Low de Vries
PhD Zoology
Pr. Sci. Nat. Zoological Science

Scoping Survey for Avifauna on the Proposed Tournee 1 Solar PV and Tournee 2 Solar PV facilities near Standerton in Mpumalanga, South Africa.

February 2023

Prepared for:
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EXPERTISE OF BIRD SPECIALISTS

Low de Vries is a registered bat assessment specialist with SABAA and has consulted for numerous field projects, which included bird surveys and the removal of dangerous snakes in Mozambique, as well as several biodiversity surveys in South Africa. He obtained a PhD in Zoology while investigating the general ecology of aardwolves with special focus on home range, diet, and prey abundance. After his PhD he spent 14 months on Marion Island assisting with field work on elephant seals, fur seals and killer whales. During his subsequent postdoctoral position at the University of Pretoria he spent six years conducting research on the ecology of bats and has obtained extensive knowledge on bat behaviour and movements, as well as experience in bat handling.

Justin obtained a BSc in Zoology & Botany, followed by a Honours degree in Biodiversity and Conservation. He is a professional bird guide (over 15 years of experience), who has lead tours across 4 continents (over 20 countries) and is well versed in field identification, ecology and bird calls and has a sound understanding of rigorous scientific data collection. He has served as a bird specialist for Enviro-Insight, EXM as well as Birdlife South Africa. He had lead avifaunal research and atlassing projects both on mainland Africa in the renewable energy sector, as well as conducted data collection out at sea to Antarctica and along the west coast from South Africa to Namibia.

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Disclaimer by Volant Environmental Director

I declare that the work presented in this report is my own and has not been influenced in any way by the developer. At no point has the developer asked me as specialist to manipulate the results to make it more favorable for the proposed development. I consider myself bound to the rules and ethics of the South African Council for Natural Scientific Professions (SACNASP) and the EIA Regulations (2014, as amended). I have the necessary qualifications and expertise (*Pr. Sci. Nat. Zoological Science)* in conducting this specialist report.

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COMPLIANCE WITH APPENDIX 6 OF THE 2014 EIA REGULATIONS, AS AMENDED

Requirements of Appendix 6 – GN R326 2014 EIA Regulations, 7 April 2017	Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain a) details of: i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	*Document Appendix*
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	*Declaration*
c) an indication of the scope of, and the purpose for which, the report was prepared;	Project *details*
cA. an indication of the quality and age of base data used for the specialist report;	Methods
cB. a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	*Included in final EIA*
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Field *surveys*
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	*Methods*
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	*Sensitive bird areas*
g) an identification of any areas to be avoided, including buffers;	*Sensitive bird areas*
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	*Project location*
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	*Assumptions and Limitations*
j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	*Include in final EIA*
k) any mitigation measures for inclusion in the EMPr;	*Include in final EIA*
l) any conditions for inclusion in the environmental authorisation;	*Include in final EIA*
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	*Include in final EIA*
n) a reasoned opinion i. whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	*Conclusion*

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Requirements of Appendix 6 – GN R326 2014 EIA Regulations, 7 April 2017	Specialist Report
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	*Include in final EIA*
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	*NA*
q) any other information requested by the competent authority.	*NA*
2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	*NA*

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ACRONYMS & GLOSSARY OF TERMS

AOI: Area of Influence, the area that is affected by the proposed development.

Buffer zone: A zone established around areas that are identified as sensitive for bats and includes flyways, foraging areas and bat roosts.

CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Cumulative Impact: Impacts created due to past, present, and future activities and impacts associated with these activities.

EMPr: Environmental Management Programme: A legally binding working document, which stipulates environmental and socio-economic mitigation measures which must be implemented by several responsible parties throughout the duration of the proposed project.

Endemic: A species that is restricted to a particular area.

EIA (Environmental Impact Assessment): The process of identifying environmental impacts due to activities and assessing and reporting these impacts.

GPS: Global Positioning System device.

IUCN: International Union for Conservation of Nature.

MW: Megawatts.

NEMA: National Environmental Management Act.

Pre-construction phase: The period prior to the construction of a wind energy facility.

Red data species: Species included in the Critically Endangered, Endangered, Vulnerable or Rare categories as defined by the IUCN.

REDZ (Renewable Energy Development Zones): Areas were wind and solar photovoltaic power development can occur in concentrated zones.

S&EIA: Social and Environmental Impact Assessment (EIA): The process of identifying social and environmental impacts due to activities and assessing and reporting these impacts.

SACNASP: South African Council for Natural Scientific Professions.

SANBI: South African National Biodiversity Institute.

Scoping Report: A report contemplated in regulation 21 of the NEMA amended EIA regulations R326 dated 7 April 2017.

ToPS: Threatened or Protected Species.

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1. Introduction

1.1 Project details

Volant Environmental (Pty) Ltd was commissioned by WSP Group Africa (Pty) Ltd to conduct a thorough Pre-Construction Survey to assess the potentially Sensitive Areas for avifauna at the proposed Tournee 1 Solar PV facility and Tournee 2 Solar PV facility. The number of solar panels to be constructed and dimensions of each is currently not known and will be based on input from specialist surveys and environmental limitations. This survey serves as a pre-construction assessment of the possible avifaunal present in the Project Area of Influence (PAOI) of the proposed SEF.

1.2 Project location

The proposed SEF is located 24.5 km Northeast of the town of Standerton in the Lekwa Local Municipality in the Mpumalanga province of South Africa. The town is known for its large commercial and agricultural output, specializing in cattle, dairy, maize, and poultry farming. The proposed SEF cluster can be accessed off the R39 that runs just South of the project area. The SEF cluster is divided into two facilities namely Tournee 1 PV and Tournee 2 PV. Together these facilities cover an area of *ca* 811 ha (PV1 - 306.65 ha; PV2 - 505.15 ha) and is currently used as agricultural land with livestock present across a large section of the PAOI.

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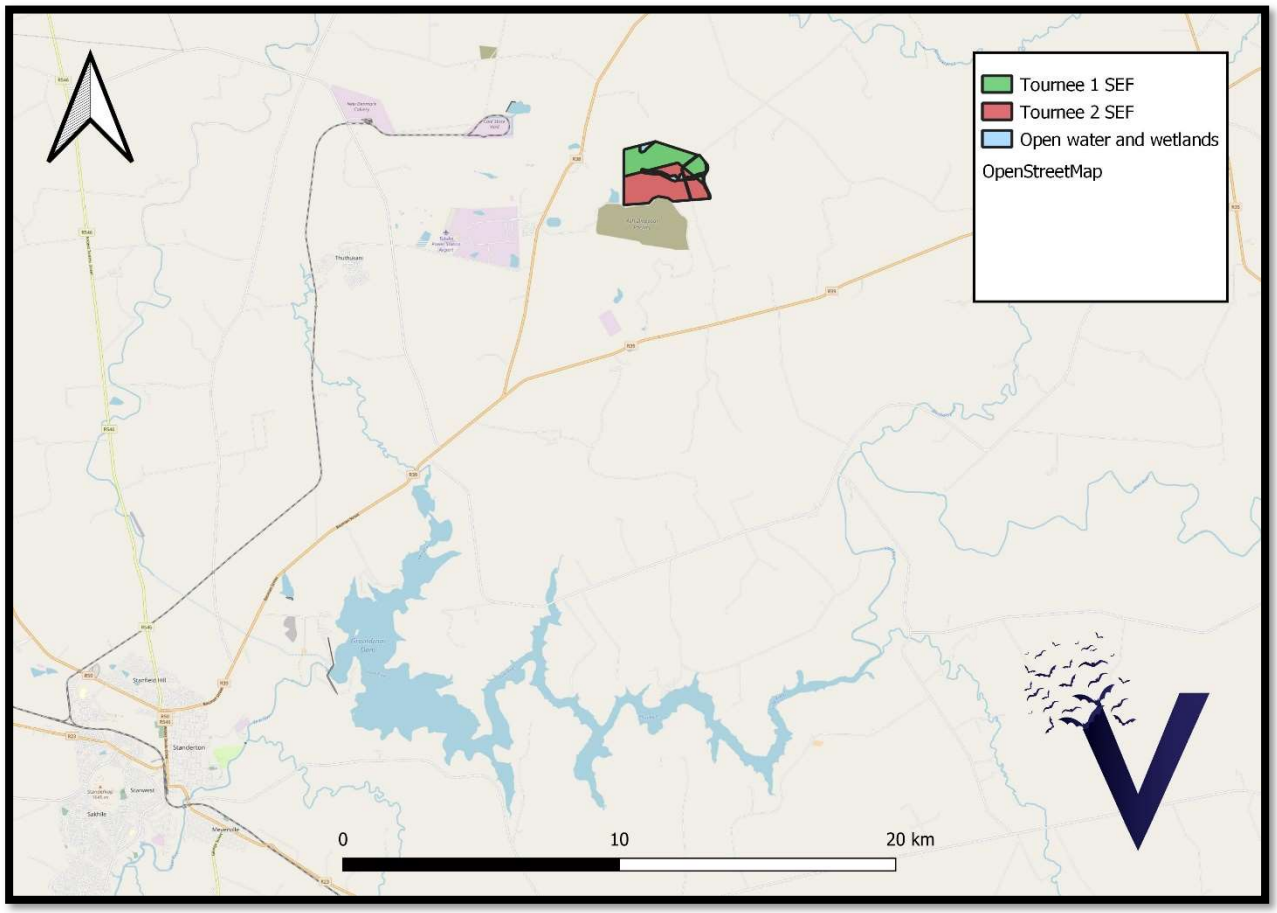

Figure 1. Location of the proposed Tournee Solar Energy Facility

1.3 Description of Ecoregion

The proposed PAOI falls across the Grassland Bioregion with Soweto Highveld Grassland vegetation present across the entire proposed development site (SANBI 2018, Figure 2). The extent of the Grassland Biome is relatively well defined on the basis of the specific known vegetation structure when seen in combination with the amount of rainfall in the summer and the average minimum temperatures in the winter. This biome occurs mainly on the high central

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plateau (Highveld), as well as the inland areas of the eastern seaboard and the established mountainous areas of KwaZulu-Natal and Eastern Cape. The biome is primarily characterised as flat to rolling, but also includes mountainous regions and escarpments. The effect of this biome being at a higher altitude result in larger temperature differences at different times of the year. The climate in winter months specifically, can be cold and dry with the occurrence and relative high frequency of frost. The presence of high amounts of moisture allows for grassland regions to be divided into two classes. Moist grassland primarily consists of sour grasses, leached and dystrophic soils and high canopy cover, high plant production and high fire frequency. Dry grasslands are seen as sweet, palatable grasses, where the soils are less leached and are eutrophic and canopy cover, plant production and fire frequency are lower than in moist grasslands. Grasslands are structurally simple and strongly dominated by grasses (*Poaceae*). It is noted that the moisture index effects canopy cover and decreases with lower mean annual rainfall but is influenced by the amount and type of grazing and by the presence of fire. This in turn allows for woody species to occur but are limited to specialised niches/habitats within the grassland biome. Soweto Highveld Grassland specifically is characterised by a moderately undulating landscape on the Highveld plateau. It primarily supports short to medium-high, dense, grassland that is almost entirely dominated *Themeda triandra*. In places that are not disturbed, scattered small wetlands, pans and occasional ridges or rocky outcrops are found that interrupt the continuous grassland cover. This ecoregion characteristics will be used when assessing avifaunal habitat as well as species assemblages that could be present on the PAOI.

The warmest month (with the highest average high temperature) is February (28.95°C) while the coldest month (with the lowest average low temperature) is June (8.8°C). The area receives an average of 177 mm of rain during January, which is the wettest month of the year based on averages.

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Figure 2. Examples of vegetation found on the Project Area of Influence.

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1.4 Assumptions and Limitations

The assumption was made that all sources of information used during the completion of this report, are reliable and accurate.
Vantage point surveys and transects are only conducted during daylight. Therefore, any bird movement for nocturnal species was recorded under *ad hoc* conditions. Some waterbirds and migrants are known to make regular flights and migration movements at night.
Although very useful, the SABAP1 bird data set is more than two decades old. This dataset does however provide an adequate baseline to use when assessing species presence, distribution, and abundance. The use of SABAP2 along with SABAP1 will provide substantial data to be used during initial desktop assessments. These data were, however, mostly obtained by citizen scientists, and accuracy depends on their identification skills.

2. Methods

2.1 Regulatory requirements

2.1.1 Screening report

The Minister of Environment, Forestry and Fisheries, gave notice that the submission of a report generated from the national web-based environmental screening tool, as contemplated in Regulation 16(1)(b)(v) of the Environmental Impact Assessment Regulations, 2014, published under Government Notice No. R982 in Government Gazette No. 38282 of 4 December 2014, as amended, will be compulsory from 4 October 2019 when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the Environmental Impact Assessment Regulations, 2014.
In addition, a set of protocols that an applicant needs to adhere to in the Environmental Authorisation (EA) process were developed and on 20 March 2020 the Minister of Forestry, Fisheries and the Environment gazetted the Protocols for national implementation purposes. The gazette '*Procedures to be followed for the Assessment and Minimum Criteria for Reporting of*

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Identified Environmental Themes in terms of Section 24(5)(a) and (h) of the National Environmental Management Act (1998) when Applying for Environmental Authorisation', has protocols that have been developed for environmental themes which include agriculture, avifauna, biodiversity (Terrestrial and Aquatic Biodiversity), noise, defence and civil aviation.

The protocols set requirements for the assessment and reporting of environmental impacts of activities requiring EA. The higher the sensitivity rating of the features on the proposed site as identified by the screening tool report, the more rigorous the assessment and reporting requirements.

Based on the screening report generated on 19/10/2022, the Avian Combined Sensitivity Theme is indicated as Low Sensitivity in areas.

2.1.2 Birds and Solar Energy Best Practise Guidelines

Based on Appendix 2 (Minimum requirements for avifaunal impact assessment) in the Best-Practice Guidelines for assessing and monitoring the impact of solar energy facilities on birds in southern Africa (Jenkins et al., 2017) monitoring at a potential SEF must follow a tiered approach with three stages.

During Stage 1 a preliminary assessment is conducted. This assessment should give an overview of likely impacts and potential red flags. During this stage methodologies for the monitoring phase should be planned.

Stage 2 includes an in-depth study with structured data collection following set methodologies on which to base the Impact Assessment Report.

The final tier is Stage 3 during which an Impact assessment is done based on the data collected during Stage 2.

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2.2 Desktop survey

A thorough desktop study was undertaken to estimate the likelihood of specific species avifauna being present at the proposed SEF. This included investigations into available literature, including Southern African Bird Atlas Project 1 (Harrison et al, 1997), The Southern African Bird Atlas Project 2 (http://sabap2.adu.org.za/v1/index.php), The Important Bird Areas report (http://www.birdlife.org.za/conservation/important-bird-areas), the IUCN 2013 Red List (http://www.iucnredlist.org/), Birdlife South Africa Checklist of Birds in South Africa (2014) and any other birds surveys or monitoring reports for nearby WEF, SEF or any facilities which included avifaunal monitoring as determined from the REEA (2022 Q1) information. Lack of public access to existing monitoring reports is a recurring problem in the industry and one that severely hampers pre-construction monitoring studies and the recommendations therein, a problem to be addressed by relevant NGOs and the governmental institutions.
A search was conducted to identify any protected areas present within 100 km of the proposed SEF project area using the South African Protected Area Data (SAPAD 2022 Q1).

2.3 Field surveys

All methods used for field surveys were implemented according to the Best Practice Guidelines for Birds & Solar Energy in South Africa (Jenkins *et al*., 2017). This document was strictly followed.

2.3.1 Site visits

Thus far one site visit has been completed between the 9th and 12th of January 2023 to obtain data for the summer period. This survey was conducted as a Site Sensitivity Verification and to obtain preliminary data on the species present at the site, and abundances of these species. An additional two site visits are planned to obtain data for the autumn and winter periods.

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2.3.2 Scoping survey

An initial Scoping Survey was performed by walking and driving across the project area and investigate areas surrounding the PAOI as a ground truthing exercise to identify potentially sensitive areas and hotspots for birds and identify areas and located possible nesting sites.

2.3.3 Driven and walked transects

All accessible roads were driven, and bird species identified based on sight and calls (Figure 3). Additionally, the survey team walked transects across the property where no roads were available to ensure that we obtained adequate coverage of the area as part of the Scoping survey. All these incidental observations were noted to construct a species list for the area. Based on these transects we identified four transects that were walked repeatedly, three times each, during different times of the day to obtain an estimate of bird activity in each habitat type.

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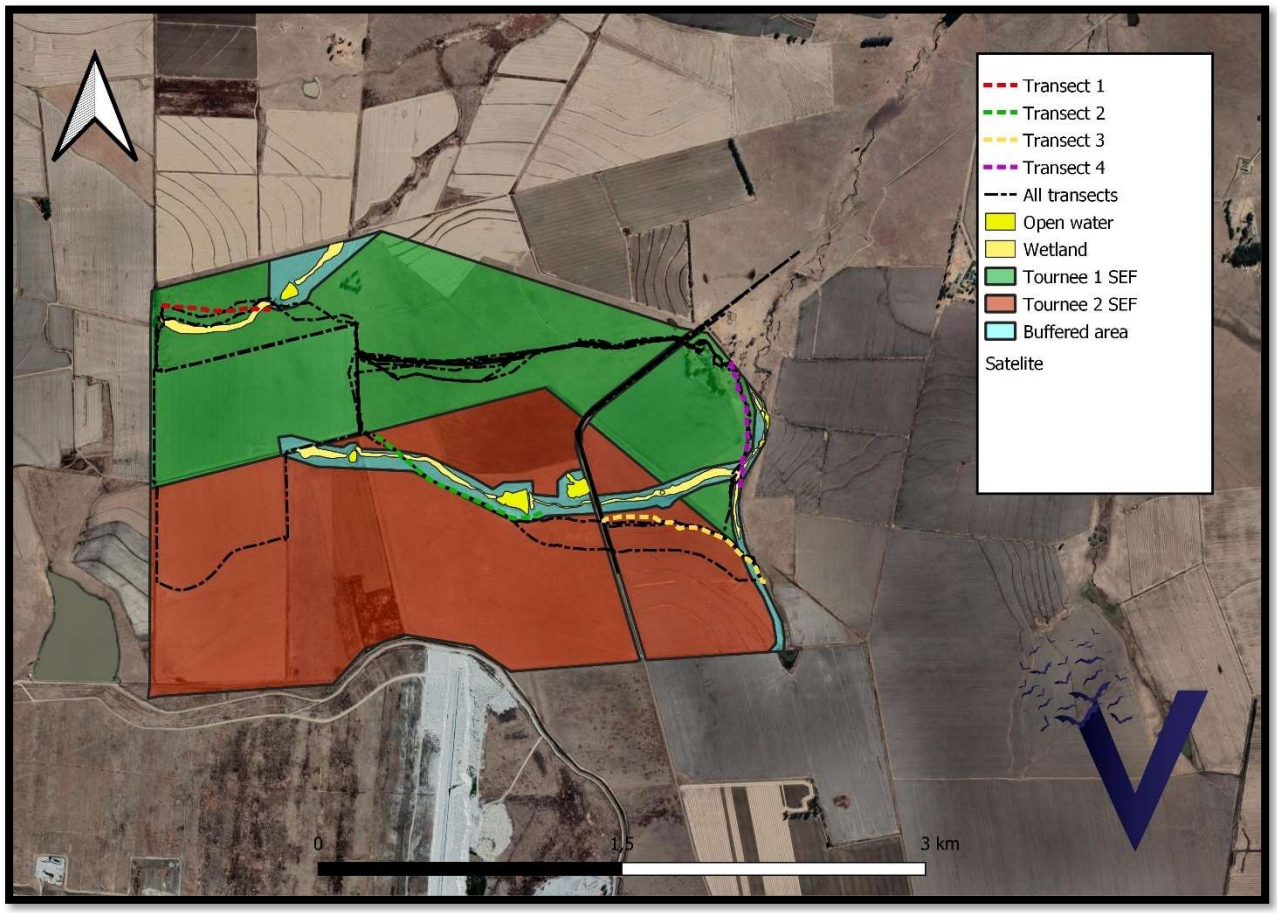

Figure 3. Driven and walked transects across the Project Area of Influence.

2.3.4. Vantage point

We identified one Vantage Point where an observer was placed for three hours at a time to count all Priority Species that flew past. Distance to the bird, height above ground and activity was noted down. We conducted three Vantage Point sessions during different times of the day.

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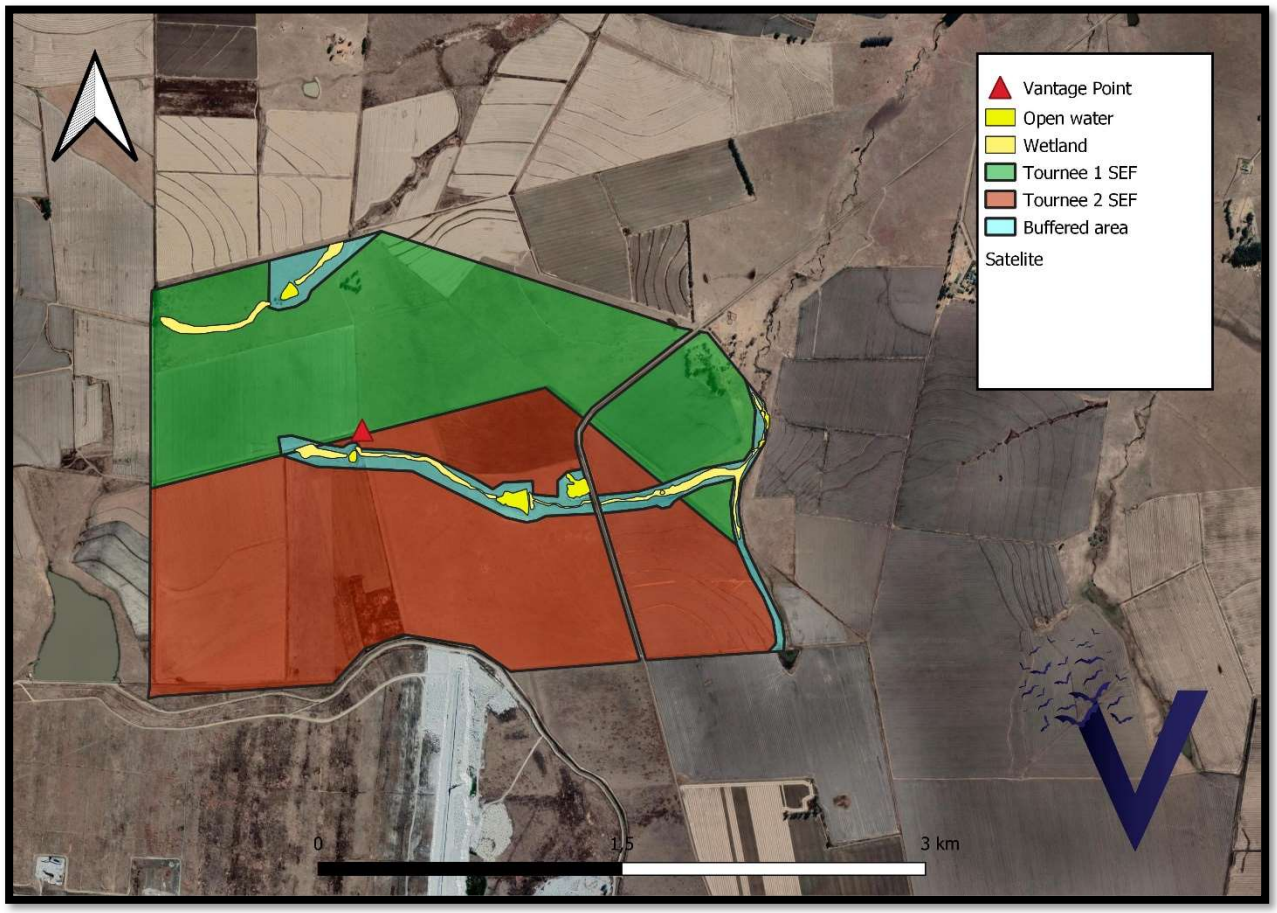

Figure 4. Position of Vantage Point.

2.4 Impact Assessment

Appendix 2 of GNR 982, as amended, requires the identification of the significance of potential impacts during scoping. To this end, an impact screening tool has been used in the scoping phase. The screening tool is based on two criteria, namely probability (Table 1) and consequence (Table 2), where the latter is based on general consideration to the intensity, extent, and duration.

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Table 1. Probability scores of identified impacts and their descriptors.

Score	Descriptor
4	**Definite**: The impact will occur regardless of any prevention measures
3	**Highly Probable**: It is most likely that the impact will occur
2	**Probable**: There is a good possibility that the impact will occur
1	**Improbable:** The possibility of the impact occurring is very low

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Table 2. Consequences scores of identified impacts and their descriptors.

Score	Negative	Positive
4	Very severe: An irreversible and permanent change to the affected system(s) or party(ies) which cannot be mitigated.	Very beneficial: A permanent and very substantial benefit to the affected system(s) or party(ies), with no real alternative to achieving this benefit.
3	Severe: A long term impacts on the affected system(s) or party(ies) that could be mitigated. However, this mitigation would be difficult, expensive or time consuming or some combination of these.	Beneficial: A long term impact and substantial benefit to the affected system(s) or party(ies). Alternative ways of achieving this benefit would be difficult, expensive or time consuming, or some combination of these.
2	Moderately severe: A medium to long term impacts on the affected system(s) or party (ies) that could be mitigated.	Moderately beneficial: A medium to long term impact of real benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are equally difficult, expensive and time consuming (or some combination of these), as achieving them in this way.
1	Negligible: A short to medium term impacts on the affected system(s) or party(ies). Mitigation is very easy, cheap, less time consuming or not necessary.	Negligible: A short to medium term impact and negligible benefit to the affected system(s) or party(ies). Other ways of optimising the beneficial effects are easier, cheaper, and quicker, or some combination of these.

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Table 3. Significance of identified impacts and their descriptors.

Consequence scale					
PROBABILITY SCALE		1	2	3	4
	1	Very Low	Very Low	Low	Medium
	2	Very Low	Low	Medium	Medium
	3	Low	Medium	Medium	High
	4	Medium	Medium	High	High

The nature of the impact must be characterized as to whether the impact is deemed to be positive (+ve) (*i.e.,* beneficial) or negative (-ve) (*i.e.,* harmful) to the receiving environment/receptor. For ease of reference, a colour reference system (Table 4) has been applied according to the nature and significance of the identified impacts.

Table 4. Impact significance colour reference system to indicate the nature of the impacts.

Negative Impacts (-ve)	Positive Impacts (+ve)
Negligible	Negligible
Very Low	Very Low
Low	Low
Medium	Medium
High	High

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3. Results

3.1 Desktop Survey

3.1.1 Previous Studies in the Region:

All nearby existing and proposed WEFs and SEF facilities were searched for online to find additional data regarding bird findings that might be of importance to the proposed SEF. Investigations into available literature on other surveys or monitoring reports for nearby (100 km) the proposed SEF application were undertaken (Table 5) as determined from the REEA (2022 Q1) information. These reports identified the potential impact of the proposed energy generating facilities on bird populations present and the mitigation strategies followed. Extensive lists of bird species, that could possibly be present on or near to the proposed SEF, was also compiled using previous study data and publicly available information.

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Table 5. Bird reports for Renewable Energy Facilities (and other developments) in the region of the proposed SEF.

Project	Report details	Consultant	Location from SEF
Camden 1 Wind Energy Facility	Camden I Wind Energy Facility	WSP Group Africa (Pty) Ltd	57.6 Km Northeast
Camden 2 Wind Energy Facility	Camden 2 Wind Energy Facility	WSP Group Africa (Pty) Ltd	63 Km Northeast
Camden 1 Solar Energy Facility	Camden 1 Solar Energy Facility	WSP Group Africa (Pty) Ltd	62 Km Northeast
Majuba PV Solar Energy Facility	Majuba PV Solar Energy Facility near Amersfoort	Savannah Environmental (Pty) Ltd	39 Km Southeast
Tutuka Solar Photovoltaic Facility	Tutuka Solar Photovoltaic Facility	Savannah Environmental (Pty) Ltd	13 Km Northwest
Volksrust truck stop and Filling Station	Proposed Truck Stop & Filling Station; Volksrust in Mpumalanga Province	SSI Engineers and Environmental Consultants	70 Km Southeast
Waaihoek Wind Energy Facility	Proposed Waaihoek Wind Energy Facility, Utrecht, Kwazulu-Natal	EOH Coastal & Environmental Services	132 Km Southeast

3.1.1.1 Camden I Wind Energy Facility

- The South African Bird Atlas Project 2 (SABAP2) data showed that a total of 234 bird species could potentially occur within the broader area of the proposed WEF PAOI.
- Of these, 37 species were classified as priority species and 16 of these were identified on the South African Red List species. Of the priority species, 25 were likely to occur regularly in the development area.
- The project site is not located in an Important Bird Area (IBA), but it is located between three IBAs.

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- Due to the proximity of the site to the IBAs, it is possible that some highly mobile priority species which are also IBA trigger species, and which occur either permanently or sporadically in the IBAs, might be impacted by the project
- Specific environmental sensitivity areas have been identified from an avifaunal perspective indicating where mitigation strategies should be applied.

3.1.1.2 Camden 2 Wind Energy Facility

- The Camden II WEF project area was classified as Medium to High sensitivity when the DFFE Screening Tool was utilized.
- This was determined based on the potential presence of several SCC namely Grey Crowned Crane (Globally and Regionally Endangered), Martial Eagle (Globally and Regionally Endangered), Southern Bald Ibis (Globally and Regionally Vulnerable), White-bellied Korhaan (Regionally Vulnerable), Secretarybird (Globally Endangered and Regionally Vulnerable) and Wattled Crane (Globally Vulnerable and Regionally Critically Endangered).
- This classification was confirmed during on-site visits and field surveys conducted throughout the study period.
- It was stated that the development in the sensitivity grassland must be limited as far as possible.
- It was stated that a 100m all infrastructure exclusion zone must be implemented around drainage lines and associated wetlands.
- After the pre-construction survey was completed, the avifauna specialist was informed of a potential Martial Eagle nest located near the Camden II WEF. A 5km no turbine exclusion zone around this nest was therefore suggested.

3.1.1.3 Camden 1 Solar Energy Facility

- It was determined that the proposed solar energy facility will have a moderate impact on priority avifauna which could be reduced to low impact through appropriate mitigation.
- No fatal flaws were discovered during the onsite investigations of the proposed SEF.

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- It was stated that the development in the sensitivity grassland must be limited as far as possible.
- It was stated that a 100m all infrastructure exclusion zone must be implemented around drainage lines and associated wetlands.

3.1.1.4 Majuba PV Solar Energy Facility near Amersfoort

- The South African Bird Atlas Project 2 (SABAP2) data showed that a total of 168 bird species could potentially occur within the broader area of the proposed SEF PAOI.
- Of these, 12 were identified on the South African Red List species.
- The proposed SEF PAOI was located on the boundary of the Grassland Biosphere Reserve IBA.
- This IBA is known to hold a large portion of South Africa's population of the endangered White-winged Flufftail. In addition, Corn Crake, Little Bittern, Baillon's Crake, Red-chested Flufftail, African Rail, and breeding populations of African Marsh Harrier, Grey Crowned Crane and African Grass Owl. It has also been established that a large portion of the global population of Rudd's Lark and Botha's Lark occur inside this IBA. The largest breeding colony of Southern Bald Ibis was also found within this area. However, none of the above-mentioned species were recorded by the specialists during the study period.
- Specific environmental sensitivity areas have been identified from an avifaunal perspective indicating where mitigation strategies should be applied.

3.1.1.5 Tutuka Solar Photovoltaic Facility

- The South African Bird Atlas Project 2 (SABAP2) data showed that a total of 190 bird species could potentially occur within the broader area of the proposed SEF PAOI.
- Of these, 10 were identified on the South African Red List species.
- It was stated that although most the Red List species could occur on the PAOI, the presence of sufficient similar habitat around the site will allow for movement of these species and no displacement impact of regional and national significance will occur.

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- The proposed SEF does not fall within an established IBA, but the Amersfoort-Bethal-Carolina District IBA lies 27 Km East of the site. Although this IBA is relatively close to the proposed development site, it was stated that it is unlikely that some of the bird species found there will occur on the PAOI site.

3.1.1.6 Proposed truck stop and filling station near Volksrust in Mpumalanga Province

- Twenty-two bird species were recorded during the brief field survey.
- It was mentioned that the species that were recorded are common, widespread and are typical of the grassland environment.
- It was stated that Southern Bald Ibis may use the site during certain times of the year for foraging purposes especially after fires. Lesser Kestrels may also be present on the proposed site.
- The specialists did not identify any threatened bird species during the brief field survey.

3.1.1.7 Proposed Waaihoek Wind Energy Facility, Utrecht, KwaZulu-Natal

- A total of 92 species were recorded at the study area during the study period.
- Of these, a total of 26 species were priority species.
- It was established that the majority of the proposed PAOI is in an IBA, namely the Grasslands Important Bird and Biodiversity Area (SA125), with the proposed power line alternatives for the grid connection located just outside the IBA.
- Ultimately it was established that the proposed wind farm will constitute a potential impact on grassland avifauna due to fragmentation of the grassland habitat.
- However, the specialist stated that if the habitat is carefully managed to conserve the grassland for the benefit of the birds, many species will benefit in the longer term through this protection and the wind farm should only constitute a moderate cumulative impact.

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3.1.2 Potential species present in the area

Based on a list of bird species drawn from nine pentads that both cover and surround the PAOI, a total of 203 species have been identified of which 30 species have been identified as Priority Species (Appendix 2). Of the Priority Species nine have an Overall Priority Score of 290 or higher, placing them in the top 30 Priority species (Table 6). These include, Black Harrier, Southern Bald Ibis, Blue Crane, Secretarybird, African Marsh Harrier, Lanner Falcon, Greater and Lesser Flamingo, and African Fish Eagle.

Table 6. Priority species that could potentially occur on the Project Area of Influence

	Common name	Scientific name	Score
1	Black Harrier	*Circus maurus*	345
2	Southern Bald Ibis	*Geronticus calvus*	330
3	Blue Crane	*Grus paradisea*	320
4	Secretarybird	*Sagittarius serpentarius*	320
5	African Marsh Harrier	*Circus ranivorus*	300
6	Lanner Falcon	*Falco biarmicus*	300
7	Greater Flamingo	*Phoenicopterus roseus*	290
8	Lesser Flamingo	*Phoeniconaias minor*	290
9	African Fish Eagle	*Haliaeetus vocifer*	290
10	Blue Korhaan	*Eupodotis caerulescens*	270
11	Pallid Harrier	*Circus macrourus*	260
12	Jackal Buzzard	*Buteo rufofuscus*	250
13	Caspian Tern	*Hydroprogne caspia*	240
14	Peregrine Falcon	*Falco peregrinus*	240
15	Osprey	*Pandion haliaetus*	230
16	White Stork	*Ciconia ciconia*	220
17	Lesser Kestrel	*Falco naumanni*	214
18	Montagu's Harrier	*Circus pygargus*	210
19	Common Buzzard	*Buteo buteo*	210
20	Amur Falcon	*Falco amurensis*	210
21	Black-winged Pratincole	*Glareola nordmanni*	202

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	Common name	Scientific name	Score
22	Grey-winged Francolin	*Scleroptila afra*	190
23	African Harrier-Hawk	*Polyboroides typus*	190
24	Long-crested Eagle	*Lophaetus occipitalis*	190
25	Marsh Owl	*Asio capensis*	190
26	Northern Black Korhaan	*Afrotis afraoides*	180
27	Black-winged Kite	*Elanus caeruleus*	174
28	Greater Kestrel	*Falco rupicoloides*	174
29	Red-footed Falcon	*Falco vespertinus*	174
30	Black Sparrowhawk	*Accipiter melanoleucus*	170

3.1.2 Nature reserves in the area

A search was conducted to identify any protected areas present within 100 km of the proposed SEF project area using the South African Protected Area Data (SAPAD 2022 Q1). The identified public/privately owned protected areas are listed the table below (Table 1).

Table 7. The identified public/privately owned protected areas identified close to proposed SEF site

NAME	LOCATION FROM SEF SITE
Moreson Nature Reserve	98 Km Southwest
Shozaloza Safaris	100 Km Southwest
Lourensa Game Farm	90 Km Southwest
Vaaldam Nature Reserve	90 Km West
S. J. Van Der Merwe Private Nature Reserve	90 Km West
J. N. Van Der Merwe Private Nature Reserve	90 Km West
Daisy Private Nature Reserve	100 Km Northwest
Voortrekker Private Nature Reserve	99 Km Northwest
Nicolaas Private Nature Reserve	99 Km Northwest

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NAME	Location from SEF site
Devon Protected Environment	96 Km Northwest
John Cairns Private Nature Reserve	97 Km North
Witbank Nature Reserve	98 Km North
Heyns Private Nature Reserve	98 Km North
Burnside Private Nature Reserve	99 Km North
Chrissiesmeer Protected Environment	90 Km Northeast
Rietvlei Private Nature Reserve	59 Km Northeast
Ahlers Private Nature Reserve	73 Km Northeast
Langcarel Private Nature Reserve[1]	65 Km East
Jericho Dam Nature Reserve	100 Km East
Majuba Nature Reserve	43 Km Southeast
Afrikan Farms Protected Environment	47 Km Southeast
Mabola Protected Environment	97 Km Southeast
Tafelkop Nature Reserve	97 Km Southeast
Mkhothane Protected Environment	73 Km Southeast
Lotterkrantz Private Nature Reserve	47 Km South
Sneeuwberg Protected Environment	85 Km South
Rosedale Private Nature Reserve	98 Km South

The reserves consist of privately as well as publicly owned land, used for wildlife conservation as well as specific livestock farming. These sites are all registered designated protected areas (SAPAD 2022, Q1). The potential bird impact on these areas will be better determined during the 12-month pre-construction period as described by the South African Best Practice Guidelines.

[1] Reserve currently going through process to be de-proclaimed

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3.2 Important Bird and Biodiversity Area

Important Bird and Biodiversity Areas (IBAs) are defined by Birdlife International, as sites of global significance for bird conservation, identified nationally through multi-stakeholder processes using globally standardized, quantitative, and scientifically agreed criteria. These areas are seen as the most important sites for conserving and should be considered during avifaunal impact assessments. The closest IBA (17 Km East) from the PAOI is known as Amersfoort–Bethal–Carolina District IBA. This specific IBA stretches throughout Mpumalanga province and covers an area of 343 320 ha (Figure 5). This specific IBA is classified as an unprotected site which correlates to no official protection under the National Environmental Management: Protected Areas Act (2003). However, the conservation response is not completely absent from unprotected IBAs with input from civil society groups, a degree of monitoring, research and conservation action still taking place at sites of biological significance. Species found within this IBA that are of conservational concern is the globally threatened Botha's Lark, with 10% of the global population suspected to be present within this area. Other globally threatened species are Blue Crane, Southern Bald Ibis, Black Harrier, Blue Korhaan, Black-winged Pratincole, Secretarybird, Martial Eagle and Denham's Bustard. Regionally threatened species are African Grass Owl, White-bellied Korhaan and Lanner Falcon. Restricted-range and biome-restricted species are the previously mentioned Botha's Lark, and Buff-streaked Chat.

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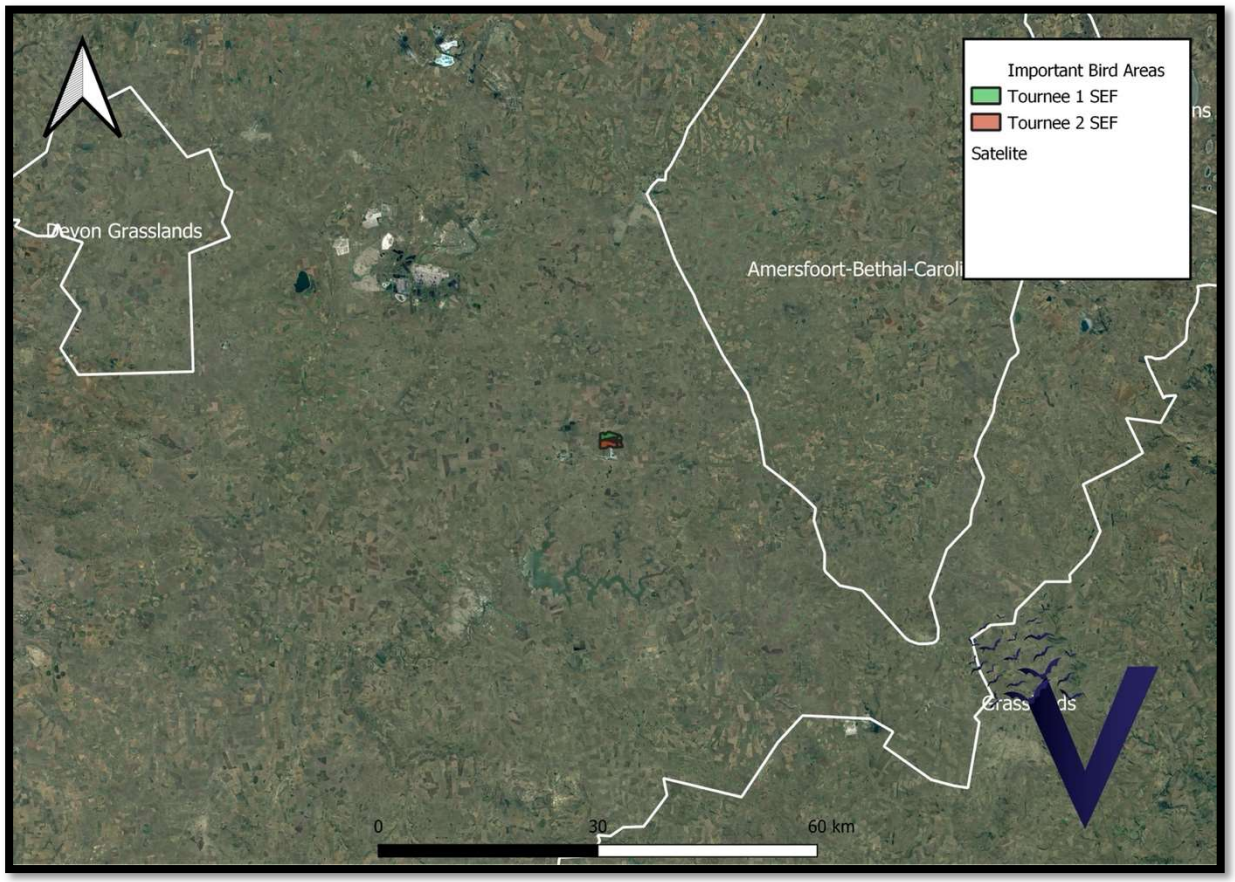

Figure 5. Position of Important Bird Areas (IBAs) in relation to the Tournee 1 and Tournee 2 Solar PV facilities

3.3. Observed species

All species that were seen or heard during both walked and driven transects were recorded. A total of 81 unique species were identified during driven and walked transects (Appendix 3). Of this list, priority species observed within the PAOI included Secretarybird, Jackal Buzzard, Blue Korhaan, Marsh Owl, Yellow-billed Kite, Common Buzzard, Black-winged Kite, and Grey-winged Francolin. Black-winged Pratincole was an additional priority species recorded on site, this addition is based off of data and images received from other specialists.

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3.4 Sensitive bird areas

Several potential bird sensitive areas were located (Figure 6) on the PAOI, these wetlands and their drainages were walked to survey for priority species, as well as to ascertain whether they could serve as breeding or roosting sites for these PAOI. Across all these wetlands, Marsh Owls were flushed, three individuals in total. One within the drainage line in Tournee 1 SEF, and two on Tournee 2 SEF, one on the western and eastern side of Tournee 2 SEF respectively. These drainage lines are suitable as roosting and foraging grounds for priority species such as Black, Montagu's, Pallid, and African Marsh Harrier, and are possible breeding sites for Blue Crane.

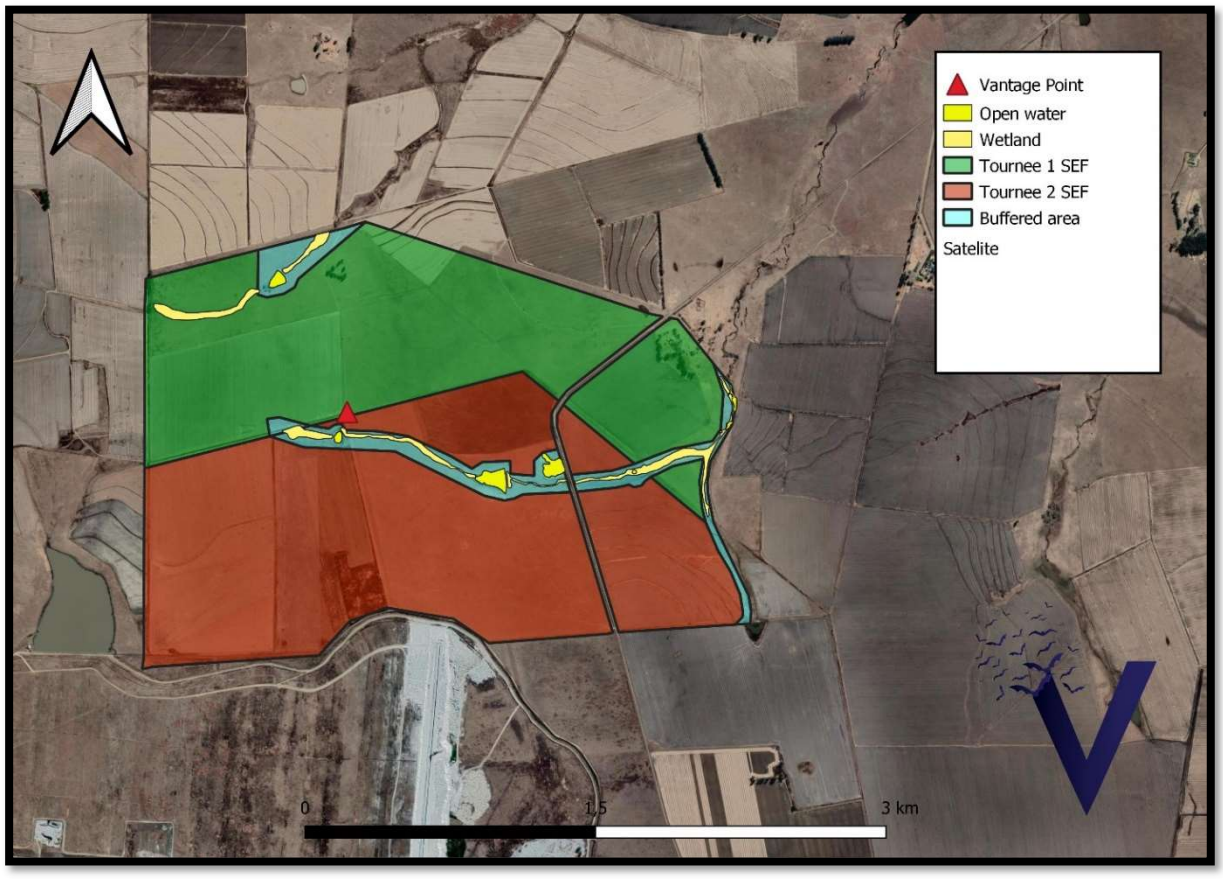

Figure 6. Sensitive bird areas located on the Project Area of Influence.

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4. Site Sensitivity Verification

Based on the screening report generated on 19/10/2022, the Avian Combined Sensitivity Theme is indicated as Low sensitivity in areas covering both the Tournee 1 and Tournee 2 Solar PV facilities. Although a number of Priority Species were observed during the Scoping Survey, they all have a relatively low Priority Score. This in conjunction with the few sensitive areas that were found during the survey shows that our findings align with the Sensitivity score given by the screening report and that the area is currently considered to be of Low Sensitivity to avifauna. Two more field sessions will be conducted to confirm our findings.

5. Impact Assessment

Due to the similarity in habitat, the impacts for Tournee SEF 1 and Tournee SEF 2 PV projects are expected to be identical, and all impacts were assessed together. A full Environmental Management Programme (EMPr) will be supplied in the final EIA report, but preliminary impacts have been identified and mitigation measures suggested.

5.1 Impacts identified

The main impacts of PV plants on avifauna which have emerged from previous studies include:

- Displacement due to disturbance, created by the construction of the solar PV plant and associated infrastructure.
- Displacement due to habitat destruction and transformation, created by the construction of the solar PV plant and associated infrastructure.
- Mortality and injury, caused by collisions with solar PV panels and associated infrastructure.
- Entrapment within perimeter fencing.
- Chemical pollution, usually linked to dust suppressants.
- Electrocution on power lines, and associated infrastructure.

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These main impacts are outlines below across the construction, operational and decommissioning phases of the project.

Table 8. Impacts identified during the scoping phase.

	Impacts Identified	Probability		Consequence		Impact Significance
	Construction Phase	Score	Descriptor	Score	Descriptor	
1	Displacement of priority species due to disturbance associated with construction of Tournee SEF Cluster and associated infrastructure.	4	Definite	2	Negative	Medium
2	Displacement of priority species due to habitat transformation associated with construction of Tournee SEF Cluster and associated infrastructure.	4	Definite	3	Negative	High
	Operational Phase	Score	Descriptor	Score	Descriptor	
1	Mortality of priority species due to collisions with solar panels.	3	Highly Probable	1	Negative	Low
2	Entrapment of large-bodied birds in the perimeter fence lines of Tournee SEF Cluster.	3	Highly Probable	2	Negative	Medium
3	Mortality of priority species due to electrocution with reticulation networks.	3	Highly Probable	2	Negative	Medium
4	Mortality of priority species due to collisions with reticulation networks.	3	Highly Probable	2	Negative	Medium

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Table 9. Impact due to the displacement or Priority Species during the construction phase

Nature: Displacement of priority species due to disturbance associated with construction of Tournee SEF Cluster and associated infrastructure.
Mitigation: • Construction activity should be restricted as far as possible to the immediate footprint of the required infrastructure. • Access to the surrounding site outside of the footprint should be controlled and limited to reduce unnecessary disturbance to priority species. • Best practice guidelines should be followed to control noise and dust. • Existing roads should be used and construction of new roads kept to a minimum. • Recommendations of the ecological specialist studies should be strictly followed.
Residual Risks: The residual risk of displacement will be reduced, but will remain at a moderate level after mitigation, if proposed mitigation measures are implemented.

Table 10. Impact due to the habitat transformation during the construction phase

Nature: Displacement of priority species due to habitat transformation associated with construction of Tournee SEF Cluster and associated infrastructure.
Mitigation: • A 100m solar panel free buffer zone should be implemented around dams, wetlands, and drainage lines. • Existing roads should be used and construction of new roads kept to a minimum. • Recommendations of the ecological specialist studies should be strictly followed.
Residual Risks: The residual risk of displacement is high, but can be reduced to a moderate level after mitigation, if proposed mitigation measures are implemented. For some species this may remain high, due to the change in habitat.

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Table 11. Impact due to mortality during the Operational Phase

Nature: Mortality of priority species due to collisions with solar panels.
Mitigation: Water dependant priority species were not prevalent on site. These species are known to confuse PV solar panel arrays with waterbodies, but due to their absence, the expected significance of this impact is low and no mitigation measures are recommended.
Residual Risks: Not applicable.

Table 12. Impact due to entrapment during the Operational Phase

Nature: Entrapment of large-bodied birds in the perimeter fence lines of Tournee SEF Cluster.
Mitigation: • A single perimeter fence is recommended to reduce entrapment of priority species. • Increasing the spacing between the two top wires (minimum of 30cm) and ensuring wires are barbless and correctly tensioned, will reduce snaring risk of birds (Especially the Marsh Owls present on site)
Residual Risks: The residual risk of entrapment will remain low if mitigation measures are followed.

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Table 13. Impact due to electrocution during the Operational Phase

Nature: Mortality of priority species due to electrocution with reticulation networks.
Mitigation: • Use underground cables as much as possible. • Use raptor friendly pole designs, approved by an avifaunal specialist.
Residual Risks: The residual risk of electrocution will be reduced from low, to very low if mitigation measures are followed.

Table 14. Impact due to collision during the Operational Phase

Nature: Mortality of priority species due to collisions with reticulation networks.
Mitigation: • Use underground cables as much as possible. • All overhead lines must be marked with Eskom approved flight diverters/flappers according to the latest official Eskom Engineering Instruction.
Residual Risks: The residual risk of collision will still be present for Blue Korhaan and Blue Crane, but should be significantly reduced for other species. Collisions by migratory raptor species likely to occur such as Black Harrier in winter, could have regional affects. Mitigation measures, if adhered to could reduce residual risk from moderate, to low.

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6. Conclusion

During the Scoping Survey ten priority species were identified, namely Yellow-billed Kite, Marsh Owl, Secretarybird, Jackal Buzzard, Common Buzzard, Black-winged Kite, Grey-winged Francolin, Amur Falcon, Black-winged Pratincole, and Blue Korhaan. No nests or communal roosts of priority species were observed on the PAOI. Based on only thirty percent of expected priority species being located during the scoping, we provisionally label both the Tournee 1 Solar PV and Tournee 2 Solar PV facilities as LOW SENSITIVITY for avifauna. No fatal flaws were discovered during the investigations.

For the EIA phase, two follow up seasonal visits will provide a better understanding of the density and usage of the PAOI by priority species. Here data obtained during replicated walked transects, as well as from a vantage point survey, will be run through DISTANCE analysis, to calculate the density of various avifaunal assemblages and priority species on both Tournee 1 Solar PV and Tournee 2 Solar PV.

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7. References

EOH Coastal & Environmental Services, (2015). Proposed Waaihoek Wind Energy Facility, Final Amended Environmental Impact Assessment Report, CES, East London.

Jenkins, A.R. , Ralston-Paton, S., Smit-Robinson, H.A.. 2017. Best Practise guidelines for birds and solar facilities.

Ladislav, M., Rutherford, M.C., (2006). The vegetation of South Africa, Lesotho and Swaziland, South African National Biodiversity Institute.

WSP Group Africa (Pty) Ltd (2022). Camden I Wind Energy Facility Environmental Impact Assessment report.

WSP Group Africa (Pty) Ltd (2022). Camden I Solar Energy Facility Final Environmental Impact Assessment Report.

WSP Group Africa (Pty) Ltd (2022). Camden II Wind Energy Facility Final Environmental Impact Assessment Report.

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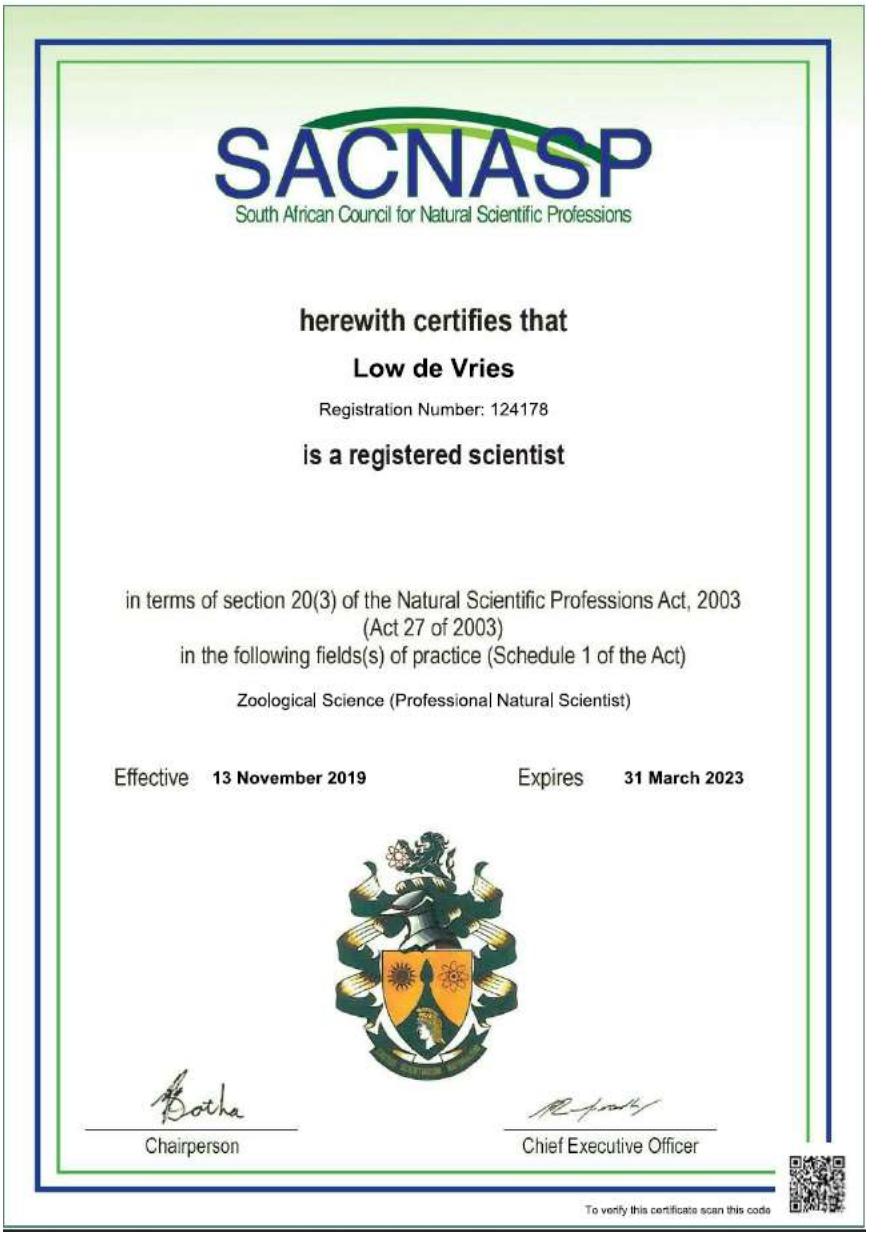
8. Appendix 1.

8.1 Qualification of specialist



SACNASP
South African Council for Natural Scientific Professions

herewith certifies that

Low de Vries

Registration Number: 124178

is a registered scientist

in terms of section 20(3) of the Natural Scientific Professions Act, 2003
(Act 27 of 2003)
in the following fields(s) of practice (Schedule 1 of the Act)

Zoological Science (Professional Natural Scientist)

Effective **13 November 2019** Expires **31 March 2023**

Chairperson

Chief Executive Officer

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Appendix 2: Potential species present

Table 15: List of potential species that could be present at the Project Area of Influence which Priority Species in red.

COMMON NAME	SCIENTIFIC NAME
Ostriches (Struthionidae)	
Common Ostrich	*Struthio camelus*
Ducks, Geese, Swans (Anatidae)	
White-faced Whistling Duck	*Dendrocygna viduata*
Fulvous Whistling Duck	*Dendrocygna bicolor*
White-backed Duck	*Thalassornis leuconotus*
Spur-winged Goose	*Plectropterus gambensis*
Egyptian Goose	*Alopochen aegyptiaca*
South African Shelduck	*Tadorna cana*
Blue-billed Teal	*Spatula hottentota*
Cape Shoveler	*Spatula smithii*
African Black Duck	*Anas sparsa*
Yellow-billed Duck	*Anas undulata*
Mallard	*Anas platyrhynchos*
Cape Teal	*Anas capensis*
Red-billed Teal	*Anas erythrorhyncha*
Southern Pochard	*Netta erythrophthalma*
Maccoa Duck	*Oxyura maccoa*
Guineafowl (Numididae)	
Helmeted Guineafowl	*Numida meleagris*
Pheasants & Allies (Phasianidae)	
Grey-winged Francolin	*Scleroptila afra*
Orange River Francolin	*Scleroptila gutturalis*
Common Quail	*Coturnix coturnix*
Swainson's Spurfowl	*Pternistis swainsonii*
Swifts (Apodidae)	
African Palm Swift	*Cypsiurus parvus*

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Common Swift	*Apus apus*
African Black Swift	*Apus barbatus*
Little Swift	*Apus affinis*
White-rumped Swift	*Apus caffer*
Bustards (Otididae)	
Blue Korhaan	*Eupodotis caerulescens*
Northern Black Korhaan	*Afrotis afraoides*
Cuckoos (Cuculidae)	
Diederik Cuckoo	*Chrysococcyx caprius*
Pigeons, Doves (Columbidae)	
Rock Dove	*Columba livia*
Speckled Pigeon	*Columba guinea*
Red-eyed Dove	*Streptopelia semitorquata*
Ring-necked Dove	*Streptopelia capicola*
Laughing Dove	*Spilopelia senegalensis*
Namaqua Dove	*Oena capensis*
Rails, Crakes & Coots (Rallidae)	
African Crake	*Crecopsis egregia*
Common Moorhen	*Gallinula chloropus*
Red-knobbed Coot	*Fulica cristata*
African Swamphen	*Porphyrio madagascariensis*
Black Crake	*Zapornia flavirostra*
Cranes (Gruidae)	
Blue Crane	*Grus paradisea*
Grebes (Podicipedidae)	
Little Grebe	*Tachybaptus ruficollis*
Great Crested Grebe	*Podiceps cristatus*
Flamingos (Phoenicopteridae)	
Greater Flamingo	*Phoenicopterus roseus*
Lesser Flamingo	*Phoeniconaias minor*
Stone-curlews, Thick-knees (Burhinidae)	

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Spotted Thick-knee	*Burhinus capensis*
Stilts, Avocets (Recurvirostridae)	
Black-winged Stilt	*Himantopus himantopus*
Pied Avocet	*Recurvirostra avosetta*
Plovers (Charadriidae)	
Blacksmith Lapwing	*Vanellus armatus*
Crowned Lapwing	*Vanellus coronatus*
African Wattled Lapwing	*Vanellus senegallus*
Kittlitz's Plover	*Charadrius pecuarius*
Three-banded Plover	*Charadrius tricollaris*
Sandpipers, Snipes (Scolopacidae)	
Ruff	*Calidris pugnax*
Curlew Sandpiper	*Calidris ferruginea*
Little Stint	*Calidris minuta*
African Snipe	*Gallinago nigripennis*
Common Sandpiper	*Actitis hypoleucos*
Marsh Sandpiper	*Tringa stagnatilis*
Wood Sandpiper	*Tringa glareola*
Common Greenshank	*Tringa nebularia*
Coursers, Pratincoles (Glareolidae)	
Black-winged Pratincole	*Glareola nordmanni*
Gulls, Terns, Skimmers (Laridae)	
Grey-headed Gull	*Chroicocephalus cirrocephalus*
Caspian Tern	*Hydroprogne caspia*
Whiskered Tern	*Chlidonias hybrida*
White-winged Tern	*Chlidonias leucopterus*
Storks (Ciconiidae)	
African Openbill	*Anastomus lamelligerus*
White Stork	*Ciconia ciconia*
Anhingas, Darters (Anhingidae)	
African Darter	*Anhinga rufa*

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Cormorants, Shags (Phalacrocoracidae)	
Reed Cormorant	*Microcarbo africanus*
White-breasted Cormorant	*Phalacrocorax lucidus*
Ibises, Spoonbills (Threskiornithidae)	
African Sacred Ibis	*Threskiornis aethiopicus*
Southern Bald Ibis	*Geronticus calvus*
Hadada Ibis	*Bostrychia hagedash*
Glossy Ibis	*Plegadis falcinellus*
African Spoonbill	*Platalea alba*
Herons, Bitterns (Ardeidae)	
Little Bittern	*Ixobrychus minutus*
Black-crowned Night Heron	*Nycticorax nycticorax*
Squacco Heron	*Ardeola ralloides*
Western Cattle Egret	*Bubulcus ibis*
Grey Heron	*Ardea cinerea*
Black-headed Heron	*Ardea melanocephala*
Goliath Heron	*Ardea goliath*
Purple Heron	*Ardea purpurea*
Great Egret	*Ardea alba*
Intermediate Egret	*Ardea intermedia*
Black Heron	*Egretta ardesiaca*
Little Egret	*Egretta garzetta*
Hamerkop (Scopidae)	
Hamerkop	*Scopus umbretta*
Secretarybird (Sagittariidae)	
Secretarybird	*Sagittarius serpentarius*
Ospreys (Pandionidae)	
Osprey	*Pandion haliaetus*
Kites, Hawks, Eagles (Accipitridae)	
Black-winged Kite	*Elanus caeruleus*
African Harrier-Hawk	*Polyboroides typus*
Long-crested Eagle	*Lophaetus occipitalis*
Black Sparrowhawk	*Accipiter melanoleucus*
African Marsh Harrier	*Circus ranivorus*

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Black Harrier	*Circus maurus*
Pallid Harrier	*Circus macrourus*
Montagu's Harrier	*Circus pygargus*
Yellow-billed Kite	*Milvus aegyptius*
African Fish Eagle	*Haliaeetus vocifer*
Common Buzzard	*Buteo buteo*
Jackal Buzzard	*Buteo rufofuscus*
Barn Owls (Tytonidae)	
Western Barn Owl	*Tyto alba*
Owls (Strigidae)	
Marsh Owl	*Asio capensis*
Spotted Eagle-Owl	*Bubo africanus*
Mousebirds (Coliidae)	
Speckled Mousebird	*Colius striatus*
Hoopoes (Upupidae)	
African Hoopoe	*Upupa africana*
Wood Hoopoes (Phoeniculidae)	
Green Wood Hoopoe	*Phoeniculus purpureus*
Rollers (Coraciidae)	
European Roller	*Coracias garrulus*
Kingfishers (Alcedinidae)	
Malachite Kingfisher	*Corythornis cristatus*
Giant Kingfisher	*Megaceryle maxima*
Pied Kingfisher	*Ceryle rudis*
African Barbets (Lybiidae)	
Black-collared Barbet	*Lybius torquatus*
Crested Barbet	*Trachyphonus vaillantii*
Woodpeckers (Picidae)	
Red-throated Wryneck	*Jynx ruficollis*

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Caracaras, Falcons (Falconidae)	
Lesser Kestrel	*Falco naumanni*
Rock Kestrel	*Falco rupicolus*
Greater Kestrel	*Falco rupicoloides*
Red-footed Falcon	*Falco vespertinus*
Amur Falcon	*Falco amurensis*
Lanner Falcon	*Falco biarmicus*
Peregrine Falcon	*Falco peregrinus*
Old World Parrots (Psittaculidae)	
Rose-ringed Parakeet	*Psittacula krameri*
Bushshrikes (Malaconotidae)	
Bokmakierie	*Telophorus zeylonus*
Shrikes (Laniidae)	
Red-backed Shrike	*Lanius collurio*
Lesser Grey Shrike	*Lanius minor*
Southern Fiscal	*Lanius collaris*
Figbirds, Old World Orioles, Piopios (Oriolidae)	
Black-headed Oriole	*Oriolus larvatus*
Crows, Jays (Corvidae)	
Cape Crow	*Corvus capensis*
Pied Crow	*Corvus albus*
Larks (Alaudidae)	
Spike-heeled Lark	*Chersomanes albofasciata*
Chestnut-backed Sparrow-Lark	*Eremopterix leucotis*
Eastern Clapper Lark	*Mirafra fasciolata*
Rufous-naped Lark	*Mirafra africana*
Pink-billed Lark	*Spizocorys conirostris*
Red-capped Lark	*Calandrella cinerea*
Bulbuls (Pycnonotidae)	
Dark-capped Bulbul	*Pycnonotus tricolor*
Swallows, Martins (Hirundinidae)	

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Banded Martin	*Neophedina cincta*
Brown-throated Martin	*Riparia paludicola*
Rock Martin	*Ptyonoprogne fuligula*
White-throated Swallow	*Hirundo albigularis*
Barn Swallow	*Hirundo rustica*
Common House Martin	*Delichon urbicum*
Lesser Striped Swallow	*Cecropis abyssinica*
Greater Striped Swallow	*Cecropis cucullata*
South African Cliff Swallow	*Petrochelidon spilodera*
Leaf Warblers (Phylloscopidae)	
Willow Warbler	*Phylloscopus trochilus*
Reed Warblers & Allies (Acrocephalidae)	
Lesser Swamp Warbler	*Acrocephalus gracilirostris*
Great Reed Warbler	*Acrocephalus arundinaceus*
Sedge Warbler	*Acrocephalus schoenobaenus*
Common Reed Warbler	*Acrocephalus scirpaceus*
Grassbirds & Allies (Locustellidae)	
Little Rush Warbler	*Bradypterus baboecala*
Cisticolas & Allies (Cisticolidae)	
Levaillant's Cisticola	*Cisticola tinniens*
Neddicky	*Cisticola fulvicapilla*
Zitting Cisticola	*Cisticola juncidis*
Cloud Cisticola	*Cisticola textrix*
Pale-crowned Cisticola	*Cisticola cinnamomeus*
Wing-snapping Cisticola	*Cisticola ayresii*
Tawny-flanked Prinia	*Prinia subflava*
Black-chested Prinia	*Prinia flavicans*
White-eyes (Zosteropidae)	
Cape White-eye	*Zosterops virens*
Starlings, Rhabdornises (Sturnidae)	
Common Myna	*Acridotheres tristis*
Wattled Starling	*Creatophora cinerea*
Cape Starling	*Lamprotornis nitens*
Pied Starling	*Lamprotornis bicolor*

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Thrushes (Turdidae)	
Karoo Thrush	*Turdus smithi*
Chats, Old World Flycatchers (Muscicapidae)	
Spotted Flycatcher	*Muscicapa striata*
Cape Robin-Chat	*Cossypha caffra*
African Stonechat	*Saxicola torquatus*
Ant-eating Chat	*Myrmecocichla formicivora*
Mountain Wheatear	*Myrmecocichla monticola*
Capped Wheatear	*Oenanthe pileata*
Old World Sparrows, Snowfinches (Passeridae)	
Cape Sparrow	*Passer melanurus*
Southern Grey-headed Sparrow	*Passer diffusus*
House Sparrow	*Passer domesticus*
Weavers, Widowbirds (Ploceidae)	
White-browed Sparrow-Weaver	*Plocepasser mahali*
Southern Masked Weaver	*Ploceus velatus*
Red-billed Quelea	*Quelea quelea*
Yellow-crowned Bishop	*Euplectes afer*
Southern Red Bishop	*Euplectes orix*
Yellow Bishop	*Euplectes capensis*
Fan-tailed Widowbird	*Euplectes axillaris*
White-winged Widowbird	*Euplectes albonotatus*
Long-tailed Widowbird	*Euplectes progne*
Waxbills, Munias & Allies (Estrildidae)	
Common Waxbill	*Estrilda astrild*
Quailfinch	*Ortygospiza atricollis*
Red-headed Finch	*Amadina erythrocephala*
Orange-breasted Waxbill	*Amandava subflava*
Indigobirds, Whydahs (Viduidae)	
Pin-tailed Whydah	*Vidua macroura*
Wagtails, Pipits (Motacillidae)	
Cape Wagtail	*Motacilla capensis*
Cape Longclaw	*Macronyx capensis*

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African Pipit	*Anthus cinnamomeus*
Nicholson's Pipit	*Anthus nicholsoni*
Finches, Euphonias (Fringillidae)	
Black-throated Canary	*Crithagra atrogularis*
Yellow-fronted Canary	*Crithagra mozambica*
Yellow Canary	*Crithagra flaviventris*
Streaky-headed Seedeater	*Crithagra gularis*
Cape Canary	*Serinus canicollis*
Buntings (Emberizidae)	
Lark-like Bunting	*Emberiza impetuani*
Cinnamon-breasted Bunting	*Emberiza tahapisi*
Species: 201	
IOC World Bird List 13.1 (January 2023)	

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Appendix 3. Bird species found on the PAOI during the survey period

Table 16. Bird species found during survey period

COMMON NAME	SCIENTIFIC NAME
Ostriches (Struthionidae)	
Ducks, Geese, Swans (Anatidae)	
Spur-winged Goose	*Plectropterus gambensis*
Cape Shoveler	*Spatula smithii*
Yellow-billed Duck	*Anas undulata*
Guineafowl (Numididae)	
Helmeted Guineafowl	*Numida meleagris*
Pheasants & Allies (Phasianidae)	
Grey-winged Francolin	*Scleroptila afra*
Common Quail	*Coturnix coturnix*
Swainson's Spurfowl	*Pternistis swainsonii*
Swifts (Apodidae)	
African Palm Swift	*Cypsiurus parvus*
Little Swift	*Apus affinis*
White-rumped Swift	*Apus caffer*
Bustards (Otididae)	
Blue Korhaan	*Eupodotis caerulescens*
Cuckoos (Cuculidae)	
Diederik Cuckoo	*Chrysococcyx caprius*
Pigeons, Doves (Columbidae)	
Speckled Pigeon	*Columba guinea*
Red-eyed Dove	*Streptopelia semitorquata*
Ring-necked Dove	*Streptopelia capicola*
Rails, Crakes & Coots (Rallidae)	
Corn Crake	*Crex crex*
Red-knobbed Coot	*Fulica cristata*
Grebes (Podicipedidae)	
Little Grebe	*Tachybaptus ruficollis*
Stone-curlews, Thick-knees (Burhinidae)	
Spotted Thick-knee	*Burhinus capensis*
Plovers (Charadriidae)	
Blacksmith Lapwing	*Vanellus armatus*
Crowned Lapwing	*Vanellus coronatus*

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African Wattled Lapwing	*Vanellus senegallus*
Three-banded Plover	*Charadrius tricollaris*
Sandpipers, Snipes (Scolopacidae)	
African Snipe	*Gallinago nigripennis*
Common Greenshank	*Tringa nebularia*
Anhingas, Darters (Anhingidae)	
African Darter	*Anhinga rufa*
Cormorants, Shags (Phalacrocoracidae)	
Reed Cormorant	*Microcarbo africanus*
Ibises, Spoonbills (Threskiornithidae)	
African Sacred Ibis	*Threskiornis aethiopicus*
Hadada Ibis	*Bostrychia hagedash*
Glossy Ibis	*Plegadis falcinellus*
Herons, Bitterns (Ardeidae)	
Western Cattle Egret	*Bubulcus ibis*
Grey Heron	*Ardea cinerea*
Black-headed Heron	*Ardea melanocephala*
Intermediate Egret	*Ardea intermedia*
Hamerkop (Scopidae)	
Hamerkop	*Scopus umbretta*
Secretarybird (Sagittariidae)	
Secretarybird	*Sagittarius serpentarius*
Kites, Hawks, Eagles (Accipitridae)	
Black-winged Kite	*Elanus caeruleus*
Yellow-billed Kite	*Milvus aegyptius*
Common Buzzard	*Buteo buteo*
Jackal Buzzard	*Buteo rufofuscus*
Barn Owls (Tytonidae)	
Western Barn Owl	*Tyto alba*
Owls (Strigidae)	
Marsh Owl	*Asio capensis*
Mousebirds (Coliidae)	
Red-faced Mousebird	*Urocolius indicus*
Caracaras, Falcons (Falconidae)	
Amur Falcon	*Falco amurensis*
Shrikes (Laniidae)	
Southern Fiscal	*Lanius collaris*
Crows, Jays (Corvidae)	
Cape Crow	*Corvus capensis*

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Larks (Alaudidae)	
Pink-billed Lark	*Spizocorys conirostris*
Red-capped Lark	*Calandrella cinerea*
Bulbuls (Pycnonotidae)	
Dark-capped Bulbul	*Pycnonotus tricolor*
Swallows, Martins (Hirundinidae)	
Brown-throated Martin	*Riparia paludicola*
White-throated Swallow	*Hirundo albigularis*
Barn Swallow	*Hirundo rustica*
Greater Striped Swallow	*Cecropis cucullata*
South African Cliff Swallow	*Petrochelidon spilodera*
Reed Warblers & Allies (Acrocephalidae)	
Common Reed Warbler	*Acrocephalus scirpaceus*
Cisticolas & Allies (Cisticolidae)	
Levaillant's Cisticola	*Cisticola tinniens*
Zitting Cisticola	*Cisticola juncidis*
Cloud Cisticola	*Cisticola textrix*
Pale-crowned Cisticola	*Cisticola cinnamomeus*
Wing-snapping Cisticola	*Cisticola ayresii*
Black-chested Prinia	*Prinia flavicans*
Starlings, Rhabdornises (Sturnidae)	
Wattled Starling	*Creatophora cinerea*
Cape Starling	*Lamprotornis nitens*
Pied Starling	*Lamprotornis bicolor*
Chats, Old World Flycatchers (Muscicapidae)	
Cape Robin-Chat	*Cossypha caffra*
African Stonechat	*Saxicola torquatus*
Old World Sparrows, Snowfinches (Passeridae)	
Cape Sparrow	*Passer melanurus*
Southern Grey-headed Sparrow	*Passer diffusus*
Weavers, Widowbirds (Ploceidae)	
Southern Masked Weaver	*Ploceus velatus*
Red-billed Quelea	*Quelea quelea*
Yellow-crowned Bishop	*Euplectes afer*
Southern Red Bishop	*Euplectes orix*
Fan-tailed Widowbird	*Euplectes axillaris*
White-winged Widowbird	*Euplectes albonotatus*
Long-tailed Widowbird	*Euplectes progne*

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Waxbills, Munias & Allies (Estrildidae)	
Common Waxbill	*Estrilda astrild*
Quailfinch	*Ortygospiza atricollis*
Indigobirds, Whydahs (Viduidae)	
Pin-tailed Whydah	*Vidua macroura*
Wagtails, Pipits (Motacillidae)	
Cape Wagtail	*Motacilla capensis*
Cape Longclaw	*Macronyx capensis*
African Pipit	*Anthus cinnamomeus*

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Appendix 4. CV of Specialist

Personal details

Full Name	John Low de Vries
DOB	7 November 1984
Nationality	South African
Marital Status	Married
Email	low@volantenvironmental.com
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ID number	841107 5188087

Education

Completed	Degree and Institution
2002	Matric, Hoërskool Jeugland, Kempton Park, South Africa
2006	B. Sc Zoology, University of Pretoria, Pretoria, South Africa
2007	B. Sc (Hons) Zoology, University of Pretoria, Pretoria, South Africa
2014	PhD Zoology, University of Pretoria, Pretoria, South Africa

Key areas of expertise

- Bat Specialist — Conducting surveys on bat diversity and abundance and researh on bat ecology.
- Environmental Assessment Practitioner — Writing and collating Basic Assessment (BA) for proposed Wind Energy Facilities

Memberships & Certificates

- SACNASP Registered Professional Natural Scientist in the field of Zoological Science - Registration Number: 124178
- Bat Assessment Specialist with South African Bat Assessment Association (SABAA)

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Other Training

- Multivariate statistical modelling (Cape Town, South Africa)
- Bat handling and identification course (AfricanBats)
- Snake handling (Chameleon Village (South Africa)
-
- ArcGis online course
- First Aid level 2 (Johannesburg, South Africa)

Publications

Wood, M., de Vries, JL., Monadjem, A., Markotter, W. A critical review of factors influencing interspecific variation in home range size of bats. Mammal Review. *In submission*

Markotter W, de Vries, J.L, Paweska, J. 2022. Wing tattoos: A cost-effective and permanent method for marking bats. *In review*

Geldenhuys, M., de Vries, JL., Dietrich, M., Mortlock, M., Epstein, J. H., Weyer, J., Paweska, J T., Markotter, W. Longitudinal surveillance of diverse coronaviruses within a *Rousettus aegyptiacus* maternal colony towards understanding viral maintenance and excretion dynamics. *In submission*

Markotter, W., Coertse, J., de Vries, JL., Geldenhuys, M., Mortlock, M. 2020. Bat-borne viruses in Africa: A critical review. Journal of Zoology. 311:2. 77-98

de Vries JL, Marneweck D, Dalerum F, Page-Nicholson S, Mills MGL, Yarnell RW, Sliwa A, Do Linh San E. 2016. A conservation assessment of *Proteles cristata*. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

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Dalerum F, Le Roux A, de Vries JL, Kamler JF, Page-Nicholson S, Stuart C, Stuart M, Wilson B, Do Linh San E. 2016. A conservation assessment of *Otocyon megalotis*. In Child MF, Roxburgh L, Do Linh San E, Raimondo D, Davies-Mostert HT, editors. The Red List of Mammals of South Africa, Swaziland and Lesotho. South African National Biodiversity Institute and Endangered Wildlife Trust, South Africa.

Dalerum, F., de Vries, J.L., Pirk, C.W.W., Cameron, E.Z. 2016. Spatial and temporal dimensions to the taxonomic diversity of arthropods in an arid grassland savannah. *Journal of Arid Environments*. 144. 21-30

Kotze, R., Bennett, N., Cameron, E.Z., de Vries, J.L., Marneweck, D.G., Pirk, C.W.W., Dalerum, F. 2012. Temporal patterns of den use suggest polygamous mating patterns in an obligate monogamous mammal. *Animal Behaviour*. 84. 1573-1578

de Vries, J.L., Pirk, C.W.W., Bateman, P.W., Cameron, E.Z., Dalerum, F. 2011. Extension of the diet of an extreme foraging specialist, the aardwolf (*Proteles cristata*). *African Zoology*. 6:1 194-196.

de Vries, J. L., Oosthuizen, M. K., Sichilima, A. M., Bennett, N. C. 2008. Circadian rhythms of locomotor activity in Ansell's mole-rat: are mole-rat's clocks ticking? *Journal of Zoology*.
276:4. 343-349

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Conference Contributions

Markotter W, **de Vries, J.L,** Wood, M. 2022. Small scale movement of *Rousettus aegyptiacus*. International Bat Research Conference. Austin, Texas

Infectious Diseases of Bats Symposium. Fort Collins, Colorado 2017. Body mass index of the Egyptian fruit bat, *Rousettus aegyptiacus*: An indicator of infection status. **de Vries, J.L**., Dietrich, M., Paweska, J., Markotter, W.

SASAS 2016. **de Vries, J.L.,** Jonker, M.L., Kriel, D., Kotze, A.K. The Tankwa goat: Phenotypically that different?

De Beers Diamond Route Conference, 2010. **de Vries, J.L.,** Pirk, C.W.W., Bennett, N.C. Is the aardwolf a seasonally influenced optimal forager?

Kimberley biodiversity research symposium, 2009. **de Vries, J.L.,** Bennett, N.C., Pirk, C.W.W., Dalerum, F., Cameron, E.Z. Den and home range use of the aardwolf, *Proteles cristatus*

Employment & work-related experiences

2020 - present	Director and founder of Volant Environmental
2016 - present	Postdoctoral fellow, University of Pretoria
2015 - 2016	Postdoctoral fellow, NZG
2014 - 2015	Marion Island field assistant, University of Pretoria
2013	Documentary presenter, Oxford Scientific Films
2010 - 2011	Wildlife Education Trainer, Enviro- Insight
2010 - 2011	Game Raning Lecturer, Damelin Centurion
2009 - 2018	Lecturer and tutor, University of Pretoria

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Recent Project Experience

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Time span	Nature of project	Capacity	Industry / Sector	Client / Developer	Country (Province)
2022	Thand Tau Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Free State)
2022	Camden Bird Impact Assessment	Bird Specialist	Renewable Energy / Onshore Wind	EDF Renewables	South Africa (Mpumalanga)
2022	Castle Wind Energy walkthrough	Bat Specialist	Renewable Energy / Onshore Wind	Savannah Environmental	South Africa (Northern Cape)
2022	Doringbaai Wind Energy Facility	Bat Specialist	Renewable Energy / Onshore Wind	WKN-Windcurrent	South Africa (Western Cape)
2022	Aggeneys Bat Impact Assessment Review	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Northern Cape)
2021	Dordrecht Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Indwe Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Waschbank Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	ACED (Pty) Ltd	South Africa (Eastern Cape)
2021	Gorachouqua Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Northern Cape)
2021	Khoemana Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Northern Cape)
2021-2022	Dalmanutha Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Enertrag SA (Pty) Ltd	South Africa (Mpumalanga)

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2020-2021	Bergrivier Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Western Cape)
2020-2021	Botterblom Bat Impact Assessment	Bat Specialist	Renewable Energy / Onshore Wind	Genesis Eco-Energy Developments (Pty) Ltd	South Africa (Northern Cape)
2012	Dangerous snake removal	Herpetologist	Mining (Coal)	Anadarko	Mocimboa da Paia, Mozambique

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