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Terrestrial Ecology Specialist Assessment

Plessis Dam PV1 Grid Connection Project near De Aar in Northern Cape Province.

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For: Landscape Dynamics

13 May 2022

TABLE OF CONTENTS


TABLE OF CONTENTS	1
SPECIALIST DETAILS & DECLARATION	2
STATEMENT OF INDEPENDENCE:	2
INTRODUCTION	3
DESCRIPTION OF PROPOSED PROJECT	3
IDENTIFIED THEME SENSITIVITIES	5
<i>Plant theme</i>	5
<i>Animal theme</i>	5
<i>Terrestrial Biodiversity theme</i>	5
METHODOLOGY	6
SURVEY TIMING.....	6
FIELD SURVEY APPROACH.....	6
SOURCES OF INFORMATION.....	6
<i>Vegetation and Plant species</i>	6
<i>Regional plans</i>	7
RESULTS	8
BROAD VEGETATION PATTERNS	8
<i>Northern Upper Karoo</i>	8
VEGETATION CONSERVATION STATUS	9
<i>National status</i>	9
PROVINCIAL C-PLAN STATUS.....	11
HABITATS ON SITE.....	12
<i>Lowland plains</i>	12
<i>Depression</i>	12
RED LIST PLANT SPECIES OF THE STUDY AREA.....	17
PROTECTED TREES	17
RED LIST ANIMAL SPECIES OF THE STUDY AREA	17
ASSESSMENT OF PROPOSED INFRASTRUCTURE	18
GRID	18
<i>Assessment of impacts: Construction Phase</i>	18
<i>Assessment of impacts: Operation Phase</i>	20
<i>Summary of impacts</i>	21
COMPARISON OF ALTERNATIVES	21
CONCLUSIONS	22
RECOMMENDATIONS	22
REFERENCES:	23
APPENDIX 1: CHECKIST OF PLANT SPECIES FOUND ON SITE AND NEARBY.	24
APPENDIX 2: CHECKIST OF ANIMAL SPECIES FOUND ON SITE OR NEARBY.	26
APPENDIX 3: LIST OF PROTECTED TREE SPECIES (NATIONAL FORESTS ACT).	27

SPECIALIST DETAILS & DECLARATION

This report has been prepared in accordance with the "Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species, terrestrial plant species and terrestrial biodiversity", as promulgated in terms of Section 24 (5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998), published in GN. No. 320 dated 20 March 2020. It has been prepared independently of influence or prejudice by any parties.

The details of Specialists are as follows –

Table 1: Details of Specialist

Specialist	Qualification and accreditation	Signature
Dr David Hoare	<ul style="list-style-type: none">• PhD Botany• Pr.Sci.Nat. 400221/05 (Ecological Science, Botanical Science)	 Date: 13/05/2022

Details of Author:

Dr David Hoare

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Professional Natural Scientist, South African Council for Natural Scientific Professions, Reg. no. 400221/05 (Ecology, Botany)

Statement of independence:

I, David Hoare, as the appointed terrestrial biodiversity / plant species specialist, hereby declare/affirm the correctness of the information provided in this compliance statement, and that I:

1. meet the general requirements to be independent and
2. have no business, financial, personal or other interest in the proposed development and that no circumstances have occurred that may have compromised my objectivity; and
3. am aware that a false declaration is an offence in terms of regulation 48 of the EIA Regulations (2014).



Dr David Hoare

13 May 2022

Date

INTRODUCTION

The proposed infrastructure is a powerline connecting the Du Plessis PV1, on the farm Du Plessis Dam 179, to the Central Substation on the farm De Aar 180. This is just to the east of the town of De Aar in the Northern Cape Province, within the quarter degree grid 3024CA (Figure 1).

The topography of the study site is gentle to flat. There is a gentle increase in elevation northwards. The elevation on site varies from 1240 to 1336 m above sea level.

Most of the site consists of natural vegetation. The exception is a gravel road crossing the alignment corridor approximately at its central point, and there is some historical disturbance in the northern part of the corridor area.

The activities to be undertaken under this planned application trigger activities listed under National Environmental Management Act (NEMA), thus, a basic assessment process is being followed for this application. The results of the Department of Forestry, Fisheries and the Environment (DFFE) environmental screening report indicates that the proposed project area is located within an area of medium, high and very high environmental sensitivity of Plant, Animal and Terrestrial Biodiversity respectively.

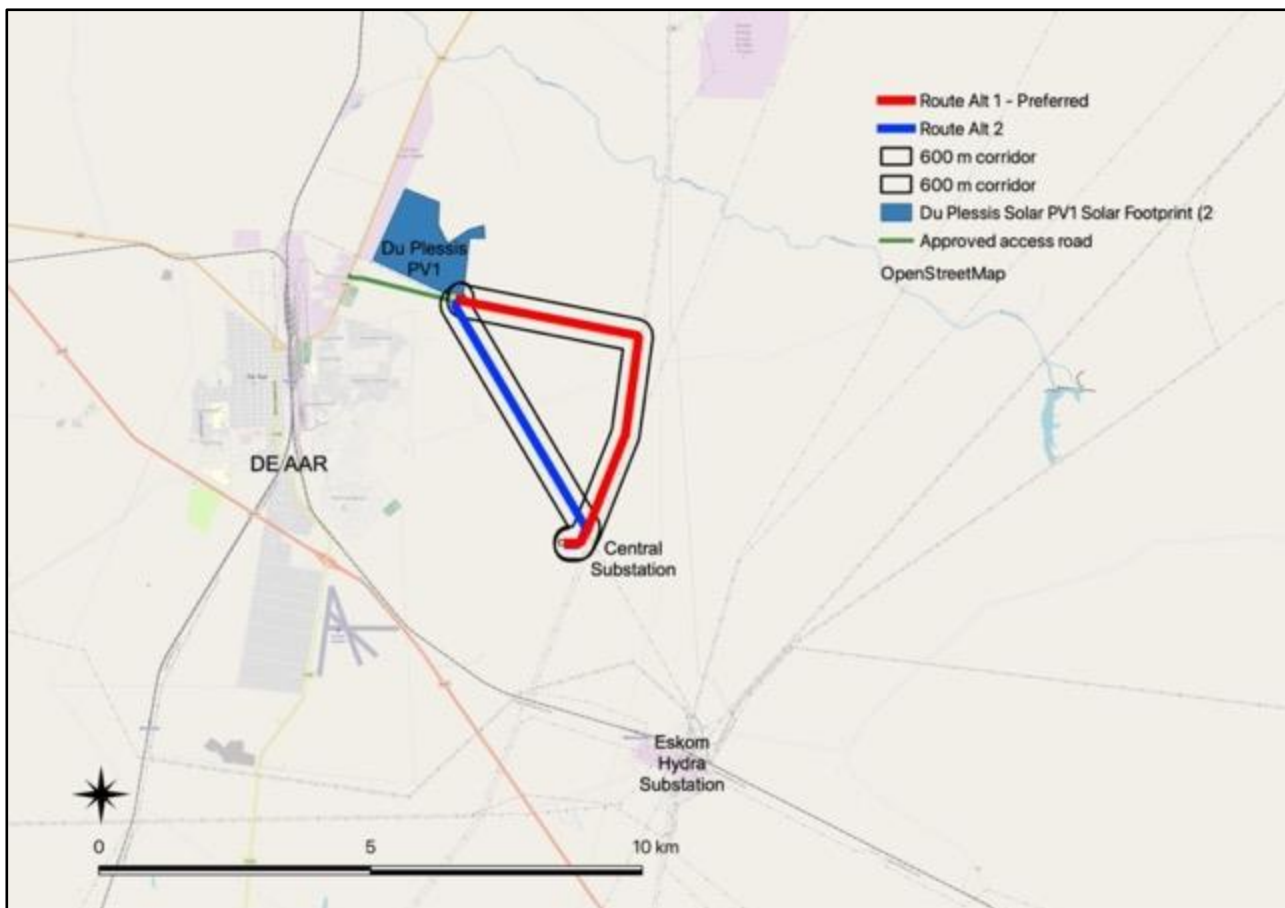


Figure 1: Location of the site near De Aar in the Northern Cape Province.

Description of proposed project

- ± 2 km, 12m wide access road
 - Starting point at the R48 and ends at the PV1 switching station
 - This access road is existing but will be widened to 12m
- Du Plessis Eskom Switching Station of ± 0.5 hectares in size (50m x 100m)
 - Internal access roads of 6m wide
- 132kV power line of ± 8 km
 - The power line will connect the PV1 Eskom Switching Station with the Mulilo Cluster 1 Substation
 - Servitude width approximately 31m
- ± 6 m wide access road will be constructed along the line route for construction and maintenance purposes – *this road will be inside the servitude*
- A laydown area of ± 1 hectares directly adjacent to the PV1 Switching Station
- Diesel storage of less than 80m³ for the 132kV Switching Station:
 - During construction, diesel is required for construction vehicles as well as generators for the construction camp and commissioning whilst waiting for the Eskom grid connection works to be completed

During operations, diesel is required for Operations & Maintenance vehicles at the PV plants but also required for backup Diesel generators at the substations. The Generators supply auxiliary power to the substation's protection and communications systems, should there be outages on the grid. This is an Eskom requirement together with a battery room at the substations to act as UPS for these critical systems.

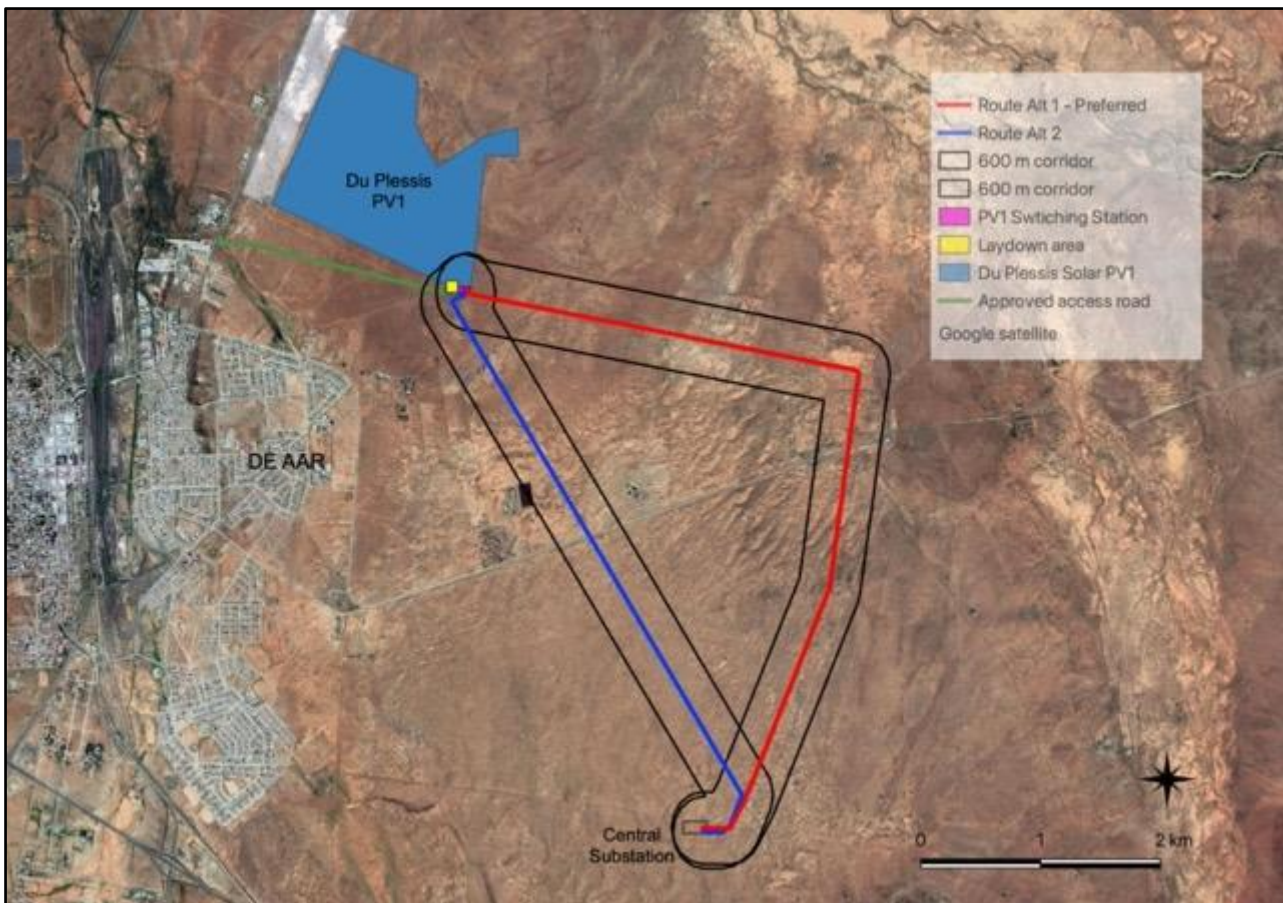


Figure 2: Aerial image of the corridor and surrounding areas.

Identified Theme Sensitivities

A sensitivity screening report from the DEA Online Screening Tool was requested in the application category: Utilities Infrastructure | Electricity | Distribution and transmission | Substation. The DEA Screening Tool report for the area indicates the following ecological sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Plant Species Theme			X	
Animal Species Theme		X		
Terrestrial Biodiversity Theme	X			

Plant theme

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Medium	Tridentea virescens

Animal theme

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
High	Aves-Neotis ludwigii
Medium	Aves-Neotis ludwigii

Terrestrial Biodiversity theme

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Very High	Critical Biodiversity Area 2
Very High	Ecological support area

METHODOLOGY

The detailed methodology followed as well as the sources of data and information used as part of this assessment is described below.

Survey timing

The study commenced as a desktop-study followed by a site-specific field study on 4 and 5 March 2022. The site is within the Nama-Karoo Biome. The climate is arid to semi-arid. Rainfall occurs from November to March, but peaks in mid- to late summer (February / March). Mean annual rainfall is 275 mm per year. There had been relatively good recent rainfalls prior to the field survey. The timing of the survey in early summer is therefore acceptable in terms of assessing the flora and vegetation of the site. The vegetation on site was in relatively good condition in terms of the seasonal presence of perennial plant species, although grass cover had not recovered from the previous winter period. The overall condition of the vegetation was therefore possible to be determined with a moderately high degree of confidence.

Field survey approach

During the field survey, the entire corridor was assessed on foot. A hand-held Garmin GPSMap 64s was used to record a track within which observations were made. Digital photographs were taken of features and habitats on site, as well as of all plant species that were seen. All plant species recorded were uploaded to the iNaturalist website and are accessible by viewing the observations for this site.

Aerial imagery from Google Earth was used to identify and assess habitats on site. Patterns identified from satellite imagery were verified on the ground. Digital photographs were taken at locations where features of interest were observed. During the field survey, particular attention was paid to ensuring that all habitat variability was covered physically on the ground.

Digital photographs were taken of features of interest that were seen on site, as well as of habitat in different parts of the site.

Sources of information

Vegetation and Plant species

- Broad vegetation types occurring on site were obtained from Mucina and Rutherford (2006), with updates according to the SANBI BGIS website (<http://bgis.sanbi.org>). The description of each vegetation type includes a list of plant species that may be expected to occur within the particular vegetation type.
- Plant species that could potentially occur on in the general area was extracted from the NewPosa database of the South African National biodiversity Institute (SANBI) for the quarter degree grid/s in which the site is located.
- The IUCN Red List Category for plant species, as well as supplementary information on habitats and distribution, was obtained from the SANBI Threatened Species Programme (Red List of South African Plants, <http://redlist.sanbi.org>).

- Lists were compiled specifically for any species at risk of extinction (Red List species) previously recorded in the area. Historical occurrences of threatened plant species were obtained from the South African National Biodiversity Institute (<http://posa.sanbi.org>) for the quarter degree square/s within which the study area is situated. Habitat information for each species was obtained from various published sources. The probability of finding any of these species was then assessed by comparing the habitat requirements with those habitats that were found, during the field survey of the site, to occur there.
- Regulations published for the National Forests Act (Act 84 of 1998) (NFA) as amended, provide a list of protected tree species for South Africa. The species on this list were assessed in order to determine which protected tree species have a geographical distribution that coincides with the study area and habitat requirements that may be met by available habitat in the study area. The distribution of species on this list were obtained from published sources (e.g. van Wyk & van Wyk 1997) and from the SANBI Biodiversity Information System website (<http://sibis.sanbi.org/>) for quarter degree grids in which species have been previously recorded. Species that have been recorded anywhere in proximity to the site (within 100 km), or where it is considered possible that they could occur there, were listed and were considered as being at risk of occurring there.
- Mapping was done from aerial imagery on Google Earth, which also provides historical imagery for a period up to 15 years ago.

Regional plans

- Information from the National Protected Areas Expansion Strategy (NPAES) was consulted for possible inclusion of the site into a protected area in future (available on <http://bgis.sanbi.org>).
- The Northern Cape Biodiversity Conservation Plan maps were consulted for inclusion of the site into a Critical Biodiversity Area or Ecological Support Area (biodiversityadvisor.sanbi.org).

RESULTS

Broad vegetation patterns

There is one regional vegetation type in the study area, namely Northern Upper Karoo (NKu3), which occurs throughout the site (Figure 3), briefly described below, including expected species composition.

Northern Upper Karoo

Distribution

Northern Cape and Free State Provinces: Northern regions of the Upper Karoo plateau from Prieska, Vosburg and Carnarvon in the west to Philipstown, Petrusville and Petrusburg in the east. Bordered in the north by Niekerkshoop, Douglas and Petrusburg and in the south by Carnarvon, Pampoenpoort and De Aar. A few patches occur in Griqualand West. Altitude varies mostly from 1 000–1 500 m.

Vegetation & Landscape Features

Shrubland dominated by dwarf karoo shrubs, grasses and *Senegalia mellifera* subsp. *detinens* and some other low trees (especially on sandy soils in the northern parts and vicinity of the Orange River). Flat to gently sloping, with isolated hills of Upper Karoo Hardeveld in the south and Vaalbos Rocky Shrubland in the northeast and with many interspersed pans.

Geology & Soils

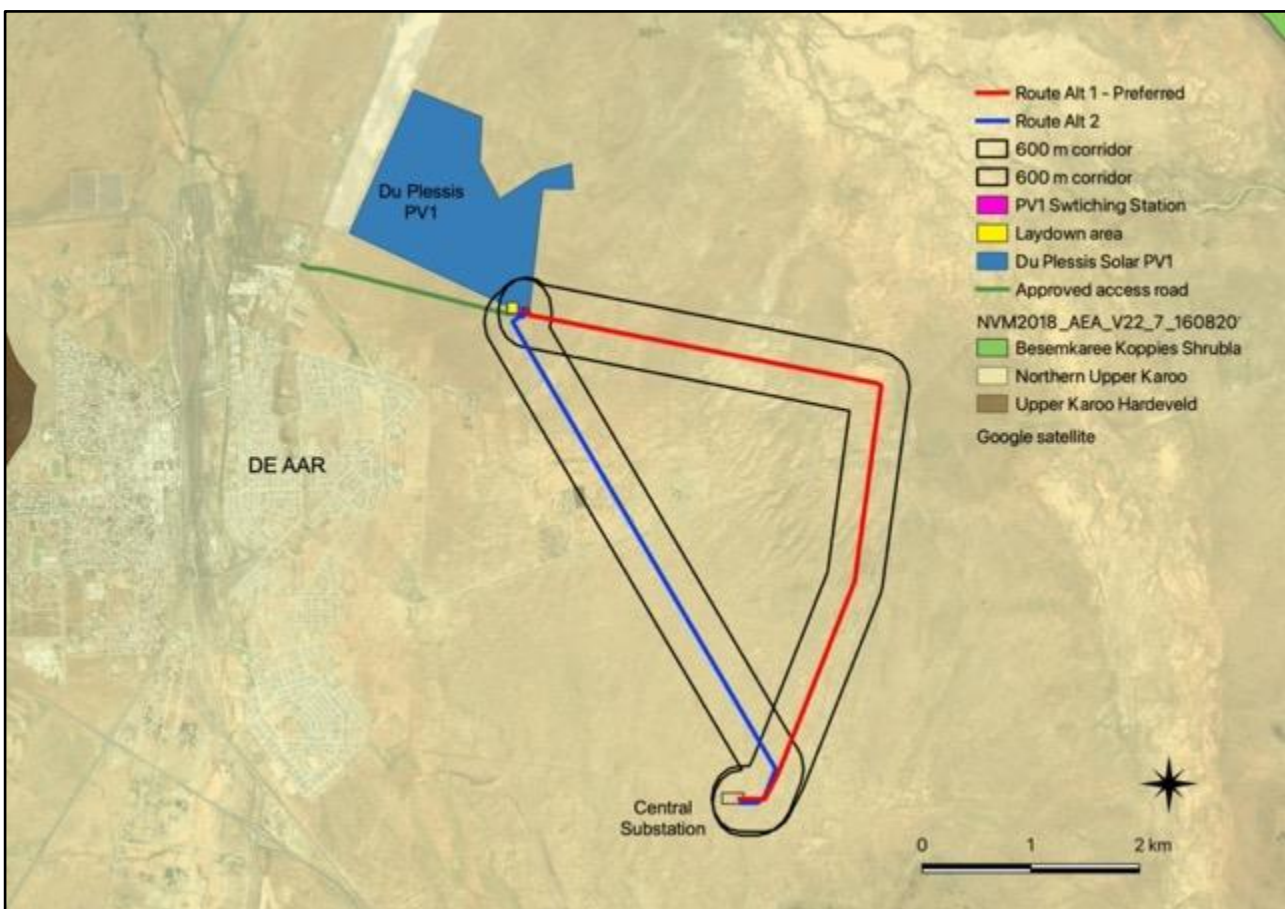


Figure 3: Regional vegetation types of the site and surrounding areas.

Shales of the Volksrust Formation and to a lesser extent the Prince Albert Formation (both of the Ecca Group) as well as Dwyka Group diamictites form the underlying geology. Jurassic Karoo Dolerite sills and sheets support this vegetation complex in places. Wide stretches of land are covered by superficial deposits including calcretes of the Kalahari Group. Soils are variable from shallow to deep, red-yellow, apedal, freely drained soils to very shallow Glenrosa and Mispah forms. Mainly Ae, Ag and Fc land types.

Climate

Rainfall peaks in autumn (March). MAP ranges from about 190 mm in the west to 400 mm in the northeast. Mean maximum and minimum monthly temperatures for Britstown are 37.9°C and -3.6°C for January and July, respectively. Corresponding values are 37.1°C and -4.8°C for De Aar and 39.0°C and -2.3°C for Kareekloof (northwest of Strydenburg).

Important Taxa

Small Trees: *Senegalia mellifera* subsp. *definens*, *Boscia albitrunca*.

Tall Shrubs: *Lycium cinereum* (d), *L. horridum*, *L. oxycarpum*, *L. schizocalyx*, *Rhigozum trichotomum*.

Low Shrubs: *Chrysocoma ciliata* (d), *Gnidia polycephala* (d), *Pentzia calcarea* (d), *P. globosa* (d), *P. incana* (d), *P. spinescens* (d), *Rosenia humilis* (d), *Amphiglossa triflora*, *Aptosimum marlothii*, *A. spinescens*, *Asparagus glaucus*, *Barleria rigida*, *Berkheya annectens*, *Eriocephalus ericoides* subsp. *ericoides*, *E. glandulosus*, *E. spinescens*, *Euryops asparagoides*. *Felicia muricata*, *Helichrysum lucilioides*, *Hermannia spinosa*, *Leucas capensis*, *Limeum aethiopicum*, *Melolobium candicans*, *Microloma armatum*, *Osteospermum leptolobum*, *O. spinescens*, *Pegolettia retrofracta*, *Pentzia lanata*, *Phyllanthus maderaspatensis*, *Plinthus karooicus*, *Pteronia glauca*, *P. sordida*, *Selago geniculata*, *S. saxatilis*, *Tetragonia arbuscula*, *Zygophyllum lichtensteinianum*.

Succulent Shrubs: *Hertia pallens*, *Salsola calluna*, *S. glabrescens*, *S. rabieana*, *S. tuberculata*, *Zygophyllum flexuosum*.

Semiparasitic Shrub: *Thesium hystrix* (d),

Herbs: *Chamaesyce inaequilatera*, *Convolvulus sagittatus*, *Dicoma capensis*, *Gazania krebsiana*, *Hermannia comosa*, *Indigofera alternans*, *Lessertia pauciflora*, *Radyera urens*, *Sesamum capense*, *Sutera pinnatifida*, *Tribulus terrestris*, *Vahlia capensis*.

Succulent Herb: *Psilocaulon coriarium*.

Geophytic Herb: *Moraea pallida*.

Graminoids: *Aristida adscensionis* (d), *A. congesta* (d), *A. diffusa* (d), *Enneapogon desvauxii* (d), *Eragrostis lehmanniana* (d), *E. obtusa* (d), *E. truncata* (d), *Sporobolus fimbriatus* (d), *Stipagrostis obtusa* (d), *Eragrostis bicolor*, *E. porosa*, *Fingerhuthia africana*, *Heteropogon contortus*, *Stipagrostis ciliata*, *Themeda triandra*, *Tragus berteronianus*, *T. koelerioides*, *T. racemosus*.

Biogeographically Important Taxa

Herb (western distribution limit): *Convolvulus boedeckerianus*.

Tall Shrub (southern limit of distribution): *Gymnosporia szyszylowiczii* subsp. *namibiensis*.

Endemic Taxa

Succulent Shrubs: *Lithops hookeri*, *Stomatium pluridens*.

Low Shrubs: *Atriplex spongiosa*, *Galenia exigua*.

Herb: *Manulea deserticola*.

Vegetation conservation status

National status

The conservation status of Northern Upeer Karoo is Least Concern.

The vegetation type is not listed in The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004).

Table 2: Conservation status of vegetation types occurring in the study area, according to Mucina et al. 2005 and the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).

Vegetation Type	Status (Mucina et al. 2005)	Status (NEMBA – 2011)	Status (NBA 2018)
Northern Upeer Karoo	Least threatened	LC	LC

Provincial C-Plan status

The Northern Cape CBA map classifies the natural vegetation of the province according to conservation value in decreasing value, as follows:

1. Protected
2. Critical Biodiversity Area One (Irreplaceable Areas) (RED)
3. Critical Biodiversity Area Two (Important Areas) (ORANGE)
4. Ecological Support Area (GREEN)
5. Other Natural Area (YELLOW)

This shows features within the study area within two of these classes, as follows (Figure 4):

1. Critical Biodiversity Area Two: northern quarter of the corridors.
2. Ecological Support Areas: Remainder of the corridors, which corresponds with all remaining natural habitat.

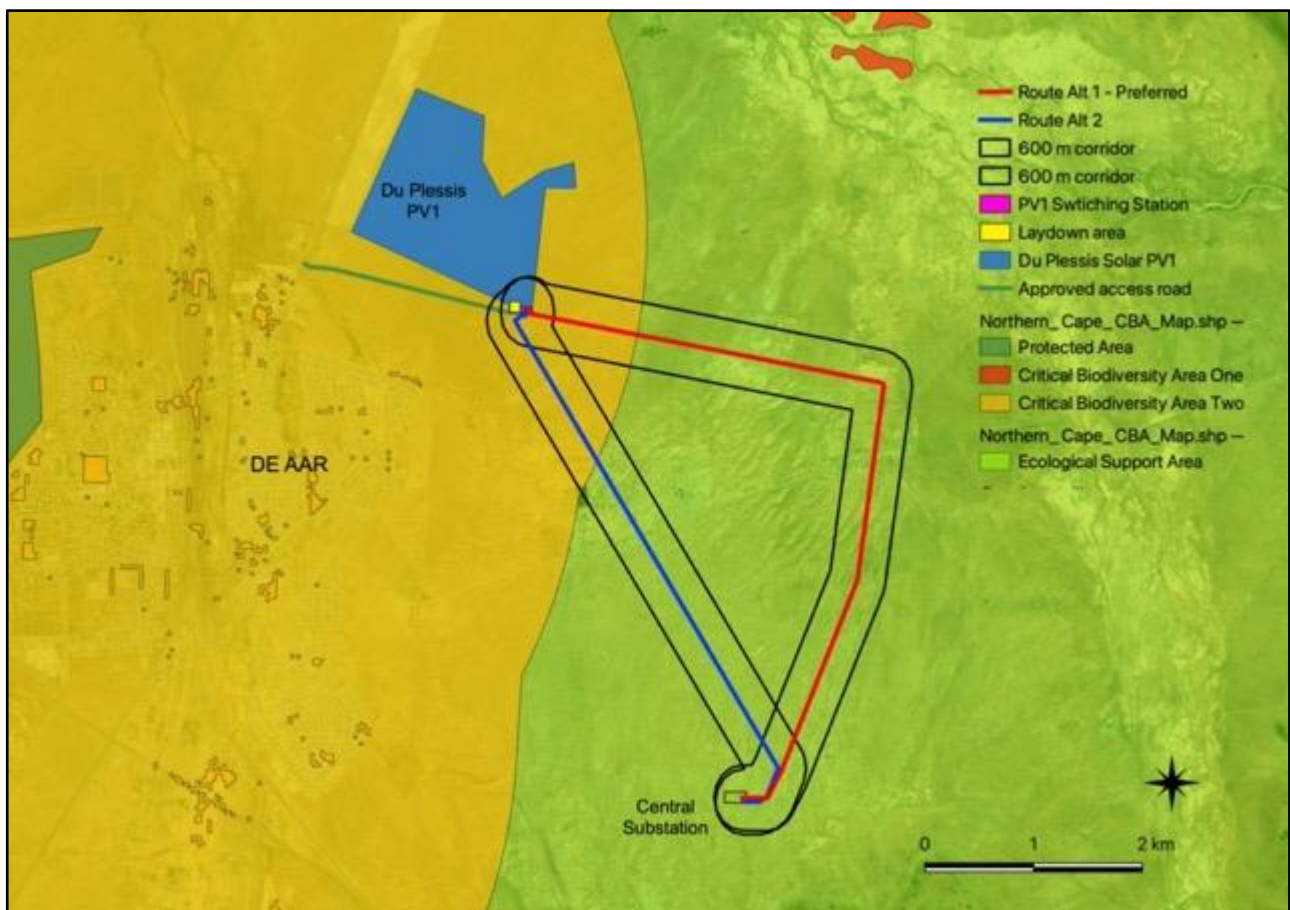


Figure 4: Northern Cape Biodiversity Conservation Plan for the site and surrounding areas.

Habitats on site

A broad habitat map was produced to provide context for the general occurrence of plant species, as well as likely habitat for plant or animal species of concern, which are usually restricted to specific habitat types. The habitat map is shown in Figure 5.

Lowland plains

This is the widespread plains vegetation of the area around De Aar. It is generally found on loamy soils with relatively low rock cover. The vegetation consists mostly of low dwarf shrubs, such as *Pentzia incana*, *Chrysocoma ciliata*, *Aizoon africanum*, *Eriocephalus ericoides*, and *Ruschia intricata*, along with various grasses, including *Aristida congesta*, *Fingerhuthia africana*, *Eragrostis lehmanniana*, *Eragrostis obtusa*, *Chloris virgata*, *Stipagrostis uniplumis*, *Enneapogon cenchroides*, and *Cynodon dactylon*. It is relatively species poor, and is uniform across wide areas. Grasses are present, even dominant, during times of rainfall, but disappear during dry periods, giving the appearance that only dwarf shrubs exist in the landscape. The sensitivity is classified here as MEDIUM (Figure 6).

Depression

There are three small locations on site in which it appears that there may have been some historical removal of material and/or irrigation pipe leakage where seasonal to permanent water collection now occurs. Within these depressions in the northern part of the site, rain water is able to collect and, at the time of the field survey, was ideal habitat for a large number of frogs, including the Giant Bullfrog, *Pyxicephalus adspersus*. On this basis, these areas are treated here as having higher sensitivity than the surrounding plains, even though they are artificially-created habitats, and

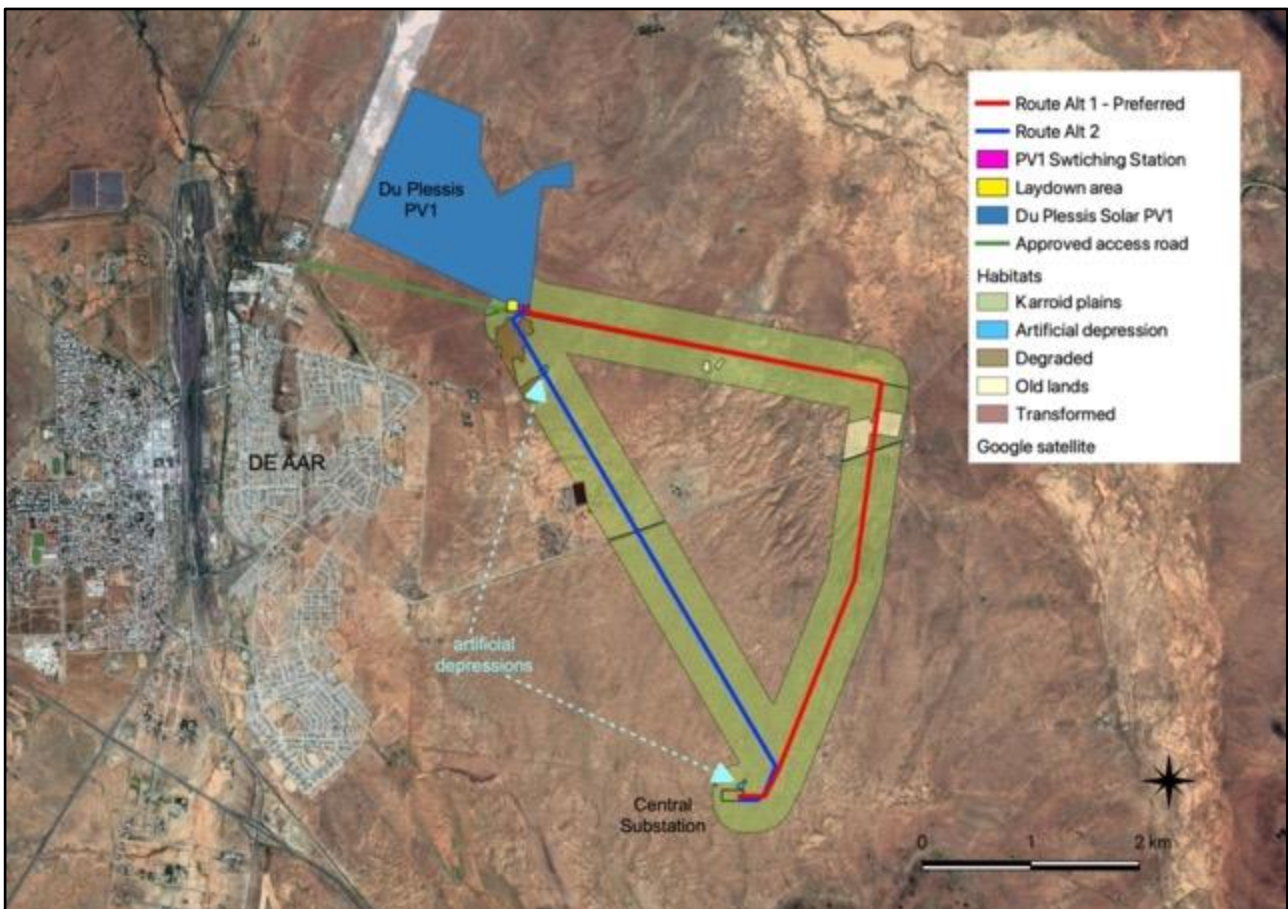


Figure 5: Habitats within the corridor.

are classified as having MEDIUM-HIGH sensitivity (Figure 6). In an arid environment, any location with water will attract life disproportionately to surrounding areas.

Degraded and transformed areas

This includes roads, borrow-pits, earthworks, bare areas and cultivated or previously-cultivated areas.

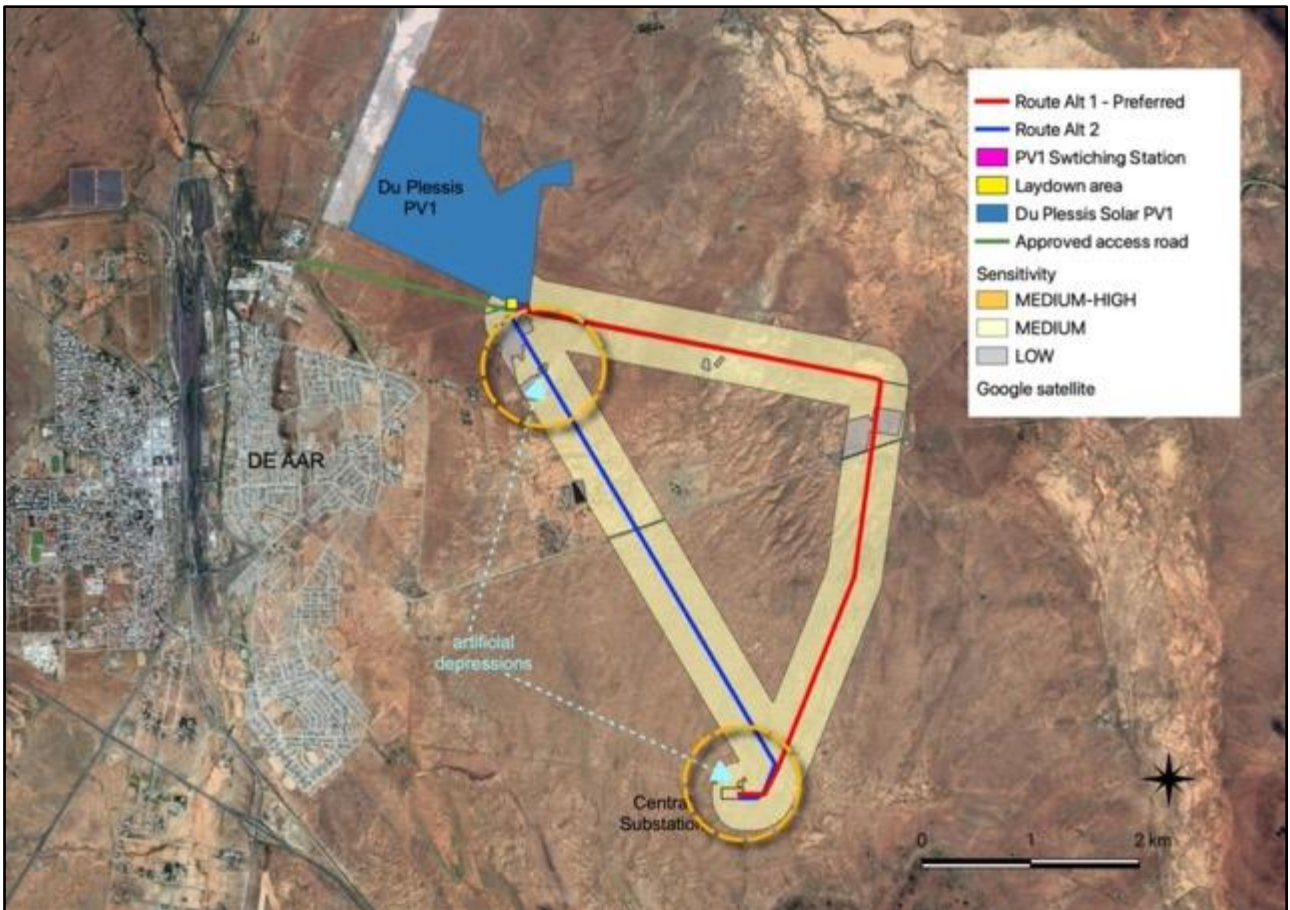


Figure 6: Sensitivity of habitats within the corridor.



Figure 7: View of plains vegetation under existing power lines on site.



Figure 8: View of corridor at northern end.



Figure 9: Degraded areas in northern part of corridor.



Figure 10: Depression in northern part of corridor.



Figure 11: General view of habitat within corridor.



Figure 12: General view of habitat within corridor.

Red List plant species of the study area

There is one plant species flagged for the site in the DEA Online Screening Tool output, namely *Tridentea virescens*, listed as Rare. It has a wide distribution over the drier parts of the Northern Cape and northern parts of the Eastern Cape (Bruyns 1994), as well as in southern Namibia. It occurs on stony ground, or on hard loam in floodplains. This habitat preference does not match any habitat within the corridor. The species has been recorded twice previously near to De Aar but, based on habitat requirements, it is not likely to occur on site.

There are no known additional listed species from further afield with a geographical distribution that may include the site.

Protected trees

Tree species protected under the National Forest Act are listed in Appendix 2. There is one that has a geographical distribution that includes the study area, *Boscia albitrunca* (Shepherd's Tree / Witgatboom / !Xhi).

Boscia albitrunca occurs in semi-desert areas and bushveld, often on termitaria, but is common on sandy to loamy soils and calcrete soils. No individuals were found on site and none are likely to occur there.

Red List animal species of the study area

There is one animal species flagged for the site in the DEA Online Screening Tool output, namely *Neotis ludwigii* (Ludwig's Bustard), listed as Endangered. A specialist avifaunal assessment forms a separate component of the environmental assessment application and birds in general are not discussed here. However, the habitat for this species is considered here as part of the general ecological assessment. Ludwig's Bustard occurs in flat, open, semi-arid shrublands, including in the Nama-Karoo. The study area forms part of the general area of occurrence for this species and is near the core high density distribution range for the species (Taylor et al. 2015). All habitat on site is therefore potentially suitable for this species. Habitat loss due to the current project will be relatively insignificant. However, the main impact on this species is due to collisions with overhead power lines.

One Near Threatened reptile species was east of the corridor, the Tent Tortoise (*Psammobates tentorius*). This species has a wide distribution in South Africa from south-east of Graaff-Reinet to southern Namibia. The current observation is near to the north-eastern edge of the known distribution range. The main general threats to the species include primarily general habitat degradation and loss. The loss of habitat due to the current project will not have a significant impact on the overall availability of habitat for this species.

Other listed animal species that could possibly occur in the study area are mostly small carnivores, including Black-footed Cat (Vulnerable) and Brown Hyaena (Near Threatened), both mobile species that will move away from any human disturbance.

ASSESSMENT OF PROPOSED INFRASTRUCTURE

Grid

The location for the proposed infrastructure is shown in Figure 6 in relation to habitat sensitivity on site. The switching station occurs within lowland plains and, for both alternatives, most of the power line is within lowland plains. Possible impacts from the proposed project are as follows:

1. Loss of natural habitat.
2. Loss of individuals of protected trees, protected plants or other listed species (no specific concerns seen on site).
3. Loss of faunal habitat.
4. Invasion by alien invasive plant species as a result of disturbance.

The impact of the proposed project is relatively insignificant relative to the approved solar PV projects within the same area.

Assessment of impacts: Construction Phase

Possible impacts during the construction phase are as follows:

1. Loss of natural habitat.
2. Loss of individuals of protected trees, protected plants or other listed species.
3. Loss of faunal habitat.

These are assessed below (Table 7-9).

Table 3: Assessment of impact: "Loss of natural habitat".

Impact Description Loss of natural habitat due to clearing						
Cumulative impact description Cumulative loss of habitat due to all project components						
Mitigation Minimise vegetation clearing and disturbance to footprint areas only. Compile a rehabilitation programme and rehabilitate disturbed areas. Compile and implement Alien Invasive Management Plan. Limit access to sensitive areas during construction. Undertake monitoring to evaluate whether further measures are required.						
Impact Assessment						
Name of Impact	Extent	Duration	Probability	Reversibility of impact	Significance without mitigation	Significance after mitigation
Loss of natural habitat	Site	Permanent	Definite	Low	Moderate	Moderate

Impact on Irreplaceable Resources (after mitigation) If yes, please explain	YES	NO
Cumulative impact rating (after mitigation) If high, please explain	Low	Medium High

Table 4: Assessment of impact: "Loss of individuals of listed and protected plant species".

Impact Description Loss of individuals of listed and protected plant and tree species due to clearing						
Cumulative impact description Cumulative loss of individuals of listed and protected plant and tree species due to all project components						
Mitigation All mitigation measures that apply for "Loss of habitat". Obtain permits for protected plants that will be affected by the proposed project.						
Impact Assessment						
Name of Impact	Extent	Duration	Probability	Reversibility of impact	Significance without mitigation	Significance after mitigation
Loss of listed / protected flora	Site	Medium	Possible	Medium	Low	Low
Impact on Irreplaceable Resources (after mitigation) If yes, please explain					YES	NO
Cumulative impact rating (after mitigation) If high, please explain				Low	Medium High	

Table 5: Assessment of impact: "Loss of habitat or individuals of sensitive faunal species".

Impact Description Loss of habitats or individuals of sensitive fauna species						
Cumulative impact description Cumulative loss of individuals or habitat of sensitive fauna species due to all project components						
Mitigation All mitigation measures that apply for "Loss of habitat". Avoid direct disturbance of "Depressions" occurring within the corridor.						

Impact Assessment						
Name of Impact	Extent	Duration	Probability	Reversibility of impact	Significance without mitigation	Significance after mitigation
Loss of sensitive fauna	Site	Medium	Possible	Medium	Low	Low
Impact on Irreplaceable Resources (after mitigation) If yes, please explain					YES	NO
Cumulative impact rating (after mitigation) If high, please explain				Low	Medium	High

Assessment of impacts: Operation Phase

Possible impacts during the construction phase are as follows:

1. Invasion by alien invasive plant species as a result of disturbance (equal risk for both options).

These are assessed below (Table 10).

Table 6: Assessment of impact: "Invasion by alien invasive plant species".

Impact Description Invasion by alien invasive plant species						
Cumulative impact description Cumulative invasion due to all project components						
Mitigation Compile and implement Alien Invasive Management Plan. Rehabilitate disturbed areas.						
Impact Assessment						
Name of Impact	Extent	Duration	Probability	Reversibility of impact	Significance without mitigation	Significance after mitigation
Invasion by alien invasive plant species	Local	Long-term	Probable	Medium	Moderate	Low
Impact on Irreplaceable Resources (after mitigation) If yes, please explain					YES	NO
Cumulative impact rating (after mitigation) If high, please explain				Low	Medium	High

Summary of impacts

Construction Phase

Name of Impact	Significance without mitigation	Significance after mitigation
Loss of natural habitat	Moderate	Moderate
Loss of listed / protected flora/trees	Low	Low
Loss of sensitive fauna	Low	Low

Post-Construction and Operational Phase

Name of Impact	Significance without mitigation	Significance after mitigation
Invasion by alien invasive plant species	Moderate	Low

Comparison of alternatives

Both alternatives cross similar plains habitat that have Medium sensitivity. From this perspective, either option is therefore acceptable. Alternative 1 (preferred) is slightly longer, but Alternative 2 crosses an area where Giant Bullfrog was found. The species is likely to be more widespread than just the locality it was observed, but the confirmed location should be avoided, if possible. The entire northern section of Alternative 1 (preferred) is along a fenceline that has an existing road / fire-break. This is an existing disturbance that can be utilized as an access road.

CONCLUSIONS

- The regional vegetation type that occurs on site and in surrounding areas is not listed or of conservation concern.
- The corridors are both partially within a Critical Biodiversity Area 2 and partially within an Ecological Support Area (ESA), the latter of which extends across vast distances in all areas close to De Aar. There are therefore no options outside of this ESA for the project, and the CBA2 area is the location of the associated solar PV project, which has already been authorised.
- No plant species of concern were found on site. One Rare plant species, *Tridentea virescens*, could potentially occur in the general area but was not seen. It occurs across a very wide geographical area and loss of a small area of habitat will not affect the species.
- One protected amphibian, the Giant Bullfrog (*Pyxicephalus adspersus*), was found on site. The observation was within the Alternative 2 corridor in a specific location where it is likely to be resident. Loss of a small area of habitat for the proposed projects will not adversely affect the species, but it would be preferable to avoid impacts, if possible. From this perspective, Alternative 1 (preferred) is therefore marginally preferred here.
- Impacts of the proposed project components are relatively insignificant in comparison to the variety of approved solar PV projects within the immediate surroundings.

RECOMMENDATIONS

The following recommendations are made to protect and enhance sensitive ecological features on site, which occur outside the proposed footprint areas:

- The small depressions within the Alternative 2 corridor on site should be treated as moderately sensitive. Measures should be implemented to protect these areas from direct impacts.
- Alien invasive species must be strictly managed.

REFERENCES:

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Appendix 1: Checklist of plant species found on site and nearby.

Species	Category
<i>Afroscirpodes dioeca</i>	
<i>Agave americana</i>	Category
<i>Aizoon africanum</i>	
<i>Aizoon canariense</i>	
<i>Aizoon plinthoides</i>	
<i>Albuca</i> sp.	
<i>Aloe broomii</i>	
<i>Aptosimum marlothii</i>	
<i>Argemone ochroleuca</i>	Category 1b
<i>Aristida adscensionis</i>	
<i>Aristida congesta</i> subsp. <i>congesta</i>	
<i>Asparagus glaucus</i>	
<i>Asparagus striatus</i>	
<i>Asplenium cordatum</i>	
<i>Berkheya pinnatifida</i>	
<i>Berkheya spinosissima</i>	
<i>Boscia albitrunca</i>	PROTECTED
<i>Bulbine frutescens</i>	
<i>Cadaba aphylla</i>	
<i>Cenchrus ciliaris</i>	
<i>Chelanthes eckloniana</i>	
<i>Chloris virgata</i>	
<i>Chrysocoma ciliata</i>	
<i>Coccinia sessilifolia</i>	
<i>Cucumis africanus</i>	
<i>Cynodon dactylon</i>	
<i>Cynodon incompletus</i>	
<i>Cyperus usitatus</i>	
<i>Datura ferox</i> *	Category 1b
<i>Diospyros austro-africana</i>	
<i>Dipcade crispum</i>	
<i>Eleocharis dregeana</i>	
<i>Enneapogon cenchroides</i>	
<i>Enneapogon desvauxii</i>	
<i>Eragrostis bergiana</i>	
<i>Eragrostis bicolor</i>	
<i>Eragrostis curvula</i>	
<i>Eragrostis homomalla</i>	
<i>Eragrostis lehmanniana</i>	
<i>Eragrostis obtusa</i>	
<i>Eriocephalus africanus</i>	
<i>Eriocephalus ericoides</i>	
<i>Felicia filifolia</i>	
<i>Fingerhuthia africana</i>	
<i>Gazania jurineifolia</i>	
<i>Gazania krebsiana</i>	
<i>Gomphocarpus fruticosus</i>	
<i>Helichrysum</i> sp.	

Heliophila minima	
Hermannia althaeifolia	
Hermannia coccocarpa	
Heteropogon contortus	
Hibiscus trionum	
Indigofera alternans	
Jamesbrittenia sp.	
Juncus rigidus	
Kohautia amatymbica	
Lasiosiphon polycephalus	
Ledebouria apertiflora	
Limosella major	
Lobelia thermalis	
Lycium cinereum	
Lycium horridum	
Mesembryanthemum coriarium	
Mesembryanthemum junceum	
Mestoklema tuberosum	
Monsonia salminiflora	
Opuntia engelmannii	Category 1b
Opuntia robusta*	Category 1b
Osteospermum scariosum	
Osteospermum spinescens	
Panicum impeditum	
Peliostomum leucorrhizum	
Pentzia incana	
Pentzia sphaerocephala	
Phragmites australis	
Phymaspermum parvifolium	
<i>Polygala ephedroides</i>	
Prosopis glandulosa	Category 1b
Ruschia intricata	
Scabiosa columbaria	
Schoenoplectus muricinux	
Searsia burchellii	
Selago sp.	
Solanum elaeagnifolium	Category 1b
Solanum sp.	
Stipagrostis obtusa	
Stipagrostis uniplumis	
Themeda triandra	
Tragus berteronianus	
Tragus koelerioides	
Tribulus terrestris	
Zygophyllum sp.	

Appendix 2: Checklist of animal species found on site or nearby.

Species	Category
REPTILES:	
Trachylepis sulcata	
Naja nivea	
Psammobates tentorius	NEAR THREATENED
MAMMALS	
Antidorcus marsupialis	
Raphicerus campestris	
Elephantulus rupestris	
Hystrix africaeaustralis	
Orycteropus afer	
Geosciurus inauris	
Procavia capensis	
Lepus saxatilis	
Pronolagus saundersiae	
Xerus inauris	
AMPHIBIANS	
Amietia poyntoni	
Tomopterna tandyi	
Pyxicephalus adspersus	PROTECTED
Poytonophrynus vertebralis	
INVERTEBRATES	
Locustana pardalina	
Acanthopplus sp.	
Hycleus burmeisteri	
Subfamily Coenosiinae	
Tribe Tylopsidini	
Scarabeus sp.	
Subfamily Asilinae	
Orthetrum caffrum	
Zonocerus elegans	
Family Lycosidae	
Genus Argiope	
Vanessa cardui	

Appendix 3: List of protected tree species (National Forests Act).

<i>Vachellia erioloba</i>	<i>Vachellia haematoxylon</i>
<i>Adansonia digitata</i>	<i>Azelia quanzensis</i>
<i>Balanites</i> subsp. <i>maughamii</i>	<i>Barringtonia racemosa</i>
<i>Boscia albitrunca</i>	<i>Brachystegia spiciformis</i>
<i>Breonadia salicina</i>	<i>Bruguiera gymnorhiza</i>
<i>Cassipourea swaziensis</i>	<i>Catha edulis</i>
<i>Ceriops tagal</i>	<i>Cleistanthus schlechteri</i> var. <i>schlechteri</i>
<i>Colubrina nicholsonii</i>	<i>Combretum imberbe</i>
<i>Curtisia dentata</i>	<i>Elaeodendron (Cassine) transvaalensis</i>
<i>Erythrophysa transvaalensis</i>	<i>Euclea pseudebenus</i>
<i>Ficus trichopoda</i>	<i>Leucadendron argenteum</i>
<i>Lumnitzera racemosa</i> var. <i>racemosa</i>	<i>Lydenburgia abottii</i>
<i>Lydenburgia cassinoides</i>	<i>Mimusops caffra</i>
<i>Newtonia hildebrandtii</i> var. <i>hildebrandtii</i>	<i>Ocotea bullata</i>
<i>Ozoroa namaensis</i>	<i>Philenoptera violacea</i> (<i>Lonchocarpus capassa</i>)
<i>Pittosporum viridiflorum</i>	<i>Podocarpus elongatus</i>
<i>Podocarpus falcatus</i>	<i>Podocarpus henkelii</i>
<i>Podocarpus latifolius</i>	<i>Protea comptonii</i>
<i>Protea curvata</i>	<i>Prunus africana</i>
<i>Pterocarpus angolensis</i>	<i>Rhizophora mucronata</i>
<i>Sclerocarya birrea</i> subsp. <i>caffra</i>	<i>Securidaca longependunculata</i>
<i>Sideroxylon inerme</i> subsp. <i>inerme</i>	<i>Tephrosia pondoensis</i>
<i>Warburgia salutaris</i>	<i>Widdringtonia cedarbergensis</i>
<i>Widdringtonia schwarzii</i>	

Boscia albitrunca has a geographical distribution that includes the study area.