AVIFAUNA SPECIALIST ASSESSMENTS

Ruspoort 1 Solar Photovoltaic Facility

De Aar, Northern Cape Province

April 2023

CLIENT

Prepared by:

The Biodiversity Company

Cell: +27 81 319 1225

Fax: +27 86 527 1965

info@thebiodiversitycompany.comww

w.thebiodiversitycompany.com

Report Name	**AVIFAUNA SPECIALIST ASSESSMENTS**
Reference	**Ruspoort 1 Solar PV**
Submitted to	savannah environmental
Fieldwork	**Ernest Porter** Ernest has gained birding experience in the Northern Cape, North West, Mpumalanga, Limpopo, Kwazulu Natal, Free State, Western Cape and also Gauteng. He is a qualified FGASA NQF2 Field Guide and a committee member of Black Eagle Project Roodekrans and The Botanical Society of South Africa (Bankenveld Branch).
Report Writer	**Lindi Steyn** Dr Lindi Steyn has completed her PhD in Biodiversity and Conservation from the University of Johannesburg. Lindi is a terrestrial ecologist with a special interest in ornithology. She has completed numerous studies ranging from basic Assessments to Environmental Impact Assessments following IFC standards.
Reviewer	**Andrew Husted** Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 13 years' experience in the environmental consulting field.
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, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. 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.

Executive Summary

The Biodiversity Company was appointed to undertake an Avifauna Assessment for the proposed Ruspoort 1 Solar Photovoltaic (PV) facility. The project (Ruspoort 1 Solar) is part of a cluster known as the Crossroads Green Energy Cluster. The Cluster entails the development of up to Twenty-one (21) solar energy facilities in three phases. Fieldwork for the facilities was undertaken simultaneously and data collected for the whole project area is presented in order to ensure the cumulative impact can be considered and to allow for the possible movement and home ranges of the species.

Based on desktop information 234 avifauna species are expected to occur in the area, of which eleven are regarded as species of conservation concern (SCC) either regionally or/and internationally. Of the eleven SCCs expected, five species were confirmed during the two field assessments. An additional four SCC were also recorded that was not listed as expected based on SABAP 2 data. During the first field assessment 124 bird species were recorded, while during the second survey 109 species were recorded. The SCCs recorded were: Kori Bustard (*Ardeotis kori*) (NT Regional, NT International); Verreaux's Eagle (*Aquila verreauxii*) (VU, LC); Blue Crane (*Grus paradisea*) (NT, VU); Secretarybird (*Sagittarius serpentarius*) (EN, EN); Tawny Eagle (*Aquila rapax*) (EN, VU); Black Harrier (*Circus maurus*) (EN, EN), Blue Korhaan (*Eupodotis caerulescens*) (LC, NT), Karoo Korhaan (*Eupodotis vigorsii*) (NT, LC) and Lanner Falcon (*Falco biarmicus*) (VU; NT).

During the nest surveys, three active Verreauxs Eagle nests were observed as well as an additional two inactive nests. Two active Secretarybird nests were also found. As per the Species Environmental Assessment Guidelines (2020) a core area of 1 km (core buffer) surrounding the nests must be treated as a no-go area, an additional area of 5.2 km (seasonal buffer) was also placed around the nest as per the Birdlife Verreaux's Eagle and Wind Farms Guidelines (2021). This 5.2 km area is based on the average home range of the Verreaux Eagle during the breeding season, and as such this area must be avoided during the breeding season of the species which stretches from April to July to avoid disturbing the species. As per the guidelines, buffers were also placed around the inactive nests. For the Secretarybird nests a 4 km buffer were placed around the nests, 2 km must be treated as no go (core buffer), while the other 2 km must be low impact development (low impact buffer) (pers comms Birdlife, 2022). Secretarybirds breeds year around therefore low impact development is required and a breeding season limitation will not suffice. The main impacts identified in the assessment were disruption of the nests, habitat loss, collisions and electrocutions. These impacts ratings ranged from Very-High- Medium pre mitigation and High- Low post mitigation.

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1 Introduction

1.1 Project Description

Ruspoort 1 Solar Energy (Pty) Ltd (a consortium consisting of Akuo Energy Afrique, Africoast Investments and Golden Sunshine Trading) propose to develop the Ruspoort 1 Solar PV Facility and its associated electrical infrastructure on Portion 5 of the Farm Bokken Kraal 81 in the Renosterberg Local Municipality in the greater Pixley ka Seme District Municipality in the Northern Cape Province. The project site is located approximately 20km north of Philipstown and 30km west of Petrusville and within the Central Transmission Corridor. The Project (Ruspoort 1 Solar PV Facility) is part of a cluster known as the Crossroads Green Energy Solar Cluster. The Cluster entails the development of up to Twenty-one (21) solar energy facilities.

A technically suitable project site of ~1355ha has been identified by Akuo Energy Afrique for the establishment of the PV facility. The proposed facility will have a contracted capacity of 100MW and will include the following infrastructure:

- Solar PV array comprising PV modules and mounting structures (monofacial or bifacial and a single axis tracking system);
- Inverters and transformers;
- Cabling between the project components;
- Battery Energy Storage System (BESS);
- On-site facility substation and power lines between the solar PV facility and the Eskom substation (to be confirmed and assessed through a separate process);
- Site offices, Security office, operations and control, and maintenance and storage laydown areas; and
- Access roads, internal distribution roads.

1.2 Background

The Biodiversity Company was appointed to undertake an Avifauna Assessment for the proposed Ruspoort 1 Solar Photovoltaic (PV) facility. The project (Ruspoort 1 Solar) is part of a cluster known as the Crossroads Green Energy Cluster. The Cluster entails the development of up to Twenty-one (21) solar energy facilities in three phases (Figure 1-1).

Although the fieldwork for the facilities was undertaken simultaneously and data collected for the whole project area is presented, this report only details the assessment of the Ruspoort 1 facility component. The approach was informed by 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 320 (20 March 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 project area as "Very High". The animal sensitivity is rated as "Medium".

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.

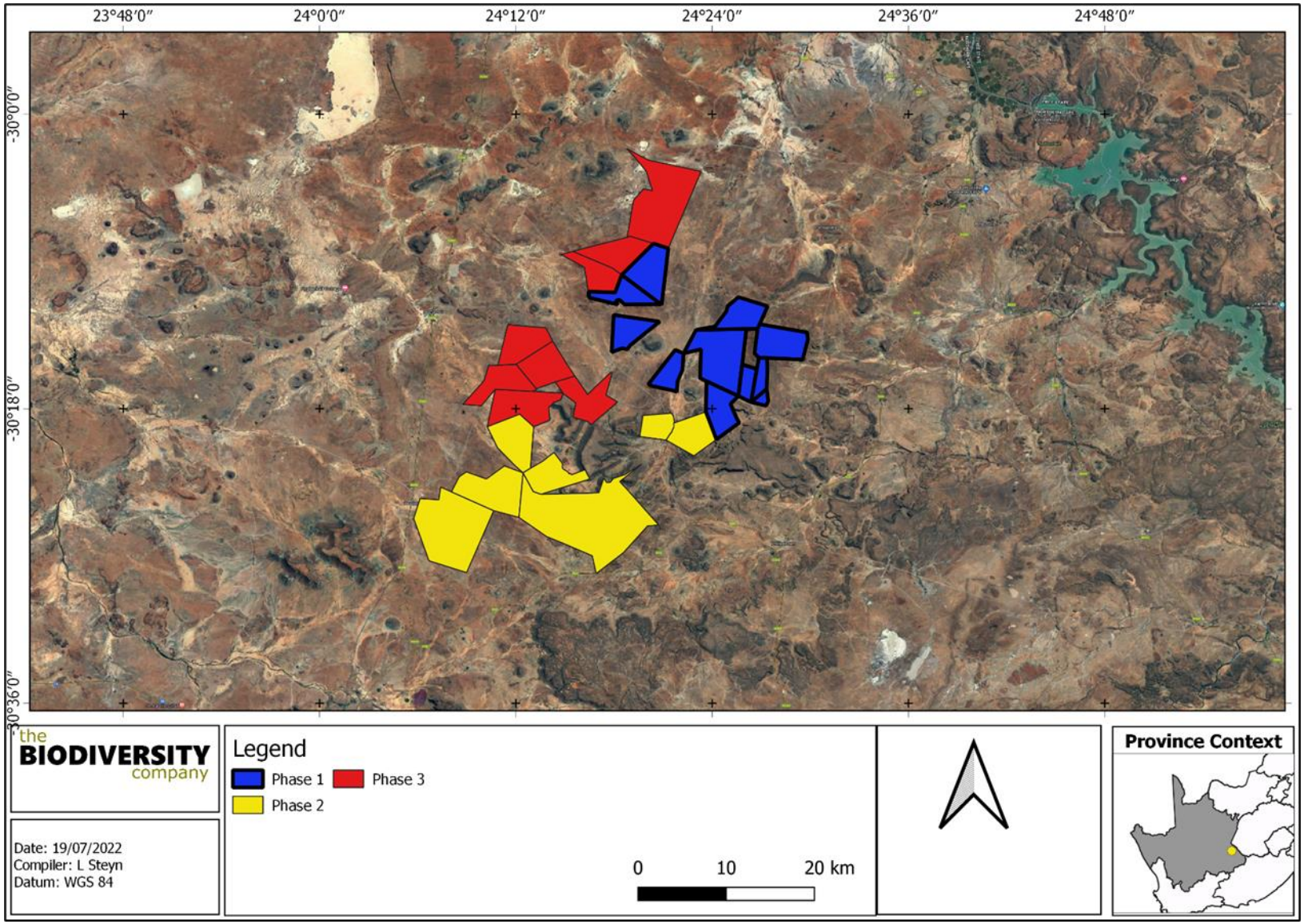

Figure 1-1 The proposed Crossroads Green Energy Cluster projects

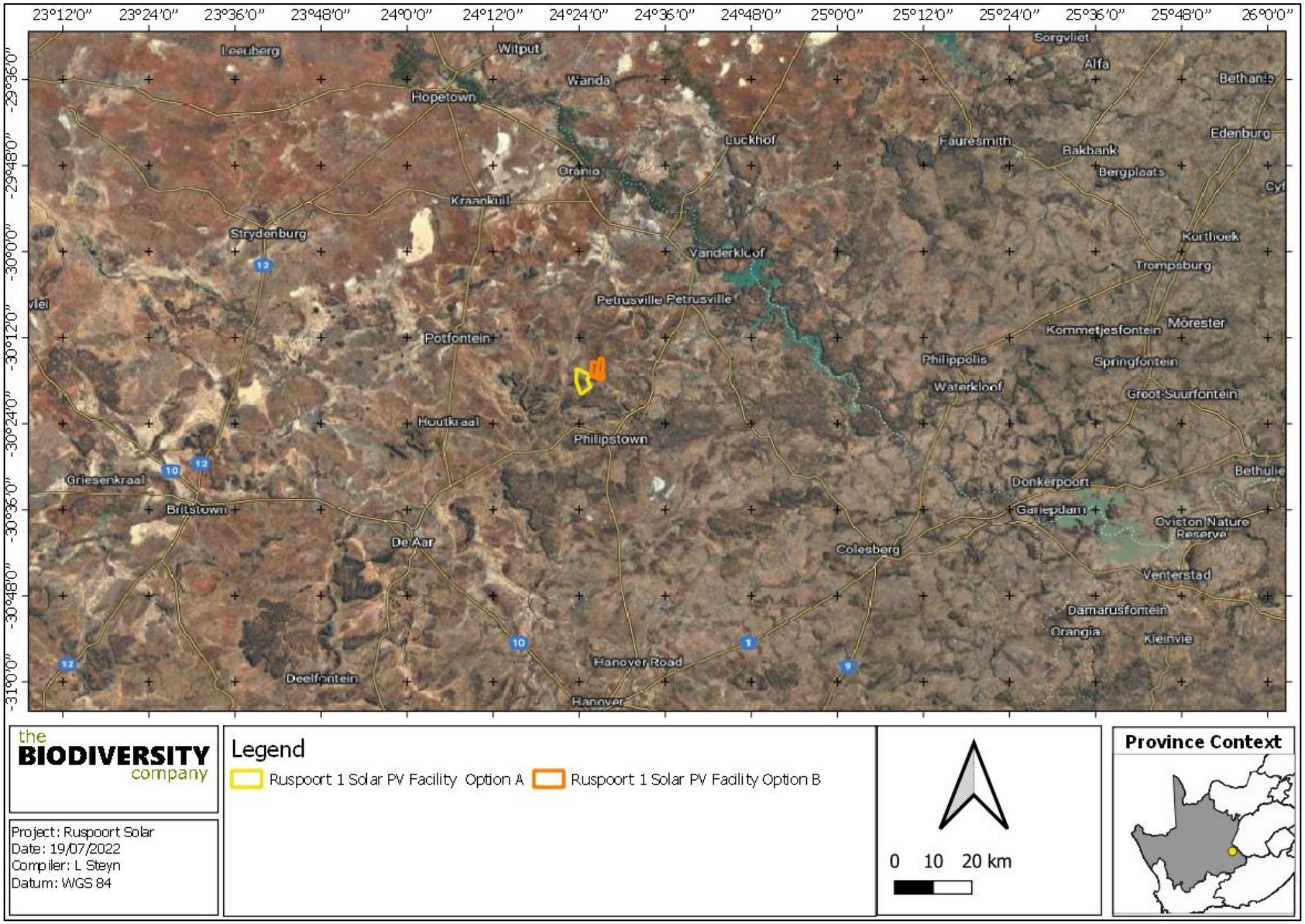

Figure 1-2 Proposed location of the project area in relation to the nearby towns

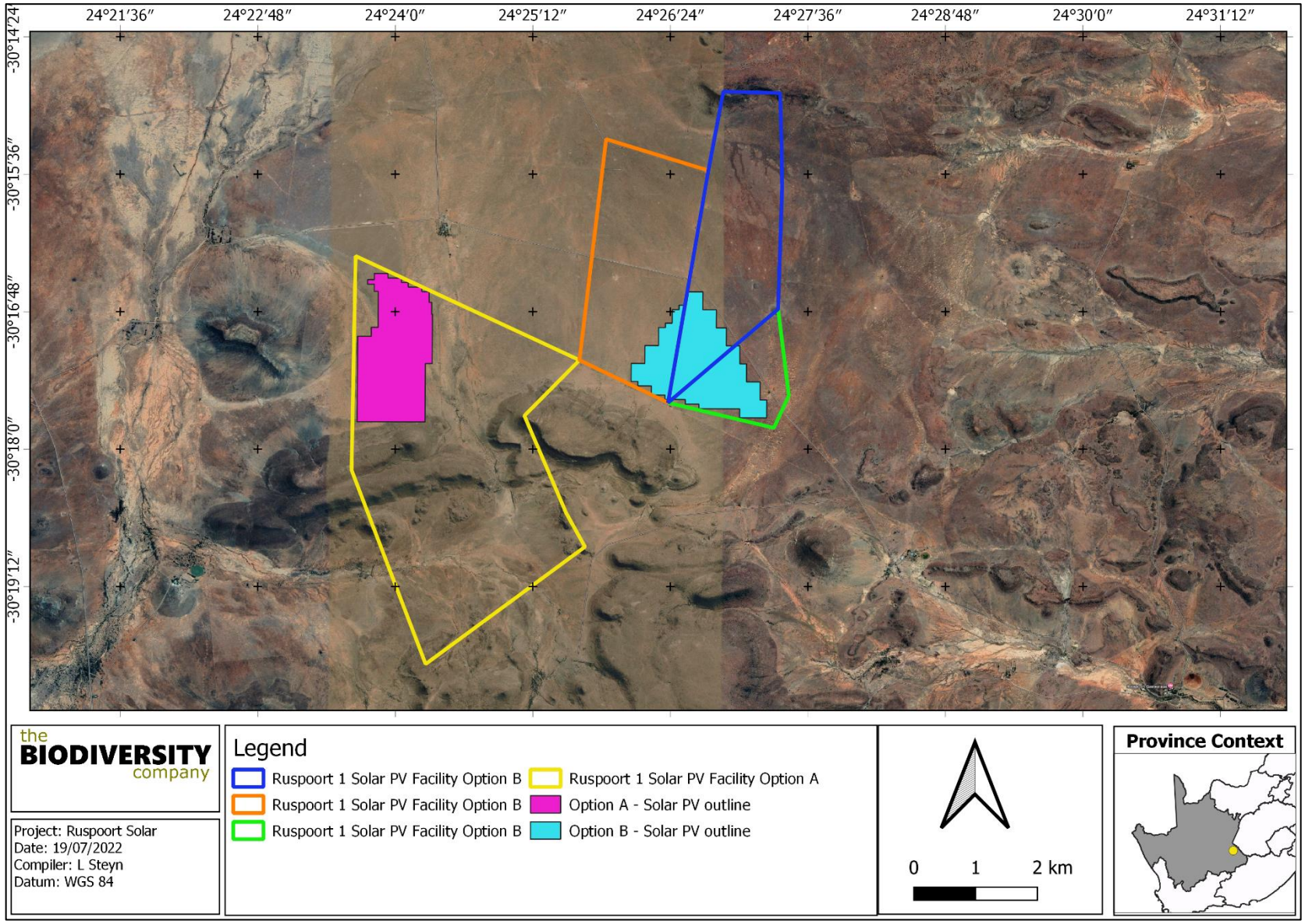

Figure 1-3 The layout of the solar plant on the property

1.3 Assumptions and Limitations

The following assumptions and limitations should be noted for the assessment:

- Information relating to project activities, spatial data and infrastructure locations for the proposed development was obtained from information provided by the client. The potential impacts and recommendations described in this report apply specifically to the provided information;
- Although considerable time has been spent to ensure that information utilised in this report is verified. It is assumed that all third-party information utilised in the compilation of this report is correct at the time of compilation (e.g., spatial data, online databases, and species lists);
- Long term nest and flight monitoring was not done;
- The field work component of the project was done for the three clusters concurrently;
- Flight analyses were not performed due to time restraints; and
- Night surveys were not done due to safety risk.

2 Scope of Work

The assessment was achieved according to the above-mentioned legislation and the best-practice guidelines and principles for avifaunal impact assessments within the context of solar energy facilities as outlined by Birdlife South Africa.

The scope of the Avifaunal Impact Assessment included the following:

- Description of the baseline avifaunal community;
- Identification of present or potentially occurring Species of Conservation Concern (SCC);
- Sensitivity assessment and map to identify sensitive areas in the project area; and
- Impact assessment, mitigation measures to prevent or reduce the possible impacts.

3 Key Legislative Requirements

The legislation, policies and guidelines listed below in Table 3-1 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 3-1 A list of key legislative requirements relevant to biodiversity and conservation in the Northern Cape Provinces

Region	Legislation / Guideline
International	Convention on Biological Diversity (CBD, 1993)
	The Convention on Wetlands (RAMSAR Convention, 1971)
	The United Nations Framework Convention on Climate Change (UNFCC,1994)
	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
	The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
National	Constitution of the Republic of South Africa (Act No. 108 of 1996)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)

	The National Environmental Management: Biodiversity Act (Act No. 10 of 2004), Threatened or Protected Species Regulations
	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, GNR 320 of Government Gazette 43310 (March 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, GNR 1150 of Government Gazette 43855 (October 2020)
	The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
	The Environment Conservation Act (Act No. 73 of 1989)
	National Protected Areas Expansion Strategy (NPAES)
	Natural Scientific Professions Act (Act No. 27 of 2003)
	National Biodiversity Framework (NBF, 2009)
	National Forest Act (Act No. 84 of 1998)
	National Veld and Forest Fire Act (101 of 1998)
	National Water Act (NWA) (Act No. 36 of 1998)
	National Spatial Biodiversity Assessment (NSBA)
	World Heritage Convention Act (Act No. 49 of 1999)
	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations and, Alien and Invasive Species List 20142020, published under NEMBA
	South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) (CARA)
	Sustainable Utilisation of Agricultural Resources (Draft Legislation).
	White Paper on Biodiversity
Provincial	Northern Cape Nature Conservation act no. 9 of 2009
	Northern Cape Planning and Development Act no. 7 of 1998

4 Methods

4.1 Desktop Assessment

The desktop assessment was principally undertaken using a Geographic Information System (GIS) to access the latest available spatial datasets to develop digital cartographs and species lists. These datasets and their date of publishing are provided below.

4.1.1 Ecologically Important Landscape Features

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

- National Biodiversity Assessment (NBA) 2018 (Skowno *et al*, 2019) - The purpose of the 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:
    - *Ecosystem Threat Status* – 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), Near Threatened (NT)

or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition.

- *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. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems.

- Protected areas - South Africa Protected Areas Database (SAPAD) (DFFE, 2021) – The SAPAD Database contains spatial data pertinent to the conservation of South African biodiversity. It includes spatial and attribute information for both formally protected areas and areas that have less formal protection. SAPAD 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) (SANBI, 2016) – The NPAES provides spatial information on areas that are suitable for terrestrial ecosystem protection. These focus areas are large, intact and unfragmented and therefore, of high importance for biodiversity, climate resilience and freshwater protection.
- Conservation/Biodiversity Sector Plan:

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

  The identification of Critical Biodiversity Areas for the Northern Cape was undertaken using a Systematic Conservation Planning approach. Available data on biodiversity features (incorporating both pattern and process, and covering terrestrial and inland aquatic realms), their condition, current Protected Areas and Conservation Areas, and opportunities and constraints for effective conservation were collated.

  The Northern Cape Critical Biodiversity Area (CBA) Map updates, revises and replaces all older systematic biodiversity plans and associated products for the province. These include the:

  - Namakwa District Biodiversity Sector Plan;
  - Cape Fine-Scale Plan (only the extent of the areas in the Northern Cape i.e. Bokkeveld and Nieuwoudtville); and
  - Richtersveld Municipality Biodiversity Assessment.

- Important Bird and Biodiversity Areas (IBAs) (BirdLife South Africa, 2015) – IBAs constitute a global network of over 13 500 sites, of which 112 sites are found in South Africa. IBAs are sites of global significance for bird conservation, identified through multi-stakeholder processes using globally standardised, quantitative and scientifically agreed criteria; and

- South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (Van Deventer *et al.,* 2018) – A SAIIAE was established during the NBA of 2018. It is a collection of data layers that represent the extent of river and inland wetland ecosystem types and pressures on these systems.

4.1.2 Desktop Avifaunal Assessment

The avifaunal desktop assessment comprised of the following, compiling an expected:

- Avifauna list, generated from the SABAP2 dataset by looking at pentads 2945_2420; 2945_2425; 2950_2420; 2955_2440; 3000_2450; 3010_2410; 3010_2415; 3010_2420; 3005_2420. The area overlapping with project area itself has not been sampled well, thus areas adjacent to the project area were included to get a representative list of expected species.

4.2 Field Assessment

The first field survey was undertaken during 25 April- 6 May 2022, while the second survey was conducted from 1-10 July 2022. All properties affected by the Crossroads Green Energy Cluster were surveyed during these field surveys. Effort was made to cover all the different habitat types within the limits of time and access. Areas surrounding the project area were also surveyed, this included areas at the nearby dams and some of the nearby ridges due to the mobility of avifauna species and home range sizes of larger species (Figure 4-1). The focus of the point counts were more on the areas of development rather than the whole properties.

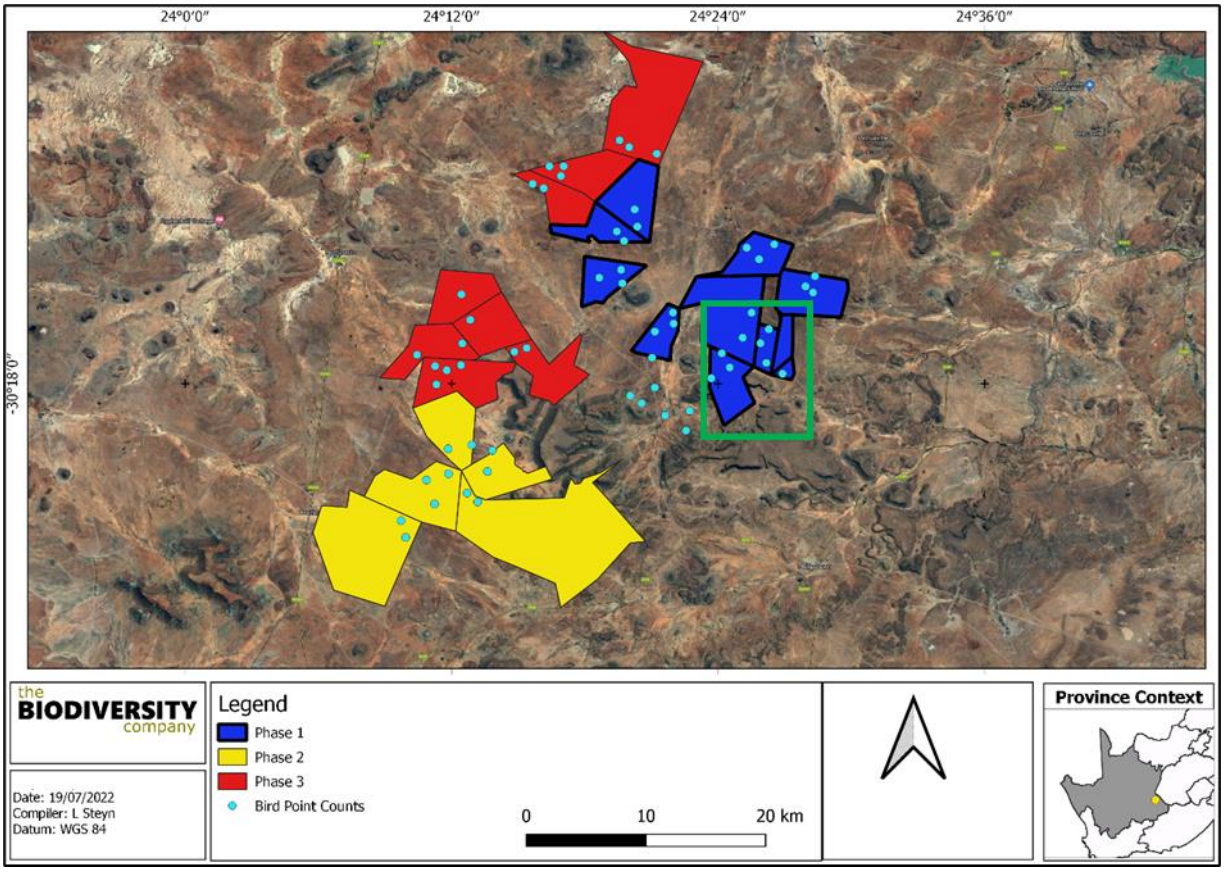

Figure 4-1 Map illustrating the field survey area. The green square indicates the Ruspoort 1 Project area

Sampling consisted of standardized point counts as well as random diurnal incidental surveys and vantage point surveys. Standardized point counts (following Buckland *et al.* 1993) were conducted to gather data on the species composition and relative abundance of species within the broad habitat types identified. Each point count was run over a 10 min period. The horizontal detection limit was set at 500 m. At each point the observer would document the date, start time, and end time, habitat, numbers of each species, detection method (seen or heard), behaviour (perched or flying) and general notes on habitat and nesting suitability for conservation important species. To supplement the species inventory with cryptic and illusive species that may not be detected during the rigid point count protocol, diurnal

incidental searches and one nocturnal search were conducted. This involved the opportunistic sampling of species between point count periods, river scanning and road cruising.

4.2.1 Data analysis

Point count data was arranged into a matrix with point count samples in rows and species in columns. The table formed the basis of the various subsequent statistical analyses. In order to ascertain the differences in the structure of the species assemblage between habitats, a Bray-Curtis dissimilarity matrix was used. The data was subject to fourth-root transformation to downscale the contribution of very abundant species while upscaling the influence of less abundant species. However, the effect of species abundance was negligible and ultimately the raw data proved more informative. Thirdly, raw count data was converted to relative abundance values and used to establish dominant species and calculate the diversity of each habitat using the Shannon Diversity Index (H'). Lastly, present, and potentially occurring species were assigned to 13 major trophic guilds loosely based on the classification system developed by González-Salazar *et al.* (2014). Species were first classified by their dominant diet (carnivore, herbivore, granivore, frugivore, nectarivore, omnivore), then by the strata matrix within which they most frequently forage (ground, water, foliage, air) and lastly by their diel activity period (nocturnal or diurnal).

4.3 Site Ecological Importance (SEI)

The different habitat types within the project area were delineated and identified based on observations during the field assessment, and available satellite imagery. These habitat types will be assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern 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 on the site) and Receptor Resilience (RR) (its resilience to impacts) as follows.

BI is a function of Conservation Importance (CI) and the Functional Integrity (FI) of the receptor as follows. The criteria for the CI and FI ratings are provided in Table 4-1 and Table 4-2, respectively.

Table 4-1 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 4-2 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 4-3.

Table 4-3 Matrix used to derive Biodiversity Importance (BI) from Functional Integrity (FI) and Conservation Importance (CI)

Biodiversity Importance (BI)		Conservation Importance (CI)				
		Very high	**High**	**Medium**	**Low**	**Very low**
Functional Integrity (FI)	**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 4-4.

Table 4-4 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.

Subsequent to the determination of the BI and RR, the SEI can be ascertained using the matrix as provided in Table 4-5.

Table 4-5 Matrix used to derive Site Ecological Importance from Receptor Resilience (RR) and Biodiversity Importance (BI)

Site Ecological Importance		Biodiversity Importance (BI)				
		Very high	**High**	**Medium**	**Low**	**Very low**
Receptor Resilience (RR)	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 4-6.

Table 4-6 Guidelines for interpreting Site Ecological Importance in the context of the proposed development 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.

5 Results & Discussion

5.1 Desktop Assessment

5.1.1 Ecologically Important Landscape Features

The GIS analysis pertaining to the relevance of the proposed project to ecologically important landscape features is summarised in Table 5-1.

Table 5-1 Summary of relevance of the proposed project to ecologically important landscape features

Desktop Information Considered	Relevant/Irrelevant	Section
Ecosystem Threat Status	Irrelevant – Overlaps with a Least Concern ecosystem	5.1.1.1
Ecosystem Protection Level	Relevant – Overlaps with a Poorly Protected Ecosystem	5.1.1.2

Renewable Energy Development Zones	Irrelevant - The project area is ~129 km for the closest REDZ	-
Powerline Corridor	Relevant- The project area falls within the Central Corridor	5.1.1.7
Critical Biodiversity Area	Relevant – The project area overlaps with ESA classified area	5.1.1.3
Important Bird and Biodiversity Areas	Relevant – The project area is within the Platberg-Karoo Conservancy IBA	5.1.1.4
South African Inventory of Inland Aquatic Ecosystems	Relevant - The project areas overlap with unclassified wetlands	5.1.1.5
National Freshwater Priority Area	Relevant– The project areas does not overlap with any wetlands or rivers	5.1.1.6
Coordinated Waterbird Count	Relevant – Three CWAC sites is in the surrounding area; Bosduiwekop, De Aar sewage works and Nooitgedaght	5.1.1.9
Coordinated Avifaunal Road Count	Relevant – The project areas are close to a CAR route.	5.1.1.8

5.1.1.1 Ecosystem Threat Status

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), Near Threatened (NT) 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 spatial dataset the proposed project overlaps with a LC ecosystem (Figure 5-1).

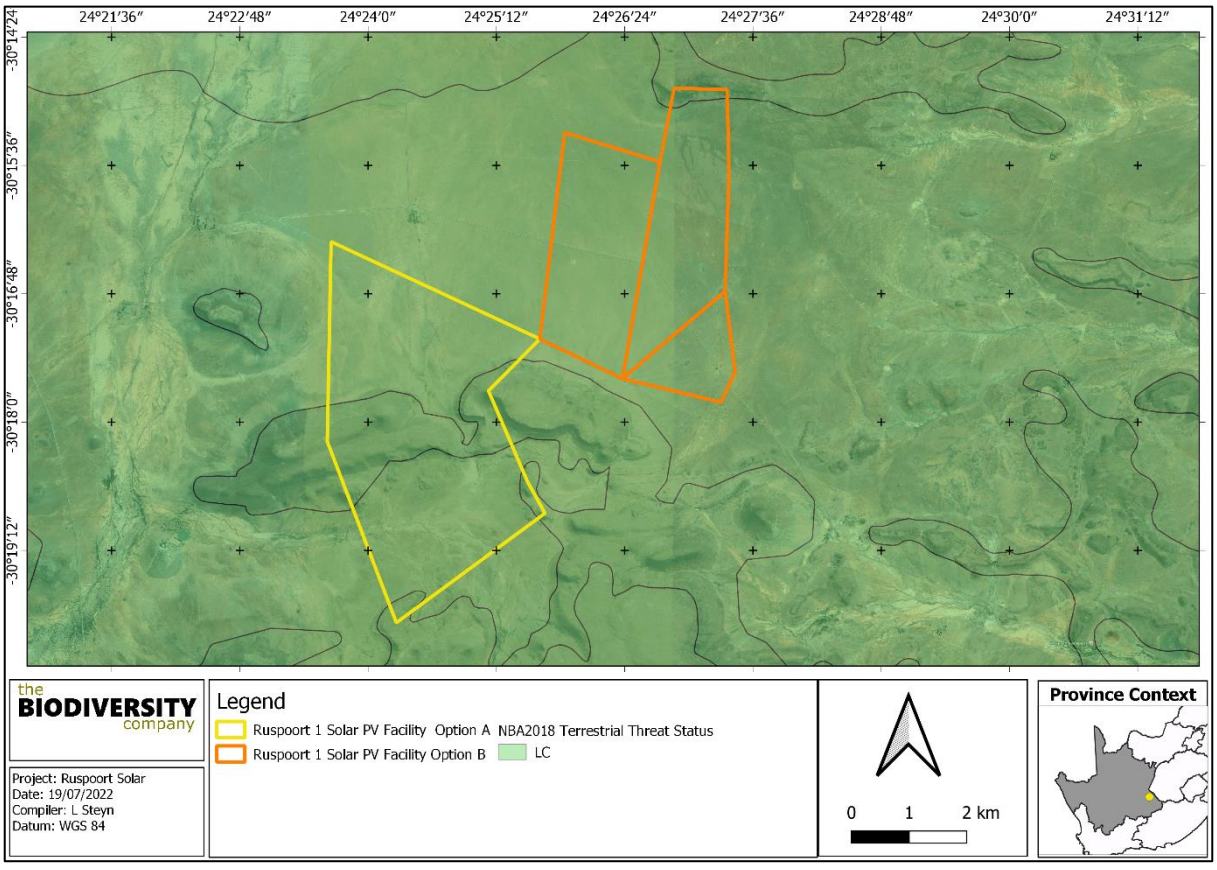

Figure 5-1 Map illustrating the ecosystem threat status associated with the project area.

5.1.1.2 Ecosystem Protection Level

This is an 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. NP, PP or MP ecosystem types are collectively

referred to as under-protected ecosystems. The proposed project overlaps with a PP ecosystem (Figure 5-2).

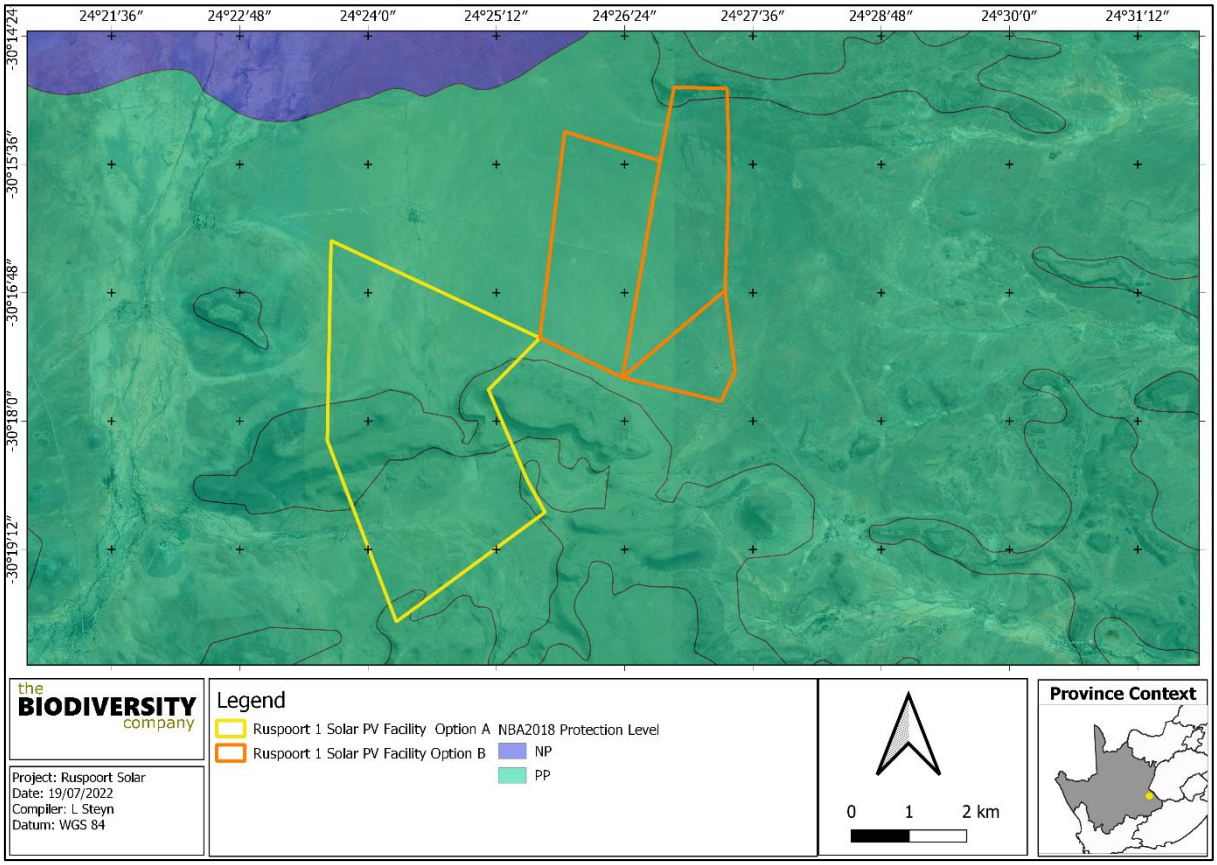

Figure 5-2 Map illustrating the ecosystem protection level associated with the project areas

5.1.1.3 Critical Biodiversity Areas and Ecological Support Areas

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

Figure 5-3 shows the project area superimposed on the Terrestrial CBA maps. The project areas overlap with ESA classified area. Development of this nature (ie: Solar PV facilities and associated infrastructure) may occur in an ESA area provided all mitigation measures are adhered to. It must be noted, however, when taken into consideration in conjunction with the other Solar PV facilities planned for all three phases of the overall proposed development, that the cumulative fragmentation of the ESA is very high. The associated cumulative fragmentation impacts are expected to be high for the overall development. This project should ideally not be considered in insolation but rather as a part of the full proposed development when considering impacts.

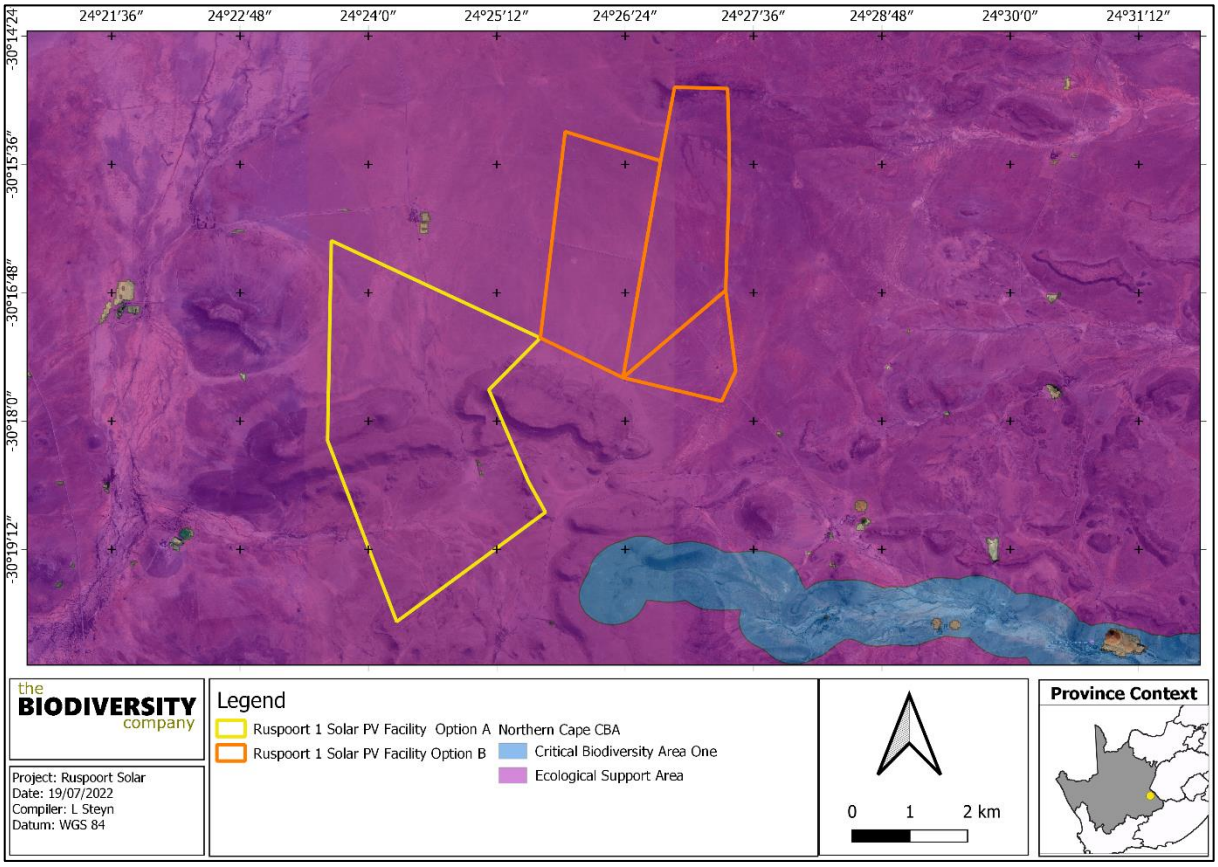

Figure 5-3 Map illustrating the locations of CBAs in the project area

5.1.1.4 Important Bird and Biodiversity Areas

Important Bird & Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by BirdLife International. These sites are also all Key Biodiversity Areas; sites that contribute significantly to the global persistence of biodiversity (Birdlife, 2017).

According to Birdlife International (2017), the selection of IBAs is achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge of the sizes and trends of bird populations. The criteria ensure that the sites selected as IBAs have true significance for the international conservation of bird populations and provide a common currency that all IBAs adhere to, thus creating consistency among, and enabling comparability between, sites at national, continental and global levels. Figure 5-4 shows the project area is within the Platberg-Karoo Conservancy IBA.

Platberg–Karoo Conservancy IBA can be found in the districts of De Aar, Philipstown and Hanover. This IBA falls across two biomes, the Nama Karroo and the Grassland Biome, which contributes to its diversity of species. In total 289 bird species have been recorded here. Threats in this IBA include overgrazing, erosion and encroachment by Karroo shrubs, all of which result in the loss of habitat and a decrease in available food for large terrestrial birds.

Large terrestrial birds and raptors found here includes: Blue Crane *Anthropoides paradiseus*, Ludwig's Bustard *Neotis ludwigii*, Kori Bustard *Ardeotis kori*, Blue Korhaan *Eupodotis caerulescens*, Black Stork *Ciconia nigra*, Secretarybird *Sagittarius serpentarius*, Martial Eagle *Polemaetus bellicosus*, Verreauxs' Eagle *Aquila verreauxii* and Tawny Eagle *A. rapax*.

Biome-restricted species found here include Karoo Lark *Calendulauda albescens*, Karoo Long-billed Lark *Certhilauda subcoronata*, Karoo Chat *Cercomela schlegelii*, Tractrac Chat *C. tractrac*, Sickle-winged Chat *C. sinuata*, Namaqua Warbler *Phragmacia substriata*, Layard's Tit-Babbler *Sylvia layardi*, Pale-

winged Starling *Onychognathus nabouroup* and Black-headed Canary *Serinus alario*. Two congregatory species found here are the Lesser Kestrel and the Amur Falcon (Birdlife, 2015).

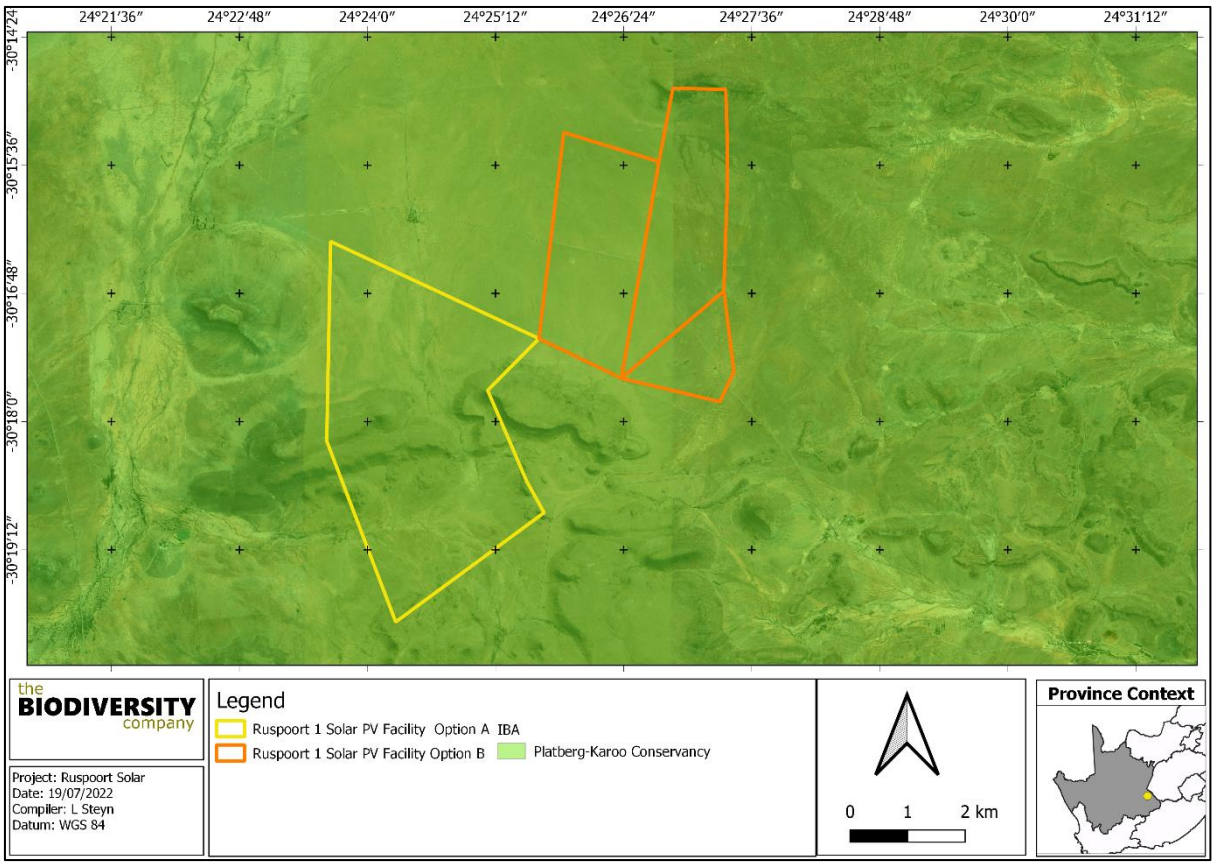

Figure 5-4 The project area in relation to the Platberg Karoo Conservancy IBA

5.1.1.5 Hydrological Setting

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the NBA 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT, with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.,* 2019; Skowno *et al.,* 2019). The project areas overlap with unclassified wetlands (Figure 5-5).

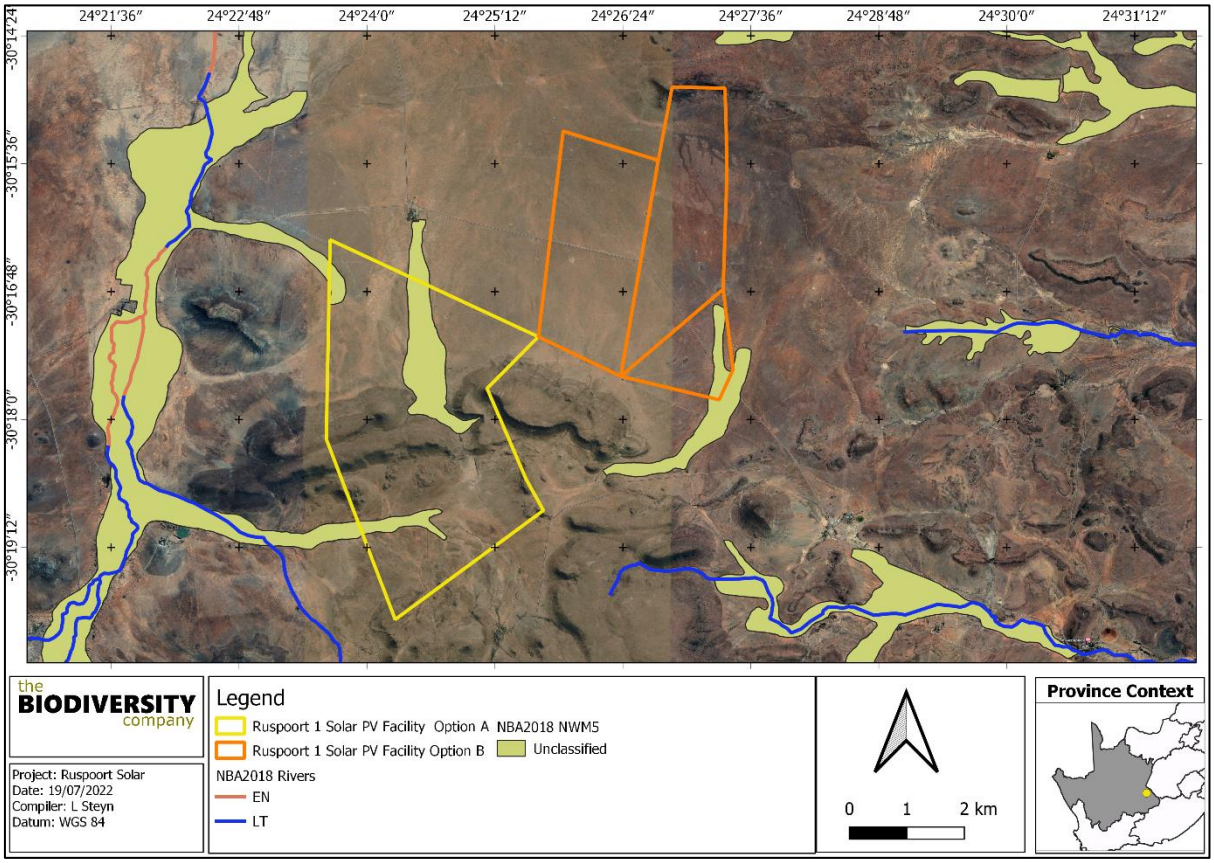

Figure 5-5 Map illustrating ecosystem threat status of rivers and wetland ecosystems in the project area

5.1.1.6 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).

Figure 5-6 shows the project areas does not overlaps with wetlands nor rivers.

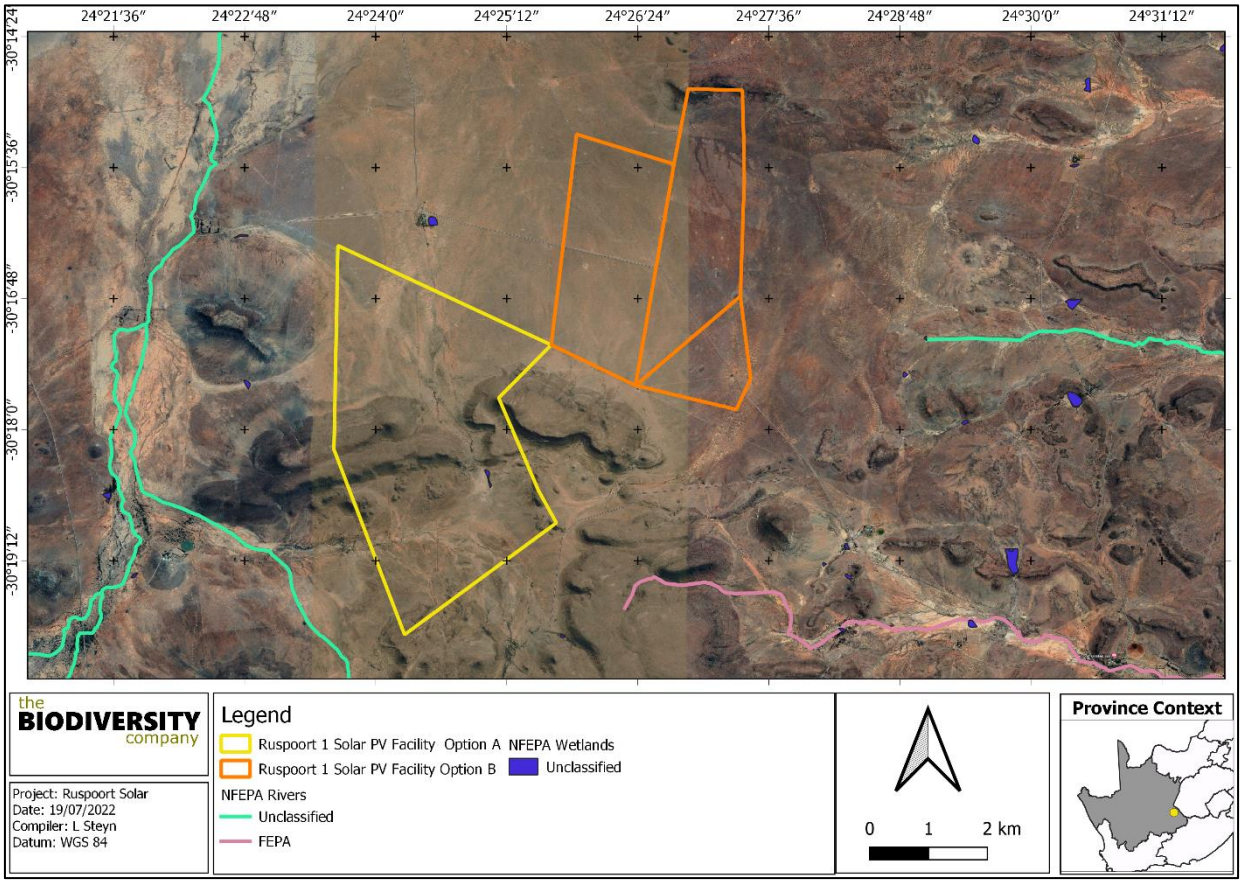

Figure 5-6 The project area in relation to the National Freshwater Ecosystem Priority Areas.

5.1.1.7 Strategic Transmission Corridors (EGI)

On the 16 February 2018 Minister Edna Molewa published Government Notice No. 113 in Government Gazette No. 41445 which identified 5 strategic transmission corridors important for the planning of electricity transmission and distribution infrastructure as well as procedure to be followed when applying for environmental authorisation for electricity transmission and distribution expansion when occurring in these corridors.

On 29 April 2021, Minister Barbara Dallas Creecy published Government Notice No. 383 in Government Gazette No. 44504, which expanded the eastern and western transmission corridors and gave notice of the applicability of the application procedures identified in Government Notice No. 113, to these expanded corridors. More information on this can be obtained from https://egis.environment.gov.za/egi.

Figure 5-7 shows the project areas fall within the central corridor.

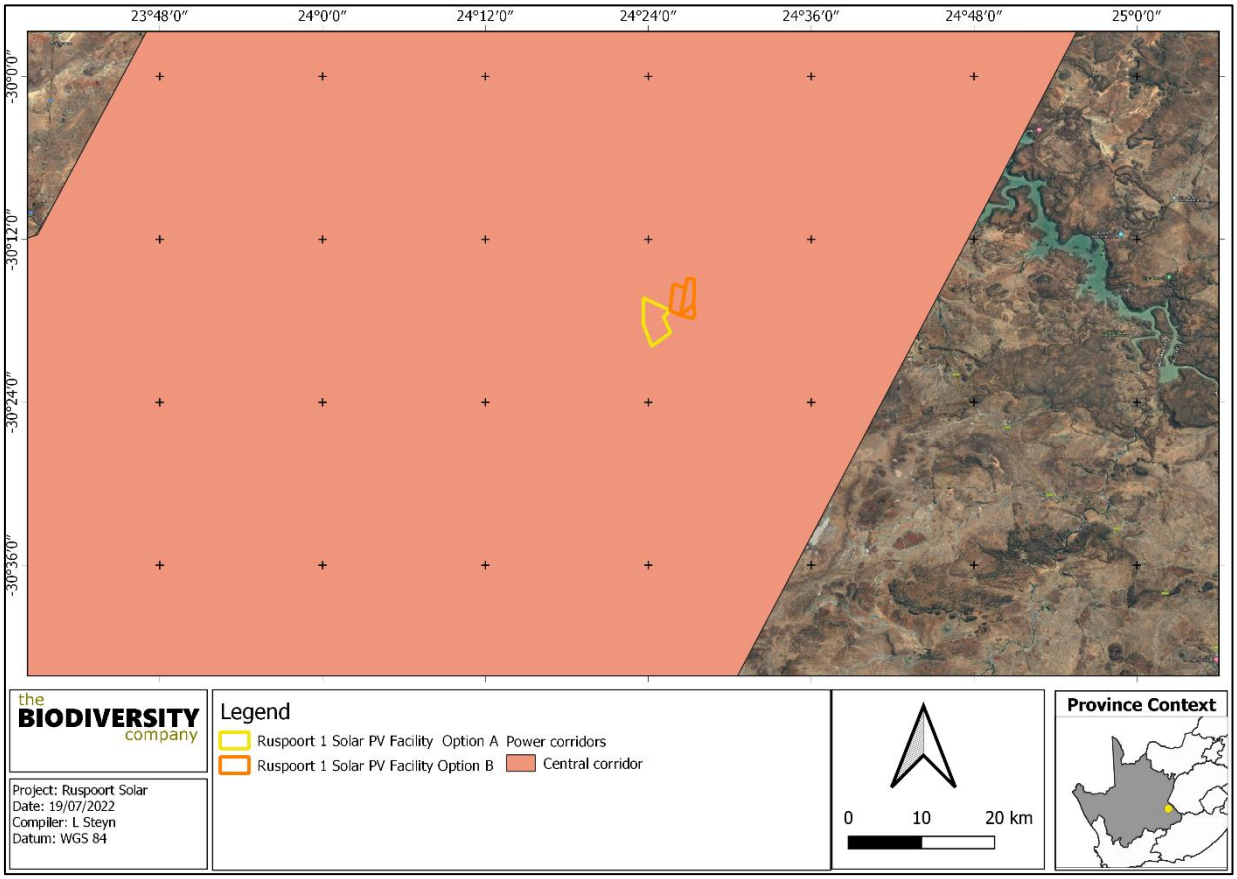

Figure 5-7 The project area in relation to the closest EGI corridor

5.1.1.8 Coordinated Avifaunal Roadcount (CAR)

The ADU/Cape bird club pioneered avifaunal roadcount of larger birds in 1993 in South africa. Originally it was started to monitor the Blue Crane *Anthropoides paradiseus* and Denham's/Stanley's Bustard *Neotis denhami*. Today it has been expanded to the monitoring of 36 species of large terrestrial birds (cranes, bustards, korhaans, storks, Secretarybird and Southern Bald Ibis) along 350 fixed routes covering over 19 000 km. Twice a year, in midsummer (the last Saturday in January) and midwinter (the last Saturday in July), roadcounts are carried out using this standardised method. These counts are important for the conservation of these larger species that are under threat due to loss of habitat through changes in land use, increases in crop agriculture and human population densities, poisoning as well as man-made structures like power lines. With the prospect of wind and solar farms to increase the use of renewable energy sources monitoring of these species is most important (CAR, 2020). Figure 5-8 shows that the project areas are is close to a CAR route.

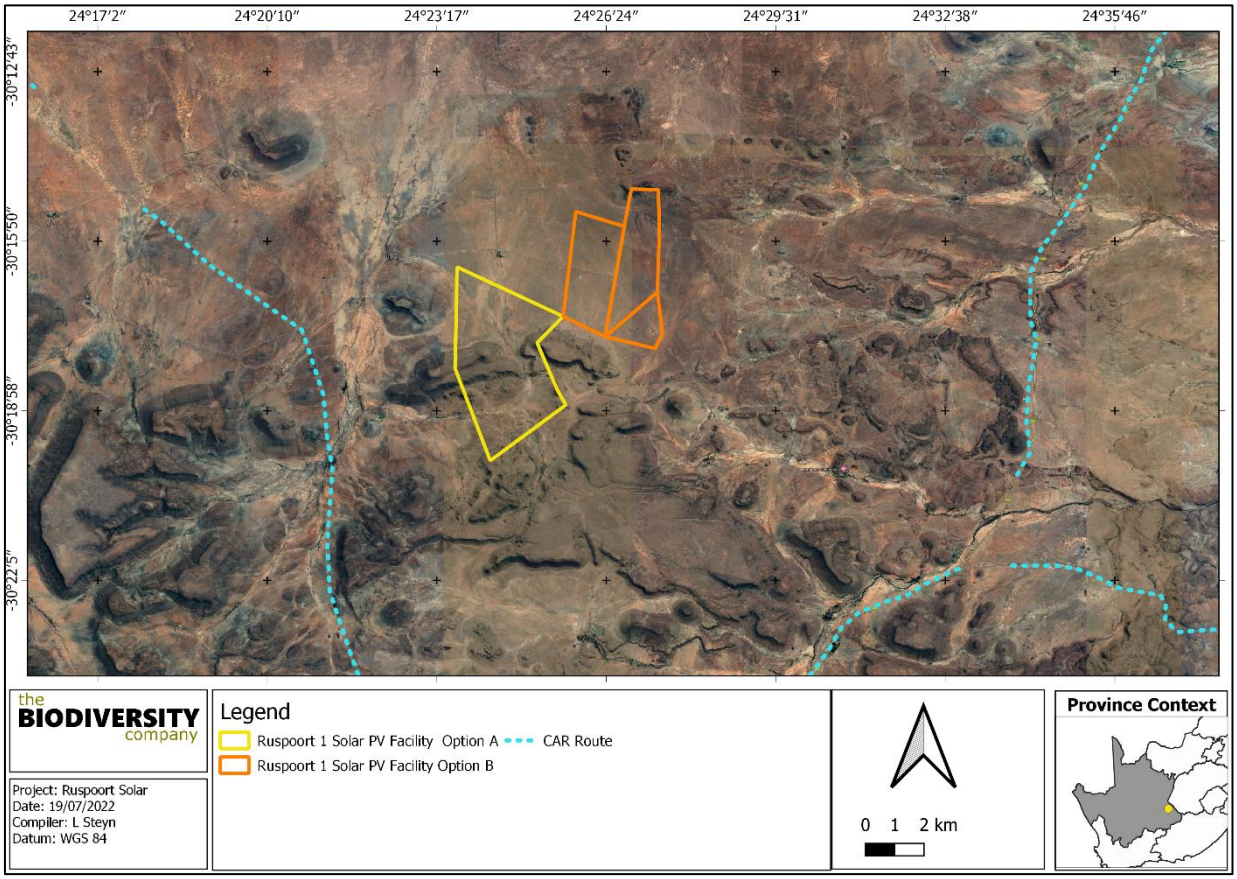

Figure 5-8 The project area in relation to the CAR routes

5.1.1.9 Coordinated Waterbird Counts (CWAC)

The Animal demographic unit launched the Coordinated Waterbird Counts (CWAC) project in 1992 as part South Africa's commitment to International waterbird conservation. Regular mid-summer and mid-winter censuses are done to determine the various features of water birds including population size, how waterbirds utilise water sources and determining the heath of wetlands. For a full description of CWAC please refer to http://cwac.birdmap.africa/about.php. Three CWAC sites are in the surrounding area; Bosduiwekop, De Aar sewage works and Nooitgedacht (Figure 5-9 and Table 5-2).

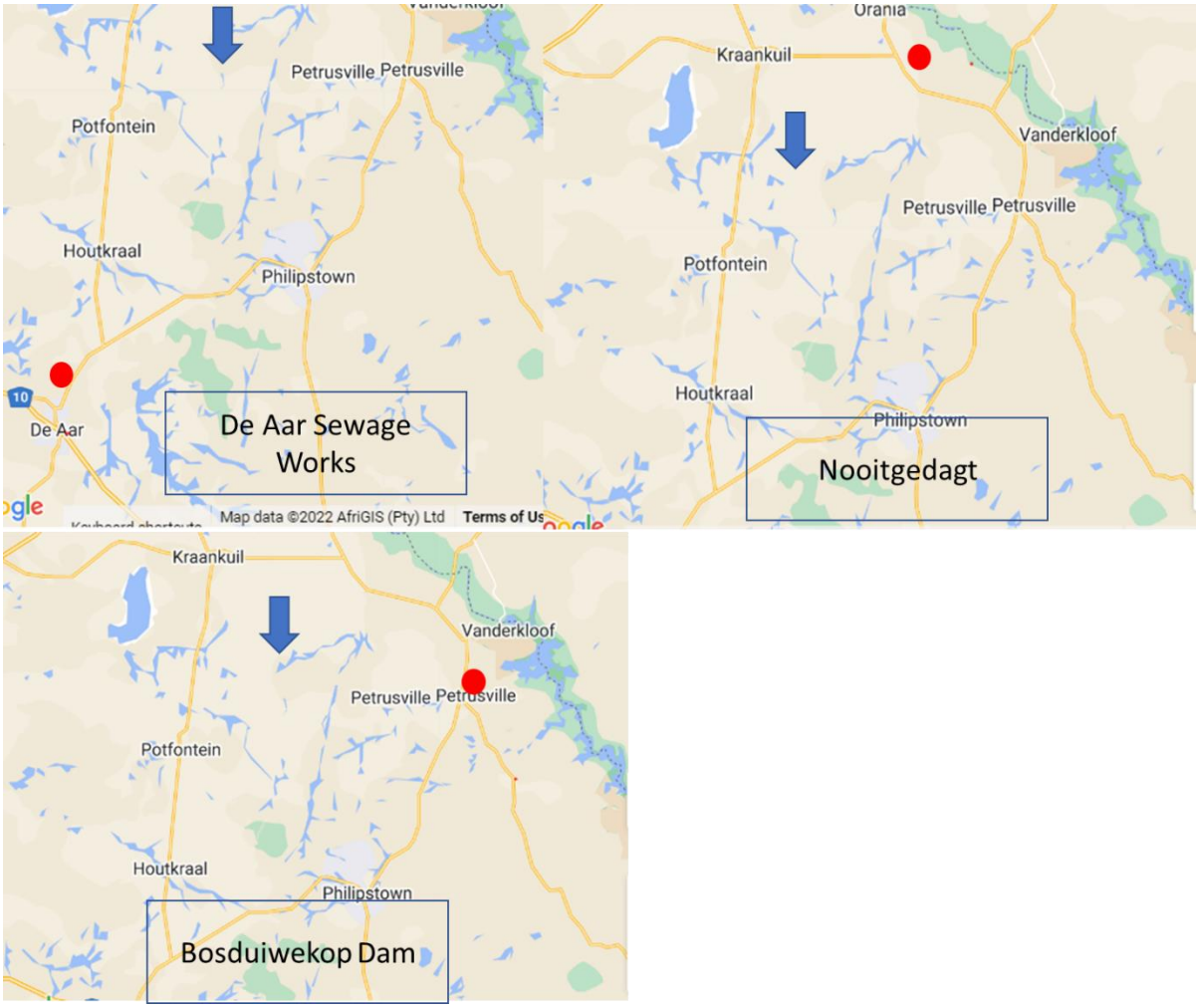

Figure 5-9 ***The project area in relation to the closest CWAC site, red dot the CWAC site, blue arrow estimate location of the project area***

Table 5-2 ***Observed species in the CWAC sites and their average reporting rate***

Common name	Taxonomic name	De Aar Sewage	Nooitgedaght	Bosduiwekop
Sandpiper, Common	*Actitis hypoleucos*	1.00	2.00	5.00
Goose, Egyptian	*Alopochen aegyptiaca*	2.00	333.73	63.35
Teal, Cape	*Anas capensis*	15.33	6.00	8.00
Teal, Red-billed	*Anas erythrorhyncha*		14.54	6.11
Duck, African Black	*Anas sparsa*			2.50
Duck, Yellow-billed	*Anas undulata*	7.67	27.50	104.53
Darter, African	*Anhinga rufa*		3.00	
Heron, Grey	*Ardea cinerea*	1.71	2.00	1.86
Heron, Goliath	*Ardea goliath*		1.00	
Heron, Black-headed	*Ardea melanocephala*	1.50		1.00
Ibis, Hadada	*Bostrychia hagedash*	11.00	6.75	2.00
Egret, Western Cattle	*Bubulcus ibis*		6.00	
Thick-knee, Water	*Burhinus vermiculatus*			2.00

Common name	Taxonomic name	De Aar Sewage	Nooitgedaght	Bosduiwekop
Sandpiper, Curlew	*Calidris ferruginea*		123.33	4.50
Stint, Little	*Calidris minuta*	8.50	78.20	164.86
Ruff	*Calidris pugnax*	10.00	78.43	40.20
Plover, Common Ringed	*Charadrius hiaticula*		3.00	3.00
Plover, Chestnut-banded	*Charadrius pallidus*			14.00
Plover, Kittlitz's	*Charadrius pecuarius*		30.38	15.67
Plover, Three-banded	*Charadrius tricollaris*	3.17	7.75	6.17
Tern, Whiskered	*Chlidonias hybrida*			8.00
Tern, White-winged	*Chlidonias leucopterus*			9.50
Duck, White-faced Whistling	*Dendrocygna viduata*		7.63	
Egret, Little	*Egretta garzetta*		1.00	
Coot, Red-knobbed	*Fulica cristata*	4.67	127.38	388.89
Snipe, African	*Gallinago nigripennis*		1.00	3.00
Moorhen, Common	*Gallinula chloropus*		3.09	
Eagle, African Fish	*Haliaeetus vocifer*		1.00	1.20
Stilt, Black-winged	*Himantopus himantopus*	9.60	17.14	10.40
Tern, Caspian	*Hydroprogne caspia*			1.00
Cormorant, Reed	*Microcarbo africanus*	3.00	9.64	3.75
Wagtail, African Pied	*Motacilla aguimp*			1.00
Wagtail, Cape	*Motacilla capensis*	4.00	5.11	19.08
Stork, Yellow-billed	*Mycteria ibis*		3.00	1.00
Pochard, Southern	*Netta erythrophthalma*		3.50	8.00
Duck, Maccoa	*Oxyura maccoa*			1.00
Cormorant, White-breasted	*Phalacrocorax lucidus*		1.00	3.75
Flamingo, Greater	*Phoenicopterus roseus*	4.00	17.60	24.00
Spoonbill, African	*Platalea alba*		3.25	2.75
Goose, Spur-winged	*Plectropterus gambensis*	4.75	42.33	88.00
Ibis, Glossy	*Plegadis falcinellus*		15.00	3.00
Grebe, Great Crested	*Podiceps cristatus*			10.00
Swamphen, African	*Porphyrio madagascariensis*		1.00	
Avocet, Pied	*Recurvirostra avosetta*		20.20	7.67
Martin, Brown-throated	*Riparia paludicola*	1.00	1.00	1.00
Duck, Knob-billed	*Sarkidiornis melanotos*		1.50	
Hamerkop	*Scopus umbretta*			1.20
Teal, Blue-billed	*Spatula hottentota*		1.50	
Shoveler, Cape	*Spatula smithii*		15.85	14.50
Grebe, Little	*Tachybaptus ruficollis*	9.00	38.00	68.63
Shelduck, South African	*Tadorna cana*	2.25	71.00	28.11

Common name	Taxonomic name	De Aar Sewage	Nooitgedaght	Bosduiwekop
Duck, White-backed	*Thalassornis leuconotus*		1.33	28.00
Ibis, African Sacred	*Threskiornis aethiopicus*	6.00	1.00	2.13
Sandpiper, Wood	*Tringa glareola*	4.00	7.00	
Greenshank, Common	*Tringa nebularia*	1.00	3.83	32.00
Sandpiper, Marsh	*Tringa stagnatilis*	3.00	9.00	3.00
Lapwing, Blacksmith	*Vanellus armatus*	11.36	10.80	12.41

5.1.2 Expected Avifauna

The SABAP2 Data lists 234 avifauna species that could be expected to occur within the area (Appendix B). Eleven (11) of these expected species are regarded as SCC (Table 5-3).

Table 5-3 Threatened avifauna species that are expected to occur within the project area. CR = Critically Endangered, EN = Endangered, LC = Least Concern, NT = Near Threatened and VU = Vulnerable

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Anthus crenatus	Pipit, African Rock	NT	NT	High
Aquila verreauxii	Eagle, Verreaux's	VU	LC	Confirmed
Ciconia abdimii	Stork, Abdim's	NT	LC	High
Cursorius rufus	Courser, Burchell's	VU	LC	Moderate
Eupodotis vigorsii	Korhaan, Karoo	NT	LC	Confirmed
Falco biarmicus	Falcon, Lanner	VU	LC	Confirmed
Anthropoides paradisea	Crane, Blue	NT	VU	Confirmed
Neotis ludwigii	Bustard, Ludwig's	EN	EN	High
Phoeniconaias minor	Flamingo, Lesser	NT	NT	High
Phoenicopterus roseus	Flamingo, Greater	NT	LC	High
Sagittarius serpentarius	Secretarybird	VU	EN	Confirmed

Anthus crenatus (African Rock Pipit) is endemic to South Africa and Lesotho (IUCN, 2017). They are classed as NT after undergoing a decline in habitat of 34% in the last 10 years (IUCN, 2017). The species is associated with rocky habitats that has abundant shrub and grassy areas. Suitable habitat can be found in the project areas, therefore the species has a high likelihood of occurring.

Aquila verreauxii (Verreaux's Eagle) is listed as VU on a regional scale and LC on a global scale. This species is locally persecuted in southern Africa where it coincides with livestock farms, but because the species does not take carrion, is little threatened by poisoned carcasses. Where hyraxes are hunted for food and skins, eagle populations have declined (IUCN, 2017). Numerous breeding pairs were observed throughout the project area.

Ciconia abdimii (Abdim's Stork) is listed as NT on a local scale and the species is known to be found in open grassland and savanna woodland often near water but also in semi-arid areas, gathering beside pools and water-holes. They tend to roost in trees or cliffs (IUCN, 2017). The existence of wet areas creates the potential for this species to occur in the area therefore likelihood of occurrence was rated as high.

Cursorius rufus (Burchell's Courser) is categorised as VU on a regional scale. It inhabits open short-sward grasslands, dry savannas, fallow fields, overgrazed or burnt grasslands and pastures, bare or sparsely

vegetated sandy or gravelly deserts, stony areas dotted with small shrubs and saltpans (IUCN, 2017). The species is threatened in the south of its range by habitat degradation as a result of poor grazing practices and agricultural intensification. The likelihood of occurrence in the project area is rated as moderate.

Eupodotis vigorsii (Karoo Korhaan) is listed as NT on a regional scale and as LC on a global scale. This korhaan lives in a range of arid habitats associated with the karoo and other arid scrubland habitats found in eastern South Africa and Namibia. It is also found in slightly denser scrubland, preferring habitat with cover ranging from 10 to 50 cm off the ground. This species was confirmed in the project area.

Falco biarmicus (Lanner Falcon) is native to South Africa and inhabits a wide variety of habitats, from lowland deserts to forested mountains (IUCN, 2017). They may occur in groups up to 20 individuals, but have also been observed solitary. Their diet is mainly composed of small birds such as pigeons and francolins. This species was confirmed in the project area.

Anthropoides paradiseus (Blue Crane) is listed as NT on a regional scale and as VU on a global scale. This species has declined, largely owing to direct poisoning, power-line collisions and loss of its grassland breeding habitat owing to afforestation, mining, agriculture and development (IUCN, 2017). This species breeds in natural grass- and sedge-dominated habitats, preferring secluded grasslands at high elevations where the vegetation is thick and short. Numerous birds were observed throughout the project area, a farmer also indicated the birds breed near one on the dams (see section 6.1).

Neotis ludwigii (Ludwig's Bustard) is listed as EN both locally and internationally. This species is found in the desert, grassland and shrubland specifically in rocky areas such as mountains and cliffs. The main reason for the decline in the numbers are ascribed to the collisions with power lines. Based on the highly suitable habitat, this species were given a high likelihood of occurring.

Phoeniconaias minor (Lesser Flamingo) is listed as NT on a global and regional scale whereas *Phoenicopterus roseus* (Greater Flamingo) is listed as NT on a regional scale only. Both species have similar habitat requirements and the species breed on large undisturbed alkaline and saline lakes, salt pans or coastal lagoons, usually far out from the shore after seasonal rains have provided the flooding necessary to isolate remote breeding sites from terrestrial predators and the soft muddy material for nest building (IUCN, 2017). Some suitable water sources can be found in the project area where both species might occur, and these species have a high likelihood of occurrence.

Sagittarius serpentarius (Secretarybird) occurs in sub-Saharan Africa and inhabits grasslands, open plains, and lightly wooded savanna. It is also found in agricultural areas and sub-desert (IUCN, 2017). Two breeding pairs were observed in the project area.

6 Field Assessment

6.1 First Assessment

One hundred and twenty-four (124) bird species were recorded across all properties in the first survey. The full list of species recorded, their threat status, guild and location observed is shown in Appendix C. A list of the species incidentally recorded moving between point count locations are provided in Appendix D. Seven of the species recorded were SCCs on a national or international scale. The species were some observe on a single sighting, while others were observed on numerous occasions throughout the project area (Figure 6-1, Figure 6-2 and Table 6-1).

Table 6-1 Species of conservation concern observed during the first field survey. EN = Endangered, LC = Least Concern, NT = Near Threatened and VU = Vulnerable

Common Name	Species	Conservation Status		Total Birds	Total Sightings
		Regional (SANBI, 2016)	IUCN (2021)		
Kori Bustard	*Ardeotis kori*	NT	NT	15	8

Verreaux's Eagle	*Aquila verreauxii*	VU	LC	11	7
Blue Crane	*Grus paradisea*	NT	VU	81	20
Secretarybird	*Sagittarius serpentarius*	VU	EN	10	8
Tawny Eagle	*Aquila rapax*	EN	VU	4	2
Black Harrier	*Circus maurus*	EN	EN	1	1
Blue Korhaan	*Eupodotis caerulescens*	LC	NT	2	1

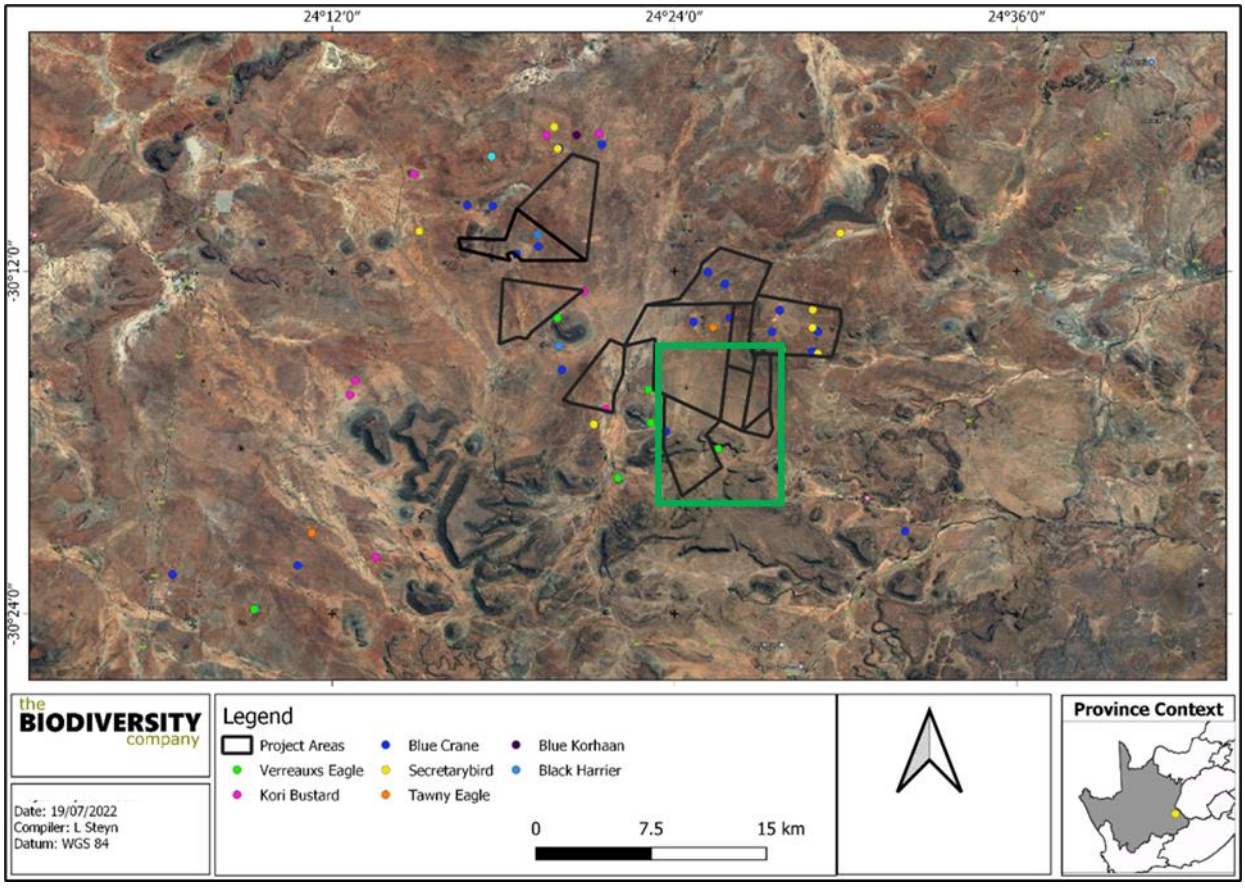

Figure 6-1 The location of the recordings of the species of conservation concern. The green square indicates the Ruspoort 1 Project area.

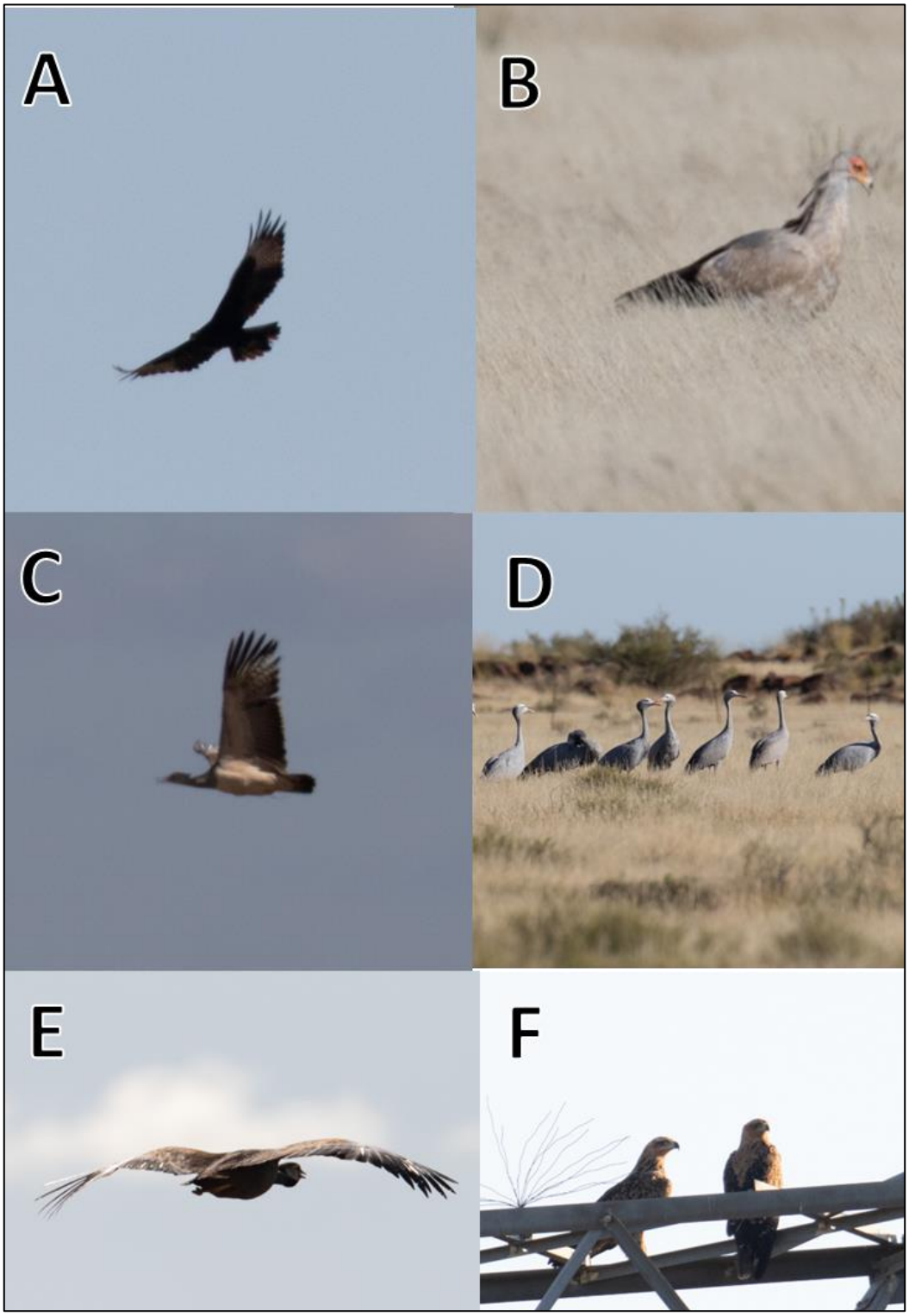

Figure 6-2 ***Photographs of some of the SCCs recorded, A & B) Verreauxs Eagle, B) Secretarybird, C) Kori Bustard, D) Blue Crane, E) Blue Korhaan, and F) Tawny Eagle***

Blue Crane

Grus paradiseus (Blue Crane) are endemic to Southern Africa occurring mainly in the southern and eastern Mpumalanga Highveld through the Free State, KwaZulu-Natal and the Eastern Cape. Blue cranes are omnivorous with their diet consisting of plant material such as small bulbs, seeds and roots, and animals such as insects (especially grasshoppers), small reptiles, frogs, fish, crustaceans and small

mammals (SANBI, 2015). This species has declined, largely owing to direct poisoning, power-line collisions and loss of its grassland breeding habitat owing to afforestation, mining, agriculture and development (IUCN, 2017). This species breeds in natural grass- and sedge-dominated habitats, preferring secluded grasslands at high elevations where the vegetation is thick and short. The risk of powerline collisions is enhanced by their habit to fly in a v-shape formation sometimes at a rate of 60-70km, this increases the likelihood of multiple bird strikes at once.

Secretarybird

Sagittarius serpentarius (Secretarybird) is listed as EN on a global scale (BirdLife International, 2020). The species has a wide distribution across sub-Saharan Africa, but surveyed densities suggest that the total population size does not exceed a five-figure number. Ad-hoc records, localised surveys and anecdotal observations indicate apparent declines in many parts of the species' range, especially in South Africa where reporting rates decreased by at least 60% of quarter degree grid cells used in Southern African Bird Atlas Projects. Threats include excessive burning of grasslands that may suppress populations of prey species, whilst the intensive grazing of livestock is also probably degrading otherwise suitable habitat. Disturbance by humans is likely to negatively affect breeding. The species is captured and traded; however, it is unknown how many deaths occur in captivity and transit. Direct hunting and nest-raiding for other uses and indiscriminate poisoning at waterholes are also further threats. A proposed conservation action is that landowners of suitable properties should join biodiversity stewardship initiatives and to manage their properties in a sustainable way for the species' populations.

Blue Korhaan

Eupodotis caerulescens (Blue Korhaan) is endemic to South Africa and Lesotho and occurs in grassveld usually over 1 500 m above sea level, preferring open, fairly short grassland and a mixture of grassland and karoo dwarf-shrubland within 1 km of water, with termite mounds and few or no trees (BirdLife International, 2017). The total global population is estimated to number between 12 000-15 000 individuals, equivalent to 8 000-10 000 mature individuals, with a decreasing population trend. The main threat is intensive agriculture, especially within the east of its range.

Black Harrier

Circus maurus (Black Harrier) is endemic to southern Africa, where its core range is in the Western Cape, but also occurs in the Eastern Cape, the Northern Cape and Free State (where it is irruptive in both areas), Lesotho and Namibia (BirdLife International, 2021b). The species occupies coastal and montane fynbos, highland grasslands, Karoo subdesert scrub, open plains with low shrubs and croplands. It often breeds close to coastal and upland marshes with tall shrubs or reeds, occurring in dry steppe and grassland areas further north in the non-breeding season. Local fluctuations in breeding numbers may be related to population cycles in its prey base, such as mice whose numbers fluctuate with rainfall, especially in the more arid regions. The total population is estimated at < 1 000 individuals in South Africa, Lesotho and Eswatini (Taylor et al, 2015) with only around 10 mature individuals outside this region. The population is thought to have undergone a major decline of 85% in the past 100 years (17% in 20 years) due to habitat loss (BirdLife International, 2021b). Habitat is primarily lost to agriculture, and this is compounded by the uncontrolled burning of fynbos and grassland, which renders these habitats unsuitable for breeding for about five years. Additional threats include low hatching rates due to pesticide use and overgrazing.

Verreaux Eagle

Aquila verreauxii (Verreaux's Eagle) is found in mountainous and rocky cliff habitat. They are usually found in pairs that remain close for up to 95 % of the day. This monogamous pair are solitary nesters with two nests in their territories, a main and an alternative nest. The nest is a stick structure, up to 1.8m in diameter. They mainly breed on steep inaccessible cliffs, but artificial structures and in some instances large trees are also used. Breeding occurs from April to November (Del Hoyo, 1994). Their diet consist of Hyrax (60%), Vervet Moneys, Chacma Baboons and smaller mammal species. The species is locally

persecuted in southern Africa where it coincides with livestock farms, but because the species does not take carrion, is little threatened by poisoned carcasses. Where hyraxes are hunted for food and skins, eagle populations have declined (Ferguson- Lees and Christie, 2001).

Kori Bustard

Ardeotis kori (Kori Bustard) is listed as NT on a regional and global scale (BirdLife International, 2016a). This species has a large but disjunct range in sub-Saharan Africa, occurring from Ethiopia and Somalia south to Tanzania, and from southern Angola and Zimbabwe south to South Africa. The species occupies flat, arid, mostly open country such as grassland, karoo, bushveld, thornveld, scrubland and savanna but also including modified habitats such as wheat fields and firebreaks. The diet includes a wide range of plants and animals including insects, reptiles, small rodents, birds, carrion, seeds, berries and roots. It is largely sedentary but does undertake local movements. The global population size has not been quantified, but the population in South Africa has been estimated at 2 000-5 000 birds individuals (BirdLife International, 2016c). A major threat is collision with overhead powerlines but the causes of population declines and range losses in many parts of the distribution are unknown. These have been hypothesised to include persecution, rangeland degradation and bush encroachment.

Tawny Eagle

Aquila rapax (Tawny Eagle) is listed as VU on a global scale (BirdLife International, 2021a) and EN on a regional scale (Taylor et al, 2015). This is a widespread raptor occurring over large areas of Sub-Saharan Africa, with isolated populations in North Africa, the Middle East and South Asia, albeit the African population is now becoming increasingly dependent on protected areas (BirdLife International, 2021a). The species occupies dry open from sea level to 3000 m and will occupy both woodland and wooded savannah. Aquila rapax rapax predates on mammals, birds, reptiles, insects, and occasionally fish and amphibians. It will also regularly consume carrion and pirate other raptors' prey. The African population is estimated at 73 860 pairs with a severely declining population at a rate of decline as > 60% over the past 50 years within South Africa, Lesotho and eSwatini. The main threats are secondary poisoning, direct persecution and collisions with powerlines (BirdLife International, 2021a).

6.1.1 Dominant Species

Table 6-2 provide lists of the dominant species for the first survey together with the frequency with which each species appeared in the point count samples. The data shows that Pied Crow, Red-billed Quelea, Spiked-heel Lark and Pink-billed Lark were the most abundant species recorded during the survey. Figure 6-3 shows some of the bird species that were recorded during the survey.

Table 6-2 Dominant avifaunal species within the cluster area during the first survey as defined as those species whose relative abundances cumulatively account for more than 86% of the overall abundance shown alongside the frequency with which a species was detected among point counts.

Common Name	Scientific Name	Relative abundance	Frequency
Pied Crow	*Corvus albus*	0,106	52,632
Red-billed Quelea	*Quelea quelea*	0,106	8,772
Spike-heeled Lark	*Chersomanes albofasciata*	0,104	54,386
Pink-billed Lark	*Spizocorys conirostris*	0,082	10,526
Ant-eating Chat	*Myrmecocichla formicivora*	0,066	50,877
Rufous-eared Warbler	*Malcorus pectoralis*	0,056	49,123
Wattled Starling	*Creatophora cinerea*	0,049	3,509
Blue Crane	*Grus paradisea*	0,045	10,526
Desert Cisticola	*Cisticola aridulus*	0,032	29,825

Black-chested Prinia	*Prinia flavicans*	0,030	31,579
Eastern Clapper Lark	*Mirafra fasciolata*	0,030	15,789
Large-billed Lark	*Galerida magnirostris*	0,025	24,561
Northern Black Korhaan	*Afrotis afraoides*	0,024	28,070
Speckled Pigeon	*Columba guinea*	0,021	3,509
Bokmakierie	*Telophorus zeylonus*	0,015	10,526
African Pipit	*Anthus cinnamomeus*	0,014	15,789
Yellow Canary	*Crithagra flaviventris*	0,013	5,263
Kori Bustard	*Ardeotis kori*	0,011	7,018
Verreaux's Eagle	*Aquila verreauxii*	0,008	7,018
Helmeted Guineafowl	*Numida meleagris*	0,008	3,509
Spur-winged Goose	*Plectropterus gambensis*	0,008	1,754

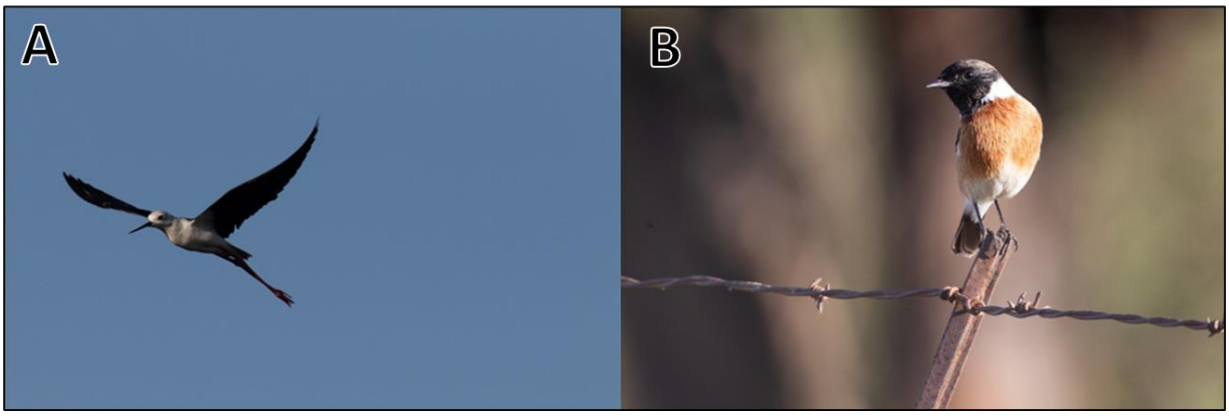

Figure 6-3 Some of the birds recorded in the project area: A) Black-winged Stilt, B) Afircan Stonechat

6.1.2 Trophic Guilds

Trophic guilds are defined as a group of species that exploit the same class of environmental resources in a similar way (González-Salazar *et al,* 2014). The guild classification used in this assessment is as per González-Salazar *et al* (2014); they divided avifauna into 13 major groups based on their diet, habitat, and main area of activity. The analysis of the major avifaunal guilds reveals that the species composition during the survey was dominated by insectivorous birds that feed on the ground during the day, i.e., Invertivore Ground Diurnal (IGD) (41%) (Figure 6-4). Omnivore Multiple Diurnal (OMD), and Granivore Ground Diurnal (GGD) made up the second highest groups (22%, respectively). As illustrated in Figure 6-4, the cluster area was dominated by a few feeding groups.

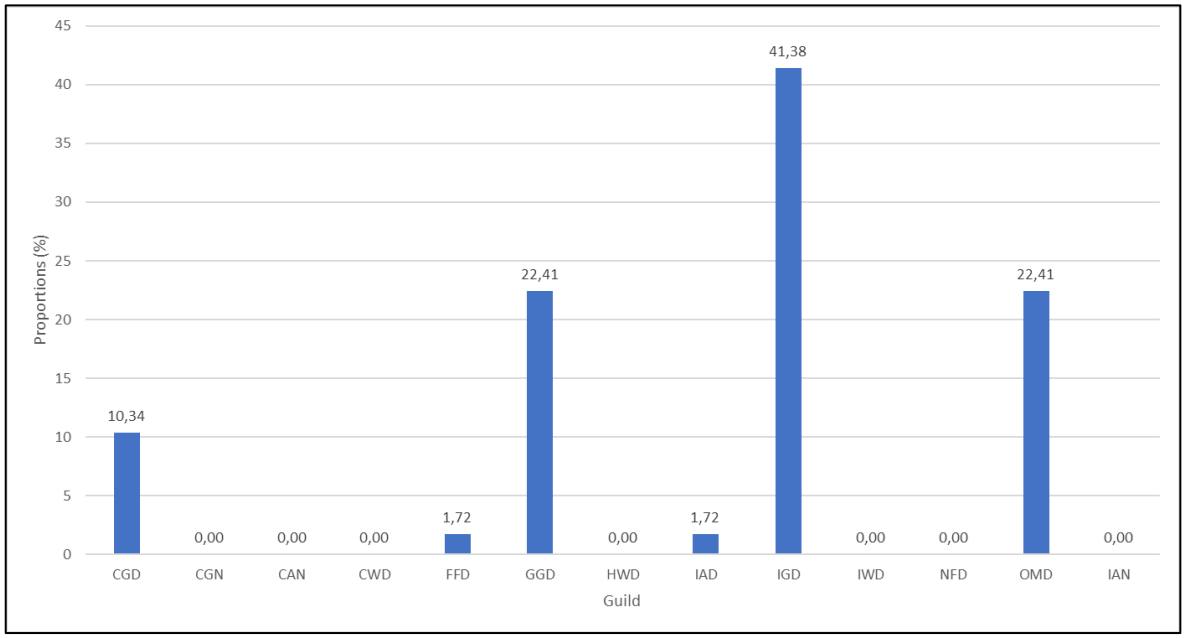

Figure 6-4 ***Avifaunal trophic guilds. CGD, carnivore ground diurnal; CGN, carnivore ground nocturnal, CAN, carnivore air nocturnal, CWD, carnivore water diurnal; FFD, frugivore foliage diurnal; GGD, granivore ground diurnal; HWD, herbivore water diurnal; IAD, insectivore air diurnal; IGD, insectivore ground diurnal; IWD, insectivore water diurnal; NFD, nectivore foliage diurnal; OMD, omnivore multiple diurnal; IAN, Insectivore air nocturnal.***

6.1.3 Risk Species

A number of species were found during the survey that would be regarded as 'high risk' species (Table 6-3 and Figure 6-5 to Figure 6-9). Priority species are susceptible to impacts from energy developments (Ralston Paton *et al.* 2017). These species are typically susceptible to collisions. This list (Ralston Paton *et al.* 2017) was developed initially for use with Wind Energy Facilities; however, the collision, electrocution and habitat loss risks are considered appropriate for renewable energy developments and so are utilised here. Also utilised here is the Eskom and EWT poster: Birds and Powerlines (Eskom and EWT, Date unknown) poster, which identifies birds most prone to collision and electrocution from powerlines. Some birds are not included in these lists, but are considered by the TBC avifauna specialists as risk species for collisions, electrocutions and habitat loss as a result of Solar PV infrastructure. All of species are referred to collectively in this report as "Risk Species". The fence could also pose a collision risk for various species as described in section 8.2.

Table 6-3 ***At risk species found in the survey.***

Common Name	Scientific Name	Collision	Electrocution	Habitat Loss
African Darter	*Anhinga rufa*	x		
African Fish Eagle	*Haliaeetus vocifer*	x	x	
African Harrier-Hawk	*Polyboroides typus*	x	x	
Black Harrier	*Circus maurus*	x	x	x
Black-chested Snake Eagle	*Circaetus pectoralis*		x	
Black-headed Heron	*Ardea melanocephala*	x	x	
Blue Crane	*Grus paradisea*	x		x
Blue Korhaan	*Eupodotis caerulescens*	x	x	x

Egyptian Goose	*Alopochen aegyptiaca*	x	x	
Gabar Goshawk	*Micronisus gabar*		x	
Greater Kestrel	*Falco rupicoloides*		x	
Grey Heron	*Ardea cinerea*	x	x	
Hadeda (Hadada) Ibis	*Bostrychia hagedash*	x	x	
Hamerkop	*Scopus umbretta*	x		
Helmeted Guineafowl	*Numida meleagris*		x	
Jackal Buzzard	*Buteo rufofuscus*	x	x	
Kori Bustard	*Ardeotis kori*	x	x	x
Lanner Falcon	*Falco biarmicus*			x
Northern Black Korhaan	*Afrotis afraoides*	x	x	x
Pale Chanting Goshawk	*Melierax canorus*	x	x	
Pied Crow	*Corvus albus*		x	
Rock Kestrel	*Falco rupicolus*		x	
Secretarybird	*Sagittarius serpentarius*	x		x
South African Shelduck	*Tadorna cana*	x	x	
Spotted Eagle-Owl	*Bubo africanus*		x	
Spur-winged Goose	*Plectropterus gambensis*	x	x	
Tawny Eagle	*Aquila rapax*	x	x	x
Verreaux's Eagle	*Aquila verreauxii*	x	x	x
Western Barn Owl	*Tyto alba*		x	
Western Cattle Egret	*Bubulcus ibis*		x	
White-breasted Cormorant	*Phalacrocorax lucidus*	x	x	
White-faced Whistling Duck	*Dendrocygna viduata*	x	x	
White-necked Raven	*Corvus albicollis*		x	
Yellow-billed Duck	*Anas undulata*	x	x	

Figure 6-5 Some of the high collision risk species recorded on site: A) White-faced Duck and B) Sacred Ibis

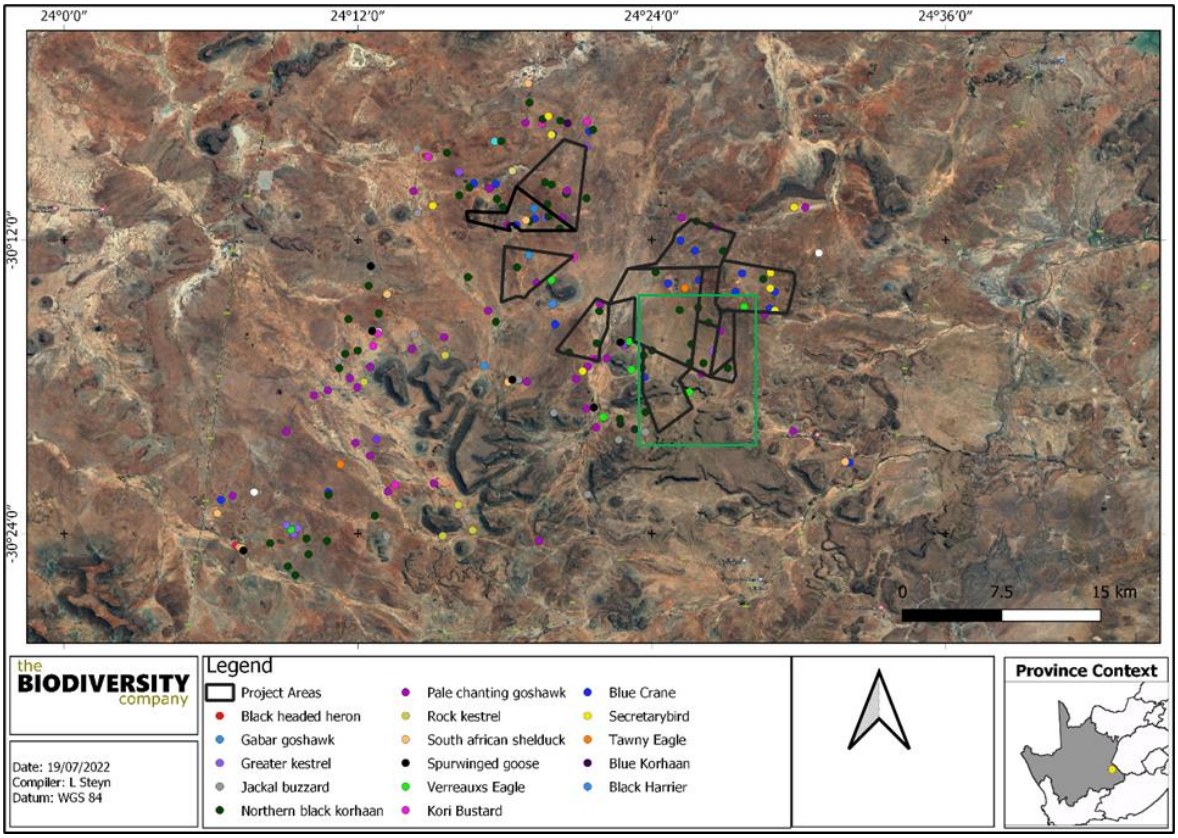

Figure 6-6 Location of some of the risk species observed in and around the project areas. The green square indicates the Ruspoort 1 Project Area.

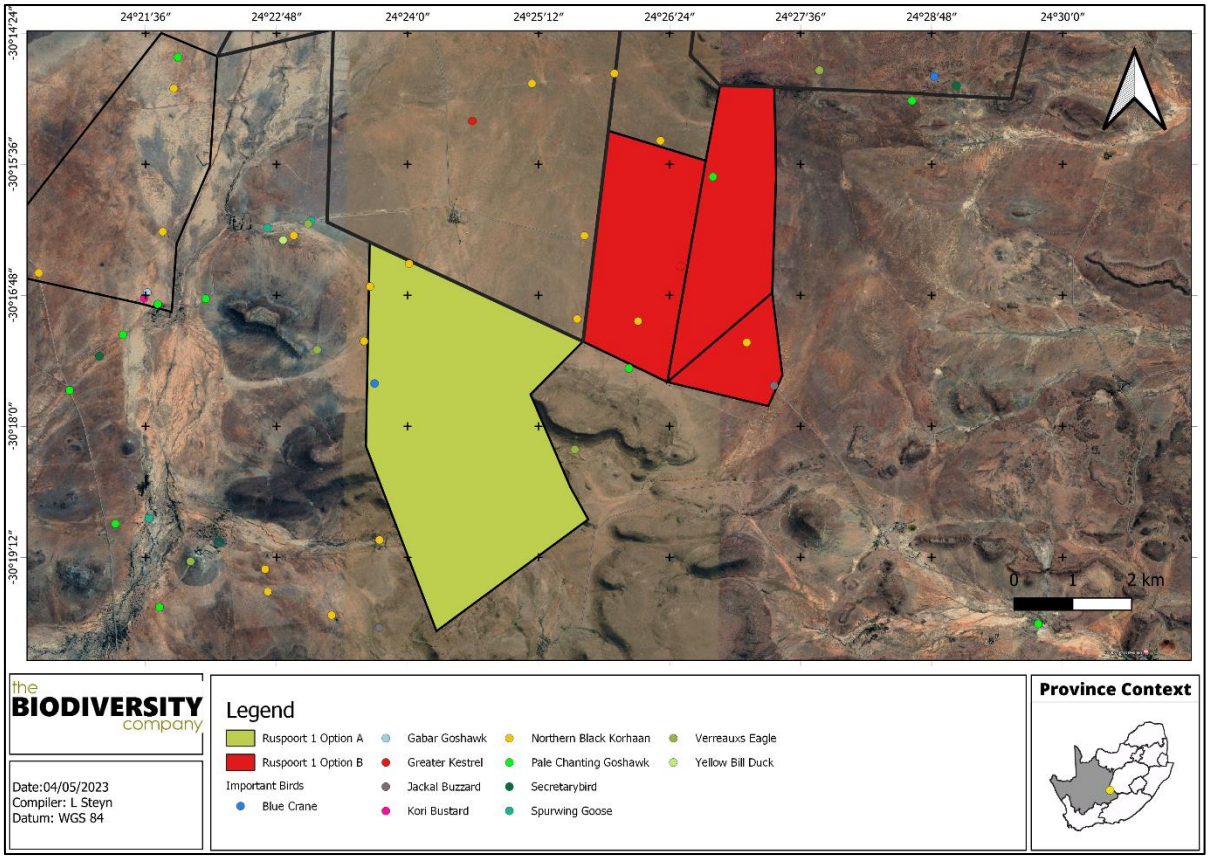

Figure 6-7 The risk species in close proximity to the project area

6.2 Second Assessment

One hundred and two (102) bird species were recorded during the second survey across all areas surveyed. The full list of species recorded, their threat status, guild and location observed is provided in Appendix E, incidental records are listed in Appendix F. Nine of the species recorded were SCC on a national or international scale. They were found in varying degrees of frequency.

Table 6-4 lists the species as well as their threatened status, Figure 6-8 shows the locations where the species were observed and Figure 6-10 provides photographs of these recorded SCC.

Table 6-4 Species of conservation concern observed during the survey (EN = Endangered; VU= Vulnerable, LC = Least Concerned, NT = Near Threatened)

Common Name	Scientific Name	Conservation Status		Total Birds	Total Sightings
		Regional	Global		
Tawny Eagle	*Aquila rapax*	EN	VU	3	2
Verreaux's Eagle	*Aquila verreauxii*	VU	LC	5	3
Kori Bustard	*Ardeotis kori*	NT	NT	1	1
Black Harrier	*Circus maurus*	EN	EN	1	1
Blue Korhaan	*Eupodotis caerulescens*	LC	NT	2	1
Karoo Korhaan	*Eupodotis vigorsii*	NT	LC	3	2
Lanner Falcon	*Falco biarmicus*	VU	NT	1	1
Blue Crane	*Grus paradisea*	NT	VU	69	4
Secretarybird	*Sagittarius serpentarius*	VU	EN	18	12

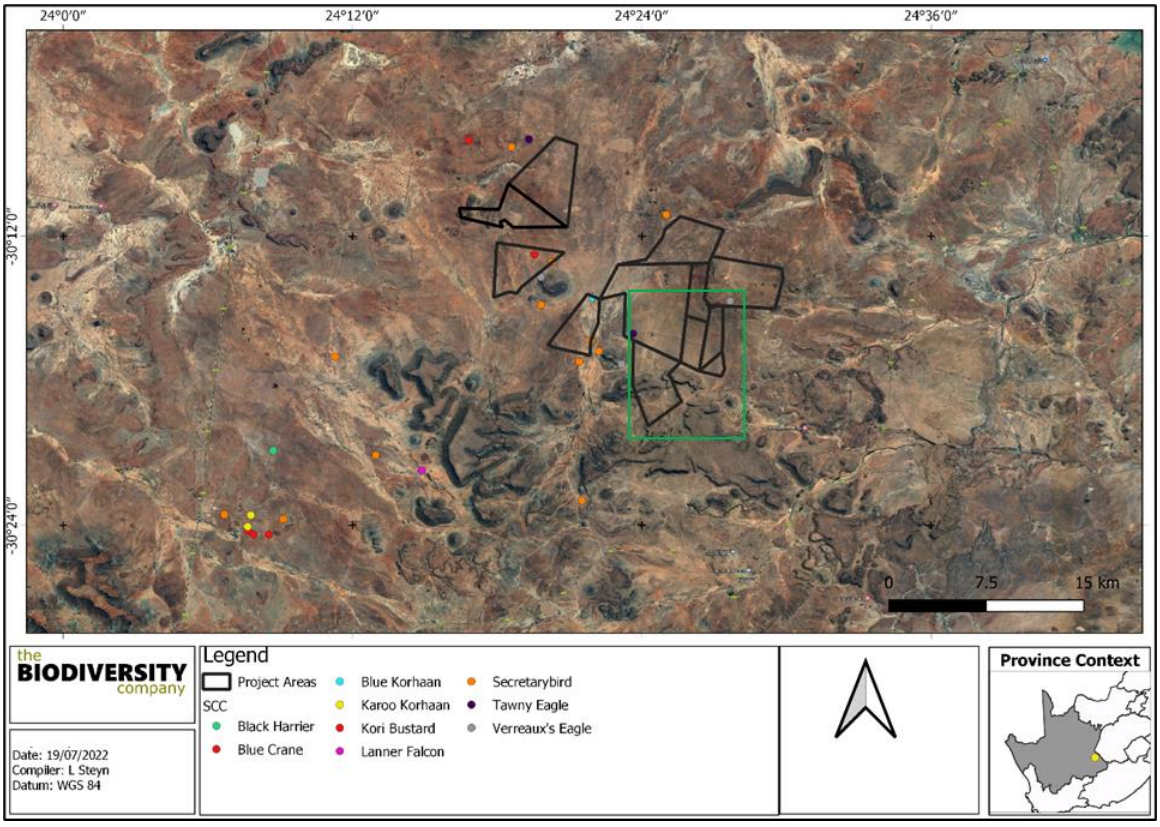

Figure 6-8 The location of the recordings of the species of conservation concern in the 2nd survey. The green square indicates the Ruspoort 1 Project Area.

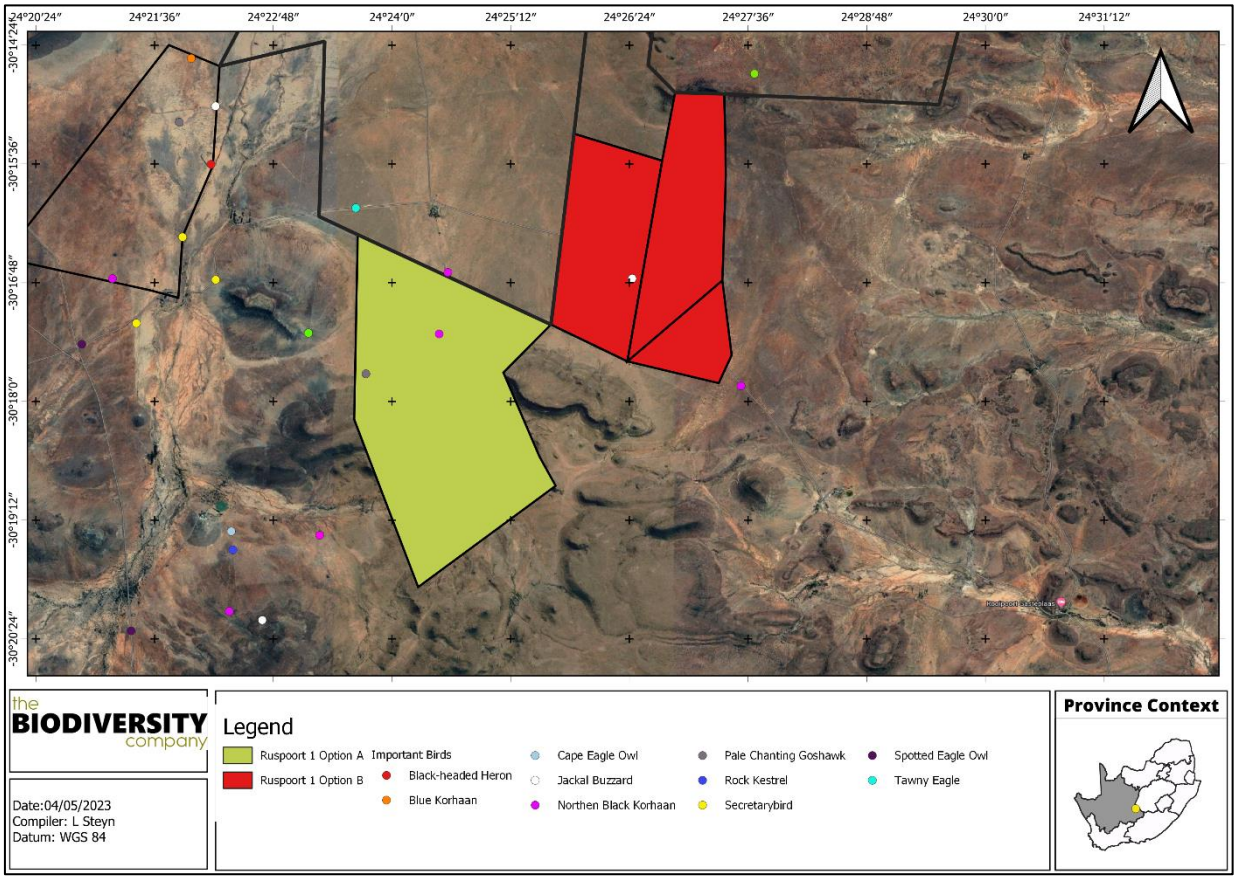

Figure 6-9 The risk species in close proximity to the project area

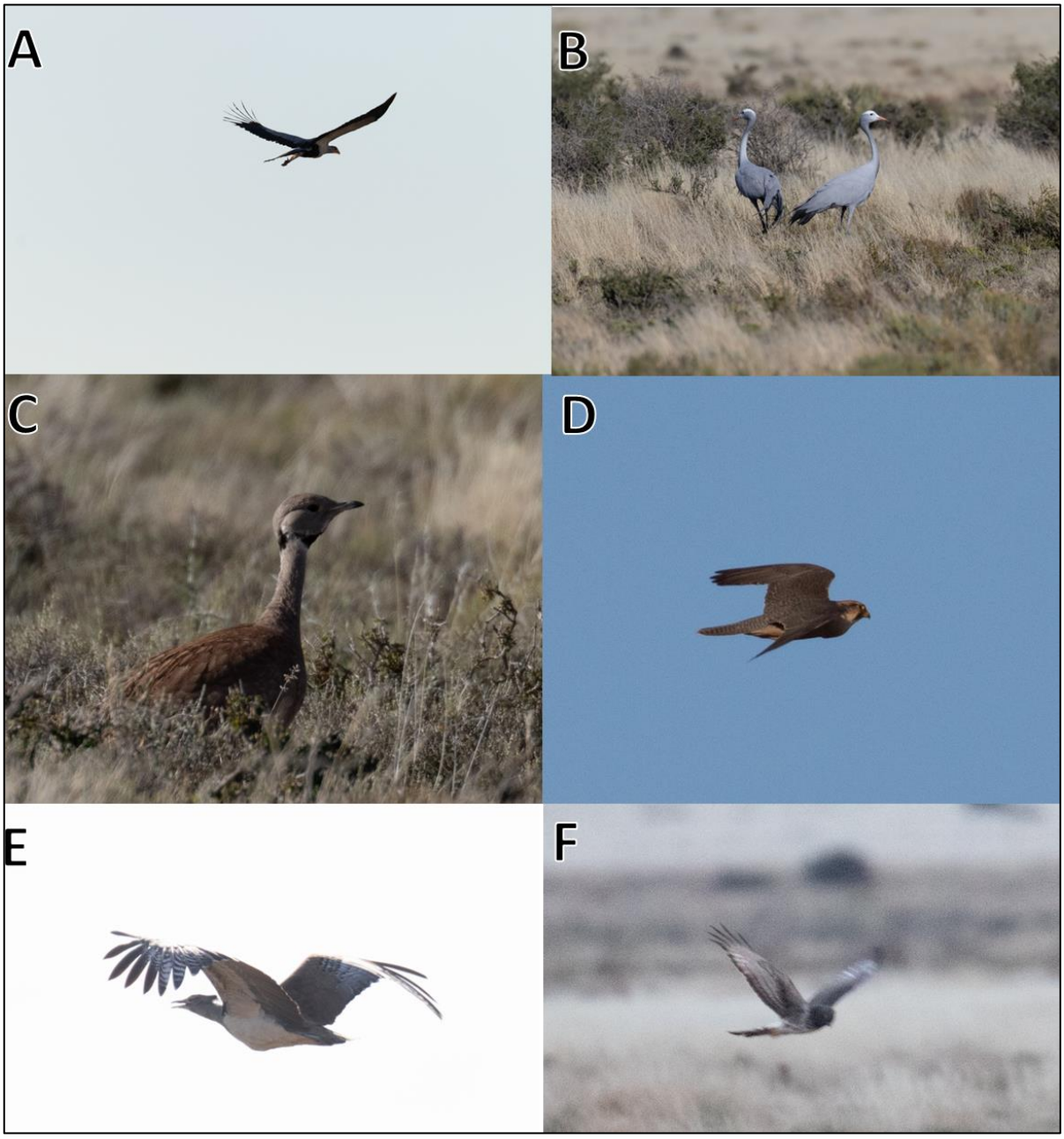

Figure 6-10 Photographs of some of the recorded species, A) Secretarybird, B) Blue Crane, C) Karoo Korhaan, D) Lanner Falcon, E) Kori Bustard, and F) Black Harrier

During the second survey similar SCCs were recorded with the exception of the Karoo Korhaan and Lanner Falcon.

Karoo Korhaan

Eupodotis vigorsii (Karoo Korhaan) is found in dwarf arid shrubland of the Nama Karoo and Succulent Karoo. They are resident and sedentary species which means their movement is restricted to their home range and they do not migrate locally. Their diets consist mainly of invertebrates, reptiles and plant matter, on which they feed while walking along. The pairs are monogamous and often breed in family groups. Helpers can assist in defending the territory or feeding of the young. They nest on the ground with the main egg-laying season being between June and February. Main threats include habitat degradation due to agricultural practices and ecosystem stresses due to climate change (IUCN, 2022).

Lanner Falcon

Falco biarmicus (Lanner Falcon) is native to South Africa and inhabits a wide variety of habitats, from lowland deserts to forested mountains (IUCN, 2017). Global population estimates is more than 30000 breeding pairs, in South Africa it is estimated to be 1400 pairs. They may occur in groups up to 20 individuals, but have also been observed solitary. They are partial and facultative migrants, that breeds from May to early September. Nests are mostly found on cliff ledges, and they may alternate between more than one nest. Their diet is mainly composed of small birds such as pigeons and francolins. Anecdotal evidence suggest these species are susceptible to agrochemicals, another threat to their population is the clearing of grassland habitats (Roberts *et al.,* 2023).

6.2.1 Dominant Species

Table 6-5 lists the dominant species for the second survey together with the frequency with which each species appeared in the point count samples. The data shows the Helmeted Guineafowl, Pink-billed Lark, Spike-heeled Lark, Ant-eating Chat and Pied Crow were the most abundant species during the survey. Figure 6-11 shows some of the birds that were recorded during the survey.

Table 6-5 Dominant avifaunal species within the project site during the winter survey as defined as those species whose relative abundances cumulatively account for more than 88% of the overall abundance shown alongside the frequency with which a species was detected among point counts.

Common Name	Scientific Name	Relative abundance	Frequency (%)
Helmeted Guineafowl	*Numida meleagris*	0,120	6,667
Pink-billed Lark	*Spizocorys conirostris*	0,097	18,333
Spike-heeled Lark	*Chersomanes albofasciata*	0,089	61,667
Ant-eating Chat	*Myrmecocichla formicivora*	0,072	48,333
Pied Crow	*Corvus albus*	0,068	50,000
Desert Cisticola	*Cisticola aridulus*	0,058	61,667
African Quail-finch	*Ortygospiza atricollis*	0,053	6,667
Red-billed Quelea	*Quelea quelea*	0,049	5,000
Rufous-eared Warbler	*Malcorus pectoralis*	0,049	51,667
Eastern Clapper Lark	*Mirafra fasciolata*	0,047	35,000
Large-billed Lark	*Galerida magnirostris*	0,033	33,333
Black-chested Prinia	*Prinia flavicans*	0,025	30,000
Northern Black Korhaan	*Afrotis afraoides*	0,024	21,667
Yellow Canary	*Crithagra flaviventris*	0,018	6,667
Sickle-winged Chat	*Emarginata sinuata*	0,013	13,333
African Pipit	*Anthus cinnamomeus*	0,011	15,000
Cape Sparrow	*Passer melanurus*	0,009	3,333
Common Quail	*Coturnix coturnix*	0,009	6,667
Verreaux's Eagle	*Aquila verreauxii*	0,009	6,667
Bokmakierie	*Telophorus zeylonus*	0,008	8,333
Pale Chanting Goshawk	*Melierax canorus*	0,008	8,333
Wattled Starling	*Creatophora cinerea*	0,008	1,667

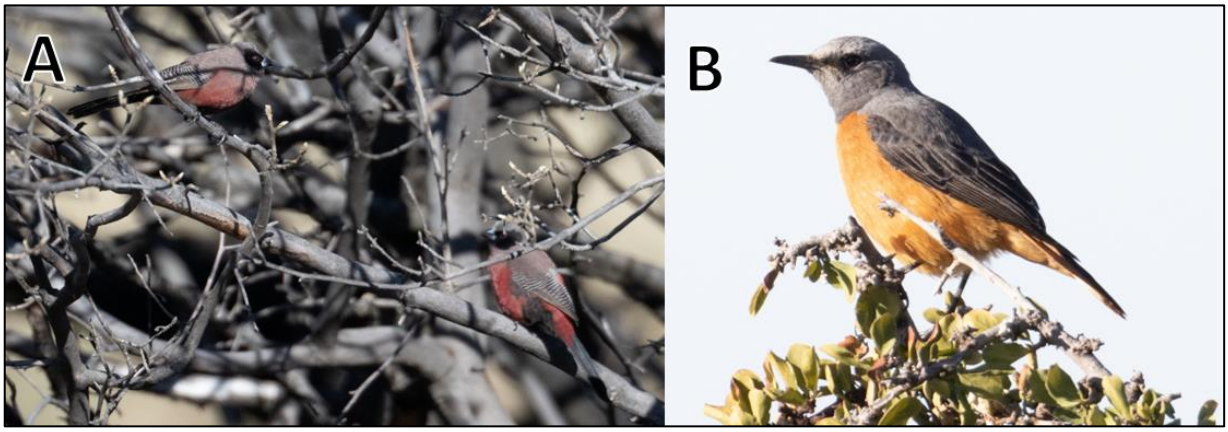

Figure 6-11 Some of the birds recorded in the project area: A) Black-faced Waxbill and B) Short-toed Rock Thrush

6.2.2 Trophic Guilds

Trophic guilds are defined as a group of species that exploit the same class of environmental resources in a similar way (González-Salazar *et al,* 2014). The guild classification used in this assessment is as per González-Salazar *et al* (2014); they divided avifauna into 13 major groups based on their diet, habitat, and main area of activity. The analysis of the major avifaunal guilds reveals that the species composition during the survey was dominated by insectivorous birds that feed on the ground during the day (IGD) (31%) (Figure 6-4 and Figure 6-12). Omnivorous species (OMD) (25 %) made up the second highest groups, followed by the granivores (GGD) (23 %). A higher number of carnivores were observed in the second survey compared to the first survey.

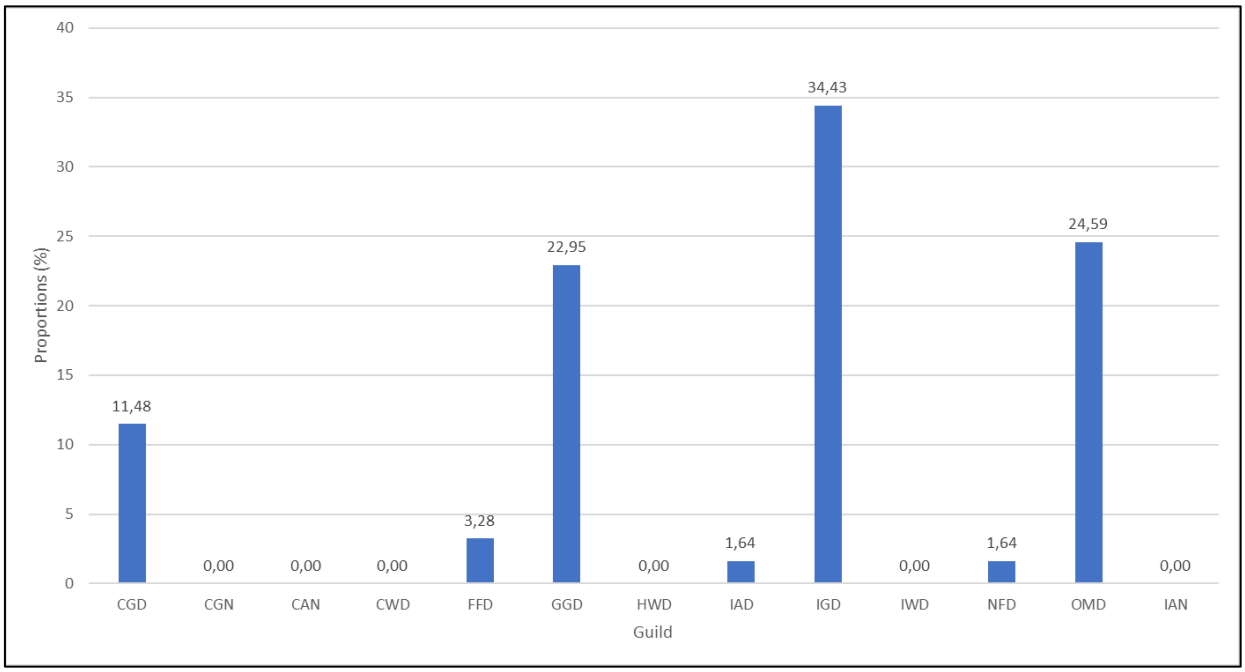

Figure 6-12 Avifaunal trophic guilds. CGD, carnivore ground diurnal; CGN, carnivore ground nocturnal, CAN, carnivore air nocturnal, CWD, carnivore water diurnal; FFD, frugivore foliage diurnal; GGD, granivore ground diurnal; HWD, herbivore water diurnal; IAD, insectivore air diurnal; IGD, insectivore ground diurnal; IWD, insectivore water diurnal; NFD, nectivore foliage diurnal; OMD, omnivore multiple diurnal; IAN, Insectivore air nocturnal.

6.2.3 Risk Species

A number of species were found that would be regarded as 'high risk' species (Table 6-6 and Figure 6-13). High risk species are species that would be sensitive to habitat loss, that are regarded as collision prone species and species that would have a high electrocution risk.

Table 6-6 At risk species found in the 2nd survey.

Common Name	Scientific Name	Collision	Electrocution	Habitat Loss
African Harrier-Hawk	*Polyboroides typus*	x	x	
African Sacred Ibis	*Threskiornis aethiopicus*	x	x	
Black Harrier	*Circus maurus*	x	x	x
Black-headed Heron	*Ardea melanocephala*	x	x	
Blue Crane	*Grus paradisea*	x		x
Blue Korhaan	*Eupodotis caerulescens*	x	x	x
Cape Eagle-Owl	*Bubo capensis*		x	
Egyptian Goose	*Alopochen aegyptiaca*	x	x	
Greater Kestrel	*Falco rupicoloides*		x	
Hadeda (Hadada) Ibis	*Bostrychia hagedash*	x	x	
Helmeted Guineafowl	*Numida meleagris*		x	
Jackal Buzzard	*Buteo rufofuscus*	x	x	
Karoo Korhaan	*Eupodotis vigorsii*	x	x	x
Kori Bustard	*Ardeotis kori*	x	x	x
Lanner Falcon	*Falco biarmicus*			x
Northern Black Korhaan	*Afrotis afraoides*	x	x	x
Pied Crow	*Corvus albus*		x	
Reed Cormorant	*Microcarbo africanus*	x	x	
Rock Kestrel	*Falco rupicolus*		x	
Secretarybird	*Sagittarius serpentarius*	x		x
South African Shelduck	*Tadorna cana*	x	x	
Spotted Eagle-Owl	*Bubo africanus*		x	
Tawny Eagle	*Aquila rapax*	x	x	x
Verreaux's Eagle	*Aquila verreauxii*	x	x	x
White-necked Raven	*Corvus albicollis*		x	

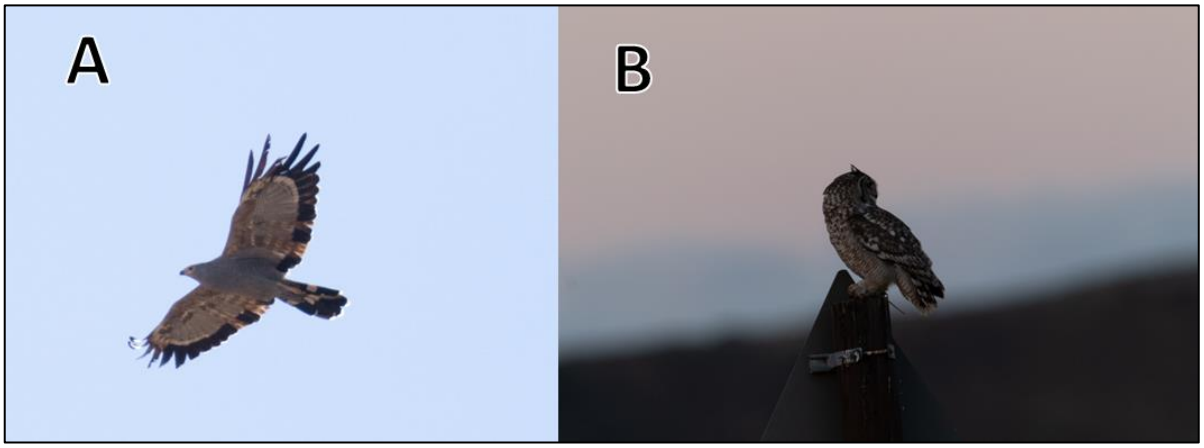

Figure 6-13 Some of the high collision risk species recorded on site: A) African Harrier-Hawk and B) Spotted Eagle Owl

6.3 Nest Analysis

Observing and monitoring nesting sites are important in ascertaining habitat sensitivity and evaluating the impact risk significance of any proposed development. During the field survey recording nesting sites within the larger cluster area were undertaken for certain species. Three active Verreauxs Eagle nests were observed and an additional two inactive nests were also noted. Two active Secretarybird nests were also found. As per the Species Environmental Assessment Guidelines (2020) a core area of 1 km (core buffer) surrounding the nests must be treated as a no-go area, an additional area of 5.2 km (seasonal buffer) was also placed around the nest as per the Birdlife Verreaux's Eagle and Wind Farms Guidelines (2021). This 5.2 km area is based on the average home range of the Verreaux Eagle during the breeding season, and as such this area must be avoided during the breeding season of the species which stretches from April to July to avoid disturbing the species. As per the guidelines buffers were also placed around the inactive nests. For the Secretarybird nests a 4 km buffer were placed around the nests, 2 km must be treated as no go (core buffer), while the other 2 km must be low impact development (low impact buffer) (pers comms Birdlife, 2022). Secretarybirds breeds year around therefore low impact development is required and a breeding season limitation will not suffice. Figure 6-14 further shows the nest locations.

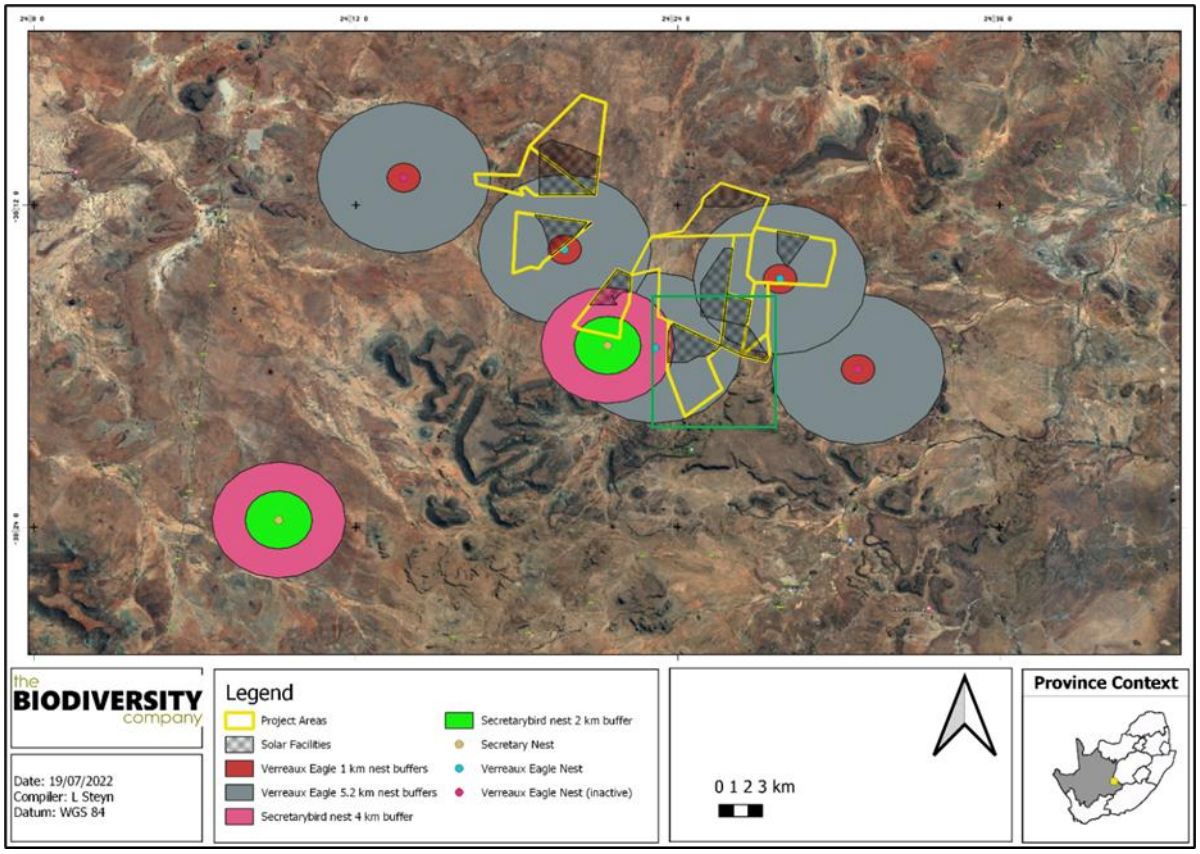

Figure 6-14 Nests of the SCC in the project area and surrounds and their associated buffers. The green square indicates the Ruspoort 1 project area.

7 Fine-Scale Habitat Use

Fine-scale habitats within the landscape are important in supporting a diverse avifauna community as they provide differing nesting, foraging and reproductive opportunities. The assessment area overlapped with three habitat types namely, Grassland Karoo, Shrubland Karoo and Water Resources (Dams, drainage lines and river). These habitats were based on the species compositions in the various areas. The areas of interests outside of the direct footprint were included as these areas could also support species that could be influenced by the development. Habitat types delineated within the direct project footprint and adjacent survey areas are illustrated Figure 7-5. The Water resources were only delineated to the extend it was surveyed in the avifauna assessment and does not represent the true extend of the features. The habitats were only delineated for the areas of interest surrounding the PV plants and not the properties as a whole. Numerous ridges and mountains were surveyed around the project area, as all of them fall outside the project areas they were excluded from the habitat delineations.

Karoo grassland habitat was made up of mainly grass species with some herbs and forbs spread throughout. The grasses in this habitat type formed dense carpets of grass (Figure 7-1). Majority of the habitats where the PV plants are proposed to be placed consisted of grasslands. The grasses found here are mainly found in areas covered by a sandy soils (SANBI, 2022). Drivers in these grasslands consist mainly of livestock grazing. The grasslands Avifauna species found here included African Pipit, Northern Black Korhaan, Large-billed Lark, Desert Cisticola, Common Quail and African Stonechat.

Figure 7-1 Example of the Karoo grassland habitat type

Karoo Shrubland, made up a small section of the delineated habitats. This habitat was dominated by dwarf shrublands, found in lime-rich soil (Figure 7-2). Most of the shrubs are deciduous in response to the rainfall (500-2000mm) (SANBI, 2022). Avifauna species found here includes Rufous-eared Warbler, Karoo Scrub-robin, Yellow Canary, Fairy Flycatcher, Kori Bustard and Sickle-winged Chat.

Figure 7-2 Example of the Karoo Shrubland habitat found in the PAOI

The water resources identified on site consisted of drainage lines, dams and a river (Figure 7-3). These water sources provide crucial habitat and water for the avifauna species found in the area. As per communication with a farmer the one dam also provide breeding habitat for Blue Crane (Figure 7-4), this could not be confirmed during the assessments. Other species found here include: African Fish Eagle, African Spoonbill, Cape Shoveler, Red-billed Teal, South African Shelduck and Spurwing Goose.

Figure 7-3 Examples of the water resources found in the PAOI and surrounds

Figure 7-4 Use of the water features by the Blue Crane

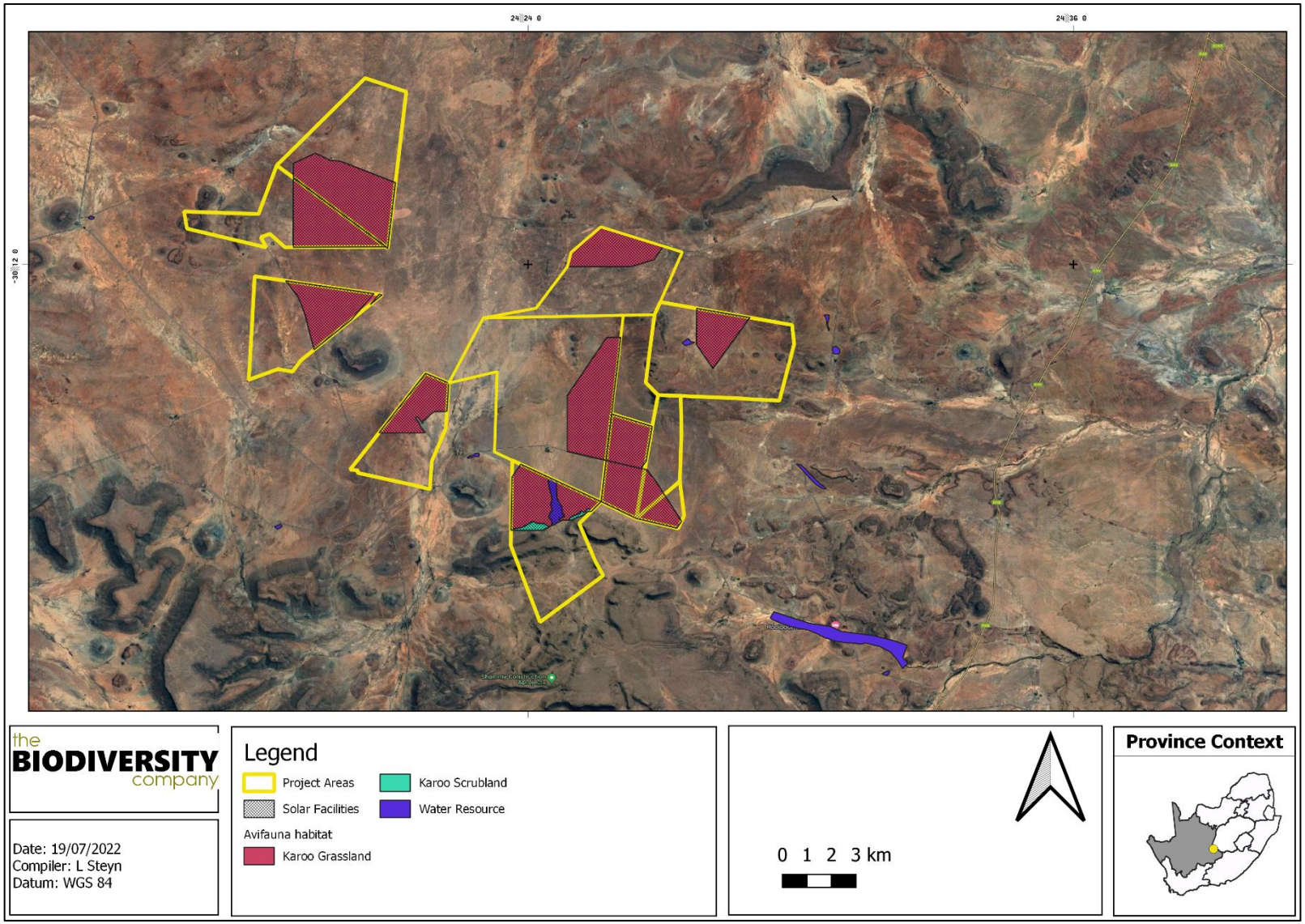

Figure 7-5 The avifauna habitats found in the cluster area.

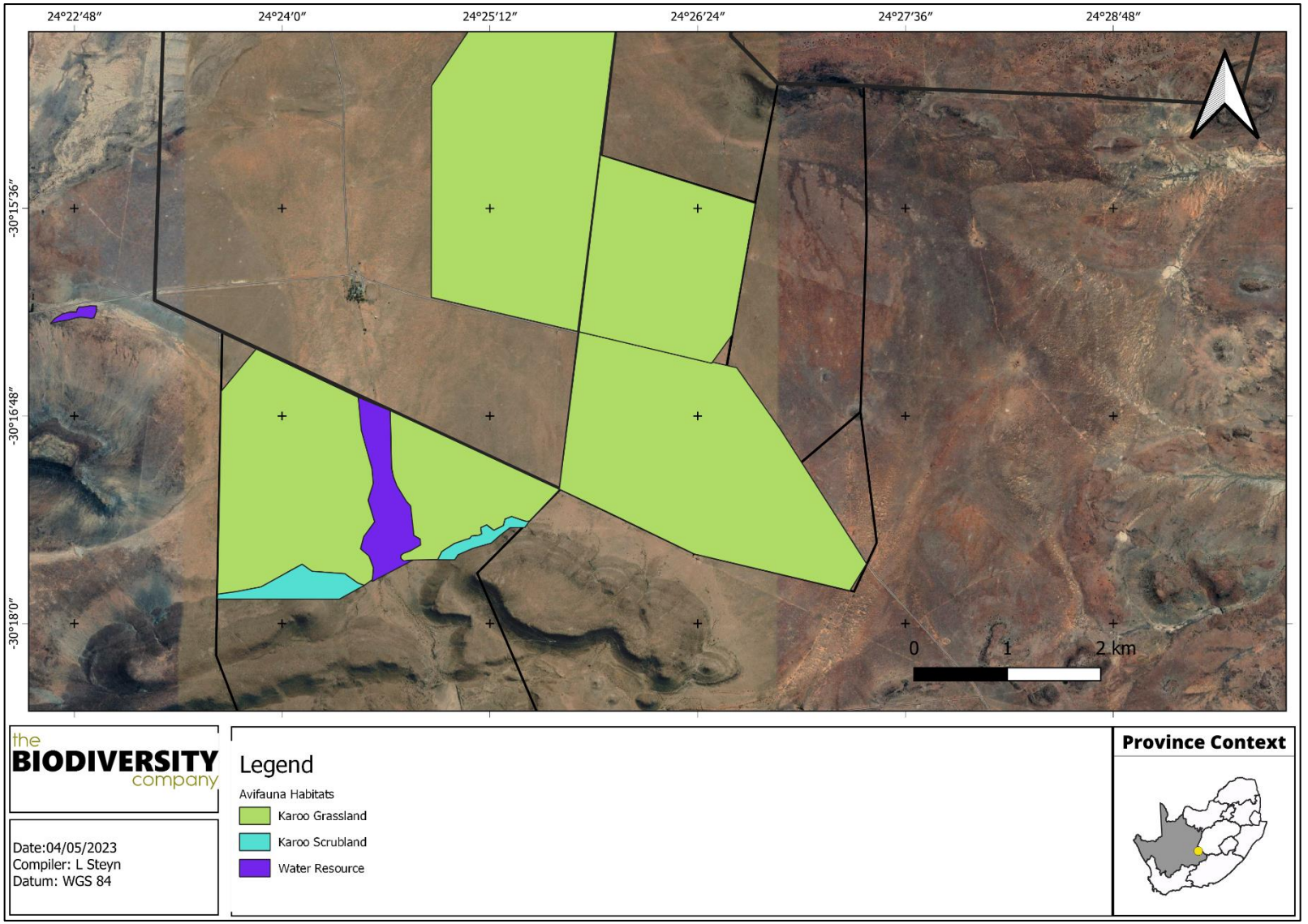

Figure 7-6 The avifauna habitats found in the project area

8 Site Sensitivity

The biodiversity theme sensitivity, as indicated in the screening report, was derived to be Very High, (Figure 8-1) while the fauna sensitivity was rated as 'High' (Figure 8-2). The very high terrestrial sensitivity was due to the ESA1 status of the project area. The Medium fauna sensitivity is based on the known occurrence of both Ludwig's Bustards in the area. The terrestrial sensitivity from an avifauna perspective is confirmed, the animal sensitivity is disputed, it should be rated as high based on the high number of avifauna SCCs present.

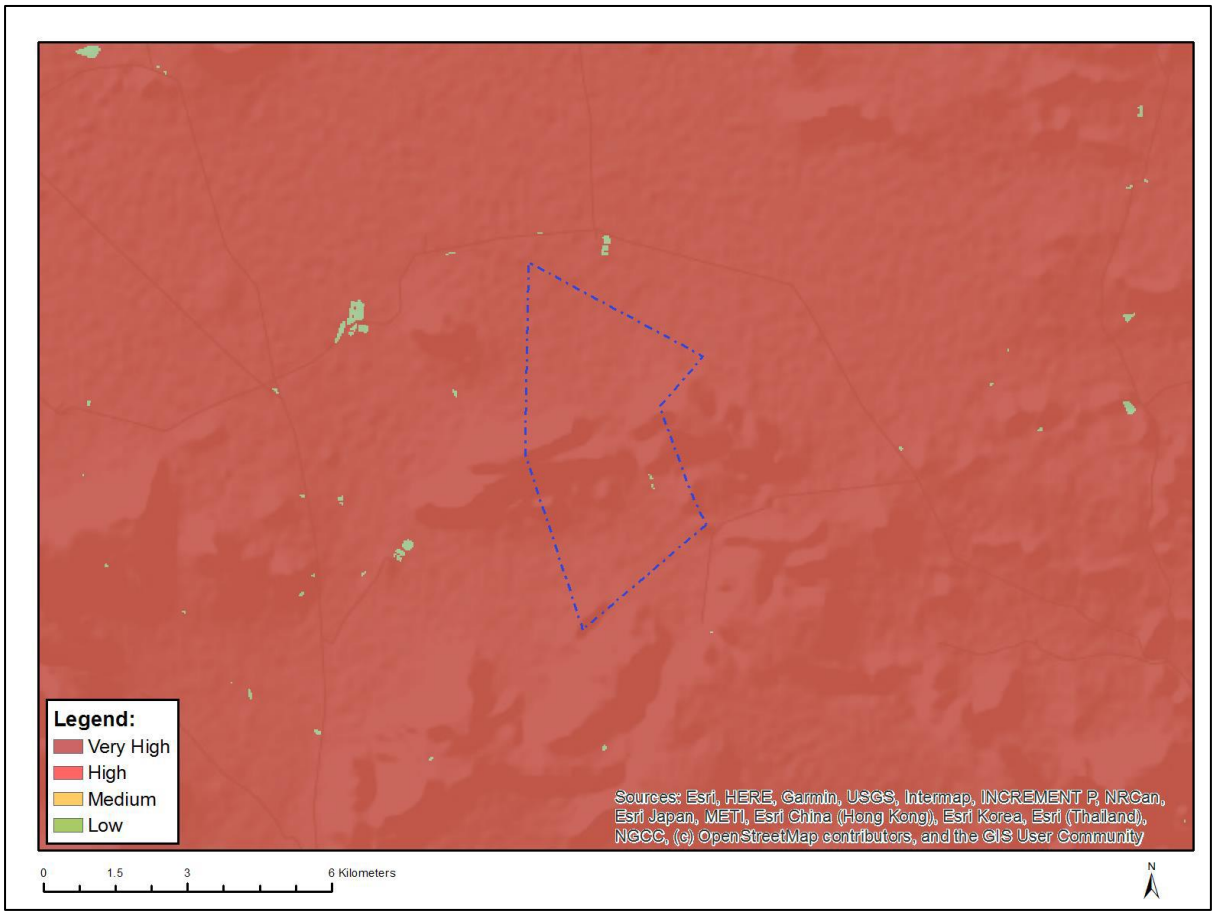

Figure 8-1 Terrestrial Biodiversity Theme Sensitivity, National Web based Environmental Screening Tool

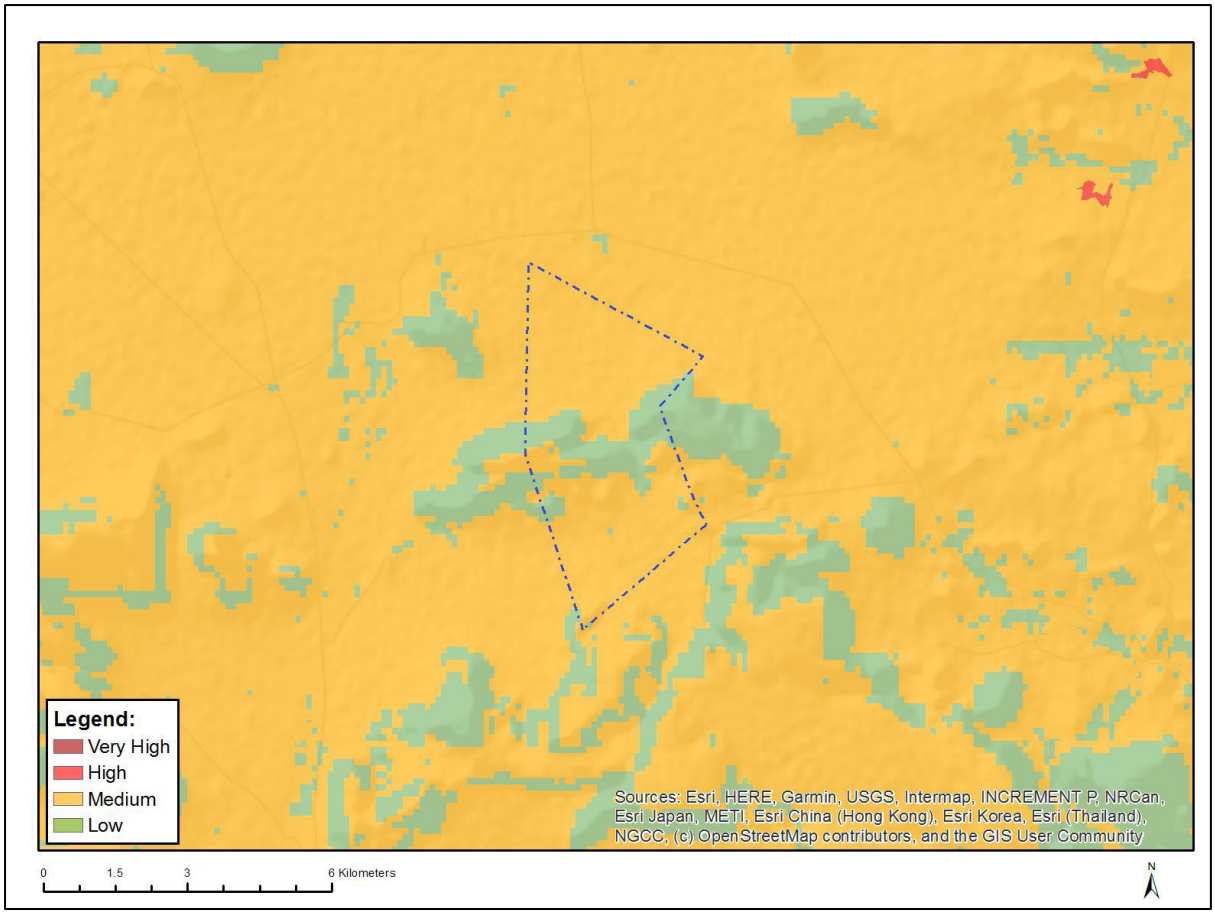

Figure 8-2 Fauna Theme Sensitivity, National Web based Environmental Screening Tool

Sensitivities were compiled for the avifauna study based on the field results and desktop information. Based on the criteria provided in Section 4.3 of this report, all habitats within the assessment area of the proposed project were allocated a sensitivity category (Table 8-1). The sensitivities of the habitat types delineated are illustrated in Figure 8-3, the sensitivities specific to the Ruspoort 1site is shown in Figure 8-4. The Water resources and Nest buffers were given a very high sensitivity based on the low receptor resilience these areas and species will have to change. The Karoo scrubland and Karoo Grasslands all support a large number of SCCs (9 species), the biodiversity importance of these areas are thus high.

Table 8-1 SEI Summary of habitat types delineated within field assessment area of project area

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Karoo grassland	High	High	High	Medium	High
Karoo scrubland	High	High	High	Medium	High
Water resources	High	High	High	Low	Very High
Nest buffers (Core)	High	High	High	Low	Very High
Nest Buffers (Outside)	High	High	High	Medium	High

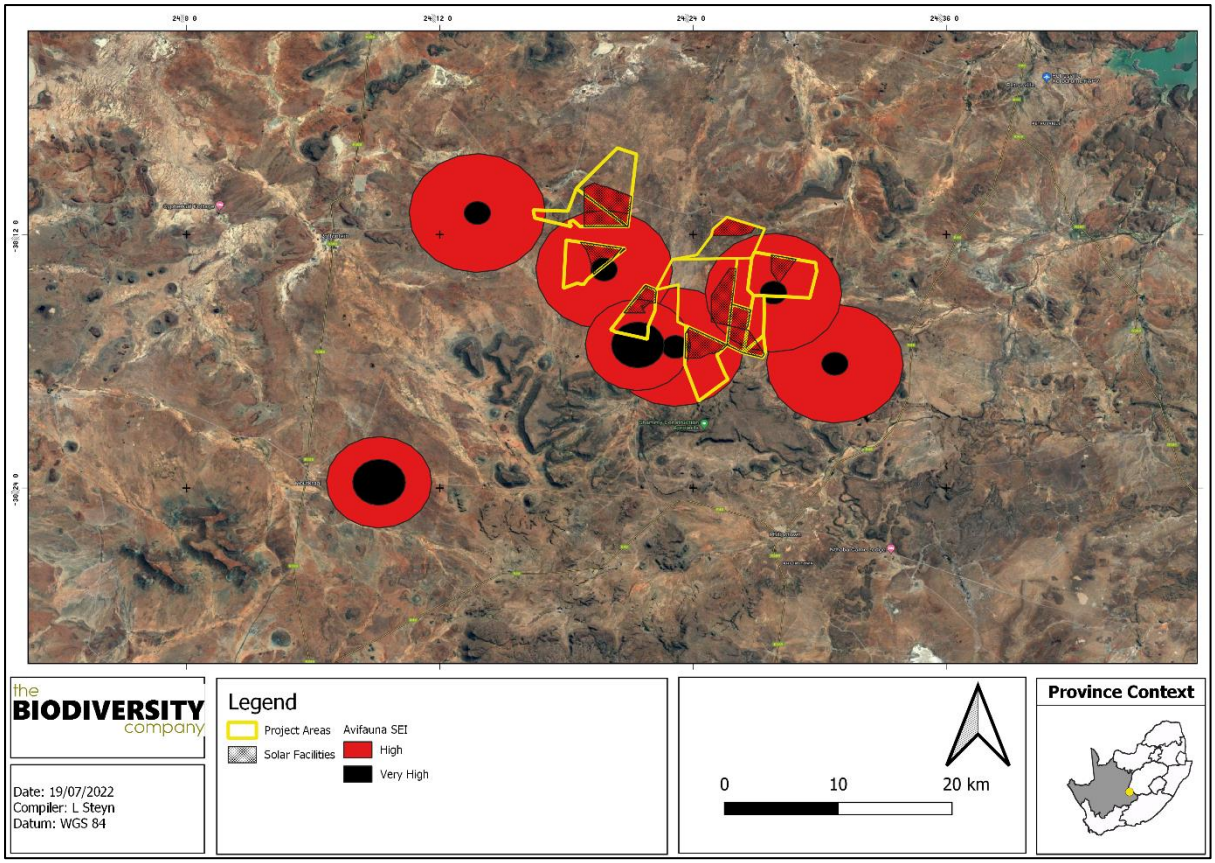

Figure 8-3 Avifauna sensitivities

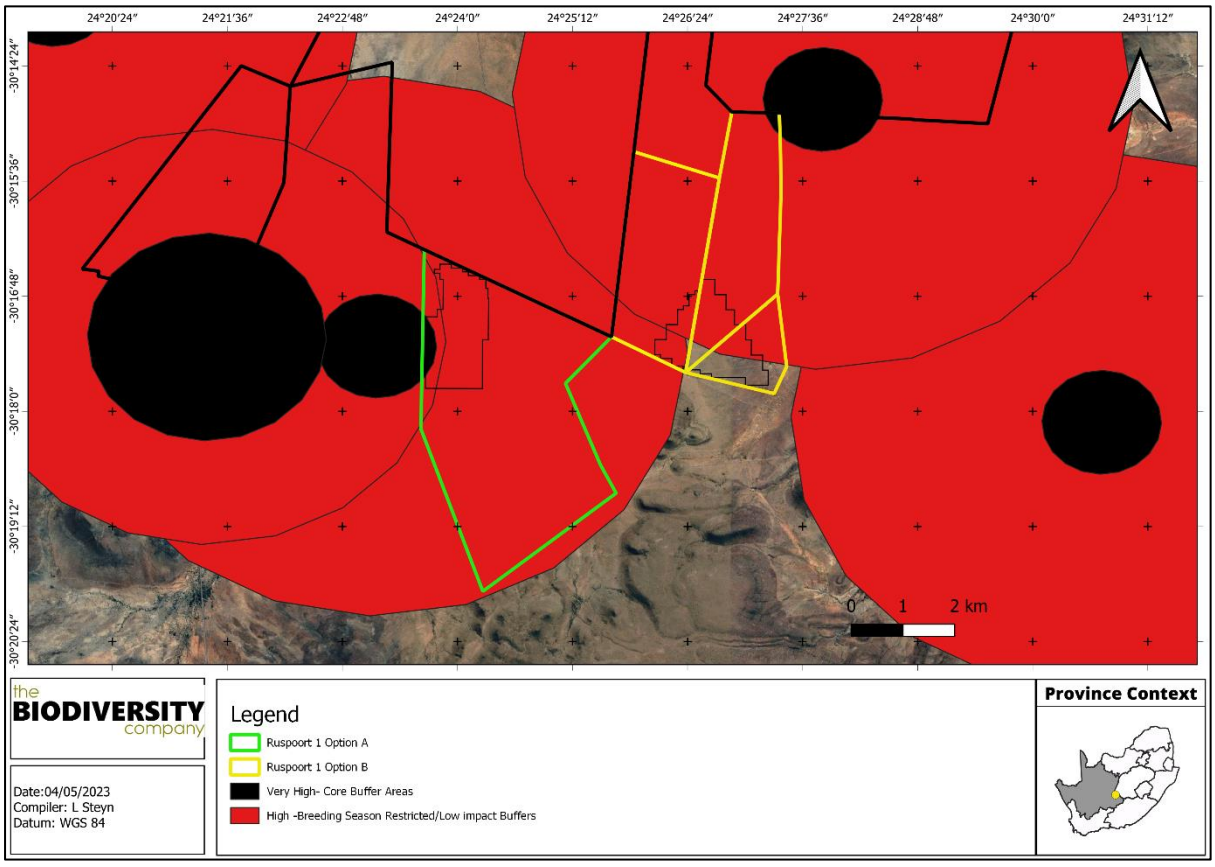

Figure 8-4 Ruspoort 1 Project area in relation to the buffer areas

Interpretation of the SEI in the context of the proposed project is provided in Table 8-2.

Table 8-2 Guidelines for interpreting Site Ecological Importance in the context of the proposed development 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.

9 Impact Assessment

Potential impacts were evaluated against the data captured during the fieldwork and from a desktop perspective to identify relevance to the project site, specifically the proposed development footprint area.

The assessment of the significance of direct, indirect and cumulative impacts was undertaken using the method as developed by Savannah Environmental (Pty) Ltd.

Bennun *et al* (2021) describes three broad types of impacts associated with solar energy development:

- Direct impacts – Impacts that result from project activities or operational decisions that can be predicted based on planned activities and knowledge of local biodiversity, such as habitat loss under the project footprint, habitat frag- mentation as a result of project infrastructure and species disturbance or mortality as a result of project operations.
- Indirect impacts – Impacts induced by, or 'by-products' of, project activities within a project's area of influence.
- Cumulative impacts – Impacts that result from the successive, incremental and/or combined effects of existing, planned and/or reasonably anticipated future human activities in combination with project development impacts.

The assessment of impact significance was undertaken in consideration of the following:

- Extent of impact;
- Duration of impact;
- Magnitude of impact;
- Probability of impact; and
- Reversibility.

The assessment of impact significance considers pre-mitigation as well as implemented post-mitigation scenarios. Three phases were considered for the impact assessment:

- Construction Phase;
- Operational Phase; and

- Closure/Rehabilitation Phase.

9.1 Current Impacts

The current impacts observed during the survey are listed below. Photographic evidence of a selection of these impacts is shown in Figure 9-1.

- Multiple high voltage powerlines;
- Grazing and trampling of natural vegetation by livestock;
- Farm roads and main roads (and associated traffic and wildlife road mortalities);
- Some alien vegetation species; and
- Fences.

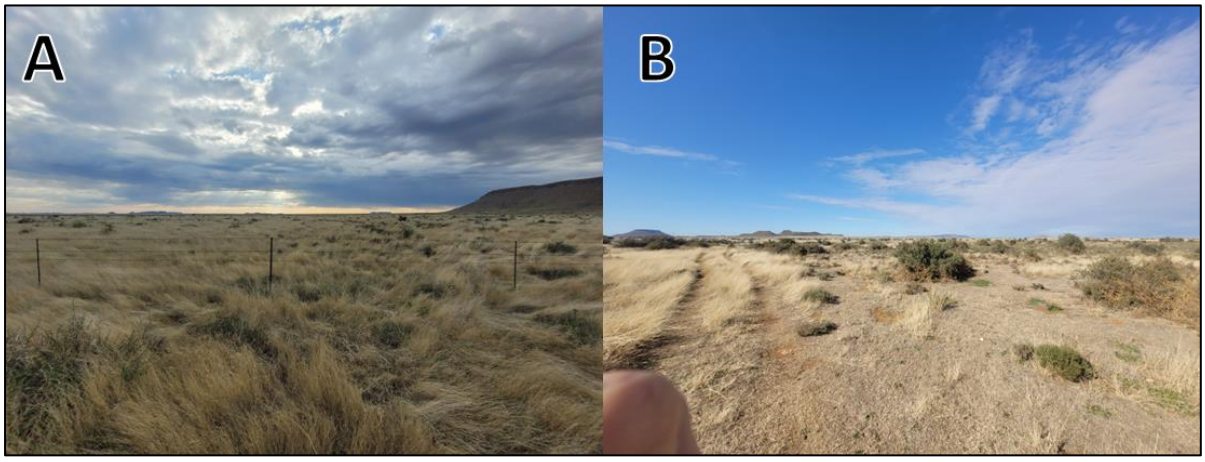

Figure 9-1 Some of the identified impacts within the project area; A) Fences and B) Farm roads.

9.2 Avifauna Impact Assessment

This section describes the potential impacts on avifauna associated with the construction and operational phases of the proposed development and is only relevant to the PV site and associated infrastructure and does not consider the powerline grid system. During the construction phase vegetation clearing and brush cutting of vegetation for the associated infrastructure will lead to direct habitat loss. Vegetation clearing will create a disturbance and will therefore potentially lead to the displacement of avifaunal species. The operation of construction machinery on site will generate noise and cause dust pollution. Should non-environmentally friendly dust suppressants be used, chemical pollution can take place. Increased human presence can lead to poaching and the increase in vehicle traffic will potentially lead to roadkill.

The principal impacts of the operational phase are electrocution, collisions, fencing, chemical pollution due to chemical for the cleaning of the PV panels and habitat loss. Solar panels have been implicated as a potential risk for bird collisions. Collisions are thought to arise when birds (particularly waterbirds) mistake the panels for waterbodies, known as the “lake effect” (Lovich & Ennen, 2011), or when migrating or dispersing birds become disorientated by the polarised light reflected by the panels. This “lake-effect” hypothesis has not been substantiated or refuted to date (Visser *et al.,* 2019). It can however be said that the combination of powerlines, fencing and large infrastructure will influence avifauna species. Visser *et al.* (2019) performed a study at a utility-scale photovoltaic solar energy facility in the Northern Cape and found that most of the species affected by the facility were passerine

species. Larger species were said to be more influenced by the facilities when they were found foraging close by and were disturbed by predators which resulted in collisions.

Large passerines are particularly susceptible to electrocution because owing to their relatively large bodies, they are able to touch conductors and ground/earth wires or earthed devices simultaneously. The chances of electrocution are increased when feathers are wet, during periods of high humidity or during defecation. Prevailing wind direction also influences the rate of electrocution casualties.

Fencing of the PV site can influence birds in six ways (Birdlife SA, 2015);

1. Snagging: Occurs when a body part is impaled on one or more barbs or razor points of a fence.
2. Snaring: When a birds foot/leg becomes trapped between two overlapping wires.
3. Impact injuries: birds flying into a fence, the impact may kill or injure the bird.
4. Snarling: When birds try and push through a mesh or wire stands, ultimately becoming trapped (uncommon).
5. Electrocution: Electrified fence can kill or severely injure birds.
6. Barrier effect: Fences may limit flightless birds (e.g. Moulting waterfowl) from resources.

Chemical pollution from PV cleaning, if not environmentally friendly will result in either long term or short-term poisoning. Should this chemical run into the water sources it would also impact the whole bird population and not just species found in and around the PV footprint.

9.2.1 Alternatives considered

Two location alternatives were provided, Ruspoort 1 option A and Ruspoort 1 option B. Ruspoort 1 Option A overlaps with a 1 km core buffer of a Verreaux Eagle nest, therefore option B is the preferred option.

9.2.2 Loss of Irreplaceable Resources

- Loss of habitat and possible reduction in breeding success of SCCs;
- Loss of ESA; and
- Loss of IBA habitat.

9.3 Assessment of Impact Significance

The assessment of impact significance considers pre-mitigation as well as implemented of post-mitigation scenarios. Although different species and groups will react differently to the development, the risk assessment was undertaken bearing in mind the potential impacts to the priority species listed in this report. All the impacts for option A and B are regarded as similar, with the exception of the Loss and disruption of SCC nests. The impact assessment is based on the development outside of the nest buffer and does not consider development within the nest buffers as these areas are seen as a No-Go area. More mitigations can be seen in section 10.

9.3.1 Construction Phase

The construction of the associated infrastructure (Including BESS) and the PV site has been assessed collectively as their impacts overlap.

The following potential impacts were considered (Table 9-1 till Table 9-4):

- Destruction, fragmentation and degradation of habitats;

- Displacement of avifaunal community (Including several SCC) due to disturbance such as noise, light, dust, vibration;
- Collection of eggs and poaching;
- Roadkill; and
- Loss and disruption of SCC nests.

Table 9-1 Construction activities impacts on the avifauna

Nature:		
Destruction, fragmentation and degradation of habitats;		
	Without mitigation	**With mitigation**
Extent	Regional (4)	Local (3)
Duration	Permanent (5)	Long term (4)
Magnitude	High (8)	High (8)
Probability	Definite (5)	Highly probable (4)
Significance	**High (85)**	**Medium (60)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	To some extent, habitat will still be lost	
Mitigation:		
• The loss of habitat in the project footprint cannot be negated but can be restricted to some extent. The loss of habitat will result in the loss of territory, feeding area, nesting sites and prey availability for numerous species. • The habitat outside the footprint can be protected by implementing the following mitigations: • Construction activity to only be within the project footprint and the area is to be well demarcated. • Areas where vegetation has been cleared must be re-vegetated within local indigenous plant species. • The affected area must be monitored for invasive plant encroachment and erosion and must be controlled. • The use of laydown areas within the development footprint must be used, to avoid habitat loss and disturbance to adjoining areas. • 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 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. • Nest Core Buffers must be regarded as no-go buffers and the seasonal buffers must be avoided from April- July.		
Residual Impacts:		
The loss of habitat is a residual impact that is unavoidable. The disturbance may also cause some erosion and invasive alien plant encroachment. Movement corridors will be disrupted in the area.		

Table 9-2 Construction activities impacts on the avifauna

Nature:		
Displacement of avifaunal community (Including several SCC) due to disturbance such as noise, light, dust, vibration		
	Without mitigation	**With mitigation**
Extent	Regional (4)	Footprint and Surrounds (2)
Duration	Long term (4)	Short term (2)
Magnitude	High (8)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**High (64)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes, but only to a limited extent. The mitigation of noise pollution during construction is difficult to mitigate against	
Mitigation:		
• Minimize disturbance impact by abbreviating construction time. Schedule the activities to avoid breeding and movement time. • Ensure lights are kept to a minimum, lights must be red or green and not white to reduce confusion for nocturnal migrants. Lights should be placed so that they face downward onto working areas and not straight or upward to reduce the sky glow effect. • Dust management need to be done in the areas where the vegetation will be removed, this includes wetting of the soil.		
Residual Impacts:		
Displacement of endemic and SCC avifauna species.		

Table 9-3 Construction activities impacts on the avifauna

Nature:		
Collection of eggs and poaching		
	Without mitigation	With mitigation
Extent	Regional (4)	Footprint and surrounding areas (2)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (48)**	**Low (16)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation:		

- All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting or hunting terrestrial species (e.g., guineafowl and francolin), and owls, which are often persecuted out of superstition.
- Signs must be put up stating that should any person be found poaching any species they will be fined.

Residual Impacts:

There is a possibility that the eggs to be poached could be that of an SCC with decreasing numbers

Table 9-4 Construction activities impacts on the avifauna

Nature:		
Roadkill		
	Without mitigation	With mitigation
Extent	Local (3)	Footprint and Surrounding areas (2)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (44)**	**Low (12)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

- All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area.
- All vehicles (construction or other) accessing the site should adhere to a low speed limit on site (40 km/h max) to avoid collisions with susceptible avifauna, such as nocturnal and crepuscular species (e.g., nightjars and owls) which sometimes forage or rest on roads, especially at night.

Residual Impacts:

Roadkills could still occur

Table 9-5 Construction activities impacts on the avifauna option A

Nature:		
Loss and disruption of SCC nests		
	Without mitigation	With mitigation
Extent	Very high (5)	Very low (1)
Duration	Permanent (5)	Very short term (1)
Magnitude	Very high (10)	None (0)
Probability	Highly probable (4)	Very improbable (1)
Significance	**High (80)**	**Low (2)**
Status (positive or negative)	Negative	Negative

Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes, but only if the nest buffers are treated as no go areas	
Mitigation:		
• This is not the preferred option and can only be mitigated if avoided and construction not take place.		
Residual Impacts:		
Nests can still be disturbed		

Table 9-6 Construction activities impacts on the avifauna option B

Nature:		
Loss and disruption of SCC nests		
	Without mitigation	**With mitigation**
Extent	Very high (5)	High (4)
Duration	Permanent (5)	Long term (4)
Magnitude	Very high (10)	High (8)
Probability	Highly probable (4)	Probable (3)
Significance	**High (80)**	**Medium (48)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes, but only if the nest core buffers are treated as no go areas	
Mitigation:		
• If the nest buffers are not adhered to then this impact cannot be mitigated. The core area of 1 km surrounding the nests must be treated as no-go area, the additional areas must be avoided from April to July to avoid disturbing the species.		
Residual Impacts:		
Nests can still be disturbed		

9.3.2 Operational Phase

The operational phase of the impact of daily activities is anticipated to lead to collisions and electrocutions. Moving vehicles do not only cause sensory disturbances to avifauna, affecting their life cycles and movement, but will lead to direct mortalities due to collisions. The area surrounding the direct footprint will be maintained to prevent uncontrolled events such as fire, this practice will however result in the disturbance and displacement of breeding and non-breeding species.

The following potential impacts were considered (Table 9-7 to Table 9-10):

- Collisions with PV panels, BESS, associated powerlines and connection lines and fences;
- Electrocution with solar plant connections;
- Roadkill during maintenance procedures; and

- Habitat degradation and displacement of resident, visiting and breeding species (as well as SCCs).

Table 9-7 Operational activities impacts on the avifauna

Nature:		
Collisions with PV panels, BESS, associated connection lines and fences		
	Without mitigation	With mitigation
Extent	Regional (4)	Moderate (3)
Duration	Permanent (5)	Long term (4)
Magnitude	Very high (10)	Moderate (6)
Probability	Highly probable (4)	Probable (3)
Significance	**High (76)**	**Medium (39)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation:		

• Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used.
• White strips must be placed on the edge of the solar panels to reduce reflection and prevent collisions.
• If any connection lines are to be placed above ground, they must be marked with industry standard bird flight diverters.
• **During the first year of operation quarterly reports, summarizing interim findings should be complied and submitted to BirdLife South Africa. If the findings indicate that electrocutions have not occurred or are minimal with no red-listed species, an annual report can be submitted.**
• Fencing mitigations:
  ○ Top 2 strands must be smooth wire
  ○ Routinely retention loose wires
  ○ Minimum 30cm between wires
  ○ Place markers on fences		

Residual Impacts:		
Some collisions of SCCs might still occur regardless of mitigations		

Table 9-8 Operational activities impacts on the avifauna

Nature:		
Electrocution with solar plant connections		
	Without mitigation	With mitigation
Extent	Regional (4)	Footprint and Surrounding areas (2)
Duration	Long term (4)	Long term (4)
Magnitude	High (8)	Moderate (6)
Probability	Highly probable (4)	Improbable (2)

Significance	**High (64)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation:		

- Infrastructure should be consolidated where possible/practical in order to minimise the amount of ground and air space used.
- Ensure that monitoring is sufficiently frequent to detect electrocutions reliably and that any areas where electrocutions occurred are repaired as soon as possible.
- During the first year of operation quarterly reports, summarizing interim findings should be complied and submitted to BirdLife South Africa. If the findings indicate that electrocutions have not occurred or are minimal with no red-listed species, an annual report can be submitted.

Residual Impacts:

Electrocutions might still occur regardless of mitigations

Table 9-9 Operational activities impacts on the avifauna

Nature:		
Roadkill during maintenance procedures		
	Without mitigation	With mitigation
Extent	Footprint & surrounding areas (2)	Footprint & surrounding areas (2)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (36)**	**Low (20)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation:		

- All personnel should undergo environmental induction with regards to avifauna and their behaviour on roads.
- All vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed.
- All vehicles accessing the site should adhere to a low speed limit on site (40 km/h max) to avoid collisions with susceptible avifauna, such as nocturnal and crepuscular species (e.g., nightjars and owls) which sometimes forage or rest on roads, especially at night.

Residual Impacts:

Road collisions can still occur regardless of mitigations

Table 9-10 Operational activities impacts on the avifauna

Nature:		
Habitat degradation and displacement of resident, visiting and breeding species (as well as SCCs) in areas affected by maintenance.		
	Without mitigation	With mitigation
Extent	Regional (4)	Local (3)
Duration	Long term (4)	Short term (2)
Magnitude	High (8)	Moderate (6)
Probability	Highly probable (4)	Probable (3)
Significance	**High (64)**	**Medium (33)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	**No, the footprint has already been disturbed. The area surrounding the development can be mitigated to some extent**	
Mitigation:		
• Minimising habitat destruction caused by the maintenance by demarcating the footprint so that it does not increase yearly. • All areas where maintenance must be for example grass cutting walked through prior to any activity to ensure no nests or fauna species are found in the area. Should any Species of Conservation Concern 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.		

9.3.3 Decommissioning Phase

This phase is when the scaling down of activities ahead of temporary or permanent closure is initiated. During this phase, the operational phase impacts will persist until of the activity reduces and the rehabilitation measures are implemented.

The following potential impacts were considered (Table 9-11 to Table 9-12):

- Continued fragmentation and degradation of habitats;
- Displacement of faunal community (including SCC) due disturbance (road collisions, noise, dust, vibration).

Table 9-11 Decommissioning activities impacts on the avifauna

Nature:		
Continued fragmentation and degradation of habitats		
	Without mitigation	With mitigation
Extent	Local (3)	Footprint and surrounding areas (2)
Duration	Short term (4)	Very short term (1)
Magnitude	High (8)	Minor (2)
Probability	Highly probable (4)	Very improbable (1)
Significance	**Medium (52)**	**Low (5)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low

Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

- Implementation of a rehabilitation plan.
- Implementation of an alien invasive management plan and monitoring on an annual basis for 3 years post construction.
- There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous flora.

Residual Impacts:

No significant residual risks are expected, although IAP encroachment and erosion might still occur but would have a negligible impact if effectively managed.

Table 9-12 Decommissioning activities impacts on the avifauna

Nature:

Displacement of faunal community (including SCC) due disturbance (road collisions, noise, dust, vibration).

	Without mitigation	**With mitigation**
Extent	Regional (4)	Local (3)
Duration	Short term (2)	Short term (2)
Magnitude	High (8)	Moderate (6)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium (56)**	**Low (22)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

- Minimize disturbance impact by abbreviating decommissioning time
- Schedule the activities to avoid breeding and movement times report
- Dust management need to be done in the areas where the vegetation will be removed, this includes wetting of the soil. This area must be rehabilitated as soon as possible.
- All vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the decommissioning area.
- All vehicles accessing the site should adhere to a low speed limit on site (40 km/h max) to avoid collisions with susceptible avifauna, such as nocturnal and crepuscular species (e.g., nightjars and owls) which sometimes forage or rest on roads, especially at night.

Residual Impacts:

If this is mitigated and monitored correctly no residual impacts should be present

9.4 Cumulative Impacts

Cumulative impacts are assessed within the context of the extent of the proposed cluster project area, other developments and activities in the area (existing and proposed) and general habitat loss and disturbance resulting from any other anthropogenic activities in the area. The impacts of projects are often assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation this provides a good method of assessing a project's impact. However, in areas where baselines have already been affected, or where future development will continue to add to the impacts in an area or region, it is appropriate to consider the cumulative effects of development or disturbance activities. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a specific point in time may actually represent a significant change from the original state of the system. This section describes the potential cumulative impacts of the project on the local and regional avifauna community.

Localised cumulative impacts include those from operations that are close enough to potentially cause additive effects on the local environment or any sensitive receivers (such as nearby large road networks, other solar PV facilities, and power infrastructure). Relevant activities and impacts include dust deposition, noise and vibration, loss of corridors or habitat, disruption of waterways, groundwater drawdown, groundwater and surface water depletion, and transport activities. Long-term cumulative impacts associated with the site development activities can lead to the loss of endemic and threatened species, including natural habitat and vegetation types, and these impacts can even lead to the degradation of conserved areas such as the adjacent game parks and reserves.

A total area of 30 km surrounding the PAOI were used to assess the total habitat loss in the area and subsequently the cumulative impact. To determine the intact remnant habitat the NBA (2018) remnant spatial data was utilised. The future renewable energy projects were also considered by utilising the REEA Q4 (2022) spatial dataset. In order to remove any duplication, only the areas that overlap with the remanence areas were considered. The total cumulative loss was found to be 16.8% (Table 9-13), a visual representation of this is shown in Figure 9-2. Table 9-14 rates the cumulative impact as Low.

Table 9-13 The cumulative impacts considered for avifauna

Total Area of 30 km^2	Intact Remnant Habitat	REEA area that does not overlap with disturbed areas	Total Disturbed/Transformed habitat	Percentage area lost
494454.44 Ha	460532.1 Ha	49369 Ha	83291.31 Ha	16.8%

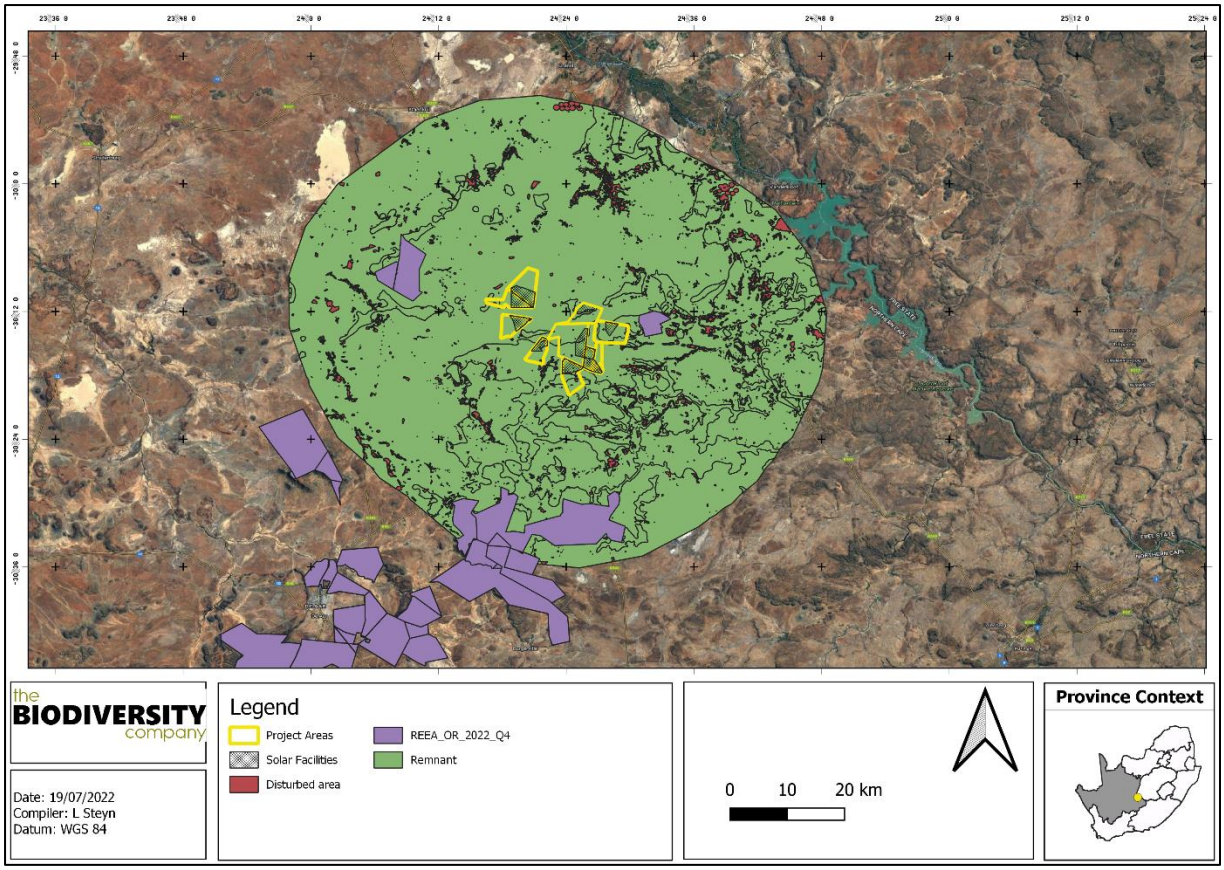

Figure 9-2 Map illustrating the additional renewable energy developments within the landscape overlaid onto the remnant vegetation types

Table 9-14 Cumulative impact of the solar facility

Nature: Cumulative habitat loss within the region		
The development of the proposed infrastructure will contribute to cumulative habitat loss within ESAs and result in the loss of habitat for SCCs		
	Project in isolation	**Project with adjacent PV projects with associated infrastructure**
Extent	Moderate (3)	High (4)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	High (8)
Probability	Probable (3)	Probable (3)
Significance	**Medium (42)**	**Medium (51)**
Status (positive or negative)	Negative	Negative
Reversibility	None	None
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	No	
Mitigation:		
Even though collisions can be mitigated to some extent for individual solar plants their combined densities will increase the rate of collisions. Monitoring of the implementation of mitigation measures needs to be done to ensure the cumulative impact does not become high.		
Residual Impacts:		

Loss of habitat for endemic and SCC. Loss of SCC due to collisions.

10 Specialist Management Plan

The aim of the management outcomes is to present the mitigations in such a way that they can be incorporated into the Environmental Management Programme (EMPr), allowing for more successful implementation and auditing of the mitigations and monitoring guidelines. Table 10-1 to Table 10-4 presents the recommended mitigation measures and the respective timeframes, targets, and performance indicators for the avifaunal study.

Table 10-1 Mitigation measures including requirements for timeframes, roles and responsibilities for this report

OBJECTIVE: Minimise the habitat degradation of avifauna habitats		
Project component/s	Impacts of the PV facility and roads on the avifauna habitat	
Potential Impact	Destruction, fragmentation and degradation of habitats	
Activity/risk source	Without mitigations: High (76) With mitigations: Medium (39)	
Mitigation: Target/Objective	Avoidance / minimisation of the disturbance and degradation of intact vegetation	
Mitigation: Action/control	**Responsibility**	**Timeframe**
• The loss of habitat in the project footprint cannot be negated but can be restricted to some extent. The loss of habitat will result in the loss of territory, feeding area, nesting sites and prey availability for numerous species. • The habitat outside the footprint can be protected by implementing the following mitigations: • Construction activity to only be within the project footprint and the area is to be well demarcated. • Areas where vegetation has been cleared must be re-vegetated within local indigenous plant species. • The affected area must be monitored for invasive plant encroachment and erosion and must be controlled. • The use of laydown areas within the development footprint must be used, to avoid habitat loss and disturbance to adjoining areas. • 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 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. • Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any	Project Manager, Environmental Officer	Construction and Operational Phase

disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type. • Erosion control and alien invasive management plan must be compiled. • A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas. • Nest buffers core areas must be treated as no go areas.		
Performance Indicator	• Project footprint • Roads and path used. • Assess the state of rehabilitation and encroachment of alien vegetation. • Road edges and project site footprint • Erosion and alien invasive species	
Monitoring	• Areas of indigenous vegetation • Nest buffers	

Table 10-2 Mitigation measures including requirements for timeframes, roles and responsibilities for this report

OBJECTIVE: Minimise the displacement of avifaunal community (Including confirmed and possible SCC)		
Project component/s	Impacts of the PV facility and roads on the displacement of avifaunal community	
Potential Impact	Displacement of avifauna and disruption of breeding success of SCC	
Activity/risk source	Without mitigations: High (64) With mitigations: Low (12)	
Mitigation: Target/Objective	Avoidance / minimisation noise, light, vibration and dust disturbance Collection of eggs and poaching Avoid Roadkill	
Mitigation: Action/control	**Responsibility**	**Timeframe**
• Minimize disturbance impact by abbreviating construction time. Schedule the activities to avoid breeding and movement time. • Ensure lights are kept to a minimum, lights must be red or green and not white to reduce confusion for nocturnal migrants. Lights should be placed so that they face downward onto working areas and not straight or upward to reduce the sky glow effect. • Dust management need to be done in the areas where the vegetation will be removed, this includes wetting of the soil. • Environmentally friendly dust suppressants need to be utilised.	Project Manager, Environmental Officer, Avifauna specialist	Duration of project

• The BESS must be enclosed, and the outside surface must be non-reflective to ensure fire is not a risk and that bird collisions does not take place. • All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting or hunting terrestrial species (e.g., guineafowl and francolin), and owls, which are often persecuted out of superstition. • Signs must be put up stating that should any person be found poaching any species they will be fined. • All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area. • All vehicles (construction or other) accessing the site should adhere to a low speed limit on site (40 km/h max) to avoid collisions with susceptible avifauna, such as nocturnal and crepuscular species (e.g., nightjars and owls) which sometimes forage or rest on roads, especially at night.		
Performance Indicator	• Signs must be put up. • Remove any trapping devices and report illegal poaching to authorities. • Implement speed limit to avoid roadkill and dust. • Bird species identification training	
Monitoring	• Continuously monitor noise, light, vibration and dust disturbance. • Monitor Avifauna communities around the proposed footprint.	

Table 10-3 Mitigation measures including requirements for timeframes, roles and responsibilities for this report

OBJECTIVE: Minimise collisions with the proposed project infrastructure		
Project component/s	PV panels, associated power lines and connection lines and fences	
Potential Impact	Mortality and severe injuries	
Activity/risk source	Without mitigations: High (80) With mitigations: Medium (39)	
Mitigation: Target/Objective	Avoidance / minimisation of collision with the proposed project infrastructure.	
Mitigation: Action/control	**Responsibility**	**Timeframe**

• Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used. • White strips must be placed on the edge of the solar panels to reduce reflection and prevent collisions. • If any connection lines are to be placed above ground, they must be marked with industry standard bird flight diverters. • Fencing mitigations: o Top 2 strands must be smooth wire o Routinely retention loose wires o Minimum 30cm between wires o Place markers on fences	Project Manager, Environmental Officer, Avifauna specialist	Duration of project
Performance Indicator	• Number of collision mitigation installed. • Annual walk transects to determine any fatalities. • Fence maintenance done regularly	
Monitoring	• Annual monitoring.	

Table 10-4 Mitigation measures including requirements for timeframes, roles and responsibilities for this report

OBJECTIVE: Minimise electrocution risk		
Project component/s	Connection lines, infrastructure and fences	
Potential Impact	Mortality and severe injuries	
Activity/risk source	Without mitigations: High (64) With mitigations: Low (24)	
Mitigation: Target/Objective	Avoidance / minimisation the number of electrocution with the proposed project infrastructure.	
Mitigation: Action/control	**Responsibility**	**Timeframe**
• Infrastructure should be consolidated where possible/practical in order to minimise the amount of ground and air space used. • All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution. • As far as possible power cables within the project area should be thoroughly insulated and preferably buried.	Project Manager, Environmental Officer, Avifauna specialist	Duration of the project
Performance Indicator	• Number of bird guards and insulation installed. • Annual walk transects to determine any fatalities.	

Monitoring	• Annual monitoring. • An Avifauna Monitoring Management Plan must be implemented with follow-ups of at least two visits per year for four years. However, thereafter annual checks need to be conducted on the condition of the mitigations and needs to be replaced if damaged. The monitoring will be conducted over a period of four years, which will include two annual walk transects along the proposed fence line and around the infrastructure to look at the effectiveness of these mitigations. The location, identity and number of all electrocution and/or collision causalities found must be recorded. • During the first year of operation quarterly reports, summarizing interim findings should be complied and submitted to BirdLife South Africa. If the findings indicate that electrocutions have not occurred or are minimal with no red-listed species, an annual report can be submitted.

11 Monitoring

A follow-up assessment on avian biodiversity and species abundance within the assessment area and surrounding areas must be conducted within one year after the facility has been in operation and should be repeated every 3-5 years. Information obtained from the monitoring must be provided to BirdLife Renewable Energy Programme on energy@birdlife.org.za. The data must be presented as described in Jenkins *et al.,* 2017. Nest monitoring must be done for 4 years as suggested by Birdlife South Africa (Birdlife, 2021) and the details along with the land owner details must be provided to Birdlife South Africa. On completion of each annual period the data can be reviewed to determine the necessity to continue monitoring. Table 11-1 lists monitoring guidelines to be followed.

Table 11-1 Monitoring guidelines

Avian group	Survey Type	Survey objective	Timing
Raptor and larger ground birds	Drive transect & Incidental	To evaluate the population size To determine the abundance of the species and their use of habitat types To determine the effect of the PV on these species	Timing must overlap with birds breeding season as well as for migratory visitors
Passerines	Point Counts	Point count gives you a good representation of the species diversity and distribution throughout the various habitats. Also allows for an understanding of the impact of the PV on the various habitats.	Summer survey must be performed.
All species, but more specifically Secretarybird and Verreauxs Eagle	Nest monitoring	To ensure the breeding patterns and attempts are not interrupted or discontinued nest monitoring will be done from a distance with binoculars.	During the breeding season

12 Conclusion

During the first field assessment 124 bird species were recorded within the larger cluster area of which seven are SCCs on a national or international scale. Kori Bustard (*Ardeotis kori*) (NT Regional, NT International); Verreaux's Eagle (*Aquila verreauxii*) (VU, LC); Blue Crane (*Grus paradisea*) (NT, VU); Secretarybird (*Sagittarius serpentarius*) (EN, EN); Tawny Eagle (*Aquila rapax*) (EN, VU); Black Harrier (*Circus maurus*) (EN, EN) and Blue Korhaan (*Eupodotis caerulescens*) (LC, NT). During the second survey 109 species were recorded, the same group of SCCs were again observed with the addition of the Karoo Korhaan (*Eupodotis vigorsii*) (NT, LC) and Lanner Falcon (*Falco biarmicus*) (VU; NT).

Three active Verreauxs Eagle nests were observed and an additional two inactive nests were also noted. Two active Secretarybird nests were also found. As per the Species Environmental Assessment Guidelines (2020) a core area of 1 km surrounding the nests must be treated as a no-go area, an additional area of 5.2 km was also placed around the nest as per the Birdlife Verreaux's Eagle and Wind Farms Guidelines (2021). This 5.2 km area is based on the average home range of the Verreaux Eagle during the breeding season, and as such this area must be avoided during the breeding season of the species which stretches from April to July to avoid disturbing the species. As per the guidelines buffers were also placed around the inactive nests. For the Secretarybird nests a 4 km buffer were placed around the nests, 2 km must be treated as no go, while the other 2 km must be low impact development (pers comms Birdlife, 2022). Ruspoort 1 option A overlaps with a Verreaux's Eagle nest no-go buffer, therefore option B is the preferred option.

Apart from the disruption of the nests, habitat loss, collisions and electrocutions are regarded as the main impacts. Should the mitigations, monitoring and avoidance guidelines be followed the impacts can be reduced to a Moderate-Low level.

12.1 Impact Statement

- The development within the area of the nest core buffers is regarded as a fatal flaw[1] and no development is to be allowed in these areas.
- In the seasonal/low impact buffer areas construction is permitted, however must be considered with caution based on the high number of species of conservation concern and 'risk' species present. It is recommended that should development take place in the seasonal/ low impact buffers that the rest of the property remain undeveloped.

[1] **Fatal flaw** – in the context of EIA, is a problem, issue or conflict (real or perceived) that could result in the application for a proposed development being rejected or modified by the competent authority. When related to biodiversity, a fatal flaw is usually due to an anticipated impact that would result in irreplaceable and / or irreversible loss of biodiversity (Species Protocols, 2020).

13 References

BirdLife South Africa. (2017). Important Bird Areas Factsheet. http://www.birdlife.org

Birdlife South Africa (2017b). Birds and Solar Energy Best Practice Guidelines. https://www.birdlife.org.za/wp-content/uploads/2020/03/BLSA-Guidelines-Solar-and-Energy.pdf

Birdlife South Africa (2015). Fences & birds, minimising unintended impacts. https://www.birdlife.org.za/what-we-do/landscape-conservation/what-we-do/birds-and-fences/

Coordinated Avifaunal Roadcounts (CAR) (2020). http://car.birdmap.africa/index.php

Del Hoyo, J., Collar, N.J., Christie, D.A., Elliott, A., Fishpool, L.D.C., Boesman, P. & Kirwan, G.M. (1996). HBW and BirdLife International Illustrated Checklist of the Birds of the World. Volume 2: Passerines. Lynx Editions and BirdLife International, Barcelona, Spain and Cambridge, UK.

Department of Forestry, Fisheries and the Environment (DFFE). 2021. SACAD (South Africa Conservation Areas Database) and SAPAD (South Africa Protected Areas Database). http://egis.environment.gov.za

Eskom. (2015). Taylor, M.R., Peacock, F. & Wanless, R.M. (Eds).The 2015 Eskom Red Data Book of birds of South Africa, Lesotho and Swaziland. BirdLife South Africa, Johannesburg.

Hockey, P.A.R., Dean, W.R.J. & Ryan, P.G. (Eds). (2005). Roberts – Birds of Southern Africa, VIIth ed. The Trustees of the John Voelcker Bird Book Fund, Cape Town.

Horvath, G., Blaho, M., Egri A., Kriska, G., Seres, I. & Robertson, B. 2010. Reducing the Maladaptive Attractiveness of Solar Panels to Polarotactic Insects Conservation biology 24 (6) 1644-1653

IUCN. (2021). The IUCN Red List of Threatened Species. www.iucnredlist.org

Jenkins, A.R., van Rooyen, C.S., Smallie, J.J., Harrison., J.A., Diamond., M., Smit-Robinson., H.A. & Ralston., S. (2015). Birds and Wind-Energy Best-Practice Guidelines. Birds and Wind-Energy Best-Practice Guidelines.

Lovich, J.E. & Ennen, J.R. (2011). Wildlife conservation and solar energy development in the desert southwest, United States. BioScience 61:982-992

SANBI-BGIS. 2017. Technical guidelines for CBA Maps: Guidelines for developing a map of Critical Biodiversity Areas & Ecological Support Areas using systematic biodiversity planning.

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

Van Deventer, H., Smith-Adao, L., Mbona, N., Petersen, C., Skowno, A., Collins, N.B., Grenfell, M., Job, N., Lötter, M., Ollis, D., Scherman, P., Sieben, E. & Snaddon, K. 2018. South African National Biodiversity Assessment 2018: Technical Report. Volume 2a: South African Inventory of Inland Aquatic Ecosystems (SAIIAE). Version 3, final released on 3 October 2019. Council for Scientific and Industrial Research (CSIR) and South African National Biodiversity Institute (SANBI): Pretoria, South Africa.

Visser, Elke & Perold, V. & Ralston-Paton, S. & Cardenal, A. C. & Ryan, P.G., 2019. "Assessing the impacts of a utility-scale photovoltaic solar energy facility on birds in the Northern Cape, South Africa," Renewable Energy, Elsevier, vol. 133(C), pages 1285-1294.

14 Appendix Items

14.1 Appendix A: Specialist Declaration of Independence

I, Lindi Steyn, 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.

Lindi Steyn

Biodiversity Specialist

The Biodiversity Company

April 2023

14.2 Appendix B: Expected species

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Acridotheres tristis	Myna, Common	Unlisted	LC
Acrocephalus arundinaceus	Reed-warbler, Great	Unlisted	LC
Acrocephalus baeticatus	Reed-warbler, African	Unlisted	Unlisted
Acrocephalus gracilirostris	Swamp-warbler, Lesser	Unlisted	LC
Acrocephalus schoenobaenus	Warbler, Sedge	Unlisted	LC
Actitis hypoleucos	Sandpiper, Common	Unlisted	LC
Afrotis afraoides	Korhaan, Northern Black	Unlisted	LC
Alopochen aegyptiaca	Goose, Egyptian	Unlisted	LC
Amadina erythrocephala	Finch, Red-headed	Unlisted	LC
Anas capensis	Teal, Cape	Unlisted	LC
Anas erythrorhyncha	Teal, Red-billed	Unlisted	LC
Anas sparsa	Duck, African Black	Unlisted	LC
Anas undulata	Duck, Yellow-billed	Unlisted	LC
Anhinga rufa	Darter, African	Unlisted	LC
Anthoscopus minutus	Penduline-tit, Cape	Unlisted	LC
Anthus cinnamomeus	Pipit, African	Unlisted	LC
Anthus crenatus	Pipit, African Rock	NT	NT
Anthus leucophrys	Pipit, Plain-backed	Unlisted	LC
Anthus nicholsoni	Nicholson's pipit	Unlisted	LC
Anthus nicholsoni	Nicholson's pipit	Unlisted	LC
Apus affinis	Swift, Little	Unlisted	LC
Apus apus	Swift, Common	Unlisted	LC
Apus barbatus	Swift, African Black	Unlisted	LC
Apus bradfieldi	Swift, Bradfield's	Unlisted	LC
Apus caffer	Swift, White-rumped	Unlisted	LC
Apus horus	Swift, Horus	Unlisted	LC
Aquila verreauxii	Eagle, Verreaux's	VU	LC
Ardea alba	Egret, Great	Unlisted	LC
Ardea cinerea	Heron, Grey	Unlisted	LC
Ardea goliath	Heron, Goliath	Unlisted	LC
Ardea intermedia	Egret, Yellow-billed (Intermediate)	Unlisted	LC
Ardea melanocephala	Heron, Black-headed	Unlisted	LC
Ardea purpurea	Heron, Purple	Unlisted	LC
Batis pririt	Batis, Pririt	Unlisted	LC
Bostrychia hagedash	Ibis, Hadeda	Unlisted	LC
Bradypterus baboecala	Rush-warbler, Little	Unlisted	LC

Brunhilda erythronotos	Waxbill, Black Cheecked	Unlisted	LC
Bubo africanus	Eagle-owl, Spotted	Unlisted	LC
Bubulcus ibis	Egret, Cattle	Unlisted	LC
Burhinus capensis	Thick-knee, Spotted	Unlisted	LC
Buteo buteo	Buzzard, Common (Steppe)	Unlisted	LC
Buteo rufofuscus	Buzzard, Jackal	Unlisted	LC
Calandrella cinerea	Lark, Red-capped	Unlisted	LC
Calendulauda africanoides	Lark, Fawn-coloured	Unlisted	LC
Calendulauda sabota	Lark, Sabota	Unlisted	LC
Calidris pugnax	Ruff	Unlisted	LC
Campethera abingoni	Woodpecker, Golden-tailed	Unlisted	LC
Caprimulgus pectoralis	Nightjar, Fiery-necked	Unlisted	LC
Caprimulgus rufigena	Nightjar, Rufous-cheeked	Unlisted	LC
Cecropis cucullata	Swallow, Greater Striped	Unlisted	LC
Cecropis semirufa	Swallow, Red-breasted	Unlisted	LC
Centropus burchellii	Coucal, Burchell's	Unlisted	Unlisted
Cercotrichas coryphoeus	Scrub-robin, Karoo	Unlisted	LC
Cercotrichas paena	Scrub-robin, Kalahari	Unlisted	LC
Certhilauda semitorquata	Lark, Eastern Long-billed	Unlisted	LC
Certhilauda subcoronata	Lark, Karoo Long-billed	Unlisted	LC
Ceryle rudis	Kingfisher, Pied	Unlisted	LC
Charadrius hiaticula	Plover, Common Ringed	Unlisted	LC
Charadrius pecuarius	Plover, Kittlitz's	Unlisted	LC
Charadrius tricollaris	Plover, Three-banded	Unlisted	LC
Chersomanes albofasciata	Lark, Spike-heeled	Unlisted	LC
Chlidonias hybrida	Tern, Whiskered	Unlisted	LC
Chrysococcyx caprius	Cuckoo, Diderick	Unlisted	LC
Chrysococcyx klaas	Cuckoo, Klaas's	Unlisted	LC
Ciconia abdimii	Stork, Abdim's	NT	LC
Ciconia ciconia	Stork, White	Unlisted	LC
Cinnyris fuscus	Sunbird, Dusky	Unlisted	LC
Cisticola aridulus	Cisticola, Desert	Unlisted	LC
Cisticola fulvicapilla	Neddicky, Neddicky	Unlisted	LC
Cisticola juncidis	Cisticola, Zitting	Unlisted	LC
Cisticola subruficapilla	Cisticola, Grey-backed	Unlisted	LC
Cisticola textrix	Cisticola, Cloud	Unlisted	LC
Cisticola tinniens	Cisticola, Levaillant's	Unlisted	LC
Colius colius	Mousebird, White-backed	Unlisted	LC
Colius striatus	Mousebird, Speckled	Unlisted	LC

Columba guinea	Pigeon, Speckled	Unlisted	LC
Columba livia	Dove, Rock	Unlisted	LC
Corvus albicollis	Raven, White-necked	Unlisted	LC
Corvus albus	Crow, Pied	Unlisted	LC
Corythornis cristatus	Kingfisher, Malachite	Unlisted	Unlisted
Cossypha caffra	Robin-chat, Cape	Unlisted	LC
Creatophora cinerea	Starling, Wattled	Unlisted	LC
Crithagra albogularis	White-throated Canary	LC	LC
Crithagra atrogularis	Canary, Black-throated	Unlisted	LC
Crithagra flaviventris	Canary, Yellow	Unlisted	LC
Curruca layardi	Tit-Babbler, Layard's	Unlisted	LC
Curruca subcoerulea	Tit-babbler, Chestnut-vented	Unlisted	Unlisted
Cursorius rufus	Courser, Burchell's	VU	LC
Cypsiurus parvus	Palm-swift, African	Unlisted	LC
Delichon urbicum	House-martin, Common	Unlisted	LC
Dendrocygna viduata	Duck, White-faced Whistling	Unlisted	LC
Dendropicos fuscescens	Woodpecker, Cardinal	Unlisted	LC
Dicrurus adsimilis	Drongo, Fork-tailed	Unlisted	LC
Egretta garzetta	Egret, Little	Unlisted	LC
Elanus caeruleus	Kite, Black-shouldered	Unlisted	LC
Emarginata schlegelii	Chat, Karoo	Unlisted	LC
Emarginata sinuata	Chat, Sickle-winged	Unlisted	LC
Emberiza capensis	Bunting, Cape	Unlisted	LC
Emberiza impetuani	Bunting, Lark-like	Unlisted	LC
Emberiza tahapisi	Bunting, Cinnamon-breasted	Unlisted	LC
Eremomela icteropygialis	Eremomela, Yellow-bellied	Unlisted	LC
Eremopterix verticalis	Sparrowlark, Grey-backed	Unlisted	LC
Estrilda astrild	Waxbill, Common	Unlisted	LC
Euplectes afer	Bishop, Yellow-crowned	Unlisted	LC
Euplectes orix	Bishop, Southern Red	Unlisted	LC
Eupodotis vigorsii	Korhaan, Karoo	NT	LC
Falco biarmicus	Falcon, Lanner	VU	LC
Falco naumanni	Kestrel, Lesser	Unlisted	LC
Falco peregrinus	Falcon, Peregrine	Unlisted	LC
Falco rupicoloides	Kestrel, Greater	Unlisted	LC
Falco rupicolus	Kestrel, Rock	Unlisted	LC
Fulica cristata	Coot, Red-knobbed	Unlisted	LC
Galerida magnirostris	Lark, Large-billed	Unlisted	LC
Gallinula chloropus	Moorhen, Common	Unlisted	LC

Granatina granatina	Waxbill, Violet-eared	Unlisted	LC
Grus paradisea	Crane, Blue	NT	VU
Halcyon albiventris	Kingfisher, Brown-hooded	Unlisted	LC
Haliaeetus vocifer	Fish-eagle, African	Unlisted	LC
Hieraaetus pennatus	Eagle, Booted	Unlisted	LC
Himantopus himantopus	Stilt, Black-winged	Unlisted	LC
Hirundo albigularis	Swallow, White-throated	Unlisted	LC
Hirundo dimidiata	Swallow, Pearl-breasted	Unlisted	LC
Hirundo rustica	Swallow, Barn	Unlisted	LC
Indicator indicator	Honeyguide, Greater	Unlisted	LC
Indicator minor	Honeyguide, Lesser	Unlisted	LC
Lagonosticta senegala	Firefinch, Red-billed	Unlisted	LC
Lamprotornis bicolor	Starling, Pied	Unlisted	LC
Lamprotornis nitens	Starling, Cape Glossy	Unlisted	LC
Lanius collaris	Fiscal, Common (Southern)	Unlisted	LC
Lanius collurio	Shrike, Red-backed	Unlisted	LC
Lanius minor	Shrike, Lesser Grey	Unlisted	LC
Lophoceros nasutus	Hornbill, African Grey	Unlisted	LC
Malcorus pectoralis	Warbler, Rufous-eared	Unlisted	LC
Megaceryle maxima	Kingfisher, Giant	Unlisted	Unlisted
Melaenornis infuscatus	Flycatcher, Chat	Unlisted	LC
Melaenornis silens	Flycatcher, Fiscal	Unlisted	LC
Melaniparus afer	Tit, Grey	Unlisted	Unlisted
Melaniparus cinerascens	Tit, Ashy	Unlisted	LC
Melierax canorus	Goshawk, Southern Pale Chanting	Unlisted	LC
Merops apiaster	Bee-eater, European	Unlisted	LC
Merops bullockoides	Bee-eater, White-fronted	Unlisted	LC
Merops hirundineus	Bee-eater, Swallow-tailed	Unlisted	LC
Microcarbo africanus	Cormorant, Reed	Unlisted	LC
Micronisus gabar	Goshawk, Gabar	Unlisted	LC
Mirafra fasciolata	Lark, Eastern Clapper	Unlisted	LC
Monticola brevipes	Rock-thrush, Short-toed	Unlisted	LC
Motacilla aguimp	Wagtail, African Pied	Unlisted	LC
Motacilla capensis	Wagtail, Cape	Unlisted	LC
Muscicapa striata	Flycatcher, Spotted	Unlisted	LC
Myrmecocichla formicivora	Chat, Anteating	Unlisted	LC
Myrmecocichla monticola	Wheatear, Mountain	Unlisted	LC
Neotis ludwigii	Bustard, Ludwig's	EN	EN
Nilaus afer	Brubru	Unlisted	LC

Numida meleagris	Guineafowl, Helmeted	Unlisted	LC
Nycticorax nycticorax	Night-Heron, Black-crowned	Unlisted	LC
Oena capensis	Dove, Namaqua	Unlisted	LC
Oenanthe familiaris	Chat, Familiar	Unlisted	LC
Oenanthe pileata	Wheatear, Capped	Unlisted	LC
Onychognathus morio	Starling, Red-winged	Unlisted	LC
Onychognathus nabouroup	Starling, Pale-winged	Unlisted	LC
Ortygospiza atricollis	Quailfinch, African	Unlisted	LC
Pandion haliaetus	Osprey, Osprey	Unlisted	LC
Passer diffusus	Sparrow, Southern Grey-headed	Unlisted	LC
Passer domesticus	Sparrow, House	Unlisted	LC
Passer melanurus	Sparrow, Cape	Unlisted	LC
Pavo cristatus	Peacock, Common	Unlisted	LC
Petrochelidon spilodera	Cliff-swallow, South African	Unlisted	LC
Phalacrocorax lucidus	Cormorant, White-breasted	Unlisted	LC
Phoeniconaias minor	Flamingo, Lesser	NT	NT
Phoenicopterus roseus	Flamingo, Greater	NT	LC
Phoeniculus purpureus	Wood-hoopoe, Green	Unlisted	LC
Phragmacia substriata	Warbler, Namaqua	Unlisted	Unlisted
Phylloscopus trochilus	Warbler, Willow	Unlisted	LC
Platalea alba	Spoonbill, African	Unlisted	LC
Plectropterus gambensis	Goose, Spur-winged	Unlisted	LC
Plegadis falcinellus	Ibis, Glossy	Unlisted	LC
Plocepasser mahali	Sparrow-weaver, White-browed	Unlisted	LC
Ploceus velatus	Masked-weaver, Southern	Unlisted	LC
Podiceps cristatus	Grebe, Great Crested	Unlisted	LC
Polyboroides typus	Harrier-Hawk, African	Unlisted	LC
Prinia flavicans	Prinia, Black-chested	Unlisted	LC
Prinia maculosa	Prinia, Karoo	Unlisted	LC
Pternistis swainsonii	Spurfowl, Swainson's	Unlisted	LC
Pterocles namaqua	Sandgrouse, Namaqua	Unlisted	LC
Ptyonoprogne fuligula	Martin, Rock	Unlisted	Unlisted
Pycnonotus nigricans	Bulbul, African Red-eyed	Unlisted	LC
Quelea quelea	Quelea, Red-billed	Unlisted	LC
Rallus caerulescens	Rail, African	Unlisted	LC
Recurvirostra avosetta	Avocet, Pied	Unlisted	LC
Rhinopomastus cyanomelas	Scimitarbill, Common	Unlisted	LC
Rhinoptilus africanus	Courser, Double-banded	Unlisted	LC
Riparia paludicola	Martin, Brown-throated	Unlisted	LC

Riparia riparia	Martin, Sand	Unlisted	LC
Sagittarius serpentarius	Secretarybird	VU	EN
Saxicola torquatus	Stonechat, African	Unlisted	LC
Scleroptila afra	Francolin, Grey-winged	Unlisted	LC
Scleroptila gutturalis	Francolin, Orange River	Unlisted	LC
Scopus umbretta	Hamerkop, Hamerkop	Unlisted	LC
Serinus alario	Canary, Black-headed	Unlisted	LC
Spatula smithii	Shoveler, Cape	Unlisted	LC
Spilopelia senegalensis	Dove, Laughing	Unlisted	LC
Sporopipes squamifrons	Finch, Scaly-feathered	Unlisted	LC
Stenostira scita	Flycatcher, Fairy	Unlisted	LC
Streptopelia capicola	Turtle-dove, Cape	Unlisted	LC
Streptopelia semitorquata	Dove, Red-eyed	Unlisted	LC
Struthio camelus	Ostrich, Common	Unlisted	LC
Sturnus vulgaris	Starling, Common	Unlisted	LC
Sylvietta rufescens	Crombec, Long-billed	Unlisted	LC
Tachybaptus ruficollis	Grebe, Little	Unlisted	LC
Tachymarptis melba	Swift, Alpine	Unlisted	LC
Tadorna cana	Shelduck, South African	Unlisted	LC
Tchagra australis	Tchagra, Brown-crowned	Unlisted	LC
Telophorus zeylonus	Bokmakierie, Bokmakierie	Unlisted	LC
Terpsiphone viridis	Paradise-flycatcher, African	Unlisted	LC
Threskiornis aethiopicus	Ibis, African Sacred	Unlisted	LC
Trachyphonus vaillantii	Barbet, Crested	Unlisted	LC
Tricholaema leucomelas	Barbet, Acacia Pied	Unlisted	LC
Tringa glareola	Sandpiper, Wood	Unlisted	LC
Tringa nebularia	Greenshank, Common	Unlisted	LC
Tringa stagnatilis	Sandpiper, Marsh	Unlisted	LC
Turdus smithi	Thrush, Karoo	Unlisted	LC
Turnix sylvaticus	Buttonquail, Kurrichane	Unlisted	LC
Tyto alba	Owl, Barn	Unlisted	LC
Upupa africana	Hoopoe, African	Unlisted	LC
Urocolius indicus	Mousebird, Red-faced	Unlisted	LC
Vanellus armatus	Lapwing, Blacksmith	Unlisted	LC
Vanellus coronatus	Lapwing, Crowned	Unlisted	LC
Vidua chalybeata	Indigobird, Village	Unlisted	LC
Vidua macroura	Whydah, Pin-tailed	Unlisted	LC
Zapornia flavirostra	Crake, Black	Unlisted	LC
Zosterops pallidus	White-eye, Orange River	Unlisted	LC

Zosterops virens	White-eye, Cape	Unlisted	LC

14.3 Appendix C: Observed species during the point counts of the first survey

Common Name	Scientific Name	RD (Regional, Global)	Guild code	Relative abundance	Frequency (%)
Northern Black Korhaan	*Afrotis afraoides*	0	IGD	0,024	28,070
Cape Penduline-tit	*Anthoscopus minutus*	0	IGD	0,004	1,754
African Pipit	*Anthus cinnamomeus*	0	IGD	0,014	15,789
Buffy Pipit	*Anthus vaalensis*	0	IGD	0,006	1,754
Verreaux's Eagle	*Aquila verreauxii*	VU, LC	CGD	0,008	7,018
Kori Bustard	*Ardeotis kori*	NT, NT	OMD	0,011	7,018
Pririt Batis	*Batis pririt*	0	IGD	0,001	1,754
Hadeda (Hadada) Ibis	*Bostrychia hagedash*	0	OMD	0,003	1,754
Jackal Buzzard	*Buteo rufofuscus*	0	CGD	0,003	1,754
Fawn-coloured Lark	*Calendulauda africanoides*	0	GGD	0,001	1,754
Sabota Lark	*Calendulauda sabota*	0	OMD	0,001	1,754
Karoo Scrub Robin	*Cercotrichas coryphoeus*	0	IGD	0,004	5,263
Kalahari Scrub Robin	*Cercotrichas paena*	0	IGD	0,006	5,263
Karoo Long-billed Lark	*Certhilauda subcoronata*	0	IGD	0,004	3,509
Spike-heeled Lark	*Chersomanes albofasciata*	0	IGD	0,104	54,386
Desert Cisticola	*Cisticola aridulus*	0	IGD	0,032	29,825
Grey-backed Cisticola	*Cisticola subruficapilla*	0	IGD	0,004	5,263
Speckled Pigeon	*Columba guinea*	0	FFD	0,021	3,509
White-necked Raven	*Corvus albicollis*	0	OMD	0,004	5,263
Pied Crow	*Corvus albus*	0	OMD	0,106	52,632
Common Quail	*Coturnix coturnix*	0	OMD	0,007	7,018
Wattled Starling	*Creatophora cinerea*	0	OMD	0,049	3,509
White-throated Canary	*Crithagra albogularis*	0	GGD	0,003	3,509
Yellow Canary	*Crithagra flaviventris*	0	GGD	0,013	5,263
Chestnut-vented Tit-Babbler (Warbler)	*Curruca subcoerulea*	0	IGD	0,003	3,509
Black-winged Kite	*Elanus caeruleus*	0	CGD	0,001	1,754
Sickle-winged Chat	*Emarginata sinuata*	0	IGD	0,006	7,018
Cinnamon-breasted Bunting	*Emberiza tahapisi*	0	GGD	0,006	5,263
Yellow-bellied Eremomela	*Eremomela icteropygialis*	0	IGD	0,006	3,509
Greater Kestrel	*Falco rupicoloides*	0	CGD	0,006	5,263
Large-billed Lark	*Galerida magnirostris*	0	IGD	0,025	24,561
Blue Crane	*Grus paradisea*	NT, VU	OMD	0,045	10,526
Southern (Common) Fiscal	*Lanius collaris*	0	IAD	0,003	3,509

Rufous-eared Warbler	*Malcorus pectoralis*	0	IGD	0,056	49,123
Chat Flycatcher	*Melaenornis infuscatus*	0	IGD	0,001	1,754
Pale Chanting Goshawk	*Melierax canorus*	0	CGD	0,006	7,018
Eastern Clapper Lark	*Mirafra fasciolata*	0	IGD	0,030	15,789
Ant-eating Chat	*Myrmecocichla formicivora*	0	IGD	0,066	50,877
Helmeted Guineafowl	*Numida meleagris*	0	OMD	0,008	3,509
Namaqua Dove	*Oena capensis*	0	GGD	0,003	3,509
Capped Wheatear	*Oenanthe pileata*	0	IGD	0,006	3,509
Cape Sparrow	*Passer melanurus*	0	GGD	0,007	3,509
Spur-winged Goose	*Plectropterus gambensis*	0	OMD	0,008	1,754
Southern Masked Weaver	*Ploceus velatus*	0	GGD	0,003	1,754
Black-chested Prinia	*Prinia flavicans*	0	IGD	0,030	31,579
Red-billed Quelea	*Quelea quelea*	0	GGD	0,106	8,772
Double-banded Courser	*Rhinoptilus africanus*	0	IGD	0,004	3,509
Secretarybird	*Sagittarius serpentarius*	VU, EN	CGD	0,004	3,509
Grey-winged Francolin	*Scleroptila afra*	0	GGD	0,003	1,754
Laughing Dove	*Spilopelia senegalensis*	0	GGD	0,004	3,509
Pink-billed Lark	*Spizocorys conirostris*	0	GGD	0,082	10,526
Scaly-feathered Finch (Weaver)	*Sporopipes squamifrons*	0	GGD	0,004	1,754
Cape Turtle (Ring-necked) Dove	*Streptopelia capicola*	0	GGD	0,004	5,263
Long-billed crombec	*Sylvietta rufescens*	0	IGD	0,004	3,509
South African Shelduck	*Tadorna cana*	0	OMD	0,003	1,754
Bokmakierie	*Telophorus zeylonus*	0	OMD	0,015	10,526
Acacia Pied Barbet	*Tricholaema leucomelas*	0	OMD	0,001	1,754
Crowned Lapwing	*Vanellus coronatus*	0	IGD	0,006	1,754

14.4 Appendix D: Incidental Observations

These are species observed moving between point counts. This list is included to provide a list of species that might not have been observed through the point count method.

Common Name	Scientific Name
Acacia Pied Barbet	*Tricholaema leucomelas*
Spike-heeled Lark	*Chersomanes albofasciata*
Secretarybird	*Sagittarius serpentarius*
Verreaux's Eagle	*Aquila verreauxii*
Blue Crane	*Grus paradisea*
Ant-eating Chat	*Myrmecocichla formicivora*
Northern Black Korhaan	*Afrotis afraoides*

Grey-backed Cisticola	*Cisticola subruficapilla*
Capped Wheatear	*Oenanthe pileata*
Pied Crow	*Corvus albus*
Wattled Starling	*Creatophora cinerea*
Bokmakierie	*Telophorus zeylonus*
Lilac-breasted Roller	*Coracias caudatus*
African Sacred Ibis	*Threskiornis aethiopicus*
Rufous-eared Warbler	*Malcorus pectoralis*
Large-billed Lark	*Galerida magnirostris*
Helmeted Guineafowl	*Numida meleagris*
Desert Cisticola	*Cisticola aridulus*
Black-winged Kite	*Elanus caeruleus*
Red-billed Quelea	*Quelea quelea*
African Pipit	*Anthus cinnamomeus*
Buffy Pipit	*Anthus vaalensis*
Kori Bustard	*Ardeotis kori*
Sabota Lark	*Calendulauda sabota*
Karoo Scrub Robin	*Cercotrichas coryphoeus*
Chat Flycatcher	*Melaenornis infuscatus*
African Pipit	*Anthus cinnamomeus*
Eastern Clapper Lark	*Mirafra fasciolata*
Common Quail	*Coturnix coturnix*
Greater Kestrel	*Falco rupicoloides*
Fawn-coloured Lark	*Calendulauda africanoides*
African Pipit	*Anthus cinnamomeus*
Scaly-feathered Finch (Weaver)	*Sporopipes squamifrons*
Crowned Lapwing	*Vanellus coronatus*
Cape Turtle (Ring-necked) Dove	*Streptopelia capicola*
Speckled Pigeon	*Columba guinea*
Yellow Canary	*Crithagra flaviventris*
Cape Sparrow	*Passer melanurus*
Cape Glossy (Cape) Starling	*Lamprotornis nitens*
Gabar Goshawk	*Micronisus gabar*
Spotted Eagle-Owl	*Bubo africanus*
Western Barn Owl	*Tyto alba*
Greater Striped Swallow	*Cecropis cucullata*
Grey-winged Francolin	*Scleroptila afra*
Cinnamon-breasted Bunting	*Emberiza tahapisi*
Egyptian Goose	*Alopochen aegyptiaca*

Brown-throated Martin	*Riparia paludicola*
Blacksmith Lapwing	*Vanellus armatus*
Little Grebe	*Tachybaptus ruficollis*
White-throated Canary	*Crithagra albogularis*
Sabota Lark	*Calendulauda sabota*
Sabota Lark	*Calendulauda sabota*
Red-capped Lark	*Calandrella cinerea*
Buffy Pipit	*Anthus vaalensis*
Cape Bunting	*Emberiza capensis*
Chat Flycatcher	*Melaenornis infuscatus*
Cape Penduline-tit	*Anthoscopus minutus*
Red-headed Finch	*Amadina erythrocephala*
Tawny Eagle	*Aquila rapax*
Spotted Thick-knee	*Burhinus capensis*
Red-eyed Dove	*Streptopelia semitorquata*
Lesser Grey Shrike	*Lanius minor*
Red-knobbed coot	*Fulica cristata*
Black-winged Stilt	*Himantopus himantopus*
Southern Masked Weaver	*Ploceus velatus*
Three-banded Plover	*Charadrius tricollaris*
Double-banded Courser	*Rhinoptilus africanus*
Fawn-coloured Lark	*Calendulauda africanoides*
South African Shelduck	*Tadorna cana*
Large-billed Lark	*Galerida magnirostris*
Yellow-bellied Eremomela	*Eremomela icteropygialis*
Buffy Pipit	*Anthus vaalensis*
Nicholson's Pipit	*Anthus nicholsoni*
African Harrier-Hawk	*Polyboroides typus*
Pink-billed Lark	*Spizocorys conirostris*
Blue Korhaan	*Eupodotis caerulescens*
White-faced Whistling Duck	*Dendrocygna viduata*
Black-faced Waxbill	*Brunhilda erythronotos*
African Sacred Ibis	*Threskiornis aethiopicus*
African Palm Swift	*Cypsiurus parvus*
Black-headed Heron	*Ardea melanocephala*
African Fish Eagle	*Haliaeetus vocifer*
Brown-hooded Kingfisher	*Halcyon albiventris*
African Red-eyed Bulbul	*Pycnonotus nigricans*
Buffy Pipit	*Anthus vaalensis*

White-backed Mousebird	*Colius colius*
Southern Grey-headed Sparrow	*Passer diffusus*
Rock Kestrel	*Falco rupicolus*
Namaqua Dove	*Oena capensis*
Long-billed crombec	*Sylvietta rufescens*
White-browed Sparrow-Weaver	*Plocepasser mahali*
Fiscal Flycatcher	*Melaenornis silens*
Cape Robin-chat	*Cossypha caffra*
Pied Starling	*Lamprotornis bicolor*
Red-faced Mousebird	*Urocolius indicus*
Chestnut-vented Tit-Babbler (Warbler)	*Curruca subcoerulea*
Fawn-coloured Lark	*Calendulauda africanoides*
Spur-winged Goose	*Plectropterus gambensis*
Common Ostrich	*Struthio camelus*
Little Swift	*Apus affinis*
Pririt Batis	*Batis pririt*
African Stonechat	*Saxicola torquatus*
Rock Martin	*Ptyonoprogne fuligula*
Yellow-billed Duck	*Anas undulata*
Fawn-coloured Lark	*Calendulauda africanoides*
Fairy Flycatcher	*Stenostira scita*
African Hoopoe	*Upupa africana*
Karoo Thrush	*Turdus smithi*
Black-throated Canary	*Crithagra atrogularis*
Orange River White-eye	*Zosterops pallidus*
Black-chested Snake Eagle	*Circaetus pectoralis*
Grey Heron	*Ardea cinerea*
Reed Cormorant	*Microcarbo africanus*
African Spoonbill	*Platalea alba*
Red-billed Teal	*Anas erythrorhyncha*
Kittlitz's Plover	*Charadrius pecuarius*
Cape Wagtail	*Motacilla capensis*
Lanner Falcon	*Falco biarmicus*
Cape Shoveler	*Spatula smithii*
African Darter	*Anhinga rufa*
Hamerkop	*Scopus umbretta*
Hadeda (Hadada) Ibis	*Bostrychia hagedash*
Black Harrier	*Circus maurus*
Western Cattle Egret	*Bubulcus ibis*

Pale-winged Starling	*Onychognathus nabouroup*
Green-winged Pytilia	*Pytilia melba*
Southern (Common) Fiscal	*Lanius collaris*
Dusky Sunbird	*Cinnyris fuscus*
White-breasted Cormorant	*Phalacrocorax lucidus*
Short-toed Rock Thrush	*Monticola brevipes*

14.5 Appendix E: Observations during the second survey

Common Name	*Scientific Name*	RD (Regional, Global)	Guild code	Relative abundance	Frequency (%)
Northern Black Korhaan	*Afrotis afraoides*		IGD	0,024	21,667
African Pipit	*Anthus cinnamomeus*		IGD	0,011	15,000
Verreaux's Eagle	*Aquila verreauxii*	VU, LC	CGD	0,009	6,667
Black-headed Heron	*Ardea melanocephala*		CGD	0,001	1,667
Kori Bustard	*Ardeotis kori*	NT, NT	OMD	0,001	1,667
Hadeda (Hadada) Ibis	*Bostrychia hagedash*		OMD	0,005	6,667
Jackal Buzzard	*Buteo rufofuscus*		CGD	0,004	3,333
Karoo Scrub Robin	*Cercotrichas coryphoeus*		IGD	0,004	5,000
Kalahari Scrub Robin	*Cercotrichas paena*		IGD	0,003	3,333
Spike-heeled Lark	*Chersomanes albofasciata*		IGD	0,089	61,667
Southern Double-collared Sunbird	*Cinnyris chalybeus*		NFD	0,001	1,667
Desert Cisticola	*Cisticola aridulus*		IGD	0,058	61,667
Grey-backed Cisticola	*Cisticola subruficapilla*		IGD	0,003	1,667
Cloud Cisticola	*Cisticola textrix*		IGD	0,004	3,333
Speckled Pigeon	*Columba guinea*		FFD	0,003	1,667
Pied Crow	*Corvus albus*		OMD	0,068	50,000
Common Quail	*Coturnix coturnix*		OMD	0,009	6,667
Wattled Starling	*Creatophora cinerea*		OMD	0,008	1,667
White-throated Canary	*Crithagra albogularis*		GGD	0,006	5,000
Yellow Canary	*Crithagra flaviventris*		GGD	0,018	6,667
Chestnut-vented Tit-Babbler (Warbler)	*Curruca subcoerulea*		IGD	0,001	1,667
Sickle-winged Chat	*Emarginata sinuata*		IGD	0,013	13,333
Cape Bunting	*Emberiza capensis*		OMD	0,001	1,667
Cinnamon-breasted Bunting	*Emberiza tahapisi*		GGD	0,005	5,000
Yellow-bellied Eremomela	*Eremomela icteropygialis*		IGD	0,005	5,000
Grey-backed Sparrow-lark	*Eremopterix verticalis*		GGD	0,001	1,667
Southern Red Bishop	*Euplectes orix*		GGD	0,005	1,667
Blue Korhaan	*Eupodotis caerulescens*	LC, NT	OMD	0,003	1,667

Greater Kestrel	*Falco rupicoloides*		CGD	0,003	1,667
Rock Kestrel	*Falco rupicolus*		CGD	0,001	1,667
Large-billed Lark	*Galerida magnirostris*		IGD	0,033	33,333
Blue Crane	*Grus paradisea*	NT, VU	OMD	0,001	1,667
Pied Starling	*Lamprotornis bicolor*		IGD	0,004	1,667
Rufous-eared Warbler	*Malcorus pectoralis*		IGD	0,049	51,667
Chat Flycatcher	*Melaenornis infuscatus*		IGD	0,003	1,667
Fiscal Flycatcher	*Melaenornis silens*		OMD	0,001	1,667
Pale Chanting Goshawk	*Melierax canorus*		CGD	0,008	8,333
Eastern Clapper Lark	*Mirafra fasciolata*		IGD	0,047	35,000
Ant-eating Chat	*Myrmecocichla formicivora*		IGD	0,072	48,333
Mountain Wheatear	*Myrmecocichla monticola*		IGD	0,003	1,667
Helmeted Guineafowl	*Numida meleagris*		OMD	0,120	6,667
Namaqua Dove	*Oena capensis*		GGD	0,006	5,000
African Quail-finch	*Ortygospiza atricollis*		GGD	0,053	6,667
Southern Grey-headed Sparrow	*Passer diffusus*		GGD	0,003	1,667
Cape Sparrow	*Passer melanurus*		GGD	0,009	3,333
Black-chested Prinia	*Prinia flavicans*		IGD	0,025	30,000
Rock Martin	*Ptyonoprogne fuligula*		IAD	0,005	5,000
African red-eyed Bulbul	*Pycnonotus nigricans*		OMD	0,006	5,000
Red-billed Quelea	*Quelea quelea*		GGD	0,049	5,000
Double-banded Courser	*Rhinoptilus africanus*		IGD	0,003	1,667
Secretarybird	*Sagittarius serpentarius*	VU, EN	CGD	0,006	5,000
Grey-winged Francolin	*Scleroptila afra*		GGD	0,003	1,667
Laughing Dove	*Spilopelia senegalensis*		GGD	0,003	1,667
Pink-billed Lark	*Spizocorys conirostris*		GGD	0,097	18,333
Scaly-feathered Finch (Weaver)	*Sporopipes squamifrons*		GGD	0,006	3,333
South African Shelduck	*Tadorna cana*		OMD	0,003	1,667
Brown-crowned Tchagra	*Tchagra australis*		OMD	0,003	1,667
Bokmakierie	*Telophorus zeylonus*		OMD	0,008	8,333
Acacia Pied Barbet	*Tricholaema leucomelas*		OMD	0,004	5,000
Red-faced Mousebird	*Urocolius indicus*		FFD	0,001	1,667
Blacksmith Lapwing	*Vanellus armatus*		IGD	0,001	1,667

14.6 Appendix F: Incidental observations second survey

Common Name	Scientific Name
Pale Chanting Goshawk	*Melierax canorus*
Yellow Canary	*Crithagra flaviventris*
Secretarybird	*Sagittarius serpentarius*
Desert Cisticola	*Cisticola aridulus*
Rufous-eared Warbler	*Malcorus pectoralis*
Pied Crow	*Corvus albus*
African Pipit	*Anthus cinnamomeus*
Red-billed Quelea	*Quelea quelea*
White-browed Sparrow-Weaver	*Plocepasser mahali*
Blacksmith Lapwing	*Vanellus armatus*
South African Shelduck	*Tadorna cana*
Ant-eating Chat	*Myrmecocichla formicivora*
Red-billed Teal	*Anas erythrorhyncha*
Eastern Clapper Lark	*Mirafra fasciolata*
Spike-heeled Lark	*Chersomanes albofasciata*
Speckled Pigeon	*Columba guinea*
Black-chested Prinia	*Prinia flavicans*
Cape Sparrow	*Passer melanurus*
Northern Black Korhaan	*Afrotis afraoides*
Cape Wagtail	*Motacilla capensis*
White-throated Canary	*Crithagra albogularis*
Karoo Korhaan	*Eupodotis vigorsii*
Pin-tailed Whydah	*Vidua macroura*
Large-billed Lark	*Galerida magnirostris*
Laughing Dove	*Spilopelia senegalensis*
Red-faced Mousebird	*Urocolius indicus*
Lanner Falcon	*Falco biarmicus*
Helmeted Guineafowl	*Numida meleagris*
Wattled Starling	*Creatophora cinerea*
Chestnut-vented Tit-Babbler (Warbler)	*Curruca subcoerulea*
Hadeda (Hadada) Ibis	*Bostrychia hagedash*
Chat Flycatcher	*Melaenornis infuscatus*
Orange River Francolin	*Scleroptila gutturalis*
Black-throated Canary	*Crithagra atrogularis*
African Pipit	*Anthus cinnamomeus*
Eastern Long-billed Lark	*Certhilauda semitorquata*
Karoo Chat	*Emarginata schlegelii*

Jackal Buzzard	*Buteo rufofuscus*
Egyptian Goose	*Alopochen aegyptiaca*
Rock Martin	*Ptyonoprogne fuligula*
Rock Kestrel	*Falco rupicolus*
Tawny Eagle	*Aquila rapax*
Red-eyed Dove	*Streptopelia semitorquata*
Reed Cormorant	*Microcarbo africanus*
Cape Glossy (Cape) Starling	*Lamprotornis nitens*
Fiscal Flycatcher	*Melaenornis silens*
Pririt Batis	*Batis pririt*
Dusky Sunbird	*Cinnyris fuscus*
Chat Flycatcher	*Melaenornis infuscatus*
Southern (Common) Fiscal	*Lanius collaris*
Chestnut-vented Tit-Babbler (Warbler)	*Curruca subcoerulea*
Short-toed Rock Thrush	*Monticola brevipes*
Sabota Lark	*Calendulauda sabota*
Black-necked Grebe	*Podiceps nigricollis*
Three-banded Plover	*Charadrius tricollaris*
Black-winged Kite	*Elanus caeruleus*
Pied Starling	*Lamprotornis bicolor*
Cloud Cisticola	*Cisticola textrix*
Red-capped Lark	*Calandrella cinerea*
Cape Turtle (Ring-necked) Dove	*Streptopelia capicola*
Kittlitz's Plover	*Charadrius pecuarius*
Cape Robin-chat	*Cossypha caffra*
White-backed Mousebird	*Colius colius*
Grey-backed Cisticola	*Cisticola subruficapilla*
Black-faced Waxbill	*Brunhilda erythronotos*
Fairy Flycatcher	*Stenostira scita*
African Red-eyed Bulbul	*Pycnonotus nigricans*
Karoo Thrush	*Turdus smithi*
Red-billed Firefinch	*Lagonosticta senegala*
African Sacred Ibis	*Threskiornis aethiopicus*
Fawn-coloured Lark	*Calendulauda africanoides*
Cape Eagle-Owl	*Bubo capensis*
White-necked Raven	*Corvus albicollis*
African Harrier-Hawk	*Polyboroides typus*
Mountain Wheatear	*Myrmecocichla monticola*
African Stonechat	*Saxicola torquatus*