considered as part of the Scoping Process;
- 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;
- The identification of all legislation and guidelines applicable to the proposed project;
- A description of environmental issues and potential impacts, including cumulative impacts, that have been identified;
- Details of the public participation process conducted to date; and
- A plan of study for environmental impact assessment (PoS for EIA) including the methodology that will be adopted in assessing the potential impacts that have been identified, including specialist studies or specialised processes that will be undertaken.

The conclusions and recommendations of this Scoping Study and Report are the result of both desk-top studies and on-site inspections conducted by the environmental specialist team.

10.1. Potential Environmental Impacts Identified in the Scoping Study

A summary of the potentially significant issues associated with the proposed 40MW OCGT power plant, identified within the Environmental Scoping Study, is provided in Table 10.1 overleaf. Specialist input was received for the following disciplines: Geohydrology; Hydrology; Wetlands; Soils and Agricultural Potential; Biodiversity; Social; Air Quality; Visual; Micro-economic; Heritage and Noise. The area of potential impact and recommendations for investigations to be undertaken within the EIA phase are also specified.

Table 10.1: Potentially significant issues associated with the proposed OCGT power plant, identified within the revised Environmental Scoping Study.

ISSUE	AREA OF POTENTIAL IMPACT	RECOMMENDATIONS
Geohydrology	The possible sources of contamination or infrastructure that may impact on the groundwater resources include: • The raw water storage tanks - source of artificial recharge to the groundwater. • Potable water storage tanks - source of artificial recharge to the groundwater. • The wastewater treatment plant. • The sewage plant and dams – seepage or irrigation of effluent may impact on groundwater. • Treated (demineralised) water system – resultant wet waste brine may impact on groundwater. • Recovery (dirty water) dams – overflow, seepage, or irrigation may impact on groundwater. • Fuel oil and stored chemicals - oil/chemicals enters water and requires treatment • Solid waste site - source of leachate or poor quality water. • Some sections of the operations plants, e.g. workshops, batching plants, etc. • Ash from the gasification process. • The UCG process itself.	The impacts are thus related to potential artificial recharge, causing increased groundwater levels, changes in groundwater flow patterns, and the potential to cause deterioration of groundwater quality with time. Based on the available data and envisaged impacts on the groundwater resources, the following issues should be taken into consideration: • The 40MW OCGT power plant and auxiliary infrastructure can potentially impact negatively on the groundwater. • Artificial recharge can increase groundwater levels directly adjacent to the water impoundments associated with power generation. Groundwater levels can become elevated because of infiltration; • Persistent sources of contaminants can alter the hydrochemistry, causing an increase in dissolved solids and metals. The sources must, therefore, be located within areas where groundwater usage or potential for use is reduced. A peer review of the geohydrology study

ISSUE	AREA OF POTENTIAL IMPACT	RECOMMENDATIONS
		undertaken for the study area will completed in the EIA phase.
Hydrology	The potential impacts on hydrology include: • possible flooding; • possible pollution from station activities; • increased runoff from disturbed areas and infrastructure; • generation and transport of domestic and industrial waste; • water supply demands of environment and other water; • The volume of groundwater lost during the mining process (in terms of a water use); • The likely chemistry of the water [void] post mining as it may be contentious to assume it can be leached until equivalent to the pre-mining water quality. • The possible impacts associated with ground/overburden collapse should this occur, both in terms of yield impacts and future decant points, time to decant and quality of decant. Possible post mining water treatment may need to be considered and budgeted for. • If the surface is to contain waste (liquid or solid) during or post mining through related activities, then detail on water management of these structures will be required.	A peer review of the hydrology study undertaken for selected farms in the study area will be completed in the EIA phase. Furthermore a water monitoring grid has been established around the Majuba Power Station and a hydrological model will be studied in the EIA phase.

ISSUE	AREA OF POTENTIAL IMPACT	RECOMMENDATIONS
Wetlands	• If associated infrastructure is located within a wetland, then the assumption has been made that the wetland is likely to be completely transformed, resulting in the complete loss of wetland habitat as well as functionality of the affected part of the wetland (and possibly the functionality of the downstream portion of the wetland). • Construction-related impacts: - General construction related impacts. - Impacts related to mining areas. - Impacts related to pipelines. - Impacts related to access roads. - Impacts related to power lines. • Operation-related impacts: - Impacts related to mining areas. - Impacts related to pipelines. - Impacts related to access roads. - Impacts associated with polluted runoff water. - Water treatment infrastructure. - Impacts related to power lines • Decommissioning impacts: - The potential impacts on wetlands related to the decommissioning of the plant and proposed infrastructure are similar in many aspects to construction-related impacts, if infrastructure such as buildings is physically removed. • Post-closure impacts: - Potential post-closure impacts would equate to	More detail regarding the layout of the proposed plant is required to be provided for further, more detailed assessment and identification of potential impacts associated with the proposed plant and required mitigation measures in the EIA phase. If alignments of proposed linear infrastructure are provided for assessment, these could be able to be assessed in terms of their potential impact upon wetlands, and any design or re-alignment considerations that will need to be considered in order to mitigate or reduce the impact. A detailed on-site delineation and assessment of the wetlands occurring in certain parts of the study site where verification of wetland/hydromorphic soil existence is required will need to be undertaken as part of the EIA studies.

ISSUE	AREA OF POTENTIAL IMPACT	RECOMMENDATIONS
	residual impacts resulting from the improper decommissioning of the plant and associated infrastructure or lack of removal of any potential pollutants related to the processes of the plant that may over time enter the water cycle.	
Soils and Agricultural Potential	• The soils found on the site of the proposed Eskom UCG project are mainly restricted to structured soils of shallow to variable depth. The main land use is grassland used for extensive grazing. A limited area is used for dryland agriculture and the agricultural potential of these areas is relatively low due to the dominance of structured and limited depth soils. • The proposed mining process will impact large areas but soil conditions will not be altered drastically due to the characteristics of the soils. In the case of swelling soils their self-mulching nature will lead to the disappearance of small disturbances over time. It is anticipated that the grazing potential of the impacted areas will be negatively impacted but it is possible that this potential will improve with time as the signs of impacts fade. • The overall impacts on soils and agricultural potential are considered to be low due to a low baseline. However, the impact area is considered	A detailed assessment of the study area will be undertaken within the EIA phase in order to adequately assess the potential impacts on soils and agricultural potential as a result of the proposed project and recommend appropriate mitigation measures, where required.

ISSUE	AREA OF POTENTIAL IMPACT	RECOMMENDATIONS
	to be large and as such the activities can impact negatively on the low intensity land use of extensive grazing.	
Biodiversity	The following impacts/issues were identified that could affect the floristic and faunal attributes of the study area adversely: • Potential impacts on the local and regional biodiversity; • Potential impacts on sensitive/pristine habitat types; • Potential impacts on threatened/protected species and habitat; • Potential impacts on surrounding habitat and species; and • Potential impacts on fauna species. Impacts of a cumulative nature include: • Potential increase in habitat transformation (e.g. loss of habitat); • Potential increase in habitat fragmentation (e.g. loss of migratory routes); and • Potential increase in environmental degradation (e.g. loss of habitat quality).	A detailed assessment of the study area will be undertaken within the EIA phase in order to adequately assess the potential impacts on biodiversity as a result of the proposed project and recommend appropriate mitigation measures, where required.

ISSUE	AREA OF POTENTIAL IMPACT	RECOMMENDATIONS
Social	The following are likely to have an impact on the social environment: • Geographical change processes - A temporary loss of cultivated and grazing land due to construction activities can be expected on neighbouring farms if associated infrastructure such as pipelines cross these farms. - the presence of an OCGT plant and its associated infrastructure might prohibit future developments encroaching upon the plant footprint or pipeline servitudes, which means that land is lost for other development. • Demographic change processes - Influx of construction workers - Influx of job seekers • Institutional and empowerment change processes - It is possible that the majority of the construction workforce would be sourced from outside the area due to the skills levels required. The construction workforce would then most probably be housed within a construction village. • Socio-cultural processes - If construction workers have dissimilar social practices than local residents, conflict can be expected.	A detailed assessment of the study area will be undertaken within the EIA phase in order to adequately assess the potential impacts on the social environment as a result of the proposed project and recommend appropriate mitigation measures, where required.

ISSUE	AREA OF POTENTIAL IMPACT	RECOMMENDATIONS
	- Socially acceptable integration, including the risk of spreading STIs and HIV/AIDS with an impact on health. - If social integration between newcomers and residents is hindered, it can lead to conflict, which in turn delays the construction process and has economic implications for Eskom. - Where conflict exists, it increases the risk for social mobilisation. - Presence of construction workers and job seekers leads people to believe that there will be an increase in crime, which impacts on surrounding landowners' sense of safety and security.	
Air Quality	The following possible sources of fugitive dust and particulate emissions were identified as activities which could potentially generate air pollution during construction operations: • Demolition and debris removal. • Site preparation (earthworks). • General construction. The following possible sources of fugitive dust and particulate emissions were identified as activities which could potentially generate air pollution during operation: • Gas released from potential storage tanks;	A detailed assessment of the study area will be undertaken within the EIA phase in order to adequately assess the potential impacts on air quality as a result of the proposed project and recommend appropriate mitigation measures, where required.

ISSUE	AREA OF POTENTIAL IMPACT	RECOMMENDATIONS
	• Gas released from the stacks of the 40MW OCGT as well as from the flare of the UCG pilot plant and safety valves during regular or upset conditions; • Release of condensate from the processing plant; • Material transfer operations; • Wind erosion from exposed storage piles (sand for construction); and • Vehicle entrained dust from both paved and unpaved road surfaces. The following activities are associated with the decommissioning phase: • Existing buildings and structures demolished, rubble removed and the area levelled; • Remaining exposed excavated areas filled and levelled using overburden • Topsoil replaced using topsoil recovered from stockpiles; and • Land and permanent waste piles prepared for re-vegetation. Possible sources of fugitive dust emission during the closure and post-closure phase include: • Grading of sites; • Infrastructure demolition;	

ISSUE	AREA OF POTENTIAL IMPACT	RECOMMENDATIONS
	• Infrastructure rubble piles; • Transport and dumping of building rubble; • Transport and dumping of topsoil; and • Preparation of soil for re-vegetation – ploughing and addition of fertiliser, compost etc.	
Visual	• The issues relating to visual impact are the following: - Visual exposure of a moving gas field across the site and the likelihood of sprawl development; - Distance and observer proximity; - Viewer incidence and perception (input from public participation process); - Visual Absorption Capacity; and - Night lighting.	A detailed assessment of the study area will be undertaken within the EIA phase in order to adequately assess the potential visual impacts as a result of the proposed project and recommend appropriate mitigation measures, where required.
Micro-economic	The following are likely to have an impact on the micro-economic environment: • Decrease in agricultural production and dependent indirect production in other industries. • Increase in energy production and construction, and dependent indirect production in other industries. • Decrease in direct employment opportunities in agriculture. • Increase in direct employment opportunities in	The main recommendations pertaining to the impact assessment phase are to: • Continue to obtain information from the public participation consultants on registered landowners and those residing on the land to determine the exact extent of economic activities and employment numbers in the area. • Obtain information from the public participation consultants on possible land transactions and claims in the area to determine if any possible

ISSUE	AREA OF POTENTIAL IMPACT	RECOMMENDATIONS
	construction and energy. • Unforeseen costs, inconvenience and job related implications of relocation. • Loss of property value due to presence of project activities. • Fixed investment in durable capital goods that may enable the economy. • Local and national government tax revenue.	property impact exists related to power generation activities. • Contact landowners and tenants to further expand on economic activities and current job creation. • Obtain information from the proponent on expected value of the project in construction and operations, expected tax revenues from the operation and expected job creation. • Analyse the current Majuba supply chain to determine extent of possible local supplier benefits. • Evaluate applicable information contained in previous local economic assessment reports report completed in the area for Eskom for inclusion into the EIA phase.
Heritage	• No sites, features or objects of cultural significance are currently known from the study area. However, there is a high likelihood that some will be identified during an intensive Phase 1 heritage survey. These would mostly relate to historic times and can include old farmsteads and informal cemeteries. These are generally viewed to have a medium significance on a region level, to a high significance on a local level.	It is recommended that in terms of Section 38 of the National Heritage Resources Act, No. 25 of 1999, a full Phase 1 survey of the study area is conducted prior to the development taking place.

ISSUE	AREA OF POTENTIAL IMPACT	RECOMMENDATIONS
Noise	Potential noise impacts consist of the following: • Impacts on the residual (existing) noise climate. • Predicted noise climate – pre-construction phase. • Predicted noise climate – construction phase. • Predicted noise climate – operational phase - OCGT power plant. - OCGT power plant generated traffic.	No noise impact assessment will be conducted in the EIA phase as the potential noise impacts during the construction and operational phases are considered to be of low significance. Appropriate mitigation measures will be proposed in the EMP.

10.2. Recommendations

Based on the specialist studies, **no** environmental fatal flaws have been identified as a result of the proposed project. However, a number of potentially significant environmental impacts have been identified that requires further in-depth study.

Therefore, an EIA is to be undertaken in order to provide an assessment of these potential impacts and recommend appropriate mitigation measures, where required.

11. PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

Potential environmental impacts (biophysical, social and economic) associated with the proposed 40MW Open Cycle Gas Turbine (OCGT) power plant have been identified by the specialists as well as through the public participation process in the Environmental Scoping Study (ESS). All potentially significant impacts will be further investigated and assessed within the Environmental Impact Assessment (EIA) phase of the project through specialist studies.

The EIA phase will aim to adequately investigate and address all potentially significant environmental issues in order to provide the Department of Water and Environmental Affairs (DW&EA) – the lead authority and the Mpumalanga Department of Agriculture and Land Affairs (MDALA – commenting authority) with sufficient information to make an informed decision regarding the proposed project.

11.1. Approach to Undertaking the Environmental Impact Assessment

The following outlines the proposed approach to undertaking the EIA phase of the project. It is believed that the proposed approach will adequately fulfil the environmental authorities' requirements, the requirements of the EIA Regulations (2006) and the objectives of environmental best practice, so as to ensure transparency and to allow an informed decision regarding the proposed project to be made.

11.1.1. Authority Consultation

- ***Pre-application Consultation***

  Consultation with the DW&EA was initiated prior to the commencement of the environmental studies for the project, in order to determine the lead authority for the project as well as specific authority requirements regarding the proposed project. During these consultations, it was determined that DEAT would be the lead authority, with MDALA acting as the commenting authority.

- ***On going authority consultation***

  Ongoing consultation with all relevant authorities, including DW&EA, MDALA,, the South African National Heritage Resources Agency (SAHRA), the local and district municipalities (Pixley ka Seme Local Municipality and Gert Sibande District Municipality) and all other authorities (Department of Minerals, SANRAL, Mpumalanga Tourism and Parks Agency, Department of Transport and Department of Health) identified during the Environmental Scoping Study (ESS) phase of the project (and further ones that may be identified during the EIA phase) will continue throughout the duration of the project. Authority consultation is therefore seen as a continuous process that takes place through the duration of the environmental investigations.

- ***Subsequent meetings with Authorities***

  Authority meetings be held (if and when necessary) during the public review period of the draft Environmental Impact Report (EIR) and during the EIA phase of the project – so as to ensure the Authorities' continued understanding of the proposed project and to ensure that all requirements of the Authorities are received by the environmental team, and included in the EIA phase.

11.1.2. Application for Authorisation

An application for authorisation in terms of the National Environmental Management Act No 107 of 1998 (as amended), in respect of the activities identified in terms of Section 24 and 24D of the said Act was submitted to DW&EA on 07 August 2009. This application included information regarding the applicant, as well as the proposed project and was submitted together with a declaration of independence from the independent environmental assessment practitioner.

A separate application for a waste licence will be lodged with the DW&EA (Directorate: Authorisation and Waste Disposal Management) in terms of section 45 of the National Environmental Management: Waste Act (No 59 of 2008).

The application for an Integrated Water Use Licence (IWUL) will be lodged in accordance with Section 40 of the National Water Act, 1998 (Act No 36 of 1998) with the DW&EA.

In terms of the National Environmental Management: Air Quality Act No. 39 of 2004, Eskom will apply separately for an air quality permit as carbonisation and coal gasification is a scheduled process in terms of the Act.

11.2. The Environmental Impact Assessment Phase

11.2.1. Aims of the Environmental Impact Assessment Phase

An EIA Report will be compiled according to the guidelines provided Government Notice R.385 of the EIA Regulations (2006) and will contain the following:

- a description of the proposed activity;
- 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;
- a description of the need and desirability of the proposed activity 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;
- 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 any specialist report or report on a specialised process;
- a description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures;
- an assessment of each identified potentially significant impact, including –
  i) cumulative impacts;
  ii) the nature of the impact;
  iii) the extent and duration of the impact;
  iv) the probability of the impact occurring;
  v) the degree to which the impact can be reversed;
  vi) the degree to which the impact may cause irreplaceable loss of resources; and
  vii) the degree to which the impact can be mitigated;
- a description of any assumptions, uncertainties and gaps in knowledge;
- an opinion as to whether the activity should or should not be authorised,
- an environmental impact statement which contains –
  i) a summary of the key findings of the environmental impact assessment; and
  ii) a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives;
- a draft environmental management plan;
- copies of any specialist reports and reports on specialised processes; as well as
- any specific information that may be required by the competent authority.

11.3. Detailed Specialist Studies to be undertaken as part of the EIA

As required in the EIA process, a suite of specialist studies (each study undertaken by a specialist in that field) were proposed due to identified potential significant impacts on the environment. As part of the Scoping exercise, the team of specialists attended site visits and specialist discussions/workshop to ensure the scope of each specialist study was presented as accurate as possibly. The outcome of the discussions/workshop was the need to further investigate all identified issues into the EIA phase as best-practice and a means to fully understand their implications.

Each of the specialists involved has extensive experience in their field to undertake the proposed detail of studies. Curriculum Vitae of the specialist team are available on request.

A description of each proposed specialist study and its Terms of Reference are provided below.

- **Potential Impacts on Geohydrology**
  Peer Review: Reinie Meyer (Private)

This study will entail a peer review of the geohydrological report compiled for the study area, making informed assessments as to the repercussions of the proposed OCGT power plant on the groundwater resources locally and regionally with a view of both the primary and secondary effects.

- **Potential Impacts on Hydrology**
  Peer Review: Chris Waygood (Jones and Wagner)

This study will entail a peer review of the hydrological report compiled for the study area, making informed assessments as to the repercussions of the proposed OCGT power plant on the surface water resources locally and regionally with a view of both the primary and secondary effects.

- **Potential Impacts on Wetlands**
  Specialist input: Paul da Cruz – SiVEST

The desktop level assessment has identified that wetlands are distributed across the study area site, comprising 47.6% of the areas of the study site. All wetlands occurring on the site are sensitive features of the natural environment, and should be protected from any adverse affect/impact due to the proposed development. The proposed UCG plant and associated infrastructure has been scoped in terms of the possible impact on wetlands, using the list of infrastructure provided as the basis on which to identify impacts. This has been done across all life stages of the project, from construction to post-closure. It should be noted that at this stage of the project no potential layouts/alignments of infrastructure are available for assessment.

As part of the technical project information provided by the proponent, the mining areas will not be located within any wetland area, or within a buffer delineated around all wetlands on the study site, nor will any wetland areas be undermined. It has been assumed that the same principle will be applied to the locating of infrastructure and the plant itself (although certain linear infrastructure will have to cross wetlands as described below). This factor greatly reduces the potential for the plant and associated infrastructure as well as surface mining-related operations to directly impact (physically alter) wetlands.

A policy of zero-discharges to the receiving environment also reduces the potential impacts for discharges from the plant to potentially pollute wetlands. A set of proposed linear infrastructure, including a power line, raw water pipeline, and access roads would likely need to cross wetlands, thus potentially physically affecting them. The nature of the design and mitigation measures adopted, as well as alignment will determine the degree of potential impact of this linear infrastructure on wetlands.

More detail regarding the layout of the proposed plant is required for further, more detailed assessment and identification of potential impacts associated with the proposed plant and required mitigation measures in the EIA phase. If alignments of proposed linear infrastructure are provided for assessment, these will be able to be assessed in terms of their potential impact upon wetlands, and any design or re-

alignment considerations that will need to be considered in order to mitigate or reduce the impact.

A detailed on-site delineation and assessment of the wetlands occurring in certain parts of the study site where verification of wetland/hydromorphic soil existence is required will need to be undertaken as part of the EIA studies.

- **Potential Impacts on Soils and Agricultural Potential**
  Specialist input: Johan van der Waals – Terra Soil Science

The Terms of Reference for the Soils and Agricultural Potential study during the EIA phase are included below:

- Undertake an assessment to predict potential impacts and their significance due to the proposed development on soils and agricultural potential.
- Propose mitigation measures to reduce or eliminate the identified impacts and offer an opinion on the preference between the sites.
- Sensitivity maps will be compiled to show the soil profile and agricultural potential of the sites selected. In addition, a report will be compiled to reflect the findings of the study.

- **Potential impacts on Biodiversity (Terrestrial and Aquatic)**
  Specialist input: Riaan Robbeson and Dewald Kamfer – Bathusi Environmental Consulting

Environmental regulations pertaining to minimum requirements for biodiversity assessments require full surveys on all biodiversity data and mitigation measures to manage the impact on these living systems. In order to compile detailed knowledge of the biodiversity of the study area the following aspects should be included as part of the EIA investigation.

- **Floristic investigation**

  - Map the location and extent of all plant communities, indicating size and ecological sensitivity, areas of disturbance, surrounding land use, etc;
  - Compile a list of potential Threatened Plant Species that occur in the area;
  - Conduct flora surveys during the growing season of all species that may potentially occur;
  - Supply comprehensive plant species lists;
  - Identify plant species that may be of conservation importance down to species level;
  - Provide locality, date surveyed, GPS location, spatial resolution and distribution, including actual numbers, of plant species that may be of conservation importance;
  - Provide a list of alien plant species occurring on the property, considering eradication programmes of alien vegetation; and
  - Provide relocation plans for plants of conservation importance. These species may include:
    * Species endemic to the province;
    * Red Data listed plants;

- Medicinal plants; and
- Protected plants.

- **Faunal investigation**

The following methodology is recommended to assess the potential occurrence of red data faunal species as well as the biodiversity elements within the study area pertaining to the relevant faunal species, assemblages and communities present in the general region:

- ***Invertebrates***
  - Pitfall trapping to assess various areas within the study area in terms of relative biodiversity elements such as species richness and species diversity. Specific groups such as beetles (Insecta: Coleoptera) will be used as indicator groups to standardise and simplify the data analyses.
  - A hand-held butterfly net will be used to collect butterfly species (Insecta: Lepidoptera) found in the study area. Butterflies are the best known Invertebrate group (both ecologically and taxonomically) and is useful as ecological and biodiversity indicators.
  - Scorpions will be sampled by excavation of burrows during daytime and night-time surveys using black-lights (UV-lights).

- ***Amphibians***
  - Identification of species-specific calls of males (early evening) at different surface water areas.
  - A digital audio field recorder will be used to record animal sounds during the night-time at specific areas (usually near ecological “bottle-necks” such as pans or rivers). The calls of frogs will be identified as part of this remote audio survey.

- ***Reptiles***
  - Preferred reptile habitat such as outcrops, rocky areas, open water and disused termite mounds will be actively searched for the presence of reptile species.
  - Reptiles caught in the pitfall traps (as “by-catch”) will also be identified.

- ***Mammals***
  - Small mammal live traps will be used to assess the rodent assemblages of the study area. These traps will be baited with various bait types to include as many rodents and insectivores’ food requirements as possible.
  - Ecological tracks and signs will be used to assess the presence of large and medium-sized mammals.
  - Digital remote sensing cameras will be used to assess the presence of mammals. These cameras will be baited with bovine rumen to attract various undulates and carnivores.
  - A digital audio field recorder will be used to record animal sounds during the night-time at specific areas (usually near ecological “bottle-necks”

such as pans or rivers). The calls of nocturnal mammals will be identified as part of this remote audio survey.

In addition to these the effect of expected or likely impacts on the biological environment should be determined by compilation of an EIA that take the following aspects into consideration:

- the relationship of potential impacts to temporal scales;
- the relationship of potential impacts to spatial scales;
- the severity of potential impacts;
- the risk or likelihood of potential impacts occurring; and
- the degree of confidence placed in the assessment of potential impacts.

This should be done in a holistic manner, taking both the floristic and faunal environment into consideration.

- **Potential Social Impacts**
  Specialist input: Nonka Byker – Master-Q Research

The table below outlines the Terms of Reference for the studies to be carried out during the EIA Phase as part of the Social Impact Assessment.

Table 11.1: Terms of Reference for Social studies to be carried out in the EIA Phase

CHANGE PROCESS	RECOMMENDED STUDIES
Geographical	• Obtain and analyse information from the relevant specialist on the agricultural potential of the sites; and • Scrutinise the IDP and SDF of the affected district and local municipality in terms of future developments. If additional information is required other than that contained in the IDP/SDF, interview(s) with relevant town planners will be conducted.
Demographic	• Conduct a desktop study to determine what the expected population growth rate is and how this would be influenced by the HIV infection rate in order to establish how the population would have expanded without the influx of construction workers and/or job seekers; • Obtain information from the project proponent and/or their appointed contractor on the size of the construction team and where labour would be sourced from; and • Obtain and analyse information from the public participation consultants on the local residents' expectations in terms of the proposed project within the social realm, in order to better understand local residents' viewpoint on the proposed project and the potential risk for conflict and other forms of active and passive social mobilisation.

CHANGE PROCESS	RECOMMENDED STUDIES
Institutional and Empowerment	• Obtain the issues register or issues report from the public participation consultants to determine the recurrent issues raised from the public's side and how these issues were addressed throughout the process. An analysis of these issues would indicate the risk for social mobilisation; and • Obtain information from the local municipality on the existing capacity to deliver municipal services and to determine the capacity for an additional demand on municipal services.
Socio-cultural	• Conduct focus group meetings with community leaders and/or an observational study to determine the cultural dynamics and movement patterns of local residents; • Obtain and analyse information, if any, from the project proponent on the mechanisms implemented at a construction site to enhance the safety of both the construction worker as well as that of local residents passing through the area; and • Obtain information from the public participation consultants on the surrounding landowners. Either attend or organise a focus group meeting with these landowners to determine their attachment to the area.

- **Potential Impacts on Air Quality**
  Specialist input: Raylene Watson and Palesa Riba – Bohlweki-SSI Environmental (Air Quality Unit)

In terms of this Air Quality Scoping Assessment, the following sources of current air pollution have been identified:

- Stack, vent and fugitive emissions from the existing Majuba Power Station operations;
- Agricultural activities on the surrounding farms;
- Vehicle entrained dust and exhaust emissions;
- Domestic Fuel Burning; and
- Veld Fires.

It is anticipated that the impacts will remain more localised. However, this can only be known once detailed modelling is undertaken, which will take into account the pollutants and rates at which emissions are released. The meteorological data selected for use will also provide a better indication of the proposed impacts at the site.

In order to provide a better indication of the extent of the impacts expected from the proposed construction and operational phases of this development, dispersion

simulation will need to be undertaken. This will however only be able to take place once more detail is available regarding the nature of each source type and their respective emission rates.

Once these impacts have been quantified, appropriate management measures can be suggested to best mitigate the predicted impacts. These modelled results will similarly allow for the assessment of compliance to current South African Ambient Standards.

- **Potential Visual Impacts**
  Specialist input: Dawie van Vuuren – MetroGIS

As part of the EIA phase the following visual components will be integrated into a single visual impact matrix and spatially represented to arrive at more conclusive results:

- Visual exposure of a moving gas field across the site and the likelihood of sprawl development;
- Distance and observer proximity;
- Viewer incidence and perception (input from public participation process);
- Visual Absorption Capacity;
- Night lighting and
- Possible mitigation measures.

- ***Micro-economic Study***
  Specialist input: Raoul de Villiers - MasterQ Research

The points below outline the variables that will be examined in the micro-economic study to be carried out during the EIA Phase:

- Obtain and analyse information from the project proponent;
- Obtain and analyse information from the project proponent on the construction and operating financial projections;
- Obtain and analyse information from StatsSA, LED plans and IDPs;
- Research likely impacts on property values for surrounding landowners;
- Determine losses to agricultural production and employment;
- Determine value of potential capital investments; and
- Determine value of potential local government revenues.

A detailed report on the findings of the study will be compiled for the assessment. The report will provide the economic impact of the proposed development in the regional (micro-economic) economic status. Furthermore, the report will propose measures to mitigate any negative impacts and enhance positive impacts resulting from the development.

- **Potential Impacts on Heritage**
  Specialist input: Johnny van Schalkwyk

A full Phase 1 archaeological survey of the study area in accordance with the requirements of Section 38(3) of the National Heritage Resources Act (Act 25 of 1999) will be conducted in the EIA phase. Site-specific, detailed management and mitigation measures will furthermore be compiled for inclusion in the Environmental Management Plan (EMP). The study should provide a map of the identified archaeological artefacts as well as a report detailing the finding of the study, and mitigation of any impacts.

11.4. Public Participation Process

The primary aims for the public participation process will include the following:

- serving as a structure for liaison and communication with I&APs for meaningful and timeous participation of I&APs;
- promoting transparency and an understanding of the proposed project and its potential environmental (social, economic and biophysical) impacts;
- assisting in identifying potential environmental (biophysical, social and economic) impacts associated with the proposed development;
- ensuring inclusivity (the needs, interests and values of I&APs must be considered in the decision-making process); and
- encouragement of shared responsibility and a sense of ownership.

The public participation process during the EIA phase is outlined below:

11.4.1. Advertising

In compliance with the EIA Regulations, the commencement of the EIA phase of the project was advertised within the *Recorder* (local) and *City Press* (national) newspapers. The primary aim of these advertisements was to ensure that the widest group of I&APs possible are informed of the project. Other advertisements to be placed during the course of the EIA phase of the project will relate to the availability of reports for public review, as well as the advertisement of dates of public meetings.

11.4.2. Identification of and Consultation with I&APs and Key Stakeholders

I&APs and key stakeholders have been identified during the initial ESS phase of the project. The identification of I&APs and key stakeholders will continue through into the EIA phase of the project as the public participation process is a continuous process that runs throughout the duration of an environmental investigation.

11.4.3. I&AP Database

An existing I&AP database provided by Eskom for the 2100MW Combined Cycle Gas Turbine Project was utilised as a starting point. The identification of additional I&APs through existing contacts, responses to newspaper advertisements, networking

within the nominated study area and initial Scoping Study was used to further identify and invite I&APs. This vehicle will continue to be used in the EIA phase.

11.4.4. Consultation and Public Involvement

Consultation with I&APs is considered to be critical to the success of any EIA process. Therefore, one-on-one consultation, focus group meetings and public meetings with I&APs will be undertaken. The aim of this process will be to provide I&APs with details regarding the process and to obtain further comments regarding the proposed project. The information and comments gathered during these consultation sessions will also inform the detail of the studies to be undertaken at the EIA phase.

Minutes of all meetings held will be compiled and forwarded to all attendees. These minutes will also be included in the EIA Report. This consultation process will be on-going throughout the process.

- ***Public Meeting***

A Public meeting will be held during the review period of the draft Environmental Impact Report in order to inform I&APs of the findings of the EIA phase of the proposed project. The primary aims of this meeting will be to:

- provide I&APs and stakeholders with information regarding the proposed 40OCGT and associated infrastructure;
- provide I&APs and stakeholders with information regarding the EIA process;
- provide an opportunity for I&APs and stakeholders to seek clarity on the project;
- record issues and concerns raised; and
- provide a forum for interaction with the project team.

- ***Focus Group Meetings***

The purpose of the Focus Group Meetings is to allow key stakeholders with specific issues to provide their views on aspects they would like addressed in the EIA process, and to facilitate the interaction of the key stakeholders and the project team. The meetings will allow for smaller groups of I&APs and/or representatives of larger interest groups or organisations who wish to play an active role in the process an opportunity for consultation.

11.4.5. Issues Trail

All issues, comments and concerns raised during the public participation process of the EIA process will be compiled into an Issues Trail. This Issues Trail will be incorporated as part of the reports produced in the EIA phase.

11.5. Assessment of Identified Potentially Significant Impacts

In order to evaluate the significance of the identified impacts, the following characteristics of each potential impact will be identified (Table 11.2):

Table 11.2: Criteria for the classification of environmental impacts[12]

CATEGORY	DESCRIPTION OF DEFINITION
Cumulative Impact	In relation to an activity, means 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.
Nature	A brief written statement of the environmental aspect being impacted upon by a particular action or activity.
Extent (Scale) • Site • Local • Regional • National • International	The area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact. For example, high at a *local* scale, but low at a *regional* scale. • The immediate vicinity of the project (radius ±100 m). • Within a radius of 10-12 km of the project. • Provincial (and parts of neighbouring provinces). • The whole of South Africa. • Beyond the borders of South Africa.
Status • Positive (+) • Negative (-) • Neutral	Denotes the perceived effect of the impact on the affected area. • Beneficial impact. • Deleterious or adverse impact. • Impact is neither beneficial nor adverse. It is important to note that the status of an impact is assigned based on the *status quo* – i.e. should the project not proceed. Therefore not all negative impacts are equally significant.
Duration • Short-term • Medium-term	Indicates what the lifetime of the impact will be. • 0 - 10years • 11 - 20 years

[12] Criteria for the classification of impacts are as per Regulation 32 of the EIA Regulations (July 2006) promulgated under the National Environmental Management Act (Act 107 of 1998)(as amended)

CATEGORY	DESCRIPTION OF DEFINITION
• Long-term • Permanent	• Impact will cease after the operational life of the activity • Permanent
Probability • Improbable • Probable • Highly probable • Definite	Describes the likelihood of an impact actually occurring. • Possibility of the impact materialising is very low • Distinct possibility that the impact will occur • Most likely that the impact will occur • Impact will occur regardless of any preventative measures (i.e. mitigation)
Intensity • Low • Medium • High	Describes whether an impact is destructive or benign. • Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected • Effected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way • Natural, cultural and social functions and processes are altered to extent that they temporarily or permanently cease
Significance • Low • Medium • High • Very High	The significance of an impact is determined through a synthesis of <u>all</u> of the above aspects. • No influence on decision-making • Will have an influence. • Will have an influence on decision-making regardless of mitigation. • Fatal flaw (an impact that is unable to be mitigated to within an acceptable level. A fatal flaw can also be regarded as any problem, issue or conflict (real or perceived) that could result in a proposed project being rejected or stopped).

The suitability and feasibility of all proposed mitigation measures will be included in the assessment of significant impacts. This will be achieved through the comparison of the significance of the impact before and after the proposed mitigation measure is implemented.

11.6. Review of the Environmental Impact Assessment Report

11.6.1. Public Review of the draft Environmental Impact Assessment Report

The draft EIA report will be made available at public places for public review and comment. A 30-day period will be allowed for this review process. An advert

indicating the availability of this report for public scrutiny will be placed within the local and national newspapers. I&APs registered on the project database will be notified of the availability of this report by individualised letters. Comments made to the draft EIA report during the public review period will be submitted to Bohlweki-SSI Environmental (the consultants).

After the public review period, all relevant comments and questions received from the public will be considered and responded to and included into the final EIA report.

11.6.2. Authority Review of the Environmental Impact Assessment Report

After the public review period, all relevant comments and questions received from the public will be considered and responded to and included into the final EIA report. This final document will be submitted to the authorities for final review and decision-making. Changes between the draft and final reports will be tracked so as to facilitate the review.

11.7. Environmental Authorisation

On receipt of environmental authorisation (positive or negative) for the project, I&APs registered on the project database will be informed in writing of this environmental authorisation and its associated terms and conditions.

11.8. Environmental Management Plan

A draft Environmental Management Plan (EMP) will be compiled for this project and submitted along with the draft EIA Report to the relevant authorities and simultaneously made available to the public for review and comment. The EMP will prioritise management principles for the construction, operation and maintenance phases of the proposed project. The EMP will be largely based on the recommendations of the specialist studies and the requirements as stipulated in Regulation 34 of the Environmental Impact Assessment Regulations, 2006. It will contain all the mitigation and management measures to which the project proponent must adhere to during the life cycle of the project. The EMP will be finalised upon receipt of environmental authorisation, so as to ensure that any specific conditions of approval are addressed in the EMP.

11.9. Key Milestones for the EIA Phase

The envisaged key milestones of the programme for the Environmental Impact Assessment (EIA) phase of the project are outlined in the table below. It is imperative that all parties involved in the project adhere to the project timeframes to avoid any delays to this strategically important project.

Table 11.3: Key milestones of the programme for the EIA phase of the project

KEY MILESTONE ACTIVITY	PROPOSED COMPLETION DATE
Undertake further public participation – public meetings and focus group meetings,	October 2009
Finalisation of Environmental Scoping Report	November 2009
DW&EA acceptance of the Environmental Scoping Report and Plan of Study to undertake the Environmental Impact Assessment	Mid-January 2010
Undertake detailed specialist studies	November 2009 – January 2010
Compile draft EIA Report and draft EMP	November 2009 – March 2010
Making draft EIA Report and draft EMP available to the public, stakeholders and authorities	March – April 2010
Submit final EIA Report and EMP to authorities	April 2010
Authority review period	April – August 2010
Issuing of authorisation (positive or negative)	Mid-August 2010
Notify I&APs of authorisation	Mid-August 2010

11.10. Environmental Study Team

Details of the environmental study team and their fields of specialisation are provided in Table 11.4 below.

Table 11.4 Proposed specialist team and their areas of expertise

NAME AND ORGANISATION	SPECIALIST STUDY TO BE UNDERTAKEN DURING EIA PHASE
Malcolm Roods - Bohlweki-SSI Environmental	Project Director for the EIA process; review and quality control of EIA process documentation.
Prashika Reddy - Bohlweki-SSI Environmental	Project Manager for the EIA process. Management of specialist team. Compilation of all project documentation; assistance in public participation.
Sibongile Hlomuka - Bohlweki-SSI Environmental	Project Manager for the public participation process.
Yolisa Zokufa - Bohlweki-SSI Environmental	Assistance with the public participation process.
Reinie Meyer - Private	Peer review of geohydrology assessment
Chris Waygood – Jones and Wagner	Peer review of hydrology assessment
Paul da Cruz – SiVEST	Wetland delineation study
Dr Johan van der Waals - Terra Soil Science	Soils and Agricultural Potential
Riaan Robbeson and Dewald Kamfer - Bathusi Environmental Consulting (BEC)	Ecological assessment (flora and fauna)

NAME AND ORGANISATION	SPECIALIST STUDY TO BE UNDERTAKEN DURING EIA PHASE
Nonka Byker and Raoul de Villiers - MasterQ Research	Baseline Social Impact Assessment and Micro-economic study
Dr Raylene Watson - Bohlweki-SSI Environmental (Air Quality Unit)	Air Quality Assessment
Dawie van Vuuren – MetroGIS	Visual Impact assessment and GIS mapping
Dr Johnny van Schalkwyk – Private	Heritage Impact Assessment