

OCTOBER 2021



BULHOEK FARM CHICKEN HOUSE EXPANSION PROJECT
SITE SENSITIVITY VERIFICATION & AVIFAUNAL COMPLIANCE STATEMENT

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

PREPARED FOR:
MEGAN SMITH
ENVIROWORKS
BLOCK B2, EDISON SQUARE
C/O CENTURY AVENUE AND EDISON WAY
CENTURY CITY, 7446
MEGAN.SMITH@ENVIROWORKS.CO.ZA

PROFESSIONAL EXPERIENCE

Ms. Megan Diamond Megan 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 15 years' worth of experience in the field of bird interactions with various infrastructure developments and during this time has completed impact assessments for over 140 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 properties 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), IAIA (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 Powerline 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 Enviroworks (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 compliance statement 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 avifaunal compliance statement is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken.
- * This statement is based on a desktop investigation using the available information and data related to the site to be affected and a one-day, single season site visit to the study area on 14 September 2021. No long-term investigation or monitoring has been conducted.
- * The Precautionary Principle has been applied throughout this investigation.
- * The findings, results, observations, conclusions and recommendations given in this statement are based on the author's best scientific and professional knowledge as well as available information at the time of the 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 statement.
- * The specialist investigator reserves the right to modify this statement, recommendations and conclusions at any stage should additional information become available.
- * Information, recommendations and conclusions in this compliance statement cannot be applied to any other area without proper investigation.
- * This statement, 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 statement, in any physical or digital form, serves to confirm acknowledgment of these terms and liabilities.

TABLE OF CONTENTS

PROFESSIONAL EXPERIENCE	2
DECLARATION OF INDEPENDENCE	3
INDEMNITY	3
1. INTRODUCTION	5
2. STUDY METHODOLOGY	6
2.1 Terms of Reference	6
2.2 Structure of this report.....	7
2.3 Methods	9
2.4 Data Sources.....	9
3. ASSUMPTIONS, UNCERTAINTIES & GAPS IN KNOWLEDGE	12
4. SITE DESCRIPTION/ DESCRIPTION OF THE BASELINE CONDITIONS	13
4.1 Avifaunal Habitats.....	13
4.2 Relevant Bird Populations.....	14
4.2.1 <i>Important Bird Areas</i>	14
4.2.2 <i>Coordinated Avifaunal Roadcount (CAR) Routes</i>	14
4.2.3 <i>Coordinated Waterbird Count (CWAC) Sites</i>	14
4.2.4 <i>South African Bird Atlas Project 2 Data (SABAP2)</i>	14
4.2.5 <i>Primary Data Collection</i>	14
5. SITE SENSITIVITY VERIFICATION.....	15
6. IMPACT ASSESSMENT	15
6.1 Significance of the Impacts.....	15
6.2 Environmental Management Programme (EMPr) Input.....	17
7. AVIFAUNAL COMPLIANCE STATEMENT	18
8. IMPACT STATEMENT	18
9. REFERENCES	19
APPENDIX 1: SOUTH AFRICAN BIRD ATLAS PROJECT DATA (SABAP2) FOR THE PROPOSED CHICKEN HOUSE EXPANSION PROJECT.....	20
APPENDIX 2: AVIFAUNAL HABITAT OBSERVED WITHIN THE PROPOSED DEVELOPMENT AREA	27
APPENDIX 3: METHOD OF ASSESSING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS	30
APPENDIX 4: CURRICULUM VITAE	33

1. INTRODUCTION

Quantum Foods (Pty) Ltd (hereinafter referred to as *Quantum Foods*) is proposing to expand their existing poultry houses, located on Farm Bulhoek 389, in the Swartruggens area of the North West Province (FIGURE 1). The proposed expansion comprises of an additional eight layer and rearing houses, six of which will be positioned on existing footprints - each with a footprint of either 60m x 13.5m or 100m x 12m depending on the site. Eighteen evaporation ponds (each being 25m²) are also proposed to treat the wash water and similarly 16 ponds will be positioned on existing footprints.

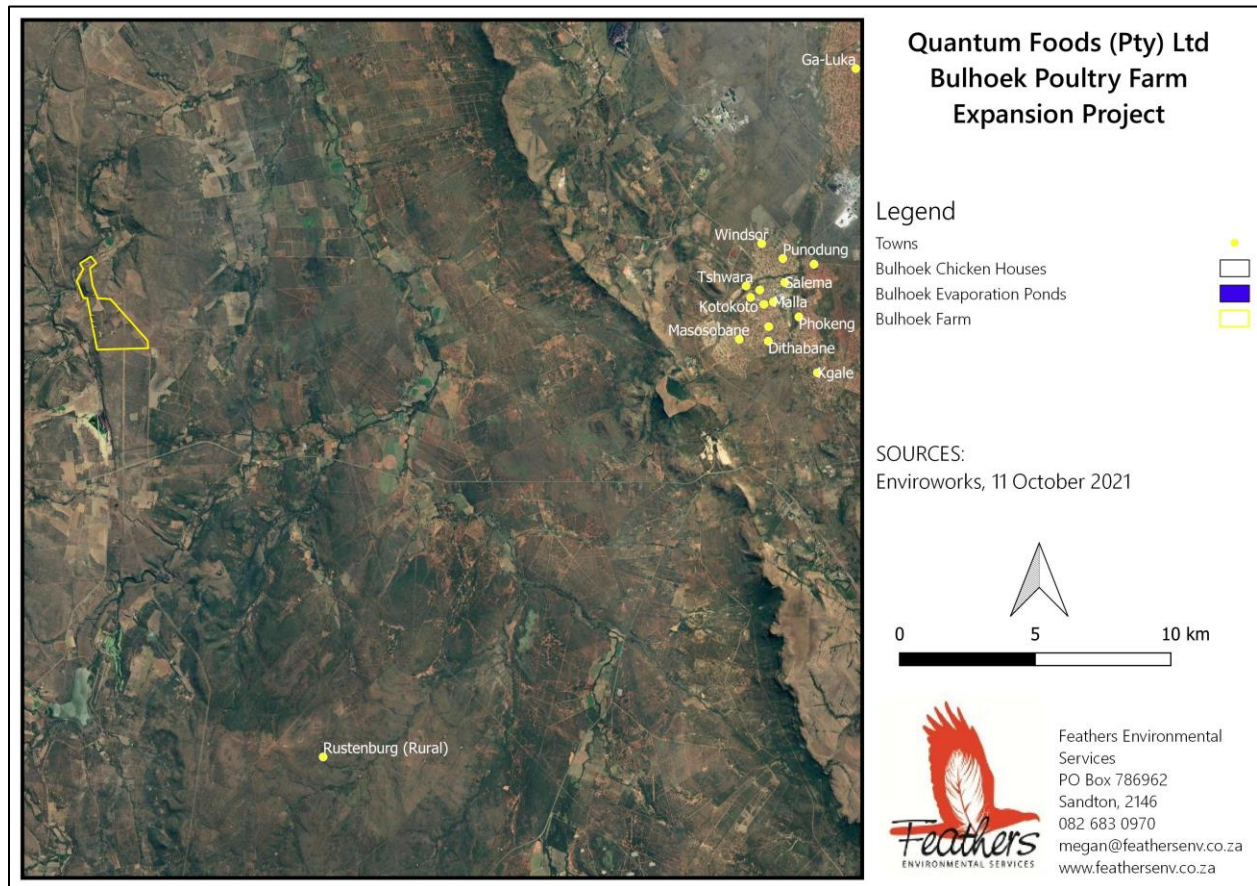


FIGURE 1: Regional map detailing the location of the proposed Bulhoek Farm Chicken House Expansion Project, located in the North West Province.

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 these requirements, *Quantum Foods* appointed Enviroworks (Pty) Ltd, (hereinafter referred to as *Enviroworks*) as the independent Environmental Assessment Practitioner (EAP) to undertake and manage the

Basic Assessment process for the proposed development. Feathers Environmental Services CC is subcontracted to *Enviroworks* in the role of Avifaunal Specialist to undertake a site sensitivity verification in order to confirm the current land use and avifaunal sensitivity of the proposed project area, as identified by the National Web-Based Environmental Screening Tool and compile a statement confirming the identified impacts and any changes with the revised layout.

2. STUDY METHODOLOGY

2.1 Terms of Reference

This avifaunal compliance statement has been compiled in accordance with the *Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species* (October, 2020) and is based on a MEDIUM terrestrial animal sensitivity, identified by the National Web-based Environmental Screening Tool. The following scope of work is required:

- * A site sensitivity verification must be undertaken through the use of:
 - o a desk top analysis, using satellite imagery;
 - o a preliminary on-site inspection; and
 - o any other available and relevant information.

- * The outcome of the site sensitivity verification must be recorded in the form of a report that:
 - o confirms or disputes the current use of the land and environmental sensitivity as identified by the screening tool;
 - o contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and
 - o is submitted together with the relevant assessment report prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

- * A site identified by the screening tool as being of “medium sensitivity” for terrestrial animal species must submit either a Terrestrial Animal Species Specialist Assessment Report or a Terrestrial Animal Species Compliance Statement, depending on the outcome of a site inspection.

- * Where no Species of Conservation Concern (SCC) are found on site during the site inspection or the presence is confirmed to be unlikely, a Terrestrial Animal Species Compliance Statement must be submitted.

- * The compliance statement must:
 - o be applicable to the study area;
 - o confirm that the study area, is of “low” sensitivity for terrestrial animal species; and
 - o indicate whether or not the proposed development will have any impact on the SCC.

2.2 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: 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-	
	details of-	
(a)	(i) the specialist who prepared the report; and	Professional Experience and Appendix 4
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Professional Experience and Appendix 4
(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 2
(cA)	an indication of the quality and age of base data used for the specialist report;	Section 2
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 4
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 2
(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 2
(g)	an identification of any areas to be avoided, including buffers;	Not Applicable

Legal Requirement		Relevant Section in Specialist study
(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;	Not Applicable
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 3
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 4,5 and 6
(k)	any mitigation measures for inclusion in the EMPr;	Section 6
(l)	any conditions for inclusion in the environmental authorisation;	Section 6
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Not Applicable
(n)	a reasoned opinion	Section 7 and 8
	whether the proposed activity, activities or portions thereof should be authorised;	Section 7 and 8
	regarding the acceptability of the proposed activity or activities; and	Section 7 and 8
	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 7 and 8
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Not Applicable
(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 <i>gazetted</i> 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.	Not Applicable

Further to the list of Specialist Report Requirements, the following describes the requirements as per Government Notice No. 648 for the Terrestrial Animal Species Compliance Statement:

- * Contact details of the specialist, their SACNASP registration number, their field of expertise and a *curriculum vitae* - Front Page and Appendix 4;
- * A signed statement of independence by the specialist - Page 3;
- * 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 2 ;
- * A baseline profile description of biodiversity and ecosystems of the site - Section 4;
- * The methodology used to verify the sensitivities of the terrestrial biodiversity and plant species features on the site including the equipment and modelling used where relevant - Section 2;
- * Where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr Section 6;
- * A description of the assumptions made as well as any uncertainties or gaps in knowledge or data - Section 3; and
- * Any conditions to which this statement is subjected - Section 7 and 8.

2.3 Methods

The following methodology was employed to compile this avifaunal compliance statement:

- * A site sensitivity verification was conducted through the use of a desk top analysis, using satellite imagery; and other available and relevant information, in addition to an on-site inspection;
- * Various avifaunal datasets were assessed and the avifaunal communities (particularly with reference to SCC) most likely to impacted on by the proposed expansion project are described; and
- * The provision of recommendations and compliance.

2.4 Data Sources

The following data sources and reports were used in varying levels of detail for this study:

- * Screening Report for an Environmental Authorisation as required by the 2014 EIA Regulations - Proposed Site Environmental Sensitivity: Bulhoek Farm, Quantum Foods Chicken Houses Expansion compiled by *Enviroworks* on 28 June 2021;
- * The Important Bird Areas (IBAs) report (Marnewick et al. 2015) was consulted to determine the location of the nearest IBAs and their importance for this study (FIGURE 2);
- * The Co-ordinated Waterbird Count (CWAC – Taylor et al. 1999) data was consulted determine if large concentrations of water birds, associated with South African wetlands, may occur within the study area (FIGURE 2);
- * The Coordinated Avifaunal Roadcount project (CAR – Young et al, 2003) data was consulted to obtain relevant data on large terrestrial bird report rates in the area;

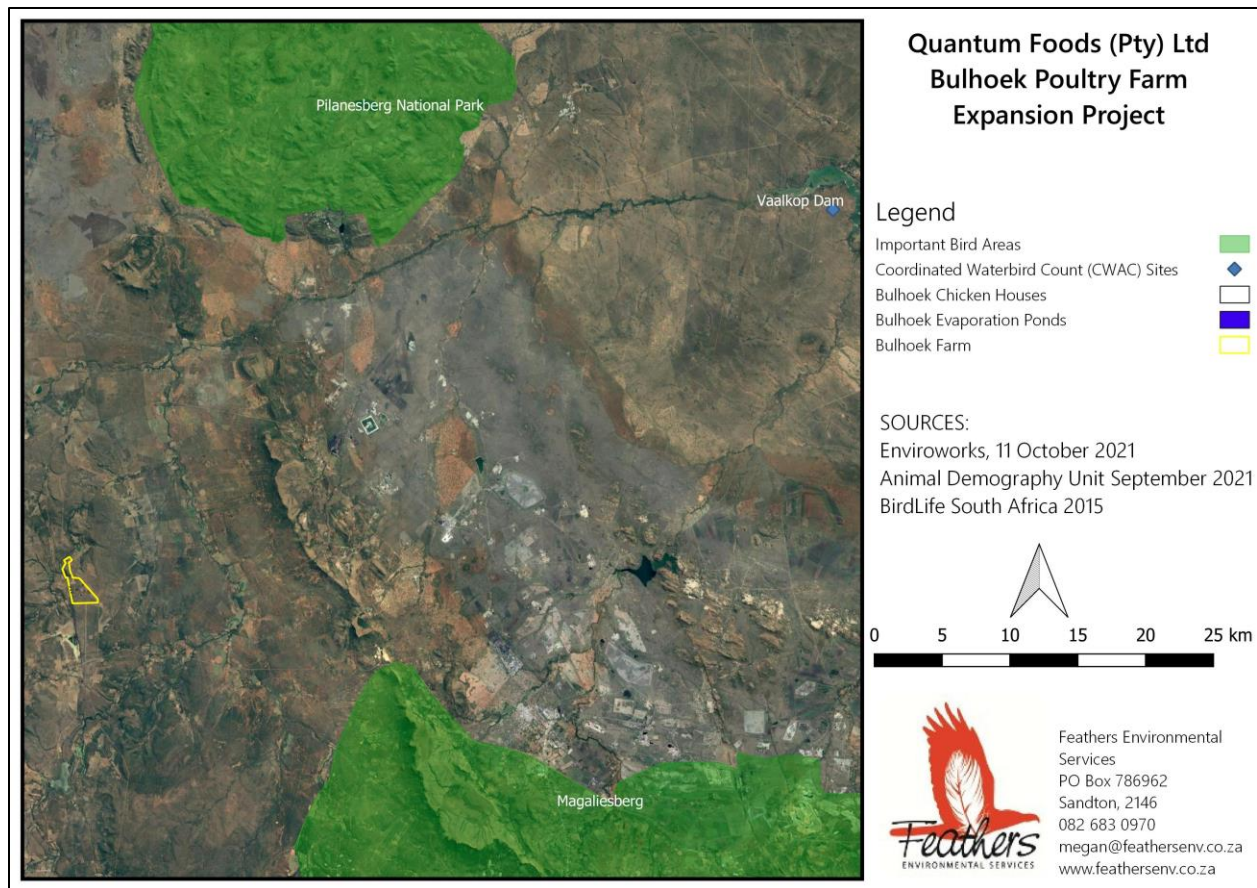


FIGURE 2: Regional map detailing the location of the proposed Bulhoek Farm Chicken House Expansion Project in relation to Important Bird Areas (IBAs) and Coordinated Waterbird Count (CAWC) Sites

- * Bird distribution data of the South African Bird Atlas 2 (SABAP 2) was obtained from the Animal Demography Unit of the University of Cape Town (13 September 2021) as a means to ascertain which species occur within the study area, based on four pentad grid cells (2530_2650; 2530_2655; 2535_2650 and 2535_2655) within which the proposed poultry farm expansion is located. Between 2007 and 2020, a total of 74 full protocol cards (i.e. 74 bird surveys lasting a minimum of two hours each) and an additional 58 adhoc surveys have been completed across the pentads (FIGURE 3);
- * The conservation status and endemism information of all bird species occurring in the aforementioned pentads was then determined with the use of the Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland (Taylor et al. 2015) and the IUCN Red List of Threatened Species (www.iucnredlist.org);
- * High-resolution Google Earth ©2021 imagery was used to examine the microhabitats within the proposed study area;
- * KMZ/KML shapefile detailing the location of the proposed poultry farm expansion was obtained from Enviroworks on 20 September 2021, a revised site layout dated 7 October 2021 and a further revised layout dated 20 October detailing the locations of the evaporation ponds; and

- * A one-day field visit to the proposed study area was conducted on 14 September 2021 to form a first-hand impression of avifaunal species presence and micro-habitat occurring within the proposed development area (FIGURE 4). This information, together with the SABAP2 data was used to compile a comprehensive list of species that could occur in the study area.

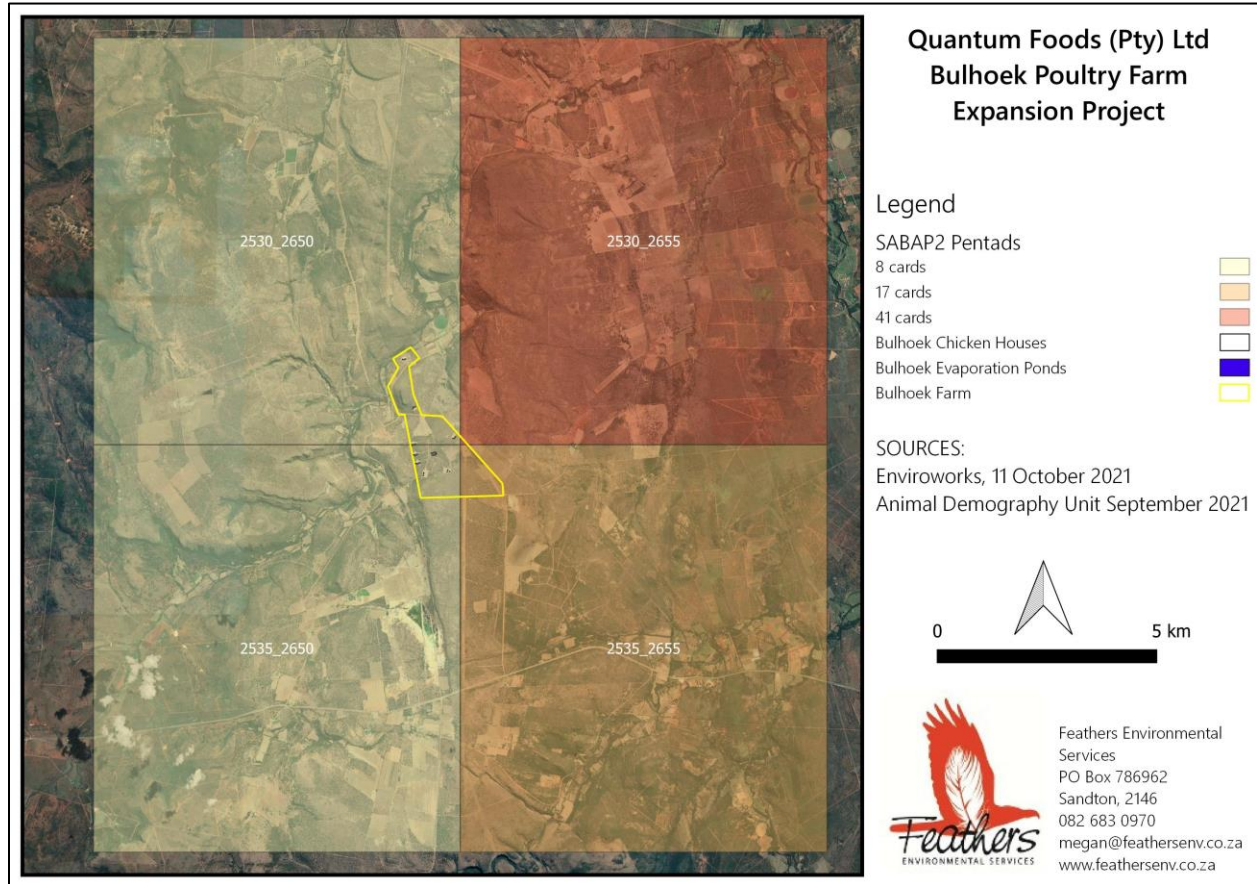


FIGURE 3: The four South African Bird Atlas Project 2 (SABAP2) pentad grid cells that were considered for the proposed Bulhoek Farm Chicken House Expansion Project

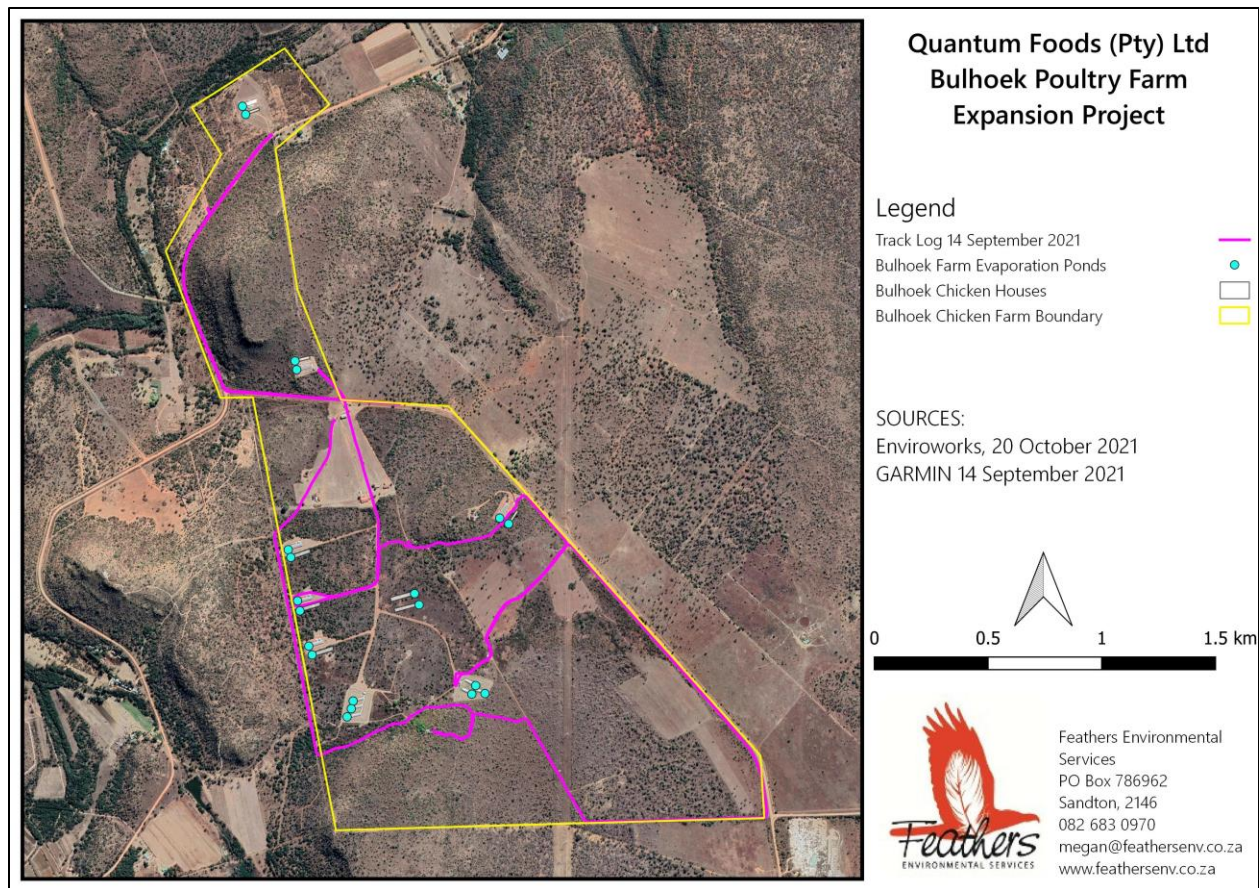


FIGURE 4: Location map detailing the routes surveyed during the site verification of the development area conducted on 14 September 2021.

3. ASSUMPTIONS, UNCERTAINTIES & GAPS IN KNOWLEDGE

The avifaunal specialist assumed that the sources of information used for this 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.

- * The report is the result of a short-term study and is based on a one-day site verification visit to the proposed study area. No long-term, seasonal monitoring was conducted by the avifaunal specialist. This assessment relies upon secondary data sources with regards to bird occurrence and abundance such as the SABAP2 and IBA projects. These comprehensive datasets provide a valuable baseline against which any changes in species presence, abundance, and distribution can be monitored. However, primary information on bird habitat and avifaunal species occurrence collected during the site visit and together with professional judgement, based on extensive field experience since 2006, was used directly in determining which species of conservation importance are likely to occur within suitable avifaunal habitat types within the proposed development area;

- * 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 can't 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 displacement impacts associated with the proposed chicken house expansion project will be unavoidable, they are likely to be temporary and of moderate-low significance.

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 compliance statement.

4. SITE DESCRIPTION/ DESCRIPTION OF THE BASELINE CONDITIONS

4.1 Avifaunal Habitats

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. Investigation of the proposed chicken house expansion development area and the broader area revealed five broadly described avifaunal micro habitats i.e. bushveld, fallow land, mountainous areas, exotic tree stands and built-up areas with APPENDIX 2 providing a photographic record of the bird habitats.

The proposed development area is located in the Savanna Biome and is comprised entirely of Dwarsberg-Swartruggens Mountain Bushveld (Mucina & Rutherford, 2006). This vegetation unit contains a highly variable vegetation structure that is differentiated by diverse tree and shrub layers and is dominated by *Vachellia* species. In some places, the woody layer may occur as bush clumps and the grass layer is generally very dense with a great variety of grass species. Bushveld supports a large variety of bird species but very few bird species are restricted to this biome. Woodland is particularly rich in raptors and some large terrestrial species i.e. Secretarybird *Sagittarius serpentarius*. It must be noted that additional chicken houses are to be constructed within the confines of existing footprints - areas that have been transformed to a large extent and subject to

existing disturbance associated with the operational activities of the existing poultry farm. It is highly unlikely that the microhabitats within the proposed development area will support Secretarybird.

4.2 Relevant Bird Populations

4.2.1. Important Bird Areas

The proposed expansion project area is not located within the confines of an IBA. The closest IBAs (i.e. Magaliesberg and Pilanesberg National Park) to the proposed development area occur within a 30km radius (FIGURE 4). Although Secretarybird occurs regularly within both IBAs (Marnewick et al, 2015), the construction and operation activities associated with the proposed chicken house expansion project will not have a significant negative impact on the IBAs and the species they support.

4.2.2. Coordinated Avifaunal Roadcount (CAR) Routes

The CAR project monitors the populations of 36 species of large terrestrial birds (including Secretarybird) in agricultural habitats, in addition to gamebirds, raptors and corvids along 350 fixed routes covering over 19 000km (<http://car.adu.org.za/>). There are no CAR routes within close proximity to the proposed development area and therefore no records of Secretarybird.

4.2.3. Coordinated Waterbird Count (CWAC) Sites

The CWAC project was launched as part South Africa's commitment to International waterbird conservation, by means of a programme of regular mid-summer and mid-winter censuses at a large number of South African waterbodies. Currently the project regularly monitors over 400 waterbodies and furthermore curates waterbird data for over 600 sites (<http://cwac.birdmap.africa/sites>). There are no CWAC sites within close proximity to the proposed development area.

4.2.4. South African Bird Atlas Project 2 Data (SABAP2)

A total of 242 bird species have been recorded within the expansion project development area, six of which are Red List species (APPENDIX 1). However these species have not been observed in abundance, with only 1-3 individuals recorded during the SABAP2 atlassing period to date. It is important to note that Secretarybird has not been recorded in any of the four pentad grid cells (Taylor et al, 2015).

4.2.5. Primary Data Collection

The site visit produced a combined list of 29 species (APPENDIX 1 - highlighted in grey), covering both the development area and to a limited extent, the surrounding area. Secretarybird was not observed. The majority of observations were of passerine species that are common to this area. Each of these species has the potential to be displaced by the construction of proposed chicken houses as a result of disturbance. However, these species have persisted despite existing disturbance (i.e. pastoral, agricultural, residential activities and vehicle disturbance within the study area. This resilience, coupled with the fact that similar habitat is available throughout the broader area, means that the displacement impact will not be of regional or national significance.

5. SITE SENSITIVITY VERIFICATION

A screening report for the proposed project area was compiled on 28 June 2021. The proposed development area is considered to have a MEDIUM Animal Species Theme sensitivity, based on the presence of habitat within the proposed development area that may potentially support Secretarybird and/or historical records that indicate that Secretarybird are likely to be present. Information gathered from the desktop analysis and in-field site verification find the proposed development area to be of LOW sensitivity owing to the fragmented nature of the habitat within the development area and the degree of existing disturbance which preclude the presence of this SCC. Secretarybird were not observed during the field survey, which further supports the LOW sensitivity rating.

6. IMPACT ASSESSMENT

6.1 Significance of the Impacts

The key impact associated with the chicken house expansion project is the displacement of SCC as a result of habitat loss or transformation and disturbance associated with construction activities. The effect of the vegetation clearing is always more marked in woodland areas, where construction necessitates the removal of woody plants, and especially large trees. Relevant to this project, the additional houses and evaporation ponds will be constructed adjacent to the existing footprints and will require minimal removal of the natural vegetation. The loss of habitat may potentially be more significant for the more common passerine species. While each of these species has the potential to be displaced by the construction of the power line infrastructure, identical habitat features prominently in the surrounding areas providing alternate foraging, roosting and breeding areas for the species observed.

Excavation and construction activities are a source of significant disturbance particularly as a result of the machinery and construction personnel that are present on site for the duration of the construction of the proposed chicken houses and evaporation ponds. For most bird species, construction activities are likely to be a cause of temporary disturbance impacting on foraging, and roosting behaviours but in more extreme cases, construction may impact on the breeding success of certain species particularly if the disturbance happens during a critical part of the breeding cycle, resulting in temporary breeding failure or permanent nest abandonment. The proposed development area is already subjected to a degree of disturbance associated with the operation of the poultry farm and the majority of species are accustomed to the existing disturbance and have persisted within the development area. This impact is likely to cause temporary displacement of the common passerines from the area.

Evaporation ponds are one of many sources that may contribute to entrapment and drowning impacts to birds. The risk of mortality increases where ponds are located in areas with few water resources, making them more attractive to birds (McCrary et al. 1986; Kagan et al. 2014; Smith & Dwyer 2016) as a food and drinking

source, but also an area of potential impact by being a source of toxicity. Entrapment and drowning has been well documented at evaporation ponds associated with oil fields and solar facilities, and although little to no information pertaining to avian mortalities at evaporation ponds, associated with agricultural and poultry facilities exists, the potential for this impact to occur at the proposed facility remains possible albeit it of low significance for SSC. In the event that mortalities are recorded, this impact is easily mitigated with the installation of netting to exclude birds.

TABLE 2: Assessment of the habitat loss and/or transformation caused by the construction and operation of the proposed chicken houses and evaporation ponds

Activity:	Construction and operation of the proposed chicken houses & evaporation ponds				
Impact:	Displacement of SCC as a result of habitat loss & transformation				
Significance rating:	Magnitude	Duration	Scale	Probability	Significance
Pre-Mitigation	4	2	2	3	(24) LOW
Post-Mitigation	2	2	1	2	(10) LOW
Is the Impact Reversible?	* Medium reversibility - The construction of the infrastructure may require the removal of riparian vegetation within the project footprint.				
Residual impacts:	* Species are likely return once the construction activity is completed and the vegetation reestablishes itself.				

TABLE 3: Assessment of the disturbance impact caused by the construction and operation of the proposed chicken houses and evaporation ponds

Activity:	Construction and operation of the proposed chicken houses & evaporation ponds				
Impact:	Displacement of Red List species as a result of disturbance				
Significance rating:	Magnitude	Duration	Scale	Probability	Significance
Pre-Mitigation	4	2	1	3	(21) LOW
Post-Mitigation	2	2	1	2	(10) LOW
Is the Impact Reversible?	* High reversibility - After the construction activities, have ceased, the source of displacement will cease.				
Residual impacts:	* The majority of species observed in the study area may return once the construction activity is completed				

TABLE 4: Assessment of the mortality (entrapment and drowning) impact caused by the construction and operation of the proposed evaporation ponds

Activity:	Construction and operation of the proposed evaporation ponds				
Impact:	Mortality of Red List species as a result of entrapment and drowning				
Significance rating:	Magnitude	Duration	Scale	Probability	Significance
Pre-Mitigation	6	4	2	2	(24) LOW
Post-Mitigation	2	4	2	1	(16) LOW
Is the Impact Reversible?	* High reversibility - the implementation of mitigation measures will significantly reduce the mortality impact.				
Residual impacts:	* None				

6.2 Environmental Management Programme (EMPr) Input

OBJECTIVE: Mitigate the displacement and mortality impacts to ensure that the impacts remains at a low risk/sensitivity

Project component/s	Chicken houses & evaporation ponds	
Potential Impact	Permanent displacement and mortality of local populations of Red List species caused by habitat loss, disturbance, entrapment and drowning.	
Activity/risk source	Unmitigated construction and operational activities.	
Mitigation: Action/control	Responsibility	Timeframe
<p><i>Displacement as a result of habitat loss:</i></p> <ul style="list-style-type: none"> * Avoid removal of sensitive vegetation types. The recommendations of the botanical study must be strictly implemented, especially as far as limitation of the construction footprint and rehabilitation of disturbed areas is concerned. * Construction activity should be restricted to the immediate footprint of the infrastructure in areas of HIGH sensitivity. * All construction activities should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. * All temporary disturbed areas should be rehabilitated according to the site's rehabilitation plan, following construction. 	<p>Construction Manager, Environmental Control Officer and Avifaunal Specialist.</p>	<p>From the commencement of construction (inclusive of all project components to the completion of construction.</p>

<p><i>Displacement as a result of disturbance:</i></p> <ul style="list-style-type: none"> * Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of SCC. * Measures to control noise should be applied according to current best practice in the industry. 	<p>Construction Manager, Environmental Control Officer and Avifaunal Specialist.</p>	<p>From the commencement of construction (inclusive of all project components to the completion of construction.</p>
<p><i>Mortality as a result of entrapment and drowning within the evaporation ponds</i></p> <ul style="list-style-type: none"> * The installation of mesh netting will ensure that birds are excluded from the ponds * Mesh netting must be maintained and replaced as and when required. 	<p>Environmental Control Officer and Avifaunal Specialist.</p>	<p>From the commencement of construction (inclusive of all project components to the completion of construction.</p> <p>For the duration of the operational lifespan of the Bulhoek poultry farm</p>

7. AVIFAUNAL COMPLIANCE STATEMENT

Through the site verification, background investigation and impact assessment, the following are confirmed by the specialist:

- * The proposed development site is of LOW avifaunal sensitivity.
- * The areas earmarked for the additional chicken houses and evaporation ponds are located adjacent to the existing chicken house footprints located on sparse vegetation and is a significant distance from any sensitive or unique ecological feature.
- * Impacts have been identified with proposed mitigation measures. Should these measures be adhered to, the proposed expansion project would remain a low sensitivity.
- * A list of conditions has been provided that should be included in the EMPr.

8. IMPACT STATEMENT

The overall impact of the proposed Bulhoek Farm Chicken House Expansion Project, on the avifaunal community, particularly Secretarybird, is seen as acceptably LOW and therefore, impacts can be mitigated to acceptable levels (see section 6) allowing for the development to be authorised.



MEGAN DIAMOND
 Avifaunal Specialist (BSc Environmental Management)
 25 October 2021

9. REFERENCES

Animal Demography Unit. 2015. <http://cwac.adu.org.za/>. Accessed 13 September 2021

Animal Demography Unit. 2017. <http://car.adu.org.za/>. Accessed 13 September 2021

Kagan RA, Viner TC, Trail PW, Espinoza EO. 2014. Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis. National Fish and Wildlife Forensics Laboratory Ashland, Oregon

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.

McCrary M, McKernan R, Schreiber R, Wagner W, Sciarrotta T. 1986. Avian mortality at a solar energy power plant. *Journal of Field Ornithology* 57:135–141

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

Smith JA, Dwyer JF. 2016. Avian interactions with renewable energy infrastructure: An update. *Condor* 118:411–423

Southern African Bird Atlas Project 2 (SABAP2). <http://sabap2.adu.org.za>. Accessed 13 September 2021

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.

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 PROPOSED CHICKEN HOUSE EXPANSION PROJECT

Family Name	Scientific name	Red List Global	Red List Regional	Endemicity South Africa	Full Protocol Report Rate	No.of Birds	Adhoc Report Rate	Adhoc No.of Birds
Babbler, Arrow-marked	<i>Turdoides jardineii</i>				85.1	63	13.8	8
Babbler, Southern Pied	<i>Turdoides bicolor</i>				6.8	5	6.9	4
Barbet, Acacia Pied	<i>Tricholaema leucomelas</i>				8.1	6	0.0	0
Barbet, Black-collared	<i>Lybius torquatus</i>				60.8	45	12.1	7
Barbet, Crested	<i>Trachyphonus vaillantii</i>				83.8	62	15.5	9
Batis, Chinspot	<i>Batis molitor</i>				43.2	32	12.1	7
Bee-eater, European	<i>Merops apiaster</i>				36.5	27	6.9	4
Bee-eater, Little	<i>Merops pusillus</i>				1.4	1	3.4	2
Bee-eater, White-fronted	<i>Merops bullockoides</i>				13.5	10	8.6	5
Bishop, Southern Red	<i>Euplectes orix</i>				4.1	3	0.0	0
Bishop, Yellow-crowned	<i>Euplectes afer</i>				2.7	2	0.0	0
Bokmakierie	<i>Telophorus zeylonus</i>				1.4	1	0.0	0
Boubou, Southern	<i>Laniarius ferrugineus</i>				70.3	52	13.8	8
Brubru	<i>Nilaus afer</i>				8.1	6	0.0	0
Buffalo-Weaver, Red-billed	<i>Bubalornis niger</i>				1.4	1	0.0	0
Bulbul, African Red-eyed	<i>Pycnonotus nigricans</i>				4.1	3	0.0	0
Bulbul, Dark-capped	<i>Pycnonotus tricolor</i>				95.9	71	29.3	17
Bunting, Cape	<i>Emberiza capensis</i>				1.4	1	0.0	0
Bunting, Cinnamon-breasted	<i>Emberiza tahapisi</i>				25.7	19	10.3	6
Bunting, Golden-breasted	<i>Emberiza flaviventris</i>				33.8	25	12.1	7
Bush-shrike, Grey-headed	<i>Malaconotus blanchoti</i>				18.9	14	0.0	0
Bush-shrike, Orange-breasted	<i>Chlorophoneus sulfureopectus</i>				23.0	17	6.9	4
Buzzard, Steppe	<i>Buteo buteo</i>				10.8	8	6.9	4
Camaropectera, Grey-backed	<i>Camaropectera brevicaudata</i>				29.7	22	5.2	3
Canary, Black-throated	<i>Crithagra atrogularis</i>				20.3	15	3.4	2
Canary, Yellow-fronted	<i>Crithagra mozambica</i>				48.6	36	13.8	8
Chat, Familiar	<i>Cercomela familiaris</i>				1.4	1	0.0	0
Cisticola, Desert	<i>Cisticola aridulus</i>				2.7	2	1.7	1
Cisticola, Lazy	<i>Cisticola aberrans</i>				6.8	5	0.0	0
Cisticola, Levaillant's	<i>Cisticola tinniens</i>				2.7	2	0.0	0
Cisticola, Rattling	<i>Cisticola chiniana</i>				25.7	19	8.6	5
Cisticola, Zitting	<i>Cisticola juncidis</i>				25.7	19	5.2	3
Cliff-Swallow, South African	<i>Petrochelidon spilodera</i>			Endemic	1.4	1	0.0	0
Coot, Red-knobbed	<i>Fulica cristata</i>				4.1	3	0.0	0
Cormorant, Reed	<i>Phalacrocorax africanus</i>				9.5	7	0.0	0
Cormorant, White-breasted	<i>Phalacrocorax lucidus</i>				6.8	5	0.0	0
Coucal, Burchell's	<i>Centropus burchellii</i>				18.9	14	5.2	3
Courser, Temminck's	<i>Cursorius temminckii</i>				2.7	2	1.7	1

Family Name	Scientific name	Red List Global	Red List Regional	Endemicity South Africa	Full Protocol Report Rate	No.of Birds	Adhoc Report Rate	Adhoc No.of Birds
Crake, Black	<i>Amaurornis flavirostra</i>				1.4	1	0.0	0
Crombec, Long-billed	<i>Sylvietta rufescens</i>				31.1	23	6.9	4
Crow, Pied	<i>Corvus albus</i>				20.3	15	20.7	12
Cuckoo, Black	<i>Cuculus clamosus</i>				17.6	13	15.5	9
Cuckoo, Diderick	<i>Chrysococcyx caprius</i>				21.6	16	12.1	7
Cuckoo, Jacobin	<i>Clamator jacobinus</i>				9.5	7	3.4	2
Cuckoo, Levillant's	<i>Clamator levillantii</i>				10.8	8	5.2	3
Cuckoo, Red-chested	<i>Cuculus solitarius</i>				25.7	19	13.8	8
Cuckooshrike, Black	<i>Campephaga flava</i>				16.2	12	8.6	5
Dove, Laughing	<i>Streptopelia senegalensis</i>				85.1	63	25.9	15
Dove, Namaqua	<i>Oena capensis</i>				2.7	2	5.2	3
Dove, Red-eyed	<i>Streptopelia semitorquata</i>				79.7	59	19.0	11
Dove, Rock	<i>Columba livia</i>				6.8	5	1.7	1
Drongo, Fork-tailed	<i>Dicrurus adsimilis</i>				87.8	65	36.2	21
Duck, African Black	<i>Anas sparsa</i>				1.4	1	0.0	0
Duck, Comb	<i>Sarkidiornis melanotos</i>				0.0	0	1.7	1
Duck, White-faced	<i>Dendrocygna viduata</i>				2.7	2	3.4	2
Duck, Yellow-billed	<i>Anas undulata</i>				12.2	9	0.0	0
Eagle, Martial	<i>Polemaetus bellicosus</i>	VU	EN		1.4	1	0.0	0
Eagle, Verreaux's	<i>Aquila verreauxii</i>	LC	VU		1.4	1	0.0	0
Eagle, Wahlberg's	<i>Hieraaetus wahlbergi</i>				1.4	1	1.7	1
Eagle-Owl, Spotted	<i>Bubo africanus</i>				8.1	6	8.6	5
Egret, Cattle	<i>Bubulcus ibis</i>				27.0	20	12.1	7
Egret, Great	<i>Egretta alba</i>				1.4	1	0.0	0
Egret, Little	<i>Egretta garzetta</i>				1.4	1	0.0	0
Eremomela, Burnt-necked	<i>Eremomela usticollis</i>				0.0	0	3.4	2
Eremomela, Yellow-bellied	<i>Eremomela icteropygialis</i>				2.7	2	0.0	0
Falcon, Amur	<i>Falco amurensis</i>				1.4	1	0.0	0
Finch, Cut-throat	<i>Amadina fasciata</i>				2.7	2	5.2	3
Finch, Scaly-feathered	<i>Sporopipes squamifrons</i>				0.0	0	1.7	1
Firefinch, Jameson's	<i>Lagonosticta rhodopareia</i>				18.9	14	5.2	3
Firefinch, Red-billed	<i>Lagonosticta senegala</i>				18.9	14	5.2	3
Fiscal, Common	<i>Lanius collaris</i>				23.0	17	6.9	4
Fish-Eagle, African	<i>Haliaeetus vocifer</i>				18.9	14	3.4	2
Flycatcher, Fairy	<i>Stenostira scita</i>			Near endemic	2.7	2	0.0	0
Flycatcher, Fiscal	<i>Sigelus silens</i>			Near endemic	6.8	5	0.0	0
Flycatcher, Marico	<i>Bradornis mariquensis</i>				8.1	6	1.7	1
Flycatcher, Southern Black	<i>Melaenornis pammelaina</i>				51.4	38	15.5	9
Flycatcher, Spotted	<i>Muscicapa striata</i>				27.0	20	13.8	8

Family Name	Scientific name	Red List Global	Red List Regional	Endemicity South Africa	Full Protocol Report Rate	No.of Birds	Adhoc Report Rate	Adhoc No.of Birds
Francolin, Crested	<i>Dendroperdix sephaena</i>				58.1	43	10.3	6
Go-away-bird, Grey	<i>Corythaixoides concolor</i>				94.6	70	36.2	21
Goose, Egyptian	<i>Alopochen aegyptiaca</i>				25.7	19	6.9	4
Goose, Spur-winged	<i>Plectropterus gambensis</i>				4.1	3	3.4	2
Goshawk, Gabar	<i>Melierax gabar</i>				5.4	4	1.7	1
Goshawk, Southern Pale Chanting	<i>Melierax canorus</i>				2.7	2	0.0	0
Grebe, Little	<i>Tachybaptus ruficollis</i>				13.5	10	3.4	2
Green-Pigeon, African	<i>Treron calvus</i>				4.1	3	0.0	0
Guineafowl, Helmeted	<i>Numida meleagris</i>				66.2	49	22.4	13
Hamerkop	<i>Scopus umbretta</i>				13.5	10	1.7	1
Harrier-Hawk, African	<i>Polyboroides typus</i>				1.4	1	0.0	0
Hawk-eagle, African	<i>Aquila spilogaster</i>				1.4	1	0.0	0
Helmet-shrike, White-crested	<i>Prionops plumatus</i>				9.5	7	3.4	2
Heron, Black-headed	<i>Ardea melanocephala</i>				8.1	6	0.0	0
Heron, Goliath	<i>Ardea goliath</i>				1.4	1	0.0	0
Heron, Grey	<i>Ardea cinerea</i>				10.8	8	1.7	1
Honeyguide, Greater	<i>Indicator indicator</i>				4.1	3	1.7	1
Honeyguide, Lesser	<i>Indicator minor</i>				16.2	12	0.0	0
Hoopoe, African	<i>Upupa africana</i>				33.8	25	12.1	7
Hornbill, African Grey	<i>Tockus nasutus</i>				75.7	56	24.1	14
Hornbill, Southern Red-billed	<i>Tockus rufirostris</i>				2.7	2	0.0	0
Hornbill, Southern Yellow-billed	<i>Tockus leucomelas</i>				25.7	19	5.2	3
Ibis, African Sacred	<i>Threskiornis aethiopicus</i>				2.7	2	0.0	0
Ibis, Hadedda	<i>Bostrychia hagedash</i>				60.8	45	15.5	9
Indigobird, Dusky	<i>Vidua funerea</i>				1.4	1	0.0	0
Indigobird, Purple	<i>Vidua purpurascens</i>				1.4	1	1.7	1
Indigobird, Village	<i>Vidua chalybeata</i>				2.7	2	3.4	2
Jacana, African	<i>Actophilornis africanus</i>				1.4	1	0.0	0
Kestrel, Greater	<i>Falco rupicoloides</i>				1.4	1	0.0	0
Kestrel, Lesser	<i>Falco naumanni</i>				4.1	3	1.7	1
Kestrel, Rock	<i>Falco rupicolus</i>				1.4	1	0.0	0
Kingfisher, Brown-hooded	<i>Halcyon albiventris</i>				47.3	35	10.3	6
Kingfisher, Giant	<i>Megaceryle maxima</i>				1.4	1	0.0	0
Kingfisher, Pied	<i>Ceryle rudis</i>				6.8	5	0.0	0
Kingfisher, Striped	<i>Halcyon chelicuti</i>				13.5	10	6.9	4
Kingfisher, Woodland	<i>Halcyon senegalensis</i>				21.6	16	8.6	5
Kite, Black-shouldered	<i>Elanus caeruleus</i>				45.9	34	25.9	15
Kite, Yellow-billed	<i>Milvus aegyptius</i>				1.4	1	0.0	0
Korhaan, Northern Black	<i>Afrotis afroides</i>				0.0	0	1.7	1

Family Name	Scientific name	Red List Global	Red List Regional	Endemicity South Africa	Full Protocol Report Rate	No.of Birds	Adhoc Report Rate	Adhoc No.of Birds
Korhaan, Red-crested	<i>Lophotis rufticrista</i>				1.4	1	3.4	2
Korhaan, White-bellied	<i>Eupodotis senegalensis</i>	LC	VU		1.4	1	0.0	0
Lapwing, African Wattled	<i>Vanellus senegallus</i>				17.6	13	13.8	8
Lapwing, Blacksmith	<i>Vanellus armatus</i>				50.0	37	6.9	4
Lapwing, Crowned	<i>Vanellus coronatus</i>				62.2	46	8.6	5
Lark, Eastern Clapper	<i>Mirafra fasciolata</i>				1.4	1	0.0	0
Lark, Flappet	<i>Mirafra rufocinnamomea</i>				2.7	2	1.7	1
Lark, Monotonous	<i>Mirafra passerina</i>				1.4	1	1.7	1
Lark, Rufous-naped	<i>Mirafra africana</i>				23.0	17	15.5	9
Lark, Sabota	<i>Calendulauda sabota</i>				2.7	2	0.0	0
Mannikin, Bronze	<i>Lonchura cucullata</i>				2.7	2	0.0	0
Martin, Brown-throated	<i>Riparia paludicola</i>				1.4	1	0.0	0
Martin, Rock	<i>Hirundo fuligula</i>				1.4	1	0.0	0
Masked-weaver, Lesser	<i>Ploceus intermedius</i>				1.4	1	1.7	1
Masked-Weaver, Southern	<i>Ploceus velatus</i>				78.4	58	24.1	14
Moorhen, Common	<i>Gallinula chloropus</i>				1.4	1	0.0	0
Mousebird, Red-faced	<i>Urocolius indicus</i>				55.4	41	12.1	7
Mousebird, Speckled	<i>Colius striatus</i>				51.4	38	8.6	5
Mousebird, White-backed	<i>Colius colius</i>				1.4	1	0.0	0
Myna, Common	<i>Acridotheres tristis</i>				63.5	47	19.0	11
Neddicky	<i>Cisticola fulvicapilla</i>				52.7	39	12.1	7
Nightjar, Fiery-necked	<i>Caprimulgus pectoralis</i>				10.8	8	6.9	4
Nightjar, Rufous-cheeked	<i>Caprimulgus rufigena</i>				12.2	9	8.6	5
Olive-Pigeon, African	<i>Columba arquatrix</i>				2.7	2	0.0	0
Oriole, Black-headed	<i>Oriolus larvatus</i>				70.3	52	19.0	11
Ostrich, Common	<i>Struthio camelus</i>				1.4	1	8.6	5
Owl, Barn	<i>Tyto alba</i>				14.9	11	5.2	3
Owlet, Pearl-spotted	<i>Glaucidium perlatum</i>				9.5	7	6.9	4
Oxpecker, Red-billed	<i>Buphagus erythrorhynchus</i>				14.9	11	8.6	5
Palm-Swift, African	<i>Cypsiurus parvus</i>				20.3	15	10.3	6
Paradise-Flycatcher, African	<i>Terpsiphone viridis</i>				35.1	26	6.9	4
Paradise-Whydah, Long-tailed	<i>Vidua paradisaea</i>				2.7	2	6.9	4
Petronia, Yellow-throated	<i>Gymnoris supercilialis</i>				2.7	2	0.0	0
Pigeon, Speckled	<i>Columba guinea</i>				23.0	17	8.6	5
Pipit, African	<i>Anthus cinnamomeus</i>				23.0	17	8.6	5
Pipit, Bushveld	<i>Anthus caffer</i>				1.4	1	0.0	0
Plover, Three-banded	<i>Charadrius tricollaris</i>				18.9	14	0.0	0
Prinia, Black-chested	<i>Prinia flavicans</i>				10.8	8	1.7	1
Prinia, Tawny-flanked	<i>Prinia subflava</i>				47.3	35	6.9	4

Family Name	Scientific name	Red List Global	Red List Regional	Endemicity South Africa	Full Protocol Report Rate	No.of Birds	Adhoc Report Rate	Adhoc No.of Birds
Puffback, Black-backed	<i>Dryoscopus cubla</i>				47.3	35	12.1	7
Pytilia, Green-winged	<i>Pytilia melba</i>				12.2	9	0.0	0
Quailfinch, African	<i>Ortygospiza fuscocrissa</i>				8.1	6	1.7	1
Quelea, Red-billed	<i>Quelea quelea</i>				28.4	21	10.3	6
Robin-Chat, Cape	<i>Cossypha caffra</i>				1.4	1	0.0	0
Robin-Chat, White-throated	<i>Cossypha humeralis</i>				13.5	10	5.2	3
Roller, European	<i>Coracias garrulus</i>	LC	NT		0.0	0	1.7	1
Roller, Lilac-breasted	<i>Coracias caudatus</i>				13.5	10	17.2	10
Roller, Purple	<i>Coracias naevius</i>				1.4	1	0.0	0
Scimitarbill, Common	<i>Rhinopomastus cyanomelas</i>				0.0	0	1.7	1
Scops-Owl, African	<i>Otus senegalensis</i>				6.8	5	1.7	1
Scops-Owl, Southern White-faced	<i>Ptilopsis granti</i>				8.1	6	3.4	2
Scrub-Robin, Kalahari	<i>Erythropygia paena</i>				1.4	1	1.7	1
Scrub-Robin, White-browed	<i>Erythropygia leucophrys</i>				28.4	21	10.3	6
Seedeater, Streaky-headed	<i>Crithagra gularis</i>				8.1	6	0.0	0
Shrike, Crimson-breasted	<i>Laniarius atrococcineus</i>				28.4	21	5.2	3
Shrike, Lesser Grey	<i>Lanius minor</i>				8.1	6	8.6	5
Shrike, Magpie	<i>Corvinella melanoleuca</i>				35.1	26	19.0	11
Shrike, Red-backed	<i>Lanius collurio</i>				25.7	19	6.9	4
Snake-Eagle, Black-chested	<i>Circaetus pectoralis</i>				6.8	5	13.8	8
Snake-Eagle, Brown	<i>Circaetus cinereus</i>				1.4	1	5.2	3
Sparrow, Cape	<i>Passer melanurus</i>				6.8	5	1.7	1
Sparrow, Great	<i>Passer motitensis</i>				0.0	0	1.7	1
Sparrow, House	<i>Passer domesticus</i>				6.8	5	1.7	1
Sparrow, Southern Grey-headed	<i>Passer diffusus</i>				75.7	56	15.5	9
Sparrowhawk, Black	<i>Accipiter melanoleucus</i>				5.4	4	0.0	0
Sparrowhawk, Little	<i>Accipiter minullus</i>				4.1	3	1.7	1
Sparrowhawk, Ovambo	<i>Accipiter ovampensis</i>				1.4	1	0.0	0
Sparrow-Weaver, White-browed	<i>Plocepasser mahali</i>				18.9	14	19.0	11
Spoonbill, African	<i>Platalea alba</i>				5.4	4	0.0	0
Spurfowl, Natal	<i>Pternistis natalensis</i>				31.1	23	8.6	5
Spurfowl, Swainson's	<i>Pternistis swainsonii</i>				62.2	46	17.2	10
Starling, Burchell's	<i>Lamprotornis australis</i>				1.4	1	0.0	0
Starling, Cape Glossy	<i>Lamprotornis nitens</i>				67.6	50	22.4	13
Starling, Red-winged	<i>Onychognathus morio</i>				9.5	7	1.7	1
Starling, Violet-backed	<i>Cinnyricinclus leucogaster</i>				14.9	11	13.8	8
Starling, Wattled	<i>Creatophora cinerea</i>				1.4	1	3.4	2
Stonechat, African	<i>Saxicola torquatus</i>				1.4	1	0.0	0
Stork, Black	<i>Ciconia nigra</i>	LC	VU		4.1	3	0.0	0

Family Name	Scientific name	Red List Global	Red List Regional	Endemicity South Africa	Full Protocol Report Rate	No.of Birds	Adhoc Report Rate	Adhoc No.of Birds
Stork, White	<i>Ciconia ciconia</i>				2.7	2	1.7	1
Sunbird, Amethyst	<i>Chalcomitra amethystina</i>				40.5	30	12.1	7
Sunbird, Marico	<i>Cinnyris mariquensis</i>				1.4	1	3.4	2
Sunbird, White-bellied	<i>Cinnyris talatala</i>				77.0	57	13.8	8
Swallow, Barn	<i>Hirundo rustica</i>				36.5	27	13.8	8
Swallow, Greater Striped	<i>Cecropis cucullata</i>				29.7	22	13.8	8
Swallow, Lesser Striped	<i>Cecropis abyssinica</i>				24.3	18	13.8	8
Swallow, Pearl-breasted	<i>Hirundo dimidiata</i>				24.3	18	8.6	5
Swallow, Red-breasted	<i>Cecropis semirufa</i>				8.1	6	6.9	4
Swallow, White-throated	<i>Hirundo albigularis</i>				4.1	3	0.0	0
Swift, African Black	<i>Apus barbatus</i>				1.4	1	0.0	0
Swift, Common	<i>Apus apus</i>				2.7	2	1.7	1
Swift, Little	<i>Apus affinis</i>				5.4	4	3.4	2
Swift, White-rumped	<i>Apus caffer</i>				14.9	11	8.6	5
Tchagra, Black-crowned	<i>Tchagra senegalus</i>				16.2	12	8.6	5
Tchagra, Brown-crowned	<i>Tchagra australis</i>				35.1	26	12.1	7
Teal, Red-billed	<i>Anas erythrorhyncha</i>				8.1	6	0.0	0
Thick-knee, Spotted	<i>Burhinus capensis</i>				9.5	7	10.3	6
Thrush, Groundscraper	<i>Turdus litsitsirupa</i>				64.9	48	19.0	11
Thrush, Karoo	<i>Turdus smithi</i>			Near endemic	13.5	10	5.2	3
Thrush, Kurrichane	<i>Turdus libonyanus</i>				59.5	44	15.5	9
Tinkerbird, Yellow-fronted	<i>Pogoniulus chrysoconus</i>				63.5	47	10.3	6
Tit, Southern Black	<i>Parus niger</i>				1.4	1	3.4	2
Tit-babbler, Chestnut-vented	<i>Sylvia subcaerulea</i>				31.1	23	6.9	4
Tit-Flycatcher, Grey	<i>Myioparus plumbeus</i>				2.7	2	1.7	1
Turtle-Dove, Cape	<i>Streptopelia capicola</i>				77.0	57	10.3	6
Vulture, Cape	<i>Gyps coprotheres</i>	EN	EN		0.0	0	3.4	2
Wagtail, Cape	<i>Motacilla capensis</i>				0.0	0	1.7	1
Warbler, Willow	<i>Phylloscopus trochilus</i>				16.2	12	8.6	5
Waxbill, Black-faced	<i>Estrilda erythronotos</i>				1.4	1	1.7	1
Waxbill, Blue	<i>Uraeginthus angolensis</i>				60.8	45	15.5	9
Waxbill, Common	<i>Estrilda astrild</i>				1.4	1	0.0	0
Waxbill, Violet-eared	<i>Uraeginthus granatinus</i>				10.8	8	1.7	1
Weaver, Cape	<i>Ploceus capensis</i>			Near endemic	1.4	1	1.7	1
Weaver, Red-headed	<i>Anaplectes rubriceps</i>				4.1	3	0.0	0
Weaver, Thick-billed	<i>Amblyospiza albifrons</i>				2.7	2	1.7	1
Weaver, Village	<i>Ploceus cucullatus</i>				1.4	1	6.9	4
White-eye, Cape	<i>Zosterops virens</i>			Near endemic	58.1	43	12.1	7
Whydah, Pin-tailed	<i>Vidua macroura</i>				8.1	6	5.2	3

Family Name	Scientific name	Red List Global	Red List Regional	Endemicity South Africa	Full Protocol Report Rate	No.of Birds	Adhoc Report Rate	Adhoc No.of Birds
Whydah, Shaft-tailed	<i>Vidua regia</i>				5.4	4	0.0	0
Widowbird, Long-tailed	<i>Euplectes progne</i>				1.4	1	0.0	0
Widowbird, Red-collared	<i>Euplectes ardens</i>				5.4	4	0.0	0
Widowbird, White-winged	<i>Euplectes albonotatus</i>				16.2	12	8.6	5
Wood-Dove, Emerald-spotted	<i>Turtur chalcospilos</i>				54.1	40	8.6	5
Wood-Hoopoe, Green	<i>Phoeniculus purpureus</i>				24.3	18	3.4	2
Woodpecker, Bearded	<i>Dendropicus namaquus</i>				10.8	8	1.7	1
Woodpecker, Cardinal	<i>Dendropicos fuscescens</i>				12.2	9	5.2	3
Woodpecker, Golden-tailed	<i>Campethera abingoni</i>				17.6	13	1.7	1

APPENDIX 2: AVIFAUNAL HABITAT OBSERVED WITHIN THE PROPOSED DEVELOPMENT AREA



FIGURE 1: Bushveld habitat



FIGURE 2: Cleared bushveld area, possibly for agriculture (historical).



FIGURE 3: Existing chicken houses. Natural habitat has been completely cleared from these areas.



FIGURE 4: Stands of *Eucalyptus* trees in the broader area



FIGURE 5: Expansive tracts of land that have been cleared resulting in no natural bushveld habitat

APPENDIX 3: METHOD OF ASSESSING THE SIGNIFICANCE OF POTENTIAL ENVIRONMENTAL IMPACTS

The impact assessment was undertaken using a matrix selection process, the most used methodology, for determining the significance of potential environmental impacts/risks. This methodology is based on the minimum requirements as outlined in Appendix 3 of the EIA Regulations of 2014. The methodology incorporates four aspects for assessing the potential significance of impacts, namely direction, severity, probability of occurrence, and reversibility, which are further sub-divided as follows.

Table 1: Impact assessment factors

Direction	Severity			Probability	Reversibility
Positive/ negative	Magnitude	Duration	Scale/extent	Probability of occurrence	Reversible/ irreversible

To determine the significance of each potential impact/risk, the following four ranking scales are used

Table 2: Impact assessment scoring methodology

Value	Description
<i>Magnitude</i>	
10	Very high/unknown (of the highest order possible within the bounds of impacts that could occur. In the case of adverse impacts, there is no possible mitigation that could offset the impact, or mitigation is difficult, expensive, time-consuming or some combination of these. Social, cultural, and economic activities of communities are disrupted to such an extent that these come to a halt).
8	High
6	Moderate (impact is real, but not substantial in relation to other impacts that might take effect within the bounds of those that could occur. In the case of adverse impacts, mitigation is both feasible and easily possible. Social, cultural, and economic activities of communities are changed, but can be continued (albeit in a different form). Modification of the project design or alternative action may be required).
4	Low (impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts, mitigation is either easily achieved or little will be required, or both. Social, cultural, and economic activities of communities can continue unchanged.)
2	Minor
<i>Duration</i>	
5	Permanent (Permanent or beyond closure)
4	Long term (more than 15 years)
3	Medium-term (5 to 15 years)
2	Short-term (1 to 5 years)

Value	Description
1	Immediate (less than 1 year)
<i>Scale</i>	
5	International
4	National
3	Regional
2	Local
1	Site only
0	None
<i>Probability</i>	
5	Definite/unknown (impact will definitely occur)
4	Highly probable (most likely, 60% to 90% chance)
3	Medium probability (40% to 60% chance)
2	Low probability (5% to 40% chance)
1	Improbable (less than 5% chance)
0	None

$$\text{Significance} = (\text{Magnitude} + \text{Duration} + \text{Scale}) \times \text{Probability}$$

Table 3: Significance of impact based on point allocation

Points	Significance	Description
SP>75	High environmental significance	An impact which could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 - 75	Moderate environmental significance	An impact or benefit which is sufficiently important to require management, and which could have an influence on the decision unless it is mitigated.
SP<30	Low environmental significance	Impacts with little real effect and which will not have an influence on or require modification of the project design.
+	Positive impact	An impact that is likely to result in positive consequences/effects.

For the methodology outlined above 2), the following definitions were used:

- * Direction of an impact may be positive, neutral, or negative with respect to the impact
- * Magnitude is a measure of the degree of change in a measurement or analysis (e.g., the severity of an impact on human health, well-being, and the environment), and is classified as none/negligible, low, moderate, high, or very high/unknown
- * Scale/geographic extent refers to the area that could be affected by the impact and is classified as site, local, regional, national, or international
- * Duration refers to the length of time over which an environmental impact may occur i.e., immediate/transient, short-term, medium term, long-term, or permanent
- * Probability of occurrence is a description of the probability of the impact occurring as improbable, low probability, medium probability, highly probable or definite
- * Reversibility of an impact, which may be described as reversible or irreversible

APPENDIX 4: 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.

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.