Proposed Perseverance Quarry near Aberdeen in the Eastern Cape

Avifaunal Impact Assessment Report

Compiled for

By

Cossypha Ecological

April 2026

REPORT PRODUCTION

Specialist	Role	Project Component	Qualifications and Professional Registration
Robyn Phillips	Avifaunal Specialist	Ecological assessment of birds; Field work and report compilation	MSc (Zoology) UNP SACNASP: *Pr.Sci.Nat.* Reg. no.: 400401/12 Fields: Zoological and Ecological Years' Experience: 25, primary expertise in avifauna and terrestrial biodiversity

Refer to **Appendix B** for an abridged CV of the specialist.

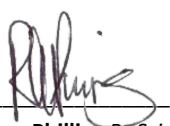
CONTACT INFORMATION

Robyn Phillips
16 MacDonald Road
Woodside, Westville
KwaZulu-Natal, 3629
Cell: 084 695 1648
Email: robyn@cossypha.co.za

SPECIALIST DECLARATION OF INDEPENDENCE

I, **Robyn Phillips**, in my capacity as a specialist consultant, hereby declare that I –

- Act as an independent consultant;
- Do not have any financial interest in the undertaking of the activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998);
- Do not have and will not have vested interest in the proposed activity proceeding;
- Have no, and will not engage in, conflicting interests in the undertaking of the activity;
- Undertake to disclose, to the Competent Authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998);
- Will provide the Competent Authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not;
- As a registered member of the South African Council for Natural Scientific Professions, will undertake my profession in accordance with the Code of Conduct of the Council, as well as any other societies to which I am a member;
- Based on information provided to me by the project proponent and in addition to information obtained during the course of this study, have presented the results and conclusion within the associated document to the best of my professional ability;
- Reserve the right to modify aspects pertaining to the present investigation should additional information become available through ongoing research and/or further work in this field; and
- Undertake to have my work peer reviewed on a regular basis by a competent specialist in the field of study for which I am registered.



Robyn Phillips *Pr.Sci.Nat.*
Terrestrial Ecologist
SACNASP Reg. No. 400401/12

28 April 2026
Date

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

BA	Basic Assessment
BI	Biodiversity Importance
CBA	Critical Biodiversity Area
CI	Conservation Importance
CR	Critically Endangered
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECBCP	Eastern Cape Biodiversity Conservation Plan
EI	Ecological Infrastructure
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
En	Endemic
EN	Endangered
EOO	Extent of Occupancy
ESA	Ecological Support Area
EW	Extinct in the Wild
EX	Extinct
FI	Functional Integrity
IUCN	International Union for Conservation of Nature
LC	Least Concern
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act 107 of 1998
NEMBA	National Environmental Management: Biodiversity Act 10 of 2004
NFEPA	National Freshwater Ecosystem Priority Area
NPAES	National Protected Areas Expansion Strategy
NT	Near Threatened
PA	Protected Area
PAOI	Project Area of Influence
Pr	Protected
QDGC	Quarter Degree Grid Cell
SABAP	South African Bird Atlas Project
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SEI	Site Ecological Importance
SSV	Site Sensitivity Verification
RLE	Red List of Ecosystems
RR	Receptor Resilience
VU	Vulnerable

1. INTRODUCTION

Power Construction (Pty) Ltd intends to apply for a permit to mine aggregate from an area of approximately 5 ha on a farm near Aberdeen in the Eastern Cape. Greenmined Environmental Consulting (Greenmined) has been appointed as the independent Environmental Assessment Practitioner (EAP) to undertake the environmental process, in this case a Basic Assessment (BA), required in terms of the National Environmental Management Act 107 of 1998 (NEMA), and the Environmental Impact Assessment (EIA) Regulations, 2014 (GN R982, as amended by GN R326). Cossypha Ecological was appointed to conduct an Avifaunal Impact Assessment for the proposed development to inform the process.

1.1 PROJECT DESCRIPTION

The proposed Perseverance quarry will include a mining area, laydown area, and access road. The mining method will involve drilling and blasting to loosen the hard rock, after which the material will be loaded and transported to a crushing plant for screening into various sized stockpiles. The mineral will be stockpiled within the designated laydown area prior to being transported off-site by tipper trucks. All mining-related activities will be contained within the approved mining permit boundary. The operation will cover approximately 5 ha and is expected to be active for a period of at least two years, with the possibility of a further three-year extension subject to permit renewal. The aggregate to be extracted will support local demand associated with planned wind farm developments, as well as the broader construction industry in and around the Aberdeen area.

1.2 THE STUDY AREA

1.2.1 LOCATION

The site for the proposed Perseverance Quarry occurs on Portion 0 of Farm 94 adjacent to the R61 regional road, approximately 23 km west of the town of Aberdeen. The study area falls within the Dr Beyers Naudé Local Municipality, in the Sarah Baartman District of the Eastern Cape Province (**Figure 1**). The study area falls within Quarter Degree Grid Cell (QDGC) 3223BAD and lies between 32°28'08.70" and 32°28'16.68" south and 23°49'01.27" and 23°49'24.39" east. The study area is flat to gently undulating and ranges in altitude from around 868 – 880 m above mean sea level (a.m.s.l).

1.2.2 CLIMATE

Situated in the semi-arid Karoo region, the study area experiences a dry, temperate climate with hot summers and cold winters. The region experiences high levels of mean annual potential evaporation and low annual rainfall with a Mean Annual Precipitation (MAP) of around 200 mm with most rain falling in late summer and autumn (highest in March). Summer temperatures often exceed 30°C while temperatures can drop significantly below freezing during winter. As an arid region, temperature fluctuations between day and night can be extreme, especially in winter (Mucina and Rutherford, 2006; SAExplorer, 2025).

1.2.3 TOPOGRAPHY AND SURROUNDING LAND USES

The study area is located within the flat plain of the lower eastern karoo basin, in a rural setting comprising of farmlands and natural karoo vegetation, with hills and mountains in the surrounding areas to the north and east. The dominant land use of the area is livestock (cows and sheep) farming. Many non-perennial drainages and dry floodplains cross the landscape feeding the Kraal and Sand Rivers to the east (**Figure 2**).

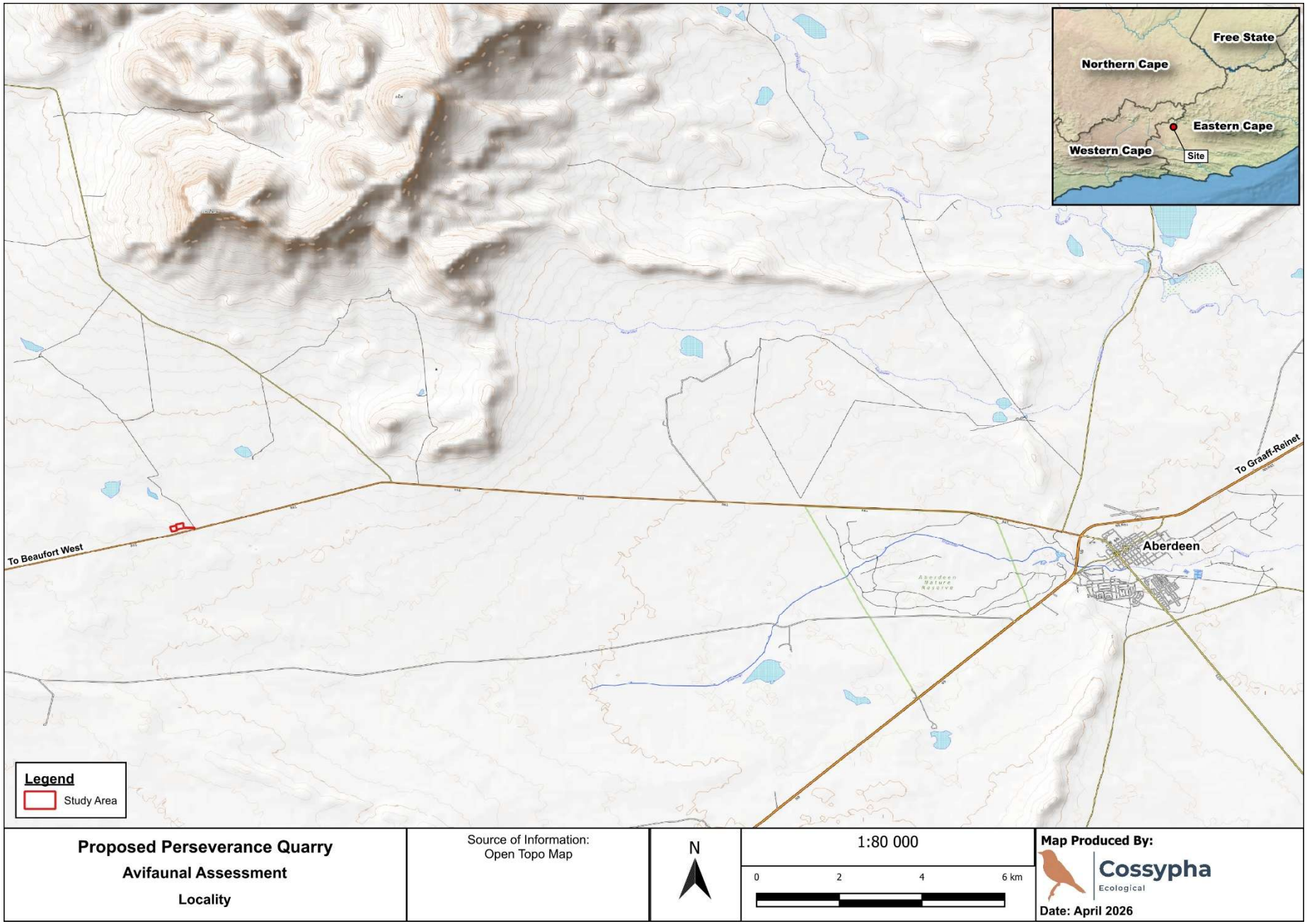


Figure 1: Location of the study area

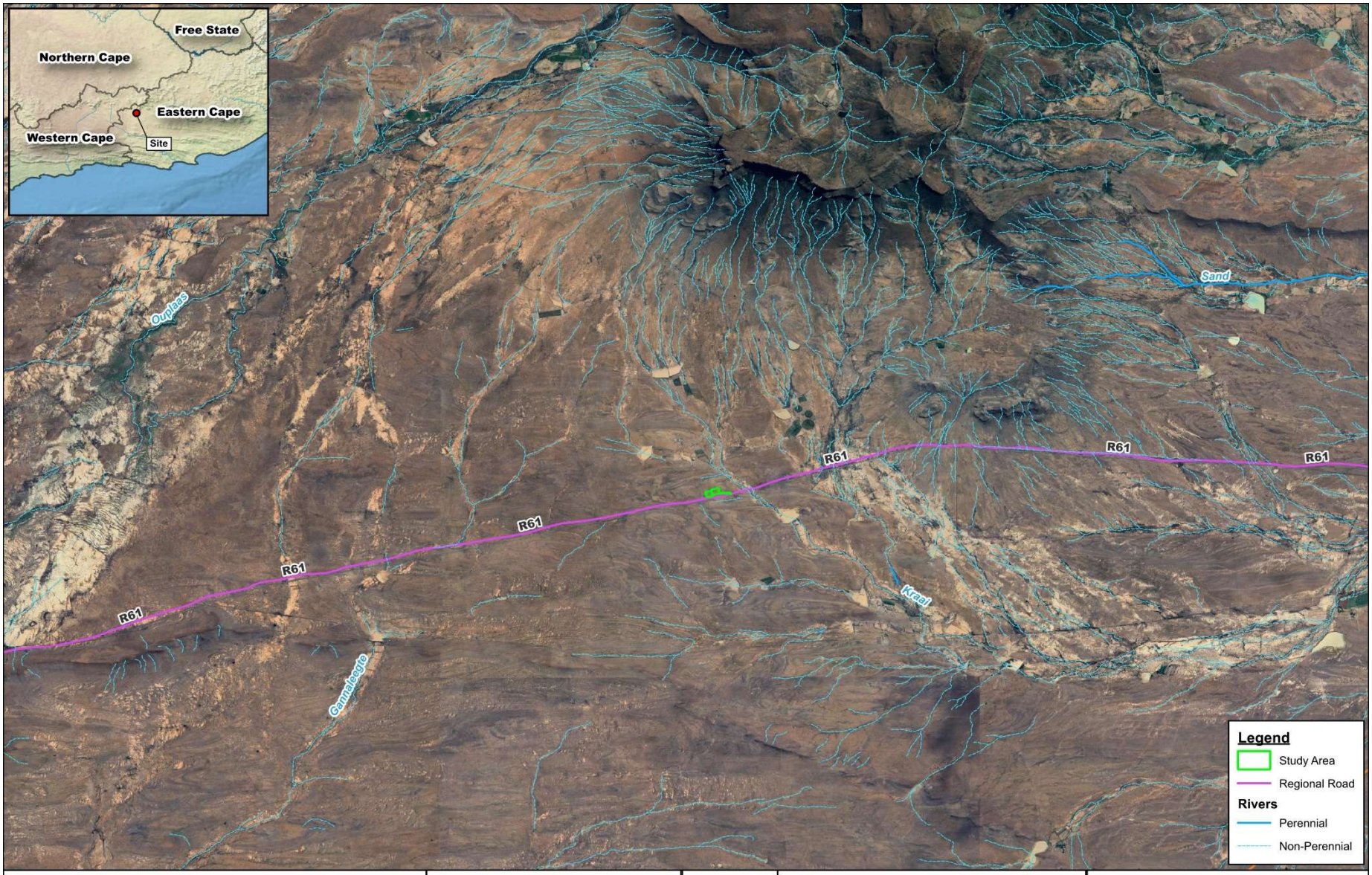


Figure 2: Aerial context of the study area

2. REPORTING REQUIREMENTS

2.1 SCREENING TOOL

A Screening Report for proposed site environmental sensitivity, as required by the Environmental Impact Assessment (EIA) Regulations of 2014 (as amended in 2017) for the Application for EA in terms of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998) was generated for the project using the National Web-Based Environmental Screening Tool on 03/02/2026. The report identified the site as having **High** sensitivity for the Animal Species theme due to the potential occurrence of the following bird species of conservation concern (SCC):

- High: Aves: Ludwig's Bustard *Neotis ludwigii* Endangered (EN)
- High: Aves: Southern Black Korhaan *Afrotis afra* Vulnerable (VU)

Therefore, an avifaunal assessment is required for the project, which must be compiled in accordance with the requirements of the *Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes when Applying for EA* (GN R320 of 2020) and comply with the following gazetted protocol. This protocol replaces the requirements of Appendix 6 of the EIA Regulations, 2014 (as amended) in terms of NEMA:

- *Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Animal Species* (GN 1150 of 30 October 2020) as amended 28 July 2023.

The following report therefore comprises an investigation of the birds present in the study area, including an assessment of the ecological sensitivities and possible impacts associated with the proposed project on the ecology pertaining to avifauna in the area.

2.2 SITE SENSITIVITY VERIFICATION

According to the above-mentioned protocol, the current use of the land and the potential environmental sensitivity identified by the screening tool, of the site under consideration, must be confirmed by undertaking a site sensitivity verification prior to commencing with the specialist assessment. This will confirm the actual use of the land on the ground versus that which has been identified by the screening tool and the validity of the sensitivity rating assigned by the screening tool. This will confirm whether a full Specialist Assessment Report (applicable for **Very High** and **High** sensitivity sites) or a Compliance Statement (applicable for **Low** sensitivity sites) is required.

In the case of species assessments, because **Medium** sensitivity data represents suspected habitat for SCC based on occurrence records for these species collected prior to 2002 or is based on habitat suitability modelling, the presence or likely presence of the SCC identified by the screening tool must be investigated through a site inspection. Where SCC are found on the site or have been confirmed to be likely present by the specialist, an Animal Species Specialist Assessment must be compiled in accordance with the requirements specified for **Very High** and **High** sensitivity in the protocol. Where no SCC are found on the site or the presence is confirmed to be unlikely during the site inspection, an **Animal Species Compliance Statement** must be submitted.

For the site in question, the initial site inspection and field surveys were combined into one site visit and took place on the 24th and 25th of March 2026. The site inspection revealed that the assessment area is comprised of natural but grazed vegetation, with areas adjacent to the site being mined in the past. The site is small and located next to a regional highway. None of the SCC listed by the screening tool were observed in the study area during the field surveys, however both species have been recorded in the surrounding areas according to

iNaturalist. The site sensitivity for birds can therefore drop to **Low** or **Medium** in general due to the previous disturbances as well as the small size of the area comprising natural vegetation. Please refer to **Section 6** for the methodology and detailed discussion around this conclusion.

Theme	Screening tool sensitivity rating	Screening Tool Site feature	Confirmed site sensitivity rating	Site Features
Animal Species	**High**	Aves: *Polemaetus bellicosus* Aves: *Afrotis afra*	**Medium**	No SCC recorded on site

The following Report therefore comprises an investigation of the birds in the study area in the form of a **Compliance Statement** with the aim of providing mitigation measures for potential impacts to the natural habitat from an avifaunal perspective.

2.3 TERMS OF REFERENCE

The terms of reference for the avifaunal assessment were to:

- Complete a habitat assessment to determine the likelihood of bird SCC occurring within the study area.
- Compile an Avifaunal Impact Assessment Report or Compliance Statement following the Species Environmental Assessment Guidelines (SANBI, 2020), with the following included:
  - Description of the status quo of the site and description of habitats assessed.
  - Photographic record of the site characteristics, including major habitat units and sensitive areas.
  - Determination of potential Impact Receptors pertaining to birds (essentially habitats) that occur within the Project Area of Influence (PAOI).
  - Assessment of Site Ecological Importance (SEI) and Sensitivity following the methodology described in the Species Environmental Assessment Guidelines (SANBI, 2020).
  - Assessment of impacts conducted in accordance with the Species Environmental Assessment Guidelines (SANBI, 2020); and
  - Mitigation measures and recommendations for inclusion in the Environmental Management Programme (EMPr).

3. METHODOLOGY

The study was based on desktop assessment as well as field surveys. The methodology broadly entailed the following.

3.1 DESKTOP ASSESSMENT

The desktop assessment entailed the following:

- Available recent and historical satellite and aerial imagery using Google Earth and the Chief Directorate National Geospatial Information (CDNGI) Geospatial Portal was reviewed to differentiate areas with natural vegetation versus modified and transformed areas of the study area.
- Review of all relevant literature including distribution data and conservation status of birds and vegetation/habitat types expected to occur in the study area.

- Review available information layers within the Geographic Information System (GIS) e.g. regional vegetation types, relevant provincial spatial conservation or biodiversity plan, Key Biodiversity Areas (KBAs), Protected Areas Database etc.
- Bird species lists for the Quarter Degree Grid Cells (QDGC[1]) in which the study area falls, obtained from electronic databases within Roberts VII Multimedia Birds of Southern Africa (SA Birding, 2026) where distribution maps have been interpreted and updated from the Atlas of Southern African Birds (Harrison *et al*., 1997), and supplemented with current SABAP2[2] (2026) data. From this, SCC potentially occurring in the study area and surroundings were identified.
- Other online databases such as Co-ordinated Wetland Counts (CWAC), Co-ordinated Avifaunal Road Counts (CAR), Global Biodiversity Information Facility (GBIF), and iNaturalist were searched for avifaunal SCC potentially occurring in the area.
- Bird names follow the new internationally accepted AviList: the Global Bird Checklist published in 2025 (AviList Core Team, 2025) while conservation status follows the latest Red Data Book of Birds (Taylor *et al*., 2015), which is updated yearly by BirdLife South Africa in their Checklist of Birds. The latest version was published in January 2026. Conservation status follows the International Union for Conservation of Nature (IUCN) categories
- The conservation status of species is reported on a national level and global level, based on the International Union for Conservation of Nature (IUCN) Red List Categories and Criteria (**Figure 3**).

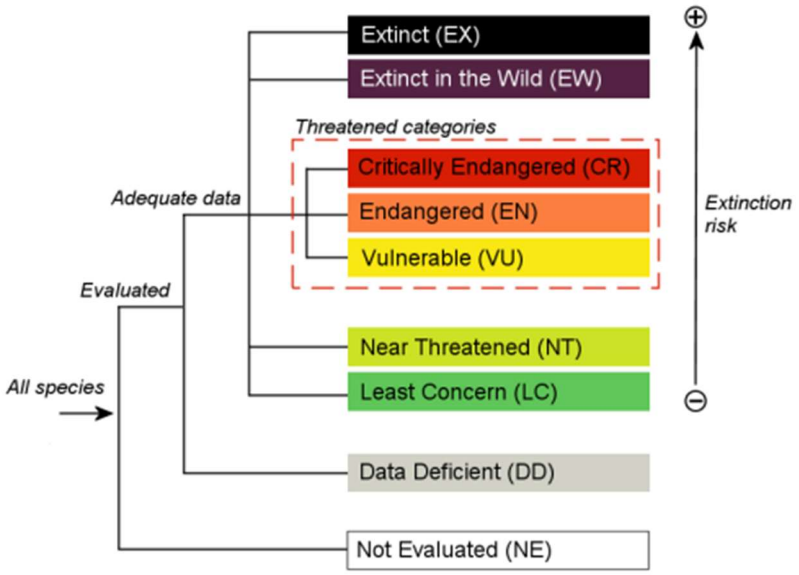


Figure 3: IUCN Red List Categories (www.iucnredlist.org)

3.2 FIELD ASSESSMENT

The study area was surveyed on the 24th and 25th of March 2026. The preliminary site investigation and the field surveys were combined into one visit. Observations were made within the study area to achieve the following:

[1] An atlas area of 15' × 15' – roughly 24 × 27 km

[2] SABAP2 is the follow-up project to the Southern African Bird Atlas Project (SABAP1) that ran from 1987-1991. SABAP2 started on 1 July 2007 and plans to run indefinitely. The project aims to map the distribution and relative abundance of birds in southern Africa including South Africa, Lesotho and Swaziland. SABAP2 data is recorded per pentad which is a 5 minute x 5 minute coordinate grid super-imposed over the country for spatial reference. One QDGC comprises of 9 pentads. Report rates are an expression (%) of the number of times a species was seen in a grid cell divided by the number of times the grid cell was surveyed.

- Assessment of the current ecological state of the site with a focus on habitats for birds (especially SCC) in the study area.
- Presence of bird species within the study area and surroundings; and
- Significant landscape features, ecological corridors, and landscape connectivity.

Survey techniques included on-site meander searches on foot. Bird species were detected by sight, call, and evidence such as nests, feathers, spoor, and droppings while moving slowly through the study area. Species were verified using the Roberts Bird Guide 2 iap (Edition 2.1) and Roberts VII Multimedia Birds of Southern Africa (SA Birding, 2011). During meander searches, changes in land cover and habitat, as well as species present in the study area were observed and recorded. Landscape features that were considered of high ecological importance were mapped.

The likelihood of occurrence of species was determined using geographical distribution and the presence of suitable habitat on site. High likelihood of occurrence would pertain to species that occur within the QDGC, have a distribution range within the geographic locality of the study area as well as the presence of suitable habitat occurring on the study site. Medium likelihood of occurrence refers to species that occur within the QDGC, have a distribution range that is marginal to the study site, or its habitat is found to be within the surroundings of the study area. Medium likelihood of occurrence is also applied to species whose distribution range falls within the geographic locality of the study site, with the presence of suitable habitat occurring on the study site, but the level of degradation or disturbance in the surrounding landscape renders the species unlikely to utilise the site. Low likelihood of occurrence indicates that while the species may occur within the QDGC, its distribution range may or may not fall within the geographic locality of the study site and no suitable habitat for the species exists on site, or the habitat is severely degraded.

3.3 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations pertain to the current study:

- To obtain a comprehensive understanding of the dynamics of the biota on site, including SCC, studies should include sampling through the different seasons of the year, over several years, and extensive sampling of the area. Such long-term research is not feasible for non-academic studies of this nature, and the survey was conducted during one field visit during the late summer season.
- Vegetation habitat boundaries usually consist of subtle transitional zones or ecotones, which cannot be captured as distinct lines. Boundaries of habitat types are therefore approximately defined.
- Habitat types were defined and mapped in the context of use by birds and not in terms of botanical species associations. Similarly, the habitat associated with rivers and wetlands described in this report are defined in terms of broad habitat use by avifauna and do not denote the boundaries of wetlands and watercourses.
- During the field surveys, high winds experienced each day made hearing bird calls difficult and likely prevented birds from flying freely around the site and therefore species estimates were most likely underestimated.
- Potential impacts of the proposed project were evaluated based on the layout provided at the time of writing, and where necessary, recommendations for the most appropriate mitigation measures have been provided.
- Findings, recommendations, and conclusions provided in this report are based on the author's best scientific and professional knowledge as well as information available at the time of compilation.

- It is assumed that the report will be read in its entirety and that conclusions cannot be made from single sections.

4. DESKTOP ASSESSMENT RESULTS

4.1 REGIONAL BIODIVERSITY SETTING

4.1.1 NATIONAL VEGETATION TYPES AND TERRESTRIAL ECOSYSTEMS

The study area is situated within the Lower Karoo Bioregion of the Nama Karoo Biome (Rutherford and Westfall, 1994; Mucina and Rutherford, 2006), which is characterised by high levels of mean annual potential evaporation relatively low levels of rainfall, which is concentrated in late summer and early autumn. The Nama Karoo Biome is relatively species-poor with a low level of endemism. The biome includes contributions of succulent genera of the families Aizoaceae, Crassulaceae, Euphorbiaceae, and Apocynaceae. In the north and east, contribution of elements of the sub-tropical, summer rainfall floras increase. Unpredictable rainfall and fluctuating temperatures do not enable leaf succulents or grasses to dominate, which causes abrupt changes in vegetation structure and composition depending on the soil type and depth and local changes in moisture availability (Mucina and Rutherford, 2006).

The biomes in southern Africa are divided into smaller units known as vegetation types. According to the latest National VegMAP (SANBI, 2024) the study area is situated within the **Eastern Lower Karoo** vegetation type (**Figure 4**), which is endemic to South Africa. Eastern Lower Karoo vegetation occurs on the plains east of the Kariega and Buffels Rivers in the area south of the Camdeboo Mountains encompassing Aberdeen, Graaff-Reinet, and Pearston (region called Camdeboo), and the plains south of Aberdeen. It is characterised by short and middle-height microphyllus shrubland with leaf succulent dwarf shrubs of the families Aizoaceae and Crassulaceae, as well as drought-resistant grasses (Mucina and Rutherford, 2006). The landscape around the study area is mostly uniform and covered with arid karoo scrub and is used for grazing livestock (mostly cattle and sheep).

According to the recently gazetted list of threatened ecosystems (DFFE, 2022), **Eastern Lower Karoo** is currently listed as **Least Concern** as the ecosystem has has experienced low rates of habitat loss and biotic disruptions, placing the ecosystem at low risk of collapse (SANBI, 2021). The conservation target for this vegetation type is 16% with 98% of natural habitat remaining. It is however poorly protected with only 2.8% conserved in statutory reserves (SANBI, 2021).

4.1.2 EASTERN CAPE BIODIVERSITY CONSERVATION PLAN (ECBCP)

A provincial Biodiversity Conservation Plan (BCP) aims to build on national plans at the provincial level and is a tool that guides and informs land use and resource-use planning and decision-making by a full range of sectors whose policies, programmes and decisions impact on biodiversity to preserve long-term functioning and health of priority areas known as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). The Eastern Cape Biodiversity Conservation Plan (ECBCP: DEDEAT, 2019) was updated in 2019 and is based on a systematic biodiversity planning approach, which is clearly outlined in the guidelines for bioregional planning (NEMBA Guidelines No 291 of 2009) and the technical guidelines for CBA maps (SANBI, 2017). It is intended to be used by all who are involved in land-use and development planning, most particularly those specialists who need a comprehensive source of biodiversity information. The ECBCP provides a spatial representation of important and unique biodiversity that prioritises and maps information about biodiversity pattern and ecological processes, current and future land use, and the protected area network in the context of achieving biodiversity targets set for species and ecosystems (DEDEAT, 2019).

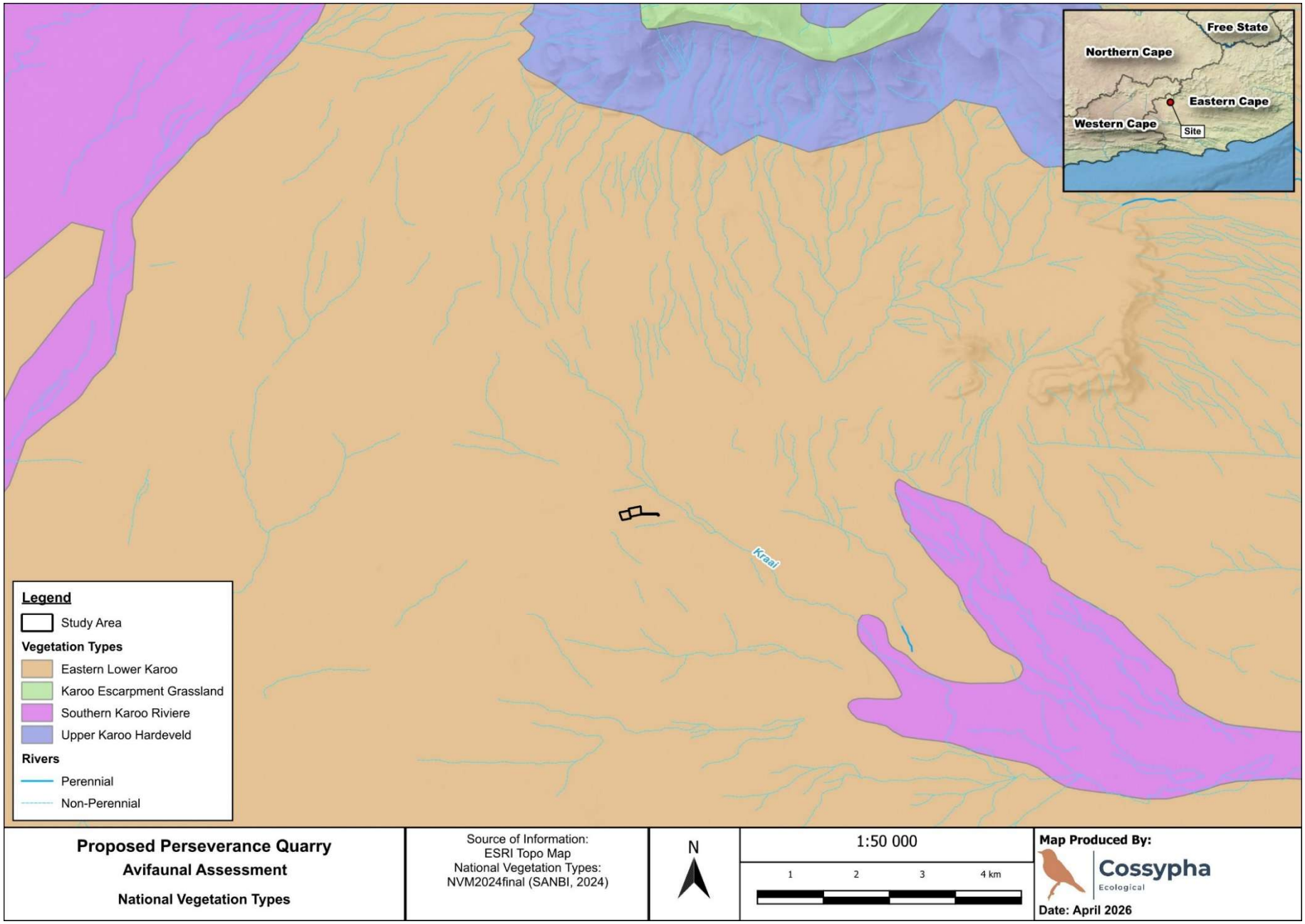


Figure 4: The study area in relation to national vegetation types

Separate terrestrial and aquatic CBA layers were generated in the planning process, with the following categories included in each CBA map:

- **Protected Areas (PA):** Areas that have been formally declared or recognised in terms of the National Environmental Management: Protected Areas Act (Act 57 of 2003) (NEMPAA) and include PA and Conservation Areas (CAs).
- **CBA:** Areas selected to meet biodiversity targets for species, ecosystems and ecological processes and include Critically Endangered (CR) and Endangered (EN) ecosystems, critical linkage points in the corridor network, and all areas required to meet biodiversity targets and to ensure future persistence of species, ecosystems and special habitats. CBAs are areas of high biodiversity value and should be maintained in a natural state, with no further loss of habitat.
    - **CBA 1:** Critical patches of vegetation, high-priority forest patches; irreplaceable sites selected to meet conservation targets, and special habitats (e.g. bat roosts, Cape Vulture breeding colonies, Bearded Vulture nests).
    - **CBA 2:** All other important patches of vegetation and forest, next best sites selected to meet conservation targets, and selected cliffs buffered by 100 m.
- **ESA:** Areas that are not essential for meeting biodiversity targets but are essential in terms of ensuring connectivity between CBAs, strengthening climate change resilience, and proper function of ecosystem infrastructure for delivery of ecosystem services. From a terrestrial perspective, ESAs may include riparian areas, coastal corridors, and ridges, etc. From an aquatic perspective, ESAs extend into catchments that are essential for the maintenance of CBA rivers and wetlands. ESAs need to be maintained in a semi-natural, if not natural, state.
    - **ESA 1:** Buffers of CBA1 habitats, sites required to complete the ecological corridor network, climate change refugia, and coastal functional zone.
    - **ESA 2:** Where there is no natural habitat remaining in an area that would have been designated as a CBA 1, CBA 2 or ESA 1.
- **Other Natural Areas (ONA):** Areas in a natural or near natural state that have not been identified as priority areas in the current plan. ONAs still support biodiversity and deliver ecosystem services.
- **No Natural Habitat remaining (NNR):** Areas that are heavily, permanently, modified and are no longer considered natural. Although some biodiversity and ecological function may be retained, irreversible impacts on biodiversity mean that they cannot contribute towards targets.

According to the Terrestrial CBA map (**Figure 5**), the study area falls mostly within an area classified as ESA1 and marginally within an area classified as CBA2 at the western boundary of the proposed mining area (DEDEAT, 2019). This section of the site however does not differ from the rest of the site.

4.1.3 PROTECTED AREAS, KEY BIODIVERSITY AREAS, AND IMPORTANT BIRD AREAS

The study area does not fall within or near any Protected Area (South African Protected Area Database (SAPAD) 2025 Q3; DFFE, 2025), Key Biodiversity Area (KBA) (World Database of KBAs (WDKBA), 2025), or Important Bird Area (IBA) (Marnewick *et al*., 2015). The nearest Protected Area is the Aberdeen Nature Reserve, which lies approximately 14.8 km to the east of the site; the nearest KBA is the Camdeboo KBA, which occurs ~6.3 km to the north of the site; and the nearest IBA is the Camdeboo National Park IBA, which occur ~61 km to the northeast of the site.

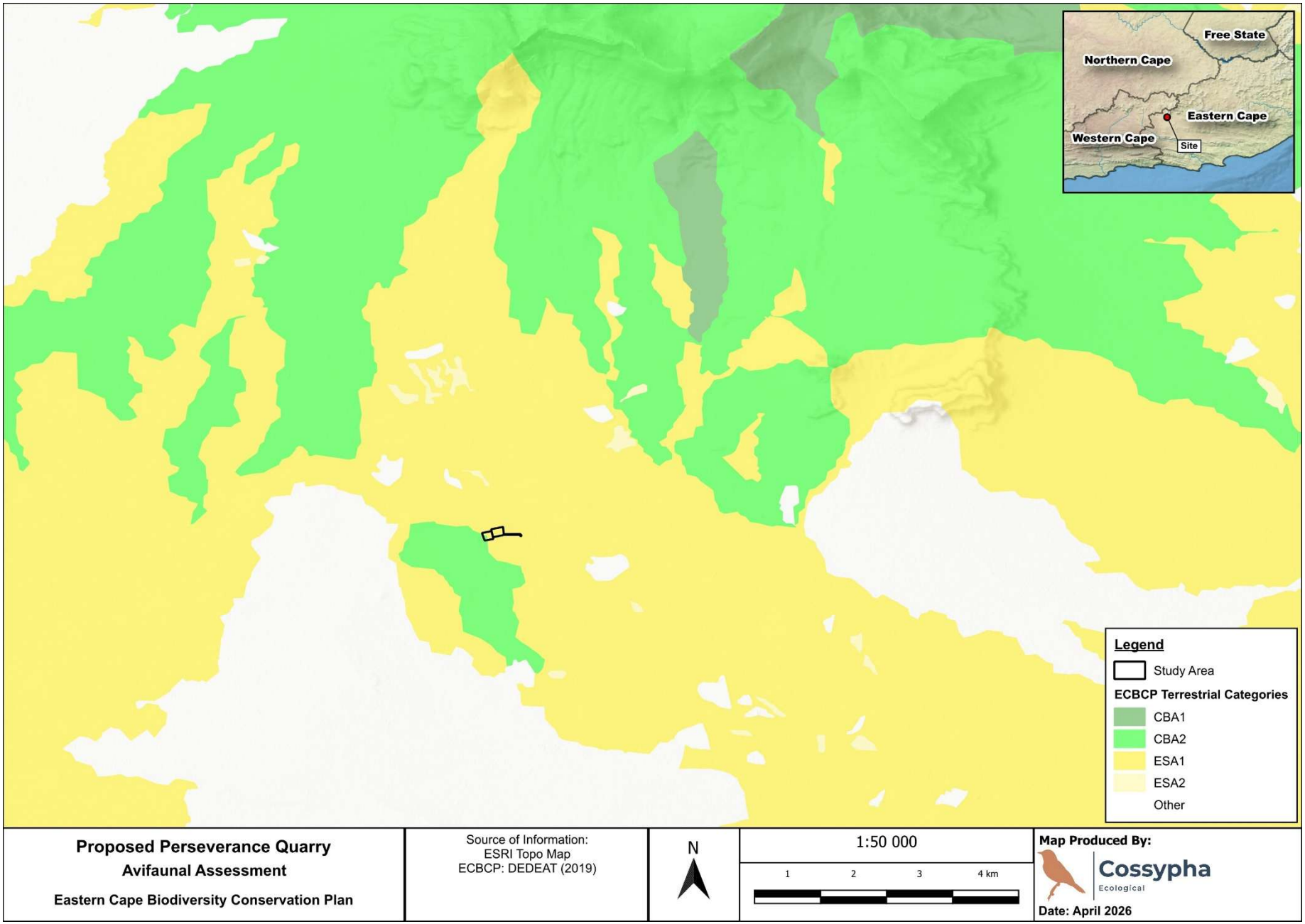


Figure 5: The study area in relation to the ECBCP Terrestrial CBA map

4.2 HISTORICAL LAND USE OF THE STUDY AREA

According to recent and historical satellite and aerial imagery, a quarry was excavated adjacent to the proposed site for the Perseverance quarry in the 1960s. The excavated pit is still there today. The R61 was built adjacent to the site in the 1960s and upgraded to tar in the early 1970s. The site itself has not changed in the last ~80 years (according to available historical imagery) and has likely only been used for grazing livestock.

4.3 SPECIES DISTRIBUTION FROM ONLINE DATABASES

The region has moderate to low avifaunal diversity with around 244 bird species potentially occurring within QDGC 3223BD according to the distribution maps in Roberts VII Multimedia Birds of Southern Africa (SA Birding, 2011). The Southern African Bird Atlas Project (SABAP2) has been collecting data since 2007 and includes data from the previous SABAP1, which ran from 1987 to 1991. SABAP2 aims to map the distribution and relative abundance of birds in southern Africa. SABAP2 data is recorded per pentad[3] and therefore represents a more focussed search. The study area falls within pentad 3225_2345, which has been moderately sampled with 11 cards submitted to date. According to this data, 135 bird species have been recorded within the pentad. This includes 11 SCC and 15 species that are endemic to southern Africa (**Table** 1). This includes both species that were listed on the DFFE screening tool report, Ludwig's Bustard and Southern Black Korhaan, with reporting rates[4] of 45.5% and 81.8% respectively.

Table 1: Bird SCC and endemic species recorded in the SABAP2 pentad in which the site falls, in order of RR

Common Name	Taxonomic Name	Red List Status (National, Global)	Endemism	SABAP2 RR (%)
Karoo Korhaan	*Heterotetrax vigorsii*	NT, LC		100
Blue Crane	*Grus paradisea*	VU, VU	SLE NE	81.8
Southern Black Korhaan*	*Afrotis afra*	VU, VU	E	81.8
Karoo Prinia	*Prinia maculosa*	LC, LC	NE	81.8
Sickle-winged Chat	*Emarginata sinuata*	LC, LC	NE	72.7
Ludwig's Bustard*	*Neotis ludwigii*	EN, EN		45.5
Large-billed Lark	*Galerida magnirostris*	LC, LC	NE	45.5
Hamerkop	*Scopus umbretta*	NT, LC		36.4
Yellow-billed Duck	*Anas undulata*	NT, LC		36.4
Fiscal Flycatcher	*Sigelus silens*	LC, LC	NE	36.4
Pied Starling	*Lamprotornis bicolor*	LC, LC	SLE	36.4
Grey Tit	*Melaniparus afer*	LC, LC	NE	27.3
Secretarybird	*Sagittarius serpentarius*	VU, EN		18.2
Kori Bustard	*Ardeotis kori*	NT, NT		18.2
Jackal Buzzard	*Buteo rufofuscus*	LC, LC	NE	18.2
Black-headed Canary	*Serinus alario*	LC, LC	NE	18.2
Verreaux's Eagle	*Aquila verreauxii*	VU, LC		18.2
Fairy Flycatcher	*Stenostira scita*	LC, LC	NE	18.2
Karoo Thrush	*Turdus smithi*	LC, LC	NE	18.2
Layard's Warbler	*Curruca layardi*	LC, LC	NE	18.2

[3] Pentad: 5' x 5' coordinate spatial grid reference and a subset of the QDGC. One QDGC comprises of nine pentads. 5' x 5' = roughly 8 x 9 km.
[4] Reporting rates are expressed as a percentage of the number of times a species was seen in a pentad divided by the number of times the pentad was surveyed.

Common Name	Taxonomic Name	Red List Status (National, Global)	Endemism	SABAP2 RR (%)
Cape White-eye	*Zosterops virens*	LC, LC	NE	18.2
Martial Eagle	*Polemaetus bellicosus*	EN, EN		9.1
Grey-winged Francolin	*Scleroptila afra*	LC, LC	SLE	9.1
Lesser Kestrel	*Falco naumanni*	VU, LC		0

EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern

E = Endemic; NE = near endemic (70% or more of population in RSA); SLE = endemic to SA, Lesotho, and eSwatini

Bird SCC and endemic species that have been recorded in the vicinity of the study area (i.e. within a 10 km radius) on citizen science online databases such as iNaturalist and GBIF are listed in **Table 2**. This includes four SCC and eight species that are endemic to southern Africa.

Table 2: Bird SCC recorded within a 10 km radius of the site on iNaturalist

Common Name	Taxonomic Name	Red List Status (National, Global)	Endemism
Ludwig's Bustard	*Neotis ludwigii*	EN, EN	
Blue Crane	*Grus paradisea*	VU, VU	SLE NE
Kori Bustard	*Ardeotis kori*	NT, NT	
Lanner Falcon	*Falco biarmicus*	NT, LC	
Pied Starling	*Lamprotornis bicolor*	LC, LC	SLE
Cape White-eye	*Zosterops virens*	LC, LC	NE
Sickle-winged Chat	*Emarginata sinuata*	LC, LC	NE
African Rock Pipit	*Anthus crenatus*	LC, LC	SLE
Large-billed Lark	*Galerida magnirostris*	LC, LC	NE
Layard's Warbler	*Curruca layardi*	LC, LC	NE
Fairy Flycatcher	*Stenostira scita*	LC, LC	NE

EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern

NE = near endemic (70% or more of population in RSA); SLE = endemic to SA, Lesotho, and eSwatini

5. FIELD SURVEY RESULTS

5.1 LANDSCAPE FEATURES AND HABITATS WITHIN THE STUDY AREA

The study area is situated in a rural setting surrounded by farmland and the flat expanse of natural karoo vegetation of the eastern lower karoo basin. A few dry river floodplains know as Southern Karoo Riviere occur in the landscape, with the hills and mountains of the Camdeboo range occurring ~7 km to the north. The study area is located on a plain comprised of natural arid karoo vegetation that is used for livestock grazing (cattle and sheep). The entrance to the site is located on the R61 regional highway after which the proposed access road, quarry, and laydown areas are located in natural but grazed karoo vegetation (**Figure 6**). The habitat has a rocky substrate with patches of bare ground with shorty scrubby karroid vegetation with a mixture of woody and succulent species. A few small trees are scattered along the southern edge of the site. The site becomes more disturbed towards the road to the south, especially at the entrance to the site, and near the existing quarry pit to the west of the site. An existing track meanders through site.

Important habitat in the surrounding areas include the mountains and ridges occurring to the north and east of the site, and the vast expanse of karoo vegetation interspersed with drainage lines and dry floodplains. The non-perennial Kraal River, which leads to few small farm dams downstream, occurs ~300 m to the east of the site.

Figure 6: Landscape features and habitats within the study area

Rocky, karoo vegetation with patches of bare ground on the proposed quarry site

Denser, more woody vegetation in the southern section of the site

Existing track leading to through the proposed mining and laydown areas

View of the surrounding areas with mountains, ridges and expanses of natural karoo vegetation

5.2 SPECIES OCCURRENCE

During the field surveys, only 12 bird species were recorded on the site and in the immediate surroundings, none of which are currently SCC. This low number is attributed to high winds which made identifying birds by call extremely difficult and hot temperatures meant that birds were mostly inactive. These are listed in **Table 3** along with their national and global conservation status. Bird species observed consisted of species typically found in a karoo / farmland mosaic. This included mostly small passerines such as prinias, buntings, finches, barbets, and swallows. One bird SSC[5] was recorded in the surrounding areas during the field survey; a Karoo Korhaan *Heterotetrax vigorsii* (NT) was heard calling in the veld near the Kraal River to the east of the site.

Table 3: Avifaunal species recorded during the field surveys listed in taxonomic order

Common Name	Scientific Name	Conservation Status	
		National	Global
Egyptian Goose	*Alopochen aegyptiaca*	LC	LC
Acacia Pied Barbet	*Tricholaema leucomelas*	LC	LC
Greater Kestrel	*Falco rupicoloides*	LC	LC
Cape Crow	*Corvus capensis*	LC	LC
Pied Crow	*Corvus albus*	LC	LC
Bokmakierie	*Telophorus zeylonus*	LC	LC
Barn Swallow	*Hirundo rustica*	LC	LC
Black-chested Prinia	*Prinia flavicans*	LC	LC
Cape Wagtail	*Motacilla capensis*	LC	LC
Scaly-feathered Weaver	*Sporopipes squamifrons*	LC	LC
Lark-like Bunting	*Emberiza impetuani*	LC	LC
Cinnamon-breasted Bunting	*Emberiza tahapisi*	LC	LC
Egyptian Goose	*Alopochen aegyptiaca*	LC	LC

NT = Near Threatened; LC = Least Concern

[5] Species that are currently of conservation concern (SCC) are those with a Red List status higher than Least Concern (LC) at a national level (BirdLife SA, 2026) and global level (IUCN, 2026) and/or species Protected (Pr) at a national level (DFFE, 2023).

6. SITE ECOLOGICAL IMPORTANCE AND SENSITIVITY

6.1 SITE SENSITIVITY CRITERIA

The study area was assessed in terms of ecological importance, which takes conservation value (conservation importance) and ecological function (functional integrity) from an avifaunal perspective, into account, as well as the receptor resilience to impacts. Site Ecological Importance (SEI), and therefore sensitivity to the proposed development, can be classified.

According to the methodology described in the Species Environmental Assessment Guideline for the implementation of the Terrestrial Fauna Species Protocols for Environmental Impact Assessments (SANBI, 2020), SEI is considered to be a function of the Biodiversity Importance (BI) of the impact receptor (e.g. species of conservation concern, the vegetation/fauna community or habitat type present on the site) and its resilience to impacts i.e. Receptor Resilience (RR) as follows:

SEI = BI + RR

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

BI = CI + FI

BI can then be derived from a simple matrix of CI and FI as follows:

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**

Following successful evaluation of both BI and RR (see definitions below), SEI is then evaluated from the following final matrix:

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**	**Low**
	Medium	**Very High**	**High**	**Medium**	**Low**	**Very Low**
	High	**High**	**Medium**	**Low**	**Low**	**Very Low**
	Very High	**Medium**	**Low**	**Very Low**	**Very Low**	**Very Low**

SEI is described in the above manner for each impact receptor within the PAOI and clearly mapped in relation to the proposed development activities and infrastructure.

Definitions:

Conservation Importance: The importance of a site for supporting biodiversity features of conservation concern present e.g. populations of IUCN Threatened and Near-Threatened species (CR, EN, VU and NT), Rare, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes (SANBI, 2020). CI criteria are as follows:

Very High – Ecosystems or habitats with high species richness and confirmed to provide suitable habitat for species of conservation concern, or habitats representative of a CR ecosystem. These areas should be maintained for the persistence of biodiversity.

- Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare 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 EN ecosystem type.
- Globally significant populations of congregatory species (>10% of global population).

High – Ecosystems or habitats with high species richness and usually provide suitable habitat for species of conservation concern, or habitats representative of an EN ecosystem. These areas should be maintained for the persistence of biodiversity.

- Confirmed or highly likely occurrence of CR, EN, VU species that have a global Extent of Occurrence of > 10 km^2. IUCN threatened species (CR, EN, VU) must be listed under any criterion other than A.
- 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 – Ecosystems or habitats with medium species richness and usually provide suitable habitat for species of conservation concern, or habitats representative of a VU ecosystem.

- Confirmed or highly likely occurrence of populations of NT species, and threatened species (CR, EN, VU) listed under A criterion only and which have more than 10 locations or more than 10 000 mature individuals.
- Any area of natural habitat of threatened ecosystem type with status of VU.
- Presence of range-restricted species.
- > 50 % of receptor contains natural habitat with potential to support SCC.

Low – Ecosystems or habitats with low species richness.

- 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 – Areas with little or no conservation potential and are usually species poor or contain transformed and/or degraded habitat (majority of species are usually alien).

- No confirmed and highly unlikely populations of SCC.
- No confirmed and highly unlikely populations of range-restricted species.
- No natural habitat remaining.

Ecological Function (Functional Integrity): Ecological function describes the intactness of the structure and function of the vegetation communities which in turn support faunal communities. It also refers to the degree of ecological connectivity between the identified vegetation association and/or habitats and other systems within

the landscape. Therefore, systems with a high degree of landscape connectivity among each other are perceived to be more sensitive. FI criteria are as follows:

Very High – Natural areas with no or low evidence of human impact are considered to have intact ecosystem function and are considered important for the maintenance of ecosystem integrity. Most habitats are represented by vegetation communities that are intact and ecosystems with connectivity to other important ecological systems, or are specialised habitats for fauna. These areas also offer valuable ecosystem services or ecological infrastructure.

- 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 (e.g. ploughing).

High – Natural areas with low evidence of human impact are considered to have intact ecosystem function and are considered important for the maintenance of ecosystem integrity. Most habitats are represented by vegetation that is intact with connectivity to other important ecological systems, or are specialised habitats for fauna. These areas also offer valuable ecosystem services or ecological infrastructure.

- 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 (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential.

Medium – Habitat that occurs at disturbances of medium intensity and are representative of vegetation communities in secondary successional stages with some degree of connectivity with other ecological systems. These areas, although often disturbed, are usually utilised by fauna.

- 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 (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance; moderate rehabilitation potential.

Low – Disturbed habitat or modified vegetation with little ecological function.

- Small (>1 ha but <5 ha) area.
- Almost no habitat connectivity but migrations still possible across some transformed or degraded natural habitat and a very busy used road network surrounds the area.
- Several minor and major current negative ecological impacts; Low rehabilitation potential

Very Low – Degraded and highly disturbed habitat or modified vegetation with little or no ecological function.

- Very small (<1 ha) area.
- No habitat connectivity except for flying species or flora with wind-dispersed seeds.
- Several major current negative ecological impacts.

Receptor Resilience: RR is defined as the intrinsic capacity of the impact receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention.

Very High – Habitat that can recover rapidly (~ less than 5 years) to restore > 70% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.

High – Habitat that can recover relatively quickly (~ 5-10 years) to restore > 70% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.

Medium – Habitat that will recover slowly (~more than 10 years) to restore > 70% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.

Low – Habitat that is unlikely to be able to recover fully after a relatively long period: > 15 years required to restore ~less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.

Very Low – Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

Interpretation of SEI in the context of the proposed development activities is then provided using the following guidelines:

Table 4: Development guidelines according to SANBI (2020)

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.

6.2 EVALUATION OF SITE ECOLOGICAL IMPORTANCE

Based on the findings of the field assessment, SEI pertaining to birds was evaluated using the above criteria. The features and habitats in the study area were evaluated in the table below (**Table 5**). The SEI and thus sensitivity to the proposed development, was then mapped (**Figure 7**).

While no bird SCC were recorded in the study area during the field survey, many bird SCC have been recorded in the vicinity of the study area according to Citizen Science databases, and the vast expanse of the surrounding karoo vegetation supports these species. While the site comprises largely natural karoo habitat, the small size of the proposed development i.e., the small amount of natural vegetation that will be removed (~5 ha) means that it likely does not provide important or critical habitat for birds, especially those of conservation concern. The site was therefore classified as having low Biodiversity Importance (**BI**), i.e., low Conservation Importance (**CI**) and medium-low Functional Integrity (**FI**) from an avifaunal perspective. However, an overall rating of medium resulted for Site Ecological Importance (**SEI**) due to the low resilience (**RR**) of the karoo vegetation to disturbance.

Table 5: Evaluation of Site Ecological Importance (SEI)

<table>
<tr><th>Habitat</th><th>CI</th><th>FI</th><th>RR</th><th>SEI</th></tr>
<tr><td rowspan="2">Natural karoo vegetation</td><td>Low
Ecosystems or habitats with medium-low species richness and no confirmed or highly likely populations of SCC and/or range-restricted species</td><td>Medium-low
Small (>1 ha but <5 ha) area Natural habitat that occurs at disturbances of medium intensity with some degree of connectivity with other ecological systems</td><td rowspan="2">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</td><td rowspan="2">MEDIUM
BI = Low
RR = Low</td></tr>
<tr><td colspan="2">BI = Low</td></tr>
<tr><td rowspan="2">Modified areas (disturbed roadside)</td><td>Very Low
Areas with little or no conservation potential and are usually species poor or contain transformed and/or degraded habitat</td><td>Very Low
Degraded and highly disturbed habitat or modified vegetation with little or no ecological function</td><td rowspan="2">Very High
Habitat is already transformed</td><td rowspan="2">VERY LOW
BI = Very Low
RR = Very High</td></tr>
<tr><td colspan="2">BI = Very Low</td></tr>
</table>

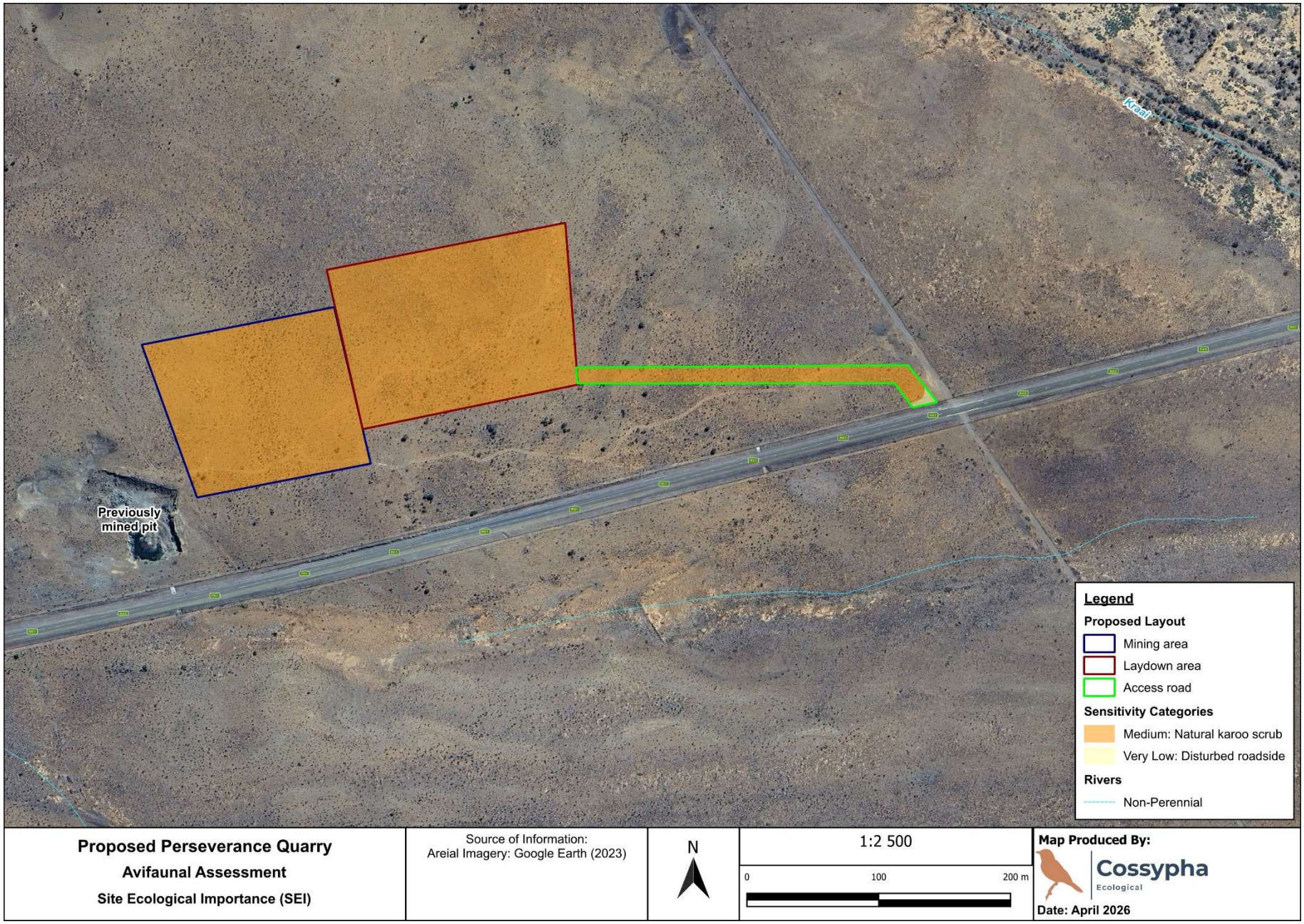


Figure 7: Site Ecological Importance (SEI) and sensitivity within the study area

7. SUMMARY AND RECOMMENDATIONS

7.1 SUMMARY OF SITE ASSESSMENT

The study area is situated in a rural setting surrounded by farmland and a flat expanse of natural karoo vegetation. The site is relatively undisturbed and comprises karoo scrub that has not changed in at least the last 80 years according to available historical imagery. The vegetation becomes more disturbed towards the R61 adjacent to the site and near the existing excavated pit on the western side of the site. Important habitat in the surrounding areas include the vast expanse of karoo vegetation interspersed with drainage lines and dry river floodplains, which is the main habitat supporting the majority of the bird species found in the region, and the mountains and ridges occurring to the north and east of the site.

Few bird species were recorded on the site and in the immediate surroundings during the field surveys, which was attributed to high winds and high temperatures, which made bird detectability difficult. Bird species observed consisted of species typically found in a karoo / farmland mosaic and included mostly small passerines such as prinias, buntings, finches, barbets, and swallows.

While no bird SCC were recorded in the study area during the field survey, many bird SCC have been recorded in the vicinity of the study area according to Citizen Science databases, and the vast expanse of the surrounding karoo vegetation supports these species. It is likely that SCC may cross the site from time to time, however it does not provide important or critical habitat for such species. This coupled with the small size resulted in the site being classified as having low Biodiversity Importance (i.e., low Conservation Importance and medium-low Functional Integrity) from an avifaunal perspective. However, an overall rating of medium resulted for Site Ecological Importance due to the low resilience of the karoo vegetation to disturbance.

The small size of the proposed development i.e., the small amount of natural vegetation that will be removed (~5 ha) means that potential impacts from an avifaunal perspective will be low to negligible.

7.2 IMPACT MANAGEMENT

The perceived impacts from the proposed development from an avifaunal perspective are considered to be low to negligible. The following recommendations are however important for ensuring the impacts are kept to a minimum, and must be included in the Environmental Management Programme (EMPr):

1. An experienced, independent Environmental Control Officer (ECO) must be appointed to oversee the construction activities and compliance with the EMPr.
2. The footprint of the development must be minimised as far as possible, and the construction and operational activities must remain strictly within the approved area. Any spill-over into the adjacent natural areas must be prohibited
3. The construction camp must remain strictly within the development area and crews must keep out of the adjacent natural areas.
4. During construction, no wild bird or animal may under any circumstance be handled, removed, or be interfered with by construction workers. No wild bird or animal may under any circumstance be hunted, snared, captured, injured, or killed. This includes animals perceived to be vermin.
5. Alien plant eradication and control must be undertaken throughout the construction and operational phases.
6. The site must be rehabilitated using best practices for karoo vegetation following decommissioning.

7.3 CONCLUSION

It is the opinion of the specialist that the impacts on avifauna and avifaunal habitat would be low to negligible considering the small size of the proposed development footprint, and that the project may be authorised subject to the recommendations in the EMPr being adhered to.

- This compliance statement is applicable to the study area as described in the EIA documentation and shown in **Figure 6**;
- The ground-truthed sensitivity for avifauna under the Animal Species theme was verified to be **Medium**.
- It is likely that the proposed development will not have any impact on avifaunal SCC, avifaunal habitat, or areas that perform critical ecosystem functions; and
- There are no conditions to which this compliance statement is subjected.

8. REFERENCES

AviList Core Team (2025): *AviList: The Global Avian Checklist*, v2025. https://doi.org/10.2173/avilist.v2025

BirdLife South Africa (2026): Check List of Birds in South Africa 2026, Cape Town: Tandym Print.

Chittenden, H. (2007): *Roberts Bird Guide. A comprehensive field guide to over 950 bird species in southern Africa*, Cape Town: John Voelcker Bird Book Fund.

Chief Directorate National Geospatial Information (CDNGI) Geospatial Portal: http://www.cdngiportal.co.za/cdngiportal/

Coordinated Waterbird Counts (CWAC): https://cwac.birdmap.africa/sites.php?sitecode=31421812

DEA (2011): National Environmental Management: Biodiversity Act, 2004: National list of ecosystems that are threatened and in need of protection, *Government Gazette Number 34809*, Notice 1002, 9 December 2011, Pretoria: Department of Environmental Affairs.

DEA (2015): NEMBA 2004 (Act 10 of 2004): Threatened or Protected Species Regulations, *Government Gazette No. 38600*, 31 March 2015, Pretoria: Department of Environmental Affairs.

DEDEAT (2019): Eastern Cape Biodiversity Conservation Plan Terrestrial [Vector] 2020. Available from the Biodiversity GIS website, Eastern Cape Department: Economic Development, Environmental Affairs and Tourism.

DFFE (2022): National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004), The Revised National List of Ecosystems that are Threatened and in need of Protection, *Government Gazette Number 47526*, Notice 2747, 18 November 2022, Pretoria: Department of Forestry, Fisheries and the Environment.

DFFE (2025): South African Protected Area Database (SAPAD) 2025 Quarter 3, Pretoria: Department of Forestry, Fisheries and the Environment, https://egis.environment.gov.za/protected_areas_register

Driver A., Sink, K.J., Nel, J.L., Holness, S., Van Niekerk, L., Daniels, F., Jonas, Z., Majiedt, P.A., Harris, L. and Maze, K. (2012) National Biodiversity Assessment 2011: An assessment of South Africa's biodiversity and ecosystems, Synthesis Report, Pretoria: South African National Biodiversity Institute and Department of Environmental Affairs.

Global Biodiversity Information Facility (GBIF) (2026): Free and open access to biodiversity data: https://www.gbif.org/

Grobler, A., Vlok, J., Cowling, R, van der Merwe, S., Skowno, A.L., and Dayaram, A. (2018): Technical Report: Integration of the Subtropical Thicket Ecosystem Project (STEP) vegetation types into the VEGMAP national vegetation map 2018.

Harrison, J.A., Allan D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V. and Brown, C.J. (1997): *The Atlas of Southern African Birds*, Johannesburg: BirdLife South Africa.

Hockey, P.A.R., Dean, W.R.J. and Ryan P.G. (2005): *Roberts Birds of Southern Africa, 7th Edition*, Cape Town: John Voelcker Bird Book Fund.

iNaturalist (California Academy of Sciences and the National Geographic Society) Online Database (2026): https://www.inaturalist.org/

IUCN (2025): IUCN Red List of Threatened Species, Version 2025-2: http://www.iucnredlist.org

Key Biodiversity Areas Partnership (2026) *Key Biodiversity Areas factsheet: Camdeboo*. Extracted from the World Database of Key Biodiversity Areas. Developed by the Key Biodiversity Areas Partnership: BirdLife International, IUCN, American Bird Conservancy, Amphibian Survival Alliance, Conservation International, Critical Ecosystem Partnership Fund, Global Environment Facility, Re:wild, NatureServe, Rainforest Trust, Royal Society for the Protection of Birds, World Wildlife Fund and Wildlife Conservation Society.

Marnewick, M. D., Retief, E. F., Theron, N. T., Wright, D. R. and Anderson, T. A. (2015): *Important Bird and Biodiversity Areas of South Africa*, Johannesburg: BirdLife South Africa.

Mountain Zebra Camdeboo Protected Environment (2014): Government Gazette No. 38281 Vol. 594 December 2014, Pretoria: DFFE.

Mucina, L. and Rutherford, M.C. (2006): The vegetation of South Africa, Lesotho and Swaziland, *Strelitzia 19*, Pretoria: South African National Biodiversity Institute.

Rutherford, M.C. and Westfall, R.H. (1994): *Biomes of Southern Africa: an objective categorisation*, Pretoria: National Botanical Institute.

SAExplorer (2026): https://www.saexplorer.co.za/south-africa/climate/aberdeen_climate.html

SANBI (2024): Vegetation Map of South Africa, Lesotho and Swaziland [*vector geospatial dataset*], Pretoria: South African National Biodiversity Institute.

SANBI (2020): *Species Environmental Assessment Guideline. Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa*, Version 3.1 2022, Pretoria: South African National Biodiversity Institute.

SANBI (2021): South Africa's Terrestrial Red List of Ecosystems (RLE) 2022: Technical report on the revision of the "List of terrestrial ecosystems that are threatened and in need of protection", *Report 7639*, Pretoria: South African National Biodiversity Institute.

SANBI (2024): What is a KBA Map? SANBI Factsheet series. South African National Biodiversity Institute, Pretoria.

Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzotti, B. and Slingsby, J.A. (eds.). (2019): *South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm*. South African National Biodiversity Institute, Pretoria.

South African Bird Atlas Project 2 (SABAP2) (2026): http://sabap2.adu.org.za/index.php/

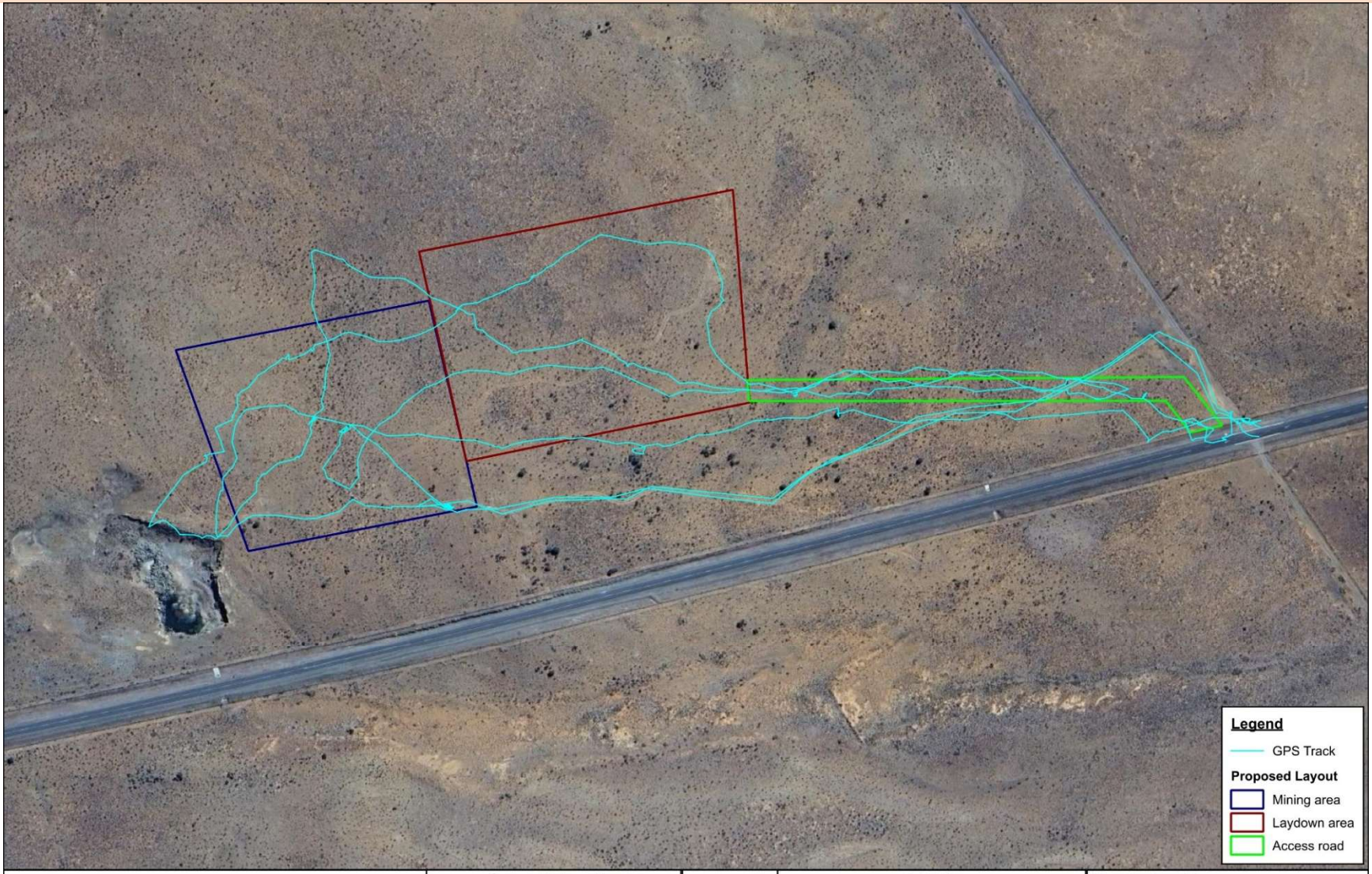
Southern African Birding cc. (2011): Roberts VII Multimedia, Birds of Southern Africa, Computer Software.

Taylor, M.R., Peacock, F. and Wanless, R.M. (eds.) (2015): *Eskom Red Data Book of Birds of South Africa Lesotho and Swaziland*, Johannesburg: BirdLife South Africa.

World Database of KBAs (WDKBA) (2025): https://wdkba.keybiodiversityareas.org/

9. APPENDICES

APPENDIX A: MAP SHOWING COVERAGE OF THE STUDY AREA



APPENDIX B: ABRIDGED CV OF THE SPECIALIST

Name and Surname	:	Robyn Phillips
Date of Birth	:	28 08 1975
Company Name	:	Cossypha Ecological
Field of Expertise	:	Terrestrial Ecologist and Avifaunal Specialist
SACNASP Registration	:	*Pr.Sci.Nat.* 400401/12 (Zoological and Ecological Sciences)
Highest Qualification	:	MSc (Zoology) *cum laude*
Years of Experience	:	25
Contact Number	:	084 695 1648
Email	:	robyn@cossypha.co.za

The first half of my professional career was spent working in ecological research at the University of KwaZulu-Natal. Since starting in consulting in 2011, I have been involved in many projects requiring biodiversity surveys and ecological assessments as part of the legislated requirements for the Environmental Impact Assessment (EIA) process. These studies Include field assessment of habitat, species occurrence (especially those of conservation concern), assessment of ecological importance and sensitivity of floral and faunal communities and habitat, as well as assessment of impacts. Tasks also include making recommendations and prescribing mitigation measures after applying the mitigation hierarchy, aimed at minimising impacts.

Following is a list of mining projects undertaken:

- Avifaunal Assessments for the Proposed Perseverance and Kriegerskraal Quarries near Aberdeen in the Eastern Cape (Greenmined) – March 2026 to Present.
- Terrestrial Biodiversity Assessment for the Proposed Aasvoelkrans and Umgala-Knight's Hill Underground Coal Mines near Utrecht, KwaZulu-Natal (GCS) – 2025.
- Avifaunal Assessment for the Mining Right Application for the Proposed Tungsten Mine in the Kromantonies River Valley near Piketberg, Western Cape (Greenmined) – 2023.
- Avifaunal Assessment for the Proposed Riversdale Colliery Ropeway near Vryheid (Greenmined), KwaZulu-Natal – 2023.
- Monthly Avifaunal Monitoring for the Transnet Berths Expansion Project, Port of Durban, KZN (Transnet) – 2018 to 2023.
- Terrestrial Biodiversity Assessment for the Proposed Expansion of the MSR Tormin Mine near Lutzville, Western Cape (SRK) – 2021 to 2023.
- Terrestrial Biodiversity Assessment for the proposed Mining Right Application on the Farm De Punt near Lutzville, Western Cape (SRK) – 2021 to 2023.
- Biodiversity Assessment and Offset Report for the Proposed Expansion of the Zandberg Sand Mine near Robertson, Western Cape (Greenmined) – 2021 to 2022.
- Terrestrial Biodiversity Assessment for the proposed Prospecting Right Application on the Remaining Extent of the Farm Widouw 309 Farm near Vanryhnsdorp, Western Cape (Sephaku) – 2021.
- Terrestrial Biodiversity Assessment for the proposed Mining Right Application on the Remaining Extent of the Farms Vaderlandsche Rietkuil 308 and Widouw 309 near Vanryhnsdorp, Western Cape (SA Lime and Gypsum) – 2021.
- Ecological and Avifaunal Assessment for the Kalagadi Manganese Mining Right Amendment, Hotazel, Northern Cape (Kalagadi Manganese) – 2018 to 2019.
- Review of EIA specialist studies and provide specialist advice that will aid the Minister of Environmental Affairs in the appeal against the refusal to grant an EA by the DMR to Subiflex for the mining of coal on the remainder of the Farm The Duel 186 MT, Vhembe District, Limpopo (DEA) – 2017 to 2018.
- Specialist review of ecological and agricultural impacts that will aid in advising the Minister of Environmental Affairs in the appeal by DAFF against the awarding of kimberlite prospecting rights to De Beers for diamond exploration near Viljoenskroon, Free State (DEA) – 2017 to 2018.
- Faunal and Avifaunal Impact Assessment for the Proposed Kangala Coal Mine Extension, Eloff, Mpumalanga (Licebo Environmental and Mining (Pty) Ltd) – 2014 to 2017.
- Faunal and Avifaunal Impact Assessment for the Doornfontein Calcrete Mine, Zeerust, North West Province (SA Lime) – 2016.
- Annual African Grass-Owl *Tyto capensis* Monitoring Programme for Khutala Colliery, Ogies, Mpumalanga (South 32) – 2011 to 2014.

- Biodiversity Assessment and Biodiversity Action Plan (BAP) For Khutala Colliery Mining Rights Area, Ogies, Mpumalanga (South 32) – 2013 to 2014.
- Faunal and Avifaunal Impact Assessment for the Elandspruit Opencast Mine, Middleburg, Mpumalanga (Cabanga Concepts) – 2014.
- Faunal and Avifaunal Impact Assessment for the Mbila Underground and Msebe Opencast Mining Project, Nongoma, KZN (Prime Resources) – 2014.
- Faunal and Avifaunal Impact Assessment for the Proposed Brakfontein Opencast Mine, Delmas, Mpumalanga (Cabanga Concepts) – 2013.
- Faunal and Avifaunal Assessments for the Rietspruit Colliery Closure Assessment, Kriel, Mpumalanga (BHP Billiton) – 2012 to 2013.
- Faunal and Avifaunal Assessments for the Majuba Colliery Closure Assessment, Amersfoort, Mpumalanga (Eskom) – 2012 to 2013.
- Faunal and Avifaunal Impact Assessment for the Proposed Canyon Springs Opencast Mine, Loding, Mpumalanga (Prime Resources) – 2012 to 2013.
- Faunal and Avifaunal Impact Assessment for the Proposed Opencast Coal Mines at Paardekop and Amersfoort, Mpumalanga (Xstrata Coal South Africa) – 2011 to 2013.
- Faunal and Avifaunal Impact Assessment for the Proposed Kangwane South Anthracite Mine, Kimatipoort, Mpumalanga (Prime Resources) – 2012.
- Biodiversity Assessment and Biodiversity Action Plan (Bap) for Union Section Platinum Mine near Northam, Limpopo (Anglo American) – 2011 to 2012.
- Faunal and Avifaunal Assessments for the Transvaal Navigation Colliery Closure Assessment, Kriel, Mpumalanga (BHP Billiton) – 2011 to 2012.
- Faunal and Avifaunal Assessments for the Middleburg Mines Pan Assessments and Monitoring, Middleburg, Mpumalanga (BHP Billiton) – 2011 to 2012.
- Faunal and Avifaunal Impact Assessment for the Proposed Boschmanskrans Colliery Expansion and Canal Construction, Emalahleni, Mpumalanga (BHP Billiton) – 2011 to 2012.
- Faunal and Avifaunal Impact Assessment for the Proposed opencast mine on Portion 9 of the farm Twyfelaar, Carolina, Mpumalanga (World Wide Coal) – 2011 to 2012.
- Faunal and Avifaunal Assessments for the Carolina Mines Wetland Biodiversity Assessment, Carolina, Mpumalanga (Cabanga Concepts) – 2011 to 2012.