AVIFAUNA IMPACT ASSESSMENT FOR THE PROPOSED SCSC SOLAR FACILITIES FOR SIYANDA BAKGATLA PLATINUM MINE

Northam, Limpopo & North West Provinces

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CLIENT

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1 Introduction

1.1 Background

The Biodiversity Company was appointed to undertake an avifauna assessment for the proposed SBPM & SCSC Solar Facilities for Siyanda Bakgatla Platinum Mine in Northam, Limpopo Province. The project infrastructure is located in both the Limpopo and also North West provinces. The project is located 6.5 km west from Northam. The Northam focus area has been identified for the construction and operation of solar and battery facilities consisting of the following affected properties:

- SCSC (273 Ha); and
- SBPM (251 Ha) (Figure 1-2).

Although the fieldwork for the facilities was undertaken simultaneously, this report only details the findings of the SBPM 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 "Moderate".

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.

1.2 Project Description

1.2.1 SCSC PV RE project, Limpopo Province

Main Street 1887 Proprietary Limited proposes the development of the Solar PV facility and associated infrastructure on a site bordering the eastern end of the Siyanda Bakgatla Platinum Mine area near Northam. The solar PV facility will comprise several arrays of PV panels, a Battery Energy Storage System (BESS), and associated infrastructure with a contracted capacity of up to 100MW.

The purpose of the proposed project is to generate electricity for exclusive use by the Siyanda Mine, following which any excess power produced will be distributed to the national grid, if applicable. The construction of the PV facility aims to reduce the Siyanda Mine's dependency on direct supply from Eskom's national grid for operation activities, while simultaneously decreasing the mine's carbon footprint.

A preferred project site with an extent of ~1138ha and a development area of 564 has been identified by Main Street 1887 Proprietary Limited as a technically suitable area for the development of the Solar PV Facility with a contracted capacity of up to 100MW. The study area is located on Portion 3 of Farm Grootkuil 409. The project site falls within the Thabazimbi Local Municipality within the Waterberg District Municipality in the Limpopo Province. The site is located ~6.5 km west of the town of Northam and is accessible via the Swartklip Road which branches off the R510 provincial route.

Infrastructure associated with the solar PV facility will include:

- 100 MW Solar PV array comprising PV modules and mounting structures;
- Inverters and transformers;
- Cabling between the project components;
- Battery Energy Storage System (BESS);

- On-site facility substation between the solar PV facility and the Eskom substation;
- Site offices, Security office, operations and control, and maintenance and storage laydown areas; and
- Access roads, internal distribution roads.

Grid connection solution.

To evacuate the generated power to the Siyanda Mine, the grid connection solution consisting of the following is proposed:

The power generated by the solar PV facility will be transferred to the three step up transformers at the on-site/plant substation. Power will then be delivered from each step-up transformer as follows:

- Two 6.6 km, 33 kV transmission lines to the Mortimer substation with four step down transformers (33/6.6 kV; 10 MVA);
- Two 4.7 km, 33 kV transmission lines to the Fridge substation with two step down transformers (33/6.6 kV; 10 MVA);
- Two 2.9 km, 33 kV transmission lines to the Ivan substation with three step down transformers (33/11 kV; 10 MVA); and
- One 132kV transmission line to the south west area of the project site where a new substation (to be assessed through separate Environmental Impact Assessment (EIA) processes) for the furnace is proposed to be built.

The grid connection is proposed on the following properties:

- Portion 3 of Farm Grootkuil 409;
- Portion 4 of Farm Grootkuil 409; and
- Portion 5 of Farm Grootkuil 409.

The development area of 574 ha is larger than the area needed for the construction of a 100MW PV facility and will provide the opportunity for the optimal placement of the infrastructure, ensuring avoidance of major identified environmental sensitivities by the development footprint of ~ 240ha[1]. To avoid areas of potential sensitivity and to ensure that potential detrimental environmental impacts are minimised as far as possible, the full extent of the larger development area was considered in the Scoping Phase, and a development footprint within which the infrastructure of the PV facility and associated infrastructures will be located was fully assessed during the EIA Phase.

[1] The development footprint is the defined area (located within the development area) where the PV panel array and other associated infrastructure for Solar PV will be planned to be constructed. This will be the actual footprint of the facility, and the area which would be disturbed. The extent of the development footprint will be determined in the EIA Phase.

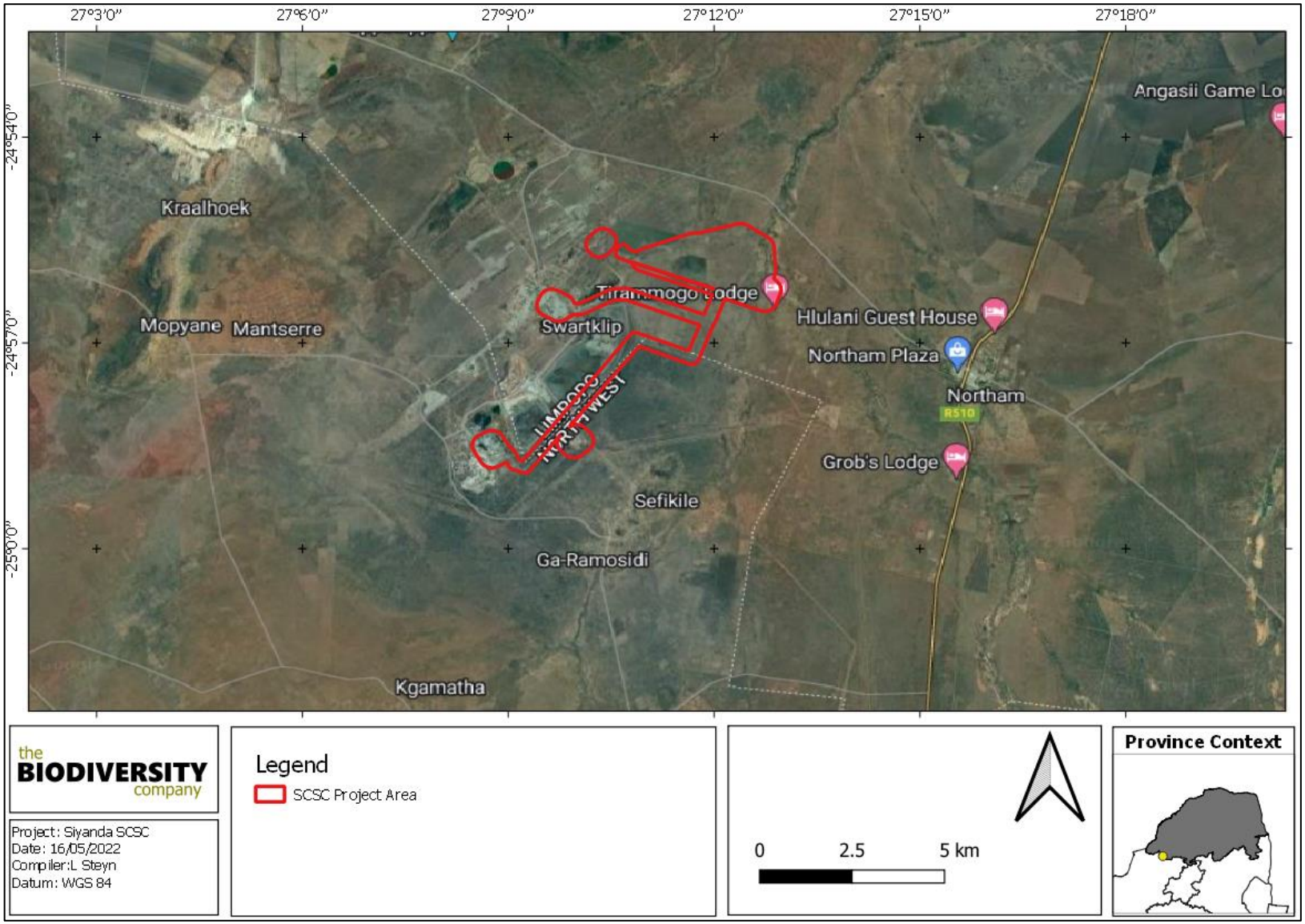

Figure 1-1 Proposed location of the project area in relation to the nearby towns

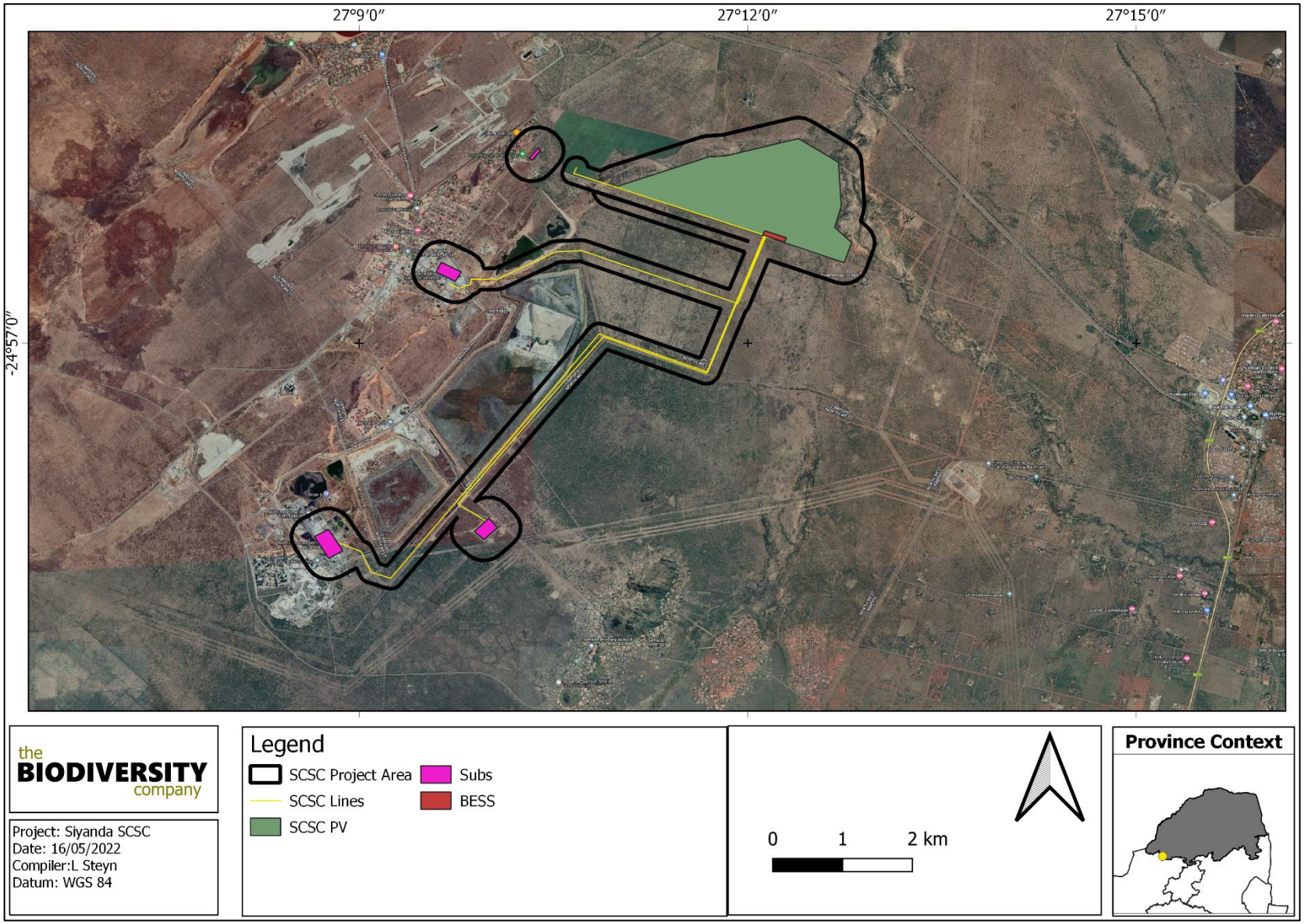

Figure 1-2 The various components of the project

1.3 Specialist Details

Report Name	**AVIFAUNA IMPACT ASSESSMENT FOR THE PROPOSED SCSC SOLAR FACILITIES FOR SIYANDA BAKGATLA PLATINUM MINE**
Reference	**SCSC/Siyanda PV**
Submitted to	savannah environmental
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 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.
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.

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 site; 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 Limpopo and North West 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
	Limpopo Conservation Plan (2018)
Provincial	Limpopo Environmental Management Act (2003)
	North-West Biodiversity Sector Plan of 2015 (READ, 2015).
	The North West Biodiversity Management Amendment Bill, 2017

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 Plans:

The **Limpopo Conservation Plan** was completed in 2018 for the Limpopo Department of Economic Development, Environment & Tourism (LEDET) (Desmet *et al.,* 2013). The purpose of the LCPv2 was to develop the spatial component of a bioregional plan (i.e., map of Critical Biodiversity Areas and associated land-use guidelines). The previous Limpopo Conservation Plan (LCPv1) was completely revised and updated (Desmet et al., 2013). A Limpopo Conservation Plan map was produced as part of this plan and sites were assigned to the following CBA categories based on their biodiversity characteristics, spatial configuration, and requirement for meeting targets for both biodiversity pattern and ecological processes:

- Critical Biodiversity Area 1 (CBA1);
- Critical Biodiversity Area 2 (CBA2);
- Ecological Support Area 1 (ESA1);
- Ecological Support Area 2 (ESA2);
- Other Natural Area (ONA);
- Protected Area (PA); and
- No Natural Remaining (NNR).

Critical Biodiversity Areas (CBAs) are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (Desmet *et al.,* 2013).

Ecological Support Areas (ESA's) are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services (SANBI, 2017). Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic.

Other Natural Areas (ONAs) consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs. A biodiversity sector plan or bioregional plan must not specify the desired state/management objectives for ONAs or provide land-use guidelines for ONAs (Driver *et al.,* 2017).

Areas with No Natural Habitat Remaining (NNR) are areas in poor ecological condition that have not been identified as CBAs or ESAs. They include all irreversibly modified areas (such as urban or industrial areas and mines), and most severely modified areas (such as cultivated fields and forestry plantations). A biodiversity sector plan or bioregional plan must not specify the desired state/management objective or provide land-use guidelines for NNR areas (Driver *et al.,* 2017).

The **North-West Department of Rural, Environment, and Agricultural Development (READ),** as custodian of the environment in the North West, is the primary implementing agent of the Biodiversity Sector Plan. The spatial component of the Biodiversity Sector Plan is based on systematic biodiversity planning undertaken by READ. The purpose of a Biodiversity Sector Plan is to inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management, undertaken by a range of sectors whose policies and decisions impact on

biodiversity. This is done by providing a map of biodiversity priority areas, referred to as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), with accompanying land use planning and decision-making guidelines (READ, 2015).

- 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 2450_2700; 2450_2705; 2455_2700; 2455_2700; 2455_2705; 2455_2710; 2500_2700_2500_2705).

4.2 Field Assessment

The first field survey was undertaken during 4-8 April 2022 (Autumn), while the second survey was conducted from 27-30 June 2022 (Winter) to determine the presence of SCC. 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 on the river and some of the nearby ridges due to the mobility of avifauna species and home range sizes of larger species (Figure 4-1).

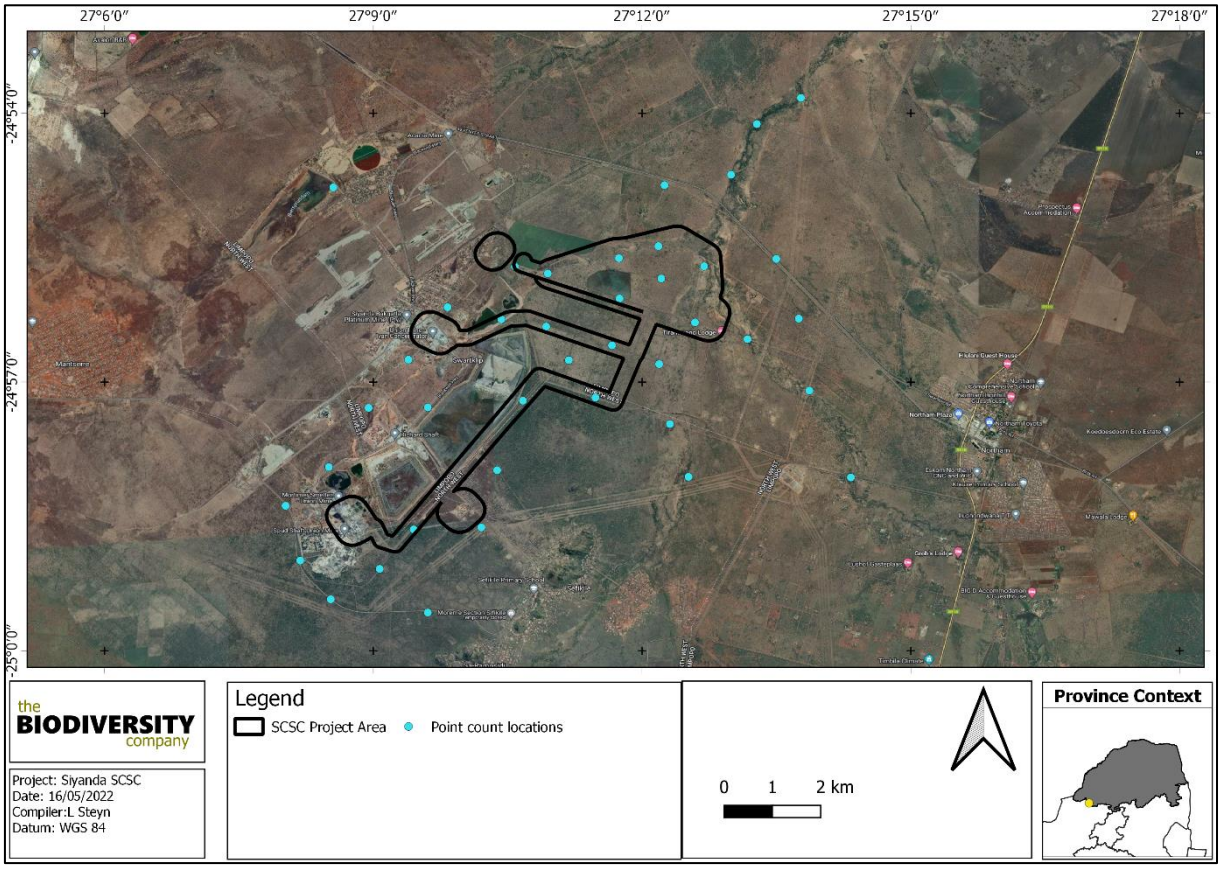

Figure 4-1 Map illustrating the field survey area

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 theShannon 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.

4.4 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); and
- No field survey was undertaken during Spring and Summer and therefore, migratory species that may utilise the area would not have been recorded. This may potentially affect the severity of the impact
-

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 Moderately Protected Ecosystem	5.1.1.2
Protected Areas	Relevant – The project area overlaps with the Rustenburg Platinum Mines (Union Section) Private Nature Reserve and is located within the 5 km buffer of surrounding protected areas	5.1.1.4
Renewable Energy Development Zones	Irrelevant - The project area is 167 km for the closest REDZ	-
Powerline Corridor	Irrelevant- The project area falls 88 km from the Northern Corridor	-
National Protected Areas Expansion Strategy	Relevant – The project area overlap with a NPAES protected area	5.1.1.5
Critical Biodiversity Area	Relevant – The project area overlaps with CBA2, ESA1, NNR and ONA classified areas	5.1.1.3
Important Bird and Biodiversity Areas	Relevant – Located adjacent to the Northern Turf Thornveld IBA	5.1.1.6
South African Inventory of Inland Aquatic Ecosystems	Relevant - The project area overlaps with a CR NBA river and is adjacent to a CR wetland	5.1.1.7
National Freshwater Priority Area	Relevant – The project area overlaps with an unclassified FEPA wetland and an unclassified FEPA river	5.1.1.8
Strategic Water Source Areas	Irrelevant- The project area is 57 km from the closest SWSA	-
Coordinated Waterbird Count	Relevant – 106 km from a CWAC site	-
Coordinated Avifaunal Road Count	Relevant – 112 km from the closest CAR route	-

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).

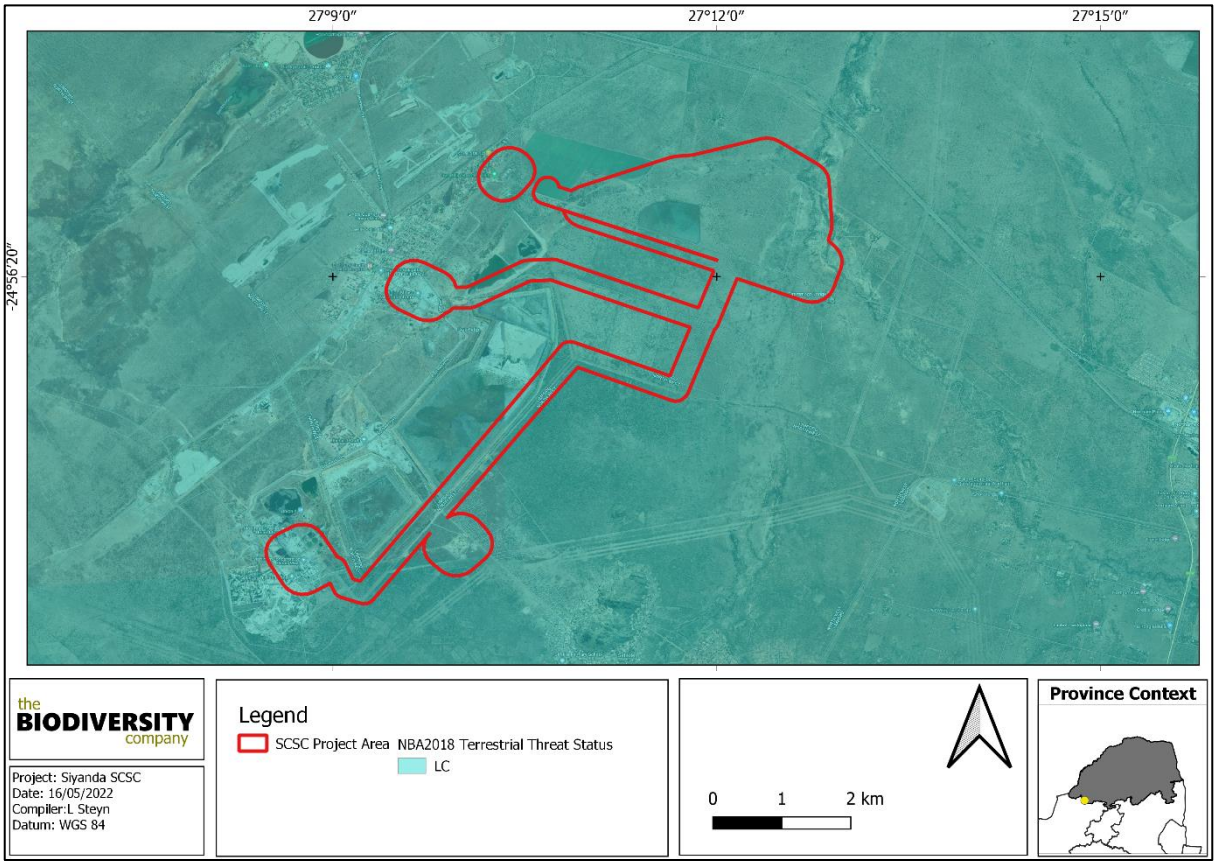

Figure 5-1 Map illustrating the ecosystem threat status associated with the project area.

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 MP ecosystem (Figure 5-2).

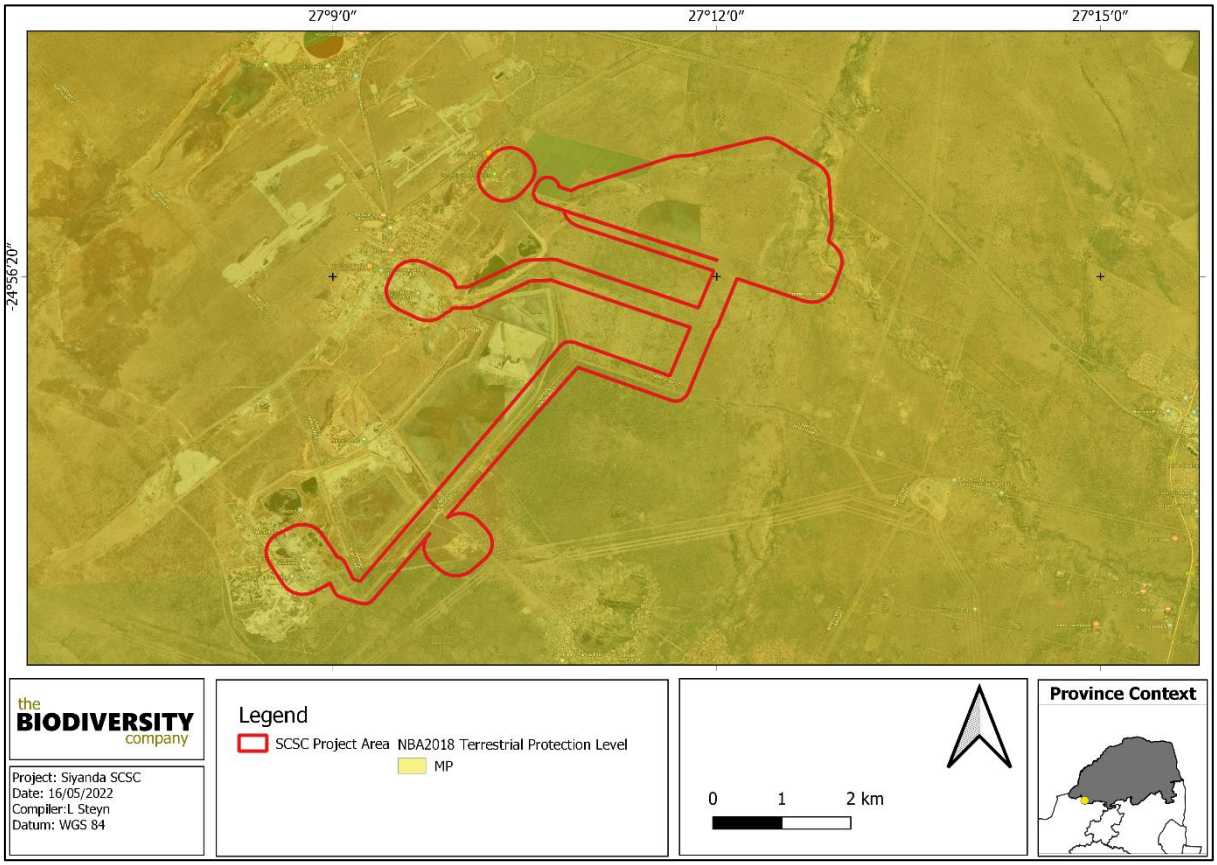

Figure 5-2 Map illustrating the ecosystem protection level associated with the project area

5.1.1.3 Critical Biodiversity Areas and Ecological Support Areas

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

The provincial CBA spatial data for the North West province indicates that both feasibility areas don't traverse any CBA nor Ecological Support Areas (ESAs) and Other Natural Areas (ONAs). Based on the Limpopo Conservation Plan the SCSC feasibility area traverses ESA1 and NNR areas, whereas the SBPM feasibility area traverses ESA1, NNR and ONA area.

The purpose of the Limpopo C-Plan (2018) is to inform land-use planning and development on a provincial scale and to aid in natural resource management. One of the outputs is a map of Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These are classified into different categories, namely Protected Areas, CBA1 areas, CBA2 areas, ESA1 areas, ESA2 areas, Other Natural Areas (ONAs) and areas with No Natural Habitat Remaining (NNR) based on biodiversity characteristics, spatial configuration, and requirements for meeting targets for both biodiversity patterns and ecological processes.

Figure 5-3 shows the project area superimposed on the Terrestrial CBA maps. The project area overlaps with CBA2, ESA1, NNR and ONA classified areas. Development in these areas is feasible, but developments other than the preferred biodiversity-compatible land-uses should be investigated in detail and the mitigation hierarchy applied.

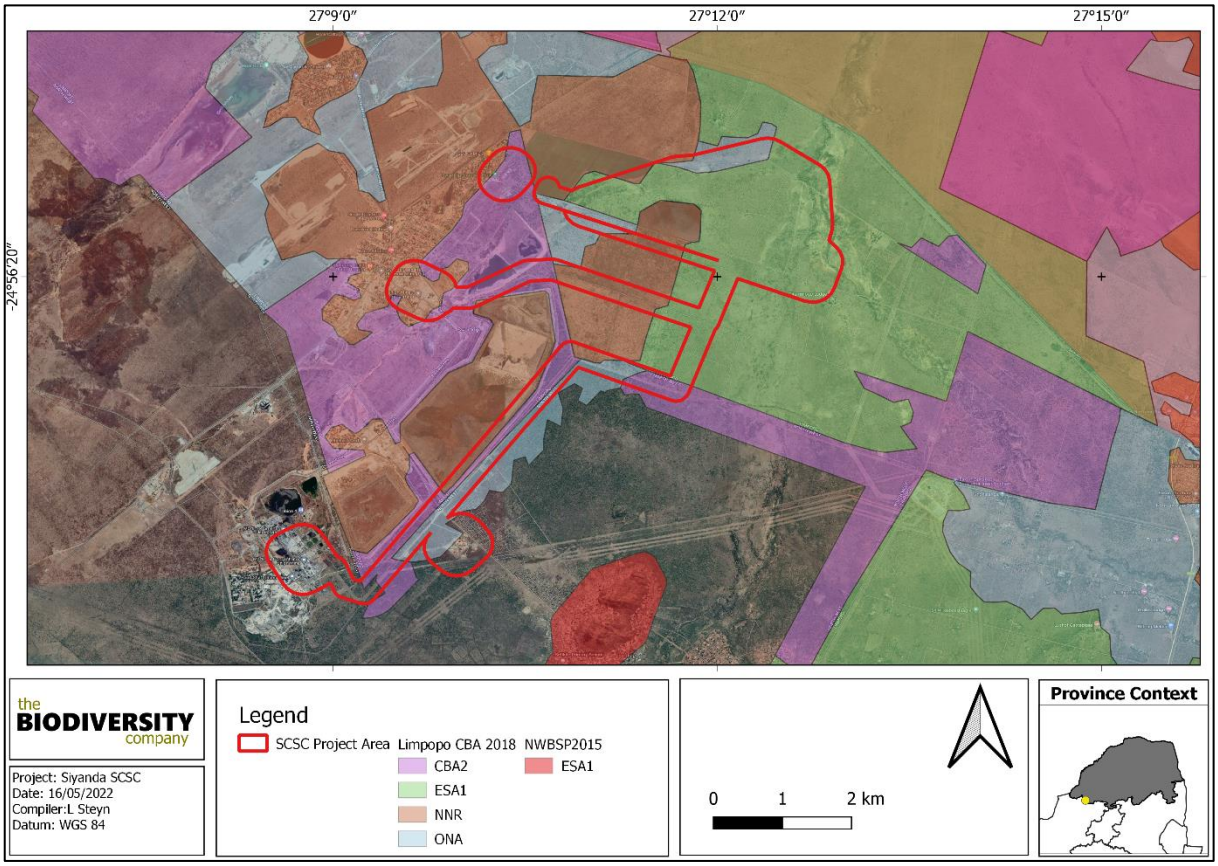

Figure 5-3 Map illustrating the locations of CBAs in the project area

5.1.1.4 Protected areas

According to the protected area spatial datasets from SAPAD (2021), the project area overlaps with the Rustenburg Platinum Mines (Union Section) Private Nature Reserve (Figure 5-4). From the imagery, and confirmed by the site visit, the portion of the reserve in which the project area is located is comprised of an old tailings dam in various stages of rehabilitation and is therefore not considered ecologically sensitive. Several additional private nature reserves are in close proximity to the project area. These are the Leopard Hills, Animalia, Youngs and Leeuwkopje private nature reserves. All of these reserves are within 5 km of the project area which means that the project area is within the buffer zone of the nature reserves.

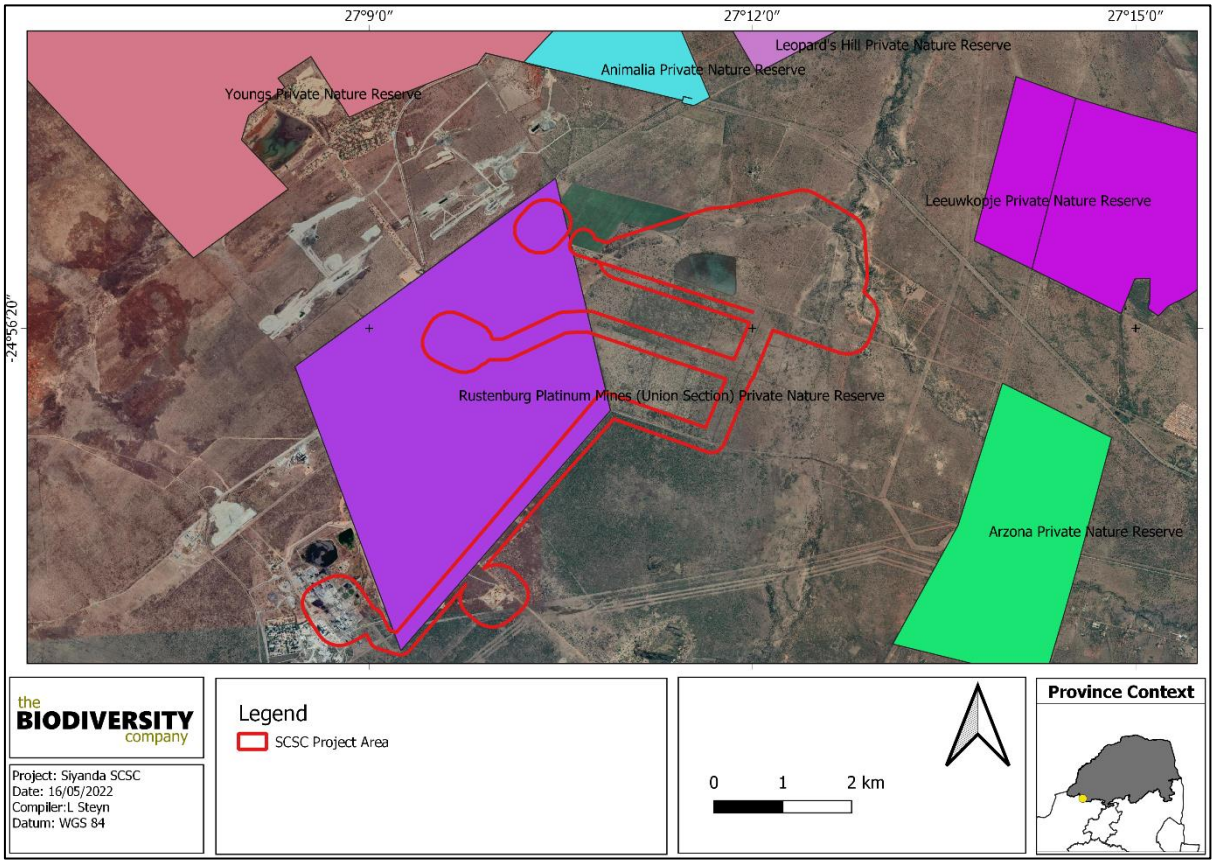

Figure 5-4 The project area in relation to the protected areas

5.1.1.5 National Protected Area Expansion Strategy

National Protected Area Expansion Strategy 2016 (NPAES) areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with a strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for finescale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities (NPAES, 2016). The project area overlaps with an NPAES protected area as can be seen in Figure 5-5. Developments in these areas must be mitigated to an acceptable level.

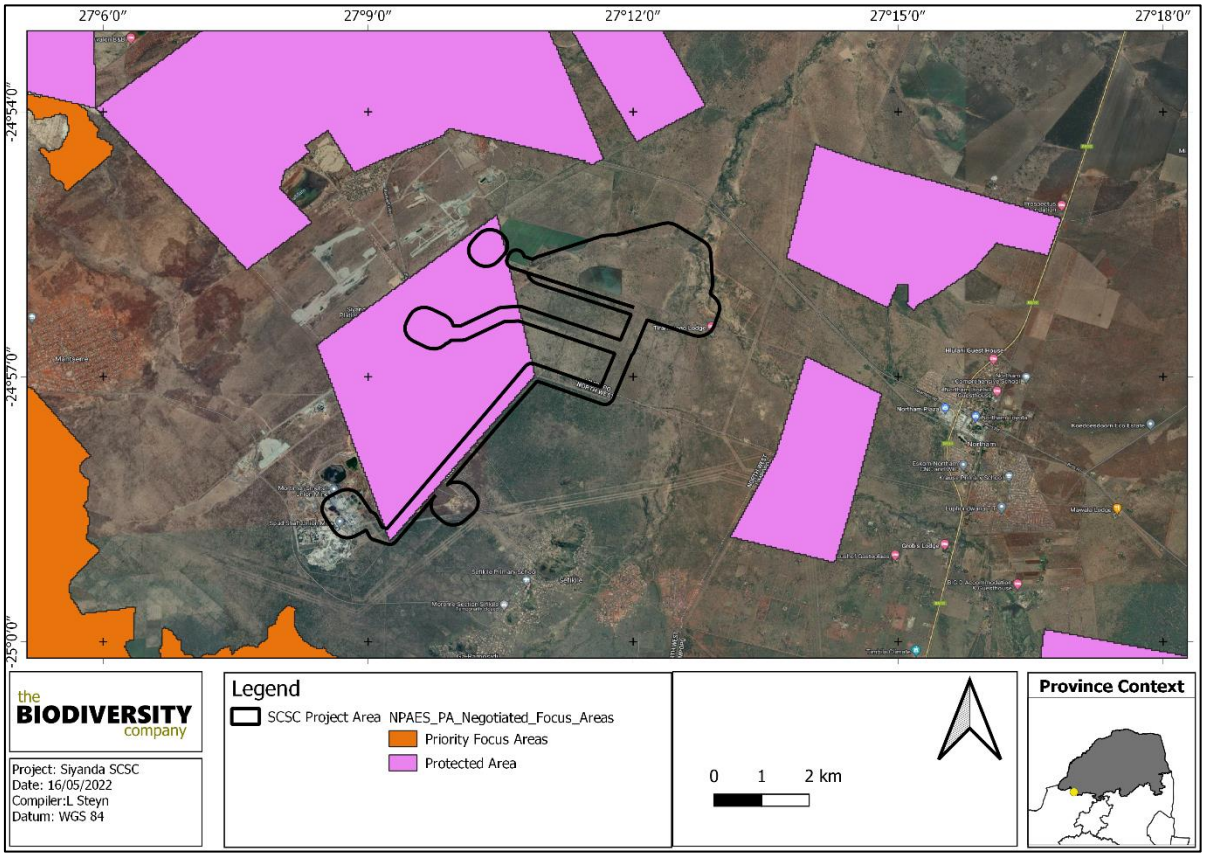

Figure 5-5 The project area in relation to the National Protected Area Expansion Strategy

5.1.1.6 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 5-6 shows the project area is adjacent to the Northern Turf Thornveld IBA.

The Northern Turf Thornveld IBA consists of a group of privately owned farms that forms a triangle delineated roughly by the Crocodile River in the east and the Bierspruit River in the west; the confluence of these two rivers is approximately 3 km south-west of Thabazimbi. This IBA is important as it is home to the Yellow-throated Sandgrouse *Pterocles gutturalis and* is regarded as the core range of the resident South African population (Birdlife South Africa, 2015B).

Other important birds in the IBA include the Secretarybird *Sagittarius serpentarius*, Kori Bustard *Ardeotis kori*, Lanner Falcon *Falco biarmicus* and Black-winged Pratincole *Glareola nordmanni*.

Common biome-restricted species found within this IBA include Kurrichane Thrush *Turdus libonyanus*, White-throated Robin-Chat *Cossypha humeralis*, Burchell's Starling *Lamprotornis australis*, White-bellied Sunbird *Cinnyris talatala* and the fairly common Kalahari Scrub Robin *Erythropygia paena* (Birdlife South Africa, 2015B).

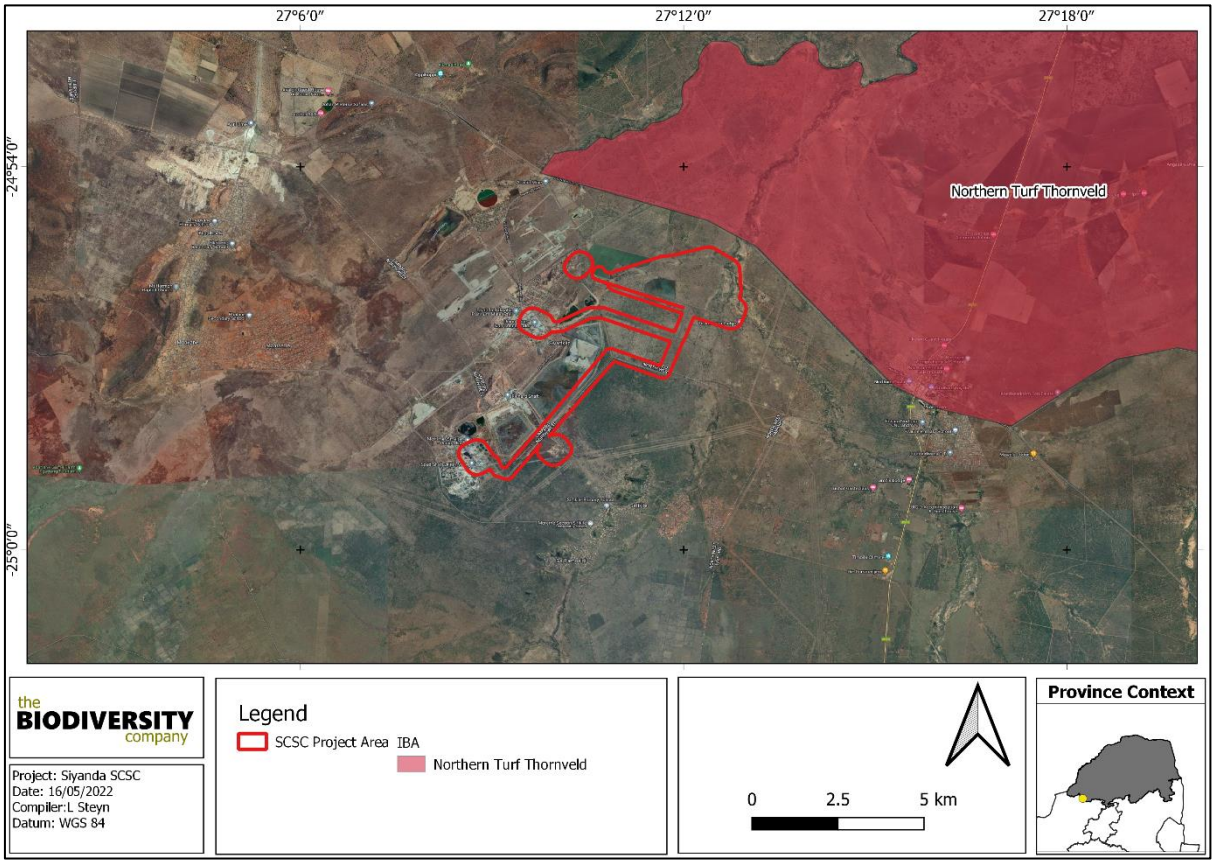

Figure 5-6 The project area in relation to the Northern turf thornveld IBA

5.1.1.7 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 area overlaps with a CR river and is adjacent to a CR wetland (Figure 5-7).

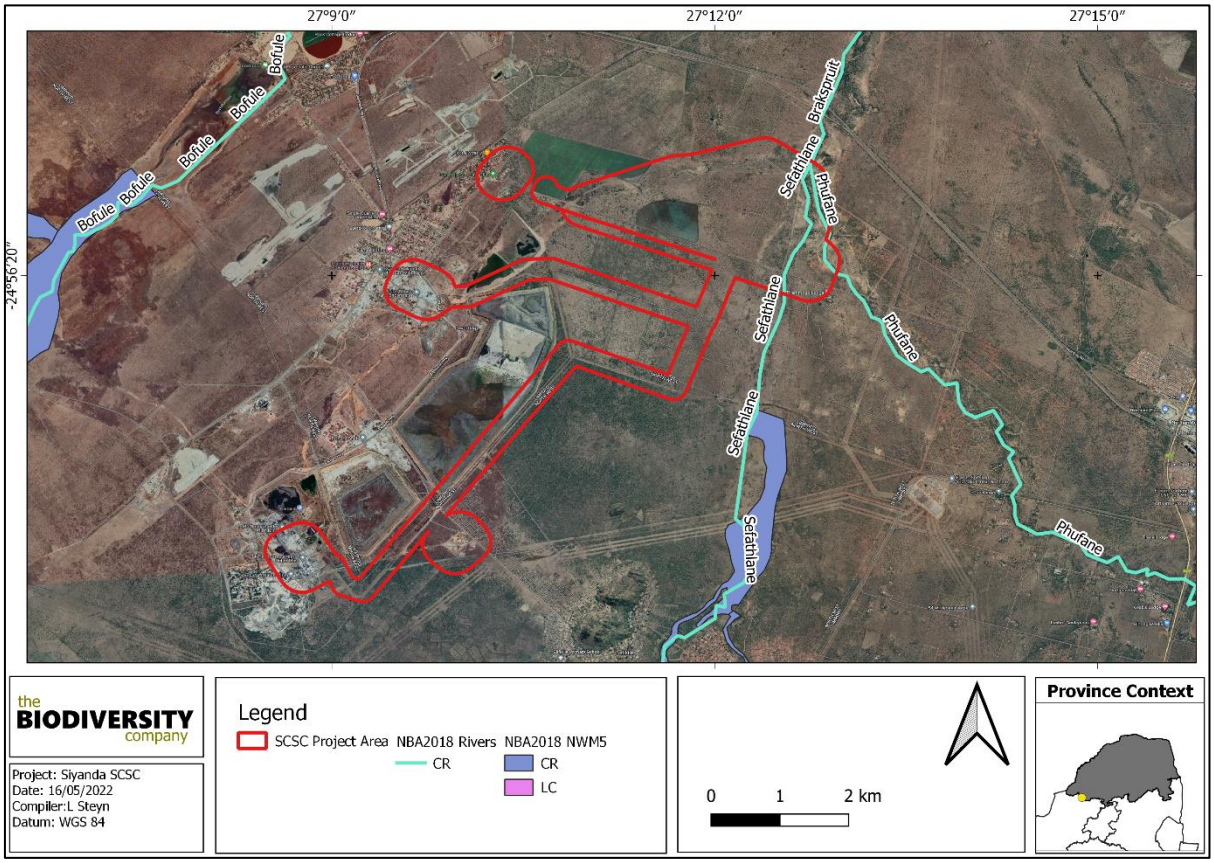

Figure 5-7 Map illustrating ecosystem threat status of rivers and wetland ecosystems in the project area

5.1.1.8 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 5-8 shows the project area overlaps with unclassified FEPA wetlands and unclassified FEPA rivers.

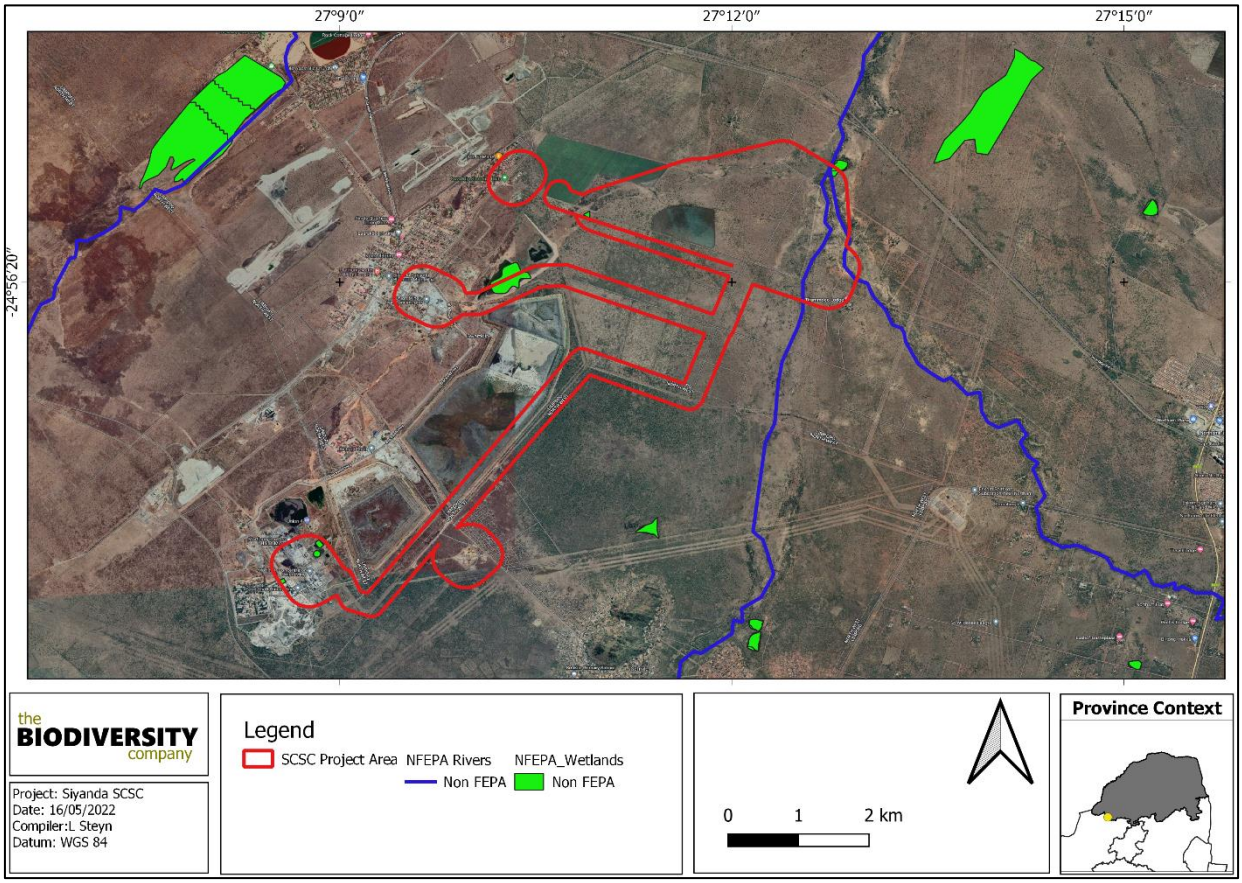

Figure 5-8 The project area in relation to the National Freshwater Ecosystem Priority Areas.

5.1.1.9 Nearby solar PV plants planned

There are several solar energy facilities within the surrounding landscape that have been approved or are presently in the application process. The project area forms a part of a PV facility that is in the application process, while there are two approved projects within the surrounding area (Figure 5-9).

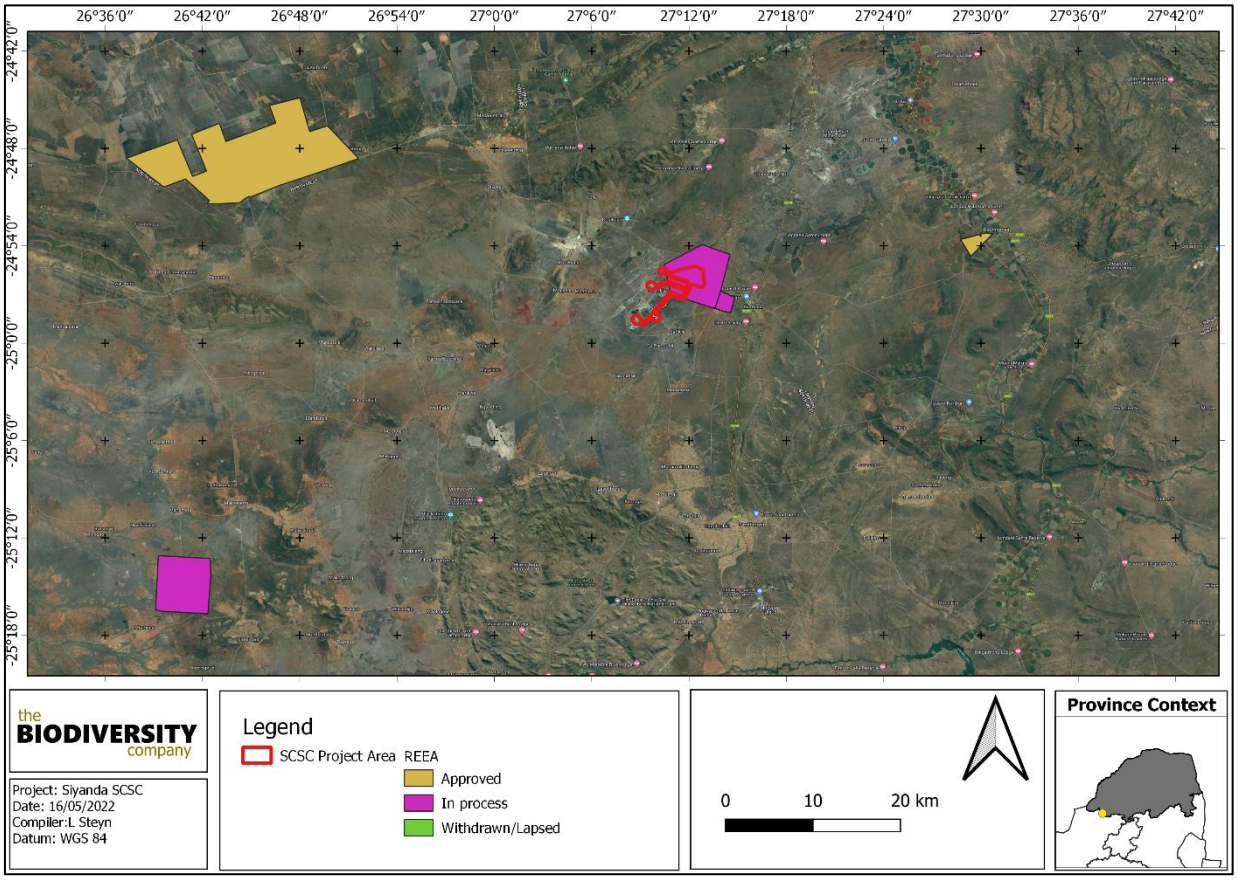

Figure 5-9 Map illustrating the SBPM Project Area in relation to nearby PV facilities

5.1.2 Review of previous reports

In 2019 TBC completed a terrestrial study for the modernization of the nearby Amandelbult Complex, in that study we delineated four primary habitats: Degraded Thornveld, Fragmented Thornveld, Wetland and Transformed in which a total of 42 tree, shrub and herbaceous plant species were recorded. No avifauna SCCs were recorded.

Scientific Aquatic Services (2020 a, b) conducted a basic assessment on Amandelbult during which they found three avifauna SCC, namely; *Gyps coprotheres* (Cape Vulture, EN), *Leptoptilos crumeniferus* (Marabou Stork, NT) and *Falco biarmicus* (Lanner Falcon, VU). They identified four habitat types in their study: Transformed habitat, Thornveld Habitat Unit, Freshwater Habitat Unit, and Broad-leaf Savanna.

Scientific Terrestrial Services (2019), identified the Bierspruit which splits into the Brakspruit and Bofule river on either side of the project area as an important habitat in the area with a high sensitivity. During the assessment no SCCs were recorded, however *Pterocles gutturalis* (Yellow-throated Sandgrouse, Threatened) were considered to have a high likelihood of occurrence.

In April 2021 TBC conducted an avifauna assessment for a nearby PV in Northam. During the three-day size visit, a total of 102 bird species were recorded. Of these, 58 species were recorded during the standardised point counts. No SCCs were recorded during that assessment however, Cape Vulture (*Gyps coprotheres*) was detected during the screening assessment of the project.

The ENVASS assessment for the Siyanda Bakgatla development that was conducted in 2020 is based on a 2006 baseline study performed by Engelbrecht and Grosel (2006) where they recorded 237 bird species in and around their project area. Of the 237 avifaunal species that have been recorded within the area, one (1) was Critically Endangered, namely *Gyps africanus* (White-backed Vulture), two (2) Endangered, two (2) Vulnerable and one (1) Near Threatened species (Table 5-2).

Table 5-2 List of species recorded by Engelbrecht and Grosel (2006) as described in the ENVASS 2020 report CR = Critically Endangered, EN = Endangered, NT = Near Threatened and VU = Vulnerable

Scientific Name	Common Name	Conservation Status
Ardeotis kori	Kori Bustard	NT
Gyps africanus	White-backed Vulture	CR
Gyps coprotheres	Cape Vulture	EN
Polemaetus bellicosus	Martial Eagle	VU
Sagittarius serpentarius	Secretarybird	VU
Torgos tracheliotus	Lappet-faced Vulture	EN

5.1.3 Faunal Assessment

5.1.3.1 Avifauna

The SABAP2 Data lists 306 avifauna species that could be expected to occur within the area (Appendix B). Ten (10) of these expected species are regarded as SCC (Table 5-3). Three of the species have a low likelihood of occurrence due to lack of suitable habitat and food sources in the project area. The likelihood of occurrence is also related to the disturbed nature of portions of the project area.

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)	Global (IUCN, 2021)	
Ardeotis kori	Bustard, Kori	NT	NT	Low
Ciconia nigra	Stork, Black	VU	LC	Low
Coracias garrulus	Roller, European	NT	LC	Moderate
Falco biarmicus	Falcon, Lanner	VU	LC	High
Glareola nordmanni	Pratincole, Black-winged	NT	NT	Low
Mycteria ibis	Stork, Yellow-billed	EN	LC	Moderate
Polemaetus bellicosus	Eagle, Martial	EN	EN	High
Pterocles gutturalis	Sandgrouse, Yellow-throated	NT	LC	Observed
Sagittarius serpentarius	Secretarybird	VU	EN	High
Tyto capensis	Grass-owl, African	VU	LC	High

Coracias garrulous (European Roller) is a winter migrant from most of South-central Europe and Asia occurring throughout sub-Saharan Africa (IUCN, 2017). The European Roller has a preference for bushy plains and dry savannah areas (IUCN, 2017). There is a moderate chance of this species occurring in the project area as they prefer to forage in open areas.

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. The likelihood of incidental records of this species in the project area is rated as high due to the natural veld condition and the presence of many bird species on which Lanner Falcons may predate.

Mycteria ibis (Yellow-billed Stork) is listed as EN on a regional scale and LC on a global scale. This species is migratory and has a large distributional range which includes much of sub-Saharan Africa. It is

typically associated with freshwater ecosystems, especially wetlands and the margins of lakes and dams (IUCN, 2017). The presence of some water bodies within the project area creates a high possibility that this species may occur there.

Polemaetus bellicosus (Martial Eagle) is listed as EN on a regional scale and on a global scale. This species has an extensive range across much of sub-Saharan Africa, but populations are declining due to deliberate and incidental poisoning, habitat loss, reduction in available prey, pollution and collisions with power lines (IUCN, 2017). It inhabits open woodland, wooded savanna, bushy grassland, thorn-bush and, in southern Africa, more open country and even sub-desert (IUCN, 2017). Suitable foraging and breeding area is found in the project area.

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). The likelihood of occurrence is rated as high due to the extensive grasslands and wetland areas present in the project area.

Tyto capensis (African Grass-owl) is rated as VU on a regional basis. The distribution of the species includes the eastern parts of South Africa. The species is generally solitary, but it does also occur in pairs in moist grasslands where it roosts (IUCN, 2017). This species specifically has a preference for nesting in dense stands of the grass species *Imperata cylindrica*. Wetlands with suitable habitat can be found in the project area therefore the likelihood of occurrence is rated as high.

6 Field Assessment

6.1 First Assessment

One hundred and thirty-four (134) bird species were recorded 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. Three of the species recorded were SCCs on a national or international scale. The Lanner Falcon were observed on four occasions, while the Yellow-throated Sandgrouse were observed twice and the Cape Vulture once (Figure 6-1, Figure 6-2 and Table 6-1). The Yellow-throated Sandgrouse *Pterocles gutturalis* and is regarded as one of the core residents of the Northern Turf Thornveld IBA area (Birdlife South Africa, 2015B).

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

Species Name	Common Name	Conservation Status	
		Regional (SANBI, 2016)	Global (IUCN, 2021)
Lanner Falcon	*Falco biarmicus*	VU	LC
Cape Vulture	*Gyps coprotheres*	EN	EN
Yellow-throated Sandgrouse	*Pterocles gutturalis*	NT	LC

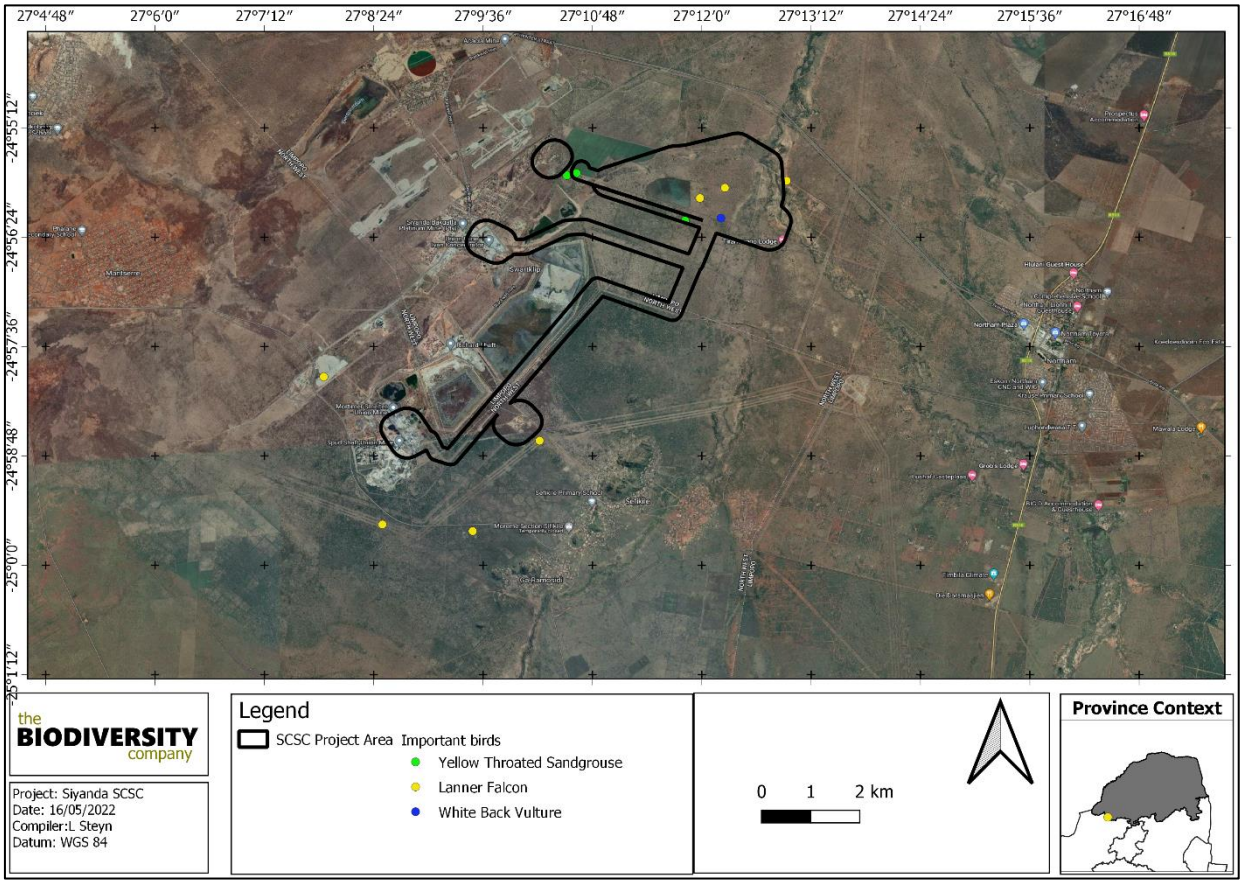

Figure 6-1 The location of the recordings of the species of conservation concern

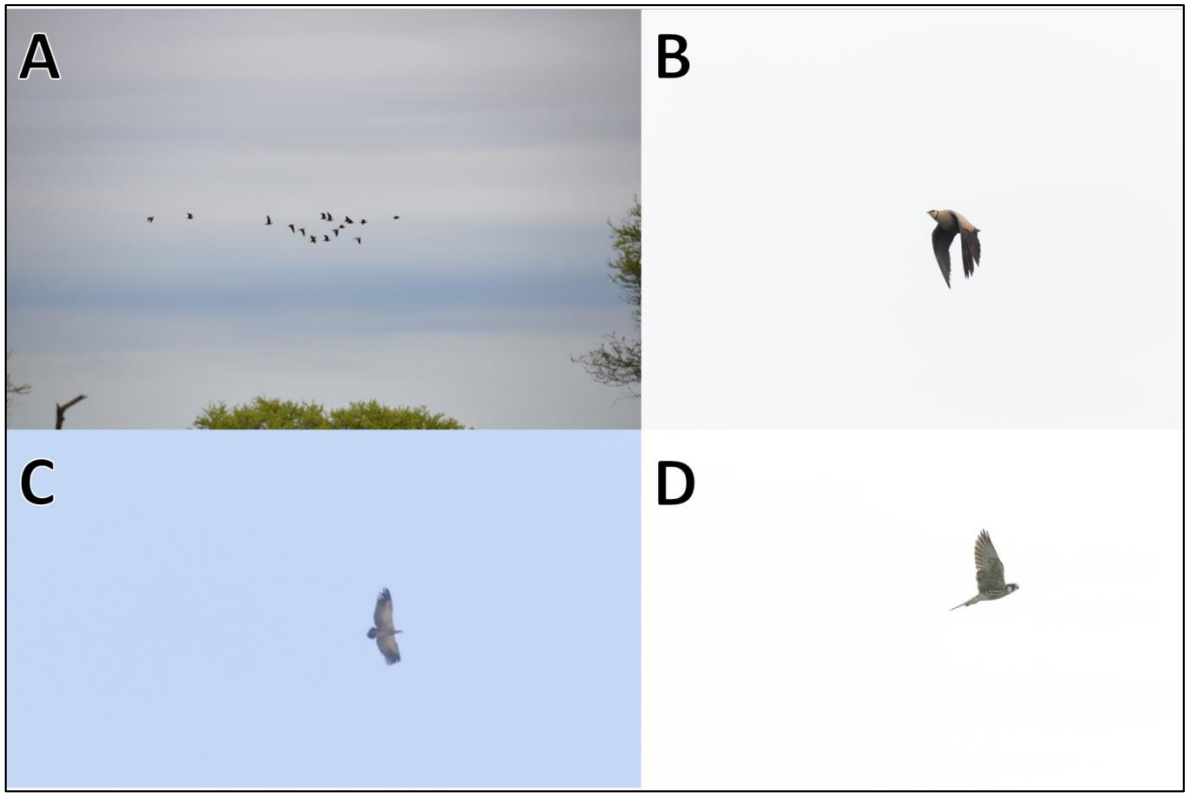

Figure 6-2 Photographs of the recorded species, A & B) Pterocles gutturalis (Yellow-Throated Sandgrouse), C) Gyps coprotheres (Cape Vulture) and D) Falco biarmicus (Lanner Falcon)

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. that *Quelea quelea* (Red-billed Quelea), *Apus affinis* (Little Swift), *Uraeginthus angolensis* (Blue Waxbill) and *Sarkidiornis melanotos* (Knob-billed Duck) 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 project site during the first survey as defined as those species whose relative abundances cumulatively account for more than 79% of the overall abundance shown alongside the frequency with which a species was detected among point counts.

Common Name	Scientific Name	Relative abundance	Frequency (%)
Red-billed Quelea	*Quelea quelea*	0,471	52,632
Little Swift	*Apus affinis*	0,143	21,053
Blue Waxbill	*Uraeginthus angolensis*	0,025	50,000
Knob-billed Duck	*Sarkidiornis melanotos*	0,024	5,263
Magpie Shrike	*Urolestes melanoleucus*	0,017	28,947
Cape Turtle (Ring-necked) Dove	*Streptopelia capicola*	0,017	60,526
Helmeted Guineafowl	*Numida meleagris*	0,014	15,789
Blue-cheeked Bee-eater	*Merops persicus*	0,013	15,789
Southern Masked Weaver	*Ploceus velatus*	0,013	18,421
Barn Swallow	*Hirundo rustica*	0,011	21,053
Natal Spurfowl	*Pternistis natalensis*	0,010	36,842
Western Cattle Egret	*Bubulcus ibis*	0,010	10,526
Lazy Cisticola	*Cisticola aberrans*	0,009	28,947
Red-faced Mousebird	*Urocolius indicus*	0,008	13,158
Spur-winged Goose	*Plectropterus gambensis*	0,008	5,263

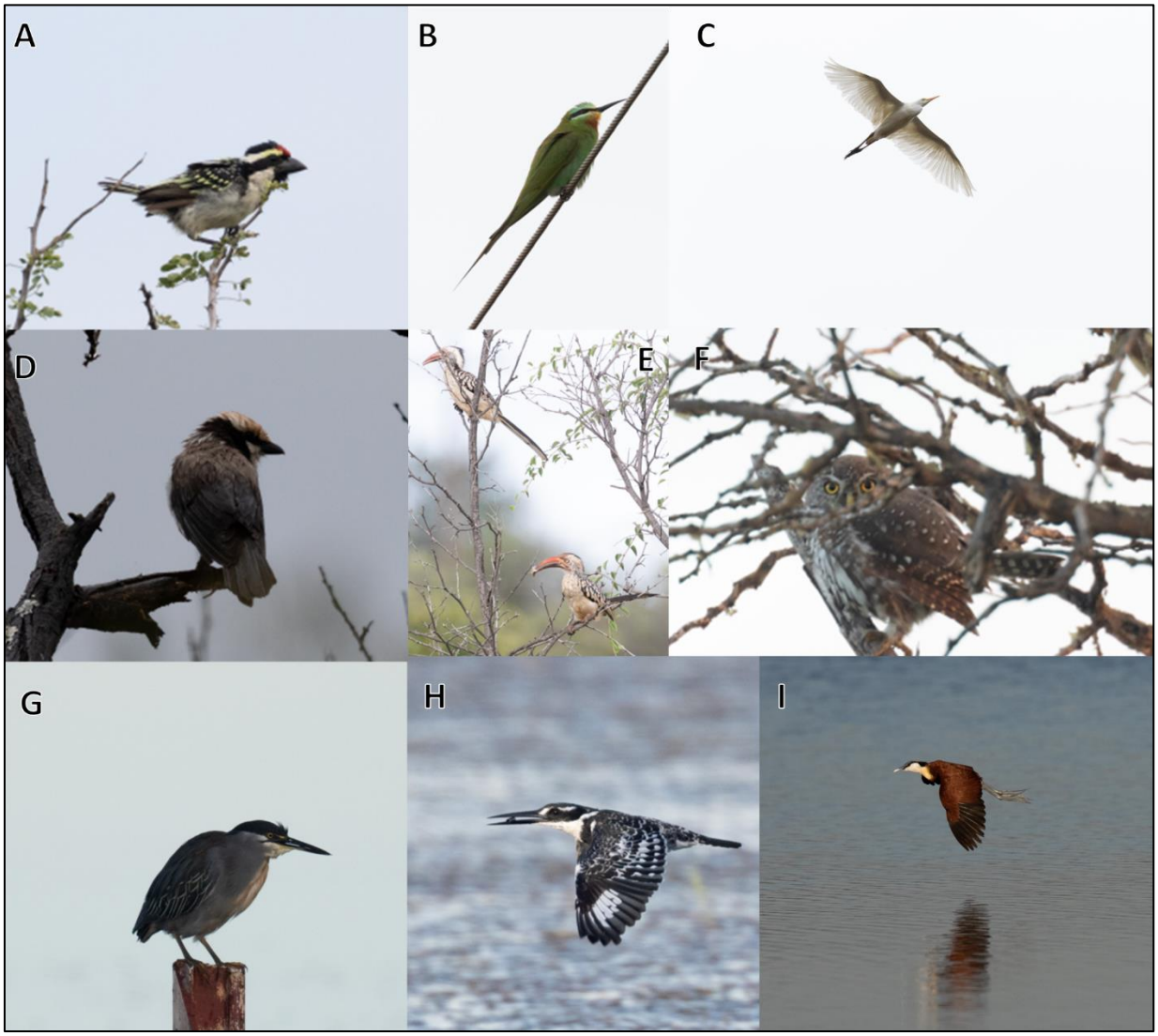

Figure 6-3 ***Some of the birds recorded in the project site: A) Acacia Pied Barbet B) Blue-cheeked Bee-eater, C) Cattle Egret, D) Southern White-crowned Shrike, E) Southern Red-billed Hornbill, F) Pearl-spotted Owlet, G) Green-backed (Striated) Heron, H) Pied Kingfisher, and I) African Jacana***

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) (27%) (Figure 6-4). Omnivores that do not have a set habitat Omnivore Multiple Diurnal (OMD) made up the second highest group (16%), followed by Granivore Ground Diurnal (GGD) species (13%). As illustrated in Figure 6-4, the project area supports a diverse functional feeding guild assemblage, including carnivorous and frugivorous species.

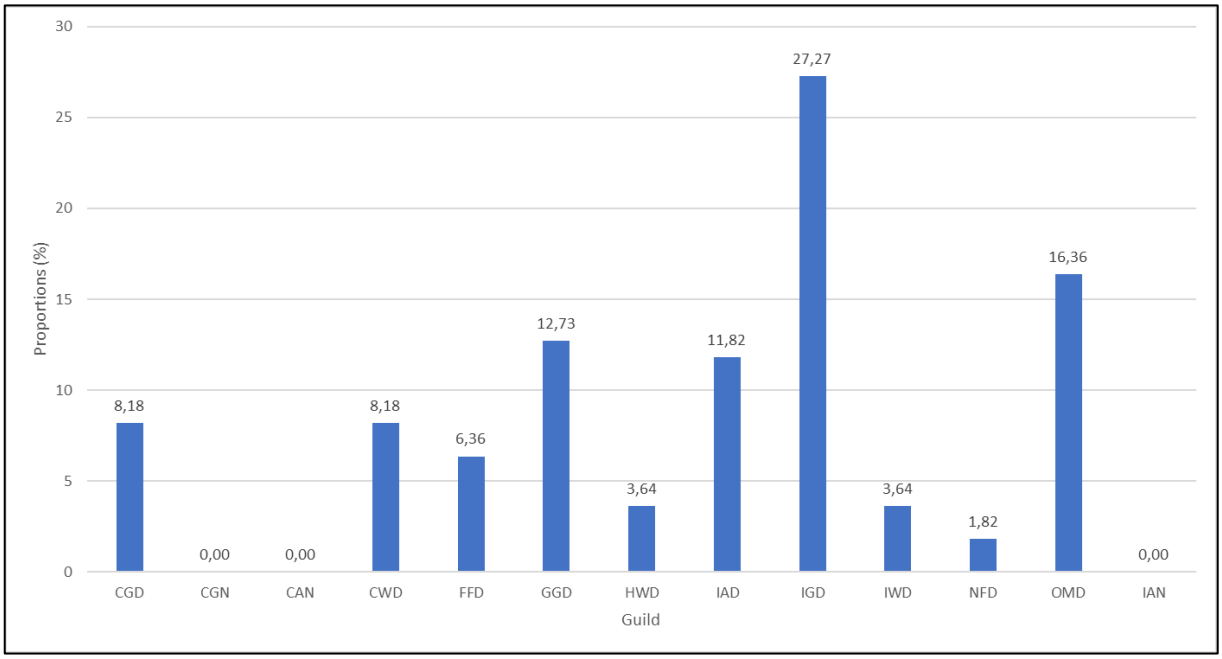

Figure 6-4 ***Avifaunal trophic guilds. CGD, carnivore ground diurnal; CGN, carnivore ground nocturnal, CAN, carnivore air nocturnal, CWD, carnivore water diurnal; FFD, frugivore foliage diurnal; GGD, granivore ground diurnal; HWD, herbivore water diurnal; IAD, insectivore air diurnal; IGD, insectivore 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). 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. Species recorded at the nearby river and dam were included as they could very likely be influenced should they be moving between water sources. Even though the panels do not pose an extensive collision risk for larger birds, powerlines associated with the infrastructure, guidelines (anchor lines) and connection lines do pose a risk. 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	Conservation Status (Regional, Global)	Collision	Electrocution	Habitat Loss
African Darter	*Anhinga rufa*		x		x
African Fish Eagle	*Haliaeetus vocifer*		x	x	
African Hawk Eagle	*Aquila spilogaster*		x	x	
Black-chested Snake Eagle	*Circaetus pectoralis*			x	
Black-headed Heron	*Ardea melanocephala*		x	x	
Egyptian Goose	*Alopochen aegyptiaca*		x	x	
Gabar Goshawk	*Micronisus gabar*		x		
Glossy Ibis	*Plegadis falcinellus*		x	x	
Green-backed (Striated) Heron	*Butorides striata*		x		
Hadeda (Hadada) Ibis	*Bostrychia hagedash*		x	x	
Hamerkop	*Scopus umbretta*		x		

Helmeted Guineafowl	*Numida meleagris*			x	
Lanner Falcon	*Falco biarmicus*	VU, LC	x		x
Marsh Owl	*Asio capensis*		x	x	x
Spur-winged Goose	*Plectropterus gambensis*		x	x	
White-backed Vulture	*Gyps africanus*	CR, CR	x	x	x
White-faced Whistling Duck	*Dendrocygna viduata*		x	x	
Yellow-throated Sandgrouse	*Pterocles gutturalis*	NT, LC			x

Figure 6-5 Two of the high collision risk species recorded on site: A) Spur-winged Geese and B) Black-headed Heron

6.2 Second Assessment

One hundred and eight (108) bird species were recorded during the second survey. The full list of species recorded, their threat status, guild and location observed is provided in Appendix E. Two of the species recorded were SCC on a national or international scale. One individual Cape Vulture was found circling north of the project area and an additional 6 individuals of this species was observed west of the project area. A total of 31 Yellow-throated Sandgrouse were observed in various parts of the project area.

Table 6-4 lists the species as well as their threatened status, Figure 6-6 shows the locations where the species were observed and Figure 6-7 provides photographs of these recorded SCC.

Table 6-4 Species of conservation concern observed during the survey (EN Endangered; NT, Near Threatened)

Common Name	Scientific Name	Conservation status	
		Regional	Global
Cape Vulture	*Gyps coprotheres*	EN	EN
Yellow-throated Sandgrouse	*Pterocles gutturalis*	NT	LC

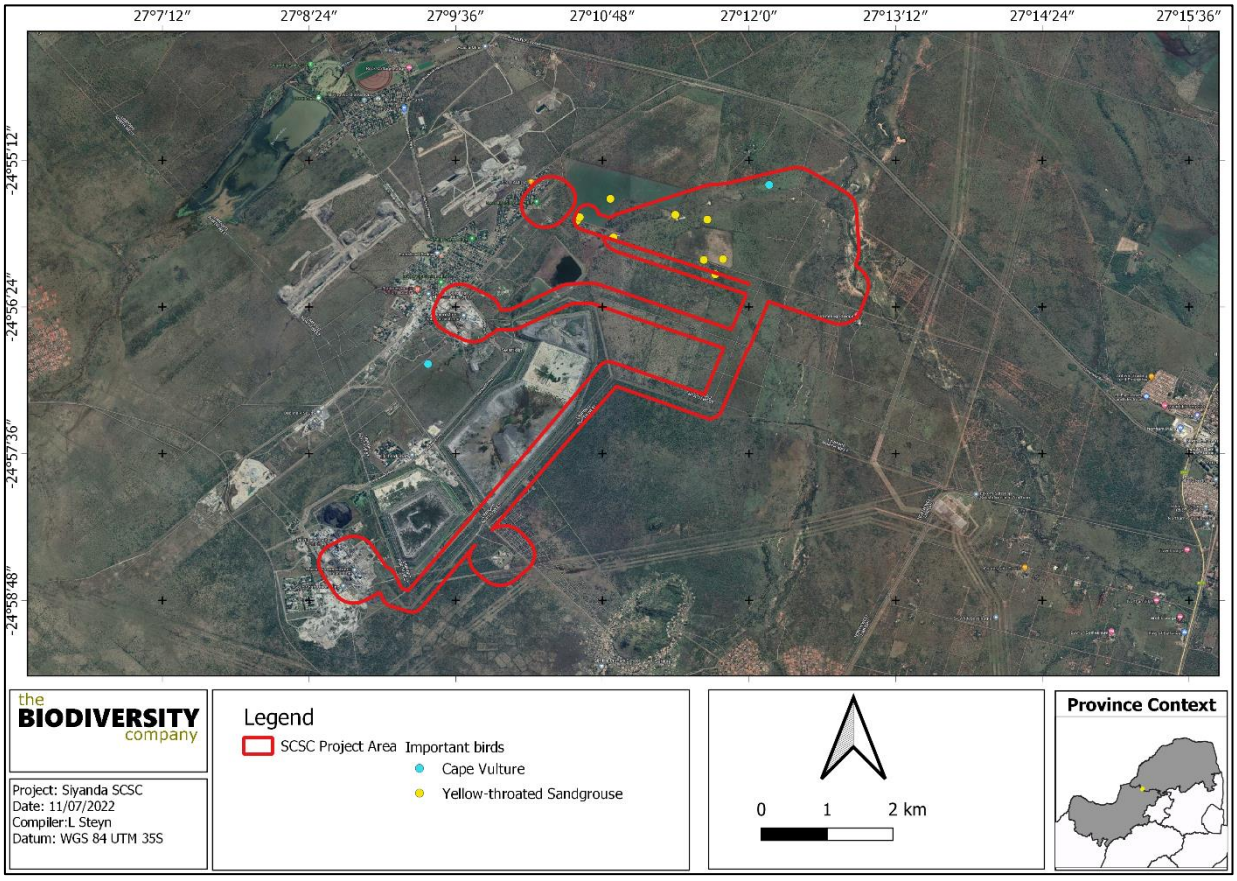

Figure 6-6 The location of the recordings of the species of conservation concern

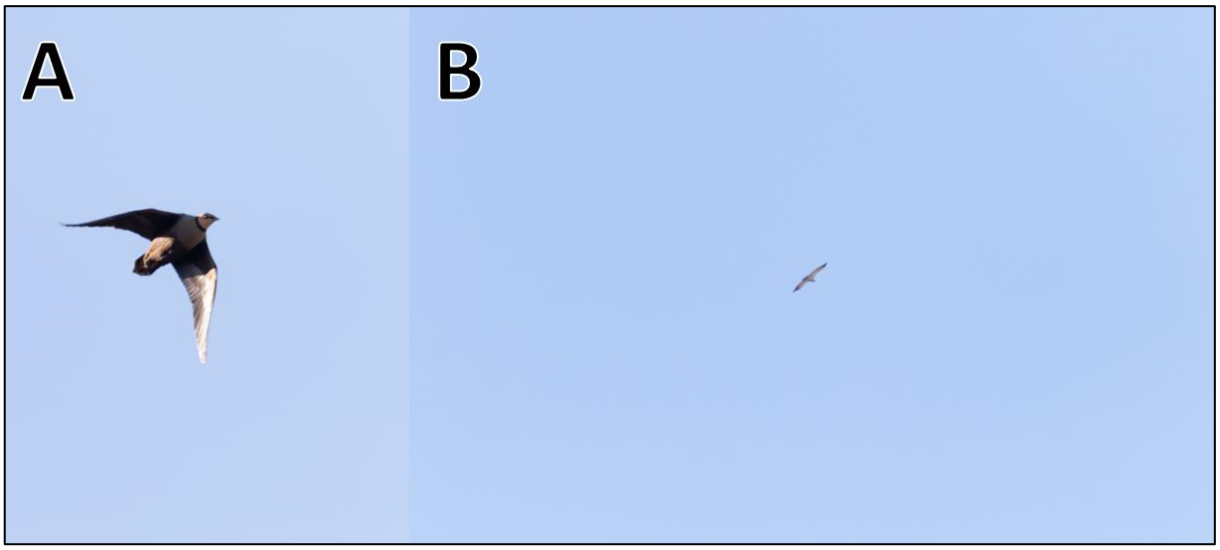

Figure 6-7 Photographs of the recorded species, A) Pterocles gutturalis (Yellow-throated Sandgrouse) and B) Gyps coprotheres (Cape Vulture)

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 Red-billed Quelea, Red-knobbed Coot, Helmeted Guineafowl, African Palm Swift and Blue Waxbill were the most abundant species during the survey. Figure 6-8 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 78% of the overall abundance shown alongside the frequency with which a species was detected among point counts.

Common Name	Scientific Name	Conservation Status		Relative abundance	Frequency (%)
		Regional (SANBI, 2016)	IUCN (2017)		
Red-billed Quelea	*Quelea quelea*	Unlisted	LC	0,169	10,811
Red-knobbed coot	*Fulica cristata*	Unlisted	LC	0,102	2,703
Helmeted Guineafowl	*Numida meleagris*	Unlisted	LC	0,089	13,514
African Palm Swift	*Cypsiurus parvus*	Unlisted	LC	0,070	18,919
Blue Waxbill	*Uraeginthus angolensis*	Unlisted	LC	0,066	62,162
White-faced Whistling Duck	*Dendrocygna viduata*	Unlisted	LC	0,051	2,703
Cape Turtle (Ring-necked) Dove	*Streptopelia capicola*	Unlisted	LC	0,032	72,973
Yellow-throated Sandgrouse	*Pterocles gutturalis*	NT	LC	0,032	16,216
Magpie Shrike	*Urolestes melanoleucus*	Unlisted	LC	0,027	32,432
Long-billed Crombec	*Sylvietta rufescens*	Unlisted	LC	0,017	37,838
Chestnut-vented Tit-Babbler (Warbler)	*Curruca subcoerulea*	Unlisted	LC	0,015	37,838
Rattling Cisticola	*Cisticola chiniana*	Unlisted	LC	0,014	35,135
Burchell's Starling	*Lamprotornis australis*	Unlisted	LC	0,013	21,622
Pied Crow	*Corvus albus*	Unlisted	LC	0,012	29,730
Grey Go-away-bird	*Corythaixoides concolor*	Unlisted	LC	0,011	21,622
Green-winged Pytilia	*Pytilia melba*	Unlisted	LC	0,010	18,919
Marico Flycatcher	*Melaenornis mariquensis*	Unlisted	LC	0,010	18,919
Red-faced Mousebird	*Urocolius indicus*	Unlisted	LC	0,010	8,108
Reed Cormorant	*Microcarbo africanus*	Unlisted	LC	0,010	2,703
Swainson's Spurfowl	*Pternistis swainsonii*	Unlisted	LC	0,010	18,919
White-breasted Cormorant	*Phalacrocorax lucidus*	Unlisted	LC	0,010	2,703
Red-billed Buffalo Weaver	*Bubalornis niger*	Unlisted	LC	0,009	2,703
Yellow-billed Duck	*Anas undulata*	Unlisted	LC	0,009	2,703

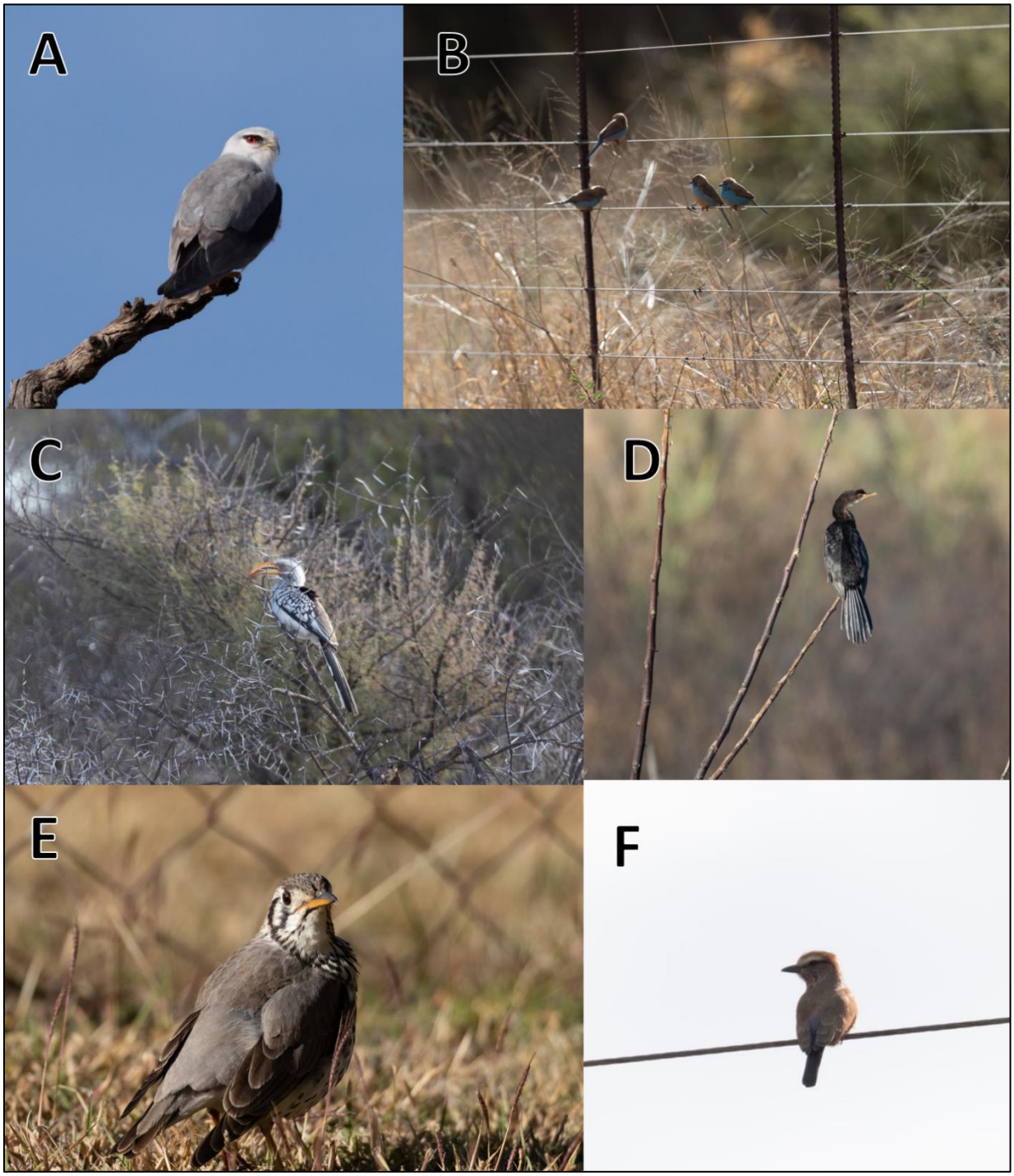

Figure 6-8 ***Some of the birds recorded in the project site: A) Black Shouldered Kite, B) Blue Waxbill, C) Yellow-billed Hornbill, D) White-breasted Cormorant, E) Groundscraper Thrush, and F) Purple Roller.***

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 6-9). Granivores that feed on the ground (GGD) and the omnivorous species (OMD) (16 %) made up the second highest groups.

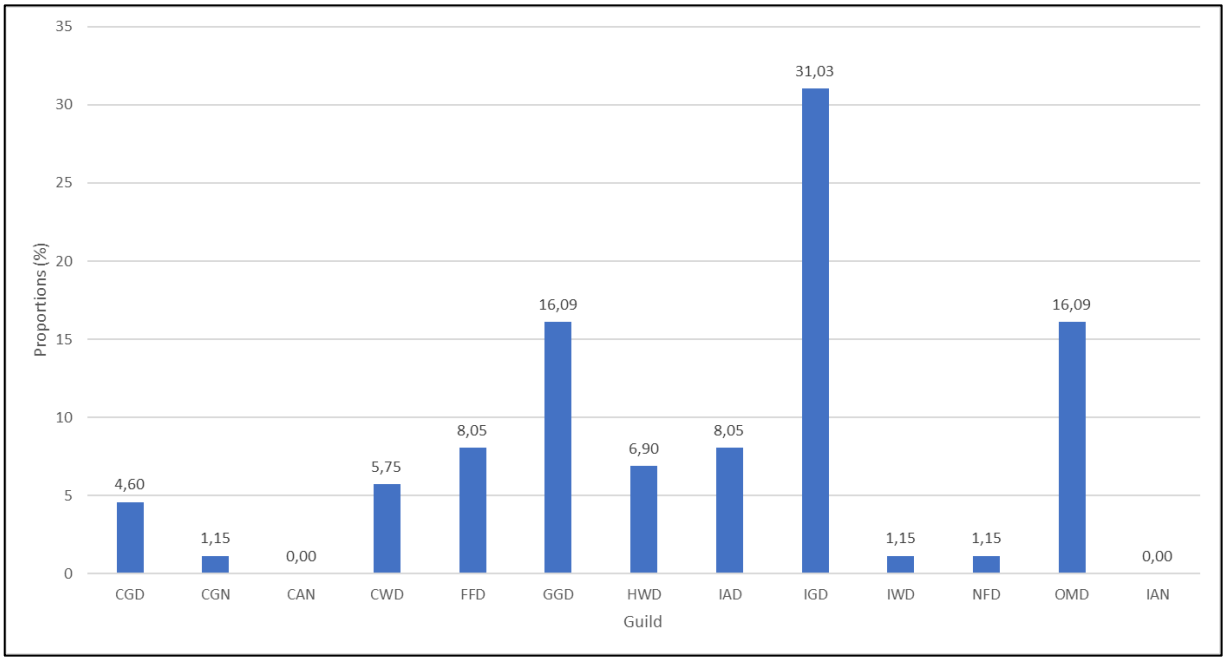

Figure 6-9 ***Avifaunal trophic guilds. CGD, carnivore ground diurnal; CGN, carnivore ground nocturnal, CAN, carnivore air nocturnal, CWD, carnivore water diurnal; FFD, frugivore foliage diurnal; GGD, granivore ground diurnal; HWD, herbivore water diurnal; IAD, insectivore air diurnal; IGD, insectivore 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 6-10). 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 survey.***

Common Name	Scientific Name	Conservation Status (Regional, Global)	Collisions	Electrocution	Habitat Loss
African Darter	*Anhinga rufa*		x		x
African Fish Eagle	*Haliaeetus vocifer*		x	x	
African Hawk Eagle	*Aquila spilogaster*		x	x	
Black-headed Heron	*Ardea melanocephala*		x	x	
Black-winged Kite	*Elanus caeruleus*			x	
Brown Snake Eagle	*Circaetus cinereus*			x	
Cape Shoveler	*Spatula smithii*		x	x	
Cape Vulture	***Gyps africanus***	EN, EN	x	x	x
Egyptian Goose	*Alopochen aegyptiaca*		x	x	
Hadeda (Hadada) Ibis	*Bostrychia hagedash*			x	x
Hamerkop	*Scopus umbretta*			x	
Helmeted Guineafowl	*Numida meleagris*			x	
Knob-billed Duck	*Sarkidiornis melanotos*		x	x	
Pale Chanting Goshawk	*Melierax canorus*		x		

Pied Crow	*Corvus albus*		x	x	
Red-billed Teal	*Anas erythrorhyncha*		x	x	
Western Cattle Egret	*Bubulcus ibis*		x	x	
White-faced Whistling Duck	*Dendrocygna viduata*		x	x	
Yellow-throated Sandgrouse	*Pterocles gutturalis*	NT, LC			x

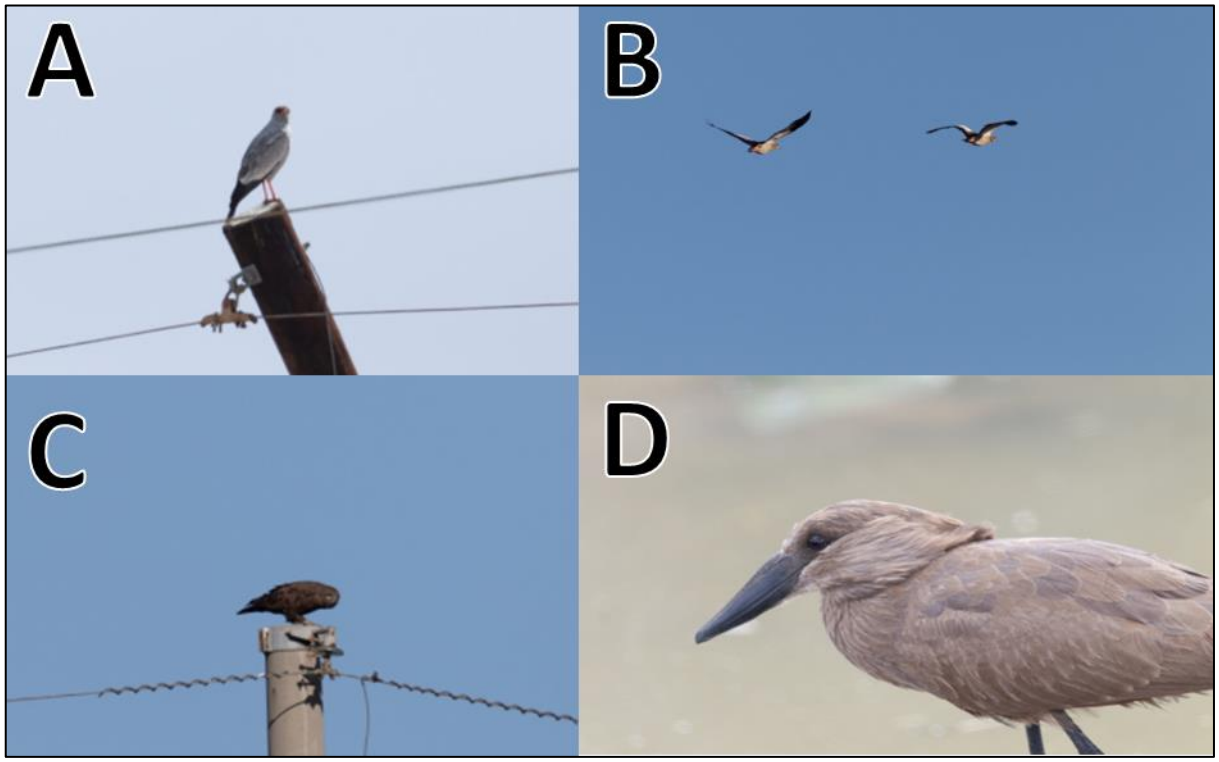

Figure 6-10 Some of the high collision risk species recorded on site: A) Pale Chanting Goshawk, B) Egyptian Goose, C) Brown Snake Eagle and D) Hamerkop

6.3 Flight and Nest Analysis

Observing and monitoring flight paths and nesting sites are important in ascertaining habitat sensitivity and evaluating the impact risk significance of any proposed development. During the field survey recording flight-paths and nesting sites were undertaken for certain species. However, given the limited time available the results of this section must be interpreted with caution, as each species movement is likely to be more extensive and there may have been nesting sites that were not observed. No nest of species of conservation concern were observed. What was however noted was that the Yellow Throated Sandgrouse use the wetlands on site extensively (high density areas of occurrence on Figure 6-11) and these wetland areas must thus be avoided during development. Figure 6-11 further shows the flight path of an African Fish Eagle crossing the transmission line.

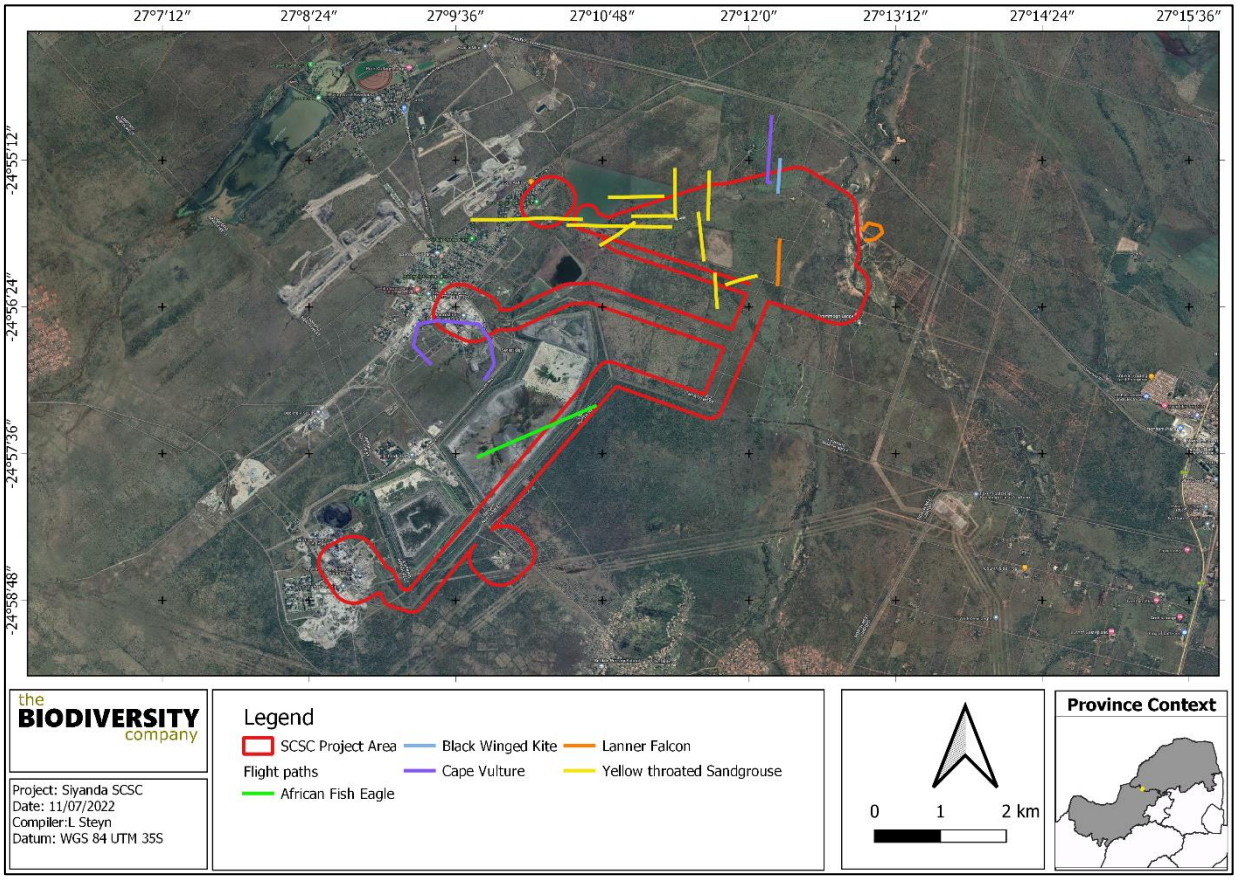

Figure 6-11 Flight paths of some of the risk species in the project area and surrounds

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 five habitat types namely, Degraded Bushveld, Disturbed, Fragmented Bushveld, Transformed as well as Wetlands and other water resources (Dam and river) (Figure 7-2). 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 7-1.

Degraded Bushveld comprised of a number of woody species which are good perching and nesting locations for species such as Black-Winged Kites, Black-chested Snake Eagles and African Hawk Eagles. The present impacts to this habitat unit were found to be limited and it presented a healthy combination of insect, seed and fruit eaters as well as numerous carnivorous species.

The Disturbed habitat is regarded as areas that have been impacted by historic overgrazing, mismanagement and land use. These habitats are not entirely transformed but in a constant disturbed state as it cannot recover to a more natural state due to ongoing disturbances and impacts it receives from grazing and mismanagement. Grass species were mostly prevalent in this habitat, therefore a number of granivores species were found here. These species included Red-billed Queleas, Blue Waxbills and Southern- Masked Weavers.

Transformed habitat included areas where mining previously took place as well as the areas where agriculture is currently taking place. Species found here included Red-faced Mousebirds and Cape-Turtle Doves.

Fragmented Bushveld consisted of areas that were isolated from the other areas, this was mainly due to fences or roads. Some portions of this habitat would previously have been described as disturbed but as

it is now allowed to recover its, general ecological state is in a better condition. It is however still exposed to edge effects. Species found here also included a high number of carnivores species due to the larger tree species found here.

Wetlands and Other Water Resources consisted of the onsite wetlands as well as the nearby, Sefathlane, Brakspruit, Phufane rivers as well as the dam found on the Bofule river. Some of the rivers/portions of the rivers were dry during the first survey they did however still have plant growth on the edge that are restricted to water sources. The birds utilising these habitats included Woodlands Kingfisher, White-faced Whistling Duck, Green-backed (Striated) Heron, White-winged Tern, African Darter, Lesser Swamp Warbler and Squacco Heron. The wetlands found in the project area is utilised by the Yellow-throated Sandgrouse as water sources and is thus considered to be sensitive.

The general physiognomy of the afore-described habitat types is illustrated in Figure 7-2 below.

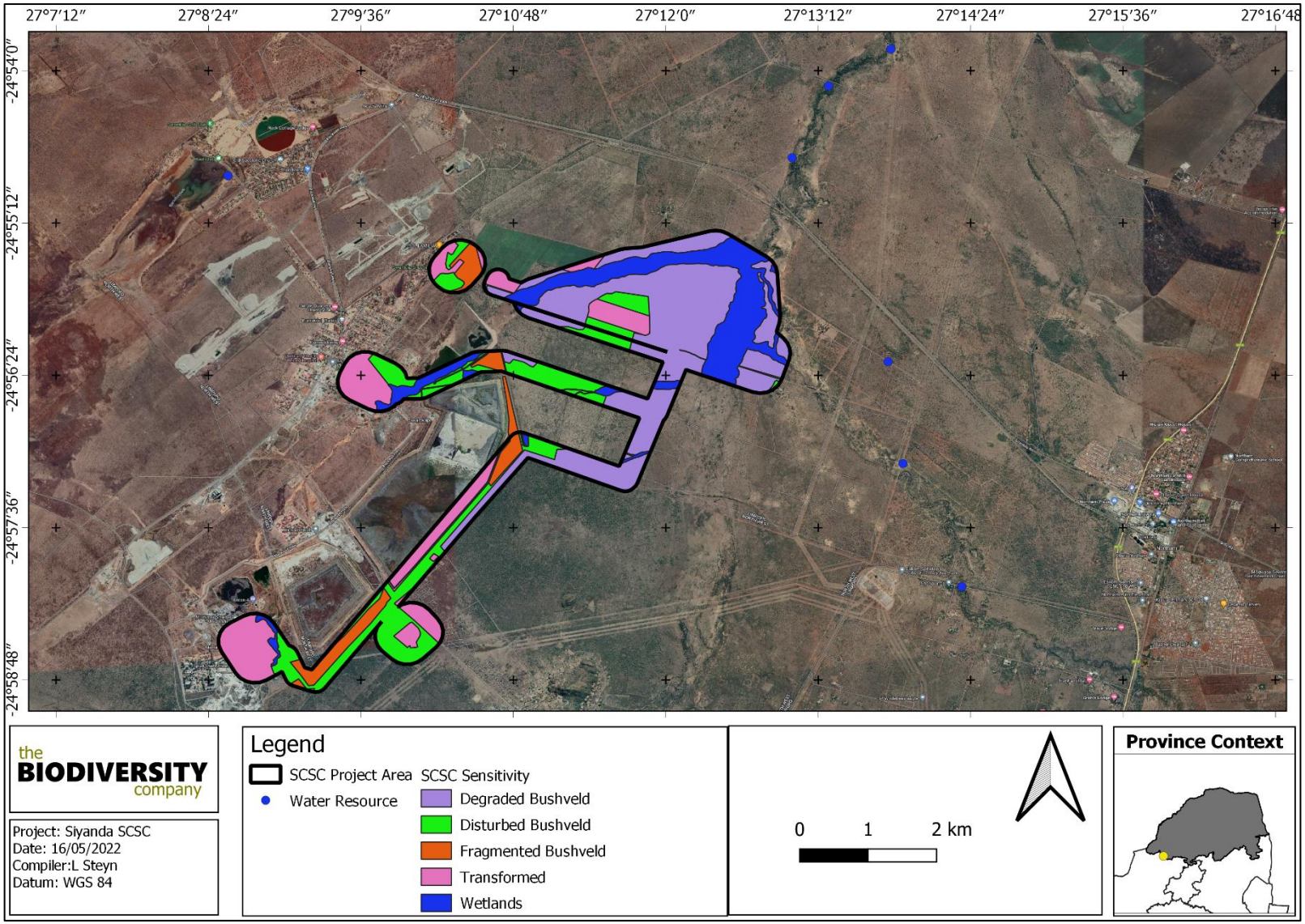

Figure 7-1 The avifauna habitats found in the project site.

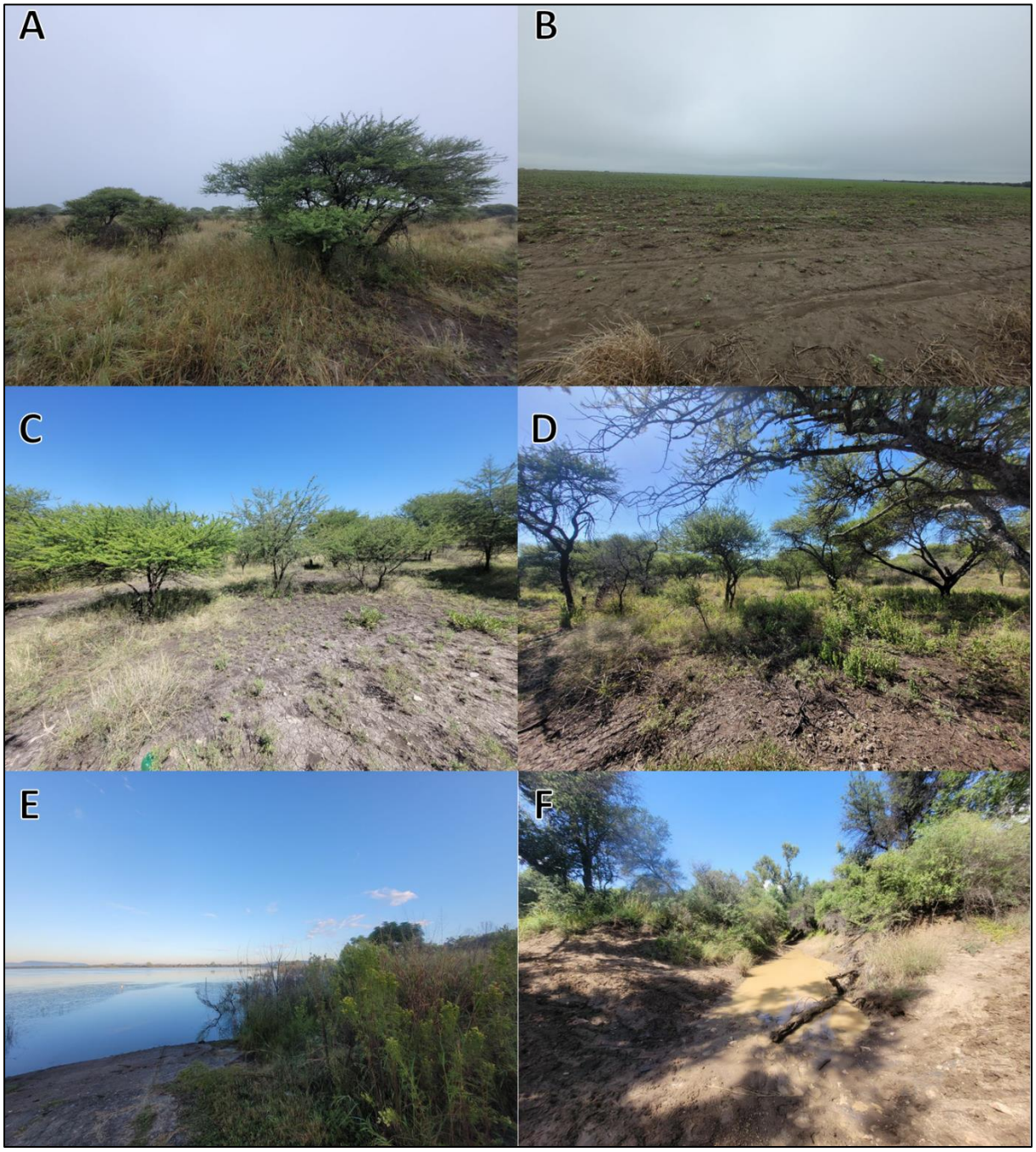

Figure 7-2 ***Photographs illustrating the habitats identified during the assessments: A) Degraded Bushveld, B)Transformed, C) Disturbed, D) Fragmented Bushveld and E & F) Wetlands and Water Resources***

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 'Moderate' (Figure 8-2). The very high terrestrial sensitivity was due to the CBA2 and ESA1 status of the project area as well as the Rustenburg Platinum Mines Private Nature Reserve with which the project area overlaps.

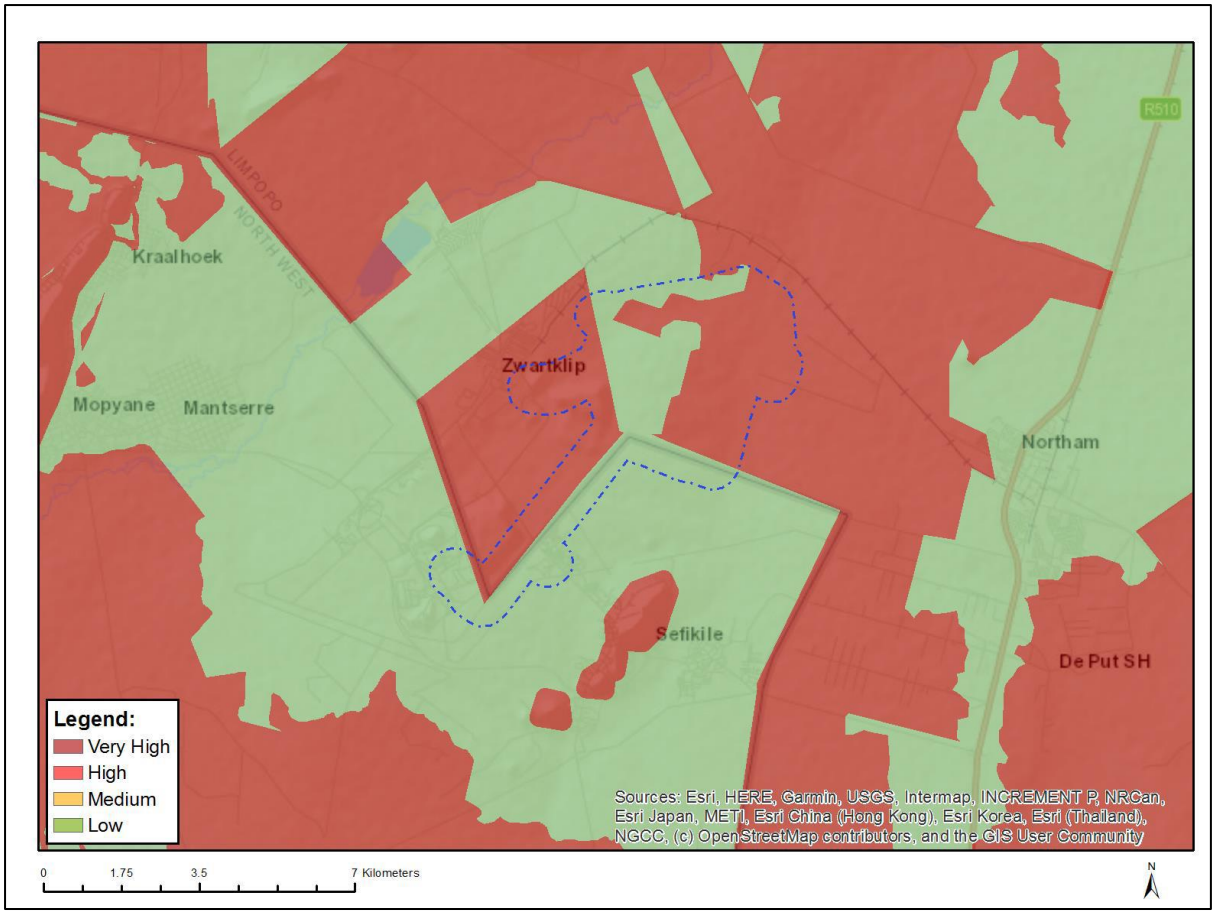

Figure 8-1 Terrestrial Biodiversity Theme Sensitivity, National Web based Environmental Screening Tool

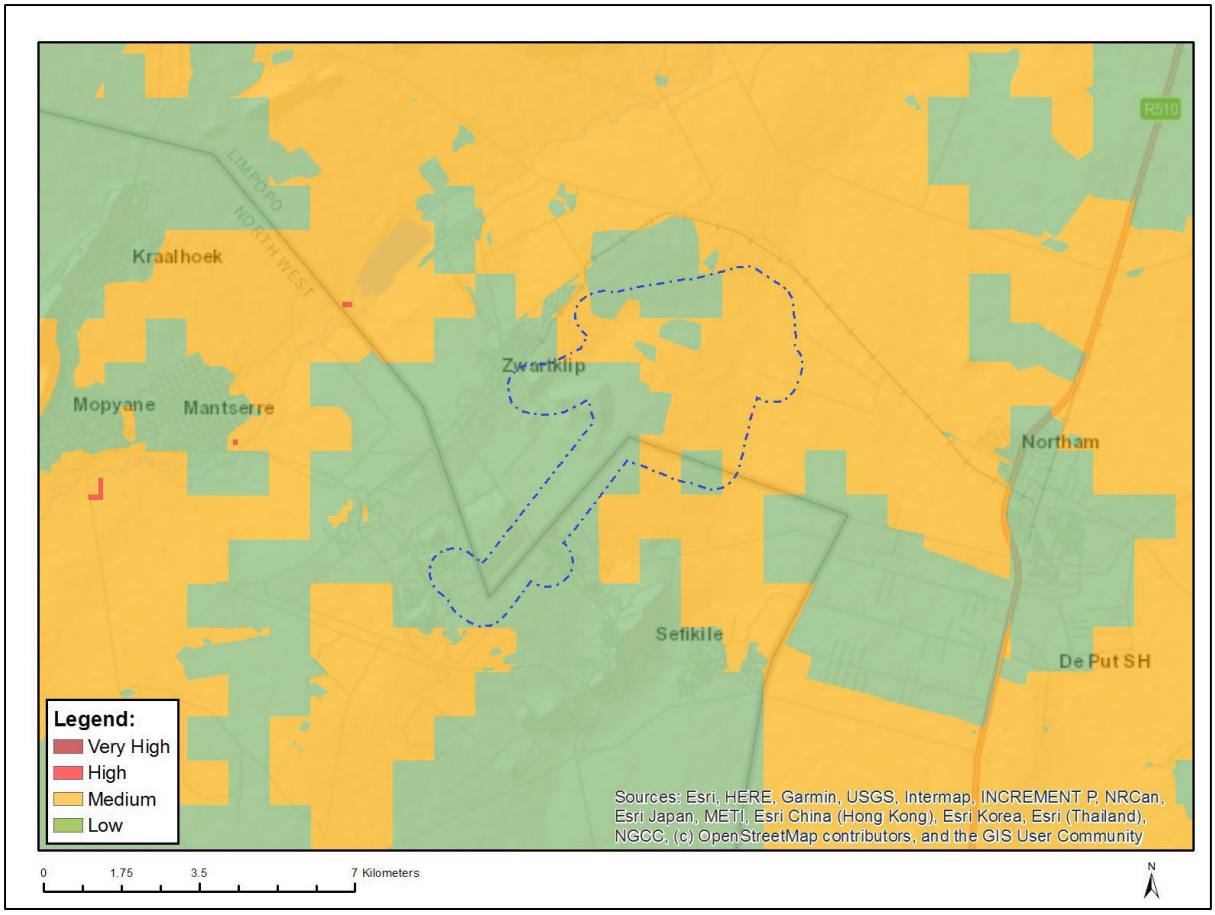

Figure 8-2 Fauna Theme Sensitivity, National Web based Environmental Screening Tool

Sensitivities were compiled for the avifauna study based on only 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 Wetlands and Degraded Bushveld were given a high sensitivity based on the importance of these areas for the Yellow-throated Sandgrouse as well as a number of risk species that would utilise this area for both foraging, as water source and nesting.

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
Wetlands	High	High	High	Medium	High
Degraded Bushveld	High	High	High	Medium	High
Disturbed Bushveld	Low	Low	Low	Medium	Low
Fragmented Bushveld	Medium	Medium	Medium	Medium	Medium
Transformed	Very Low	Very Low	Very Low	High	Very Low

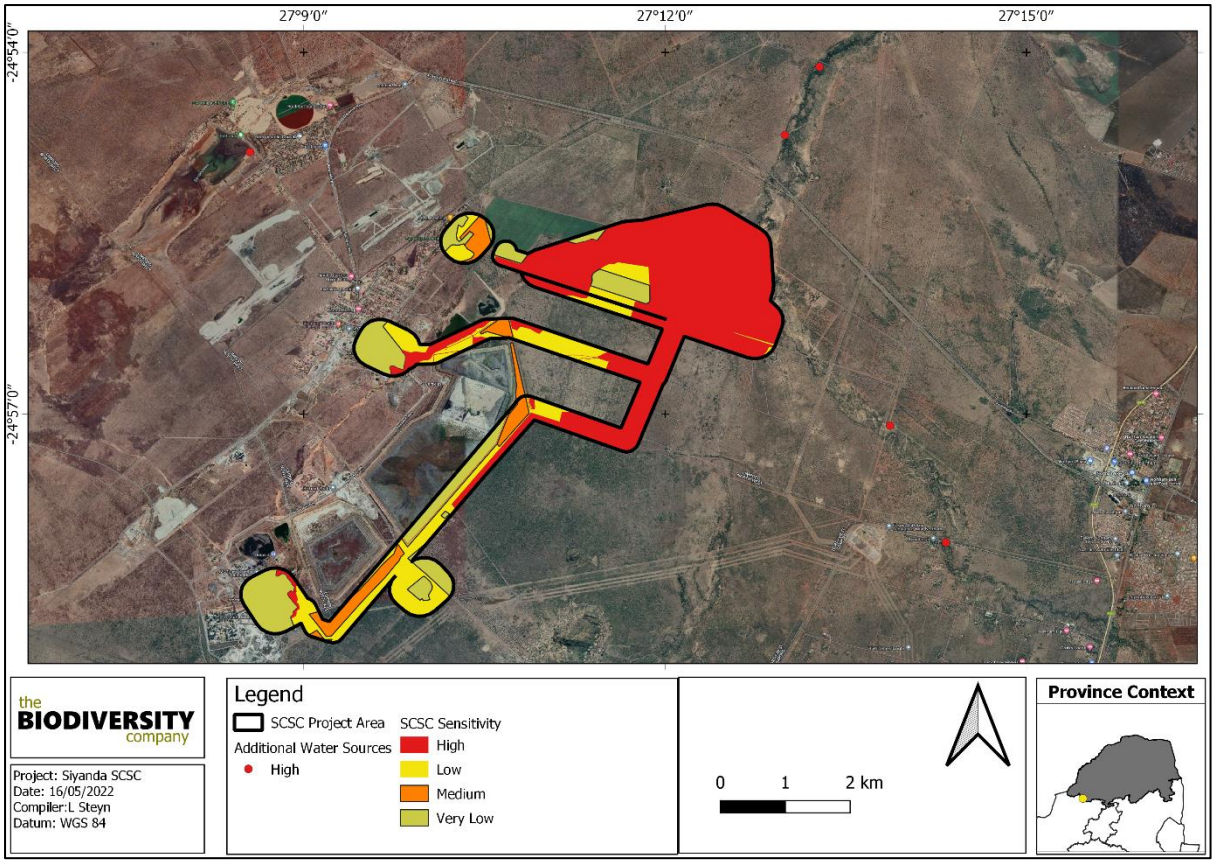

Figure 8-3 Avifauna assessment sensitivities

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
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.

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); and
- Fences.

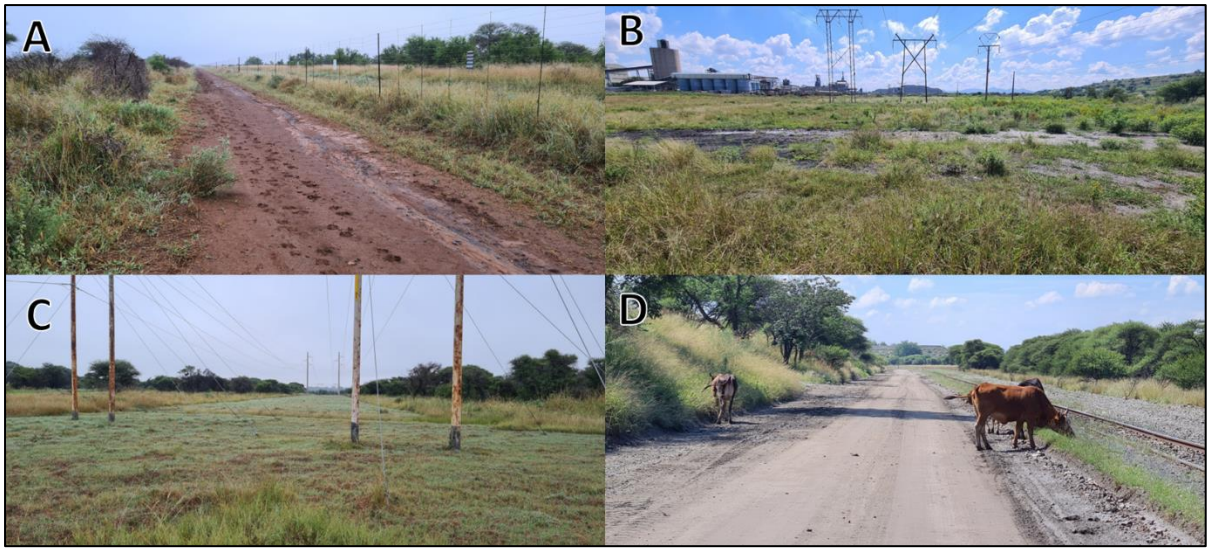

Figure 9-1 Some of the identified impacts within the project site; A) Fences and roads, B) Mining activities, C) Power lines, D) Livestock

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.

PV sites require the overall removal of vegetation, this is a measure that is implemented to restrict the risk of fire (Birdlife, 2017). The removal of vegetation results in the loss of habitat for a number of species in this case it would be displacing grassland, tree dwellers from the alien clumps and waterfowl.

9.2.1 Alternatives considered

No alternative was provided.

9.2.2 Loss of Irreplaceable Resources

Loss of habitat of three SCCs, Cape Vulture, Yellow-throated Sandgrouse and Lanner Falcon.

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. More mitigations can be seen in section 9.

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.

Table 9-1 Construction activities impacts on the avifauna

Nature:		
Destruction, fragmentation and degradation of habitats;		
	Without mitigation	**With mitigation**
Extent	Regional (4)	Local area (3)
Duration	Short term (2)	Short term (2)
Magnitude	High (8)	Moderate (6)
Probability	Highly probable (4)	Probable (3)
Significance	**Medium**	**Medium**

Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
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.
- The wetland areas must be avoided during development. This is especially pertinent to the wetland on the western side of the PV where the Yellow-throated Sandgrouse is known to utilise the water source.

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)	Local area (3)
Duration	Short term (2)	Short term (2)
Magnitude	High (8)	Moderate (6)
Probability	Highly probable (4)	Improbable (2)
Significance	**Medium**	**Low**
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**	**Low**
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 Areas (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**	**Low**
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		

9.3.2 Operational Phase

The operational phase of the impact of daily activities is anticipated to lead to collisions and electrocutions. Moving vehicles don't 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 9-5 to Table 9-8):

- 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 9-5 Operational activities impacts on the avifauna

Nature:		
Collisions with PV panels, BESS, associated powerlines and connection lines and fences		
	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)	Probable (3)
Significance	**High**	**Medium**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low

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

Mitigation:

- The design of the proposed solar plant must be of a type or similar structure as endorsed by the Eskom-Endangered Wildlife Trust (EWT) Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa.
- Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used. This would involve using existing/approved pylons and associated infrastructure for different lines.
- White strips must be placed on the edge of the solar panels to reduce reflection and prevent collisions. This is especially pertinent to Pterocles gutturalis (Yellow-throated Sandgrouse), as the species exhibits daily movement between water resources and feeding/nesting areas. The species may recognise the panel array as water bodies (lake effect as described above) and collide with the panels, causing mortality.
- If any powerlines/connection lines are to be placed above ground they must be marked with industry standard bird flight diverters.
- 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 9-6 Operational activities impacts on the avifauna

Nature:		
Electrocution with solar plant connections and powerline		
	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**	**Low**
Status (positive or negative)	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation:

- The design of the proposed solar plant and grid lines must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa.
- Infrastructure should be consolidated where possible/practical in order to minimise the amount of ground and air space used. This would involve using the existing/approved pylons and associated infrastructure for different lines.

- 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 9-7 Operational activities impacts on the avifauna

Nature:

Roadkill during maintenance procedures

	Without mitigation	With mitigation
Extent	Local (3)	Local (3)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	**Medium**	**Low**
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 9-8 Operational activities impacts on the avifauna

Nature:

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

	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**	**Medium**

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.		
Residual Impacts:		
Migratory routes of avifauna species could change, and the species composition could also change regardless of mitigations		

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 9-9 to Table 9-10):

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

Table 9-9 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	Long term (4)	Very short term (1)
Magnitude	High (8)	Minor (2)
Probability	Highly probable (4)	Very improbable (1)
Significance	**Medium**	**Low**
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 9-10 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	Long term (4)	Moderate term (3)
Magnitude	High (8)	Moderate (6)
Probability	Highly probable (4)	Improbable (2)
Significance	**High**	**Low**
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 construction 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 construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the decommissioning 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:

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

9.4 Cumulative Impacts

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. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a point in time may represent a significant change from the original state of the system. This section describes the potential impacts of the project that are cumulative for terrestrial fauna and flora.

Localised cumulative impacts include the cumulative effects from operations that are close enough to potentially cause additive effects on the environment or sensitive receivers (such as the nearby existing

solar facility and the existing powerlines). These include dust deposition, noise and vibration, disruption of corridors or habitat, , groundwater drawdown, groundwater and surface water quality, and transport.

Long-term cumulative impacts due to the large number of development close by (Section 5.3) can lead to the loss of endemic and threatened species, loss of habitat and vegetation types and even degradation of well conserved areas. A number of solar plants and powerlines can already be found in the project site, this combination of obstacles increases the risk of bird collisions and habitat loss as well as territorial disputes (species forced out of the one area to just again be forced out) (Table 9-11). The table below assumes that the impacts has been mitigated and the risk reduced. In the light of all above, the expected cumulative impact is expected to be highly detrimental.

Table 9-11 Cumulative impact of the solar facility

Nature:		
Loss of habitat and increase in bird collisions		
	Project in isolation	**Project with adjacent PV projects with associated infrastructure**
Extent	Local (3)	Regional (4)
Duration	Moderate Term (3)	Long Term (4)
Magnitude	Moderate (6)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Medium**	**Medium**
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 lines/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 presents the recommended mitigation measures and the respective timeframes, targets, and performance indicators for the avifaunal study.

Table 10-1 Summary of management outcomes pertaining to impacts to avifauna and their habitats

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Management outcome: Habitats				
Areas outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible.	Life of operation	Project manager, Environmental Officer	Areas of indigenous vegetation	Ongoing
The wetland areas must be avoided during development. This is especially pertinent to the wetland on the western side of the PV where the Yellow-throated Sandgrouse is known to utilise the water source.	Life of operation	Project manager, Environmental Officer	Wetland areas	Ongoing
The development footprint must be used for storage and the contractors' camps as well. This may not be outside the direct project area to ensure the disturbance area is as small as possible.	Construction	Project manager, Environmental Officer	Project footprint	During Stage
Where possible, existing access routes and walking paths must be made use of.	Construction/Operational Phase	Environmental Officer & Design Engineer	Roads and paths used	Ongoing
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species.	Closure Phase/Rehabilitation phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure
Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.	Closure Phase/ Post Closure Phase	Environmental Officer & Contractor	Road edges and project site footprint	During Phase
Rehabilitation of the disturbed areas existing in the project site must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type.	Operational/Closure Phase	Environmental Officer & Contractor	Road edges and footprint	During Phase
Erosion control and alien invasive management plan must be compiled.	Life of operation	Environmental Officer & Contractor	Erosion and alien invasive species	Ongoing
Environmentally friendly dust suppressants need to be utilised	Operational phase	Environmental Officer & Contractor	Water pollution	During Phase
A fire management plan needs to be compiled and implemented to restrict	Life of operation	Environmental Officer & Contractor	Fire Management	During Phase

the impact fire might have on the surrounding areas.				
Management outcome: Avifauna				
Impact Management Actions	**Implementation**		**Monitoring**	
	Phase	Responsible Party	Aspect	Frequency
The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this.	Construction/Operational Phase	Project manager, Environmental Officer	Infringement into these areas	Ongoing
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 to enforce this.	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing
The duration of the construction should be kept to a minimum to avoid disturbing avifauna.	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Construction/Closure Phase	During Phase
Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (red/green) lights should be used wherever possible.	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Light pollution and period of light.	During Phase
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40 km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	Life of operation	Health and Safety Officer	Compliance to the training.	Ongoing
Schedule or limit (where feasible) activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons (June – August)	Construction/Operational Phase	Project manager, Environmental Officer & Design Engineer	Activities should take place during the day in winter.	During Phase
All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region	Construction/Operational Phase	Project manager, Environmental Officer	Noise	During Phase
All areas to be developed must be walked through prior to any activity to ensure no nests or avifauna species are found in the area. Should any Species of Conservation Concern be found and not move out of the area, or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.	Planning, Construction and Decommissioning	Project manager, Environmental Officer	Presence of Nests and faunal species	During Phase
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	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of fire or bird strikes	During Phase

The design of the proposed PV and grid lines must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa (Jenkins *et al.,* 2015).	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of electrocuted birds or bird strikes	During Phase
Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used.	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of bird collisions	During phase
All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of electrocuted birds	During phase
Use environmentally friendly cleaning and dust suppressant products	Construction and operation	Environmental Officer & Contractor, Engineer	Presence of chemicals in and around the project site	During phase
Fencing mitigations: • Top 2 strands must be smooth wire • Routinely retention loose wires • Minimum 30 cm between wires • Place markers on fences	Planning, construction, and operation	Environmental Officer & Contractor, Engineer	Presence of birds stuck /dead in fences Monitor fences for slack wires	During phase
As far as possible power cables within the project site should be thoroughly insulated and preferably buried.	Planning and construction	Environmental Officer & Contractor, Engineer	Exposed cables	During phase
Any exposed parts must be covered (insulated) to reduce electrocution risk	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of electrocuted birds	During phase
White strips should be placed along the edges of the panels, to reduce similarity to water and deter birds and insects (Horvath *et al,* 2010). Consider the use of bird deterrent devices to limit collision risk.	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of dead birds in the project site	During phase

11 Monitoring

Should the development be authorised SCC monitoring must be done to determine the effect of the development on these species, this would also allow for more available data for future projects.

Monitoring must be done prior to the construction phase, at time of construction and for 3 consecutive years after construction. Standard methods as per the species protocols must be followed.

12 Recommendations

The following recommendations are proposed for the project:

- As very little is known about the impacts of solar facilities on birds in South Africa, a construction monitoring regime is recommended for the proposed project area to document any impacts and this data must be used for improving mitigation measures to reduce the impact on biological resources, particularly avifauna; and
- A follow-up assessment on avian biodiversity and species abundance within the project 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.

13 Conclusion

From a desktop perspective the project area overlaps CBA2 and ESA1 classified areas and falls within the Northern Turf Thornveld IBA. This IBA is important as it is home to the Yellow-throated Sandgrouse *Pterocles gutturalis* and is regarded as the core range of the resident South African population. Other important birds in the IBA include the Secretarybird *Sagittarius serpentarius*, Kori Bustard *Ardeotis kori*, Lanner Falcon *Falco biarmicus* and Black-winged Pratincole *Glareola nordmanni*. Common biome-restricted species found within this IBA include Kurrichane Thrush *Turdus libonyanus*, White-throated Robin-Chat *Cossypha humeralis*, Burchell's Starling *Lamprotornis australis*, White-bellied Sunbird *Cinnyris talatala* and the fairly common Kalahari Scrub Robin *Erythropygia paena* (Birdlife South Africa, 2015B).

During the first field assessment 134 bird species were recorded of which three are SCCs on a national or international scale. The Lanner Falcon *Falco biarmicus* (VU- regionally), were observed on four occasions, while the Yellow-throated Sandgrouse *Pterocles gutturalis* (NT- regionally) were observed twice and the Cape Vulture *Gyps coprotheres* (EN-regionally and internationally) once. The Yellow-throated Sandgrouseis regarded as one of the core residents of the Northern Turf Thornveld IBA area. Of the 134 species, 18 species (13%) were identified as 'high risk' species. High risk species are those that would be at greater risk to powerline collisions, electrocutions or habitat loss due to the development. In the second survey 108 species were recorded, of which two were SCC, Yellow-throated Sandgrouse *Pterocles gutturalis* and Cape Vulture *Gyps coprotheres* (EN-regionally and internationally).

Any development in the medium-high sensitivity areas will lead to the direct destruction and loss of portions of functional ESA and CBA areas, and therefore, will also negatively impact the avifaunal species that utilise this habitat. Thus, if these areas are not maintained in a natural or near natural state, destroyed or fragmented, then meeting targets for biodiversity features will not be achieved. The mitigations, management and associated monitoring regarding these operational impacts will be the most important factor of this project and must be considered by the issuing authority.

14 Impact Statement

The main expected impacts of the proposed PV and grid infrastructure will include the following:

- Habitat loss and fragmentation;
- Electrocutions; and
- Collisions resulting in mortalities of amongst other SCCs.

Mitigation measures as described in this report can be implemented to reduce the significance of the risk to an acceptable residual risk level. Considering the above-mentioned information and that the facility is required for power supply to an existing mine, it is the opinion of the specialist that the project may be favourably considered, on condition that all the mitigation and recommendations are followed.

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16 Appendix Items

16.1 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

May 2022

16.2 Appendix B: Expected species

Species	Common Name	Conservation Status	
		Regional (SANBI, 2016)	IUCN (2021)
Accipiter badius	Shikra	Unlisted	LC
Accipiter minullus	Sparrowhawk, Little	Unlisted	LC
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
Actitis hypoleucos	Sandpiper, Common	Unlisted	LC
Actophilornis africanus	Jacana, African	Unlisted	LC
Afrotis afraoides	Korhaan, Northern Black	Unlisted	LC
Alopochen aegyptiaca	Goose, Egyptian	Unlisted	LC
Amadina erythrocephala	Finch, Red-headed	Unlisted	LC
Amadina fasciata	Finch, Cut-throat	Unlisted	Unlisted
Amandava subflava	Waxbill, Orange-breasted	Unlisted	Unlisted
Amblyospiza albifrons	Weaver, Thick-billed	Unlisted	LC
Anaplectes rubriceps	Weaver, 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 leucophrys	Pipit, Plain-backed	Unlisted	LC
Anthus nicholsoni	Nicholson's pipit	Unlisted	LC
Apalis thoracica	Apalis, Bar-throated	Unlisted	LC
Apus affinis	Swift, Little	Unlisted	LC
Apus apus	Swift, Common	Unlisted	LC
Apus barbatus	Swift, African Black	Unlisted	LC
Apus caffer	Swift, White-rumped	Unlisted	LC
Apus horus	Swift, Horus	Unlisted	LC
Aquila rapax	Eagle, Tawny	EN	VU
Aquila spilogaster	Hawk-eagle, African	Unlisted	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
Ardeola ralloides	Heron, Squacco	Unlisted	LC
Ardeotis kori	Bustard, Kori	NT	NT
Asio capensis	Owl, Marsh	Unlisted	LC
Batis molitor	Batis, Chinspot	Unlisted	LC
Bostrychia hagedash	Ibis, Hadeda	Unlisted	LC
Bradypterus baboecala	Rush-warbler, Little	Unlisted	LC
Brunhilda erythronotos	Waxbill, Black Cheecked	Unlisted	LC
Bubalornis niger	Buffalo-weaver, Red-billed	Unlisted	LC
Bubo africanus	Eagle-owl, Spotted	Unlisted	LC
Bubulcus ibis	Egret, Cattle	Unlisted	LC
Buphagus erythrorynchus	Oxpecker, Red-billed	Unlisted	Unlisted
Burhinus capensis	Thick-knee, Spotted	Unlisted	LC
Buteo buteo	Buzzard, Common (Steppe)	Unlisted	LC
Butorides striata	Heron, Green-backed	Unlisted	LC
Calamonastes fasciolatus	Wren-warbler, Barred	Unlisted	LC
Calandrella cinerea	Lark, Red-capped	Unlisted	LC
Calendulauda sabota	Lark, Sabota	Unlisted	LC
Calidris minuta	Stint, Little	LC	LC
Calidris pugnax	Ruff	Unlisted	LC
Camaroptera brevicaudata	Camaroptera, Grey-backed	Unlisted	Unlisted
Campephaga flava	Cuckoo-shrike, Black	Unlisted	LC
Campethera abingoni	Woodpecker, Golden-tailed	Unlisted	LC
Caprimulgus pectoralis	Nightjar, Fiery-necked	Unlisted	LC
Cecropis abyssinica	Swallow, Lesser Striped	Unlisted	LC
Cecropis cucullata	Swallow, Greater Striped	Unlisted	LC
Cecropis semirufa	Swallow, Red-breasted	Unlisted	LC
Centropus burchellii	Coucal, Burchell's	Unlisted	Unlisted
Cercotrichas leucophrys	Scrub-robin, White-browed	Unlisted	LC
Cercotrichas paena	Scrub-robin, Kalahari	Unlisted	LC
Ceryle rudis	Kingfisher, Pied	Unlisted	LC
Chalcomitra amethystina	Sunbird, Amethyst	Unlisted	LC
Charadrius pecuarius	Plover, Kittlitz's	Unlisted	LC
Charadrius tricollaris	Plover, Three-banded	Unlisted	LC
Chlidonias hybrida	Tern, Whiskered	Unlisted	LC
Chlidonias leucopterus	Tern, White-winged	Unlisted	LC
Chlorocichla flaviventris	Greenbul, Yellow-bellied	Unlisted	LC
Chlorophoneus sulfureopectus	Bush-Shrike, Orange-breasted	Unlisted	LC

Chloropicus namaquus	Woodpecker, Bearded	Unlisted	LC
Chrysococcyx caprius	Cuckoo, Diderick	Unlisted	LC
Chrysococcyx klaas	Cuckoo, Klaas's	Unlisted	LC
Ciconia ciconia	Stork, White	Unlisted	LC
Ciconia nigra	Stork, Black	VU	LC
Cinnyricinclus leucogaster	Starling, Violet-backed	Unlisted	LC
Cinnyris mariquensis	Sunbird, Marico	Unlisted	LC
Cinnyris talatala	Sunbird, White-bellied	Unlisted	LC
Circaetus cinereus	Snake-eagle, Brown	Unlisted	LC
Circaetus pectoralis	Snake-eagle, Black-chested	Unlisted	LC
Cisticola aberrans	Cisticola, Lazy	Unlisted	LC
Cisticola aridulus	Cisticola, Desert	Unlisted	LC
Cisticola chiniana	Cisticola, Rattling	Unlisted	LC
Cisticola fulvicapilla	Neddicky, Neddicky	Unlisted	LC
Cisticola juncidis	Cisticola, Zitting	Unlisted	LC
Cisticola textrix	Cisticola, Cloud	Unlisted	LC
Cisticola tinniens	Cisticola, Levaillant's	Unlisted	LC
Clamator glandarius	Cuckoo, Great Spotted	Unlisted	LC
Clamator jacobinus	Cuckoo, Jacobin	Unlisted	LC
Clamator levaillantii	Cuckoo, 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
Coracias caudatus	Roller, Lilac-breasted	Unlisted	LC
Coracias garrulus	Roller, European	NT	LC
Coracias naevius	Roller, Purple	Unlisted	LC
Corvus albus	Crow, Pied	Unlisted	LC
Corvus capensis	Crow, Cape	Unlisted	LC
Corythornis cristatus	Kingfisher, Malachite	Unlisted	Unlisted
Cossypha humeralis	Robin-chat, White-throated	Unlisted	LC
Coturnix delegorguei	Quail, Harlequin	Unlisted	LC
Creatophora cinerea	Starling, Wattled	Unlisted	LC
Crinifer concolor	Go-away-bird, Grey	Unlisted	LC
Crithagra atrogularis	Canary, Black-throated	Unlisted	LC
Crithagra flaviventris	Canary, Yellow	Unlisted	LC
Crithagra gularis	Seedeater, Streaky-headed	Unlisted	LC
Crithagra mozambica	Canary, Yellow-fronted	Unlisted	LC
Cuculus clamosus	Cuckoo, Black	Unlisted	LC

Cuculus solitarius	Cuckoo, Red-chested	Unlisted	LC
Curruca subcoerulea	Tit-babbler, Chestnut-vented	Unlisted	Unlisted
Cursorius temminckii	Courser, Temminck's	Unlisted	LC
Cypsiurus parvus	Palm-swift, African	Unlisted	LC
Delichon urbicum	House-martin, Common	Unlisted	LC
Dendrocygna bicolor	Duck, Fulvous	Unlisted	LC
Dendrocygna viduata	Duck, White-faced Whistling	Unlisted	LC
Dendroperdix sephaena	Francolin, Crested	Unlisted	LC
Dendropicos fuscescens	Woodpecker, Cardinal	Unlisted	LC
Dicrurus adsimilis	Drongo, Fork-tailed	Unlisted	LC
Dryoscopus cubla	Puffback, Black-backed	Unlisted	LC
Egretta ardesiaca	Heron, Black	Unlisted	LC
Egretta garzetta	Egret, Little	Unlisted	LC
Elanus caeruleus	Kite, Black-shouldered	Unlisted	LC
Emberiza capensis	Bunting, Cape	Unlisted	LC
Emberiza flaviventris	Bunting, Golden-breasted	Unlisted	LC
Emberiza tahapisi	Bunting, Cinnamon-breasted	Unlisted	LC
Eremomela icteropygialis	Eremomela, Yellow-bellied	Unlisted	LC
Eremomela usticollis	Eremomela, Burnt-necked	Unlisted	LC
Eremopterix leucotis	Sparrowlark, Chestnut-backed	Unlisted	LC
Estrilda astrild	Waxbill, Common	Unlisted	LC
Euplectes afer	Bishop, Yellow-crowned	Unlisted	LC
Euplectes albonotatus	Widowbird, White-winged	Unlisted	LC
Euplectes orix	Bishop, Southern Red	Unlisted	LC
Eurocephalus anguitimens	Shrike, Southern White-crowned	Unlisted	LC
Falco amurensis	Falcon, Amur	Unlisted	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
Gallinago nigripennis	Snipe, African	Unlisted	LC
Gallinula chloropus	Moorhen, Common	Unlisted	LC
Glareola nordmanni	Pratincole, Black-winged	NT	NT
Glaucidium perlatum	Owlet, Pearl-spotted	Unlisted	LC
Granatina granatina	Waxbill, Violet-eared	Unlisted	LC
Gymnoris superciliaris	Petronia, Yellow-throated	Unlisted	LC
Gyps africanus	Vulture, White-backed	CR	CR

Gyps coprotheres	Vulture, Cape	EN	EN
Halcyon albiventris	Kingfisher, Brown-hooded	Unlisted	LC
Halcyon senegalensis	Kingfisher, Woodland	Unlisted	LC
Haliaeetus vocifer	Fish-eagle, African	Unlisted	LC
Hieraaetus wahlbergi	Eagle, Wahlberg's	Unlisted	LC
Himantopus himantopus	Stilt, Black-winged	Unlisted	LC
Hippolais icterina	Warbler, Icterine	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
Ixobrychus minutus	Bittern, Little	Unlisted	LC
Ixobrychus sturmii	Bittern, Dwarf	Unlisted	LC
Lagonosticta rhodopareia	Firefinch, Jameson's	Unlisted	LC
Lagonosticta rubricata	Firefinch, African	Unlisted	LC
Lagonosticta senegala	Firefinch, Red-billed	Unlisted	LC
Lamprotornis australis	Starling, Burchell's	Unlisted	LC
Lamprotornis nitens	Starling, Cape Glossy	Unlisted	LC
Laniarius atrococcineus	Shrike, Crimson-breasted	Unlisted	LC
Laniarius ferrugineus	Boubou, Southern	Unlisted	LC
Lanius collaris	Fiscal, Common (Southern)	Unlisted	LC
Lanius collurio	Shrike, Red-backed	Unlisted	LC
Lanius minor	Shrike, Lesser Grey	Unlisted	LC
Leptoptilos crumenifer	Stork, Marabou	Unlisted	LC
Lophoceros nasutus	Hornbill, African Grey	Unlisted	LC
Lophotis ruficrista	Korhaan, Red-crested	Unlisted	LC
Lybius torquatus	Barbet, Black-collared	Unlisted	LC
Malaconotus blanchoti	Bush-shrike, Grey-headed	Unlisted	LC
Megaceryle maxima	Kingfisher, Giant	Unlisted	Unlisted
Melaenornis mariquensis	Flycatcher, Marico	Unlisted	LC
Melaenornis pallidus	Flycatcher, Pale	Unlisted	LC
Melaenornis pammelaina	Flycatcher, Southern Black	Unlisted	LC
Melaenornis silens	Flycatcher, Fiscal	Unlisted	LC
Melaniparus cinerascens	Tit, Ashy	Unlisted	LC
Melaniparus niger	Tit, Southern Black	Unlisted	Unlisted
Melierax canorus	Goshawk, Southern Pale Chanting	Unlisted	LC
Merops apiaster	Bee-eater, European	Unlisted	LC
Merops bullockoides	Bee-eater, White-fronted	Unlisted	LC

Merops persicus	Bee-eater, Blue-cheeked	Unlisted	LC
Merops pusillus	Bee-eater, Little	Unlisted	LC
Microcarbo africanus	Cormorant, Reed	Unlisted	LC
Micronisus gabar	Goshawk, Gabar	Unlisted	LC
Milvus aegyptius	Kite, Yellow-billed	Unlisted	Unlisted
Mirafra africana	Lark, Rufous-naped	Unlisted	LC
Mirafra fasciolata	Lark, Eastern Clapper	Unlisted	LC
Mirafra passerina	Lark, Monotonous	Unlisted	LC
Mirafra rufocinnamomea	Lark, Flappet	Unlisted	LC
Motacilla aguimp	Wagtail, African Pied	Unlisted	LC
Motacilla capensis	Wagtail, Cape	Unlisted	LC
Muscicapa striata	Flycatcher, Spotted	Unlisted	LC
Mycteria ibis	Stork, Yellow-billed	EN	LC
Myioparus plumbeus	Tit-flycatcher, Grey	Unlisted	LC
Netta erythrophthalma	Pochard, Southern	Unlisted	LC
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
Oriolus larvatus	Oriole, Black-headed	Unlisted	LC
Ortygospiza atricollis	Quailfinch, African	Unlisted	LC
Otus senegalensis	Scops-owl, African	Unlisted	LC
Passer diffusus	Sparrow, Southern Grey-headed	Unlisted	LC
Passer domesticus	Sparrow, House	Unlisted	LC
Passer melanurus	Sparrow, Cape	Unlisted	LC
Passer motitensis	Sparrow, Great	Unlisted	LC
Pavo cristatus	Peacock, Common	Unlisted	LC
Peliperdix coqui	Francolin, Coqui	Unlisted	LC
Phalacrocorax lucidus	Cormorant, White-breasted	Unlisted	LC
Phoeniculus purpureus	Wood-hoopoe, Green	Unlisted	LC
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 cucullatus	Weaver, Village	Unlisted	LC

Ploceus intermedius	Masked-weaver, Lesser	Unlisted	LC
Ploceus velatus	Masked-weaver, Southern	Unlisted	LC
Podiceps cristatus	Grebe, Great Crested	Unlisted	LC
Pogoniulus chrysoconus	Tinkerbird, Yellow-fronted	Unlisted	LC
Poicephalus meyeri	Parrot, Meyer's	Unlisted	LC
Polemaetus bellicosus	Eagle, Martial	EN	EN
Porphyrio madagascariensis	Swamphen, African Purple	Unlisted	Unlisted
Prinia flavicans	Prinia, Black-chested	Unlisted	LC
Prinia subflava	Prinia, Tawny-flanked	Unlisted	LC
Prodotiscus regulus	Honeybird, Brown-backed	Unlisted	LC
Pternistis natalensis	Spurfowl, Natal	Unlisted	LC
Pternistis swainsonii	Spurfowl, Swainson's	Unlisted	LC
Pterocles bicinctus	Sandgrouse, Double-banded	Unlisted	LC
Pterocles gutturalis	Sandgrouse, Yellow-throated	NT	LC
Ptilopsis granti	Scops-owl, Southern White-faced	Unlisted	Unlisted
Ptyonoprogne fuligula	Martin, Rock	Unlisted	Unlisted
Pycnonotus nigricans	Bulbul, African Red-eyed	Unlisted	LC
Pycnonotus tricolor	Bulbul, Dark-capped	Unlisted	Unlisted
Pytilia melba	Pytilia, Green-winged	Unlisted	LC
Quelea quelea	Quelea, Red-billed	Unlisted	LC
Recurvirostra avosetta	Avocet, Pied	Unlisted	LC
Rhinopomastus cyanomelas	Scimitarbill, Common	Unlisted	LC
Riparia paludicola	Martin, Brown-throated	Unlisted	LC
Sagittarius serpentarius	Secretarybird	VU	EN
Sarkidiornis melanotos	Duck, Comb	Unlisted	LC
Saxicola torquatus	Stonechat, African	Unlisted	LC
Scopus umbretta	Hamerkop, Hamerkop	Unlisted	LC
Spatula smithii	Shoveler, Cape	Unlisted	LC
Spermestes cucullata	Mannikin, Bronze	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
Sylvia borin	Warbler, Garden	Unlisted	LC
Sylvietta rufescens	Crombec, Long-billed	Unlisted	LC
Tachybaptus ruficollis	Grebe, Little	Unlisted	LC
Tachymarptis melba	Swift, Alpine	Unlisted	LC

Tchagra australis	Tchagra, Brown-crowned	Unlisted	LC
Tchagra senegalus	Tchagra, Black-crowned	Unlisted	LC
Terpsiphone viridis	Paradise-flycatcher, African	Unlisted	LC
Thalassornis leuconotus	Duck, White-backed	Unlisted	LC
Threskiornis aethiopicus	Ibis, African Sacred	Unlisted	LC
Tockus leucomelas	Hornbill, Southern Yellow-billed	Unlisted	LC
Tockus rufirostris	Hornbill, Southern Red-billed	Unlisted	Unlisted
Trachyphonus vaillantii	Barbet, Crested	Unlisted	LC
Treron calvus	Green-pigeon, African	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
Turdoides bicolor	Babbler, Southern Pied	Unlisted	LC
Turdoides jardineii	Babbler, Arrow-marked	Unlisted	LC
Turdus libonyana	Thrush, Kurrichane	Unlisted	Unlisted
Turdus litsitsirupa	Thrush, Groundscraper	Unlisted	Unlisted
Turdus smithi	Thrush, Karoo	Unlisted	LC
Turnix sylvaticus	Buttonquail, Kurrichane	Unlisted	LC
Turtur chalcospilos	Wood-dove, Emerald-spotted	Unlisted	LC
Tyto alba	Owl, Barn	Unlisted	LC
Tyto capensis	Grass-owl, African	VU	LC
Upupa africana	Hoopoe, African	Unlisted	LC
Uraeginthus angolensis	Waxbill, Blue	Unlisted	LC
Urocolius indicus	Mousebird, Red-faced	Unlisted	LC
Urolestes melanoleucus	Shrike, Magpie	Unlisted	LC
Vanellus armatus	Lapwing, Blacksmith	Unlisted	LC
Vanellus coronatus	Lapwing, Crowned	Unlisted	LC
Vanellus senegallus	Lapwing, African Wattled	Unlisted	LC
Vidua chalybeata	Indigobird, Village	Unlisted	LC
Vidua funerea	Indigobird, Dusky	Unlisted	LC
Vidua macroura	Whydah, Pin-tailed	Unlisted	LC
Vidua paradisaea	Paradise-whydah, Long-tailed	Unlisted	LC
Vidua regia	Whydah, Shaft-tailed	Unlisted	LC
Zapornia flavirostra	Crake, Black	Unlisted	LC
Zosterops virens	White-eye, Cape	Unlisted	LC

16.3 Appendix C: Observed species during the point counts

Common Name	Scientific Name	Guild code	Relative abundance	Frequency (%)
Shikra	*Accipiter badius*	CGD	0,001	5,263
Common Myna	*Acridotheres tristis*	OMD	0,002	5,263
Lesser Swamp Warbler	*Acrocephalus gracilirostris*	IGD	0,001	2,632
African Jacana	*Actophilornis africanus*	IWD	0,001	2,632
Egyptian Goose	*Alopochen aegyptiaca*	HWD	0,002	5,263
African Darter	*Anhinga rufa*	CWD	0,001	2,632
Little Swift	*Apus affinis*	IAD	0,143	21,053
African Hawk Eagle	*Aquila spilogaster*	CGD	0,001	2,632
Black-headed Heron	*Ardea melanocephala*	CGD	0,001	2,632
Squacco Heron	*Ardeola ralloides*	CWD	0,001	2,632
Chinspot Batis	*Batis molitor*	IGD	0,005	23,684
Hadeda (Hadada) Ibis	*Bostrychia hagedash*	OMD	0,002	5,263
Western Cattle Egret	*Bubulcus ibis*	IGD	0,010	10,526
Red-billed Oxpecker	*Buphagus erythrorynchus*	IGD	0,001	2,632
Green-backed (Striated) Heron	*Butorides striata*	CWD	0,001	2,632
Grey-backed Camaroptera	*Camaroptera brevicaudata*	IGD	0,003	13,158
Golden-tailed Woodpecker	*Campethera abingoni*	IGD	0,001	2,632
Greater Striped Swallow	*Cecropis cucullata*	IAD	0,001	5,263
White-browed Scrub Robin	*Cercotrichas leucophrys*	IGD	0,005	21,053
Pied Kingfisher	*Ceryle rudis*	CWD	0,001	2,632
Three-banded Plover	*Charadrius tricollaris*	IWD	0,001	2,632
Whiskered Tern	*Chlidonias hybrida*	CWD	0,001	2,632
White-winged Tern	*Chlidonias leucopterus*	CWD	0,006	2,632
Diederik Cuckoo	*Chrysococcyx caprius*	IGD	0,001	2,632
Marico Sunbird	*Cinnyris mariquensis*	NFD	0,001	2,632
White-bellied Sunbird	*Cinnyris talatala*	NFD	0,001	5,263
Black-chested Snake Eagle	*Circaetus pectoralis*	CGD	0,001	5,263
Lazy Cisticola	*Cisticola aberrans*	IGD	0,009	28,947
Rattling Cisticola	*Cisticola chiniana*	IGD	0,002	5,263
Tinkling Cisticola	*Cisticola rufilatus*	IGD	0,002	2,632
Speckled Mousebird	*Colius striatus*	FFD	0,001	2,632
Speckled Pigeon	*Columba guinea*	FFD	0,003	7,895
Lilac-breasted Roller	*Coracias caudatus*	IAD	0,002	7,895
Pied Crow	*Corvus albus*	OMD	0,005	21,053
Grey Go-away-bird	*Corythaixoides concolor*	FFD	0,005	18,421
White-throated Robin-chat	*Cossypha humeralis*	IGD	0,001	2,632
Black-throated Canary	*Crithagra atrogularis*	OMD	0,001	2,632

Chestnut-vented Tit-Babbler (Warbler)	*Curruca subcoerulea*	IGD	0,007	31,579
African Palm Swift	*Cypsiurus parvus*	IAD	0,002	7,895
Fulvous Whistling Duck	*Dendrocygna bicolor*	HWD	0,005	2,632
White-faced Whistling Duck	*Dendrocygna viduata*	HWD	0,001	2,632
Crested Francolin	*Dendroperdix sephaena*	OMD	0,002	7,895
Fork-tailed Drongo	*Dicrurus adsimilis*	IAD	0,003	7,895
Black-backed Puffback	*Dryoscopus cubla*	OMD	0,001	2,632
Black-winged Kite	*Elanus caeruleus*	CGD	0,002	10,526
Cinnamon-breasted Bunting	*Emberiza tahapisi*	GGD	0,002	2,632
Burnt-necked Eremomela	*Eremomela usticollis*	IGD	0,007	23,684
Southern White-crowned Shrike	*Eurocephalus anguitimens*	IGD	0,003	5,263
Lanner Falcon	*Falco biarmicus*	CGD	0,003	10,526
Cape Vulture	*Gyps coprotheres*	CGD	0,003	2,632
Brown-hooded Kingfisher	*Halcyon albiventris*	CWD	0,002	7,895
Woodland Kingfisher	*Halcyon senegalensis*	CWD	0,001	5,263
African Fish Eagle	*Haliaeetus vocifer*	CGD	0,002	7,895
Barn Swallow	*Hirundo rustica*	IAD	0,011	21,053
Jameson's Firefinch	*Lagonosticta rhodopareia*	GGD	0,001	2,632
African Firefinch	*Lagonosticta rubricata*	GGD	0,002	5,263
Burchell's Starling	*Lamprotornis australis*	IGD	0,001	2,632
Cape Glossy (Cape) Starling	*Lamprotornis nitens*	IGD	0,001	2,632
Crimson-breasted Shrike	*Laniarius atrococcineus*	IGD	0,004	15,789
Lesser Grey Shrike	*Lanius minor*	IGD	0,005	18,421
African Grey Hornbill	*Lophoceros nasutus*	IGD	0,001	5,263
Black-collared Barbet	*Lybius torquatus*	FFD	0,002	5,263
Marico flycatcher	*Melaenornis mariquensis*	IAD	0,003	13,158
Fiscal Flycatcher	*Melaenornis silens*	OMD	0,001	2,632
European Bee-eater	*Merops apiaster*	IAD	0,003	7,895
White-fronted Bee-eater	*Merops bullockoides*	IAD	0,006	5,263
Blue-cheeked Bee-eater	*Merops persicus*	IAD	0,013	15,789
Little Bee-eater	*Merops pusillus*	IAD	0,003	7,895
Reed Cormorant	*Microcarbo africanus*	CWD	0,002	2,632
Gabar Goshawk	*Micronisus gabar*	CGD	0,002	7,895
Cape Wagtail	*Motacilla capensis*	IGD	0,001	2,632
Spotted flycatcher	*Muscicapa striata*	IAD	0,001	2,632
Helmeted Guineafowl	*Numida meleagris*	OMD	0,014	15,789
Namaqua Dove	*Oena capensis*	GGD	0,001	5,263
Black-headed Oriole	*Oriolus larvatus*	OMD	0,001	2,632
cape sparrow	*Passer melanurus*	GGD	0,001	5,263

African Spoonbill	*Platalea alba*	IWD	0,001	2,632
Spur-winged Goose	*Plectropterus gambensis*	OMD	0,008	5,263
White-browed Sparrow-Weaver	*Plocepasser mahali*	OMD	0,002	2,632
Southern Masked Weaver	*Ploceus velatus*	GGD	0,013	18,421
Yellow-fronted Tinkerbird	*Pogoniulus chrysoconus*	FFD	0,001	2,632
Black-chested Prinia	*Prinia flavicans*	IGD	0,007	23,684
Tawny-flanked Prinia	*Prinia subflava*	IGD	0,002	7,895
Natal Spurfowl	*Pternistis natalensis*	OMD	0,010	36,842
Swainson's Spurfowl	*Pternistis swainsonii*	OMD	0,007	23,684
Yellow-throated Sandgrouse	*Pterocles gutturalis*	GGD	0,006	5,263
Dark-capped Bulbul	*Pycnonotus tricolor*	OMD	0,002	5,263
Green-winged Pytilia	*Pytilia melba*	GGD	0,001	2,632
Red-billed Quelea	*Quelea quelea*	GGD	0,471	52,632
Knob-billed Duck	*Sarkidiornis melanotos*	HWD	0,024	5,263
Laughing Dove	*Spilopelia senegalensis*	GGD	0,002	10,526
Scaly-feathered Finch (Weaver)	*Sporopipes squamifrons*	GGD	0,002	7,895
Cape Turtle (Ring-necked) Dove	*Streptopelia capicola*	GGD	0,017	60,526
Red-eyed Dove	*Streptopelia semitorquata*	GGD	0,003	10,526
Common Ostrich	*Struthio camelus*	OMD	0,001	2,632
Long-billed crombec	*Sylvietta rufescens*	IGD	0,007	26,316
Southern Yellow-billed Hornbill	*Tockus leucomelas*	IGD	0,003	13,158
Southern Red-billed Hornbill	*Tockus rufirostris*	IGD	0,001	5,263
Crested Barbet	*Trachyphonus vaillantii*	FFD	0,001	2,632
Acacia Pied Barbet	*Tricholaema leucomelas*	OMD	0,003	15,789
Common Greenshank	*Tringa nebularia*	IWD	0,001	2,632
Arrow-marked Babbler	*Turdoides jardineii*	IGD	0,002	2,632
Emerald-spotted Wood Dove	*Turtur chalcospilos*	OMD	0,001	2,632
Blue Waxbill	*Uraeginthus angolensis*	GGD	0,025	50,000
Red-faced Mousebird	*Urocolius indicus*	FFD	0,008	13,158
Magpie Shrike	*Urolestes melanoleucus*	IAD	0,017	28,947
Blacksmith Lapwing	*Vanellus armatus*	IGD	0,001	2,632
Crowned Lapwing	*Vanellus coronatus*	IGD	0,005	7,895
African Wattled Lapwing	*Vanellus senegallus*	IGD	0,002	2,632
Black Crake	*Zapornia flavirostra*	OMD	0,001	2,632

16.4 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
Southern Yellow-billed Hornbill	*Tockus leucomelas*
Green Wood-hoopoe	*Phoeniculus purpureus*
Chinspot Batis	*Batis molitor*
Pied Crow	*Corvus albus*
Lilac-breasted Roller	*Coracias caudatus*
Southern White-crowned Shrike	*Eurocephalus anguitimens*
Fork-tailed Drongo	*Dicrurus adsimilis*
Swainson's Spurfowl	*Pternistis swainsonii*
Crested Francolin	*Dendroperdix sephaena*
Namaqua Dove	*Oena capensis*
Natal Spurfowl	*Pternistis natalensis*
Lazy Cisticola	*Cisticola aberrans*
Cape Turtle (Ring-necked) Dove	*Streptopelia capicola*
Blacksmith Lapwing	*Vanellus armatus*
Acacia Pied Barbet	*Tricholaema leucomelas*
European Bee-eater	*Merops apiaster*
Lanner Falcon	*Falco biarmicus*
Speckled Mousebird	*Colius striatus*
African Firefinch	*Lagonosticta rubricata*
Brown-crowned Tchagra	*Tchagra australis*
White-throated Robin-chat	*Cossypha humeralis*
Diederik Cuckoo	*Chrysococcyx caprius*
Tawny-flanked Prinia	*Prinia subflava*
Southern Red-billed Hornbill	*Tockus rufirostris*
African Palm Swift	*Cypsiurus parvus*
African Grey Hornbill	*Lophoceros nasutus*
Red-backed Shrike	*Lanius collurio*
Grey Go-away-bird	*Corythaixoides concolor*
Sabota Lark	*Calendulauda sabota*
Shaft-tailed Whydah	*Vidua regia*
Southern Grey-headed Sparrow	*Passer diffusus*
Helmeted Guineafowl	*Numida meleagris*
White-browed Sparrow-Weaver	*Plocepasser mahali*
Glossy Ibis	*Plegadis falcinellus*
Purple Roller	*Coracias naevius*

Burchell's Coucal	*Centropus burchellii*
Crested Francolin	*Dendroperdix sephaena*
Black-headed Heron	*Ardea melanocephala*
Southern Black Tit	*Melaniparus niger*
Greater Striped Swallow	*Cecropis cucullata*
Little Swift	*Apus affinis*
Speckled Pigeon	*Columba guinea*
White-bellied Sunbird	*Cinnyris talatala*
Brown-throated Martin	*Riparia paludicola*
Horus Swift	*Apus horus*
Marico Sunbird	*Cinnyris mariquensis*
Common Myna	*Acridotheres tristis*
Red-billed Oxpecker	*Buphagus erythrorynchus*
Black-throated Canary	*Crithagra atrogularis*
Yellow-fronted Tinkerbird	*Pogoniulus chrysoconus*
Long-tailed Paradise Whydah	*Vidua paradisaea*
Golden-tailed Woodpecker	*Campethera abingoni*
Pearl-spotted Owlet	*Glaucidium perlatum*
African Darter	*Anhinga rufa*
Green-backed (Striated) Heron	*Butorides striata*
Malachite Kingfisher	*Corythornis cristatus*
White-breasted Cormorant	*Phalacrocorax lucidus*
African Paradise Flycatcher	*Terpsiphone viridis*
Squacco Heron	*Ardeola ralloides*
Village Indigobird	*Vidua chalybeata*
Southern Grey-headed Sparrow	*Passer diffusus*
Violet-eared Waxbill	*Granatina granatina*
Village Indigobird	*Vidua chalybeata*
Hamerkop	*Scopus umbretta*
Pin-tailed Whydah	*Vidua macroura*
Marsh Owl	*Asio capensis*
Southern White-faced Owl	*Ptilopsis granti*