JUNE 2023

200MW LION THORN PHOTOVOLTAIC SOLAR ENERGY FACILITY & ELECTRICAL GRID INFRASTRUCTURE PROJECT

DESKTOP AVIFAUNAL SCREENING ASSESSMENT

DRAFTED BY:
MEGAN DIAMOND
FEATHERS ENVIRONMENTAL SERVICES
P.O. BOX 786962
SANDTON, 2146
MEGAN@FEATHERSENV.CO.ZA

PREPARED FOR:
SIVEST SA (PTY) LTD
PO BOX 1899
UMHLANGA ROCKS, 1685

PROFESSIONAL EXPERIENCE

Ms. Megan Diamond completed a Bachelor of Science degree in Environmental Management from the University of South Africa and has been involved in conservation for 20 years. She has 17 years' worth of experience in the field of bird interactions with electrical infrastructure and during this time has completed impact assessments for over 160 projects. During her tenure at the Endangered Wildlife Trust's Wildlife & Energy Programme and the Programme's primary project (i.e. the Eskom-EWT Strategic Partnership) from 2006 to 2013, Megan was responsible for assisting the energy industry and the national utility in minimising the negative impacts, associated with the construction and operation of electrical infrastructure, on wildlife through the provision of strategic guidance, risk and impact assessments, training and research. Megan (SACNASP Environmental Science Registration number 300022/14) currently owns and manages *Feathers Environmental Services* and is tasked with providing guidance to industry through the development of best practice procedures and avifaunal specialist studies for various developments including renewable energy facilities, power lines, power stations and substation infrastructure in addition to railway infrastructure and residential developments within South Africa and elsewhere within Africa. Megan has attended and presented at several conferences and facilitated workshops, as a subject expert, since 2007. Megan has authored and co-authored several academic papers, research reports and energy industry related guidelines, including the *BirdLife South Africa/ Endangered Wildlife Trust best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa* and the *Avian Wind Farm Sensitivity Map for South Africa* (2015), and played an instrumental role in facilitating the endorsement of these two products by the South African Wind Energy Association (SAWEA), IAIAsa (International Association for Impact Assessment South Africa) and Eskom. She chaired the Birds and Wind Energy Specialist Group in South Africa (2011/2012) and the IUCN/SSC Crane Specialist Group's Crane and Power line Network (2013-2015), a working group comprised of subject matter experts from across the world, working in partnership to share lessons, develop capacity, pool resources, and accelerate collective learning towards finding innovative solutions to mitigate this impact on threatened crane populations. She is currently a member of the IUCN Stork, Ibis and Spoonbill Specialist Group and the Eskom-EWT Strategic Partnership Ludwig's Bustard Working Group.

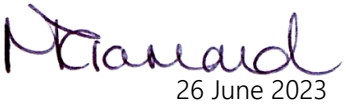
DECLARATION OF INDEPENDENCE

I, Megan Diamond, in my capacity as a specialist consultant, hereby declare that I:

- Act as an independent specialist to *SiVEST SA (Pty) Ltd* for this project.
- Do not have any personal or financial interest in the project except for financial compensation for specialist investigations completed in a professional capacity as specified by the Amendment to Environmental Impact Assessment Regulations, 2017.
- Will not be affected by the outcome of the environmental process, of which this report forms part of.
- Do not have any influence over the decisions made by the governing authorities.
- Do not object to or endorse the proposed development, but aim to present facts and our best scientific and professional opinion with regard to the impacts of the development.
- Undertake to disclose to the relevant authorities any information that has or may have the potential to influence its decision or the objectivity of any report, plan, or document required in terms of the Amendment to Environmental Impact Assessment Regulations, 2017.

INDEMNITY

- This screening report is based on a desktop investigation using the available information and data related to the site to be affected. No site verification survey or monitoring has been conducted.
- The Precautionary Principle has been applied throughout this screening assessment.
- The findings, results, conclusions and recommendations given in this screening report are based on the author's best scientific and professional knowledge as well as available information at the time of this screening assessment.
- Additional information may become known or available during a later stage of the process for which no allowance could have been made at the time of this screening report.
- The specialist investigator reserves the right to modify this screening report, recommendations and conclusions at any stage should additional information become available.
- Information, recommendations and conclusions in this screening report cannot be applied to any other area without proper investigation.
- This screening report, in its entirety or any portion thereof, may not be altered in any manner or form or for any purpose without the specific and written consent of the specialist investigator as specified above.
- Acceptance of this screening report, in any physical or digital form, serves to confirm acknowledgment of these terms and liabilities.



26 June 2023

EXECUTIVE SUMMARY

In order to demonstrate commitment to sustainable development and a pledge to move towards a cleaner energy future Upgrade Energy Africa (Pty) Ltd proposes the construction and operation of a 200MW photovoltaic Solar Energy Facility (SEF). The proposed SEF will alleviate existing capacity constraints and support future electricity demands. The proposed SEF is situated on land parcel T95338/1996 Lion Thorn, situated approximately 9km east of Leeudoringstad, in the Maquassi Hills Local Municipality within the North West Province. The project site that has been earmarked for the proposed SEF is approximately 324ha in extent.

A total of 163 bird species have been recorded within the relevant pentads during the South African Bird Atlas Project 2 atlassing period to date. The presence of these species in the broader area provides an indication of the diversity of species that could potentially occur within the areas earmarked for the proposed development area, particularly where pockets of natural vegetation/habitats persist. Of the 163 species, four of these are considered to be of regional conservation concern. Fifty-two species are designated priority species.

Vegetation is one of the primary factors determining bird species distribution and abundance in an area. It is widely accepted within ornithological circles that vegetation structure is more important in determining which bird species will occur there. Whilst much of the distribution and abundance of bird species can be attributed to the broad vegetation types present in an area, it is the smaller spatial scale habitats (micro habitats) that support the requirements of a particular bird species that need to be examined in greater detail. Micro habitats are shaped by factors other than vegetation, such as topography, land use, food availability, and various anthropogenic factors all of which will either attract or deter birds and are critically important in mapping the site in terms of avifaunal sensitivity and ultimately informing mitigation requirements. This desktop investigation revealed at least six broadly described avifaunal micro habitats i.e. rivers/drainage lines, waterbodies, wetlands, grassland, exotic/alien tree stands and high voltage power lines.

In accordance with the minimum report requirements listed in the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species (Government Gazette No 43855, 30 October 2020), a screening report for the proposed study area was generated on 7 June 2023. Parts of the proposed study area are considered to have a HIGH Avian Theme Sensitivity, as a result of the site being within 20km of a vulture restaurant and a MEDIUM Animal Species Theme Sensitivity as a result of the potential presence of Secretarybird *Sagittarius serpentarius*.

The Inkhoek Vulture Restaurant, located on the farm Inkbospan, is no longer operational (pers comms. Kerri Wolter, June 2023). The HIGH Avian Theme Sensitivity is therefore refuted. A single Secretarybird was recorded in the broader nine-pentad assessment area in 2016. Secretarybird was not recorded during the seasonal avifaunal monitoring conducted at the 9.9MW Leeuwbosch 1 Photovoltaic SEF, the 9.9MW Leeuwbosch 2

Photovoltaic SEF (van Rooyen et al, 2021) and the 15MW Leeuwbosch 3 Photovoltaic SEF (van Rooyen et al 2022). In addition, recent surveys pertaining to the Leeudoringstad 132kV power line grid connection, did not yield Secretarybird observations (Diamond, 2022). However, the species was recorded during a survey conducted in August 2022 at the 9.9MW Wildebeestkuil 1 Photovoltaic SEF and the 9.9MW Wildebeestkuil 2 Photovoltaic SEF. This observation coupled with the availability of suitable habitat, confirms the MEDIUM sensitivity rating. This rating will be verified further during the EIA phase of the project, following a site verification and seasonal surveys to the proposed development area and broader PAOI.

SCREENING TOOL SENSITIVITY	VERIFIED SENSITIVITY	OUTCOME STATEMENT/PLAN OF STUDY	RELEVANT SECTION MOTIVATING VERIFICATION
AVIFAUNAL SCREENING ASSESSMENT			
High	Medium	EIA Phase – Site Survey and Avifaunal Impact Assessment	Section 8 & 9
Medium	Medium	EIA Phase – Site Survey and Avifaunal Impact Assessment	Section 8 & 9

The effects of any development on birds are highly variable and depend on a wide range of factors including the specification of the development, the topography of the surrounding land, the habitats affected and the number and diversity of species present. The principal areas of concern for SCC and non-SCC priority species related to the proposed development are listed below:

* Displacement due to habitat loss in the physical *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project* footprint;
* Displacement due to disturbance associated with establishment, construction, operation/maintenance and decommissioning of the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project*;
* Mortality due to collisions with the PV panels (impact trauma); and
* Entrapment and entanglement in perimeter fencing

The aforementioned impacts will be described and assessed in detail, following the site verification and seasonal surveys to the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project* development area and PAOI during the EIA phase of the project process.

A single land portion is being considered for the establishment of the *200MW Lion Thorn Photovoltaic Solar Energy Facility*. A preferred layout for the SEF will be determined based on the avoidance of the avifaunal sensitivities delineated as part of this screening/scoping phase (FIGURE 4) as well as those sensitivities identified, following the detailed assessment of the primary data collected during the seasonal site surveys during the EIA phase of the project.

In conclusion, this high-level desktop assessment has identified at least six avifaunal habitats of varying sensitivities within the proposed development area and PAOI. Despite anthropogenic impacts, mostly in the

form of pastoral practices, sensitive habitat persists within the study area (FIGURE 4). The establishment and operation of the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project* will likely result in impacts of medium significance, which may be reduced through the application of stringent mitigation measures.

In order to ensure the sustainable development of the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project* further, specialist avifaunal impact assessment studies must be conducted as part of the EIA process in order to:

* Confirm avifaunal microhabitats within the proposed development area and assess these for their suitability to support SCC and non-SCC priority species, in terms of breeding, roosting and foraging;
* Describe the avifaunal communities (both SCC and non-SCC priority species) most likely to be impacted, based on data collected as part of a systematic and quantified data collection process. Primary data will be collected during two seasonal surveys within a six month period:

    a. Sample counts of small terrestrial species

    Small terrestrial birds are an important component of this programme. Given the spatial scale of the development, these smaller species may be particularly vulnerable to displacement and habitat level effects. Sampling these species is aimed at establishing indices of abundance for small terrestrial birds in the study area. These counts should be done when conditions are optimal. In this case this means the times when birds are most active and vocal, i.e. early mornings. A minimum of 12 point count survey points will be established across the PAOI.

    b. Counts of large terrestrial species and raptors

    This is a very similar data collection technique to that above, the aim being to establish indices of abundance for large terrestrial species and raptors. These species are relatively easily detected from a vehicle, hence vehicle-based counts are conducted in order to determine the presence and number of birds of relevant species in the study area. Detection of these large species is less dependent on their activity levels and calls, so these counts can be done later in the day. A minimum of one driven transect route will be established and conducted during the site survey.

    c. Focal site surveys and monitoring

    Any particularly sensitive sites such as wetlands, waterbodies and breeding sites will be identified and monitored during the site survey.

    d. Incidental observations

All other incidental sightings of SCC and non-SCC priority species (and particularly those suggestive of breeding or important feeding or roosting sites) within the PAOI will be georeferenced and documented.

* Provide a detailed description of the impacts associated with the construction, operation and decommissioning of the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project*;
* Assess the significance (rated according to a pre-determined set of criteria, as supplied by the primary consultant) of the identified direct, indirect and cumulative impacts, during the construction, operation and decommissioning phases of the proposed development based on data collected in-field;
* Consider layout plans and advise possible changes to the layout;
* Recommend practical mitigation measures for the management of the identified impacts, at each stage of the development process, for inclusion in the draft Environmental Management Programme (EMPr);
* Propose a monitoring programme for the sensitive areas, species or receptors (if necessary); and
* Describe the gaps in baseline data will be provided. An indication of the confidence levels will be given. The best available data sources will be used to predict the impacts, and extensive use will be made of local knowledge if available.

TABLE OF CONTENTS

1. INTRODUCTION

South Africa's Renewable Energy potential is significant and together with a national commitment to transition to a low carbon economy, 26 030 megawatt (MW) of the 2019 Integrated Resources Plan target of newly generated power are expected to be from renewable energy sources (https://ipp-projects.co.za). The Renewable Energy Independent Power Producer (REIPP) Procurement Programme was established to stimulate the renewable industry by contributing to the 26 030MW target and to ensure socio-economic and environmentally sustainable growth within South Africa. In order to demonstrate commitment to sustainable development and a pledge to move towards a cleaner energy future Upgrade Energy Africa (Pty) Ltd (hereafter referred to as *Upgrade Energy*) proposes the construction and operation of a 200MW photovoltaic Solar Energy Facility (SEF). The proposed SEF will alleviate existing capacity constraints and support future electricity demands.

The National Environmental Management Act (NEMA) (Act 107 of 1998) requires that an impact assessment be conducted for any development which could have a significant effect on the environment, with the objective to identify, predict and evaluate the actual and potential impacts of these activities on ecological systems; identify alternatives; and provide recommendations for mitigation to minimize the negative impacts. In order to meet the Scoping and Environmental Impact Reporting (S&EIR) requirements as outlined in the 2014 National Environmental Management Act (No 107 of 1998) Regulations GNR 983, GNR 984 and GNR 985, as amended in 2017, *Upgrade Energy* require detailed specialist studies that will document any potential fatal flaws, the impacts of the project and recommend measures to manage (maximise positive and minimise negative) and monitor those impacts. *Upgrade Energy* has appointed SiVEST SA (Pty) Ltd (hereinafter referred to as *SiVEST*) as independent environmental assessment practitioners to manage the S&EIR for the SEF including related infrastructure and the Basic Assessment (BA)/Registration process for the Electrical Grid Infrastructure (EGI) which mainly comprises an extension of the Independent Power Producer (IPP) substation, Lion Thorn Switching Substation (SS) and underground 33kV cables for the grid connection including associated infrastructure.

2. PROJECT LOCATION

Upgrade Energy intends to develop the *200MW Lion Thorn Photovoltaic Solar Energy Facility* on land parcel T95338/1996 Lion Thorn, situated approximately 9km east of Leeudoringstad, in the Maquassi Hills Local Municipality within the North West Province (FIGURE 1).

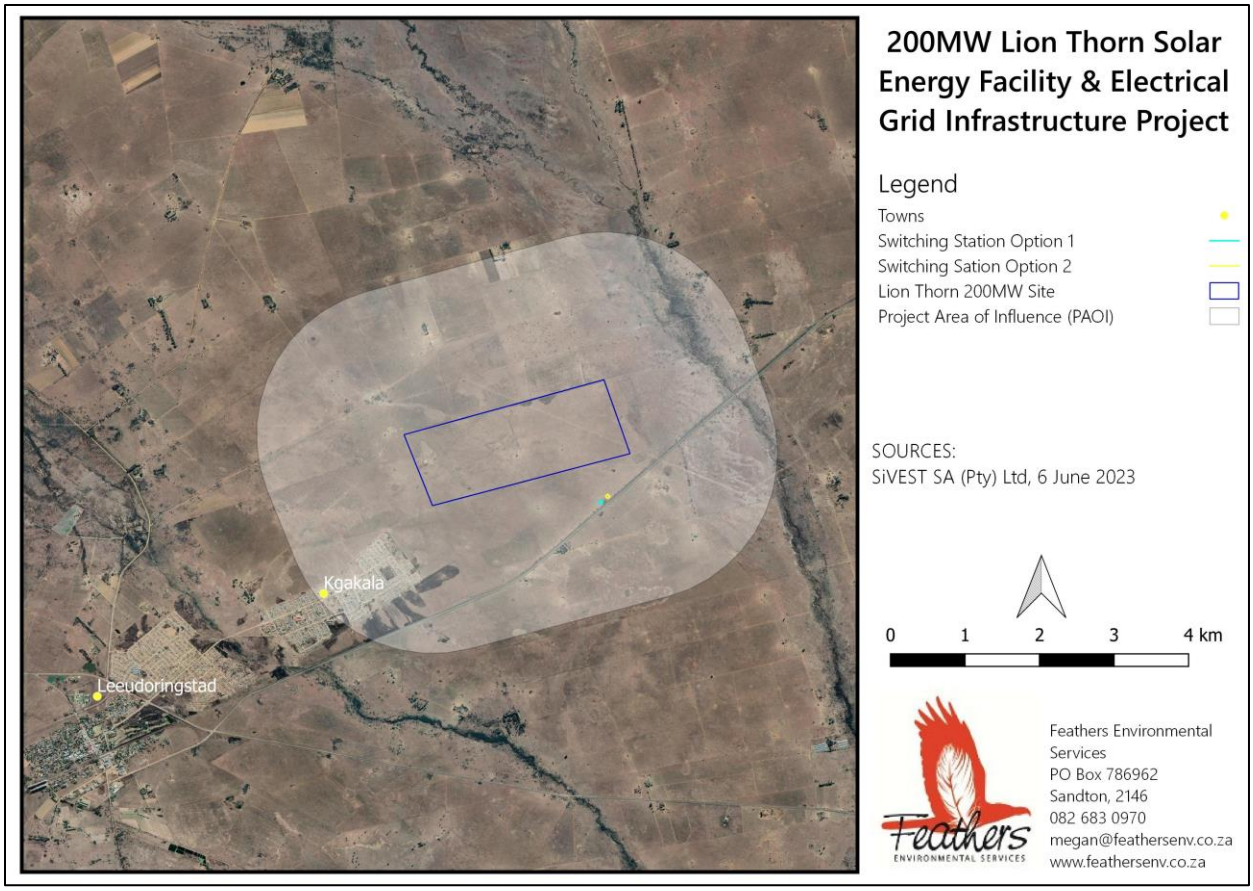


FIGURE 1: Regional map detailing the location of the proposed 200MW Lion Thorn Solar Energy Facility and Electrical Grid Infrastructure Project located within the Maquassi Hills Local Municipality, North West Province

3. PROJECT DESCRIPTION

The total *200MW Lion Thorn Photovoltaic Solar Energy Facility* development footprint is approximately 324ha (including on-site supporting infrastructure, but excluding underground cables). The key infrastructure components associated with the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project* consists of the following:

Solar Energy Facility

- Approximate combined capacity: 200 MWac
- Approximate properties affected/ Site extent: 324ha
- Associated infrastructure includes:
    - Solar PV panels;
    - Substation complex, 33/ 132 kilovolts (kV) Lion Thorn Substation, Security; Operation and Maintenance (O&M)/ office buildings;

- Battery Energy Storage Systems (BESS) of 4.5GWh, which could be either lithium-ion or redox flow technology, etc.; and
- Underground electrical reticulation (33 kV)

Electrical Grid Infrastructure

* Lion Thorn Substation:
  - The proposed development of a 33/ 132kV Substation, including associated infrastructure at the Substation.
* Underground Cables:
  - The proposed installation of 33kV cables from the solar facility to the extended IPP Substation and Lion Thorn Substation, a 15.5m corridor on either side of the line will be assessed.

4. THIS REPORT

4.1 Scope of Work

*Feathers Environmental Services CC (*hereafter referred to as *Feathers)* was appointed by *SiVEST* to compile an avifaunal desktop screening assessment for this first (scoping) phase of the EIA process. This report is based on a desktop review of various data sets to determine which avian species are likely to regularly occur within the proposed study area, the availability of bird micro habitats (i.e. avifaunal sensitive areas), a preliminary assessment of the possible impacts of the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project*.

4.2 Terms of Reference

Feathers has conducted this screening assessment according to the following terms of reference:

* Identify avifaunal microhabitats within the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure* development area most likely to support avifaunal communities, in terms of breeding, roosting and foraging;
* Describe the avifaunal communities most likely to impacted on by the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure* development;
* Provide a desktop verification of the site sensitivity assigned to the proposed development area by the Department of Forestry, Fisheries and the Environment (DFFE) National Screening Tool;
* Identify potentially significant avifaunal impacts associated with the establishment, operation and decommissioning of the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure*;

- Identify areas of avifaunal sensitivity where development must be avoided;
- Detail the methodology to be adopted during the EIA phase that will enable the collection of primary avifaunal and habitat data to assess the significance of the impacts associated with the *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure* development.

4.3 Structure of this report

In terms of the NEMA 2014 EIA Regulations contained in GN R982 of 04 December 2014 (as amended) all specialist studies must comply with Appendix 6 of the NEMA 2014 EIA Regulations GN R982 of 04 December 2014 (TABLE 1) and in accordance with the Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species (Government Gazette No 43855, 30 October 2020) (TABLE 2).

TABLE 1: Information to be included in specialist reports

Legal Requirement		Relevant Section in Specialist study
(1)	A specialist report prepared in terms of these Regulations must contain-	
(a)	details of-	
	(i) the specialist who prepared the report; and	Professional Experience and Appendix 2
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Professional Experience and Appendix 2
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Declaration of Independence
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 4
(cA)	an indication of the quality and age of base data used for the specialist report;	Section 5
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 8
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Not Applicable
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 5
(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;	Section 8,9,10
(g)	an identification of any areas to be avoided, including buffers;	Section 11
(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;	Section 11

Legal Requirement		Relevant Section in Specialist study
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 13
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 8, 9 and 11
(k)	any mitigation measures for inclusion in the EMPr;	Not Applicable
(l)	any conditions for inclusion in the environmental authorisation;	Not Applicable
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 12
(n)	a reasoned opinion	Section 12
	whether the proposed activity, activities or portions thereof should be authorised;	Section 12
	regarding the acceptability of the proposed activity or activities; and	Section 12
	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;	Section 12
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 8
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not Applicable
(q)	any other information requested by the competent authority.	Not Applicable
(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.	Table 2, Section 5, 6, 7, 8, 9, 10 and 11

TABLE 2: Minimum report requirements listed in the protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species (Government Gazette No 43855, 30 October 2020)

HIGH SENSITIVITY RATING FOR TERRESTRIAL ANIMAL SPECIES	
SITE SENSITIVITY VERIFICATION	
The site sensitivity verification must be undertaken by an environmental assessment practitioner or specialist.	Professional Experience and Appendix 2
The site sensitivity verification must be undertaken through the use of: (a) a desk top analysis, using satellite imagery; (b) a preliminary on-site inspection; and (c) any other available and relevant information.	Section 9
The outcome of the site sensitivity verification must be recorded in the form of a report that: (a) confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.; (b) contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and	Section 9

(c) is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations	
SPECIALIST ASSESSMENT & MINIMUM REPORT CONTENT REQUIREMENTS	
Contact details and relevant experience as well as the SACNASP Registration number of the specialist preparing the assessment including a curriculum vitae;	Professional Experience and Appendix 2
A signed statement of independence by the specialist;	Declaration of Independence
A statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;	Section 5
A description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant;	Section 5
A description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	Not Applicable
A description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 13
details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	Section 8
the online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the PAOI;	Not Applicable
The location of areas not suitable for development and to be avoided during construction where relevant;	Section 11
a discussion on the cumulative impacts;	Not Applicable
Impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);	Not Applicable
A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and	Section 12
A motivation must be provided if there were any development footprints identified as per paragraph 2.2.12 above that were identified as having "low" or "medium" terrestrial animal species sensitivity and were not considered. appropriate.	Not Applicable

5. APPROACH AND METHODOLOGY

5.1 Methodology

The following methods were employed to compile this desktop screening assessment report:

* The focus of this desktop screening assessment is primarily on the potential impacts of the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure* on priority species. Priority species are defined as those species which could potentially be impacted by displacement

through habitat transformation and/or disturbance as well as those impacts associated with the ancillary infrastructure i.e. power lines based on specific morphological and/or behavioural characteristics. These include both Species of Conservation Concern (SCC) as defined by the *Species Environmental Assessment Guideline: Guidelines for the implementation of the Terrestrial Fauna and Terrestrial Flora Species Protocols for environmental impact assessments in South Africa (2020)* i.e. those species listed on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species or South Africa's National Red List website as Critically Endangered, Endangered, Vulnerable, Near Threatened and Data Deficient, as well as certain other impact susceptible species.

* By virtue of their mobility, the identification of bird presence and abundance cannot be confined to the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure* development area, therefore the Project Area of Influence (PAOI) is defined as a 2km zone around the proposed development area. Avifaunal sensitivity has been defined for this PAOI.
* The proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project* is located within a single South African Bird Atlas Project 2 (SABAP2) pentad grid cell (2710_2615), however a larger area is necessary to obtain a dataset that is large enough (encompassing nine pentad grid cells) to ensure that reasonable conclusions about species diversity and densities, in a particular habitat type, can be drawn. A total of 27 full protocol lists and 22 ad hoc protocol lists have been completed. The SABAP2 data is regarded as a reliable reflection of the avifauna which could potentially occur in the PAOI. The relevant pentads within the study area include: 2615_2955; 2615_3000; 2615_3005; 2620_2955; 2620_3000; 2620_3005; 2625_2955; 2625_3000 and 2625_3005 (FIGURE 2).

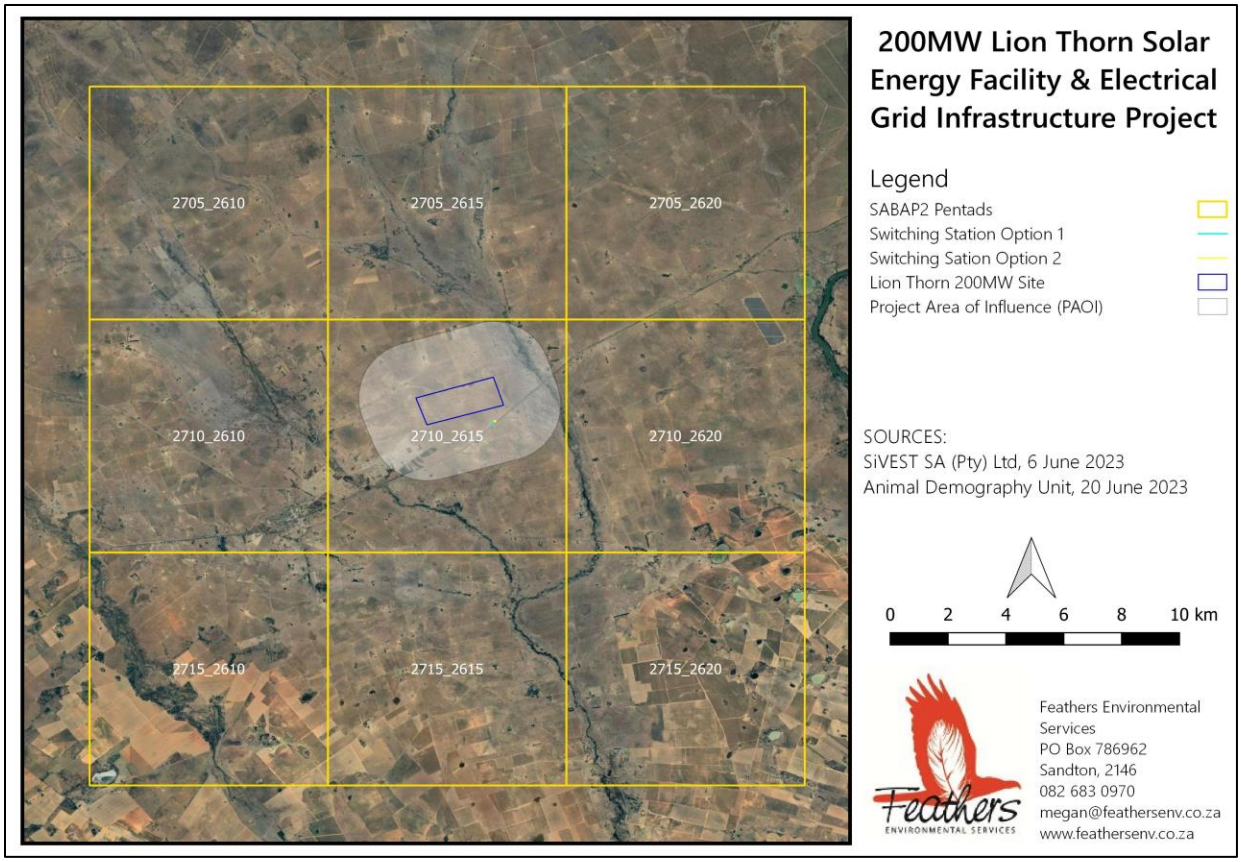


FIGURE 2: Location of the four South African Bird Atlas Project 2 (SABAP2) pentad grid cells that were considered for the 200MW Lion Thorn Solar Energy Facility and Electrical Grid Infrastructure Project

5.2 Data Sources

The following data sources (features) were considered in varying levels of detail for this desktop screening assessment:

* Screening Report for an Environmental Authorisation or for an Environmental Authorisation as required by the 2014 EIA Regulations - Proposed Site Environmental Sensitivity: Lion Thorn Solar PV Facility compiled by *SiVEST*, 7 June 2023;
* Screening Report for an Environmental Authorisation or for an Environmental Authorisation as required by the 2014 EIA Regulations - Proposed Site Environmental Sensitivity: Switching Station Option 1_Lion Thorn Solar PV Facility compiled by *SiVEST*, 7 June 2023;
* Screening Report for an Environmental Authorisation or for an Environmental Authorisation as required by the 2014 EIA Regulations - Proposed Site Environmental Sensitivity: Switching Station Option 2_Lion Thorn Solar PV Facility compiled by *SiVEST*, 7 June 2023;
* Bird distribution data of the South African Bird Atlas 2 (SABAP 2) (Animal Demography Unit, 20 June 2023);
* The Important Bird Areas (IBAs) report (Marnewick et al. 2015);
* Co-ordinated Waterbird Count Database (CWAC – Taylor et al. 1999);

* Coordinated Avifaunal Roadcount project database (CAR – Young et al, 2003);
* The global and regional conservation status and endemism information of all bird species (Taylor et al. 2015) and the latest (2022-1) IUCN Red List of Threatened Species (http://www.iucnredlist.org);
* Vulture colony and roost data for the PAOI (VulPro, 2020);
* Vulture restaurant location data for the PAOI (VulPro, 2020);
* African Grass Owl *Tyto capensis* breeding location data for the PAOI (Endangered Wildlife Trust, 2023)
* Hooded Vulture *Necrosyrtes monachus* breeding location data for the PAOI (Endangered Wildlife Trust, 2023)
* The latest vegetation classification described in the Vegetation Map of South Africa (South African National Biodiversity Institute, 2012 and Mucina & Rutherford, 2006);
* High-resolution Google Earth ©2023 imagery was used to examine the microhabitats within the proposed study area;
* KMZ. shapefile detailing the location of proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project*, provided by *SiVEST* on 6 June 2023;

6. APPLICABLE LEGISLATION, POLICIES AND GUIDELINES

The following pieces of legislation are applicable to this assessment:

6.1 Agreements and Conventions

South Africa is party to various agreements and conventions (TABLE 3) which are relevant to the conservation of avifauna (BirdLife International, 2022).

TABLE 3: Agreements and conventions which South Africa is party to and which is relevant to the conservation of avifauna.

Convention Name	Description	Geographic Scope
African-Eurasian Waterbird Agreement (AEWA)	The Agreement on the Conservation of African-Eurasian Migratory Water birds (AEWA) is an intergovernmental treaty dedicated to the conservation of migratory waterbirds and their habitats across Africa, Europe, the Middle East, Central Asia, Greenland and the Canadian Archipelago. The AEWA covers 255 species of birds ecologically dependent on wetlands for at least part of their annual cycle, including many species of divers, grebes, pelicans, cormorants, herons, storks, rails, ibises, spoonbills, flamingos, ducks, swans, geese, cranes, waders, gulls, terns, tropic birds, auks, frigate birds and even the South African penguin. The core activities carried out under AEWA are described in its Action Plan, which is legally binding for all countries that have joined the Agreement. The AEWA Action Plan details the various measures to be undertaken by Contracting Parties to guarantee the conservation of migratory waterbirds within their national boundaries. These include species and habitat protection, and the management of human activities, as well as legal and emergency measures.	Regional

Convention on Biological Diversity (CBD), Nairobi, 1992	The CBD represents a commitment to sustainable development. The Convention has three main objectives: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources. The convention makes provision (in a general policy guideline) for keeping and restoring biodiversity. In addition to this the CBD is an ardent supporter of thorough assessment procedures (Strategic Environmental Assessments (SEAs) and Environmental Impact Assessments (EIAs)) and requires that Parties apply these processes when planning activities that will have a biodiversity impact. An important principle encompassed by the CBD is the precautionary principle which essentially states that where serious threats to the environment exist, lack of full scientific certainty should not be used as a reason for delaying management of these risks. The burden of proof that the impact will *not* occur lies with the proponent of the activity posing the threat. In addition, the Aichi Biodiversity Targets (CBD 2011) address several priority issues i.e. the loss of biodiversity and its causes; reducing direct pressure on biodiversity; safeguarding ecosystems, species and genetic diversity and participatory planning to enhance implementation of biodiversity conservation. Each of these is relevant to a project of this nature and bird conservation through all project phases from planning to the implementation of mitigation measures for all developments.	Global
Convention on the Conservation of Migratory Species of Wild Animals, (CMS), Bonn, 1979	The most appropriate instrument to deal with the conservation of terrestrial, aquatic and avian migratory species. The convention includes policy and guidelines with regards to the impacts associated with man-made infrastructure. CMS requires that Parties take measures to avoid migratory species from becoming endangered (Art II, par. 1 and 2) and to make every effort to prevent the adverse effects of activities and obstacles that seriously impede or prevent the migration of migratory species (Art III, par. 4b and 4c). At CMS/CoP7 (2002) Res. 7.2 on Impact Assessment and Migratory Species was accepted, requesting Parties to apply appropriate SEA and EIA procedures for all proposed developments. An agreement developed in the framework of CMS, in force since November 1999, brings the 119 Range States of the Africa Eurasian Waterbird Agreement (AEWA) region together in a common policy to protect migratory waterbirds that use the flyway from the Arctic to southern Africa. The agreement contains a number of obligations that are relevant to migratory waterbirds and infrastructure development.	Global
Convention on the International Trade in Endangered Species of Wild Flora and Fauna, (CITES), Washington DC, 1973	CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.	Global
Ramsar Convention on Wetlands of International Importance, Ramsar, 1971	The Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.	Global
Memorandum of Understanding on the Conservation of Migratory Birds of Prey in Africa and Eurasia	The Signatories will aim to take coordinated measures to achieve and maintain the favourable conservation status of birds of prey throughout their range and to reverse their decline when and where appropriate.	Regional

6.2 National & Provincial Legislation

The following pieces of national legislation, provincial legislation and best practice guidelines (TABLE 4) are applicable to this assessment:

TABLE 4: National and provincial legislation which is relevant to the conservation of avifauna.

Legislation	Description	Geographic Scope
The National Environmental Management Act 107 of 1998 (NEMA)	The National Environmental Management Act 107 of 1998 (NEMA) creates the legislative framework for environmental protection in South Africa and is aimed at giving effect to the environmental right in the Constitution. It sets out a number of guiding principles that apply to the actions of all organs of state that may significantly affect the environment. Sustainable development (socially, environmentally and economically) is one of the key principles, and internationally accepted principles of environmental management, such as the precautionary principle and the polluter pays principle, are also incorporated. NEMA also provides that a wide variety of listed developmental activities, which may significantly affect the environment, may be performed only after an environmental impact assessment has been done and authorization has been obtained from the relevant authority. Many of these listed activities can potentially have negative impacts on bird populations in a variety of ways. The clearance of natural vegetation, for instance, can lead to a loss of habitat and may depress prey populations, while erecting structures needed for generating and distributing energy, communication, and so forth can cause mortalities by collision or electrocution.	National
The National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA) and the Threatened or Protected Species Regulations, February 2007 (TOPS Regulations)	The National Environmental Management: Biodiversity Act (No. 10 of 2004), (NEMBA) regulations on Threatened and Protected Species (TOPS) provides for the consolidation of biodiversity legislation through establishing national norms and standards for the management of biodiversity across all sectors and by different management authorities. The national Act provides for among other things, the management and conservation of South Africa's biodiversity; protection of species and ecosystems that necessitate national protection and the sustainable use of indigenous biological resources.	National
The National Environmental Management: Protected Areas Act 57 of 2003	The National Environmental Management: Protected Areas Act (No. 57 of 2003), as amended in 2014, provides for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. The Act also provides for the establishment of a national register of all national, provincial and local protected areas that are managed in accordance with national norms and standards; and to endure intergovernmental co-operation and public consultation in matters concerning protected areas. Protected areas are declared in order to regulate the area as a buffer zone for protection of a special nature reserve, world heritage site or nature reserve; to enable owners of land to take collective action to conserve biodiversity on their land and to seek legal recognition therefor; to protect the area if the area is sensitive to development due to its- (i) biological diversity; (ii) natural characteristics; (iii) scientific, cultural, historical, archaeological or geological value; (iv) scenic and landscape value; or (v) provision of environmental goods and services; to protect a specific ecosystem outside of a special nature reserve, world heritage site or nature reserve; to ensure that the use of natural resources in the area is sustainable. This Act explicitly states that no development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority.	National
The National Environmental Management Act 107 of 1998 (NEMA) Protocol for the	This protocol provides the criteria for the specialist assessment and minimum report content requirements for impacts on terrestrial animal and/or avifaunal species for activities requiring environmental authorisation. This protocol replaces	National

Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal and or Avifaunal Species	the requirements of Appendix 6 of the Environmental Impact Assessment Regulations. The assessment and reporting requirements of this protocol are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool) for terrestrial animal species. The relevant terrestrial animal species data in the screening tool has been provided by the South African National Biodiversity Institute (SANBI).	
Species Environmental Assessment Guideline: Guidelines for the implementation of the Terrestrial Flora (3c) & Terrestrial Fauna (3d) Species Protocols for environmental impact assessments in South Africa.	The *Species Environmental Assessment Guideline* provides background and context to the assessment and minimum reporting criteria contained within the Terrestrial Animal and Plant Species Protocols; as well as to provide guidance on sampling and data collection methodologies for the different taxonomic groups that are represented in the respective protocols. This guideline is intended for specialist studies undertaken for activities that have triggered a listed and specified activity in terms of the National Environmental Management Act, 1998 (No. 107 of 1998) (NEMA), as identified by the EIA Regulations, 2014 (as amended) and Listing Notices 1-3.	National
The Standard for the Development and Expansion of Power Lines and Substations within Identified Geographical Areas	Section 24(2)(c) - (e) of NEMA provides the ability of the Minister, or MEC in concurrence with the Minister to identify activities and geographical areas within which activities may be excluded from the requirement to obtain environmental authorisation. Section 24(2)(d) provides the additional ability to link such exclusions with compliance with prescribed norms or standards. The *Standard for the Development and Expansion of Power lines and Substations within Identified Geographical Areas* allows for the exclusion of activities which relate to the development and expansion of electricity transmission and distribution infrastructure as identified in Listing Notices 1 and 2 of the Environmental Impact Assessment (EIA) Regulations. This Standard has been developed based on two Strategic Environmental Assessment (SEA) processes undertaken for the development of Electricity Grid Infrastructure (EGI) in South Africa. This Standard has been prepared to allow a proponent to achieve planning, routing, siting and remediation objectives that will ensure the acceptability of the impacts of the development of EGI including substations on the environment, independently from the need for an assessment by the competent authority. This Standard and exclusions do not apply in the following instances:	National
The North West Biodiversity Management Act No.4 of 2016 & the North West Biodiversity Management Amendment Bill of 2017	This Act and Bill have been published but not yet in force. It provides for the management and conservation of the North West Province's biophysical environment and protected areas within the framework of the National Environmental Management Act, 1998 (Act No 107 of 1998); to provide for the protection of species and ecological- systems that warrant provincial protection; to provide for the sustainable use of indigenous biological resources	Provincial
Best Practice Guidelines: Birds and Solar Energy	The most important guidance document from an avifaunal impact perspective that is currently applicable (but not legally binding) to solar energy development in South Africa is the *Birds and Solar Energy: Guidelines for assessing and monitoring the impact of solar power generating facilities on birds in southern* (Jenkins et al, 2017). A gradient of survey and monitoring requirements for avian studies is recommended in the guidelines and is dependent on the proposed technology, size of footprint, the amount of available data, and the estimated sensitivity of the receiving environment. Based on these criteria, the proposed 10MW PV Solar Energy Facility has been assessed based on Regime 1, where structured and repeated baseline data collection is not required due to the lower-risk nature of the proposed development. Such projects require that the consulting specialist visit the site at least once, during peak period of avian abundance and activity. Sufficient time must be spent on site in order to obtain first-hand knowledge of the avian habitats present, and to predict the affected avifauna, the nature and scale of impacts and the best mitigation options available.	National

7. SENSITIVITY CLASSIFICATION

Five sensitivity categories, ranging from LOW to HIGH, were assigned to the respective avifaunal features and habitat classes found within the PAOI, based on the most recent bird species occurrence and breeding data and the importance of the specific habitat type from a priority species perspective. TABLE 5 and TABLE 6 list the avifaunal and habitat features and their assigned sensitivity ratings. Avifaunal and habitat sensitivity are classified based on the following criteria and determining factors:

HIGH SENSITIVITY ZONE:

These areas are globally important for the conservation of bird populations, contain breeding areas, avifaunal habitats that provide corridors for movement (flyways) and avifaunal habitats that provide suitable breeding and foraging habitats for species that have specific habitat requirements. These habitats and the avifaunal species they support are highly susceptible to anthropogenic disturbances associated with this development. Relevant to this scoping assessment, protected and conservation areas, IBAs, breeding locations (and their respective buffers), rivers and wetland habitats (and their respective buffers) are classified in the high sensitivity category. Development in these areas is NOT PREFERRED.

MEDIUM-HIGH SENSITIVITY ZONES:

These areas contain avifaunal habitats that provide suitable breeding and foraging habitats for priority species. Habitat types that are likely to support a high diversity of species are also included in this classification. Low levels of transformation and habitat fragmentation are characteristic of this sensitivity zone. Typically, the avifaunal species that utilise these areas support, are susceptible to anthropogenic disturbances associated with this development. Relevant to this scoping assessment, CWAC sites, grassland habitat, permanent and seasonal waterbodies (i.e. dams and pans) and natural rock surfaces are classified in this medium-high sensitivity category. Development in these areas is ACCPETABLE, with appropriate monitoring, assessment and mitigation. Areas that contain high species diversity, abundances and high utilisation may be subject to additional seasonal monitoring.

MEDIUM SENSITIVITY ZONES:

Areas within this sensitivity zone are comprised of indigenous natural habitat, characterised by moderate levels of fragmentation. Priority species that are tolerant of or accustomed to disturbance may utilise these areas for foraging. Relevant to this scoping assessment, dense indigenous forest and woodland, open or sparse woodland, cultivated lands and fallow lands have been classified in this category. Development in these areas is ACCPETABLE, with appropriate and thorough monitoring, assessment and mitigation.

MEDIUM-LOW SENSITIVITY ZONES:

All areas where the natural habitat has been transformed to a large extent but may still provide foraging and roosting habitat for priority species. Relevant to this scoping assessment plantation forests and artificial

waterbodies have been classified in this category. Development in these areas is ACCPETABLE, with appropriate monitoring, assessment and mitigation.

LOW SENSITIVITY ZONES:

Areas classified in this category are wholly transformed and do not contain any natural habitat. The likelihood of priority species inhabiting these areas is negligible. Relevant to this scoping assessment, industrial areas, mines, urban, villages, residential, small holdings, infrastructure and transformed or degraded areas (i.e. landfills and bare areas) have been classified in this category. Development in these areas is PREFERRED, since these areas contain minimal biodiversity constraints.

8. DESCRIPTION OF THE AFFECTED ENVIRONMENT

8.1 Relevant Bird Populations

The following bird population datasets (TABLE 5 and FIGURE 3) were considered for this desktop screening assessment. The table provides a description of each avifaunal feature; the location of the feature either within the proposed development site or the broader PAOI; the assigned sensitivity according to the national screening tool; required buffers; priority species complements; the screening assessment sensitivity rating and the assigned development category.

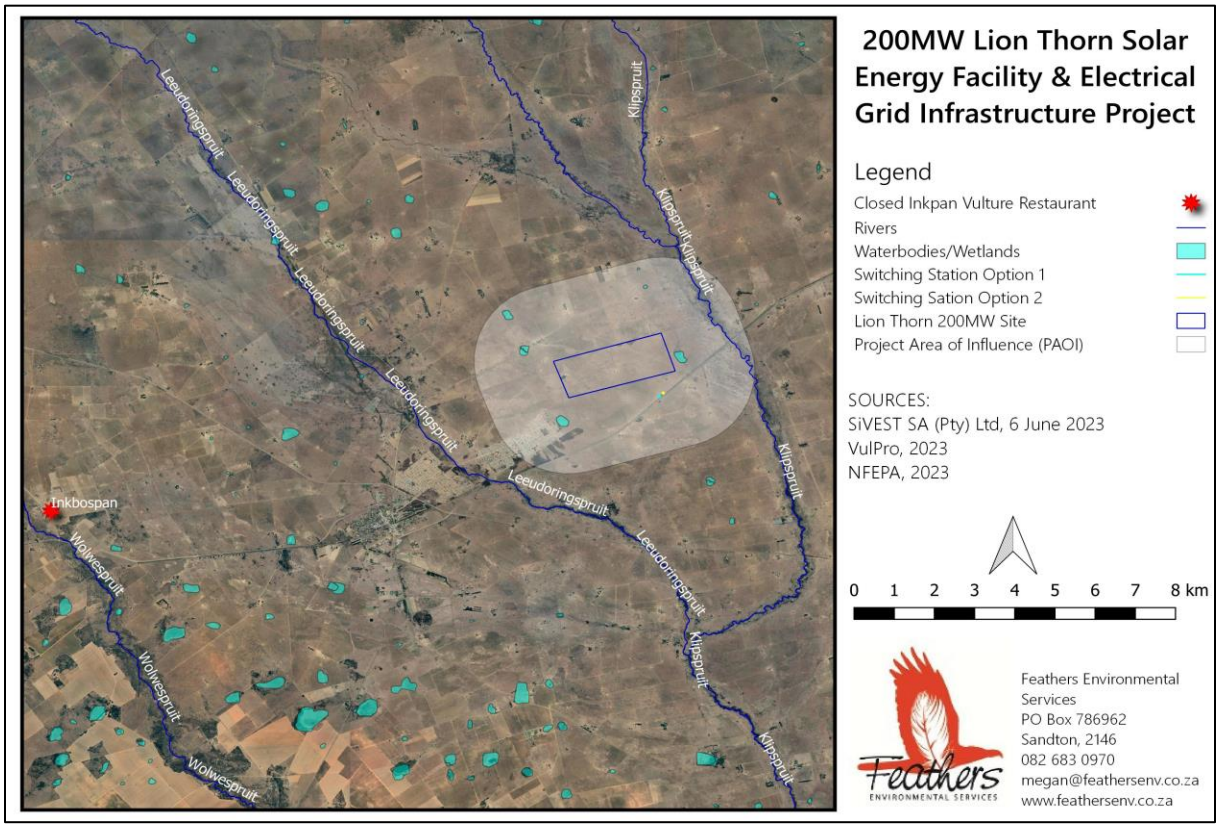


FIGURE 3: Regional map detailing the location of the closed Inkpan Vulture Restaurant and sensitive avian habitat i.e. rivers, wetlands and waterbodies within the project PAOI

TABLE 5: Avifaunal features considered for the identification of sensitive areas within the identified development area

CRITERIA	FEATURE	SOURCE	DESCRIPTION	SENSITIVITY: NATIONAL SCREENING TOOL	BUFFER	FEATURE ID	PRIORITY SPECIES	SCREENING ASSESSMENT SENSITIVITY RATING	DEVELEOPMENT CATEGORY
Birds	Important Bird Areas (IBA)	BirdLife South Africa Marnewick, 2015	Areas that are globally important for the conservation of bird populations based on species abundance and the complements they hold. These areas provide an indication of the species that are likely to occur in similar habitat types within the identified area.	**Very High** - These areas are potentially unsuitable for development owing to the presence of critical habitat (utilised for breeding, roosting and foraging) and the confirmed presence of priority species vulnerable to wind energy development	None	No IBAs within a 30km radius of the proposed development area	None	**HIGH**	**NON-PREFERRED** Areas where development is discouraged i.e. no-go areas **NOTE: Development within IBAs will be subject to intense scrutiny by environmental NGOs and I&APs and are likely to require seasonal monitoring to inform the avifaunal impact assessment report**
Birds	Co-ordinated Waterbird Count Sites (CWAC)	Animal Demography Unit of the University of Cape Town, accessed 20 June 2023 Harrison et al, 2004	Any body of water which supports a significant number (approx. 500 individuals) of birds which use the site for foraging, breeding and roosting. These areas provide an indication of the waterbird species that are likely to occur in various waterbody/wetland habitats within the identified area.	**High** - Confirmed occurrences of rare and threatened species. Habitat likely to be of importance to priority bird species sensitive to wind energy developments.	None	No CWAC sites occur within a 30km radius of the proposed development area	None	**MEDIUM-HIGH**	**ACCEPTABLE:** Areas surrounding the CWAC sites are developable but with appropriate monitoring, assessment and mitigation.

CRITERIA	FEATURE	SOURCE	DESCRIPTION	SENSITIVITY: NATIONAL SCREENING TOOL	BUFFER	FEATURE ID	PRIORITY SPECIES	SCREENING ASSESSMENT SENSITIVITY RATING	DEVELEOPMENT CATEGORY
Birds	Co-ordinated Avifaunal Roadcount Routes (CAR)	Animal Demography Unit of the University of Cape Town, accessed 20 June 2023 Young et al, 2003	Cranes, bustards, storks and other large terrestrial birds spend most of their time on the ground, need open spaces & are not restricted to protected areas. This project monitors 36 species of large terrestrial birds, gamebirds, raptors and corvids in agricultural habitats which are used extensively for feeding, roosting and breeding.	**High** - Confirmed occurrences of rare and threatened species. Habitat likely to be of importance to priority bird species sensitive to wind energy developments.	None	No CAR routes occur within a 30km radius of the proposed development area	None	**MEDIUM-HIGH**	**ACCEPTABLE:** Areas surrounding the CAR routes are developable but with appropriate monitoring, assessment and mitigation.
Birds	Southern African Bird Atlas Project 2 **APPENDIX 1**	Animal Demography Unit of the University of Cape Town, accessed 20 June 2023	The Southern African Bird Atlas Project 2 maps the distribution of birds, based on records of bird species observed during >2hour surveys within a geographical pentad (approx. 8 × 7.6 km in size).	**High** - Confirmed occurrences of rare and threatened species.	None	Nine pentad grid cells are relevant to this desktop screening assessment. Between 2007 and 2023, a total of 27 full protocol lists and 22 ad hoc protocol lists (bird surveys) have been completed for identified area.	163 species in total 3 Global Red List Species (SCC) 4 Regional Red List Species (SCC) 2 South African Endemics 6 South African Near Endemics 52 Solar Priority Species 40 Power Line Species **APPENDIX 1**	The diversity and abundance of priority species recorded within the identified area were considered when assessing the sensitivity of the habitats that support these species.	The diversity and abundance of priority species recorded within the identified area were considered when assigning the development category.

CRITERIA	FEATURE	SOURCE	DESCRIPTION	SENSITIVITY: NATIONAL SCREENING TOOL	BUFFER	FEATURE ID	PRIORITY SPECIES	SCREENING ASSESSMENT SENSITIVITY RATING	DEVELEOPMENT CATEGORY
Birds	White-backed Vulture Nests	VulPro, 2020	Nesting in loose colonies of 2 to 13 birds, situated in the crown or fork of a large tree.	**High** - Confirmed occurrences of rare and threatened species.	50km	None	None	N/A - There are no documented vulture nests within 50km of the development area	N/A - There are no documented vulture nests within 50km of the development area
Birds	Cape Vulture Colonies	VulPro, 2020	Colonies of several hundred birds on high cliffs.	**Very High** - These areas are potentially unsuitable for development owing to the presence of critical habitat (utilised for breeding, roosting and foraging) and the confirmed presence of priority species vulnerable to wind energy development	50km	None	None	N/A - There are no documented Cape Vulture colonies (or their associated 50km buffers occur within or intersect the PAOI	N/A - There are no documented Cape Vulture colonies (or their associated 50km buffers occur within or intersect the PAOI
Birds	Cape Vulture Roosts	VulPro, 2020	Areas where Cape Vultures will rest overnight. This can be on cliffs or on electricity poles/towers.	**Very High** - These areas are potentially unsuitable for development owing to the presence of critical habitat (utilised for breeding, roosting and foraging) and the confirmed presence of priority species vulnerable to wind energy development	50km	None	None	N/A - There are no documented vulture roosts within 50km of the PAOI	N/A - There are no documented vulture roosts within 50km of the PAOI

CRITERIA	FEATURE	SOURCE	DESCRIPTION	SENSITIVITY: NATIONAL SCREENING TOOL	BUFFER	FEATURE ID	PRIORITY SPECIES	SCREENING ASSESSMENT SENSITIVITY RATING	DEVELEOPMENT CATEGORY
Birds	Vulture Restaurants	VulPro, 2020	To promote the survival of vultures, the practice of supplemental feeding in so called vulture restaurants, was initiated and today there are 236 documented vulture restaurants scattered throughout South Africa.	**Very High** - These areas are potentially unsuitable for development owing to the presence of critical habitat (utilised for breeding, roosting and foraging) and the confirmed presence of priority species vulnerable to wind energy development	10km	None	None	N/A - There are no documented active vulture restaurants within 10km of the PAOI	N/A - There are no documented active vulture restaurants within 10km of the PAOI
Birds	African Grass Owl Breeding Data	Endangered Wildlife Trust: Threatened Species No-go Interactive Map	Confirmed breeding locations of African Grass Owl	**High** - Confirmed occurrences of rare and threatened species.	1km	None	None	N/A - There are no documented African Grass Owl breeding sites within the PAOI	N/A - There are no documented African Grass Owl breeding sites within the PAOI
Birds	Hooded Vulture Breeding Data	Endangered Wildlife Trust: Threatened Species No-go Interactive Map	Confirmed breeding locations of Hooded Vulture	**High** - Confirmed occurrences of rare and threatened species.	50km	None	None	N/A - There are no documented Hooded Vulture breeding sites within the PAOI	N/A - There are no documented Hooded Vulture breeding sites within the PAOI

CRITERIA	FEATURE	SOURCE	DESCRIPTION	SENSITIVITY: NATIONAL SCREENING TOOL	BUFFER	FEATURE ID	PRIORITY SPECIES	SCREENING ASSESSMENT SENSITIVITY RATING	DEVELEOPMENT CATEGORY
Protected Area	Ecological Support Area 1	North West Biodiversity Plan, 2015	Areas that must be restored and/or managed to minimise impact on ecological infrastructure and functioning	**Very High** - These areas are potentially unsuitable for development owing to the presence of critical habitat (utilised for breeding, roosting and foraging) and the confirmed presence of priority species	0-3km	Ecological Support Area 1 Endangered Vaal-Vet Sandy Grassland	Amur Falcon Black-chested Snake Eagle Blacksmith Lapwing Black-winged Kite Cape White-eye Cloud Cisticola Common Buzzard Eastern Long-billed Lark Fiscal Flycatcher Greater Kestrel Karoo Thrush Lesser Kestrel Melodious Lark Secretarybird Sickle-winged Chat Western Cattle Egret	**MEDIUM-HIGH**	**ACCEPTABLE:** Areas are developable but with mitigation

8.2 Bird Habitat Classes (Microhabitats)

Vegetation is one of the primary factors determining bird species distribution and abundance in an area. It is widely accepted within ornithological circles that vegetation structure is more important in determining which bird species will occur there. The classification of vegetation types is from Mucina & Rutherford (2006 and 2012), while from an avifaunal perspective, the Atlas of southern African Birds (SABAP1) recognises six primary vegetation divisions or biomes within South Africa, namely (1) Fynbos (2) Succulent Karoo (3) Nama Karoo (4) Grassland (5) Savanna and (6) Forest (Harrison et al. 1997). Whilst much of the distribution and abundance of bird species can be attributed to the broad vegetation types present in an area, it is the smaller spatial scale habitats (micro habitats) that support the requirements of a particular bird species that need to be examined in greater detail. Micro habitats are shaped by factors other than vegetation, such as topography, land use, food availability, and various anthropogenic factors all of which will either attract or deter birds and are critically important in mapping the site in terms of avifaunal sensitivity and ultimately informing mitigation requirements. A desktop investigation of the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project* PAOI revealed at least six broadly described avifaunal micro habitats (TABLE 6 and FIGURE 3) i.e. rivers, wetlands, waterbodies, grassland, exotic/alien tree stands and high voltage power lines.

TABLE 6: Habitat features considered for the identification of sensitive areas within the identified development area and PAOI

CRITERIA	FEATURE	SOURCE	DESCRIPTION	SENSITIVITY: NATIONAL SCREENING TOOL	BUFFER	FEATURE ID	PRIORITY SPECIES	SCOPING ASSESSMENT SENSITIVITY RATING	DEVELEOPMENT CATEGORY
Habitat	Ephemeral Rivers/Drainage Lines	DEA National Landcover Dataset 2020 NFEPA Rivers 2014	Rivers and drainage lines provide important corridors of microhabitat for waterbirds that will utilise rivers as a source of drinking water, food, bathing and shelter for skulking species.	**Very High** - These areas are potentially unsuitable for development owing to the presence of critical habitat (utilised for breeding, roosting and foraging) and the confirmed presence of priority species vulnerable to WEF development	0-1km (500m)	Klipspruit (located within the PAOI, but not the proposed development site)	African Darter African Sacred Ibis African Spoonbill Black-crowned Night Heron Black-headed Heron Black-winged Stilt Cape Shoveler Cape Teal Egyptian Goose Glossy Ibis Great Egret Grey Heron Little Egret Little Grebe Little Stint Maccoa Duck Malachite Kingfisher Marsh Sandpiper Pied Kingfisher Red-billed Teal Red-knobbed Coot Reed Cormorant Ruff South African Shelduck Southern Pochard Whiskered Tern White-breasted Cormorant White-faced Whistling Duck Wood Sandpiper Yellow-billed Duck	**HIGH**	**NON-PREFERRED** Areas where development is discouraged i.e. non-go areas

CRITERIA	FEATURE	SOURCE	DESCRIPTION	SENSITIVITY: NATIONAL SCREENING TOOL	BUFFER	FEATURE ID	PRIORITY SPECIES	SCOPING ASSESSMENT SENSITIVITY RATING	DEVELEOPMENT CATEGORY
Habitat	Wetlands	DEA National Landcover Dataset 2020 NFEPA Wetlands 2014	Wetlands are characterized by slow flowing seasonal water (or permanently wet) and tall emergent vegetation (rooted or floating) and provide habitat for many water birds.	**Very High** - These areas are potentially unsuitable for development owing to the presence of critical habitat (utilised for breeding, roosting and foraging) and the confirmed presence of priority species vulnerable to WEF development	0-1km (500m)	Small wetlands located in natural depressions in grassland habitat within the PAOI	African Sacred Ibis Black-headed Heron Glossy Ibis Great Egret Little Stint	**MEDIUM-HIGH**	**ACCEPTABLE:** Areas are developable but with mitigation
Habitat	Waterbodies	DEA National Landcover Dataset 2020	Pans are endorheic wetlands with closed drainage systems. Water depth is shallow with ephemeral flooding. When these pans hold water, they attract waterbirds, while large raptors could use them for bathing and drinking. Although man-made, dams are very important for a variety of species.	**Very High** - These areas are potentially unsuitable for development owing to the presence of critical habitat (utilised for breeding, roosting and foraging) & the confirmed presence of priority species vulnerable to WEF development	0-1km (500m)	1 x waterbody within the development area 4 x waterbodies within the PAOI	Greater Flamingo Lesser Flamingo Maccoa Duck African Darter African Sacred Ibis African Spoonbill Black-winged Stilt Cape Shoveler Cape Teal Egyptian Goose Glossy Ibis Great Egret Grey Heron Little Egret Little Grebe Little Stint Maccoa Duck Marsh Sandpiper Pied Kingfisher Red-billed Teal Red-knobbed Coot Reed Cormorant Ruff South African Shelduck Southern Pochard Spur-winged Goose Whiskered Tern	**MEDIUM-HIGH**	**ACCEPTABLE:** Areas are developable but with mitigation

CRITERIA	FEATURE	SOURCE	DESCRIPTION	SENSITIVITY: NATIONAL SCREENING TOOL	BUFFER	FEATURE ID	PRIORITY SPECIES	SCOPING ASSESSMENT SENSITIVITY RATING	DEVELEOPMENT CATEGORY
							White-breasted Cormorant White-faced Whistling Duck Wood Sandpiper Yellow-billed Duck		
Habitat	Grassland	DEA National Landcover Dataset 2020	350 bird species occur in the Grassland biome. This includes 29 species of conservation concern, ten endemics, and as many as 40 specialist species that are exclusively dependent on grassland habitat for foraging and breeding.	**High** - Areas that contain habitat likely to be of importance to priority bird species sensitive to WEF developments	-	Natural grassland	Amur Falcon Black-chested Snake Eagle Black-headed Heron Blacksmith Lapwing Black-winged Kite Cape White-eye Cloud Cisticola Common Buzzard Eastern Long-billed Lark Fiscal Flycatcher Greater Kestrel Karoo Thrush Lesser Kestrel Melodious Lark Secretarybird Sickle-winged Chat Western Cattle Egret	**MEDIUM**	**ACCEPTABLE:** Areas are developable but with mitigation
Habitat	Exotic Tree Plantations	DEA National Landcover Dataset 2020	Although tree plantations are strictly speaking exotic species, they have become important refuges for certain species of raptors.	**Low** - These areas possibly do not support priority populations of threatened species that are susceptible to impacts from WEFs	-	Exotic Tree Plantations	Amur Falcon Black-chested Snake Eagle Black-winged Kite Common Buzzard Gabar Goshawk Greater Kestrel Lesser Kestrel	**MEDIUM-LOW**	**ACCEPTABLE:** Areas are developable but with mitigation

CRITERIA	FEATURE	SOURCE	DESCRIPTION	SENSITIVITY: NATIONAL SCREENING TOOL	BUFFER	FEATURE ID	PRIORITY SPECIES	SCOPING ASSESSMENT SENSITIVITY RATING	DEVELEOPMENT CATEGORY
Habitat	Infrastructure	SiVEST SA (Pty) Ltd Eskom SOC Holdings Ltd	High voltage lines are an important roosting substrate for raptors. The proposed development site is bisected by the Mercury – Mookodi 1 400kV line	**Medium** - These areas support priority raptors that are susceptible to power line related impacts	2km (if breeding)	High Voltage Power Lines	Black-chested Snake Eagle Black-winged Kite Common Buzzard Gabar Goshawk Greater Kestrel Lesser Kestrel	**MEDIUM-LOW**	**ACCEPTABLE:** Areas are developable but with mitigation

9. DESKTOP SITE SENSITIVITY VERIFICATION

A screening report for the proposed study area was generated on 7 June 2022 by *SiVEST*. Parts of the proposed study area are considered to have a HIGH Avian Theme Sensitivity, as a result of the site being within 20km of a vulture restaurant and a MEDIUM Animal Species Theme Sensitivity as a result of the potential presence of Secretarybird *Sagittarius serpentarius*.

The Inkhoek Vulture Restaurant, located on the farm Inkbospan, is no longer operational (pers comms. Kerri Wolter, June 2023). The HIGH Avian Theme Sensitivity is therefore refuted. A single Secretarybird was recorded in the broader nine-pentad assessment area in 2016. Secretarybird was not recorded during the seasonal avifaunal monitoring conducted at the 9.9MW Leeuwbosch 1 Photovoltaic SEF, the 9.9MW Leeuwbosch 2 Photovoltaic SEF (van Rooyen et al, 2021) and the 15MW Leeuwbosch 3 Photovoltaic SEF (van Rooyen et al 2022). In addition, recent surveys pertaining to the Leeudoringstad 132kV power line grid connection, did not yield Secretarybird observations (Diamond, 2022). However, the species was recorded during a survey conducted in August 2022 at the 9.9MW Wildebeestkuil 1 Photovoltaic SEF and the 9.9MW Wildebeestkuil 2 Photovoltaic SEF. This observation coupled with the availability of suitable habitat, confirms the MEDIUM sensitivity rating. This rating will be verified further during the EIA phase of the project, following a site verification and seasonal surveys to the proposed development area and broader PAOI.

TABLE 7: Summary of desktop verification outcome

SCREENING TOOL SENSITIVITY	VERIFIED SENSITIVITY	OUTCOME STATEMENT/PLAN OF STUDY	RELEVANT SECTION MOTIVATING VERIFICATION
AVIFAUNAL SCREENING ASSESSMENT			
High	**Medium**	EIA Phase – Site Survey and Avifaunal Impact Assessment	Section 8 & 9
Medium	**Medium**	EIA Phase – Site Survey and Avifaunal Impact Assessment	Section 8 & 9

10. GENERAL DESCRIPTION OF THE POTENTIAL IMPACTS

The effects of any development on birds are highly variable and depend on a wide range of factors including the specification of the development, the topography of the surrounding land, the habitats affected and the number and diversity of species present. The principal areas of concern for SCC and non-SCC priority species related to the proposed development are listed below:

* Displacement due to habitat loss in the physical *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project* footprint;
* Displacement due to disturbance associated with establishment, construction, operation/maintenance and decommissioning of the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project*;

* Mortality due to collisions with the PV panels (impact trauma); and
* Entrapment and entanglement in perimeter fencing

The aforementioned impacts will be described and assessed in detail, following the site verification and seasonal surveys to the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project* development area and PAOI during the EIA phase of the project process.

11. PRELIMINARY AVIFAUNAL SENSITIVITY MAP

A single land portion is being considered for the establishment of the *200MW Lion Thorn Photovoltaic Solar Energy Facility*. A preferred layout for the SEF will be determined based on the avoidance of the avifaunal sensitivities delineated as part of this screening/scoping phase (FIGURE 4) as well as those sensitivities identified, following the detailed assessment of the primary data collected during the seasonal site surveys during the EIA phase of the project.

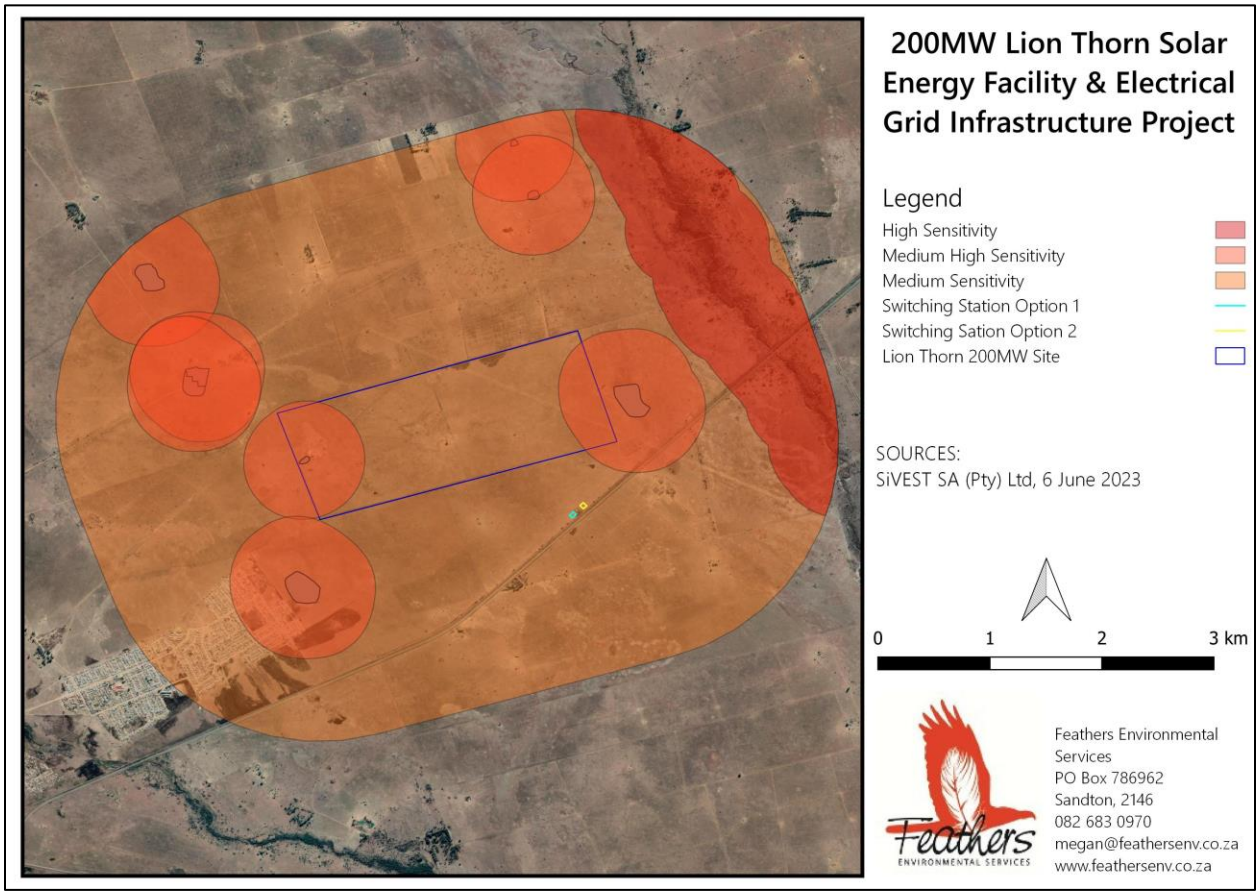


FIGURE 4: High sensitivity (non-preferred) development areas based on the presence of rivers/drainage lines and Medium-High Sensitivity (acceptable with mitigation) development areas based on presence of wetlands/waterbodies

12. CONCLUSION & EIA PLAN OF STUDY

12.1 Reasoned Opinion on the acceptability of the proposed activity

In conclusion, this high-level desktop assessment has identified at least six avifaunal habitats of varying sensitivities within the proposed development area and PAOI. Despite anthropogenic impacts, mostly in the form of pastoral practices, sensitive habitat persists within the study area (FIGURE 4). The establishment and operation of the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project* will likely result in impacts of medium significance, which may be reduced through the application of stringent mitigation measures.

12.2 Plan of Study (EIA Phase)

In order to ensure the sustainable development of the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project* further, specialist avifaunal impact assessment studies must be conducted as part of the EIA process in order to:

* Confirm avifaunal microhabitats within the proposed development area and assess these for their suitability to support SCC and non-SCC priority species, in terms of breeding, roosting and foraging;
* Describe the avifaunal communities (both SCC and non-SCC priority species) most likely to be impacted, based on data collected as part of a systematic and quantified data collection process. Primary data will be collected during two seasonal surveys within a six month period:

    a. Sample counts of small terrestrial species

    Small terrestrial birds are an important component of this programme. Given the spatial scale of the development, these smaller species may be particularly vulnerable to displacement and habitat level effects. Sampling these species is aimed at establishing indices of abundance for small terrestrial birds in the study area. These counts should be done when conditions are optimal. In this case this means the times when birds are most active and vocal, i.e. early mornings. A minimum of 12 point count survey points will be established across the PAOI.

    b. Counts of large terrestrial species and raptors

    This is a very similar data collection technique to that above, the aim being to establish indices of abundance for large terrestrial species and raptors. These species are relatively easily detected from a vehicle, hence vehicle-based counts are conducted in order to determine the presence and number of birds of relevant species in the study area. Detection of these large species is less dependent on their activity levels and calls, so these counts can be done later in the day. A minimum of one driven transect route will be established and conducted during the site survey.

c. Focal site surveys and monitoring

Any particularly sensitive sites such as wetlands, waterbodies and breeding sites will be identified and monitored during the site survey.

d. Incidental observations

All other incidental sightings of SCC and non-SCC priority species (and particularly those suggestive of breeding or important feeding or roosting sites) within the PAOI will be georeferenced and documented.

* Provide a detailed description of the impacts associated with the construction, operation and decommissioning of the proposed *200MW Lion Thorn Photovoltaic Solar Energy Facility & Electrical Grid Infrastructure Project*;
* Assess the significance (rated according to a pre-determined set of criteria, as supplied by the primary consultant) of the identified direct, indirect and cumulative impacts, during the construction, operation and decommissioning phases of the proposed development based on data collected in-field;
* Consider layout plans and advise possible changes to the layout;
* Recommend practical mitigation measures for the management of the identified impacts, at each stage of the development process, for inclusion in the draft Environmental Management Programme (EMPr);
* Propose a monitoring programme for the sensitive areas, species or receptors (if necessary); and
* Describe the gaps in baseline data will be provided. An indication of the confidence levels will be given. The best available data sources will be used to predict the impacts, and extensive use will be made of local knowledge if available.

13. ASSUMPTIONS, UNCERTAINTIES & GAPS IN KNOWLEDGE

The avifaunal specialist assumed that the sources of information used for this screening assessment are reliable. However, it must be noted that there are limiting factors and these may potentially detract from the accuracy of the predicted results.

* This screening report is the result of a desktop review of the available information. Therefore, the pre-cautionary principle was applied throughout this screening assessment. This screening report relies on secondary data sources with regards to bird occurrence and abundance such as the SABAP2, IBA projects and various species breeding data. These comprehensive datasets provide a valuable baseline against which any changes in species presence, abundance, and distribution can be monitored.
* This desktop screening assessment and the resultant preliminary sensitivity map provides guidance in terms of areas that are potentially developable and those areas that are not suitable for development. It does not replace thorough and robust EIA, which must include a site verification survey and two

seasonal surveys (of which one must be conducted during the peak season) to obtain primary species and habitat data.

* Predictions in this study are based on experience of these and similar species in different parts of South Africa, through the authors' experience working in the avifaunal specialist field since 2006. However, bird behaviour cannot be reduced to formulas that will hold true under all circumstances. It must also be noted that, it is often not possible to entirely eliminate the risk of the disturbance and displacement impacts associated with the construction and operational activities. Our best possible efforts can probably not ensure zero impact on birds. Assessments such as this attempt to minimise the risk as far as possible, and although the impacts associated with the proposed development will be unavoidable, they are likely to be temporary.

The above limitations need to be stated as part of this assessment so that the reader fully understands the complexities. However, they do not detract from the confidence that this author has in the findings of this scoping report and recommendations for subsequent phases of this project.

14. REFERENCES

Animal Demography Unit. 2015. http://cwac.adu.org.za/. Accessed 20 June, 2023

Animal Demography Unit. 2017. http://car.adu.org.za/. Accessed 20 June, 2023

Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V & Brown, C.J. (eds). 1997. The atlas of southern African birds. Vol. 1&2. BirdLife South Africa, Johannesburg.

International Finance Corporation. 2012. Performance Standards on Environmental and Social Sustainability. http://www.ifc.org. Accessed 20 July 2021

IUCN (2016). The IUCN Red List of threatened species. http://www.iucnredlist.org/ Accessed on 29 July 2022

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

Mucina, L; Rutherford, C. 2006. The Vegetation of South Africa, Lesotho and Swaziland, South African National Biodiversity Institute, Pretoria.

Southern African Bird Atlas Project 2 (SABAP2). http://sabap2.adu.org.za. Accessed 20 June, 2023

South African National Biodiversity Institute. http://bgisviewer.sanbi.org. Accessed 20 June, 2023

Taylor, P.B., Navarro, R.A., Wren- Sargent, M., Harrison, J.A. & Kieswetter, S.L. 1999. TOTAL CWAC Report. Coordinated waterbird counts in South Africa, 1992-97. Avian Demography Unit, University of Cape Town.

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

Vulpro. Vulture movement data. Accessed 20 June, 2023

Vulpro. Vulture colony data. Accessed 20 June, 2023

Vulpro. White-backed Vulture nest locations. Accessed 20 June, 2023

Vulpro. Vulture restaurant locations. Accessed 20 June, 2023

Young, D.J., Harrison, J.A, Navarro, R.A., Anderson, M.A., & Colahan, B.D. (Eds). 2003. Big birds on farms: Mazda CAR Report 1993-2001. Avian Demography Unit: Cape Town.

APPENDIX 1: SOUTH AFRICAN BIRD ATLAS PROJECT DATA (SABAP2) FOR THE 200MW LION THORN PHOTOVOLTAIC SOLAR ENERGY FACILITY AND ELECTRICAL GRID INFRASTRUCTURE PAOI

Species name	Scientific name	Full Protocol	Ad hoc Protocol	Global Red List	Regional Red List	Endemic	Endemic Detail
Acacia Pied Barbet	Tricholaema leucomelas	70.4	0.0	-	-		
African Black Swift	Apus barbatus	3.7	0.0	-	-		
African Darter	Anhinga rufa	3.7	0.0	-	-		
African Hoopoe	Upupa africana	29.6	0.0	-	-		
African Palm Swift	Cypsiurus parvus	14.8	4.5	-	-		
African Pipit	Anthus cinnamomeus	25.9	0.0	-	-		
African Red-eyed Bulbul	Pycnonotus nigricans	74.1	4.5	-	-		
African Sacred Ibis	Threskiornis aethiopicus	22.2	0.0	-	-		
African Spoonbill	Platalea alba	3.7	0.0	-	-		
African Stonechat	Saxicola torquatus	22.2	0.0	-	-		
Amur Falcon	Falco amurensis	3.7	13.6	-	-		
Ant-eating Chat	Myrmecocichla formicivora	51.9	13.6	-	-		
Ashy Tit	Melaniparus cinerascens	11.1	0.0	-	-		
Barn Swallow	Hirundo rustica	37.0	13.6	-	-		
Black-chested Prinia	Prinia flavicans	81.5	0.0	-	-		
Black-chested Snake Eagle	Circaetus pectoralis	0.0	4.5	-	-		
Black-crowned Night Heron	Nycticorax nycticorax	3.7	0.0	-	-		
Black-faced Waxbill	Brunhilda erythronotos	3.7	0.0	-	-		
Black-headed Heron	Ardea melanocephala	25.9	4.5	-	-		
Blacksmith Lapwing	Vanellus armatus	85.2	0.0	-	-		
Black-throated Canary	Crithagra atrogularis	59.3	0.0	-	-		
Black-winged Kite	Elanus caeruleus	40.7	9.1	-	-		
Black-winged Stilt	Himantopus himantopus	11.1	0.0	-	-		
Blue Waxbill	Uraeginthus angolensis	25.9	0.0	-	-		
Bokmakierie	Telophorus zeylonus	29.6	0.0	-	-		
Brown-crowned Tchagra	Tchagra australis	33.3	0.0	-	-		
Brown-hooded Kingfisher	Halcyon albiventris	3.7	0.0	-	-		
Brown-throated Martin	Riparia paludicola	7.4	0.0	-	-		
Brubru	Nilaus afer	3.7	0.0	-	-		
Cape Longclaw	Macronyx capensis	48.1	0.0	-	-		
Cape Penduline Tit	Anthoscopus minutus	11.1	0.0	-	-		
Cape Robin-Chat	Cossypha caffra	29.6	0.0	-	-		
Cape Shoveler	Spatula smithii	3.7	0.0	-	-		
Cape Sparrow	Passer melanurus	81.5	0.0	-	-		
Cape Starling	Lamprotornis nitens	63.0	4.5	-	-		
Cape Teal	Anas capensis	14.8	0.0	-	-		
Cape Turtle Dove	Streptopelia capicola	33.3	9.1	-	-		
Cape Wagtail	Motacilla capensis	44.4	0.0	-	-		
Cape White-eye	Zosterops virens	11.1	0.0	-	-	x	Near endemic
Capped Wheatear	Oenanthe pileata	3.7	0.0	-	-		
Cardinal Woodpecker	Dendropicos fuscescens	3.7	0.0	-	-		

Species name	Scientific name	Full Protocol	Ad hoc Protocol	Global Red List	Regional Red List	Endemic	Endemic Detail
Chestnut-backed Sparrow-Lark	Eremopterix leucotis	3.7	4.5	-	-		
Chestnut-vented Warbler	Curruca subcoerulea	81.5	0.0	-	-		
Cinnamon-breasted Bunting	Emberiza tahapisi	18.5	0.0	-	-		
Cloud Cisticola	Cisticola textrix	22.2	0.0	-	-	x	Near endemic
Common Buzzard	Buteo buteo	3.7	9.1	-	-		
Common Myna	Acridotheres tristis	70.4	4.5	-	-		
Common Ostrich	Struthio camelus	14.8	4.5	-	-		
Common Scimitarbill	Rhinopomastus cyanomelas	7.4	0.0	-	-		
Common Swift	Apus apus	3.7	0.0	-	-		
Common Waxbill	Estrilda astrild	3.7	0.0	-	-		
Crested Barbet	Trachyphonus vaillantii	70.4	0.0	-	-		
Crowned Lapwing	Vanellus coronatus	85.2	4.5	-	-		
Desert Cisticola	Cisticola aridulus	37.0	0.0	-	-		
Diederik Cuckoo	Chrysococcyx caprius	29.6	0.0	-	-		
Domestic Goose	Anser anser domesticus	3.7	0.0	-	-		
Eastern Clapper Lark	Mirafra fasciolata	33.3	0.0	-	-		
Eastern Long-billed Lark	Certhilauda semitorquata	3.7	0.0	-	-	x	Endemic
Egyptian Goose	Alopochen aegyptiaca	29.6	0.0	-	-		
European Bee-eater	Merops apiaster	29.6	4.5	-	-		
Fiscal Flycatcher	Melaenornis silens	29.6	0.0	-	-	x	Near endemic
Fork-tailed Drongo	Dicrurus adsimilis	7.4	0.0	-	-		
Gabar Goshawk	Micronisus gabar	3.7	0.0	-	-		
Glossy Ibis	Plegadis falcinellus	7.4	0.0	-	-		
Great Egret	Ardea alba	3.7	0.0	-	-		
Greater Flamingo	Phoenicopterus roseus	3.7	0.0	-	NT		
Greater Kestrel	Falco rupicoloides	11.1	4.5	-	-		
Greater Striped Swallow	Cecropis cucullata	44.4	9.1	-	-		
Green-winged Pytilia	Pytilia melba	18.5	0.0	-	-		
Grey Heron	Ardea cinerea	14.8	0.0	-	-		
Groundscraper Thrush	Turdus litsitsirupa	3.7	0.0	-	-		
Hadada Ibis	Bostrychia hagedash	63.0	9.1	-	-		
Helmeted Guineafowl	Numida meleagris	55.6	13.6	-	-		
House Sparrow	Passer domesticus	44.4	0.0	-	-		
Kalahari Scrub Robin	Cercotrichas paena	51.9	0.0	-	-		
Karoo Thrush	Turdus smithi	14.8	0.0	-	-	x	Near endemic
Lark-like Bunting	Emberiza impetuani	3.7	0.0	-	-		
Laughing Dove	Spilopelia senegalensis	96.3	22.7	-	-		
Lesser Flamingo	Phoeniconaias minor	3.7	0.0	NT	NT		
Lesser Grey Shrike	Lanius minor	14.8	0.0	-	-		
Lesser Kestrel	Falco naumanni	29.6	13.6	-	-		
Lesser Swamp Warbler	Acrocephalus gracilirostris	7.4	0.0	-	-		
Levaillant's Cisticola	Cisticola tinniens	25.9	0.0	-	-		
Lilac-breasted Roller	Coracias caudatus	3.7	0.0	-	-		
Little Egret	Egretta garzetta	3.7	0.0	-	-		

Species name	Scientific name	Full Protocol	Ad hoc Protocol	Global Red List	Regional Red List	Endemic	Endemic Detail
Little Grebe	Tachybaptus ruficollis	25.9	0.0	-	-		
Little Stint	Calidris minuta	3.7	0.0	-	-		
Little Swift	Apus affinis	55.6	4.5	-	-		
Long-billed Crombec	Sylvietta rufescens	3.7	0.0	-	-		
Long-tailed Paradise Whydah	Vidua paradisaea	25.9	0.0	-	-		
Long-tailed Widowbird	Euplectes progne	70.4	13.6	-	-		
Maccoa Duck	Oxyura maccoa	3.7	0.0	VU	NT		
Malachite Kingfisher	Corythornis cristatus	3.7	0.0	-	-		
Mallard	Anas platyrhynchos	3.7	0.0	-	-		
Marsh Sandpiper	Tringa stagnatilis	3.7	0.0	-	-		
Melodious Lark	Mirafra cheniana	3.7	0.0	-	-	x	Near endemic
Namaqua Dove	Oena capensis	40.7	4.5	-	-		
Neddicky	Cisticola fulvicapilla	63.0	0.0	-	-		
Northern Black Korhaan	Afrotis afraoides	70.4	4.5	-	-		
Orange River Francolin	Scleroptila gutturalis	14.8	0.0	-	-		
Orange River White-eye	Zosterops pallidus	29.6	0.0	-	-		
Pied Crow	Corvus albus	48.1	18.2	-	-		
Pied Kingfisher	Ceryle rudis	7.4	0.0	-	-		
Pin-tailed Whydah	Vidua macroura	11.1	0.0	-	-		
Pririt Batis	Batis pririt	25.9	0.0	-	-		
Quailfinch	Ortygospiza atricollis	70.4	0.0	-	-		
Rattling Cisticola	Cisticola chiniana	7.4	0.0	-	-		
Red-backed Shrike	Lanius collurio	29.6	0.0	-	-		
Red-billed Firefinch	Lagonosticta senegala	18.5	0.0	-	-		
Red-billed Quelea	Quelea quelea	51.9	0.0	-	-		
Red-billed Teal	Anas erythrorhyncha	14.8	0.0	-	-		
Red-breasted Swallow	Cecropis semirufa	14.8	4.5	-	-		
Red-capped Lark	Calandrella cinerea	11.1	0.0	-	-		
Red-crested Korhaan	Lophotis ruficrista	3.7	0.0	-	-		
Red-eyed Dove	Streptopelia semitorquata	63.0	9.1	-	-		
Red-faced Mousebird	Urocolius indicus	63.0	0.0	-	-		
Red-headed Finch	Amadina erythrocephala	14.8	0.0	-	-		
Red-knobbed Coot	Fulica cristata	29.6	0.0	-	-		
Reed Cormorant	Microcarbo africanus	14.8	0.0	-	-		
Rock Dove	Columba livia	22.2	9.1	-	-		
Ruff	Calidris pugnax	3.7	0.0	-	-		
Rufous-naped Lark	Mirafra africana	25.9	4.5	-	-		
Sabota Lark	Calendulauda sabota	29.6	0.0	-	-		
Scaly-feathered Weaver	Sporopipes squamifrons	96.3	0.0	-	-		
Secretarybird	Sagittarius serpentarius	3.7	0.0	EN	VU		
Shaft-tailed Whydah	Vidua regia	11.1	0.0	-	-		
Sickle-winged Chat	Emarginata sinuata	3.7	0.0	-	-	x	Near endemic
South African Cliff Swallow	Petrochelidon spilodera	40.7	27.3	-	-	x	Endemic (Breeding)
South African Shelduck	Tadorna cana	14.8	0.0	-	-		

Species name	Scientific name	Full Protocol	Ad hoc Protocol	Global Red List	Regional Red List	Endemic	Endemic Detail
Southern Fiscal	Lanius collaris	88.9	18.2	-	-		
Southern Grey-headed Sparrow	Passer diffusus	77.8	0.0	-	-		
Southern Masked Weaver	Ploceus velatus	85.2	13.6	-	-		
Southern Pochard	Netta erythrophthalma	3.7	0.0	-	-		
Southern Red Bishop	Euplectes orix	40.7	4.5	-	-		
Southern Yellow-billed Hornbill	Tockus leucomelas	3.7	0.0	-	-		
Speckled Mousebird	Colius striatus	11.1	0.0	-	-		
Speckled Pigeon	Columba guinea	55.6	4.5	-	-		
Spike-heeled Lark	Chersomanes albofasciata	3.7	0.0	-	-		
Spotted Flycatcher	Muscicapa striata	14.8	0.0	-	-		
Spur-winged Goose	Plectropterus gambensis	11.1	4.5	-	-		
Swainson's Spurfowl	Pternistis swainsonii	70.4	0.0	-	-		
Swallow-tailed Bee-eater	Merops hirundineus	7.4	4.5	-	-		
Village Indigobird	Vidua chalybeata	11.1	0.0	-	-		
Violet-eared Waxbill	Granatina granatina	18.5	0.0	-	-		
Wattled Starling	Creatophora cinerea	29.6	0.0	-	-		
Western Cattle Egret	Bubulcus ibis	92.6	9.1	-	-		
Whiskered Tern	Chlidonias hybrida	7.4	0.0	-	-		
White-backed Mousebird	Colius colius	48.1	0.0	-	-		
White-bellied Sunbird	Cinnyris talatala	7.4	0.0	-	-		
White-breasted Cormorant	Phalacrocorax lucidus	3.7	0.0	-	-		
White-browed Sparrow-Weaver	Plocepasser mahali	96.3	9.1	-	-		
White-faced Whistling Duck	Dendrocygna viduata	14.8	0.0	-	-		
White-fronted Bee-eater	Merops bullockoides	14.8	0.0	-	-		
White-rumped Swift	Apus caffer	7.4	9.1	-	-		
White-throated Swallow	Hirundo albigularis	3.7	0.0	-	-		
White-winged Tern	Chlidonias leucopterus	3.7	0.0	-	-		
White-winged Widowbird	Euplectes albonotatus	7.4	0.0	-	-		
Wood Sandpiper	Tringa glareola	7.4	0.0	-	-		
Yellow Canary	Crithagra flaviventris	59.3	0.0	-	-		
Yellow-billed Duck	Anas undulata	18.5	0.0	-	-		
Yellow-crowned Bishop	Euplectes afer	18.5	0.0	-	-		
Yellow-fronted Canary	Crithagra mozambica	11.1	0.0	-	-		
Zitting Cisticola	Cisticola juncidis	11.1	0.0	-	-		

APPENDIX 2: CURRICULUM VITAE

MEGAN DIAMOND

PERSONAL DETAILS

Date of Birth | *7 December 1978*
Driver's License | *Code A and B*
Home Language | *English*
Other Languages | *Afrikaans*

EDUCATION

BSc Environmental Management | *University of South Africa (UNISA)* 2002 – 2009

ACCREDITATION

South African Council for Natural Scientific Professions | *Environmental Science*
Registration Number: 300022/14

EXPERIENCE

Owner & Avifaunal Specialist | *Feathers Environmental Services*
July 2013 – Present

- Perform specialist avifaunal assessment studies to minimise the impact of industrial infrastructure on birds and their habitats;
- Provide strategic guidance to industry through the development of best practice procedures and guidelines;
- Review and comment on methodologies, specialist studies and EIA reports for Renewable Energy projects;
- Provide input into renewable energy and power line developments elsewhere in Africa and across the globe;
- Manage the collection and collation of relevant and complete desktop and/or field datasets;
- Manage pre- and post-construction avifaunal monitoring data collected at wind and solar energy facilities;
- Site assessments, either as part of the project team or independently;
- Preparation of reports according to project deadlines, including the use of Geographic Information Systems (GIS) to portray data;
- Attendance of specialist integration meetings; and
- Liaison with stakeholders where necessary.

Wildlife & Energy Programme Manager | *Endangered Wildlife Trust*
October 2006 – June 2013

Programme management

- Annually review the programme's conservation and research strategic objectives and update in accordance with the EWT's and programme's vision and mission including work plans for staff etc.;

- Ensure timeous, professional delivery on all aspects of Wildlife & Energy Programme activities;
- Formulate, prioritise and approve relevant research and conservation projects;
- Ensure acceptable quality of all research projects and their outputs;
- Participate in international network liaison as and when required;
- Produce regular popular articles & media releases on the Wildlife & Energy Programme projects and outputs & contribute to the EWT publications;
- Establish & maintain a network with relevant national & international stakeholders;
- Deliver presentations at relevant meetings, functions, workshops & conferences on behalf of the programme;
- Assist with compilation of newsletters, updating of webpage, compilation of press articles, any advocacy issues;
- Identify & establish partnerships to achieve Wildlife & Energy Programme conservation goals.

Eskom –EWT Strategic Partnership

- Ensure that this partnership is managed effectively and sustainably against its goals. Manage staff in this division;
- Develop and maintain relationships with Eskom;
- Negotiate the terms of reference for the annual service level agreements between EWT and Eskom, to ensure the sustainability of the relationship;
- Compile annual report to Eskom Corporate Environment and Sustainability;
- Produce monthly reports to Eskom's regional grids on the status of incident follow-up;
- Attend applicable forums to interact with Eskom stakeholders;
- Participate in international network liaison as and when required;
- Maintain a network with all relevant local and regional level stakeholders (meetings, forums, workshops, etc.);
- Identify research needs relating to the management of wildlife interaction with power lines;
- Conduct research projects on wildlife and power line interaction and present the results at national and international conferences and workshops;
- Development and implementation of training for Eskom field services staff (at various levels) in the management of wildlife interactions; and
- Conduct special investigations on power lines relating to wildlife induced faulting.

Environmental Impact Assessment Division

- Ensure that this division operates effectively and efficiently at all times and manage staff in this division; and
- Conduct specialist avifaunal studies for new power lines developments including: tendering/quoting for the projects, conducting field work, preparing reports, presenting results & negotiating the acceptance of recommendations, final "walk through" as part of Environmental Management Plans; general project management, all liaison with clients, Eskom, authorities, Interested and Affected Parties etc.

Management and administration

- Ensure all programme staff have relevant terms of reference;
- Ensure that all programme staff are performance appraised against their terms of reference;
- Compile and manage programme budgets, monthly reports, work plans and strategy;
- Monitor expenditure and take corrective action if necessary; and
- Ensure timely delivery on all projects to all stakeholders.

CONFERENCE ATTENDANCE

- *Society for Conservation Biology 21st Annual Meeting (1-5 July 2007)*
- *The 6th TAWIRI Scientific Conference (3 – 6 December 2007) Presented a paper titled "*Co-operative management of wildlife and power line conflicts: an African solution"
- Pan-African Ornithological Congress (7-12 September 2008)
- International Conference on Overhead Lines, Design, Construction, Inspection & Maintenance, Fort Collins Colorado USA. (29 March – 1 April 2010) Presented a paper titled "Bird's eye view: how birds see is key to avoiding power line collision"
- Windaba 2011 – Implementing South African Wind Energy (27-29 September 2011)
- Pan African Vulture Summit (16-20 April 2012) Presented a paper titled "Electrification in Africa – Are our vultures being strung along"
- 4th Wind Power Africa Conference & Renewable Energy Exhibition (28-30 May 2012) Presented a paper titled "Wind Energy in Africa – what does this really mean for our continent's birds"
- 13th Pan-African Ornithological Congress (14-21 October 2012) Presented a paper titled "Stringing South Africa's Terrestrial Birds Along - Monitoring of Bird Interactions with Power Line and Experimental Testing of Bird Collision Mitigation at the Karoo Long Term Monitoring Site"
- AEWA Single Species Action-Planning Workshop for the Conservation of the Grey Crowned Crane (10-13 September 2013) Presented and participated in the workshop as a subject expert (energy and bird interactions)

AUTHORED & CO-AUTHORED PAPERS

Jenkins, A.R., Smallie, J. & Diamond, M. 2009. Balls, flashers, flappers and coils: South African perspectives on a global search for ways to prevent avian collisions with overhead lines. In: Harebottle, D.M., Craig, A.J.F.K., Anderson, M.D., Rakatomonana, H. & Muchai, M. (eds). Proceedings of the 12th Pan-African Ornithological Congress, 2008. Cape Town, Animal Demography Unit.

Smallie, J., Diamond, M. & Jenkins, A. 2009. Lighting up the African continent – what does it mean for our birds? pp. 38–43. In: Harebottle, D.M., Craig, A.J.F.K., Anderson, M.D., Rakotomanana, H. & Muchai. (eds). *Proceedings of the 12th Pan-African Ornithological Congress, 2008.* Cape Town, Animal Demography Unit.

Jenkins, A. R., Smallie, J.J and Diamond, M. 2010 Avian collisions with power lines: a global review of causes and mitigation with a South African perspective. Bird Conservation International, page1 of16.

Retief, E.F., Diamond, M., Anderson, M.D., Smit, H.A., Jenkins, A.R., Brooks, M. 2011. Avian Wind Farm Sensitivity Map for South Africa.

Jenkins, A.R., Van Rooyen, C.S., Smallie, J.J., Harrison, J.A., Diamond, M. And Smit, H.A. 2012. BirdLife South Africa / Endangered Wildlife Trust best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa.

Jenkins, A.R., De Goede, K.H., Sebele, L. and Diamond, M. 2013. Brokering a settlement between eagles and industry: sustainable management of large raptors nesting on power infrastructure. Bird Conservation International (2013) 23:232 – 246.

Diamond, M., Harris, J., Mirande, C. and Austin, J. 2014. People of a feather flock together: A global initiative to address crane and power line interactions. 13th North American Crane Workshop Summary. Lafayette, Louisiana.

Page-Nicholson, S., Tate, G., Hoogstad, C., Murison, M., Diamond, M., Blofield, A., Pretorius, M., Michael, M.D. 2018. Mitigating the Impact of Large Mammals on Wooden Electrical Distribution Poles in the Kruger National Park, South Africa. African Journal of Wildlife Research.

Diamond, M. and Hoogstad, C. (in press) Collisions and habitat loss associated with utility lines and wind turbines. IUCN SSC Crane Specialist Group – Crane Conservation Strategy.