AVIFAUNAL COMPARATIVE ASSESSMENT

PART 1 EA AMENDMENT APPLICATION: 132kV Grid Alignment (i.e., Overhead Power Line) and 132kV Eskom Portion of the Shared On-site Substation for the 100 MW Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF) near Loeriesfontein, Hantam Local Municipality, Northern Cape

Province – DFFE Reference Number: 12/12/20/2321/2/2

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Expertise of Specialist

Curriculum vitae: Chris van Rooyen

Profession/Specialisation	:	Avifaunal Specialist
Highest Qualification	:	BA LLB
Nationality	:	South African
Years of experience	:	26 years

Key Experience

Chris van Rooyen has decades of experience in the assessment of avifaunal interactions with industrial infrastructure. He was employed by the Endangered Wildlife Trust as head of the Eskom-EWT Strategic Partnership from 1996 to 2007, which has received international acclaim as a model of co-operative management between industry and natural resource conservation. He is an acknowledged global expert in this field and has consulted in South Africa, Namibia, Botswana, Lesotho, New Zealand, Texas, New Mexico and Florida. He also has extensive project management experience and he has received several management awards from Eskom for his work in the Eskom-EWT Strategic Partnership. He is the author and/or co-author of 17 conference papers, co-author of two book chapters, several research reports and the current best practice guidelines for avifaunal monitoring at wind farm sites. He has completed around 130 power line assessments; and has to date been employed as specialist avifaunal consultant on more than 50 renewable energy generation projects. He has also conducted numerous risk assessments on existing power lines infrastructure. He also works outside the electricity industry and he has done a wide range of bird impact assessment studies associated with various residential and industrial developments. He serves on the Birds and Wind Energy Specialist Group which was formed in 2011 to serve as a liaison body between the ornithological community and the wind industry.

Expertise of Specialist

Curriculum vitae: Albert Froneman

Profession/Specialisation	:	Avifaunal Specialist
Highest Qualification	:	MSc (Conservation Biology)
Nationality	:	South African
Years of experience	:	24 years

Key Qualifications

Albert Froneman (Pr.Sci.Nat) has more than 18 years' experience in the management of avifaunal interactions with industrial infrastructure. He holds a M.Sc. degree in Conservation Biology from the University of Cape Town. He managed the Airports Company South Africa (ACSA) – Endangered Wildlife Trust Strategic Partnership from 1999 to 2008 which has been internationally recognized for its achievements in addressing airport wildlife hazards in an environmentally sensitive manner at ACSA's airports across South Africa. Albert is recognized worldwide as an expert in the field of bird hazard management on airports and has worked in South Africa, Swaziland, Botswana, Namibia, Kenya, Israel, and the USA. He has served as the vice chairman of the International Bird Strike Committee and has presented various papers at

international conferences and workshops. At present he is consulting to ACSA with wildlife hazard management on all their airports. He also an accomplished specialist ornithological consultant outside the aviation industry and has completed a wide range of bird impact assessment studies. He has co-authored many avifaunal specialist studies and pre-construction monitoring reports for proposed renewable energy developments across South Africa. He also has vast experience in using Geographic Information Systems to analyse and interpret avifaunal data spatially and derive meaningful conclusions. Since 2009 Albert has been a registered Professional Natural Scientist (reg. nr 400177/09) with The South African Council for Natural Scientific Professions, specialising in Zoological Science.

1 BACKGROUND

South Africa Mainstream Renewable Power Loeriesfontein 3 (Pty) Ltd received the original Environmental Authorisation (EA) for the 100 megawatt (MW) Loeriesfontein 3 Photovoltaic (PV) Solar Energy Facility (SEF) and Grid Connection infrastructure on 29 October 2012 (DFFE Ref: 12/12/20/2321/2). Further to this, the original EA was amended on 10 July 2014 (DFFE Ref: 12/12/20/2321/2/A1), 27 October 2015 (DFFE Ref: 12/12/20/2321/2/AM2), 04 October 2017 (DFFE Ref: 12/12/20/2321/2/AM3) and 24 September 2019 (DFFE Ref: 12/12/20/2321/2/AM4). In addition, following thee 2019 amendment, the EA was subsequently split into two separate EAs (1 for the 100MW PV SEF and 1 for the grid connection infrastructure), both dated 21 May 2021, as follows :

1) EA for the 100MW Loeriesfontein 3 PV SEF, 33/132kV Independent Power Producer (IPP) portion of the shared on-site substation (including Transformer) and associated infrastructure (DFFE Ref: 12/12/20/2321/2/1); and
2) EA for the 132kV Grid Alignment and 132kV Eskom Portion of the shared on-site substation to service the 100MW Loeriesfontein 3 PV SEF (DFFE Ref: 12/12/20/2321/2/2).

It should be noted that the split EAs for the Loeriesfontein 3 PV SEF (DFFE Ref:.12/12/20/2321/2/1) and Grid Connection infrastructure (DFFE Ref: 12/12/20/2321/2/2) dated 21 May 2021 respectively replaced the original EA dated 29 October 2012, as well as the subsequent amendments. **This report however addresses the 132kV Grid Alignment and 132kV Eskom Portion of the shared on-site substation EA extension application specifically, and the EA extension application for the Loeriesfontein 3 PV SEF has been assessed and reported on as part of a separate standalone report.**

The validity of the split EA for the 132kV Powerline and Eskom portion of the on-site substation to service the 100MW Loeriesfontein 3 PV SEF lapsed on 29 October 2022, however, a Part 1 EA Amendment Application to extend the validity of the EA by 5 years (i.e., EA lapses on 29 October 2027) was submitted to the Department of Forestry, Fisheries and the Environment (DFFE) on 26 October 2022. It is important to note that according to Regulation 28(1B) of the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014 (as amended), "*an environmental authorisation which is the subject of an amendment application contemplated in this Chapter remains valid pending the finalisation of such amendment application."* The Part 1 EA Amendment Application was acknowledged by the DFFE on 09 November 2022 and additional information was requested to be submitted to the DFFE for consideration. Following this, comparative assessments are to be undertaken to motivate why the Department should extend the validity
period of the EA for a further 5 years.

The grid connection infrastructure to service the 100MW Loeriesfontein 3 PV SEF (as authorised as part of split EA dated 21 May 2021 with reference: 12/12/20/2321/2/2) consists of the following:

- A 132kV overhead powerline and an on-site 132kV substation (Eskom's portion of the shared on-site substation) that will connect the Solar PV to the Grid; and
- Loeriesfontein 3 Grid Connection Powerline Corridor.

As mentioned above, the EA for the grid connection infrastructure (power line and substation) to service the Loeriesfontein 3 PV SEF (as authorised under 12/12/20/2321/2, and as amended in 12/12/20/2321/2/A1;

12/12/20/2321/2/AM2; 12/12/20/2321/2/AM3; 12/12/20/2321/2/AM4 and 12/12/20/2321/2/2) lapsed on 29 October 2022. The Applicant therefore wishes to extend the validity period of the EA for a period of five (5) years (i.e., EA lapses on 29 October 2027).

As mentioned, Regulation 28(1B) of the NEMA EIA Regulations of 2014 (as amended) state that "*an environmental authorisation which is the subject of an amendment application contemplated in this Chapter remains valid pending the finalisation of such amendment application."* A Part 1 EA Amendment Application to extend the validity of the EA was submitted to the DFFE on 26 October 2022 and acknowledged on 09 November 2022.

See Figure 1 for the location and lay-out of the proposed PV facility and 132kV grid connection.

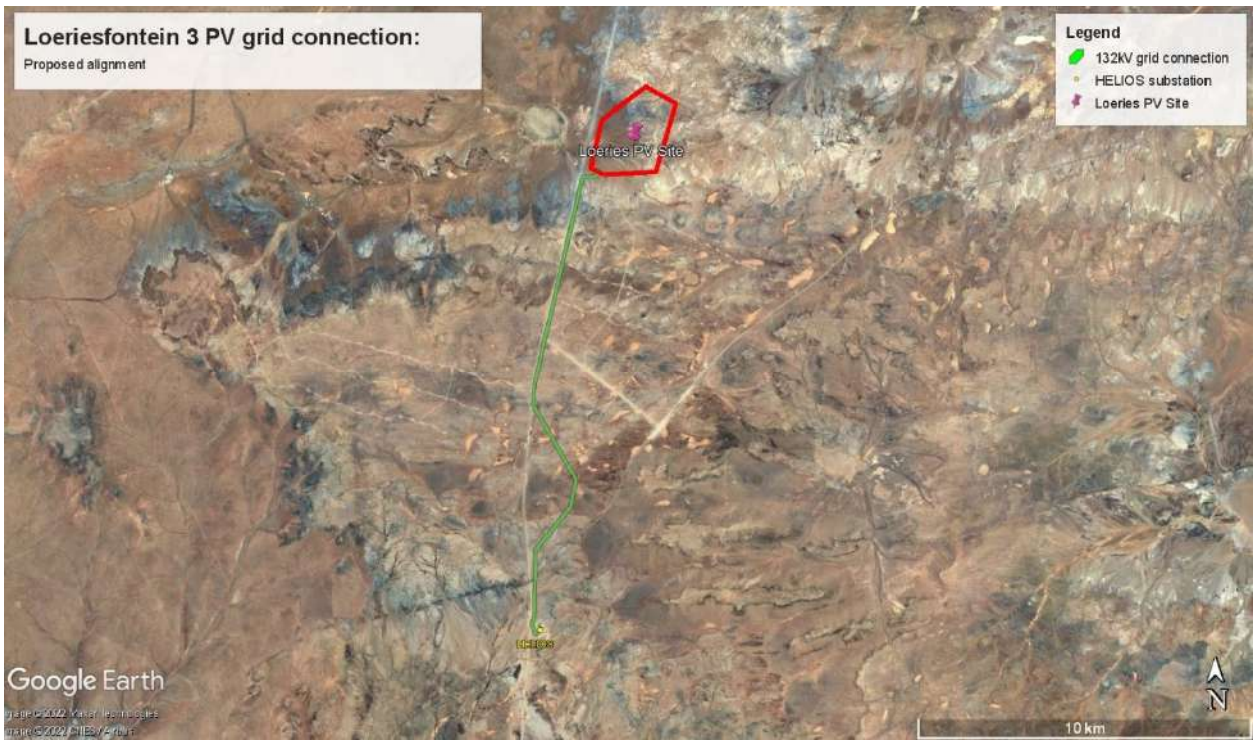


Figure 1: The layout of the proposed Loeriesfontein 3 PV grid connection.

2 TERMS OF REFERENCE

The following terms of reference are applicable to this specialist comment:

- Undertake a site visit to the authorised Loeriesfontein 3 PV grid connection site and compile a specialist comment/statement addressing the following:
    - The implications of the proposed amendment, if any, in terms of the potential impacts within your area of expertise;
    - An investigation to determine if the baseline environment has changed significantly since the original assessment, which was conducted approximately 10 years ago. This will be required for the proposed amendment to extend the validity period of the EA.

- A statement as to whether or not the proposed amendments will result in an increased level or change in the nature of the impact, which was initially assessed and considered when application was made for the environmental authorisation.
- If the mitigation measures provided in the initial assessment are still applicable; or if there are any new mitigation measures which need to be included into the EA, should the request to extend the commencement period be granted by the Department.
- An assessment of the cumulative impacts of the proposed amendment

3 FINDINGS OF PREVIOUS ASSESSMENTS

The key findings relevant to the Loeriesfontein 3 PV grid connection in the Final Environmental Impact Report which was compiled for the Loeriesfontein Wind Farm (SiVEST 2012) are summarised below:

- The proposed grid connection site is situated in an ecological transitional zone between the Nama Karoo and Succulent Karoo biomes (Harrison et.al. 1997). Both Karoo biomes support a particularly high diversity of species endemic to southern Africa. The ecotonal nature of the study area is apparent from the presence of typical species of both Succulent and Nama Karoo at the wind farm site e.g. Karoo Eremomela *Eremomela gregalis* and Red Lark *Calendulauda burra*.
- An important feature of the arid landscape where the proposed grid connection is located is the presence of pans. Pans are endorheic wetlands having closed drainage systems; water usually flows in from small catchments but with no outflow from the pan basins themselves. They are of poorly drained, relatively flat and dry regions. Water loss is mainly through evaporation, sometimes resulting in saline conditions, especially in the most arid regions. Water depth is shallow (<3m) and flooding characteristically ephemeral (Harrison et al. 1997).
- Although the grid connection site itself does not contain any significant pans, there are several large pans situated in a 20km radius around the site. When these pans hold water, waterbird movement between them are likely, including Greater Flamingo *Phoenicopterus roseus* and Lesser Flamingo *Phoenicopterus minor*. Some of that movement might take place over the proposed PV site.
- It is estimated that at least 76 bird species could potentially occur at the site, of which 60 were recorded during pre-construction monitoring in similar habitat at the adjacent Loeriesfontein wind farm in September 2011 – September 2013. The species potentially occurring at the site can be broadly classified in four groupings namely large terrestrial species, soaring species, waterbirds and small birds:
    - Large terrestrial species: Medium to large birds that spend most of the time foraging on the ground. They do not fly often and then generally short distances at low to medium altitude, usually powered flight. Some species undertake longer distance flights at higher altitudes, when commuting between foraging and roosting areas. At the wind farm site, cranes, bustards and korhaans are included in this category.
    - Soaring species: Species that spend a significant time on the wing in a variety of flight modes including soaring, kiting, hovering and gliding at medium to high altitudes. These are mostly raptors.
    - Waterbirds: These are species that are generally associated with aquatic habitats, e.g pans. In the vicinity of solar PV site, these comprise ducks, waders and flamingos.

- Small birds: These are mainly several species of passerines. These species generally spend most of the time on the ground or calling from perches. Sandgrouse undertake long distance flights.

- A number of Red Data species could occur at the site. These are listed in Table 1:

Table 1: Red Data species potentially occurring at the proposed Loeriesfontein 3 PV grid connection site (SiVEST 2012)

Species	*Scientific Name*	Conservation Status (Taylor *et al.* 2015)	Recorded on the site and immediate environment?
Martial Eagle	*Polemaetus bellicosus*	Endangered	Y
Karoo Korhaan	*Eupodotis vigorsii*	Near threatened	Y
Lanner Falcon	*Falco biarmicus*	Vulnerable	Y
Kori Bustard	*Ardeotis kori*	Near threatened	Y
Ludwig's Bustard	*Neotis ludwigii*	Endangered	Y
Sclater's Lark	*Spizocorys sclateri*	Near threatened	Y
Red Lark	*Certhilauda burra*	Vulnerable	Y

- A number of overall impact tables have been prepared in terms of the primary impacts that the grid components could exert on the avifauna on the site. These are presented below.

Mortality due to collisions with the powerline

IMPACT TABLE	
Environmental Parameter	Biodiversity
Issue/Impact/Environmental Effect/Nature	Bird Collisions
Extent	The impact is only expected to affect the site.
Probability	Impact will certainly occur (Greater than a 75% chance of occurrence).
Reversibility	The impact is reversible
Irreplaceable loss of resources	The impact will result in marginal loss of resources
Duration	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years)
Cumulative effect	The impact could result in minor cumulative effects
Intensity/magnitude	Impact alters the quality, use and integrity of the system/component but system/component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).

Significance Rating	**<u>Prior to mitigation measures</u>:** There will be a negative medium impact i.e. the anticipated impact will have moderate negative effects and will require intense mitigation measures **<u>After mitigation measures</u>:** After mitigation measures, a negative low impact will be achieved.	
	Pre-mitigation impact rating	**Post mitigation impact rating**
Extent	1	1
Probability	4	2
Reversibility	1	1
Irreplaceable loss	2	1
Duration	3	1
Cumulative effect	3	1
Intensity/magnitude	2	1
Significance rating	-28 (medium negative)	-7(low negative)
Mitigation measures	▪ Bird flappers must be maintained on the power lines. ▪ Bird guards or similar must be maintained.	

<u>Mortality due to electrocutions on the powerline</u>

Table 61: Rating of impacts related to bird electrocutions

IMPACT TABLE	
Environmental Parameter	Biodiversity
Issue/Impact/Environmental Effect/Nature	Bird Electrocutions
Extent	The impact is only expected to affect the site.
Probability	Impact will certainly occur (Greater than a 75% chance of occurrence).
Reversibility	The impact is reversible
Irreplaceable loss of resources	The impact will result in marginal loss of resources
Duration	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years)
Cumulative effect	The impact could result in minor cumulative effects
Intensity/magnitude	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).

Significance Rating	**Prior to mitigation measures:** There will be a negative medium impact i.e. the anticipated impact will have moderate negative effects and will require intense mitigation measures **After mitigation measures:** After mitigation measures, a negative low impact will be achieved.	
	Pre-mitigation impact rating	**Post mitigation impact rating**
Extent	1	1
Probability	4	2
Reversibility	1	1
Irreplaceable loss	2	1
Duration	3	1
Cumulative effect	3	1
Intensity/magnitude	2	1
Significance rating	-28 (medium negative)	-7(low negative)
Mitigation measures	▪ Bird flappers must be maintained on the power lines. ▪ Bird guards or similar must be maintained.	

4 SUBSEQUENT ASSESSMENTS

The site was inspected on 21 November 2022 to assess whether the conditions at the site have changed materially from when the original assessment was done in February 2012. The development area was inspected with a 4 x 4 vehicle and on foot for one day. Photographs of the development area were taken to record the habitat and a bird list was compiled.

5 RECEIVING ENVIRONMENT

5.1 DFFE National Screening Tool

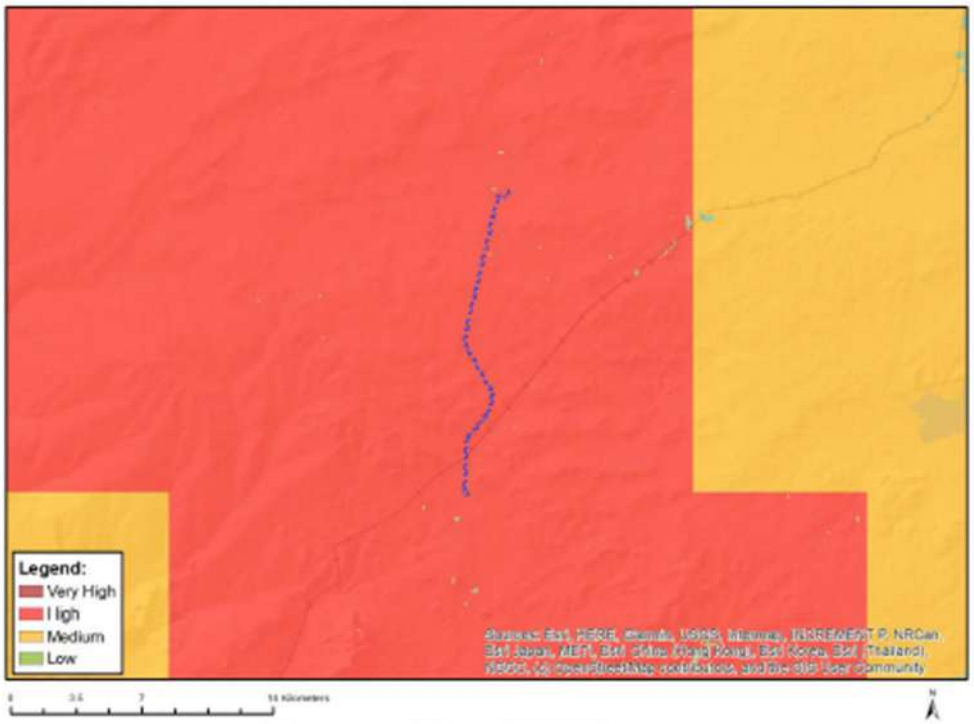
The project development area is classified as **High** sensitivity for avifauna, according to the DFFE online screening tool. The development sites contain confirmed habitat for Red Data species. The classification of High sensitivity is linked to the potential occurrence Ludwig's Bustard *Neotis ludwigii* (Regionally and Globally Endangered), Red Lark Red Lark *Calendulauda burra* (Regionally and Globally Vulnerable), Lanner Falcon *Falco biarmicus* (Regionally Vulnerable), Martial Eagle *Polemaetus bellicosus* (Regionally and Globally Endangered) and Burchell's Courser *Cursorius rufus* (Regionally Vulnerable). (Figure 2).

The occurrence of Species of Conservation Concern (SCC) was confirmed during the original surveys in the adjacent Loeriesfontein Wind Farm, which took place in the period of September 2011 through to September 2013. Karoo Korhaan (Regionally Near threatened), Ludwig's Bustard (Regionally and Globally Endangered), Red Lark, Martial Eagle (Regionally and Globally Endangered) Sclater's Lark (Globally and Regionally Near threatened) and Burchell's Courser were recorded at the site. The subsequent site visit in November 2022 **confirmed that the habitat has not changed and that habitat for the above listed SCC, as well as the other SCC listed in Table 1, exists at the development area**. This classification is assessed to be accurate as far as the potential presence of SCC is concerned, based on actual conditions recorded

on the ground during the site visits in September 2011 through to September 2013, and the subsequent site visit conducted in November 2022.

See Appendix 1 for the Site Sensitivity Report

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Aves-Cursorius rufus
High	Aves-Neotis ludwigii
High	Aves-Falco biarmicus
High	Aves-Polemaetus bellicosus
High	Aves-Calendulauda burra
Low	Subject to confirmation
Medium	Aves-Sagittarius serpentarius
Medium	Aves-Calendulauda burra

Figure 2: The classification of the Project Site according to the animal species theme in the DFFE National Screening Tool. The High sensitivity is linked to the possible occurrence of Ludwig's Bustard *Neotis ludwigii (*Regionally and Globally Endangered), Red Lark Red Lark *Calendulauda burra* (Regionally and Globally Vulnerable), Lanner Falcon *Falco biarmicus*

(Regionally Vulnerable), Martial Eagle *Polemaetus bellicosus* (Regionally and Globally Endangered) and Burchell's Courser *Cursorius rufus* (Regionally Vulnerable).

5.2 Avifauna

Bird distribution data of the South African Bird Atlas 2 (SABAP 2) was obtained from the University of Cape Town (2022), as a means to ascertain which species occur within the broader area i.e., within a block consisting of 4 pentads where the proposed project development area will be located (Figure 4). A pentad grid cell covers 5 minutes of latitude by 5 minutes of longitude (5'× 5'). Each pentad is approximately 8 × 7.6 km. From 2007 to date, a total of 41 full protocol lists (i.e., surveys lasting a minimum of two hours each) have been completed for this area. In addition, 56 ad hoc protocol lists (i.e., surveys lasting less than two hours but still yielding valuable data) have been completed. The broader area was selected on the basis of the number of checklists that had been completed, in order to get a more representative view of the avifauna that could occur at the project site.

According to the SABAP2 project surveys, a total of 95 species occurs in the broader area (Table 1). The species that were recorded on and around the project development area during the pre-construction monitoring at the adjacent Loeriesfontein Wind Farm (September 2011 – September 2013) and the subsequent site visit in November 2022 are listed in Table 1.

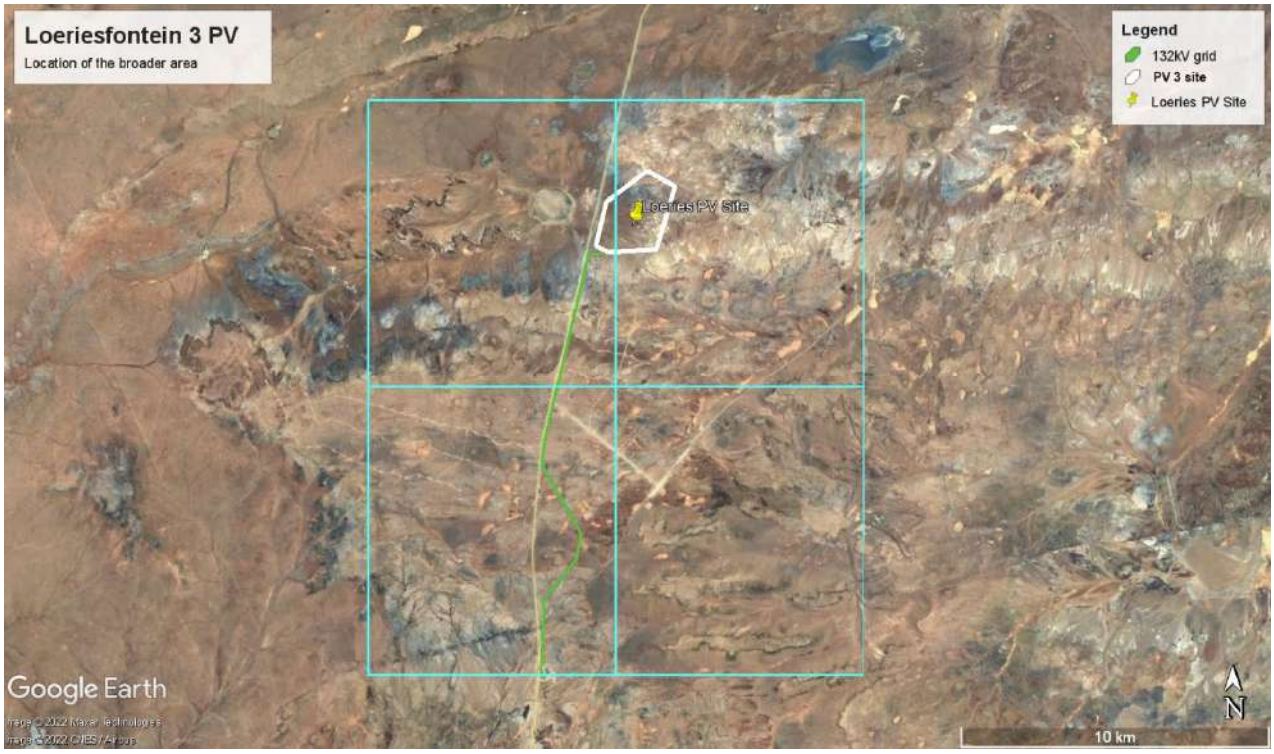


Figure 3: The broader area (4 x pentad grid cells) where the project development area is located.

Table 2: Avifauna recorded by SABAP 2 and during surveys in the broader area in September 2011 – September 2013 and at the Loeriesfontein 3 PV grid connection site in November 2022. Species of conservation concern (SCC) are shaded in green.

Species name	*Scientific name*	SABAP2 Full protocol reporting rate	SABAP2 Ad hoc protocol reporting rate	Global status	Regional status	Recorded during monitoring 2011-2013	Recorded during monitoring 2022

Acacia Pied Barbet	*Tricholaema leucomelas*	12.20	0.00	-	-		
African Black Duck	*Anas sparsa*	2.44	0.00	-	-		
African Pipit	*Anthus cinnamomeus*	9.76	3.57	-	-		x
African Red-eyed Bulbul	*Pycnonotus nigricans*	2.44	0.00	-	-		
Ant-eating Chat	*Myrmecocichla formicivora*	29.27	3.57	-	-		
Barn Swallow	*Hirundo rustica*	21.95	5.36	-	-	x	
Black-chested Prinia	*Prinia flavicans*	2.44	0.00	-	-		
Black-chested Snake Eagle	*Circaetus pectoralis*	2.44	3.57	-	-	x	
Black-eared Sparrow-Lark	*Eremopterix australis*	58.54	8.93	-	-	x	
Black-headed Canary	*Serinus alario*	9.76	3.57	-	-		
Blacksmith Lapwing	*Vanellus armatus*	2.44	0.00	-	-		
Black-winged Stilt	*Himantopus himantopus*	2.44	0.00	-	-		
Bokmakierie	*Telophorus zeylonus*	70.73	3.57	-	-	x	x
Booted Eagle	*Hieraaetus pennatus*	4.88	0.00	-	-		
Burchell's Courser	*Cursorius rufus*	7.32	0.00	-	VU		
Cape Bunting	*Emberiza capensis*	43.90	14.29	-	-	x	x
Cape Crow	*Corvus capensis*	24.39	7.14	-	-		
Cape Penduline Tit	*Anthoscopus minutus*	43.90	5.36	-	-	x	x
Cape Sparrow	*Passer melanurus*	97.56	46.43	-	-	x	x
Cape Turtle Dove	*Streptopelia capicola*	51.22	0.00	-	-		
Cape Wagtail	*Motacilla capensis*	29.27	0.00	-	-		
Capped Wheatear	*Oenanthe pileata*	48.78	7.14	-	-	x	
Chat Flycatcher	*Melaenornis infuscatus*	73.17	17.86	-	-	x	
Common Quail	*Coturnix coturnix*	2.44	0.00	-	-		
Common Swift	*Apus apus*	14.63	0.00	-	-		
Crowned Lapwing	*Vanellus coronatus*	4.88	1.79	-	-		
Double-banded Courser	*Rhinoptilus africanus*	24.39	5.36	-	-		
Dusky Sunbird	*Cinnyris fuscus*	12.20	0.00	-	-	x	
European Bee-eater	*Merops apiaster*	12.20	3.57	-	-		x
Familiar Chat	*Oenanthe familiaris*	41.46	8.93	-	-		x
Greater Kestrel	*Falco rupicoloides*	68.29	12.50	-	-	x	x
Greater Striped Swallow	*Cecropis cucullata*	4.88	0.00	-	-		
Grey Tit	*Melaniparus afer*	29.27	5.36	-	-		
Grey-backed Cisticola	*Cisticola subruficapilla*	24.39	5.36	-	-	x	x
Grey-backed Sparrow-Lark	*Eremopterix verticalis*	46.34	17.86	-	-		
House Sparrow	*Passer domesticus*	34.15	3.57	-	-		x
Jackal Buzzard	*Buteo rufofuscus*	7.32	3.57	-	-	x	x
Karoo Chat	*Emarginata schlegelii*	90.24	55.36	-	-	x	x
Karoo Eremomela	*Eremomela gregalis*	63.41	21.43	-	-	x	x
Karoo Korhaan	*Eupodotis vigorsii*	90.24	37.50	-	NT	x	x
Karoo Long-billed Lark	*Certhilauda subcoronata*	92.68	23.21	-	-	x	
Karoo Prinia	*Prinia maculosa*	24.39	7.14	-	-	x	x
Karoo Scrub Robin	*Cercotrichas coryphoeus*	78.05	5.36	-	-	x	x
Lanner Falcon	*Falco biarmicus*	7.32	0.00	-	VU	x	
Lappet-faced Vulture	*Torgos tracheliotos*	2.44	0.00	EN	EN		
Large-billed Lark	*Galerida magnirostris*	87.80	35.71	-	-	x	
Lark-like Bunting	*Emberiza impetuani*	78.05	21.43	-	-	x	
Laughing Dove	*Spilopelia senegalensis*	39.02	1.79	-	-		x
Layard's Warbler	*Curruca layardi*	4.88	0.00	-	-	x	
Lesser Flamingo	*Phoeniconaias minor*	2.44	0.00	NT	NT		
Little Swift	*Apus affinis*	9.76	0.00	-	-	x	
Ludwig's Bustard	*Neotis ludwigii*	58.54	8.93	EN	EN	x	
Malachite Sunbird	*Nectarinia famosa*	0.00	1.79	-	-		
Martial Eagle	*Polemaetus bellicosus*	14.63	3.57	EN	EN	x	x

Namaqua Dove	*Oena capensis*	36.59	3.57	-	-		x
Namaqua Sandgrouse	*Pterocles namaqua*	87.80	26.79	-	-	x	
Nicholson's Pipit	*Anthus nicholsoni*	4.88	0.00	-	-		
Northern Black Korhaan	*Afrotis afraoides*	2.44	0.00	-	-	x	
Pale Chanting Goshawk	*Melierax canorus*	78.05	17.86	-	-	x	x
Pied Crow	*Corvus albus*	90.24	32.14	-	-	x	x
Pied Starling	*Lamprotornis bicolor*	0.00	1.79	-	-		x
Red Lark	*Calendulauda burra*	92.68	25.00	VU	VU	x	x
Red-capped Lark	*Calandrella cinerea*	82.93	17.86	-	-	x	
Red-headed Finch	*Amadina erythrocephala*	2.44	0.00	-	-		
Rock Kestrel	*Falco rupicolus*	17.07	17.86	-	-	x	x
Rock Martin	*Ptyonoprogne fuligula*	53.66	7.14	-	-		
Rufous-cheeked Nightjar	*Caprimulgus rufigena*	4.88	0.00	-	-		
Rufous-eared Warbler	*Malcorus pectoralis*	90.24	33.93	-	-	x	
Sclater's Lark	*Spizocorys sclateri*	41.46	0.00	NT	NT	x	
Sickle-winged Chat	*Emarginata sinuata*	4.88	17.86	-	-	x	
South African Shelduck	*Tadorna cana*	7.32	0.00	-	-		
Southern Double-collared Sunbird	*Cinnyris chalybeus*	2.44	0.00	-	-		
Southern Fiscal	*Lanius collaris*	68.29	3.57	-	-		x
Southern Masked Weaver	*Ploceus velatus*	46.34	0.00	-	-		
Speckled Pigeon	*Columba guinea*	70.73	8.93	-	-		
Spike-heeled Lark	*Chersomanes albofasciata*	92.68	35.71	-	-	x	
Spotted Eagle-Owl	*Bubo africanus*	26.83	0.00	-	-	x	
Spotted Flycatcher	*Muscicapa striata*	2.44	0.00	-	-		
Spotted Thick-knee	*Burhinus capensis*	19.51	3.57	-	-		
Spur-winged Goose	*Plectropterus gambensis*	2.44	0.00	-	-		
Stark's Lark	*Spizocorys starki*	7.32	5.36	-	-		
Three-banded Plover	*Charadrius tricollaris*	9.76	0.00	-	-		
Tractrac Chat	*Emarginata tractrac*	97.56	44.64	-	-	x	
Western Barn Owl	*Tyto alba*	0.00	1.79	-	-		x
White-backed Mousebird	*Colius colius*	2.44	0.00	-	-		
White-rumped Swift	*Apus caffer*	4.88	0.00	-	-		
White-throated Canary	*Crithagra albogularis*	58.54	10.71	-	-		x
Yellow Canary	*Crithagra flaviventris*	100.00	50.00	-	-	x	x
Yellow-bellied Eremomela	*Eremomela icteropygialis*	41.46	1.79	-	-	x	
Yellow-billed Kite	*Milvus aegyptius*	2.44	0.00	-	-		
Kori Bustard	*Ardeotis kori*	0.00	0.00			x	
Fairy Flycatcher	*Stenostira scita*	0.00	0.00			x	
African Hoopoe	*Upupa africana*	0.00	0.00				x
Yellow-fronted Canary	*Crithagra mozambica*	0.00	0.00				x

6 CUMULATIVE IMPACTS

Cumulative effects are commonly understood to be impacts from different projects that combine to result in significant change in an area, which could be larger than the sum of all the individual impacts. The assessment of cumulative effects therefore needs to consider all renewable energy projects within a 30 km radius that have received an EA or are in process at the time of starting the environmental impact process, as well as the proposed Loeriesfontein PV project and associated grid connection infrastructure (the subject of this report). There are currently twelve (12) renewable energy projects authorised, operational or in process within a 30 km radius around the proposed Loeriesfontein 3 PV SEF and associated grid connection infrastructure (Figure 4). The projects were identified using the latest (Q3 2022) Renewable Energy EIA

Application Database for SA from the Department of Fisheries, Forestry and Environment (DFFE) and publically available documents on the internet.

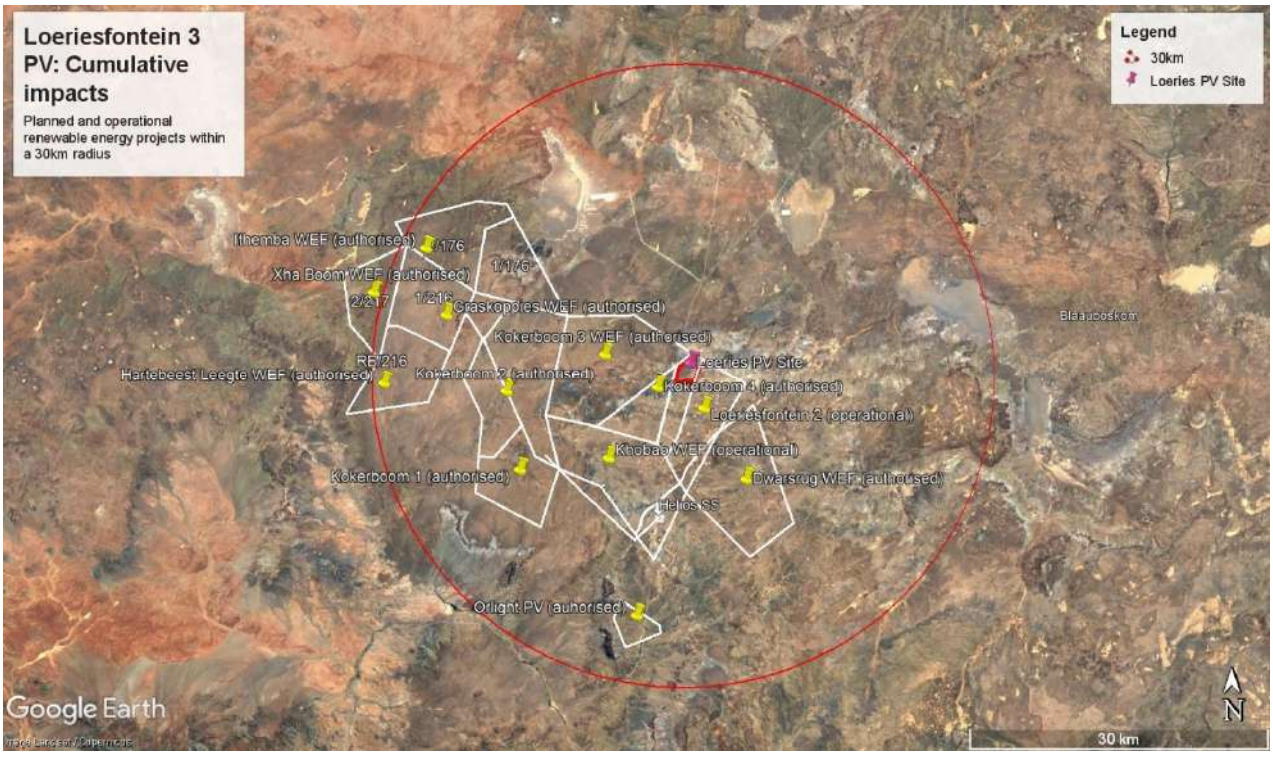


Figure 4: The planned renewable energy project land parcels within a 30km radius around the proposed Loeriesfontein 3 PV SEF and associated grid connection infrastructure project.

The total number of new grid connections that are planned for the renewable energy projects within a 30km radius around the proposed Loeriesfontein 3 PV SEF and associated grid connection infrastructure, including the latter, equals about 137.2km (counting parallel lines as one), and the existing Eskom high voltage lines equals 57km. Thus, the total number of existing and planned lines within this area equals about 194.3 km. Of this total, the proposed Loeriesfontein 3 PV grid (15.2km) constitute 7.8%. The cumulative impact of the proposed Loeriesfontein 3 PV grid connection infrastructure is thus anticipated to be **low**. However, the impact of the total number of existing and planned high voltage lines is within the 30km radius is considered to be **high but can be reduced to medium with appropriate mitigation.**

Table 3 below summarise the post-mitigation cumulative impacts associated with the proposed development. For the assessment criteria, please see Appendix 4.

Table 3: Summary of cumulative impacts pre-and post-mitigation

Nature: *Displacement of priority avifauna due to disturbance due to the construction of the 132kV powerline and on-site substation*		
	Cumulative impact of the proposed Loeriesfontein 3 PV Grid Infrastructure within a 30km radius (post mitigation).	**Cumulative impact of the proposed Loeriesfontein 3 PV Grid Infrastructure and other planned and existing powerlines and substations within a 30km radius (post mitigation)**
Extent	2 local	3 regional
Duration	1 very short	2 short term
Magnitude	4 low	6 moderate
Probability	2 improbable	4 highly probable

Significance	**14 LOW**	**44 MEDIUM**
Status (positive/negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Confidence in findings: Medium.		
Mitigation: • Construction activity should be restricted to the immediate footprint of the infrastructure. • Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of powerline sensitive species. • Measures to control noise and dust should be applied according to current best practice in the industry. • Maximum used should be made of existing access roads and the construction of new roads should be kept to a minimum.		
Nature: *Displacement of priority avifauna due to habitat transformation due to the construction of the 132kV powerline and on-site substation*		
	Cumulative impact of the proposed Loeriesfontein 3 PV Grid Infrastructure within a 30km radius (post mitigation).	**Cumulative impact of the proposed Loeriesfontein 3 PV Grid Infrastructure and other planned and existing powerlines and substations within a 30km radius (post mitigation)**
Extent	1 site only	3 regional
Duration	4 long term	4 long term
Magnitude	2 minor	4 low
Probability	2 improbable	3 probable
Significance	**14 LOW**	**33 MEDIUM**
Status (positive/negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes, but only to some extent	
Confidence in findings: Medium.		
Mitigation: • Vegetation clearance should be limited to what is absolutely necessary. • The mitigation measures proposed by the biodiversity specialist must be strictly enforced.		
Nature: *Collision mortality of priority avifauna due to the construction of the 132kV powerline.*		
	Cumulative impact of the proposed Loeriesfontein 3 PV Grid Infrastructure within a 30km radius (post mitigation).	**Cumulative impact of the proposed Loeriesfontein 3 PV Grid Infrastructure and other planned and existing powerlines and substations within a 30km radius (post mitigation)**
Extent	2 local	3 regional
Duration	4 long term	4 long term
Magnitude	4 low	6 moderate
Probability	2 improbable	3 probable
Significance	**20 LOW**	**39 MEDIUM**
Status (positive/negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Confidence in findings: Medium.		
Mitigation:		

• Bird Flight Diverters must be fitted to the entire powerline according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). These devices must be installed as soon as the conductors are strung.		
Nature: *Electrocution of priority avifauna due to the construction of the on-site substations*		
	Cumulative impact of the proposed Loeriesfontein 3 PV Grid Infrastructure within a 30km radius (post mitigation).	**Cumulative impact of the proposed Loeriesfontein 3 PV Grid Infrastructure and other planned and existing powerlines and substations within a 30km radius (post mitigation)**
Extent	2 local	3 regional
Duration	4 long term	4 long term
Magnitude	2 minor	4 low
Probability	2 improbable	2 improbable
Significance	**16 LOW**	**22 LOW**
Status (positive/negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Confidence in findings: Medium.		
Mitigation: • The hardware within the proposed on-site substation yard is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List powerline sensitive species are unlikely to frequent the switching station and substation and be electrocuted		

7 ASSESSMENT OF IMPACTS

Due to the long period that had transpired since the original impact assessment was completed (9 years), and due to experience gained in assessing the potential impacts of solar PV grid connection infrastructure on avifauna since the original impact study, it was decided that the impacts and proposed mitigation measures need to be re-assessed before a recommendation can be made with regard to the proposed extension of the EA. The following potential impacts were identified:

- Displacement due to disturbance associated with the construction and decommissioning of the 132kV substation and 132kV powerline;
- Displacement due to habitat transformation associated with the of the 132kV substation and 132kV powerline;
- Collisions with the 132kV powerline; and
- Electrocutions within the substation yard.

7.1 Displacement due to disturbance associated with the construction of the 132kV grid connection and substation

Apart from direct habitat destruction, the construction activities impact on birds through disturbance; this could lead to breeding failure if the disturbance happens during a critical part of the breeding cycle. Construction activities in close proximity to breeding locations could be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. A potential mitigation measure is the timeous identification of nests and the timing of the construction activities to avoid disturbance during

a critical phase of the breeding cycle. Breeding terrestrial species are most likely to be affected by displacement due to disturbance.

At the PV facility, the species which would be most severely affected by disturbance would be ground dwelling species, those that utilise low shrubs for nesting.

See Table 4 for an assessment of the impact. The assessment criteria are explained in Appendix 4.

Table 4: Displacement due to disturbance associated with the construction and decommissioning of the 132kV grid connection and substation

Nature: *Displacement of powerline sensitive species due to* ***disturbance*** *associated with construction of the on-site substation and 132kV overhead powerline.*		
	Without mitigation	**With mitigation**
Extent	2 local	2 local
Duration	1 very short	1 very short
Magnitude	8 high	6 moderate
Probability	4 highly probable	2 improbable
Significance	**44 MEDIUM**	**18 LOW**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: • Construction activity should be restricted to the immediate footprint of the infrastructure. • Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of powerline sensitive species. • Measures to control noise and dust should be applied according to current best practice in the industry. • Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.		
Residual Risks: The residual risk of displacement will be reduced to a low level after mitigation, if the proposed mitigation measures are implemented.		

7.2 Displacement due to habitat transformation associated with the construction of the 132kV grid connection and substation

Construction activities could impact on birds breeding, foraging, and roosting in or in close proximity of the proposed 132kV on-site substation and 132kV powerline through transformation of habitat, which could result in temporary or permanent displacement. Unfortunately, very little mitigation can be applied to reduce the significance of this impact as the total permanent transformation of the natural habitat within the construction footprint of the on-site substation is unavoidable. In the case of the 132kV overhead powerline, the direct habitat transformation is limited to the pole/tower footprints and the narrow access road/track under the powerline.

The habitat in the broader area is vast and highly uniform from a bird impact perspective. The loss of habitat is a relatively small quantity of the habitat for avifauna due to direct habitat transformation associated with the construction of the proposed substation and grid connection is likely to be fairly minimal.

See Table 5 for an assessment of the impact. The assessment criteria are explained in Appendix 4.

Table 5: Displacement due to habitat transformation associated with the construction of the substation and 132kV grid connection

Nature: *Displacement of powerline sensitive species due to* ***habitat transformation*** *associated with construction of the on-site substation and 132kV overhead powerline.*		
	Without mitigation	**With mitigation**
Extent	1 site only	1 site only
Duration	4 long term	4 long term
Magnitude	6 moderate	4 low
Probability	3 probable	2 improbable
Significance	**33 MEDIUM**	**18 LOW**
Status (positive or negative)	Negative	Negative
Reversibility	Medium	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	To a limited extent	
Mitigation: • Vegetation clearance should be limited to what is absolutely necessary. • The mitigation measures proposed by the biodiversity specialist must be strictly enforced.		
Residual Risks: The residual risk of displacement will be further reduced after mitigation.		

7.3 Mortality of avifauna due to collisions with the 132kV grid connection

Collisions may be the biggest threat posed by high voltage powerlines to birds in southern Africa (Van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes, and various species of waterbirds, and to a lesser extent, vultures. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with high voltage powerlines (Van Rooyen 2004).

Using a controlled experiment spanning a period of nearly eight years (2008 to 2016), the Endangered Wildlife Trust (EWT) and Eskom tested the effectiveness of two types of line markers in reducing powerline collision mortalities of large birds on three 400kV transmission lines near Hydra substation in the Karoo. Marking was highly effective for Blue Cranes, with a 92% reduction in mortality, and large birds in general with a 56% reduction in mortality, but not for bustards, including the endangered Ludwig's Bustard. The two different marking devices were approximately equally effective, namely spirals and bird flappers, they found no evidence supporting the preferential use of one type of marker over the other (Shaw *et al*. 2017).

Terrestrial species, particularly bustards, are most likely to be impacted by powerline collisions with the proposed 132kV grid connection.

See Table 6 for an assessment of the impact. The assessment criteria are explained in Appendix 4.

Table 6: Mortality due to collisions with the 132kV grid connection

Nature: *Mortality of powerline sensitive species due to* ***collisions*** *with the proposed 132kV powerline*		
	Without mitigation	**With mitigation**
Extent	2 local	2 local
Duration	4 long term	4 long term
Magnitude	8 high	6 moderate
Probability	4 highly probable	3 improbable
Significance	**56 MEDIUM**	**36 MEDIUM**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation: • Bird Flight Diverters must be fitted to the entire powerline according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). These devices must be installed as soon as the conductors are strung.
Residual Risks: There will be an ongoing residual risk of collisions with the grid connection powerline, but mitigation should make a marked difference.
Residual Risks: The residual risk of electrocution will be low once mitigation is implemented.

7.4 Mortality due to electrocution in the substation yard

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (Van Rooyen 2004). The electrocution risk is largely determined by the pole/tower design. Relevant to the proposed 132kV grid connection, the risk of electrocution will be minimal due to the large clearances between the live and grounded components.

Electrocutions within the on-site substation is possible, however the likelihood of this impact on the more sensitive Red List priority species is remote, as these species are unlikely to regularly utilise the infrastructure within the switching station for perching or roosting.

Species that are more vulnerable to this impact are medium-sized raptors, crows, owls and certain species of waterbirds.

See Table 7 for an assessment of the impact. The assessment criteria are explained in Appendix 4.

Table 7: Mortality due to electrocution in the onsite substation

Nature: *Mortality of powerline sensitive species due to* ***electrocution*** *within the on-site substation*		
	Without mitigation	**With mitigation**
Extent	2 local	2 local
Duration	4 long term	4 long term
Magnitude	8 high	4 low
Probability	3 possible	2 improbable
Significance	**42 MEDIUM**	**20 LOW**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: • The hardware within the proposed on-site substation yard is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site-specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List powerline sensitive species are unlikely to frequent the switching station and substation and be electrocuted.		
Residual Risks: The residual risk of electrocution will be low once mitigation is implemented.		

Table 8: Comparison of summarised impacts on avifauna

Nature of the Impact	Rating prior to mitigation	Rating post mitigation
Displacement of powerline sensitive species due to ***disturbance*** *associated with construction of the on-site substation and 132kV overhead powerline.*	44 MEDIUM	18 LOW

Nature of the Impact	Rating prior to mitigation	Rating post mitigation
*Displacement of powerline sensitive species due to **habitat transformation** associated with construction of the on-site substation and 132kV overhead powerline.*	33 MEDIUM	18 LOW
*Mortality of powerline sensitive species due to **collisions** with the 132kV powerline.*	56 MEDIUM	36 MEDIUM
*Mortality of powerline sensitive species due to **electrocution** within the on-site substation.*	42 MEDIUM	20 LOW
*Displacement of powerline sensitive species due to **disturbance** associated with decommissioning of the Carolus Grid Connection on-site substation and 132kV overhead powerline.*	44 MEDIUM	18 LOW
AVERAGE SIGNIFICANCE RATING	**43.8 MEDIUM**	**22 LOW**

8 CONCLUSIONS

- A number of additional impacts on avifauna were identified during the site inspection in November 2022 that had not been identified previously in the Final Impact Assessment Report (SiVEST 2012).
- No nests of Red Data priority species were recorded at the project site during the site inspection in November 2022.
- The site inspection in November 2022 **confirmed that the receiving environment had not changed in any material way**.
- A number of **additional mitigation measures were identified as a result of the site inspection in November 2022 (see Section 7 and Appendix 3)**.
- Although several additional impacts were identified during the follow up inspection in November 2022, the aggregate ratings of all the impacts did not differ from the original ratings i.e. **medium pre-mitigation and low post mitigation.**

9 RECOMMENDATION

It is recommended that the validity of the EA be extended by an additional 5 years, provided the recommendations in this report (Section 7 and Appendix 3) are strictly implemented.

10 REFERENCES

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APPENDIX 1: SITE SENSITIVITY VERIFICATION REPORT

SITE SENSITIVITY VERIFICATION REPORT (SSVR)

1 Introduction

A site verification visit has been undertaken on 19 November 2022 in order to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (Screening Tool).

2 Site Sensitivity Verification

The following methods and sources were used to compile this report:

- Bird distribution data of the South African Bird Atlas 2 (SABAP 2) was obtained from the University of Cape Town (2022), as a means to ascertain which species occur within the broader area i.e., within a block consisting of 4 pentads where the proposed project development area will be located (Figure 4). A pentad grid cell covers 5 minutes of latitude by 5 minutes of longitude (5'× 5'). Each pentad is approximately 8 × 7.6 km. From 2007 to date, a total of 41 full protocol lists (i.e., surveys lasting a minimum of two hours each) have been completed for this area. In addition, 56 ad hoc protocol lists (i.e., surveys lasting less than two hours but still yielding valuable data) have been completed. The broader area was selected on the basis of the number of checklists that had been completed, in order to get a more representative view of the avifauna that could occur at the project site.
- The national threatened status of all priority species was determined with the use of the most recent edition of the Red Data Book of Birds of South Africa (Taylor *et al.* 2015).
- The global threatened status of all priority species was determined by consulting the (2022) IUCN Red List of Threatened Species (http://www.iucnredlist.org/).
- A classification of the vegetation in the project site was obtained from the Atlas of Southern African Birds 1 (SABAP 1) (Harrison *et al.* 1997) and the National Vegetation Map (2018) from the South African National Biodiversity Institute website (Mucina & Rutherford 2006 & http://bgisviewer.sanbi.org).
- Satellite imagery (Google Earth ©2022) was used in order to view the broader area on a landscape level and to help identify sensitive bird habitat.
- The DFFE National Screening Tool was used to determine the assigned avian sensitivity of the project site.
- A one-day site survey was conducted on 19 November 2022 to assess the habitat and record the avifauna at the development area. See Appendix 1 for the avifauna recorded during the site survey.

3 Outcome of Site Sensitivity Verification

The proposed site is situated approximately 62km north of the town of Loeriesfontein, in the Northern Cape Province. The habitat in the broader development area is highly homogenous and consists of extensive sandy and gravel plains with low shrub. The vegetation on the site itself consists mostly of shrubs scattered between bare patches of sand and gravel. The dominant vegetation is a mixture of Bushmanland Arid Grassland and Bushmanland Basin Shrubland. These vegetation types consist of dwarf shrubland dominated by a mixture of low, sturdy and spiny (and sometimes also succulent) shrubs (*Rhigozum sp., Salsola sp., Pentzia sp.,* and *Eriocephalus sp.*), 'white' grasses (*Stipagrostis sp.*) and in years of high rainfall also abundant annual flowering

plants such as species of *Gazania sp.* and *Leysera sp*. (Mucina & Rutherford 2006). The closest Important Bird Area (IBA), the Bitterputs Conservation Area IBA SA036, is located approximately 75km to the north (Birdlife 2014) and falls outside the zone of influence of this development.

SABAP1 recognises six primary vegetation divisions within South Africa, namely (1) Fynbos (2) Succulent Karoo (3) Nama Karoo (4) Grassland (5) Savanna and (6) Forest (Harrison *et al.* 1997). The criteria used by the authors to amalgamate botanically defined vegetation units, or to keep them separate were (1) the existence of clear differences in vegetation structure, likely to be relevant to birds, and (2) the results of published community studies on bird/vegetation associations. It is important to note that no new vegetation unit boundaries were created, with use being made only of previously published data. Using this classification system, the natural vegetation in the study area is classified as Nama Karoo.

Nama Karoo as dominated by low shrubs and grasses; peak rainfall occurs in summer from December to May. Trees, e.g. *Vachellia karroo* are mainly restricted to ephemeral watercourses, but in the proposed development area, due to the extreme aridity the ephemeral watercourses are devoid of trees. The warmest month (with the highest average high temperature) is January (29.7°C). The months with the lowest average high temperature are June and July (15.1°C). The month with the highest average low temperature is February (17.7°C). The coldest month (with the lowest average low temperature) is July (5.7°C) (www.weatheratlas.com).

The project site lies in an ecotonal area between the Nama Karoo and the Succulent Karoo. In comparison with the Succulent Karoo, the Nama Karoo has higher proportions of grass and tree cover. The two Karoo vegetation types support a particularly high diversity of bird species endemic to Southern Africa, particularly in the family *Alaudidae* (Larks). Its avifauna typically comprises ground-dwelling species of open habitats. Because rainfall in the Nama Karoo falls mainly in summer, while peak rainfall in the Succulent Karoo occurs mainly in winter, it provides opportunities for birds to migrate between the Succulent and Nama Karoo, to exploit the enhanced conditions associated with rainfall. Many typical karroid species are nomads, able to use resources that are patchy in time and space (Barnes 1998).

Figures 1 and 2 are samples of the typical habitat at the Loeriesfontein 3 grid connection development area

Figure 1: Typical Bushmanland habitat at the project site in the solar array footprint.

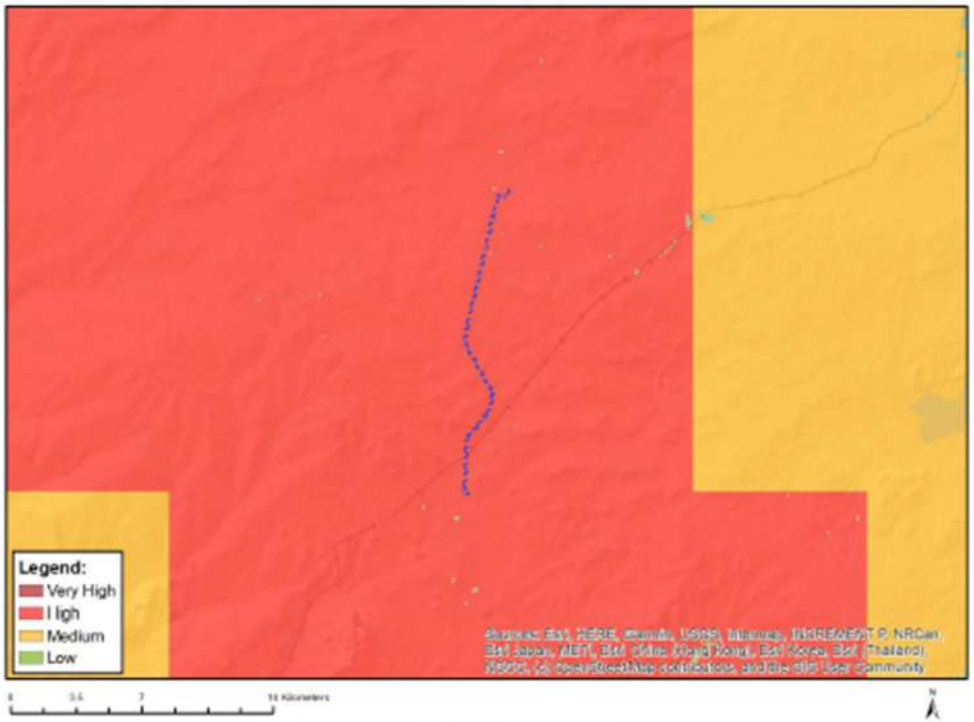
Figure 2: Typical Bushmanland habitat at the project site in the solar array footprint.

4 National Environmental Screening Tool

The project development area is classified as **High** sensitivity for avifauna, according to the DFFE online screening tool. The development sites contain confirmed habitat for Red Data species. The classification of High sensitivity is linked to the potential occurrence Ludwig's Bustard *Neotis ludwigii* (Regionally and Globally Endangered), Red Lark Red Lark *Calendulauda burra* (Regionally and Globally Vulnerable), Lanner Falcon *Falco biarmicus* (Regionally Vulnerable), Martial Eagle *Polemaetus bellicosus* (Regionally and Globally Endangered) and Burchell's Courser *Cursorius rufus* (Regionally Vulnerable) (Figure 3).

The occurrence of SCC was confirmed during the original surveys in the adjacent Loeriesfontein Wind Farm, in September 2012 to September 2013. Karoo Korhaan (Regionally Near threatened), Ludwig's Bustard (Regionally and Globally Endangered), Red Lark, Martial Eagle (Regionally and Globally Endangered) Sclater's Lark (Globally and Regionally Near threatened) were recorded at the site. The **subsequent site visit in November 2022 confirmed that the habitat has not changed and that habitat for the above listed SCC, as well as the other SCC listed in Table 1, exists at the development area**. This classification is assessed to be accurate as far as the potential presence of SCC is concerned, based on actual conditions recorded on the ground during the site visits in September 2012 to September 2013, and the subsequent site visit conducted in November 2022.

MAP OF RELATIVE ANIMAL SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
	X		

Sensitivity Features:

Sensitivity	Feature(s)
High	Aves-Cursorius rufus
High	Aves-Neotis ludwigii
High	Aves-Falco biarmicus
High	Aves-Polemaetus bellicosus
High	Aves-Calendulauda burra
Low	Subject to confirmation
Medium	Aves-Sagittarius serpentarius
Medium	Aves-Calendulauda burra

Figure 3: The classification of the Project Site according to the animal species theme in the DFFE National Screening Tool. The High sensitivity is linked to the possible occurrence of Ludwig's Bustard *Neotis ludwigii* (Regionally and Globally Endangered), Red Lark Red Lark *Calendulauda burra* (Regionally and Globally Vulnerable).

5 Conclusion

The proposed classification of **High Sensitivity** in the screening tool was **confirmed** during the site sensitivity verification survey which was conducted on 19 November 2022.

6 References

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APPENDIX 2: AVIFAUNA RECORDED DURING THE SITE SENSITIVITY SURVEY

Species name	Scientific name	SABAP2 Full protocol reporting rate	SABAP2 Ad hoc protocol reporting rate	Global status	Regional status	Recorded during monitoring 2022
Greater Kestrel	Falco rupicoloides	68.29	12.50	-	-	x
Jackal Buzzard	Buteo rufofuscus	7.32	3.57	-	-	x
Karoo Eremomela	Eremomela gregalis	63.41	21.43	-	-	x
Karoo Korhaan	Eupodotis vigorsii	90.24	37.50	-	NT	x
Karoo Prinia	Prinia maculosa	24.39	7.14	-	-	x
Martial Eagle	Polemaetus bellicosus	14.63	3.57	EN	EN	x
Pale Chanting Goshawk	Melierax canorus	78.05	17.86	-	-	x
Pied Starling	Lamprotornis bicolor	0.00	1.79	-	-	x
Red Lark	Calendulauda burra	92.68	25.00	VU	VU	x
Rock Kestrel	Falco rupicolus	17.07	17.86	-	-	x
Western Barn Owl	Tyto alba	0.00	1.79	-	-	x

APPENDIX 3: ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

Management Plan for the Construction Phase

Impact	Mitigation/Management Objectives and Outcomes	Mitigation/Management Actions	Monitoring		
			Methodology	*Frequency*	*Responsibility*
Avifauna: Displacement due to disturbance					
The noise and movement associated with the construction activities at the development footprint will be a source of disturbance which would lead to the displacement of avifauna from the area	Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (CEMPr.)	A site-specific CEMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. The CEMPr must specifically include the following: 1. No off-road driving; 2. Maximum use of existing roads, where possible; 3. Measures to control noise and dust according to latest best practice; 4. Restricted access to the rest of the property; 5. Strict application of all recommendations in the biodiversity specialist report pertaining to the limitation of the footprint.	1. Walk-through by avifaunal specialist to record eagle nests on the existing powerlines. 2. Implementation o the CEMPr. Oversee activities to ensure that the CEMPr is implemented and enforced via site audits and inspections. Report and record any non-compliance. 3. Ensure that construction personnel are made aware of the impacts relating to off-road driving. 4. Construction access roads must be demarcated clearly. Undertake site inspections to verify. 5. Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance. 6. Ensure that the construction area is demarcated clearly and that construction personnel are made aware of these demarcations. Monitor via site	1. Once-off 2. On a daily basis 3. Weekly 4. Weekly 5. Weekly 6. Weekly	1. Avifaunal Specialist 2. Contractor and ECO 3. Contractor and ECO 4. Contractor and ECO 5. Contractor and ECO 6. Contractor and ECO

Impact	Mitigation/Management Objectives and Outcomes	Mitigation/Management Actions	Monitoring		
			Methodology	*Frequency*	*Responsibility*
			inspections and report non-compliance.		
Avifauna: Mortality due to collision with the overhead powerline					
Mortality of avifauna due to collisions with the overhead powerline.	Reduction of avian collision mortality	Mark the powerline with Bird Flight Diverters	1. Bird Flight Diverters must be fitted to the entire powerline according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). These devices mus be installed as soor as the conductors are strung.	1. Once-off	1. Contractor

Management Plan for the Operational Phase

Impact	Mitigation/Management Objectives and Outcomes	Mitigation/Management Actions	Monitoring		
			Methodology	*Frequency*	*Responsibility*
Avifauna: Displacement due to habitat transformation in the substations					
Total or partial displacement of avifauna due to habitat transformation associated with vegetation clearance in the onsite substation area. .	Prevent unnecessary displacement of avifauna by ensuring that rehabilitation of transformed areas is implemented where possible by an appropriately qualified rehabilitation specialist, according to the recommendations of the biodiversity specialist study.	1. Develop a Habitat Restoration Plan (HRP) and ensure that it is approved. 2. Monitor rehabilitation via site audits and site inspections to ensure compliance. Record and report any non-compliance.	1. Appointment of rehabilitation specialist to develop HRP. 2. Site inspections to monitor progress of HRP. 3. Adaptive management to ensure HRP goals are met.	1. Once-off 2. Once a year 3. As and when required	1. Facility operator
Avifauna: Mortality of avifauna due to electrocution in the on-site substations					
Mortality of avifauna due to electrocutions in the substation.	Reduction of avian electrocution mortality	1. Monitor the electrocution mortality in the substation. 2. Apply mitigation if electrocution happens regularly.	1. Regular inspections of the substation yard	1. Weekly	1. Facility operator

Management Plan for the Decommissioning Phase

Impact	Mitigation/Management Objectives and Outcomes	Mitigation/Management Actions	Monitoring		
			Methodology	*Frequency*	*Responsibility*
Avifauna: Displacement due to disturbance					

Impact	Mitigation/Management Objectives and Outcomes	Mitigation/Management Actions	Monitoring		
			Methodology	***Frequency***	***Responsibility***
The noise and movement associated with the decommissioning activities will be a source of disturbance which would lead to the displacement of avifauna from the area.	Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Decommissioning EMPr.	A site-specific Decommissioning EMPr (DEMPr) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the DEMPr and should apply good environmental practice during decommissioning. The DEMPr must specifically include the following: 1. No off-road driving; 2. Maximum use of existing roads during the decommissioning phase and the construction of new roads should be kept to a minimum as far as practical; 3. Measures to control noise and dust according to latest best practice; 4. Restricted access to the rest of the property; 5. Strict application of all recommendations in the botanical specialist report pertaining to the limitation of the footprint.	1. Implementation of the DEMPr. Oversee activities to ensure that the DEMPr is implemented and enforced via site audits and inspections. Repor and record any non-compliance. 2. Ensure that decommissioning personnel are made aware of the impacts relating to off-road driving. 3. Access roads must be demarcated clearly. Undertake site inspections to verify. 4. Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance. 5. Ensure that the decommissioning area is demarcated clearly and that personnel are made aware of these demarcations. Monitor via site inspections and report non-compliance.	1. On a daily basis 2. Weekly 3. Weekly 4. Weekly 5. Weekly	1. Contractor and ECO 2. Contractor and ECO 3. Contractor and ECO 4. Contractor and ECO 5. Contractor and ECO

APPENDIX 4: ASSESSMENT CRITERIA

The EIA Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effect of an environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.

Determination of Significance of Impacts

Direct, indirect and cumulative impacts of the issues identified through the EIA process were assessed in terms of the following criteria:

- The nature, which includes a description of what causes the effect, what will be affected and how it will be affected.

- The extent, wherein it is indicated whether the impact will be
    - 1 = site only
    - 2 = local
    - 3 = regional
    - 4 = national
    - 5 = international

- The duration, wherein is indicated whether:
    - 1 = the lifetime of the impact will be of a very short duration (0–1 years)
    - 2 = the lifetime of the impact will be of a short duration (2-5 years)
    - 3 = medium-term (5–15 years)
    - 4 = long term (> 15 years)
    - 5 = permanent

- The consequences (magnitude), quantified on a scale from 0-10, where:
    - 0 = small and will have no effect on the environment
    - 2 = minor and will not result in an impact on processes
    - 4 = low and will cause a slight impact on processes
    - 6 = moderate and will result in processes continuing but in a modified way
    - 8 = high (processes are altered to the extent that they temporarily cease)
    - 10 = very high and results in complete destruction of patterns and permanent cessation of processes.

- The probability of occurrence, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale of 1–5, where:
    - 1 = very improbable (probably will not happen)
    - 2 = improbable (some possibility, but low likelihood)
    - 3 = probable (distinct possibility)

    - 4 = highly probable (most likely)
    - 5 is definite (impact will occur regardless of any prevention measures)

- The significance, which is determined through a synthesis of the characteristics described above and is assessed as low, medium or high
- The status, which is described as either positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

S = (E+D+M)P

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).