ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED HOTAZEL SOLAR PV FACILITY AND ASSOCIATED INFRASTRUCTURE, HOTAZEL, NORTHERN CAPE:

FAUNA & FLORA SPECIALIST EIA REPORT

Cape EAPrac

PRODUCED FOR CAPE EAPRAC

BY

3Foxes Biodiversity Solutions

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EXECUTIVE SUMMARY

ABO Wind Hotazel PV (Pty) Ltd is proposing the establishment of a 100 MW commercial photovoltaic solar energy facility, called Hotazel Solar, on the Remaining Extent (Portion 0) of the farm York A 279, situated in the District of Hotazel in the Northern Cape Province. The development is currently in the EIA Phase and 3Foxes Biodiversity Solutions has been appointed to provide a specialist terrestrial biodiversity EIA study of the development site as part of the EIA process.

A full field assessment as well as a desktop review of the available ecological information for the area was conducted in order to identify and characterise the ecological features of the site. The site falls within the Kathu Bushveld vegetation type, which is a relatively localised vegetation type for an arid area, but has not been significantly impacted by transformation and is classified as Least Threatened. The site has a high abundance of *Acacia erioloba* and *Acacia haematoxylon*, which are protected tree species. *Acacia haematoxylon* is particularly common and approximately 2000-6000 individuals would potentially be lost as a result of the development. The extent to habitat loss (275 ha) associated with the development is however not seen as being highly significant for this species and as such no additional specific mitigation in this regard is considered necessary.

Cumulative impacts associated with the development are a concern given the development pressure in the wider Hotazel-Kathu area. The loss of 275ha of habitat associated with the development is however not considered highly significant given the spatial context of the site adjacent to mining, railway and road footprint areas. In terms of potential losses to landscape connectivity, the location of the site in an impacted area indicates that it is not likely an area that is important for faunal movement. As such, the overall cumulative impact of the development is considered likely to be low. This is supported by the fact that the area does not fall within a CBA or within a national or provincial protected area expansion strategy focus area.

There is no significant difference between the PV footprint development alternatives and both would result in similar ecological impact. As such, the preferred alternative, Alternative 2 is supported from an ecological perspective. The on-site grid connection options with the loop-in loop-out connection to the 132kV line that traverses the site are preferable to the 6km connection to the Hotazel substation as the former would generate minimal ecological impact. There are no impacts associated with the development that are considered to be of high significance and which cannot be mitigated to an acceptable level.

Impact Statement

The development footprint of the Preferred Alternative 2 Hotazel Solar facility is restricted largely to moderately sensitive habitat typical of the wider Hotazel area. The affected area is considered suitable for development and there are no impacts associated with the Hotazel

Solar facility that cannot be mitigated to a low level. As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, the Hotazel Solar facility can be supported from a terrestrial ecology point of view. The Hotazel Solar Grid Connection with associated infrastructure is likely to generate low impacts on fauna and flora after mitigation. No high impacts that cannot be avoided were observed and from a flora and terrestrial fauna perspective, there are no reasons to oppose the development of the grid connections and associated infrastructure.

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COMPLIANCE WITH APPENDIX 6 OF THE 2014 EIA REGULATIONS, AS AMENDED

Requirements of Appendix 6 – GN R326 2014 EIA Regulations, 7 April 2017	**Addressed in the Specialist Report**
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b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	6
c) an indication of the scope of, and the purpose for which, the report was prepared;	7-11
(cA) an indication of the quality and age of base data used for the specialist report;	11-12
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	12-26
d) the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	12
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g) an identification of any areas to be avoided, including buffers;	25-26
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i) a description of any assumptions made and any uncertainties or gaps in knowledge;	13-14
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k) any mitigation measures for inclusion in the EMPr;	30-35
l) any conditions for inclusion in the environmental authorisation;	
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	
n) a reasoned opinion- i. whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	35-36
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	See Main Report
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	See Main Report
q) any other information requested by the competent authority.	
2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	N/A

SHORT CV/SUMMARY OF EXPERTISE – SIMON TODD

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

A selection of recent work is as follows:

Strategic Environmental Assessments

Co-Author. Chapter 7 - Biodiversity & Ecosystems - Shale Gas SEA. CSIR 2016.
Co-Author. Chapter 1 Scenarios and Activities – Shale Gas SEA. CSIR 2016.
Co-Author – Ecological Chapter – Wind and Solar SEA. CSIR 2014.
Co-Author – Ecological Chapter – Eskom Grid Infrastructure SEA. CSIR 2015.
Contributor – Ecological & Conservation components to SKA SEA. CSIR 2017.

Recent Specialist Ecological Studies in the Vicinity of the Current Site

- Kathu Solar PV Facility. Fauna and Flora EIA Process. Cape EAPrac 2015.
- Mogobe Solar PV Facility. Fauna and Flora EIA Proces. Cape EAPrac 2015.
- Logoko Solar PV Facility. Fauna and Flora EIA Proces. Cape EAPrac 2015.
- RE Capital 10 Solar Power Plant, Postmasburg. Fauna and Flora EIA Proces. Cape EAPrac 2015.
- Walk-through study of Kumba Iron Ore expansion area at Dingleton, Northern Cape. MSA Group. 2017.
- Adams PV Project – EIA process and follow-up vegetation survey. Aurora Power Solutions. 2016.
- Mamatwane Compilation Yard. Fauna and Flora EIA process. ERM. 2013.
- Olifantshoek-Emil 132kV power line. Fauna and Flora BA process. Savannah Environmental 2017.

SPECIALIST DECLARATION

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

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

Signature of the specialist: 

Name of Specialist: ____Simon Todd_____

Date: ____24 July 2018_____

1 INTRODUCTION

ABO Wind Hotazel PV (Pty) Ltd is proposing the establishment of a commercial photovoltaic solar energy facility, called Hotazel Solar, on the farm known as the Remaining Extent (Portion 0) of the farm York A 279, situated in the District of Hotazel in the Northern Cape Province. Hotazel Solar will have a net generating capacity of 100 MW_{AC} with an estimated maximum footprint of ± 275 ha. ABO Wind Hotazel PV (Pty) Ltd has appointed Cape EAPrac to undertake the required application for environmental authorisation process for the above development. The development is currently in the EIA Phase and ABO Wind Hotazel PV (Pty) Ltd has appointed 3Foxes Biodiversity Solutions to provide a specialist terrestrial ecology EIA study of the development site as part of the EIA process.

The purpose of the Hotazel Solar Terrestrial Biodiversity EIA Phase Report is to describe and detail the ecological features of the proposed PV project site, provide an assessment of the ecological sensitivity of the site, and identify the likely impacts associated with the development of the site as a solar PV facility. Several site visits as well as a desktop review of the available ecological information for the area were conducted in order to identify and characterise the ecological features of the site. This information is used to derive an ecological sensitivity map which has been used to inform the layout of the development. Impacts are assessed for the preconstruction, construction, operation, and decommissioning phases of the development. A variety of avoidance and mitigation measures associated with each identified impact are recommended to reduce the likely impact of the development, which should be included in the EMPr for the development. The full scope of study is detailed below.

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 environment 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.

- Identify recommendations for mitigatory measures to minimise impacts.
- Outline 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

1.1 ASSESSMENT APPROACH & PHILOSOPHY

This assessment is conducted according to the 2014 EIA Regulations (Government Notice Regulation 982) in terms of the National Environmental Management Act (Act 107 of 1998) as amended (NEMA), as well as 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 (RDB) 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.

1.2 RELEVANT ASPECTS OF THE PROPOSED DEVELOPMENT

The proposed development site is located on the Remaining Extent (Portion 0) of the farm York A 279, situated in the District of Hotazel in the Northern Cape Province (Figure 1). Hotazel Solar is to consist of solar photovoltaic (PV) technology with fixed, single or double

axis tracking mounting structures, with a net generation (contracted) capacity of 100 MW_{AC}, as well as associated infrastructure, which will include:

- On-site switching-station / substation;
- Auxiliary buildings (gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Inverter-stations, transformers and internal electrical reticulation (underground cabling);
- Access and internal road network;
- Laydown area;
- Overhead 132kV electrical transmission line / grid connection connecting to the authorised Hotazel substation;
- Rainwater tanks; and
- Perimeter fencing and security infrastructure.

Figure 1. Satellite image of the Hotazel Solar study site, illustrating the Alternative 1 in yellow and Alternative 2 in orange, as well as the power line alternatives.

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 & Rutherford 2006 and 2012 Powrie update) as well as the National List of Threatened Ecosystems (2011), where relevant.
- Information on plant species recorded for the broad area around the site was extracted from the SANBI POSA database hosted by SANBI. The species list was derived from a considerably larger area than the study site, but this is necessary to ensure a conservative approach as well as counter the fact that the site itself or the immediate area has not been well sampled in the past.
- The IUCN conservation status of the species in the list was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants (2018).

Ecosystem

- Critical Biodiversity Areas (CBAs) were extracted from the Northern Cape Critical Biodiversity Areas Map (Oosthuysen & Holness 2016).
- 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 Animal Demography Unit (ADU) Virtual Museum spatial database (http://vmus.adu.org.za/).
- 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 fauna was extracted from the ADU web portal 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 mammals is based on the IUCN Red List Categories (EWT/SANBI 2016), while reptiles are based on the South African Reptile Conservation Assessment (Bates et al. 2013) and amphibians on Minter et al. (2004) as well as the IUCN (2018).

2.2 SENSITIVITY MAPPING & ASSESSMENT

An ecological sensitivity map of the site was produced by integrating the available ecological and biodiversity information available in the literature and various spatial databases with mapping based on the satellite imagery of the site as well as personal knowledge of the site. This includes delineating different habitat units identified on the satellite imagery and assigning likely 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:

Sensitivity	Description
Low	Units with a low sensitivity where there is likely to be a low impact on ecological processes and terrestrial biodiversity. This category represents transformed or natural areas where the impact of development is likely to be local in nature and of low significance with standard mitigation measures.
Medium	Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impacts such as erosion low. 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. 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/No-Go	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.

2.3 SAMPLING LIMITATIONS AND ASSUMPTIONS

The current study consisted of a detailed field assessment as well as a desktop study, which serves to significantly reduce the limitations and assumptions required for the study. For the current assessment, the vegetation was in an excellent condition for sampling at the time of the field assessment with the result that there are few limitations with regards to the vegetation sampling and the timing of the site visit. The plant species lists obtained from the field assessment are therefore considered comprehensive and reliable.

In terms of fauna, a number of activities and steps have been taken to obtain a reliable indication of the faunal community in the area. Sherman trapping for small mammals was

conducted at the site in order to better characterise the small mammal community and while the sampling period was short, this provides a reliable insight into the dominant species present. Camera trapping was conducted at the site over several days and nights. Although this was a short period, it nevertheless provides an insight into the common species present at the site. Apart from the active searches that were conducted for reptiles and amphibians during the current study, additional species presence is inferred based on results obtained from the previous studies the consultant has conducted in the area. However, many fauna are difficult to observe in the field and their potential presence at the site is evaluated based on the literature and available databases. Many remote areas have not been well-sampled in the past with the result that the species lists derived from the available spatial databases for the area do not always adequately reflect the actual fauna present at the site. This is acknowledged as a limitation of the study however it is substantially reduced by the previous experience in the area. In order to further reduce this limitation, and ensure a conservative approach, the species lists derived for the site from the literature were obtained from an area significantly larger than the study site and are likely to include a much wider array of species than actually occur at the site. This is a cautious and conservative 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), the site is restricted to the Kathu Bushveld vegetation type. This vegetation unit occupies an area of 7 443 km^2 and extends from around Kathu and Dibeng in the south through Hotazel and to the Botswana border between Van Zylsrus and McCarthysrus. In terms of soils the vegetation type is associated with aeolian red sand and surface calcrete and deep sandy soils of the Hutton and Clovelly soil forms. The main land types are Ah and Ae with some Ag. The Kathu Bushveld vegetation type is still largely intact and less than 2% has been transformed by mining activity and it is classified as Least Threatened. It is however, poorly conserved and does not currently fall within any formal conservation areas. Although no endemic species are restricted to this vegetation type a number of Kalahari endemics are known to occur in this vegetation type such as *Acacia luederitzii* var *luederitzii, Anthephora argentea*, *Megaloprotachne albescens*, *Panicum kalaharense* and *Neuradopsis bechuanensis*. It is more fully described as it occurs at the site in the next section. Other vegetation types that occur in the immediate area include Kuruman Thornveld to the east and Gordonia Duneveld to the west, neither of which is of conservation concern or occur within the site.

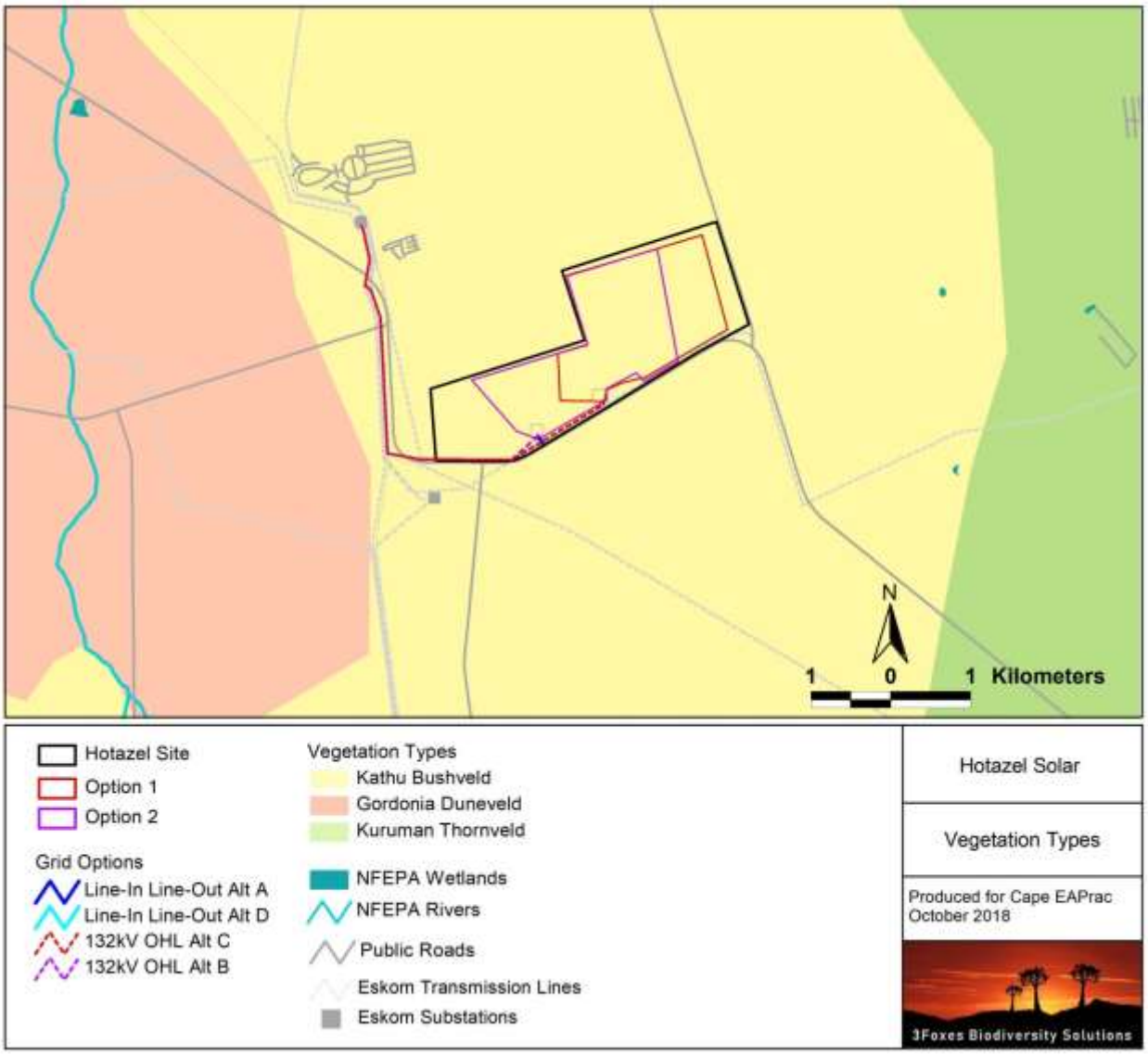

Figure 2. Broad-scale overview of the vegetation in and around the Hotazel Solar site. The vegetation map is an extract of the national vegetation map as produced by Mucina and Rutherford (2006/2012), and also includes wetlands delineated by the NFEPA assessment (Nel et al. 2011).

3.2 HABITATS & PLANT COMMUNITIES

The vegetation of the site consists of Bushveld with a well-developed grass layer and a variable-density tree layer. A feature of the site that is also clearly visible from the satellite imagery of the site are the *Acacia mellifera* bush clumps that occur across the site. As this is a bush encroaching species, this is considered to represent a symptom of degradation and the aggregations of trees are not considered sensitive. Apart from the *Acacia mellifera* bush clumps, *Acacia erioloba* and *Acacia haematoxylon* are also dominant species across large

parts of the site and are particularly dense in the western section of the site. The grass layer is fairly homogenous across the site and there is not a lot a variation in the grass layer which can be ascribed to the sandy substrate. Apart from the above dominant trees, other common woody species present at the site include *Zizyphus mucronata*, *Gymnosporia buxifolia*, *Acacia mellifera* subsp. *detinens*, *Searsia ciliata*, *Ehretia rigida* subsp. *rigida*, *Diospyros lycioides* subsp. *lycioides* and *Grewia flava*. The grass layer is dominated by *Schmidtia pappophoroides*, *Aristida meridionalis, Aristida stipitata* subsp. *stipitata*, *Stipagrostis uniplumis* var. *uniplumis*, *Stipagrostis obtusa*, *Cynodon dactylon, Enneapogon desvauxii, Eragrostis lehmanniana* and Aristida *congesta* subsp. *congesta*. The density and diversity is shrubs is fairly low but includes *Asparagus laricinus*, *Asparagus retrofractus*, *Felicia muricata* subsp. c*inerascens*, *Pentzia calcarea*, *Acacia hebeclada*, *Hermannia tomentosa*, *Gnidia polycephala* and *Lantana rugosa*. Due to the good rains preceding the site visit, forbs were abundant and included *Dicoma schinzii*, *Geigeria ornativa*, *Elephantorrhiza elephantina*, *Indigofera daleoides* var. *daleoides* and *Gisekia pharnacioides* var. *pharnacioides*.

Figure 3. The western margin of the site, showing the high density of trees in this area with dense *Acacia mellifera* in the foreground and *Acacia haematoxylon* in the distance with occasional *Acacia erioloba*. This part of the site is not within the development footprint of either PV footprint option.

Figure 4. Typical vegetation of the site with the low *Acacia hebeclada* in the foreground and numerous *Acacia haematoxylon* throughout the area.

Figure 5. Example of more open veld from near the centre of the site, showing more open grassland with occasional *Acacia haematoxylon* and *Acacia mellifera*.

3.3 LISTED AND PROTECTED PLANT SPECIES

Two NFA-protected tree species occur at the site, *Acacia erioloba* and *Acacia haematoxylon*. The density of both species is fairly high across the site and it would not be possible to avoid impact on these species. Although *Acacia erioloba* has a higher density in some parts of the site, *Acacia haematoxylon* is widely distributed across the site and there are no areas where this species does not occur to some degree. The density of *Acacia haematoxylon* at the site varies from less than 10 trees/ha to approximately 30 trees/ha in the higher density areas. As a result, several thousand trees would likely be lost as a result of the development. This species is however very common in the area and their loss from the development area would not compromise the local population. Devils' Claw *Harpagophytum procumbens* is common at the site, especially in the west, but is widely distributed and would not be significantly affected by the development.

Figure 6. Devils' Claw is common at the site, especially in the west of the site.

3.4 FAUNAL COMMUNITIES

3.4.1 Mammals

The mammalian community at the site is likely to be of moderate diversity; although more than 50 species of terrestrial mammals are known from the wider area, the extent and

habitat diversity of the site is too low to support a very wide range of mammals. Species observed or otherwise confirmed present at the site (Figure 7, Figure 8) include Aardvark, Cape Porcupine, Springhare, South African Ground Squirrel, Scrub hare, Vervet Monkey, Small-spotted Genet, Yellow Mongoose, Slender Mongoose, Black-Backed Jackal, Steenbok, Duiker and Kudu. Small mammals trapped in the area on the current or previous site visits include Desert Pygmy Mouse *Mus indutus*, Multimammate Mouse *Mastomys coucha*, Bushveld Gerbil *Tatera leucogaster*, Hairy footed Gerbil *Gerbillurus paeba*, Pouched Mouse *Saccostomus campestris* and Grey Climbing Mouse *Dendromus melanotis*.

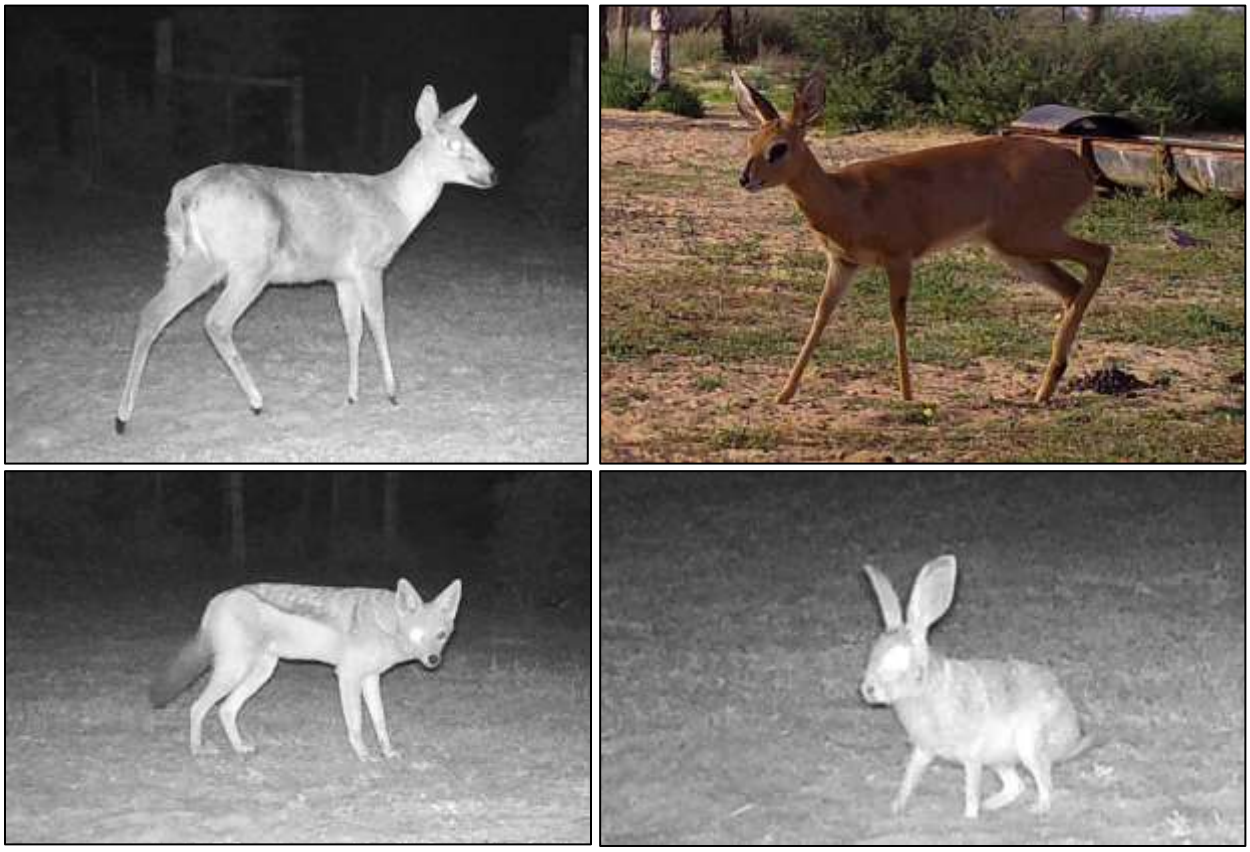

Figure 7. Species observed with the camera traps at the site include from top left, Duiker, Steenbok, Black-backed Jackal and Scrub Hare.

Six listed terrestrial mammal species potentially occur in the area; these are the Brown Hyaena *Hyaena brunnea* (Near Threatened), Black-footed Cat *Felis nigripes* (Vulnerable), Leopard *Panthera pardus* (VU), Ground Pangolin *Smutsia temminckii* (Vulnerable), South African Hedgehog *Atelerix frontalis* (Vulnerable). The Leopard and Brown Hyaena are not likely to occur in the area on account of the agricultural land-use in the area which is not usually conducive to the persistence of large carnivores. The Black-footed Cat is a secretive species which occurs across most of the Northern Cape and as such is likely to be present in the broad area given that the habitat is seen as broadly suitable. The Hedgehog and

Ground Pangolin may also occur in the area at typically low density. Given the extensive national ranges of these species, the impact of the development on habitat loss for these species would be minimal and a long-term impact on these species would be unlikely.

Figure 8. Small mammals observed at the site include from top left, Pouched Mouse, Hairy-footed Gerbil and Bushveld Gerbil.

3.4.2 Reptiles

The Hotazel site lies in or near the distribution range of more than 50 reptile species, although many of these are unlikely to occur at the site as it is restricted largely to sandy substrate and does not include rocky habitat or other habitats that are important for reptiles (Appendix 3). No species of conservation concern are known to occur in the area. The habitat diversity within the study area is relatively low with the result that the number of reptile species present within the site is likely to be relatively low and only a proportion of the species known from the area are likely to be present on the site itself.

Species observed at the site or in the area in the past include Serrated Tent Tortoise *Psammobates oculifer (*Figure 9*)*, Cape Cobra *Naja nivea*, Ground Agama *Agama aculeata*, Spotted Sand Lizard *Pedioplanis lineoocellata*, Variable Skink *Trachylepis varia*, Bibron's Blind Snake *Afrotyphlops bibronii*, Western Rock Skink *Mabuya sulcata sulcata*, Cape Gecko *Lygodactylus capensis capensis*, Speckled Rock Skink *Trachylepis punctatissima*, Striped

Skaapsteker *Psammophylax tritaeniatus* and Boomslang *Dispholidus typus typus*. Impacts on reptiles are likely to be restricted largely to habitat loss within the development footprint. This is likely to be of local significance only as there are no very rare species or specialised habitats present within the footprint areas.

Figure 9. The Serrated Tent Tortoise *Psammobates oculifer* was observed at the site.

3.4.3 Amphibians

The site lies within or near the range of 10 amphibian species, indicating that the site potentially has a moderately diverse frog community for an arid area. There is no natural permanent water or artificial earth dams within the site that would represent suitable breeding habitat for most of these species. Given the paucity of permanent water at the site, only those species which are relatively independent of water are likely to occur in the area. Species observed in the area include Eastern Olive Toad *Amietophrynus garmani* and Bushveld Rain Frog *Breviceps adspersus*, both of which are likely to occur at the site. There is no standing water on the site that could be used by amphibians for breeding purposes.

The only species of conservation concern which occurs in the wider area is the Giant Bullfrog *Pyxicephalus adspersus*. The site lies at the margin of the known distribution of this species and it has not been recorded from any of the quarter degree squares around the site, suggesting that it is unlikely to occur at the site. Impacts on amphibians are however likely to be low and restricted largely to habitat loss during construction.

3.5 CRITICAL BIODIVERSITY AREAS & BROAD-SCALE PROCESSES

An extract of the Northern Cape Critical Biodiversity Areas map for the study area is depicted below in Figure 10. The site lies within an area classified as "Other natural areas" and is not classified as a CBA or ESA. There are no CBAs in close proximity to the site, indicating that the development does not pose a threat to any CBAs or other areas considered to be of significance from a broad-scale conservation planning perspective.

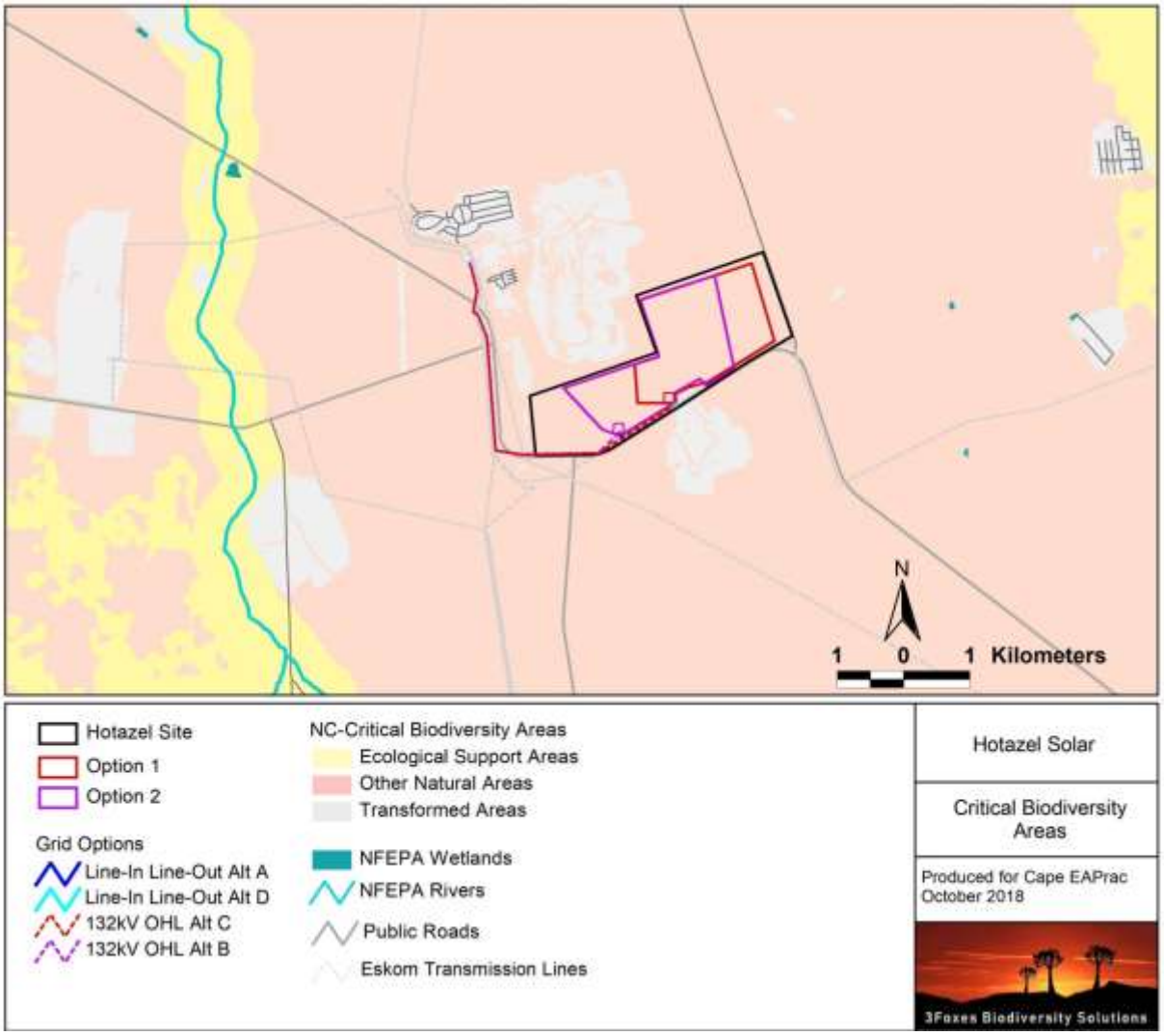

Figure 10. Extract of the Northern Cape Critical Biodiversity Areas map for the study area, showing that there are no CBAs in close proximity to the site.

3.6 CURRENT BASELINE & CUMULATIVE IMPACT

There are several other proposed PV facilities in the wider Hotazel area (Figure 11). The only constructed project is the 10MW Adams PV facility south of the site. In the wider area there are several constructed PV plants towards Kathu including the Kalahari Solar, Kathu Solar and Sishen Solar Farms. The total extent of the constructed plants in the wider area as far south as Kathu is approximately 1000ha. The already built solar power plants are considered to form part of the existing baseline for the area and represent existing impact. The 1000ha footprint of these is however small in comparison with the iron and manganese mines in the area, which with an existing footprint of at least 12 000ha are currently the major driver of habitat loss and transformation in the Kathu-Hotazel area. There are also several authorised developments in close vicinity to the Hotazel site, raising the potential for cumulative impact in the area. However, the overall development pressure in the wider area is still low and the proximity of the current development to Hotazel, the road and railway line as well as existing mine footprint areas suggests that the site is not likely to be of high significance for landscape connectivity. Consequently, the overall extent of cumulative impact due to the solar energy development in the area is seen to be relatively low and the contribution of the current development to cumulative impact is seen as low and of local significance only. The specific contribution of the current development is up to 275ha.

Figure 11. Map of DEA registered renewable energy applications as at July 2018.

3.7 SITE SENSITIVITY ASSESSMENT

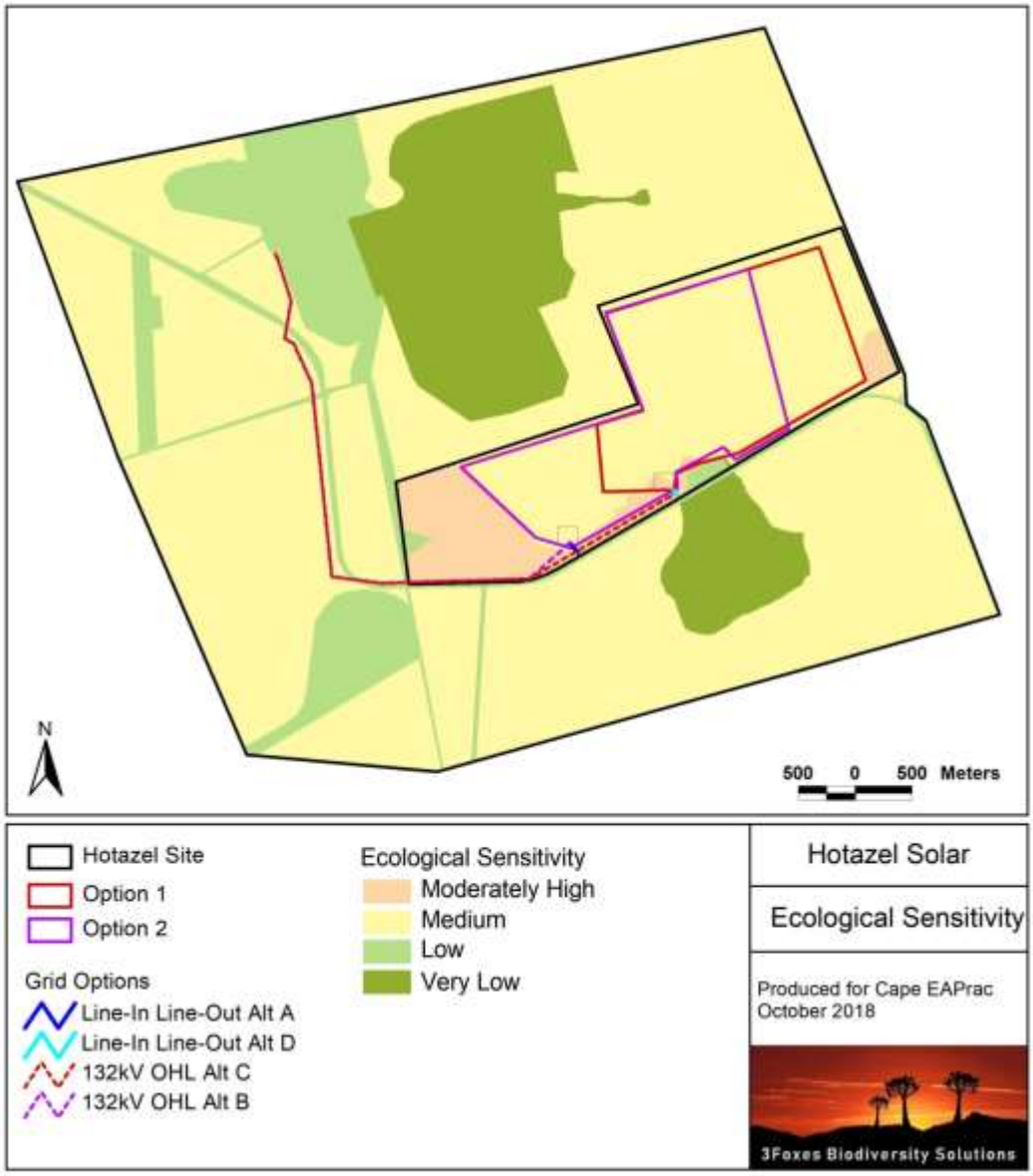

Figure 12. Sensitivity map for the Hotazel Solar project, showing the two alternatives.

The sensitivity map for the Hotazel study area is illustrated above in Figure 12. There is not a lot of variation in sensitivity across the site, with the main driver of differences being the density of protected tree such as *Acacia erioloba* and *Acacia haematoxylon*. The majority of the site is considered medium sensitivity and apart from the protected trees has a low abundance of other species or features of conservation concern. The west of the site as well as a small area in the eastern corner of the site are considered moderately high sensitivity on account of the high tree density in these areas. No no-go or very high sensitivity areas

were observed at the site and while it is considered broadly suitable for development, the potential impact on protected tree species is a concern. While it is pertinent to consider the number of individuals of protected trees impacted, the ultimate concern should be around the extent of habitat loss resulting from the development within habitats and vegetation types which support these species. When considered in this light, the 275ha of habitat loss is not considered to represent a large amount of habitat loss for *Acacia erioloba* and *Acacia haematoxylon* which are widely distributed and are the dominant species across large areas surrounding the study area. In terms of the two alternatives, these are not considered significantly different from an ecological perspective and either is considered acceptable.

4 IDENTIFICATION & NATURE OF IMPACTS

In this section, the potential impacts and associated risk factors that may be generated by the development are identified

4.1 IDENTIFICATION OF IMPACTS TO BE ASSESSED

In this section each of the potential impacts identified as being likely to occur as a result of the development 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.

Impacts on vegetation and protected plant species

Several protected species occur at the site which may be impacted by the development, most notably *Acacia erioloba* and *A.haematoxylon*. Vegetation clearing during construction will lead to the loss of currently intact habitat within the development footprint and is an inevitable consequence of the development. As this impact is certain to occur it will be assessed for the construction phase as this is when the impact will occur, although the consequences will persist for a long time after construction.

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 impact on fauna is highly likely to occur during construction as well as operation and this impact will therefore be assessed for the construction phase and operational phase.

Reduced ability to meet conservation obligations & targets

The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the country's ability to meet its conservation targets. Although the receiving vegetation type in the study area is classified as Least Threatened and is still more than 98% intact, it is a relatively restricted vegetation type for an arid area and is therefore vulnerable to cumulative impact. This impact is therefore assessed in light of the current development as well as any other developments in the surrounding area which would also contribute to cumulative impacts.

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 presence of a number of other renewable energy and mining developments in the area, this is a potential cumulative impact of the development that is assessed.

5 ASSESSMENT OF IMPACTS

The various identified impacts are assessed below for the different phases of the development. It is important to note that the assessment is based on the layouts as provided and any changes to the layout or project description could invalidate the assessment.

5.1 HOTAZEL SOLAR PV DEVELOPMENT

The following is an assessment of the Hotazel Solar facility, for the planning and construction and operational phase of the development. As there is not a significant difference between the two options in terms of likely ecological impact, these are not differentiated in the assessment.

5.1.1 Planning & Construction Phase

Impact 1. Impacts on vegetation and listed or protected plant species resulting from construction activities

Nature of impact	**Impacts on vegetation and listed or protected plant species resulting from construction activities**							
Alternative	**Spatial Extent**	**Duration**	**Intensity**	**Probability**	**Reversibility**	**Significance and Status**		**Confidence level**
						Without Mitigation	**With Mitigation**	
Alternative 1/2	Local	Long-Term	Medium	Definite	Low	Medium Negative	Medium Negative	High

Mitigation/Management Actions

- Preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated (such as aloes) as well as comply with the Northern Cape Nature Conservation Act and DENC/DAFF 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 of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.
- Environmental Control Officer (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 clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area.
- 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.

Impact 2. Direct Faunal Impacts Due to Construction Activities

Nature of impact	**Direct Faunal Impacts During Construction**							
Alternative	**Spatial Extent**	**Duration**	**Intensity**	**Probability**	**Reversibility**	**Significance and Status**		**Confidence level**
						Without Mitigation	**With Mitigation**	
Alternative 1/2	Local	Short- Term	Medium	High	High	Medium	Medium-Low Negative	High
Mitigation/Management Actions • 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 construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises. • 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 cabling, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are standing open should have places where there are soil ramps allowing fauna to escape the trench.								

5.1.2 Operational Phase Impacts

Impact 1. Faunal Impacts due to Operation

Nature of Impact	**Faunal Impacts due to operational activities**							
Alternative	**Spatial Extent**	**Duration**	**Intensity**	**Probability**	**Reversibility**	**Significance and Status**		Confidence level
						Without Mitigation	**With Mitigation**	
Alternative 1/2	Local	Long-term	Medium-Low	Moderate	High	Medium-Low Negative	Low-Negative	High
Mitigation/Management Actions • Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. • If the site must be lit at night for security purposes, this should be done with downward-directed 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 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 some species such as tortoises are susceptible to electrocution from electric fences because they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks. Alternatively, the electrified strands should be placed on the inside of the fence and not the outside as is the case on the majority of already constructed PV plants.

5.2 HOTAZEL SOLAR GRID CONNECTION

The following is an assessment of the Grid Connection for the Hotazel Solar facility, for the planning and construction and operational phases of the development. There is not a significant difference in potential impact between the two connections to the Eskom Hotazel Substation and as such they are not differentiated here. However, the loop-in loop-out connection to the line that runs along the southern boundary of the site would generate minimal ecological impact and the assessment below is for the 6km grid options to the Eskom Hotazel Substation and as such represents the worst-case scenario for the development.

5.2.1 Planning & Construction Phase

Impact 1. Impacts on vegetation and listed or protected plant species resulting from power line construction activities

Impact Nature	**Impacts on vegetation and listed or protected plant species resulting from power line construction activities**							
Nature of impact	**Spatial Extent**	**Duration**	**Intensity**	**Probability**	**Reversibility**	**Significance and Status**		**Confidence level**
						Without Mitigation	**With Mitigation**	
Grid Connection	Local	Long-Term	Moderate	High	Low	Medium-Low Negative	Low Negative	High
Mitigation/Management Actions								
• Preconstruction walk-through of the power line route 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/DAFF permit conditions. • Construction and vegetation clearing to commence only after walk through has been conducted and necessary permits obtained. • No large woody species should be unnecessarily cleared from the power line servitude. It may be necessary to remove some individuals from the directly beneath the power line due to safety and operational concerns, however, within the servitude the presence of large woody species does not increase the fire risk and there are no valid reasons to remove such trees. If these are too tall and cause safety problems, they can be cut to a lower height rather than removed and as growth rate in arid							

Impact Nature	Impacts on vegetation and listed or protected plant species resulting from power line construction activities						
Nature of impact	**Spatial Extent**	**Duration**	**Intensity**	**Probability**	**Reversibility**	**Significance and Status**	**Confidence level**
						Without Mitigation / **With Mitigation**	

areas is slow. It would take many years before such trees would need to be trimmed again. Such trees can be trimmed to 1m height if necessary although this would almost certainly result in the mortality of large *Acacia erioloba* individuals. DAFF has a guideline available for tree clearing and trimming within power line servitudes which should serve as a guide.

- Preconstruction environmental induction for all construction staff 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.
- Vegetation clearing along the power line corridor should only be conducted where necessary and should not be cleared using herbicides or with a bulldozer. Vegetation can be cleared manually with bush cutters to 0.5m height where necessary.
- Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity.

Impact 2. Faunal Impacts due to power line construction activities.

Impact Nature	Direct Faunal Impacts During Construction							
Alternative	**Spatial Extent**	**Duration**	**Intensity**	**Probability**	**Reversibility**	**Significance and Status**		**Confidence level**
						Without Mitigation	**With Mitigation**	
Grid Connection	Local	Short- Term	Medium-Low	High	High	Medium-Low Negative	Low Negative	High

Mitigation/Management Actions

- 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 construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.
- 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 holes or trenches need to be dug, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Holes should only be dug when they are required and should be used and filled shortly thereafter.

5.3 CUMULATIVE IMPACTS

The following are the cumulative impacts that are assessed as being a likely consequence of the development of the Hotazel Solar PV Facility. These are assessed in context of the extent of the current site, other developments in the area as well as general habitat loss and transformation resulting from mining and other activities in the area.

Cumulative Impact 1. Reduced ability to meet conservation obligations & targets due to cumulative habitat loss

Nature of impact	**Reduced ability to meet conservation obligations & targets due to cumulative habitat loss**							
Alternative	**Spatial Extent**	**Duration**	**Intensity**	**Probability**	**Reversibility**	**Significance and Status**		**Confidence level**
						Without Mitigation	**With Mitigation**	
Hotazel Solar	Regional	Long-Term	Low	Low	Moderate	Low Negative	Low Negative	Moderate-High
Mitigation/Management Actions • 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.								

Cumulative Impact 2. Impact on broad-scale ecological processes due to cumulative loss and fragmentation of habitat

Nature of Impact	**Impact on broad-scale ecological processes due to cumulative loss and fragmentation of habitat**							
Alternative	**Spatial Extent**	**Duration**	**Intensity**	**Probability**	**Reversibility**	**Significance and Status**		**Confidence level**
						Without Mitigation	**With Mitigation**	
Hotazel Solar	Regional	Long-Term	Medium	Moderate	Low	Medium-Low Negative	Low Negative	Moderate-High

Mitigation/Management Actions

- Minimise the development footprint as far as possible. A cover of indigenous grasses should be encouraged and maintained within the facility. This prevents the invasion of weeds and is the easiest to manage in the long-term. Furthermore, if possible. the grasses can be maintained low through livestock (sheep) grazing which is being successfully used at some existing PV facilities (See Figure 13 below for an operational example).
- The facility should be fenced off in a manner which allows small fauna to pass through the facility. In practical terms this means that the facility should be fenced-off to include only the developed areas and should include as little undeveloped ground or natural veld as possible. In addition, there should not be electrified ground-strands present within 30cm of the ground and the electrified strands should be located on the inside of the fence and not the outside. Furthermore, the fence should be a single layer fence and not a double fence with a large gap between. Images of suitable fencing types from existing PV facilities are available on request.

Figure 13. Sheep grazing within the Jasper PV Plant near to Postmasburg in the Northern Cape.

6 CONCLUSION & RECOMMENDATIONS

The vegetation of the Hotazel Solar site consists of Kathu Bushveld with a relatively high abundance of *Acacia erioloba* and *Acacia haematoxylon* and some loss of individuals of these species cannot be avoided should the development go ahead. Although relatively large numbers of *Acacia haematoxylon* (2000-6000) would potentially be lost as a result of the development, the extent to habitat loss (275 ha) is not seen as being highly significant for this species and is of local relevance only and as such, is not seen as sufficient to warrant an offset or other similar off-site mitigation measure.

Cumulative impacts in the area are a concern due firstly to the mining activity that characterises the area and secondly due to the proliferation of solar energy development in the wider Hotazel-Kathu area. In terms of habitat loss, the affected Kathu Bushveld vegetation type is still approximately 90% intact and while this is not a very extensive vegetation type, the loss of 275ha of habitat is not considered highly significant, especially given the spatial context of the site adjacent to mining, railway and road footprint areas. In terms of potential losses to landscape connectivity, the location of the site in an impacted area indicates that it is not likely in an area that is important for faunal movement. As such, the overall cumulative impact of the development is considered likely to be low. This is also supported by the fact that the area has not been identified as being a CBA or NPAES Focus Area.

There is no significant difference between the PV footprint development alternatives and both would result in similar ecological impact. As such, the preferred alternative, Alternative 2 is supported from an ecological perspective. The on-site grid connection options with the loop-in loop-out connection to the 132kV line that traverses the site are preferable to the 6km connection to the Hotazel substation as the former would generate minimal ecological impact. There are no impacts associated with the development that are considered to be of high significance and which cannot be mitigated to an acceptable level.

Impact Statement

The development footprint of the Preferred Alternative 2 Hotazel Solar facility is restricted largely to moderately sensitive habitat typical of the wider Hotazel area. The affected area is considered suitable for development and there are no impacts associated with the Hotazel Solar facility that cannot be mitigated to a low level. As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layout provided for the assessment, the Hotazel Solar facility can be supported from a terrestrial ecology point of view. The Hotazel Solar Grid Connection with associated infrastructure is likely to generate low impacts on fauna and flora after mitigation. No high impacts that cannot be avoided were observed and from a flora and terrestrial fauna

perspective, there are no reasons to oppose the development of the grid connections and associated infrastructure.

7 REFERENCES

Alexander, G. & Marais, J. 2007. *A Guide to the Reptiles of Southern Africa*. Struik Nature, Cape Town.

Bates, M.F., Branch, W.R., Bauer, A.M., Burger, M., Marais, J., Alexander, G.J. & de Villiers, M. S. 2014. Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland. Strelitzia 32. SANBI, Pretoria.

Branch W.R. 1998. *Field guide to snakes and other reptiles of southern Africa*. Struik, Cape Town.

Du Preez, L. & Carruthers, V. 2009. *A Complete Guide to the Frogs of Southern Africa*. Struik Nature., Cape Town.

EWT & SANBI, 2016. Red List of Mammals of South Africa, Lesotho and Swaziland. EWT, Johannesburg.

Marais, J. 2004. *Complete Guide to the Snakes of Southern Africa*. Struik Nature, Cape Town.

Nel, J.L., Murray, K.M., Maherry, A.M., Petersen, C.P., Roux, D.J., Driver, A., Hill, L., Van Deventer, H., Funke, N., Swartz, E.R., Smith-Adao, L.B., Mbona, N., Downsborough, L. and Nienaber, S. (2011). Technical Report for the National Freshwater Ecosystem Priority Areas project. WRC Report No. K5/1801.

Minter LR, Burger M, Harrison JA, Braack HH, Bishop PJ & Kloepfer D (eds). 2004. Atlas and Red Data book of the frogs of South Africa, Lesotho and Swaziland. SI/MAB Series no. 9. Smithsonian Institution, Washington, D.C.

Mucina L. & Rutherford M.C. (eds) 2006. *The Vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

Oosthuysen, E. & Holness, S. 2016. Northern Cape Critical Biodiversity Areas (CBA) Map. Northern Cape Department of Environment and Nature Conservation & Nelson Mandela Metropolitan University. Available at SANBI BGIS http://bgis.sanbi.org/.

Skinner, J.D. & Chimimba, C.T. 2005. The mammals of the Southern African Subregion. Cambridge University Press, Cambridge.

8 ANNEX 1. LIST OF PLANT SPECIES

List of plant species confirmed present at the Hotazel site during the course of the field assessment.

Family	Species	IUCN Status
ACANTHACEAE	*Barleria rigida*	LC
ACANTHACEAE	*Justicia puberula*	LC
AIZOACEAE	*Plinthus sericeus*	LC
AMARANTHACEAE	*Gomphrena celosioides*	LC
AMARANTHACEAE	*Hermbstaedtia odorata var. odorata*	LC
AMARANTHACEAE	*Pupalia lappacea var. lappacea*	LC
AMARYLLIDACEAE	*Boophone disticha*	LC
ANACARDIACEAE	*Searsia ciliata*	LC
APOCYNACEAE	*Raphionacme velutina*	LC
ASPARAGACEAE	*Asparagus laricinus*	LC
ASPARAGACEAE	*Asparagus retrofractus*	LC
ASPHODELIACEAE	*Bulbine narcissifolia*	LC
ASTERACEAE	*Chrysocoma ciliata*	LC
ASTERACEAE	*Dicoma schinzii*	LC
ASTERACEAE	*Felicia muricata subsp. cinerascens*	LC
ASTERACEAE	*Gazania krebsiana subsp. krebsiana*	LC
ASTERACEAE	*Geigeria ornativa*	LC
ASTERACEAE	*Helichrysum zeyheri*	LC
ASTERACEAE	*Hertia pallens*	LC
ASTERACEAE	*Nolletia ciliaris*	LC
ASTERACEAE	*Osteospermum muricatum*	LC
ASTERACEAE	*Pegolettia retrofracta*	LC
ASTERACEAE	*Pentzia calcarea*	LC
ASTERACEAE	*Pentzia sphaerocephala*	LC
ASTERACEAE	*Pteronia incana*	LC
ASTERACEAE	*Rosenia humilis*	LC
ASTERACEAE	*Senecio inaequidens*	LC
ASTERACEAE	*Tarchonanthus camphoratus*	LC
ASTERACEAE	*Verbesina encelioides*	LC
BORAGINACEAE	*Ehretia rigida subsp. rigida*	LC
BORAGINACEAE	*Heliotropium ciliatum*	LC
CAPPARACEAE	*Cleome rubella*	LC
CELASTRACEAE	*Gymnosporia buxifolia*	LC
COMMELINACEAE	*Commelina africana var. africana*	LC
CUCURBITACEAE	*Acanthosicyos naudinianus*	LC
CUCURBITACEAE	*Coccinia sessilifolia*	LC
CUCURBITACEAE	*Cucumis africanus*	LC

CYPERACEAE	*Cyperus margaritaceus var. margaritaceus*	LC
CYPERACEAE	*Kyllinga alba*	LC
EBENACEAE	*Diospyros lycioides subsp. lycioides*	LC
ERIOSPERMACEAE	*Eriospermum sp.*	LC
EUPHORBIACEAE	*Tragia dioica*	LC
FABACEAE	*Acacia hebeclada*	LC
FABACEAE	*Acacia erioloba*	LC
FABACEAE	*Acacia haematoxylon*	LC
FABACEAE	*Acacia karroo*	LC
FABACEAE	*Acacia mellifera subsp. detinens*	LC
FABACEAE	*Cyamopsis serrata*	LC
FABACEAE	*Elephantorrhiza elephantina*	LC
FABACEAE	*Indigofera daleoides var. daleoides*	LC
FABACEAE	*Lessertia pauciflora var. pauciflora*	LC
FABACEAE	*Melolobium exudans*	LC
FABACEAE	*Melolobium macrocalyx var. macrocalyx*	LC
FABACEAE	*Senna italica subsp. arachoides*	LC
FABACEAE	*Tephrosia burchellii*	LC
FABACEAE	*Tephrosia longipes subsp. longipes var. longipes*	LC
GERANIACEAE	*Monsonia angustifolia*	LC
GISEKIACEAE	*Gisekia pharnacioides var. pharnacioides*	LC
HYACINTHACEAE	*Dipcadi viride*	LC
HYACINTHACEAE	*Ledebouria ovatifolia*	LC
IRIDACEAE	*Babiana bainesii*	LC
LAMIACEAE	*Acrotome inflata*	LC
LAMIACEAE	*Leucas capensis*	LC
MALVACEAE	*Corchorus pinnatipartitus*	LC
MALVACEAE	*Grewia flava*	LC
MALVACEAE	*Hermannia comosa*	LC
MALVACEAE	*Hermannia jacobeifolia*	LC
MALVACEAE	*Hermannia linnaeoides*	LC
MALVACEAE	*Hermannia tomentosa*	LC
MALVACEAE	*Hibiscus marlothianus*	LC
MALVACEAE	*Hibiscus pusillus*	LC
MALVACEAE	*Pavonia burchellii*	LC
MOLLUGINACEAE	*Hypertelis salsoloides*	LC
MOLLUGINACEAE	*Limeum aethiopicum var. intermedium*	LC
MOLLUGINACEAE	*Limeum argute carinatum var argute carinatum*	LC
MOLLUGINACEAE	*Limeum fenestratum var. fenestratum*	LC
MOLLUGINACEAE	*Limeum sulcatum var sulcatum*	LC
MOLLUGINACEAE	*Mollugo cerviana*	LC
OROBANCHACEAE	*Striga bilabiata subsp. bilabiata*	LC
OXALIDACEAE	*Oxalis depressa*	LC
OXALIDACEAE	*Oxalis lawsonii*	LC

PEDALIACEAE	*Sesamum triphyllum*	LC
PHYLLANTHACEAE	*Phyllanthus maderaspatensis*	LC
POACEAE	*Aristida adscensionis*	LC
POACEAE	*Aristida congesta subsp. congesta*	LC
POACEAE	*Aristida meridionalis*	LC
POACEAE	*Aristida stipitata subsp. graciliflora*	LC
POACEAE	*Aristida stipitata subsp. stipitata*	LC
POACEAE	*Brachiaria marlothii*	LC
POACEAE	*Cenchrus ciliaris*	LC
POACEAE	*Cymbopogon popischilli*	LC
POACEAE	*Cynodon dactylon*	LC
POACEAE	*Enneapogon cenchroides*	LC
POACEAE	*Enneapogon desvauxii*	LC
POACEAE	*Eragrostis biflora*	LC
POACEAE	*Eragrostis lehmanniana var. chaunantha*	LC
POACEAE	*Eragrostis nindensis*	LC
POACEAE	*Eragrostis obtusa*	LC
POACEAE	*Fingerhuthia africana*	LC
POACEAE	*Melinis repens subsp. repens*	LC
POACEAE	*Oropetium capense*	LC
POACEAE	*Pogonarthria squarrosa*	LC
POACEAE	*Schmidtia pappophoroides*	LC
POACEAE	*Stipagrostis obtusa*	LC
POACEAE	*Stipagrostis uniplumis var. uniplumis*	LC
POACEAE	*Tragus berteronianus*	LC
POLYGALACEAE	*Polygala seminuda*	LC
PORTULACACEAE	*Portulaca kermesina*	LC
PORTULACACEAE	*Talinum arnotii*	LC
RANUNCULACEAE	*Clematis brachiata*	LC
RHAMNACEAE	*Ziziphus mucronata subsp. mucronata*	LC
RUBIACEAE	*Kohautia caespitosa subsp. brachyloba*	LC
SCROPHULARIACEAE	*Aptosimum albomarginatum*	LC
SCROPHULARIACEAE	*Aptosimum elongatum*	LC
SCROPHULARIACEAE	*Aptosimum lineare var. lineare*	LC
SCROPHULARIACEAE	*Chaenostoma halimifolium*	LC
SCROPHULARIACEAE	*Jamesbrittenia atropurpurea subsp. atropurpurea*	LC
SCROPHULARIACEAE	*Peliostomum leuchorhizum*	LC
SCROPHULARIACEAE	*Selago mixta*	LC
SCROPHULARIACEAE	*Sutera griquensis*	LC
SOLANACEAE	*Datura stramonium*	LC
SOLANACEAE	*Lycium hirsutum*	LC
THYMELAEACEAE	*Gnidia polycephala*	LC
VAHLIACEAE	*Vahlia capensis subsp. vulgaris var. vulgaris*	LC
VERBENACEAE	*Chascanum pinnatifidum var. pinnatifidum*	LC

VERBENACEAE	*Lantana rugosa*	LC
ZYGOPHYLLACEAE	*Tribulus terrestris*	LC

9 ANNEX 2. LIST OF MAMMALS

List of mammals which have been observed or which are likely to occur in the vicinity of the Hotazel site. Conservation status is from 2016 EWT/SANBI Red List.

Family	Scientific name	Common name	Red list category	Number of records
Bathyergidae	*Bathyergus janetta*	Namaqua Dune Mole-rat	Least Concern (2016)	1
Bathyergidae	*Cryptomys hottentotus*	Southern African Mole-rat	Least Concern (2016)	6
Bathyergidae	*Fukomys damarensis*	Damara Mole-rat	Least Concern (2016)	12
Bovidae	*Antidorcas marsupialis*	Springbok	Least Concern (2016)	7
Bovidae	*Oreotragus oreotragus*	Klipspringer	Least Concern (2016)	6
Bovidae	*Oryx gazella*	Gemsbok	Least Concern (2016)	16
Bovidae	*Raphicerus campestris*	Steenbok	Least Concern (2016)	9
Bovidae	*Sylvicapra grimmia*	Bush Duiker	Least Concern (2016)	8
Bovidae	*Tragelaphus strepsiceros*	Greater Kudu	Least Concern (2016)	12
Canidae	*Canis mesomelas*	Black-backed Jackal	Least Concern (2016)	10
Canidae	*Otocyon megalotis*	Bat-eared Fox	Least Concern (2016)	5
Canidae	*Vulpes chama*	Cape Fox	Least Concern (2016)	7
Cercopithecidae	*Papio ursinus*	Chacma Baboon	Least Concern (2016)	8
Erinaceidae	*Atelerix frontalis*	Southern African Hedgehog	Near Threatened (2016)	9
Felidae	*Caracal caracal*	Caracal	Least Concern (2016)	1
Felidae	*Felis nigripes*	Black-footed Cat	Vulnerable (2016)	3
Felidae	*Felis silvestris*	Wildcat	Least Concern (2016)	1
Felidae	*Panthera pardus*	Leopard	Vulnerable (2016)	4
Gliridae	*Graphiurus platyops*	Flat-headed African Dormouse	Data deficient	1
Herpestidae	*Cynictis penicillata*	Yellow Mongoose	Least Concern (2016)	2
Herpestidae	*Herpestes sanguineus*	Slender Mongoose	Least Concern (2016)	2
Herpestidae	*Suricata suricatta*	Meerkat	Least Concern (2016)	3
Hyaenidae	*Hyaena brunnea*	Brown Hyena	Near Threatened	12
Hyaenidae	*Proteles cristata*	Aardwolf	Least Concern (2016)	6
Hystricidae	*Hystrix africaeaustralis*	Cape Porcupine	Least Concern	16
Leporidae	*Lepus capensis*	Cape Hare	Least Concern	18
Leporidae	*Lepus saxatilis*	Scrub Hare	Least Concern	16

Leporidae	*Pronolagus rupestris*	Smith's Red Rock Hare	Least Concern (2016)	14
Macroscelididae	*Elephantulus intufi*	Bushveld Elephant Shrew	Least Concern (2016)	1
Macroscelididae	*Elephantulus myurus*	Eastern Rock Elephant Shrew	Least Concern (2016)	29
Macroscelididae	*Elephantulus rupestris*	Western Rock Elephant Shrew	Least Concern (2016)	37
Macroscelididae	*Macroscelides proboscideus*	Short-eared Elephant Shrew	Least Concern (2016)	1
Manidae	*Smutsia temminckii*	Ground Pangolin	Vulnerable (2016)	23
Muridae	*Aethomys chrysophilus*	Red Veld Aethomys	Least Concern (2016)	3
Muridae	*Aethomys namaquensis*	Namaqua Rock Mouse	Least Concern	171
Muridae	*Desmodillus auricularis*	Cape Short-tailed Gerbil	Least Concern (2016)	38
Muridae	*Gerbilliscus brantsii*	Highveld Gerbil	Least Concern (2016)	4
Muridae	*Gerbilliscus leucogaster*	Bushveld Gerbil	Least Concern (2016)	103
Muridae	*Gerbilliscus paeba*	Paeba Hairy-footed Gerbil	Least Concern (2016)	2
Muridae	*Gerbilliscus vallinus*	Brush-tailed Hairy-footed Gerbil	Least Concern (2016)	4
Muridae	*Mastomys coucha*	Southern African Mastomys	Least Concern (2016)	56
Muridae	*Mus (Nannomys) minutoides*	Southern African Pygmy Mouse	Least Concern	27
Muridae	*Otomys auratus*	Southern African Vlei Rat	Near Threatened (2016)	3
Muridae	*Parotomys brantsii*	Brants's Whistling Rat	Least Concern (2016)	1
Muridae	*Rhabdomys pumilio*	Xeric Four-striped Grass Rat	Least Concern (2016)	41
Mustelidae	*Ictonyx striatus*	Striped Polecat	Least Concern (2016)	2
Mustelidae	*Mellivora capensis*	Honey Badger	Least Concern (2016)	4
Nesomyidae	*Saccostomus campestris*	Southern African Pouched Mouse	Least Concern (2016)	45
Orycteropodidae	*Orycteropus afer*	Aardvark	Least Concern (2016)	4
Pedetidae	*Pedetes capensis*	South African Spring Hare	Least Concern (2016)	23
Procaviidae	*Procavia capensis*	Cape Rock Hyrax	Least Concern (2016)	15
Sciuridae	*Xerus inauris*	South African Ground Squirrel	Least Concern	16
Soricidae	*Crocidura cyanea*	Reddish-gray Musk Shrew	Least Concern (2016)	3
Soricidae	*Crocidura hirta*	Lesser Red Musk Shrew	Least Concern (2016)	12
Suidae	*Phacochoerus africanus*	Common Warthog	Least Concern (2016)	11

10 ANNEX 2. LIST OF REPTILES

List of reptiles which are likely to occur at the proposed Hotazel site, based on the ReptileMap database. Conservation status is from Bates et al. (2014).

Family	Scientific name	Common name	Red list category	Number of records
Agamidae	*Agama aculeata aculeata*	Common Ground Agama	Least Concern (SARCA 2014)	41
Agamidae	*Agama atra*	Southern Rock Agama	Least Concern (SARCA 2014)	17
Amphisbaenidae	*Monopeltis mauricei*	Maurice's Worm Lizard	Least Concern (SARCA 2014)	1
Amphisbaenidae	*Zygaspis quadrifrons*	Kalahari Dwarf Worm Lizard	Least Concern (SARCA 2014)	4
Chamaeleonidae	*Chamaeleo dilepis dilepis*	Common Flap-neck Chameleon	Least Concern (SARCA 2014)	8
Colubridae	*Dasypeltis scabra*	Rhombic Egg-eater	Least Concern (SARCA 2014)	2
Colubridae	*Dispholidus typus typus*	Boomslang	Least Concern (SARCA 2014)	3
Colubridae	*Philothamnus semivariegatus*	Spotted Bush Snake	Least Concern (SARCA 2014)	1
Colubridae	*Telescopus semiannulatus semiannulatus*	Eastern Tiger Snake	Least Concern (SARCA 2014)	9
Cordylidae	*Karusasaurus polyzonus*	Karoo Girdled Lizard	Least Concern (SARCA 2014)	7
Elapidae	*Aspidelaps scutatus scutatus*	Speckled Shield Cobra	Least Concern (SARCA 2014)	4
Elapidae	*Dendroaspis polylepis*	Black Mamba	Least Concern (SARCA 2014)	1
Elapidae	*Naja nigricincta woodi*	Black Spitting Cobra	Least Concern (SARCA 2014)	2
Elapidae	*Naja nivea*	Cape Cobra	Least Concern (SARCA 2014)	4
Gekkonidae	*Chondrodactylus angulifer*	Giant Ground Gecko	Least Concern (IUCN 2009)	4
Gekkonidae	*Chondrodactylus angulifer angulifer*	Common Giant Ground Gecko	Least Concern (SARCA 2014)	9
Gekkonidae	*Chondrodactylus bibronii*	Bibron's Gecko	Least Concern (SARCA 2014)	3
Gekkonidae	*Lygodactylus bradfieldi*	Bradfield's Dwarf Gecko	Least Concern (SARCA 2014)	1
Gekkonidae	*Lygodactylus capensis capensis*	Common Dwarf Gecko	Least Concern (SARCA 2014)	8
Gekkonidae	*Pachydactylus capensis*	Cape Gecko	Least Concern (SARCA 2014)	14
Gekkonidae	*Pachydactylus rugosus*	Common Rough Gecko	Least Concern (SARCA 2014)	1
Gekkonidae	*Pachydactylus wahlbergii wahlbergii*	Kalahari Ground Gecko	Least Concern (SARCA 2014)	12
Gekkonidae	*Ptenopus garrulus garrulus*	Common Barking Gecko	Least Concern (SARCA 2014)	12
Gerrhosauridae	*Gerrhosaurus flavigularis*	Yellow-throated Plated Lizard	Least Concern (SARCA 2014)	1
Lacertidae	*Heliobolus lugubris*	Bushveld Lizard	Least Concern (SARCA 2014)	23
Lacertidae	*Meroles squamulosus*	Common Rough-scaled Lizard	Least Concern (SARCA 2014)	3
Lacertidae	*Nucras intertexta*	Spotted Sandveld Lizard	Least Concern (SARCA 2014)	14

Lacertidae	*Pedioplanis lineoocellata lineoocellata*	Spotted Sand Lizard	Least Concern (SARCA 2014)	37
Lacertidae	*Pedioplanis namaquensis*	Namaqua Sand Lizard	Least Concern (SARCA 2014)	4
Lamprophiidae	*Aparallactus capensis*	Black-headed Centipede-eater	Least Concern (SARCA 2014)	1
Lamprophiidae	*Atractaspis bibronii*	Bibron's Stiletto Snake	Least Concern (SARCA 2014)	4
Lamprophiidae	*Atractaspis duerdeni*	Duerden's Stiletto Snake	Least Concern (SARCA 2014)	1
Lamprophiidae	*Boaedon capensis*	Brown House Snake	Least Concern (SARCA 2014)	9
Lamprophiidae	*Lycophidion capense capense*	Cape Wolf Snake	Least Concern (SARCA 2014)	4
Lamprophiidae	*Prosymna sundevallii*	Sundevall's Shovel-snout	Least Concern (SARCA 2014)	6
Lamprophiidae	*Psammophis brevirostris*	Short-snouted Grass Snake	Least Concern (SARCA 2014)	9
Lamprophiidae	*Psammophis notostictus*	Karoo Sand Snake	Least Concern (SARCA 2014)	1
Lamprophiidae	*Psammophis trinasalis*	Fork-marked Sand Snake	Least Concern (SARCA 2014)	10
Lamprophiidae	*Pseudaspis cana*	Mole Snake	Least Concern (SARCA 2014)	7
Lamprophiidae	*Xenocalamus bicolor bicolor*	Bicoloured Quill-snouted Snake	Least Concern (SARCA 2014)	1
Leptotyphlopidae	*Leptotyphlops scutifrons scutifrons*	Peters' Thread Snake		6
Pelomedusidae	*Pelomedusa subrufa*	Central Marsh Terrapin	Least Concern (SARCA 2014)	4
Pythonidae	*Python natalensis*	Southern African Python	Least Concern (SARCA 2014)	1
Scincidae	*Acontias kgalagadi kgalagadi*	Striped Blind Legless Skink	Least Concern (SARCA 2014)	6
Scincidae	*Panaspis wahlbergi*	Wahlberg's Snake-eyed Skink	Least Concern (SARCA 2014)	1
Scincidae	*Trachylepis occidentalis*	Western Three-striped Skink	Least Concern (SARCA 2014)	12
Scincidae	*Trachylepis punctatissima*	Speckled Rock Skink	Least Concern (SARCA 2014)	12
Scincidae	*Trachylepis punctulata*	Speckled Sand Skink	Least Concern (SARCA 2014)	1
Scincidae	*Trachylepis spilogaster*	Kalahari Tree Skink	Least Concern (SARCA 2014)	38
Scincidae	*Trachylepis sulcata sulcata*	Western Rock Skink	Least Concern (SARCA 2014)	15
Scincidae	*Trachylepis variegata*	Variegated Skink	Least Concern (SARCA 2014)	49
Testudinidae	*Psammobates oculifer*	Serrated Tent Tortoise	Least Concern (SARCA 2014)	10
Testudinidae	*Stigmochelys pardalis*	Leopard Tortoise	Least Concern (SARCA 2014)	3
Typhlopidae	*Rhinotyphlops lalandei*	Delalande's Beaked Blind Snake	Least Concern (SARCA 2014)	1
Varanidae	*Varanus albigularis albigularis*	Rock Monitor	Least Concern (SARCA 2014)	13
Viperidae	*Bitis arietans arietans*	Puff Adder	Least Concern (SARCA 2014)	10

11 ANNEX 3. LIST OF AMPHIBIANS

List of amphibians which are likely to occur in the vicinity of the Hotazel Site, according to the Southern African Atlas of Frogs. Conservation is from Minter et al. (2004).

Family	Genus	Species	Common name	Red list category
Brevicepitidae	*Breviceps*	*adspersus*	Bushveld Rain Frog	Least Concern
Bufonidae	*Amietophrynus*	*gutturalis*	Guttural Toad	Least Concern
Bufonidae	*Amietophrynus*	*poweri*	Power's Toad	Least Concern
Bufonidae	*Amietophrynus*	*rangeri*	Raucous Toad	Least Concern
Bufonidae	*Poyntonophrynus*	*vertebralis*	Southern Pygmy Toad	Least Concern
Bufonidae	*Vandijkophrynus*	*gariepensis*	Karoo Toad	Least Concern
Pipidae	*Xenopus*	*laevis*	Common Platanna	Least Concern
Pyxicephalidae	*Amietia*	*angolensis*	Common or Angola River Frog	Least Concern
Pyxicephalidae	*Cacosternum*	*boettgeri*	Common Caco	Least Concern
Pyxicephalidae	*Pyxicephalus*	*adspersus*	Giant Bull Frog	Near Threatened
Pyxicephalidae	*Tomopterna*	*cryptotis*	Tremelo Sand Frog	Least Concern