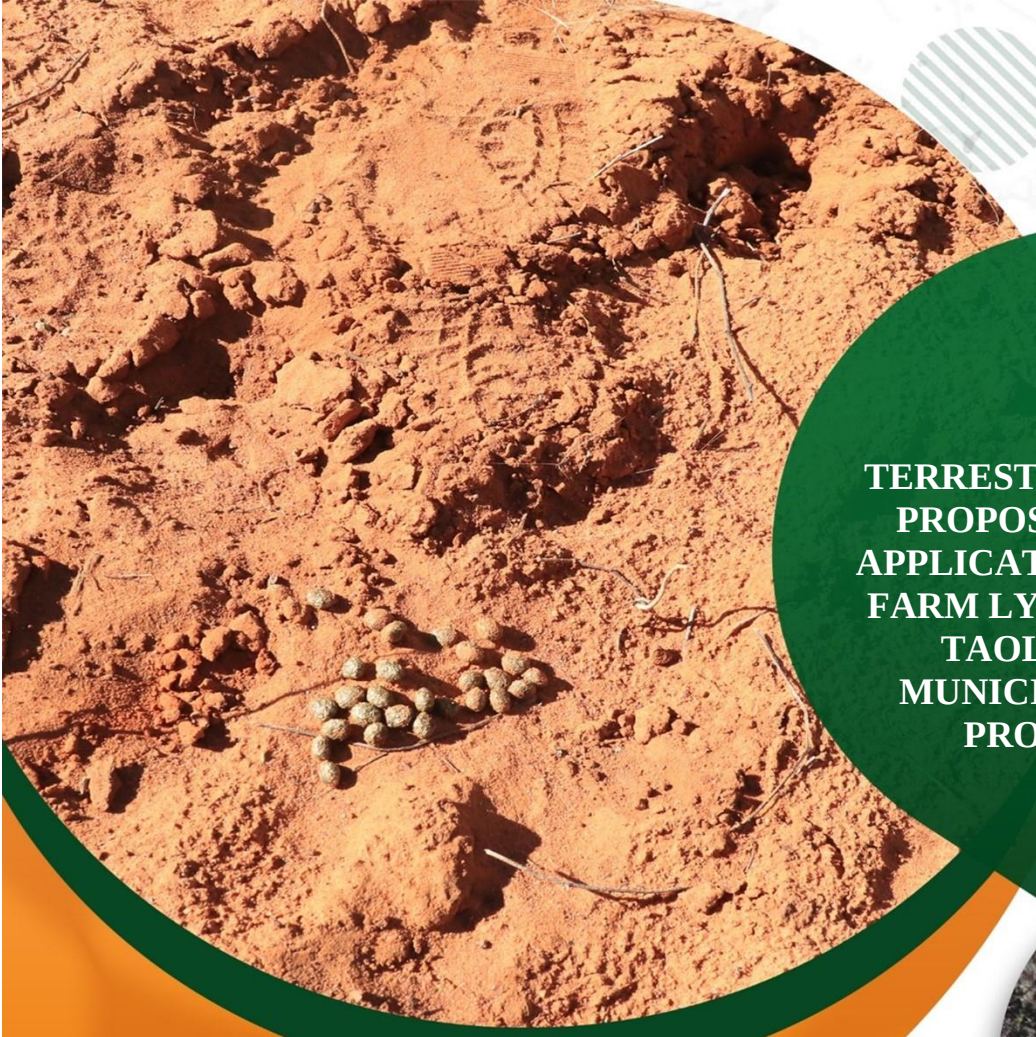

TERRESTRIAL BIODIVERSITY STUDY: PROPOSED PROSPECTING RIGHTS APPLICATION ON PORTION 0 AND 1 OF FARM LYMINGTON 423 WITHIN JOHN TAOLO GAETSEWE DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE, SOUTH AFRICA

Prepared for: Jomela Consulting (Pty) Ltd
Prepared by: MORA Ecological Services (Pty) Ltd
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January 2023

DOCUMENT CONTROL

Project title	TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT: PROPOSED PROSPECTING RIGHTS APPLICATION ON PORTION 0 AND 1 OF FARM LYMINGTON 423 WITHIN JOHN TAOLO GAETSEWE DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE, SOUTH AFRICA
Report reference	BIA-LYM/11-23
Document prepared for	Jomela Consulting (Pty) Ltd
Document prepared by	MORA Ecological Services (Pty) Ltd
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SPECIALIST INFORMATION AND LEGAL REQUIREMENTS

National Environmental Management Act, 1998 (Act No. 107 of 1998) and Environmental Impact Regulations 2014 (as amended) Requirements for Specialist Reports (Appendix 6):

The details of -	
○ the specialist who prepared the report; and	Page 6
○ the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page 6-7
A declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 11
An indication of the scope of, and the purpose for which, the report was prepared;	Page 4
○ An indication of the quality and age of base data used for the specialist report;	Page 24
○ A description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Page 24
The duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Page 24
A description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Page 24
Details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Page 15
An identification of any areas to be avoided, including buffers;	Page 15
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 15
A description of any assumptions made and any uncertainties or gaps in knowledge;	Page 5
A description of the findings and potential implications of such findings on the impact of the proposed activity, or activities;	Page 25
Any mitigation measures for inclusion in the EMPr;	Page 25
Any conditions for inclusion in the environmental authorisation;	Page 25
Any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Page 25

A reasoned opinion-	Page 38
○ whether the proposed activity, activities or portions thereof should be authorised;	Page 38
○ regarding the acceptability of the proposed activity or activities; and	Page 38
○ if the opinion is that the proposed activity, activities 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 38
A description of any consultation process that was undertaken during the course of preparing the specialist report;	Not applicable
A summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not applicable
Any other information requested by the competent authority.	Not applicable
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Page 19

EXECUTIVE SUMMARY

Project background

Jomela Consulting (Pty) Ltd has been appointed by Elengabadi Construction & Projects to undertake the required environmental impact assessment process for the proposed prospecting rights application on Portion 0 and 1 of Farm Lymington 423 within John Taolo Gaetsewe District Municipality, Northern Cape Province, South Africa. As part of the application process, MORA Ecological Services (Pty) Ltd was appointed by Jomela Consulting (Pty) Ltd to conduct a terrestrial biodiversity impact assessment on the abovementioned sites.

The ecological diversity information from the desktop study and that was collected as part of our investigations will be used to inform the Government's review during the application process of the proposed prospecting activities.

No other alternative sites were identified on the affected property(ies) for the proposed prospecting activities. The current study site is referred to as the preferred site. Some limited sensitive features occur on the site such as non-perennial river and protected trees. The size of the site makes provision for the exclusion of any sensitive environmental features that may arise through the EIA process to enable the appropriate allocation for prospecting area.

TERMS OF REFERENCE

MORA Ecological Services (Pty) Ltd was requested by Jomela Consulting (Pty) Ltd to conduct an ecological specialist study towards their pursuit of obtaining the requisite environmental authorisations for the proposed prospecting rights application. The critical objective of this specialist study is to determine the site sensitivity of the biodiversity of the site based on a desktop and field assessment, as well as mapping using the national vegetation classification system.

The main objective of the assessment was to include every species with the slightest chance of occurring within the site in the species list. The following tasks were undertaken by MORA Ecological Services (Pty) Ltd to achieve the assessment objective:

- A visual inspection of the study area was done before surveys were conducted.

- During the process different homogenous vegetation units were identified and subsequently surveyed on foot and by vehicle in order to determine the floristic composition of each unit.
- A plotless sampling method was used to record data.
- Walk transects to identify faunal species.
- Species identification was done following reputable checklists and field guides.
- Where necessary, plant material was collected and/or photographs taken of specimens for identification purposes.

ASSUMPTIONS, LIMITATIONS, UNCERTAINITIES AND GAP ANALYSIS

- The findings, results, observations, conclusions and recommendations provided in this report are based on the author's best scientific and professional knowledge as well as available information regarding the potential impacts of prospecting activities on the vegetation composition.
- The assessment of impacts was based on the current state of the primary environment currently .
- MORA Ecological Services (Pty) Ltd relied on Jomela Consulting (Pty) Ltd, as the EAP, to supply correct information on the site locality and extent, as well as project details which were assumed to be correct.
- It was assumed that the information contained in existing databases, reports and publications is correct.
- MORA reserves the right to amend this report, recommendations and/or conclusions at any stage should any additional or otherwise significant information come to light.

SPECIALIST DETAILS, CURRICULUM VITAE AND DECLARTION

The surveys and assessment were undertaken by Mokgatla Jerry Molepo, a registered Ecologist and Director of MORA Ecological Services (Pty) Ltd.

Curriculum vitae

EDUCATION:

- MSc Zoology, Nelson Mandela University (Percy FitzPatrick Institute of African Ornithology Centre of Excellence)

Research Project Topic: Foraging behaviour and thermal physiology in Cape Sugarbirds: sex-specific responses to temperature.

- BSc Honours in Zoology, University of Limpopo

Research Project Topic: Morphometrics and plumage variation in the South African Fiscal flycatcher *Sigelus silens* Shaw 1809.

- BSc Botany & Zoology, University of Venda
- Grade 12, Marobathota High School

CERTIFICATES:

- SASS5 Aquatic Biomonitoring, GroundTruth
- Hydropedology and Wetland Functioning, Terra Soil Science & Water Business Academy
- Section 21 (c) & (i) Water Use Authorisation Training, Department of Water and Sanitation
- Basic Project Management, Hudisa Business School

PROFESSIONAL MEMBERSHIP:

- South African Council for Natural Scientific Professions (SACNASP) – Professionally registered as Professional Natural Scientist. **Registration number:** 009509
- British Ecological Society (BES). **Membership number**: 1010709
- Zoological Society of Southern Africa (ZSSA). **Membership number**: 691

WORK EXPERIENCE:

- MORA Ecological Services (Pty) Ltd: April 2018 – Current, I am Biodiversity Specialist, and my duties include; (i) Conducting Biodiversity, Aquatic Impact Assessments, Rehabilitation (ii) Compilation of specialist reports.

- Arcus Consulting: May - November 2017, I was a subcontracted avifaunal surveyor for the proposed Highlands Wind Energy Farm, Somerset East, Eastern Cape.
- Centre for African Conservation Ecology (ACE), Nelson Mandela University: 2015 - 2016, I was a field guide/ environmental educator. Responsibilities: taking school learners on trial walks inside the Nelson Mandela University Nature Reserve.
- South African National Biodiversity Institute (SANBI): May – December 2014, I was a Zoological Systematics Technician. Responsibilities: (i) Insect identification and curation, and (ii) compiling the animal checklist of South Africa, (iii) Sourcing wildlife crime reports on endangered animals and plants for Barcode of Wildlife Project, (iv) Monitoring the bird population in the Botanical Garden.
- Department of Zoology, University of Venda: 2009 – 2013, I was a Research Assistant under Dr. T.C Munyai who was conducting a long-term research project which monitored the effects of climate change on biota and processes influencing ecosystem functioning and species diversity patterns.
- Percy FitzPatrick Institute of African Ornithology: March – April 2014, I was a Research Assistant under Dr. Rita Covas' Sociable Weaver Research Project. This is a long-term study which looks at the reproductive success of Sociable weavers at Benfontein Nature Reserve in Kimberley.

Key experience in specialist projects

Year	Project	Location:	Role(s)
2022	Avifaunal Impact Assessment for the proposed 132kV for Musina-Makhado Special Economic Zone North Site	Musina, Limpopo	Avifaunal Specialist/Ornithologist
2022	Avifaunal Impact Assessment for the proposed Khauta PV Solar including 44kV and 132kV Powerline	Welkom, Free State	Avifaunal Specialist/Ornithologist
2022	Avifaunal Impact Assessment for the proposed NAOS PV Solar including 132kV Powerline	Free State	Avifaunal Specialist/Ornithologist

2022	Preconstruction Avifaunal Assessment for the proposed Lichtenburg PV Solar including 132kV Powerline	Lichtenburg, North West	Avifaunal Specialist/Ornithologist
2022	Preconstruction Botanical Assessment for the proposed Lichtenburg PV Solar including 132kV Powerline	Lichtenburg, North West	Ecologist
2022	Biodiversity Assessment, Land Capability and Veld Condition Assessment for PPC Cement SA Slurry	Slurry, North West	Ecologist
2021	Avifaunal Impact Assessment for the proposed Upington-Aries 2x 400kV	Upington, Northern Cape	Avifaunal Specialist/Ornithologist
2021	Habitat Assessment Post Rehabilitation for PPC Cement SA Dwaalboom Factory	Dwaalboom, Limpopo	Ecologist
2021	Habitat Assessment Post Rehabilitation for Gibson Bay Wind Energy Farm	Humansdorp, Eastern Cape	Ecologist
2021	Wetland Rehabilitation for the sewer pipeline construction in Daveyton	Ekurhuleni East College Campus, Daveyton, Gauteng	Wetland Ecologist
2021	12 Months Wetland Rehabilitation Supervision for Ekangala Ext F Waterborne Sanitation Project	City of Tshwane Metropolitan Municipality, Ekangala, Gauteng	Aquatic Ecologist
2021	Bi-annual Aquatic Biomonitoring for Ekangala Ext F Waterborne Sanitation Project	City of Tshwane Metropolitan Municipality, Ekangala, Gauteng	Aquatic Ecologist
2021	12 Months Surface water and Groundwater monitoring for Ekangala Ext F Waterborne Sanitation Project	City of Tshwane Metropolitan Municipality, Ekangala, Gauteng	Aquatic Ecologist
2021	Estuarine Impact Assessments for the Proposed Mkhambathi and Mbotyi Beach Developments, Ingquza Hill Municipality, Eastern Cape	Ingquza Hill Municipality, Eastern Cape	Ecologist
2021	Botanical Search and Rescue Monitoring Report for A 140 Megawatt Roggeveld Wind Farm and Associated Infrastructure.	Karoo Hoogland Local Municipality, Northern Cape & Laingsburg Local Municipality,	Ecologist

		Western Cape Provinces	
2021	Ecological walkthrough for the proposed National Route 3 (N3) between Cato Ridge and Camperdown in KwaZulu-Natal.	Cato Ridge, KwaZulu-Natal	Ecologist
2021	Avifaunal Impact Assessment for the proposed Musina-Makhado Special Economic Zone South Site	Musina-Makhado, Limpopo	Avifaunal Specialist/Ornithologist
2021	Ecological Impact Assessment for the proposed prospecting on Farm In Die Kom 345 JQ	North West	Ecologist
2021	Rehabilitation Plan for Roggeveld Wind Energy Facility and associated Substation and 33kV and 132kV transmission powerlines.	Karoo Hoogland Local Municipality, Northern Cape & Laingsburg Local Municipality, Western Cape Provinces	Rehabilitation Specialist
2021	Rehabilitation Plan of the sewage effluent in Bethal.	Bethal, Mpumalanga	Rehabilitation Specialist
2021	Invasive Alien Plants Species Eradication and Control Program for Castle Gate Shopping Centre.	Pretoria, Gauteng	Ecologist
2020	Avifaunal Impact Assessment for the proposed 33kV overhead powerlines on Roggeveld Wind Energy Farm.	Karoo Hoogland Local Municipality, Northern Cape & Laingsburg Local Municipality, Western Cape Provinces	Avifaunal Specialist/Ornithologist
2020	Avifaunal & Ecological Impact Assessment for the proposed solar farm on Vaalkloof Nature Reserve.	Breede Valley Municipality, Western Cape	Ecologist
2020	Wetland assessment for the proposed water pipeline upgrade.	Daveyton, Gauteng	Ecologist
2020	Biodiversity Impact Assessment (BIA) for the proposed township establishment in Pretoria North.	Pretoria, Gauteng	Ecologist
2020	Freshwater impact assessment for the proposed water Kagiso Regional Park.	Kagiso, Gauteng	Ecologist

2019	Basic Assessment Report and EMPr for the proposed borehole drilling to supplement water supply for broiler in Delmas, Mpumalanga Province.	Delmas, Mpumalanga	Environmental Assessment Practitioner
2019	Wetland and Ecological Assessment for the proposed upgrading of bulk sewer pipeline in Amsterdam.	Amsterdam, Mkhondo Local Municipality	Ecologist
2019	Ecological assessment for the proposed mine on Farm Palmietfontein 189 IP situated within JB Marks Local Municipality, North West Province.	Ventersdorp, North West	Ecologist
2019	Biodiversity Management Plans for Evander Gold Mine.	Evander, Mpumalanga	Ecologist
2019	Avifaunal assessment for the proposed granite mine outside Mokopane.	Mogalakwena Local Municipality, Limpopo	Avifaunal Specialist/ Ornithologist
2019	Wetland assessment for the proposed grey water pipeline for irrigation.	Makhado Municipality, Limpopo	Ecologist
2019	Ecological assessment for the proposed for Nandoni mixed development.	Nandoni, Thulamela Local Municipality, Limpopo	Ecologist
2019	Ecological assessment for the proposed cultural village on farm Mphaphuli 278MT.	Mukomaasinandu, Thulamela Local Municipality, Limpopo	Ecologist
2019	Ecological assessment for the proposed Musina mixed development.	Musina, Limpopo	Ecologist
2019	Preliminary Ecological assessment for the prospecting on Kroomdrai farm, Mokopane.	Mokopane, Mogalakwena Local Municipality, Limpopo	Ecologist
2018	Invasive Alien Plants Species Eradication and Control Program Plan for Kwazenzele Ext. 1 Phase 2.	Lesedi Local Municipality, Gauteng province	Ecologist
2018	Updating of Wetland Assessment Report for the Magalies Lapatrie to Moruleng Pipeline.	Moses Kotana Local Municipality, North West province	Ecologist

2018	Avifaunal impact assessment for the proposed construction of two double storey on Mooifontein farm no 14IR, Portion 22 in Norkem, Kempton Park.	City of Ekurhuleni, Gauteng province	Avifaunal Specialist/ Ornithologist
2018	Ecological assessment for the proposed shopping centre and filling station in Madombidzha.	Madombidzha, Makhado Municipality, Limpopo province	Ecologist
2018	Biodiversity Assessment & Management Plan for Cullinan Diamond Mine.	Cullinan, Gauteng province	Ecologist (Faunal Specialist)
2017	Preconstruction Avifaunal Assessment for the Proposed Highlands Wind Energy Farm.	Somerset East, Eastern Cape province.	Ornithologist

DECLARATION BY THE SPECIALIST

I, Mokgatla Jerry Molepo , declare that:

• I act as the independent specialist in this application;

• I 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 applicant;

• I declare that there are no circumstances that may compromise my objectivity in performing such work;

• I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;

• I will comply with the Act, Regulations and all other applicable legislation;

• I have no, and will not engage in, conflicting interests in the undertaking of the activity;

• I undertake to disclose to the applicant 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; 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 form are true and correct; and

• I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the Specialist

MORA Ecological Services (Pty) Ltd

Name of Company

11/01/2023

Date

INTRODUCTION

Proposed development

Jomela Consulting (Pty) Ltd has been appointed by Elengabadi Construction & Projects to undertake the required environmental impact assessment process for the proposed prospecting rights application on Portion 0 and 1 of Farm Lymington 423 within John Taolo Gaetsewe District Municipality, Northern Cape Province, South Africa. As part of the application process, MORA Ecological Services (Pty) Ltd was appointed by Jomela Consulting (Pty) Ltd to conduct a terrestrial biodiversity impact assessment on the abovementioned sites.

The ecological diversity information from the desktop study and that was collected as part of our investigations will be used to inform the Government's review during the application process of the proposed development.

SITE DESCRIPTION OF AFFECTED ENVIRONMENT

The study site falls within within Gamagara Local Municipality and John Taolo Gaetsewe District Municipality in the Northern Cape Province (Figure **1**). Ecological surveys were conducted to evaluate potential impacts arising from the proposed prospecting activities.

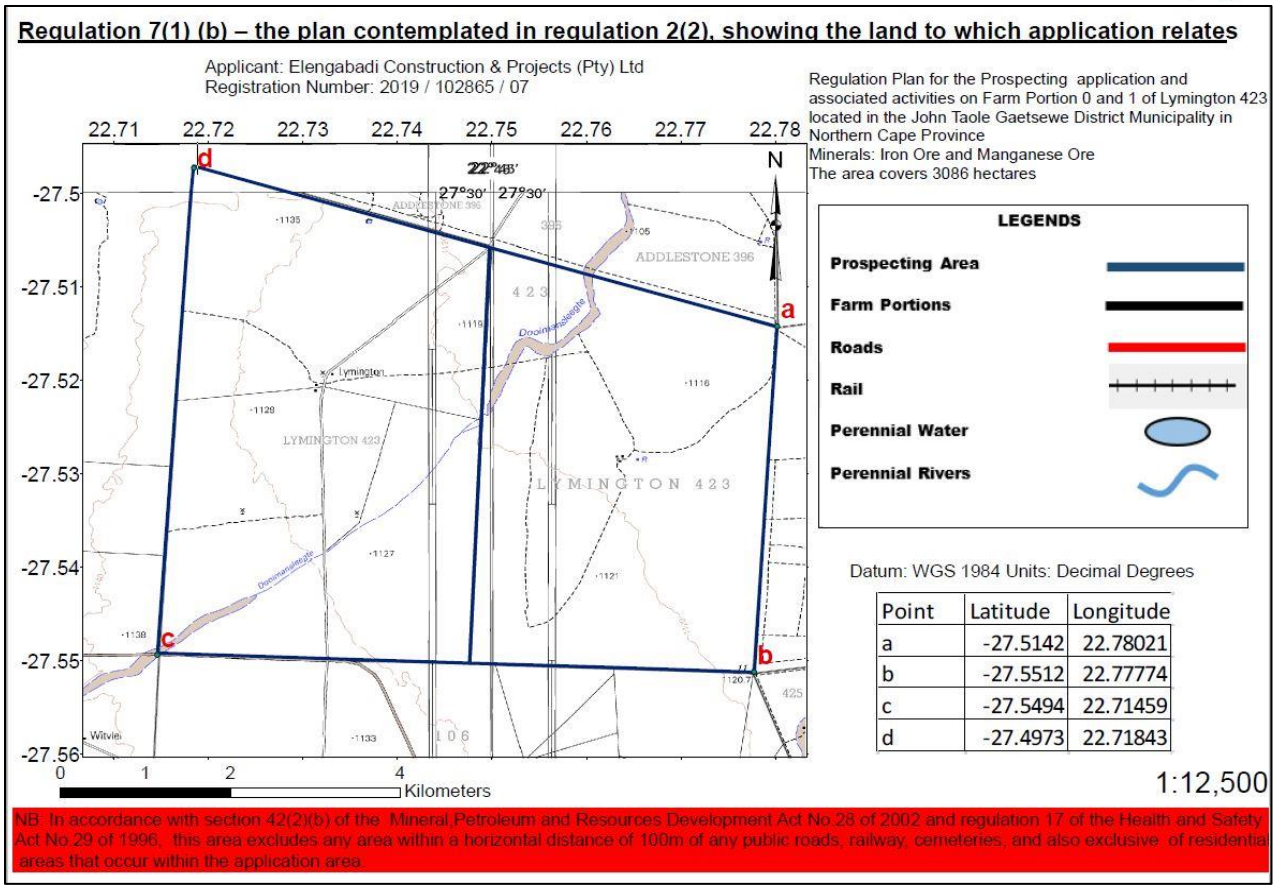

Figure 1. Locality map of the proposed development area.

Biome and bioregion

The geographic region of the study site falls on the Savanna Biome as shown in Figure **2** below. The Savanna Biome is the largest Biome in southern Africa, occupying 46% of its area, and over one-third the area of South Africa. It is well developed over the lowveld and Kalahari region of South Africa and is also the dominant vegetation in Botswana, Namibia and Zimbabwe. It is characterized by a grassy ground layer and a distinct upper layer of woody plants. Where this upper layer is near the ground the vegetation may be referred to as Shrubveld, where it is dense as Woodland, and the intermediate stages are locally known as Bushveld.

The environmental factors delimiting the biome are complex: altitude ranges from sea level to 2 000 m; rainfall varies from 235 to 1 000 mm per year; frost may occur from 0 to 120 days per year; and almost every major geological and soil type occurs within the biome. A major factor delimiting the biome is the lack of sufficient rainfall which prevents the upper layer from dominating, coupled

with fires and grazing, which keep the grass layer dominant. Summer rainfall is essential for the grass dominance, which, with its fine material, fuels near-annual fires. In fact, almost all species are adapted to survive fires, usually with less than 10% of plants, both in the grass and tree layer, killed by fire. Even with severe burning, most species can resprout from the stem bases.

The grass layer is dominated by C 4-type grasses, which are at an advantage where the growing season is hot, but where rainfall has a stronger winter component, C 3-type grasses dominate. The shrub-tree layer may vary from 1 to 20 m in height, but in Bushveld typically varies from 3 to 7 m. The shrub-tree element may come to dominate the vegetation in areas which are being overgrazed (Low & Rebelo, 1996).

The vegetation types found within the study site are Granite Lowveld and Tzaneen Sour Bushveld (Figure **3**), and they are described below.

Southern Kalahari Mekgacha

Distribution

This vegetation type is found Northern Cape and North-West Provinces as shown in Figure 3 below: Valleys (including beds and adjacent slopes) of the intermittent rivers draining the dry savanna south of the Bakalahari Schwelle (broad interfluve at 1 000–1 100 m altitude) in the South African part of the Kalahari region. The major mekgacha of the region include the Nossob, Auob, Molopo and Kuruman Rivers. A more extensive (endorheic) system of mekgacha is found north of the Bakalahari Schwelle in central Botswana.

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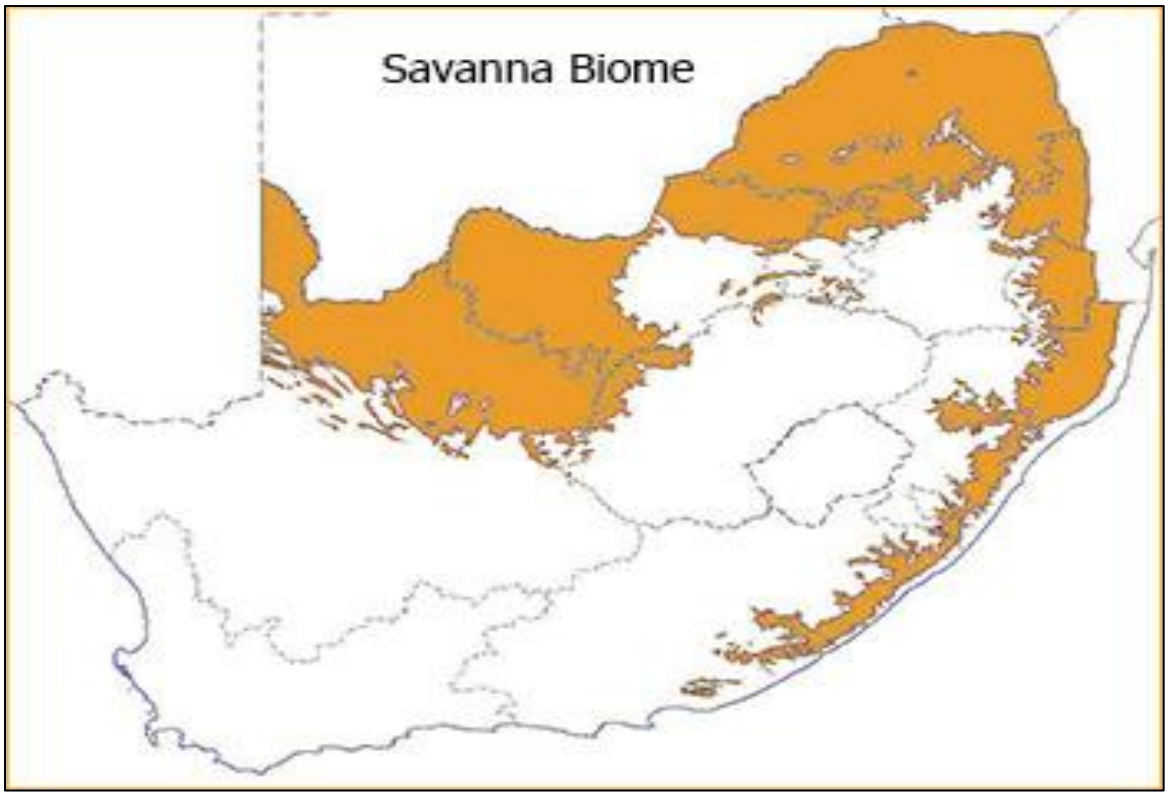

Figure 2. Location map of the Savanna Biome within South Africa (Low & Rebelo, 1996).

Vegetation

The dominant vegetation type found on the study site is Kathu Bushveld, where the proposed prospecting activities will take place (Figure **3**). According to the 2016 Northern Cape Critical Biodiversity Plan, the site falls within, Ecological Support Area and Other Natural Areas (Figure **1**Figure 4).

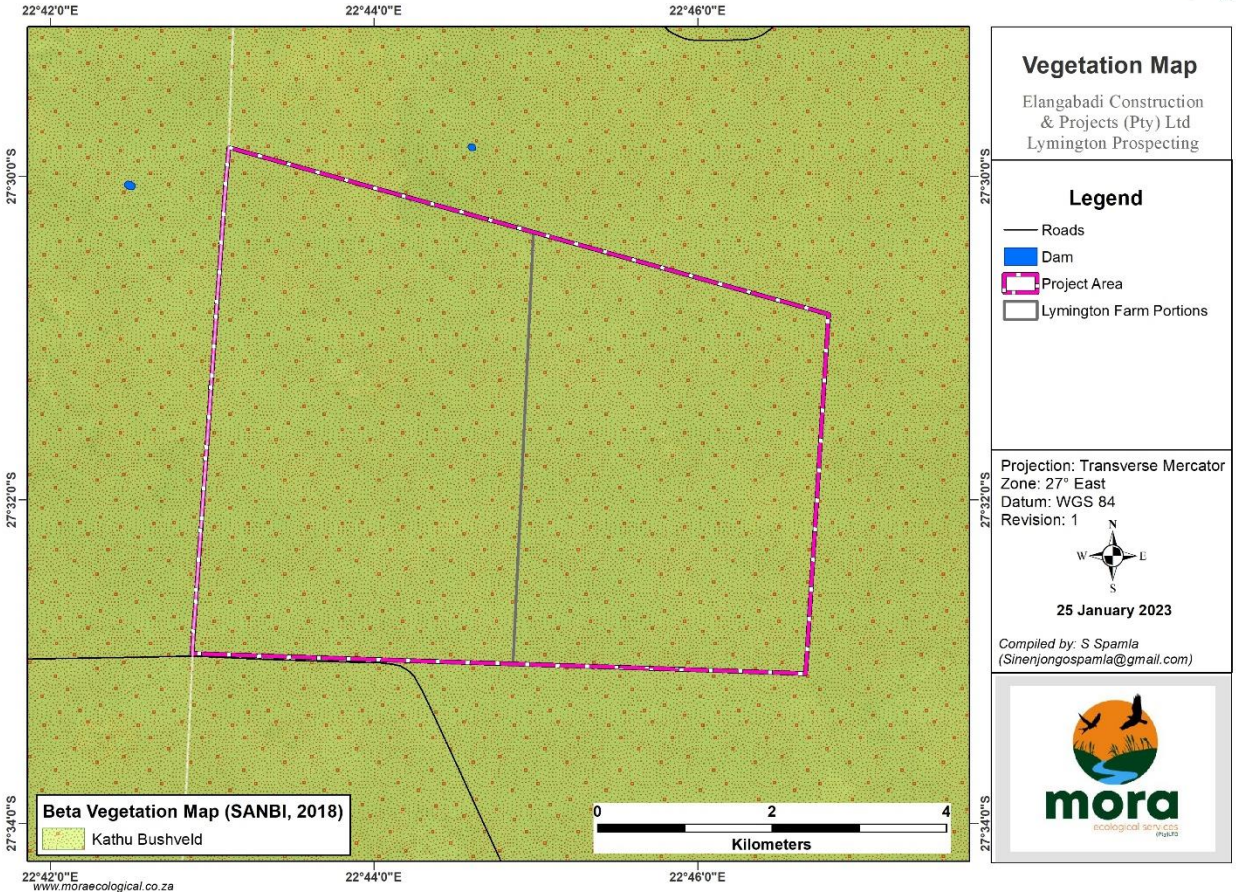

Figure 3. Vegetation map relative to the proposed development area.

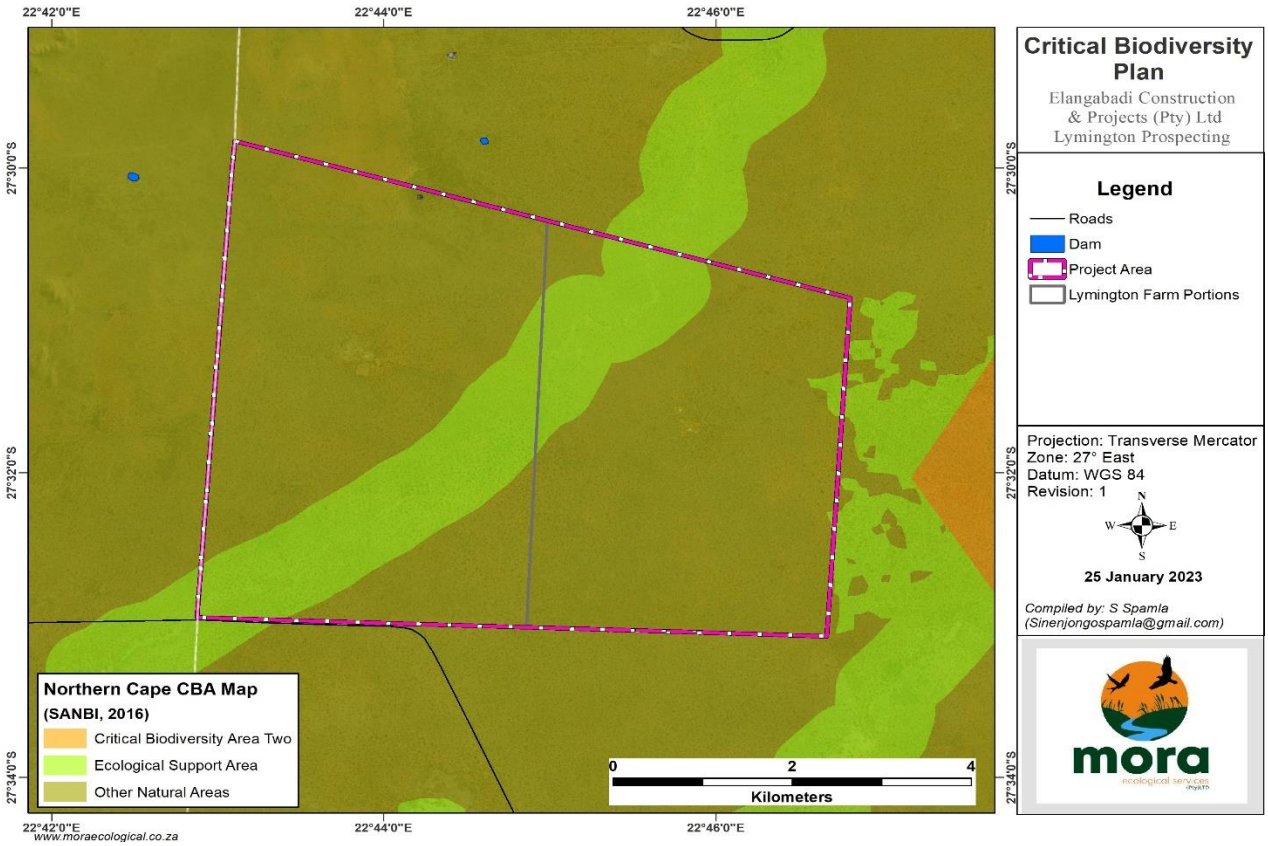

Figure 4. Northern Cape Critical Biodiversity Plan within the proposed development area.

Climate

The climate is characterized by summer and autumn rainfall with very dry winters. MAP is about 220 - 380 mm. Frost is frequent in winter. Mean monthly maximum and minimum temperatures for Sishen are 37.0°C and -2.2°C for December and July, respectively (Figure **5**).

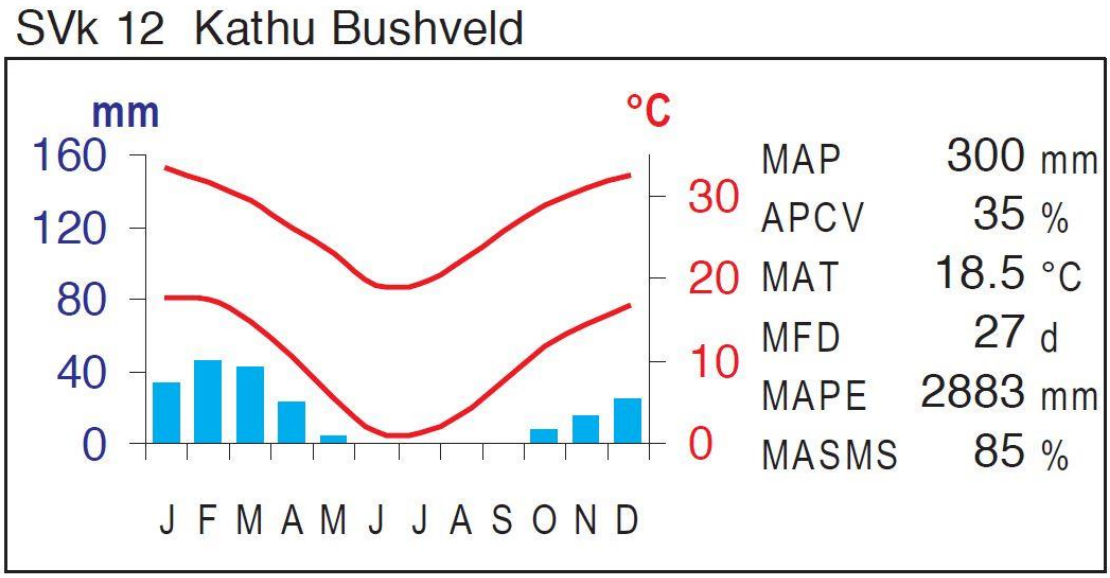

Figure 5. Climatic diagram representative of the region (Mucina and Rutherford, 2006).

Site Sensitivity Assessment

The Department of Environment , Fisheries and Forestry (DFFE) screening tool report revealed that the site has low sensitivity in terms of fauna and flora, and high sensitivity in terms of aquatic and terrestrial biodiversity. However, this high sensitivity is due to the Dooimansleegte river that traverse the site.

Table 1. Site sensitivity ratings to species data in the screening tool

Sensitivity Rating	**Description of Sensitivity Rating**
Very high	Habitat for species that are endemic to South Africa, where all the known occurrences of that species are within an area of 10 km^2 is considered critical habitat, as all remaining habitat is irreplaceable. Typically, these include species that qualify under the CR, EN, or VU criteria of the IUCN or species listed as Critically/Extremely Rare under South Africa's National Red List Criteria. For

	each species reliant on a critical habitat, all remaining suitable habitat has been manually mapped at a fine scale.
High	Recent occurrence records for all threatened (CR, EN, VU) and/or Rare endemic species are included in the high sensitivity level. Spatial polygons of suitable habitat have been produced for each species by intersecting recently collected occurrence records (those collected since the year 2002) that have a spatial confidence level of less than 250 m with segments of remaining natural habitat. For birds, species distribution models (SDMs) and SABAP2 data (http://sabap2.birdmap.africa/) were combined to delineate the 'high' sensitivity areas
Medium	Medium Model-derived suitable habitat areas for threatened and/or rare species are included in the medium sensitivity level. Two types of spatial models have been included. The first is a simple rule-based habitat suitability model where habitat attributes such as vegetation type and altitude are selected for all areas where a species has been recorded to occur. The second is a species distribution model which uses species occurrence records combined with multiple environmental variables to quantify and predict areas of suitable habitat. The models provide a probability-based distribution indicating a continuous range of habitat suitability across areas that have not been previously surveyed. A probability threshold of 75% for suitable habitat has been used to convert the modelled probability surface and reduce it into a single spatial area which defines areas that fall within the medium sensitivity level.
Low	Low Areas where no species of conservation concern (SCC) are known or expected to occur.

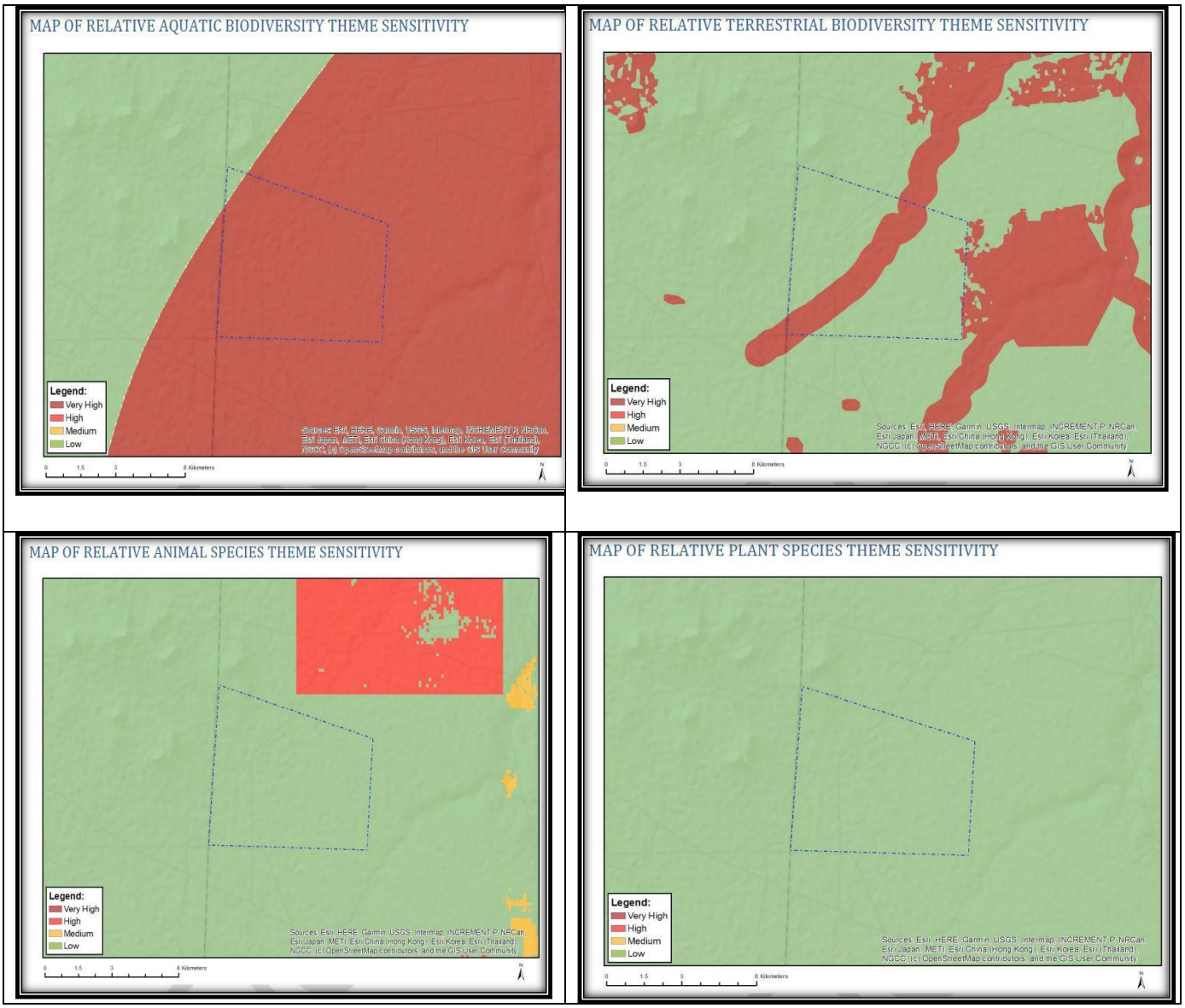

Figure 6. DFFE Screening Tool Sensitivity in relation to the study site.

LEGAL FRAMEWORK RELATING TO FLORA SPECIES AND PROPOSED DEVELOPMENT

International law and conventions

The importance of sustainable development and the protection of environmental resources have globally become a driving factor in the construction of new legislation governing industrial practices and their impact on the environment. South Africa has signed and ratified a number of global treaties, protocols and conventions, agreeing to implement the policies, which endorse sustainable development and promote a positive environmental legacy for future generations. A considerable international convention to which South Africa is in agreement with in signatory is namely the Convention on Biological Diversity (CBD). The CBD is notably the key international convention for sustainable development. The CBD has three main objectives which lead and encourage a sustainable future. These are:

- The conservation of biological diversity;
- The sustainable use of its components; and
- The fair and equitable sharing of the benefits from the use of genetic resources.

The convention covers all possible domains that are directly or indirectly related to biodiversity and its role in development, ranging from science, politics and education to agriculture, business and culture.

South African Constitution

The foundation of South Africans Environmental law is set in the Constitution of the Republic of South Africa (1996), specifically "Chapter 2- The Bill of Rights: section 24". This has allowed for the rapid development of environmentally based legislations which guard, enforce and guide all parties to maintain the human rights granted in the Constitution. These rights include:

- The right to an environment that is not harmful to their health or well-being; and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures 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.

National Environmental Management Act (NEMA)

The National Environmental Management Act (NEMA), Act 107 of 1998 is the fundamental environmental legislation which aims to strengthen the rights granted in the South African Constitution. The NEMA Act is the foundation of environmental law in South Africa and has set the framework for additional legislation to build on. The Act establishes principles for decision-making on environmental matters, as well as providing motive for institutions which promote cooperative governance, and which can coordinate environmental action plans. Section 2(4) specifies that sustainable development requires the consideration of all relevant factors. In the regard to biodiversity and South Africa's ecological integrity, development should not result in the disturbance of ecosystems and loss of biological diversity, if not possible, these effects must be minimised and remedied. A low-risk, cautious approach should always be applied, considering limits of current knowledge concerning consequences and actions. Always anticipate possible negative impacts on the environment and people's environmental rights, identified impacts should be prevented and where they cannot be altogether prevented, are minimised and mitigated. Outlined NEMA principles with regard to biodiversity are to:

- Prevent pollution and ecological degradation
- Promote conservation; and
- Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

National Environmental Management of Biodiversity Act (NEMBA)

The National Environmental Management of Biodiversity Act (NEMBA) Act 10 of 2004 was designed to provide a management and conservation outline for biological diversity, as drafted under the NEMA. NEMBA focuses on the management and conservation of biodiversity, with its relevant components, which includes the use of indigenous biological resources in a sustainable manner, the fair and equitable sharing of benefits arising from bio-prospecting, cooperative governance in biodiversity management and conservation within the structures of NEMA. The Act, in protecting biodiversity, deals with the protection of threatened ecosystems and species, the control of alien invasive species, genetically modified organisms and regulates bio-prospecting. As with NEMA, NEMBA incorporates and gives effect to international agreements relating to

biodiversity. The Act gives the Minister of Environmental Affairs, Forestry and Fisheries the power to categorise any process or activity in a listed ecosystem, as a threatening process, thereafter, be regarded as an activity contemplated in Section 24(2) (b) of NEMA which states that: Specified activities may not be commenced without prior authorisation from the Minister or MEC and specify such activities. NEMBA is the most prominent statute containing provisions directly aimed at the conservation of b with the Threatened or Protected Species Regulations, February 2007 (TOPS Regulations). The NEMBA Regulations on Threatened or Protected Species (TOPS, 2007) lists all of the species that are threatened with extinction and therefore, nationally protected under an approach to sustainable use and development. Periodically, Red Data books are published, and the data used to update these lists of protected species.

Additionally, NEMBA regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Chapter 5 of the Act relates to species and organisms posing a potential threat to biodiversity. The purpose of Chapter 5 is:

- To prevent the unauthorized introduction and spread of alien species and invasive species to ecosystems and habitats where they do not naturally occur;
- To manage and control alien species and invasive species to prevent or minimize harm to the environment and to biodiversity in particular;
- To eradicate alien species and invasive species from ecosystems and habitats where they may harm such ecosystems or habitats;

According to Section 65 of the Act, "Restricted activities involving alien species":

- A person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7.

Restricted activities include the following:

- Importing into the Republic, including introducing from the sea, any specimen of a listed invasive species.
- Having in possession or exercising physical control over any specimen of a listed invasive species.
- Growing, breeding or in any other way propagating any specimen of a listed invasive species, or causing it to multiply.

- Conveying, moving, or otherwise translocating any specimen of a listed invasive species.
- Selling or otherwise trading in, buying, receiving, giving, donating, or accepting as a gift, or in any other way acquiring or disposing of any specimen of a listed invasive species.
- Spreading or allowing the spread of any specimen of a listed invasive species.
- Releasing any specimen of a listed invasive species.

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

In terms of the amendments to the regulations under this Act, landowners are legally responsible for the control of invasive alien plants on their properties. The schedules provide a list of declared weeds and invaders, which have been divided into three categories, as follows:

- Category 1 plants are prohibited and must be controlled.
- Category 2 plants (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.
- Category 3 plants (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading there of, except within the flood line of watercourses and wetlands.

The Northern Cape Nature Conservation Act (NCNCA, Act No 9 of 2009)

The purpose of this Act is to provide for the sustainable utilisation of wild animals, aquatic biota and plants; to provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; to provide for offences and penalties for contravention of the Act; to provide for the appointment of nature conservators to implement the provisions of the Act; to provide for the issuing of permits and other authorisations; and to provide for matters connected therewith.

Restricted activities involving protected plants and specially protected plants:

49(1) No person may, without a permit –

- Pick
- Import
- Export

- Transport
- Possess
- Cultivate; or
- Trade in,
- A specimen of a specially protected plant

50 (1) Subject to the provision of section 52, no person may, without a permit –

- Pick
- Import
- Export
- Transport
- Cultivate; or
- Trade in,
- A specimen of a protected plant

Northern Cape Critical Biodiversity Areas

The Northern Cape CBA Map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole.

METHODS

Methodology

Prior to conducting field assessments, a comprehensive literature review of available published and unpublished literature pertaining to the current use of the land and the potential environmental sensitivity of the site. Part of desktop included the retrieval of previously recorded plants in the area. This data was obtained from BRAHMS Online (SANBI). The species are listed under appendix C.

The main objective of the flora assessment was to include every plant species with the slightest chance of occurring within the site in the species list. The following tasks were undertaken by MORA Ecological Services (Pty) Ltd to achieve the assessment objective:

Flora

- A visual inspection of the study area was done before surveys were conducted.
- During the process different homogenous vegetation units were identified and subsequently surveyed on foot and by vehicle in order to determine the floristic composition of each unit.
- A plotless sampling method was used to record data.
- Species identification was done following reputable checklists and field guides.
- Where necessary, plant material was collected and/or photographs taken of specimens for identification purposes.

Fauna

- Prior to the initial visit, satellite images (Google Earth) of the site were studied and the different habitat types identified (uniform features from an aerial perspective). The sites were then ground-truthed upon arrival.
- Non-invasive walk transects were performed during the site assessment, documenting all animal sightings.
- Avifaunal surveys were conducted by means of walk transects and point count method. A 12 minutes point count method on a 20 m radius was used (Macchi & Grau 2012).

- No formal consultation process was conducted as part of this faunal study as it was not deemed necessary at the time of the study.

The site visit was conducted on the 20th to 21st November 2022 and on the 05th to 06th January 2023 to conduct necessary in-field procedures in assessing the vegetation and faunal composition and within the study area. The surveys were conducted by four senior fieldworkers. Surveys involved recording species encountered within the identified site.

RESULTS OF THE ECOLOGICAL ASSESSMENT

The vegetation around the study area is characterised by low shrubs, few tall trees and tall grasses (Figure **7**).

No sensitive faunal species were observed during the survey.

Species recorded in the proposed development area are represented in Appendix B. All of the recorded species are of low sensitivity as they are mostly widespread species. There are no objections from an ecological perspective for the proposed prospecting activitiesto proceed.

Figure 7. Photographic representation of the untransformed habitats.

Figure 8. Photographic representation of the untransformed habitat.

Figure 9. Photographic representation of the untransformed habitat.

Figure 10. Purple Roller (top), White-browed Sparrow Weaver (bottom) and nest of Sociable Weaver.

Alien and Invasive flora species

Invasive alien species are establishing and expanding in growing number world, and in many parts of the invasions are often followed by major negative effects on ecosystems, the environment, and human health. No alien and invasive species were encountered on site.

IMPACT ASSESSMENT RATINGS AND MITIGATION REQUIREMENTS

The methodology is included as Appendix A: Method of Environmental Assessment at the end of this report. The rating rankings for assessing impacts significance are as shown in Table 2 below. The findings of the impact assessment ratings are shown in the tables below. Table 3 is the impacts

matrix used for scoring environmental significance and Table 4 is a summary of impacts ratings for the proposed prospecting using Appendix A.

Table 2. Impact rating scoring used for the impact assessment of the proposed prospecting activities.

Points	**Impact significance rating**	**Description**
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

An impact assessment of all potential pre-construction, construction, operational and maintenance phase impacts associated with the activities pertaining to the proposed prospecting activities are provided in Table **3**.

Table 3. Impact rating scoring used for the flora impact assessment at the proposed prospecting activities.

Construction Phase	Preferred Alternative	
	Before Mitigation	After Mitigation
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Vehicle movement and compaction of soil minimising plant growth of indigenous flora	Vehicles should only use designated roadways to access the site
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	1
Total SP:	42	16
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Alteration of natural environment and habitat loss	Have a biodiversity protocol and rehabilitation plan in place that will be implemented upon closure.
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	36	16
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Spreading of invasive alien plants. The altered environment will also favour species that are better adapted to disturbed/transformed areas.	Invasive plant material should be disposed by incineration, or alternatively, composting to break down seeds. If seedbank persists, invasive alien plant management and eradication measures should be implemented
Magnitude:	3	2
Duration:	3	2

Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	45	20
Significance rating:	Negative medium impact	Negative low impact
Operation Phase	**Preferred Alternative**	
	Before Mitigation	**After Mitigation**
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Vehicle movement and compaction of soil minimising plant growth of indigenous flora	Vehicles should only use designated roadways to access the site
Magnitude:	3	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	45	20
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Alteration of natural environment and loss of habitat	The ecological footprint of the proposed development should be restricted to the approved (less sensitive) area. Areas outside the area of the proposed development should not be cleared.
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	36	16
Significance rating:	Negative medium impact	Negative low impact

POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Spreading of invasive alien plants. The altered environment will also favour species that are better adapted to disturbed/transformed areas.	Invasive plant material should be disposed by incineration, or alternatively, composting to break down seeds. If seedbank persists, invasive alien plant management and eradication measures should be implemented
Magnitude:	3	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	3	2
Probability:	3	2
Total SP:	36	18
Significance rating:	Negative medium impact	Negative low impact
Decommissioning Phase	**Preferred Alternative**	
	Before Mitigation	**After Mitigation**
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Continuous proliferation of invasive alien plants	Effective alien invasive plant management and eradication measures should be implemented on an ongoing basis
Magnitude:	3	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	45	20
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Exposed disturbed area with no indigenous vegetation	Implement effective rehabilitation measures upon closure
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	36	16
Significance rating:	Negative medium impact	Negative low impact

Table 4. Summary of flora impact ratings for the proposed prospecting activities.

	Average impact rating	Significance class	Average mitigated impact	Significance class
Potential impact on the current vegetation structure before and after mitigation	40.64	Negative medium impact	18.00	Negative low impact

Table 5. Animal species composition impact ratings for the proposed prospecting activities.

Construction Phase/Site Establishment	**Preferred Alternative**	
	Before Mitigation	**After Mitigation**
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Loss of priority fauna species from important habitats	Reserve indigenous vegetation wherever possible.
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	1
Total SP:	42	16
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Loss of resident fauna through increased disturbance	Reserve indigenous vegetation wherever possible. Avoid vegetation clearance during the breeding season.
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1

Probability:	3	2
Total SP:	36	16
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats.	Use designated roads to access the site. Rehabilitate unused areas with indigenous flora.
Magnitude:	3	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	45	20
Significance rating:	Negative medium impact	Negative low impact
Operation Phase	**Preferred Alternative**	
	Before Mitigation	**After Mitigation**
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important habitats for fauna species.	Reserve indigenous vegetation wherever possible.
Magnitude:	3	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1

Probability:	3	2
Total SP:	45	20
Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Loss of resident fauna through increased disturbance	Reserve indigenous vegetation wherever possible. Avoid vegetation clearance during the breeding season. No hunting of fauna is allowed.
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	36	16
Significance rating:	Negative medium impact	Negative low impact
Decommissioning Phase	**Preferred Alternative**	
	Before Mitigation	**After Mitigation**
POTENTIAL IMPACTS ASPECTS		
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Long-term or permanent degradation and modification of the receiving environment resulting to the loss of important avian habitats	Have a biodiversity protocol and rehabilitation plan that will be implemented following the decommissioning phase
Magnitude:	3	2
Duration:	3	2
Geographical Extent:	1	1
Loss of Resources:	3	2
Reversibility:	3	2
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	45	20

Significance rating:	Negative medium impact	Negative low impact
POTENTIAL ENVIRONMENTAL IMPACT / NATURE OF IMPACT:	Displacement of resident fauna species through increased disturbance	Have a biodiversity protocol and rehabilitation plan that will be implemented following the decommissioning phase
Magnitude:	3	2
Duration:	2	1
Geographical Extent:	1	1
Loss of Resources:	2	2
Reversibility:	2	1
Cumulative Effect:	2	1
Probability:	3	2
Total SP:	36	16
Significance rating:	Negative medium impact	Negative low impact

Table 6. Summary of the fauna species impact ratings for the proposed prospecting activities.

	Average impact rating	**Significance class**	**Average mitigated impact**	**Significance class**
Overall faunal impacts of the prospecting activities	42.92	Negative medium impact	20.50	Negative low impact

NO-GO AREAS, BUFFERS AND ALTERNATIVES

No go areas are applicable to the project site from an ecological perspective. Should the proposed activity not proceed, due to other specialist studies, the site will remain unchanged.

No other possible sites were identified on the affected property(ies) for the prospecting. This site is referred to as the preferred site. Some limited sensitive features occur on the site such as the non-perennial river and protected trees. No protected trees may be disturbed without obtaining a relevant tree permit from the department.

The size of the site makes provision for the exclusion of any sensitive environmental features that may arise through the EIA process to enable the appropriate selection of the suitable prospecting locations within the site.

CONCLUSION AND RECOMMENDATIONS

Although the NCCBA classifies majority of the site as being under Other Natural Areas, the on site assessment revealed that the site has a high abundance of Camelthorn trees, which are protected. This species should be avoided during prospecting activities, and where avoidance is inevitable, relevant permits should be obtained before any disturbance.

Important recommendations for the conservation of the current vegetation structure

- 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 vegetation 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 (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.

Important recommendations for the invasive alien plants

An alien management plan should be compiled by an Ecologist. The applicant can implement the alien management plan with the guide of the Ecologist.

Specific conditions recommended for the EA from a flora and vegetation perspective.

1. Implement mitigation controls during the prospecting phase as specified in the mitigation requirements. Monitor and report on their effectiveness.

2. Implement mitigation controls during the prospecting phase as specified in the mitigation. Monitor and report on their effectiveness.

3. Monitoring of implementation of mitigation controls, especially of invasive alien plants.

4. As much of the natural habitat as possible should be preserved during prospecting phase to reduce the irreversibility of impacts.

5. Effective restoration of the natural habitats that were intact before the prospecting should be implemented and reported on after decommissioning.

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APPENDICES

Appendix A: Method of Environmental Assessment

1.1 METHOD OF ENVIRONMENTAL ASSESSMENT

The environmental assessment aims to identify the various possible environmental impacts that could results from the proposed activity. Different impacts need to be evaluated in terms of its significance and in doing so highlight the most critical issues to be addressed.

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e., site, local, national or global whereas intensity is defined by the severity of the impact e.g., the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 2.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

1.1.1 Impact Rating System

Impact assessment must take account of the nature, scale and duration of impacts on the environment whether such impacts are positive or negative. Each impact is also assessed according to the project phases:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance should also be included. The rating system is applied to the potential impacts on the receiving environment and includes an objective evaluation of the mitigation of the impact. In assessing the significance of each impact, the following criteria is used:

Table 6. The rating system

NATURE		
Include a brief description of the impact of the environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be experienced.		
1	Site	The impact will only affect the site.
2	Local/district	Will affect the local area or district.
3	Province/region	Will affect the entire province or region.
4	International and National	Will affect the entire country.
PROBABILITY		
This describes the chance of occurrence of an impact.		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
DURATION		
This describes the duration of the impacts. Duration indicates the lifetime of the impact as a result of the proposed activity.		
1	Short term	The impact will either disappear with mitigation or will be mitigated through natural processes in a span shorter than the construction phase (0 – 1 years), or the impact will last for the period of a relatively short construction period and a limited recovery time after

		construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 30 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered indefinite.
INTENSITY/ MAGNITUDE		
Describes the severity of an impact.		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/ component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.

4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired. Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.
REVERSIBILITY		
This describes the degree to which an impact can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures.
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.

CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts. A cumulative impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible cumulative impact	The impact would result in negligible to no cumulative effects.
2	Low cumulative impact	The impact would result in insignificant cumulative effects.
3	Medium cumulative impact	The impact would result in minor cumulative effects.
4	High cumulative impact	The impact would result in significant cumulative effects
SIGNIFICANCE		
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The calculation of the significance of an impact uses the following formula: (Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity. The summation of the different criteria will produce a non-weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.		
Points	Impact significance rating	Description
6 to 28	Negative low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive low impact	The anticipated impact will have minor positive effects.

29 to 50	Negative medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative high impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive high impact	The anticipated impact will have significant positive effects.
74 to 96	Negative very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive very high impact	The anticipated impact will have highly significant positive effects.

Appendix B: Species list of species identified on site

1. Plant species

Species	Common Name	Growth Form	IUCN Conservation Status
Vachellia erioloba	Camel thorn	Tree	LC (Protected)
Senegalia mellifera	Black thorn	Tree	LC
Grewia flava	Velvet raisin	Shrub	LC
Dicoma capensis	Karmedik	Herb	LC
Aristida meridionalis	Gemsbokgrass	Graminoid	LC
Schmidtia pappophoroides	Blougrass	Graminoid	LC
Eragrostis lehmanniana	Lehman love grass	Graminoid	LC

2. Avifauna species

Common name	Scientific name	IUCN Conservation Status
Cape Starling	*Lamprotornis nitens*	LC
Lilac-breasted	*Coracias caudatus*	
Ring-necked Dove	*Streptopelia capicola*	LC
Neddicky	*Cisticola fulvicapilla*	LC
Hadeda Ibis	*Bostrychia hagedash*	LC
Black-headed Heron	*Ardea melanocephala*	LC
Laughing Dove	*Spilopelia senegalensis*	LC
House Sparrow	*Passer domesticus*	LC
Cape Sparrow	*Passer melanurus*	LC
Pied Crow	*Corvus albus*	LC
Cape Glossy Starling	*Lamprotornis nitens*	LC

Appendix C: Historical species records from the broader study area (VMS, Animal Demographic Unit).

No	Family	Scientific name	Common name	Red List Category	Number of QDss	Number of records	Last recorded
1	*Bathyergidae*	*Cryptomys hottentotus*	Southern African Mole-rat	Least Concern (2016)	1	1	1989/04/03
2	*Bovidae*	*Antidorcas marsupialis*	Springbok	Least Concern (2016)	1	1	2014/05/23
3	*Bovidae*	*Damaliscus pygargus phillipsi*	Blesbok	Least Concern (2016)	1	1	2014/05/23
4	*Bovidae*	*Sylvicapra grimmia*	Bush Duiker	Least Concern (2016)	1	1	2014/05/21
5	*Canidae*	*Vulpes chama*	Cape Fox	Least Concern (2016)	1	5	
6	*Erinaceidae*	*Atelerix frontalis*	Southern African Hedgehog	Near Threatened (2016)	1	5	
7	*Felidae*	*Felis nigripes*	Black-footed Cat	Vulnerable (2016)	1	1	
8	*Felidae*	*Panthera pardus*	Leopard	Vulnerable (2016)	1	2	
9	*Hyaenidae*	*Hyaena brunnea*	Brown Hyena	Near Threatened (2015)	1	4	
10	*Hystricidae*	*Hystrix africaeaustralis*	Cape Porcupine	Least Concern	1	2	2014/05/21
11	*Leporidae*	*Lepus capensis*	Cape Hare	Least Concern	1	2	1989/03/31
12	*Leporidae*	*Lepus saxatilis*	Scrub Hare	Least Concern	1	1	2014/05/22
13	*Macroscelididae*	*Elephantulus rupestris*	Western Rock Elephant Shrew	Least Concern (2016)	1	14	1989/04/03
14	*Manidae*	*Smutsia temminckii*	Ground Pangolin	Vulnerable (2016)	1	4	

15	*Muridae*	*Aethomys namaquensis*	Namaqua Rock Mouse	Least Concern	1	17	1989/04/03
16	*Muridae*	*Desmodillus auricularis*	Cape Short-tailed Gerbil	Least Concern (2016)	1	14	1989/04/03
17	*Muridae*	*Gerbilliscus leucogaster*	Bushveld Gerbil	Least Concern (2016)	1	11	1989/04/03
18	*Muridae*	*Mastomys coucha*	Southern African Mastomys	Least Concern (2016)	1	25	1989/04/04
19	*Muridae*	*Mus (Nannomys) minutoides*	Southern African Pygmy Mouse	Least Concern	1	17	1989/04/03
20	*Muridae*	*Rhabdomys pumilio*	Xeric Four-striped Grass Rat	Least Concern (2016)	1	17	1989/04/03
21	*Mustelidae*	*Ictonyx striatus*	Striped Polecat	Least Concern (2016)	1	1	2014/05/23
22	*Mustelidae*	*Mellivora capensis*	Honey Badger	Least Concern (2016)	1	2	
23	*Nesomyidae*	*Saccostomus campestris*	Southern African Pouched Mouse	Least Concern (2016)	1	3	1989/03/31
24	*Nycteridae*	*Nycteris thebaica*	Egyptian Slit-faced Bat	Least Concern (2016)	1	7	1989/03/31
25	*Pedetidae*	*Pedetes capensis*	South African Spring Hare	Least Concern (2016)	1	1	1989/03/29
26	*Sciuridae*	*Xerus inauris*	South African Ground Squirrel	Least Concern	1	3	2014/05/23

Historical reptile species records from the broader study area (VMS, Animal Demographic Unit).

No	Family	Scientific name	Common name	Red list category	Number of QDSs	Number of records	Last recorded
1	Agamidae	*Agama aculeata aculeata*	Common Ground Agama	Least Concern (SARCA 2014)	1	2	2008/06/21
2	Colubridae	*Dasypeltis scabra*	Rhombic Egg-eater	Least Concern (SARCA 2014)	1	1	2006/03/01
3	Colubridae	*Telescopus semiannulatus semiannulatus*	Eastern Tiger Snake	Least Concern (SARCA 2014)	1	3	2006/04/01
4	Lacertidae	*Pedioplanis lineoocellata lineoocellata*	Spotted Sand Lizard	Least Concern (SARCA 2014)	1	1	1988/10/06
5	Lamprophiidae	*Atractaspis bibronii*	Bibron's Stiletto Snake	Least Concern (SARCA 2014)	1	1	2007/06/20
6	Lamprophiidae	*Boaedon capensis*	Brown House Snake	Least Concern (SARCA 2014)	1	2	2006/04/01
7	Lamprophiidae	*Lycophidion capense capense*	Cape Wolf Snake	Least Concern (SARCA 2014)	1	1	2006/03/02
8	Lamprophiidae	*Psammophis brevirostris*	Short-snouted Grass Snake	Least Concern (SARCA 2014)	1	1	2006/04/01
9	Lamprophiidae	*Psammophis leightoni*	Cape Sand Snake	Vulnerable (SARCA 2014)	1	2	2006/04/01
10	Scincidae	*Trachylepis sulcata sulcata*	Western Rock Skink	Least Concern (SARCA 2014)	1	1	2019/11/17

11	Testudinidae	*Stigmochelys pardalis*	Leopard Tortoise	Least Concern (SARCA 2014)	1	1	2008/06/20
12	Varanidae	*Varanus albigularis albigularis*	Rock Monitor	Least Concern (SARCA 2014)	1	3	2017/10/22

Historical frog species records from the broader study area (VMS, Animal Demographic Unit).

No	Family	Scientific name	Common name	Red list category	Number of QDSs	Number of records	Last recorded
1	Bufonidae	*Sclerophrys garmani*	Olive Toad	Least Concern (IUCN, 2016)	1	1	2000/12/06
2	Pyxicephalidae	*Amietia delalandii*	Delalande's River Frog	Least Concern (2017)	1	1	2000/12/06
3	Pyxicephalidae	*Tomopterna cryptotis*	Tremelo Sand Frog	Least Concern	1	1	2000/12/06

Appendix F: SABAP 2 bird list of the area (BirdLife South Africa).

Ref	Common_group	Common_species	Genus	Species
722		Bokmakierie	*Telophorus*	*zeylonus*
731		Brubru	*Nilaus*	*afer*
105		Secretarybird	*Sagittarius*	*serpentarius*
161		Shikra	*Accipiter*	*badius*
536	Babbler	Southern Pied	*Turdoides*	*bicolor*
432	Barbet	Acacia Pied	*Tricholaema*	*leucomelas*
674	Batis	Pririt	*Batis*	*pririt*
404	Bee-eater	European	*Merops*	*apiaster*
411	Bee-eater	Swallow-tailed	*Merops*	*hirundineus*
67	Bittern	Little	*Ixobrychus*	*minutus*
544	Bulbul	African Red-eyed	*Pycnonotus*	*nigricans*
871	Bunting	Lark-like	*Emberiza*	*impetuani*
196	Buttonquail	Common	*Turnix*	*sylvaticus*
860	Canary	Black-throated	*Crithagra*	*atrogularis*
865	Canary	White-throated	*Crithagra*	*albogularis*
866	Canary	Yellow	*Crithagra*	*flaviventris*
575	Chat	Ant-eating	*Myrmecocichla*	*formicivora*
570	Chat	Familiar	*Oenanthe*	*familiaris*
630	Cisticola	Desert	*Cisticola*	*aridulus*
278	Courser	Double-banded	*Rhinoptilus*	*africanus*
341	Cuckoo	African	*Cuculus*	*gularis*
344	Cuckoo	Black	*Cuculus*	*clamosus*
352	Cuckoo	Diederik	*Chrysococcyx*	*caprius*
346	Cuckoo	Great Spotted	*Clamator*	*glandarius*
348	Cuckoo	Jacobin	*Clamator*	*jacobinus*
316	Dove	Cape Turtle	*Streptopelia*	*capicola*
317	Dove	Laughing	*Spilopelia*	*senegalensis*
318	Dove	Namaqua	*Oena*	*capensis*
314	Dove	Red-eyed	*Streptopelia*	*semitorquata*
517	Drongo	Fork-tailed	*Dicrurus*	*adsimilis*
368	Eagle-Owl	Spotted	*Bubo*	*africanus*
61	Egret	Western Cattle	*Bubulcus*	*ibis*
600	Eremomela	Yellow-bellied	*Eremomela*	*icteropygialis*
114	Falcon	Lanner	*Falco*	*biarmicus*
126	Falcon	Pygmy	*Polihierax*	*semitorquatus*
820	Finch	Red-headed	*Amadina*	*erythrocephala*
837	Firefinch	Red-billed	*Lagonosticta*	*senegala*
707	Fiscal	Southern	*Lanius*	*collaris*
663	Flycatcher	Chat	*Melaenornis*	*infuscatus*
665	Flycatcher	Fiscal	*Melaenornis*	*silens*

661	Flycatcher	Marico	*Melaenornis*	*mariquensis*
654	Flycatcher	Spotted	*Muscicapa*	*striata*
339	Go-away-bird	Grey	*Crinifer*	*concolor*
89	Goose	Egyptian	*Alopochen*	*aegyptiaca*
162	Goshawk	Gabar	*Micronisus*	*gabar*
165	Goshawk	Pale Chanting	*Melierax*	*canorus*
192	Guineafowl	Helmeted	*Numida*	*meleagris*
57	Heron	Purple	*Ardea*	*purpurea*
418	Hoopoe	African	*Upupa*	*africana*
424	Hornbill	African Grey	*Lophoceros*	*nasutus*
426	Hornbill	Southern Yellow-billed	*Tockus*	*leucomelas*
403	Kingfisher	Striped	*Halcyon*	*chelicuti*
130	Kite	Black-winged	*Elanus*	*caeruleus*
1035	Korhaan	Northern Black	*Afrotis*	*afraoides*
224	Korhaan	Red-crested	*Lophotis*	*ruficrista*
242	Lapwing	Crowned	*Vanellus*	*coronatus*
1183	Lark	Eastern Clapper	*Mirafra*	*fasciolata*
459	Lark	Fawn-colored	*Calendulauda*	*africanoides*
457	Lark	Monotonous	*Mirafra*	*passerina*
460	Lark	Sabota	*Calendulauda*	*sabota*
474	Lark	Spike-heeled	*Chersomanes*	*albofasciata*
506	Martin	Rock	*Ptyonoprogne*	*fuligula*
392	Mousebird	Red-faced	*Urocolius*	*indicus*
391	Mousebird	White-backed	*Colius*	*colius*
734	Myna	Common	*Acridotheres*	*tristis*
372	Nightjar	Rufous-cheeked	*Caprimulgus*	*rufigena*
1	Ostrich	Common	*Struthio*	*camelus*
364	Owl	Southern White-faced Scops	*Ptilopsis*	*granti*
359	Owl	Western Barn	*Tyto*	*alba*
365	Owlet	Pearl-spotted	*Glaucidium*	*perlatum*
748	Oxpecker	Red-billed	*Buphagus*	*erythrorynchus*
311	Pigeon	Speckled	*Columba*	*guinea*
238	Plover	Three-banded	*Charadrius*	*tricollaris*
650	Prinia	Black-chested	*Prinia*	*flavicans*
830	Pytilia	Green-winged	*Pytilia*	*melba*
805	Quelea	Red-billed	*Quelea*	*quelea*
413	Roller	Lilac-breasted	*Coracias*	*caudatus*
307	Sandgrouse	Namaqua	*Pterocles*	*namaqua*
421	Scimitarbill	Common	*Rhinopomastus*	*cyanomelas*
586	Scrub Robin	Kalahari	*Cercotrichas*	*paena*
711	Shrike	Crimson-breasted	*Laniarius*	*atrococcineus*

706	Shrike	Lesser Grey	*Lanius*	*minor*
708	Shrike	Red-backed	*Lanius*	*collurio*
786	Sparrow	Cape	*Passer*	*melanurus*
784	Sparrow	House	*Passer*	*domesticus*
4142	Sparrow	Southern Grey-headed	*Passer*	*diffusus*
485	Sparrow-Lark	Grey-backed	*Eremopterix*	*verticalis*
780	Sparrow-Weaver	White-browed	*Plocepasser*	*mahali*
743	Starling	Burchell's	*Lamprotornis*	*australis*
737	Starling	Cape	*Lamprotornis*	*nitens*
735	Starling	Wattled	*Creatophora*	*cinerea*
764	Sunbird	Dusky	*Cinnyris*	*fuscus*
755	Sunbird	Marico	*Cinnyris*	*mariquensis*
493	Swallow	Barn	*Hirundo*	*rustica*
502	Swallow	Greater Striped	*Cecropis*	*cucullata*
387	Swift	African Palm	*Cypsiurus*	*parvus*
378	Swift	Common	*Apus*	*apus*
385	Swift	Little	*Apus*	*affinis*
275	Thick-knee	Spotted	*Burhinus*	*capensis*
557	Thrush	Groundscraper	*Turdus*	*litsitsirupa*
514	Tit	Ashy	*Melaniparus*	*cinerascens*
108	Vulture	Lappet-faced	*Torgos*	*tracheliotos*
107	Vulture	White-backed	*Gyps*	*africanus*
658	Warbler	Chestnut-vented	*Curruca*	*subcoerulea*
619	Warbler	Rufous-eared	*Malcorus*	*pectoralis*
841	Waxbill	Black-faced	*Brunhilda*	*erythronotos*
840	Waxbill	Violet-eared	*Granatina*	*granatina*
779	Weaver	Red-billed Buffalo	*Bubalornis*	*niger*
789	Weaver	Scaly-feathered	*Sporopipes*	*squamifrons*
783	Weaver	Sociable	*Philetairus*	*socius*
803	Weaver	Southern Masked	*Ploceus*	*velatus*
568	Wheatear	Capped	*Oenanthe*	*pileata*
1171	White-eye	Orange River	*Zosterops*	*pallidus*
847	Whydah	Shaft-tailed	*Vidua*	*regia*
419	Wood Hoopoe	Green	*Phoeniculus*	*purpureus*
451	Woodpecker	Bearded	*Chloropicus*	*namaquus*
446	Woodpecker	Bennett's	*Campethera*	*bennettii*
450	Woodpecker	Cardinal	*Dendropicos*	*fuscescens*
447	Woodpecker	Golden-tailed	*Campethera*	*abingoni*