

TERRESTRIAL BIODIVERSITY SPECIALIST ASSESSMENT:

THE DEVELOPMENT OF A 400 MW SOLAR PHOTOVOLTAIC (PV) FACILITY AND ASSOCIATED INFRASTRUCTURE (PHASE 3) ON THE REMAINDER OF FARM GOEDE HOOP 26C, PORTION 3 OF FARM GOEDE HOOP 26C AND OTHER PROPERTIES, BETWEEN DE AAR & HANOVER, EMTHANJENI LOCAL MUNICIPALITY, PIXLEY KA SEME DISTRICT MUNICIPALITY, NORTHERN CAPE PROVINCE, SOUTH AFRICA.



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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 the specialist;	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

TABLE OF CONTENTS

Table of Contents	3
List of Figures.....	4
Short CV/Summary of Expertise – Simon Todd.....	5
Specialist Declaration.....	7
1 Introduction	8
1.1 Scope of Study	8
1.2 Relevant Aspects of the Development.....	11
2 Methodology.....	12
2.1 Data Sourcing and Review	12
2.2 Site Visits & Field Assessment Dates.....	13
2.3 Sampling Limitations and Assumptions.....	14
3 Soventix Phase 3 Baseline Description	14
3.1 Faunal Communities.....	16
3.2 Critical Biodiversity Areas & Broad-Scale Processes.....	17
3.3 Cumulative Impacts.....	18
4 Soventix Phase 3 site Constraints	19
5 Impacts and Issues Identification	21
5.1 Identification of Potential Impacts.....	21
6 Assessment of Impacts on Terrestrial Biodiversity– Soventix Phase 3 PV Facility	21
6.1 Construction Phase Impact on ESAs & Ecological Processes.....	22
6.2 Operational Phase Impact on ESAs & Ecological Processes	23
6.3 Cumulative Impact 1. Cumulative Impacts on Broad-Scale Ecological Processes	25
6.4 No-Go Alternative	26
7 Conclusion & Recommendations	26
8 References.....	28

LIST OF FIGURES

Figure 1. Satellite image showing the location of the proposed Soventix Phase 3 project located off the N10 between Hanover and De Aar in the Northern Cape.	12
Figure 2. The national vegetation map (SANBI 2018 Update) for the Soventix Phase 3 site and surrounding area.	15
Figure 3. Typical open plains present Soventix Phase 3 study area, corresponding with the Northern Upper Karoo vegetation type. The typical plains of the study area are considered low sensitivity and considered suitable for the PV development.....	16
Figure 4. Extract of the Northern Cape CBA map for the Soventix Phase 3 study area, showing that the whole of the Phase 3 study area falls within an extensive ESA.....	18
Figure 5. Map showing other PV developments in the broad area around the Soventix Phase 3 study Area.....	19
Figure 6. Ecological constraints map for the Soventix Phase 3 site.	21

SHORT CV/SUMMARY OF EXPERTISE – SIMON TODD



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.

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- 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

Environmental Impact Assessment for the Proposed Komsberg East and Komsberg West Wind Farms and Associated Grid Connection Infrastructure: Fauna & Flora Specialist Impact Assessment. Arcus Consulting 2014.

Proposed Rietkloof & Brandvallei Wind Farms and Associated Grid Connection Infrastructure: Fauna & Flora Specialist Impact Assessment Report. EOH 2016.

Proposed Gunstfontein Wind Farm and Associated Grid Connection Infrastructure: Fauna & Flora Specialist Impact Assessment Report. Savannah Environmental 2016.

Mainstream South Africa Dwarsrug Wind Energy Facility: Fauna & Flora Specialist Impact Assessment Report. Sivest 2014.

Phezukomoya and San Kraal Wind Energy Facilities and associated grid connection. Fauna and Flora specialist studies. Arcus Consulting 2018.

Kokerboom Wind Energy Facilities (1-4) and associated grid connections. Fauna and Flora specialist studies. Aurecon 2017.

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 September 2022 _____

1 INTRODUCTION

Soventix South Africa (Pty) Ltd is proposing the development of a 400 MW Solar Photovoltaic (PV) facility and associated infrastructure (Phase 3) on the Remainder of Farm Goede Hoop 26C, Portion 3 of Farm Goede Hoop 26C and other properties, between De Aar & Hanover, Emthanjeni Local Municipality, Pixley Ka Seme District Municipality, Northern Cape Province, South Africa. Ecoleges is conducting the required EIA process for the authorisation of the development and 3Foxes Biodiversity Solutions has been appointed by Ecoleges, on behalf of Soventix South Africa to provide a Terrestrial Biodiversity Assessment for the proposed Phase 3 PV Facility as part of the EIA application. The DFFE Screening Tool indicates that the Soventix Phase 3 site contains areas mapped as Very High Sensitivity due to the presence of Ecological Support Areas within the site. Consequently, in terms of the regulations, a Terrestrial Biodiversity Assessment is required for the Soventix Phase 3 project. To these ends, this Terrestrial Biodiversity Assessment for the Soventix Phase 3 PV Facility, addresses the potential impacts of the Facility 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 EMP for the development.

1.1 SCOPE OF STUDY

In terms of GN 320 and GN 1150 (20 March 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 Soventix Phase 3 site contains areas of Very High sensitivity for the Terrestrial Biodiversity Theme due to the presence of areas of a large ESA 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.

1.2 RELEVANT ASPECTS OF THE DEVELOPMENT

The Soventix Phase 3 site is located in the Northern Cape Province, off the N10 between De Aar and Hanover. The size of the proposed development footprint for the 400 MW solar PV facility is approximately 650 ha. This area includes four interconnected blocks of solar PV arrays, with associated infrastructure. The PV system will be connected via transmission lines to the authorised substation on Phase 1. The substation ties into the existing ESKOM 400KV overhead powerlines. Existing roads will be used for main access, which may need to be enlarged to allow large equipment to access the site during construction. The location of the Soventix Phase 3 PV development is illustrated below in Figure 1.

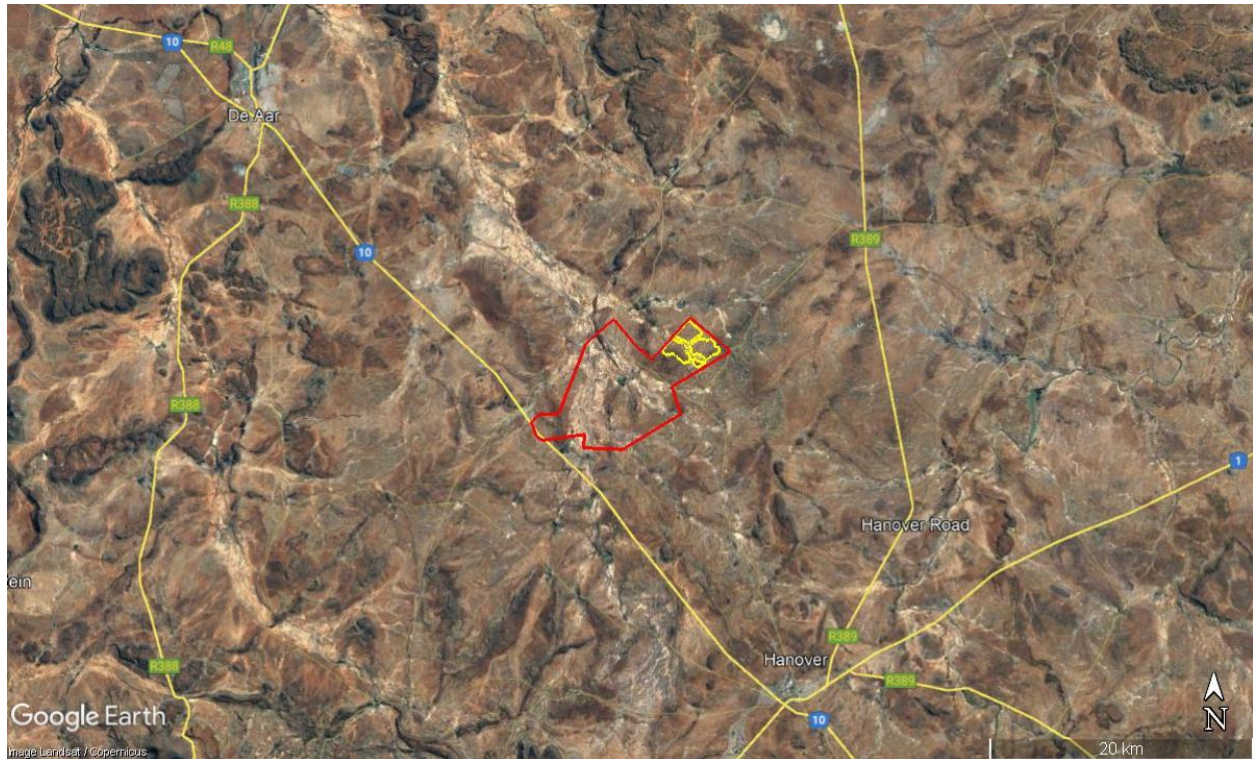


Figure 1. Satellite image showing the location of the proposed Soventix Phase 3 project located off the N10 between Hanover and De Aar in the Northern Cape.

2 METHODOLOGY

2.1 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 (2021).

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) in the study area were obtained from the 2017 Western Cape Biodiversity Spatial Plan (WC-BSP), for the Beaufort West Municipality, which includes the study area.

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 (2020).

2.2 SITE VISITS & FIELD ASSESSMENT DATES

The site was visited for the current Phase 3 study on the 15th and 16th of March 2022. Conditions during the site visit were excellent for sampling as there had been good rains leading up the site visit, with the result that vegetation was green and growing well and all of the pans and water bodies present on the site were filled with water. Apart from the current site visit, the wider site, but including the Phase 3 site, was also previously sampled in March 2017 over four full days. During the field assessments, all of the access roads within the site were driven and the site was investigated at various points of interest that were observed in the field or had been identified from satellite imagery of the site. This included rocky outcrops, pans, dams and gravel patches where present. These areas were searched for fauna such as amphibians and reptiles. In the 2017 survey, the site was also trapped for small mammals using Sherman live traps. Walk-through plant surveys were conducted across the site and a total of 68 different plant species were recorded within the development footprint. No plant species of conservation concern were observed at the site and given the good conditions at the time of sampling, there are few limitations in this regard.

2.3 SAMPLING LIMITATIONS AND ASSUMPTIONS

Conditions during the site visit were excellent for sampling and the vegetation of the site was very green and included a large abundance of forbs, annuals and grasses. Given the amount of time spent on-site as well as the favourable sampling conditions, the full complement of flora present is likely to have been represented, with the result, that there are considered to be few limitations with regards to the sampling of the vegetation, which has been well-characterised during the current study. As a result, sufficient time has been spent on-site to ensure that the vegetation and habitats present have been well characterised and that it is unlikely that there are any significant features present that have not been observed. The site is large and not all parts of the site could be assessed and directly sampled in the field. However, specific effort was made to investigate all the different habitats present and obtain a representative sample of all the areas and habitats present. In terms of fauna, there are some limitations regarding detecting the presence of rare or shy species, but overall, it is unlikely that the site is a significant site for any of these species as the areas affected by the PV footprint are typical of the wider area and not considered particularly favorable for any of the listed fauna that are known from the wider region. In terms of ecological process and the habitats present, there are few limitations in this regard as the site is open and all significant features present are readily visible and can easily be accessed.

3 SOVENTIX PHASE 3 BASELINE DESCRIPTION

The national vegetation map (Mucina & Rutherford 2006 & SANBI 2018 update) for the study area is depicted below in Figure 2. The whole of the site falls within the Northern Upper Karoo vegetation type. Although there are some other vegetation types within the broader area including Besemkaree Koppies Shrubland and Eastern Upper Karoo, these are well outside of the development footprint. The vegetation within the site is described and illustrated briefly below as observed at the site.

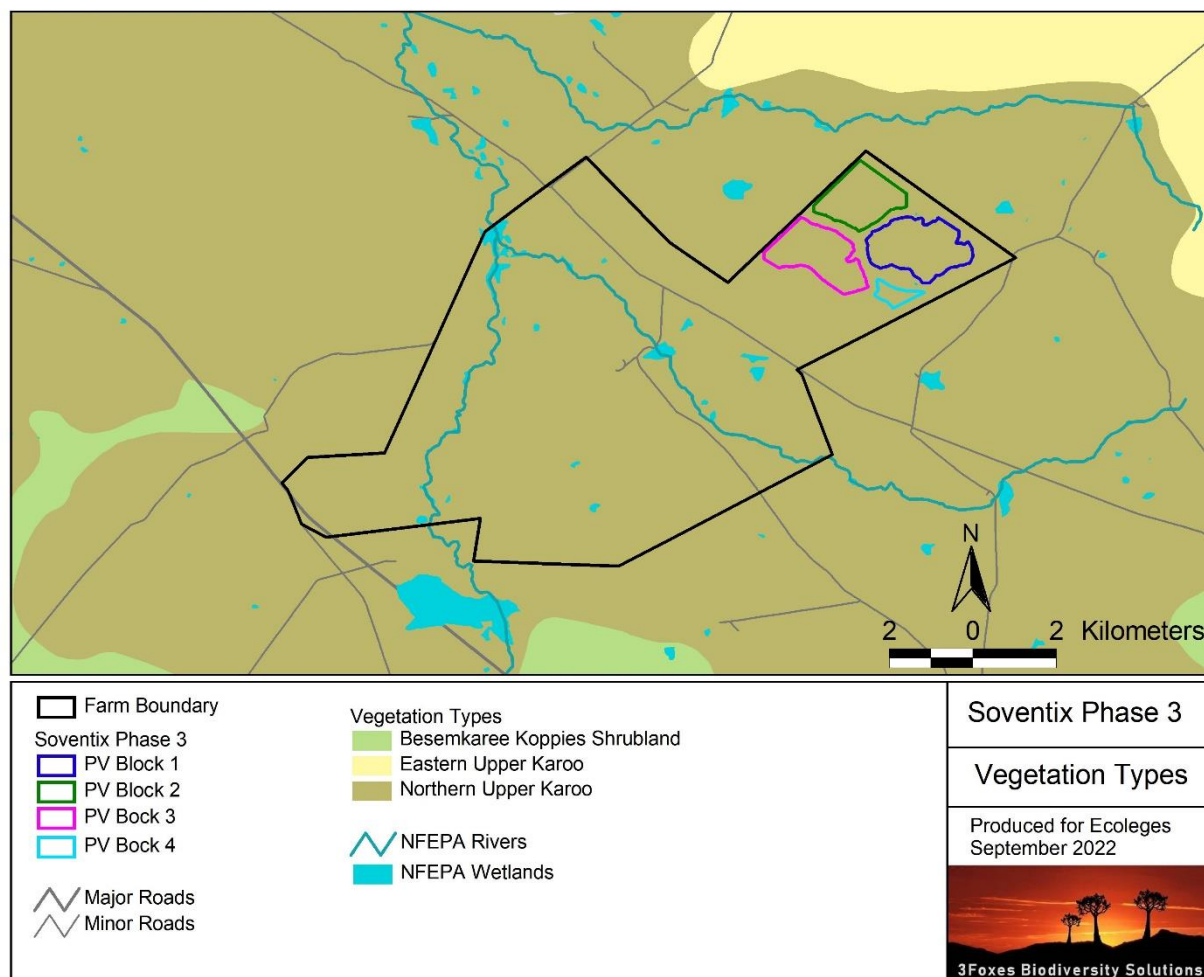


Figure 2. The national vegetation map (SANBI 2018 Update) for the Soventix Phase 3 site and surrounding area.

Northern Upper Karoo

Northern Upper Karoo is one of the most extensive vegetation types in the country and occupies over 40 000km² of the interior Karoo. This vegetation type occurs on the Upper Karoo plateau from Prieska, Vosburg and Carnarvon in the west to Phillipstown, Petrusville and Petrusburg in the east. It is bordered by Niekerkshoop, Douglas and Petrusburg in the north and by Carnarvon, Pampoenpoort and De Aar in the south. The vegetation consists of shrubland dominated by dwarf Karoo shrubs, grasses and *Acacia mellifera* subsp. *detinens*, and other low trees particularly on the sandy soils. The vegetation is flat to gently sloping with isolated hills of Upper Karoo Hardeveld in the south and Vaalbos Rocky Shrubland in the northeast and with many interspersed pans (Mucina & Rutherford 2006). Soils and geology are not very specific and consist of shales of the Volksrust formation and the Prince Albert Formation, as well as Dwyka Group diamictites, while there are also dolerite sills and sheets in places. Large areas are also covered by superficial deposits of calcrete from the Kalahari Group. Soils are variable and may be deeper sandy soils or shallow soils of the Glenrosa and Mispah forms. Land types are mainly Ae, Ag and Fc. Four

plant species are known to be endemic to the vegetation type, *Lithops hookeriana*, *Stomatium pluridens*, *Galenia exigua* and *Manulea deserticola*. Northern Upper Karoo has not been significantly affected by transformation and is still approximately 96% intact and is classified as Least Threatened.

Within the study area, the vegetation consists of a mosaic of grassy and more shrubby areas, with shrubs being more prevalent on the stony and shallow soils of the site. No indigenous trees are present within the site and the vegetation consists of low grassland shrubland. Dominant and common species include *Lycium cinereum*, *Rhigozum trichotomum*, *Rosenia humilis*, *Pentzia incana*, *Asparagus glaucus*, *Berkheya annectens*, *Eriocephalus ericoides*, *E. spinescens*, *Felicia muricata*, *Melolobium candicans*, *Pegolettia retrofracta*, *Plinthus karooicus*, *Hertia pallens*, *Aristida adscensionis*, *A. diffusa*, *Enneapogon desvauxii*, *Eragrostis lehmanniana*, *E. obtusa*, *Fingerhuthia africana*, *Tragus berteronianus* and *T. koelerioides*.



Figure 3. Typical open plains present Soventix Phase 3 study area, corresponding with the Northern Upper Karoo vegetation type. The typical plains of the study area are considered low sensitivity and considered suitable for the PV development.

3.1 FAUNAL COMMUNITIES

The faunal communities of the site are detailed in the Faunal Compliance Statement and are not fully repeated here. In summary, there are no amphibians or reptiles of concern that are likely to occur at the site with the result that the site is considered low sensitivity for these species. There

are however several drainage features and some dams present that represent important habitat for amphibians and which should be excluded from the development footprint. There are three red-listed mammals which are known from the broader region, including the Black-footed Cat *Felis nigripes* (VU), South African Hedgehog *Atelerix frontalis* (NT) and the Brown Hyena *Hyaena brunnea* (NT). However, the site is considered relatively unfavourable for any of these species and it is considered unlikely that there are any resident individuals of these species present within the development footprint. Consequently, the site is considered low sensitivity for fauna overall.

3.2 CRITICAL BIODIVERSITY AREAS & BROAD-SCALE PROCESSES

Although there are no CBAs within the affected area, the whole of the Soventix Phase 3 site falls within an extensive ESA (Figure 4). According to the reasons layer that accompanies the CBA map, the ESA is based on the selection of the area as Northern Upper Karoo, the Platberg - Karoo Conservancy Important Bird Area, the presence of natural wetlands, rivers, and wetland FEPAs. However, the aquatic features listed above have been excluded from the development footprint, with the result that the impact of the development on these features would be minimal. The Northern Upper Karoo is a very extensive vegetation type and the loss of the area within the PV footprint would have a negligible impact on the availability of this vegetation type for future conservation purposes. The impact of the development on the IBA would also be minimal as the PV footprint represents a very small (>>1%) of the IBA and would not represent significant habitat loss within the IBA. However, most importantly, the primary purpose of ESAs is to ensure the broad-scale maintenance of ecological processes and within the site, the primary ecological features and associated processes would be around the drainage features of the site and the corridors associated with the drainage systems linking the wetlands and artificial dams of the site. As these would be outside of the PV footprint, the processes associated with these features would not be compromised by the development of the PV facility. It would however be important to ensure that erosion within the development areas and consequent siltation of the nearby drainage systems does not occur. As such, an erosion plan and a runoff management system for the site would be important to ensure that the development does not negatively impact the adjacent hydrological features.

In terms of other conservation planning priorities and features of the site, there are no formal declared conservation areas within the site or NC-PAES focus areas. Not surprisingly, there are no forests or protected trees within the site. Given the low transformation rate and extensive nature of the affected vegetation type, the development would have minimal impact on the future ability to meet conservation targets for this vegetation type. The overall impact of the development on the ability to meet future conservation targets would therefore be minimal.

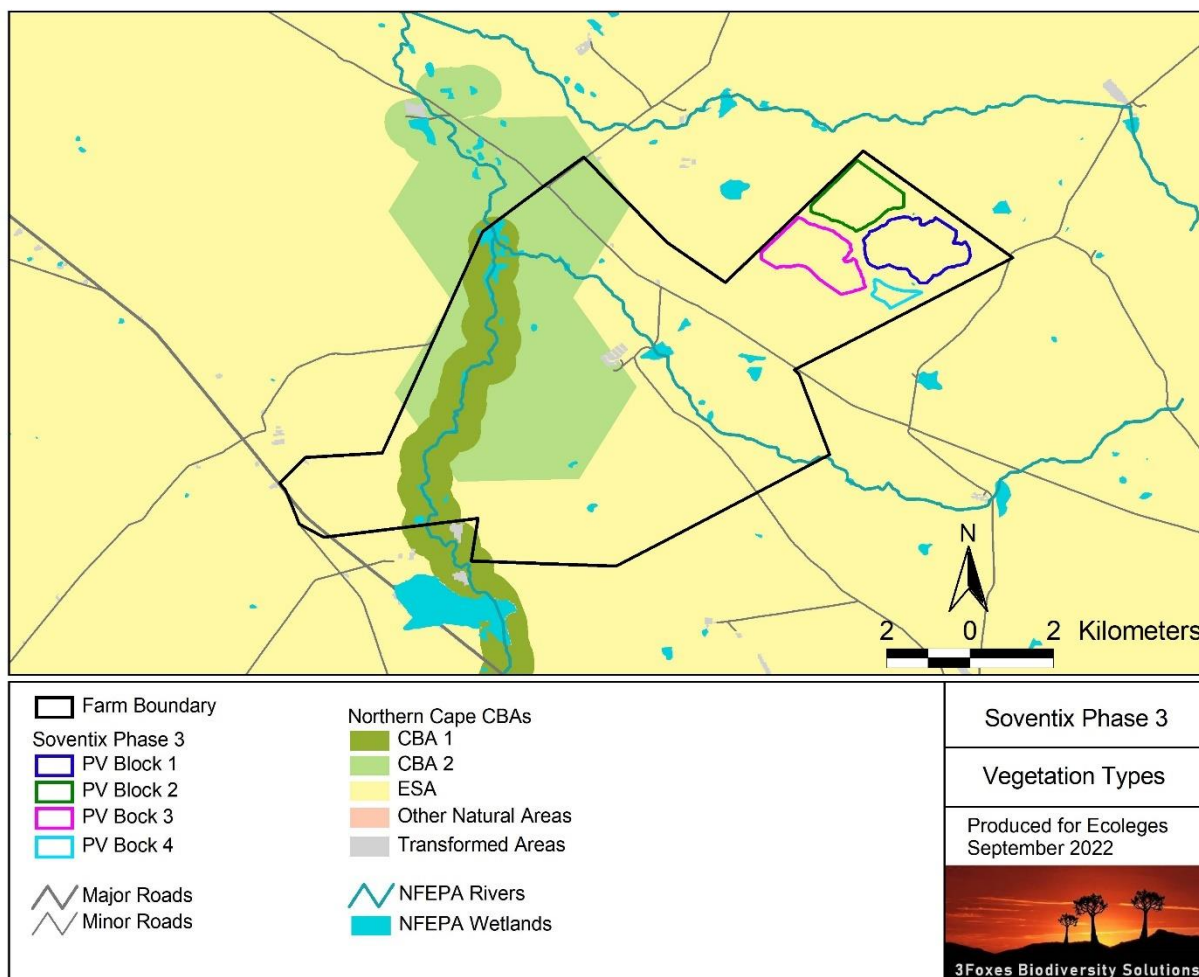


Figure 4. Extract of the Northern Cape CBA map for the Soventix Phase 3 study area, showing that the whole of the Phase 3 study area falls within an extensive ESA.

3.3 CUMULATIVE IMPACTS

Where other renewable energy developments occur within 30km of a site, a cumulative impact assessment is required. This includes a general assessment of cumulative impact as well as an assessment of different potential cumulative impact sources and an indication of the size or extent of the identified cumulative impact.

In terms of cumulative impacts in and around the Soventix Phase 3 site, the closest and most relevant projects are the Soventix Phase 1 and Phase 2 projects which are adjacent to the current site. Soventix Phase 1 has been authorised, but is not a preferred bidder, while Phase 2 is still in-process. Further afield, there is a node of development around De Aar, with some built facilities as well as several approved and in-process projects. The estimated footprint of the Soventix Phase 1 and Phase 2 projects would be approximately 600ha, while the built projects

which are located largely around De Aar, but also include the Linde PV project near Hanover is approximately 640ha. The planned projects would amount to approximately 1500ha of additional habitat loss if all were to be built. However, the affected vegetation types, which is largely Northern Upper Karoo is a very extensive vegetation type and has not experienced a large amount of habitat loss to date. In addition, as there is some distance between the current facility and the developments at De Aar and Richmond, fragmentation and the potential for other forms of ecological disruption across the area is currently still low. The contribution of the Soventix Phase 3 development is listed at 650ha and is not considered highly significant, especially given the avoidance of the important ecological features of the site such as the drainage areas. The contribution of the Soventix Phase 3 development to cumulative impact is therefore considered acceptable.

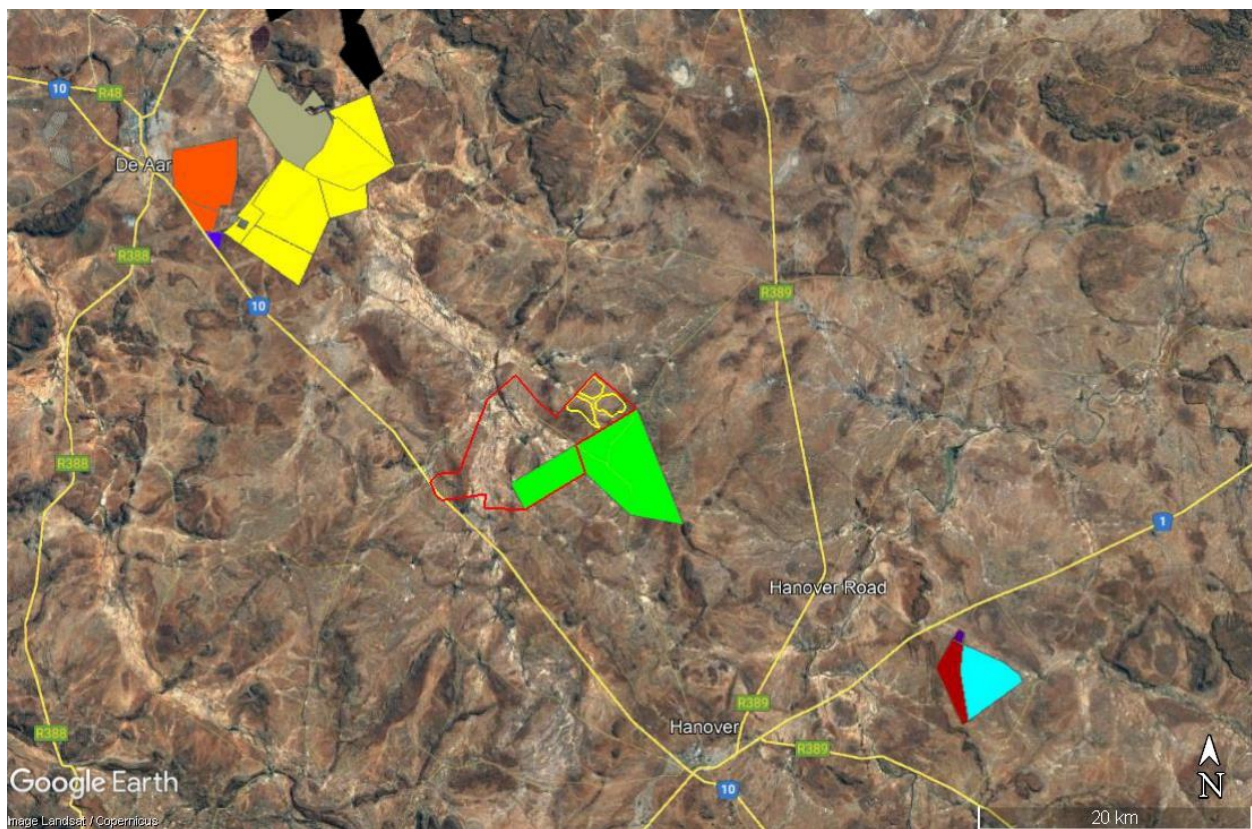


Figure 5. Map showing other PV developments in the broad area around the Soventix Phase 3 study Area.

4 SOVENTIX PHASE 3 SITE CONSTRAINTS

In order to ensure the maintenance of ecological processes within the PV project area and the minimisation of impacts on terrestrial biodiversity, a constraints map for the site was produced.

This has been used to inform the development layout and ensure that impacts on the sensitive features of the site are maintained within acceptable limits (Figure 6). There are several constraints operating across the site, associated largely with the pans and drainage features of the area as well as the rocky hills that occur in the eastern corner of the site. Although these features which are considered unsuitable for development, there are also extensive areas of open plains within the site that are considered low to moderate sensitivity and which are considered suitable for PV development. Development of the Solar PV facility should be excluded from the no-go watercourse area (the ephemeral drainage line), with the exception of linear infrastructure crossings, specifically road crossings, underground cables and pipelines, and the grid line. The layout assessed is considered acceptable in terms of impacts and would not compromise the ecological integrity or functioning of the important biodiversity features of the site.

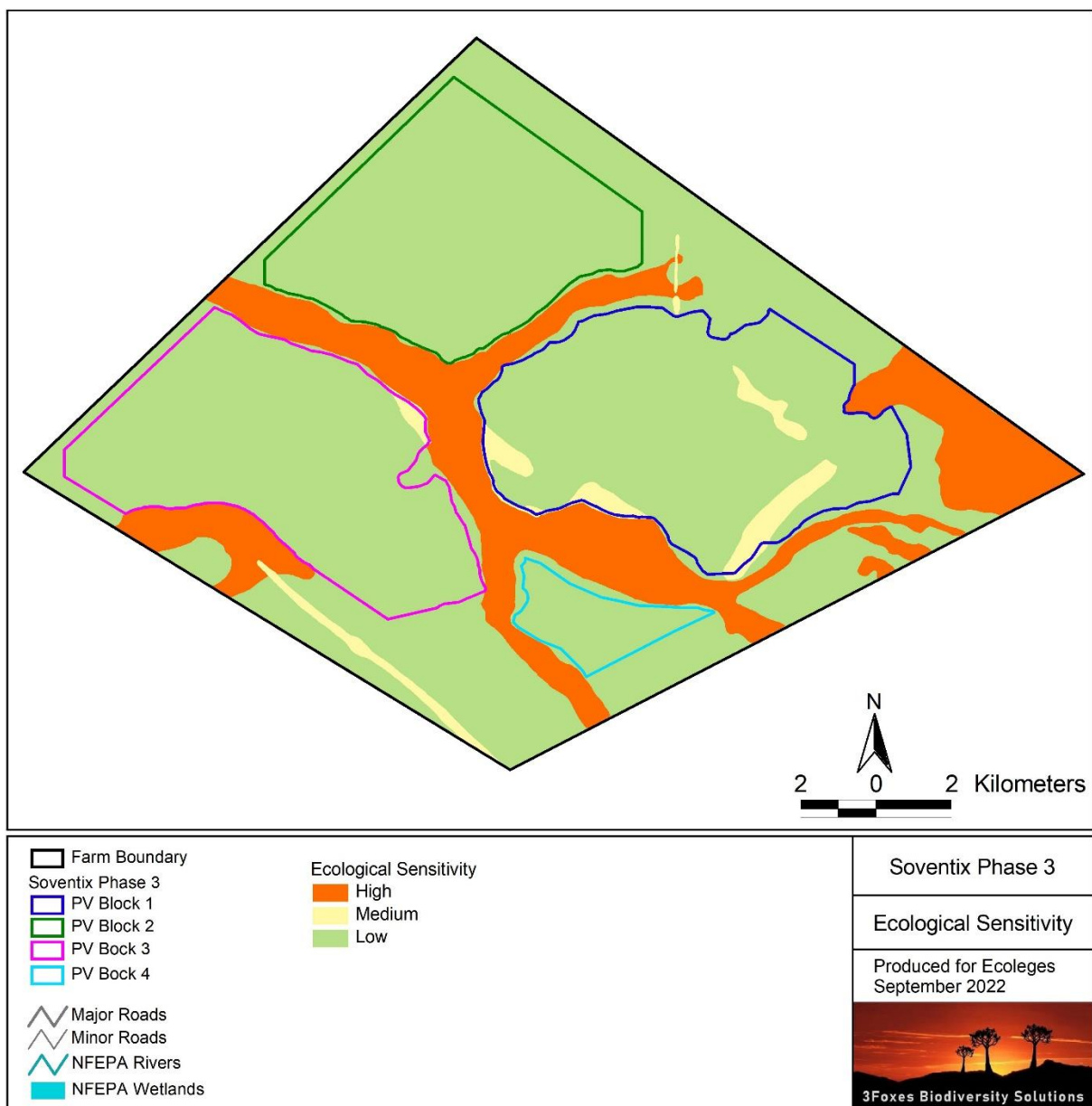


Figure 6. Ecological constraints map for the Soventix Phase 3 site.

5 IMPACTS AND ISSUES IDENTIFICATION

5.1 IDENTIFICATION OF POTENTIAL IMPACTS

The development of the Soventix Phase 3 site 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 reduced but there would still be some potential impact due to a reduction in connectivity for some fauna within the site. The following impacts are identified as the major impacts that are likely to be associated with the development of the Soventix Phase 3 site on Terrestrial Biodiversity.

Impact 1. Impacts on ESAs and broad-scale ecological processes

The majority of the site falls within an ESA and there would be approximately 650ha of habitat loss associated with the development of the PV facility. In addition, the development would cause some habitat fragmentation and pose some impact on broad-scale ecological processes in the area. These impacts cannot be fully mitigated and there is likely to be some minor residual impact on broad-scale ecological processes. During operation, the level of anthropogenic disturbance associated with the PV facility would be significantly reduced as compared to the construction phase and is not considered to be significant.

Impact 2. Cumulative Impacts

The development of the Soventix Phase 3 PV Facility would result in habitat loss and an increase in overall cumulative impacts on fauna and flora in the area. This would be in addition to the two existing phases of the Soventix development cluster, which would result in approximately 600ha of habitat loss. Although the area currently experiences a relatively low level of impact, there are several existing PV facilities towards De Aar as well as numerous developments currently being planned in the area, especially towards De Aar and it is highly likely that cumulative impacts are going to increasingly become a concern. The contribution of the Soventix Phase 3 PV Facility to direct habitat loss at 650 ha is however relatively small but would have some local impacts on connectivity.

6 ASSESSMENT OF IMPACTS ON TERRESTRIAL BIODIVERSITY– SOVENTIX PHASE 3 PV FACILITY

An assessment of the likely significance of the impacts identified above is made below for the impacts of the Soventix Phase 3 PV Facility on Terrestrial Biodiversity.

6.1 CONSTRUCTION PHASE IMPACT ON ESAs & ECOLOGICAL PROCESSES

Issue	Impacts on Ecological Support Areas (ESAs) and general ecological processes within the site	
Description of Impact		
Construction phase impact on ESAs and ecological processes within the site.		
Type of Impact	Direct/Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Probable	Conceivable
Significance	Medium -	Low -
Degree to which impact can be reversed	The affected environment will only recover from the impact with significant intervention	
Degree to which impact may cause irreplaceable loss of resources	The affected environment will only recover from the impact with significant intervention	
Degree to which impact can be mitigated	Mitigation exists and will notably reduce significance of impacts. The overall footprint within the ESA is relatively low relative to the overall extent of the ESA and is considered acceptable. The avoidance of the sensitive features of the site such as the drainage lines is key to maintaining a low assessed impact on the ESA.	

Mitigation actions					
The following measures are recommended:	<ul style="list-style-type: none"> • The use of existing access roads should be used where possible to reduce the additional impact of the PV facility. • Minimise the development footprint as far as possible, which includes locating temporary-use areas such as construction camps and lay-down areas in low sensitivity or previously disturbed areas. • Avoid impact to restricted and specialised habitats such as pans, wetlands and rock pavements. These areas should be demarcated and marked as no-go areas during construction with construction tape or similar. • Minimise the development footprint near watercourses and other ecologically significant features. • Ensure that the fencing around the facility is fauna-friendly, which includes ensuring that it does not have electric strands close to the ground which can shock and kill tortoises. 				
Monitoring					
The following monitoring is recommended:	<ul style="list-style-type: none"> • Monitoring of construction activities to ensure that the development footprint within the ESA is restricted to the authorised development footprint. 				
Cumulative impacts					
Nature of cumulative impacts	As the total extent of habitat loss within the ESA is relatively low, the potential for the Soventix Phase 3 PV Facility to contribute to cumulative impacts on ESA is seen as acceptable.				
Rating of cumulative impacts	<table border="1"> <thead> <tr> <th>Without Mitigation</th> <th>With Mitigation</th> </tr> </thead> <tbody> <tr> <td>Low -</td> <td>Low -</td> </tr> </tbody> </table>	Without Mitigation	With Mitigation	Low -	Low -
Without Mitigation	With Mitigation				
Low -	Low -				

6.2 OPERATIONAL PHASE IMPACT ON ESAs & ECOLOGICAL PROCESSES

Issue	Impacts on Ecological Support Areas (ESAs) and general ecological processes within the site	
Description of Impact		
Operational phase impact on ESAs and ecological processes		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Medium
Duration	Long-term	Long-term
Extent	Local	Local

Consequence	Medium	Medium
Probability	Probable	Conceivable
Significance	Medium -	Low -
Degree to which impact can be reversed	The affected environment will only recover from the impact with significant intervention	
Degree to which impact may cause irreplaceable loss of resources	The affected environment will only recover from the impact with significant intervention	
Degree to which impact can be mitigated	Mitigation exists and will notably reduce significance of impacts. The footprint within ESA is considered acceptable. The low intensity pre-mitigation impacts are the result of avoidance of the sensitive features of the site at the planning stage.	
Mitigation actions		
The following measures are recommended:	<ul style="list-style-type: none"> Adhere to the open space management plan which makes provision for the favourable management of the facility and the surrounding area for fauna. Appropriate design of roads and other infrastructure to minimise faunal impacts and allow fauna to pass over, through or underneath these features as appropriate. A log should be kept detailing and fauna-related incidences or mortalities that occur on site, including roadkill, electrocutions etc. These should be reviewed annually and used to inform operational management and mitigation measures. Vegetation within the PV facility should not be controlled using herbicides, and manual clearing methods should be used when necessary. 	
Monitoring		
The following monitoring is recommended:	<ul style="list-style-type: none"> Monitoring of fauna-related incidents such as snakes that need to be removed, animals trapped within the facility, animals being trapped or killed within the boundary fence of the facility etc. This information should be reviewed annually to inform the management of the facility and reduce fauna-related impacts. Fence condition monitoring to ensure that the ground clearance of the electrified strands remains at least 30cm above the ground, so as not to increase the likelihood that fauna would be shocked by the fence. 	
Cumulative impacts		
Nature of cumulative impacts	As the total extent of habitat loss within the ESA within the site is considered acceptable, the potential for the Soventix Phase 3 PV Facility to contribute to cumulative impacts on ESAs is also seen as being acceptably low.	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Low -	Low -

6.3 CUMULATIVE IMPACT 1. CUMULATIVE IMPACTS ON BROAD-SCALE ECOLOGICAL PROCESSES

Issue	Cumulative habitat loss, the ability to meet conservation targets and impact on broad-scale ecological processes	
Description of Impact		
Cumulative impact on broad-scale ecological processes		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	Without Mitigation	With Mitigation
Intensity	Medium	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Conceivable	Conceivable
Significance	Low -	Low -
Degree to which impact can be reversed	The affected environmental will be able to recover from the impact	
Degree to which impact may cause irreplaceable loss of resources	The resource is not damaged irreparably or is not scarce	
Degree to which impact can be mitigated	With avoidance and mitigation, impact on ecological processes can be reduced to low levels.	
Mitigation actions		
The following measures are recommended:	<ul style="list-style-type: none"> Adherence to the sensitivity mapping and no-go areas provided within this assessment when determining the final layout of the PV Arrays. Linear infrastructure may traverse the ephemeral drainage lines and other areas mapped as high sensitivity. Demarcate sensitive habitats such as riparian areas as no-go areas during construction and at decommissioning with construction tape or similar markers and signage. 	
Monitoring		
The following monitoring is recommended:	<ul style="list-style-type: none"> Ensure that all the operational phase management plans are fully implemented and that the associated monitoring and feedback mechanisms to management are in place. 	
Cumulative impacts		
Nature of cumulative impacts	The development would contribute to habitat loss and fragmentation for some species. However, given the current low levels of transformation in the area, the contribution of the current development to cumulative impacts on broad-scale ecological processes is considered low given the intact nature of the surrounding landscape.	
Rating of cumulative impacts	Without Mitigation	With Mitigation
	Low -	Low -

6.4 NO-GO ALTERNATIVE

Assuming that the project does not occur, 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 farming 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. Overall, the no-go alternative is considered to result in a low negative impact on terrestrial biodiversity.

7 CONCLUSION & RECOMMENDATIONS

The Soventix Phase 3 site is mapped as falling within the Northern Upper Karoo. This vegetation type has been little impacted by transformation to date and is classified as Least Concern. In terms of fauna, there are several listed mammals which occur in the area and which would potentially be impacted by the development. This includes the Black-footed Cat, Brown Hyena and South African Hedgehog. None of these species were recorded on the site and it is considered unlikely that there are any individuals of these species resident within the PV footprint area.

Although the whole of the PV area falls within an extensive ESA, it is unlikely that the development would compromise the functioning of the ESA or destroy the underlying important biodiversity features present in these areas. The drainage systems and washes of the site as well as the rocky hills present in the eastern corner of the site have been avoided with the result that the broad-scale corridors or ecological gradients that present within the site are unlikely to be disrupted by the development. The impact of the development on the ESA is therefore considered acceptable.

In terms of the sensitivity and constraints mapping conducted as part of this study, there are several constraints operating across the site, associated largely with the drainage features of the area, as well as the rocky outcrops in the east of the site. There are however also extensive open plains present across the site that are considered low to moderate sensitivity and which are considered suitable for PV development. The assessed layout is considered acceptable and would generate low to moderate impacts on fauna and flora.

In terms of potential cumulative impacts in and around the Soventix Phase 3 site, these currently amount to approximately 600ha of planned PV projects in the immediate environment and then a significant node of existing and potential development towards De Aar. The Soventix Phase 3 project would contribute an additional 650ha of long-term habitat loss to this total. As the broader

area is still largely intact with few existing renewable energy facilities present, cumulative impacts associated with the current project are considered acceptable.

Impact Statement – Soventix Phase 3 Impact on Terrestrial Biodiversity

There are no impacts associated with the development of the Soventix Phase 3 site on terrestrial biodiversity that cannot be mitigated to an acceptable level. As such, should all the proposed mitigation be implemented, the Soventix Phase 3 development is deemed acceptable from a terrestrial ecological impact perspective. In terms of cumulative impacts, the affected area has not been significantly impacted by renewable energy development to date and the contribution of the current development to cumulative impact is considered acceptable. It is thus the reasoned opinion of the specialist that there the Soventix Phase 3 site development should be authorised subject to the various mitigation and avoidance measures as indicated.

8 REFERENCES

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