

**DEVELOPMENT OF A LODGE
FACILITY IN MKHUHLU,
MPUMALANGA PROVINCE**

**General Ecological and
Biodiversity Report**

Khantshi Ndivhuho

THOMATREE FAMILY



T

MAY 2019

Declaration of Consultants independence

Specialist declaration

I, declare that -

- I act as an independent specialist in this application;
- I have performed the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity;
- I have expertise in conducting the specialist report relevant to this application, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the relevant environmental legislation, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in this project;
- I undertake to disclose to the applicant and the authorities all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this report are true and correct.

Contents

EXECUTIVE SUMMARY	3
1. INTRODUCTION.....	4
1.1 SCOPE OF STUDY.....	4
2. REGULATORY AND LEGISLATIVE OVERVIEW	6
3. METHODS AND REPORTING	9
3.1 Assumptions, Uncertainties and Limitations.....	9
3.2 General.....	9
3.3 Vegetation & Habitats	9
3.4 Terrestrial Fauna	10
3.5 Ecological importance and sensitivity rating of habitats	10
4. DESCRIPTION OF AFFECTED ENVIRONMENT CONSERVATION STATUS.....	11
4.1. Location.....	11
4.2. Conservation Status.....	11
4.3. Representative views from the study area.	12
4.1 Fine-scale Vegetation Patterns	13
4.2 Listed Plant species	13
4.3 Site Sensitivity Assessment	15
4.4 Identification of Risks and Potential Impacts.....	15
5. IMPACT ASSESSMENT.....	16
5.1 Assessment and significant criteria	16
5.2 Nature of the Impacts.....	16
5.3. Extent of the Impacts	16
5.4 Duration of the Impact.....	17
5.5 Activity for Inclusion in the Draft EMP	17
6. DISCUSSION	19
7. RECOMMENDATIONS FOR MONITORING	19
9. REFERENCES.....	22

EXECUTIVE SUMMARY

Phaskani Msiska has developed a lodge facility along the Hazyview – Kruger Gate road R536 on the farm Cork 295-KU in Mpumalanga Province. The development will cater for both local and international tourist, with a maximum of 15 room's accommodation and the area coverage is approximately 6 ha in extent. In terms of the Environmental Impact Assessment (EIA) Regulations of 2014 as amended under the National Environmental Management Act (NEMA) (Act No. 107 of 1998), the development requires an environmental authorization to proceed.

As part of the EIA process, biodiversity specialist report must be compiled which comprise of an assessment and detail of the potential impacts of the development on the flora and fauna at the area. The possible impacts of the development on the ecological functioning of the area are assessed and outline possible mitigation measures, rehabilitation procedures and or vegetation removal procedures that would reduce the potential impacts of the development. According to Mucina and Rutherford (2006), the study area falls under the Pretoriuskop Sour Bushveld vegetation unit of the Lowveld Bioregion in the Savannah Biome.

After a week stay in the site, an extensive desktop study were conducted and the results used to generate ecological analysis information of the area in review. To these ends, NEDA Resources has appointed Thoma Tree Family to perform a specialist biodiversity assessment of the site as part of the EIA process. The purpose of this study is to characterise and describe the terrestrial environment, habitats and species present at the site and provide an assessment of the likely impacts of the development of a Lodge facility at the site.

1. INTRODUCTION

Background

Phaskani Msiska has developed a lodge facility at Cork, along R536, approximately 30 km away from Hazyview in Mpumalanga Province. The development will cater for a both local and international tourist, with a maximum of 15 room's accommodation and the area coverage is approximately 6 ha in extent. In terms of the Environmental Impact Assessment (EIA) Regulations of 2014 as amended under the National Environmental Management Act (NEMA) (Act No. 107 of 1998), the development requires an environmental authorization to proceed.

The broad terms of reference for the assessment include the following:

- Assess and detail the potential impacts of development on both vegetation and fauna at the site.
- Outline possible mitigation measures, rehabilitation procedures and or vegetation removal procedures that would reduce the potential impacts of the development.
- Identify and rate the significance of potential impacts and outline additional management guidelines.

The detailed terms of reference for the study are described below.

1.1 SCOPE OF STUDY

Vegetation Study

- Carry out fieldwork to locate and describe the current state of vegetation on the study area, key focus on the impact footprint(s) for site, so that there is a baseline description/status quo against which impacts can be identified and measured.
- Determine the species present and localities within each vegetation types.
- Generate a vegetation map showing the site in relation to any Critical Biodiversity Areas and links to ecological corridors and support areas, vegetation sensitivity, disturbed, transformed and potential "no-go" areas.
- Determine whether the study area falls wholly or partially within the distribution range of species listed as Vulnerable, Endangered or Critically Endangered and Protected.
- Provide site photos that show the current state of the vegetation (i.e. natural, transformed, disturbed etc.) Identify and describe the conservation value and

conservation planning frameworks relevant to this site (Regional Planning) for represented vegetation units.

- A detailed list of species of special concern.
- An indication of the irreplaceability value of vegetation types present on site.
- Describe the areas where indigenous vegetation has been transformed.
- Determine alien species present; their distribution within the study area and recommended management actions.
- A description of different micro-habitats, and the species associated with those habitats.
- Note and record the position of unusually large specimens of trees.
- Describe the potential direct, indirect and cumulative negative and positive impacts of the proposed activity on vegetation species during the construction, operation and decommissioning phases of the project.
- Identification of issues and potential direct, indirect and cumulative biodiversity impacts, which are to be considered in combination with any additional relevant issues that may be raised through the public consultation process. These include:
 - The cumulative impact of clearing for the construction of solar facilities on floral species of concern both on the farm and in the greater area.
 - Disclose any gaps in information or assumptions made.
 - Recommendations for mitigatory measures to minimise impacts identified.
 - An outline of additional management guidelines.
- Provide monitoring requirements, mitigation measures and recommendations in a table format as input into the Environmental Management Plan (EMP), as well as generic rehabilitation and re-vegetation guidelines.

Fauna/ Study

- Carry out fieldwork to describe and assesses the current state of terrestrial fauna in the area so that there is a baseline description/status quo against which impacts can be identified and measured.
- Conduct a faunal assessment that can be integrated into the ecological study.
- Describe the existing impacts of current land use as they affect the fauna.
- Describe the different micro-habitats, and the species associated with those habitats.
- Describe the potential direct, indirect and cumulative negative and positive impacts of the proposed activity on inhabitant and reliant faunal species during the construction, operation and decommissioning phases of the project.
- Provide a detailed fauna sensitivity map of the site, including mapping of faunal community disturbance, transformation and potential "no-go" areas on site.
- Clarify species of special concern (SSC) and that are known to be: endemic to the region; o that are considered to be of conservational concern; o that are in commercial trade (CITES listed species); o or, are of cultural significance.
- A description of species composition and conservation status in terms of protected, endangered or vulnerable faunal species.
- This description will include species which are likely to occur within, traverse across or forage within the proposed project area, as well as species which may

not necessarily occur on site, but which are likely to be impacted upon as a result of the proposed development.

- Identification of issues and potential direct, indirect and cumulative biodiversity impact which are to be considered in combination with any additional relevant issues that may be raised through the public consultation process, These include:
 - ✓ The cumulative impact of clearing for the construction of solar facilities on faunal species of concern both on the farm and in the greater area.

General Considerations:

- Disclose any gaps in information or assumptions made.
- Recommendations for migratory measures to minimise impacts identified,
- An outline of additional management guidelines.
- Provide monitoring requirements, mitigation measures and recommendations in a table format as input into the Environmental Management Plan (EMP) for faunal related issues,

A description of the potential impacts of the development and recommended mitigation measures are to be provided which will be separated into the following project phases:

- Construction
- Operational phases

2. REGULATORY AND LEGISLATIVE OVERVIEW

A summary of the relevant portions of the Acts which govern the activities and potential impacts to the environment associated with the development are listed below. Provided that standard mitigation and impact avoidance measures are implemented, not all the activities listed in the Acts below would actually be triggered.

National Environmental Management Act (NEMA) (Act No 107, 1998):

NEMA requires that measures are taken that "prevent pollution and ecological degradation; promote conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development." In addition:

- That the disturbance of ecosystems and loss of biological diversity are avoided, or where they cannot be altogether avoided, are minimised and remedied:
- That a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
- Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in

management and planning procedures, especially where they are subject to significant human resource usage and development pressure.

Environment Conservation Act (ECA) (No 73 of 1989 Amendment Notice No. RI 183 of 1997)

This Act provides for the effective protection and controlled utilisation of the environment. This Act has been largely repealed by NEMA, but certain provisions remain, in particular provisions relating to environmental impact assessments. The ECA requires that developers must undertake Environmental Impact Assessments (EIA) for all projects listed as a Schedule 1 activity in the EIA regulations.

National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004):

The National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The Draft National List of Threatened Ecosystems (Notice 1477 of 2009, Government Gazette No 32689, 6 November 2009) has been gazetted for public comment. The list of threatened terrestrial ecosystems supersedes the information regarding terrestrial ecosystem status in the NSBA 2004. In terms of the EIA regulations, a basic assessment report is required for the transformation or removal of indigenous vegetation in a critically endangered or endangered ecosystem regardless of the extent of transformation that will occur. However, all of the vegetation types within and surrounding the study site are classified as Least Threatened.

The Act provides for listing of species as threatened or protected, under one of the following categories:

- Critically Endangered: any indigenous species facing an extremely high risk of extinction in the wild in the immediate future.
- Endangered: any indigenous species facing a high risk of extinction in the wild in the near future, although it is not a critically endangered species.
- Vulnerable: any indigenous species facing an extremely high risk of extinction in the wild in the medium-term future; although it is not a critically endangered species or an endangered species.
- Protected species: any species which is of such high conservation value or national importance that it requires national protection. Species listed in this category include, among others, species listed in terms of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

NEMBA also deals with endangered, threatened and otherwise controlled species, under the TOPS Regulations (Threatened or Protected Species Regulations). These regulations deal with the hunting industry as well as any other activities which involve the

cultivation, keeping or impacting listed species. A permit is required for any listed activities involving protected or endangered species. These permits are usually administered by the provincial authorities and may take the form of an Integrated Permit, which covers both the provincial and national TOPS requirements.

Apart from the TOPS regulations NEMBA also provides for the regulation of certain activities, known as Restricted Activities. These activities may not proceed without environmental authorization. Those relevant to the current study are listed below.

Under the Environmental Impact Assessment Regulations Listing Notice 3 of 2014 the following activities are likely to be triggered:

Activity 6 The development of resorts, lodges, hotels and tourism or hospitality facilities F(i)(gg) Areas within 10 kilometers from national parks or world heritage sites or 5 kilometers from any other protected area identified in terms of NEMPAA or

And, under Environmental Impact Assessment Regulations Listing Notice 1 of 2010 (R.546):

Activity 27. The clearance of an area of 1 hectare or more, but less than 20 hectares of Indigenous vegetation, except where such clearance of indigenous vegetation is required for— i) the undertaking of a linear activity; or
(ii) Maintenance purposes undertaken in accordance with a maintenance management plan.

Conservation of Agricultural Resources Act (Act 43 Of 1983)'

The Conservation of Agricultural Resources Act provides for the regulation of control over the utilisation of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. The Conservation of Agricultural Resources Act defines different categories of alien plants and those listed under Category 1 are prohibited and must be controlled while those listed under Category 2 must be grown within a demarcated area under permit. Category 3 plants includes ornamental plants that may no longer be planted but existing plants may remain provided that all reasonable steps are taken to prevent the spreading thereof, except within the flood line of water courses and wetlands.

Although several listed invasive species were observed at the site, such as Lantana Camara, and Dychrostachys senaria, the abundance and density of alien plants at the site was generally low, Alien species were largely associated with disturbed areas such as around the fence.

3. METHODS AND REPORTING

3.1 Assumptions, Uncertainties and Limitations

The results and recommendations of the report are based on the actual site status. Assumptions that are made and uncertainties that are encountered are indicated in the report (where applicable). As indicated under the relevant sections in the report consultation of authorities' data bases forms part of this report.

The faunal survey was not a comprehensive specialist survey but rather an overview of the available habitats and their potential to be utilized by fauna. No nocturnal surveys were conducted.

3.2 General

The author relied on aerial images and orthophotos to remotely assess the site before the actual on site investigation in order to get familiarized with the different features and vegetation communities (habitats) present within the affected areas.

The information thus gathered was used for selecting survey sites and to identify possible sensitive areas. Problematic, as well as potential sensitive areas were identified during the site assessment and these were thoroughly investigated as explained in the following two sections. All literature and other references used to support findings and to assist in making conclusions are listed. Illustrations of the environment and typical habitats are included with section 4.

3.3 Vegetation & Habitats

Floral diversity was determined by completing survey transects and sample sites along all the different habitats within the physiographic zones represented in the study area (Deal *et al.* 1989). In order to attain scientifically reliable results, obviously distinct vegetation communities were surveyed by selecting representative sites in each homogenous unit (Mathews *et al.* 1992). The vegetation units of Mucina & Rutherford (2006) are used as reference but where necessary communities are named according to a unit's diagnostic floral feature and/or topographical setting or other biophysical features (or a combination of several descriptive features). By combining the available literature with the survey results, stratification of vegetation communities was possible. The survey transects and sites in the affected areas were also intensively searched for important species and the potential for Red Data Listed (RDL) and other important species were established and cross referenced with PRECIS Data for the relevant quarter degree grid/s (POSA) as obtained from the SANBI data base. The aim was to identify distinct vegetation types and to establish their integrity and representation in the study area.

3.4 Terrestrial Fauna

The fauna investigation is based on a desktop study verified by cross reference with available habitats of the study area in order to establish the faunal potential. All fauna that were observed during field trips and floral surveys were also recorded.

However, selected survey sites were searched for fauna and habitats were identified during the vegetation surveys so as to establish the faunal potential of a particular area.

3.5 Ecological importance and sensitivity rating of habitats

By considering the results of all the above investigations, the authors allocate a qualitative sensitivity rating to the habitat that were identified, based upon its ecological importance and biodiversity value. A qualitative method was chosen at the first stage of assessment instead of a quantitative method in order to simplify the procedure of assessment. In order to simplify the decision making process, a scale of *Low*, *Medium*, *High* and *Very High* is used, based upon biodiversity value and ecological functions (Table 3.1). This method is used as a first level of expressing the sensitivity of a specific component and is not used in comparative assessments of alternatives where a quantitative approach will be more appropriate.

Table 3.1 Criteria used for sensitivity rating of habitats

Ecological Importance/Biodiversity Value Sensitivity

Ecological Importance/Biodiversity Value	Sensitivity Rating
Terrestrial and Riparian Communities	
Natural communities (habitats and ecosystems) that are regarded as pristine or largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged and the community is regarded as very important for the maintenance of biodiversity and rare and important taxa are present (e.g. occurrence of RDL, Endemic and/or Protected species). The local area is an important ecological support area and any external impacts will have a significant negative effect on its status	<i>Very High</i>
Natural communities (habitats and ecosystems) which are regarded as ecologically important and sensitive and important for the maintenance of biodiversity. It may be linked to other important communities and provide an important refuge/corridor for biodiversity (fauna and flora). This rating can also be allocated due to the presence of one or more unique qualities (E.g. occurrence of RDL, Endemic and/or Protected species). The presence of unnatural impacts is low and can be managed.	High

Natural communities which have a limited ecological function and a limited function for maintaining biodiversity. This may be due to homogenous habitat conditions and/or the negative effects of external impacts. External impacts can be managed and mitigated to reduce the significance of their magnitude	Medium
Communities which have been significantly modified or transformed with the result that little or no natural flora and habitats remain intact. Ecological importance as well as biodiversity value is low. External impacts will not have a significant impact on its status.	Low

4. DESCRIPTION OF AFFECTED ENVIRONMENT CONSERVATION STATUS

4.1. Location

The project is located on the Hazyview – Kruger Gate road R536 just past the railway line in Mkhuhlu Township. The proposed development area is located on the remainder of the Farm Cork 295-KU, Mkhuhlu in the Bushbuckridge Municipality of Mpumalanga Province

4.2. Conservation Status

The study area (in the proximity of the World well-known Paul Kruger Gate of the Kruger National Park), according to Mucina and Rutherford (2006), falls under the Pretoriuskop Sour Bushveld vegetation unit of the Lowveld Bioregion in the Savannah Biome. The area was used for controlled grazing for the livestock by the subsistence local farmers in the past.

Table 4.1. Vegetation Unit SVI 10 Pretoriuskop Sour Bushveld (Mucina Rutherford 2006)

<i>Name of vegetation type</i>	<i>Pretoriuskop Sour Bushveld</i>
<i>Code as used in the Book - contains space</i>	<i>SVI10</i>
<i>Conservation Target (percent of area) from NSBA</i>	<i>19%</i>
<i>Protected (percent of area) from NSBA</i>	<i>39.5%</i>
<i>Remaining (percent of area) from NSBA</i>	<i>83.8%</i>
<i>Description of conservation status from NSBA</i>	<i>Least threatened</i>

<i>Description of the Protection Status from NSBA</i>	<i>Well protected</i>
<i>Area (sqkm) of the full extent of the Vegetation Type</i>	<i>942.91</i>
<i>Name of the Biome</i>	<i>Savanna Biome</i>
<i>Name of Group (only differs from Bioregion in Fynbos)</i>	<i>Lowveld Bioregion</i>
<i>Name of Bioregion (only differs from Group in Fynbos)</i>	<i>Lowveld Bioregion</i>

4.3. Representative views from the study area.



**Stream on Eastern side of the lodge.
(Approximately 300 M away)**



Soil erosion on the project site.



**Picture showing disturbed area along the fence
of the site.**



**Habitat fragmentation, the patches should be
patched to connects the habitat areas.**

4.1 Fine-scale Vegetation Patterns

At a broad scale, there are differences in vegetation structure and composition related to soil types and rock cover at the site. The most noticeable differences are the Western side which is well wooded compared to the Eastern side adjacent to basin, but however the site is largely composed of greater bush cover. Within the development area, the vegetation is however fairly heterogeneous and it was easy to differentiate different plant communities within this area.

The vegetation within the developed area consists of woody plants. The dominant species within the project site is Marula (*Sclerocarya Birrea*), Red bushwillow (*Combretum apiculatum*). Common and dominant grasses include *Enneapogon scoparius*, *Digitaria eriantha*, *Themeda triandra*, *Eragrostis obtusa*, and *Fingerhutia Africana*. There are some species associated with the bush clumps include *Carissa macrocarpa*. Trees include *vachellia karroo* and *Diospyros lycoides*. There are also a number of succulents and aloe species present such as *Aloe ferox*. The drainage lines were dominated by species such as *Acacia karroo* and *Diospyros lycoides*.

The site was relatively free of alien species. There were some alien plants around disturbed area, but the developed site was generally free of aliens. The following are the alien species found around the site; *Lantana Camara* which occurred as scattered individuals which was common throughout the site but is less visible on account of its' low stature. *Lantana Camara* is however a serious weeds and is poisonous to herbivorous animals and it spreads by means of seed blown by wind. Alien invasive and weed species are listed in the Conservation of Agricultural Resources Act of 1983 (CARA) and the Mpumalanga Conservation Act (1998). The control by landowners of the presence and spreading of such species is regulated by these Acts. Several important exotic / invader species were recorded on the study area (Table 4.2).

Table 4.2. Aliens, weeds and exotics, CARA categories are indicated where applicable

Name	Legislation	Status	Comments / GPS reference
<i>Dichrostachys cinerea</i>	CARA	Declared	Bush encroachment
<i>Acacia ataxacantha</i>	CARA	Declared	Bush encroachment
<i>Lantana camara</i>	CARA	Declared	Category 1 weed/invader

4.2 Listed Plant species

Approximately 50 plant species were observed at the site over the various site visits. This is a relatively big number given the limited extent of the site and reflects the high diversity

of the area as well as the multiple site visits which have captured the majority of species present. According to the SANBI SIBIS database, 23 red-data listed species are known from the area (Table 4.3). Of these, one was confirmed as being present on the red-data listed species, Marula tree. A number of the larger species can be confirmed as definitely not being present on account of the limited extent of the site and their noticeable nature.

In addition to the red-data listed species a number of protected species were also confirmed as being present; this includes *Drimia altissima* as well as several aloe species such as *Aloe simii* was also present, but this is not a protected species. The abundance of the protected species was generally quite low and would not likely to be impacted by the development.

Table 4.3 National RDL species potential for the study area.

Species	National Status	Habitat preference
<i>Acridocarpus natalitius</i>	Near threatened	Forest, thickets, outcrops, Drainage lines.
<i>Adenia gumnifera</i>	Declining	Bushveld habitats. Outcrops.
<i>Aloe kniphofioides</i>	Near threatened	Grassland habitats.
<i>Aloe simii</i>	Critically endangered	Tall, open grassland. Above altitude 900m
<i>Ansellia Africana</i>	Declining	Bushveld, epiphyte
<i>Boophane disticha</i>	Near threatened	Several habitat types. Prefers higher altitude grassland.
<i>Brachystelma chlorozonum</i>	Vulnerable	Bushveld habitats.
<i>Crinum macowanii</i> Baker	Declining	Riparian and moist areas
<i>Elaeodendron transvaalense</i>	Near Threatened	Expected in natural bushveld;
<i>Encephalartos laevifolius</i>	Critically endangered	Adaptable to several habitat types. Prefers higher altitude grassland.

<i>Eriosema naviculare</i>	Endangered	Expected in natural bushveld;
<i>Hypoxis hemerocallidea</i>	Declining	Prefers higher altitude grassland.
<i>Ilex mitis</i> var. <i>mitis</i>	Declining	Forest, thicket and riparian areas
<i>Siphonochilus aethiopicus</i>	Critically Endangered	Forests
<i>Drimia altissima</i>	Declining	

4.3 Site Sensitivity Assessment

The area of development is relatively homogenous and there are some of Marula trees (*Sclerocarya Birrea*) within the developed area that were left standing for the purpose of conservation. Marula was found and classified as high sensitive species than the rest across the site on account of the greater plant species richness of this area. The presence of a large number of red-listed and protected species Marula at the site is the major characteristic feature of the site. Although the development will inevitably result in some loss of habitat for such species, the loss of individuals can to some extent be mitigated by translocation affected plants outside of the development footprint.

4.4 Identification of Risks and Potential Impacts

Prospective impacts on the terrestrial ecology of the site resulting from the development of the Village lodge include negative impacts on the following.

- Biodiversity – where biodiversity is taken to despicable
 - (i) the number of different species and individuals in a habitat or geographical area;
 - (ii) the variety of different habitats within an area;
 - (iii) the variety of interactions that occur between different species in a habitat; and
 - (iv) the range of genetic variation among individuals within a species. □
- Sensitive Habitats – impacts to ecologically sensitive habitats such as areas which are the habitat of rare or endangered species.
- Connectivity –reduction in the ability of animals to move about the landscape, this may impact ecosystem function as well as gene flow and other aspects of biodiversity.

In terms of the activities involved in the construction of the Village lodge, specific risks stem from the following activities.

- The clearing and levelling of land for the foundations of buildings and drive ways.
- The excavation of borrow pits.
- Increased risk of chemical contamination by construction vehicles.
- Disturbance of natural ecosystems, making them vulnerable to invasion by alien organisms.
- Damaging plants and animals by construction as a result of the construction activities.

5. IMPACT ASSESSMENT

5.1 Assessment and significant criteria

The assessment criteria used in the assessment are described below and are drawn from the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the environmental Conservation Act NO. 73 of 1998 as well as Brownlie (2005).

5.2 Nature of the Impacts

The development has both (negative) ecological as well as (positive) impacts on the environment. It is therefore important that the impacts are objectively evaluated according to the findings of the sensitivity analyses or vice versa. The description include who or what would be affected and how.

5.3. Extent of the Impacts

Using the following scale to assess the spatial scale of the impact:

- **On the site:** the impacts that are limited to the site boundaries.
- **Local:** impacts that are affected on the area in a radius of 250m around the site.
- **Regional:** impacts that affect regionally important environmental resources or are experienced at regional scale as determined by administrative boundaries, habitat types and ecosystem.
- **National;** impacts that affect nationally important environmental resources or affect an area that is nationally important or have macro-economic consequences.
- **Transboundary/ international:** impacts that affect internationally important resources such as areas protected by international conventions.

5.4 Duration of the Impact

The lifespan of the duration impact is assessed as follows:

- Temporary: impacts are predicted to be of short duration and occasional
- Short-term: impacts that are predicted to last only for the duration of the development period
- Long-term: impacts will continue for the life of the project development but come to an end when the area is fully completed.
- Permanent: impacts that because a permanent change in the affected receptor or resource, (e.g. removal or destruction of ecological habitat) endures substantially beyond the project lifetime.

5.5 Activity for Inclusion in the Draft EMP

Below are the measures that should be implemented as a part of the EMP for the development. The mitigation below do not exactly match with the impacts that have been identified above, as certain mitigation measures, such as limiting the loss of vegetation may be effective at combating several different impacts such as Erosion and fauna impacts.

Objectives: Limit disturbance of the site			
Project components	All components which create disturbance during construction		
Potential impacts	Construction and clearing will impact listed and protected plants species at the site		
Activity/ risk source	Construction related disturbance		
Mitigation: Target/ objective	Tag of warning not to cut the listed plants species		
Mitigation: action/ control	responsibility	Time frame	
(1) Preconstruction walk down of the access road as well as the facility itself before and clearing takes place to locate and identify all species suitable for search and rescue	Management	On going	
Performance indicator	Success search and rescue operation		
Monitoring	<ul style="list-style-type: none"> • Preconstruction survey for species suitable for search and rescue • fellow-up monitoring every 6 months for a year to assess survival rates of translocated plants 		

Objective: limit alien plant invasion		
Project components	All components which create disturbance during construction	
Potential impacts	Alien plant invasion leading to habitat degradation loss of ecosystem services and loss of biodiversity	
Activity/ risk source	Construction related disturbance	
Mitigation: Target/ objective	Low abundance of alien plant species at the site	
Mitigation: action/ control	responsibility	Time frame
(2) clear alien plants on a bi-annual basis	Management	Operation
Performance indicator	Low abundance of alien plant species at the site	
Monitoring	<ul style="list-style-type: none"> • Bi-annual monitoring for the presence of alien species at the site • Record of clearing activities and the species involved 	

Objective: Limit Faunal Impacts		
Project components	All components which create disturbance during construction as well as security fencing and transmission lines	
Potential impacts	Loss of habitat and landscape connectivity for terrestrial fauna	
Activity/ risk source	Habitat transformation during construction: site fencing, presence of construction and operation personnel	
Mitigation: Target/ objective	Low faunal impact during construction and operation	
Mitigation: action/ control	Responsibility	Time frame
(1) Environmental induction for all staff (2) Use low UV lighting at night to avoid attracting insects (3) ECO on duty during the site clearing (4) Permeable fencing at strategic places (5) No electric fencing within 30 cm of the ground	Management / ECO	Construction / Operation
Performance indicator	No mortality of fauna during construction	
Monitoring	Monitoring for compliance during the construction phase	

Objective: Control Erosion		
Project components	All components which trigger erosion during construction	
Potential impacts	Soil erosion is one of the most triggered environmental risk factor. Soil erosion is a serious ecological issue as it has the potential to cause ecosystem-wide impacts. Soil disturbance is the primary driver of erosion risk and consequently, soil disturbances of all kinds should be kept to an outright minimum level.	
Activity/ risk source	Over clearing of vegetation cover, to an area where it is not necessary.	
Mitigation: Target/ objective	Avoid construction of road on the steep slopes as far as possible because it becomes difficult to regulate the flow of water with increasing slope and the risk of erosion increases rapidly. Should some of the steeper roads at the site prove vulnerable to erosion problems, then these areas should be surfaced with concrete or tar. Roads should not be built wider than necessary and only essential roads should be built.	
Mitigation: action/ control	responsibility	Time frame
(3) Plant vegetation covers	Management	Operation
Performance indicator	Low rate of soil erosion	

6. DISCUSSION

The major anticipated impact on biodiversity is the loss and fragmentation of habitat means the loss of living space (habitat) for animals and natural vegetation alike. The loss and degradation of habitat has already occurred in the general area and on site. Therefore, the loss of vegetation and fragmentation of habitat will continue in this area with little control being implemented by the lodge management. No sensitive features are present or will be affected. As the development footprint has a relatively small size the consequent impact on the natural environment will be limited to the site footprint and it is unlikely that it will have negative consequences on the Ecological Support Area.

7. RECOMMENDATIONS FOR MONITORING

Possible impacts and the associated recommendations for monitoring are listed in Table 8.1 In general, during the construction phase, monitoring should be used to ensure that

the development takes place within the guidelines provided by this document and to ensure that construction does not impact adjacent natural vegetation, fauna and ecosystems. During the operational phase, monitoring should be focused on ensuring that there are no residual impacts such as soil erosion and alien plant invasion resulting from the construction phase and on reducing the day to day impact of the Lodge. Recommendations and mitigation measures are provided regarding monitoring

Table 7.1 Assessment of impacts on natural vegetation and habitats, including proposed mitigation measures.

Nature of impacts	Intensity	Significance before mitigation	Nature of impact and Mitigation measures
Loss of vegetation	High	Low	<p>Minimize loss and disturbance of natural habitat by using already disturbed areas (cultivated and cleared lands).</p> <p>Make use of existing access roads.</p> <p>Align access roads with existing linear infrastructure (e.g. roads, power lines)</p> <p>Make every effort to save protected trees.</p> <p>Retain large and protected trees where possible.</p>
Loss of important flora species	High	Medium	<p>Protected trees on site are well represented in the surrounding area and the loss of single Specimens on site will not have a high significance.</p> <p>Retain large and protected trees where possible.</p>
Invasive vegetation	High	Medium	<p>Implement weed control program.</p> <p>Use only indigenous flora for landscaping.</p>
Negative impacts on terrestrial fauna	High	Medium	<p>This impact has medium significance as most of the fauna has been lost on site.</p> <p>Reptiles and/or subterranean vertebrates that are unearthed during construction must be allowed to escape to the surrounds or must be relocated by a specialist.</p> <p>No-one is allowed to kill snakes or any other wild animals.</p> <p>Excavations must be inspected daily in order to rescue trapped animals</p>
Negative impacts on <i>Ecological Support Area</i>		Medium	<p>As the development footprint has a relatively small size the consequent impact on the natural environment will be limited to the site footprint and it is unlikely that it will have negative consequences on the <i>Ecological Support Area</i>.</p> <p>The construction personnel and future residents must be educated to respect and realise the importance of biodiversity and a clean environment.</p> <p>The applicant must ensure that services with regards to waste management and sewage treatment are effective and are maintained.</p>

Regarding monitoring the following preventative and mitigating measures are incorporated with the construction and operational phases of the Lodge and that they are implemented.

Construction Phase

- The proponent must be committed to a conservation approach of practice and the actual footprint of disturbance must be kept to a minimum.
- As much of the natural environment must be conserved, there should be minimal construction of access roads and bush clearing.
- Relocation of important species, identification and demarcation of specimens and sub-habitats not to be disturbed will have to be done beforehand by a specialist.
- Important species (fauna as well as flora) that will be threatened by the development must be relocated to safer habitats by suitable specialists.
- Preventative erosion control measures to be put in place;

Operational Phase

- Maintenance team must be educated with regards of the importance of biodiversity, and maintenance of the Lodge must be done in such a way to conserve vegetation and create as least disturbance as possible.
- The operational phase must be monitored by the environmental officer appointed by the proponent to ensure that enough mitigation measures are in place and to take reactive measures in places where impacts pose problematic.

9. REFERENCES

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