ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED RE CAPITAL 3 SOLAR ENERGY FACILITY AND ASSOCIATED GRID CONNECTION INFRASTRUCTURE, DYASON'S KLIP, NORTHERN CAPE.

FAUNA & FLORA SPECIALIST REPORT FOR EIA

PRODUCED FOR CAPE EAPRAC

BY

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DECEMBER 2013

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DECLARATION OF CONSULTANTS' INDEPENDENCE

- I Simon Todd, as the appointed independent specialist hereby declare that I:
- act/ed as the independent specialist in this application;
- 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, 2010 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2010 (specifically in terms of regulation 17 of GN No. R. 543) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 71 of GN No. R. 543.

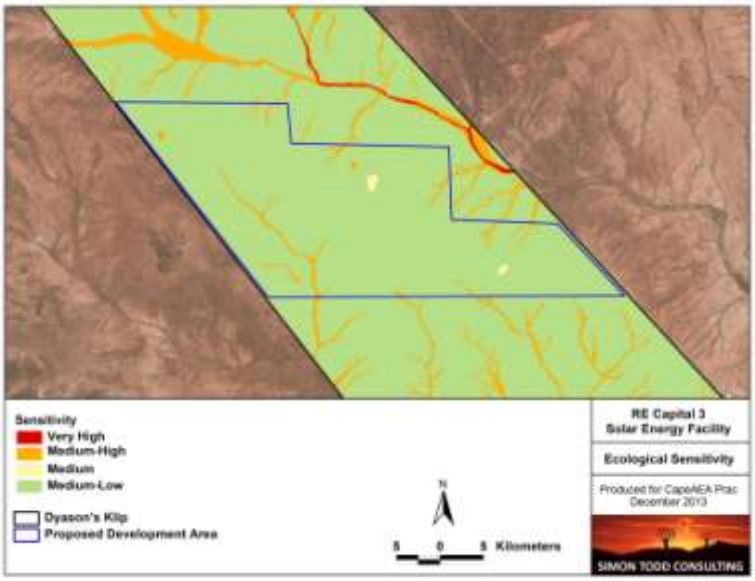
Note: The terms of reference must be attached.

Simon Todd Pr.Sci.Nat 400425/11.
December 2013

EXECUTIVE SUMMARY

RE Capital 3 (Pty) Ltd is an Independent Power Producer (IPP) proposing the establishment of a commercial solar energy facility of 225 MW on the property Dyason's Klip located near Upington in the Northern Cape. The facility will be known as the Re Capital 3 Solar Energy Development and will be developed in three 75MW phases. As part of the EIA process, this ecological specialist study details the ecological characteristics of the site and provides an assessment of the likely ecological impacts associated with the development.

A site visit and associated desktop review of the available ecological information was conducted to assess the presence and distribution of ecologically sensitive, species and habitats at the site. An ecological sensitivity map for the site was generated which is depicted below. The site visit revealed that the site consists largely of Bushman Arid Grassland and that the division of the site into this and the Kalahari Karroid Shrubland vegetation type as depicted by the national vegetation map is not a useful or accurate representation of the vegetation patterns at the site. Rather the majority of the site consists of arid grassland or grassy shrubland the two vegetation types are simply the endpoints of a continuum. There is however little to differentiate the sensitivity of the site at a broad scale, based on these vegetation types and the sensitivity as mapped is determined by local features such as the presence of drainage lines, pans and rocky outcrops.



Although some listed species such as *Acacia erioloba* and some protected species such as *Boscia foetida* and *Boscia albitrunca* are common at the site, *Acacia erioloba* and *Boscia albitrunca* are concentrated along the lower section of the Helbrandkloofspruit and few individuals would be threatened by the development. *Boscia foetida* is however more widespread and a relatively large number of individuals would be impacted by the development. This species is however one of the most common trees in the arid parts of the Northern Cape and their loss from the development area would not be considered highly significant. The majority of the site consists of arid grassland or grassy shrubland on open plains considered to be of moderate to low sensitivity. This habitat type forms the vast majority of the development footprint and as there are few listed or protected species present in these areas, the impacts on vegetation are likely to be relatively low.

In terms of the likely ecological impacts associated with the development, impacts on vegetation and fauna during the construction phase are likely to be relatively high and are difficult to mitigate as little can be done to avoid the large amounts of disturbance associated with this phase of the development. This is however transient and disturbance levels during operation would be much lower. As the affected vegetation types are widespread and have been little impacted by transformation to date, the impact on vegetation is of locally high intensity, but is not considered to be of broader significance. Similarly, while there are likely to be some listed fauna utilising the site, these are widespread species and the development would not be likely to generate a significant impact on the populations of these species. Cumulative impacts are highlighted as a potential concern given the abundance of other renewable energy developments in the area. However in the context of an arid, largely intact landscape, development within concentrated nodes is preferable to scattered development and as such, the proximity of the current development to other renewable energy developments is seen as a positive factor which reduces rather than increases the cumulative impact associated with the development.

With the application of suitable mitigation, there are no severe impacts or highly significant impacts associated with the development which would represent a red-flag or fatal flaw which might be considered sufficient grounds to prevent the development going forward.
A summary assessment of the pre- and post-mitigation impacts associated with the development of the RE Capital 3 facility at Dyason's Klip is provided below.

Phase	Pre Mitigation	Post Mitigation
Preconstruction		
Loss of Vegetation and Listed Species	Medium-Low	Low
Faunal Impacts	Medium-Low	Low
Construction		
Loss of Vegetation and Listed Species	High	Medium
Faunal Impacts	Medium	Medium-Low
Increased Erosion	Medium	Low
Operation		
Alien Plant Invasion Risk	Medium	Low
Increased Erosion Risk	Medium	Low
Faunal Impacts	Medium	Low
Cumulative Impact		
Reduced ability to meet conservation	Medium-Low	Low

obligations & targets		
Impact on broad-scale ecological processes	Medium	Low

1 INTRODUCTION

RE Capital 3 (Pty) Ltd is an Independent Power Producer (IPP) proposing the establishment of a commercial solar energy facility of 225 MW on the property Dyason's Klip located near Upington in the Northern Cape. The facility will be known as the Re Capital 3 Solar Energy Development and will be developed in three 75MW phases. In terms of the EIA Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, Act No. 107 of 1998), the development requires authorisation from the National Department of Environmental Affairs (DEA) before it can proceed. As part of the EIA process, this ecological specialist study details the ecological characteristics of the site and provides an assessment of the likely ecological impacts associated with the development. The full scope of study is detailed below.

1.1 SCOPE OF STUDY

The scope of the study includes the following activities

- a description of the environment that may be affected by the activity and the manner in which the environ mint may be affected by the proposed project
- a description and evaluation of environmental issues and potential impacts (incl. using direct, indirect and cumulative impacts) that have been identified
- a statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts
- an indication of the methodology used in determining the significance of potential environmental impacts
- an assessment of the significance of direct indirect and cumulative impacts in terms of the following criteria :
    - the nature of the impact, which shall include a description of what causes the effect, what will be affected and how it will be affected
    - the extent of the impact, indicating whether the impact will be local (limited to the immediate area or site of development), regional, national or international
    - the duration of the impact, indicating whether the lifetime of the impact will be of a short-term duration (0-5 years), medium-term (5- 15 years), long-term (> 15 years, where the impact will cease after the operational life of the activity) or permanent
    - the probability of the impact, describing the likelihood of the impact actually occurring, indicated as improbable (low likelihood) probable (distinct possibility), highly probable (most likely), or definite (Impact will occur regardless of any preventable measures)
    - the severity/beneficial scale indicating whether the impact will be very severe/beneficial (a permanent change which cannot be mitigated/permanent and significant benefit with no real alternative to achieving this benefit) severe/beneficial (long-term impact that could be mitigated/long-term

benefit) moderately severe/beneficial (medium- to long-term impact that could be mitigated/ medium- to long-term benefit), slight or have no effect
    - the significance which shall be determined through a synthesis of the characteristics described above and can be assessed as low medium or high
    - the status which will be described as either positive, negative or neutral
    - the degree to which the impact can be reversed
    - the degree to which the impact may cause irreplaceable loss of resources
    - the degree to which the impact can be mitigated

- a description and comparative assessment of all alternatives
- recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the Environmental Management Programme (EMPr)
- an indication of the extent to which the issue could be addressed by the adoption of mitigation measures
- a description of any assumptions uncertainties and gaps in knowledge
- an environmental impact statement which contains :
    - a summary of the key findings of the environmental impact assessment;
    - an assessment of the positive and negative implications of the proposed activity;
    - a comparative assessment of the positive and negative implications of identified alternatives

General Considerations:

- Disclose any gaps in information or assumptions made.
- Recommendations for mitigatory measures to minimise impacts identified.
- An outline of additional management guidelines.
- Provide monitoring requirements, mitigation measures and recommendations in a table format as input into the Environmental Management Plan (EMP) for faunal related issues.

A description of the potential impacts of the development and recommended mitigation measures are to be provided which will be separated into the following project phases:

- Preconstruction
- Construction
- Operational Phase

1.2 ASSESSMENT APPROACH & PHILOSOPHY

The assessment will be conducted according to the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989 as well as within the best-practice

guidelines and principles for biodiversity assessment as outlined by Brownlie (2005) and De Villiers et al. (2005).

This includes adherence to the following broad principles:

- That a precautionary and risk-averse approach be adopted towards projects which may result in substantial detrimental impacts on biodiversity and ecosystems, especially the irreversible loss of habitat and ecological functioning in threatened ecosystems or designated sensitive areas: i.e. Critical Biodiversity Areas (as identified by systematic conservation plans, Biodiversity Sector Plans or Bioregional Plans) and Freshwater Ecosystem Priority Areas.

- Demonstrate how the proponent intends complying with the principles contained in section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), which, amongst other things, indicates that environmental management should.

    - In order of priority aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
    - Avoid degradation of the environment;
    - Avoid jeopardising ecosystem integrity;
    - Pursue the best practicable environmental option by means of integrated environmental management;
    - Protect the environment as the people's common heritage;
    - Control and minimise environmental damage; and
    - Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

These principles serve as guidelines for all decision-making concerning matters that may affect the environment. As such, it is incumbent upon the proponent to show how proposed activities would comply with these principles and thereby contribute towards the achievement of sustainable development as defined by the NEMA.

In order to adhere to the above principles and best-practice guidelines, the following approach forms the basis for the study approach and assessment philosophy:
The study will include data searches, desktop studies, site walkovers / field survey of the property and baseline data collection, describing:

- A description of the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.

In terms of **pattern**, the following will be identified or described:

Community and ecosystem level

- The main vegetation type, its aerial extent and interaction with neighbouring types, soils or topography;
- Threatened or vulnerable ecosystems (*cf. SA vegetation map/National Spatial Biodiversity Assessment, fine-scale systematic conservation plans, etc*).

Species level

- Red Data Book species (giving location if possible using GPS)
- The viability of an estimated population size of the RDB species that are present (include the degree of confidence in prediction based on availability of information and specialist knowledge, i.e. High=70-100% confident, Medium 40-70% confident, low 0-40% confident)
- The likelihood of other RDB species, or species of conservation concern, occurring in the vicinity (include degree of confidence).

Fauna

- Describe and assess the terrestrial fauna present in the area that will be affected by the proposed development.
- Conduct a faunal assessment that can be integrated into the ecological study.
- Describe the existing impacts of current land use as they affect the fauna.
- Clarify species of special concern (SSC) and that are known to be:
    - endemic to the region;
    - that are considered to be of conservational concern;
    - that are in commercial trade (CITES listed species);
    - or, are of cultural significance.
- Provide monitoring requirements as input into the Environmental Management Plan (EMP) for faunal related issues.

Other pattern issues

- Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.
- The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than infestation of undisturbed sites).
- The condition of the site in terms of current or previous land uses.

In terms of **process**, the following will be identified or described:

- The key ecological "drivers" of ecosystems on the site and in the vicinity, such as fire.
- Any mapped spatial component of an ecological process that may occur at the site or in its vicinity (i.e. *corridors* such as watercourses, upland-lowland gradients, migration routes, coastal linkages or inland-trending dunes, and *vegetation boundaries* such as edaphic interfaces, upland-lowland interfaces or biome boundaries)
- Any possible changes in key processes, e.g. increased fire frequency or drainage/artificial recharge of aquatic systems.
- Furthermore, any further studies that may be required during or after the EIA process will be outlined.
- All relevant legislation, permits and standards that would apply to the development will be identified.
- The opportunities and constraints for development will be described and shown graphically on an aerial photograph, satellite image or map delineated at an appropriate level of spatial accuracy.

1.3 RELEVANT ASPECTS OF THE DEVELOPMENT

The proposed development site is located on the Remainder of Farm 454, Dyason's Klip, which is situated within the jurisdiction of the Khai Garib local Municipality in the Northern Cape Province.

The development will consist of the following:

- The proposed facility is planned and designed for the generation of approximately 225 MW.
- The project will consist of and be developed in three phases, consisting each of 75MW, which will be fed into the national electricity grid.
- The proposed development area required to meet the proposed capacity will cover an area of approximately 500 hectares.
- Two areas are currently under investigation as options for the location of the facility, an area towards the northern boundary of the site and an area within the central part of the site.
- The site is located 5-10 km from the planned new Eskom MTS Substation, for which an EIA is still underway. The exact location of the MTS is still to be made known to the public.

Infrastructure associated with the solar energy facility is likely to include:

» Photovoltaic (PV) panels on a mounting structure with inverter stations;

- A new on-site substation to facilitate the connection between the solar energy facility and the electricity grid. Auxiliary buildings including buildings for control, equipment and maintenance;
- Cabling between the above mentioned infrastructures, to be laid underground where practical;
- A 6m wide access road from the N14 to the facility.
- Internal access roads (4m wide) and fencing;

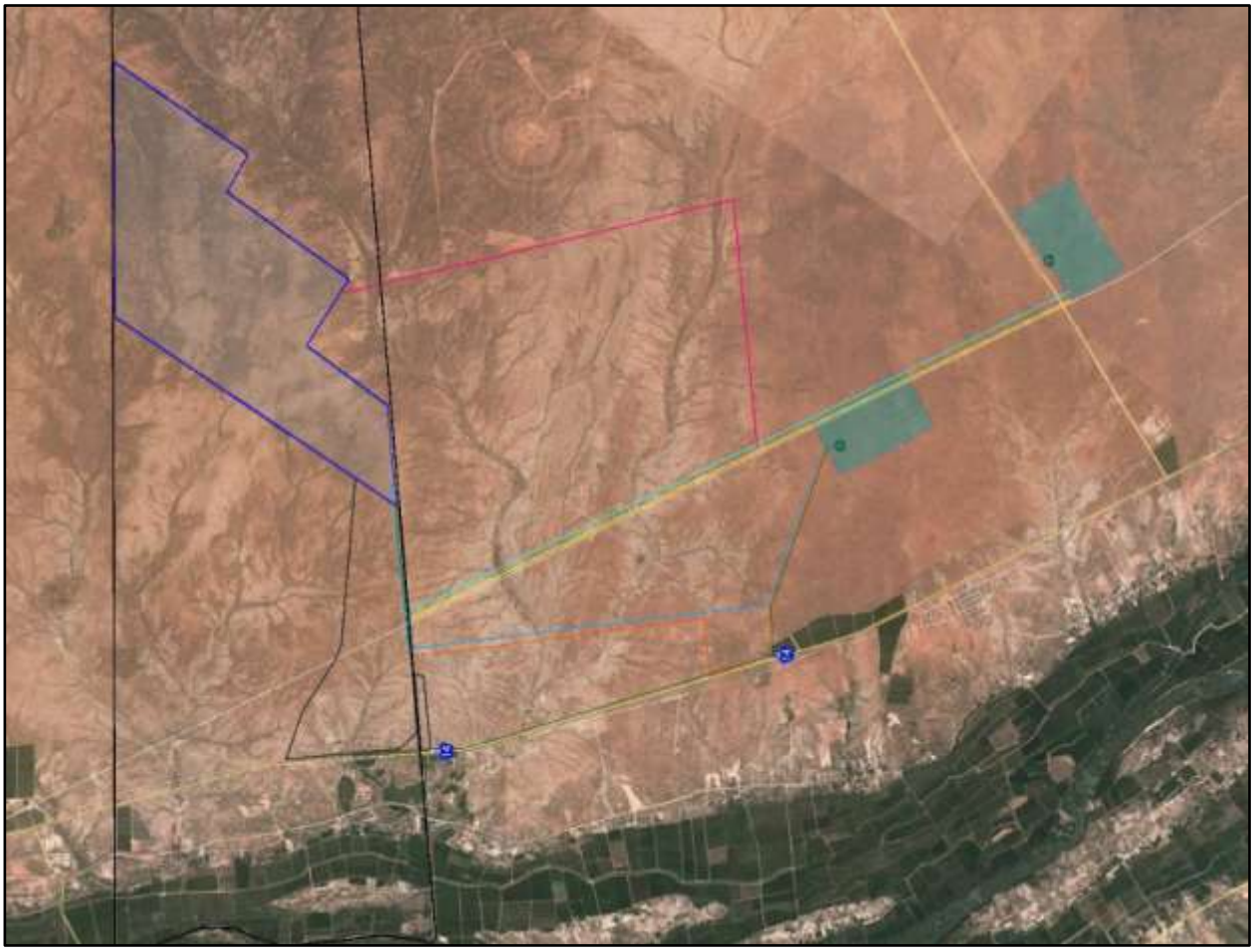


Figure 1. Satellite image of the RE Capital 3 Renewable Energy Project study site, illustrating the Dyason's Klip boundary in black and the proposed development area in blue. The various grid connection options and access road are also illustrated.

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 (Mucina and Rutherford 2006) as well as the National List of Threatened Ecosystems (2011), where relevant.
- No Critical Biodiversity Areas (CBA) mapping or systematic conservation planning has been conducted for the area with the result that no detailed conservation priority area information is available for the area.
- Information on plant and animal species recorded for the Quarter Degree Square (QDS) 2820 BD, DB and 2821 AC and CA was extracted from the SABIF/SIBIS database hosted by SANBI. This is a considerably 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 probably not been well sampled in the past.
- The IUCN conservation status (Table 1) 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 (2013).
- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel et al. 2011).
- Important catchments and protected areas expansion areas were extracted from the National Protected Areas Expansion Strategy 2008 (NPAES).

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 various spatial databases (SANBI's SIBIS and BGIS databases).
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, Friedmann and Daly (2004) and Skinner and Chimimba (2005) for mammals.
- Apart from the literature sources, additional information on reptiles were extracted from the SARCA web portal, hosted by the ADU, http://vmus.adu.org.za
- The faunal species lists provided are based on species which are known to occur in the broad geographical area, as well as a preliminary assessment of the availability and quality of suitable habitat at the site.
- The conservation status of each species is also listed, based on the IUCN Red List Categories and Criteria version 3.1 (2013) (See Figure 1) and where species have

not been assessed under these criteria, the CITES status is reported where possible. These lists are adequate for mammals and amphibians, the majority of which have been assessed, however the majority of reptiles have not been assessed and therefore, it is not adequate to assess the potential impact of the development on reptiles, based on those with a listed conservation status alone. In order to address this shortcoming, the distribution of reptiles was also taken into account such that any narrow endemics or species with highly specialized habitat requirements occurring at the site were noted.

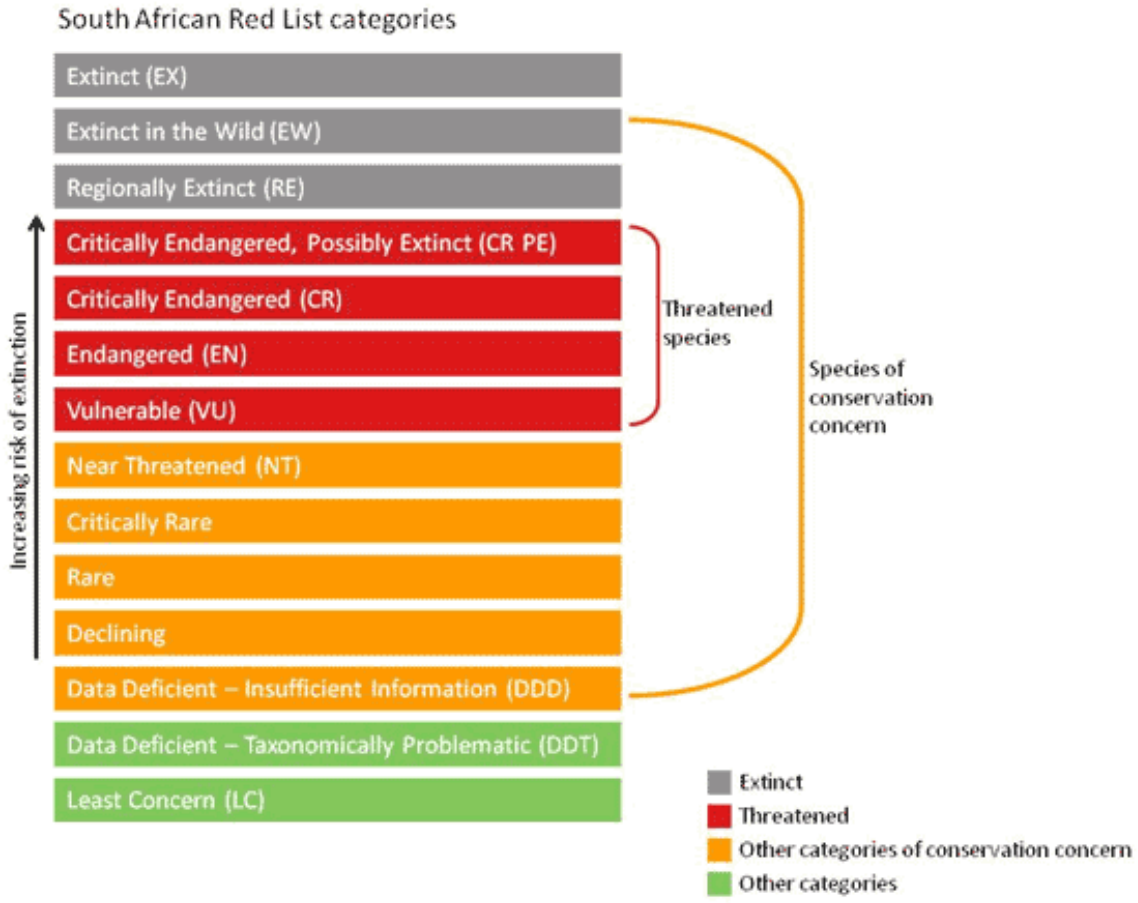


Figure 2. Schematic representation of the South African Red List categories. Taken from http://redlist.sanbi.org/redcat.php

2.2 SITE VISIT

- The site visit took place over two full days on the 14th and 15th of June 2013.
- During the course of the field assessment, the different biodiversity features, habitat, and landscape units present at the site were identified and mapped in the field.

Specific features visible on the satellite imagery of the site were also marked for field inspection and were verified and assessed during the site visit. This included features such as pans and rocky outcrops that were not visible from the access roads of the site and might have otherwise been missed.

- Walk-through-surveys were conducted within representative areas across the different habitats units identified and all plant and animal species observed were recorded.
- Active searches for reptiles and amphibians were also conducted within habitats likely to harbour or be important for such species.
- The presence of sensitive habitats such as wetlands or pans and unique edaphic environments such as rocky outcrops or quartz patches were noted in the field if present and recorded on a GPS and mapped onto satellite imagery of the site.

2.3 SENSITIVITY MAPPING & ASSESSMENT

An ecological sensitivity map of the site was produced by integrating the information collected on-site with the available ecological and biodiversity information available in the literature and various spatial databases. This includes delineating the different habitat units identified in the field and assigning sensitivity values to the units based on their ecological properties, conservation value and the potential presence of species of conservation concern. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

- **Low** – Areas of natural or transformed habitat with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. Most types of development can proceed within these areas with little ecological impact.
- **Medium**- Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. These areas usually comprise the bulk of habitats within an area. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
- **High** – Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. These areas may contain or be important habitat for faunal species or provide important ecological services such as water flow regulation or forage provision. Development within these areas is undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.
- **Very High** – Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided as much as possible.

In some situations, areas were also classified between the above categories, such as Medium-High, where it was deemed that an area did not fit well into a certain category but rather fell most appropriately between two sensitivity categories.

2.4 SAMPLING LIMITATIONS AND ASSUMPTIONS

The major potential limitation associated with the sampling approach is the narrow temporal window of sampling. Ideally, a site should be visited several times during different seasons to ensure that the full complement of plant and animal species present are captured. However, this is rarely possible due to time and cost constraints and therefore, the representivity of the species sampled at the time of the site visit should be critically evaluated.

It was the dry season at the time of the site visit and as a result a large proportion of vegetation present at the site was in a dormant state. Although the dominant species present could all be identified, it is likely that there are numerous forbs and annuals present at the site which were not present or could not be identified at the time of the site visit. Nevertheless, the broad characteristics of the site could be adequately evaluated based on the dominant species present and it is highly unlikely that the dry conditions had a significant influence on the sensitivity map that was produced for the site. Furthermore, it is unlikely that there are any listed species present at the site which would not have been observed during the site visit.

The lists of avifauna, amphibians, reptiles and mammals for the site are based on those observed at the site as well as those likely to occur in the area based on their distribution and habitat preferences. This represents a sufficiently conservative and cautious approach which takes the study limitations into account.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT- BASELINE

3.1 BROAD-SCALE VEGETATION PATTERNS

According to the national vegetation map (Mucina & Rutherford 2006), there are three vegetation types within the boundaries of the site, and an additional two which are common in the area, but which do not occur within the site (Figure 2). In terms of the conservation status of the various vegetation types of the area, only Lower Gariep Alluvial Vegetation is of concern and is listed as Endangered. This vegetation type is however associated with the alluvium along the Orange River and would not be impacted by the current development which is some distance from the river itself. Furthermore, within the study area the majority of the Lower Gariep Alluvial Vegetation has been transformed by intensive agriculture, which along with alien plant invasion, form the major threats to this vegetation type.

Within the area affected by the proposed development, two vegetation types occur, namely Kalahari Karroid Shrubland and Bushmanland Arid Grassland. Both Kalahari Karroid Shrubland and Bushmanland Arid Grassland are classified as Least Threatened and have been little impacted by transformation and more 99% of their original extent is still intact

(Table 2). Both are considered Hardly Protected within formal conservation areas, while Gordonia Duneveld is Moderately Protected. Mucina & Rutherford (2006), list 6 endemic species for Bushmanland Arid Grassland, while no vegetation-type endemic species are known from either Kalahari Karroid Shrubland or Gordonia Duneveld. The biogeographically important and endemic species known from these vegetation types tend to be widespread within the vegetation type itself and local-level impacts are not likely to be of significance for any of these vegetation types or species concerned. Both Bushmanland Arid Grassland and Gordonia Duneveld are widely distributed and represent some of the most extensive vegetation types in South Africa. Kalahari Karroid Shrubland is less extensive, but represents a transitional vegetation type between the northern Nama Karoo and Kalahari (Savannah) vegetation types.

Table 1. Vegetation types that occur within or near the site with their basic conservation statics and status according to the National List of Threatened Ecosystems (2011).

Name	Extent km^2	Remaining	Conservation Target	Protected	Status
Kalahari Karroid Shrubland	8284	99.2%	21%	0.1%	Least threatened
Gordonia Duneveld	36772	99.8%	16%	14.2%	Least threatened
Lower Gariep Alluvial Vegetation	752	50.3%	31%	5.8%	Endangered
Lower Gariep Broken Veld	4538	99.5%	21%	3.9%	Least threatened
Bushmanland Arid Grassland	45479	99.4%	21%	0.4%	Least threatened

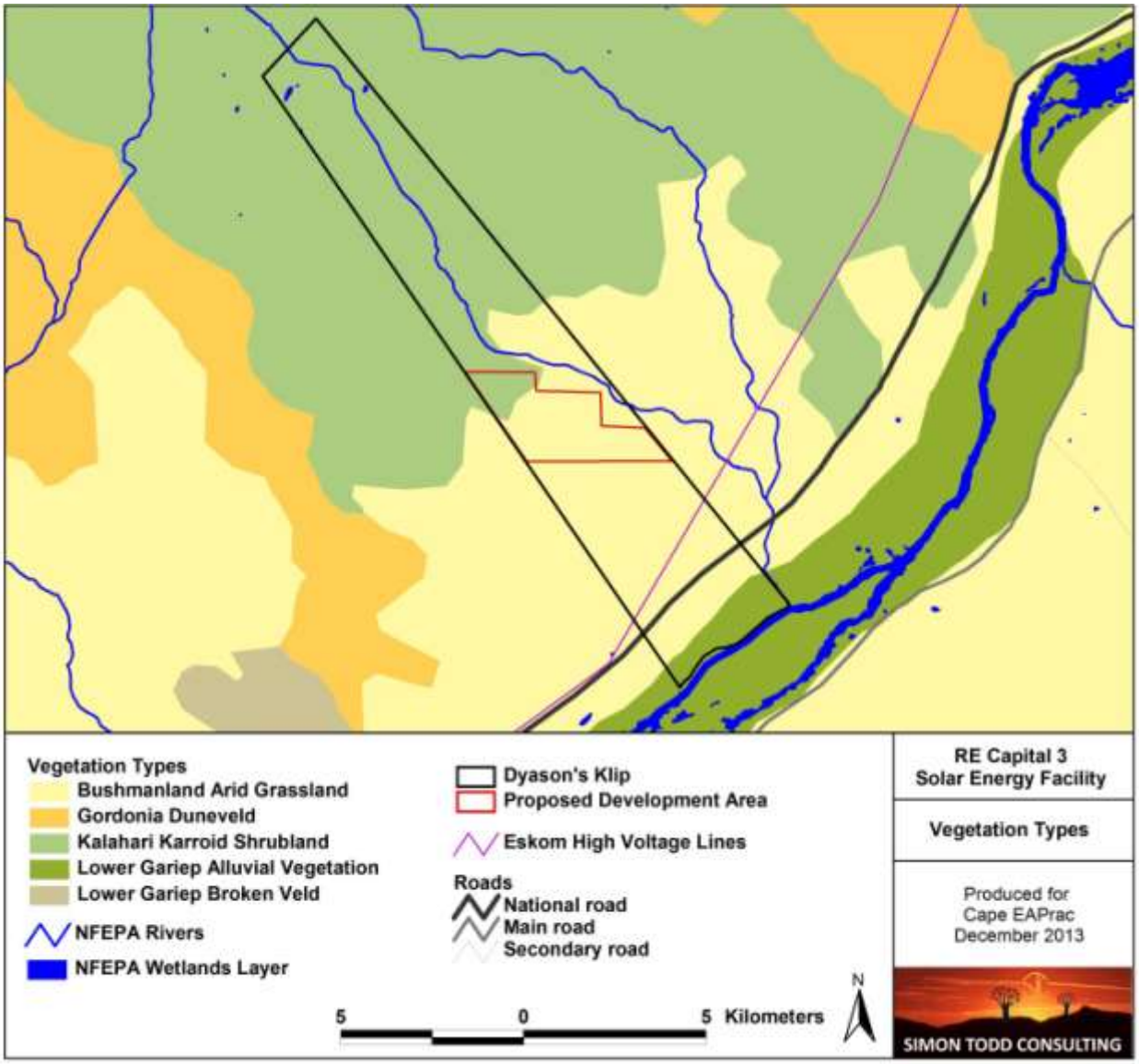


Figure 3. Broad-scale overview of the vegetation in and around the RE Capital 3 Solar Energy Development. The vegetation map is an extract of the national vegetation map as produced by Mucina & Rutherford (2006), and also includes rivers and wetlands delineated by the National Freshwater Ecosystem Priority Areas assessment (Nel et al. 2011).

3.2 Fine-Scale Vegetation Patterns

Bushmanland Arid Grassland

Although the national vegetation map lists two vegetation types within the study area, with Bushmanland Arid Grassland towards the Orange River and Kalahari Karroid Shrubland within the more distant half of the site, this is a very poor reflection of the vegetation patterns on the ground. There is not a clear differentiation of the northern and southern

halves of the site into grassland and shrubland, but rather a mosaic of more grassy or more shrub-dominated vegetation related to soil depth, with a greater abundance of shrubs in areas of gravel or shallow soils associated with the tops of the low hills and ridges of the site. The vast majority of lowlands of the site are dominated by perennial grasses and have greater affinity with the Bushmanland Arid Grassland vegetation type than the Kalahari Karroid Shrubland vegetation type.

Figure 4. Examples of Bushmanland Arid Grassland – type vegetation from the study area, taken from the southern half of the site at left and near the northern boundary of the site at right. This is the predominant vegetation type at the site and is not restricted to the southern half of the site as suggested by the national vegetation map.

The areas of Bushmanland Arid Grassland are widespread at the site and the majority of plains and lowlands correspond to this type of vegetation. Common and dominant species include *Stipagrostis ciliata*, S.obtusa, *S.uniplumis* and *S.amabilis*. Species of conservation concern were not abundant in this habitat and the only species of concern that was observed in this habitat type was *Hoodia gordonii*, which was rare and the number of potentially affected individuals would be very low. Protected species which occur in this habitat type include *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba*. *Boscia albitrunca* and *Acacia erioloba* are generally restricted to drainage lines and would be little impacted by the development, while *Boscia foetida* is more widespread and larger but not highly significant numbers of this species are likely to be affected by the development.

Kalahari Karroid Shrubland

The stony hilltops and low ridges of the site are typically shrub-dominated and correspond loosely with the Kalahari Karroid Shrubland vegetation type. Typical species include *Leucosphaera bainesii*, *Hermannia spinosa*, *Monoechma genistifoilium*, *Salsola rabieana*, *Aptosimum albomarginatum*, *A.spinecens*, *Kleinia longiflora*, *Limeum argute-carinatum*,

Phyllanthus maderaspatensis, *Zygophyllum dregeanum* and grasses such as *Stipagrostis anomala*, *S.ciliata*, *S.uniplumis*, *S.hochstetteriana*, *S.uniplumis* and *Schmidtia kalariensis*. As this habitat occurs on the more exposed parts of the topography, areas of exposed calcrete or quartz outcrops are often present and it is in these areas that species of conservation concern are usually located. Although such areas were searched, no species of conservation concern were located. Some of these species such as *Lithops* spp. are however cryptic and given the very dry conditions at the time of the site visit would be very difficult to locate. Therefore, the possibility that such species occur at the site is not precluded.

Figure 5. Examples of areas within the site which correspond with the Kalahari Karroid Shrubland vegetation type. These occur throughout the site and are not restricted to any particular area, but are associated with areas of shallow or gravelly soils which usually occur in the higher-lying parts of the landscape.

It is important to note that the areas of Kalahari Karroid Shrubland within the site are not very clearly defined and have not been mapped separately from the Bushmanland Basin Grassland vegetation type. There is a continuum in vegetation composition between the two vegetation extremes with large parts of the site falling variously along a gradient in composition between the two endpoints. Furthermore, there is little basis on which to differentiate the sensitivity of the two vegetation types and so an attempt to map the two vegetation types at the site has not been made as there would be little utility in doing so and there is not a natural differentiation of the vegetation types within the study area.

Plains Wash

Especially within the northern part of the site, there are large flat drainage areas, which unlike drainage lines, do not have a well-defined bed and associated vegetation, but rather form open, often tree-less wash areas. These areas are usually dominated by perennial

grasses such as *Stipagrostis anomala*, *S.ciliata*, *S.uniplumis*, *S.hochstetteriana*, *S.uniplumis* and *Schmidtia kalariensis*. Taller woody species may be present such as *Phaeoptilum spinosum*, *Rhigozum trichotomum* and *Lycium oxycarpum*, but there is often little differentiation of the grass and low shrub layer from the surrounding vegetation. From a functional perspective, these features tend to develop in areas where there is a sandy substrate and low slope. Due to the characteristics of these areas, overland flow in these areas is low and is a lot less common than in the more stony parts of the site, where more typical confined drainage lines tend to develop. Aside from *Boscia foetida* which is fairly common in these areas, there are few listed or protected species which were observed in this habitat type. As these areas receive runoff from adjacent areas and consequently often have a greater abundance of

Figure 6. Examples of the plains wash habitat type. In these examples, the wash areas are indicated by the higher density of woody species such as *Phaeoptilum spinosum* and Boscia *foetida*, but there is not a well-defined drainage channel or bed present.

Drainage Lines

The large drainage area which traverses the northern extent of the site and leaves the site area just to the east of the proposed development area is the Helbrandkloofspruit. This is by far the largest and most well-developed drainage feature within the site. It is characterised by the presence of large trees such as *Acacia erioloba*, *Boscia albitrunca*, *Zizyphus mucronata* and *Searsia lancea* with a grass layer dominated by *Stipagrostis namaquensis*. The smaller less-well developed drainage lines do not have a similar abundance of large trees but are rather dominated by species such as *Acacia mellifera*, *Boscia foetida* and *Phaeoptilum spinosum*.

Figure 7. The Helbrandkloofspruit river near the eastern boundary of the site, with large *Acacia erioloba*, *Searsia lancea* and *Boscia albitrunca* trees. The bed, pictured left is sandy and dominated by *Stipagrostis namaquensis*.

Figure 8. Example of one of the smaller drainage lines at the site. with dense *Acacia mellifera* along the sides of the bed and a lone *Acacia erioloba* with Sociable Weaver nest.

Pans

There are a number of small pans scattered across the site. Some of these have been modified to make them deeper, which has impacted their ecological value. The smaller pans are not very large and may be as little as 10 m across including the flanking vegetation. In the broader context these smaller pans are not highly significant as they do not hold water for long enough to provide habitat for species which utilise pans such as Giant Bullfrogs or temporary water organisms such as cladocerans and copepods. There is however a large pan towards the northern boundary of the site which along with the fringing woody vegetation is more than 10ha in extent. This pan is significantly larger than the average size pan in the area and is considered a significant feature of the local and broader landscape. Due to the ecological role that such a pan is likely to play, it is

considered highly sensitive and should not be impacted. It is however about 9km from the nearest point of the current development area and would not be impacted by the current development. The larger pans are bordered by large numbers of *Boscia foetida*, but no other plant species of concern were noted in these areas.

Figure 9. Typical example of the smaller pans at the site, which are generally about 10-15m across and have a fringe of woody vegetation usually *Phaeoptilum spinosum* and R*higozum trichotomum*, with an open centre usually consisting of *Sporobolus fimbriatus*.

Figure 10. Part of the large pan near the north-western boundary of the site. The pan itself is open and dominated by of *Sporobolus fimbriatus*, while there is a fringe of woody vegetation around the pan which is dominated by *Boscia foetida* and *Phaeoptilum spinosum*.

Special Habitats

Although they were not abundant at the site, some localised specialised habitats were noted at the site, in particular some rocky outcrops and some quartz outcrops. These areas were very limited in extent and do not comprise a significant proportion of the site. The quartz outcrops tended to be concentrated towards the northern extent of the site and would not be impacted by the current development footprint. These areas are usually home to species

such as *Lithops*, which the consultant has observed in similar habitat on the adjacent property Van Roois Vley, but which were not observed at the current site. It was however dry at the time of the site visit and these cryptic plants are difficult to locate at the best of times, so they may also be present within these areas at the current site. Some individuals of provincially protected *Anancampceros* were however observed in the quartz patches. The rocky outcrops consist of some very localised outcrops of dolerite boulders. Although there does not appear to be any flora associated with these areas, they are important for fauna associated with rocky habitats and for small to medium sized mammals which preferentially make burrows under the boulders. There were no rocky outcrops or quartz patches in the vicinity of the current development area that might be affected by the development.

Figure 11. Example of one of the small quartz outcrops at the site. Such outcrops at the site are however highly localised and contained few specialised plant species due to their limited extent.

Figure 12. A hill towards the northern extent of the site which is covered in dolerite boulders and which creates an important habitat for fauna as there are few other parts of the site with significant rock cover.

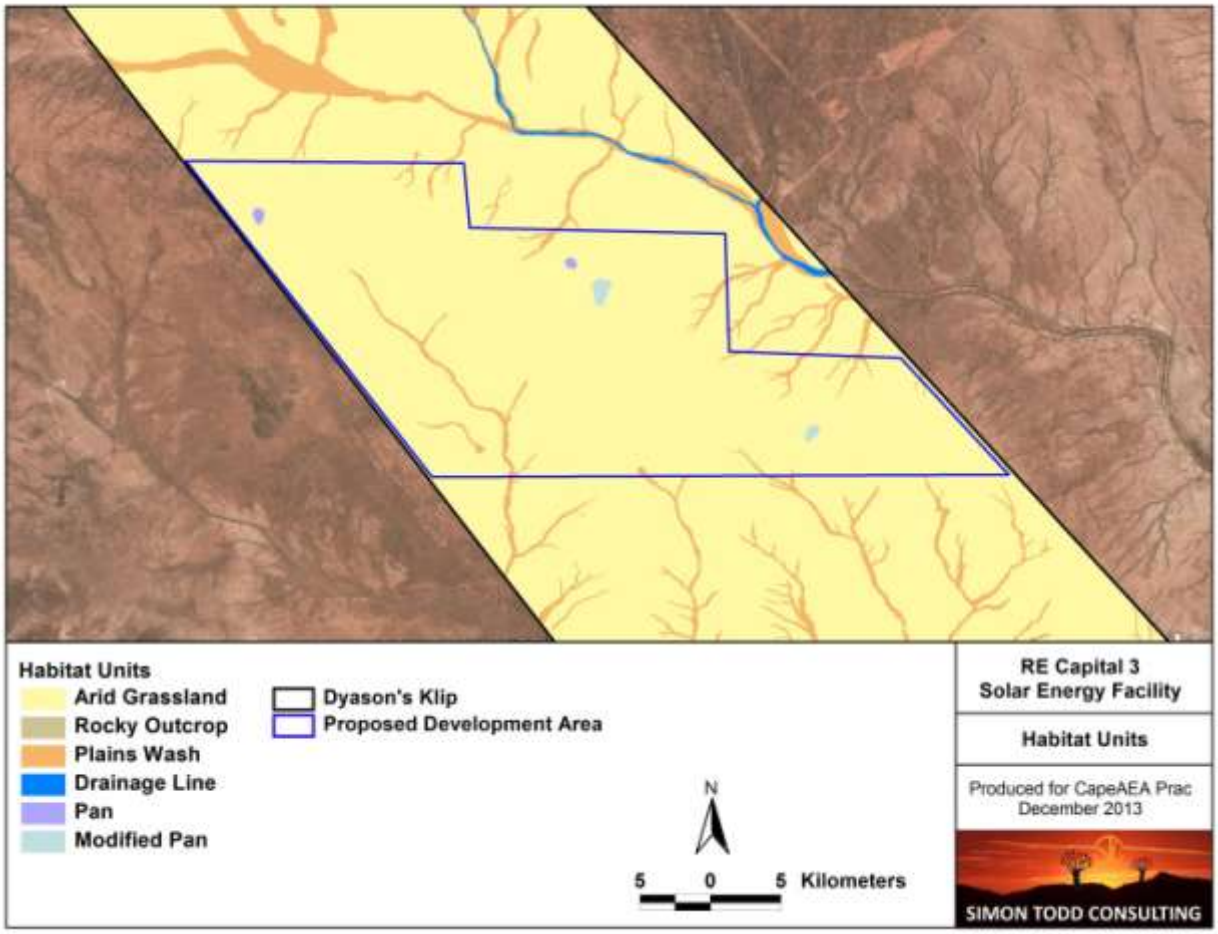


Figure 13. Habitat map of the proposed development area of the RE Capital 3 Solar Energy Project. Not all of the habitat units that were mapped at the site are present in the vicinity of the proposed development area.

3.3 Listed and Protected Plant Species

According to the SANBI SIBIS database, 286 indigenous plant species have been recorded from the quarter degree squares 2820 BD, DB and 2821 AC and CA. This includes 7 species of conservation concern as listed below in Table 3. Two of these can be confirmed present at the site, with *Hoodia gordonii* present in low numbers and *Acacia erioloba* common along

the larger drainage lines. There are also additional species present which are either protected under the National Forests Act such as *Boscia albitrunca* or protected under the Northern Cape Nature Conservation Act of 2009, which includes *Boscia foetida*, all *Mesembryanthemaceae*, , all species within the *Euphorbiaceae*. *Oxalidaceae*, *Iridaceae*, all species within the genera *Nemesia* and *Jamesbrittenia*. It is not likely that many *Boscia albitrunca* would be affected by the development as this species is mostly restricted to the larger drainage lines at the site. *Boscia foetida* is however common along the smaller drainage lines as well as in the open veld, and it is likely that a fairly large number of these would be affected, but probably less than 100 plants, which would not be considered highly significant given then abundance in the local area.

Table 2. Listed species which may occur within the RE Capital 3 Solar Energy Development, including their IUCN status and the likelihood that they occur at the site.

Family	Species	IUCN Status	Likelihood
ASPHODELACEAE	*Aloe dichotoma*	VU	Low
MESEMBRYANTHEMACEAE	*Dinteranthus wilmotianus*	NT	Low
AMARYLLIDACEAE	*Crinum bulbispermum*	Declining	Low
FABACEAE	*Acacia erioloba*	Declining	Confirmed
APOCYNACEAE	*Hoodia gordonii*	DDD	Confirmed
ASTERACEAE	*Felicia deserti*	DDD	High
ASTERACEAE	*Senecio glutinarius*	DDT	Low

3.4 Critical Biodiversity Areas & Broad-Scale Processes

No fine-scale conservation planning has been conducted for the region and as a result, no Critical Biodiversity Areas have been defined for the study area. In terms of other broad-scale planning processes, the site does not fall within a National Protected Areas Expansion Strategy Focus Area (NPAES), indicating that the area has not been identified as an area of exceptional biodiversity or of significance for the long-term maintenance of broad-scale ecological processes and climate change buffering within the region. The development would however contribute to cumulative impacts in the area, which are becoming increasingly large given the concentration of renewable energy facilities in the immediate area (Figure 14). This includes the Abengoa Khi Solar One CSP facility under construction adjacent to the site, an approved CSP facility on Van Roois Vley northeast of the site as well as a 200MW solar energy facility to the west of the site. The concentration of development within the area will increase the fragmentation of the landscape and impact landscape connectivity.

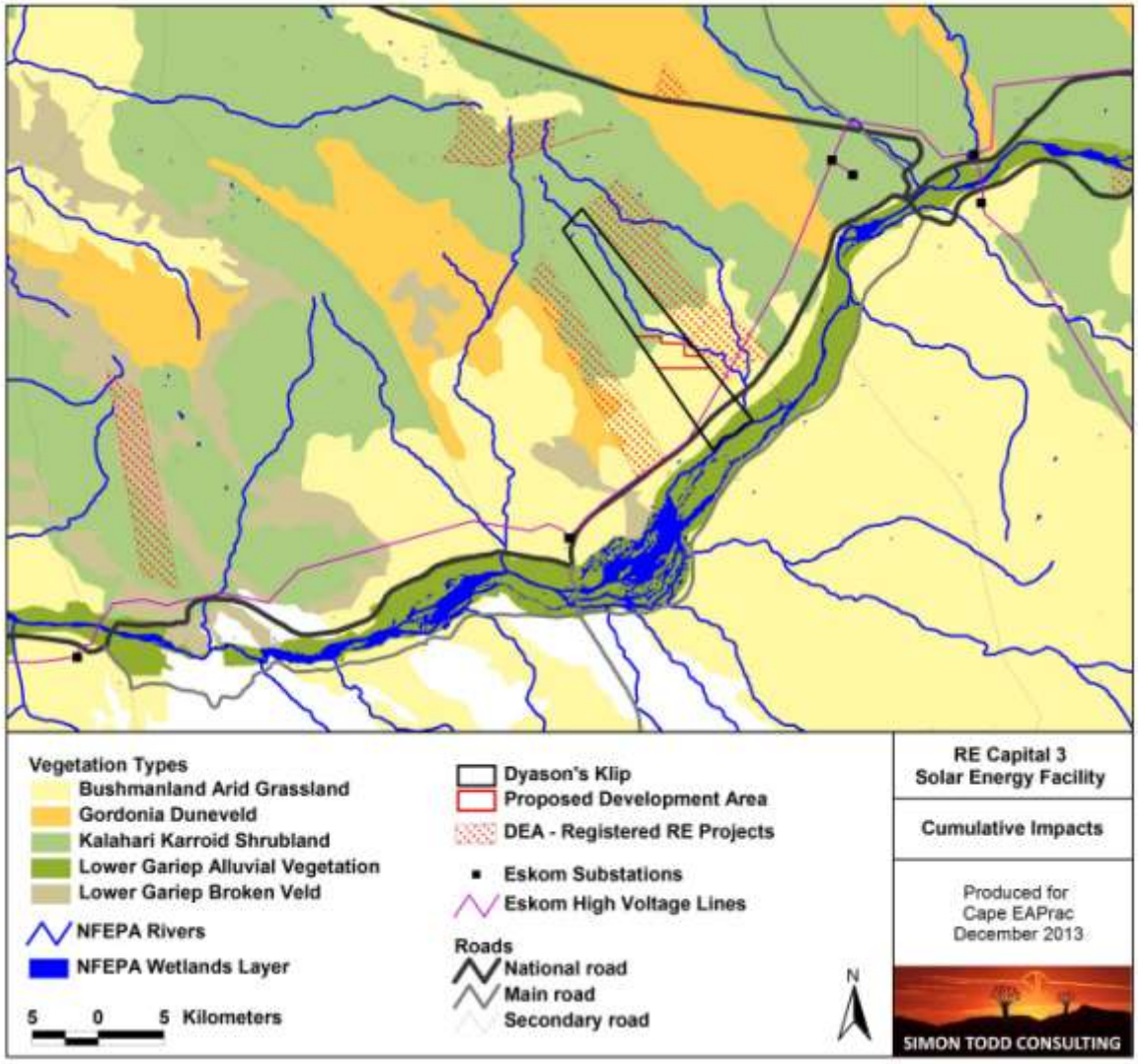


Figure 14. Map of the DEA-registered projects in the vicinity of the Dyason's Klip site, as at December 2012. The consultant is aware of at least two additional projects within this area, which are currently in the early stages of the EIA process.

3.5 FAUNAL COMMUNITIES

Mammals

The site falls within the distribution range of 46 terrestrial mammals, indicating that the mammalian diversity at the site is of moderate potential. Areas of specific significance for mammals are likely to be the drainage lines, in particular the well vegetated sections of the Helbrandkloofspruit and the rocky outcrops. The intervening veld is not considered highly sensitive from a faunal perspective as similar habitat is widely available in the area.

Three listed terrestrial mammals may occur at the site, the Honey Badger *Mellivora capensis* (Endangered), Brown Hyaena *Hyaena brunnea* (Near Threatened) and Black-footed cat *Felis nigripes* (Vulnerable). Although the area is used for livestock production, human activity in the area is currently low and it is likely that all three listed species occur in the general area. As these species have a wide national distribution, the development would not create a significant extent of habitat loss for these species, a single individual of which has a home range far exceeding the extent of the current development.

The site lies within the distribution range of 6 bat species, indicating that the richness of bats at the site is probably quite low. Bat activity is probably focused along the Orange River, where there is ample food as well as an abundance of natural and artificial shelter. The lack of wetlands and large drainage lines away from the Orange River suggests that bat activity patterns within the site are likely to be low. The pans would also be areas that would attract bats when they had water, but this is likely to be infrequently and so the pans are not likely to be significant in terms of providing long-term habitat and foraging grounds for bats.

Overall there do not appear to be any highly significant issues regarding mammals and the development of the site. In general the major impact associated with the development of the site for mammals would be habitat loss and potentially some disruption of the broad-scale connectivity of the landscape.

Reptiles

According to the SARCA database, 39 reptile species are known from the area suggesting that the reptile diversity within the site is likely to be moderate to low. Species observed at the site include the Karoo Girdled Lizard *Karusasaurus polyzonus* which is restricted to the rocky outcrops at the site, the Namaqua Mountain Gecko *Pachydactylus montanus* which was found under exfoliating granite rock sheets towards the southern extent of the site near the N14, and the Spotted Sand Lizard *Pedioplanis lineoocellata* which was widespread across the site but appeared to be more abundant in and around the pans.

Within the proposed development area, there are no large rocky outcrops or other specialised reptile habitats. As with mammals, the development is likely to result in local habitat loss for reptiles but as there are no listed or range-restricted reptiles that are likely to occur at the site the impacts are not likely to be of broader significance.

The construction of the solar panels with supporting structures and electrical connections would significantly alter the habitat structure within the development area as compared to the original open vegetation. This is likely to change the reptile composition within the affected area and species able to tolerate or utilise the novel conditions will increase at the expense of those species associated with the open vegetation. Functionally this is likely to represent an increase in geckos and other climbing species at the expense of diurnal

ground-foraging species. This effect is likely to be of local extent and given that there are few listed species that might be affected, of relatively low significance as well.

Figure 15. Namaqua Mountain Gecko *Pachydactylus montanus* observed under an exfoliating granite rock sheet during active reptile searching in the southern part of the site.

Amphibians

The site lies within the distribution range of 10 amphibian species. The only listed species which may occur at the site is the Giant Bullfrog *Pyxicephalus adspersus* which is listed as Near Threatened. The large pan towards the north-west corner of the site is the only potentially suitable breeding habitat for this species at the site. As this pan is not near the current development footprint, direct impacts on this species are highly unlikely. This pan and the Helbrandkloofspruit are likely to be the only areas of significance for amphibians at the site. There are however no natural perennial water sources at the site and amphibian abundance in the vicinity of the development area is likely to be low. As a result impacts on amphibians are likely to be local in extent and of low significance.

Avifauna

According to the SABAP 1 and 2 data sets, 190 bird species are known from the broad area surrounding the site. This includes 7 IUCN listed species (Table 3), all of which except for the Black Stork are likely to occur at the site. All of the listed species are susceptible to some degree to either or both electrocution or collision from power-line infrastructure. Larger raptors are susceptible to both collision and electrocution, while storks and bustards are all vulnerable to collision with power lines. This is a significant source of impact for these species. The new Eskom MTS substation is however likely to be in close proximity to the site and the length of the new transmission lines required for the development are likely to be less than 10km long. The large amount of development in the vicinity of the site is likely to make the area less attractive to larger raptors, storks and bustards while the use of

bird flight diverters can also reduce the impact of transmission lines and is a recommended standard practice for new transmission line infrastructure. Although the habitat loss resulting from the construction of the facility is the most obvious avifauna-related impact, power lines may generate a more significant long-term cumulative impact as slow breeding species are often affected and without mitigation, the impact persists for the lifetime of the power line.

Table 3. Listed bird species known to occur in the vicinity of the proposed RE Capital 3 Solar Energy Facility site, according to the SABAP 1 and 2 databases, and their risk of collision with or electrocution from power line infrastructure.

Species	Common Name	Status	Collision	Electrocution
Falco biarmicus	Lanner Falcon	NT	High	Moderate
Falco naumanni	Lesser Kestrel	VU	High	Moderate
Ciconia nigra	Black Stork	NT	High	
Falco peregrinus	Peregrine Falcon	NT	High	Moderate
Ardeotis kori	Kori Bustard	VU	High	
Neotis ludwigii	Ludwig's Bustard	VU	High	
Polemaetus bellicosus	Martial Eagle	VU	Moderate	High

3.6 SITE SENSITIVITY ASSESSMENT

The sensitivity map for the proposed development area of the RE Capital 3 Solar Energy Project is illustrated below in Figure 16. Although a sensitivity map was generated for the entire site, the figure illustrates the affected area around the proposed development footprint only so that the smaller details of the sensitivity map can be discerned.

The majority of the site consists of arid grassland or grassy shrubland on open plains considered to be of moderate to low sensitivity. This habitat type forms the vast majority of the development footprint and as there are few listed or protected species present in these areas, the impacts on vegetation are likely to be relatively low. The Helbrandkloofspruit is the dominant sensitive feature present in the vicinity of the proposed development area, but is some distance away and would not be directly affected by the development. Although there are a number of other sensitive features present at the site such as the large pan near the north-west corner of the site as well as some rocky outcrops and quartz patches, these are all outside of the current proposed development area. There are a number of small pans within the proposed development area, some of which have been modified by the landowner apparently in an attempt to turn them into dams which can hold water for livestock watering purposes. The ecological functioning of the modified pans has been compromised and they are not considered highly sensitive. There are however a few natural pans within the development area that would be affected by the development. This is a potentially highly significant impact due to the ecological sensitivity of pans. The

affected pans are however very small and are not likely to represent important habitat for species which utilise such areas such as the Giant Bullfrog Pyxicephalus *adspersus*. Therefore, although their loss is considered undesirable, it is not considered highly significant given that such small pans are relatively abundant in the area and that there is a much larger more ecologically significant pan at the site, which would not be affected by the development.

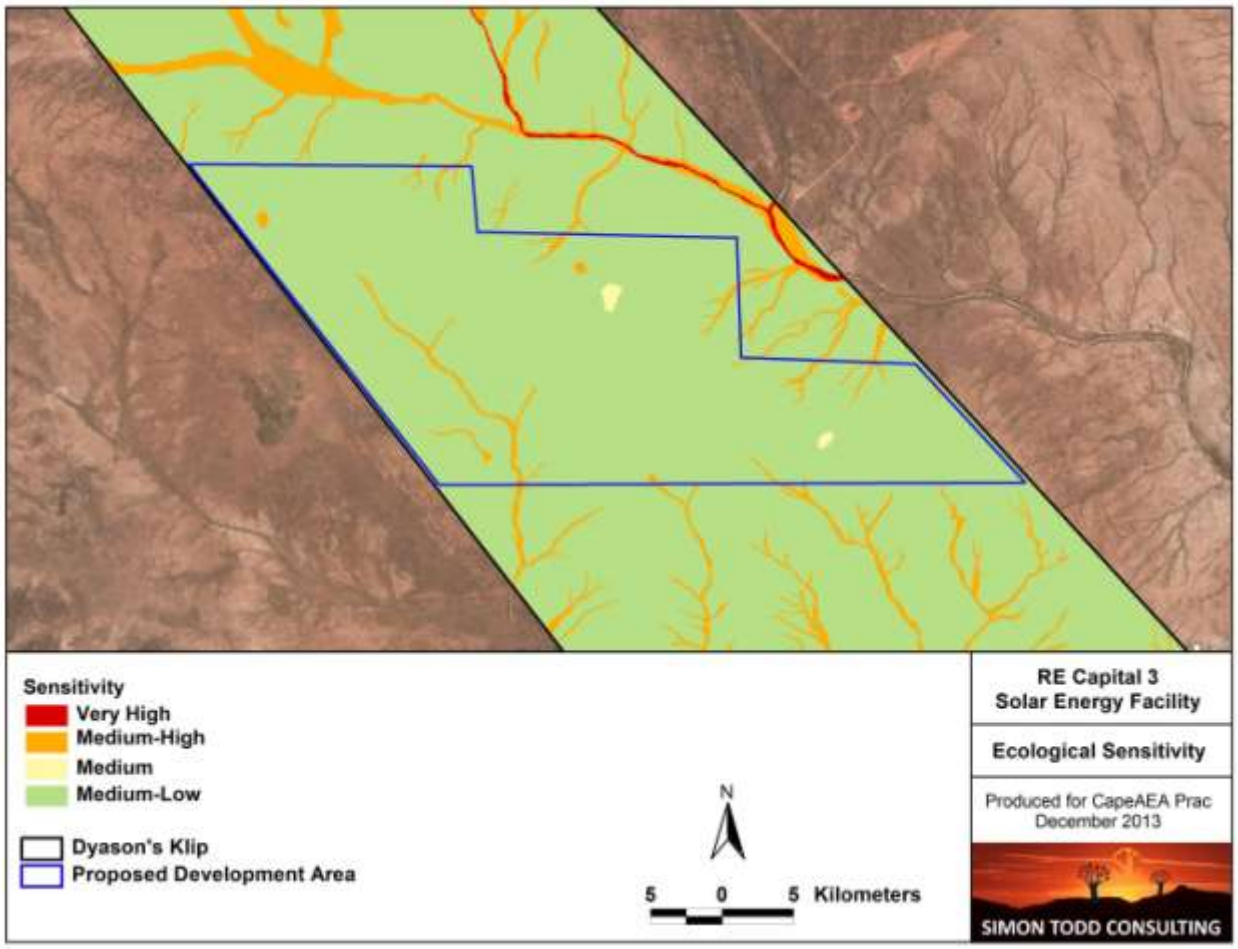


Figure 16. Ecological sensitivity map of the proposed development area of the RE Capital 3 Solar Energy Project.

It is important to note that the current development consists of 3 phases, each of which would be subject to a separate bid process under the RE-IPPP. As such, it is important to assess the extent to which the impact of any one phase would be greater than the other phases. A draft layout for each phase of the development was supplied to the consultant based on the preliminary results of this study, but is not presented here as the layout has not been finalised. However, based on these preliminary results, it seems highly unlikely that any one phase of the development would have a significantly higher or lower impact than the other phases. As such, the assessment provided here is considered valid for each

of the three phases and for the assessment of cumulative impacts it is assumed that all three phases would be built. In reality, the impact of each phase of the development on certain aspects of the ecology would be progressively less due to the majority of impact being generated by the first phase and the initiation of a significant impact within a currently intact landscape.

4 ASSESSMENT METHODOLOGY

4.1 ASSESSMENT & SIGNIFICANCE CRITERIA

In order to identify potential impacts (both positive and negative) it is important that the nature of the proposed activity is well understood so that the impacts associated with the activity can be understood. The process of identification and assessment of impacts includes the following:

- Determine the current environmental conditions in sufficient detail so that there is a baseline against which impacts can be identified and measured.
- Determine future changes to the environment that will occur if the activity does not proceed.
- An understanding of the activity in sufficient detail to understand its consequences; and
- The identification of significant impacts which are likely to occur if the activity is undertaken.

As per DEA *Guideline 5: Assessment of Alternatives and Impacts* the following methodology is applied to the predication and assessment of impacts. Potential impacts are rated in terms of direct, indirect and cumulative impacts:

- **Direct impacts** are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

- **Indirect impacts** of an activity are indirect or induced changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

- **Cumulative impacts** are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

- **Spatial extent** – The size of the area that will be affected by the impact:

- Site specific
- Local (<2 km from site)
- Regional (within 30 km of site)
- National.

- **Intensity** –The anticipated severity of the impact:

  - High (severe alteration of natural systems, patterns or processes)
  - Medium (notable alteration of natural systems, patterns or processes)
  - Low (negligible alteration of natural systems, patterns or processes).

- **Duration –The timeframe during which the impact will be experienced:**

  - Temporary (less than 1 year)
  - Short term (1 to 6 years)
  - Medium term (6 to 15 years)
  - Long term (the impact will cease after the operational life of the activity)
  - Permanent (mitigation will not occur in such a way or in such a time span that the impact can be considered transient).

Using the criteria above, the impacts are further assessed in terms of the following:

Probability –The probability of the impact occurring:

- Improbable (little or no chance of occurring)
- Probable (<50% chance of occurring)
- Highly probable (50 – 90% chance of occurring)
- Definite (>90% chance of occurring).

Significance – Will the impact cause a notable alteration of the environment?

- Low to very low (the impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures, and will not have an influence on decision-making)
- Medium (the impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures, and will only have an influence on the decision-making if not mitigated)
- High (the impacts will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making).

Status - Whether the impact on the overall environment will be:

- positive - environment overall will benefit from the impact
- negative - environment overall will be adversely affected by the impact
- neutral - environment overall not be affected.

Confidence – The degree of confidence in predictions based on available information and specialist knowledge:

- Low
- Medium
- High

Management Actions and Monitoring of the Impacts (EMP):

- Where negative impacts are identified, mitigatory measures will be identified to avoid or reduce negative impacts. Where no mitigatory measures are possible this will be stated
- Where positive impacts are identified, augmentation measures will be identified to potentially enhance positive impacts
- Quantifiable standards for measuring and monitoring mitigatory measures and enhancements will be set. This will include a programme for monitoring and reviewing the recommendations to ensure their ongoing effectiveness.

Cumulative Impact

Consideration is given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts are evaluated with an assessment of similar developments already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

5 IDENTIFICATION & NATURE OF IMPACTS

In this section, the potential impacts and associated risk factors that may be generated by the development are identified. In order to ensure that the impacts identified are broadly applicable and inclusive, all the likely or potential impacts that may be associated with the development are listed. The relevance and applicability of each potential impact to the current situation are then examined in more detail in the next section.

5.1 IDENTIFICATION OF POTENTIAL IMPACTS AND DAMAGING ACTIVITIES

Potential ecological impacts resulting from the development of three 75 MW phases of solar energy facility at Dyason's Klip would stem from a variety of different activities and risk factors associated with the preconstruction, construction and operational phases of the project including the following:

Preconstruction Phase

- Human presence and uncontrolled access to the site may result in negative impacts on fauna and flora through poaching of fauna and uncontrolled collection of plants for traditional medicine or other purpose.
- Site clearing & exploration activities for site establishment would have a negative impact on biodiversity if this was not conducted in a sensitive manner.

Construction Phase

- Vegetation clearing for the PV arrays, access roads, site fencing etc could impact listed plant species as well as high-biodiversity plant communities. Vegetation clearing will also lead to habitat loss for fauna and potentially the loss of sensitive faunal species, habitats and ecosystems.
- Increased erosion risk would occur due to the loss of plant cover and soil disturbance created during the construction phase. This may impact downstream riparian and wetland habitats if a lot of silt enters the drainage systems.
- Presence and operation of construction machinery on site. This will create a physical impact as well as generate noise, pollution and other forms of disturbance at the site.
- Increased human presence can lead to poaching, illegal plant harvesting and other forms of disturbance such as fire.

Operational Phase

- The operation of the facility will generate noise and disturbance which may deter some fauna from the area.
- The areas inside the facility will requirement management and if this is not done appropriately, it could impact adjacent intact areas through impacts such as erosion, alien plant invasion and contamination from pollutants, herbicides or pesticides.
- Overhead power lines will pose a risk to avifauna susceptible to collisions and electrocution with power line infrastructure.

Cumulative Impacts

- The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets.
- Transformation of intact habitat would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

5.2 IDENTIFICATION OF IMPACTS TO BE ASSESSED

In this section each of the potential impacts identified above is explored in more detail with reference to the features and characteristics of the site and the likelihood that each impact would occur given the characteristics of the site and the extent and nature of the development.

5.2.1 Preconstruction Phase

Impacts on vegetation and protected plant species

Preconstruction activities such as geotechnical investigations, access road construction or other unauthorised vegetation clearing may have a negative impact on vegetation and listed species. As listed and protected species are widespread at the site this is a plausible impact associated with the development, it is assessed for the preconstruction phase.

Impacts on fauna during the preconstruction phase

Uncontrolled access to the site and preconstruction activities may be detrimental to fauna. Poaching of susceptible species may occur as a result of increased access to the site and site clearing or disturbance with heavy machinery may also result in mortality of fauna unable to avoid the disturbance. As this is a possible outcome of the development it is assessed.

5.2.2 Construction Phase

Impacts on vegetation and protected plant species

There are a number of listed and protected species present at the site and it is highly likely that some of these would be impacted by the development. The loss of currently intact habitat resulting from site clearing within the development footprint is an inevitable consequence of the development. This impact is certain to occur and is therefore assessed for the construction phase, for the facility and for the grid connection.

Soil erosion and associated degradation of ecosystems

The large amount of disturbance created during construction would potentially leave the site vulnerable to soil erosion. The site is gently sloping and disturbance leading to the loss of plant cover over large parts of the site will certainly increase the risk of wind and water erosion at the site. Soil erosion is therefore considered a likely impact and is assessed for the construction phase.

Direct faunal impacts

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some mammals and reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present. Some impact on fauna is highly likely to occur during construction and this impact is therefore assessed for the construction phase.

5.2.3 Operational Phase

Alien Plant Invasion

The disturbance created during construction is highly likely to encourage the invasion of the disturbed areas by alien species. Although there were not a lot of alien

species present within the intact parts of the site, there were some aliens present in disturbed areas such as around watering points. Such species will rapidly increase in abundance and expand into the disturbed areas if given the opportunity. This impact is deemed highly likely to occur and is assessed as a likely impact associated with the development.

Direct faunal impacts

During the operational phase of the development, interactions between fauna and the infrastructure of the facility may generate negative impacts on fauna. Possible impacts include electrocution of fauna such as tortoises along electric fencing around the facility, or the persecution or poaching of fauna within and around the facility. As there is a possibility that this impact would occur, it is assessed for the development.

Avifaunal Impacts Due to Power Lines

Large raptors and many larger bird species such as cranes and bustards are vulnerable to collisions with or electrocution from power line infrastructure. This can be a particular problem if the power line lies within the movement or migration pathway of the birds. As many of the vulnerable species are long-lived slow-breeding species, collisions with power lines can be a major source of mortality for such species and may threaten the viability of local or regional populations. Insulating electrical components and fitting bird flight diverters can provide some mitigation against such impacts and is recommended as standard practice for new power line infrastructure. It important to note with regards to power line impacts that even if the impact at any one moment in time is low, it is the cumulative long-term impact which can generate significant impact. This impact is associated with the grid connection only and is assessed separately for that component of the development.

5.2.4 Cumulative impacts

Reduced ability to meet conservation obligations & targets

The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets. The receiving vegetation type in the study area is classified as Least Threatened and is an extensive vegetation type that is still more than 98% intact. The development of all three phases would result in the loss of up to 700ha ha of intact habitat from this vegetation unit which on its own is not considered highly significant, but there is an array of other developments in the area, which raises the possibility for significant cumulative impact on the affected vegetation types.

Impact on broad-scale ecological processes

Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental

fluctuations. Due to the large amount of development in the area, this is a likely cumulative impact of the development.

6 IMPACT ASSESSMENT

6.1 SOLAR DEVELOPMENT

The following assessed impacts are those for the solar facility itself, for the preconstruction, construction and operational phases of the development

6.1.1 Preconstruction Phase

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Mitigation/Management Actions	Significance and Status		Confidence level
							Without Mitigation	With Mitigation	
Impacts on vegetation and listed or protected plant species resulting from preconstruction activities	Local	Long-Term	Low	Probable	Moderate	• No unauthorised access to the site. • No unauthorised site clearing or disturbance at the site without an ECO present. • The final development area should be surveyed for species suitable for search and rescue, which should be translocated prior to the commencement of construction activities. • Areas where exploration work is permissible should be clearly demarcated.	Medium-Low Negative	Low Negative	High

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Mitigation/Management Actions	Significance and Status		Confidence level
							Without Mitigation	With Mitigation	
Direct Faunal Impacts During Preconstruction	Local	Short-Term	Medium	High	High	• Site access to be controlled and no unauthorized persons should be allowed onto the site. • The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.	Medium-Low	Low	High

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Mitigation/Management Actions	Significance and Status		Confidence level
							Without Mitigation	With Mitigation	
						• No open excavations, holes or pits should be left at the site as fauna can fall in and become trapped.			

6.1.2 Construction Phase

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Mitigation/Management Actions	Significance and Status		Confidence level
							Without Mitigation	With Mitigation	
Impacts on vegetation and listed or protected plant species resulting from construction activities	Local	Long-Term	High	Definite	Low	• Preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated as well as comply with the Northern Cape Nature Conservation Act and DENC permit conditions. • Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained. • Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc. • Eco to provide supervision and oversight of vegetation clearing activities within sensitive areas. • Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. • All construction vehicles should adhere to	High Negative	Medium Negative	High

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Mitigation/Management Actions	Significance and Status		Confidence level
							Without Mitigation	With Mitigation	
						clearly defined and demarcated roads. No off-road driving to be allowed. • Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.			
Direct Faunal Impacts During Construction	Local	Short-Term	Medium	High	High	• All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. • Any fauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer. • 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. • If trenches need to be dug for water pipelines or electrical cabline, these should not be left open for extended periods of time as fauna may fall in and become trapped in them.	Medium Mitigation	Medium-Low Mitigation	High
Soil Erosion Risk During Construction	Local	Medium-term	Medium-High	High	Low	• Dust suppression and erosion management should be an integrated component of the construction approach. • Regular monitoring for erosion problems along the access roads and other cleared areas. • Erosion problems should be rectified on a regular basis.	Medium Negative	Low Negative	High

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Mitigation/Management Actions	Significance and Status		Confidence level
							Without Mitigation	With Mitigation	
						• A low cover of vegetation should be left wherever possible to bind the soil, prevent erosion and promote post-disturbance recovery of an indigenous ground cover.			

6.1.3 Operational Phase

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Mitigation/Management Actions	Significance and Status		Confidence level
							Without Mitigation	With Mitigation	
Alien Plant Invasion Risk During Operation	Local	Long-term	Medium-High	High	Low	• Wherever excavation is necessary, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. • The recovery of the indigenous grass layer should be encouraged through leaving some areas intact through the construction phase to create a seed source for adjacent cleared areas. • Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. • Regular monitoring for alien plants within the development footprint. • Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides	Medium Negative	Low Negative	High

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Mitigation/Management Actions	Significance and Status		Confidence level
							Without Mitigation	With Mitigation	
						should be avoided as far as possible.			
Soil Erosion Risk During Operation	Local	Long-term	Medium-High	High	Low	• All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. • Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance. • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. • All cleared areas should be revegetated with indigenous perennial grasses	Medium Negative	Low Negative	High
Faunal impacts during operation	Low	Long-term	Medium	Moderate	High	• No unauthorized persons should be allowed onto the site. • Any potentially dangerous fauna such snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. • The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. • If the site must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract 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	Medium-Negative	Low-Negative	High

						to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises. • If the facility is to be fenced, then no electrified strands should be placed within 30cm of the ground as come species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks.			

6.2 POWER LINE & GRID CONNECTION

The following assessed impacts are those for the grid connection required to connect the facility to the Eskom grid, for the construction and operational phases of the development. No preconstruction-phase impacts are anticipated for the grid connection.

6.2.1 Construction Phase

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Mitigation/Management Actions	Significance and Status		Confidence level
							Without Mitigation	With Mitigation	
Impacts on vegetation and listed or protected plant species resulting from preconstructi on activities	Local	Long-Term	Low	Probable	Moderate	• No unauthorised access to the site. • No unauthorised site clearing or disturbance at the site without an ECO present. • The final development area should be surveyed for species suitable for search and rescue, which should be translocated prior to the commencement of construction activities. • Areas where exploration work is permissible should be clearly demarcated.	Medium-Low Negative	Low Negative	High

6.2.2 Operational Phase

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Mitigation/Management Actions	Significance and Status		Confidence level
The operation and presence of the facility may lead to negative impacts on avifauna as a result of electrocution or collisions with the associated power transmission infrastructure .	Local	Long-Term	Low	Probable	Moderate	• Ensure that all new lines are marked with bird flight diverters along their entire length, but particularly in areas where larger birds are likely to pass such as near drainage lines, dams or pans and hills. • All new power line infrastructure should be bird-friendly in configuration and adequately insulated (Lehman et al. 2007). • Any electrocution and collision events that occur should be recorded, including the species affected and the date. If repeated collisions occur within the same area, then further mitigation and avoidance measures may need to be implemented.	Medium-Low Negative	Low Negative	Moderate

6.3 CUMULATIVE IMPACTS

The following are the cumulative impacts that are assessed as being a likely consequence of the development.

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Mitigation/Management Actions	Significance and Status		Confidence level
							Without Mitigation	With Mitigation	
Reduced ability to meet conservation obligations & targets due to cumulative habitat loss	Regional	Long-Term	Low	Low	Moderate	• The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas. • An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland.	Medium-Low Negative	Low Negative	Moderate-High

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Mitigation/Management Actions	Significance and Status		Confidence level
							Without Mitigation	With Mitigation	
Impact on broad-scale ecological processes due to cumulative fragmentation of habitat	Regional	Long-Term	Medium	Moderate	Low	• Minimise the development footprint as far as possible. • Avoid impact to potential corridors such as the riparian corridor associated with the Helbrandkloofspruit.	Medium Negative	Low Negative	Moderate-High

6.4 No-Go Alternative

The no-go alternative would maintain the status quo with the site being used for extensive livestock production. This is a long-term sustainable activity and while there are some impacts associated with extensive livestock production, it has the advantage of maintaining the vegetation in a near-natural condition. As such, the majority of fauna are still able to use the site and most ecological processes are able to continue. The development of the site will certainly have an impact on the ecological value of the areas within the development footprint and biodiversity will be significantly lower than under the current situation. In addition, the development may also impact some broad-scale ecological processes which are little impacted under the current land-use. There are however no impacts associated with the development which are considered severe or of high overall significance and which would pose a red flag or fatal flaw for the development. Therefore the economic benefits and global ecological benefit of reduced carbon emissions associated with the development must be weighed up against the local-level ecological cost of the development. It is not the purpose of this study to make this value judgment suffice to say that there are some ecological costs associated with the development, but these are largely of local extent and with the suggested mitigation, would not compromise biodiversity at a broader scale.

6.5 Summary Assessment

The summary assessment for the RE Capital 3 Solar Project and the required grid connection is provided below in Table 4 and 5. It is only the construction-phase impacts that cannot be mitigated to a low level. The large amounts of noise and disturbance generated during construction are an unavoidable activity and little can be done to mitigate these impacts. The disturbance is however transient and during operation disturbance levels are likely to be lower and confined to the bounds of the facility. The footprint of the power line is low and with standard environmental good-practice, it is not likely to generate significant terrestrial impact. Avifaunal impacts associated with power lines are potentially high due to their cumulative impact, but there do not appear to be any reasons to indicate that the relatively short grid connection would generate a significant impact on avifauna given its location near to existing development and human disturbance.

Table 4. Summary assessment of the pre- and post-mitigation impacts associated with the development of the RE Capital 3 facility at Dyason's Klip.

Phase	Pre Mitigation	Post Mitigation
Preconstruction		
Loss of Vegetation and Listed Species	Medium-Low	Low
Faunal Impacts	Medium-Low	Low

Construction		
Loss of Vegetation and Listed Species	High	Medium
Faunal Impacts	Medium	Medium-Low
Increased Erosion	Medium	Low
Operation		
Alien Plant Invasion Risk	Medium	Low
Increased Erosion Risk	Medium	Low
Faunal Impacts	Medium	Low
Cumulative Impact		
Reduced ability to meet conservation obligations & targets	Medium-Low	Low
Impact on broad-scale ecological processes	Medium	Low

Table 5. Summary assessment of the pre- and post-mitigation impacts associated with the grid connection required for the RE Capital 3 facility at Dyason's Klip.

Phase	Pre Mitigation	Post Mitigation
Construction		
Loss of Vegetation and Listed Species along power line route	Medium-Low	Low
Operation		
Avifaunal Impacts due to power lines	Medium-Low	Low

7 CONCLUSION & RECOMMENDATIONS

According to the national vegetation map, the proposed development is located within two vegetation types, Bushmanland Arid Grassland and Kalahari Karroid Shrubland, both of which have been little impacted by transformation and neither of which is of conservation concern. The site visit revealed that the national vegetation map is gross oversimplification of the situation at the site and does not represent a useful depiction of the vegetation patterns at the site. The majority of the site is however arid grassland corresponding to the Bushmanland Arid Grassland vegetation type and there are also some areas present which can be considered Kalahari Karroid Shrubland. These two vegetation types are however the end points of a spectrum and a large proportion of the site falls variously along a gradient between these two endpoints. Regardless, there is little to differentiate the ecological

sensitivity of these two vegetation units at a broad level and local features and characteristics are the overall determinant of the sensitivity patterns at the site. Specific sensitive features observed include the drainage lines, pans and some rocky outcrops. Of particular significance is the Helbrandkloofspruit which is the only large, well developed drainage line at the site, a large pan near the north western boundary of the site and some localised rocky and quartz outcrops.

There are however few significant ecological features within the proposed development footprint. There are several small pans present within the footprint, some of which have been modified to increase their water holder capacity. The ecological functioning of the modified pans has been compromised and they are not considered highly sensitive. There are however a few natural pans within the development area that would be affected by the development. This is a potentially highly significant impact due to the ecological sensitivity of pans. The affected pans are however very small and are not likely to represent important habitat for species which utilise such areas such as the Giant Bullfrog *Pyxicephalus adspersus*. Therefore, although their loss is considered undesirable, it is not considered highly significant given that such small pans are relatively abundant in the area and that there is a much larger more ecologically significant pan at the site, which would not be affected by the development.

Although some listed species such as *Acacia erioloba* and some protected species such as *Boscia foetida* and *Boscia albitrunca* are common at the site, *Acacia erioloba* and *Boscia albitrunca* are concentrated along the lower section of the Helbrandkloofspruit and few individuals would be threatened by the development. *Boscia foetida* is however more widespread and a relatively large number of individuals would be impacted by the development. This species is however one of the most common trees in the arid parts of the Northern Cape and their loss from the development area would not be considered highly significant. The majority of the site consists of arid grassland or grassy shrubland on open plains considered to be of moderate to low sensitivity. This habitat type forms the vast majority of the development footprint and as there are few listed or protected species present in these areas, the impacts on vegetation are likely to be relatively low.

It is also important to note that the final development footprint as depicted in this report is the result of an iterative process, refined as the results of the scoping studies and then the EIA studies became available to the developer. As such, the developer has been able to implement avoidance measures with regards to the location of the final development footprint in relation to the sensitive features of the site. This is the most important mitigation measure that can be implemented as it is the only totally effective manner of avoiding impact to sensitive features. As such the development footprint depicted here has been optimised based on this as well as the other specialist studies and is itself a mitigated design.

In terms of the likely ecological impacts associated with the development, impacts on vegetation and fauna during the construction phase are likely to be relatively high and are difficult to mitigate as little can be done to avoid the large amounts of disturbance associated with this phase of the development. This is however transient and disturbance levels during operation would be much lower. As the affected vegetation types are widespread and have been little impacted by transformation to date, the impact on vegetation is of locally high intensity, but is not considered to be of broader significance. Similarly, while there are likely to be some listed fauna utilising the site, these are widespread species and the development would not be likely to generate a significant impact on the populations of these species. Cumulative impacts are however certainly a concern given the abundance of other renewable energy developments in the area. However in the context of an arid, largely intact landscape, development within concentrated nodes is preferable to scattered development and as such, the proximity of the current development to other renewable energy developments is seen as a positive factor which reduces rather than increases the cumulative impact associated with the development.

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9 ANNEX 1. LIST OF MAMMALS

List of mammals which are likely to occur in the vicinity of the RE Capital 3 site. Habitat notes and distribution records are based on Skinner & Chimimba (2005), while conservation status is from the IUCN Red Lists 2013 and South African Red Data Book for Mammals.

Scientific Name	Common Name	Status	Habitat	Likelihood
Macroscledidea (Elephant Shrews):				
Macroscelides proboscideus	Round-eared Elephant Shrew	LC	Species of open country, with preference for shrub bush and sparse grass cover, also occur on hard gravel plains with sparse boulders for shelter, and on loose sandy soil provided there is some bush cover	High
Elephantulus rupestris	Western Rock Elephant Shrew	LC	Rocky koppies, rocky outcrops or piles of boulders where these offer sufficient holes and crannies for refuge.	Low
Tubulentata:				
Orycteropus afer	Aardvark	LC	Wide habitat tolerance, being found in open woodland, scrub and grassland, especially associated with sandy soil	Definite
Hyracoidea (Hyraxes)				
Procavia capensis	Rock Hyrax	LC	Outcrops of rocks, especially granite formations and dolomite intrusions in the Karoo. Also erosion gullies	Low
Lagomorpha (Hares and Rabbits):				
Lepus capensis	Cape Hare	LC	Dry, open regions, with palatable bush and grass	Definite
Lepus saxatilis	Scrub Hare	LC	Common in agriculturally developed areas, especially in crop-growing areas or in fallow lands where there is some bush development.	High
Rodentia (Rodents):				
Hystrix africaeaustralis	Cape Porcupine	LC	Catholic in habitat requirements.	Definite
Pedetes capensis	Springhare	LC	Occur widely on open sandy ground or sandy scrub, on overgrazed grassland, on the fringes of vleis and dry river beds.	High
Xerus inauris	South African Ground Squirrel	LC	Open terrain with a sparse bush cover and a hard substrate	Definite
Graphiurus ocularis	Spectacled Dormouse	LC	Associated with sandstones of Cape Fold mountains, which have many vertical and horizontal crevices.	Low
Rhabdomys pumilio	Four-striped Grass Mouse	LC	Essentially a grassland species, occurs in wide variety of habitats where there is good grass cover.	High
Mastomys coucha	Southern Multimammate Mouse	LC	Wide habitat tolerance.	High
Thallomys paedulcus	Acacia Tree Rat	LC	Associated with stands of Acacia woodland	Low
Thallomys nigricauda	Black-tailed Tree Rat	LC	Associated with stands of Acacia woodland	Low
Aethomys namaquensis	Namaqua Rock Mouse	LC	Catholic in their habitat requirements, but where there are rocky koppies, outcrops or boulder-strewn hillsides they use these preferentially	Definite
Parotomys brantsii	Brants' Whistling Rat	LC	Associated with a dry sandy substrate in more arid parts of the Nama-karoo and Succulent Karoo. Species selects areas of low percentage of plant cover and areas with deep sands.	High

Parotomys littledalei	Littledale's Whistling Rat	LC	Riverine associations or associated with Lycium bushes or Psilocaulon absimile	Low
Desmodillus auricularis	Cape Short-tailed Gerbil	LC	Tend to occur on hard ground, unlike other gerbil species, with some cover of grass or karroid bush	High
Gerbillurus paeba	Hairy-footed Gerbil	LC	Gerbils associated with Nama and Succulent Karoo preferring sandy soil or sandy alluvium with a grass, scrub or light woodland cover	High
Gerbilliscus leucogaster	Bushveld Gerbil	LC	Predominantly associated with light sandy soils or sandy alluvium	Low
Gerbilliscus brantsii	Higheld Gerbil	LC	Sandy soils or sandy alluvium with some cover of grass, scrub or open woodland	High
Saccostomus campestris	Pouched Mouse	LC	Catholic habitat requirements, commoner in areas where there is a sandy substrate.	High
Malacothrix typica	Gerbil Mouse	LC	Found predominantly in Nama and Succulent Karoo biomes, in areas with a mean annual rainfall of 150-500 mm.	High
Primates:				
Papio ursinus	Chacma Baboon	LC	Can exploit fynbos, montane grasslands, riverine courses in deserts, and simply need water and access to refuges.	Definite
Cercopithecus mitis	Vervet Monkey	LC	Most abundant in and near riparian vegetation of savannahs	Definite
Eulipotyphla (Shrews):				
Crocidura cyanea	Reddish-Grey Musk Shrew	LC	Occurs in relatively dry terrain, with a mean annual rainfall of less than 500 mm. Occur in karroid scrub and in fynbos often in association with rocks.	Low
Erinaceomorpha (Hedgehog)				
Atelerix frontalis	South African Hedgehog	SARDB VU	Generally found in semi-arid and subtemperate environments with ample ground cover	Moderate
Carnivora:				
Proteles cristata	Aardwolf	LC	Common in the 100-600mm rainfall range of country, Nama-Karoo, Succulent Karoo Grassland and Savanna biomes	Definite
Hyaena brunnea	Brown Hyaena	NT	Nama and Succulent Karoo and the drier parts of the Grassland and Savanna Biomes	Low
Caracal caracal	Caracal	LC	Caracals tolerate arid regions, occur in semi-desert and karroid conditions	High
Felis silvestris	African Wild Cat	LC	Wide habitat tolerance.	High
Felis nigripes	Black-footed cat	VU	Associated with arid country with MAR 100-500 mm, particularly areas with open habitat that provides some cover in the form of tall stands of grass or scrub.	High
Genetta genetta	Small-spotted genet	LC	Occur in open arid associations	High
Suricata suricatta	Meerkat	LC	Open arid country where substrate is hard and stony. Occur in Nama and Succulent Karoo but also fynbos	High
Cynictis penicillata	Yellow Mongoose	LC	Semi-arid country on a sandy substrate	Definite
Galerella sanguinea	Slender Mongoose	LC	Catholic habitat requirements but does not occur in the south.	Low
Herpestes pulverulentus	Cape Grey Mongoose	LC	Wide habitat tolerance	High

Atilax paludinosus	Marsh Mongoose	LC	Associated with well-watered terrain, living in close association with rivers, streams, marshes, etc.	Low
Vulpes chama	Cape Fox	LC	Associated with open country, open grassland, grassland with scattered thickets and coastal or semi-desert scrub	High
Canis mesomelas	Black-backed Jackal	LC	Wide habitat tolerance, more common in drier areas.	High
Otocyon megalotis	Bat-eared Fox	LC	Open country with mean annual rainfall of 100-600 mm	High
Aonyx capensis	African Clawless Otter	LC	Predominantly aquatic and do not occur far from permanenet water	Low
Ictonyx striatus	Striped Polecat	LC	Widely distributed throughout the sub-region	High
Mellivora capensis	Ratel/Honey Badger	IUCN LC/SA RDB EN	Catholic habitat requirements	High
Rumanantia (Antelope):				
Sylvicapra grimmia	Common Duiker	LC	Presence of bushes is essential	High
Raphicerus campestris	Steenbok	LC	Inhabits open country,	Definite
Chiroptera (Bats)				
Pipistrellus capensis	Cape Serotine Bat	LC	Wide habitat tolerances, but often found near open water	High
Tadarida aegyptiaca	Egyptian Free-tailed Bat	LC	In arid areas. often associated with water sources	High
Nycteris thebaica	Egyptian Slit-faced Bat	LC	Wide habitat tolerance	High
Rhinolophus denti	Dent's Horseshoe Bat	LC	Arid areas but require caves or rock crevices	High
Rhinolophus darlingi	Darling's Horsehoe Bat	LC	Savanna woodland species but requires caves	Low
Eidolon helvum	Straw-coloured fruit bat	LC	Occasional migratory visitors within southern Africa	Low

10 ANNEX 2. LIST OF REPTILES

List of reptiles which are likely to occur at the proposed RE Capital 3 Solar Energy Facility, based on the SARCA database, accessed December 2013.

Family	Genus	Species	Subspecies	Common name	Red list category
Agamidae	*Agama*	*aculeata*	*aculeata*	Common Ground Agama	Not Evaluated
Agamidae	*Agama*	*anchietae*		Anchieta's Agama	Not Evaluated
Agamidae	*Agama*	*atra*		Southern Rock Agama	Not Evaluated
Colubridae	*Boaedon*	*capensis*		Brown House Snake	Not Evaluated
Colubridae	*Dasypeltis*	*scabra*		Rhombic Egg-eater	Not Evaluated
Colubridae	*Dipsina*	*multimaculata*		Dwarf Beaked Snake	Not Evaluated
Colubridae	*Prosymna*	*frontalis*		Southwestern Shovel-snout	Not Evaluated
Colubridae	*Psammophis*	*trinasalis*		Fork-marked Sand Snake	Not Evaluated
Colubridae	*Telescopus*	*beetzii*		Beetz's Tiger Snake	Not Evaluated
Cordylidae	*Karusasaurus*	*polyzonus*		Karoo Girdled Lizard	Not Evaluated
Elapidae	*Aspidelaps*	*lubricus*	*lubricus*	Coral Shield Cobra	Not listed
Elapidae	*Naja*	*nivea*		Cape Cobra	Not Evaluated
Gekkonidae	*Chondrodactylus*	*angulifer*	*angulifer*	Common Giant Ground Gecko	Not Evaluated
Gekkonidae	*Chondrodactylus*	*bibronii*		Bibron's Gecko	Not Evaluated
Gekkonidae	*Chondrodactylus*	*turneri*		Turner's Gecko	Not Evaluated
Gekkonidae	*Lygodactylus*	*bradfieldi*		Bradfield's Dwarf Gecko	Not Evaluated
Gekkonidae	*Lygodactylus*	*capensis*	*capensis*	Common Dwarf Gecko	Not Evaluated
Gekkonidae	*Pachydactylus*	*latirostris*		Quartz Gecko	Not Evaluated
Gekkonidae	*Pachydactylus*	*punctatus*		Speckled Gecko	Not Evaluated
Gekkonidae	*Pachydactylus*	*purcelli*		Purcell's Gecko	Not Evaluated
Gekkonidae	*Ptenopus*	*garrulus*	*garrulus*	Common Barking Gecko	Not Evaluated
Gekkonidae	*Ptenopus*	*garrulus*	*maculatus*	Spotted Barking Gecko	Not Evaluated
Lacertidae	*Heliobolus*	*lugubris*		Bushveld Lizard	Not Evaluated
Lacertidae	*Meroles*	*suborbitalis*		Spotted Desert Lizard	Not Evaluated
Lacertidae	*Pedioplanis*	*inornata*		Plain Sand Lizard	Not Evaluated
Lacertidae	*Pedioplanis*	*namaquensis*		Namaqua Sand Lizard	Not Evaluated
Scincidae	*Acontias*	*kgalagadi*	*kgalagadi*	Striped Blind Legless Skink	Not Evaluated
Scincidae	*Acontias*	*lineatus*		Striped Dwarf Legless Skink	Not Evaluated
Scincidae	*Trachylepis*	*occidentalis*		Western Three-striped Skink	Not Evaluated

Scincidae	*Trachylepis*	*sparsa*		Karasburg Tree Skink	Not Evaluated
Scincidae	*Trachylepis*	*spilogaster*		Kalahari Tree Skink	Not Evaluated
Scincidae	*Trachylepis*	*striata*		Striped Skink	Not Evaluated
Scincidae	*Trachylepis*	*sulcata*	*sulcata*	Western Rock Skink	Not Evaluated
Scincidae	*Typhlosaurus*	*lineatus*		Striped Blind Legless Skink	Not listed
Testudinidae	*Psammobates*	*tentorius*	*subsp. ?*	Tent Tortoise (subsp. ?)	Not Evaluated
Testudinidae	*Psammobates*	*tentorius*	*verroxii*	Verrox's Tent Tortoise	Not listed
Typhlopidae	*Rhinotyphlops*	*schinzi*		Schinz's Beaked Blind Snake	Not Evaluated
Varanidae	*Varanus*	*niloticus*		Water Monitor	Not Evaluated
Viperidae	*Bitis*	*arietans*	*arietans*	Puff Adder	Not Evaluated

11 ANNEX 3. LIST OF AMPHIBIANS

List of amphibians which are likely to occur in the vicinity of the RE Capital 3 Site. Habitat notes and distribution records are based on Du Preez and Carruthers (2009), while conservation status is from the IUCN Red Lists 2013.

Scientific Name	Common Name	Status	Habitat	Distribution	Likelihood
Amietophrynus gutturalis	Guttural Toad	Not Threatened	Around open pools, dams, vleis and other semi-permanent or permenent water	Widespread	Low
Amietophrynus poweri	Western Olive Toad	Not Threatened	Around vleis and pans in thornveld savanna	Widespread	Low
Amietophrynus rangeri	Raucous Toad	Not Threatened	Rivers and stream in grassland and fynbos	Endemic	Low
Vandijkophrynus gariepensis	Karoo Toad	Not Threatened	Karoo Scrub	Widespread	High
Pyxicephalus adspersus	Giant Bullfrog	Near Threatened	Breed in shallow margins of rain-filled depressions.	Widespread	Low
Xenopus laevis	Common Platanna	Not Threatened	Any more or less permanent water	Widespread	High
Cacosternum boettgeri	Common Caco	Not Threatened	Marshy areas, vleis and shallow pans	Widespread	High
Amietia angolensis	Common River Frog	Not Threatened	Banks of slow-flowing streams or permanent bodies of water	Widespread	High
Tomopterna cryptotis	Tremelo Sand Frog	Not Threatened	Savanna and grassland	Widespread	High
Tomopterna tandyi	Tandy's Sand Frog	Not Threatened	Nama karoo grassland and savanna	Widespread	High

12 ANNEX 4. LIST OF BIRDS

List of birds which are likely to occur in the vicinity of the RE Capital 3 Solar Energy Project site. The list is derived from the SABAP 1 and 2 datasets and the South African conservation status from the list of threatened birds available from the Bird Life South Africa website, http://www.birdlife.org.za.

Family	*Species*	Status	Family	*Species*	Status
Alaudidae	*Calandrella cinerea*	LC	Alaudidae	*Calendulauda africanoides*	LC
Alaudidae	*Calendulauda sabota*	LC	Alaudidae	*Certhilauda curvirostris*	LC
Alaudidae	*Chersomanes albofasciata*	LC	Alaudidae	*Eremopterix australis*	LC
Alaudidae	*Eremopterix verticalis*	LC	Alaudidae	*Mirafra apiata*	LC
Alaudidae	*Spizocorys starki*	LC	Anatidae	*Alopochen aegyptiacus*	LC
Anatidae	*Anas capensis*	LC	Anatidae	*Anas erythrorhyncha*	LC
Anatidae	*Anas sparsa*	LC	Anatidae	*Anas undulata*	LC
Anatidae	*Dendrocygna viduata*	LC	Anatidae	*Plectropterus gambensis*	LC
Anatidae	*Tadorna cana*	LC	Anhingidae	*Anhinga rufa*	LC
Apodidae	*Apus affinis*	LC	Apodidae	*Apus apus*	LC
Apodidae	*Apus caffer*	LC	Apodidae	*Cypsiurus parvus*	LC
Bucerotidae	*Tockus leucomelas*	LC	Burhinidae	*Burhinus capensis*	LC
Capitonidae	*Tricholaema leucomelas*	LC	Caprimulgidae	*Caprimulgus rufigena*	LC
Charadriidae	*Charadrius hiaticula*	LC	Charadriidae	*Charadrius pecuarius*	LC
Charadriidae	*Charadrius tricollaris*	LC	Charadriidae	*Vanellus armatus*	LC
Charadriidae	*Vanellus coronatus*	LC	Ciconiidae	*Ciconia abdimii*	LC
Ciconiidae	*Ciconia ciconia*	LC	Ciconiidae	*Ciconia nigra*	NT
Coliidae	*Colius colius*	LC	Coliidae	*Urocolius indicus*	LC
Coraciidae	*Coracias caudatus*	LC	Corvidae	*Corvus albus*	LC
Cuculidae	*Chrysococcyx caprius*	LC	Dicruridae	*Dicrurus adsimilis*	LC
Estrildidae	*Amadina erythrocephala*	LC	Estrildidae	*Estrilda astrild*	LC
Estrildidae	*Granatina granatina*	LC	Estrildidae	*Lagonosticta senegala*	LC
Falconidae	*Falco biarmicus*	NT	Falconidae	*Falco chicquera*	LC
Falconidae	*Falco naumanni*	VU	Falconidae	*Falco peregrinus*	NT
Falconidae	*Falco rupicolus*	LC	Falconidae	*Falco rupicoloides*	LC
Falconidae	*Polihierax semitorquatus*	LC	Fringillidae	*Crithagra albogularis*	LC
Fringillidae	*Crithagra atrogularis*	LC	Fringillidae	*Crithagra flaviventris*	LC
Fringillidae	*Emberiza impetuani*	LC	Fringillidae	*Serinus alario*	LC
Glareolidae	*Cursorius rufus*	LC	Glareolidae	*Rhinoptilus africanus*	LC
Halcyonidae	*Alcedo cristata*	LC	Halcyonidae	*Ceryle rudis*	LC
Halcyonidae	*Megaceryle maximus*	LC	Hirundinidae	*Hirundo albigularis*	LC
Hirundinidae	*Hirundo cucullata*	LC	Hirundinidae	*Hirundo fuligula*	LC
Hirundinidae	*Hirundo rustica*	LC	Hirundinidae	*Riparia paludicola*	LC
Indicatoridae	*Indicator minor*	LC	Jacanidae	*Actophilornis africanus*	LC

Laniidae	*Lanius collaris*	LC	Laniidae	*Lanius minor*	LC
Laridae	*Chlidonias hybrida*	LC	Laridae	*Chlidonias leucopterus*	LC
Laridae	*Larus cirrocephalus*	LC	Malaconotidae	*Laniarius atrococcineus*	LC
Malaconotidae	*Nilaus afer*	LC	Malaconotidae	*Telophorus zeylonus*	LC
Meropidae	*Merops apiaster*	LC	Meropidae	*Merops hirundineus*	LC
Motacillidae	*Anthus cinnamomeus*	LC	Motacillidae	*Anthus similis*	LC
Motacillidae	*Motacilla aguimp*	LC	Motacillidae	*Motacilla capensis*	LC
Muscicapidae	*Batis pririt*	LC	Muscicapidae	*Bradornis infuscatus*	LC
Muscicapidae	*Bradornis mariquensis*	LC	Muscicapidae	*Muscicapa striata*	LC
Muscicapidae	*Sigelus silens*	LC	Muscicapidae	*Stenostira scita*	LC
Nectariniidae	*Cinnyris chalybeus*	LC	Nectariniidae	*Cinnyris fuscus*	LC
Numididae	*Numida meleagris*	LC	Otididae	*Ardeotis kori*	VU
Otididae	*Afrotis afra*	LC	Otididae	*Eupodotis vigorsii*	LC
Otididae	*Lophotis ruficrista*	LC	Otididae	*Neotis ludwigii*	VU
Paridae	*Parus cinerascens*	LC	Phalacrocoracidae	*Phalacrocorax africanus*	LC
Phalacrocoracidae	*Phalacrocorax carbo*	LC	Phasianidae	*Coturnix coturnix*	LC
Phoeniculidae	*Rhinopomastus cyanomelas*	LC	Picidae	*Campethera abingoni*	LC
Picidae	*Dendropicos fuscescens*	LC	Plataleidae	*Bostrychia hagedash*	LC
Plataleidae	*Platalea alba*	LC	Plataleidae	*Threskiornis aethiopicus*	LC
Podicipedidae	*Tachybaptus ruficollis*	LC	Psittacidae	*Agapornis roseicollis*	LC
Pteroclididae	*Pterocles namaqua*	LC	Pycnonotidae	*Pycnonotus nigricans*	LC
Rallidae	*Amaurornis flavirostris*	LC	Rallidae	*Fulica cristata*	LC
Rallidae	*Gallinula chloropus*	LC	Rallidae	*Porphyrio madagascariensis*	LC
Recurvirostridae	*Himantopus himantopus*	LC	Recurvirostridae	*Recurvirostra avosetta*	LC
Remizidae	*Anthoscopus minutus*	LC	Scolopacidae	*Actitis hypoleucos*	LC
Scolopacidae	*Calidris minuta*	LC	Scolopacidae	*Tringa glareola*	LC
Scolopacidae	*Tringa nebularia*	LC	Scopidae	*Scopus umbretta*	LC
Strigidae	*Bubo africanus*	LC	Strigidae	*Glaucidium perlatum*	LC
Strigidae	*Ptilopsus granti*	LC	Struthionidae	*Struthio camelus*	LC
Sturnidae	*Creatophora cinerea*	LC	Sturnidae	*Lamprotornis nitens*	LC
Sturnidae	*Onychognathus nabouroup*	LC	Tytonidae	*Tyto alba*	LC
Upupidae	*Upupa africana*	LC	Viduidae	*Vidua macroura*	LC
Zosteropidae	*Zosterops pallidus*	LC	SYLVIIDAE	*Acrocephalus baeticatus*	LC
SYLVIIDAE	*Acrocephalus gracilirostris*	LC	ACCIPITRIDAE	*Aquila pennatus*	LC
ACCIPITRIDAE	*Aquila verreauxii*	LC	ARDEIDAE	*Ardea cinerea*	LC
ARDEIDAE	*Ardea goliath*	LC	ARDEIDAE	*Ardea melanocephala*	LC
ARDEIDAE	*Bubulcus ibis*	LC	ACCIPITRIDAE	*Buteo rufofuscus*	LC
ACCIPITRIDAE	*Buteo vulpinus*	LC	TURDIDAE	*Cercomela familiaris*	LC
TURDIDAE	*Cercomela schlegelii*	LC	TURDIDAE	*Cercomela sinuata*	LC
TURDIDAE	*Cercomela tractrac*	LC	TURDIDAE	*Cercotrichas coryphoeus*	LC
TURDIDAE	*Cercotrichas paena*	LC	ACCIPITRIDAE	*Circaetus pectoralis*	LC

SYLVIIDAE	*Cisticola aridulus*	LC	SYLVIIDAE	*Cisticola juncidis*	LC
SYLVIIDAE	*Cisticola subruficapilla*	LC	SYLVIIDAE	*Cisticola tinniens*	LC
COLUMBIDAE	*Columba guinea*	LC	COLUMBIDAE	*Columba livia*	LC
TURDIDAE	*Cossypha caffra*	LC	ARDEIDAE	*Egretta alba*	LC
ARDEIDAE	*Egretta garzetta*	LC	ARDEIDAE	*Egretta intermedia*	LC
ACCIPITRIDAE	*Elanus caeruleus*	LC	SYLVIIDAE	*Eremomela icteropygialis*	LC
PLOCEIDAE	*Euplectes orix*	LC	ACCIPITRIDAE	*Haliaeetus vocifer*	LC
SYLVIIDAE	*Malcorus pectoralis*	LC	ACCIPITRIDAE	*Melierax canorus*	LC
ACCIPITRIDAE	*Melierax gabar*	LC	TURDIDAE	*Myrmecocichla formicivora*	LC
COLUMBIDAE	*Oena capensis*	LC	TURDIDAE	*Oenanthe monticola*	LC
TURDIDAE	*Oenanthe pileata*	LC	SYLVIIDAE	*Parisoma subcaeruleum*	LC
PLOCEIDAE	*Passer diffusus*	LC	PLOCEIDAE	*Passer domesticus*	LC
PLOCEIDAE	*Passer melanurus*	LC	PLOCEIDAE	*Philetairus socius*	LC
SYLVIIDAE	*Phragmacia substriata*	LC	PLOCEIDAE	*Plocepasser mahali*	LC
PLOCEIDAE	*Ploceus velatus*	LC	ACCIPITRIDAE	*Polemaetus bellicosus*	VU
SYLVIIDAE	*Prinia flavicans*	LC	PLOCEIDAE	*Quelea quelea*	LC
PLOCEIDAE	*Sporopipes squamifrons*	LC	COLUMBIDAE	*Streptopelia capicola*	LC
COLUMBIDAE	*Streptopelia semitorquata*	LC	COLUMBIDAE	*Streptopelia senegalensis*	LC
SYLVIIDAE	*Sylvietta rufescens*	LC	TURDIDAE	*Turdus olivaceus*	LC
ACCIPITRIDAE	*Milvus migrans*	LC	ACCIPITRIDAE	*Milvus aegyptius*	LC

SHORT CV OF CONSULTANT:

SUMMARY OF EXPERTISE

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- Profession: Ecological Consultant
- Specialisation: Plant & Animal Ecology
- Years of Experience: 15 Years

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

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

General Experience & Expertise

- Conducted a large number of fauna and flora specialist assessments distributed widely across South Africa, including a large number of renewable energy facilities. Projects have ranged in extent from <50 ha to more then 50 000 ha.
- Involved in all phases of renewable energy development, from ecological prefeasibility studies to pre-construction walk-through.
- Widely-recognized ecology specialist. Published numerous peer-reviewed scientific publications based on various ecological studies across the country. Past chairman of the Arid Zone Ecology Forum and current executive committee member.
- Extensive experience in the field and exceptional level of technical expertise, particularly with regards to GIS capabilities which is essential with regards to producing high-quality sensitivity maps for use in the design of final project layouts.
- Strong research background which has proved invaluable when working on several ecologically sensitive and potentially controversial sites containing some of the most threatened fauna in South Africa.
- Published numerous research reports as well as two book chapters and a large number of papers in leading scientific journals dealing primarily with human impacts on the vegetation and ecology of the arid and semi-arid parts of South Africa.
- Maintain several long-term vegetation monitoring projects distributed across Namaqualand and the karoo.
- Guest lecturer at two universities and have also served as an external examiner.
- Reviewed papers for more than 10 international ecological journals.
- Past chairman and current committee member of the Arid Zone Ecological Forum.
- SACNASP registered as a Professional Natural Scientist, (Ecology) No. 400425/11.

A selection of recent work is as follows:

Specialist Assessments:

Wind Farm Developments:

Proposed Spitskop Wind Energy Facility: Fauna & Flora Specialist Study For Impact Assessment. Savannah Environmental 2013.

Proposed Mainstream South Africa Springfontein Wind Energy Facility: Terrestrial Fauna & Flora Specialist Study for EIA. Savannah Environmental 2012.

Environmental Impact Assessment for the Establishment of the Wolseley Wind Farm, Western Cape Province. Fauna & Flora Specialist Report. Arcus Gibb 2012.

Proposed Eskom 300MW Kleinsee Wind Energy Facility. Fauna Specialist Report For Impact Assessment. Savannah Environmental 2012.

Proposed Inca Energy Swellendam Wind Energy Facility: Fauna Specialist Report For Impact Assessment. Savannah Environmental 2012.

Proposed Moorreesburg Wind Energy Facility: Fauna & Flora Specialist Scoping Report For Impact Assessment. Savannah Environmental 2012.

Terrestrial Ecology Specialist Study for the Proposed Establishment of a Renewable Energy Facility near Sutherland, Western and Northern Cape Provinces. Environmental Resources Management (ERM) 2011.

Roggeveld Wind Farm: Ecological and Biodiversity Assessment: Terrestrial Vertebrate Fauna & Botanical Specialist Study. Specialist Report for Environmental Resources Management (ERM). 2011.

Zen Wind Energy Facility. Fauna & Flora Specialist Impact Assessment Report. Savannah Environmental. 2012.

Proposed Project Blue Wind and Solar Energy Facility, Near Kliensee. Fauna Specialist Report For Impact Assessment. Savannah Environmental 2012.

Garob Wind Farm: Fauna & Flora Specialist Report for Impact Assesment. Savannah Environmental 2012.

Loeriesfontein Wind Energy Facility – Substation & Grid Connection. Fauna & Flora Specialist Report for Basic Assessment. Savannah Environmental 2012.

Noblesfontein Wind Energy Facility, Victoria West. Ecological Walk-Through Report. Savannah Environmental 2012.

Gouda Wind Energy Facility. Fauna And Flora Walk Through Report. Savannah Environmental 2012.

Noblesfontein Wind Energy Facility, Victoria West. Ecological Walk-Through Report. Savannah Environmental 2012.

Klawer Wind Farm: Ecological and Biodiversity Assessment: Terrestrial Vertebrate Fauna & Botanical Specialist Study. Specialist Report for Environmental Resources Management. 2011.

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Solar Energy Developments:

Specialist Vegetation Assessment for EIA. The Proposed Commercial Concentrated Solar Power Tower Facility and Concentrated Photovoltaic Facility at Van Roois Vley Near Upington. WSP 2012.

Proposed Photovoltaic Solar Energy Facility on Konkoonsies, Northern Cape: Fauna & Flora Specialist Report for Impact Assessment. EScience Associates 2012.

Proposed Padrooi 13 Photovoltaic Solar Energy Facility, Northern Cape: Fauna & Flora Specialist Report for Impact Assessment. EScience Associates 2012.

Adams Photovoltaic Solar Energy Facility, Northern Cape: Fauna & Flora Specialist Report for Impact Assessment. EScience Associates 2012.

Proposed Photovoltaic Solar Energy Facility on Klein Swart Bast, Northern Cape: Fauna & Flora Specialist Report for Impact Assessment. EScience Associates 2012.

Proposed Khoi-Sun Solar Facility. Fauna & Flora Specialist Report for Impact Assessment. Cape EAPrac 2012.

Suurwater 62, Boesmanland 75mw Solar Farm, Aggeneys. Fauna & Flora Specialist Report for Impact Assessment. Cape EAPrac 2012.

Karoshoek Solar Valley Development, Upington: Fauna & Flora Specialist Impact Assessment Report. Savannah Environmental. 2012.

O'Kiep 3 PV Solar Energy Facility on a Site In O'kiep Near Springbok, Northern Cape Province. Fauna & Flora Specialist Report for Basic Assessment. Savannah Environmental 2012.

Photovoltaic Solar Energy Facility on Voëlklip, South of Springbok. Fauna & Flora Specialist Report for Basic Assessment. Savannah Environmental 2012.

Namaqua Photovoltaic Solar Energy Facility on a Site North of Kamieskroon. Fauna & Flora Specialist Report for Basic Assessment. Savannah Environmental 2012.

Inca Graafwater Photovoltaic Solar Energy Facility, Graafwater, Western Cape Province. Faunal Ecology Specialist Report for Impact Assessment. Savannah Environmental 2012.

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Venetia Solar Facility. Fauna & Flora Specialist Report for Basic Assessment. Specialist Report for Savannah Environmental. 2012.

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Tutwa Solar Energy Facility: Portion 4 of Narries 7. Fauna & Flora Specialist Report for Basic Assessment. Specialist Report for Savannah Environmental. 2012.

Valleydora Photovolataic Solar Power Plant, Free State. Fauna & Flora Specialist Report. CSIR, 2012.

Reddersburg Solar Facility - Fauna & Flora Specialist Assessment. CSIR, 2012.

Melkvlei Photovolataic Solar Power Plant. Fauna & Flora Specialist Report for Basic Assessment. Specialist report for ERM. 2012.

Ruinte Photovolataic Solar Power Plant. Fauna & Flora Specialist Report for Basic Assessment. Specialist report for ERM. 2012.

Genoegsaam Solar Park. Fauna & Flora Specialist Report for Basic Assessment. Specialist report for ERM. 2012.

Genoegsaam Solar Park. Fauna & Flora Specialist EIA Report. Specialist report for ERM. 2012.

Graspan Solar Facility. Fauna & Flora Specialist Report for Impact Assessment. Specialist report for ERM. 2012.

Olyven Kolk Solar Power Plant, Northern Cape: Botanical and Faunal Specialist Assessment. Specialist Report for Environmental Resources Management (ERM). 2011.

Skuitdrift Solar Facility. Fauna & Flora Specialist Report for Basic Assessment. Specialist Report for Cape EAPrac. 2012.

Beaufort West Solar Facility, Erf 7388 - Fauna & Flora Specialist Assessment. Specialist Report for Cape EAPrac. 2012.

Khoi-Sun Solar Facility. Fauna & Flora Specialist Scoping Report. Specialist Report for Cape EAPrac. 2012.

Boesmanland Solar Farm. Fauna & Flora Specialist Scoping Study. Specialist Report for Cape EAPrac. 2012.

Bitterfontein Solar Plant - Fauna & Flora Specialist Assessment. Specialist Report for Cape EAPrac. 2012.

Power Lines/Grid Connections:

Karoshoek Grid Integration Infrastructure. Fauna & Flora Specialist Report for Basic Assessment. Specialist Report for Savannah Environmental. 2012.

Garob to Kronos Power Line - Fauna & Flora Specialist Report for Basic Assessment. Specialist Report for Savannah Environmental. 2012.

Loeriesfontein Wind Energy Facility – Substation & Grid Connection. Fauna & Flora Specialist Report for Basic Assessment. Specialist Report for Savannah Environmental. 2012.

Gouda Wind Energy Facility – Grid Connection. Walk-Through of Overhead Power Line - Gouda WEF to Eskom Windmill Substation. Specialist Report for Savannah Environmental. 2012.

Proposed Kappa-Omega 765 KV Transmission Line. Fauna, Flora & Ecology Walk-Through Report. Specialist Report for ACER Africa. 2013.

Infrastructure/Mining Developments:

Proposed Establishment of the Gamsberg Zinc Mine, Concentrator Plant and Associated Infrastructure near the Town of Aggeneys, Northern Cape. Fauna & Flora Specialist Report For ESIA. ERM 2013.

Pella Water Board – Infrastructure Upgrade. Fauna & Flora Specialist Report for Basic Assessment. Environmental Resources Management 2012.

Transnet Manganese Ore Line Upgrade. Fauna & Flora Specialist Report for Basic Assessment. Environmental Resources Management 2012.

Proposed Mamatwane Compilation Yard, Northern Cape: Fauna & Flora Specialist Report for Impact Assessment. Environmental Resources Management 2013.

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Improvements to the Ou Kaapse Weg / Silvermine Road Intersection. Specialist Faunal Study For Basic Assessment. Khula Environmental Consultants, 2012.

Upgrading of Tourism Facilities at Goegap Nature Reserve. Specialist Ecological Assesment. Van Zyl Environmental Consultants. 2012.

Plant Sweeps on Portion 2 of the Farm Demaneng 546, Kuruman District, Northern Cape Province for SA Manganese. 2011.

Strategy/Conceptual Documents:

Renewable Energy Sector Spatial Planning Tool: To Form Part of the NDM Green Economy Strategy. Conservation South Africa, 2013.

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