TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED RYST KUIL MINING RIGHT APPLICATION PROJECT

Beaufort West Local Municipality, Central Karoo District Municipality, Western Cape Province, South Africa

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Report Name	**TERRESTRIAL BIODIVERSITY ASSESSMENT FOR THE PROPOSED RYST KUIL MINING RIGHT APPLICATION PROJECT**
Specialist Theme	Terrestrial Biodiversity, Plant and Animal Theme
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Declaration	The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, Amended. 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. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.

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1 Introduction

1.1 Background

The biodiversity company was appointed to undertake a terrestrial biodiversity assessment for the proposed Mining right application for the Ryst Kuil Project and Associated Infrastructure project near Beaufort West, Western Cape Province. The area provided and assessed is referred to as the Project Area of Influence (PAOI) as all infrastructure will be placed within this area, holistically occuing within the Mining Rights Application Area. The regional context of the PAOI can be seen in Figure 1-1. The proposed PAOI can be seen illustrated in Figure 1-2.

To determine the area's baseline ecological state and present a detailed description of the receiving environment, both a desktop assessment and field survey (19-23 May 2025) were conducted. Furthermore, the desktop assessment and field survey both involved detecting, identifying and describing any locally relevant sensitive receptors and habitats. The manner in which the proposed development may affect these sensitive features was also investigated.

This assessment was conducted in accordance with the amendments to the Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The approach has taken cognisance of the recently published Government Notices (GN) 320 (20 March 2020) and GN 1150 (30 October 2020) in terms of NEMA, dated 20 March and 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation” (Reporting Criteria). The National Web-based Environmental Screening Tool has characterised the terrestrial theme sensitivity of the PAOI as:

- Terrestrial Biodiversity Theme sensitivity is Very High;
- Plant Species Theme sensitivity is Medium; and
- Animal Species Theme sensitivity is High.

The purpose of the specialist studies is to provide relevant input into the impact assessment process and to provide a report for the proposed activities associated with the development. This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making as to the ecological viability of the proposed project.

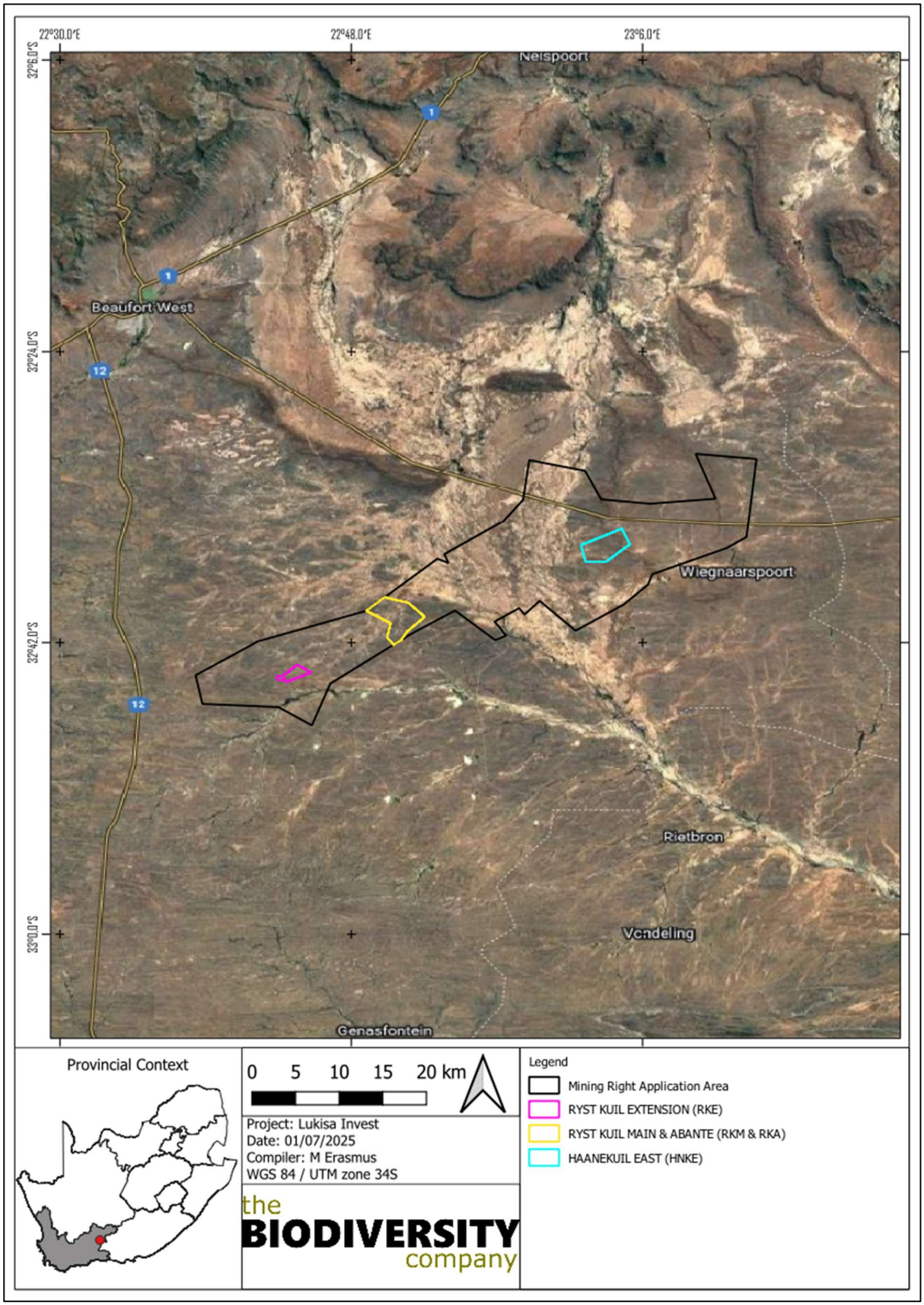


Figure 1-1 Map illustrating the regional context of the PAOI.

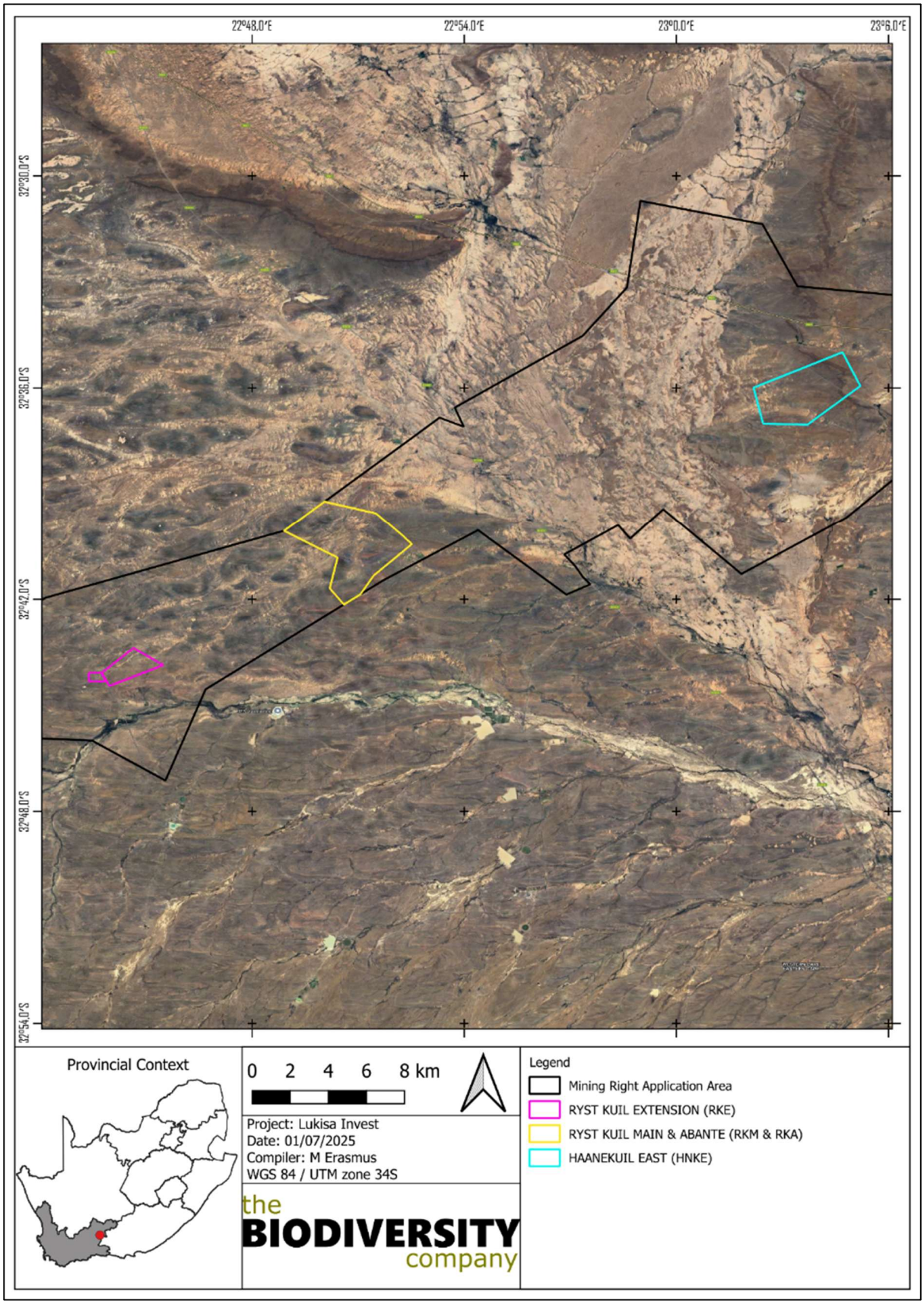


Figure 1-2 Map illustrating the PAOI.

1.2 Project Description

1.2.1 Description of the scope of the proposed overall activity

1.2.1.1 Listed and specified activities

Table 1-1 shows the location, and area (hectares) as far as possible of the listed activities and amended infrastructure which can be seen in Figure 1-3 to Figure 1-7.

Table 1-1 A list of key legislative requirements

NAME OF ACTIVITY (All activities including activities not listed)	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE
Ryst Kuil 351 RD ptn RE: Central Processing Plant (CPP)			
Land use: Agriculture to Mining	7251,9003 Ha	X	GN R983 Activity 28
Chemicals at the CPP - Sulphuric Acid (24 634t) - Pyrolusite (1080t) - Flocculant (66t) - Alamine (10m³) - Isodecanol (10m³) - Kerosene (54m³) - Sodium Carbonite (106t) - Ammonium Hydroxide (148t) - Burnt Lime (1038t) - Diesel (~75m³) - Oil (~25m³) - Hydraulic fluid (tbd)	Combined >500m³(tbd)	X	GN R984 Activity 4
CPP; TSF	217ha	X	GN R984 Activity 15 NWA S21g
Mining and mining related infrastructure: Open pit and underground operations CPP, TSF, Milling, Crushing	217 Ha	X	GN R983 Activity 12 GN R983 Activity 19 GN R984 Activity 15 GN R984 Activity 17 NWA S21j, S21a, S21g
Beneficiation plant	24Ha	X	GN R984 Activity 6 GN R984 Activity 21 GNR893 Category 4.1
Tailings Stockpile	193ha	X	GN R984 Activity 15 GN R984 Activity 6 GN R 632 & GN R633 GN R921 Category B(11) NWA S21g
ROM Stockpiles;	51ha	X	GN R984 Activity 15 GN R984 Activity 6 GN R921 Category B(11) NWA S21g
Water storage-reservoir; silt traps; Pollution control dam.	Volumes t.b.d	X	GN R983 Activity 12 GN R921 Category B(11) NWA: S21 a, b, g
Haul road (Mining operation not for public use)		X	GN R984 Activity 15 GN R984 activity 17

			GN R983 activity 19 GN R 985 activity 4
Ryst Kuil (351 RD Ptn 2) pit complex (RKA): Excavation, blasting, loading hauling, Equipment storage, berms, crushing.			
Land use: Agriculture to Mining	698,2151Ha	X	GN R983 Activity 28
Pit RKA1; RKA 2; RKA 3; RKA 4; RKA 5,	2.8ha; 46.72ha; 3.9ha; 2.8 ha; 3.1ha	x	GN R984 Activity 15 GN R 983 activity 21 GN R 984 activity 15 GN R 984 activity 17 GN R 984 activity 21
Back fill of most pits	~53ha	X	GN R984 Activity 6 NWA S21g
3 x stockpiles	19.5; 6.4; 3.5ha	X	GN R984 Activity 6 GN R921 Category B(11)
Haul road (Mining operation not for public use)		X	GN R984 activity 17 GN R983 activity 19 GN R 985 activity 4
Kat Doorn Kuil ptn RE: (RKM): Excavation, blasting, loading hauling, Equipment storage, berms, crushing.			
Land use: Agriculture to Mining	6033,6398 Ha	X	GN R983 Activity 28
Pit RKM1; RKM 2; RKM 3	17.5ha; 7.4ha; 6.5ha;	x	GN R 983 activity 21 GN R 984 activity 15 GN R 984 activity 17 GN R 984 activity 21
Back fill of most pits	~24ha	X	GN R984 Activity 6 NWA S21g
1 x stockpiles	36.8ha	X	GN R984 Activity 15 GN R984 Activity 6 GN R921 Category B(11)
Haul road (Mining operation not for public use)		X	GN R984 activity 17 GN R983 activity 19 GN R 985 activity 4
Kant Kraal ptn RE: (RKE): Excavation, blasting, loading hauling, Equipment storage, berms, crushing.			
Land use: Agriculture to Mining	6905,8035 Ha	X	GN R983 Activity 28
Pit RKE1; RKE 2; RKE3; RKE4; RKE5; RKE6; RKE7; RKE8; RKE9	2.2; 2.7; 3.6; 3.2; 8.2; 3.4; 10.2; 5.5; 2.4	x	GN R 983 activity 21 GN R 984 activity 15 GN R 984 activity 17 GN R 984 activity 21
Back fill of most pits	~35ha	X	GN R984 Activity 6 NWA S21g
5 x stockpiles	9.3ha; 5.6ha; 4.2ha; 13ha; 13ha.	X	GN R984 Activity 15 GN R984 Activity 6 GN R921 Category B(11) NWA S21g
Haul road (Mining operation not for public use)		X	GN R984 activity 17 GN R983 activity 19 GN R 985 activity 4
Haanekuil ptn 7: (HNK):): Excavation, blasting, loading hauling, Equipment storage, berms, crushing.			
Land use: Agriculture to Mining	5572,09 Ha	X	GN R983 Activity 28
Pit HNK3;	14.8ha;		GN R 983 activity 21

HNK6; HNK7; HNK8; HNK9; HNK10; HNK11; HNK12; HNK13; HNK14; HNK15; HNK16; HNK17,	2.1ha; 2.2ha; 3.9ha; 8ha; 2.1ha; 3.4ha; 2.3ha; 4.4ha; 2.3ha; 5.7ha; 2.2ha; 2.1ha;	X	GN R 984 activity 15 GN R 984 activity 17 GN R 984 activity 21
Stockpiles	52.3ha	X	GN R984 Activity 6 GN R921 Category B(11) NWA S21g
Back fill of most pits	~57ha	X	GN R984 Activity 6 NWA S21g
Haul road (Mining operation not for public use)		X	GN R984 activity 17 GN R983 activity 19 GN R 985 activity 4
Haanekuil ptn 7 & RE: (HNK): Excavation, blasting, loading hauling, Equipment storage, berms, crushing.			
Pit HNK1; HNK2,	2.7; 2.2	X	GN R983 activity 21 GN R983 Activity 27 GN R 984 activity 17 GN R 984 activity 21
Back fill of most pits	~4ha	X	GN R984 Activity 6 NWA S21g
Haul road (Mining operation not for public use)		X	GN R984 activity 17 GN R983 activity 19 GN R 985 activity 4
Haanekuil ptn RE: (HNK): Excavation, blasting, loading hauling, Equipment storage, berms, crushing.			
Land use: Agriculture to Mining	4007,9273Ha	X	GN R983 Activity 28
Pit HNK4; HNK5	1.8; 1.9;	X	GN R 983 activity 21 GN R983 Activity 27 GN R 984 activity 17 GN R 984 activity 21
Back fill of pits	~3ha	X	GN R984 Activity 6 NWA S21g
Stockpile	3	X	GN R984 Activity 6 GN R921 Category B(11)
Haul road (Mining operation not for public use)		X	GN R984 activity 17 GN R983 activity 19 GN R 985 activity 4
Transportation road			
Development (4.5m x 51.5km) and widening (by 1.5m) and upgrade (9.9km) of tracks to roads	24.66 ha	X	GN R983 activity 12 GN R983 activity 19 GN R 985 activity 4
Bridges/culverts crossing drainage lines	>100m²	X	GN R983 activity 12 NWA: S21 c & i.

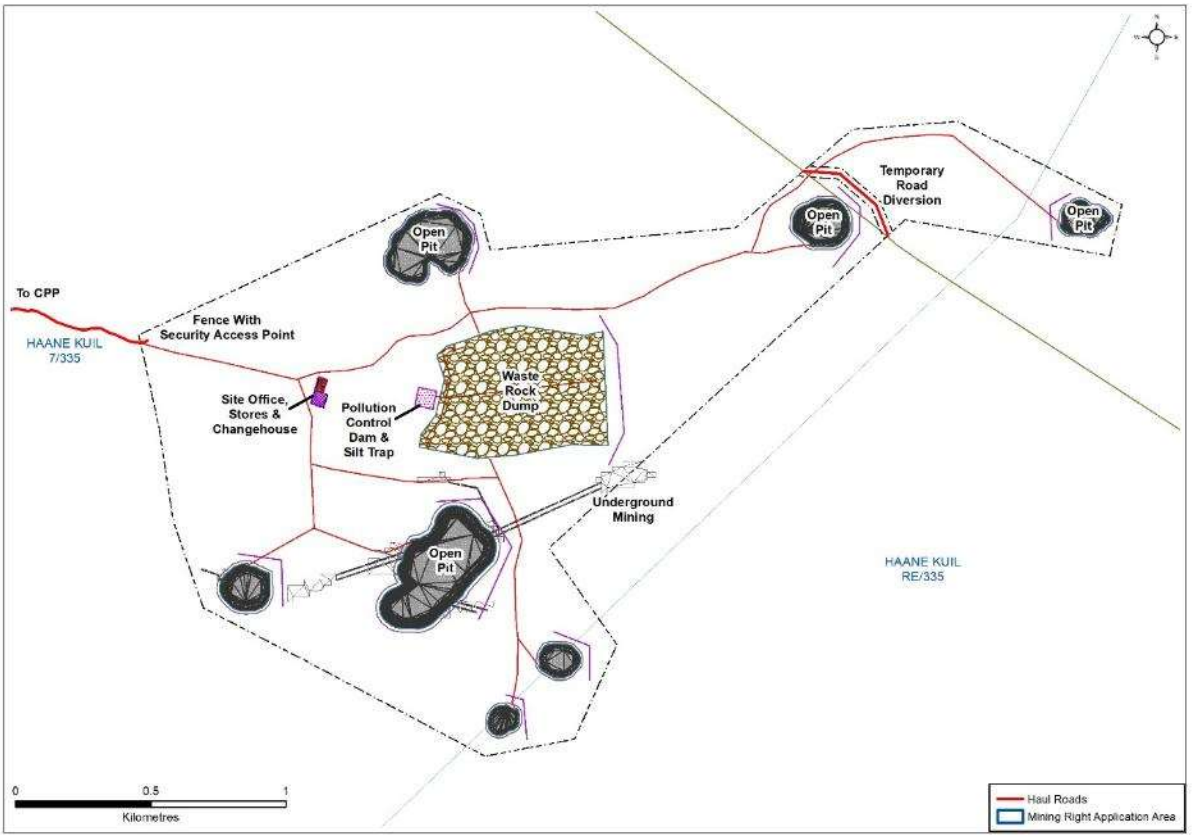


Figure 1-3 Map illustrating the Hannekuil project layout.

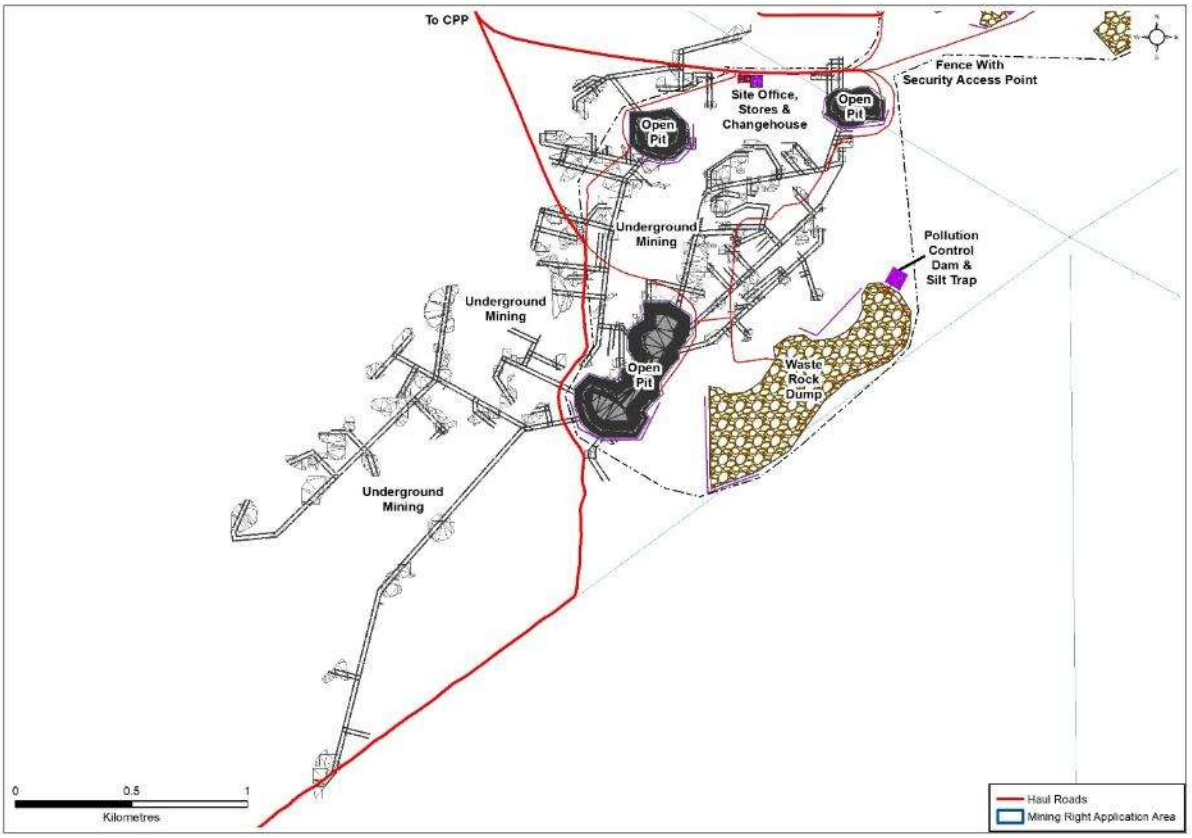


Figure 1-4 Map illustrating the Ryst Kuil Main (RKM) project layout.

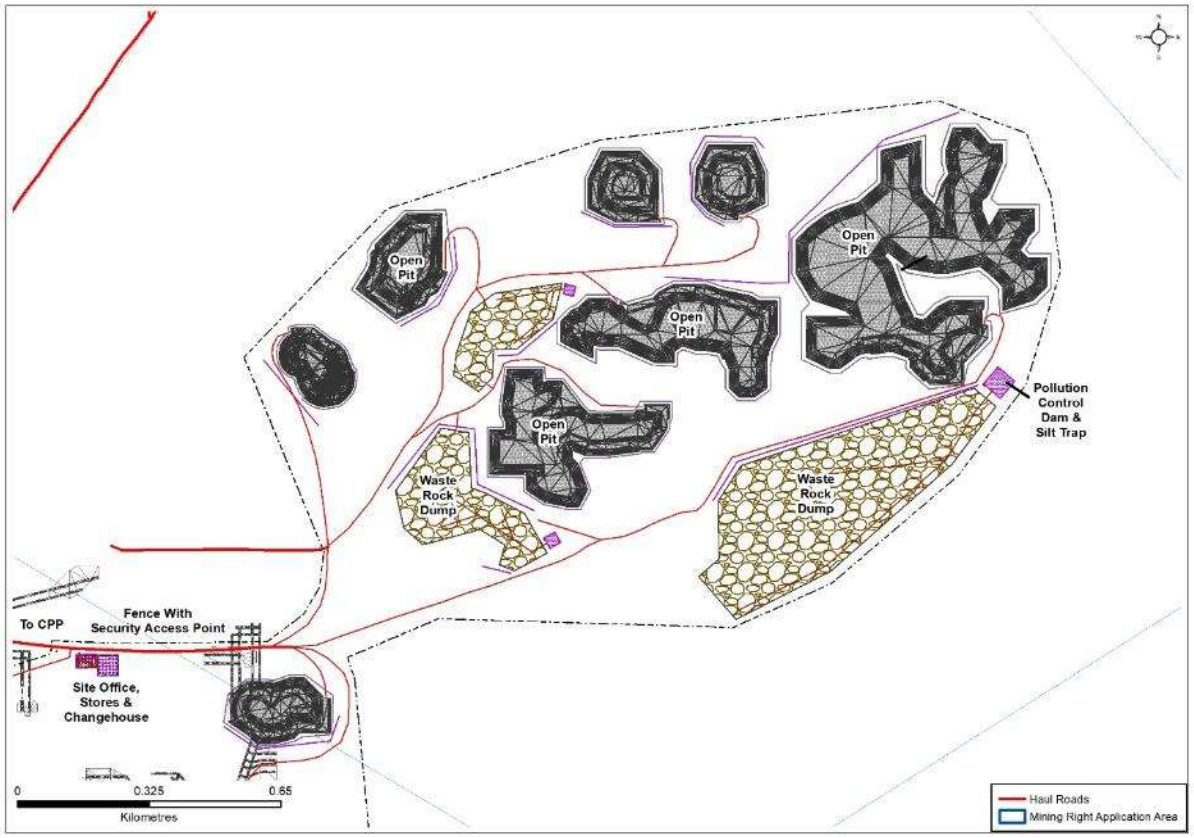


Figure 1-5 Map illustrating the Ryst Kuil Abante (RKA) project layout.

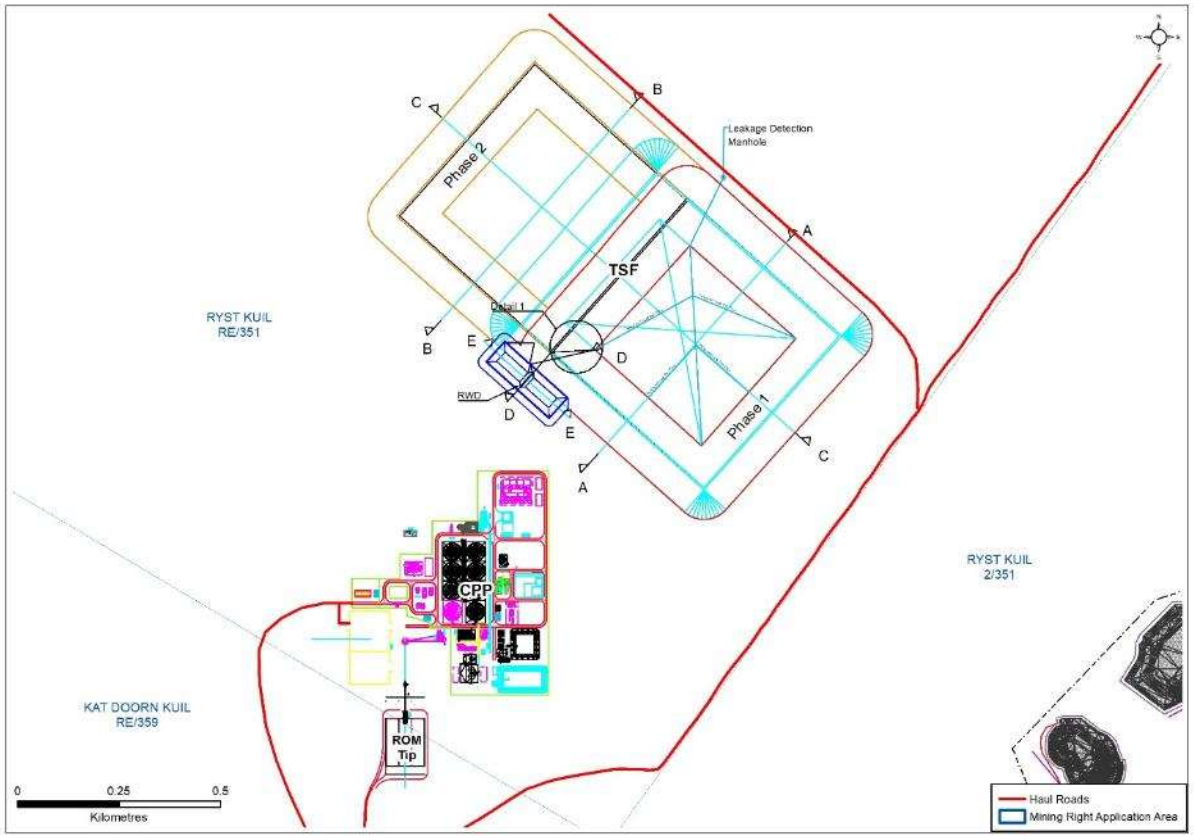


Figure 1-6 Map illustrating the RKA Tailings Storage Facility (TSF) and CPP project layout.

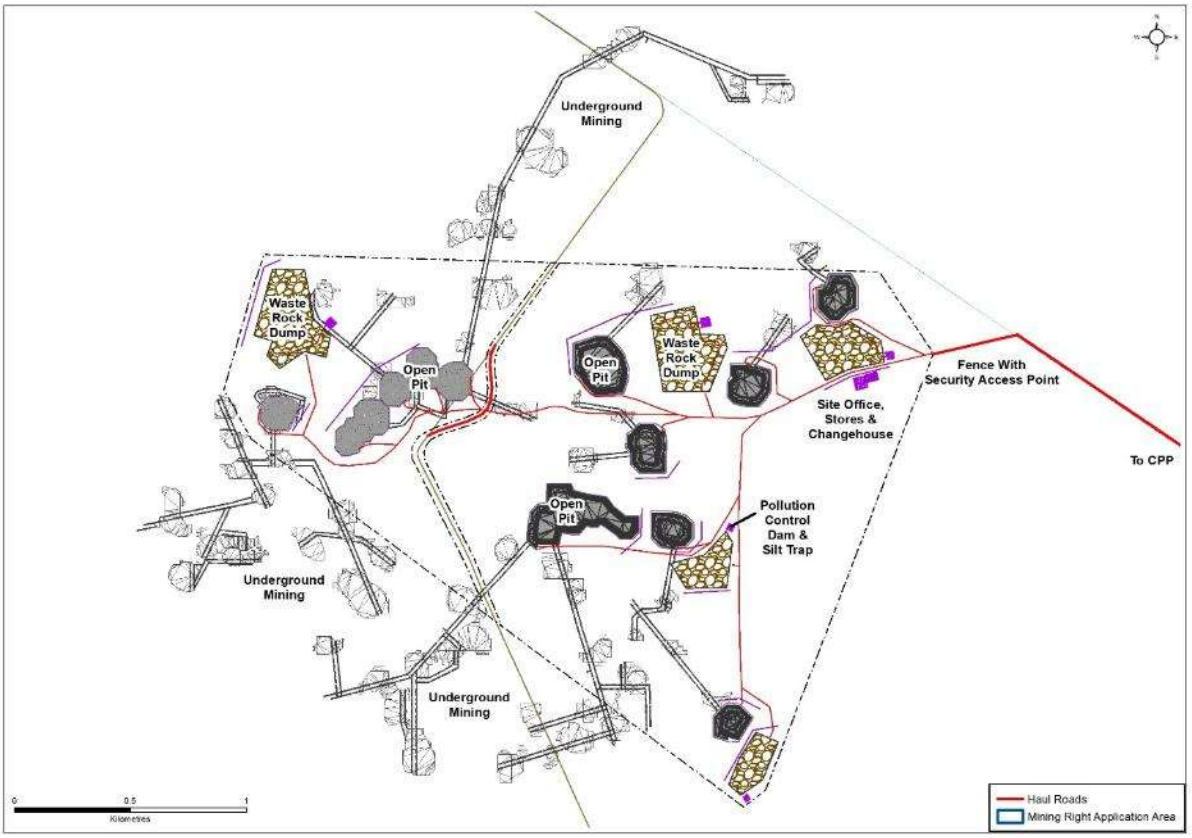


Figure 1-7 Map illustrating the RKE project layout.

1.3 Scope of Work

The aim of the biodiversity assessment was to provide information to guide the risk of the proposed activity to the current state of the associated ecosystems within the development area. This was achieved through the following:

- Desktop assessment to identify the relevant ecologically important geographical features within the PAOI and surrounding landscape;
- Desktop assessment to compile an expected species list and identify possible Species of Conservation Concern (SCC) that occur within the PAOI and surrounding landscape;
- Field survey to record flora and fauna species, especially Species of Conservation Concern (SCC);
- Determination of the Site Ecological Importance (SEI), also commonly referred to as sensitivity;
- A biodiversity impact assessment; and
- The prescription of mitigation measures for identified risks, including assigning buffer areas, where necessary.

1.4 Assumptions and Limitations

The following assumptions and limitations are applicable for this assessment:

- It is assumed that all information received from the client/developer is accurate;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area (PAOI) was based on the project areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment. Access to Ryst Kuil Abante was limited due to no landowner confirmation of permission;
- This assessment does not consider temporal trends (note that the data collected is, however, considered sufficient to derive a meaningful baseline);
- The area was only surveyed during a single site visit (dry season) and therefore, this assessment does not consider temporal trends (note that the data collected as well as the available previous data (Laurence *et al*., 2017) is considered sufficient to derive a meaningful baseline);
    - The flora identification was limited due to the lack of aboveground plant parts used to determine species, especially in regard to bulbous plants, the vegetation was dry, and most plants had already lost the green flush.
    - Fauna movement and presence was limited due to the cold winter weather, thus reducing species observations, especially herpetofauna;
- Whilst every effort was made to cover as much of the PAOI as possible, it is possible that some plant and animal species that are present within the PAOI were not recorded during the field investigations. However, it is the opinion of the specialist that an accurate representative sample of the ecological components considered within this assessment was collected; and
- The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by up to 5 m.

1.5 Key Legislative Requirements

The legislation, policies and guidelines listed below in Table 1-2 are applicable to the current project. The list below, although extensive, may not be complete and other legislation, policies and guidelines may apply in addition to those listed below.

Table 1-2 A list of key legislative requirements

Region	Legislation / Guideline	Comment
National	NEMA	Environmental Impact Assessment Regulations. 2014 (GNR 326, 7 April 2017), Appendix 6 requirements
	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA), Threatened or Protected Species Regulations	The protection of species and ecosystems that warrant protection
	Assessment Protocol (March 2020)	The minimum criteria for reporting.
	Assessment Protocol (October 2020)	Protocol for the specialist assessment and minimum report content requirements.
	NEMWA;	The regulation of waste management to protect the environment.
	NWA	The regulation of water uses.
	GN 1003 of GG 43726 of 18 Sept 2020	The regulation and management of alien invasive species.
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)	To provide for control over the utilisation of the natural agricultural resources, including the vegetation and the combating of weeds and invader plants.
Provincial	Draft Western Cape Biodiversity Bill, 2019	To provide for the management and conservation of the Province's biophysical environment and protected areas. To inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management.
	Western Cape Biodiversity Sector Plan 2023	

2 Results & Discussion

2.1 Desktop Assessment

2.1.1 Ecologically Important Landscape Features

The relevance of the proposed development to ecologically important landscape features are summarised in Table 2-1.

Table 2-1 Summary of relevance of the proposed project to ecologically important landscape features

Desktop Information Considered	Relevance	Reasoning	Section
Ecosystem Threat Status (RLE 2021)	Relevant	Overlaps with a 'Least Concern' ecosystem	2.1.1.1
Ecosystem Protection Level	Relevant	Overlaps with a 'Poorly Protected' Ecosystem	2.1.1.2
Provincial Conservation Plan	Relevant	HNKE overlaps with a Critical Biodiversity Area (CBA) 2, Ecological Support Area (ESA) 1 and Other Natural Areas. RKM & RKA-overlaps with a (ESA) 1, ESA 2 and Other Natural Areas RKE -overlaps with a (ESA) 1, ESA 2 and Other Natural Areas	2.1.1.3
Key Biodiversity Areas (KBA)	Relevant	The PAOI overlaps with the Eastern Gamka Karoo KBA	2.1.1.4
National Freshwater Priority Area (NFEPA)	Relevant	RKM -overlaps with a non-priority wetland	2.1.1.5
Protected Areas	Irrelevant	Not within range of any relevant areas	
National Protected Areas Expansion Strategy (NPAES)	Irrelevant	Does not overlap with any NPAES Priority Focus Areas	
Strategic Water Source Areas (SWSA)	Irrelevant	Does not overlap with any relevant areas	-
South African Inventory of Inland Aquatic Ecosystems (SAIIAE)	Irrelevant	Does not overlap with any relevant areas	
Mining and Biodiversity Guidelines	Irrelevant	Does not overlap with any relevant areas	

2.1.1.1 Red List of Ecosystems

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the Red List of Ecosystems dataset (Skowno & Monyeki, 2021) the proposed development overlaps with a LC ecosystem (Figure 2-1).

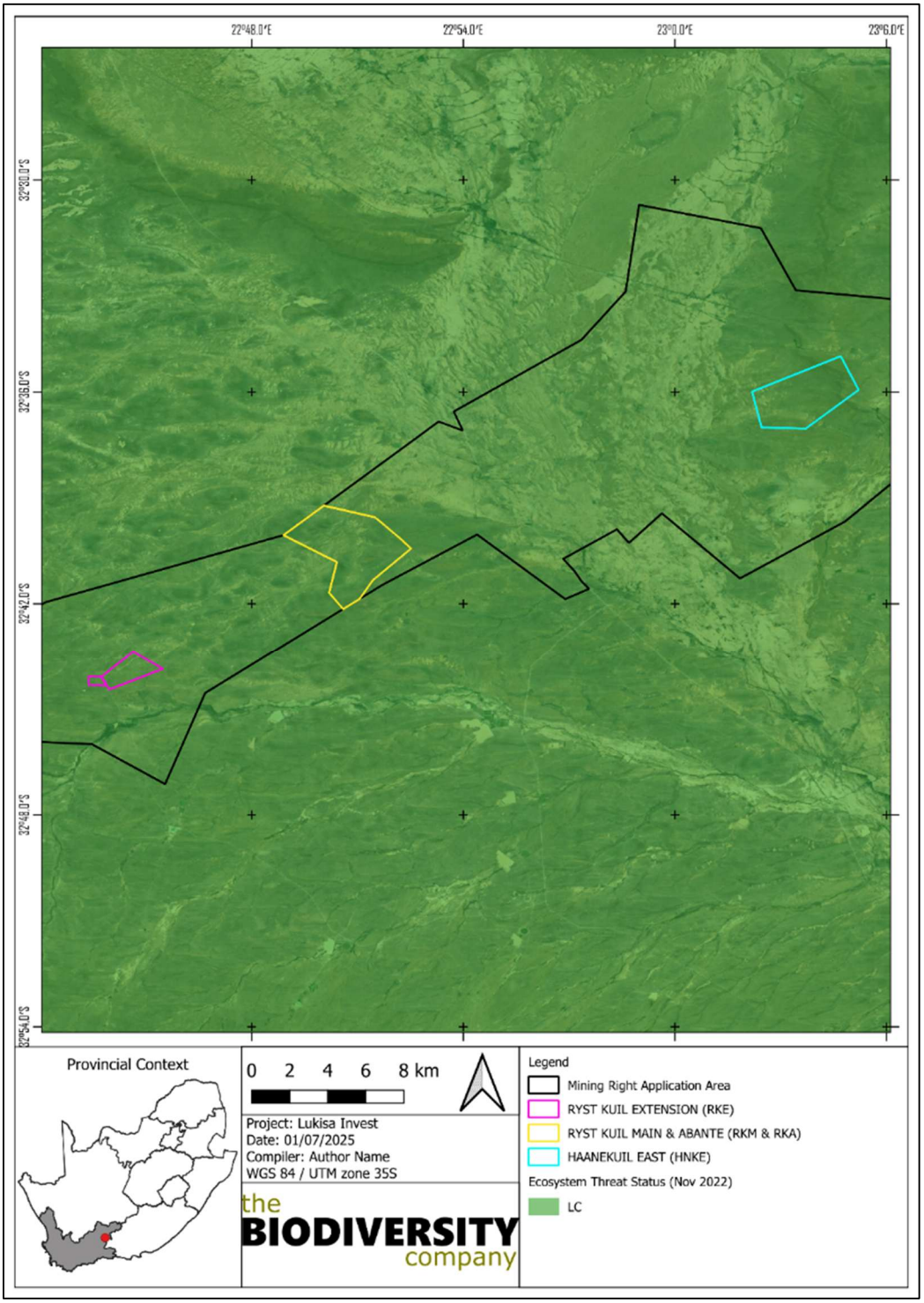


Figure 2-1 Map illustrating the ecosystem threat status associated with the PAOI.

2.1.1.2 Ecosystem Protection Level

Indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. Not Protected, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The PAOI overlaps with a PP ecosystem (Figure 2-2).

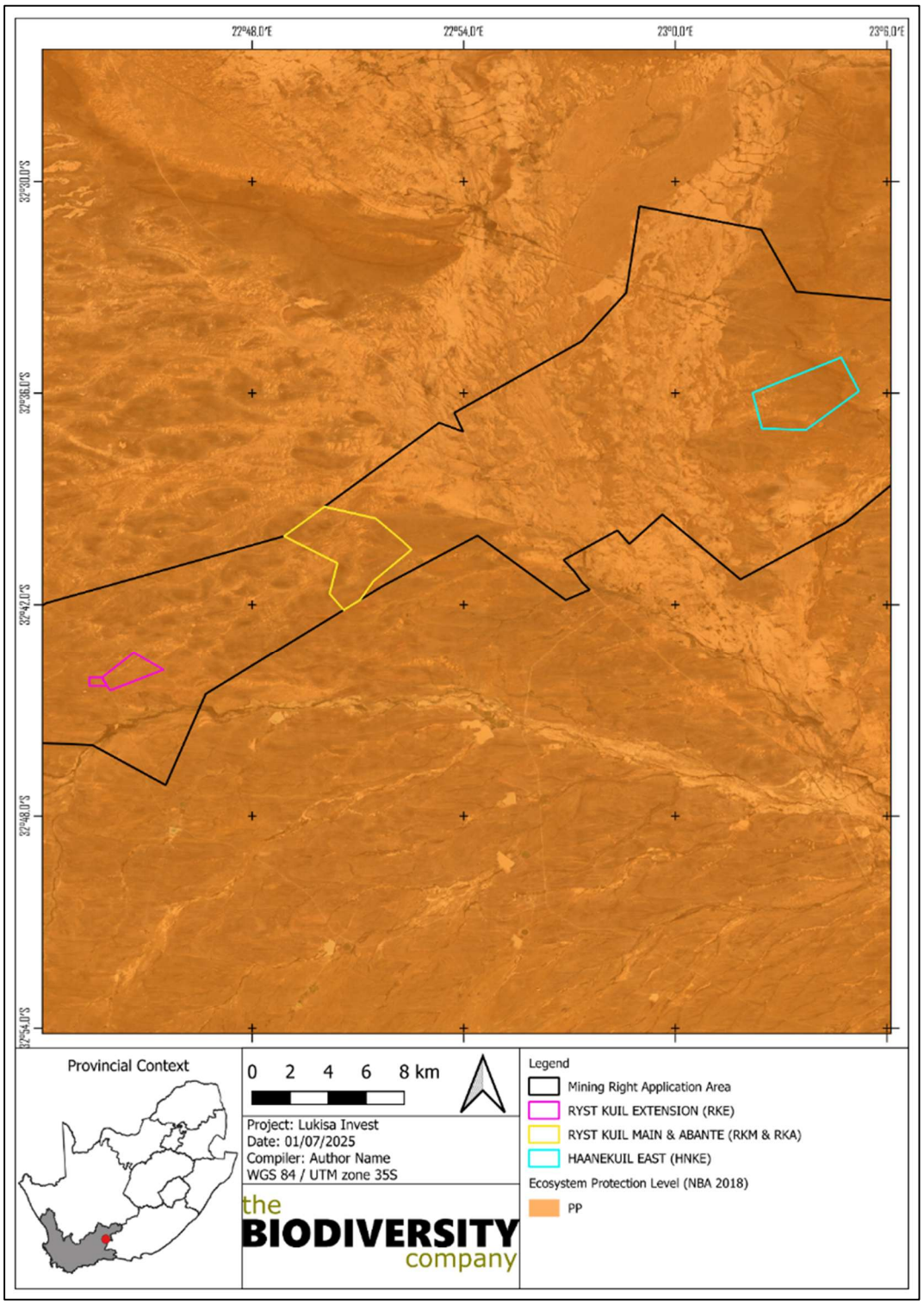


Figure 2-2 Map illustrating the ecosystem protection level associated with the PAOI.

2.1.1.3 Provincial Conservation Plan

The conservation of CBAs is crucial, in that if these areas are not maintained in a natural or near-natural state, biodiversity conservation targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI-BGIS, 2017).

The purpose of the Western Cape Biodiversity Sector Plan (BSP) (2017) is to inform land-use planning and development on a provincial scale and to aid in natural resource management. One of the outputs is a map of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These are classified into different categories, namely CBA1 areas, CBA2 areas, ESA areas and Other Natural Areas (ONAs) based on biodiversity characteristics, spatial configuration, and requirements for meeting targets for both biodiversity patterns and ecological processes.

According to the Western Cape BSP dataset, the PAOI overlaps with a CBA 1, ESA 1, ESA 2 and Other Natural Areas) (Figure 2-3).

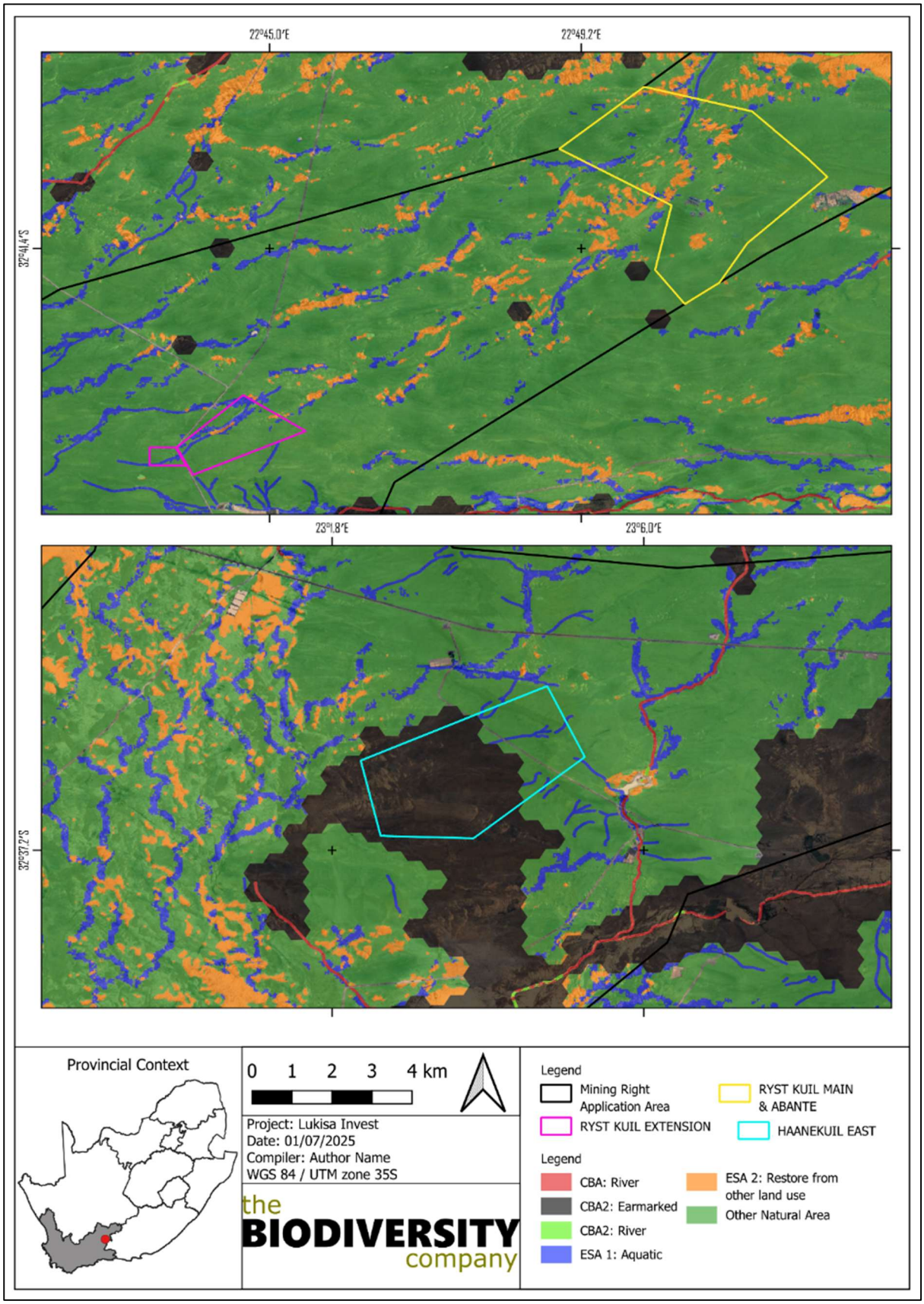


Figure 2-3 Map illustrating the PAOI in relation to the Western Cape CBA Map.

2.1.1.4 Key Biodiversity Areas

A new set of Key Biodiversity Areas (KBA) specific to South Africa has been identified using the Global Standard for the Identification of Key Biodiversity Areas version 1.2 (IUCN 2016), applied to South African species and ecosystems. KBAs are critical sites that play a vital role in maintaining global biodiversity by serving as essential habitats for species. The identification of KBAs enables governments and civil society to pinpoint key locations crucial for species and their habitats worldwide. This understanding facilitates collaborative efforts to manage and conserve these areas, thereby safeguarding global biological diversity and supporting international biodiversity objectives.

Unlike the Important Bird Areas (IBAs), which primarily focus on birds, the KBA framework encompasses a broader spectrum of biodiversity, including mammals, amphibians, plants, and other taxa. BirdLife South Africa (BLSA), in consultation with the KBA National Coordination Group, has opted to retire IBAs and integrate KBAs into its conservation strategy. This strategic shift acknowledges the necessity of investing resources effectively to protect avian and other macroecological elements at the site level within a comprehensive framework of biodiversity conservation (KBA NCG, 2024).

According to the KBA dataset, the PAOI overlaps with the Eastern Gamka Karoo KBA (Figure 2-4). This site qualifies as a Key Biodiversity Area of international significance that meets the thresholds for 3 criteria described in the Global Standard for the Identification of KBAs. Based on current available information, 4 species meet one or more KBA.

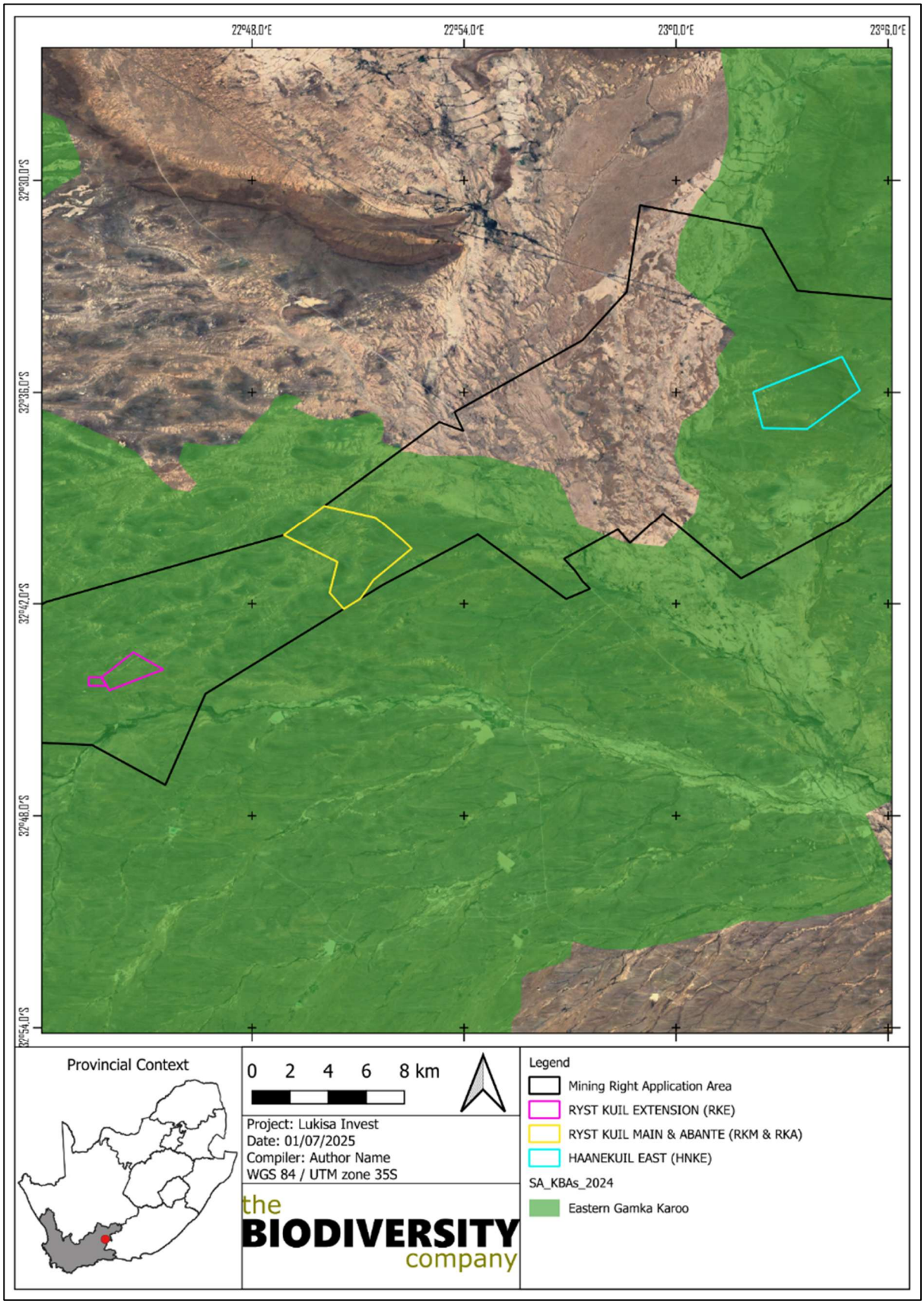


Figure 2-4 Map illustrating the PAOI in relation to the Key Biodiversity Areas dataset

2.1.1.5 National Freshwater Ecosystem Priority Area Status

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al*., 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel *et al*., 2011). The Ryst Kuil Main/Abante PAOI overlaps Non-Priority wetlands (Figure 2-5).

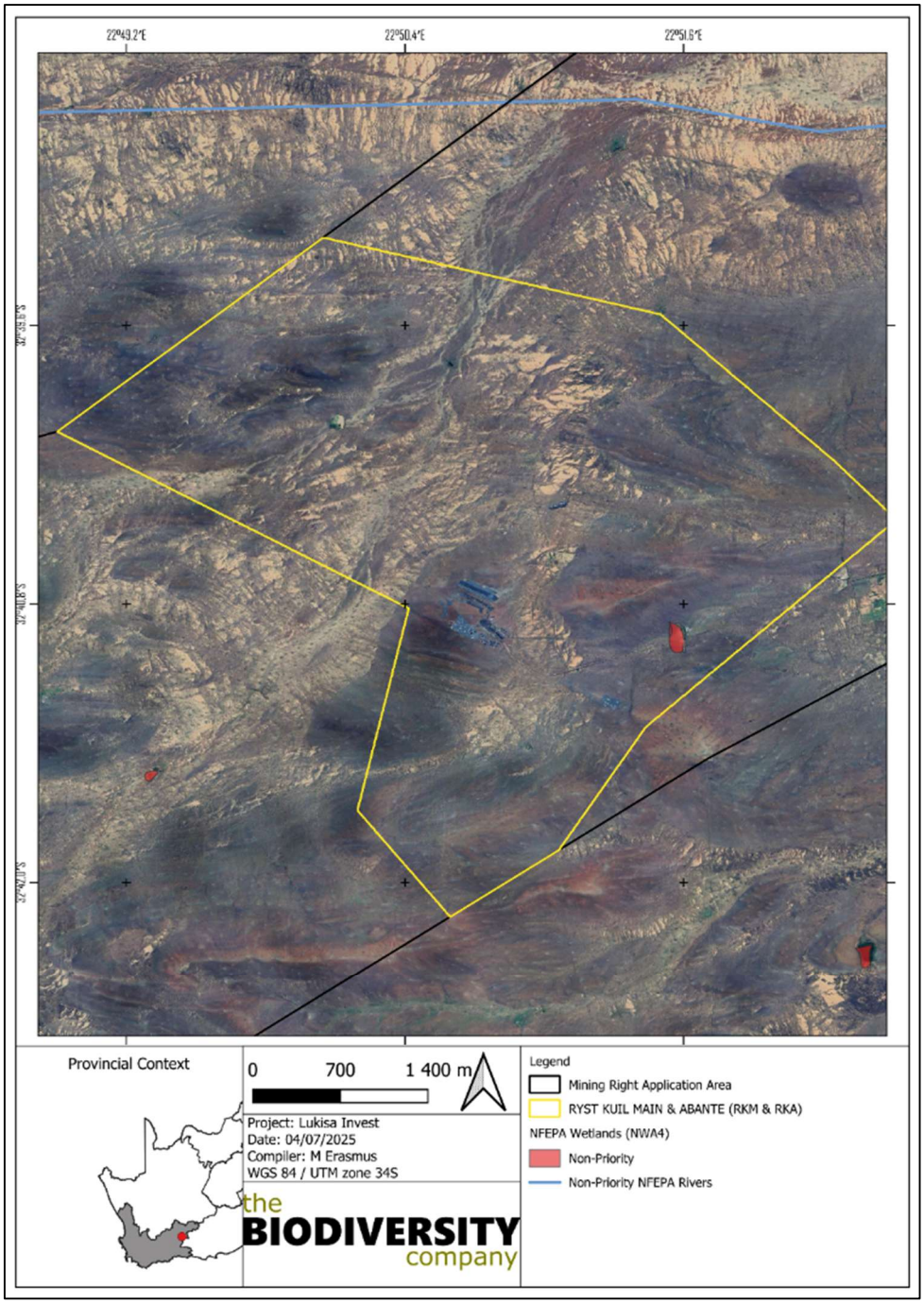


Figure 2-5 ***Map illustrating the PAOI in relation to the National Freshwater Ecosystem Priority Area dataset.***

2.1.2 Flora Assessment

This section is divided into a description of the vegetation type expected under natural conditions and the expected flora species.

2.1.2.1 Vegetation Type

The PAOI falls within the Nama Karoo Biome. This biome is found in the central plateau of the western half of South Africa. The geology underlying the biome is varied, as the distribution of this biome is determined primarily by rainfall. The rain falls in summer and varies between 100 and 520 mm per year. This also determines the predominant soil type - over 80% of the area is covered by a lime-rich, weakly developed soil over rock. Although less than 5% of rain reaches the rivers, the high erodibility of soils poses a major problem where overgrazing occurs (SANBI, 2019).

The dominant vegetation is a grassy, dwarf shrubland. Grasses tend to be more common in depressions and on sandy soils, and less abundant on clayey soils. Grazing rapidly increases the relative abundance of shrubs. Most of the grasses are of the C4 type and, like the shrubs, are deciduous in response to rainfall events (SANBI, 2019).

The PAOI is situated in the Gamka Karoo vegetation type according to SANBI (2018) (Figure 2-6), which is a member of the Lower Karoo Bioregion.

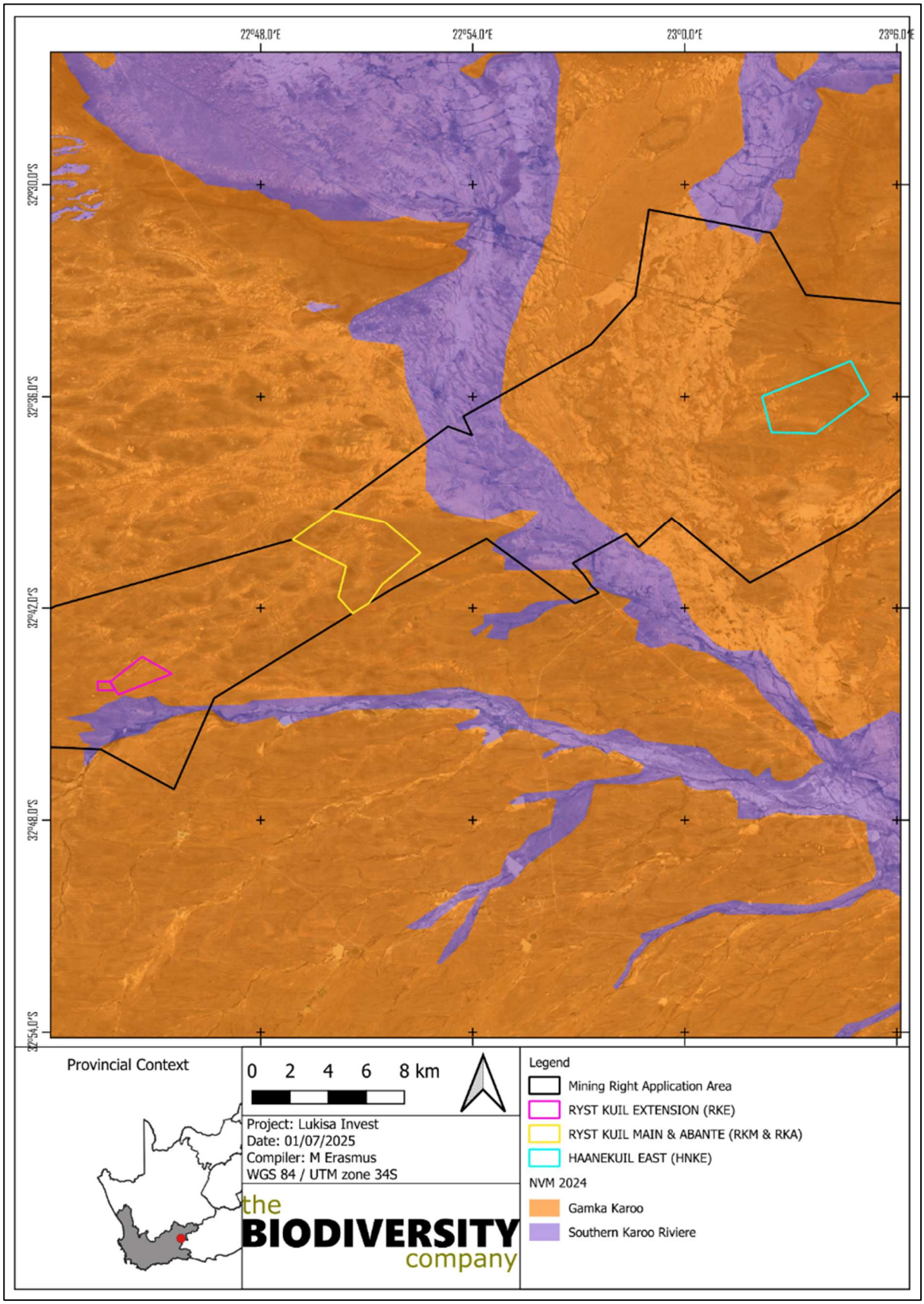


Figure 2-6 Map illustrating the vegetation types associated with the PAOI.

2.1.2.1.1 Gamka Karoo

Western Cape and Eastern Cape Provinces and marginally into the Northern Cape Province: Large basin between the Great Escarpment (Nuweveld Mountains) in the north and northwest and Cape Fold Belt Mountains (mostly Swartberg Mountains) in the south. From approximately the edge of the Gamka basin catchment area (i.e. of the Dwyka River tributary) in the west to about the Kariega River in the east. Altitude varies mostly from 500 to 1,100 m.

Vegetation & Landscape Features

Extremely irregular to slightly undulating plains covered with dwarf spiny shrubland dominated by Karoo dwarf shrubs (e.g., *Chrysocoma ciliata, Eriocephalus ericoides*) with rare low trees (e.g., *Euclea undulata*). Dense stands of drought-resistant grasses (*Stipagrostis, Aristida*) cover broad sandy bottomlands, especially after abundant rains.

Important Plant Taxa in the Gamka Karoo

Tall Shrubs: *Lycium cinereum (d), L. oxycarpum (d), Rhigozum obovatum (d), Vachellia karroo, Cadaba aphylla, Lycium schizocalyx, Searsia burchellii, Sisyndite spartea.*

Low Shrubs: *Chrysocoma ciliata (d), Eriocephalus ericoides subsp. ericoides (d), E. spinescens (d), Felicia muricata (d), Galenia fruticosa (d), Limeum aethiopicum (d), Pentzia incana (d), Pteronia adenocarpa (d), Rosenia humilis (d), Aptosimum indivisum, Asparagus burchellii, Blepharis mitrata, Eriocephalus microphyllus var. pubescens, Felicia filifolia subsp. filifolia, F. muricata subsp. cinerascens, Galenia secunda, Garuleum bipinnatum, G. latifolium, Gomphocarpus filiformis, Helichrysum lucilioides, Hermannia desertorum, H. grandiflora, H. spinosa, Melolobium candicans, Microloma armatum, Monechma spartioides, Pentzia pinnatisecta, Plinthus karooicus, Polygala seminuda, Pteronia glauca, P. sordida, P. viscosa, Selago geniculata, Sericocoma avolans, Zygophyllum microcarpum, Z. microphyllum.*

Succulent Shrubs: *Ruschia intricata (d), Aridaria noctiflora subsp. straminea, Crassula muscosa, Drosanthemum lique, Galenia sarcophylla, Kleinia longiflora, Ruschia spinosa, Salsola tuberculata, Sarcocaulon patersonii, Trichodiadema barbatum, Tripteris sinuata var. linearis.*

Semi parasitic Shrub*: Thesium lineatum*.

Herbs: *Gazania lichtensteinii (d), Chamaesyce inaequilatera, Dicoma capensis, Galenia glandulifera, Lepidium africanum subsp. africanum, L. desertorum, Lessertia pauciflora var. pauciflora, Leysera tenella, Osteospermum microphyllum, Sesamum capense, Tetragonia microptera, Tribulus terrestris, Ursinia nana.*

Geophytic Herbs: *Drimia intricata, Moraea polystachya*.

Graminoids: *Aristida congesta (d), A. diffusa (d), Fingerhuthia africana (d), Stipagrostis ciliata (d), S. obtusa (d), Aristida adscensionis, Cenchrus ciliaris, Digitaria argyrograpta, Enneapogon desvauxii, Enneapogon scaber, Eragrostis homomalla, E. lehmanniana, E. obtusa, Tragus berteronianus, T. koelerioides.*

Biogeographically Important Taxa (Endemic to Great Karoo Basin)

Succulent Shrubs: *Hereroa latipetala* (also found in Prince Albert Succulent Karoo), *H. odorata* (also found in Koedoesberge-Moordenaars Karoo), *Pleiospilos compactus* (southern and western limits of distribution), *Rhinephyllum luteum, Stapelia engleriana*.

Geophytic Herb: *Tritonia tugwelliae*.

Low Shrub: *Felicia lasiocarpa*.

Succulent Herbs*: Piaranthus comptus, Tridentea parvipuncta subsp. parvipuncta*.

Graminoid: *Oropetium capense* (westernmost limit of distribution).

Endemic Taxa

Succulent Shrubs: *Chasmatophyllum stanleyi, Hereroa incurva, Hoodia dregei, Ruschia beaufortensis*.

Low Shrubs: *Jamesbrittenia tenuifolia*.

Herb: *Manulea karrooica.*

Succulent Herb*: Piaranthus comptus*.

Conservation Status

Least threatened. The conservation target is 16%. About 2% statutorily conserved in the Karoo National Park and some in private reserves, such as Steenbokkie Private Nature Reserve (near Beaufort West). Only a small part has undergone transformation. Erosion is moderate (78%), low (11%), and high (11%)

2.1.2.2 Expected Flora Species

The iNaturalist database indicates that 393 species of plants are expected to occur within the PAOI (see Appendix D). Seven (7) species of conservation concern (SCC) were listed by the iNaturalist database. The Screening Tool lists four (4) flora SCC that may occur within the PAOI. These are presented in Table 2-2.

Please note that the Screening Tool report includes lists of bird, mammal, reptile, amphibian, butterfly and plant species of conservation concern known or expected to occur on the proposed development footprint. Some of these SCC are sensitive to illegal harvesting. Such species have had their names obscured and are listed as sensitive plant unique number / sensitive animal unique number. As per the best practise guideline that accompanies the protocol and screening tool, please, remember that the **name of the sensitive species may not appear in the final EIA report nor any of the specialist reports released into the public domain**. It should be referred to as *sensitive plant* or *sensitive animal* and its threat status may be included, e.g. *critically endangered sensitive plant* or *endangered sensitive animal*.

Table 2-2 Flora SCC expected for the PAOI. DDD = Data Deficient, EN = Endangered, NT = Near Threatened, VU = Vulnerable

Family	Scientific name	Screening Tool Designation	SANBI	Habitat	Likelihood of Occurrence
Aizoaceae	*Peersia frithii*	Medium	VU	Koedoesberge-Moordenaars Karoo, Eastern Upper Karoo, Western Upper Karoo, Eastern Lower Karoo, Gamka Karoo, Matjiesfontein Shale Renosterveld, Southern Karoo Riviere - It occurs on slopes or flats of finely weathered Ecca shales.	Moderate
Aizoaceae	*Bijlia dilatata*	-	EN	Prince Albert Succulent Karoo, Swartberg Shale Renosterveld, Southern Karoo Riviere - Flat areas covered by decomposed dolerite and quartzitic pebbles.	Moderate
Aizoaceae	*Rhinephyllum inaequale*	-	EN	Eastern Lower Karoo, Southern Karoo Riviere - It grows in crevices in sandstone outcrops.	Moderate
Aizoaceae	*Ruschia beaufortensis*	Medium	VU	It grows in arid Nama Karoo mountains	Low
Aizoaceae	*Pleiospilos nelii*	-	NT	Nama Karoo - Quartz covered flats in sparse karoo vegetation.	Moderate
Apocynaceae	*Hoodia gordonii*	-	DDD	Tanqua Escarpment Shrubland, Hantam Karoo, Bushmanland Inselberg Shrubland,	Moderate

Family	Scientific name	Screening Tool Designation	SANBI	Habitat	Likelihood of Occurrence
				Northern Knersvlakte Vygieveld, Northern Upper Karoo, Upper Karoo Hardeveld, Gamka Karoo, Bushmanland Basin Shrubland, Kalahari Karroid Shrubland, Bushmanland Arid Grassland, Western Gariep Hills Desert, Eastern Gariep Rocky Desert, Tanqua Wash Riviere - Occurs in a wide variety of arid habitats from coastal to mountainous, also on gentle to steep shale ridges, found from dry, rocky places to sandy spots in riverbeds.	
Apocynaceae	*Hoodia dregei*	-	VU	Gamka Karoo - It occurs on stony slopes of hills or on stony flat areas.	Moderate
Asparagaceae	*Eriospermum capense subsp. stoloniferum*	-	VU	Swartland Shale Renosterveld, Western Ruens Shale Renosterveld, Peninsula Shale Renosterveld, Lourensford Alluvium - Fynbos, Swartland Alluvium Fynbos	Moderate
Iridaceae	*Tritonia florentiae*		Rare	Tanqua Karoo, Prince Albert Succulent Karoo, Gamka Karoo - It occurs in a variety of vegetation types on gravel flats in washes and drainage lines, flowering in winter and responding rapidly to early winter rains that fall erratically.	Moderate
-	*Sensitive species 383*	Medium	VU	-	Moderate
-	*Sensitive species 1212*	Medium	VU	-	Confirmed

2.1.3 Fauna Assessment

2.1.3.1 Amphibians

Based on the FrogMap database, provided by the Animal Demography Unit (Fitzpatrick Institute of African Ornithology, 2023), five (5) amphibian species are expected for the PAOI (see Appendix D). One (1) amphibian SCC is expected to occur within the PAOI (Table 2-3). No species were listed by the Screening Tool.

Table 2-3 List of amphibian Species of Conservation Concern that may occur in the PAOI. NT = Near Threatened

Scientific Name	Common Name	Screening Tool Designation	Conservation Status		Likelihood of Occurrence
			SANBI	IUCN	
Pyxicephalus adspersus	Giant Bull Frog	-	NT	LC	Medium

2.1.3.2 Reptiles

Based on the ReptileMap database, provided by the Animal Demography Unit (Fitzpatrick Institute of African Ornithology, 2023), 23 reptile species are expected for the PAOI (see Appendix D). Four (4) reptile SCC are expected to occur within the PAOI (Table 2-4). One species was listed by the Screening Tool.

Table 2-4 List of reptile Species of Conservation Concern that may occur in the PAOI. LC = Least Concern, NT = Near Threatened, VU = Vulnerable

Scientific Name	Common Name	Screening Tool Designation	Conservation Status		Likelihood of Occurrence
			SANBI	IUCN	
Chersobius boulengeri	Karoo Padloper	Medium	EN	EN	Confirmed

Psammobates tentorius tentorius	Karoo Tent Tortoise	-	NT	NT	Confirmed

2.1.3.3 Mammals

The MammalMap database provided by the Animal Demography Unit (Fitzpatrick Institute of African Ornithology, 2023) lists 12 mammal species that could be expected to occur within the PAOI. Large species generally restricted to protected areas such as game reserves were not expected to occur in PAOI and were removed from the list but those identified by the Screening Tool are retained (see Appendix D). Two (2) mammal SCC are expected to occur within the PAOI (Table 2-5). One (1) mammal species was listed by the Screening Tool.

Table 2-5 List of mammal Species of Conservation Concern that may occur in the PAOI. EN = Endangered, LC = Least Concern, NT = Near Threatened, VU = Vulnerable

Scientific Name	Common Name	Screening Tool Designation	Conservation Status		Likelihood of Occurrence
			SANBI	IUCN	
Bunolagus monticularis	Riverine Rabbit	Medium	CR	CR	Low
Parotomys littledalei	Littledale's Whistling Rat	-	NT	LC	Medium

2.1.3.4 Avifauna

SABAP2 data indicate that 180 avifauna species are expected for the PAOI and surrounds (see Appendix D for full list). Of these, 18 are considered SCC (Table 2-6). The likelihood of occurrence within the POAI are included here and six SCC was observed/confirmed during the field investigations.

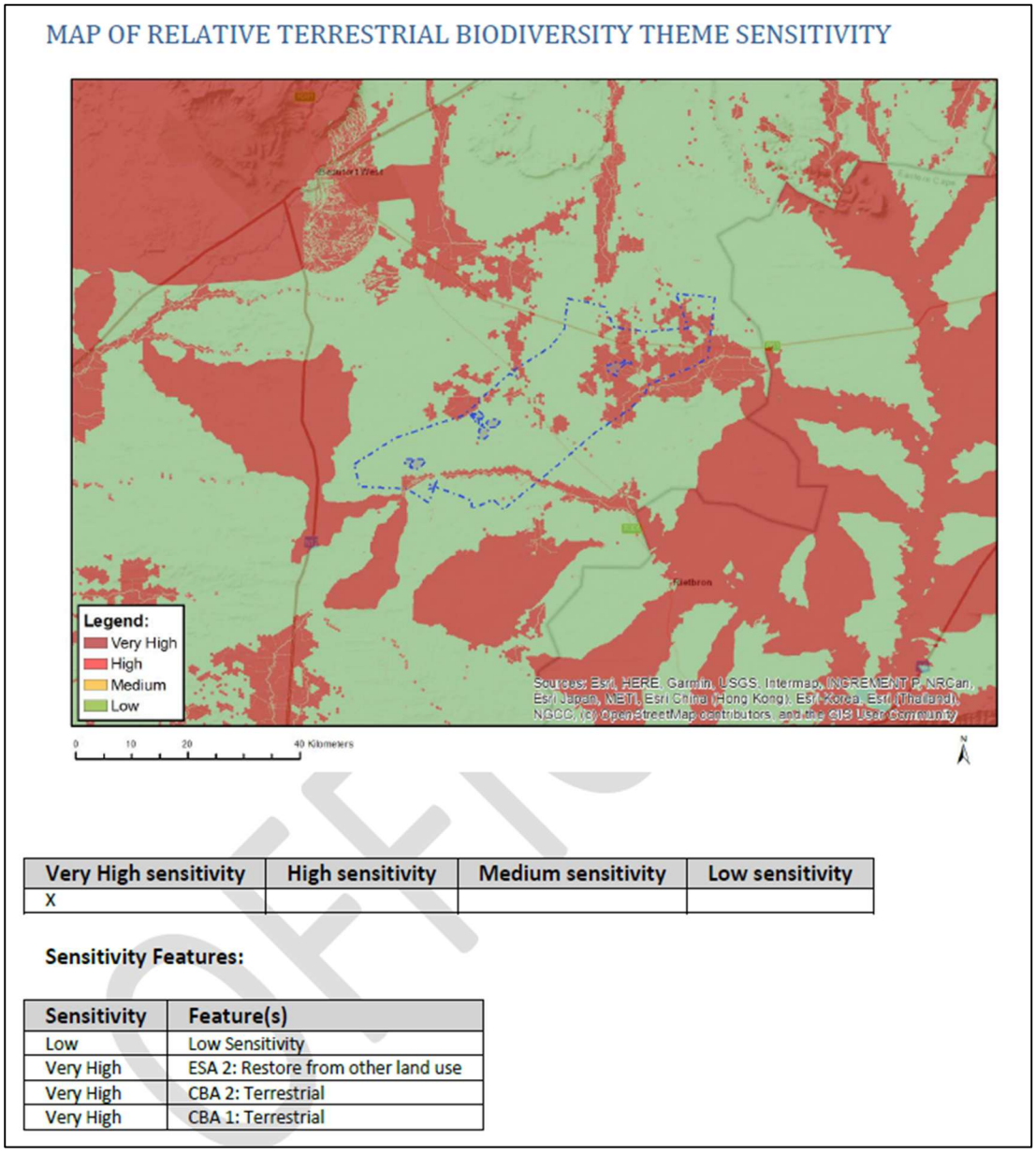
Table 2-6 Threatened avifauna species that are expected to occur within the PAOI. EN = Endangered, LC = Least Concern, NT = Near Threatened and VU = Vulnerable

Common Name	Scientific Name	Regional*	Global+	Likelihood of Occurrence
Southern Black Korhaan	*Afrotis afra**	VU	VU	Confirmed
Red-billed Teal	*Anas erythrorhyncha*	NT	LC	Low
Yellow-billed Duck	*Anas undulata*	NT	LC	Low
Blue Crane	*Anthropoides paradiseus*	VU	VU	Confirmed
Kori Bustard	*Ardeotis kori*	NT	NT	Confirmed
Kittlitz's Plover	*Charadrius pecuarius*	NT	LC	Low
Black Harrier	*Circus maurus*	EN	EN	Moderate
Burchell's Courser	*Cursorius rufus*	VU	LC	Low
Black-winged Kite	*Elanus caeruleus*	NT	LC	Moderate
Karoo Korhaan	*Eupodotis vigorsii*	NT	LC	High
Lanner Falcon	*Falco biarmicus*	NT	LC	Confirmed
Lesser Kestrel	*Falco naumanni*	VU	LC	Moderate
Ludwig's Bustard	*Neotis ludwigii*	EN	EN	Confirmed
Martial Eagle	*Polemaetus bellicosus*	EN	EN	Confirmed
Secretarybird	*Sagittarius serpentarius*	VU	EN	High
Hamerkop	*Scopus umbretta*	NT	LC	Low
Cape Shoveler	*Spatula smithii*	NT	LC	Low
Sclater's Lark	*Spizocorys sclateri*	NT	NT	Moderate

2.1.4 DFFE Screening Tool

According to the Screening Tool Report generated (Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended).

- Terrestrial Biodiversity Theme sensitivity is Very High for the PAOI, with the possibility of a CBA 1, CBA 2, ESA 2 and FEPA Subcatchment being present (Figure 2-7);
- Plant Species Theme sensitivity is Medium for the PAOI, with the possibility of numerous medium and low sensitivity plant species being present (Figure 2-8); and
- Animal Species Theme sensitivity is High for the PAOI, with the possibility of numerous high and medium sensitivity species being present (Figure 2-9).



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

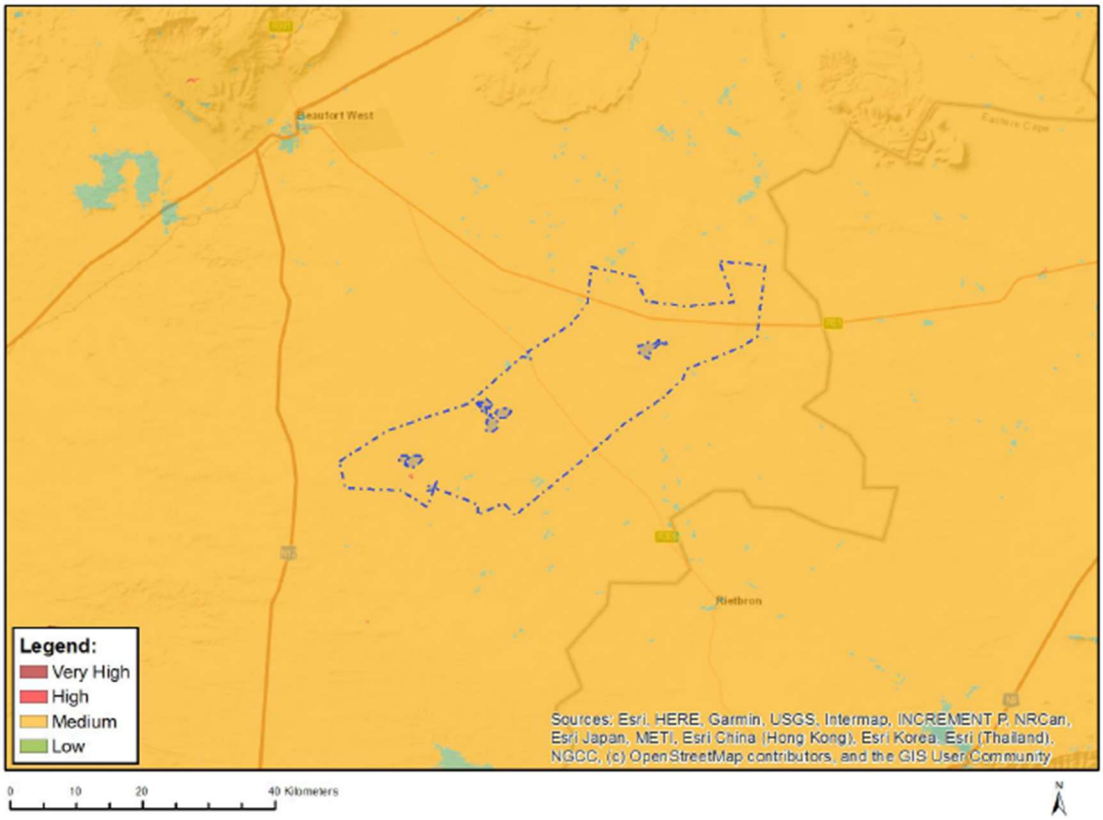
Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	ESA 2: Restore from other land use
Very High	CBA 2: Terrestrial
Very High	CBA 1: Terrestrial

Figure 2-7 Relative terrestrial biodiversity[1] theme sensitivity for the PAOI

[1] Note that the screening still uses the previous conservation plan

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

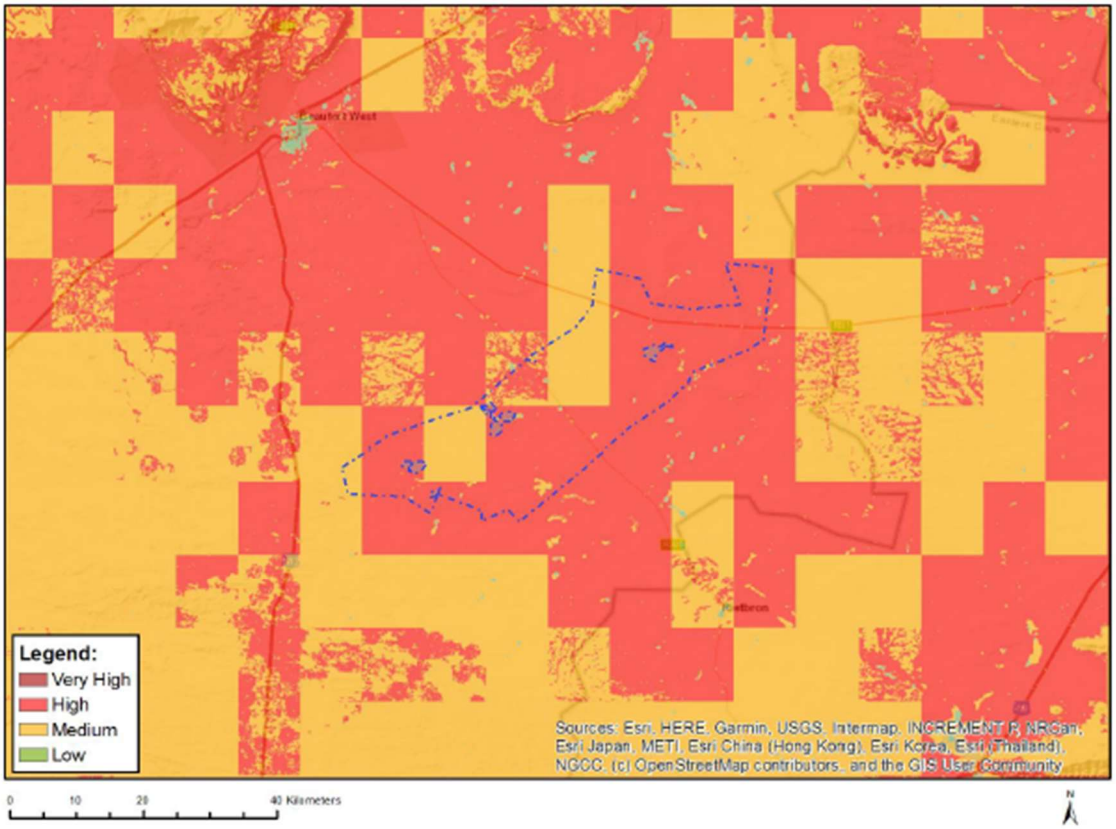
Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
		X	

Sensitivity Features:

Sensitivity	Feature(s)
Medium	Ruschia beaufortensis
Medium	Sensitive species 383
Medium	Peersia frithii
Medium	Sensitive species 1212

Figure 2-8 Relative plant species theme sensitivity for the PAOI

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Aves-Afrotis afra
High	Aves-Neotis ludwigii
High	Reptilia-Chersobius boulengeri
Low	Subject to confirmation
Medium	Aves-Afrotis afra
Medium	Aves-Neotis ludwigii
Medium	Mammalia-Bunolagus monticularis
Medium	Reptilia-Chersobius boulengeri

Figure 2-9 Relative animal species theme sensitivity for the PAOI

2.1.5 Literature Study

2.1.5.1 Introduction

An Environmental Impact Assessment (EIA) was carried out by Enviro-Insight (Laurence *et al*., 2017) and submitted in 2017 for the identical project (Figure 1-1). This previous report will be referenced to supplement and compare data, ensuring its relevance to the current assessment. The 2017 assessment is regarded as comprehensive and exemplary, providing ample information for the present evaluation.

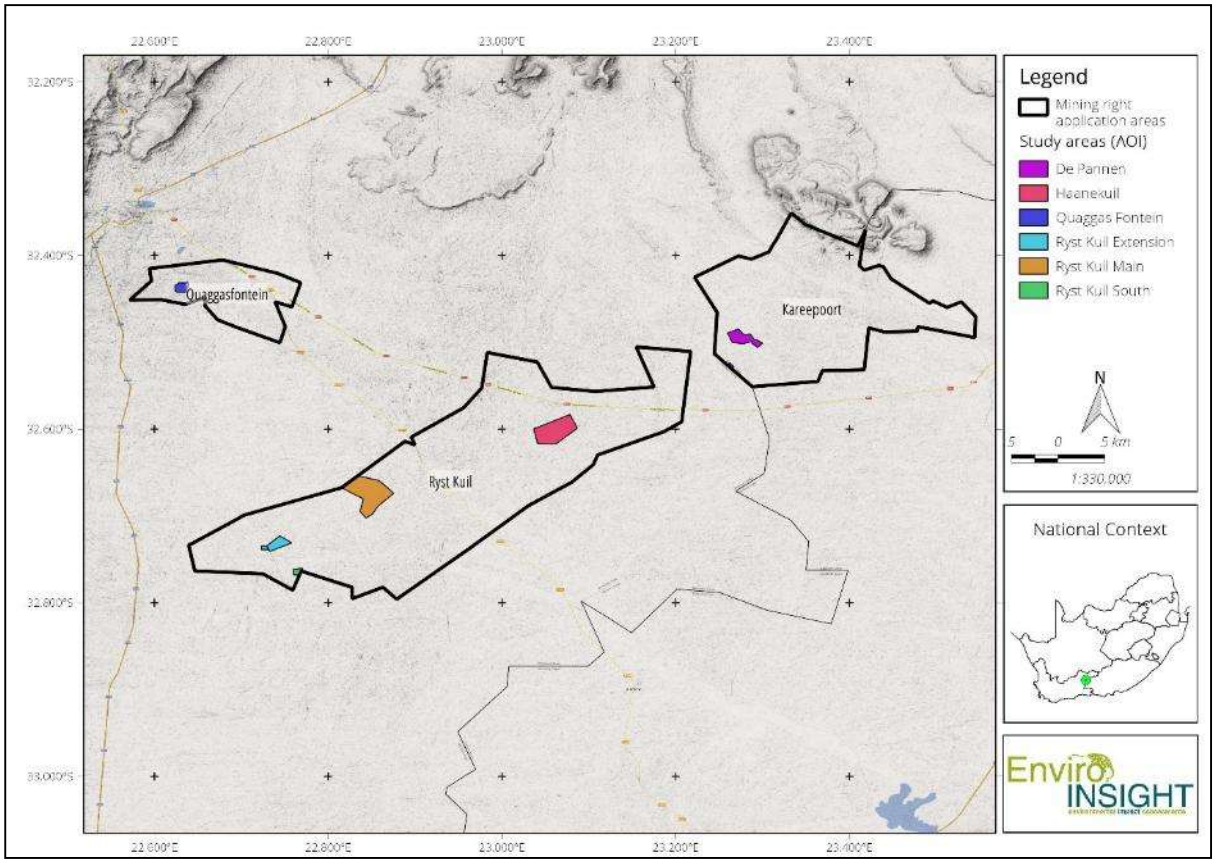


Figure 2-10 Map illustrating the study areas for the pervious project.

2.1.5.2 Flora

The study area, located in the Nama-Karoo Biome, is dominated by the Gamka Karoo vegetation type, which is largely intact and considered "Least Threatened." A total of 157 plant species from 36 families were recorded, with the highest diversity in rocky habitats. Key plant families include Poaceae, Aizoaceae, and Asteraceae. Several species of conservation concern (SCC) were identified, including the Red-Listed *Pleiospilos bolusii* (Vulnerable) and a potentially undescribed Nananthus species. Western Cape protected species such as *Aloe broomii, Crassula pyramidalis*, and *Haworthia viscosa* were also recorded. The presence of these SCCs, especially in rocky and silty habitats, elevates the sensitivity of these areas. The main threats to flora include habitat loss from mining, spread of alien species, and grazing impacts.

2.1.5.3 Fauna

2.1.5.3.1 Herpetofauna

A total of 29 reptiles and three amphibian species were observed, with high densities of tortoises (e.g., Leopard tortoise, Angulate tortoise). Species of conservation concern included the then Data Deficient Not LC Karoo Caco (*Cacosternum karooicum*), Near-Threatened giant bullfrog (*Pyxicephalus adspersus*), and the now Endangered (previously Near-Threatened) Karoo padloper (*Chersobius boulengeri*). Rocky ridges and pans are particularly important for herpetofauna, and these habitats are considered medium-high in sensitivity.

2.1.5.3.2 Mammals

A combined total of 35 mammal species were recorded, including small and large herbivores (e.g., steenbok, kudu, springbok), meso-carnivores (e.g., honey badger, black-backed jackal, caracal), and specialist insectivores (e.g., aardvark, aardwolf). Notable species of conservation concern include the black-footed cat (*Felis nigripes*, Vulnerable) and the honey badger (Mellivora capensis, NEMBA protected). Seasonal drainage lines and artificial water sources are critical for mammal diversity and movement, making these habitats highly sensitive.

2.1.5.3.3 Avifauna

A total of 66 bird species were recorded in the current study, with nine Red-Listed species confirmed, including the Endangered Ludwig's Bustard (*Neotis ludwigii*), Endangered (previously Vulnerable Secretarybird (*Sagittarius serpentarius*), and Near-Threatened Blue Crane (*Anthropoides paradiseus*). Seasonal drainage lines and water sources are vital for avifauna, serving as corridors and breeding/foraging sites. The region is of very high avifaunal importance due to the diversity and density of threatened species

2.1.5.4 Habitats and Sensitivities

Eleven broad habitat units were defined, including rocky ridges, stony slopes, sandy/silty plains, drainage lines, and artificial water points. Sensitivity rankings (1=low, 5=high) were assigned based on criteria such as species diversity, presence of SCCs, and ecological connectivity:

- Rocky ridges and drainage lines: High sensitivity (4–5), due to high species diversity, refugia potential, and presence of SCCs.
- Open water/windmill habitats: High sensitivity for fauna, especially in arid conditions.
- Sandy/silty plains: Medium sensitivity, but critical for certain SCCs like *Nananthus sp*.
- Most other habitats: Medium sensitivity, reflecting intact ecological function but lower uniqueness.

Key threats include habitat loss from mining, spread of alien species, direct mortality from vehicles, and contamination of water sources. Mitigation measures recommended include minimizing development footprints, maintaining habitat connectivity, and implementing strict controls on alien species and pollution.

2.2 Fieldwork Findings

The following results are a combination of the field survey (19-23 May 2025) conducted by TBC, as well as information as per the EIA by Enviro-Insight in 2017.

2.2.1 Flora Assessment

Numerous indigenous flora species were recorded for the PAOI (a list can be provided upon request), characteristic of the vegetation types for the site. Some of these species can be seen presented in Figure 2-11.

Due to the confirmed protected species and SCC, a site walkdown of the approved layout must be conducted prior to construction as the habitats present onsite support several species of flora SCC.

SCC and protected species were recorded in the PAOI and are presented in section 2.2.1.1 below.

Alien invasive plant (AIP) was recorded for the PAOI and is discussed further in section 3.2.2.1 below.

Figure 2-11 Photos illustrating indigenous flora species recorded for the PAOI; A) Aptosimum indivisum B) Stipagrostis ciliata, C) Selago geniculata and D) Carissa bispinosa.

2.2.1.1 SCC and Protected Species

2.2.1.1.1 SCCs

The SCC recorded within the PAOI are still in corroboration with the studies in 2017 ((Laurence *et al.*, 2017). The summary of the combined previous studies and 2025 fieldwork can be seen below (Table 2-7, Figure 2-12 shows SCCs observed in 2025.

Table 2-7 Summary of flora SCC recorded within the PAOI of Influence

Species	Habitat	Ryst Kuil Main & Abante		Ryst Kuil Extension		Haanekuil	
		2017	2025	2017	2025	2017	2025
Aloe broomii cf. var tarkaensis *2017-Rare* 2020-LC)		N/A					
Aloe longistyla *2017*-DD 2020-LC		N/A					
Crassula socialis (Rare)	In rock crevices on cliffs, which are usually south or south-east facing.	High	High	Low	High	Low	Low
Hereroa concava *2017-DDD* *2025-(Vulnerable B1ab(iii))*	Plants occur sheltered among shrubs on flats and plateaus with shale outcrops	Confirmed	Confirmed	Not Observed	Confirmed	Not Observed	Confirmed
Hoodia gordonii (DDD)	Wide variety of arid habitats	Medium	Medium	Medium	Medium	Medium	Medium
Hoodia pilifera. subsp pilifera (Near Threatened B1ab(iii,v))	On steep shale slopes or near the foot of sandstone mountains, usually on hotter, northern aspects, occasional it is found on flat areas and cooler, southern slopes.	Confirmed	Confirmed	Confirmed	Confirmed	Medium	Medium
Indigofera hantamensis (Rare)	Scree slopes.	Medium	Medium	Medium	Medium	Medium	Medium
Lotononis azureoides (Rare)	Steep, rocky sandstone slopes at 1600 m.	Low	Low	Low	Low	Low	Low
Nananthus sp.[2]	Specific micro-habitats within silty clayey habitats	Confirmed	High	High	High	High	High
Pelargonium denticulatum (Rare)	Sandy soils near freshwater streams.	Low	Low	Low	Low	Low	Low
Phymaspermum schroeteri *2017-* (Rare) 2025-LC		N/A					
Pleiospilos bolusii (VU)	Quartz flats in karroid shrubland	Confirmed	Confirmed	High	High	High	Confirmed
Pteronia hutchinsoniana *2017-* Rare 2025-LC		N/A					
Tritonia florentiae **(Rare)**	In a variety of vegetation types on dry stony clay flats.	High	High	High	High	High	High

[2] Due to the precautionary principle, the potentially undescribed *Nananthus* sp. is regarded as a potential SCC

Figure 2-12 Photos illustrating indigenous flora species recorded for the PAOI; A) Hoodia pilifera. subsp pilifera B) and C) Pleiospilos bolusii.

2.2.1.1.1 Note on the potentially undescribed Nananthus sp.

In July 2016, a potentially new, undescribed *Nananthus* species was found on Kariegesfontein farm, near Aberdeen in the Eastern Cape, South Africa. The discovery was reported to the project team in March 2017 (Enviro-Insight,2017). Nananthus is a genus of succulents with six known species in South Africa, but little is known about this possible new species. To address this, a survey was conducted from 22–25 May 2017, focusing on areas likely to be affected by mining (De Pannen, Ryst Kuil Main, and Quaggasfontein). GIS analysis was also used to identify suitable habitats. The survey found eight sub-populations totaling at least 80 individuals: six on De Pannen (previously proposed mining area) and two at Ryst Kuil Main. A detailed report with a preliminary description of the species was produced.

2.2.1.1.2 Protected Plants

Western Cape protected plant species include all species within the families Asclepiadaceae and Mesembryanthemaceae (Aizoaceae). In addition, species within the *Aloe, Haworthia and Anacampseros* genera, together with certain *Euphorbia* species are also protected. More than ten (10) species of protected plant were recorded for the PAOI (Table 2-8), some of these species are shown in Figure 2-13. These species are not to be disturbed in any way. Should they need to be removed, the appropriate permits must be procured[3] prior to the relocation or removal of these species.

Table 2-8 Provincially protected plants recorded.

Family	*Species*	IUCN
Aizoaceae	*Ruschia intricata*	LC
Amaryllidaceae	*Ammocharis coranica*	LC
Anacampserotaceae	*Anacampseros albidiflora*	LC
Anacampserotaceae	*Anacampseros filamentosa*	LC

[3] Western Cape Department of Environmental Affairs and Development Planning (DEA&DP)

Asphodelaceae	*Aloe broomii*	LC
Asphodelaceae	*Aloe longistyla*	LC
Asphodelaceae	*Aloe claviflora*	LC
Asphodelaceae	*Haworthia viscosa*	LC
Crassulaceae	*Crassula pyramidalis*	LC
Crassulaceae	*Crassula capitella*	LC
Crassulaceae	*Crassula hemisphaerica*	LC
Crassulaceae	*Crassula deltoidea*	LC
Crassulaceae	*Crassula corallina ssp. corallina*	LC
Iridaceae	*Lapeirousia plicata*	LC
Iridaceae	*Moraea polystachya*	LC
Iridaceae	*Tritonia securigera*	LC

Figure 2-13 Photos illustrating some of the protected flora species recorded for the PAOI; A) Colchicum asteroides B) Lapeirousia plicata, C) Aloe claviflora, D) Ruschia intricata and E) Crassula corallina ssp. corallina

2.2.1.2 Alien Invasive Plants

Alien Invasive Plants (AIPs) tend to dominate or replace indigenous flora, thereby transforming the structure, composition and functioning of ecosystems. Therefore, it is important that these plants are controlled by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species.

The National Environmental Management: Biodiversity Act (NEMBA) is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004)

(Government Gazette No 78 of 2014). The Alien and Invasive Species Regulations were published in the Government Gazette No. 43726, 18 September 2020. The legislation calls for the removal and / or control of alien invasive plant species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse. Below is a brief explanation of the three categories in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA):

- Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Note that according to the regulations, a person who has under his or her control a category 1b listed invasive species must immediately:

- Notify the competent authority in writing;
- Take steps to manage the listed invasive species in compliance with:
- Section 75 of the Act;
- The relevant invasive species management programme developed in terms of regulation 4; and
- Any directive issued in terms of section 73(3) of the Act.

Overall, as per the previous assessment, the study areas showed relatively low levels of alien and invasive plant infestation, which was mostly limited to specific, localized spots—often near agricultural operations or homesteads. Species of particular concern included Atriplex spp, Opuntia spp, *Argemone spp*.) or *Eucalyptus spp*. In the Karoo, most invasive plant species are spread by sheep and goats, while crows are known to contribute to the dispersal of *Opuntia ficus-indica* seeds.

2.2.2 Fauna Assessment

As stated, the biodiversity impact assessment for the study area (Laurence *et al*., 2017) was consulted extensively (especially the herpetofauna), over multiple years. The status changes between 2017 and 2015 can be seen in the relevant tables.

2.2.2.1 Mammals

The mammal assessment for the PAOI combined previous studies and new fieldwork, resulting in a comprehensive inventory. A total of 35 mammal species were recorded, including small and large herbivores, meso-carnivores, small carnivores, primates, and specialist insectivores. The region

supports a medium-rich mammal diversity, which is notable given the arid environment. No additional species were recorded within the PAOI in 2025.

Figure 2-14 Photos illustrating mammal species recorded within the PAOI; A) Otocyon megalotis (Bat-eared fox), B) Proteles cristata (Aardwolf) and C) Raphicerus campestris (Steenbok).

2.2.2.1.1 Species of Conservation Concern (SCCs)

The Riverine Rabbit (*Bunolagus monticularis*, Critically Endangered (Cr)) is unlikely to occur in the PAOI due to lack of suitable habitat. Table 2-10 is a summary of the mammal SCCs identified in the study area, including their most recent conservation status and likelihood of occurrence by site.

Table 2-9 The mammal Species of Conservation Concern (SCCs) identified in the study area

Species (Common Name)	Scientific Name	Status (IUCN/National)		Likelihood of Occurrence (by site)
		2017	2025	
Black--footed cat	*Felis nigripes*	Vulnerable, NEMBA	Vulnerable, NEMBA Protected	Low–High (varies by site, highest at De Pannen)
Cape fox	*Vulpes chama*	NEMBA Protected	NEMBA Protected	High (all sites)
Honey badger	*Mellivora capensis*	NEMBA Protected	NEMBA Protected	Low in all areas

2.2.2.2 Herpetofauna

The previous herpetofauna assessment for the Karoo Uranium Project area was comprehensive, combining literature review, field surveys, and local interviews. The study recorded 29 reptile species and three amphibian species over nine sampling days, representing 64% and 27% of the expected regional diversity, respectively. When combined with previous surveys, a total of 37 reptile and four amphibian species have been observed in and around the study areas, which is a high proportion for the region.

No additional species were recorded within the PAOI in 2025.

2.2.2.2.1 Species of Conservation Concern (SCCs)

Table 2-10 summerises the herpetofauna Species of Conservation Concern (SCCs) identified in the study area, including their most recent conservation status and likelihood of occurrence by site.

Table 2-10 The herpetofauna Species of Conservation Concern (SCCs) identified in the study area

Species (Common Name)	Scientific Name	Status (IUCN/National)		Likelihood of Occurrence (by site)
		2017	2025	
Karoo caco	*Cacosternum karooicum*	Data Deficient	LC	Confirmed (Ryst Kuil Main), Low elsewhere
Giant bullfrog	*Pyxicephalus adspersus*	NT	NT	Confirmed (Ryst Kuil Main, Ryst Kuil Extension), High (Ryst Kuil South), Low elsewhere
Karoo padloper (tortoise)	*Chersobius boulengeri boulengeri*	NT	EN	Confirmed (Ryst Kuil Main), Medium (Ryst Kuil Extension, , Haanekuil),
Karoo tent tortoises	*Psammobates tentorius tentorius*	LC	NT	Confirmed in all areas in 2025 (Figure 2-16)

Figure 2-15 Photos illustrating the 'carcass' of an SCC, Psammobates tentorius tentorius in 2025.

2.2.2.2.1.1 Karoo padloper (*Homopus boulengeri*)

This species inhabits ridges and rocky outcrops within the Karoo and is rarely encountered. Populations are thought to be in decline, primarily due to habitat degradation caused by overgrazing from livestock.

Laurence *et al,*2017 stated that since 2005, only three records of this species have been submitted to the Animal Demography Unit Virtual Museum (http://vmus.adu.org.za), with one of these records originating from the previous field survey conducted by the current author (see Ferguson *et al*. 2008). The extremely low number of observations highlights the species' rarity and underlines its conservation importance. Notably, since the 2017 study, the threat status of the Karoo padloper has increased to Endangered (EN), which is significant.

2.2.2.3 Avifauna

The avifauna assessment for the PAOI combined previous studies and new fieldwork, resulting in a robust species inventory and a clear understanding of habitat use and sensitivities. Since the previous studies, several threat statuses and name changes have occurred (Table 2-10). Eight (8) SCC were recorded during the 2025 surveys.

The region is of very high avifaunal importance due to the diversity and density of threatened and endemic species. Key habitats for birds include seasonal drainage lines, pans, and artificial water sources, which serve as critical corridors, breeding, and foraging sites. Rocky ridges are also important for raptors and other species. The main threats to avifauna are habitat loss and fragmentation, collision with powerlines and fences, road mortality, disturbance from mining activities (noise, dust, lighting), and contamination of water sources.

The study confirmed the presence of several SCCs, including globally and regionally threatened species such as Ludwig's Bustard, Blue Crane, Secretarybird, and Martial Eagle. The presence of breeding pairs and regular sightings of SCCs, especially large terrestrial and raptor species, highlight the area's conservation value (Laurence *et al*., 2017). The known breeding periods are summarised in Table 2-12.

Table 2-11 The Avifauna SCCs identified in the study area.

Common Name	Scientific Name	Regional*	Global+	2017	2025
Southern Black Korhaan	*Afrotis afra**	VU	VU	X	X
Red-billed Teal	*Anas erythrorhyncha*	NT	LC	X	
Yellow-billed Duck	*Anas undulata*	NT	LC	X	
Blue Crane	*Anthropoides paradiseus*	VU	VU	X	X
Kori Bustard	*Ardeotis kori*	NT	NT	X	X
Kittlitz's Plover	*Charadrius pecuarius*	NT	LC	X	X
Black Harrier	*Circus maurus*	EN	EN	X	
Burchell's Courser	*Cursorius rufus*	VU	LC	X	
Black-winged Kite	*Elanus caeruleus*	NT	LC	X	
Karoo Korhaan	*Eupodotis vigorsii*	NT	LC	X	X
Lanner Falcon	*Falco biarmicus*	NT	LC	X	X
Lesser Kestrel	*Falco naumanni*	VU	LC	X	
Ludwig's Bustard	*Neotis ludwigii*	EN	EN	X	X
Martial Eagle	*Polemaetus bellicosus*	EN	EN	X	X
Secretarybird	*Sagittarius serpentarius*	VU	EN	X	
Hamerkop	*Scopus umbretta*	NT	LC	X	
Cape Shoveler	*Spatula smithii*	NT	LC	X	

Figure 2-16 Photos illustrating some of the avifauna SCCs observed in 2025: A) Kittlitz's Plover, B) Ludwig's Bustard and C) Karoo Korhaan.

Table 2-12 The Avifauna SCCs identified in the study area and their known breeding periods

Species Name	Karoo Breeding/Nesting Periods[4]
Southern Black Korhaan	August–March
Red-billed Teal	Mainly January–June (after good rains)
Yellow-billed Duck	Mainly July–September, but can be year-round
Blue Crane	October–March
Kori Bustard	September–March
Kittlitz's Plover	August–April (after rain, opportunistic)
Black Harrier	August–November
Burchell's Courser	August–April (after rain, opportunistic)
Black-winged Kite	July–November (can be year-round)
Karoo Korhaan	August–March
Lanner Falcon	July–October
Lesser Kestrel	November–March (summer migrant breeder)
Ludwig's Bustard	August–March
Martial Eagle	April–November
Secretarybird	March–August (can be year-round)
Hamerkop	September–April (after rain, opportunistic)
Cape Shoveler	July–September (can be year-round)

[4] Many Karoo species breed opportunistically after rainfall, so exact timing can vary year to year. "Year-round" means breeding can occur in any month, but peaks are indicated where known. "Opportunistic" means breeding is closely tied to rainfall events, which are unpredictable in the Karoo

2.3 Site Sensitivity Verification

2.3.1 Habitat Assessment and Site Ecological Importance

2.3.1.1 Habitats

The main habitat types identified across the PAOI were initially identified largely based on aerial imagery, but also comparing with the habitats in the previous assessment. These main habitat types were refined based on the field coverage and data collected during the survey; the delineated habitats can be seen in Figure 2-17 to Figure 2-19 . Emphasis was placed on limiting timed meander searches within the natural habitats and therefore habitats with a higher potential of hosting SCC.

Field observations concluded that the eleven (11) broad habitat units that were defined and delineated in 2017, are still accurate and relevant, and thus the delineations were used verbatim, with some changes (such as modified and degraded areas, being included).

As outlined in the report by Laurence *et al*., 2017; the basic habitat substrate characteristics within the study area can be categorized into three main communities: Rocky Community habitats, Stony Community habitats, and Sedimentary Community habitats. Within each of these broad communities, habitats were further identified and distinguished according to their general location within the local terrain. Areas with local slopes of 5 degrees or greater were classified as "Ridges." Regions with slopes between 2 and 5 degrees were designated as "Slopes," while areas with slopes less than 2 degrees were identified as "Plains." These morphological features particularly slopes and plains are characterized by very subtle variations within the landscape.

A summary of these communities can be seen in Table 2-13 Each of the habitats identified and descriptions of the habitat units can be found in Table 2-14. Not all habitats described appear in each and every PAOI.

Table 2-13 Table providing a summary of the habitat communities of the habitat types delineated for the PAOI.

Community Type	Habitat Subtype	Description & Key Features	Typical Plant Species
Rocky Community	Rocky Ridge	Bedrock/boulders protrude from ground, deep cracks/fissures, steep slopes.	*Hereroa concava (VU), Hoodia pilifera. subsp pilifera (NT), Rhigozum obovatum, Tenaxia dura, Eriocephalus ericoides, Pteronia adenocarpa, Indigofera nigromontana, Euphorbia stellispina, Euphorbia ferox*
	Rocky Slope	Stones/rocks >200mm, interspersed with low bedrock, upper slopes to plains.	*Searsia burchelli, Carissa bispinosa, Gymnosporia polyacantha, Rhigozum obovatum, Tragus koelerioides, Eriocephalus ericoides, Lasiosiphon deserticola, Pteronia glomerata, Ruschia spinosa, Crassula corallina*
	Rocky Plain	Similar to rocky slope, on plains, stones/rocks >200mm.	As above
Stony Community	Stony Ridge	Ridge habitats, stones/rocks 11–200mm, no deep cracks/fissures.	*Hereroa concava (VU) Ruschia spinosa, Pentzia incana, Pteronia glomerata, Hermannia grandiflora, Pleiospilos bolusii (VU), Crassula pyramidalis*
	Stony Slope	Upper slopes to plains, stones/rocks 11–200mm, fringes sandy/silty plains.	*Hereroa concava (VU)Blepharis capensis, Euphorbia ferox, Euphorbia stellispina, Monsonia camdeboense*
	Stony Plain	Plains, stones/rocks 11–200mm, often adjacent to sandy/silty plains.	As above
Sedimentary Community	Sandy/Silty Plain	Flat areas, silty or sandy substrate, little/no rock cover, may have gravel (<10mm). Often associated with dry watercourses, periodic flooding.	*Lycium cinereum, Asparagus recurvispinus, Eragrostis x pseud-obtusa, Rosenia humilis, Kleinia longiflora, Aptosimum spinescens, Salsola tuberculata, Pentzia spp., Nananthus sp.*
	Sandy Ridge	Higher lying, upper extents of ephemeral drainage, lacks silty substrate.	*Kewa salsoloides, Hermannia grandiflora*, similar to stony ridges/slopes
	Sandy Slope	Upper to foot-slopes, sandy deposits trapped in vegetation, embedded in stony communities.	As above
	Drainage	Well-defined ephemeral channels, sandy substrate, banks may be flat or steep.	*Vachellia karoo, Gymnosporia buxifolia, Searsia burchelli, Carissa bispinosa, Lycium oxycarpum, Gymnosporia polyacantha*
	Open Water/Windmill	Artificial or natural water points, may develop wetland attributes.	Wetland-associated species (sedges, reeds), variable

The highest concentration of protected and SCC plants was found within the rocky and stony habitat communities.

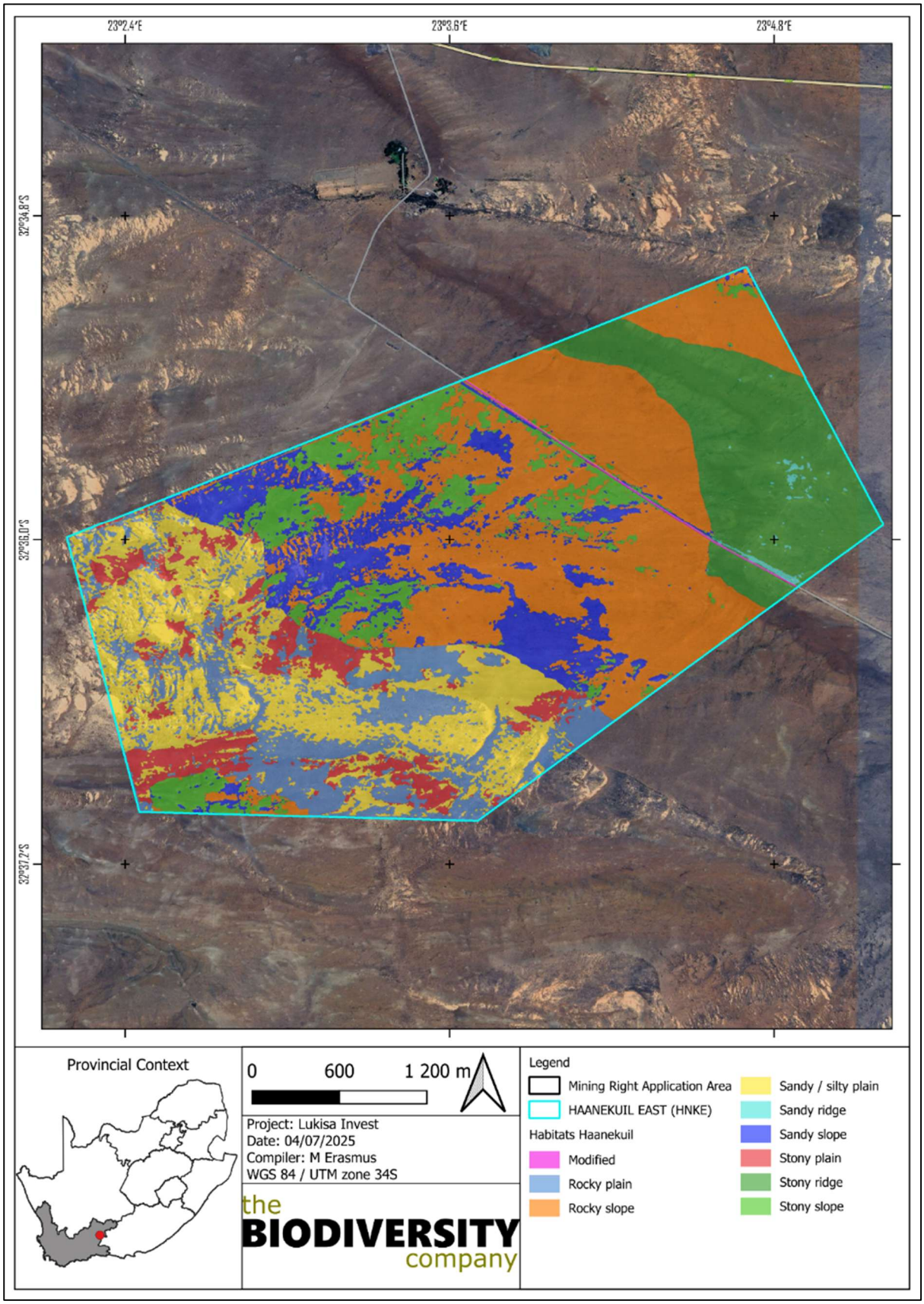


Figure 2-17 Map of the habitats delineated for the Haanekuil PAOI.

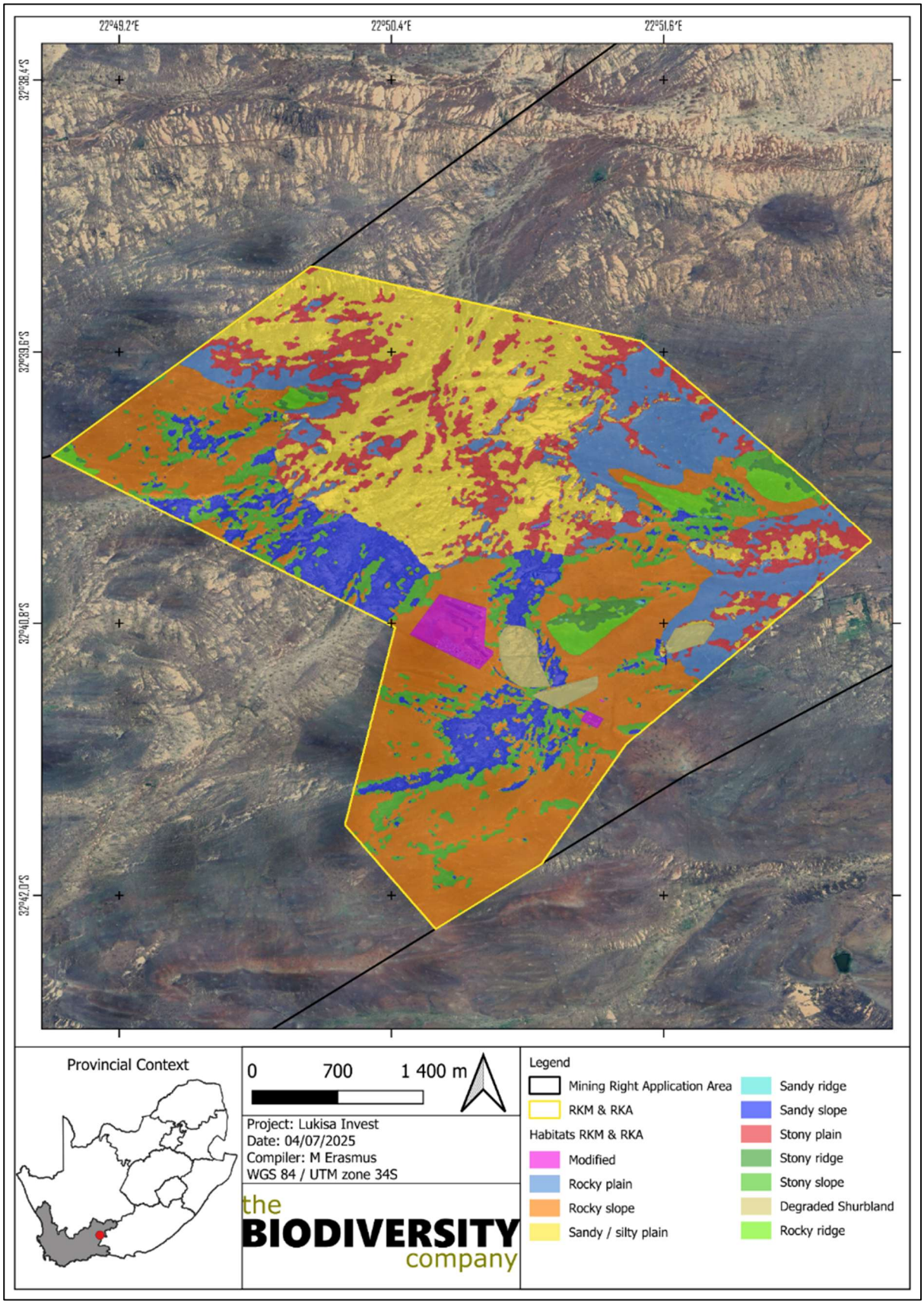


Figure 2-18 Map of the habitats delineated for the Ryst Kuil main and Abante PAOI.

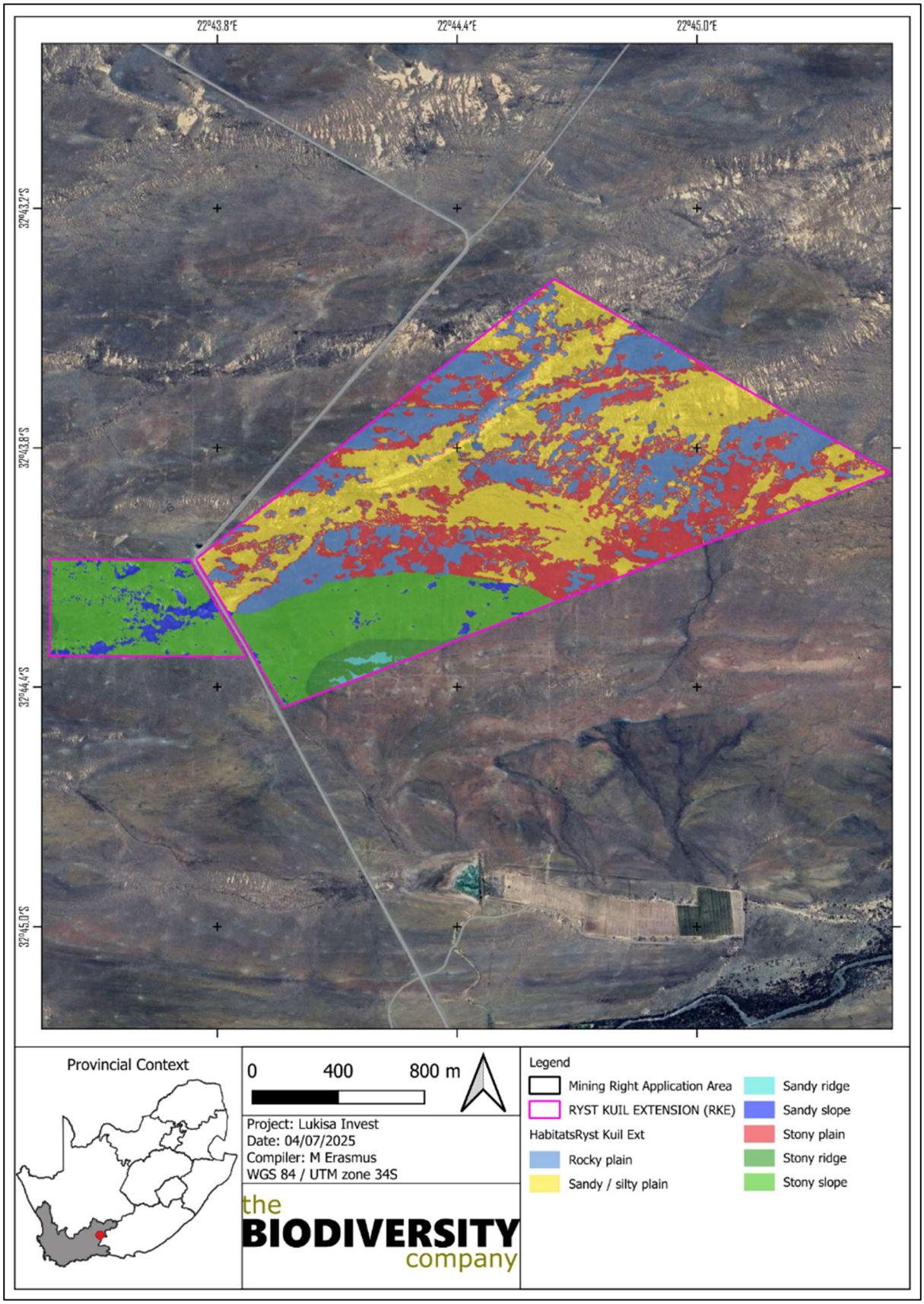
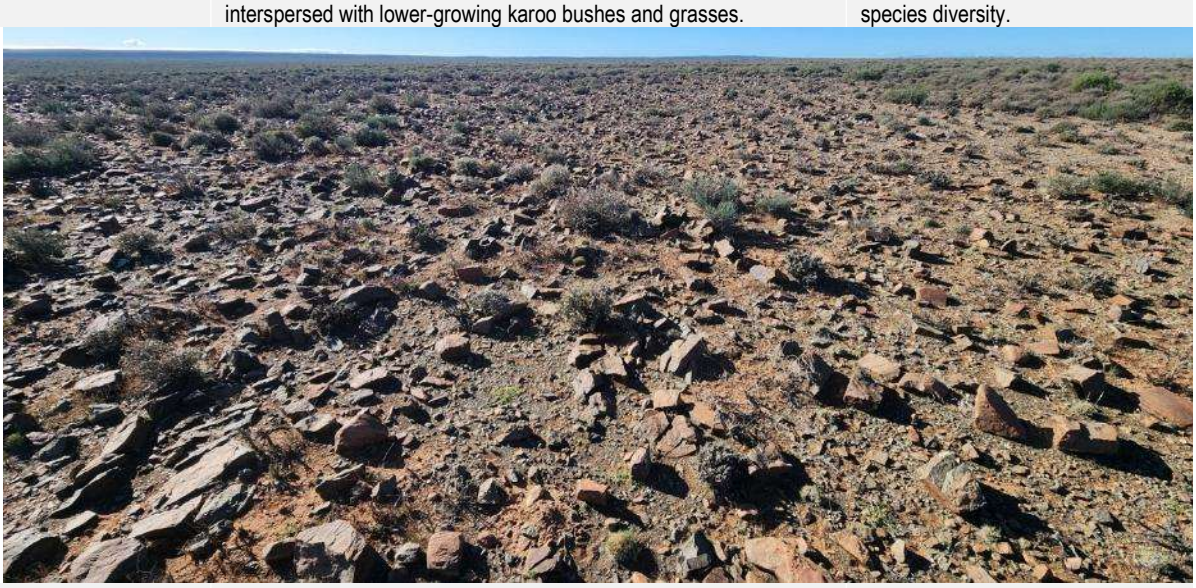


Figure 2-19 Map of the habitats delineated for the Ryst Kuil Extension PAOI.

Table 2-14 Table providing descriptions of the habitat types delineated for the PAOI.

Habitat	Description and Condition	Ecosystem Processes and Services
Rocky Plain	Flat terrain with large rocks (>200 mm), low slopes (<2°). Sparse vegetation, mostly karoo shrubs and herbs. Generally intact with limited disturbance. The floral structure consists of a mixture between tall shrubs interspersed with lower-growing karoo bushes and grasses.	Provides microhabitats for reptiles and small mammals. Contributes to soil stability and water retention. Structural heterogeneity supports species diversity.
		
Rocky Ridge	Elevated slopes (>5°), with exposed bedrock and boulders. Supports taller woody shrubs and high vegetation structural diversity. Generally high ecological condition. Plant species typically associated with Rocky Ridges include *Rhigozum obovatum, Eriocephalus ericoides, Pteronia adenocarpa, Indigofera nigromontana, Euphorbia stellispina and Euphorbia ferox*.	Offers high refugia and nesting opportunities for rupicolous (rock-dwelling) species. Stabilises slope erosion. Functions as a biodiversity hotspot within the arid landscape.
		
Rocky Slope	Intermediate slopes (2–5°) with rocky substrates. Vegetation varies from grasses to dwarf shrubs. Slightly less diverse than ridges but still relatively intact.	Important for shelter, nesting and movement of terrestrial vertebrates. Plays a role in erosion control and nutrient cycling.

Habitat	Description and Condition	Ecosystem Processes and Services
		
Sandy/Silty Plain	Flat areas with fine sandy or silty soils. Vegetation is sparse and often patchy due to grazing pressure. Condition is fair to moderate; vulnerable to degradation.	Supports burrowing species (e.g., rodents, reptiles), acts as corridors for animal movement. Fertile microsites under vegetation aid in primary productivity and soil formation.
		
Sandy Ridge	Slightly elevated terrain with sandy substrate. Often supports a mix of shrubs and grasses. Typically shows low levels of human disturbance.	Enhances drainage and infiltration. Offers movement routes and forage for small to medium-sized mammals. Also important for plant colonisation due to improved drainage and exposure.

Habitat	Description and Condition	Ecosystem Processes and Services
		
Sandy Slope	Gentle to moderate incline, sandy composition. Vegetation is more stable than on plains but more vulnerable than ridges. Condition is moderately intact.	Supports faunal movement and foraging. Assists with rainfall infiltration and erosion control. Limited refugia potential but facilitates landscape-level ecological connectivity.
		
Stony Plain	Flat terrain covered in smaller stones or gravels. Low slopes. Vegetation consists of hardy shrubs and grasses. Generally intact but moderately impacted by grazing.	Soil stabilisation, supports insect and reptile life. Offers forage for browsers and limited cover for small vertebrates. Helps moderate surface temperature fluctuations.

Habitat	Description and Condition	Ecosystem Processes and Services
		
Stony Ridge	Elevated with high stone density. Vegetation is denser and more structured than stony plains. Often serves as ecological refugia due to inaccessibility and low impact.	High importance for sheltering fauna, erosion mitigation, and biodiversity conservation. May support rare or red-listed species due to lower human disturbance.
		
Stony Slope	Mid-slope habitat with gravel and stones. Vegetation is moderately diverse. Impacts are moderate.	Important for faunal movement and ecosystem stability. Prevents excessive erosion and provides diverse niches for different animal taxa.

Habitat	Description and Condition	Ecosystem Processes and Services
		
Open Water/Windmill	Artificial or natural water points associated with windmills or dams. Often with surrounding green flushes. These are rare but vital in the arid region. May be impacted by livestock activity or contamination.	Critical water source in a dry ecosystem; attracts fauna and enhances biodiversity locally. Supports amphibians, tortoises, birds and insects. Acts as stepping stones for movement and survival in the landscape.
		
Drainage Habitat	Natural or ephemeral streams and surrounding banks, often with enhanced vegetation and rocky features. Somewhat rare and highly sensitive. May be subject to sedimentation and disturbance.	Supports species during droughts, acts as a corridor for movement, and plays a critical role in nutrient transport and vegetation regeneration. High refugia and foraging value. Key in maintaining ecological function across seasons in this arid system.

Habitat	Description and Condition	Ecosystem Processes and Services
		
Modified	This habitat unit includes all areas that maintain little to no native vegetation and/or where anthropogenic activity has substantially modified an area's primary ecological functions and species composition. This habitat unit no longer maintains its functional integrity and does not contribute significantly to ecosystem services. This habitat unit is predominantly made up of gravel roads, and old mine areas	The ecological services provided by this habitat are limited due to the extent of land transformation and the large amount of bare ground.
		

Habitat	Description and Condition	Ecosystem Processes and Services
		
Degraded Shrubland	In summary, degraded Karoo shrubland that is recovering from past disturbances is an area where the natural vegetation is slowly returning after being damaged by agriculture or other human impacts. The process is slow but vital for restoring the health and biodiversity of the Karoo landscape.	Ecosystem processes in recovering Karoo shrubland are limited until they gradually return to normal as native vegetation re-establishes, soil health improves, and animal communities return.
		

2.3.2 Site Ecological Importance

The different habitat types within the PAOI were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of SCCs and their ecosystem processes. As per the terms of reference for the project, GIS sensitivity maps are required in order to identify sensitive features in terms of the relevant specialist discipline/s within the PAOI. Based on the criteria provided in Appendix B of this report, all habitats within the PAOI were assigned a sensitivity category, i.e., a SEI category. (Table 2-15), the guidelines for each category can be seen in Table 2-16. The SEI of the PAOI is illustrated in Figure 2-20.

Table 2-15 Summary of habitat types delineated within field assessment area.

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance[5]	Project Component in relation to habitat type	Receptor Resilience	Site Ecological Importance[6]
Rocky and Stony Community Potential *Nananthus sp* habitat	Medium Confirmed or highly likely occurrence of populations of Near Threatened (NT) species, threatened species (EN, VU) etc. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.	High Large intact area for any conservation status of ecosystem type. Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts, with no signs of major past disturbance and good rehabilitation potential.	**Medium**	Planned Infrastructure	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: (i) remaining at a site even when a disturbance or impact is occurring.	**High**
Sedimentary Community	Medium Confirmed or highly likely occurrence of populations of Near Threatened (NT) species, threatened species (EN, VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Presence of range-restricted species. > 50% of receptor contains natural habitat with potential to support SCC.	High As above	**High**	Planned Infrastructure	Medium Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor	**Medium**
Degraded Shrubland	Low .< 50% of receptor contains natural habitat with limited potential to support SCC	Low Several minor and major current negative ecological impacts.	**Low**	Planned Infrastructure	Medium As Above	**Low**

[5] Considered as the 'sensitivity'
[6] Considered as the sensitivity in relation to the project component.

Modified	Low < 50% of receptor contains natural habitat with limited potential to support SCC.	Very Low Several major current negative ecological impacts.	**Very Low**	Planned Infrastructure	High Habitat that can recover relatively quickly	**Very Low**

Table 2-16 Guideline for interpreting Site Ecological Importance in the context of proposed project activities.

Site Ecological Importance	Interpretation in relation to proposed development activities
High	Avoidance mitigation wherever possible. Minimisation 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	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

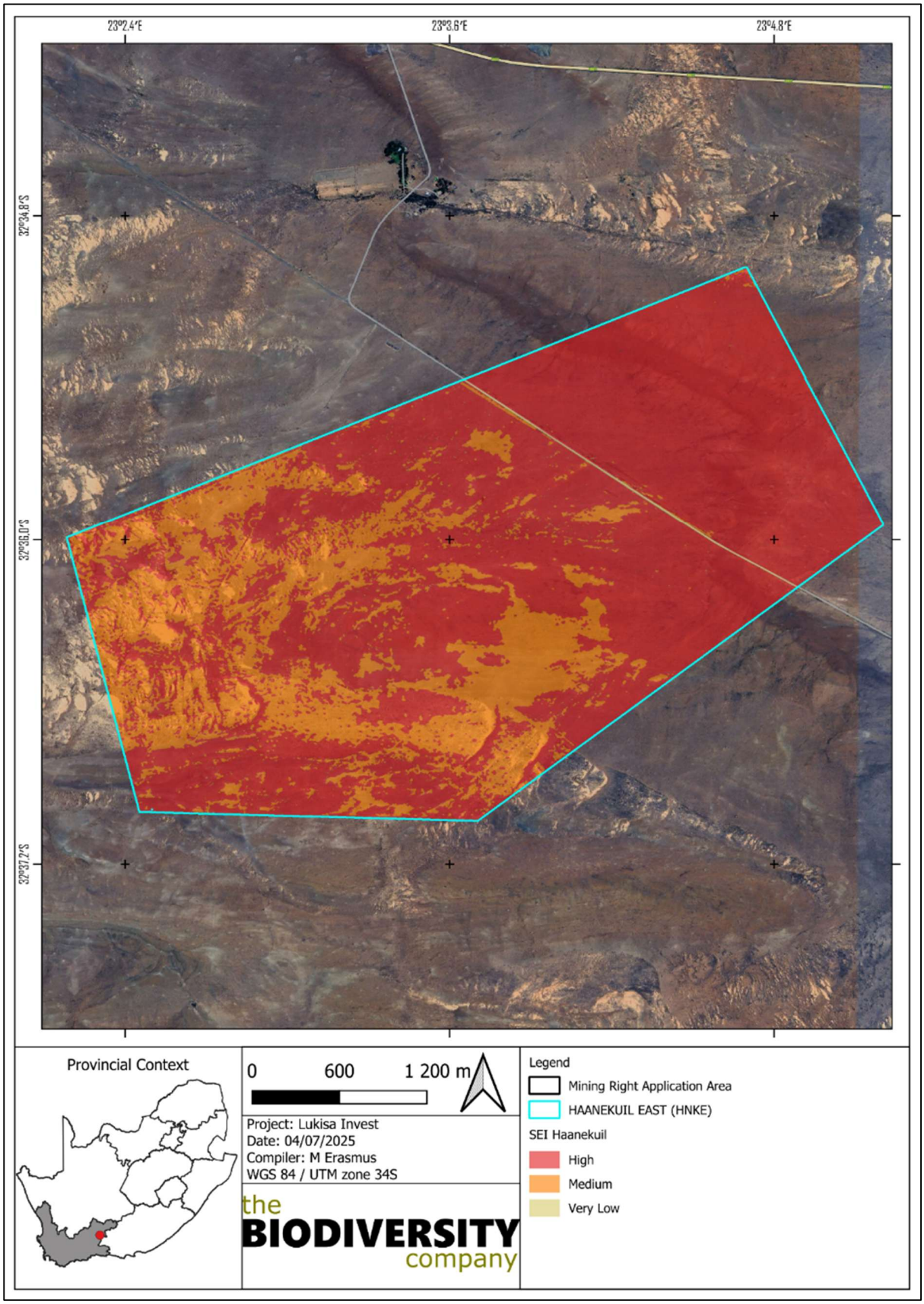


Figure 2-20 Site Ecological Importance of the Haanekuil PAOI

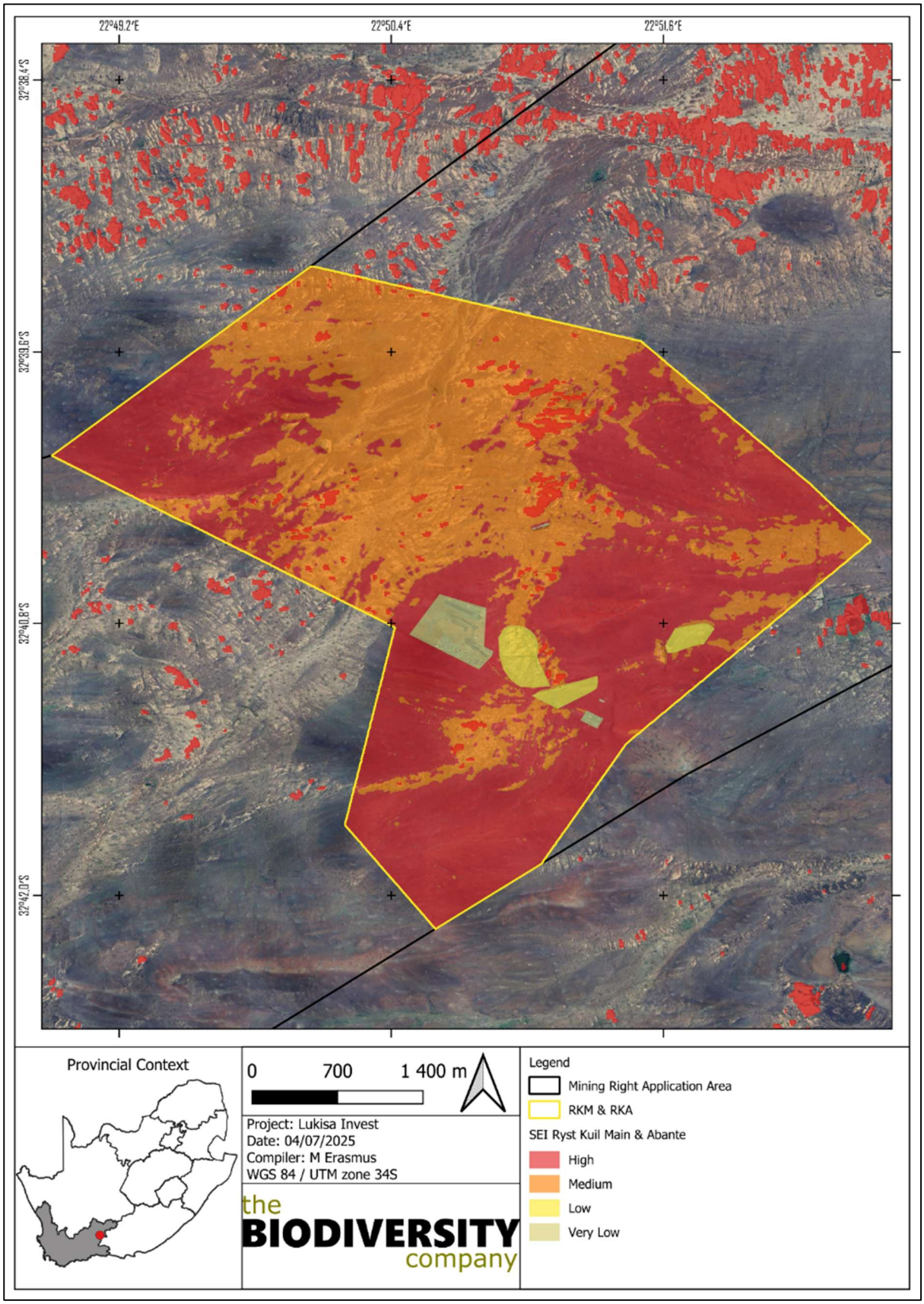


Figure 2-21 Site Ecological Importance of the RKMain & Abante PAOI

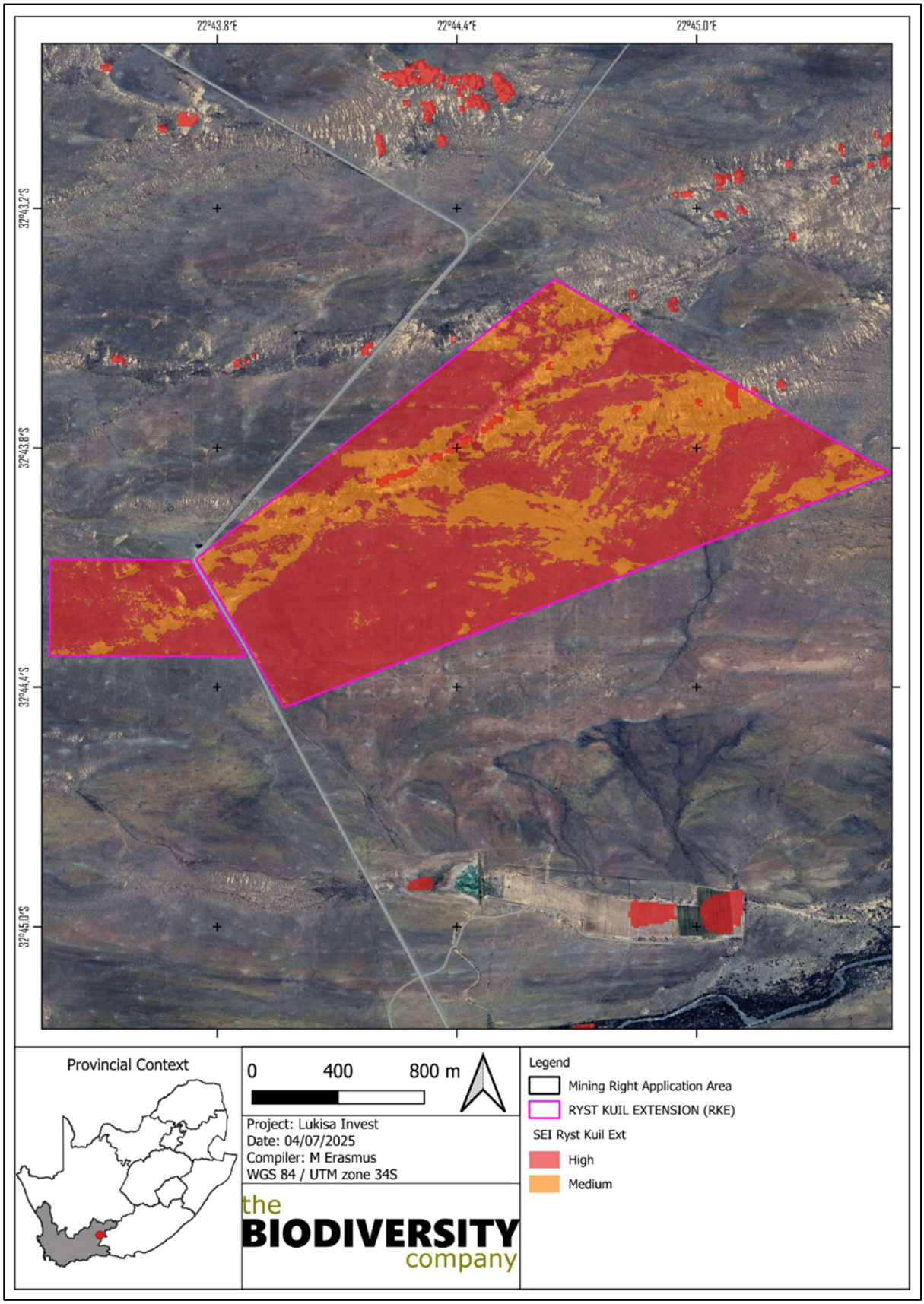


Figure 2-22 Site Ecological Importance of the RKE PAOI

2.3.3 Screening Tool Comparison

The allocated sensitivities for each of the relevant themes are either disputed or validated for the assessed areas in Table 2-17 below. A summative explanation for each result is provided as relevant. The specialist-assigned sensitivity ratings are based largely on the SEI process followed in the previous section, and consideration is given to any observed or likely presence of SCC or protected species.

Table 2-17 Summary of the screening tool vs specialist assigned sensitivities.

Screening Tool Theme	Screening Tool	Habitat	Specialist	Tool Validated or Disputed by Specialist - Reasoning
Animal Theme	**High**	**-**	**High**	Validated – High SEI habitat is intact and capable of supporting recorded and some expected SCCs.
Plant Theme	**Medium**	**-**	**High**	Disputed – High SEI habitat is intact and supports SCC. Sensitive species 1212 confirmed.
Terrestrial Theme Low-Very High		**Rocky and Stoney Community**	**High**	Disputed – Habitat remains in good condition and delivers important ecological functions. Some minor disturbance evident in the form of grazing pressure. Considered as CBA area.
		Sedimentary Community	**Medium**	Disputed – Habitat remains in good condition and delivers important ecological functions. Some minor disturbance evident in the form of grazing pressure. Considered ESA area.
		Degraded Shrubland	**Low**	Disputed – Habitat degraded and in unlikely to recover without human intervention
		Modified	**Very Low**	Disputed – Habitat is entirely modified

3 Impact Risk Assessment

3.1 Biodiversity Risk Assessment

3.1.1 Impact Assessment Considerations and Procedure

Anthropogenic activities drive habitat destruction causing displacement of fauna and flora, and possibly direct mortality. Land clearing destroys local wildlife habitat and can lead to the loss of local breeding grounds, nesting sites and wildlife movement corridors, such as rivers, streams and drainage lines, or other locally important features. The removal of natural vegetation may reduce the habitat available for fauna species and may reduce animal populations and species compositions within the area.

Potential impacts were evaluated against the data captured during the desktop and field assessment to identify relevance to the PAOI. The relevant impacts associated with the proposed construction and operation of the development were then subjected to a prescribed impact assessment method. Impacts were assessed in terms of the construction and operational phases. The operational phase refers to that phase of the project where the construction has been completed. The project activities are set to be long lasting, and a closure phase was not assessed for that reason. It should be noted that the impacts described are not exhaustive, and more impacts may be identified at a later stage. Mitigation measures were only applied to impacts deemed relevant based on the impact analysis.

Impacts were assessed for the following activities:

- Construction Phase
- Operational Phase; and
- Decommissioning and Rehabilitation.

3.1.2 Present Impacts

Considering the anthropogenic activities and influences within the landscape, several negative impacts to biodiversity were observed within the PAOI (Table 3-1).

Table 3-1 Summary of the screening tool vs specialist assigned sensitivities.

Impact	Description
Livestock grazing	Primary land use; grazing by sheep and goats leads to selective vegetation loss, displacement of native species, erosion, and spread of invasive species. This has widespread, ongoing, and cumulative effects on ecosystem health.
Fencing inhibiting free movement of fauna	Extensive fencing fragments habitats, preventing free movement and migration of fauna, leading to isolated populations and increased risk of local extinctions.
Wildlife-vehicle collisions (WVCs)	Increased road traffic causes direct mortality of fauna (tortoises, lizards, snakes, ungulates, birds) through collisions, especially where fencing funnels animals onto roads.
Fences causing direct faunal mortalities	Fencing (including “jackal proof” fences) causes direct deaths of fauna (e.g., birds, small ungulates, tortoises) through collision or entanglement.
Powerline infrastructure causing avifaunal mortality	Existing powerlines cause deaths of large birds (e.g., bustards, cranes, korhaans) due to collisions, contributing to population declines.
Presence of alien/invasive species	Localized infestations of alien/invasive plants, often near agricultural activities or homesteads. Spread mainly by livestock and sometimes by birds.
Hunting (legal and illegal)	Predator eradication campaigns and hunting (both legal and illegal) target predators and sometimes tortoises, impacting local populations.
Previous mining for uranium and associated infrastructure	Past uranium exploration and mining activities have resulted in habitat destruction, pollution, and the presence of contaminated or disturbed sites. These areas may have altered soil and water quality, persistent radioactive residues, and legacy infrastructure that continues to impact local biodiversity and ecosystem function.
Pollution and littering	Unregulated dumping of refuse and building rubble, leading to windblown litter (e.g., plastic bags) that can harm fauna through ingestion or entanglement. Feral animals are attracted to these sites.
Residential presence of feral predators	Feral cats and dogs from settlements prey on native fauna and spread diseases; cats can hybridize with African wild cats, affecting gene pools.

Dust effects and wetland contamination	Dust from roads and erosion contaminates wetlands and pans, affecting water quality and vegetation. Radioactive dust is a potential future risk.
Exploration drilling impacts	Past drilling activities have caused habitat destruction, pollution, and left unplugged drill holes that can trap and kill fauna.
Rock collection for fencing	Rocks are removed from natural areas to secure fences, causing habitat loss and direct faunal mortality, but may create artificial refugia along fences.
Previous agricultural attempts	Some areas were previously ploughed for agriculture, leading to altered vegetation and increased susceptibility to invasive species.

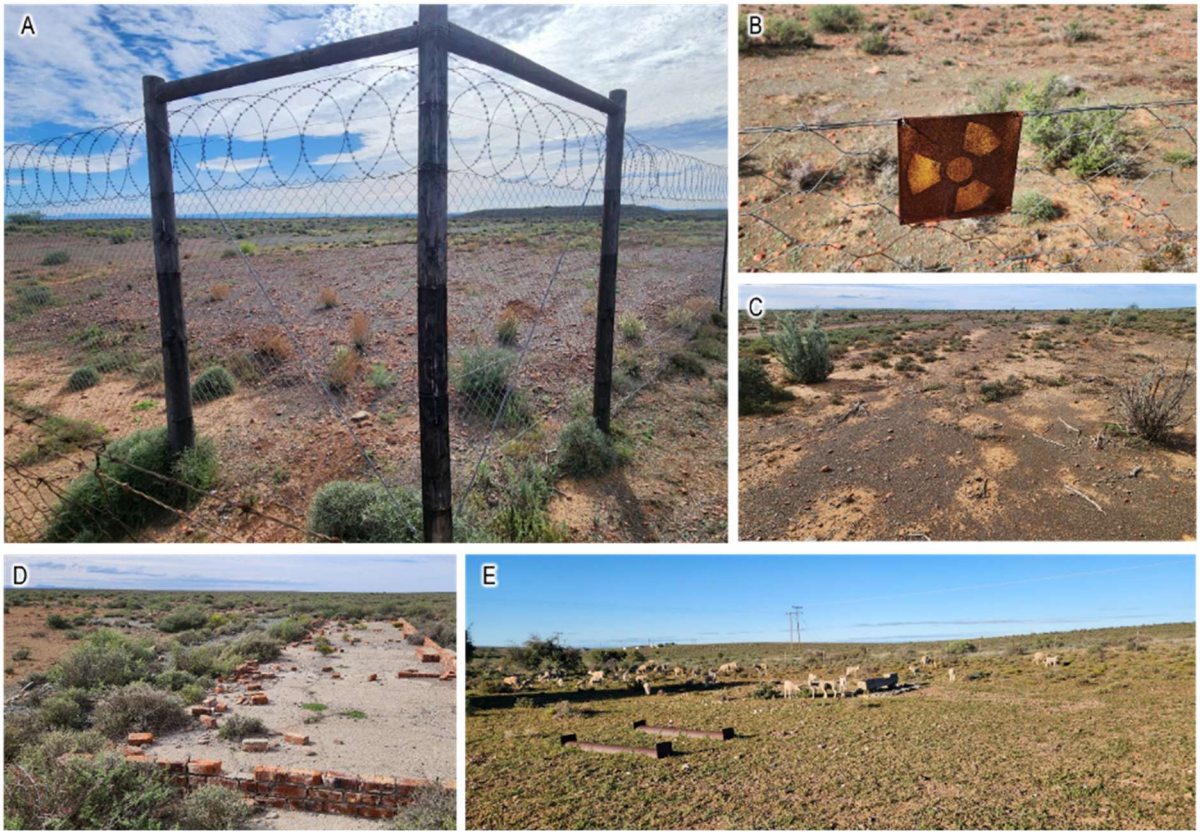


Figure 3-1 Photos illustrating some of the existing impacts observed; A) Fencing, B &C) Previous uranium mining area and infrastructure, C) Previous agriculture, D) Livestock

3.1.3 Irreplaceable Loss

Any development of the PAOI will result in the irreplaceable loss of:

- CBA 2 (Haanekuil), ESA 1, ESA 2 areas;
- Drainage lines/Water resources;
- SCC as well as Protected species; and
- Indigenous vegetation.

3.1.4 Identification of Additional Potential Impacts

The following potential activities and potential impacts are expected. A summary of the potential impacts during the construction and operational phases of the proposed activity are presented in Table 3-2.

Table 3-2 Summary of potential impacts to biodiversity associated with the proposed activity

Main Impact	Project Activities	Secondary Impacts Anticipated
Loss of indigenous habitat	• Direct loss as a result of construction and operation of the proposed development. • Secondary impacts associated with noise, dust and influx of AIPs into these areas. • Access roads and servitudes. • Prevention of fires or incorrect fire regimes. • Improper solid waste disposal. • Dust precipitation.	• Habitat fragmentation. • Loss of ecosystem services. • Emigration of fauna species, potentially including SCC. • Increased potential for soil erosion. • Habitat fragmentation. • Increased potential for establishment of alien invasive vegetation.
Encroachment of AIP species in disturbed areas.	• Vegetation removal. • Soil disturbance. • Vehicles potentially spreading seed. • Unsanitary conditions surrounding infrastructure promoting the establishment of alien and/or invasive rodents. • Creation of infrastructure suitable for breeding activities of alien and/or invasive birds.	• Habitat loss for native flora & fauna (including potential SCC). • Alteration of fauna assemblages due to habitat modification. • Reduced forage quality of grazing habitat. • Spreading of potentially dangerous diseases.
Direct mortality of fauna species.	• Clearing of vegetation. • Roadkill due to vehicle collision. • Preparation of soil with heavy machinery • Soil excavations and soil transportation. • Intentional killing of fauna for food (hunting) or persecution (especially with regard to herpetofauna). • Pollution of water resources due to spilling of hazardous chemicals from heavy machinery during construction.	• Loss of habitat. • Loss of ecosystem services. • Explosion of rodent populations and associated disease risk.
Emigration of fauna	• Disturbance from construction activities. • Loss of habitat and degradation of surrounding habitats.	• Reduced population of protected species, and potentially SCC • Loss of ecosystem services.
Reduced dispersal/migration of fauna	• Removal of vegetation • Loss of landscape used as corridor. • Compacted roads.	• Loss of ecosystem services • Reduced plant seed dispersal.
Disruption/alteration of ecological life cycles (breeding, migration, feeding) due to noise, light and dust	• Operation of machinery (generators, crushers, vehicles). • Vehicles operating at night. • Large, intense fluorescent and mercury vapor lighting.	• Loss of ecosystem services.
Loss of SCCs and/or protected species	• All unregulated/unsupervised activities outdoors. • Poaching and trapping • Staff and others interacting directly with fauna (potentially dangerous), or flora.	• Loss of SCC. • Harm to people (dangerous fauna).
Environmental pollution due to water/ mine drainage runoff	• Project activities that can cause pollution in watercourses and the surrounding environment • Chemical (organic/inorganic) spills • Erosion • Potential release of radioactive material	• Secondary impacts associated with disruption/alteration of ecological life cycles due to noise • Loss of ecosystem services • Secondary impacts associated with disruption/alteration of ecological life cycles due to dust • Loss of ecosystem services

3.1.4.1 Project Surface Infrastructure

The surface infrastructure encompasses the entire mining complex, including facilities such as offices, parking areas, change houses, workshops, substations, ROM (Run-of-Mine) tip, temporary stockpiles, Pollution Control Dams (PCD), canals, overburden and topsoil stockpiles etc. The proposed vegetation clearance and land leveling for the opencast pit, Waste Rock Dumps (WRDs), and other mining infrastructure may lead to the physical removal of vegetation, as well as the fragmentation and

destruction of terrestrial plant communities and ecosystems. Construction camps and laydown areas must be cleared of vegetation to ensure safe operations, thereby reducing available habitats for terrestrial plant species. This vegetation loss will directly and indirectly contribute to erosion, increasing the likelihood of alien and invasive species establishment due to habitat disruption, soil disturbance, and human activity.

The removal of vegetation will result in the direct loss of habitat, compelling fauna, including species listed by the International Union for Conservation of Nature (IUCN), to relocate to new areas where they may face additional challenges. Faunal populations may be disrupted by interference with their movement and breeding activities. There is a risk of direct mortality from earth-moving equipment and transport vehicles, as well as increased traffic due to construction and the transportation of personnel and materials. The unregulated movement of local people may also heighten the risk of poaching in previously secluded habitats, and could introduce diseases and feral species such as cats and dogs.

During the operational phase, as the mine develops and expands, daily activities are expected to further propagate alien invasive plants and degrade habitats due to increased dust and edge effects. The vegetation communities cleared during construction will be entirely transformed, leading to indirect impacts on surrounding vegetation communities and ecosystems. Areas adjacent to the mining operation and its infrastructure are likely to be degraded by dust (which impairs photosynthesis and pollination), livestock, and alien vegetation. The unregulated movement of local people may result in plant poaching and the clearing of vegetation for housing, agriculture, and wood due to easier access.

Ongoing displacement due to sensory disturbances (noise, light, traffic, dust, pollution, and vibrations) from machinery, generators, and blasting is a significant impact to consider. The area may be affected by poaching, mortality, litter, and the introduction of diseases and feral species due to increased human presence. Sensory impacts from blasting, light, and noise will further disrupt life cycles and continue to displace faunal communities. Acid Mine Drainage (AMD) decant is likely to occur from the operational until post-closure, significantly polluting and degrading the ecological status of the surrounding areas, especially local watercourses.

The decommissioning phase involves impacts at the end of the project lifecycle, including the removal of surface infrastructure and the closure of pits. As activities scale down ahead of temporary or permanent closure, the cessation of mining or production is initiated. During this phase, operational impacts will persist until activities decrease and rehabilitation measures are implemented. The impacts during this phase may be detrimental or beneficial to vegetation communities and ecosystems, depending on the extent and effectiveness of rehabilitation efforts. Without the removal of selected surface infrastructure, stockpiles, and machinery, or without rehabilitation measures, the potential for vegetation communities and ecosystems to re-establish within the footprint area is diminished, creating a dead zone within the region. Given the transformed state of the area, direct impacts on vegetation communities and ecosystems are unlikely. Therefore, the impact of rehabilitation versus non-rehabilitation of infrastructure is assessed.

Rehabilitation efforts, including the removal of all unnatural structures, slopes, and materials, will create conditions conducive to the potential re-establishment of vegetation communities and ecosystems, along with their associated fauna, thereby restoring land capability.

3.1.4.2 Linear Infrastructure

Linear infrastructure within the mining operation encompasses access roads (including haul roads), powerlines, and associated service corridors. The development and expansion of these linear features will necessitate the clearance and grading of vegetation for new and existing roads, powerline servitudes, and related infrastructure. This process will result in the direct removal and fragmentation of terrestrial vegetation communities and ecosystems, thereby reducing habitat continuity for plant species and increasing ecosystem vulnerability.

The disturbance and fragmentation associated with linear infrastructure significantly elevate the risk of alien and invasive plant species establishment. This is exacerbated by soil disturbance, altered phytomass dynamics, and increased human activity, all of which facilitate the introduction and spread of non-native species. While the physical footprint of powerline poles or pylons is relatively localized, the broader ecological impact is primarily driven by the construction and maintenance of access and service roads. These impacts are particularly relevant in the absence of finalized road layouts, which complicates comprehensive impact assessment.

Several areas are situated within the designated corridors for the proposed linear infrastructure. The crossing of these sensitive systems is expected to result in direct habitat loss and may disrupt connectivity, leading to further ecological fragmentation.

The removal of vegetation will also result in the direct loss of faunal habitat, potentially displacing species including those listed by the (IUCN) into less suitable areas, thereby increasing their exposure to additional threats. Construction activities increased vehicular traffic, and the movement of personnel and materials heighten the risk of direct mortality for fauna, disrupt movement and breeding patterns, and may facilitate poaching and the introduction of diseases and feral species (e.g., cats and dogs) into previously undisturbed habitats.

During the operational phase, ongoing habitat degradation is anticipated due to dust, pollution, and the encroachment of alien vegetation. The edges of linear infrastructure, particularly haul roads and servitudes adjacent to mining operations, are likely to experience further degradation from dust deposition (which impairs photosynthesis and pollination), livestock intrusion, and increased human access. Unregulated human movement may also lead to plant poaching and additional vegetation clearance for informal settlement, agriculture, or fuelwood collection.

Operational activities will continue to displace and cause mortality among fauna due to sensory disturbances (noise, light, vibration), collisions with vehicles and powerlines, and increased human presence. These factors collectively contribute to ongoing poaching, littering, and the introduction of diseases and feral species.

The decommissioning phase presents both risks and opportunities for vegetation communities and ecosystems. The extent and effectiveness of rehabilitation measures will determine whether the area can recover ecological function. Failure to remove infrastructure and undertake active rehabilitation will prevent the re-establishment of native vegetation and perpetuate ecological "dead spots" within the regional landscape. Conversely, comprehensive rehabilitation—including the removal of all artificial structures and restoration of natural landforms—can facilitate the recovery of vegetation communities and associated fauna, ultimately reinstating the land’s ecological capability.

3.2 Quantitative Impact Assessment

The identified impacts for the different phases of the development are assessed below. These assessments consider the loss of the area in relation to the proposed infrastructure.

The purpose of the impact assessment is to:

- Assess impacts of proposed activities on biodiversity of the proposed development area;
- Assess whether proposed activities are likely to have significant impacts on biodiversity and specifically species of conservation concern; and
- Identify practical, implementable mitigation measures to reduce the significance of proposed activities on biodiversity.

It is important to note that the ratings applied within the risk assessment model, considered impacts to open space or natural habitats within the development area and not for areas already transformed.

3.2.1 Project Infrastructure layout

The project SEI in relation to the proposed infrastructure layout can be seen in Figure 3-2, Figure 3-3 and Figure 3-4 . The Impact significance assessment that follows below pertains to the SEI in the figures and the expected impact to these areas.

The layout in general overlaps High SEI areas, which is expected to have a high unmitigated impact.

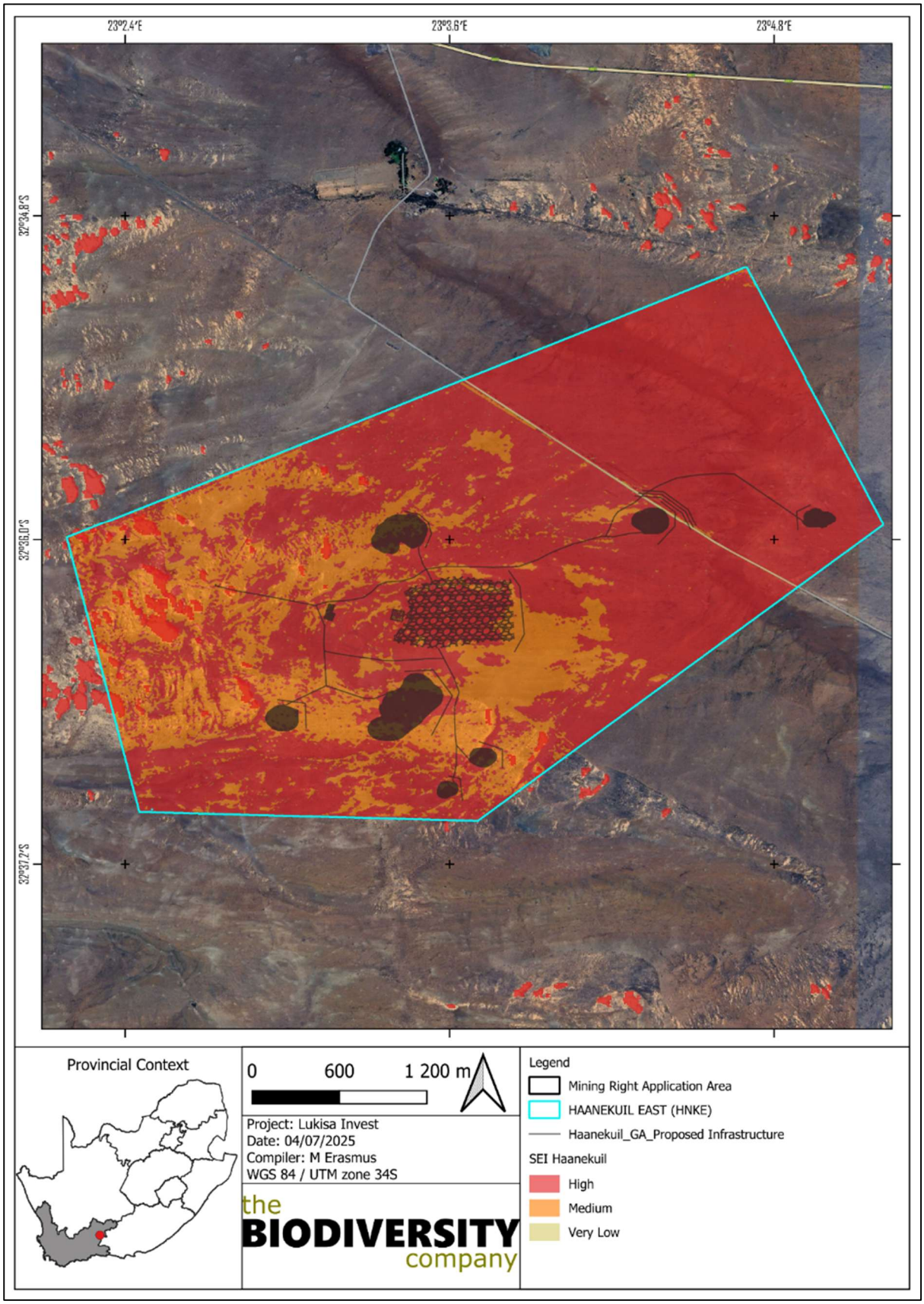


Figure 3-2 SEI in relation to Haanekuil Infrastructure.

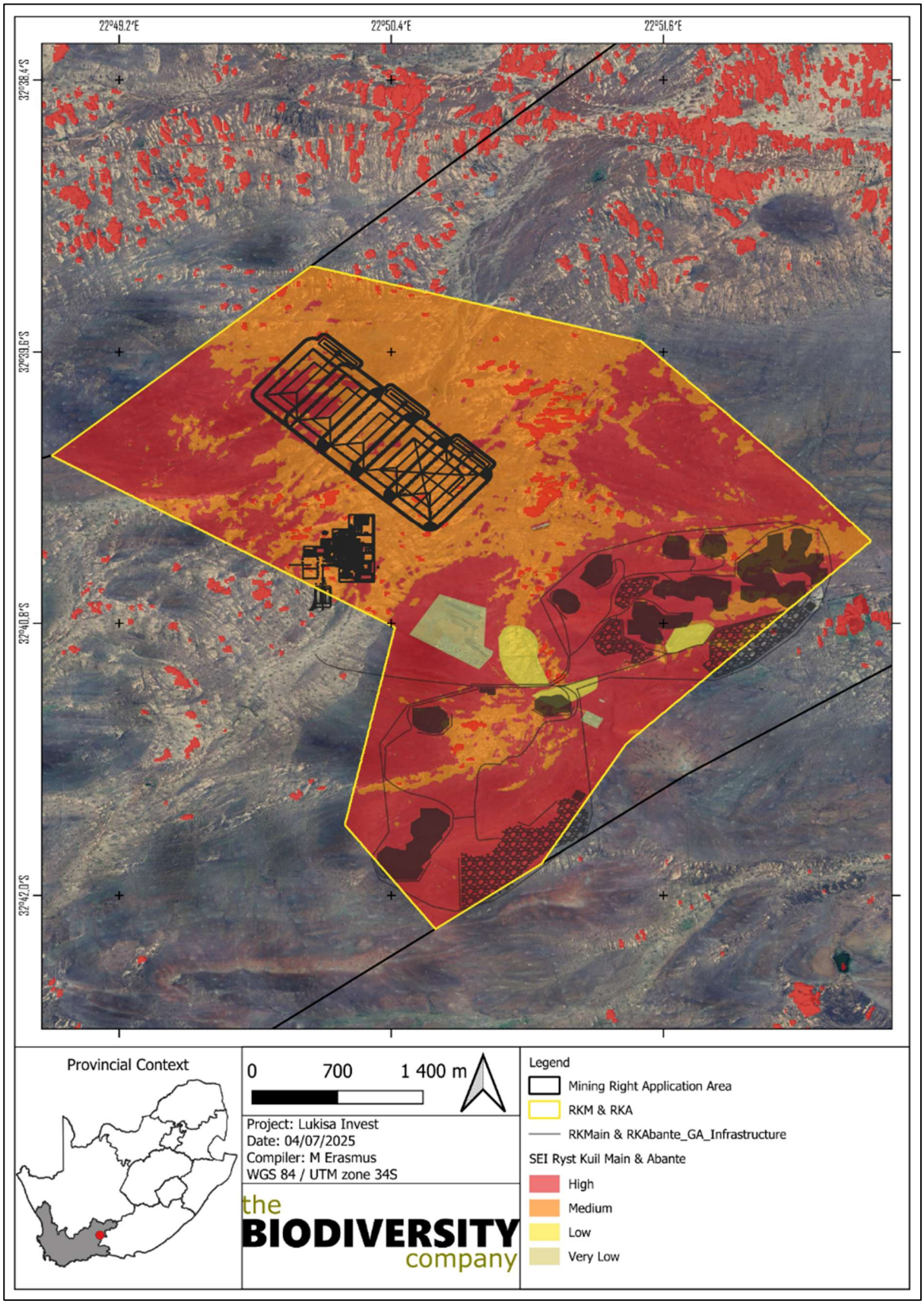


Figure 3-3 SEI in relation to RKM and RKA Infrastructure.

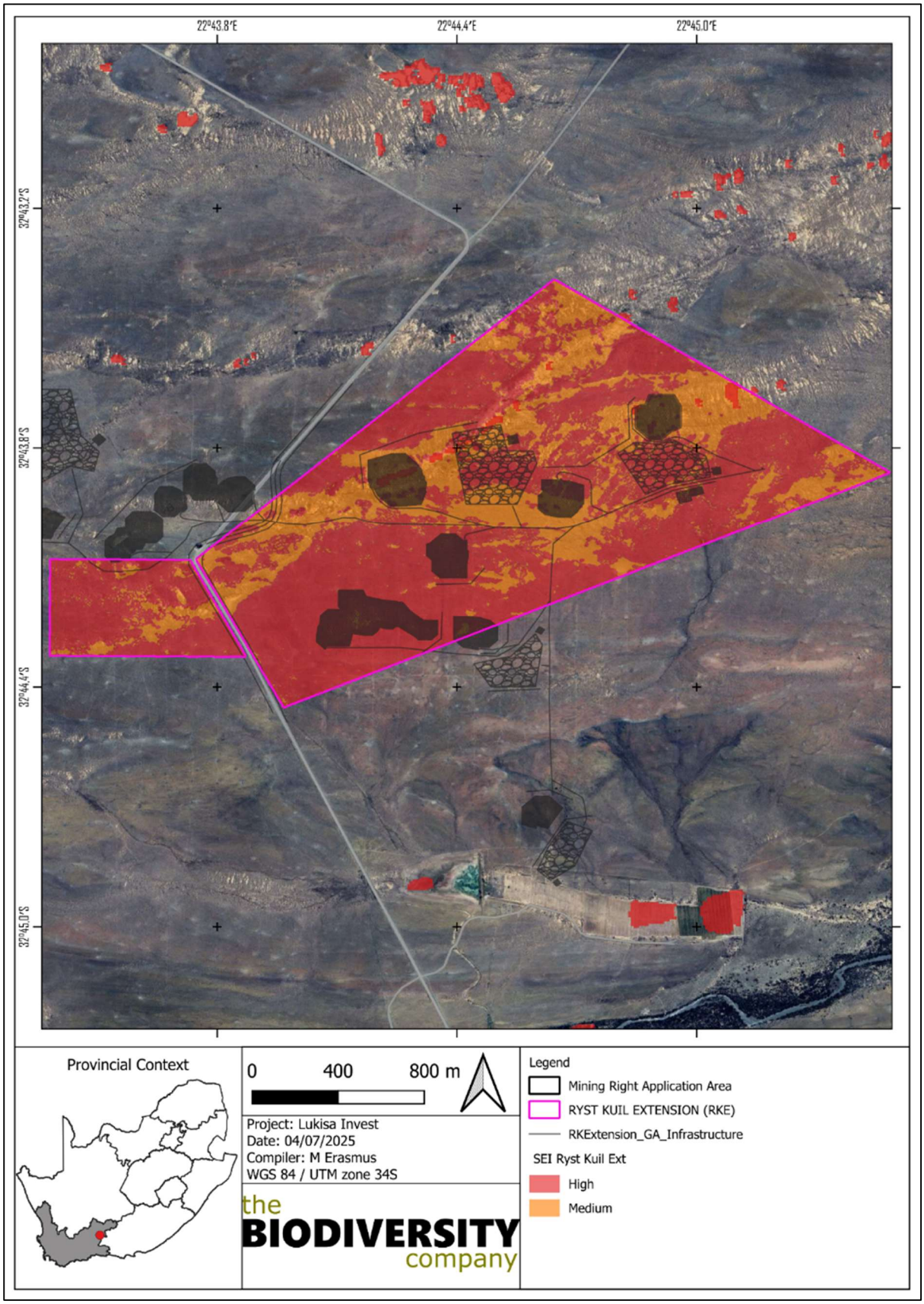


Figure 3-4 SEI in relation to RKE Infrastructure.

3.2.2 Alternatives Considered

No infrastructure alternatives were considered.

3.2.2.1 No Go Alternative

The no-go option would ensure the continued protection of the region's biodiversity, ecological processes, and sensitive habitats. It would avoid the introduction of new, potentially significant environmental risks associated with uranium mining, and maintain the ecological integrity of the Gamka-Karoo landscape.

The Gamka-Karoo vegetation type, which is largely intact and only minimally transformed by current land uses, would remain undisturbed by additional mining activities. Sensitive habitats including rocky and stony communities, drainage lines, and areas supporting species of conservation concern would be preserved in their current state. This would help maintain the region's ecological connectivity, species diversity, and ecosystem services.

3.2.3 Overview: Assessment of Impact Significance

The assessment of impact significance considers both pre-mitigation as well as post-mitigation scenarios as relevant to each potential impact. Construction phase, operational phase, and cumulative impacts are discussed and assessed below.

3.2.3.1 Construction Phase

The following potential main impacts on the biodiversity (based on the framework above) were considered for the construction phase of the proposed development. This phase refers to the period during construction when the proposed features are constructed; and is considered to have the largest direct impact on biodiversity. The following potential impacts to terrestrial biodiversity were considered (Table 3-3):

- 1) Destruction, loss and fragmentation of the of habitats, ecosystems and vegetation community;
- 2) Introduction of alien and invasive species, especially plants; and
- 3) Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching).

Table 3-3 Impacts to biodiversity associated with the proposed construction phase

Impact	Prior to mitigation						Post mitigation					
	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
	5	3	4	4	5		5	2	3	3	3	
1	Permanent	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features	Great / harmful/ ecosystem structure and function largely altered	Ecology highly sensitive /important	Definite	**High**	Permanent	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Likely	**Moderate**

- All 'High' SEI habitats and associated buffer zones outside of the proposed infrastructure are to be avoided.
  - Roads are allowed to cross these HIGH SEI drainage areas (the relevant aquatic report needs be considered). Where major drainage areas need to be crossed, exiting roads should be considered before creating new ones.
  - Roads within Rocky and Stoney habitats should be limited to existing roads
  - Pre-assessment should be conducted to avoid road construction through sensitive areas to reduce chance of collisions with SCC.
- It is recommended that areas to be developed/disturbed be specifically demarcated so that during the construction/activity phase, only the demarcated areas be impacted upon.
- Do not clear areas of indigenous vegetation outside of the authorised development footprint within the PAOI. Minimise vegetation clearing to the minimum required. Practical phased development and vegetation clearing should be practiced so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods of time.
  - Vegetation should be cleared in a manner that the topsoil and indigenous plants from the cleared areas can be used for rehabilitation.
  - A search and rescue of cleared areas should be implemented and plants rescued during construction should be used on site for rehabilitation of disturbed areas.
- Vegetation clearing commences only after the necessary permits for SCCs or protected plants have been obtained. Any individual of the SSC or protected plants that were observed needs a relocation or destruction permit in order for any individual to be removed or destroyed due to the development. High visibility flags must be placed near any protected plants in order to avoid any damage or destruction of the species. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program.
- All vehicles and personnel must make use of existing roads and walking paths where possible, especially construction/operational vehicles.
- The clearing of vegetation must be minimised where possible. All activities must be restricted to within the authorised areas.
- Consult a fire expert and compile and implement a fire management plan to minimise the risk of veld fires around the PAOI.
- Compile and implement a rehabilitation plan from the onset of the Project;
  - Areas that are denuded during construction need to be re-vegetated with indigenous vegetation according to a habitat rehabilitation plan, to prevent erosion during flood and wind events and to promote the regeneration of functional habitat. This will also reduce the likelihood of encroachment by invasive alien plant species. All grazing mammals must be kept out of the areas that have recently been re-planted
  - Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank. Surplus rehabilitation material can be applied to other others in need of stabilisation and vegetation cover.
- Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas.
- No non-environmentally friendly suppressants may be used as this could result in pollution of water sources.
- Environmental Officer (EO) to provide supervision and oversight of vegetation clearing activities.
- Any materials may not be stored for extended periods of time and must be removed from the PAOI once the construction phase has been concluded. No permanent construction phase structures should be permitted. Construction buildings should preferably be prefabricated or constructed of re-usable/recyclable materials. No storage of vehicles or equipment will be allowed outside of the designated laydown areas.
- A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site.
  - Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use.
  - No servicing of equipment on site unless necessary.
  - All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers.
  - Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them from leaking and entering the environment.
  - Construction activities and vehicles could cause spillages of lubricants, fuels and waste material negatively affecting the functioning of the ecosystem.

Impact	Prior to mitigation						Post mitigation					
	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
	○ All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the PAOI. • It must be made an offence for any staff member to take any indigenous plant species out of any portion of the Project area, or to bring any alien plant species into any portion of the Project area except for rehabilitation purposes. This is to prevent the spread of exotic or invasive species or the illegal collection of plants.											
2	4 Life of operation or less than 20 years: Long Term	3 Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	3 Significant / ecosystem structure and function moderately altered	3 Ecology moderately sensitive/ /important	4 Highly likely	**Moderate**	3 One year to five years: Medium Term	2 Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	2 Small / ecosystem structure and function largely unchanged	2 Ecology with limited sensitivity/importance	2 Possible	**Low**
	• Compile and implement an alien vegetation management plan from the onset of construction. The plan must identify areas for action (if any) and prescribe the necessary removal methods and frequencies to be applied. This plan must be also prescribing a monitoring plan and be updated as/when new data is collated; • Implementation of a waste management plan. • Temporary storage of domestic waste shall be in covered waste skips. • Removal of domestic waste on a regular basis, no overspill is permitted.											
3	4 Life of operation or less than 20 years: Long Term	3 Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features	4 Great / harmful/ ecosystem structure and function largely altered	4 Ecology highly sensitive /important	4 Highly likely	**Moderately High**	3 One year to five years: Medium Term	2 Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	3 Significant / ecosystem structure and function moderately altered	3 Ecology moderately sensitive/ /important	2 Possible	**Low**
	• Demarcate work areas during the construction phase to avoid affecting outside areas. Use physical barriers e.g., safety tape, not painted lines, and use signage. • Prior to vegetation clearing activities, the area to be cleared should be walked on foot by 1-2 individuals to create a disturbance in order for fauna to move off. Disturbance must occur as soon before vegetation clearing as possible and no unnecessary disturbance to the area is permitted ○ Permits and ethics approvals for handling of tortoises must be in place and/or organizations with relevant documentations should be contracted for the procurement ○ Any tortoises present should be removed from the affected areas before the start of site clearing/ construction and relocated them to safe areas with the PAOI. ▪ The Karoo Dwarf Tortoise is a high priority for conservation and requires special needs and should be handled only by permitted and professional individuals. ○ Any fauna threatened by the construction activities should be removed safely by an appropriately qualified environmental officer or removal specialist. ○ Field biosecurity during capture, transport, and release ▪ Sequence work from "clean" to "dirty" sites; change gloves between animals; bag and label each animal's equipment (water bowls, towels). ▪ Disinfect or use disposable liners in transport crates; one animal per crate; avoid shared water; keep crates shaded, well ventilated, and within species-appropriate temperatures. ▪ Decontaminate vehicles/equipment between sites; manage run-off away from natural waterways. ▪ Do not stage animals from different source populations together at release points; release in cohorts directly to sites. • All construction vehicles should adhere to a speed limit of maximum 30 km/h to avoid collisions. All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings, dust and erosion is limited. Appropriate speed control measures and signs must be erected.											

Impact	Prior to mitigation						Post mitigation					
	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance

- Schedule activities and operations during least sensitive period;
  - Construction and driving on roads at night should be restricted in order to reduce or prevent wildlife road mortalities which occur more frequently during this period
  - Construction should take place during the dry season (May -July) as much is feasible, especially considering the fauna and their movement.
  - Consider the known breeding times for the avifauna species (Table 2-12)
- Outside lighting should be designed and limited to minimise impacts on fauna. All outside lighting should be directed away from any sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.
- Minimise vegetation clearing to the minimum required. Areas should be cleared and disturbed on a needs basis only, as opposed to clearing and disturbing a number of sites simultaneously.
- The timing between clearing of an area and subsequent development must be minimized to avoid fauna from re-entering the site to be disturbed.
- Any holes/deep excavations must be done in a progressive manner on a needs basis only. No holes/excavations may be left open overnight. In the event holes/excavations are required to remain open overnight, these areas must be covered to prevent fauna falling into these areas and subsequently inspected prior to backfilling
- Where possible, work should be restricted to one area at a time and be systematic. This is to reduce the number and extent of on-site activities, allowing fauna to move off as the Project progresses. This will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories.
- No construction activity is to occur at night.
- Wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area.
- Fencing mitigations:
  - Top 2 strands must be smooth wire;
  - Routinely retention loose wires;
  - Minimum 300 mm between wires; and
  - Place markers on fences.
- All areas to be developed must be walked through prior to any activity to ensure no nests or avifauna species are found in the area. Should any Species of Conservation Concern be found and not move out of the area, or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.
- A nest walkdown must be performed prior to clearance of the site by a suitably qualified person. If nests are found a suitably qualified specialist must be contacted to advise on the way forward.
- Anti anti-poaching efforts should be envisaged, and the following should be the acnhors
  - Risk-based, lifecycle approach: build measures into ESIA, Biodiversity Action Plan, and Closure Plan from the start; update based on monitoring.
    - Route and site selection: avoid critical habitats and wildlife corridors
    - Lighting and fencing: use security fencing designed to limit unauthorized human entry while incorporating wildlife-friendly crossings where feasible.
  - Do no harm: align with the mitigation hierarchy (avoid–minimize)
    - Zero-tolerance policy: explicit ban on hunting, possession, transport, or purchase of wildlife/bushmeat by employees and contractors; clear, proportional sanctions.
    - Gatehouse protocols: inspect vehicles, bags, and cargo with rights-respecting procedures; record and report seizures; integrate license plate recognition where proportionate.
    - Contractor clauses: embed anti-poaching commitments in contracts; require training and data-sharing; audit compliance.
    - Busing over private vehicles: reduce private vehicle access; shift bus schedules to minimize off-hours road usage
  - Partner up: co-design with government wildlife authorities, local/Indigenous communities, and credible NGOs (Endangered Wildlife Trust (EWT))
- Provide all personnel and contractors to undergo Environmental Awareness Training to all personnel and contractors. A signed register of attendance must be kept for proof.
  - Training and must include awareness about not harming or collecting species.
  - All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species, and owls, which are often persecuted out of superstition. Signs must be put up to enforce this.

3.2.3.2 Operational Phase

It is anticipated that daily activities associated with the operation phase will lead to further spread the AIP, as well as the deterioration of the habitats due to the increase of traffic, dust and edge effect impacts. Dust reduces the ability of plants to photosynthesise and thus leads to

degradation/retrogression of the veld. Moving maintenance vehicles do not only cause sensory disturbances to fauna, affecting their life cycles and movement, but will lead to direct mortalities due to collisions, the roads and fences lead to the barrier effect reducing movement and dispersal. Operation will continue to have an effect on erosion of the site with continued disturbance of natural water flow regimes, resulting in a further loss of habitats.

The following potential impacts were considered (Table 3-4):

- 1) Continued encroachment and displacement of the natural vegetation community due to alien invasive plant species, dust, erosion and edge effects;
- 2) Continued displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, noise, light, dust, vibration and blasting, including the disruption/alteration of ecological life cycles; and
- 3) Environmental pollution due to water/ mine drainage runoff

Table 3-4 Impacts to biodiversity associated with the proposed operational phase

Impact	Prior to mitigation						Post mitigation					
	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
	4	3	4	4	4		3	2	3	3	3	
1	Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features	Great / harmful/ ecosystem structure and function largely altered	Ecology highly sensitive /important	Highly likely	**Moderately High**	One year to five years: Medium Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Likely	**Low**

- Avoid the further disturbance or destruction of High SEI areas
- It should be made an offence for any staff to /take bring any plant species into/out of any portion of the PAOI. No plant species whether indigenous or exotic should be brought into/taken from the PAOI, to prevent the spread of exotic or invasive species or the illegal collection of plants. Bring plant species into/out of the PAOI should only be allowed for rehabilitation purposes.
- A Rehabilitation Plan must be implemented.
- Access roads should have run-off control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk.
- All erosion observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.
- There should be follow-up rehabilitation and re-vegetation of any remaining denuded areas with local indigenous perennial grass, shrubs and trees.
- Develop post-mining environments, in conjunction with regional development plans; and the recreation of habitats, where possible; or structure altered landscapes to be compatible with regional habitats.
- A hydrocarbon spill management plan must be put in place, to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. A TSF operational plan must be put in place to avoid tailings spillage. The Contractor must have an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks and machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.
- Keep the surface & sub-surface water and storm water away that may run off from the dumps from the low laying areas, such as drainage nareas, as well as the surrounding areas, from leaving the project area in an uncontrolled manner.
- Construct cut-off berms downslope of working areas.
- Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair.
- Storm Water run-off & Discharge Water Quality monitoring needs to be implemented.
- Incorporate green /soft engineering stormwater measures. Avoid unnecessary vegetation clearing and preferential surface flow paths.
- Monitoring of adjacent watercourses must be undertaken to assess the impact of runoff to these systems.
- Cut-off trenches must be incorporated into the design to decrease contamination of watercourses via runoff.
- No cleaning of vehicles, machines and equipment in water resources.
- No servicing of machines, vehicles and equipment on site.
- Storage of potential contaminants in bunded areas.
- All contractors must have spill kits available and be trained in the correct use thereof.
- All released water must be within DWAF (1996) water quality standards for aquatic ecosystems, and discharge must be managed to avoid scouring and erosion of the receiving systems.
- Contain wastewater in a PCD. Contaminated water must not be discharged into the watercourses.
- Clean and dirty water must be separated. This water should be looked at for treatment and then re-introduced, to mitigate losses to the catchment water hydrodynamics.
- To at least minimise impacts to water quality, a treatment strategy is required, and the Groundwater report needs to be considered.
- Develop and execute a plan for managing alien vegetation.
    - Conduct regular checks for invasive alien plant (IAP) encroachment during the operational phase to prevent alien invasion issues due to disturbances. Monitoring should occur every three months for the first two years and every six months thereafter for the project's duration.
    - Remove or control all IAP species using the appropriate methods outlined in the IAP management plan.
- Create and implement a Solid Waste Management Plan. Prioritize waste management by ensuring all waste is collected, stored, and disposed of properly. It is recommended to remove waste from the site at least weekly.
- Implement a pest control plan, ensuring that no poisons are used.

Impact	Prior to mitigation						Post mitigation					
	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact	Significance
2	4	3	3	3	4		2	2	2	2	3	
	Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	Significant / ecosystem structure and function moderately altered	Ecology moderately sensitive/ /important	Highly likely	**Moderate**	One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology with limited sensitivity/importance	Likely	**Low**

- Any outside lighting should be designed and limited to minimize impacts on fauna. Lighting fixtures should be fitted with baffles, hoods or louvres and directed downward. Outside lighting should be directed away from highly sensitive areas such as the wetlands. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (yellow) lights should be used wherever possible;
- Where feasible, motion detection lighting must be used to minimise the unnecessary illumination of areas
- No vehicle traffic nor the use of vehicle lights should be permitted during the night.
- Noise must be kept to a minimum from dusk to dawn to minimize all possible disturbances to amphibian species and nocturnal mammals
- All personnel and contractors must undergo Environmental Awareness Training and must include awareness about not harming or collecting species.
- Any fauna threatened by the maintenance and operational activities should be removed to a safe location by an appropriate individual.
- All vehicles accessing the site should adhere to a max 30 km/h max to avoid collisions. Appropriate signs must be erected.
- Collisions, especially considering tortoises, should be monitored on a weekly basis.

3	4	3	4	4	4		2	2	2	4	4	
	Life of operation or less than 20 years: Long Term	Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features	Great / harmful/ ecosystem structure and function largely altered	Ecology highly sensitive /important	Highly likely	**Moderately High**	One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	Small / ecosystem structure and function largely unchanged	Ecology moderately sensitive/ /important	Highly Likely	**Moderate**

- Keep the surface & sub-surface water and storm water away that may run off from the dumps from the low laying areas, as well as the surrounding areas, from leaving the project area in an uncontrolled manner.
- Construct cut-off berms downslope of working areas.
- Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair.
- Storm Water run-off & Discharge Water Quality monitoring needs to be implemented.
- Incorporate green /soft engineering stormwater measures. Avoid unnecessary vegetation clearing and preferential surface flow paths.
- Monitoring of adjacent watercourses must be undertaken to assess the impact of runoff to these systems.
- Cut-off trenches must be incorporated into the design to decrease contamination of watercourses via runoff.
- No cleaning of vehicles, machines and equipment in water resources.
- No servicing of machines, vehicles and equipment on site.
- Storage of potential contaminants in bunded areas.
- All contractors must have spill kits available and be trained in the correct use thereof.
- All released water must be within DWAF (1996) water quality standards for aquatic ecosystems, and discharge must be managed to avoid scouring and erosion of the receiving systems.
- Contain wastewater in a PCD. Contaminated water must not be discharged into the watercourses.
- Clean and dirty water must be separated. This water should be looked at for treatment and then re-introduced, to mitigate losses to the catchment water hydrodynamics.
- To at least minimise impacts to water quality, a treatment strategy is required, and the Groundwater report needs to be considered.
- Aquatic monitoring must be done, this includes ground water and surface water.

3.2.3.3 Decommissioning Phase

The impact of this phase is similar to the operational phase until all mining activities has ended and the anthropogenic activity is concluded.

- 1) Decommissioning activity will likely lead to direct mortality of fauna due to earthworks, vehicle collisions and persecution. Destruction of vegetation, encroachment and displacement of the natural vegetation community due to alien invasive plant species, erosion and edge effects;
- 2) Disturbance created during decommissioning will leave the development area vulnerable to erosion and alien plant invasion for several years.

Impact	Prior to mitigation						Post mitigation					
	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact occurring	Significance	Duration of Impact	Spatial Scope	Severity of Impact	Sensitivity of Receiving Environment	Probability of Impact occurring	Significance
	4	3	3	4	5		3	2	2	2	3	
1	Life of operation or less than 20 years	Local area/ within 1 km of the site	Significant / ecosystem structure and function	Ecology highly sensitive /important	Definite	**Moderately High**	One year to five years: Medium Term	Development specific/ within the site boundary / < 100 ha	Small / ecosystem structure and function largely unchanged	Ecology with limited sensitivity/importance	Likely	**Low**

- All personnel should undergo environmental induction with regards to fauna and awareness about not harming or collecting species.
- Prior to commencing work each day, two individuals should traverse the working area in order to disturb any fauna and so they have a chance to vacate.
- Any fauna threatened by the construction activities should be removed safely by an appropriately qualified environmental officer or removal specialist.
- All construction vehicles should adhere to a speed limit of maximum 40 km/h to avoid collisions. Appropriate speed control measures and signs must be erected.
- All hazardous materials, if any, should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner.
- Any excavations should not be left open for extended periods of time as fauna may fall in and become trapped in them. Excavations should only be dug when they are required and should be used and filled shortly thereafter. Limiting the closure and rehabilitation activities to the footprint areas only. Avoid entry/access to previously undisturbed or already rehabilitated areas.
- Areas other than the footprint areas and existing surface infrastructure areas, should be declared as 'no-go' areas to vehicles (only). All essential operational staff – machinery must be limited to development area (no need to go outside the authorised area).
- The rehabilitated areas must be revegetated with indigenous vegetation.
- Reduce the dust generated by operational vehicles and earth moving machinery, through wetting the soil surface (with "dirty water") and putting up signs to enforce speed limits to enforce reduced speeds.
- Implementation of a closure / rehabilitation plan from the onset of the operation of infrastructure. Rehabilitation must be conducted concurrently. The rehabilitation must be reviewed every 3 years and amended accordingly
- Implementation of rehabilitation plan
- Develop post-mining environments in conjunction with regional development plans as well as the recreation of habitats where possible or structure altered landscapes to be compatible with regional habitats
- Monitoring of rehabilitation implementation on an annual basis for 5 years post-closure. The plan and interventions must be amended accordingly
- Any gullies or dongas must also be backfilled
- The area must be shaped to a natural topography
- Trees (or vegetation stands) removed must be replaced
- No grazing must be permitted to allow for the recovery of the area

• Implementation of an alien vegetation management plan. • If any are left standing, monitoring of the road routes must be undertaken to detect carcasses, to enable the identification of any potential areas of high impact to implement limiting vehicle speeds if not already done so. Monitoring should be undertaken at least once a month for the first year of operation												
2	4	3	4	4	3	**Moderately High**	2	2	2	2	3	**Low**
	Life of operation or less than 20 years;	Local area/ within 1 km of the site	Great / harmful/ ecosystem structure and function largely	Ecology highly sensitive /important	Likely		One month to one year: Short Term	Development specific/ within the site boundary / < 100 ha	Small / ecosystem structure and function largely unchanged	Ecology with limited sensitivity/importance	Likely	
• Rehabilitation in accordance with the Rehabilitation Plan for the development must be undertaken in areas disturbed during the decommissioning phase. • Monitoring of the rehabilitated area must be undertaken at quarterly intervals for 3 years after the decommissioning phase. • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. • There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous flora.												

3.3 Unplanned Events

The planned activities will have anticipated impacts as discussed; however, unplanned events may occur on any project and may have potential impacts which will need management.

Table 3-5 is a summary of the findings of an unplanned event assessment from a terrestrial ecology perspective. Note, not all potential unplanned events may be captured herein, and this must therefore be managed throughout all phases according to recorded events.

Table 3-5 Summary of unplanned events for terrestrial biodiversity

Unplanned Event	Potential Impact	Mitigation
Hydrocarbon and tailings spills into the surrounding environment	Contamination of habitat and water resources associated with a spillage.	A spill response kit must always be available. The incident must be reported on and if necessary, a biodiversity specialist must investigate the extent of the impact and provide rehabilitation recommendations.
Fire	Uncontrolled/unmanaged fire that spreads to the surrounding natural areas	Appropriate/Adequate fire management plan need to be implemented.
Erosion caused by water runoff from the surface	Erosion on the side of the road	Stormwater management plan must be compiled and implemented.
Acid Mine Drainage	Severe water quality and in turn habitat degradation	Water treatment, post closure water monitoring and water level management.

3.4 Project specific Mitigation

Below follows the summarised project specific mitigation mentioned in the previous report by Laurence *et al*., 2017. The mitigation in the report by Laurence *et al*., 2017 is still relevant.

3.4.1 Flora

Several plant mitigation measures to minimize the impact of mining activities on flora, especially species of conservation concern (SCC) and protected plants. The key plant mitigation measures include:

1. Minimize Disturbance Footprint
    - Carefully plan and demarcate the minimum required footprint for construction and operational activities (including parking, camps, laydown areas, etc.) to avoid unnecessary vegetation loss.
2. Pre-construction Botanical Survey and Search & Rescue
    - Conduct a pre-construction walkover and botanical survey to identify and preserve high-value plant species in situ.
    - Implement search and rescue operations for Red- and Orange-Listed species, as well as *Nananthus* sp., within a 30 m buffer around new haul roads and other infrastructure. Relocate these plants where possible.
3. Soil and Sediment Management
    - Apply soil and sediment management practices to limit erosion and prevent further habitat loss following vegetation clearing.
4. Rehabilitation and Re-vegetation
    - Rehabilitate cleared areas by planting indigenous species after construction.
    - Establish a suitable ground cover of grass first, followed by appropriate shrubs and other species to restore habitat structure and function.
    - Use a nursery to propagate selected plant species for translocation and rehabilitation.
5. Exclusion of Livestock from Sensitive Areas
    - Fence off known localities of the potentially undescribed *Nananthus* sp. to protect them from grazing and trampling, using fencing that allows movement of native fauna like tortoises.
6. Adaptive Rehabilitation Trials and Monitoring
    - Undertake re-vegetation trials to determine the most suitable species for each habitat.
    - Develop and implement an operational monitoring program to assess the success of rehabilitation, control of alien/invasive species, and water quality in sensitive habitats.
7. Control of Alien and Invasive Species
    - Develop and enforce a policy for the control of alien and invasive plant species, using mechanical and chemical methods as appropriate, and monitor for new infestations.
8. Establishment of a Plant Propagation Facility
    - Set up a facility to propagate plants needed for rehabilitation and for the conservation of SCC, including *Nananthus* sp.

9. Ex Situ Conservation (as a Last Resort)
    - Consider ex situ conservation (translocation) only if all other mitigation measures fail, and only after careful planning and assessment of risks and feasibility.
10. Ongoing Monitoring and Adaptive Management
    - Continuously monitor the effectiveness of mitigation and rehabilitation measures, and adapt management strategies as needed to ensure long-term success.

These measures are designed to avoid, minimize, and rehabilitate impacts on plant communities, with a strong emphasis on protecting species of conservation concern and maintaining ecosystem functionality

3.4.2 Fauna

The document outlines several fauna mitigation measures to reduce the impact of mining activities on mammals, birds, reptiles, amphibians, and other wildlife. The key fauna mitigation measures include:

1. Minimize Habitat Loss and Fragmentation
    - Limit the construction and operational footprint to the minimum area necessary.
    - Use existing cleared areas and roads as much as possible to avoid new habitat disturbance.
    - Demarcate all activity areas in advance to prevent accidental encroachment into sensitive habitats.
2. Maintain and Enhance Habitat Connectivity
    - Provide permeable fencing adjacent to known sensitive habitats to facilitate movement of faunal species.
    - Construct fauna underpasses (e.g., large culverts or pipes) where roads cross sensitive habitats, especially for migratory and Red-Listed species.
    - Remove or realign fences in sensitive areas or increase buffer zones to allow animal movement and escape from roads.
3. Reduce Direct Mortality
    - Implement speed limits (e.g., 40 km/h) for all vehicles within operational/private roads.
    - Install speed humps and conduct staff training to reduce wildlife-vehicle collisions.
    - Monitor and record all road mortalities and live animal observations to identify high-risk areas and adapt mitigation accordingly.
    - Use fauna barriers and underpasses to direct small animals safely across roads.
4. Protect Sensitive and Critical Habitats
    - Buffer and exclude sensitive habitats (e.g., drainage lines, pans, wetlands, rocky outcrops) from development.
    - Designate a 200 m protective buffer zone around drainage lines and wetlands, and a 100 m buffer around rocky outcrops.
5. Mitigate Impacts from Tailings Storage Facility (TSF) and Water Bodies

- Fence off the TSF and Return Water Dam to prevent access by terrestrial fauna.
- Use floating “shade balls” or bird deterrents on open water surfaces to prevent birds and insects from accessing contaminated water.
- Remove shoreline vegetation and potential roosts around TSF and RWD to reduce attraction for wildlife.
- Monitor and record all fauna mortalities around TSF and RWD, and adapt mitigation as needed.

6. Control Alien and Invasive Fauna
    - Implement rodent and pest control around camps and infrastructure, using targeted trapping and safe poison protocols to avoid harm to native species and predators.
    - Enforce a zero-tolerance policy for the trade or transport of fauna by staff and contractors.
7. Reduce Disturbance from Noise, Light, and Dust
    - Use low-noise equipment and sound insulation where possible.
    - Minimize exterior lighting, use non-UV and downward-facing lights, and avoid “up lights” to reduce attraction and disorientation of nocturnal fauna and birds.
    - Implement dust suppression measures to protect sensitive habitats and food resources.
8. Prevent and Respond to Pollution and Spills
    - Store and handle chemicals and hydrocarbons away from sensitive habitats.
    - Use spill kits and train staff in spill response, especially near aquatic habitats.
    - Monitor water quality in and around sensitive habitats.
9. Monitor and Adapt
    - Develop and implement a monitoring program for fauna activity, mortalities, and habitat use.
    - Adapt mitigation measures based on monitoring results and changing site conditions.
10. Education and Awareness
    - Provide environmental induction and ongoing training for all staff and contractors on wildlife protection, speed limits, and reporting of incidents.

These measures are designed to avoid, minimize, and rehabilitate impacts on fauna, with a focus on maintaining ecological connectivity, reducing direct mortality, and protecting sensitive species and habitats.

3.4.3 Habitats

The report recommends several habitat mitigation measures to minimize the impact of mining activities on sensitive environments and maintain ecological integrity. The key habitat mitigation strategies include:

1. Minimize Disturbance and Footprint

- Carefully plan and demarcate the minimum required footprint for all construction and operational activities (including roads, camps, laydown areas, etc.) to avoid unnecessary habitat loss.
- Maximize the use of existing disturbed areas and infrastructure to reduce new impacts.

2. Buffer and Exclude Sensitive Habitats
    - Establish and maintain buffer zones around sensitive habitats:
        1. 200 m buffer for natural seasonal pans, riparian areas, and wetlands.
        2. 50 m buffer for rocky outcrops.
    - Exclude these high-sensitivity areas from development and infrastructure placement.
3. Maintain Habitat Connectivity
    - Design infrastructure and fencing to allow for the movement of fauna between habitats, maintaining ecological corridors and landscape connectivity.
    - Use permeable fencing or wildlife underpasses where roads or fences intersect important movement routes.
4. Soil and Erosion Control
    - Implement soil and sediment management practices to limit erosion and sedimentation, especially after vegetation clearing.
    - Use ground cover and indigenous vegetation to stabilize soils and prevent degradation.
5. Rehabilitation and Restoration
    - Rehabilitate cleared or disturbed areas by planting indigenous species appropriate to the local habitat type.
    - Conduct re-vegetation trials to determine the most suitable species for each habitat.
    - Establish a nursery or plant propagation facility to support restoration efforts.
6. Hydrological Management
    - Design stormwater and surface water management systems to maintain natural hydrological processes and prevent alteration of flow regimes, especially in areas linked to aquatic ecosystems.
    - Construct berms or other engineering controls downstream of the Tailings Storage Facility (TSF) to intercept and contain runoff, preventing contamination of sensitive aquatic habitats.
7. Monitoring and Adaptive Management
    - Develop and implement a monitoring program to assess the effectiveness of habitat mitigation and rehabilitation measures.
    - Adapt management strategies based on monitoring results and changing site conditions.
8. Search and Rescue for SCCs

- Conduct pre-construction surveys and implement search-and-rescue operations for plant and animal species of conservation concern within areas to be disturbed, relocating them to suitable habitats where possible.

9. Control of Alien and Invasive Species

- Monitor and control the spread of alien and invasive plant species in disturbed and rehabilitated areas to protect native habitat integrity.

These measures are designed to avoid, minimize, and rehabilitate impacts on habitats, with a strong emphasis on protecting sensitive areas, maintaining ecosystem functionality, and supporting long-term ecological resilience

4 Conclusion

The Terrestrial Biodiversity Assessment for the proposed Ryst Kuil Mining Right Application Project provides a comprehensive evaluation of the ecological baseline, potential impacts, and mitigation measures associated with the development. The assessment, which integrates both recent fieldwork (May 2025) and a thorough review of previous studies (notably Laurence et al., 2017), confirms that the PAOI is situated within the Gamka Karoo vegetation type, a largely intact and least threatened ecosystem. The site supports a diverse array of flora and fauna, including several SCC and provincially protected species, particularly within rocky, stony, and drainage line habitats.

The main anticipated impacts of the project include habitat loss, fragmentation, the spread of alien invasive species, direct mortality of fauna (notably from vehicle collisions and potential exposure to contaminated water), and cumulative effects from ongoing land use. However, the assessment finds that, with the full implementation of the recommended mitigation hierarchy—prioritizing avoidance, minimization, restoration, and strict management of sensitive habitats and SCCs—these impacts can be reduced to acceptable levels. The project's design does not necessarily show avoidance of the most sensitive areas, however measures such as pre-construction walkdowns, search-and-rescue operations for SCCs, and robust rehabilitation and monitoring plans are prescribed to reduce the impact to an acceptable level.

Importantly, the assessment concludes that the proposed mining activities will affect only a very small fraction of the regional ecosystem, and that the potentially still undescribed *Nananthus* species and other SCCs are not at significant risk, provided mitigation is rigorously applied. The most significant residual risk relates to the potential for fauna to access contaminated water in the tailings storage facility (TSF), for which comprehensive mitigation and ongoing monitoring are recommended.

In summary, the report finds no fatal flaws for the proposed project. If all embedded controls and mitigation measures are implemented and regularly monitored, the development is not expected to pose a significant risk to regional biodiversity. A biodiversity offset may be required, depending on the effectivity of mitigation hierarchy applied. The project may therefore be favourably considered by the competent authority, on the condition that all prescribed mitigation and monitoring measures are strictly followed.

A main contributing factor to the difference in 'sensitivity' changes from 2017 to 2025 is the new SEI methodology as well as the changes in threat statuses of the recorded flora and fauna (Table 4-1).

Table 4-1 Summary of the comparison between the previous and the updated studies

Aspect	Ferret/Enviro-Insight 2017	TBC 2025 Ryst Kuil Report
Scope	Multi-area, multi-year, broad EIA	Ryst Kuil-focused, update, single season
Methodology	Multi-season fieldwork, detailed GIS	Desktop + single field season, screening tools
Baseline Findings	Extensive species/habitat inventories	Validates 2017, updates threat statuses and sensitivities.
Impact Assessment	Detailed, risk-based, site-specific	Confirms 2017, regulatory focus, mitigation hierarchy
Regulatory Context	2012–2017 frameworks	2020–2025 frameworks, screening tool
Recommendations	Mitigation, monitoring, adaptive management.	Same, potential offset may be required, compliance focus.

4.1 Reasoned Opinion

The following is a summary of the reason opinion, assimilated from previous reports and current information.

- The proposed mining activities will affect only a very small fraction of the extensive and largely intact Gamka-Karoo vegetation type, so the overall transformation of this ecosystem is considered negligible.
- The potentially undescribed *Nananthus* species, although present in the area, is not at significant risk due to its wider distribution and the presence of suitable habitat outside the mining zones. Mitigation measures such as search-and-rescue and protection from grazing are recommended to further reduce risk.
- The most significant potential impacts to biodiversity are related to radioactive dust and contaminated water from the Tailings Storage Facility (TSF) and Return Water Dam (RWD). However, modelling indicates that radiation exposure from dust will be well below regulatory limits, and ongoing monitoring is planned.
- The greatest risk to fauna is from ingestion or exposure to contaminated water in the TSF. Comprehensive mitigation measures are proposed, but further modelling and a non-human biota impact study are recommended to fully assess and manage this risk.
- The final design of the TSF cover will be developed during operations, with additional safeguards (such as berms) recommended to prevent contamination of sensitive aquatic ecosystems in the unlikely event of a TSF failure.
- Overall, if all embedded controls and mitigation measures outlined in all reports are implemented and regularly monitored, the proposed mining activities are not expected to pose a significant risk to regional biodiversity.

4.2 Impact Statement

The primary expected impacts of the proposed project will be the loss of habitat and emigration of fauna. Based on the outcomes of the SEI determination, there are areas within the PAOI that possess a ‘High’ SEI. This denotes that avoidance mitigation wherever possible must be implemented. This includes changes to project infrastructure design to limit the amount of habitat impacted.

Considering the proposed project layout, if it is left unrevised based on the proposed mitigation, the project may present a fatal flaw for the development, and in accordance with the Biodiversity Offset Guideline (2023) will incur a listed (and notable) change to the land and resource. A biodiversity offset may not be required for the proposed project if it has demonstrated the correct implementation of the mitigation hierarchy. Referring to the mitigation hierarchy, the project achieved avoidance by means of the revised and reduced spatial planning, suggested seasonal constraints for construction to prioritise the dry season period and less sensitive fauna species periods as outlined in mitigation.

The prescribed mitigation measures must be considered by the Competent Authority for the issued authorisation. Considering the above-mentioned information, no fatal flaws are evident for the proposed project. It is the opinion of the specialist that the project may be favourably considered, on condition that all prescribed mitigation measures are followed.

Table 4-2 The mining recommendations for the delineated systems

Habitat	Sensitivity	Recommendation
Rocky and Stoney Habitat	High	Mitigated mining permitted, with concurrent rehabilitation.
Sedimentary Community	Medium	Mining Permitted.
Degraded Shrubland	Low	Mining Permitted, Ancillary infrastructure should preferably be allocated within these areas
Modified	Vey Low	Mining Permitted, Ancillary infrastructure should preferably be allocated within these areas

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6 Appendix Items

6.1 Appendix A: Methods

6.1.1.1 Desktop Dataset Baseline

6.1.1.2 Ecologically Important Landscape Features

Existing ecologically relevant data layers were incorporated into a GIS to establish how the proposed development might interact with any ecologically important entities. Emphasis was placed around the following spatial datasets:

- National Biodiversity Assessment 2018 (Skowno *et al,* 2019) - The purpose of the National Biodiversity Assessment (NBA) is to assess the state of South Africa's biodiversity based on best available science, with a view to understanding trends over time and informing policy and decision-making across a range of sectors. The NBA deals with all three components of biodiversity: genes, species and ecosystems; and assesses biodiversity and ecosystems across terrestrial, freshwater, estuarine and marine environments. The two headline indicators assessed in the NBA are:
    - Red List of Ecosystems (RLE) 2021 – The list was first published in 2011 and has since been substantially revised by authors Dr Andrew Skowno and Mrs Maphale Monyeki (SANBI, 2022). This list is based on assessments that followed the International Union for Conservation of Nature (IUCN) Red List of Ecosystems Framework (version 1.1) and covers all 456 terrestrial ecosystem types described in South Africa by Mucina and Rutherford (2006). A total of 120 of the 456 terrestrial ecosystem types assessed are categorised as threatened and together make up approximately 10% of the remaining natural habitat in the country. Of these 120 ecosystem types, 55 are Critically Endangered (CR), 51 Endangered (EN) and 14 are Vulnerable (VU). The remainder are categorised as Least Concern (LC) (SANBI, 2022; Skowno & Monyeki, 2021).
- Ecosystem Protection Level – indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. Not Protected, Poorly Protected or Moderately Protected ecosystem types are collectively referred to as under-protected ecosystems.
- Protected areas:
    - South Africa Protected Areas Database (SAPAD) and South Africa Conservation Areas Database (SACAD) (DFFE, 2025a) – The South African Protected Areas Database (SAPAD) and South Africa Conservation Areas Database (SACAD) contains spatial data for the conservation of South Africa. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. The database is updated on a continuous basis and forms the basis for the Register of Protected Areas which is a legislative requirement under the National Environmental Management: Protected Areas Act, Act 57 of 2003.
    - National Protected Areas Expansion Strategy (NPAES) (DFFE, 2022b) – The National Protected Area Expansion Strategy (NPAES) provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and are therefore, of high importance for biodiversity, climate resilience and freshwater protection.
- Conservation/Biodiversity Sector Plans:

The Western Cape CBA classified areas within the province on the basis of its contribution to reach the conservation targets within the province. The C-Plan uses the following terms to categorise the various land used types according to their biodiversity and environmental importance:

- Critical Biodiversity Area (CBA);
- Ecological Support Area (ESA);
- Other Natural Area (ONA); and
- Protected Area (PA).

The purpose of the Western Cape Biodiversity Spatial Plan (BSP) (2023) is to inform land-use planning and development on a provincial scale and to aid in natural resource management. One of the outputs is a map of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These are classified into different categories, namely CBA1 areas, CBA2 areas, ESA areas and Other Natural Areas (ONAs), based on biodiversity characteristics, spatial configuration, and requirements for meeting targets for both biodiversity patterns and ecological processes.

- A new set of Key Biodiversity Areas (KBA) specific to South Africa has been identified using the Global Standard for the Identification of Key Biodiversity Areas version 1.2 (IUCN 2016), applied to South African species and ecosystems. KBAs are critical sites that play a vital role in maintaining global biodiversity by serving as essential habitats for species. The identification of KBAs enables governments and civil society to pinpoint key locations crucial for species and their habitats worldwide. This understanding facilitates collaborative efforts to manage and conserve these areas, thereby safeguarding global biological diversity and supporting international biodiversity objectives.Unlike the Important Bird Areas (IBAs), which primarily focus on birds, the KBA framework encompasses a broader spectrum of biodiversity, including mammals, amphibians, plants, and other taxa. BirdLife South Africa (BLSA), in consultation with the KBA National Coordination Group, has opted to retire IBAs and integrate KBAs into its conservation strategy. This strategic shift acknowledges the necessity of investing resources effectively to protect avian and other macroecological elements at the site level within a comprehensive framework of biodiversity conservation (KBA NCG, 2024); and
- Freshwater Ecology:
    - Strategic Water Source Areas (SWSAs) (Le Maitre *et al,* 2018) – SWSAs are defined as areas of land that supply a quantity of mean annual surface water runoff in relation to their size and therefore, contribute considerably to the overall water supply of the country. These are key ecological infrastructure assets and the effective protection of surface water SWSAs areas is vital for national security because a lack of water security will compromise national security and human wellbeing.
    - South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (Van Deventer *et al*, 2018) – A South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was established during the National Biodiversity Assessment of 2018. It is a collection of data layers that represent the extent of river and inland wetland ecosystem types as well as pressures on these systems.
    - National Freshwater Ecosystem Priority Area (NFEPA) (Nel *et al.,* 2011) – The NFEPA database provides strategic spatial priorities for conserving the country's freshwater ecosystems and associated biodiversity as well as supporting sustainable use of water resources.

- Mining and Biodiversity Guidelines:
    - The Mining and Biodiversity Guidelines (2013) was developed by the Department of Mineral Resources, the Chamber of Mines, the SANBI and the South African Mining and Biodiversity Forum, with the intention to find a balance between economic growth and environmental sustainability. The Guideline is envisioned as a tool to "foster a strong relationship between biodiversity and mining, which will eventually translate into best practice within the mining sector. It provides a tool to facilitate the sustainable development of South Africa's mineral resources, in a way that enables regulators, industry and practitioners to minimise the impact of mining on the country's biodiversity and ecosystem services. It provides the mining sector with a practical, user- friendly manual for integrating biodiversity considerations into the planning processes and managing biodiversity during the operational phases of a mine, from exploration through to closure. The Guideline provides explicit direction in terms of where: mining-related impacts are legally prohibited; biodiversity priority areas may present high risks for mining projects; and biodiversity may limit the potential for mining.
    - In identifying biodiversity priority areas, which have different levels of risk against mining, the Guideline categorises biodiversity priority areas into four categories of biodiversity priority areas in relation to their importance from a biodiversity and ecosystem service point of view as well as the implications for mining in these areas:
        A) Legally protected areas, where mining is prohibited;
        B) Areas of highest biodiversity importance, which are at the highest risk for mining;
        C) Areas of high biodiversity importance, which are at a high risk for mining; and
        D) Areas of moderate biodiversity importance, which are at a moderate risk for mining.

Table 6-1 presents the four different categories and the implications for mining within each of these categories.

Table 6-1 Summary of the Mining and Biodiversity Guidelines

Category	Biodiversity priority areas	Risk for mining	Implications for mining
A. Legally protected	• Protected areas (including National Parks, Nature Reserves, World Heritage Sites, Protected Environments, Nature Reserves) Areas declared under Section 49 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002)	**Mining prohibited**	Mining projects cannot commence as mining is legally prohibited. Although mining is prohibited in Protected Areas, it may be allowed in Protected Environments if both the Minister of Mineral Resources and Minister of Environmental Affairs approve it. In cases where mining activities were conducted lawfully in protected areas before Section 48 of the Protected Areas Act (No. 57 of 2003) came into effect, the Minister of Environmental Affairs may, after consulting with the Minister of Mineral Resources, allow such mining activities to continue, subject to prescribed conditions that reduce environmental impacts.
B. Highest biodiversity importance	• CE and EN • CBAs (or equivalent areas) from provincial spatial biodiversity plans • River and wetland Freshwater Ecosystem Priority Areas (FEPAs) and a 1 km buffer around these FEPAs • Ramsar Sites	**Highest risk for mining**	Environmental screening, environmental impact assessment (EIA) and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, and to provide site-specific basis on which to apply the mitigation hierarchy to inform regulatory decision-making for mining, water use licenses, and EAs. If they are confirmed, the likelihood of a fatal flaw for new mining projects is very high because of the significance of the biodiversity features in these areas and the associated ecosystem services. These areas are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being. An EIA should include the strategic assessment of optimum, sustainable land use for a particular area and will determine the significance of the impact on biodiversity. This assessment should fully consider the environmental sensitivity of the area, the overall environmental and socio-economic costs and benefits of mining, as well as the potential strategic importance of the minerals to the country. Authorisations may well not be granted. If granted, the authorisation may set limits on allowed activities and impacts and may specify biodiversity offsets that would be written into license agreements and/or authorisations.
C. High biodiversity importance	• Protected area buffers (including buffers around National Parks, World Heritage Sites* and Nature Reserves) • Transfrontier Conservation Areas (remaining areas outside of formally proclaimed protected areas) • Other identified priorities from provincial spatial biodiversity plans • High water yield areas • Coastal Protection Zone • Estuarine functional zone	**High risk for mining**	These areas are important for conserving biodiversity, for supporting or buffering other biodiversity priority areas, and maintaining important ecosystem services for particular communities or the country as a whole. An EIA should include an assessment of optimum, sustainable land use for a particular area and will determine the significance of the impact on biodiversity. Mining options may be limited in these areas, and limitations for mining projects are possible. Authorisations may set limits and specify biodiversity offsets that would be written into license agreements and/or authorisations.

Category	Biodiversity priority areas	Risk for mining	Implications for mining
D. Moderate biodiversity importance	• Ecological support areas • Vulnerable ecosystems • Focus areas for protected area expansion (land-based and offshore protection)	**Moderate risk for mining**	These areas are of moderate biodiversity value. EIAs and their associated specialist studies should focus on confirming the presence and significance of these biodiversity features, identifying features (e.g. threatened species) not included in the existing datasets, and on providing site-specific information to guide the application of the mitigation hierarchy. Authorisations may set limits and specify biodiversity offsets that would be written into license agreements and/or authorisations.

6.1.2 Baseline Flora Assessment

The desktop flora assessment encompassed an assessment of all the vegetation units and habitat types within the PAOI, as well as the identification of expected plant species and any locally occurring flora SCC.

The Vegetation of South Africa, Lesotho, and Swaziland (Mucina & Rutherford, 2006) and the 2018 Terrestrial & Freshwater Assessment by SANBI (2018) was used to identify the vegetation types that would have occurred under natural or pre-anthropogenically altered conditions. Furthermore, the iNaturalist database (https://www.inaturalist.org/home) was accessed to compile a list of expected flora species within the PAOI (Figure 6-1). The Red List of South African Plants website (SANBI, 2016) was used to provide the most current account of the national conservation status of flora.

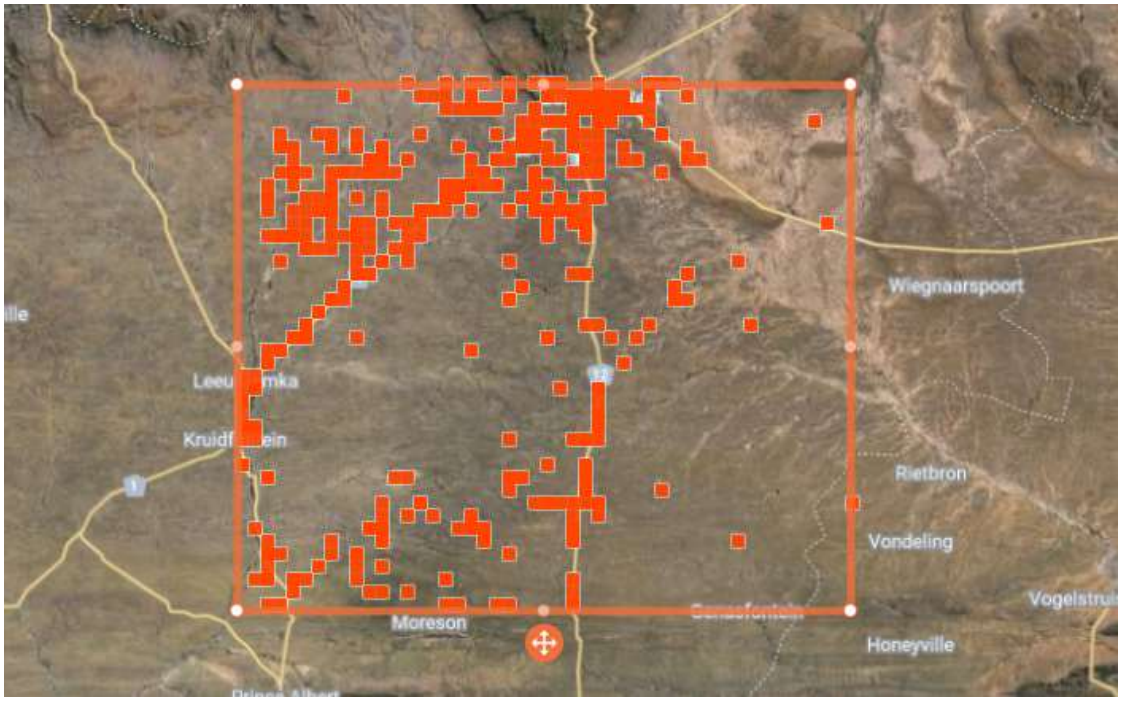

Figure 6-1 Map illustrating extent of area used to obtain the expected flora species list from the iNaturalist database. The approximate location of the PAOI is indicated in yellow

The latest information regarding provincially, and nationally protected flora was obtained from the following published legislative sources:

- Provincially Protected Plant Species (Nature Conservation Ordinance 19 of 1974);

- Nationally Protected plant species (The 2007 lists of Threatened or Protected Species (TOPS), published in terms of Section 56(1) of the NEM:BA No. 10 of 2004); and

- List of Nationally Protected Tree Species (DEFF, 2022).

6.1.3 Baseline Fauna Assessment

The faunal desktop assessment comprised of the following:

- Compiling an expected amphibian list generated from the FrogMap database of the Animal Demography Unit (Fitzpatrick Institute of African Ornithology, 2024a) using the 3222CB, 3222DA, 3222CD and 3222DC quarter degree square;

- Compiling an expected reptile list generated from the ReptileMap database of the Animal Demography Unit (Fitzpatrick Institute of African Ornithology, 2024b) using the 3222CB, 3222DA, 3222CD and 3222DC quarter degree square;

- Compiling an expected mammal list generated from the MammalMap database of the Animal Demography Unit (Fitzpatrick Institute of African Ornithology, 2024c) using the 3222CB, 3222DA, 3222CD and 3222DC quarter degree square; and

South Africa's official site for Species Information and National Red Lists (SANBI, 2022) was used to provide the most current national Red-List status of fauna. The latest information regarding provincially, and nationally protected fauna was obtained from the following published legislative lists:

- Provincially Protected Wildlife Species (Nature Conservation Ordinance 19 of 1974); and

- Nationally Protected Wildlife species (The 2007 lists of Threatened or Protected Species (TOPS), published in terms of Section 56(1) of the NEM:BA No. 10 of 2004).

6.1.4 Field Assessment

6.1.4.1 Vegetation & Flora Survey

The fieldwork and sample sites were placed within targeted areas (i.e., target sites) perceived as ecologically sensitive based on the preliminary interpretation of satellite imagery (Google Corporation) and GIS analysis (which included the latest applicable biodiversity datasets) available prior to the fieldwork. The focus of the fieldwork was, therefore, to maximise coverage and navigate to each target site in the field in order to perform a rapid vegetation and ecological assessment at each sample site.

Homogenous vegetation units were subjectively identified using satellite imagery and existing land cover maps (confirmed during the field survey). The floristic diversity and search for protected plants and flora SCC were conducted through timed meanders within representative habitat units delineated during the desktop assessment. Emphasis was placed on sensitive habitats, especially those overlapping with the PAOI.

The timed random meander method is a highly efficient method for conducting floristic analysis, specifically in detecting protected plants and flora SCC and maximising floristic coverage. In addition, the method is time and cost effective and highly suited for compiling observed flora species lists and therefore gives a rapid indication of flora diversity. The timed meander search was performed based on the original technique described by Goff et al. (1982). Suitable habitat for SCC were identified according to Raimondo et al. (2009) and targeted as part of the timed meanders.

At each sample site notes were made regarding current impacts (e.g., roads, erosion etc.), and this included the subjective recording of dominant vegetation species and any sensitive features (e.g.,

wetlands, rock outcrops etc.). In addition, opportunistic observations were made while navigating through the area.

Species were identified in field wherever possible. If they could not be identified in the field, field guides and texts were used. Relevant field guides and texts consulted for identification purposes included, but was not limited, to the following:

- Identification Guide to Southern African Grasses: An Identification Manual with Keys, Descriptions, and Distributions (Fish *et al.*, 2015);
- A Field Guide to Wild Flowers (Pooley, 1998);
- Problem Plants and Alien Weeds of South Africa (Bromilow, 2018);
- Field Guide to Succulents in Southern Africa (Smith *et al.*, 2017);
- Field Guide to Wildflowers of South Africa (Manning, 2009); and
- iNaturalist. Available at https://www.inaturalist.org/home

6.1.4.2 Fauna Survey

The faunal component of this report pertains only to mammals and herpetofauna (reptiles and amphibians), as a separate avifauna assessment was conducted. The faunal field survey utilised a variety of sampling techniques, including but not limited to:

- Visual and auditory searches: This involves strategic meandering and the use of binoculars and specialist camera equipment to view species from a distance without them being disturbed;
- Active hand-searches: Used for species that shelter in or under particular micro-habitats (typically rocks, exfoliating rock outcrops, fallen trees, leaf litter, bark etc.);
- The identification of tracks and signs, and listening to species calls; and
- Utilization of local knowledge;

Relevant field guides and texts consulted for identification purposes included the following:

- The Mammals of the Southern African Subregion (Skinner & Chimimba, 2005);
- Field Guide to Snakes and other Reptiles of Southern Africa (Branch, 1998);
- A Complete Guide to the Snakes of Southern Africa (Marais, 2004);
- Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland (Bates et al, 2014);
- A Complete Guide to the Frogs of Southern Africa (du Preez and Carruthers, 2009);
- Stuarts' Field Guide to Mammals of Southern Africa including Angola, Zambia & Malawi (Stuart and Stuart, 2015); and
- A Field Guide to the Tracks and Signs of Southern and East African Wildlife (Stuart and Stuart, 2000).

6.2 Appendix B: Terrestrial Site Ecological Importance

The different habitat types within the PAOI were delineated and identified based on observations made during the field survey, and information from available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of SCC and their ecosystem processes.

Site Ecological Importance (SEI) is a function of the Biodiversity Importance (BI) of the receptor (e.g., SCC, the vegetation/fauna community or habitat type present in the PAOI) and Receptor Resilience (RR) (its resilience to impacts).

BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor. The criteria for the CI and FI ratings are provided in Table 6-2 and Table 6-3 respectively.

Table 6-2 Summary of Conservation Importance (CI) criteria

Conservation Importance	Fulfilling Criteria
Very High	Confirmed or highly likely occurrence of Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Extremely Rare or CR species that have a global extent of occurrence (EOO) of < 10 km^2. 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 an 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 EOO 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 Near Threatened (NT) species, threatened species (CR, EN, VU) listed under Criterion A 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% of receptor contains natural habitat with potential to support SCC.
Low	No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species. < 50% of receptor contains 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.

Table 6-3 Summary of Functional Integrity (FI) criteria

Functional Integrity	Fulfilling Criteria
Very High	Very large (> 100 ha) intact area for any conservation status of ecosystem type or > 5 ha for CR ecosystem types. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. No or minimal current negative ecological impacts, with no signs of major past disturbance.
High	Large (> 20 ha but < 100 ha) intact area for any conservation status of ecosystem type or > 10 ha for EN ecosystem types. Good habitat connectivity, with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts, with no signs of major past disturbance and good rehabilitation potential.
Medium	Medium (> 5 ha but < 20 ha) semi-intact area for any conservation status of ecosystem type or > 20 ha for VU ecosystem 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 negative ecological impacts, with some major impacts 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 modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative 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 negative ecological impacts.

BI can be derived from a simple matrix of CI and FI as provided in Table 6-4.

Table 6-4 Matrix used to derive Biodiversity Importance (BI) from Functional Integrity (FI) and Conservation Importance (CI)

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

The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor, as summarised in Table 6-5.

Table 6-5 Summary of Receptor Resilience (RR) criteria

Resilience	Fulfilling Criteria
Very High	Habitat that can recover rapidly (~ less than 5 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (~ 5–10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) returning to a site once the disturbance or impact has been removed.
Medium	Will recover slowly (~ more than 10 years) to restore > 75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) 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: (i) remaining at a site even when a disturbance or impact is occurring, or (ii) 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: (i) remain at a site even when a disturbance or impact is occurring, or (ii) return to a site once the disturbance or impact has been removed.

After the determination of BI and RR, the SEI can be ascertained using the matrix as provided in Table 6-6.

Table 6-6 Matrix used to derive Site Ecological Importance from Receptor Resilience (RR) and Biodiversity Importance (BI)

Site Ecological Importance		Biodiversity Importance				
		Very High	**High**	**Medium**	**Low**	**Very Low**
Receptor Resilience	**Very Low**	Very High	Very High	High	Medium	Low
	Low	Very High	Very High	High	Medium	Very Low
	Medium	Very High	High	Medium	Low	Very Low
	High	High	Medium	Low	Very Low	Very Low
	Very High	Medium	Low	Very Low	Very Low	Very Low

Interpretation of the SEI in the context of the proposed project is provided in Table 6-7.

Table 6-7 Guideline for interpreting Site Ecological Importance in the context of proposed activities

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. Minimisation 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	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

The SEI evaluated for each taxon can be combined into a single multi-taxon evaluation of SEI for the assessment area. Either a combination of the maximum SEI for each receptor should be applied, or the SEI may be evaluated only once per receptor but for all necessary taxa simultaneously. For the latter, justification of the SEI for each receptor is based on the criteria that conforms to the highest CI and FI, and the lowest RR across all taxa.

6.3 Appendix C: Impact / Risk Assessment

Potential impacts were evaluated against the data captured during the desktop assessment to identify relevance to the PAOI. The relevant impacts associated with the proposed development were then subjected to a prescribed impact assessment methodology which is provided below.

The significance of the identified impacts will be determined using an accepted methodology from the Department of Environmental Affairs and Tourism Guideline document on EIA Regulations, April 1998. As with all impact methodologies, the impact is defined in a semi-quantitative way and will be assessed according to methodology prescribed in the following section (Table 6-8and Table 6-9), the significance matrix can be seen in Table 6-10.

Scale utilised for the evaluation of the Environmental Impact Ratings:

Table 6-8 Likelihood Descriptors

Probability of impact	Rating
Highly unlikely	1
Possible	2
Likely	3
Highly likely	4
Definite	5
Sensitivity of receiving environment	**Rating**
Ecology not sensitive/important	1
Ecology with limited sensitivity/importance	2
Ecology moderately sensitive/ /important	3

Ecology highly sensitive /important	4
Ecology critically sensitive /important	5

Table 6-9 Consequence Descriptors

Severity of impact	Rating
Insignificant / ecosystem structure and function unchanged	1
Small / ecosystem structure and function largely unchanged	2
Significant / ecosystem structure and function moderately altered	3
Great / harmful/ ecosystem structure and function largely altered	4
Disastrous / ecosystem structure and function seriously to critically altered	5
Spatial scope of impact	**Rating**
Activity specific/ < 5 ha impacted / Linear features affected < 100m	1
Development specific/ within the site boundary / < 100 ha impacted / Linear features affected < 100m	2
Local area/ within 1 km of the site boundary / < 5000ha impacted / Linear features affected < 1000m	3
Regional within 5 km of the site boundary / < 2000ha impacted / Linear features affected < 3000m	4
Entire habitat unit / Entire system/ > 2000ha impacted / Linear features affected > 3000m	5
Duration of impact	**Rating**
One day to one month: Temporary	1
One month to one year: Short Term	2
One year to five years: Medium Term	3
Life of operation or less than 20 years: Long Term	4
Permanent	5

Table 6-10 Significance Rating Matrix

	CONSEQUENCE (Severity + Spatial Scope + Duration)															
LIKELIHOOD (Frequency of activity + Frequency of impact)	0	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Absent
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	Low
	3	6	9	12	15	18	21	24	27	301	33	36	39	42	45	
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	Moderate
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	Moderately High
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105	High
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	

	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	Critical
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	

6.4 Appendix D: Expected Species Lists

6.4.1 Expected Flora Species

Family	Taxon	Common Name		Nature
Acanthaceae	*Acanthopsis hoffmannseggiana*	Gariep Spikeviolet		
Crassulaceae	*Adromischus maculatus*	spotted adromischus	LC	Indigenous; Endemic
Cyperaceae	*Afroscirpoides dioeca*			Indigenous
Asparagaceae	*Agave americana*	American century plant		Not indigenous; Naturalised; Invasive
Asparagaceae	*Agave americana americana*	American century plant		
Aizoaceae	*Aizoon papulosum*	Red Kraalbush		
Aizoaceae	*Aizoon sarcophyllum*	Creeping Vanwyks Brakbush		
Asparagaceae	*Albuca canadensis*	Soldier-in-a-box	LC	Indigenous; Endemic
Asparagaceae	*Albuca collina*		LC	Indigenous; Endemic
Asparagaceae	*Albuca prasina*			Indigenous
Asparagaceae	*Albuca setosa*	Thick Slime-lily	LC	Indigenous
Asparagaceae	*Albuca spiralis*	Curly Tamarak	LC	Indigenous; Endemic
Asparagaceae	*Albuca toxicaria*		LC	Indigenous
Asparagaceae	*Albuca unifolia*		LC	Indigenous
Asparagaceae	*Albuca virens*	Green Tamarak	LC	Indigenous
Orobanchaceae	*Alectra sessiliflora*	Yellow Paintflower	LC	Indigenous
Asphodelaceae	*Aloe broomii*	snake aloe		Indigenous
Asphodelaceae	*Aloe claviflora*	kraal aloe	LC	Indigenous
Asphodelaceae	*Aloe longistyla*	Karoo aloe	LC	Indigenous; Endemic
Asphodelaceae	*Aloe microstigma*	Cape Speckled Aloe	LC	Indigenous
Asphodelaceae	*Aloe striata*	Coral Aloe		Indigenous
Amaryllidaceae	*Ammocharis coranica*	Ground lily	LC	Indigenous
Anacampserotaceae	*Anacampseros albidiflora*		LC	Indigenous; Endemic
Anacampserotaceae	*Anacampseros arachnoides*			Indigenous
Anacampserotaceae	*Anacampseros filamentosa*		LC	Indigenous
Anacampserotaceae	*Anacampseros papyracea*		LC	Indigenous
Anacampserotaceae	*Anacampseros telephiastrum*	Large-flowered Sandrose	LC	Indigenous; Endemic
Anacampserotaceae	*Anacampseros ustulata*		LC	Indigenous; Endemic
Apiaceae	*Apium decumbens*	Sprawling Celery		Indigenous
Scrophulariaceae	*Aptosimum indivisum*	Karoo Violet	LC	Indigenous
Scrophulariaceae	*Aptosimum spinescens*	Thorn Karooviolet	LC	Indigenous
Asteraceae	*Arctotheca calendula*	Capeweed	LC	Indigenous
Asteraceae	*Arctotheca prostrata*	Prostrate Capeweed	LC	Indigenous; Endemic
Asteraceae	*Arctotis leiocarpa*	Karoo African Daisy	LC	Indigenous

Papaveraceae	*Argemone ochroleuca*	Mexican Poppy		Not indigenous; Naturalised; Invasive
Papaveraceae	*Argemone ochroleuca ochroleuca*	White-flowered Mexican Poppy		
Poaceae	*Aristida adscensionis*	sixweeks three-awn	LC	Indigenous
Poaceae	*Aristida congesta congesta*	Cat's-Tail Three-Awned Grass	LC	Indigenous
Poaceae	*Aristida diffusa*	Iron Grass		Indigenous
Asparagaceae	*Asparagus burchellii*	Burchells Asparagus	LC	Indigenous; Endemic
Asparagaceae	*Asparagus glaucus*	Blue Asparagus	LC	Indigenous
Asparagaceae	*Asparagus mucronatus*	Grey Asparagus	LC	Indigenous; Endemic
Asparagaceae	*Asparagus retrofractus*	Zigzag Asparagus	LC	Indigenous
Asparagaceae	*Asparagus striatus*	Hardleaf Asparagus	LC	Indigenous; Endemic
Asparagaceae	*Asparagus suaveolens*	Catthorn Asparagus	LC	Indigenous
Aspleniaceae	*Asplenium cordatum*	Scaly Fern	LC	Indigenous
Asphodelaceae	*Astroloba robusta*	Common Astroloba		Indigenous; Endemic
Amaranthaceae	*Atriplex lindleyi inflata*	Spongefruit Saltbush		
Amaranthaceae	*Atriplex nummularia*	Old Man Saltbush		Not indigenous; Naturalised; Invasive
Zygophyllaceae	*Augea capensis*	Willybush	LC	Indigenous
Acanthaceae	*Barleria stimulans*	Karoo Bushviolet		
Asteraceae	*Berkheya onobromoides*	Smelly Capethistle	LC	Indigenous; Endemic
Asteraceae	*Berkheya spinosa*	Spiny Capethistle	LC	Indigenous; Endemic
Aizoaceae	*Bijlia dilatata*	Clay Prince Albert Vygie	EN	Indigenous; Endemic
Acanthaceae	*Blepharis mitrata*	Stack Lashes	LC	Indigenous
Amaryllidaceae	*Boophone disticha*	Common Oxbane		Indigenous
Asphodelaceae	*Bulbine abyssinica*	African Beardstyle	LC	Indigenous
Asphodelaceae	*Bulbine frutescens*	Wild Kopieva	LC	Indigenous
Asphodelaceae	*Bulbine triebneri*		LC	Indigenous
Capparaceae	*Cadaba aphylla*	Black Storm	LC	Indigenous
Apocynaceae	*Carissa haematocarpa*	Karoo Num-num		Indigenous
Amaranthaceae	*Caroxylon aphyllum*	River Ganna		
Poaceae	*Cenchrus ciliaris*	buffelgrass	LC	Indigenous
Poaceae	*Cenchrus setaceus*	Purple Fountain Grass	NE	Not indigenous; Cultivated; Naturalised; Invasive
Aizoaceae	*Chasmatophyllum nelii*		LC	Indigenous; Endemic
Aizoaceae	*Chasmatophyllum stanleyi*		LC	Indigenous; Endemic
Amaranthaceae	*Chenopodium phillipsianum*	Nama Goosefoot		Indigenous
Poaceae	*Chloris virgata*	feather finger grass	LC	Indigenous
Asteraceae	*Chrysocoma ciliata*	Bitterbush	LC	Indigenous
Asteraceae	*Cirsium vulgare*	Bull Thistle		Not indigenous; Naturalised; Invasive
Menispermaceae	*Cissampelos capensis*	Cape Moonseed Vine	LC	Indigenous
Cucurbitaceae	*Citrullus amarus*	Makataan		

Ranunculaceae	*Clematis brachiata*	Travellers Joy		Indigenous
Colchicaceae	*Colchicum asteroides*	Star-in-a-Boat	LC	Indigenous; Endemic
Crassulaceae	*Cotyledon orbiculata*	varkoor	LC	Indigenous; Endemic
Crassulaceae	*Cotyledon orbiculata orbiculata*	Common Pigs Ear	LC	Indigenous; Endemic
Crassulaceae	*Cotyledon papillaris*	Sprawling Pigsears		
Asteraceae	*Crassothonna cacalioides*		LC	Indigenous; Endemic
Crassulaceae	*Crassula arborescens*	Tree Stonecrop		Indigenous; Endemic
Crassulaceae	*Crassula campestris*		LC	Indigenous
Crassulaceae	*Crassula capitella*	Redspot Stonecrop	LC	Indigenous
Crassulaceae	*Crassula capitella capitella*		LC	Indigenous; Endemic
Crassulaceae	*Crassula capitella thyrsiflora*			
Crassulaceae	*Crassula columnaris*	Buddha's temple		Indigenous
Crassulaceae	*Crassula corallina*	Coral Stonecrop	LC	Indigenous
Crassulaceae	*Crassula corallina corallina*		LC	Indigenous
Crassulaceae	*Crassula cotyledonis*	Fat Stonecrop	LC	Indigenous
Crassulaceae	*Crassula deltoidea*	Silver-beads	LC	Indigenous
Crassulaceae	*Crassula expansa*	Fine Stonecrop	LC	Indigenous
Crassulaceae	*Crassula hemisphaerica*		LC	Indigenous; Endemic
Crassulaceae	*Crassula montana*			Indigenous; Endemic
Crassulaceae	*Crassula montana quadrangularis*			
Crassulaceae	*Crassula muscosa*	bootlaces	NE	Indigenous
Crassulaceae	*Crassula muscosa muscosa*	Common Bootlaces	NE	
Crassulaceae	*Crassula nudicaulis platyphylla*			
Crassulaceae	*Crassula pyramidalis*	Pagoda Stonecrop	LC	Indigenous; Endemic
Crassulaceae	*Crassula rupestris*	Sosatiebush	LC	Indigenous; Endemic
Crassulaceae	*Crassula rupestris rupestris*	Concertina Stonecrop	LC	Indigenous; Endemic
Crassulaceae	*Crassula subaphylla*	Louhout Stonecrop		Indigenous
Crassulaceae	*Crassula tetragona connivens*			
Cucurbitaceae	*Cucumis africanus*	Small Wild Cucumber	LC	Indigenous
Asteraceae	*Curio hallianus*		LC	Indigenous; Endemic
Asteraceae	*Curio radicans*	Necklace Plant	LC	Indigenous
Asteraceae	*Cuspidia cernua*			Indigenous
Asteraceae	*Cuspidia cernua annua*		LC	Indigenous; Endemic
Aizoaceae	*Cylindrophyllum tugwelliae*	Quartz Fingerfig	LC	Indigenous; Endemic
Cactaceae	*Cylindropuntia fulgida*	Chain-fruit Cholla		Not indigenous; Naturalised; Invasive
Cactaceae	*Cylindropuntia fulgida mamillata*	Boxing Glove Cactus		
Cactaceae	*Cylindropuntia imbricata*	tree cholla		Not indigenous; Naturalised; Invasive
Cactaceae	*Cylindropuntia imbricata imbricata*	Northern Tree Cholla		
Cactaceae	*Cylindropuntia imbricata spinosior*	walkingstick cactus		

Cactaceae	*Cylindropuntia pallida*	Hudson Pear		Not indigenous; Cultivated; Naturalised; Invasive
Apocynaceae	*Cynanchum viminale*	Caustic Vine		Indigenous
Cyperaceae	*Cyperus congestus*	Purple Umbrella Sedge		Indigenous
Cyperaceae	*Cyperus laevigatus*	Smooth Flatsedge		Indigenous
Cyperaceae	*Cyperus longus tenuiflorus*	Sweet Cyperus		
Cyperaceae	*Cyperus marginatus*	Matting Sedge	LC	Indigenous
Cyperaceae	*Cyperus textilis*	Mat Sedge	LC	Indigenous; Endemic
Solanaceae	*Datura ferox*	White Stinkweed		Not indigenous; Naturalised; Invasive
Solanaceae	*Datura stramonium*	common thornapple		Not indigenous; Naturalised; Invasive
Aizoaceae	*Deilanthe peersii*		LC	Indigenous; Endemic
Aizoaceae	*Delosperma multiflorum*	Manyflowered Sheepfig	LC	Indigenous; Endemic
Aizoaceae	*Delosperma subincanum*	Karoo Sheepfig	LC	Indigenous; Endemic
Asteraceae	*Dicoma capensis*	Common Karmedik	LC	Indigenous
Asteraceae	*Dicoma picta*	Button Karmedik	LC	Indigenous; Endemic
Poaceae	*Digitaria eriantha*	Digitgrass	LC	Indigenous
Ebenaceae	*Diospyros lycioides*	Quilted Bluebush	LC	Indigenous; Endemic
Asparagaceae	*Dipcadi ciliare*	Curlicurly Daintybells	LC	Indigenous; Endemic
Asparagaceae	*Drimia anomala*	Rat-tail Squill	LC	Indigenous; Endemic
Asparagaceae	*Drimia physodes*	What-on-Earth-am-I Poison Squill	LC	Indigenous
Aizoaceae	*Drosanthemum archeri*		LC	Indigenous; Endemic
Aizoaceae	*Drosanthemum hispidum*	Mouse Dewfig	LC	Indigenous
Aizoaceae	*Drosanthemum karrooense*	Karoo Dewfig	LC	Indigenous; Endemic
Aizoaceae	*Drosanthemum lique*	Mound Dewfig	LC	Indigenous; Endemic
Poaceae	*Ehrharta calycina*	Perennial Veldtgrass	LC	Indigenous
Poaceae	*Enneapogon cenchroides*	Soft Feather Pappus Grass	LC	Indigenous
Poaceae	*Eragrostis obtusa*	Dew Grass	LC	Indigenous
Asteraceae	*Eriocephalus ambiguus*		LC	Indigenous
Asteraceae	*Eriocephalus brevifolius*	Shortleaf Kapok	LC	Indigenous; Endemic
Asteraceae	*Eriocephalus ericoides*	Heath Kapok	LC	Indigenous
Asteraceae	*Eriocephalus pauperrimus*		LC	Indigenous
Asparagaceae	*Eriospermum capense*	Cape Woolseed	VU	Indigenous; Endemic
Asparagaceae	*Eriospermum paradoxum*	Fuzzy Woolseed	LC	Indigenous; Endemic
Geraniaceae	*Erodium moschatum*	musk stork's-bill		Not indigenous; Naturalised; Invasive
Fabaceae	*Erythrostemon gilliesii*	yellow bird-of-paradise shrub		Not indigenous; Naturalised; Invasive
Ebenaceae	*Euclea undulata*	Common Guarri		Indigenous
Euphorbiaceae	*Euphorbia braunsii*	Common Vingerpol	LC	Indigenous
Euphorbiaceae	*Euphorbia decepta*	Sputnik Barrelwort	LC	Indigenous; Endemic
Euphorbiaceae	*Euphorbia ferox*	Thorn Noors		Indigenous; Endemic

Euphorbiaceae	*Euphorbia heptagona*	Rock Barrelwort	LC	Indigenous; Endemic
Euphorbiaceae	*Euphorbia inaequilatera*	Smooth Creeping Milkweed	NE	Indigenous
Euphorbiaceae	*Euphorbia mauritanica*	Yellow Milkbush	NE	Indigenous
Euphorbiaceae	*Euphorbia rhombifolia*	Springbuck Milkbush		Indigenous
Euphorbiaceae	*Euphorbia stellispina*	Spinestar Barrelwort		Indigenous; Endemic
Euphorbiaceae	*Euphorbia stellispina stellispina*			
Asteraceae	*Euryops nodosus*		LC	Indigenous; Endemic
Aizoaceae	*Faucaria bosscheana*	Camdeboo Tigerfig		Indigenous
Asteraceae	*Felicia filifolia*	Fine Felicia	LC	Indigenous; Endemic
Asteraceae	*Felicia muricata*	Pale Felicia	LC	Indigenous; Endemic
Asteraceae	*Felicia ovata*	Bigblue Felicia	LC	Indigenous; Endemic
Poaceae	*Fingerhuthia africana*	Thimble Grass	LC	Indigenous
Fissidentaceae	*Fissidens megalotis*			Indigenous
Asteraceae	*Garuleum bipinnatum*	Snake Root	LC	Indigenous; Endemic
Asphodelaceae	*Gasteria disticha*	Robertson Oxtongue		Indigenous
Asphodelaceae	*Gasteria disticha robusta*	Robust Oxtongue		
Asteraceae	*Gazania heterochaeta*	Dainty Gazania	LC	Indigenous
Asteraceae	*Gazania krebsiana arctotoides*	Divided Terracotta Gazania	LC	Indigenous
Asteraceae	*Gazania krebsiana krebsiana*	Common Terracotta Gazania	LC	Indigenous
Asteraceae	*Gazania lichtensteinii*	Yellow Gazania	LC	Indigenous
Asteraceae	*Geigeria filifolia*	Fine Vomitdaisy	LC	Indigenous
Amaryllidaceae	*Gethyllis transkarooica*	Karoo Kukumakranka	LC	Indigenous
Gisekiaceae	*Gisekia pharnaceoides*		LC	Indigenous
Iridaceae	*Gladiolus permeabilis*	Partridge Pypie	LC	Indigenous; Endemic
Apocynaceae	*Gomphocarpus filiformis*	Desert Broom Milkbush	LC	Indigenous
Apocynaceae	*Gomphocarpus fruticosus*	Narrow-leaf Cotton Bush	LC	Indigenous
Asphodelaceae	*Gonialoe variegata*	Common Partridge Aloe	LC	Indigenous
Asteraceae	*Gorteria alienata*	Karoo Hairdaisy		Indigenous; Endemic
Malvaceae	*Grewia robusta*	Karoo Crossberry	LC	Indigenous; Endemic
Celastraceae	*Gymnosporia buxifolia*	Common Spikethorn	LC	Indigenous
Amaryllidaceae	*Haemanthus humilis*	Pink Bloodlily	LC	Indigenous; Endemic
Amaryllidaceae	*Haemanthus humilis humilis*			
Asphodelaceae	*Haworthia decipiens*	Paper Haworthia		Indigenous
Asphodelaceae	*Haworthia decipiens cyanea*		NE	
Asphodelaceae	*Haworthia nortieri*	Cederberg haworthia	NE	Indigenous; Endemic
Asphodelaceae	*Haworthiopsis viscosa*	Robust Haworthia		Indigenous
Asteraceae	*Helichrysum lucilioides*		LC	Indigenous
Asteraceae	*Helichrysum pentzioides*	Curry Bush	LC	Indigenous; Endemic

Asteraceae	*Helichrysum pumilio*			Indigenous
Asteraceae	*Helichrysum pumilio pumilio*			
Asteraceae	*Helichrysum zeyheri*	Grey Everlasting	LC	Indigenous
Brassicaceae	*Heliophila crithmifolia*	Samphire Sunspurge	LC	Indigenous
Brassicaceae	*Heliophila suavissima*	Pepper Sunspurge	LC	Indigenous
Brassicaceae	*Heliophila trifurca*	Cow Sunspurge	LC	Indigenous
Aizoaceae	*Hereroa crassa*		LC	Indigenous; Endemic
Aizoaceae	*Hereroa pallens*		LC	Indigenous; Endemic
Aizoaceae	*Hereroa stanfordiae*		LC	Indigenous; Endemic
Malvaceae	*Hermannia cernua*	Blue Dollsrose	LC	Indigenous
Malvaceae	*Hermannia depressa*	Purpleleaf Dollsrose	LC	Indigenous
Malvaceae	*Hermannia filifolia*	Rooipoprosie	NE	Indigenous; Endemic
Malvaceae	*Hermannia grandiflora*	Bell Dollsrose	LC	Indigenous
Malvaceae	*Hermannia spinosa*	Spiny Dollsrose	LC	Indigenous
Malvaceae	*Hermannia stricta*	desert rose	LC	Indigenous
Malvaceae	*Hermannia vestita*	Grey Dollsrose	LC	Indigenous
Poaceae	*Heteropogon contortus*	tanglehead	LC	Indigenous
Apocynaceae	*Hoodia dregei*		VU	Indigenous; Endemic
Apocynaceae	*Hoodia flava*	Yellow-flowered Ghaap	LC	Indigenous
Apocynaceae	*Hoodia gordonii*	Wild Ghaap	DDD	Indigenous
Apocynaceae	*Hoodia pilifera*	Edible True Ghaap		Indigenous
Apocynaceae	*Hoodia pilifera annulata*	Purple Ghaap	VU	Indigenous; Endemic
Apocynaceae	*Hoodia pilifera pillansii*			
Orobanchaceae	*Hyobanche glabrata*	Smooth Catsnails	LC	Indigenous; Endemic
Molluginaceae	*Hypertelis umbellata*			Indigenous
Asteraceae	*Ifloga glomerata*		LC	Indigenous
Fabaceae	*Indigastrum niveum*			Indigenous
Fabaceae	*Indigofera alternans*	Springbuck Indigo		Indigenous
Fabaceae	*Indigofera sessilifolia*	Karoo Indigo	LC	Indigenous
Crassulaceae	*Kalanchoe delagoensis*	Mother-of-Millions		
Cucurbitaceae	*Kedrostis capensis*	Cape Haap	LC	Indigenous
Kewaceae	*Kewa salsoloides*	Sour Saltsorrel	LC	Indigenous
Kewaceae	*Kewa salsoloides salsoloides*			
Asteraceae	*Kleinia longiflora*	paintbrush flower	LC	Indigenous
Santalaceae	*Lacomucinaea lineata*	White Storm		Indigenous
Lamiaceae	*Lamium amplexicaule*	henbit deadnettle		Not indigenous; Naturalised; Invasive
Aizoaceae	*Lampranthus haworthii*	Purple Brightfig	LC	Indigenous; Endemic
Aizoaceae	*Lampranthus uniflorus*	Solitary Brightfig	LC	Indigenous; Endemic
Iridaceae	*Lapeirousia plicata plicata*	Pleated Kabong	LC	Indigenous

Thymelaeaceae	*Lasiosiphon deserticola*	Saffron Curryflower	LC	Indigenous; Endemic
Thymelaeaceae	*Lasiosiphon meisnerianus*	Fever Curryflower	LC	Indigenous; Endemic
Asparagaceae	*Ledebouria apertiflora*	desert African hyacinth	LC	Indigenous
Asparagaceae	*Ledebouria ovalifolia*	fynbos African hyacinth	LC	Indigenous; Endemic
Brassicaceae	*Lepidium africanum*	African Pepperwort	LC	Indigenous
Brassicaceae	*Lepidium africanum divaricatum*		LC	Indigenous
Brassicaceae	*Lepidium desertorum*		LC	Indigenous
Fabaceae	*Lessertia frutescens*	cancer bush	LC	Indigenous; Endemic
Asteraceae	*Leysera gnaphalodes*	Dune Tortoisetea	LC	Indigenous
Asteraceae	*Leysera tenella*	Little Tortoisetea		Indigenous
Limeaceae	*Limeum aethiopicum*	Pest Lizardfoot	NE	Indigenous
Limeaceae	*Limeum aethiopicum aethiopicum*		NE	
Aizoaceae	*Lithops localis*		LC	Indigenous; Endemic
Fabaceae	*Lotononis pungens*		LC	Indigenous; Endemic
Fabaceae	*Lotononis tenella*			
Solanaceae	*Lycium oxycarpum*	Wolf Honeythorn	LC	Indigenous; Endemic
Solanaceae	*Lycium schizocalyx*	Split Honeythorn	LC	Indigenous
Scrophulariaceae	*Lyperia tristis*	Sad Tearbush	LC	Indigenous
Asteraceae	*Macledium spinosum*	Spiny Dollprotea	LC	Indigenous; Endemic
Aizoaceae	*Malephora latipetala*		LC	Indigenous; Endemic
Malvaceae	*Malva parviflora*	cheeseweed mallow		Not indigenous; Naturalised
Scrophulariaceae	*Manulea chrysantha*		LC	Indigenous; Endemic
Francoaceae	*Melianthus comosus*	Crown Honeyflower	LC	Indigenous
Francoaceae	*Melianthus major*	Giant Honeyflower	LC	Indigenous; Endemic
Fabaceae	*Melolobium candicans*	Yellow Thorn	LC	Indigenous
Aizoaceae	*Mesembryanthemum emarcidum*			Indigenous; Endemic
Aizoaceae	*Mesembryanthemum geniculiflorum*	Ash Sunfig		Indigenous
Aizoaceae	*Mesembryanthemum grossum*	Gross Dropfig		Indigenous; Endemic
Aizoaceae	*Mesembryanthemum guerichianum*	Salt Icefig	LC	Indigenous
Aizoaceae	*Mesembryanthemum inachabense*		LC	Indigenous
Aizoaceae	*Mesembryanthemum junceum*	Soap Ashbush		Indigenous; Endemic
Aizoaceae	*Mesembryanthemum nodiflorum*	Slender Iceplant	LC	Indigenous
Aizoaceae	*Mesembryanthemum splendens pentagonum*	Brack-Veld Mesemb	LC	Indigenous; Endemic
Aizoaceae	*Mesembryanthemum tetragonum*	Nama Preenfig		Indigenous
Aizoaceae	*Mesembryanthemum tortuosum*	Namaqua Skeletonfig		Indigenous; Endemic
Aizoaceae	*Mestoklema tuberosum*	Common Donkeyfig	LC	Indigenous; Endemic
Apocynaceae	*Microloma armatum armatum*	True Porcupine Minimouth	LC	Indigenous
Geraniaceae	*Monsonia camdeboensis*	Camdeboo Bushcandle	LC	Indigenous; Endemic

Geraniaceae	*Monsonia crassicaulis*	Common Bushmancandle	LC	Indigenous
Geraniaceae	*Monsonia salmoniflora*	Pink Bushmancandle	LC	Indigenous
Iridaceae	*Moraea polystachya*	Karoo Tulp	LC	Indigenous
Iridaceae	*Moraea setifolia*	Paper Glasstulp	LC	Indigenous; Endemic
Iridaceae	*Moraea simulans*	Fake Glasstulp	LC	Indigenous
Fabaceae	*Neltuma odorata*	western honey mesquite		
Scrophulariaceae	*Nemesia anisocarpa*	Yellowmouth Lionface	LC	Indigenous
Scrophulariaceae	*Nemesia fruticans*	Grassveld Lionface	LC	Indigenous
Scrophulariaceae	*Nemesia ligulata*	Bonnie Lionface	LC	Indigenous; Endemic
Apocynaceae	*Nerium oleander*	oleander	NE	Not indigenous; Naturalised; Invasive
Solanaceae	*Nicotiana glauca*	tree tobacco		Not indigenous; Naturalised; Invasive
Asteraceae	*Oedera humilis*	Silver Perdekaroo		Indigenous
Asteraceae	*Oedera oppositifolia*			Indigenous; Endemic
Cactaceae	*Opuntia cespitosa*	Eastern Pricklypear		Not indigenous; Cultivated; Naturalised; Invasive
Cactaceae	*Opuntia elata*	Riverina pear		Not indigenous; Cultivated; Naturalised; Invasive
Cactaceae	*Opuntia ficus-indica*	Prickly Pear Cactus	NE	Not indigenous; Cultivated; Naturalised; Invasive
Cactaceae	*Opuntia microdasys*	Bunny Ears Cactus	NE	Not indigenous; Cultivated; Naturalised; Invasive
Cactaceae	*Opuntia robusta*	nopal tapÃ³n	NE	Not indigenous; Cultivated; Naturalised; Invasive
Colchicaceae	*Ornithoglossum undulatum*	Karoo slangkop	LC	Indigenous
Asteraceae	*Osteospermum microphyllum*		LC	Indigenous
Asteraceae	*Osteospermum scariosum*	Sheep Boneseed	NE	Indigenous
Asteraceae	*Osteospermum sinuatum*	Lamb Boneseed	LC	Indigenous
Oxalidaceae	*Oxalis algoensis*	Algoa Sorrel	LC	Indigenous; Endemic
Oxalidaceae	*Oxalis annae*	Incised Sorrel	LC	Indigenous; Endemic
Oxalidaceae	*Oxalis depressa*	Early Sorrel	LC	Indigenous
Oxalidaceae	*Oxalis fergusoniae*	Watercell Sorrel		
Oxalidaceae	*Oxalis grammopetala*		LC	Indigenous; Endemic
Oxalidaceae	*Oxalis inaequalis*	Copper Sorrel	LC	Indigenous; Endemic
Oxalidaceae	*Oxalis pocockiae*	Coconut Sorrel	LC	Indigenous; Endemic
Aizoaceae	*Peersia frithii*		LC	Indigenous; Endemic
Asteraceae	*Pegolettia retrofracta*	Common Draaibos	LC	Indigenous
Geraniaceae	*Pelargonium alternans*	Cauliflower Storksbill	LC	Indigenous; Endemic
Geraniaceae	*Pelargonium exstipulatum*	Greyleaf Storksbill	LC	Indigenous; Endemic
Geraniaceae	*Pelargonium minimum*	Almost Storksbill	LC	Indigenous
Pteridaceae	*Pellaea calomelanos*	Hard Fern		Indigenous
Pteridaceae	*Pellaea rufa*	Karoo Cliffbrake	LC	Indigenous; Endemic
Asteraceae	*Pentzia incana*	Good Karoo	LC	Indigenous

Asteraceae	*Pentzia punctata*	Beef Karoo	LC	Indigenous
Asteraceae	*Pentzia quinquefida*	Fives Karoo	LC	Indigenous; Endemic
Asteraceae	*Pentzia spinescens*	Thorn Karoo	LC	Indigenous
Poaceae	*Phragmites australis*	common reed	LC	Indigenous
Poaceae	*Phragmites australis australis*	common reed		
Apocynaceae	*Piaranthus comptus*			Present
Araceae	*Pistia stratiotes*	water lettuce		Not indigenous; Cultivated; Naturalised; Invasive
Aizoaceae	*Pleiospilos compactus*	Ostrichfoot Quaggafig	LC	Indigenous; Endemic
Aizoaceae	*Pleiospilos compactus canus*	Dog Quaggafig	LC	Indigenous; Endemic
Aizoaceae	*Pleiospilos nelii*	Splitrock Quaggafig	NT	Indigenous; Endemic
Acanthaceae	*Pogonospermum incanum*	Blue Bush		
Acanthaceae	*Pogonospermum patulum*			
Polygalaceae	*Polygala asbestina*	Woolly Falsepea	LC	Indigenous; Endemic
Portulacaceae	*Portulaca kermesina*		LC	Indigenous
Fabaceae	*Prosopis glandulosa*	honey mesquite	NE	Not indigenous; Naturalised; Invasive
Asteraceae	*Pteronia adenocarpa*		LC	Indigenous; Endemic
Asteraceae	*Pteronia empetrifolia*		LC	Indigenous; Endemic
Asteraceae	*Pteronia glauca*	Buchu Gumbush		Indigenous; Endemic
Asteraceae	*Pteronia glomerata*	Wormleaf Gumbush	LC	Indigenous; Endemic
Asteraceae	*Pteronia viscosa*	Sticky Gumbush	LC	Indigenous
Apocynaceae	*Quaqua mammillaris*	Teat Aroena	LC	Indigenous
Malvaceae	*Radyera urens*	Wild Pumpkin	LC	Indigenous
Bignoniaceae	*Rhigozum obovatum*	Karoo Gold	LC	Indigenous
Aizoaceae	*Rhinephyllum graniforme*		LC	Indigenous; Endemic
Aizoaceae	*Rhinephyllum inaequale*		EN	Indigenous; Endemic
Aizoaceae	*Rhinephyllum luteum*		LC	Indigenous; Endemic
Aizoaceae	*Rhinephyllum parvifolium*		LC	Indigenous; Endemic
Polygonaceae	*Rumex sagittatus*	Climbing dock	LC	Indigenous
Aizoaceae	*Ruschia bijliae*		LC	Indigenous; Endemic
Aizoaceae	*Ruschia cradockensis*	Thorn Tentfig	LC	Indigenous; Endemic
Aizoaceae	*Ruschia cradockensis cradockensis*	Karoo Thorn Tentfig	LC	Indigenous; Endemic
Aizoaceae	*Ruschia dejagerae*		LC	Indigenous; Endemic
Aizoaceae	*Ruschia indurata*	Enduring Tentfig	LC	Indigenous; Endemic
Aizoaceae	*Ruschia intricata*	Barbed Tentfig	LC	Indigenous; Endemic
Aizoaceae	*Ruschia spinosa*	Spiny Tentfig	LC	Indigenous
Aizoaceae	*Ruschia vanderbergiae*		LC	Indigenous; Endemic
Amaranthaceae	*Salsola kali*	Russian Tumbleweed		Not indigenous; Naturalised; Invasive
Lamiaceae	*Salvia disermas*	Dassie Sage	LC	Indigenous
Lamiaceae	*Salvia verbenaca*	wild clary	LC	Not indigenous; Naturalised; Invasive

Anacardiaceae	*Schinus molle*	Peruvian Pepper Tree	NE	Not indigenous; Naturalised; Invasive
Anacardiaceae	*Searsia burchellii*	Karoo Kunirhus	LC	Indigenous
Anacardiaceae	*Searsia lancea*	Karee	LC	Indigenous
Scrophulariaceae	*Selago albida*	Whitevein Bitterbush	LC	Indigenous
Asteraceae	*Senecio abbreviatus*	Short Ragwort	LC	Indigenous; Endemic
Asteraceae	*Senecio acutifolius*	Tipsy Ragwort	LC	Indigenous; Endemic
Asteraceae	*Senecio asperulus*	Kamiesberg Ragwort	LC	Indigenous
Asteraceae	*Senecio leptophyllus*	fineleaf groundsel	LC	Indigenous; Endemic
Amaranthaceae	*Sericocoma avolans*		LC	Indigenous
Pedaliaceae	*Sesamum capense*	Blackeye Sesame	LC	Indigenous
Poaceae	*Setaria verticillata*	Rough Bristlegrass	LC	Indigenous
Brassicaceae	*Sisymbrium capense*	Cape Mustard	LC	Indigenous
Solanaceae	*Solanum elaeagnifolium*	silverleaf nightshade		Not indigenous; Naturalised; Invasive
Solanaceae	*Solanum viarum*	tropical soda-apple		Not indigenous; Naturalised
Apocynaceae	*Stapelia engleriana*		DDT	Indigenous; Endemic
Apocynaceae	*Stapelia flavopurpurea*		LC	Indigenous
Apocynaceae	*Stapelia olivacea*		LC	Indigenous; Endemic
Poaceae	*Stipagrostis ciliata*	Tall Bushman Grass		Indigenous
Poaceae	*Stipagrostis ciliata capensis*	Cape Bushman Grass	LC	Indigenous
Poaceae	*Stipagrostis obtusa*	Small Bushman Grass	LC	Indigenous
Poaceae	*Stipagrostis uniplumis*	Silky Bushman Grass		Indigenous
Iridaceae	*Syringodea longituba*	Long Capecrocus		Indigenous; Endemic
Cactaceae	*Tephrocactus articulatus*	Paper-Spined Cholla		Not indigenous; Naturalised; Invasive
Zygophyllaceae	*Tetraena chrysopteros*			Indigenous; Endemic
Aizoaceae	*Tetragonia echinata*	Opskot Seacoral	LC	Indigenous; Endemic
Aizoaceae	*Tetragonia microptera*	Miniwing Seacoral	LC	Indigenous
Aizoaceae	*Tetragonia sarcophylla*	Fleshy Seacoral	LC	Indigenous; Endemic
Poaceae	*Themeda triandra*	Red Grass	LC	Indigenous
Pottiaceae	*Tortula atrovirens*	Rib-leaf Moss		Indigenous
Poaceae	*Tragus berteronianus*	African bur-grass	LC	Indigenous
Poaceae	*Tragus koelerioides*	Carrot-seed Grass	LC	Indigenous
Aizoaceae	*Trianthema parvifolia*	Nama Horsepurslane	LC	Indigenous
Zygophyllaceae	*Tribulus terrestris*	Common Devilthorn	LC	Indigenous
Cactaceae	*Trichocereus spachianus*	torch cactus		
Aizoaceae	*Trichodiadema mirabile*	Black Crownfig	LC	Indigenous; Endemic
Aizoaceae	*Trichodiadema pomeridianum*	Late Crownfig	LC	Indigenous
Aizoaceae	*Trichodiadema setuliferum*	Hairy Nipple Crownfig	LC	Indigenous; Endemic
Apocynaceae	*Tridentea parvipuncta parvipuncta*			
Iridaceae	*Tritonia tugwelliae*		LC	Indigenous; Endemic

Crassulaceae	*Tylecodon reticulatus reticulatus*	Common Oukoe Butterbush	LC	Indigenous
Crassulaceae	*Tylecodon wallichii*	Pegleg Butterbush		Indigenous
Crassulaceae	*Tylecodon wallichii wallichii*	Common Pegleg Butterbush		
Asteraceae	*Ursinia nana*	Little Paraseed	LC	Indigenous
Asteraceae	*Ursinia nana nana*	Yellow Margaret	LC	Indigenous
Fabaceae	*Vachellia karroo*	Sweetthorn	LC	Indigenous
Fabaceae	*Vachellia tortilis*	umbrella thorn	LC	Indigenous
Asparagaceae	*Veltheimia capensis*	Cape Sandlily	LC	Indigenous; Endemic
Plantaginaceae	*Veronica anagallis-aquatica*	blue water-speedwell	LC	Indigenous
Santalaceae	*Viscum continuum*	Sweetthorn Mistletoe	LC	Indigenous; Endemic
Santalaceae	*Viscum rotundifolium*	Redberry Mistletoe	LC	Indigenous
Asteraceae	*Xanthium spinosum*	spiny cocklebur		Not indigenous; Naturalised; Invasive
Scrophulariaceae	*Zaluzianskya venusta*	Charming Drumsticks	LC	Indigenous; Endemic
Scrophulariaceae	*Zaluzianskya violacea*	Purple Drumsticks	LC	Indigenous; Endemic

6.4.2 Expected Mammal Species

Family	*Taxon*	Common Name	Regional	Global
Bovidae	*Antidorcas marsupialis*	Springbok	LC	LC
Bovidae	*Raphicerus campestris*	Steenbok	LC	LC
Canidae	*Canis mesomelas*	Black-backed Jackal	LC	LC
Cercopithecidae	*Papio ursinus*	Chacma Baboon	LC	LC
Gliridae	*Graphiurus (Graphiurus) ocularis*	Spectacled African Dormouse	LC	LC
Hyaenidae	*Proteles cristata*	Aardwolf	LC	LC
Leporidae	*Lepus saxatilis*	Scrub Hare	LC	LC
Muridae	*Desmodillus auricularis*	Cape Short-tailed Gerbil	LC	LC
Muridae	*Parotomys brantsii*	Brants's Whistling Rat	LC	LC
Muridae	*Parotomys littledalei*	Littledale's Whistling Rat	NT	LC
Orycteropodidae	*Orycteropus afer*	Aardvark	LC	LC
Viverridae	*Genetta genetta*	Common Genet	LC	LC

6.4.3 Expected Reptile Species

Family	*Taxon*	Common Name	Regional	Global
Agamidae	*Agama aculeata aculeata*	Common Ground Agama	LC	Unlisted
Cordylidae	*Karusasaurus polyzonus*	Karoo Girdled Lizard	LC	LC
Elapidae	*Naja nivea*	Cape Cobra	LC	Unlisted
Gekkonidae	*Chondrodactylus angulifer*	Giant Ground Gecko	LC	LC
Gekkonidae	*Chondrodactylus bibronii*	Bibron's Gecko	LC	Unlisted
Gekkonidae	*Pachydactylus capensis*	Cape Gecko	LC	Unlisted
Gekkonidae	*Pachydactylus latirostris*	Quartz Gecko	LC	Unlisted
Gekkonidae	*Pachydactylus maculatus*	Spotted Gecko	LC	LC
Gekkonidae	*Pachydactylus mariquensis*	Marico Gecko	LC	LC
Gekkonidae	*Pachydactylus purcelli*	Purcell's Gecko	LC	Unlisted
Gekkonidae	*Ptenopus garrulus maculatus*	Spotted Barking Gecko	LC	Unlisted
Lacertidae	*Pedioplanis lineoocellata pulchella*	Common Sand Lizard	Unlisted	Unlisted
Lacertidae	*Pedioplanis namaquensis*	Namaqua Sand Lizard	LC	Unlisted
Lamprophiidae	*Psammophis notostictus*	Karoo Sand Snake	LC	Unlisted
Pelomedusidae	*Pelomedusa galeata*	South African Marsh Terrapin	LC	Unlisted
Scincidae	*Trachylepis sulcata sulcata*	Western Rock Skink	LC	Unlisted
Scincidae	*Trachylepis variegata*	Variegated Skink	LC	Unlisted
Testudinidae	*Chersina angulata*	Angulate Tortoise	LC	LC
Testudinidae	*Chersobius boulengeri*	Karoo Padloper	EN	EN
Testudinidae	*Psammobates tentorius*	Tent Tortoise	NT	NT
Testudinidae	*Psammobates tentorius tentorius*	Karoo Tent Tortoise	NT	NT
Testudinidae	*Psammobates tentorius verroxii*	Verrox's Tent Tortoise	NT	NT
Testudinidae	*Stigmochelys pardalis*	Leopard Tortoise	LC	LC

6.4.4 Expected Amphibian Species

Family	*Taxon*	Common Name	Regional	Global
Bufonidae	*Vandijkophrynus gariepensis gariepensis*	Karoo Toad	Not listed	Not listed
Pyxicephalidae	*Amietia fuscigula*	Cape River Frog	LC	LC
Pyxicephalidae	*Cacosternum boettgeri*	Common Caco	LC	LC
Pyxicephalidae	*Pyxicephalus adspersus*	Giant Bull Frog	NT	LC
Pyxicephalidae	*Tomopterna delalandii*	Cape Sand Frog	LC	LC

6.4.5 Expected Avifauna Species

6.5 Appendix E: Specialist Declaration of Independence

I, Martinus Erasmus, 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 71 and is punishable in terms of Section 24F of the Act.

Martinus Erasmus

Terrestrial Ecologist

The Biodiversity Company

July 2025

I, Carami Burger, 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 71 and is punishable in terms of Section 24F of the Act.

Carami Burger

Ecologist

The Biodiversity Company

July 2025

6.6 Appendix F: Specialist CVs

Martinus Erasmus

B-Tech Nature Conservation (*Pr Sci Nat*)

Cell: +27 82 448 1667
Email: martinus@thebiodiversitycompany.com
Identity Number: 9209035136082
Date of birth: 03 September 1992

Profile Summary

Working experience throughout Southern Africa as well as West Africa.

Specialist experience in exploration, mining, engineering, hydropower, private sector, and renewable energy.

Specialist guidance, support, and facilitation for compliance with legislative processes, in-country requirements, and international lenders.

Specialist expertise includes Botany and Terrestrial Ecology.

Country Experience

Botswana
Eswatini
Guinea
Lesotho
Liberia
Mauritius
Mozambique
Nigeria
South Africa
Zambia
Zimbabwe

Key Experience

- Familiar with World Bank and the International Finance Corporation requirements
- Environmental, Social, and Health Impact Assessments (ESHIA)
- Environmental Management Programmes (EMP)
- Rehabilitation Plans and Monitoring
- Botany, especially in the Limpopo, Mpumalanga, Gauteng, and North-West provinces in South Africa.
- Terrestrial Ecological Assessments
- Veld management and Veld condition

Areas of Interest

Mining, Oil & Gas, Renewable Energy & Bulk Services Infrastructure Development, Sustainability, and Conservation

Nationality

South African

Languages

English – Proficient

Afrikaans – Proficient I

Qualifications

- B-Tech in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa.
- National Diploma in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa.
- Pr Sci Nat (118630)

Carami Burger

B.Sc. Honours – Ecological Interactions and Ecosystem Resilience (Cum Laude)

(Pr Sci Nat)

Cell: +27 83 630 9077
Email: Carami@thebiodiversitycompany.com
Identity Number: 9606250185084
Date of birth: 25 June 1996

Profile Summary

Working experience in South Africa and Mozambique.

Specialist experience with infrastructure development, road development, renewable energy, mining and prospecting.

Specialist expertise include terrestrial ecology, wetland resources, rehabilitation and management plans, environmental compliance and monitoring.

Areas of Interest

Renewable Energy & Bulk Services Infrastructure Development, Mining, Farming, Sustainability and Conservation.

Key Experience

- Environmental Impact Assessments (EIA)
- Basic Assessments
- Terrestrial Ecological Assessments
- Wetland Delineation and Ecological Assessments
- Environmental Management Programmes (EMPr)
- Rehabilitation Plans
- Invasive Species Plans
- Search and Rescue Plans
- Environmental Compliance Audits
- Water Use License Applications
- Dust Fallout Monitoring
- Water Quality Monitoring

Countries worked in

South Africa

Mozambique

Zambia

Angola

Sierra Leone

Nationality

South African

Languages

English – Proficient

Afrikaans – Proficient

Qualifications

- BSc Hons Ecological Interactions and Ecosystem Resilience.
- BSc Botany and Zoology.
- Pr Sci Nat (121757)