

DRAFT SCOPING REPORT
for
**PROPOSED KAROO ARRAY TELESCOPE (MEERKAT) PROJECT ON
FARMS LOSBERG (73) AND MEY'S DAM (68) NEAR CARNARVON IN THE
NORTHERN CAPE**

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The following table provides the details of the team members who are conducting the EIA process for the proposed MeerKAT project.

Table 1: Project team undertaking the EIA process

Name	Organization	Responsibility
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EXECUTIVE SUMMARY

1 INTRODUCTION

South Africa has been short-listed with Australia to host the world's largest radio telescope, the Square Kilometre Array (SKA). The MeerKAT (Karoo Array Telescope) project is a component of the larger SKA. The MeerKAT is being developed as a pathfinder to the full SKA and will prove South Africa's commitment and capability to host the SKA.

Due to the supporting infrastructure required for the proposed MeerKAT, numerous listed activities in terms of the Environmental Impact Assessment (EIA) Regulations promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended [NEMA] are triggered (refer to Section A-1). Thus, a full Scoping and EIA process is required in order to obtain Environmental Authorisation prior to the commencement of activities.

The Northern Cape Department of Education has appointed Strategic Environmental Focus (Pty) Ltd [SEF] as independent environmental consultants to undertake the necessary Scoping and EIA process for the proposed MeerKAT.

2 GENERAL PROJECT DESCRIPTION

The proposed MeerKAT will be constructed on the study site, which encompasses the entire farms of Losberg (73) and Mey's Dam (68) near Carnarvon in the Northern Cape. The area has been identified as the most suitable area in which to construct the SKA and MeerKAT due to very low Radio Frequency Interference (RFI).

The MeerKAT project will consist of the following associated infrastructure:

- On-site complex from which the MeerKAT and KAT 7 configurations will be operated and maintained;
- Link road from the on-site complex to the MeerKAT and KAT 7 sites; and
- Underground trenching for optical fibre and power cables.

The MeerKAT project is to be constructed as soon as possible due to strict timeframes in terms of the international bid for the SKA. Construction of the on-site complex and link road are to commence as soon as the Basic Assessment process has been approved and authorised. The MeerKAT and KAT 7 configurations will commence once approval for this Scoping and EIA process has been obtained from the approving authority.

3 ENVIRONMENTAL IMPACT ASSESSMENT AND PUBLIC PARTICIPATION PROCESS

The Scoping Phase of the EIA process is almost complete. To date only a few Interested and Affected Parties (I&APs) have registered. No comments or concerns have been raised by I&APs. Once the review period for the draft Scoping Report has ended, any comments received will be included into the final Scoping Report prior to submission and approval to the approving authority.

4 KEY IMPACTS

Based on the Scoping Phase of the EIA process, the following key impacts were identified:

- Impact on erosion;
- Impacts on ecological functioning;
- Impacts on heritage and culture;
- Impacts on flora and fauna;
- Impacts on agriculture;
- Safety and security;
- Socio-economic impact; and
- Impact on visual character.

5 ALTERNATIVES

Due to the scientific nature of the SKA project, few alternatives were considered. The only alternative considered during this EIA process was the final disposal of sewage/ effluent on the site. Either septic tanks with soak aways (preferred alternative) or septic tanks with wetlands will be utilised for the final disposal of effluent on site. Due to the limited number of persons residing at the on-site complex at any given time, minimal effluent will be generated, hence the investigations into alternatives regarding septic tanks.

6 CONCLUSIONS AND RECOMMENDATIONS

The Botanical, Heritage and Visual Impact Assessments have been conducted. The findings of these specialist studies will be presented in the EIA Report. The Ecological Impact Assessment must still be conducted; this has been delayed due to seasonality with the most appropriate evaluation of ecological issues being around September/ November. The EIA Report will provide a detailed assessment of all the potential impacts associated with the proposed MeerKAT and associated infrastructure.

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LIST OF ABBREVIATIONS

DWAF	-	Department of Water Affairs and Forestry
DTEC	-	Department of Tourism, Environment and Conservation
EAP	-	Environmental Assessment Practitioner
ECO	-	Environmental Control Officer
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
HIA	-	Heritage Impact Assessment
I&APs	-	Interested and Affected Parties
IEM	-	Integrated Environmental Management
KAT	-	Karoo Array Telescope
NEMA	-	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NRF	-	National Research Foundation
PPP	-	Public Participation Process
RFI	-	Radio Frequency Interference
SAHRA	-	South African Heritage Resources Agency
SEF	-	Strategic Environmental Focus (PTY) Ltd
SIA	-	Social Impact Assessment
SKA	-	Square Kilometre Array
PoS	-	Plan of Study
VIA	-	Visual Impact Assessment
WULA	-	Water Use Licence Application

GLOSSARY OF TERMS

Alien species: A plant or animal species introduced from elsewhere: neither endemic nor indigenous.

Applicant: Any person who applies for an authorisation to undertake an activity or to cause such activity to be undertaken as contemplated in Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

Arable potential: Land with soil, slope and climate components where the production of cultivated crops is economical and practical.

Ecology: The study of the interrelationships between organisms and their environments.

Environment: all physical, chemical and biological factors and conditions that influence an object.

Environmental Impact Assessment: assessment of the effects of a development on the environment.

Environmental Management Plan: A working document on environmental and socio-economic mitigation measures that must be implemented by several responsible parties during all the phases of the proposed project.

Interested and affected party: Any person or groups of persons who may express interest in a project or be affected by the project, positively or negatively.

Key stakeholder: Any person who acts as a spokesperson for his/her constituency and/or community/organization, has specialized knowledge about the project and/or area, is directly or indirectly affected by the project or who considers himself/herself a key stakeholder.

Local relief: The difference between the highest and lowest points in a landscape.

Soil compaction: Soil becoming dense by blows, vehicle passage or other type of loading. Wet soils compact easier than moist or dry soils.

Stakeholder: Any person or group of persons whose live(s) may be affected by a project.

Study area: Refers to the entire study area encompassing both of the farms Losberg and Mey's Dam.

Succession: The natural restoration process of vegetation after disturbance.

SECTION A INTRODUCTION

The South African Square Kilometer Array (SKA) Project is a project of the National Department of Science and Technology and is administered by the National Research Foundation (NRF). South Africa has been short-listed with Australia to host the world's largest radio telescope, the SKA.

The SKA project team is currently designing and constructing a world class radio telescope, the Karoo Array Telescope (MeerKAT). The construction of the MeerKAT is to prove to the international science and astronomy community South Africa's commitment and capability to host the SKA.

The Northern Cape Department of Education is responsible for coordinating the various Northern Cape Government Departments efforts on the project. The Northern Cape Department of Education supports the delivery of infrastructure by the Northern Cape Government departments, the SKA SA and local authorities. The Northern Cape Department of Transport, Roads and Public Works is responsible for the provision of the facilities at Klerefontein (the support base approximately 5km along the Brandvlie – Carnarvon Road from the intersection with the R63) and fencing for the project. The SKA SA is responsible for the delivery of facilities at the site complex; the provision of grid power, optic fibre to the site complex and reticulation on site. Thus, in order to obtain Environmental Authorisation (EA) in terms of the Environmental Impact Assessment (EIA) Regulations of 2006 promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended [NEMA], the Department of Education has appointed Strategic Environmental Focus (Pty) Ltd [SEF] to undertake the EIA process and obtain EA for the following activities, which are to take place on site (namely the Farms of Losberg (73) and Mey's Dam (68)):

- Construction of an on-site complex;
- Construction of a link road between the on-site complex and the KAT 7 and MeerKAT sites; and
- Construction of the MeerKAT configuration.

SEF undertook a full Scoping and EIA process in 2006/2007 for the MeerKAT project. However, this EIA process only investigated a core area of approximately 5km in diameter from the proposed core site of the SKA. The current EIA is required as the proposed on-site complex and MeerKAT configuration falls outside of the previously assessed study area. The current EIA will investigate the entire extents of the Farms Losberg and Mey's Dam in order to allow for development anywhere on the site. Thus, future developments will not require EA, provided that they remain within the Losberg and Mey's Dam farm boundaries.

A-1 LEGAL REQUIREMENTS APPLICABLE TO THIS APPLICATION

The aim of this component of the report is to provide a brief overview of the pertinent policies as well as legal and administrative requirements applicable to the proposed development.

A-1.1 NEMA and Environmental Impact Assessment Regulations

The Environmental Impact Assessment (EIA) process followed is in compliance with the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations (GN. No. R. 385, GN. No. R. 386 and GN. No. R. 387) of 06 April 2006. The proposed development involves 'listed activities', as defined by the NEMA, 1998. Listed activities are activities, which may have potentially detrimental impacts on the environment and therefore require environmental authorisation from the relevant authorising body. The proposed development occurs in the Northern Cape Province and thus the Department of Tourism, Environment and Conservation (DTEC) is the responsible regulatory authority.

The proposed development involves the following listed activities as stipulated in the NEMA EIA Regulations:

As per Government Notice No. R. 386 of 2006, the following listed activities are included:

- 7 "The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic metres but less than 1 000 cubic metres at any one location or site."
- 12 "The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)".
- 13 "The abstraction of groundwater at a volume where any general authorisation issued in terms of the National Water Act, 1998 (Act No. 36 of 1998) will be exceeded."
- 14 "The construction of masts of any material or type and of any height, including those used for telecommunication broadcasting and radio transmission, but excluding –
 - a) masts of 15 metres and lower exclusively used
 - (i) by radio amateurs; or
 - (ii) for lighting purposes
 - b) flag poles; and
 - c) lightning conductor poles".
- 15 "The construction of a road that is wider than 4 metres or that has a road reserve wider than 6 metres, excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 metres long".
- 16(b) "The transformation of undeveloped, vacant or derelict land to - residential, mixed, retail, commercial, industrial or institutional use where such

development does not constitute infill and where the total area transformed is bigger than 1 hectare”.

The above activities are all Basic Assessment activities. However, we confirm that the application will proceed as a Scoping and EIA application, due to the following listed activity as per Government Notice No. 387 of 2006:

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

A-1.2 Other legal requirements

The following list of legislation applicable to biodiversity may or may not be applicable to the proposed development. Its relevance may become clear when the biodiversity is assessed and the impacts are determined during the EIA phase.

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

The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.

National Spatial Biodiversity Assessment

The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to priority levels.

Protected species – Provincial Ordinances

Provincial ordinances were developed to protect particular plant species within specific provinces. The protection of these species is enforced through permitting requirements associated with provincial lists of protected species. Permits are administered by the Provincial Departments of Environmental Affairs.

National Water Act, 1998 (Act No. 36 of 1998)

The National Water Act guides the management of water in South Africa as a common resource. The Act aims to regulate the use of water and activities, which may impact on water resources through the categorisation of 'listed water uses' encompassing water extraction, flow attenuation within catchments as well as the potential contamination of water resources, where the Department of Water Affairs and Forestry (DWAF) is the administering body in this regard.

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

The National Heritage Resources Act legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5

ha. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).

National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)

The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes. According to the legal study (Cameron Cross, 2006); this Act does not have any application to the proposed development.

A-1.3 Development Strategy/Guidelines

A-1.3.1 Kareeberg Municipality Local Integrated Development Plan (IDP)

The Municipal Systems Act (2000) defines the IDP as one of the core functions of a municipality and makes it a legal requirement for every Council to adopt a single, inclusive and strategic plan for the development of its municipality. The IDP is a legal document and a strategic planning instrument, which guides and informs all planning, budgeting, management and decision-making in a municipality.

The Kareeberg IDP highlights agriculture as the most important economic sector in the Municipal area. Agro-industrial development is critically important to the expansion and diversification of the sector and the economic development strategies of the area. Agriculture is the largest employer of labour in the area.

The Municipality's vision, mission and development objectives with regards to socio-economic objectives include:

- The improvement of the safety and security of residents;
- To promote local economic development in the Municipal area;
- To prevent the spread of HIV/Aids in the Municipal area;
- To create job opportunities; and
- To improve the social-economic conditions and quality of life of all the residents

The majority of the Kareeberg Municipality residents are urbanised and reside predominantly within the three main towns in the area, namely: Carnarvon, Vanwyksvlei and Vosburg. Almost all the residents in these towns have access to electricity, water (borehole water) and below standard sanitation facilities and infrastructure. However, the majority of the Municipality is made up of large livestock farms, most of which do not have access to electricity. Water is made available through boreholes as no perennial rivers run through the municipal area.

The Kareeberg Municipality does not have a Spatial Development Framework (SDF) for the entire area; SDFs have only been developed for the towns of Carnarvon, Vanwyksvlei and Vosburg. These detail the limits and possible future development areas within the towns. The vast majority of the Municipality is under livestock farming and will remain so if the Municipality is to grow economically and socially.

A-2 DETAILS OF THE APPLICANT

The details of the project applicant are indicated below.

Name of Applicant	Postal Address	Relevant Numbers
Department of Education (Northern Cape)	Education Building Private Bag X 5029 Kimberley	Tel: (053) 839 6777 Fax: (053) 839 6580
Contact Person: Mr. E. A. B. Williams	Kimberley 8300	

A-3 MOTIVATION FOR THE PROJECT

South Africa together with Australia are on the shortlist to host the SKA, the world's largest radio telescope. The winner of the bid will only be announced in 2011, however, in the interim South Africa is planning to build the MeerKAT in the Northern Cape, where the core of the SKA is hoped to be situated. Building the MeerKAT will prove that South Africa is committed and ready to host the SKA.

The MeerKAT comprises of approximately 80 dishes and together with the Southern African Large Telescope (SALT) they will attract international experts to the country and significantly strengthen South Africa's capacity in astronomy, computing, digital signal processing and radio frequency engineering.

The construction of the MeerKAT (due for completion by 2012) will bring investment into the local area through the provision of bulk services such as newly surfaced roads, grid power and optical fibre networks. The airstrip at Carnarvon is proposed to be upgraded (tarred) by the Department of Transport, Roads and Public Works and the electricity grid expanded.

The MeerKAT is also envisaged to contribute to educational development through its human capital development programme which provides bursaries for undergraduate and postgraduate studies in the field of engineering and science. In addition to this, the MeerKAT outreach programme will include the establishment of a cyber lab in Carnarvon at Carnarvon High School as well as a Mathematics and Science teachers programme.

The construction of the MeerKAT, and hopefully the SKA, will have significant impacts on the socio-economic environment of the area. The local community will benefit through new employment opportunities, especially during the construction

and development phase. Unskilled and semi-skilled workers will be sourced from the local communities. The local economies of the local surrounding towns will be boosted due to visiting scientists and tourists (bringing in foreign currency) who will require accommodation, subsistence and entertainment during their visits to the area. During the operational phase local contractors will be sourced for activities such as the maintenance of buildings and grounds at the on-site complex; housekeeping and security amongst others.

A-4 DESCRIPTION OF THE PROPOSED PROJECT

A-4.1 Location

The proposed activities associated with the SKA project are to be undertaken on the Farms of Losberg (73) and Mey's Dam (68) (also referred to as the 'study area'). These karoo farms are situated almost equi-distance from the local towns of Carnarvon, Williston, Brandvlei and Van Wyksvlei, in the rural area of the Northern Cape (Figure 1).

The R63 is the major arterial road that links the town of Williston and Carnarvon. Approximately 20km from Carnarvon, the Brandvlei road passes by the farms of Losberg and Mey's Dam approximately 100km from its junction with the R63.

The site is currently zoned as agriculture and will require rezoning to a combined agricultural and special scientific zoning. Due to the relatively small footprint of the infrastructure required on site, farmers are able to continue using the area for livestock (sheep) grazing which is the predominant farming activity in the area. The surrounding land uses are also agricultural livestock grazing.

Table 2 lists the co-ordinates of the current and proposed activities or sites within the study area.

Table 2: Co-ordinates of current and proposed activities in the study area

Activity	Co-ordinates	
SKA Core	30° 42' 51.86" S	21° 23' 17.50" E
MeerKAT Core	30° 42' 51.00" S	21° 24' 57.00" E
KAT 7 Core	30° 43' 17.00" S	21° 24' 38.00" E
On-site complex	30° 45' 13.20" S	21° 25' 50.70" E
Access road to the on-site complex (point on the existing farm road)	30° 45' 22.42" S	21° 26' 00.40" E
Link road between the on-site complex and the KAT 7 and MeerKAT sites (Refer to Appendix 4 for a list of Co-ordinates)	Start: 30° 45' 13.20" S	21° 25' 50.70" E
	End: 30° 43' 17.00" S	21° 24' 38.00" E

Figure 1: Locality map indicating the location of the Losberg and Mey's Dam farms in relation to the surrounding towns.

A-4.2 Proposed project operations

A-4.2.1 On-site complex

The on-site complex refers to the on-site facility which will be operational during the construction and operational phases of the KAT 7 and MeerKAT radio telescopes. The on-site complex will be located adjacent to the Losberg Hill on the Farm Losberg (Farm No. 73).

Key factors pertaining to the location of the on-site complex:

- Protection of the radio frequency interference integrity of the telescope instrument location (KAT 7 and MeerKAT) located on the flat plains to the north and west of the Losberg Hill. (i.e. the hill will shield the telescopes from radio frequency interference);
- The Losberg Hill assists in cooling, thus reducing power consumption through active cooling at the on-site complex; and
- The area is accessible via an existing road and will easily be linked up to other existing and proposed infrastructure.

The on-site complex will include the following permanent structures (total footprint area is estimated at 1 757m²):

- Access road of approximately 6 m from the existing farm gravel road (currently being upgraded)
- Construction shed for dishes;
- Covered area for containers;
- Parking & garages;
- A transient accommodation compound;
- Fencing and Security / access control;
- Buildings to house an electronics laboratory, computing facility, with its cooling plant, power supply facilities and all standard civil engineering infrastructure;
- A fuel / diesel storage facility for the stand-by power facility; and
- Water and sewerage infrastructure, which includes boreholes, a water filtration pump, storage tanks and french drains/ septic tanks.

A-4.2.2 Link road between the on-site complex and the KAT 7 and MeerKAT sites

The proposed link road from the on-site complex to the KAT 7 and MeerKAT sites will be approximately 5km long and 5m wide. The proposed link road will consist of an imported wearing course layer (100mm thick) and compacted to 93% MOD AASHTO density. The imported material will be of G4 quality.

A-4.2.3 KAT 7 configuration

The proposed KAT 7 configuration falls within the approved study area of the previous EIA undertaken in 2006/7 and thus does not require assessment in terms of this EIA.

However, the associated infrastructure, such as the link road and trenching of the optical fibre cables, power cables etc are to be assessed within this EIA, thus KAT 7 will be mentioned and referred to in this report.

KAT 7 will consist of seven dishes within 100m of the core site (Table 2). The dishes will be 12m in diameter and approximately 12-13m in height above ground level. A service container (6x3x2.5m) will be located close to configuration which will house ancillaries such as cooling, step-down transformers and optic fibre interfaces.

No other infrastructure is proposed in the immediate surrounds of KAT 7.

A-4.2.4 MeerKAT configuration

The proposed MeerKAT configuration has not been finalized due to the constantly changing nature and dynamics of science. However, it is speculated that 75% of the 80 dishes that make up the MeerKAT configuration will be located within a 1km diameter of the core site, 20% within a 5km diameter and four outer stations within 10km from the core site.

Approximately 7 service containers (as described above) will be provided at clusters of the MeerKAT configuration to provide cooling, power, optic fibre interfaces etc.

SECTION B THE RECEIVING ENVIRONMENT

B-1 BIOPHYSICAL ENVIRONMENT

B-1.1 Geology, Land Types and Soils

The area between Carnarvon and Brandvlei are generally underlain by Permian Karoo Supergroup sediments that have been intruded by Jurassic dolerite. Unconsolidated Quaternary and Tertiary deposits overly the sediments and dolerite.

Shale of the Tierberg Formation underlies most of the KAT site, which in turn is overlain with a surface cover of mostly alluvium and sand. The site is partially surrounded by dolerite capped hills the most prominent of which are Losberg to the southeast, Cronje se kop in the north, Sandberg to the southeast and the partially dolerite capped ridge at the Losberg residence in the south.

The soil cover in the area is generally very shallow (less than 50cm thick). These soil horizons may be similar to typical Mispah, Glenrosa, Brandvlei, Kimberley, Plooyburg, Prieska, Augrabies, Hutton and Addo forms of soil.

B-1.2 Topography

The MeerKAT site is situated in the lower lying areas of the Sakriver, located to the northwest, where the elevations are less than 1100m. The site is extremely flat with dolerite-capped hills surrounding most of the site from the southeast through to the north-northwest (Figure 2).

B-1.3 Wetlands and Hydrology

No wetlands occur on the site. The depth of the water table around the site is generally around 12-20m, although there are a number of boreholes in the area where the water table is less than 5m below the surface.

A few shallow drainage lines do exist on the site and the Ecological Assessment, which will be undertaken during the EIA phase of the project, will provide details of these. The Ecological Assessment to be undertaken will supplement the existing report compiled during the 2006/7 EIA process. Both reports will be included in the EIA Report for this project.

Figure 2: Photo page of the site for the proposed on-site complex. This area is typical of the greater Losberg and Mey's Dam farms.

B-1.4 Climate

The MeerKAT study area falls in a semi-arid region with very little summer rainfall. The area experiences typically desert like conditions with extreme temperatures experienced between day/ night as well as summer/ winter. Summers are typically hot and dry, whereas winters are icy and dry with dew and frost typical during the night.

The overall mean annual rainfall is estimated between 50-400mm per annum but is unreliable and very much lower than the annual evaporation rate, approximately 2300mm per annum. Within approximately 20 years from 1961 to 1990, the area experienced between 2 to 7 days of rainfall greater or equal to 1mm per month, with the winter months experiencing the most number of days.

Maximum temperatures are attained during the months of October to March, with the highest recorded temperature at 41°C during February, and -7 °C during June (Data recorded from 1961 to 1990). Detailed analysis of the weather records gathered from 1961 to 1990 at the nearby weather station at Calvinia, reveal the following:

Table 3: Average temperature and precipitation values for the Northern Cape (Calvinia area)

Season	Temperature (Avg. Daily Max)	Temperature (Avg. Daily Min)	Precipitation (Avg. Monthly rainfall)
Summer (Oct - Mar)	28.8°C	11.5°C	14.2mm
Winter (Apr - Sept)	20.0°C	5.3°C	23.8mm

B-1.5 Flora

The study area falls within the Bushmanland Nama Karoo vegetation type. This vegetation type is dominated by annuals (the highest proportion of all the Nama Karoo types) and non-succulent shrubs. Annuals, such as *Pentzia annua* and Brakspekbos (*Zygophyllum simplex*), are common and together with geophytes comprise nearly 50% of the total number of species in the region. Only 0.03% of this vegetation type is formally conserved.

The eastern portion of the SKA study area falls within the Upper Nama Karoo vegetation type, of which only 0.03% is formally conserved. The Orange River Nama Karoo vegetation type exists to the extreme west and southwest of the proposed sites. The complex geology and rocky terrain promote the establishment of numerous distinct vegetation complexes within the area, of which only 1.47% is formally conserved.

Historical farming practices, such as grazing and ploughing of the lands, were uncontrolled and indiscriminate, resulting in large areas being degraded into a semi-desert state. These degraded areas have been subsequently invaded by alien

species such as Mesquite and Velvet Mesquite (*Prosopis species*), Bitterbos (*Chrysocoma ciliate*), Rhinoceros Bush (*Elytropappus rhinocerotis*) and Resin Bush (*Euryops species*). The karoo vegetation is typically characteristic of small, close to the ground vegetation, but due to degradation and overgrazing the area has become invaded with scrubby vegetation, which is worthless as grazing for livestock or game animals.

A Botanical Assessment will be undertaken to supplement the study conducted during the 2006/7 EIA process. Both reports will be included in the EIA Report.

B-1.6 Fauna

Historically, the Northern Cape was home to herds of Springbuck, Kudu and other antelope. These herds would migrate to different areas in search of succulent vegetation and water.

Due to the proximity to Calvinia and Kimberley, and the long history of settlement and livestock agriculture in the surrounding area, very little of the original mega-fauna remain. Smaller species such as klipspringer, grey and red duiker are abundant in the area. Many other smaller mammals such as hares, bat-eared foxes, mongooses etc are prevalent in the area.

The most common birds encountered during the Scoping phase were the various Karoo Lark species, Sociable Weavers and numerous birds of prey such as the Pale Chanting Goshawk, Greater Kestrel and the Steppe Eagle. Numerous threatened and near threatened bird species are known in the Northern Cape, however the majority of these are vultures and eagle species which would only include the KAT site within their hunting territories, they would roost and nest in the surrounding mountainous areas. The construction of the dishes should not greatly affect the bird populations within the area.

However, the sociable weavers could pose a problem for the KAT 7 and MeerKAT configurations as these birds build massive communal nests, usually in trees



(Figure 3). The dishes, may pose potentially favourable nesting sites and thus, mitigation measures would have to be put in place to prevent this.

An Ecological Assessment, dealing with issues such as fauna, flora, ecological systems etc will be undertaken and will supplement the existing report compiled during the 2006/7 EIA process. Both reports will be included in the EIA Report.

Figure 3: Sociable weaver nest on a telephone pole.

B-1.7 Noise

Due to the location of MeerKAT project being on and surrounded by large farms with homesteads situated several meters/ kilometres away, the construction and future existence/ maintenance of the MeerKAT will not result in any noticeable noise disturbance.

B-2 SOCIAL ENVIRONMENT

B-2.1 Visual

Large livestock farms surround the site. The entire area is relatively flat and extends as far as the eye can see (Figure 2). Due to the topography of the area, the proposed activities may have an impact on the visual character of the area. A Visual Impact Assessment (VIA) would therefore be undertaken to determine possible mitigation measures and will form part of the EIA Report. The VIA to be undertaken for this current EIA process will supplement the existing VIA Report which was compiled during the 2006/7 EIA process. Both reports will be included in the EIA Report.

B-2.2 Heritage Resources

Although no sites of cultural historical significance were detected on site, a specialist Heritage Impact Assessment (HIA) will be undertaken in the EIA phase of the proposed development in order to assess the entire site, and discuss the significance of the site in terms of culture and heritage and proposed mitigation measures where necessary.

B-2.3 Socio-Economics

The proposed MeerKAT development will have several positive and possibly negative impacts on the socio-economic characteristics of the area. A Social Impact Assessment was undertaken during the 2006/7 EIA process. The specialist report will be attached to the EIA Report.

SECTION C ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

C-1 APPROACH TO THE EIA

An Environmental Impact Assessment (EIA) is a good planning tool. It identifies the environmental impacts of a proposed project and assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way.

The EIA for this project complies with the NEMA EIA Regulations of the Department of Environmental Affairs and Tourism (DEAT). The guiding principles of an EIA are listed below.

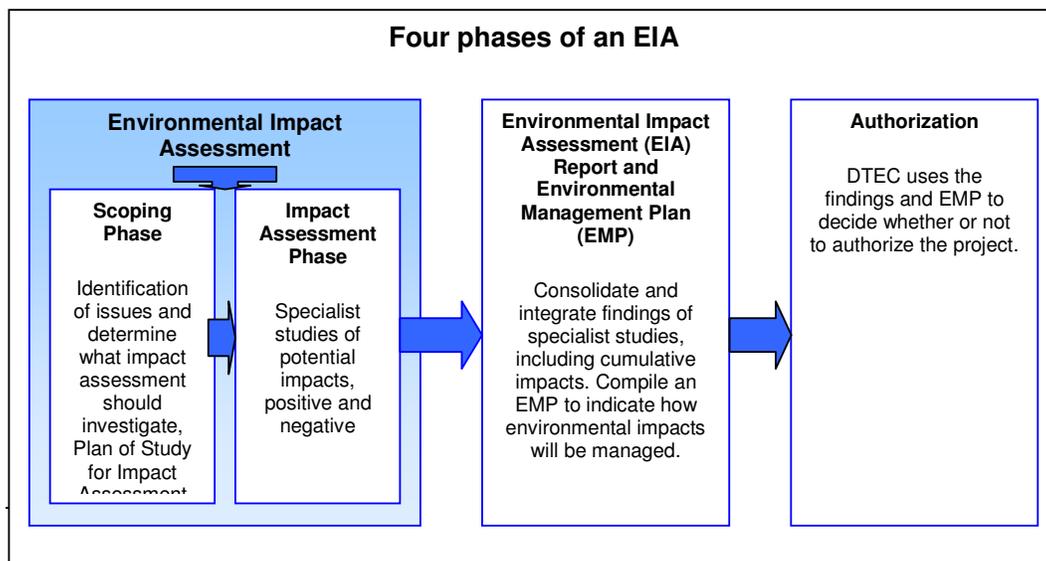
Box 1. Definition of the term "environment"

The term "environment" is used in the broadest sense in an environmental impact assessment. It covers the physical, biological, social, economic, cultural, historical, institutional and political environments.

C-2 GUIDING PRINCIPLES FOR AN EIA

- The EIA must take an open participatory approach throughout. This means that there should be no hidden agendas, no restrictions on the information collected during the process and an open-door policy by the proponent. Technical information must be communicated to stakeholders in a way that is understood by them and that enables them to meaningfully comment on the project.
- There should be ongoing consultation with interested and affected parties. Sufficient time for comment must be allowed. The opportunity for comment should be announced on an on-going basis.
- There should be opportunities for input by specialists and members of the public. Their contributions and issues should be considered when technical specialist studies are conducted and when decisions are made.

An EIA typically has four phases, as illustrated in the flow diagram below.



C-3 EIA TECHNICAL PROCESS

This section provides a summary of the technical process followed for this EIA.

C-3.1 Pre-application consultation with DTEC

The Northern Cape Department of Education, SEF and members of the SKA Team conducted a pre-application meeting with the authorities (DTEC) on Monday, 02 June 2008. DTEC was informed about the proposed project and obtained its specific requirements prior to submission of the Scoping Report.

C-3.2 Application for authorization

An application for authorization was submitted to DTEC on 03 June 2008.

C-3.3 Information gathering

Early in the EIA process, the technical specialists identified the information that would be required for the impact assessment and the relevant data were obtained. In addition, the specialists sourced available information about the receiving environment from reliable sources, interested and affected parties, previous documented studies in the area and previous EIA Reports. The EIA team and specialists then visited the site to gain first-hand information and an understanding of the existing operations and the proposed project.

C-3.4 Specialist studies

The following specialist studies were identified to be undertaken during the EIA:

- Botanical Assessment;
- Heritage Impact Assessment;
- Visual Impact Assessment; and
- Ecological Impact Assessment.

The following specialist studies have been undertaken already and the relevant information from these specialist studies will be incorporated into the EIA. These studies include:

- Botanical Assessment;
- Heritage Impact Assessment; and
- Visual Impact Assessment.

C-4 PUBLIC PARTICIPATION PROCESS

The principles of NEMA govern many aspects of EIAs, including consultation with interested and affected parties (I&APs). These principles include the provision of sufficient and transparent information to I&APs on an ongoing basis, to allow them to comment, and ensuring the participation of historically disadvantaged individuals, including women, the disabled and the youth.

C-4.1 Identification of interested and affected parties

Interested and affected parties (I&APs) representing the following sectors of society have been identified (see Appendix 3 for a complete I&AP distribution list):

- Provincial and local government:
- Agriculture, including local landowners:
- Community Based Organisations: and
- Non-Governmental Organisations.

All I&APs registered on the database of the previous EIA conducted in 2006/7 were also notified of the current EIA process and given the opportunity to register on the current EIA process.

C-4.2 Public announcement of the project

The project was announced as follows:

- Publication of a media advertisement in two local newspapers (Diamond Fields Advertiser and the Noordwester) and one national newspaper (Die Burger) on Friday 13 June 2008 (see Appendix 3).
- On-site notices advertising the EIA have been placed at the following locations on Wednesday and Thursday 11 & 12 June 2008 (see Appendix 3):
 - On site near the Losberg Farmstead;
 - On site at the intersection of the Brandvlei road and the Losberg farm road;
 - On site at the intersection of the Brandvlei road and the Mey's Dam farm road;
 - In the Williston post office; and
 - In the Carnarvon post office.
- Distribution of letters by fax/post/email to I&APs on Thursday 12 June 2008 (see Appendix 3).
- Distribution of Background Information Documents and Registration and Comment sheets by fax/post/email to I&APs on Thursday 12 June 2008 (see Appendix 3).

C-4.3 Draft Scoping Report

All the issues raised to date were captured in this Draft Scoping Report which is available in English. The EIA Regulations specify that I&APs must have an opportunity to verify that their issues have been captured. A period of 30 calendar days will be available for public comment on the Draft Scoping Report. The availability of the Draft Scoping Report was announced through letters (distributed either via fax/ email/ post) to all the registered I&APs on the database.

In addition, the Draft Scoping Report was distributed for comment as follows:

- left in public places;
 - Hardcopies of the Scoping Report were available at the Williston, Carnarvon and Brandvlei post offices;
- Electronic copies on CD was couriered to the relevant authorities and key stakeholders; and
- Mailed to I&APs who requested copies.

C-4.4 Final Scoping Report

The Final Scoping Report will be prepared after the end of the public review period, which started on **01 August 2008** and ends on **01 September 2008**. It will be updated with additional issues raised by I&APs and new information generated as a result.

C-4.5 Public participation during the Impact Assessment Phase

Public participation during the Impact Assessment Phase of the EIA will revolve around a review of the findings of the EIA and inputs into the Environmental Management Plan (EMP). The findings will be presented in a Draft Environmental Impact Assessment Report and EMP and the volume of specialist studies.

SECTION D ASSESSMENT OF IMPACTS

D-1 IDENTIFICATION OF IMPORTANT ENVIRONMENTAL ISSUES

The key issues listed in the following section have been determined through an internal process based on similar developments, environmental scoping and public participation process as well as a site visit.

The potential impacts and key issues identified include:

- Impact on erosion;
- Impacts on ecological functioning;
- Impacts on heritage and culture;
- Impacts on flora and fauna;
- Impacts on agriculture;
- Safety and security;
- Socio-economic impact; and
- Impact on visual character.

Further details associated with the construction and operation of the various activities as listed in the Project Description will be discussed in detail in the EIA Report. The EIA Report will assess the impacts of each of the activities as well as ascertain the cumulative impacts of the development in totality. The EIA Report will outline the necessary mitigation measures and delineate sensitive areas containing species of conservation importance and habitats integral to maintenance of ecosystem function.

D-2 SUMMARY OF ANTICIPATED IMPACTS

Table 4: Summary of anticipated impacts as identified during the Scoping phase of the EIA process

Environmental Aspect	Relevant Area	Environmental Objective	Potential Impacts	Additional Investigations	Potential Mitigation
PHYSICAL					
Geology and soils	Site	To ensure that the foundations are suitable for development and/or the necessary measures are implemented in order to ensure its suitability. To ensure that the site does not present any mining potential in the future, so as to ensure the sustainability of the KAT.	Subsidence, cracking of built structures, unstable foundations.	Geotechnical Study (Study from the 2006/7 EIA to be included in the current EIA Report)	Engineering techniques. Careful placement of the individual dishes and research house.
Agriculture	Site	To ensure that the agricultural potential of the land is not lost through the proposed development. To ensure that livestock farming may in fact continue once the dishes have been erected.	Livestock and other farming may need to be excluded from the site or specific areas within the site.	Agricultural impact assessment (new study no required) (Study from the 2006/7 EIA to be included in the current EIA Report)	Careful placement of the individual dishes. Delineation of important agricultural areas.
Terrestrial Ecology	Regional	To ensure that species of conservation importance are identified and preserved. To ensure that the ecological integrity and functionality of the system is maintained.	Fragmentation of habitat, loss of species of conservation importance, loss of biodiversity, disruption of natural processes and functionality.	Ecological Assessment, which includes: Vegetation; Herpetological; Invertebrates; Avifaunal as well as hydrological and other ecosystem impacts. (Study from the 2006/7 EIA to be included in the current EIA Report)	Delineation of sensitive habitats, species of conservation importance and migration corridors.

Proposed Karoo Array Telescope (MeerKAT) on Farms Losberg (73) and Mey's Dam (68)
DRAFT SCOPING REPORT

Environmental Aspect	Relevant Area	Environmental Objective	Potential Impacts	Additional Investigations	Potential Mitigation
SOCIAL SURROUNDINGS					
Safety & Security	Site	To assure safety within the site, particularly to prevent injury to people and livestock.	Threats to safety of residents and livestock.	N/A	Engineering techniques during construction to ensure steadfast structures.
Visual aspects	Regional	To minimise light and visual pollution; To ensure that the development blends in with the landscape character; and To maintain an undisrupted skyline.	Visual Impacts; Alteration of Landscape Character	Visual Impact Assessment (Study from the 2006/7 EIA to be included in the current EIA Report)	Utilisation of colours and materials which blend in with the natural landscape, minimise the use of lighting and select low intensity lighting; and Non intrusive architectural design.
Heritage and Culture	Site	To ensure that all buildings, artefacts and symbols of culture and heritage significance are identified and preserved.	Loss of significant symbols of heritage and culture.	Heritage Impact Assessment (Study from the 2006/7 EIA to be included in the current EIA Report)	Identification and mapping of sites and artefacts worthy of preservation. Delineation of buffer zones.
Socio-economic	Regional	To assure that the development is sustainable through community upliftment and involvement as well as the procurement of local people; To generate revenue for the local tourism industry; Employment, transfer of skills and training.	Employment, Social upliftment; Increased investments in the area.	Socio-Economic Assessment (new study not required) (Study from the 2006/7 EIA to be included in the current EIA Report)	Procurement policies and integration of local communities.

D-2 ASSESSMENT METHODOLOGY

D-2.1 Identification of important environmental issues

The identification of issues and impacts listed in the following sections were determined during the environmental scoping phase through an internal process based on similar developments, desk top studies, site visits and previous the 2006/7 EIA process undertaken by SEF. The potential impacts and key issues identified, included:

- Botanical impacts;
- Heritage and Cultural impacts;
- Visual impacts;
- Ecological impacts; and
- Socio-economic impacts.

D-2.2 Specialist studies

The following specialist studies were identified to be undertaken during the EIA:

- Botanical Assessment;
- Heritage Impact Assessment;
- Visual Impact Assessment; and
- Ecological Impact Assessment.

The following specialist studies have been undertaken already and the relevant information from these specialist studies will be incorporated into the EIA. These studies include:

- Botanical Assessment;
- Heritage Impact Assessment; and
- Visual Impact Assessment.

D-2.2.1 Assessment procedure for specialist studies

Terms of Reference (ToR) drafted by SEF for the specialist studies commissioned within the current EIA process included criteria for the description and assessment of environmental impacts. These criteria are drawn from the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of NEMA. Each significant impact will be assessed using the example of the procedure explained below:

IMPACTS ON VEGETATION

Impacts on rare and endangered species

Table 3: Impacts on rare and endangered species

Nature		Status	-
Impact source(s)			
Affected stakeholders			
Magnitude	<i>Extent</i>		
	<i>Intensity</i>		
	<i>Duration</i>		
	<i>Reversibility</i>		
	<i>Probability</i>		
Significance	<i>Without mitigation</i>		H
	<i>With mitigation</i>		L
Confidence			

- **Source of the impact:** provide a description of the activities that cause the impact to occur (e.g. initial vegetation clearance on site, establishment of construction camp, passage of vehicles on dirt roads, etc).
- **Description of the impact:** this must describe the interaction between the activity and the environment, i.e. how and why the impact occurs and how the activity changes the environment. This is the essence of environmental impact assessment and probably the most important part of the entire report. This description must be site-specific and indicate the location(s) where the impacts are expected to occur. The discussion should focus only on the elements of the environment that will be impacted. If there are other elements of the environment that have been surveyed, but which will not be affected, then these should not be mentioned here. Long lists of species that occur in the broader project area, for instance, must not be included here but rather placed in an appendix.
- **Significance:** an explanation of the significance rating of the impact with and without mitigation, with reference to the impact assessment criteria. If all assessment criteria are rated high, long term, etc. it will probably be clear why the impact is rated as being highly significant. If, however, some criteria are rated as high while others are rated as low, it must be explained which criteria were key in assigning a significance rating and how the significance rating was derived. If the impact is regarded as a fatal flaw in spite of the application of mitigation measures, this must be clearly stated together with reasons.
- **Mitigation:** The mitigation measures that can be implemented to eliminate or minimise negative impacts or result in the optimisation of positive benefits must, wherever possible, be expressed as practical actions. In this section, mitigation measures must be specified for the specific impacts being

considered. The nature of the mitigation must be commensurate with the value of the resource and the significance of the impact(s) on that resource.

D-2.2.3 Mitigation measures

Mitigation measures should be recommended in order to enhance benefits and minimise negative impacts and they should address the following:

a) Mitigation objectives: what level of mitigation must be aimed at?

For each identified impact, the specialist must provide mitigation objectives (tolerance limits) which would result in a measurable reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make an “educated guess” based on his / her professional experience.

b) Recommended mitigation measures

For each impact the specialist must recommend practical mitigation actions that can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided.

c) Effectiveness of mitigation measures

The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions, where possible.

D-3 ASSESSMENT CRITERIA FOR ASSESSING IDENTIFIED IMPACTS

The identification and assessment of environmental impacts is a multi-faceted process, which combines quantitative and qualitative descriptions and evaluations. It involves the application of scientific measurements and professional judgement to determine the significance of environmental impacts associated with the proposed project. The process involves consideration of *inter alia*: the purpose and need for the project; views and concerns of interested and affected parties, general public interest; and environmental legislation and guidelines.

The generic criteria and systematic approach used to identify, describe and assess impacts are outlined below. The assessment of the impacts has been conducted according to a synthesis of criteria required by the integrated environmental management procedure.

D-3.1 Nature of Impact

This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. Its description should include the receiving environment and how it is impacted.

D-3.2 Extent

The physical and spatial size of the impact, which is classified as:

- i. Local:
The impacted area extends only as far as the activity, e.g. a footprint of proposed activity.
- ii. Site:
The impact could affect the whole, or a measurable portion of the above mentioned property.
- iii. Regional:
The impact could affect the area including the neighbouring farms the transport routes and the adjoining towns.

D-3.3 Duration

The lifetime of the impact; this is measured in the context of the life-time of the proposed base.

- i. Short term (0-5 years):
The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any proposed phases.
- ii. Medium term (5-15 years):
The impact will last up to the end of the phases, where after it will be entirely negated.
- iii. Long term (duration of operation):
The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter.
- iv. Permanent:
The only class of impact, which is considered non transitory. Mitigation, either by man or natural process, will not occur in such a way or in such a time span that the impact can be considered transient.

D-3.4 Intensity

This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project. Is the impact destructive, or benign? Does it destroy the impacted environment, alter its functioning, or render it slightly altered? These are rated as:

- i. None:
No known impacts
- ii. Low:
The impact alters the affected environment in such a way that the natural processes or functions are not affected.
- iii. Medium:
The affected environment is altered, but function and process continue, albeit in a modified way.

iv. High:

Function or process of the affected environment is disturbed to the extent that it temporarily or permanently ceases.

D-3.5 Probability

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows:

i. Improbable

The possibility of the impact occurring is very low, due to the circumstances, design or experience.

ii. Probable

There is a possibility that the impact will occur to the extent that provisions must be made to mitigate the impacts.

iii. Highly probable

It is most likely that the impacts will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity.

iv. Definite

The impact will take place regardless of any prevention plans, and thus mitigatory actions or contingency plans must be relied on to contain the effect.

D-3.6 Determination of significance – without mitigation

Significance is determined through a synthesis of impact characteristics, and is an indication of the importance of the impact in terms of both physical extent and time scale. The significance of the impact “without mitigation” is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as “positive”. Significance is rated on the following scale:

i. No significance

The impact is not substantial and does not require any mitigation action.

ii. Low

The impact is of little importance, but may require limited mitigation.

iii. Medium

The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.

iv. High

The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

D-3.7 Determination of significance – with mitigation

Significance is determined through a synthesis of impact characteristics. It is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. In this case the

prediction refers to the foreseeable significance of the impact after the successful implementation of the suggested mitigation measures. Significance with mitigation is rated on the following scale:

- i. No significance
The impact will be mitigated to the point where it is regarded to be insubstantial.
- ii. Low
The impact will be mitigated to the point where it is of limited importance.
- iii. Low to medium
The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels.
- iv. Medium
Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw.
- v. Medium to high
The impact is of great importance. Through implementing the correct mitigation measures the negative impacts will be reduced to acceptable levels.
- vi. High
The impact is of great importance. Mitigation of the impact is not possible on a cost-effective basis. The impact continues to be of great importance, and, taken within the overall context of the project, is considered to be a fatal flaw in the project proposal. This could render the entire development option or entire project proposal unacceptable.

D-4 ASSESSMENT WEIGHTING

D-4.1 Ranking, Weighting and Scaling

Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it was necessary to weigh and rank all the criteria.

For each impact being assessed, a scaled weighting factor is attached to each respective impact (refer to Figure 4). The purpose of assigning such weights serves to highlight those aspects that are considered the most critical to the various stakeholders and ensure that each specialist's element of bias is taken into account. It also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of impact in terms of the potential effect that the aspect could have on the surrounding environment.

Therefore, the aspect, which is considered to have a greater importance, will be given a higher weighting than that which is of lower importance.

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Mitigated Aspects (MA)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2		Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	Medium 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4		Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	High 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

Figure 4: Description of assessment parameters with their respective weighting

D-4.2 Identifying the Potential Impacts Without Mitigation Measures (WOM)

Following the assigning of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (before the implementation of any mitigation measures).

Equation 1:

$$\text{Significance Rating (WOM)} = (\text{Extent} + \text{Duration} + \text{Intensity} + \text{Probability}) * \text{Weighting Factor}$$

D-4.3 Identifying the Potential Impacts With Mitigation Measures (WM)

However, in order to gain a more comprehensive understanding of the overall significance of the impact, it was necessary to quantify it upon the implementation of the necessary mitigation measures.

The most effective means of deriving a quantitative value of mitigated impacts is to assign each WOM value a mitigation effectiveness (ME) rating (refer to Figure 6). The allocation of such a rating is a result of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2:

$$\text{Significance Rating (WM)} = (\text{Significance Rating Without Mitigation}) * \text{Mitigation Efficiency}$$

or $WM = WOM * ME$

SECTION E ALTERNATIVES

E-1 IDENTIFICATION OF ALTERNATIVES

Due to the specific requirements in terms of technology and science limited alternatives can be investigated for the proposed activities on site.

E-2 FEASIBLE ALTERNATIVES

The only feasible alternative considered during this application for Environmental Authorisation is the treatment of the sewage or effluent generated at the on-site complex.

The alternatives to be investigated in detail are as follows:

- Preferred alternative: Septic tanks with soak aways
- Alternative: Septic tanks with wetlands

The no-go alternative for the entire project will also be discussed and evaluated in the EIA Report.

SECTION F CONCLUSION AND RECOMMENDATIONS

Based on the findings of this Scoping Phase, the following specialist studies are still to be conducted:

- Ecological Impact Assessment

All impacts associated with all activities proposed for the farms of Losberg and Mey's Dam will be investigated and reported on during the EIA phase of the process.

Proposed

SECTION C

Appendix 1:

Appendix 2:

Appendix 3:

Appendix 4: