TERRESTRIAL BIODIVERSITY THEME ASSESSMENT FOR THE KLEINZEE PV FACILITY

PRODUCED FOR SAVANNAH ENVIRONMENTAL

3Foxes Biodiversity Solutions

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First Draft – January 2023

NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT REGULATIONS, 2014 (AS AMENDED) – REPORTING REQUIREMENTS FOR SPECIALIST THEMES

GN 1150 of 30 October 2020: Terrestrial Biodiversity Specialist Assessment Report (Very High or High Sensitivity)	Section of Report
3.1.1 contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;	P5
3.1.2 a signed statement of independence by thpecialist;	P7
3.1.3 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
3.1.4 a description of the methodology used to undertake the site sensitivity verification, impact assessment and site inspection, including equipment and modelling used where relevant;	Section 2
3.1.5 a description of the mean density of observations/number of sample sites per unit area and the site inspection observations;	Section 2
3.1.6 a description of the assumptions made and any uncertainties or gaps in knowledge or data;	Section 2
3.1.7 details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;	Section 2
3.1.8 the online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;	Section 3.3
3.1.9 the location of areas not suitable for development and to be avoided during construction where relevant;	Section 3
3.1.10 a discussion on the cumulative impacts;	Section 3, Section 5
3.1.11 impact management actions and impact management outcomes proposed	Section 3, Section 5
3.1.12 a reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and	Section 6
3.1.13 a motivation must be provided if there were any development footprints identified as per paragraph 2.2.12 above [of GN 1150 of 30 October 2020] that were identified as having “low” or “medium” terrestrial animal species sensitivity and were not considered appropriate.	Section 2.4

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SHORT CV/SUMMARY OF EXPERTISE – SIMON TODD

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Ecological Solutions for People & the Environment

Simon Todd is Director and principal scientist at 3Foxes Biodiversity Solutions and has over 20 years of experience in biodiversity measurement, management and assessment. He has provided specialist ecological input on more than 200 different developments distributed widely across the country, but with a focus on the three Cape provinces. This includes input on the Wind and Solar SEA (REDZ) as well as the Eskom Grid Infrastructure (EGI) SEA and Karoo Shale Gas SEA. He is on the National Vegetation Map Committee as representative of the Nama and Succulent Karoo Biomes. Simon Todd is a recognised ecological expert and is a past chairman and current deputy chair of the Arid-Zone Ecology Forum. He is registered with the South African Council for Natural Scientific Professions (No. 400425/11).

Skills & Primary Competencies

- Research & description of ecological patterns & processes in Nama Karoo, Succulent Karoo, Thicket, Arid Grassland, Fynbos and Savannah Ecosystems.
- Ecological Impacts of land use on biodiversity
- Vegetation surveys & degradation assessment & mapping
- Long-term vegetation monitoring
- Faunal surveys & assessment.
- GIS & remote sensing

Tertiary Education:

- 1992-1994 – BSc (Botany & Zoology), University of Cape Town
- 1995 – BSc Hons, Cum Laude (Zoology) University of Natal
- 1996-1997- MSc, Cum Laude (Conservation Biology) University of Cape Town

Employment History

- 2009 – Present – Sole Proprietor of Simon Todd Consulting, providing specialist ecological services for development and research.
- 2007 Present – Senior Scientist (Associate) – Plant Conservation Unit, Department of Botany, University of Cape Town.

- 2004-2007 – Senior Scientist (Contract) – Plant Conservation Unit, Department of Botany, University of Cape Town
- 2000-2004 – Specialist Scientist (Contract) - South African National Biodiversity Institute
- 1997 – 1999 – Research Scientist (Contract) – South African National Biodiversity Institute

A selection of recent work is as follows:

Strategic Environmental Assessments

Co-Author. Chapter 7 - Biodiversity & Ecosystems - Shale Gas SEA. CSIR 2016.

Co-Author. Chapter 1 Scenarios and Activities – Shale Gas SEA. CSIR 2016.

Co-Author – Ecological Chapter – Wind and Solar SEA. CSIR 2014.

Co-Author – Ecological Chapter – Eskom Grid Infrastructure SEA. CSIR 2015.

Contributor – Ecological & Conservation components to SKA SEA. CSIR 2017.

Recent Specialist Ecological Studies in the Vicinity of the Current Site

- Nuweveld North, East and West WEFs. Fauna & Flora Specialist Study for EIA. Zutari 2021.
- Beaufort West PV Facility. Fauna & Flora Assessment. SiVest Environmental 2022.
- San Solar PV Facility, Kathu. Fauna & Flora Assessment. Savannah Environmental 2022.
- Soventix Phase 3 PV Facility, De Aar. Fauna & Flora Assessment. Ecologes Environmental Consultants, 2022.
- Sadawa PV Facilities, Tankwa Karoo. Fauna & Flora Assessment. Savannah Environmental 2021.
- Kotulo Tsatsi PV 1 Facility near Kenhardt. Fauna & Flora Assessment. Savannah Environmental 2021.
- Hyperion 2 PV Facility, Kathu. Fauna & Flora Assessment. Savannah Environmental 2021.

SPECIALIST DECLARATION

I, ..Simon Todd....., as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- all the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist: 

Name of Specialist: ____Simon Todd_____

Date: ____20 January 2023_____

1 INTRODUCTION

Energy Team (Pty) Ltd is proposing the development of a solar photovoltaic (PV) facility with a contracted capacity of up to 200 MW on a site located approximately 20km west of the town of Komaggas, and 24km southeast of Kleinzee. The solar PV development will be known as the Kleinzee Solar PV Facility and would be located within Focus Area 8 of the Renewable Energy Development Zones (REDZ), which is known as the Springbok REDZ, and within the Northern Corridor of the Strategic Transmission Corridors. Savannah Environmental are conducting the required Basic Assessment process and 3Foxes Biodiversity Solutions has been appointed on behalf of Energy Team (Pty) Ltd to provide terrestrial ecological inputs for the development in line with GN 320 (20 March 2020) and GN 1150 (30 October 2020) of the NEMA EIA Regulations of 2014.

3Foxes Biodiversity Solutions has been appointed by Savannah Environmental on behalf of Kleinzee PV Facility to undertake a terrestrial biodiversity assessment of the proposed project in terms of the Environmental Impact Assessment Regulations, 2014, as amended, including the Gazetted specialist protocols (GN R 320 and GN R 1150 of 2020). The DFFE Screening Tool indicates that the Terrestrial Biodiversity Theme for the majority of the affected area is mapped as Very High sensitivity, with the result that a full terrestrial biodiversity assessment is required. To these ends, this Terrestrial Biodiversity Assessment for the Kleinzee PV Facility and associated infrastructure, addresses the potential impacts of the development on Terrestrial Biodiversity and must be included in the EIA for the development and any mitigation and monitoring measures as identified, must be incorporated into the EMPr for the development.

1.1 SCOPE OF STUDY

In terms of GN 320 (20 March 2020) and GN 1150 (30 October 2020) of the NEMA EIA Regulations of 2014 (as amended), prior to the commencement of a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project areas as identified by the Screening Tool. In terms of the findings of the Screening Tool, the site contains areas of Very High sensitivity for the Terrestrial Biodiversity Theme due to the presence of areas of CBA 2, ESAs and FEPA Priority Subcatchments within the study area. In terms of the Assessment Criteria, this implies the following outcome:

1. An applicant intending to undertake an activity identified in the Scope of this Protocol, on a site identified as being of “very high sensitivity” for terrestrial biodiversity on the national web based environmental screening tool must submit a Terrestrial Biodiversity Impact Assessment.

2. The Terrestrial Biodiversity Impact Assessment should meet the following terms of reference:

2.1 The assessment must be undertaken by a SACNASP registered specialist, on the preferred development site.

2.2 Description of the preferred site - the following aspects, as a minimum, must be considered in the baseline description:

2.2.1 A description of the ecological drivers/processes of the system and how the proposed development will impact these;

2.2.2 Ecological functioning and ecological processes (e.g. fire, migration, pollination, etc.) that operate within the proposed development site;

2.2.3 The ecological corridors that the development would impede including migration and movement of flora and fauna;

2.2.4 The description of any significant landscape features (including rare or important flora/faunal associations, presence of Strategic Water Source Areas (SWSAs) or Freshwater Ecosystem Priority Areas (FEPA) sub catchments;

2.2.5 A description of terrestrial biodiversity and ecosystems on the proposed development site, including –

a) Main vegetation types;
b) Threatened ecosystems, including Listed Ecosystems as well as locally important habitat types identified;
c) Ecological connectivity, habitat fragmentation, ecological processes and fine-scale habitats; and
d) Species, distribution, important habitats (e.g. feeding grounds, nesting sites, etc.) and movement patterns identified.

2.3 Identify any alternative development footprints within the preferred development site which would be of a “low” sensitivity as identified by the national web based environmental screening tool and verified through the Initial Site Sensitivity Verification;

2.4 The Terrestrial Biodiversity Impact Assessment must be based on the results of a site inspection undertaken on the preferred development site and must identify:

2.5 Terrestrial Critical Biodiversity Areas (CBAs), including:

2.5.1 The reasons why an area has been identified as a CBA;

2.5.2 An indication of whether or not the development is consistent with maintaining the CBA in a natural or near natural state or in achieving the goal of rehabilitation;
2.5.3 The impact on species composition and structure of vegetation with an indication of the extent of clearing activities;
2.5.4 The impact on ecosystem threat status;
2.5.5 The impact on explicit subtypes in the vegetation;
2.5.6 The impact on overall species and ecosystem diversity of the site; and
2.5.7 The impact on populations of species of special concern in the CBA.

2.6 Terrestrial Ecological Support Areas, including;

2.6.1 The impact on the ecological processes that operate within or across the site;
2.6.2 The extent the development will impact on the functionality of the ESA; and
2.6.3 Loss of ecological connectivity (on site, and in relation to the broader landscape) due to the degradation and severing of ecological corridors or introducing barriers that impede migration and movement of flora and fauna.

2.7 Protected Areas as defined by the National Environmental Management: Protected Areas Act, 2004 including:

2.7.1 An opinion on whether the proposed development aligns with the objectives/purpose of the Protected Area and the zoning as per the Protected Area Management Plan;

2.8 Priority Areas for Protected Area Expansion, including:

2.8.1 The way in which in which the development will compromise or contribute to the expansion of the protected area network.

2.9 Strategic Water Source Areas (SWSA) including:

2.9.1 The impact(s) on the terrestrial habitat of a Strategic Water Source Area, and
2.9.2 The impacts of the development on the SWSA water quality and quantity (e.g. describing potential increased runoff leading to increased sediment load in water courses).

2.10 Freshwater Ecosystem Priority Area (FEPA) sub catchments, including:

2.10.1 The impacts of the development on habitat condition and/or species in the FEPA sub catchment.

2.11 Indigenous Forests, including:

2.11.1 Impact on the ecological integrity of the forest;
2.11.2 Extent of natural or near natural indigenous forest area lost.

3. The findings of the Terrestrial Biodiversity Impact Assessment must be written up in a Terrestrial Biodiversity Impact Assessment Report. This report must include as a minimum the following information:

3.1 Contact details and curriculum vitae of the specialist including SACNASP registration number and field of expertise and their curriculum vitae;

3.2 A signed statement of independence by the specialist;

3.3 Duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;

3.4 A description of the methodology used to undertake the impact assessment and site inspection, including equipment and modelling used where relevant;

3.5 A description of the assumptions made and any uncertainties or gaps in knowledge or data as well as a statement of the timing and intensity of site inspection observations;

3.6 Areas not suitable for development, to be avoided during construction and operation (where relevant);

3.7 Additional environmental impacts expected from the proposed development based on those already evident on the site and a discussion on the cumulative impacts;

3.8 Impact management actions and impact management outcomes proposed by the specialist for inclusion in the EMPr; and

3.9 A motivation where the development footprint identified as per section 2.3 were not considered stating reasons why these were not being not considered.

3.10 A reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not of the development and if the development should receive approval or not, and any conditions to which the statement is subjected.

4. The findings of the Terrestrial Biodiversity Impact Assessment must be incorporated into the Basic Assessment Report or the Environmental Impact Assessment Report, including the mitigation and monitoring measures as identified, which must be incorporated into the EMPr. A signed copy of the Assessment must be appended to the Basic Assessment Report or Environmental Assessment Report.

The above Terms of Reference and reporting requirements are achieved in this study and report.

2 RELEVANT ASPECTS OF THE DEVELOPMENT

The Kleinzee Solar PV Facility site is located e.g., approximately 20km west of the town of Komaggas, and 24km southeast of Kleinzee, within the Nama Khoi Local Municipality and the Namakwa District Municipality, Northern Cape. The infrastructure associated with the 200 MW solar PV facility will include:

- Solar PV array comprising PV modules and mounting structures
- Inverters and transformers
- Low voltage cabling between the PV modules to the inverters
- 33kV cabling between the project components and the facility substation
- 132kV onsite facility substation
- 132kV power line to connect to the grid at Zonnequa Collector Substation within a 300m wide and approximately 8.2 km long corridor.
- Battery Energy Storage System (BESS)
- Site offices and maintenance buildings, including workshop areas for maintenance and storage
- Laydown areas
- Site access and internal roads.

The layout of the Kleinzee PV Project is illustrated in Figure 1 below.

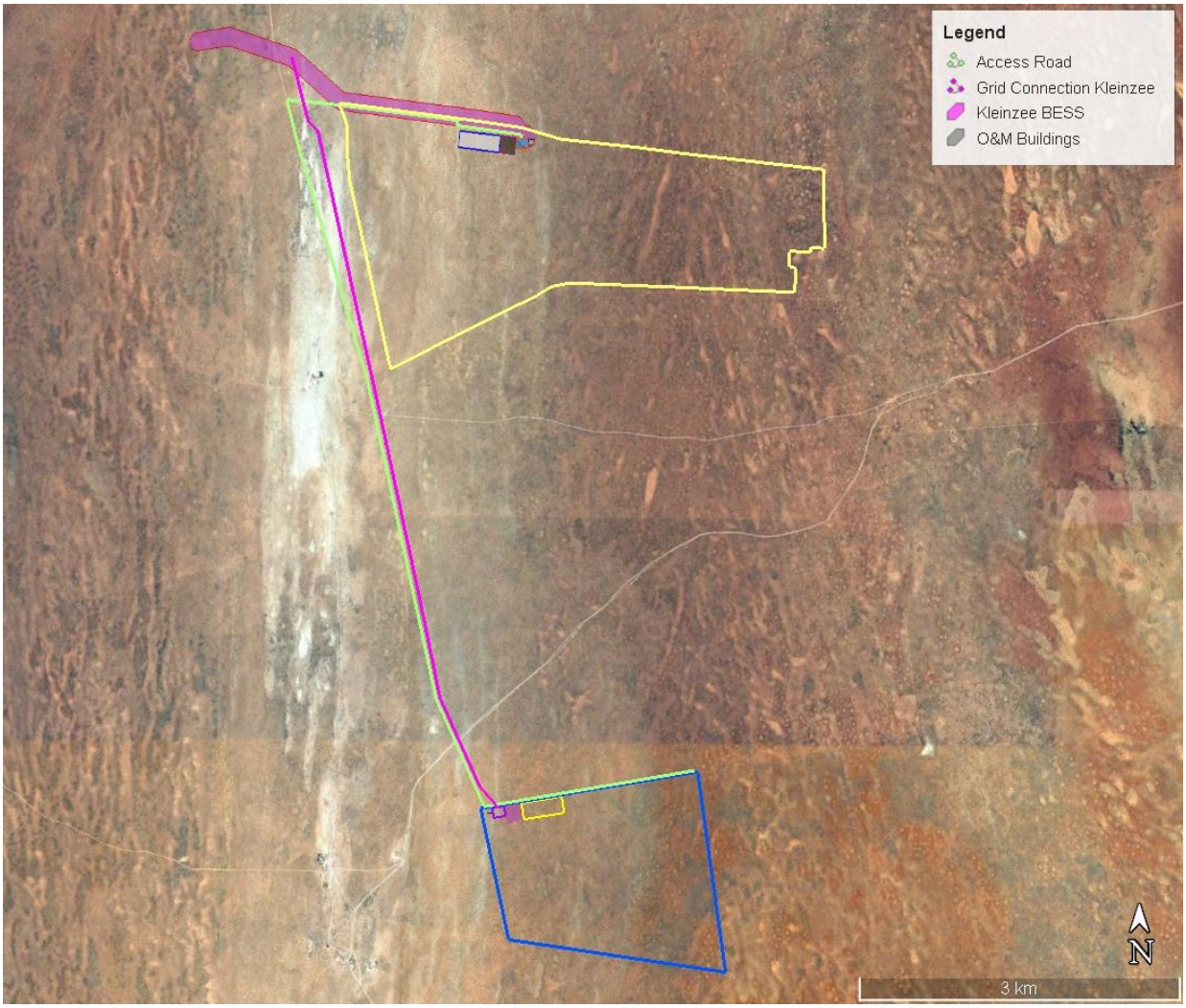

Figure 1. Satellite image showing the location of the proposed Kleinzee PV Facility (in blue) and grid connection which runs from the site northwards towards the Daisy PV Facility.

2.1 DFFE SCREENING TOOL TERRESTRIAL BIODIVERSITY THEME SENSITIVITY.

The DFFE Screening Tool for the site indicates that for the combined Terrestrial Biodiversity Theme, the site consists entirely of Very High sensitivity areas due to the presence of areas of CBA 2, ESAs, Protected Areas Expansion Strategy and Protected Areas Expansion Strategy: Sanparks (Figure 2 and Table 1). Based on the presence of these features within the site, a full terrestrial biodiversity assessment is required and represents the rationale for the current assessment.

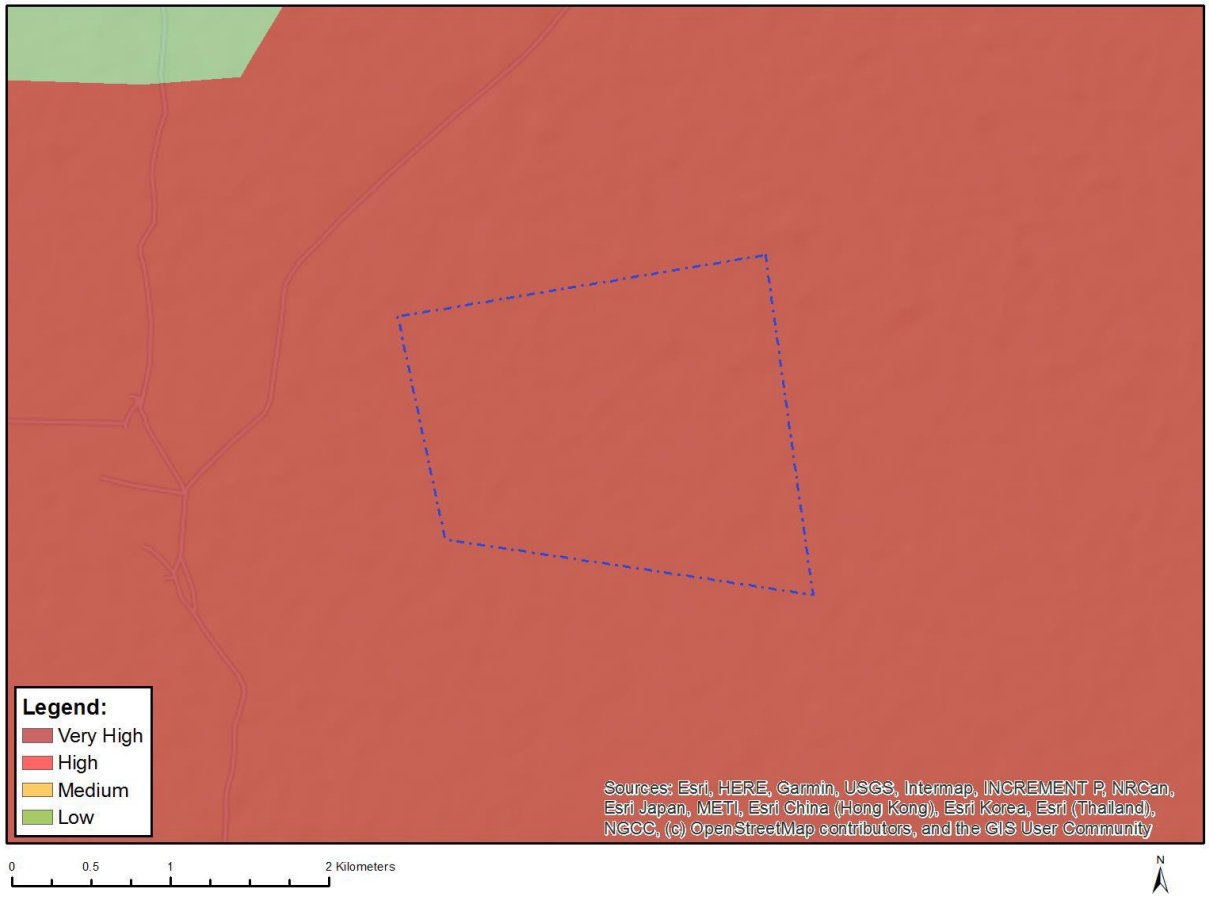

Figure 2. Terrestrial Biodiversity Theme Sensitivity Map of the Kleinzee PV Facility site and surrounds.

Table 1. Terrestrial Biodiversity Theme Features for the Kleinzee PV Facility study area.

Sensitivity	Feature(s)
Very High	Critical biodiversity area 2
Very High	Ecological support area
Very High	Protected Areas Expansion Strategy
Very High	Protected Areas Expansion Strategy: Sanparks

3 METHODOLOGY

3.1 DATA SOURCING AND REVIEW

Data sources from the literature consulted and used where necessary in the study includes the following:

Vegetation:

- Vegetation types and their conservation status were extracted from the South African National Vegetation Map (2018 update).
- Information on plant and animal species recorded for the wider area was extracted from the South African Biodiversity Information Facility (SABIF)/ SANBI Integrated Biodiversity Information System (SIBIS) database hosted by the South African National Biodiversity Institute (SANBI). Data was extracted for a significantly larger area than the study area, but this is necessary to ensure a conservative approach as well as counter the fact that the site itself has not been well sampled in the past.
- The International Union for Conservation of Nature (IUCN) conservation status of the species in the list was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants (2023).

Ecosystem:

- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel *et al.* 2011) as well as the 2018 NBA.
- Critical Biodiversity Areas (CBAs) and ESAs in the study area were obtained from the Northern Cape CBA Map (2018) as available from the SANBI BGIS Portal.
- Northern Cape PAES Focus Areas were derived from the NC-PAES layer as available from the SANBI BGIS Portal.
- NPAES Focus Areas were obtained from the 2018 NPAES layer available from the DFFE web portal.
- There are no threatened ecosystems within the site, which was verified through inspection of the ecosystem status maps as included in the 2018 NBA.
- Strategic Water Source Areas (SWSAs) for the site were extracted from the SWSAs map available on the SANBI BGIS data portal (Water Research Commission. 2017 Surface and Groundwater SWSA [Vector] 2017).

Fauna

- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and the ADU databases (ReptileMap, Frogmap and MammalMap) http://vmus.adu.org.za.
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, EWT & SANBI (2016) and Skinner and Chimimba (2005) for mammals.
- The faunal species lists provided are based on species which are known to occur in the broad geographical area, as well as an assessment of the availability and quality of suitable habitat at the site.
- The conservation status of mammals is based on the IUCN Red List Categories (EWT/SANBI 2016), while reptiles are based on the South African Reptile Conservation

Assessment (Bates *et al*. 2013) and amphibians on Minter *et al.* (2004) as well as the IUCN (2023).

3.2 SITE VISITS & FIELD ASSESSMENT DATES

The site was sampled twice for the current assessment. An initial field assessment took place on the 19th of November 2021 and then a follow-up more extensive field assessment took place from 21-23 September 2022. During the initial field assessment, it was after the typical wet season and the conditions were relatively dry. During the second field assessment, conditions were considered near-optimal for the field assessment with the vegetation in a green and growing and a high level of faunal activity. In terms of actual sampling, transects were walked across the PV footprint area, amounting to a sampling track within the development footprint of over 14km (Figure 3).

In addition to the above sampling, the site has been sampled numerous times in the past from 2017 till the present for the Zonnequa Wind Farm development which is on the same property as the current development and includes the site within its area. Sampling for that development included camera trapping across the site as well as extensive vegetation surveys to characterise the vegetation of the site and wider area.

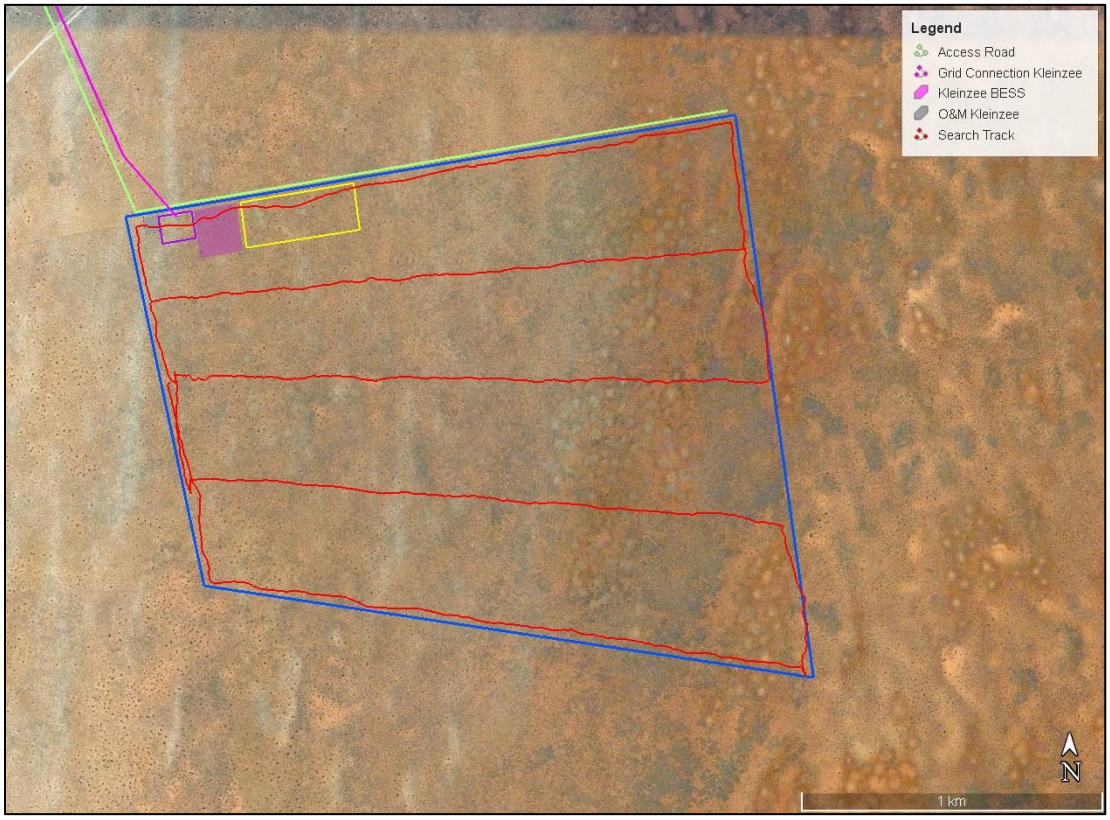

Figure 3. Figure showing the search track (red line) that was walked across the Kleinzee Solar PV Facility footprint area.

3.3 SAMPLING LIMITATIONS AND ASSUMPTIONS

There are a number of assumptions and limitations associated with the study relating to fauna and flora and the inherent variability and unpredictability of ecological systems as detailed below. These relate primarily to specific species and the likely presence or absence of these species at the site. However, from a broader perspective, the CBA mapping and conservation planning tools for the area are themselves also subject to various kinds of uncertainty and underlying assumptions that can't be dealt with in detail here.

In terms of fauna, the following limitations are inherent in the study:

- It is not possible to confirm the absence of a faunal species with 100% certainty. A species may be absent from an area during sampling but may move through the area occasionally or seasonally.
- Some species are rare or difficult to locate and it may be very difficult to confirm either the absence or presence of such species without long-term studies.
- The presence of such species are assessed in the current study based on observations of such species from the wider area in the various publicly available databases and citizen science websites (Virtual Museum & iNaturalist), as well as the habitat suitability, quality and condition as observed in the field.

In terms of vegetation, conditions at the time of the main survey were good, but this followed an extended drought in the region, the effects of which were visible at the site and included a high proportion of dead shrubs and a depressed cover of the annuals, forbs and geophytes. As such, some species which may at other times be common at the site may have been rare or absent from the site during the field assessment. However, the site was very well covered during the field assessment with the result that such effects have been reduced as far possible.

4 KLEINZEE SOLAR PV BASELINE DESCRIPTION

4.1 VEGETATION TYPES

The Kleinzee PV Facility footprint falls entirely within the Namaqualand Strandveld vegetation type. Although there is some variation in the vegetation composition of the site relating to substrate conditions, these differences represent different communities rather than different vegetation types and there are no significant vegetation features within the site.

The Namqualand Strandveld vegetation type occurs in the Northern and Western Cape Provinces from the southern Richtersveld as far south as Donkins Bay. Especially in the north of this unit it penetrates up to 40km inland and approaches the coast only near the river mouths of the Buffels,

Swartlintjies, Spoeg, Bitter and Groen Rivers. In the south of the unit it is variably narrow and approaches the coast more closely. It consists of flat to undulating coastal peneplains with vegetation being a low species richness shrubland dominated by a plethora of erect and creeping succulent shrubs as well as woody shrubs and in wet years annuals are also abundant. It is. Mucina and Rutherford (2006 and 2018) list eight endemic species for this vegetation type, which is likely an under-estimate. About 10% of this vegetation type has been lost mainly to coastal mining for heavy metals and it is not currently listed. Within the study area, the vegetation is relatively homogenous, although there is some variation depending on the nature of the underlying sand and landscape position. A single plant species of concern was confirmed present within the site, namely *Wahlenbergia asparagoides* (VU) which is occasional across most of the site. The impact of the development on this species is assessed in its' own associated plant species assessment.

Figure 4. Typical Strandveld vegetation within the Kleinzee PV Facility. The effects of the preceding drought are however still apparent as can be seen from the abundance of dead shrubs in the middle- and foreground.

4.2 FAUNAL COMMUNITIES

In terms of the fauna that are known from the wider area and potentially occur at the site, the potential diversity is considered to be moderate and numbers approximately 40 mammals, 45

reptiles and about seven frogs and toads (See Appendix 1-3). Mammals observed directly or through camera trapping include Steenbok, Cape Hare, Cape Fox, Bat-eared fox, Striped Polecat, Suricate, Cape Porcupine, Common Duiker, Honey Badger, Small Spotted Genet, Grey Mongoose, Caracal, Yellow Mongoose and African Wild Cat. Reptiles and amphibians observed on the site or in the immediate environment include Angulate Tortoise, Giant Desert Lizard, Common Giant Ground Gecko, Knox's Desert Lizard, Common Sand Lizard, Cape Skink, Coastal Dwarf Legless Skink, Namaqua Sand Lizard, Pink Blind Legless Skink, Dwarf Beaked Snake and Many-horned Adder and Namaqua Rain Frog.

In terms of the two terrestrial fauna species identified by the Screening Tool, Sensitive Species 32 can be confirmed absent with a high degree of confidence as this reptile species has a strong association and preference for rocky terrain, which is not present within or near the site. As such, this species is considered absent from the site and its surrounds and the site is considered low sensitivity for this species. In terms of the Sandveld Winter Katydid *Brinckiella mauerbergerorum*, the presence or absence of this species on the site is less definitive, but based on the amount of time spent on site and in the area which amounts to several weeks across different seasons and years and the failure to detect this species on the site, it is concluded that this species is absent from the site. As such, the site is considered low sensitivity for this species.

Apart from the species identified by the Screening Tool, four red-listed mammal SCC are known from the wider area. This includes the Leopard Panthera pardus (Vulnerable), Littledale's Whistling Rat *Parotomys littledalei* (Near Threatened), African Clawless Otter *Aonyx capensis* (Near Threatened) and Grants' Golden Mole *Eremitalpa granti granti* (Vulnerable). The Leopard and Otter can be definitively considered absent from the site as these species are associated with rugged terrain and the coastline/freshwater ecosystems respectively and would not occur within the site. The distinctive burrows made by Littledale's Whistling Rat were not observed within the site and the substrate is considered generally too soft for this species. Grants' Golden Mole is usually restricted to within 10km of the coastline and as the site is more than 16km from the coast, it is unlikely that this species is present. Furthermore, Grants' Golden Mole prefers the soft unconsolidated sands that occur closer to the coast and the habitat within the site is considered unsuitable for this species. As such, none of the mammal SCC that occur in the area are likely to be present within the site. The Desert Rain Frog *Breviceps macrops* occurs in Strandveld vegetation up to 10 km from the coastline and is listed as Vulnerable. As with Grants' Golden Mole, the site is considered too far from the coastline for this species and it is considered highly unlikely that it is present within the development footprint.

4.3 CRITICAL BIODIVERSITY AREAS & BROAD-SCALE PROCESSES

The following section provides a summary and analysis of the Kleinzee PV Facility in relation to the conservation planning context of the area and especially with reference to the potential

expansion of the Namakwa National Park. However, since the development is located within the expansion mosaic of the Namakwa National Park, SANParks, has requested an offset needs analysis for the development cluster and as such, the current section especially should be read in conjunction with that study. Where relevant, the current study refers to the outcomes of the offset needs analysis study, but does not repeat the outcomes that study in full, but restricts the current discussion to those asects relevant to the Kleinzee PV Facility and the assessment of impacts related to that facility.

The majority of the Kleinzee PV Facility site falls within a CBA 2, with the remainder of the site falling within an ESA (Figure 5). In addition, the whole of the site falls within a NPAES Focus Area associated with the Namakwa National Park, which lies approximately 18 km south of the site. As areas of CBA 2 are not considered to be irreplaceable, the development is not considered to have a very high impact on the affected CBA 2, which is considerably larger than the site. In addition, the field assessment did not identify any significant biodiversity features within the site, with the result that the development would not have a high impact on biodiversity pattern features.

As the primary purpose of CBAs is to try and secure the broad-scale ecological functioning and resilience of landscapes, it is important to consider the impact that the proposed development may have on ecological processes. As the broader study area is relatively homogenous, it is not likely that there are any specific directional movement corridors that would be affected by the development. Furthermore, although the development would result in the loss of approximately 310ha of habitat, this is within a single contiguous area and there are extensive tracts of similar intact habitat around the site with the result that it is not likely that the development would result in significant disruption of ecological processes. The Kleinzee Solar PV project area represents typical Strandveld with a relatively low abundance of SCC and no specific features of high biodiversity or ecological value.

A potential issue associated with development within CBAs is the extent to which habitat loss would impact on ecological processes within the CBA and the potential irreplaceability of the affected area. As mentioned above, the site is not considered irreplaceable, which is supported by the CBA 2 status of the site as well as the field assessment, which found that the site has a relatively low abundance of SCC and no significant biodiversity features. Similar Strandveld habitat is widely available in the area and is also well-represented within the Namakwa National Park. The development is therefore considered highly unlikely to compromise the ecological functioning of the affected CBA, given that it has not been identified as being of particular significance for broad-scale ecological processes. Consequently, the overall impact of the development on CBAs and broader scale ecological processes is considered to be relatively low and no major impacts to dispersal ability or faunal movement patterns are likely to be generated by the development.

Of greater concern than the impact on CBAs would be the impact of the development on NPAES Focus Areas and potential expansion of the Namakwa National Park. The site falls within the Namakwa National Park Buffer Area and within a priority area for future park expansion (Figure 6). Development of the site would thus place some limitations on the future expansion of traditional formalised conservation into the affected area. The total area of the affected Focus Area is 377 266 ha and the loss of 310 ha of this represents less than 0.01% of the Focus Area. In terms of a more specific impact on the affected Namaqualand Strandveld vegeation type, the Namakwa National Park currently protects 14% of the total extent of the Namaqualand Strandveld vegetation type. The current expansion mosaic area includes an additional 36% of the overall extent this vegetation type of which the Kleinsee PV Facility would comprise less than 0.6%. The presence of the Kleinsee PV Facility would reduce the available combined extent of Namaqualand Strandveld within the Park and the expansion area by 0.4%. Since the affected area is on the margin of the expansion area and does not include any high-value habitats, the area affected by the PV plant could easily be substituted by another neaby areas of Namaqualand Strandveld, with little impact on the overall integrity and efficiency of design of the park expansion area. The impact of the Kleinsee PV Facility on potential future expansion of the Namaqua National Park as well as the Namaqualand Strandveld vegetation type is therefore considered to be low and acceptable. Further analysis is provided in the offset needs analysis report.

As a result, this loss is, on its own is not considered to represent a significant loss. In addition, the site is located along the margin of the PAES Focus Area, with the result that the impact on protected area expansion is likely to be lower than if the site was located deeper within the PAES Focus Area. An additional factor that is worth noting is that solar PV facilities do not have a large edge effect in terms of noise and disturbance, with the result that their proximity to protected areas is not likely to represent a significant threat to biodiversity within these areas. Thus, the impact of the Kleinzee Solar PV Facility on the potential future expansion of the Namakwa National Park or other protected area expansion is considered to be relatively low and is considered acceptable.

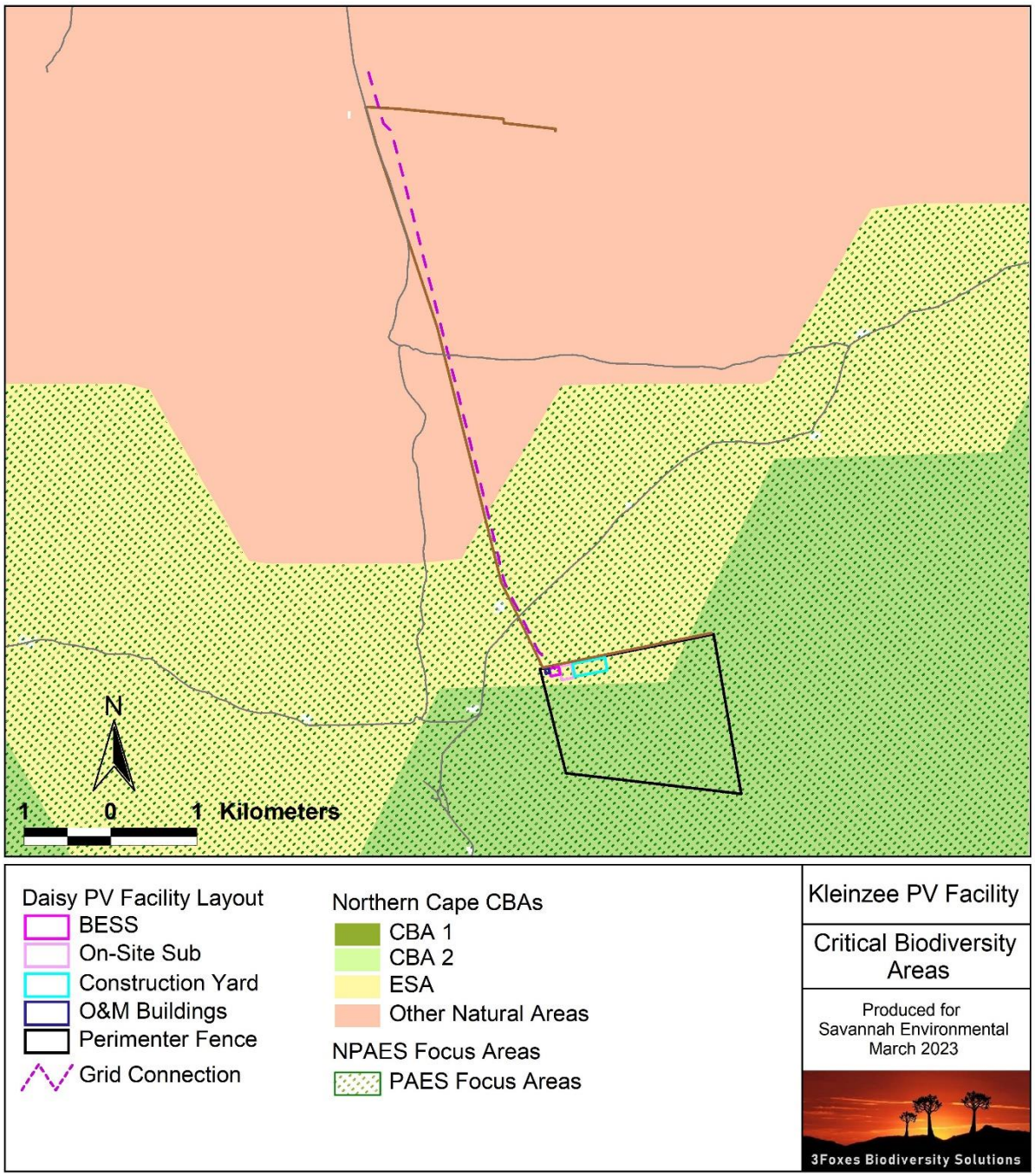

Figure 5. Extract of the Northern Cape CBA map for the Kleinzee PV Facility and surrounds.

4.4 CUMULATIVE IMPACTS

In terms of cumulative impacts, there are several approved wind energy facilities in the immediate area. This includes the Namas, Zonnequa and Kap Vlei WEFs, which would each have a development footprint of approximately 100ha each. The additional contribution of the current Kleinzee Solar PV Facility at 310 ha is considered moderate. However, the nature of this impact

is different from the wind energy facilities in that the PV development consists of a single contiguous block of development with minimal edge effect beyond the direct footprint, whereas the wind farms are diffuse and have a relatively low direct footprint but high indirect footprint as a result to turbine noise etc.

In terms of specific cumulative impacts of possible concern, there do not appear to be any major concerns for specific fauna species but should all the developments in the area go ahead, this would likely generate significant fragmentation of the landscape for some species and habitat degradation for others. This would however be related largely to the wind energy facilities present and the contribution of the Kleinzee PV Facility to such cumulative impact is considered likely to be low. The increasing development footprint would also have an impact on the local populations of some flora SCC such as *Wahlenbergia asparagoides* (VU), *Helichrysum tricostatum* (NT) and *Leucoptera nodosa* (NT). However, these species are quite dispersed and the overall footprint in area affected by the above facilities amounts to less than 5% of the landscape, with the result that these species are unlikely to be significantly affected overall.

5 IMPACTS AND ISSUES IDENTIFICATION

5.1 IDENTIFICATION OF POTENTIAL IMPACTS

The development of the Kleinzee PV Facility would result in a number of potential impacts on Terrestrial Biodiversity during the construction and operational phases of the development. During construction, the major impact would likely be habitat loss and anthropogenic disturbance while during the operational phase, direct disturbance would be much reduced although there may be some potential impact from operational and maintenance activities. The following impacts are identified as the major impacts that are likely to be associated with the development of the Kleinzee PV Facility on Terrestrial Biodiversity.

Impact 1. Impacts on CBAs and ESAs

The development would result in some impact on the affected CBA and ESA within the site through habitat loss and disturbance. The noise generated during construction would create disturbance for some fauna, which would decrease the value of the area for the affected fauna for that period. However, during the operational phase, disturbance would decrease significantly as compared to the construction phase and would not be very high. In addition, the development would result in some general habitat fragmentation and impact on broad-scale ecological processes in the area. These impacts cannot be entirely mitigated and there is likely to be some residual impact on broad-scale ecological processes due to the presence and operation of the solar PV facility.

Impact 2. Impact on NPAES Focus Areas

The Kleinzee PV Facility would be located within a NPAES Focus Area associated with the expansion of the Namakwa National Park, resulting in a direct footprint of approximately 310 ha within the NPAES Focus Area. Although this is not considered to represent a highly significant impact given the overall size of the NPAES Focus Area and the location of the development along the margin of the NPAES, the presence of the facility would impact on the ecological and conservation value of the affected area to some extent.

Cumulative Impact 1. Cumulative Impacts on broad-scale ecological processes

The development of the Kleinzee PV Facility would result in habitat loss and an increase in overall cumulative impacts on fauna and flora in the area. The contribution of the Kleinzee PV Facility to cumulative impact 310 ha is not considered highly significant, given the lack of sensitive features within the development footprint and the contiguous, concentrated nature of PV development. In addition, there are no observable corridors or gradients evident across the site that would be likely to be disrupted by the development.

6 ASSESSMENT OF IMPACTS ON TERRESTRIAL BIODIVERSITY

An assessment of the likely significance of the impacts identified above is made below for the impacts of the Kleinzee PV Facility on Terrestrial Biodiversity.

6.1 CONSTRUCTION-PHASE IMPACT ON CBAS AND ESAS

Impact Nature: Habitat transformation and the presence of the facility will contribute to habitat loss within the affected CBA and ESA.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (3)	Minor (2)
Probability	Highly Likely (4)	Highly Likely (4)
Significance	Medium (32)	Low (28)
Status	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, negative impacts ca be reduced.	
Mitigation	• Minimise the development footprint as far as possible.	

	• Locate temporary-use areas such as construction camps and lay-down areas in low sensitivity or previously disturbed areas. • Minimise the development footprint in areas mapped as high sensitivity (i.e. near dunes and other ecologically significant features). • Appropriate design of roads and other infrastructure to minimise faunal impacts and allow fauna to pass over, through or underneath these features as appropriate. • The fencing around the facility and substation or other infrastructure should not have any electrified strands within 30cm of the ground as this may result in tortoises being electrocuted. Alternatively, guard wires or mesh can be placed outside of the fence to prevent tortoises from accessing the electrified fence. • Monitoring of construction activities to ensure that the development footprint within sensitive areas is restricted to the authorised development footprint.
Residual Risks	Habitat loss within the CBAs and ESAs cannot be fully mitigated or avoided, with the result that there would some residual impact on these features, but this is considered to be low after mitigation.

6.2 CONSTRUCTION PHASE IMPACT ON NPAES FOCUS AREAS

Impact Nature: The development would impact on a NPAES Focus Area associated with the Namakwa National Park, reducing the conservation value of the area to some degree.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (3)	Minor (2)
Probability	Certain (5)	Highly Likely (4)
Significance	Medium (40)	Low (28)
Status	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	To some degree, but not entirely	
Mitigation	• Disturbance around the margins of the site should be kept to a minimum and any disturbance in these areas should be rehabilitated as quickly as possible. • An erosion monitoring programme should be put in place for at least 3-5 years after construction. Any problems observed	

	should be rectified as soon as possible using the appropriate revegetation and erosion control works. • Ensure that the project design remains ecologically sensitive and minimises edge effects such as noise and light pollution.
Residual Risks	Habitat loss within the NPAES cannot be fully mitigated or avoided with the result that some residual disturbance and degradation will occur during operation of the facility.

6.3 OPERATIONAL PHASE IMPACTS ON CBAS AND ESAS

Impact Nature: The presence and operation of the facility will contribute to disturbance and fragmentation effects on the affected CBA and ESA.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (4)	Low (3)
Probability	Probable (3)	Probable (3)
Significance	Low (27)	Low (24)
Status	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	To some degree, but some residual disturbance associated with the project is likely unavoidable.	
Mitigation	• Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. • If any parts of the facility must be lit at night for security purposes, this should be done with inward- and downward-directed low-UV type lights (such as most LEDs and HPS bulbs), which attract fewer insects. • All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. • All vehicles accessing the site should adhere to a low speed limit (30km/h max for heavy vehicles and 40km/h for light vehicles) to avoid collisions with susceptible species such as snakes and tortoises. • If any parts of the facility are fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences because they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the	

	electrified strands should be placed on the inside of the security fence and not the outside.
Residual Risks	Habitat loss within the site and affected CBA and ESA cannot be fully mitigated or avoided with the result that some residual habitat and local disturbance, for affected fauna and flora will occur during operation of the facility.

6.4 DECOMMISSIONING PHASE IMPACTS ON CBAS AND ESAS

Impact Nature: The decommissioning of the facility will contribute to disturbance within the affected CBA and ESA.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Minor (2)
Probability	Probable (3)	Unlikely (2)
Significance	Low (21)	Low (14)
Status	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Not fully, but the impact would be temporary in nature.	
Mitigation	• All vehicles should adhere to a low-speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h. • Any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities should be removed to a safe location prior to the commencement of decommissioning activities. • All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. • No excavated holes or trenches should be left open for extended periods as fauna may fall in become trapped. • All above-ground infrastructures should be removed from the site. • The footprint area should be rehabilitated with species from the local area and specific measures to reduce and limit wind erosion should be included.	

	• An erosion monitoring programme should be put in place for at least 3 years after decommissioning and should make provision for annual monitoring and rehabilitation. • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. • There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous perennial shrubs, grasses and trees from the local area. • Alien management at the site should be implemented post-decommissioning in accordance with an Alien Invasive Management Plan. • Regular (annual) monitoring for alien plants during decommissioning to ensure that no alien invasive problems have developed as result of the disturbance, as per the Alien Management Plan for the project. • Woody aliens should be controlled on at least an annual basis using the appropriate alien control techniques as determined by the species present.
Residual Risks	There may be some residual risks of degradation after decommissioning, but ultimately the functioning of the site should be restored through rehabilitation and revegetation of disturbed areas.

6.5 CUMULATIVE IMPACT 1. CUMULATIVE IMPACT ON TERRESTRIAL ECOLOGY.

Impact Nature: Development of the Kleinzee PV Facility may impact on broad-scale ecological processes such as the ability of fauna to disperse. The development would potentially contribute to habitat degradation and the loss of landscape connectivity and ecosystem function within the area, but this is likely to be relatively low as most species are likely to be able to avoid or move around the facility.

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (3)	Low (4)
Probability	Improbable (2)	Probable (3)
Significance	Low (16)	Low (27)
Status	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources	Low	Low
Can impacts be mitigated?	Only partly as a significant proportion of the impact results from the presence and operation of the facility which cannot be well mitigated.	

Mitigation	• Ensure that the mitigation hierarchy is applied with a particular emphasis on reducing the development footprint, rehabilitating disturbed areas and minimising degradation around the site. • An open space management plan should be developed for the site, which should include management of biodiversity within the affected areas, as well as that in the adjacent veld.
Residual Risks	The presence and operation of the facility would potentially represent an obstacle for some fauna which would experience some fragmentation as a result of the facility.

6.6 NO-GO ALTERNATIVE

Assuming that the project does not go ahead, the PV Facility would not be built and the current land use would continue into the future. The area is currently used for extensive livestock which is considered to be largely compatible with long-term biodiversity maintenance. Many fauna species are to some degree negatively affected by farming including many predators which are targeted due to their negative impact on livestock, while some species may also be vulnerable to habitat loss or degradation and may experience depressed populations within the farming landscape. In terms of vegetation and plant species, extensive grazing may result in changes in composition towards less palatable species and a reduction in plant cover. It is however important to recognise that the development does not represent an alternative to extensive livestock farming, but rather an additional impact independent of the current land use. Overall, the no-go alternative is considered to result in a low negative impact on terrestrial biodiversity.

7 CONCLUSION & RECOMMENDATIONS

The footprint of the Kleinzee PV Facility falls entirely within the Namaqualand Stranded vegetation type which has been impacted to a relatively limited extent by transformation to date and is classified as Least Threatened. In terms of fauna, there are several listed fauna which occur in the wider area and which would potentially be present and be impacted by the development. This includes Grants' Golden Mole, Sandveld Winter Katydid and Littledale's Whistling Rat. However, none of these species were observed at the site and it is considered unlikely that any of them are present and the site is considered low-sensitivity for these species due to a lack of suitable habitat. The field assessment found that the site has a relatively low abundance of plant SCC and only *Wahlenbergia asparagoides* (VU) was observed present. There are no significant biodiversity features within the site and it is considered relatively low sensitivity.

The site falls within a CBA 2 and ESA which raises potential concern regarding the impact of the development on these features. However, the site is not considered irreplaceable, which is supported by the CBA 2 status of the site as well as the field assessment, which found that the

site has a relatively low abundance of SCC and no significant biodiversity features. Similar Strandveld habitat is widely available in the area and is also well-represented within the Namakwa National Park. The development is therefore considered highly unlikely to compromise the ecological functioning of the affected CBA, given that it has not been identified as being of particular significance for broad-scale ecological processes. Consequently, the overall impact of the development on CBAs and broader scale ecological processes is considered to be relatively low.

The Kleinzee PV Facility development footprint falls within a NPAES Priority Focus Area and identified expansion area for the Namakwa National Park. Development of the site would thus place some limitations on the future expansion of traditional formalised conservation into the affected area. The total area of the affected Focus Area is 377 266 ha and the loss of 310 ha of this represents less than 0.01% of the Focus Area. In terms of a more specific impact on the affected Namaqualand Strandveld vegeation type, the Namakwa National Park currently protects 14% of the total extent of the Namaqualand Strandveld vegetation type. The current expansion mosaic area includes an additional 36% of the overall extent this vegetation type of which the Kleinsee PV Facility would comprise less than 0.6%. The presence of the Kleinsee PV Facility would reduce the available combined extent of Namaqualand Strandveld within the Park and the expansion area by 0.4%. In addition, the site is located along the margin of the PAES Focus Area, with the result that the impact on protected area expansion is likely to be lower than if the site was located deeper within the PAES Focus Area. An additional factor that is worth noting is that solar PV facilities do not have a large edge effect in terms of noise and disturbance, with the result that their proximity to protected areas is not likely to represent a significant threat to biodiversity within these areas. Thus, the impact of the Kleinzee Solar PV Facility on the potential future expansion of the Namakwa National Park or other protected area expansion is considered to be relatively low and is considered acceptable.

Impact Statement – Terrestrial Biodiversity impacts of the Kleinzee PV Development

There are no impacts associated with the development of the Kleinzee PV Facility on terrestrial biodiversity that cannot be mitigated to an acceptable level. As such, should all the proposed mitigation be implemented, the Kleinzee PV Facility development is deemed acceptable from a terrestrial ecological impact perspective. In terms of cumulative impacts, the contribution of the current PV development to cumulative impact is considered acceptable. It is thus the reasoned opinion of the specialist that the Kleinzee PV Facility development should be authorised subject to the various mitigation and avoidance measures as indicated.

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