

VAALKOP

TERRESTRIAL ECOLOGICAL ASSESSMENT



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EIA REGULATIONS SPECIALISTS REPORT CHECKLIST

(1) A specialist report prepared in terms of the 2014 Environmental Impact Assessment Regulations (as amended in 2017) must contain-

(a) details of-		
✓	(i) the specialist who prepared the report; and	page 07
✓	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	page 66
✓	(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	page 67
✓	(c) an indication of the scope of, and the purpose for which, the report was prepared;	page 07
✓	(d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	page 11
✓	(e) a description of the methodology adopted in preparing the report or carrying out the specialised process;	page 11
✓	(f) the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	page 41
✓	(g) an identification of any areas to be avoided, including buffers;	page 46
✓	(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	page 43
✓	(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	page 18
✓	(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	page 44
✓	(k) any mitigation measures for inclusion in the EMPr;	page 44
✓	(l) any conditions for inclusion in the environmental authorisation;	page 44
✓	(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	page 44
(n) a reasoned opinion-		
✓	(i) as to whether the proposed activity or portions thereof should be authorised; and	page 47
✓	(ii) if the opinion is that the proposed activity or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	page 47
X	(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	n/a
X	(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	n/a
✓	(q) any other information requested by the competent authority.	none

Abbreviations

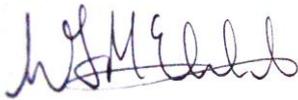
BODATSA	Botanical Database of Southern Africa
DEA	Department of Environmental Affairs
EST	Environmental Screening Tool
IBA	Important Bird Area
IUCN	International Union for Conservation of Nature
mamsl	Metres Above Mean Sea Level
NEMBA ToPS	National Environmental Management: Biodiversity Act Threatened or Protected Species Lists (No. 10 of 2004)
NFA	National Forest Act (No. 30 of 1998)
NWBMA	North West Biodiversity Management Act (No. 4 of 2016)
PRECIS	National Herbarium Pretoria (PRE) Computerised Information System
QDGS	Quarter Degree Grid Square, for example 2530 BD
SABAP2	Southern African Bird Atlas Project 2
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern

Terminology

Alien	Introduced from elsewhere: neither endemic nor indigenous.
Biodiversity	The structural, functional and compositional attributes of an area, ranging from genes to landscapes.
Disturbed	An ecosystem that is a sub-climax ecological state, usually through impacts such as low levels invasion by alien or indigenous pioneer plants, moderate overgrazing, poor burning regimes, etc. These systems still contain a large proportion of indigenous flora.
Degraded	An ecosystem that is a poor ecological state, usually through impacts such as invasion by alien plants, severe overgrazing, poor burning regimes, etc. These systems contain a low proportion of indigenous flora.
Geophyte	Plants that produce their growth points from organs stored below the ground, an adaption to survive frost, drought and / or fire.
Palearctic	The zoogeographical region comprising Eurasia north of the Himalayas, together with North Africa and the temperate part of the Arabian peninsula.
Transformed	Transformed ecosystems are no longer natural and contain little or no indigenous flora. Examples include agricultural lands, plantations, urban areas, etc.

Declaration of Independence

We declare that we have been appointed as independent consulting ecologists with no affiliation with or vested financial interests in the proponent, other than for work performed under the 2014 Environmental Impact Assessment Regulations (as amended in 2017). We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. Remuneration for our services by the proponent is not linked to approval by any decision-making authority responsible for authorising this development.



W.L. McClelland

20 November 2020



D.R. McKenzie

20 November 2020

Acknowledgments

Mr. Ricky Martin, Finfoot Lodge ranger, thanked for their contributions to this report.

1. INTRODUCTION

ECOREX Consulting Ecologists CC was appointed by Peter Velcich of NuLeaf Planning & Environmental to conduct the terrestrial ecology study for terrestrial ecosystems (flora, mammals, birds, reptiles and frogs) for a proposed tourism and housing development on a protected area north-east of Rustenburg, North West Province, South Africa. This study will provide a baseline description of the receiving environment, which will serve as a basis for the assessment of the potential impacts of the developments on terrestrial ecosystems.

The study team was as follows:

Duncan McKenzie (Terrestrial Ecologist). Duncan has been involved in biodiversity assessments for ECOREX for 12 years and countries of work experience include Lesotho, Swaziland, Mali, Mozambique, Sierra Leone, Guinea, South Africa, Tanzania and Democratic Republic of the Congo. Duncan has previously worked as a Regional Coordinator for the Mondi Wetlands Project and has lectured on many aspects of conservation in Mbombela and the Kruger National Park. He is currently the Mpumalanga Regional Co-ordinator for the South African Bird Atlas Project, formerly served on the KZN Bird Rarities Committee, is co-author of The Birds of Mbombela and is lead author on the Wildflowers of the Kruger National Park and Birds of the Northern Escarpment projects. A more detailed CV is presented in Appendix 4.

Linda McKenzie (GIS Specialist). Linda is a GIS Specialist/GIS Analyst with over 14 years' experience in the industry. For the last five years she has operated her own GIS Consultancy called Digital Earth. She has extensive experience in both the private and public sector, as has worked on a wide variety of projects and GIS applications. These include, most recently, vegetation and sensitivity mapping, landcover data capture, municipal roads master planning, hydroelectric scheme and wind farm feasibility mapping and town planning, land surveyor and engineering support services. Linda formerly served as Vice Chairperson and Treasurer for GISSA Mpumalanga and is a registered Professional GISc Practitioner (PGP0170).

2. OBJECTIVES

The objectives of the Ecology Survey are to:

- Provide a baseline ecological description of the terrestrial ecosystems that are likely to be impacted by the proposed developments;
- Provide an assessment of the ecological importance of potentially affected ecosystems; this would incorporate an assessment of the conservation importance and functional importance of the ecosystems;
- Provide an overview of key potential impacts of the projects on terrestrial ecosystems;
- Make recommendations regarding infrastructure layout, where appropriate.

The primary deliverable will be a report on Terrestrial Ecosystems, including:

- Biodiversity Baseline Description;
- Ecological Importance Assessment;
- Broad-scale Vegetation Map;
- Ecological Importance Map;
- Overview of the key potential impacts on the environment;
- Recommendations regarding infrastructure layout, where relevant.

3. STUDY AREA & PROJECT DESCRIPTION

The proposed developments are situated on the farm Vaalkop 76 JQ, within the Bojanala District Municipality, approximately 40 km north-east of the town of Rustenburg, North West Province, South Africa. The footprint is situated within the c. 3500 ha privately owned Elands River Game Reserve adjacent to the c. 4000 ha provincially managed Vaalkop Dam Nature Reserve (Figure 1). Existing infrastructure present on the reserve include the established Finfoot Lake Lodge, as well as two recently constructed safari-style tents and three dwellings. The reserve contains a network of gravel tourist roads and approximately 3 km of frontage onto the south bank of Vaalkop Dam. The reserve is primarily used for tourism and recreation purposes.

The application site consists of four small areas totalling approximately 56 ha, sequentially positioned parallel to the shoreline of the dam. The western-most area is to be developed into medium-density tourism accommodation in the form of safari-style tents. Eight tents are planned, with two already constructed. The remaining three areas are to be subdivided into 18 full title stands, with three stands already containing a dwelling.

Most of the study area is covered in natural vegetation and is surrounded by untransformed land that is mostly privately owned and managed as conservation / game farming area. The general topography is mostly flat to gently undulating, with low, scattered hills situated outside the property (such as Bulkop, at 1134 mamsl). Several game species are either naturally occurring or have been introduced into the reserve, and include Red Hartebeest *Alcelaphus buselaphus caama*, South African Giraffe *Giraffa camelopardalis giraffe*, Greater Kudu *Tragelaphus strepsiceros* and Nyala *Tragelaphus angasi*. The study area is situated within the Quarter Degree Grid Square (QDGS) 2527 AD, at an altitude of approximately 995 mamsl.

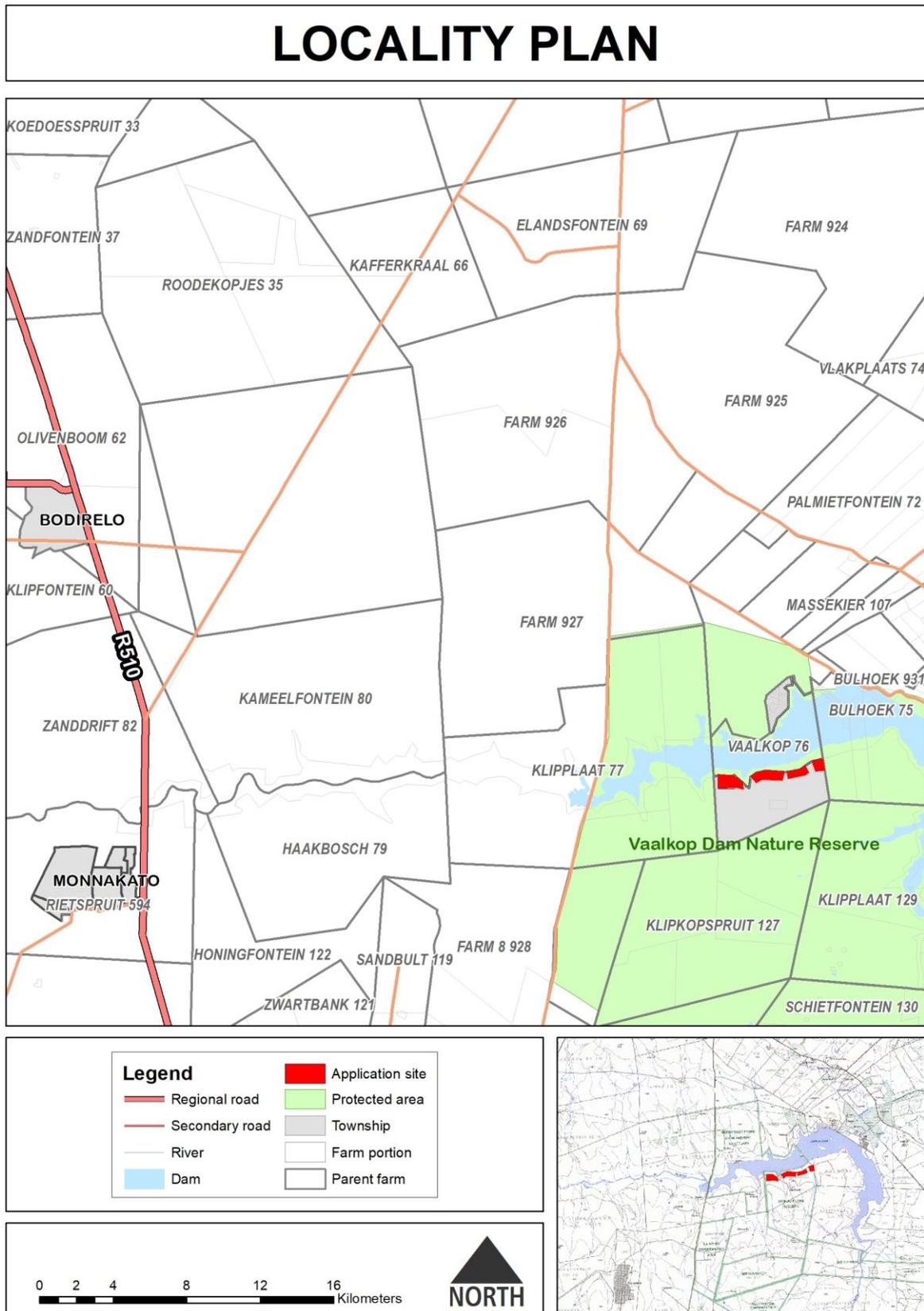


Figure 1. Location of Study Area

4. METHODS

An initial screening of the study area was undertaken using the Environmental Screening Tool (EST) of the Department of Environmental Affairs (DEA). This indicated that some portions of the study area have a Very High Terrestrial Biodiversity theme, while other portions have Low Sensitivity. More detail in this regard is provided in section 5.3.1 of this report.

4.1 Flora

Desktop

Vegetation communities were identified prior to fieldwork using satellite imagery supplied by Digital Earth. Red Data plant species listed for the QDGS 2527 AD and surrounding grids in PRECIS data from the South African National Biodiversity Institute (SANBI) was used to produce a list of the most likely threatened species, which were searched for during fieldwork.

Fieldwork

Vegetation communities identified in the desktop phase were ground-truthed on the 14th and 15th October 2020. The boundaries and layout of the proposed developments were supplied by NuLeaf and pre-loaded onto a Samsung S10 phone using LocusMap Pro™ software. This area was surveyed on foot and all visible plant species were recorded. The locations of any Species of Conservation Concern¹ (SCC) and additional species of conservation-importance were loaded onto the Samsung S10 phone using LocusMap Pro™ software. These include species listed under SANBI's Red List of South African Plants, as well as the website of the International Union for the Conservation of Nature (IUCN). The following relevant South African legislation was referred to with regard to protected species:

- North West Biodiversity Management Act (No. 4 of 2016) (NWBMA)
- National Forests Act (No. 30 of 1998) (NFA)
- National Environmental Management: Biodiversity Act (No. 10 of 2004) Threatened and Protected Species Lists (GG Notice 256, 2015) (NEMBA ToPS)

¹ Raimondo et al. (2009), includes those with a status of Critically Rare, Rare, Near Threatened and Data Deficient as well as threatened species (Vulnerable, Endangered and Critically Endangered)

4.2 Fauna

Desktop

Lists of mammal, bird, reptile and frog SCC potentially occurring within the study area were prepared using data from Child *et al.* (2016), the Southern African Bird Atlas Project 2 <http://sabap2.adu.org.za/>, Taylor *et al.* (2016), Minter *et al.* (2004), Bates *et al.* (2014), the SANBI Red List of South African Species <http://speciesstatus.sanbi.org/>, Tolley *et al.* (2019) and the IUCN Red List of Threatened Species <https://www.iucnredlist.org/>. In addition, the protected status of fauna species was provided by the following two relevant Acts:

- National Environmental Management: Biodiversity Act (No. 10 of 2004) Threatened and Protected Species Lists (GG Notice 256, 2015) (NEMBA ToPS)
- North West Biodiversity Management Act (No. 4 of 2016) (NWBMA)

The above data were captured mostly at a quarter-degree spatial resolution but were refined by excluding species unlikely to occur within the study area due to unsuitable habitat characteristics (e.g. altitude and land-use). Bat species thought to only forage over the study area (i.e. mostly cave-roosting species) were not included in the assessment due to the lack of suitable caves within the study area. Potential occurrence of fauna in the study area was predicted based on the specialist's knowledge of habitat requirements of local fauna species.

Fieldwork

Birds were identified audially and visually using Nikon 10x42 binoculars. Observations were made incidentally during the time that the vegetation survey was conducted and limited to birds seen and heard within the application sites and immediate surrounds. Mammals, reptiles and frogs were recorded incidentally as they were encountered during the survey through direct evidence (sightings) and indirect evidence (spoor, dung). Additional faunal information was obtained from Mr. R. Martin, ranger at Finfoot Lodge.

4.3 Method for the determination of Site Ecological Importance (SEI)

A standardised method for assessing site-specific ecological importance in relation to a proposed project (including the project footprint and project activities) is currently in draft format and will form part of the future guidelines for biodiversity specialists in ESIA's (SANBI, 2020). This assessment does not replace the output of the National Web-based Environmental Screening Tool but is complementary to it, providing a more site-specific assessment that is linked to the proposed project footprints / activities.

SEI is one of the most important outcomes of a specialist ecological study and provides a basis for assessing the significance of impacts that a project may have on the receiving environment. SEI is a function of the Biodiversity Importance (BI) of the receptor (e.g. the species of conservation concern, vegetation/fauna community or habitat type) and its resilience to impacts (Receptor Resilience) as follows:

$$SEI = BI + RR$$

BI in turn is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor as follows:

$$BI = CI + FI$$

Conservation Importance is defined as “the importance of a site for supporting biodiversity features of conservation concern present e.g. populations of IUCN Threatened and Near-Threatened species (CR, EN, VU & NT), Rare, Range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes” (SANBI, 2020). The fulfilling criteria for CI are presented in Table 1.

Table 1. Criteria for Determining Conservation Importance of a Receptor

Conservation Importance	Fulfilling Criteria
Very High	Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species Any area of natural habitat of a CR ecosystem type or large area (> 0.1 % of the total ecosystem type extent) of natural habitat of EN ecosystem type Globally significant populations of congregatory species (>10% of global population)
High	Confirmed or highly likely occurrence of CR, EN, VU species that have a global Extent of Occurrence of > 10 km ² . IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or < 10 000 mature individuals remaining. Small area (>0.01% but < 0.1 % of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (> 0.1 %) of natural habitat of VU ecosystem type Presence of Rare species Globally significant populations of congregatory species (>1% but <10% of global population)
Medium	Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN, VU) listed under A criterion only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU Presence of range-restricted species > 50 % natural habitat with potential to support SCC
Low	No confirmed or highly likely populations of Species of Conservation Concern No confirmed or highly likely populations of range-restricted species < 50 % of natural habitat with limited potential to support SCC
Very Low	No confirmed and highly unlikely populations of SCC No confirmed and highly unlikely populations of range-restricted species No natural habitat remaining

Functional Integrity (FI) of the receptor (e.g. the vegetation/fauna community or habitat type) is defined here as “a measure of the ecological condition of the impact receptor as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts”. Fulfilling criteria for determining FI are given in Table 2.

Table 2. Criteria for Determining Functional Integrity of a Receptor

Functional Integrity	Fulfilling Criteria
Very High	Very large (>100 ha) intact area for any conservation status of regional vegetation type or >5 ha for CR regional vegetation types High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches No or minimal current ecological impacts with no signs of major past disturbance (e.g. ploughing)
High	Large (>20 ha but <100 ha) intact area for any conservation status of regional vegetation type or >10 ha for EN regional vegetation types Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches Only minor current ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential
Medium	Medium (>5 ha but <20 ha) semi-intact area for any conservation status of regional vegetation type or > 20 ha for VU regional vegetation types Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches Mostly minor current ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance; moderate rehabilitation potential
Low	Small (>1 ha but <5 ha) area Almost no habitat connectivity but migrations still possible across some transformed or degraded natural habitat; a very busy used road network surrounds the area. Low rehabilitation potential Several minor and major current ecological impacts
Very Low	Very small (<1 ha) area No habitat connectivity except for flying species or flora with wind-dispersed seeds. Several major current ecological impacts

BI can be derived from a simple matrix of CI and FI as indicated in Table 3.

Table 3. Biodiversity Importance Two-way Matrix

Biodiversity Importance		Conservation Importance				
		Very High	High	Medium	Low	Very Low
Functional Integrity	Very High	Very High	Very High	High	Medium	Low
	High	Very High	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very Low
	Low	Medium	Medium	Low	Low	Very Low
	Very Low	Medium	Low	Very Low	Very Low	Very Low

Receptor Resilience (RR) is defined as “*the intrinsic capacity of the receptor to resist major damage from disturbance and / or to recover to its original state with limited or no human intervention*”. The fulfilling criteria for RR are presented in Table 4.

Table 4. Criteria for Determining Receptor Resilience

Receptor Resilience	Fulfilling Criteria
Very High	Habitat that can recover rapidly (~ less than 5 years) to restore > 70 % of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed
High	Habitat that can recover relatively quickly (~ 5-10 years) to restore > 70 % of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed
Medium	Will recover slowly (~more than 10 years) to restore > 70 % of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~less than 50 % of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed
Very Low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed

Once BI and RR have been calculated through the use of the above two matrices, SEI can be determined using the matrix in Table 5.

Table 5. Site Ecological Importance Two-way Matrix

SEI		Biodiversity Importance				
		Very High	High	Medium	Low	Very Low
Receptor Resilience	Very Low	Very High	Very High	High	Medium	Low
	Low	Very High	High	Medium	Low	Low
	Medium	High	Medium	Medium	Low	Very Low
	High	Medium	Low	Low	Low	Very Low
	Very High	Low	Low	Very Low	Very Low	Very Low

Guidelines for how to interpret SEI of a project in terms of impact mitigation are given in Table 6.

Table 6. Guidelines for interpreting Site Ecological Importance of Receptors in terms of project impacts

Site Ecological Importance	Interpretation in relation to proposed development activities
Very High	Avoidance mitigation - No destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages. Destructive impacts for species/ecosystems where <persistence target remains.
High	Avoidance mitigation wherever possible. Minimization mitigation – Changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimization & restoration mitigation - Development activities of medium impact acceptable followed by appropriate restoration activities
Low	Minimization & restoration mitigation - Development activities of medium to high impact acceptable followed by appropriate restoration activities
Very Low	Minimization mitigation - Development activities of medium to high impact acceptable and restoration activities may not be required

The SEI values for each vegetation community / proposed development site are indicated spatially in Figure 7.

4.4 Assumptions, Limitations and Knowledge Gaps

4.4.1 Seasonality

The assessment was based on fieldwork covering two days at the end of the dry season. It is highly likely that plants which flower at other times of the year are underrepresented although this is not seen as a limitation that could affect the Record of Decision as the specialist has assessed habitat suitability for potentially occurring threatened plant species and none are expected.

4.4.2 Overlooked Species

Certain plant species, particularly geophytes, will only flower in seasons when conditions are optimal and may thus remain undetected, even over a survey that encompasses several seasons. Other plant species may be overlooked because of very small size and / or extreme rarity. A sampling strategy will always represent merely a subset of the true diversity of the study area. However, the level of sampling effort for this study was appropriate for the objectives of the study.

5. BIODIVERSITY BASELINE DESCRIPTION

5.1 Flora

5.1.1 Regional Context

5.1.1.1 National Vegetation Types

According to the National Vegetation Map (SANBI, 2018), the study area is situated within **Central Sandy Bushveld**. This vegetation type occurs primarily between the Pilanesberg in the west and Groblersdal / GaMasemola in the east, with scattered and isolated pockets in the Waterberg and adjacent areas. Altitude varies between 850 and 1450 mamsl. The landscape is typically low and undulating, with sandy plains supporting mostly deciduous woodland. The geology is either granites in the Bushveld Complex, or sedimentary rocks in the Waterberg Group resulting in deep, sandy soils such as Hutton or Clovelly on crests and shallow, clay soils such as Glenrosa in valleys and lower slopes (Mucina & Rutherford, 2004).

Typical Central Sandy Bushveld is dominated by tall, deciduous trees such as *Terminalia sericea*, *Burkea africana* and *Sclerocarya birrea* with co-dominants including *Senegalia burkei*, *Combretum apiculatum*, *C. zeyheri*, *Peltophorum africanum* and *Vachellia tortilis*. Smaller trees and shrubs include *Combretum hereroense*, *Grewia bicolor*, *Ochna pulchra* and *Searsia leptodictya*. Dominant herbs include *Barleria macrostegia*, *Blepharis integrifolia*, *Geigeria burkei*, *Justicia anagalloides*, *Kyphocarpa angustifolia* and *Waltheria indica*. The grasses *Eragrostis rigidior*, *Brachiaria serrata*, *Themeda triandra*, *Schmidtia pappophoroides* and *Panicum maximum* are found in greatest abundance (Mucina & Rutherford, 2004).

5.1.1.2 Centres of Plant Endemism

The study area is not situated within any centres of plant endemism as defined by Van Wyk & Smith (2001).

5.1.1.3 Threatened Ecosystems

Central Sandy Bushveld is not listed as a Threatened Ecosystem (Notice 1002 of Government Gazette 34809, 9 December 2011).

5.1.2 Local Context – Plant Species Richness and Description of Development Sites

SANBI's Botanical Database of Southern Africa (BODATSA) lists a moderately rich diversity of plants with 718 plant taxa from 124 families for a 20 km radius around the study area. However, this list does include sections of the Pilanesberg range which comprises vegetation that is unlikely to be present in the study area. A total of 79 taxa from 28 families were recorded from the study area during October 2020 fieldwork, representing 11% of the BODATSA total (Appendix 1). The true plant species diversity of the sites is likely to be higher as few flowering herbs were visible during fieldwork. The full list of plant taxa confirmed to occur during fieldwork is presented in Appendix 1. The dominant plant families in the flora are Poaceae (16 spp), Fabaceae (11 spp) and Acanthaceae (5 spp).

Vegetation communities were identified within the study area on the basis of distinctive vegetation structure (grassland, woodland, thicket, etc.), floristic composition (dominant and diagnostic species) and position in the landscape (mid-slopes, terrace, crest, etc.). Two communities are present within the study area and are described briefly below. Alien plant species are indicated in these vegetation descriptions by use of an asterisk.

5.1.2.1 *Senegalia mellifera* – *Euclea undulata* Low Closed Woodland

Senegalia mellifera – *Euclea undulata* Low Closed Woodland occurs on heavy clay soils in three of the four proposed development areas surveyed (Figure 4). This community covers 17 ha, or 30% of the entire study area. Vegetation structure is mostly Low Closed Woodland (*sensu* Edwards, 1983) (Figure 2).

This community contains a low diversity of plants with the closed canopy strongly dominated by the indigenous invasive tree *Senegalia mellifera*. Additional canopy trees include *Vachellia tortilis*, *Ziziphus mucronata*, *Searsia lancea*, *Vachellia karroo* and *Boscia albitrunca*. Shrubs and dwarf shrubs represented are *Euclea undulata*, *E. crista*, *Carissa bispinosa*, *Gymnosporia maranguensis* and *Tarchonanthus camphoratus*. Few herbaceous species were observed, including *Barleria macrostegia* and *Litogyne gariiepina*. The succulents *Kalanchoe rotundifolia* and *Sansevieria aethiopica* are commonly recorded in large colonies, often at the base of trees and shrubs. Grasses are sparse, but those located in clearings and at edges include *Panicum maximum*, *Heteropogon contortus* and *Eragrostis rigidior*.

A total of 50 species (63% of the entire list) was recorded from Low Closed Woodland during fieldwork; the lower of the two communities present (Appendix 1). Species fidelity is high, with 25 species (50% of the community list) not shared with the other community.

Three conservation-important species were recorded from this community, all of which are protected under the NFA, namely the trees *Vachellia erioloba*, *Boscia albitrunca* and *Combretum imberbe* (Table 7).

5.1.2.2 *Vachellia tortilis* – *Eragrostis rigidior* Plains Woodland

This vegetation community occurs across most of the sandier western and central portions study area (Figure 4). It covers 38 ha, or 68% of the area surveyed. Vegetation structure is mostly Short to Tall Closed Woodland (*sensu* Edwards, 1983) (Figure 2) but approaches Open Woodland in places.

The canopy is dominated by the tree *Vachellia tortilis*, with additional species including *Ziziphus mucronata*, *Vachellia erioloba*, *V. karoo*, *Senegalia erubescens* and *Searsia lancea*. Dominant shrubs and dwarf shrubs are *Euclea crispa*, *Gymnosporia glaucophylla*, *Tarchonanthus camphoratus*, *Solanum campylacanthum* and *Abutilon austro-africanum*. Herbs include *Kyphocarpa angustifolia*, *Justicia anagalloides*, *Ruellia patula*, *Litogyne gariepina* and *Indigofera heterotricha*. Grasses dominate the ground layer, with the most frequently recorded species including *Eragrostis rigidior*, *Aristida adscensionis*, *Aristida congesta* subsp. *barbicollis*, *Heteropogon contortus* and *Panicum maximum*.

Fifty-three species (67% of the entire list) was recorded from Plains Woodland during fieldwork; the higher of the two communities present (Appendix 1). Species fidelity is high, with 28 species (53% of the community list) being restricted to this community.

Three conservation-important species were recorded from this community, all of which are protected under the NFA, namely the trees *Vachellia erioloba*, *Boscia albitrunca* and *Combretum imberbe* (Table 7).

Transformed areas cover the remainder of the study area and contain two recently erected safari-style tents and three dwellings.



Senegalia mellifera – *Euclea undulata* Low Closed Woodland



Vachellia tortilis – *Eragrostis rigidior* Plains Woodland

Figure 2. Photographs of Vegetation Communities present within the Study Area



Tourist Infrastructure within the Study Area

Figure 3. Photographs of Man-made Structures present within the Study Area



Figure 4. Spatial representation of vegetation communities present within the Study Area

5.1.3 Conservation-Important Flora

No threatened or Near Threatened plants were confirmed during fieldwork. Nine species recorded in 2527 AD and surrounding grids have been assessed as SCC (Table 8). Due to a lack of suitable habitat, sufficient fieldwork coverage or scarcity, only one of these is likely to occur within the study area, namely *Drimia sanguinea*. This species is discussed in greater detail below.

***Drimia sanguinea* (Schinz) Jessop** Red Drimia

This small bulb is invisible for most of the year either through dormancy or being inconspicuous due to its grass-like leaves. It is only in the flowering season that they are visible. This takes place in early spring (August to September) and it is therefore likely that this bulb was not located during fieldwork due to the timing of the survey. This plant is listed as NT due to over-collection for the medicinal plant trade¹.

Three confirmed species are protected under the NFA, namely *Boscia albitrunca*, *Combretum imberbe* and *Vachellia erioloba* (Table 7).

5.1.4 Endemic Species

No plants endemic to the North West Province were recorded during fieldwork.

5.1.5 Invasive Alien Species

Only four alien plant species were recorded during fieldwork, with one of these being listed as invasive under the National Environmental Management: Biodiversity Act (Act No. 10 OF 2004, NEMBA) Alien and Invasive Species Lists, 2016 (Appendix 1), namely the succulent * *Opuntia stricta* which occurs in low densities.

¹ Williams *et al.*, 2008

Table 7. Conservation-important plant species confirmed during fieldwork

Taxa	Growth Form	Protected	Vegetation Communities	
			Low Closed Woodland	Plains Woodland
Family Capparaceae <i>Boscia albitrunca</i> (Burch.) Gilg & Benedict	tree	NFA	u	r
Family Combretaceae <i>Combretum imberbe</i> Wawra	tree	NFA	r	r
Family Fabaceae <i>Vachellia erioloba</i> (E.Mey.) P.J.H.Hurter	tree	NFA	r	u
TOTAL	3	3	3	3

NFA - National Forests Act	u - uncommon r - rare
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Table 8. Potentially occurring plant SCC

Species	Red Data Status	Habitat Preference	Optimal Survey Time	Likelihood of Occurrence	Justification
Family Anacardiaceae <i>Searsia maricoana</i>	VU	Grassland, at the transition from bushveld, in dark soil among igneous rocks	Throughout the year (even when sterile)	Low	No suitable habitat present, only known from three locations
Family Apocynaceae <i>Brachystelma discoideum</i>	CR (PE)	Gravelly, sandy soils in bushveld	Dec-May (flowering period, deciduous species)	Very Low	Unrecorded since 1968, only recorded at the type locality
<i>Stenostelma umbelluliferum</i>	NT	Savanna, deep black turf in open woodland mainly in the vicinity of drainage lines	Dec-May (flowering period, deciduous species)	Low	No suitable habitat present
<i>Ceropegia insignis</i>	EN	Stony slopes and sandy soils in grassland and open savanna	Dec-May (flowering period, deciduous species)	Very Low	No suitable habitat present, only known from two to three locations
Family Celastraceae <i>Elaeodendron transvaalense</i>	NT	Woodland	Throughout the year (even when sterile)	Low	Edge of distribution range, no plants located despite intensive searching
Family Cucurbitaceae <i>Cucumis humifructus</i>	VU	Woodland and grassland with deep sand	Dec-Mar (flowering period, deciduous species)	Very Low	The distribution within South Africa is known from old herbarium specimens, and no collections have been made in recent years
Family Fabaceae <i>Cullen holubii</i>	VU	Bushveld on sandy flats	Octo-Mar (flowering period)	Low	Only occurs in five localities, none of which are close to the study area
Family Hyacinthaceae <i>Bowiea volubilis</i> subsp. <i>volubilis</i>	VU	Scree slopes, rocky thickets	Oct-April (deciduous species)	Very Low	No suitable habitat present

<i>Drimia sanguinea</i>	NT	Open veld and scrubby woodland in a variety of soil types.	Jul-Sep (spring-flowering, deciduous and grass-like species)	Moderate	Suitable habitat present
TOTAL	9				

NT - Near Threatened
 VU - Vulnerable
 EN - Endangered
 CR - Critically Endangered
 PE - Presumed Extinct

5.2 Terrestrial Fauna

5.2.1 Mammals

5.2.1.1 Regional Overview

The study area is situated within an established protected area in the savanna biome, adjacent to several provincial and private reserves. This area has reasonably high mammal diversity but relatively low numbers of endemics and Red Data species³. Most of the study area contains natural vegetation, and mammal populations are considered secure and protected.

Sixty-four mammal species have been recorded for the grid 2527 AD in the Fitzpatrick Institute of African Ornithology's Virtual Museum database⁴. This is a high total, but true diversity will be somewhat higher as many mammals are either small, cryptic or nocturnal in habit and therefore difficult to photograph⁵. Adjacent reserves do contain populations of SCC that are not present on the Elands River Game Reserve, for example White Rhinoceros *Ceratotherium simum*, but these may only accidentally or infrequently enter the study area.

5.2.2.2 Confirmed Species

Twenty-three mammal species were recorded from within the study area during fieldwork (Appendix 2). These include a few species that were confirmed as occurring by reserve staff, such as Tsessebe *Damaliscus lunatus lunatus*. Additional sampling, including small mammal trapping, bat sampling and camera traps, would result in additional species but are unlikely to have changed the findings of the report.

5.2.1.3 Conservation-Important Species

An estimated 30 conservation-important mammals potentially occur within the study area (Appendix 3). Several cave-roosting bat species of conservation concern such as the Short-eared Trident Bat (*Cloeotis percivali* – EN) could potentially occur overhead but these species are only likely to feed over the site because of the shortage of suitable roosting sites and have been excluded from this assessment.

³ Friedmann & Daly, 2004

⁴ http://vmus.adu.org.za/vm_sp_list.php accessed 13/11/2020

⁵ All virtual museum submissions require the inclusion of at least one photograph of the organism

Only one SCC was recorded from within the study area, although some such Leopard *Panthera pardus* may infrequently enter from the adjacent private reserves. These are unlikely to remain for long durations due to high human disturbance and these would possibly be discouraged due to undesirable predation on existing game species and incompatibility to housing estate developments where owners are permitted to walk unhindered throughout the reserve.

Of the 30 potentially occurring species, 14 are SCC⁶ with seven considered threatened (Appendix 3). Only one of these species was confirmed to occur, namely Tsessebe. This antelope is assessed as VU due to deteriorating habitat quality, unnaturally high competition from other grazers due to high stocking rates and increasing poaching⁷. However, only one animal is present (R. Martin *pers.comm.*) and therefore the reserve does not contain a viable breeding population and no further discussion is necessary. None of the remaining potentially occurring SCC are likely to occur as regular or resident species within the proposed development area due to a lack of suitable habitat present, regional scarcity or high human disturbance. The remaining potentially occurring SCC are listed as NT, meaning they may become threatened soon. None were confirmed to occur, and only one has a moderate likelihood of occurring within the study area and is discussed below:

Serval *Leptailurus serval*

This medium-sized cat species is fairly common in suitable habitat in South Africa (*pers. obs.*) and is probably resident within the general area although in low numbers due to the lack of recent records. It is listed as NT due to habitat loss and fragmentation and demand for their coats⁸. It has a moderate likelihood of occurring within the grassier parts of the study area.

Twenty-eight potentially occurring species are protected under either the NEMBA ToPS or NWBMA. Seven of these were confirmed during fieldwork and it is likely that a few additional species are present (Appendix 3).

⁶ The same approach as Raimondo *et al.* (2009) has been followed here regarding species of conservation concern (i.e. those with a status of Declining, Near Threatened and Data Deficient) and threatened species (Vulnerable, Endangered and Critically Endangered)

⁷ Child *et al.*, 2016

⁸ Child *et al.*, 2016

5.2.2 Birds

5.2.2.1 Regional Overview

Vaalkop 76 JQ is situated within savanna biome which supports the highest diversity of bird species within the Southern African sub-region⁹. The Vaalkop Dam area is avifaunally well sampled, with considerable coverage in the second Southern African Bird Atlas Project (SABAP2)¹⁰ during which time 370 species have been recorded from 484 lists submitted for the nine pentads (mapping units covering an area of approximately 77 km²) in the QDGS 2527 AD as per Full Protocol submissions¹¹. This highlights the extremely high avian diversity of the Vaalkop area.

Although the study area does not fall within an Important Bird & Biodiversity Area (IBA), the Pilanesberg National Park IBA lies approximately 25 km to the north-west. This protected area qualifies as a Global IBA under criteria A1 and A3. Three globally threatened or NT species occur, in addition to seven resident regionally threatened birds. A few migratory and vagrant threatened species also occur¹².

5.2.2.2 Local Avifaunal Assemblages

A total of 89 bird species were confirmed to occur within or adjacent to the study area during October 2020 fieldwork (Appendix 2), which equates to 24% of the QDGS species list. Aquatic birds such as waterfowl and waders were excluded from this assessment as the proposed developments are, at their closest, situated just more than 100 m from the Vaalkop Dam's full supply level. This is deemed to be sufficiently distant to justify this exclusion as the developments will not be visible from the shoreline. Sufficient sampling was undertaken for assessing habitat suitability for potentially occurring threatened species, the primary objective of the ornithological component of this study, and to describe broad bird assemblages. Additional fieldwork in summer is likely to increase the species richness of the assemblage but is unlikely to identify additional assemblages. Two assemblages are present and are dealt with below.

⁹ Hocket *et al.*, 2006

¹⁰ <http://sabap2.birdmap.africa/coverage/qdgc/2531bd> downloaded on 13/11/2020

¹¹ Full Protocol lists reflect an observer effort of between two hours and five days of data collection while Ad Hoc lists reflect an effort of less than two hours

¹² Marnewick *et al.*, 2015

1. Low Closed Woodland Assemblage

Dense low woodland dominated by *Senegalia mellifera* and *Vachellia tortilis* are present in areas with high clay soil content. These support a moderate diversity of bird species which are mostly located by sound due to the limited visibility. Commoner species include Marico Sunbird *Cinnyris mariquensis*, White-browed Scrub Robin *Cercotrichas leucophrys*, Chestnut-vented Warbler *Sylvia subcaerulea*, Grey-backed Camaroptera *Camaroptera brevicaudata*, Crimson-breasted Shrike *Laniarius atrococcineus* and Crested Francolin *Dendroperdix sephaena*. Less common species are Yellow-bellied Greenbul *Chlorocichla flaviventris* and Kalahari Scrub Robin *Cercotrichas paena*. Low Closed Woodland supports 38 species, or 43% of the entire list (Appendix 2), the lower of the two assemblages.

2. Plains Woodland Assemblage

Plains Woodland represents the dominant habitat within the study area and is characterised by deciduous *Vachellia*, *Ziziphus* and *Combretum* species which supports a wide diversity of bird species. Common and widespread species found include Blue Waxbill *Uraeginthus angolensis*, Golden-breasted Bunting *Emberiza flaviventris*, Marico Flycatcher *Bradornis mariquensis*, Burchell's Starling *Lamprotornis australis*, Chestnut-vented Warbler *Sylvia subcaerulea*, Rattling Cisticola *Cisticola chiniana* and Acacia Pied Barbet *Tricholaema leucomelas*. Less common species include Double-banded Sandgrouse *Pterocles bicinctus* and Great Spotted Cuckoo *Clamator glandarius*. Plains Woodland supports 60 species, or 67% of the entire list (Appendix 2), the higher of the two assemblages.

5.2.2.3 Conservation-Important Species

An estimated 19 SCC potentially occur in the Vaalkop area (Appendix 3), excluding waterbirds which were not considered due to the distance from the Vaalkop Dam shoreline. Ten of these are considered threatened, none of which were confirmed to occur during fieldwork, and none are expected to occur due to regional rarity, lack of suitable habitat or disturbance levels from adjacent dwellings and tourist lodges. Only one NT species has a moderate likelihood of occurring within the more open areas and is discussed below.

European Roller *Coracias garrulous*

This Palaearctic migrant prefers open, grassy areas within savanna. It is listed as NT due to habitat loss over some of its breeding grounds, particularly in Europe¹³. Suitable foraging

¹³ Taylor *et al.*, 2015

habitat is present within the study area and may be present as a non-breeding migrant on an annual basis.

5.2.3 Reptiles

5.2.3.1 Regional Overview

The Bushveld of far north-western South Africa supports a moderate diversity of reptile species, with between nine and 25 species recorded in each of the QDGS's around the study area (Bates *et al.*, 2014). Reptile endemism is low, which is to be expected in an area that lies in close proximity to Botswana and is situated within the widespread savanna biome (Bates *et al.*, 2014). Eighty-two species have been recorded from the degree grid 2527¹⁴ and, on a finer scale, 25 reptiles have been recorded from the QDGS 2527 AD¹⁵.

5.2.3.2 Confirmed Species

Only four reptiles were recorded during fieldwork, namely Striped Skink *Trachylepis striata*, Variable Skink *T. varia*, Common Dwarf Gecko *Lygodactylus capensis* and Common Rough-scaled Lizard *Meroles squamulosus* (Appendix 3). All four are common and widespread in the savanna biome¹⁶. Dedicated reptile surveys in the wet season, including trapping, would no doubt have produced a few additional species but are unlikely to have produced data that would change the recommendations in this report.

5.2.3.3 Conservation-Important Species

Of the potentially occurring species, two have been nationally assessed as VU, namely Nile Crocodile *Crocodylus niloticus*, which is also protected under NEMBA ToPS, and Lobatse Hinged Tortoise *Kinixys lobatsiana* (Appendix 5). The former is only rarely recorded from the nearby Vaalkop Dam and is therefore highly unlikely to utilise the habitats present within the study area. The Lobatse Hinged Tortoise frequents rocky hillsides in habitats of mixed *Acacia* and *Combretum* woodland¹⁷, habitat types absent from the study area although it may very occasionally pass through. Striped Variable Skink *Trachylepis laevigata* is assessed as Data Deficient (DD) due to a lack of published information for this poorly known species, but is only found in montane grassland in the Waterberg Mountains much further to the north, a habitat type that is absent from Vaalkop 76 JQ (Appendix 3). The Southern African Python *Python natalensis* is protected under the National Environmental Management: Biodiversity Act

¹⁴ http://vmus.adu.org.za/vm_sp_list.php accessed 16/11/2020

¹⁵ http://vmus.adu.org.za/vm_sp_list.php accessed 16/11/2020

¹⁶ Bates *et al.*, 2014

¹⁷ Bates *et al.*, 2014

(No.10 of 2004). This species was confirmed to occur by reserve staff and is likely to be resident within the study area.

5.2.4 Frogs

5.2.4.1 Regional Overview

The Bushveld of far north-western South Africa supports a relatively high diversity of frog species, with levels of between 11 and 20 species per QDGS¹⁸. Frog endemism, however, is low due to the proximity to Botswana and being situated within the widespread savanna biome (Minter *et al.*, 2004). Twenty-nine species have been recorded from the degree grid 2527¹⁹ and, on a finer scale, 20 reptiles have been recorded from the QDGS 2527 AD²⁰, within which the study area is situated.

5.2.4.2 Confirmed Species

No frogs were recorded during fieldwork, primarily due to a lack of open water or moist grassland habitats. Dedicated frog searches, including nocturnal surveys at the onset of the rains, would have produced at least some species but are unlikely to have produced data that would change the recommendations in this report.

5.2.4.3 Conservation-Important Species

None of the potentially occurring frogs are assessed as SCC. Giant Bullfrog *Pyxicephalus adspersus* was previously assessed as NT but is now reclassified as Least Concern²¹. No habitat (freshwater pans) is present for this species.

¹⁸ Minter *et al.*, 2004

¹⁹ http://vmus.adu.org.za/vm_sp_list.php accessed 16/11/2020

²⁰ http://vmus.adu.org.za/vm_sp_list.php accessed 16/11/2020

²¹ <http://speciesstatus.sanbi.org/assessment/last-assessment/0975/>

5.3 Ecological Sensitivity

5.3.1 Environmental Screening Tool

The EST of the DEA indicates that most of the study area has **Low** Terrestrial Biodiversity theme. However, small sections of the study area are assessed as having **Very High** Terrestrial Biodiversity theme despite no perceivable differences between these portions and the surrounding Low areas.

A map of the EST ratings is presented in Figure 5. The drivers for the Very High assessment are:

- Ecological Support Area 1 (ESA) – some parts of the study area are situated within an ESA.
- Focus Areas for land-based protected areas expansion.
- South African Protected Area.

The adjacent open water and shoreline of the Vaalkop Dam, situated a minimum of 100 m north of the study area, are assessed as having Very High Terrestrial Biodiversity theme due to being situated within an area assessed as Critical Biodiversity Area 2 (CBA2) in the North West Province Biodiversity Conservation Assessment (NWPBCA) (North West Department of Agriculture, Conservation, Environment and Rural Development, 2009).



Figure 5. Environmental Screening Tool assessment of Terrestrial Biodiversity Features in the Study Area

5.3.2 North West Province Biodiversity Conservation Assessment

The NWPBCA has classified most of the study area to be within **Other Natural Areas (ONA)** (Figure 6). These are all remaining natural areas in the Province not included in the transformed / modified, CBA or ESA categories and have not been identified as a priority in the NWPBCA. ONA's offer much more flexibility in terms of permissible land uses. However, these areas are still subject to the usual authorisation procedures, e.g. EIAs, and still require a site visit to ensure the absence of important biodiversity features before any environmental authorisation in terms of the National Environmental Management Act (NEMA, Act 107 of 1998)²².

Two small areas in the central and western portions of the study area are classified as **Ecological Support Areas (ESA) 1 – Protected Areas Buffer**. These are areas that are not essential for meeting biodiversity representation targets/thresholds but which nevertheless play an important role in supporting the ecological functioning of critical biodiversity areas and/or in delivering ecosystem services that support socio-economic development, such as water provision, flood mitigation or carbon sequestration. The degree of restriction on land use and resource use in these areas may be lower than that recommended for critical biodiversity areas²³.

The adjacent open water and shoreline of the Vaalkop Dam, situated a minimum of 100 m north of the study area, are assessed as being situated within an area assessed as **Critical Biodiversity Area 2 (CBA)** (see preceding Section). CBA's are terrestrial and aquatic features in the landscape that are critical for retaining biodiversity and supporting continued ecosystem functioning and services. natural or near-natural state in order to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. CBA's are vital for biodiversity conservation targets to be met. Maintaining an area in a natural state can include a variety of biodiversity-compatible land uses and resource uses²⁴.

²² North West Department of Agriculture, Conservation, Environment and Rural Development, 2009

²³ North West Department of Agriculture, Conservation, Environment and Rural Development, 2009

²⁴ North West Department of Agriculture, Conservation, Environment and Rural Development, 2009

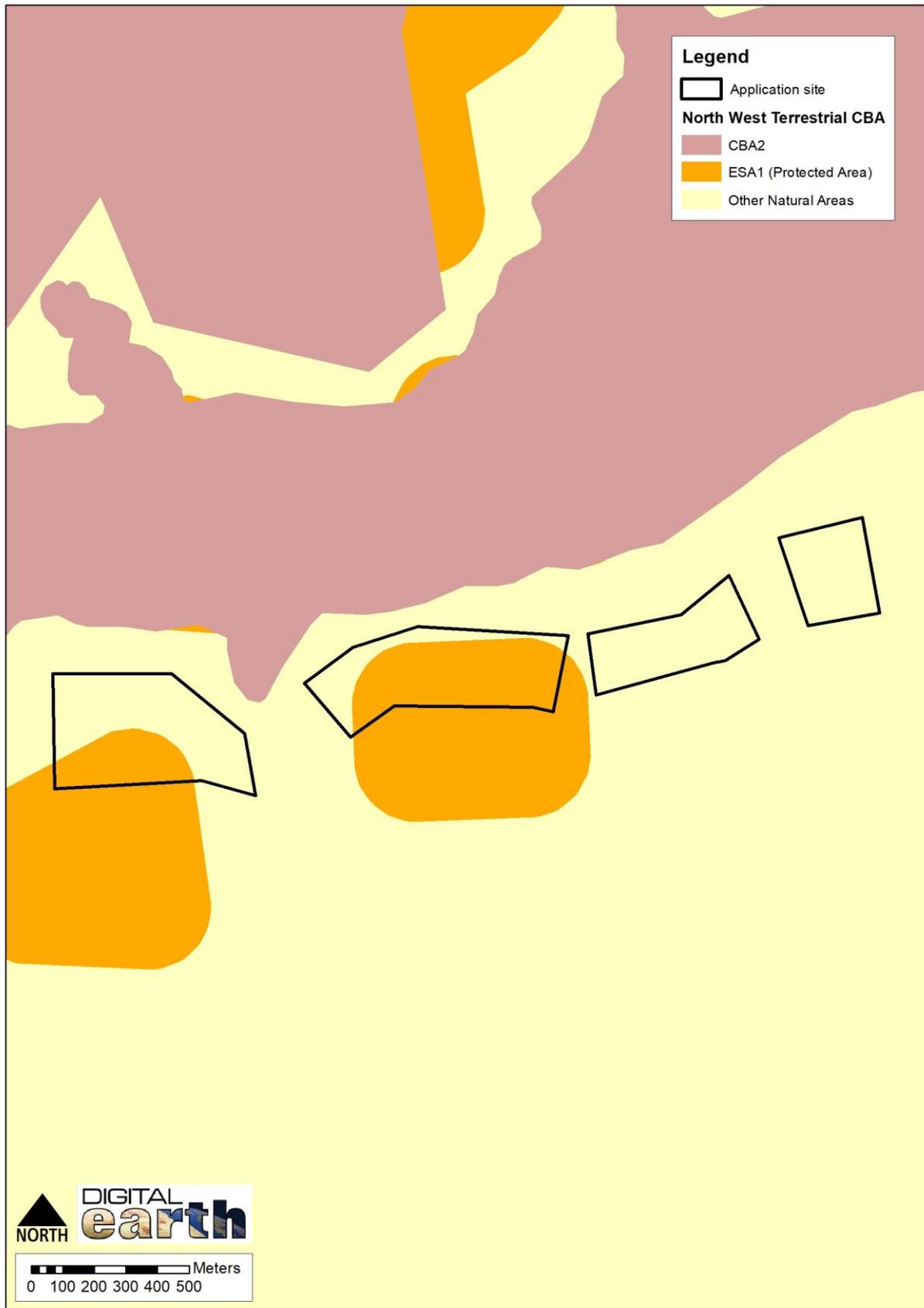


Figure 6. NWPBCA Map of the Study Area

5.3.3 Site-specific Ecological Importance Analysis

A SEI analysis of the two vegetation communities represented in the study area was undertaken using the methodology described in Section 4.3. Table 9 presents the calculation of the SEI for each community, which is displayed in Figure 7 below.

The Low Closed Woodland vegetation community has a Conservation Importance (CI) of Medium due to a lack of confirmed and low likelihood of potentially occurring SCC. The Functional Integrity (FI) is also medium as a result of encroachment of the tree *Senegalia mellifera*. When combined, the Biodiversity Importance (BI) level is **Medium**. Receptor Resilience (RR) is assessed as **Medium** as the vegetation is not sensitive to change and could recover rapidly. When integrated with the Medium BI the SEI of the vegetation community is assessed as **Medium**.

The Plains Woodland community also has a CI of Medium due to a lack of confirmed and low likelihood of potentially occurring SCC. The FI is assessed as High as the vegetation is largely undisturbed. The combination of CI and FI result in a BI level of **Medium**. Receptor Resilience is assessed as **Medium** as savanna is not highly sensitive and should recover rapidly after disturbances. When integrated with the Medium BI the SEI of the vegetation community is assessed as **Medium**.

Transformed areas, including the dwellings and safari-style tents, are assessed as having Very Low SEI (Table 9).

Table 9. Ecological Sensitivity of Vegetation Communities in the Study Area

Assessment Criteria	Low Closed Woodland	Plains Woodland	Transformed
Conservation Importance	Medium	Medium	Low
Functional Integrity	Medium	High	Very Low
Biodiversity Importance	Medium	Medium	Very Low
Receptor Resilience	Medium	Medium	High
SITE ECOLOGICAL IMPORTANCE	Medium	Medium	Very Low



Figure 7. Site Ecological Importance of the vegetation communities within the study area

6. KEY CURRENT AND POTENTIAL IMPACTS

The following are key impacts on the ecology of the area associated with the proposed developments on Vaalkop 76 JQ:

- **Losses of portions of ESA, vegetation communities with Medium Site Ecological Importance and Very High Terrestrial Biodiversity Theme** – The proposed development contains areas that have been classified as being ESA 1, which are important to biodiversity in the North West. However, both untransformed vegetation communities are situated within areas assessed as having Medium SEI;
- **Loss of plant species of conservation importance** – three nationally protected tree species could be impacted by the proposed development, namely *Boscia albitrunca*, *Combretum imberbe* and *Vachellia erioloba*. One plant SCC potentially occurs, namely the bulb *Drimia sanguinea* (NT).
- **Invasion of natural habitat by alien plants** – while only one alien invasive plant was recorded, the additional influx of people and cars into the area could lead to the establishment of many additional invasive species.
- **Impoverishment of populations of important fauna taxa** – one VU species of mammal was confirmed during fieldwork, namely Tsessebe, and one bird listed as NT (European Roller) and one mammal listed as NT (Serval) potentially occur within the study area.
- **Increased harvesting of plant and animal resources** – Clearing for development will allow increased access to all areas of the proposed footprint, including clearing and land preparation teams prior to construction, as well as builders and associated services. This influx of people into the study area could result in an increase in illegal harvesting of plant and animal resources, such as poaching for bushmeat and removing plants for the traditional muthi trade.
- **Disturbance of soils with high clay content** – parts of the study area contain soils with high clay content. These areas correspond to the Low Closed Woodland vegetation community. Disturbances within these areas, such as road construction, digging of foundations etc. may lead to irreparable damage to the soil structure and

may result in erosion and damage to buildings, vehicles getting stuck and unsightly vehicle tracks.

7. CONCLUSION AND RECOMMENDATIONS

Fifty-six ha of mostly natural vegetation was surveyed as part of a proposed tourism and residential development on the farm Vaalkop 76 JQ, situated within the Elands River Game Reserve and adjacent to Vaalkop Dam. Existing tourist infrastructure is present at the adjacent Finfoot lake Lodge, and several dwellings and safari-style tents have already been constructed within the footprint provided. Most of the surrounding areas are both formally and informally conserved, with the provincially managed Vaalkop Dam Nature Reserve situated adjacent to the study area. Most of the study area is situated within an area classified as having a Low Biodiversity theme by the DEA's EST, with smaller areas classified as Very High. Similarly, most of the study area is situated within ONA's in the NWPBCA, with smaller areas classified as ESA1. The ESA's and Other Natural Areas show much more flexibility in terms of permissible land uses, but the desired management objective should be to minimise habitat and species loss and ensure ecosystem functionality through strategic landscape planning.

Two vegetation communities were identified within the study area, namely Low Closed Woodland and Plains Woodland. Both communities have an SEI of Medium. Disturbance levels within the study area are low to moderate, with two tourist facilities and three dwellings having already been constructed. The alien plant infestation levels are low, with only one species (* *Opuntia stricta*) located. The indigenous tree *Senegalia mellifera* has invaded large areas, especially on the heavy clay soils. No threatened plants were located, and only one is likely, namely the NT-listed *Drimia sanguinea*. Three confirmed trees are protected under the NFA, namely *Boscia albitrunca*, *Senegalia erioloba* and *Combretum imberbe*. One threatened mammal is confirmed, namely Tsessebe, but only one individual is present on the reserve. One mammal (Serval) and one bird (European Roller) are listed as NT and are likely to regularly utilize the natural vegetation within the study area, at least on a regular basis. No raptor nests were located.

The following preliminary recommendations and mitigation measures for the proposed development are applicable:

- In compliance with the recommendations of a geotechnical engineer, all construction on the clay soils should be carefully planned and implemented. It is recommended that the western-most tract, adjacent to the proposed and existing safari-style tents, remain undeveloped to maintain biodiversity in the immediate area.

- No development should take place within 100m of the full supply level of the adjacent Vaalkop Dam to prevent unnecessary disturbance of the many confirmed and potentially occurring fauna species.
- Each stand, lodge, road or other proposed development areas should be checked by an experienced botanist prior to clearing and all SCC or protected plants should be marked with hazard tape to indicate where development may not take place. These plants should remain *in situ*.
- Only locally occurring, indigenous plant species should be planted around the proposed and existing dwellings. No alien plants should be allowed to be planted within any of the stands, tent sites or any other development sites.
- All existing and proposed roads should contain adequate stormwater drainage and erosion control measures.
- In order to comply with the National Environmental Management: Biodiversity Act (Act No. 10 OF 2004), all listed invasive exotic plants as indicated in Appendix 1 should be targeted and controlled. This is relevant to at least one declared invasive species, namely * *Opuntia stricta*.
- Weeds will inevitably establish around the developments and it is important that weed control, if involving herbicides, be managed correctly to reduce the impact on the adjacent natural vegetation. Regular inspections should be made to determine if any additional alien plants have established.
- Poaching is a potential threat. External labour teams used during clearing and building should preferably be accommodated off site; if this is not possible then teams should be carefully monitored to ensure that no unsupervised access to plant and animal resources takes place.

Provided the above recommendations suggested in this report are followed, and the developer complies with all relevant legislation pertaining to the development activities (such as the NEMBA), there is no objection to the proposed developments in terms of the terrestrial ecosystems of the study area. However, if the development was to proceed without the implementation of the recommendations given above then we would object to the development application.

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9. APPENDICES

Appendix 1. Checklist of Flora recorded during fieldwork

Taxa	Growth Form	Protected	NEMBA Alien Invasive Species Category	Vegetation Communities	
				Low Closed Woodland	Plains Woodland
Family Acanthaceae Acanthaceae sp. <i>Barleria macrostegia</i> Nees <i>Dicliptera minor</i> C.B.Clarke subsp. <i>minor</i> <i>Justicia anagalloides</i> (Nees) T. Anderson <i>Justicia flava</i> (Vahl) Vahl <i>Ruellia patula</i> Jacq.	herb herb herb herb herb herb			r r u r r	 u r
Family Amaranthaceae * <i>Gomphrena celosioides</i> Mart. <i>Kyphocarpa angustifolia</i> (Moq.) Lopr.	herb herb				r u
Family Amaryllidaceae <i>Crinum lugardiae</i> N.E.Br.	bulb			r	
Family Anacardiaceae <i>Searsia lancea</i> (L.f.) F.A.Barkley <i>Searsia leptodictya</i> (Diels) T.S.Yi, A.J.Mill. & J.Wen <i>Searsia pyroides</i> (Burch.) Moffett	tree tree tree			u	u r r
Family Apocynaceae <i>Carissa bispinosa</i> (L.) Desf. ex Brenan <i>Huernia</i> cf. <i>zebrina</i> (no flowers)	shrub succulent			f r	
Family Asparagaceae					

<i>Asparagus larycinus</i> Burch.	shrub			u	
<i>Asparagus</i> sp.	dwarf shrub			r	
Family Asteraceae					
* <i>Bidens bipinnata</i> L.	herb			r	
<i>Litogyne gariepina</i> (DC.) Anderb.	herb			r	r
<i>Tarchoanthus camphoratus</i> L.	tree			u	u
Family Boraginaceae					
<i>Ehretia rigida</i> (Thunb.) Druce	tree			r	
<i>Heliotropium ciliatum</i> Kaplan	herb				r
Family Cactaceae					
* <i>Opuntia stricta</i> (Haw.) Haw.	succulent		1b	r	
Family Capparaceae					
<i>Boscia albitrunca</i> (Burch.) Gilg & Benedict	tree	NFA		u	r
Family Celastraceae					
<i>Gymnosporia glaucophylla</i> Jordaan	tree			u	u
<i>Gymnosporia maranguensis</i> (Loes.) Loes.	shrub			f	
Family Combretaceae					
<i>Combretum hereroense</i> Schinz	tree			r	
<i>Combretum imberbe</i> Wawra	tree	NFA		r	r
<i>Terminalia sericea</i> Burch. ex DC.	tree				r
Family Commelinaceae					
<i>Commelina</i> sp. (no flowers)	herb				r
Family Crassulaceae					
<i>Crassula</i> cf. <i>muscosa</i>	succulent			r	
<i>Kalanchoe rotundifolia</i> (Haw.) Haw.	succulent			f	
Family Dracaenaceae					
<i>Sansevieria aethiopica</i> Thunb.	succulent			u	
Family Ebenaceae					
<i>Diospyros lycioides</i> subsp. <i>guerkei</i> (Kuntze) De Winter	tree			r	
<i>Euclea crispa</i> (Thunb.) Gürke	tree			u	u
<i>Euclea undulata</i> Thunb.	shrub			d	r
Family Euphorbiaceae					
<i>Acalypha indica</i> L. var. <i>indica</i>	herb				r
Family Fabaceae					
<i>Dichrostachys cinerea</i> (L.) Wight & Arn. subsp. <i>africana</i> Brenan & Brummitt	tree				r
<i>Indigofera heterotricha</i> DC.	herb				r

<i>Indigofera mollicoma</i> N.E.Br.	herb				r
<i>Peltophorum africanum</i> Sond.	tree				r
<i>Senegalia erubescens</i> (Welw. ex Oliv.) Kyal. & Boatwr.	tree				r
<i>Senegalia mellifera</i> (Vahl) Seigler & Ebinger	tree				d
<i>Tephrosia</i> sp. (no flowers)	dwarf shrub				r
<i>Vachellia erioloba</i> (E.Mey.) P.J.H.Hurter	tree	NFA			r
<i>Vachellia karroo</i> (Hayne) Banfi & Gallaso	tree				u
<i>Vachellia nilotica</i> (L.) P.J.H.Hurter & Mabb. subsp. <i>kraussiana</i> (Benth.) Kyal. & Boatwr.	tree				r
<i>Vachellia tortilis</i> (Forssk.) Gallaso & Banfi subsp. <i>heteracantha</i> (Burch.) Kyal. & Boatwr.	tree				f
Family Hyacinthaceae					
<i>Albuca setosa</i> Jacq.	bulb				r
<i>Drimia</i> sp. (no flowers)	bulb				r
<i>Ledebouria ovatifolia</i> (Baker) Jessop	bulb				r
Family Lamiaceae					
<i>Ocimum americanum</i> L.	herb				r
Family Lobeliaceae					
<i>Lobelia erinus</i> L.	herb				r
Family Malvaceae					
<i>Abutilon austro-africanum</i> Hochr.	dwarf shrub				r
<i>Grewia flava</i> DC.	shrub				r
<i>Sida cordifolia</i> L.	dwarf shrub				r
<i>Waltheria indica</i> L.	herb				u
Family Pedaliaceae					
<i>Ceratotheca triloba</i> (Bernh.) Hook.f.	herb				r
<i>Dicerocaryum senecioides</i> (Klotzsch) Abels	creeper				r
Family Poaceae					
<i>Aristida adscensionis</i> L.	grass				f
<i>Aristida congesta</i> Roem. & Schult. subsp. <i>barbicollis</i> (Trin. & Rupr.) De Winter	grass				r
<i>Aristida meridionalis</i> Henrard	grass				r
<i>Cymbopogon</i> sp.	grass				f
<i>Cynodon dactylon</i> (L.) Pers.	grass				r
<i>Eragrostis</i> cf. <i>trichophora</i>	grass				r
<i>Eragrostis curvula</i> (Schrad.) Nees	grass				u
<i>Eragrostis rigidior</i> Pilg.	grass				u
<i>Heteropogon contortus</i> (L.) Roem. & Schult.	grass				u
<i>Hyperthelia dissoluta</i> (Nees ex Steud.) Clayton	grass				u

<i>Melinis repens</i> (Willd.) Zizka subsp. <i>repens</i>	grass				r
<i>Panicum maximum</i> Jacq.	grass			d	r
<i>Pogonarthria squarrosa</i> (Roem. & Schult.) Pilg.	grass				u
<i>Sporobolus pyramidalis</i> P.Beauv.	grass				u
<i>Themeda triandra</i> Forssk.	grass				u
<i>Tragus berteronianus</i> Schult.	grass				r
Family Portulacaceae					
<i>Talinum cafferum</i> (Thunb.) Eckl. & Zeyh.	herb			r	
Family Rhamnaceae					
<i>Ziziphus mucronata</i> Willd. subsp. <i>mucronata</i>	tree			f	f
Family Rubiaceae					
* <i>Richardia brasiliensis</i> Gomes	herb				r
Family Solanaceae					
<i>Lycium</i> sp.	dwarf shrub			u	
<i>Solanum campylacanthum</i> A. Rich. subsp. <i>panduriforme</i>	dwarf shrub				f
TOTAL	79	3	1	50	53

NFA - National Forests Act	d - dominant
* - exotic species	f - frequent
	u - uncommon
	r - rare

Appendix 2. Checklist of Fauna recorded during fieldwork

Common Name	Scientific Name	Red Data	Protected	Low Closed Woodland	Plains Woodland
Mammals					
ORDER: PRIMATES					
Family Cercopithecidae (Old World monkeys)					
Chacma Baboon	<i>Papio ursinus</i>				x
Vervet Monkey	<i>Chlorocebus pygerythrus</i>			x	
ORDER: LAGOMORPHA					
Family Leporidae (rabbits and hares)					
Scrub Hare	<i>Lepus saxatilis</i>				x
ORDER: RODENTIA					
Family Sciuridae (squirrels)					
Tree Squirrel	<i>Paraxerus cepapi</i>			x	
Family Hystricidae (Old World porcupines)					
Cape Porcupine	<i>Hystrix africaeaustralis</i>				x
ORDER: CARNIVORA					
Family Canidae (dogs, jackals & allies)					
Black-backed Jackal	<i>Canis mesomelas</i>			x	x
Family Mustelidae (otters, badgers & allies)					
Honey Badger *	<i>Mellivora capensis</i>				x
Family Herpestidae (mongooses)					
Slender Mongoose	<i>Herpestes sanguineus</i>				x
Banded Mongoose	<i>Mungos mungo</i>				x
Family Viverridae (genets & civets)					
Genet sp.	<i>Genetta sp.</i>			x	
ORDER: TUBULIDENTATA					
Family Orycteropodidae (Aardvark)					
Aardvark	<i>Orycteropus afer</i>		NEMBA (PR) / NWBMA		x

ORDER: PERRISODACTYLA Family Equidae (horses) Plains (Burchell's) Zebra	<i>Equus quagga burchellii</i>		NEMBA (PR) / NWBMA	x	x
ORDER: CETARTIODACTYLA Family Suidae (pigs) Common Warthog	<i>Phacochoerus africanus</i>			x	x
Family Giraffidae (giraffes) South African Giraffe	<i>Giraffa camelopardalis giraffa</i>		NWBMA		x
Family Bovidae (antelope, cattle) Impala	<i>Aepyceros melampus melampus</i>			x	x
Red Hartebeest	<i>Alcelaphus buselaphus caama</i>		NEMBA (PR) / NWBMA		x
Blue Wildebeest	<i>Connochaetes taurinus</i>		NEMBA (PR) / NWBMA		x
Tsessebe *	<i>Damaliscus lunatus lunatus</i>	VU	NEMBA (PR)		x
Common Waterbuck	<i>Kobus ellipsiprymnus</i>		NWBMA		x
Steenbok	<i>Raphicerus campestris</i>				x
Common Duiker	<i>Sylvicapra grimmia</i>			x	
Nyala	<i>Tragelaphus angasi</i>			x	
Greater Kudu	<i>Tragelaphus strepsiceros</i>			x	x
Subtotal	23	1	7	10	18
Birds					
ORDER: STRUTHIONIFORMES Family Struthionidae (ostriches) Common Ostrich	<i>Struthio camelus</i>				x
ORDER: GALLIFORMES Family Numididae (guineafowl) Helmeted Guineafowl	<i>Numida meleagris</i>				x
Family Phasianidae (pheasants, fowl and allies) Crested Francolin	<i>Dendroperdix sephaena</i>			x	
Natal Spurfowl	<i>Pternistis natalensis</i>			x	
Swainson's Spurfowl	<i>Pternistis swainsonii</i>				x
ORDER: PELECANIFORMES Family Threskiornithidae (ibises and spoonbills) Hadedda Ibis	<i>Bostrychia hagedash</i>			x	

Family Ardeidae (herons and bitterns) Western Cattle Egret	<i>Bubulcus ibis</i>				x
ORDER: ACCIPITRIFORMES Family Accipitridae (kites, hawks and eagles) Wahlberg's Eagle	<i>Hieraaetus wahlbergi</i>		NWBMA		x
ORDER: OTIDIFORMES Family Otididae (bustards) Red-crested Korhaan	<i>Lophotis ruficrista</i>				x
ORDER: CHARADRIIFORMES Family Burhinidae (thick-knees) Spotted Thick-knee	<i>Burhinus capensis</i>				x
Family Charadriidae (plovers) Crowned Lapwing	<i>Vanellus coronatus</i>				x
African Wattled Lapwing	<i>Vanellus senegallus</i>				x
ORDER: PTEROCLIFORMES Family Pteroclididae (sandgrouse) Double-banded Sandgrouse	<i>Pterocles bicinctus</i>				x
ORDER: COLUMBIFORMES Family Columbidae (pigeons and doves) Red-eyed Dove	<i>Streptopelia semitorquata</i>			x	
Ring-necked Dove	<i>Streptopelia capicola</i>				x
Laughing Dove	<i>Spilopelia senegalensis</i>				x
ORDER: MUSOPHAGIFORMES Family Musophagidae (turacos) Grey Go-away-bird	<i>Corythaixoides concolor</i>			x	x
ORDER: CUCULIFORMES Family Cuculidae (cuckoos) Great Spotted Cuckoo	<i>Clamator glandarius</i>				x
Red-chested Cuckoo	<i>Cuculus solitarius</i>			x	
ORDER: STRIGIFORMES Family Strigidae (owls) Pearl-spotted Owlet	<i>Glaucidium perlatum</i>			x	
ORDER: APODIFORMES Family Apodidae (swifts) African Palm Swift	<i>Cypsiurus parvus</i>			over	over
Little Swift	<i>Apus affinis</i>			over	over

ORDER: COLIIFORMES Family Coliidae (mousebirds) Red-faced Mousebird	<i>Urocolius indicus</i>			x	x
ORDER: CORACIIFORMES Family Coraciidae (rollers) Lilac-breasted Roller	<i>Coracias caudatus</i>				x
Family Alcedinidae (kingfishers) Brown-hooded Kingfisher	<i>Halcyon albiventris</i>				x
Family Meropidae (bee-eaters) Little Bee-eater European Bee-eater	<i>Merops pusillus</i> <i>Merops apiaster</i>				x x
ORDER: BUCEROTIFORMES Family Upupidae (hoopoes) African Hoopoe	<i>Upupa africana</i>				x
Family Phoeniculidae (wood-hoopoes) Green Wood-hoopoe Common Scimitarbill	<i>Phoeniculus purpureus</i> <i>Rhinopomastus cyanomelas</i>			x	x
Family Bucerotidae (hornbills) Southern Red-billed Hornbill Southern Yellow-billed Hornbill African Grey Hornbill	<i>Tockus rufirostris</i> <i>Tockus leucomelas</i> <i>Lophoceros nasutus</i>		NWBMA		x x x
ORDER: PICIFORMES Family Lybiidae (African barbets) Black-collared Barbet Crested Barbet Acacia Pied Barbet	<i>Lybius torquatus</i> <i>Trachyphonus vaillantii</i> <i>Tricholaema leucomelas</i>			x	x x
Family Picidae (woodpeckers) Cardinal Woodpecker Bearded Woodpecker	<i>Dendropicus fuscescens</i> <i>Dendropicus namaquus</i>			x	x
ORDER: PASSERIFORMES Family Platysteiridae (wattle-eyes and batises) Chinspot Batis	<i>Batis molitor</i>				x
Family Malaconotidae (bushshrikes) Orange-breasted Bushshrike Brown-crowned Tchagra Black-backed Puffback	<i>Chlorophoneus sulfureopectus</i> <i>Tchagra australis</i> <i>Dryoscopus cubla</i>			x x x	

Crimson-breasted Shrike	<i>Laniarius atrococcineus</i>			x	
Brubru	<i>Nilaus afer</i>				x
Family Laniidae (shrikes)					
Magpie Shrike	<i>Urolestes melanoleucus</i>				x
Family Dicruridae (drongos)					
Fork-tailed Drongo	<i>Dicrurus adsimilis</i>				x
Family Monarchidae (monarchs)					
African Paradise Flycatcher	<i>Terpsiphone viridis</i>			x	
Family Corvidae (crows and jays)					
Pied Crow	<i>Corvus albus</i>				x
Family Paridae (tits and chickadees)					
Southern Black Tit	<i>Melaniparus niger</i>				x
Family Alaudidae (larks)					
Sabota Lark	<i>Calendulauda sabota</i>				x
Rufous-naped Lark	<i>Mirafraga africana</i>				x
Family Pycnonotidae (bulbuls)					
Dark-capped Bulbul	<i>Pycnonotus tricolor</i>			x	
Yellow-bellied Greenbul	<i>Chlorocichla flaviventris</i>			x	
Family Hirundinidae (swallows and martins)					
Lesser Striped Swallow	<i>Cecropis abyssinica</i>				x
Red-breasted Swallow	<i>Cecropis semirufa</i>				x
Barn Swallow	<i>Hirundo rustica</i>				x
Family Macrosphenidae (crombecs and African warblers)					
Long-billed Crombec	<i>Sylvietta rufescens</i>			x	
Family Phylloscopidae (leaf warblers and allies)					
Willow Warbler	<i>Phylloscopus trochilus</i>			x	
Family Cisticolidae (cisticolas and allies)					
Rattling Cisticola	<i>Cisticola chiniana</i>			x	x
Neddicky	<i>Cisticola fulvicapilla</i>				x
Tawny-flanked Prinia	<i>Prinia subflava</i>				x
Black-chested Prinia	<i>Prinia flavicans</i>				x
Grey-backed Camaroptera	<i>Camaroptera brevicaudata</i>			x	
Burnt-necked Eremomela	<i>Eremomela usticollis</i>			x	
Family Leiothrichidae (laughingthrushes)					
Arrow-marked Babbler	<i>Turdoides jardineii</i>			x	x
Family Sylviidae (sylviid babblers)					

Chestnut-vented Warbler	<i>Sylvia subcaerulea</i>			x	x
Family Zosteropidae (white-eyes)					
Cape White-eye	<i>Zosterops virens</i>			x	
Family Sturnidae (starlings)					
Common Myna	<i>Acridotheres tristis</i>				x
Cape Starling	<i>Lamprotornis nitens</i>				x
Burchell's Starling	<i>Lamprotornis australis</i>				x
Violet-backed Starling	<i>Cinnyricinclus leucogaster</i>			x	x
Family Buphagidae (oxpeckers)					
Red-billed Oxpecker	<i>Buphagus erythrorhynchus</i>	NWBMA			x
Family Turdidae (thrushes)					
Groundscraper Thrush	<i>Turdus litsitsirupa</i>				x
Kurrichane Thrush	<i>Turdus libonyanus</i>			x	
Family Muscicapidae (chats and Old World flycatchers)					
Kalahari Scrub Robin	<i>Cercotrichas paena</i>			x	
White-browed Scrub Robin	<i>Cercotrichas leucophrys</i>			x	
Marico Flycatcher	<i>Bradornis mariquensis</i>				x
Family Nectariniidae (sunbirds)					
Amethyst Sunbird	<i>Chalcomitra amethystina</i>			x	
Marico Sunbird	<i>Cinnyris mariquensis</i>			x	
White-bellied Sunbird	<i>Cinnyris talatala</i>			x	x
Family Passeridae (Old World sparrows)					
Southern Grey-headed Sparrow	<i>Passer diffusus</i>				x
Family Ploceidae (weavers and widowbirds)					
Lesser Masked Weaver	<i>Ploceus intermedius</i>				x
Southern Masked Weaver	<i>Ploceus velatus</i>				x
Family Estrildidae (waxbills, munias and allies)					
Green-winged Pytilia	<i>Pytilia melba</i>			x	
Jameson's Firefinch	<i>Lagonosticta rhodopareia</i>			x	
Blue Waxbill	<i>Uraeginthus angolensis</i>			x	x
Family Motacillidae (wagtails and pipits)					
African Pipit	<i>Anthus cinnamomeus</i>				x
Family Fringillidae (finches and canaries)					
Black-throated Canary	<i>Crithagra atrogularis</i>				x
Family Emberizidae (buntings and New World sparrows)					
Golden-breasted Bunting	<i>Emberiza flaviventris</i>				x

Subtotal	89	0	3	38	60
Reptiles					
ORDER: SQUAMATA					
Family Gekkonidae (geckos)					
Common Dwarf Gecko	<i>Lygodactylus capensis</i>			x	
Family Lacertidae (true lizards)					
Common Rough-scaled Lizard	<i>Meroles squamulosus</i>			x	x
Family Scincidae (skinks)					
Variable Skink	<i>Trachylepis varia</i>			x	
Striped Skink	<i>Trachylepis striata</i>			x	
Family Pythonidae (pythons)					
Southern African Python *	<i>Python natalensis</i>		NEMBA (PR)		x
Subtotal	1	1	4	43	62
TOTAL	113	2	14	91	140

PR - Protected
 VU - Vulnerable
 NEMBA - National Environmental Management: Biodiversity Act
 NWBMA - North West Biodiversity Management Act
 * - confirmed by reserve staff

Appendix 3. Potentially occurring fauna of conservation concern

Common Name	Scientific Name	Red Data	Protected	Habitat	SABAP2 Reporting Rate for 2527 AD	Likelihood	Reason
Mammals							
Red Hartebeest	<i>Alcelaphus buselaphus caama</i>		NEMBA (PR) / NWBMA	Arid savanna and grassland		Confirmed	
African Clawless Otter	<i>Aonyx capensis</i>	NT	NWBMA	Rivers and streams		Low	Suitable habitat present only along the dam shoreline, at least 100m north of the study area
Southern African Hedgehog	<i>Atelerix frontalis</i>	NT	NEMBA (PR)	Wide range of habitats		Low	Some suitable habitat present but no recent records
Caracal	<i>Caracal caracal</i>		NWBMA	Wide range of habitats		Moderate	Suitable habitat present
White Rhinoceros	<i>Ceratotherium simum</i>	NT	NEMBA (PR)	Savanna, semi desert		Very Low	Suitable habitat present but area is fenced off from the adjacent property, where a small population is present
African Civet	<i>Civettictis civetta</i>		NWBMA	Savanna		Moderate	Suitable habitat present
Blue Wildebeest	<i>Connochaetes taurinus</i>		NEMBA (PR) / NWBMA	Savanna, grassland		Confirmed	
Swamp Musk Shrew	<i>Crocidura mariquensis</i>	NT		Wetlands in savanna		Low	No suitable habitat present
Tsessebe	<i>Damaliscus lunatus lunatus</i>	VU	NEMBA (PR)	Open savanna and grassland		Confirmed	One single animal is present on the reserve
African Marsh Rat	<i>Dasymys robertsii</i>	VU	NWBMA	Wetlands		Low	No suitable habitat present
Short-snouted Sengi	<i>Elephantulus brachyrhynchus</i>		NWBMA	Steppe and savanna		Moderate	Suitable habitat present
Eastern Rock Sengi	<i>Elephantulus myurus</i>		NWBMA	Rocky outcrops in grassland and savanna		Low	No suitable habitat present

Burchell's Zebra	<i>Equus quagga burchelli</i>		NEMBA (PR) / NWBMA	Savanna, grassland		Confirmed	
Black-footed Cat	<i>Felis nigripes</i>	VU	NEMBA (PR) / NWBMA	Dry, open savanna, grasslands and Karoo semi-desert with sparse shrub and tree cover		Low	Limited suitable habitat present, no recent records
African Wildcat	<i>Felis silvestris</i>		NWBMA	Wide range of habitats		Moderate	Suitable habitat present
Southern Lesser Galago	<i>Galago moholi</i>		NWBMA	Savanna		High	Suitable habitat present
Giraffe	<i>Giraffa camelopardalis</i>		NWBMA	Savanna		Confirmed	
Dwarf Mongoose	<i>Helogale parvula</i>		NWBMA	Savanna		Moderate	Suitable habitat present
Hippopotamus	<i>Hippopotamus amphibius</i>	VU‡	NWBMA	Wetlands		Low	Small population is present in Vaalkop Dam, but these animals rarely visit the shoreline of the Elands River G.R.
Common Waterbuck	<i>Kobus ellipsiprymnus</i>		NWBMA	Savanna, grassland		Confirmed	
Serval	<i>Leptailurus serval</i>	NT	NEMBA (PR) / NWBMA	Grassland, wetlands		Moderate	Some suitable habitat present
Aardvark	<i>Orycteropus afer</i>		NEMBA (PR) / NWBMA	Wide variety of habitats		Confirmed	
Bat-eared Fox	<i>Otocyon megalotis</i>		NWBMA	Arid savanna and grassland		Low	Some suitable habitat present but no recent records, no dens located during fieldwork
Vlei Rat (Grassland type)	<i>Otomys auratus</i>	NT		Mesic grasslands and wetlands within alpine, montane and sub-montane regions		Low	No suitable habitat present
Oribi	<i>Ourebia ourebi ourebi</i>	EN	NEMBA (EN)	Upland grassland		Low	No recent records, limited suitable habitat present
Leopard	<i>Panthera pardus</i>	VU	NEMBA (VU) / NWBMA	Wide variety of habitats		Low	Could occasionally enter the study area but would not remain for long

Brown Hyaena	<i>Parahyaena brunnea</i>	NT	NEMBA (PR)	Wide variety of habitats but prefers drier areas		Low	Could occasionally enter the study area but would not remain for long
Aardwolf	<i>Proteles cristatus</i>		NEMBA (PR) / NWBMA	Wide variety of habitats		Low	Rare in the area, may occasionally pass through
Southern Bushbuck	<i>Tragelaphus sylvaticus</i>		NWBMA			Low	Rare in the area, may occasionally pass through
Sensitive Species No. 17		VU	NEMBA (VU)	Wide variety of habitats		Low	Suitable habitat present but rare in the area. May very infrequently pass through
<i>Subtotal</i>	30	14	28				
Birds							
Tawny Eagle	<i>Aquila rapax</i>	EN	NEMBA (EN)	Savanna	0,2%	Very Low	Very rare in the area
Verreaux's Eagle	<i>Aquila verreauxii</i>	VU		Mountainous areas	0,2%	Very Low	No suitable habitat present, very few records
Kori Bustard	<i>Ardeotis kori</i>	NT	NEMBA (PR)	Open savanna	-	Very Low	Limited suitable habitat present, unrecorded from the QDGS
Short-clawed Lark	<i>Certhilauda chuana</i>	NT		Arid savanna and grassland	3,2%	Low	The few local records are from arid scrub savanna / agricultural lands to the west of the study area
Abdim's Stork	<i>Ciconia abdimii</i>	NT		Wide variety of habitats	1,7%	Low	Occasional influxes possible but very rare in the area
Pallid Harrier	<i>Circus macrourus</i>	NT		Open grassland and semi-desert	-	Very Low	No suitable habitat present, unrecorded from the QDGS
African Marsh Harrier	<i>Circus ranivorus</i>	EN		Moist grassland and wetland	-	Very Low	No suitable habitat present, unrecorded from the QDGS
European Roller	<i>Coracias garrulus</i>	NT		Savanna	8,7%	Moderate	Some suitable habitat present
Lanner Falcon	<i>Falco biarmicus</i>	VU		Wide variety of habitats but nests on cliffs	2,1%	Low	Rare in the area, no suitable nesting sites (cliffs) present

Red-footed Falcon	<i>Falco vespertinus</i>	NT		Dry, open grassland or savanna	0,2%	Very Low	Very rare in the area, limited suitable habitat present
Black-winged Pratincole	<i>Glareola nordmanni</i>	NT		Dry, open grassland or savanna	2,3%	Low	Very rare in the area, limited suitable habitat present
White-backed Vulture	<i>Gyps africanus</i>	CR	NEMBA (EN)	Savanna	2,1%	Low	May very occasionally forage within study area but rare in the area and limited suitable breeding habitat (tall trees) present
Cape Vulture	<i>Gyps coprotheres</i>	EN	NEMBA (EN)	Wide variety of habitats	2,5%	Low	May very occasionally forage within study area but rare in the area and no suitable breeding habitat (cliffs) present
Marabou Stork	<i>Leptoptilos crumeniferus</i>	NT		Wide variety of habitats	6,6%	Low	Some suitable foraging habitat present but rare in the area and may only occasionally forage within
Denham's Bustard	<i>Neotis denhami</i>	VU	NEMBA (VU)	Grassland and open woodland	0,4%	Very Low	Very rare in the area, high disturbance levels, limited suitable habitat present
Martial Eagle	<i>Polemaetus bellicosus</i>	EN	NEMBA (EN)	Wide variety of habitats	0,2%	Very Low	Very rare in the area, moderate to high disturbance levels present
Yellow-throated Sandgrouse	<i>Pterocles gutturalis</i>	NT		Short grassland, old agricultural lands, arid savanna	0,4%	Very Low	No suitable habitat present, occasionally drinks in the nearby Vaalkop Dam
Secretarybird	<i>Sagittarius serpentarius</i>	VU		Open savanna and grassland	0,6%	Very Low	Very rare in the area, limited suitable habitat present
Lappet-faced Vulture	<i>Torgos tracheliotos</i>	EN	NEMBA (EN)	Savanna	-	Very Low	Some suitable foraging and breeding habitat present unrecorded from the QDGS
Subtotal	19	19	7				
Reptiles							

Nile Crocodile	<i>Crocodylus niloticus</i>	VU	NEMBA (VU)	Wetlands		Very Low	No suitable habitat present, rarely recorded in Vaalkop Dam
Lobatse Hinged Tortoise	<i>Kinixys lobatsiana</i>	VU		Rocky hillsides in habitats of mixed <i>Acacia</i> and <i>Combretum</i> woodland		Low	Although <i>Kinixys lobatsiana</i> will travel through plains savanna to reach nearby hills, the absence of any elevated or rocky areas within and around the study area makes it an unlikely inhabitant
Southern African Python	<i>Python natalensis</i>		NEMBA (PR)	Wide variety of habitats, but usually near water or rocky outcrops		High	Suitable habitat present
Striped Variable Skink	<i>Trachylepis laevigata</i>	DD		Open, rocky habitat in montane grassland and savanna		Very Low	No suitable habitat present, only known from three localities, poorly known species
<i>Subtotal</i>	1	0	1				
TOTAL	50	33	36				

CR - Critically Endangered EN - Endangered
 VU - Vulnerable NT - Near Threatened
 DD - Data Deficient PR - Protected
 NEMBA - National Environmental Management: Biodiversity Act
 NWBMA - North West Biodiversity Management Act
 ‡ - IUCN assessment

Appendix 4. Curriculum Vitae of Duncan McKenzie

Name: Duncan Robert McKenzie
Profession: Terrestrial Ecologist
Date of Birth: 9 Nov 1977
Name of Firm: ECOREX Consulting Ecologists cc
Position in Firm: Ecologist
Years with firm: 12
Nationality: South African
Qualifications:



- | | | |
|--------------------------------|-----------------------|------|
| • N.Dip. [Nature Conservation] | UNISA, RSA | 2007 |
| • N.Cert. [Nature Guiding] | Drumbeat Academy, RSA | 2004 |

Membership in Professional Societies:

- BirdLife South Africa
- Animal Demography Unit, University of Cape Town

Language:

	<u>Speaking</u>	<u>Reading</u>	<u>Writing</u>
English (home):	Excellent	Excellent	Excellent
Afrikaans:	Good	Good	Good
isiZulu:	Good	Fair	Fair

Countries of Work Experience: Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland, Zimbabwe (Guiding). South Africa, Mozambique, DRC, Mali, Lesotho, Tanzania, Morocco, Guinea, Swaziland, Sierra Leone (Consulting Ecologist)

OVERVIEW OF EXPERIENCE

- 12 years' experience in specialist species identification, conducting baseline surveys, data analysis and report writing in various biomes in southern Africa, particularly savannah, forest and grassland biomes
- 2 years' experience game reserve management (KwaZulu-Natal)
- 5 years' experience (part time) of wetland delineation and management
- 2 years' experience of plant propagation and use for rehabilitation
- Specialist knowledge of identification of vascular plants
- Specialist knowledge of identification of mammals, birds, reptiles and amphibians
- SABAP2 Regional Co-ordinator: Mpumalanga
- Former member of the Kwa-Zulu-Natal Bird Rarities Committee
- Trustee on the John Voelcker Bird Book Fund

Employment Record:

2007 - present	ECOREX	Ecologist
2005 - 2006	Iglu (London, UK)	Specialist Travel Agent
1997 - 2005	Duncan McKenzie Bird Tours	Owner, Specialist Guide
2001	KZN Wildlife	District Conservation Officer, Reserve Manager
1999 - 2001	Institute of Natural Resources	Part-time Horticulturalist and Rehabilitation Officer
1997-2001	Mondi Wetlands Project	Part-time Field Assistant and Regional Co-ordinator
1996-1997	Natal Parks Board	Ranger

Appendix 5. Specialists Declaration

10.4 The Specialist

Note: Duplicate this section where there is more than one specialist.

I ...Duncan McKenzie..., as the appointed specialist hereby declare/affirm the correctness of the information provided as part of the application, and that I:

- in terms of the general requirement to be independent (tick which is applicable):

X	other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
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	am not independent, but another EAP that is independent and meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted);
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- have expertise in conducting specialist work as required, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- will ensure compliance with the EIA Regulations 2014 (as amended in 2017);
- will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application;
- will take into account, to the extent possible, the matters listed in regulation 18 of the regulations when preparing the application and any report, plan or document relating to the application;
- will disclose to the proponent or applicant, registered interested and affected parties and the competent authority 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 or the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority (unless access to that information is protected by law, in which case I will indicate that such protected information exists and is only provided to the competent authority);
- declare that all the particulars furnished by me in this form are true and correct;
- am aware that it is an offence in terms of Regulation 48 to provide incorrect or misleading information and that a person convicted of such an offence is liable to the penalties as contemplated in section 49B(2) of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signature of the specialist

ECOREX Consulting Ecologists CC

Name of company

20/11/2020

Date