

Plant Theme Compliance Statement

prepared in accordance with the
"Protocol for the Specialist Assessment and minimum report content requirements for environmental impacts on Terrestrial Plant Species"

Paarde Valley PV2 to Vetlaagte MTS Grid Connection Project near
De Aar in Northern Cape Province



David Hoare Consulting (Pty) Ltd



David Hoare
Consulting (Pty) Ltd

Address:
Postnet Suite #116
Private Bag X025
Lynnwood Ridge
0040

41 Soetdoring Avenue
Lynnwood Manor
Pretoria

Telephone: 087 701 7629
Cell: 083 284 5111
Fax: 086 550 2053
Email: dhoare@lantic.net

Plant Theme Compliance Statement Report for the proposed Paarde Valley PV2 to Vetlaagte MTS Grid Connection Project near De Aar in Northern Cape Province

For: Paarde Valley PV2 (Pty) Ltd

5 July 2022

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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 plant species**", 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
Dr David Hoare	PhD Pr.Sci.Nat. 400221/05 (Ecological Science, Botanical Science)

Details of Author:

Dr David Hoare

PhD (Botany) – Nelson Mandela Metropolitan University, Port Elizabeth

Main areas of specialisation

- Vegetation and general ecology (grasslands, savanna, Albany thicket, fynbos, coastal systems, wetlands).
- Plant biodiversity and threatened plant species specialist.
- Alien plant identification and control / management plans.
- Remote sensing, analysis and mapping of vegetation.
- Specialist consultant for environmental management projects.

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

Member, International Association of Vegetation Scientists (IAVS)

Member, Ecological Society of America (ESA)

Member, International Association for Impact Assessment (IAIA)

Member, Herpetological Association of Africa (HAA)

Employment history

- 1 December 2004 – present, Director, David Hoare Consulting (Pty) Ltd. Consultant, specialist consultant contracted to various companies and organisations.
- 1 January 2009 – 30 June 2009, Lecturer, University of Pretoria, Botany Dept.
- 1 January 2013 – 30 June 2013, Lecturer, University of Pretoria, Botany Dept.
- 1 February 1998 – 30 November 2004, Researcher, Agricultural Research Council, Range and Forage Institute, Private Bag X05, Lynn East, 0039. Duties: project management, general vegetation ecology, remote sensing image processing.

Declaration of independence:

David Hoare Consulting (Pty) Ltd in an independent consultant and hereby declares that it does not have any financial or other vested interest in the undertaking of the proposed activity, other than remuneration for the work performed in terms of the National Environmental Management Act, 1998 (Act 107 of 1998). In addition, remuneration for services provided by David Hoare Consulting (Pty) Ltd is not subjected to or based on approval of the proposed project by the relevant authorities responsible for authorising this proposed project.

Disclosure:

David Hoare Consulting (Pty) Ltd undertakes to disclose, to the competent authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) and will provide the competent authority with access to all information at its disposal regarding the application, whether such information is favourable to the applicant or not.

Based on information provided to David Hoare Consulting (Pty) Ltd by the client and in addition to information obtained during the course of this study, David Hoare Consulting (Pty) Ltd presents the results and conclusion within the associated document to the best of the author's professional judgement and in accordance with best practise.



Dr David Hoare

5 July 2022

Date

TERMS OF REFERENCE

PROTOCOL FOR THE SPECIALIST ASSESSMENT AND MINIMUM REPORT CONTENT REQUIREMENTS FOR ENVIRONMENTAL IMPACTS ON TERRESTRIAL PLANT SPECIES

This site sensitivity assessment follows the requirements of The Environmental Impact Assessment Regulations, 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.

General information

1.1 An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of “**very high**” or “**high**” sensitivity for terrestrial plant species, must submit a Terrestrial Plant Species Specialist Assessment Report.

1.2 An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of “**medium** sensitivity” for terrestrial plant species, must submit either a Terrestrial Plant Species Specialist Assessment Report or a Terrestrial Plant Species Compliance Statement, depending on the outcome of a site inspection undertaken in accordance with paragraph 4.

1.3 An applicant intending to undertake an activity identified in the scope of this protocol, on a site identified by the screening tool as being of “**low**” sensitivity for terrestrial plant species, must submit a Terrestrial Plant Species Compliance Statement.

1.4 Where the information gathered from the site sensitivity verification differs from the screening tool designation of “very high” or “high” for terrestrial plant species sensitivity on the screening tool, and it is found to be of a “low” sensitivity, then a Terrestrial Plant Species Compliance Statement must be submitted.

1.5 Where the information gathered from the site sensitivity verification differs from the screening tool designation of “low” terrestrial plant species sensitivity and it is found to be of a “very high” or “high” terrestrial plant species sensitivity, a Terrestrial Plant Species Specialist Assessment must be conducted.

1.6 If any part of the development falls within an area of confirmed “very high” or “high” sensitivity, the assessment and reporting requirements prescribed for the “very high” or “high” sensitivity, apply to the entire development footprint. Development footprint in the context of this protocol, means the area on which the proposed development will take place and includes the area that will be disturbed or impacted.

1.7 The Terrestrial Plant Species Specialist Assessment and the Terrestrial Plant Species Compliance Statement must be undertaken within the study area.

1.8 Where the nature of the activity is not expected to have an impact on species of conservation concern (SCC) beyond the boundary of the preferred site, the study area means the proposed development footprint within the preferred site.

1.9 Where the nature of the activity is expected to have an impact on SCC beyond boundary of the preferred site, the project areas of influence (PAOI) must be determined by the specialist in accordance with Species Environmental Assessment Guideline, and the study area must include the PAOI, as determined.

Terrestrial Plant Species Specialist Assessment

2.1 The assessment must be undertaken by a specialist registered with the South African Council for Natural Scientific Professions (SACNASP), within a field of practice relevant to the taxonomic groups ("taxa") for which the assessment is being undertaken.

2.2 The assessment must be undertaken within the study area.

2.3 The assessment must be undertaken in accordance with the Species Environmental Assessment Guideline and must:

2.3.1 Identify the SCC which were found, observed or are likely to occur within the study area;

2.3.2 provide evidence (photographs) of each SCC found or observed within the study area, which must be disseminated by the specialist to a recognized online database facility immediately after the site inspection has been performed (prior to preparing the report contemplated in paragraph 3);

2.3.3 identify the distribution, location, viability and detailed description of population size of the SCC identified within the study area;

2.3.4 identify the nature and the extent of the potential impact of the proposed development to the population of the SCC located within the study area;

2.3.5 determine the importance of the conservation of the population of the SCC identified within the study area, based on information available in national and international databases including the IUCN Red List of Threatened Species, Red List of South African Plants, and/or other relevant databases;

2.3.6 determine the potential impact of the proposed development on the habitat of the SCC located within the study area;

2.3.7 include a review of relevant literature on the population size of the SCC, the conservation interventions as well as any national or provincial species management plans for the SCC. This review must provide information on the need to conserve the SCC and indicate whether the development is compliant with the applicable species management plans and if not, a motivation for the deviation;

2.3.8 identify any dynamic ecological processes occurring within the broader landscape, that might be disrupted by the development and result in negative impact on the identified SCC, for example, fires in fire-prone systems;

2.3.9 identify any potential impact on ecological connectivity within the broader landscape, and resulting impacts on the identified SCC and its long term viability;

2.3.10 determine buffer distances as per the Species Environmental Assessment Guidelines used for the population of each SCC; and

2.3.11 discuss the presence or likelihood of additional SCC including threatened species not identified by the screening tool, Data Deficient or Near Threatened Species, as well as any undescribed species; and

2.3.12 identify any alternative development footprints within the preferred development site which would be of "low" sensitivity" or "medium" sensitivity as identified by the screening tool and verified through the site sensitivity verification.

2.4 The findings of the assessment must be written up in a Terrestrial Plant Species Specialist Assessment Report.

Terrestrial Plant Species Specialist Assessment Report

3.1 This report must include as a minimum the following information:

3.1.1 contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the assessment including a curriculum vitae;

3.1.2 a signed statement of independence by the specialist;

3.1.3 a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;

3.1.4 a description of the methodology used to undertake the site sensitivity verification and impact assessment and site inspection, including equipment and modelling used where relevant;

3.1.5 a description of the assumptions made and any uncertainties or gaps in knowledge or data;

3.1.6 a description of the mean density of observations/number of samples sites per unit area of site inspection observations;

3.1.7 details of all SCC found or suspected to occur on site, ensuring sensitive species are appropriately reported;

3.1.8 the online database name, hyperlink and record accession numbers for disseminated evidence of SCC found within the study area;

3.1.9 the location of areas not suitable for development and to be avoided during construction where relevant;

3.1.10 a discussion on the cumulative impacts;

3.1.11 impact management actions and impact management outcomes proposed by the specialist for inclusion in the Environmental Management Programme (EMPr);

3.1.12 a reasoned opinion, based on the findings of the specialist assessment, regarding the acceptability or not, of the development related to the specific theme considered, and if the development should receive approval or not, related to the specific theme being considered, and any conditions to which the opinion is subjected if relevant; and

3.1.13 a motivation must be provided if there were any development footprints identified as per paragraph 2.3.12 above that were identified as having "low" or "medium" terrestrial plant species sensitivity and were not considered appropriate.

3.2 A signed copy of the assessment must be appended to the Basic Assessment Report or Environmental Impact Assessment Report.

Terrestrial Plant Species Compliance Statement

5.1 The compliance statement must be prepared by a SACNASP registered specialist under one of the two fields of practice (Botanical Science or Ecological Science).

5.2 The compliance statement must:

5.2.1 be applicable within the study area;

5.2.2 confirm that the study area is of "low" sensitivity for terrestrial plant species; and

5.2.3 indicate whether or not the proposed development will have any impact on SCC.

5.3 The compliance statement must contain, as a minimum, the following information:

5.3.1 contact details and relevant experience as well as the SACNASP registration number of the specialist preparing the compliance statement including a curriculum vitae;

5.3.2 a signed statement of independence by the specialist;

5.3.3 a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;

5.3.4 a description of the methodology used to undertake the site survey and prepare the compliance statement, including equipment and modelling used where relevant;

5.3.5 where required, proposed impact management actions and outcomes or any monitoring requirements for inclusion in the EMPr;

5.3.6 a description of the assumptions made and any uncertainties or gaps in knowledge or data;

5.3.7 the mean density of observations/ number of samples sites per unit area; and

5.3.8 any conditions to which the compliance statement is subjected.

A signed copy of the Terrestrial Plant Species Compliance Statement must be appended to the Basic Assessment Report or the Environmental Impact Assessment Report.

INTRODUCTION

Site location and details

The proposed infrastructure is a powerline connecting the authorized Paarde Valley PV2 to the Vetlaagte MTS. This is just to the north, north-east and 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 non-perennial stream close to the Paarde Valley PV2 substation site, and the ground rises from there eastwards. 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 to the north of the Vetlaagte MTS, and a railway line very close to the Paarde Valley PV2.

In accordance with GN 320 and GN 1150 (20 March 2020) of the NEMA EIA Regulations of 2014 (as amended), prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (i.e., Screening Tool). David Hoare Consulting, as the Ecological specialist, have been commissioned to verify the sensitivity of the site under these specialist protocols.

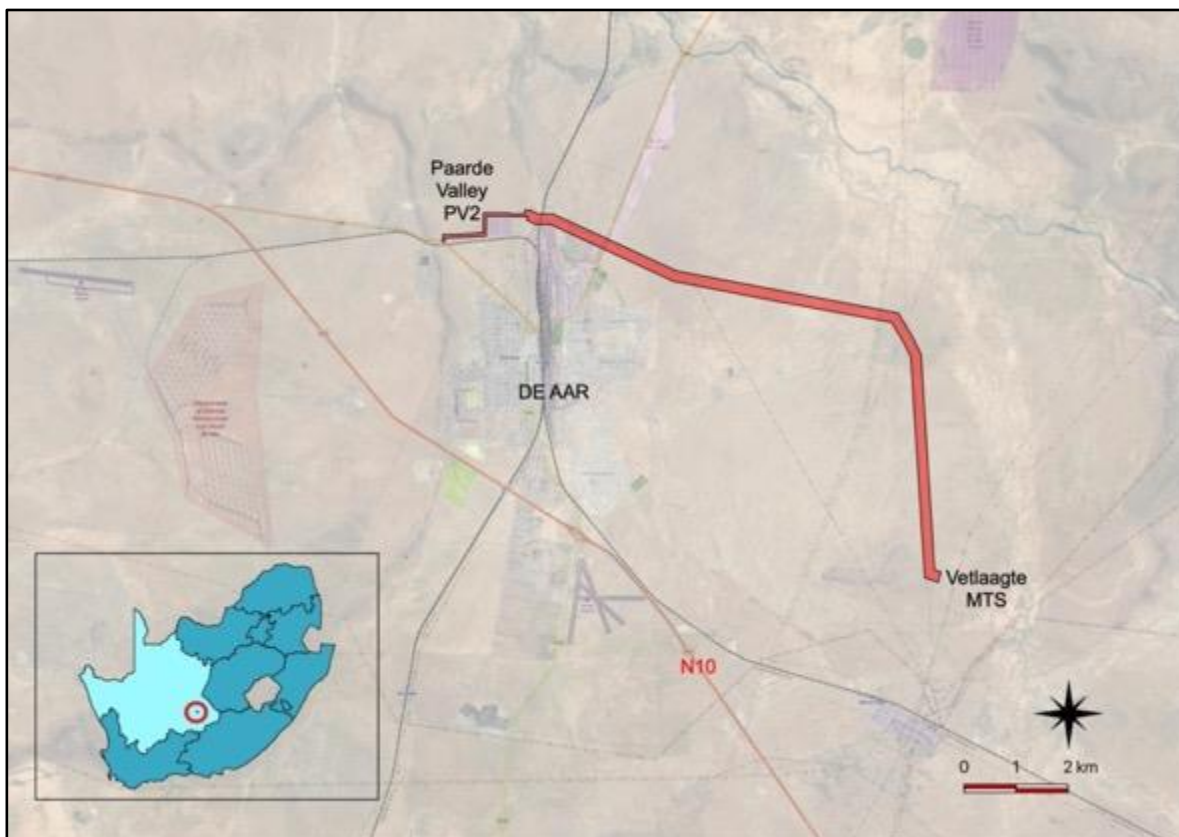


Figure 1: Location of the site adjacent to De Aar.

The scope of this report is the 200 m corridor, the boundary of which is shown in Figure 2.

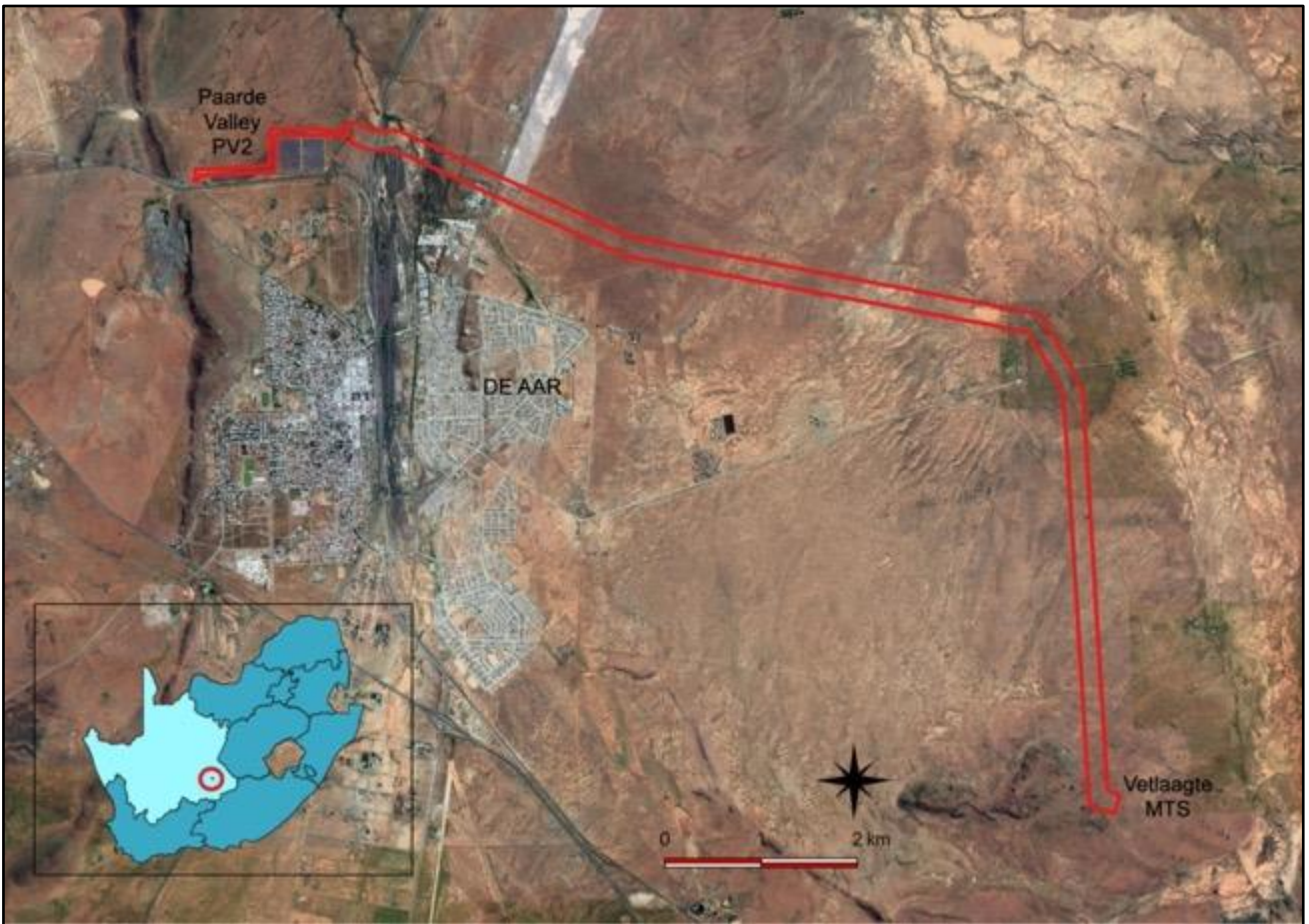


Figure 2: Aerial image of the corridor.

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 | Powerline. The DEA Screening Tool report for the area, dated 13/06/2022, indicates the following ecological sensitivities:

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Plant Species Theme			X	

Sensitivity features are indicated as follows:

Sensitivity	Feature(s)
Low	Low sensitivity
Medium	Hereroa concava
Medium	Tridentea virescens

In accordance with GN 320 and GN 1150 (20 March 2020) of the NEMA EIA Regulations of 2014 (as amended), prior to commencing with a specialist assessment, a site sensitivity verification must be undertaken to confirm the current land use and environmental sensitivity of the proposed project area as identified by the National Web-Based Environmental Screening Tool (i.e., Screening Tool). This Site Sensitivity Verification concluded that the site has **LOW** sensitivity for the Terrestrial Plant Species theme on the basis that no SCC were found on site and that the site is not suitable habitat for a SCC.

SITE SENSITIVITY VERIFICATION 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 ideal survey time in this biome is March (Figure 3). 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 optimal in terms of assessing the flora and vegetation of the site. The vegetation on site was in good condition in terms of the seasonal presence of perennial plant species. The overall condition of the vegetation was possible to be determined with a high degree of confidence.

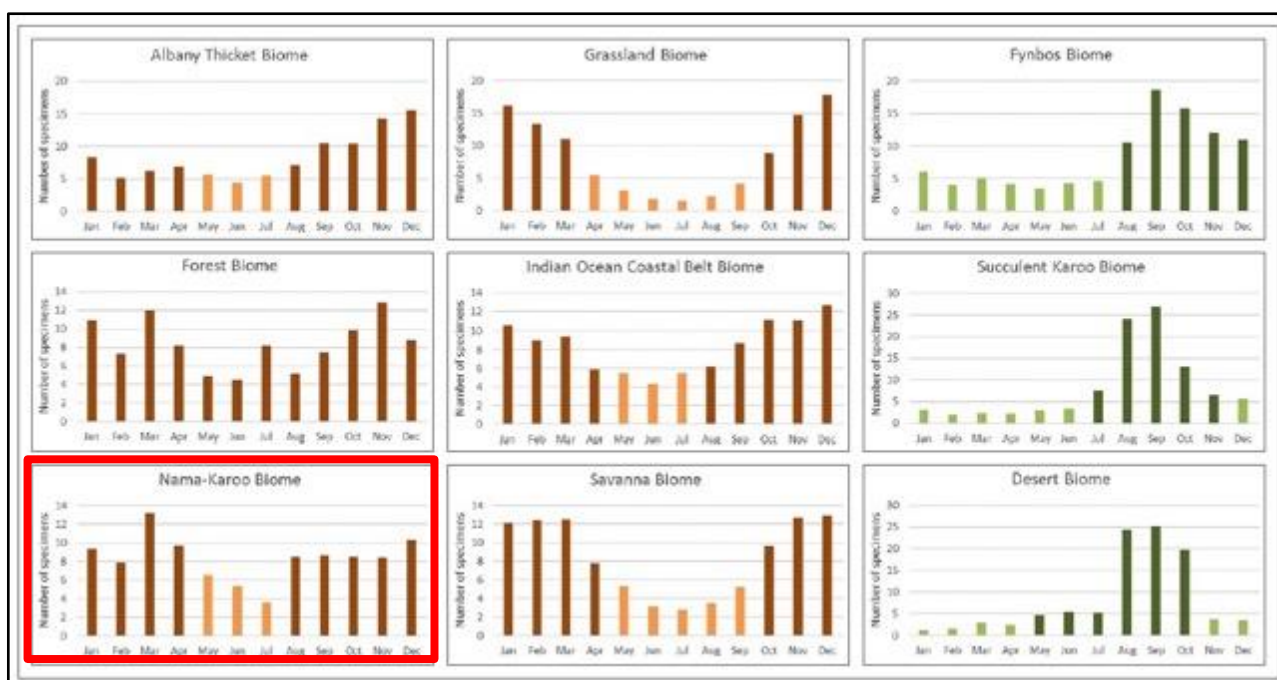


Figure 3: Recommended survey periods for different biomes (Species Environmental Assessment Guidelines). The site is within the Nama Karoo Biome.

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.

Limitations

The following assumptions, limitations, uncertainties are listed regarding the assessment of the site:

- The assessment is based on a single site visit. The current study is based on an extensive site visit as well as a desktop study of the available information. The time spent on site was adequate for understanding general patterns across affected areas.
- Compiling the list of species that could potentially occur on site is limited by the paucity of collection records for the area. The list of plant species that could potentially occur on site was therefore taken from a wider area and from literature sources that may include species

that do not occur on site and may miss species that do occur on site. In order to compile a comprehensive site-specific list of the biota on site, studies would be required that would include different seasons, be undertaken over a number of years and include extensive sampling. Due to legislated time constraints for environmental authorisation processes, this is not possible.

- Rare and threatened plant and animal species are, by their nature, usually very difficult to locate and can be easily missed.

OUTCOME OF THE ASSESSMENT

Broad vegetation patterns

There is one regional vegetation type in the study area, namely Northern Upper Karoo (NKu3), which occurs throughout the site (Figure 4), 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

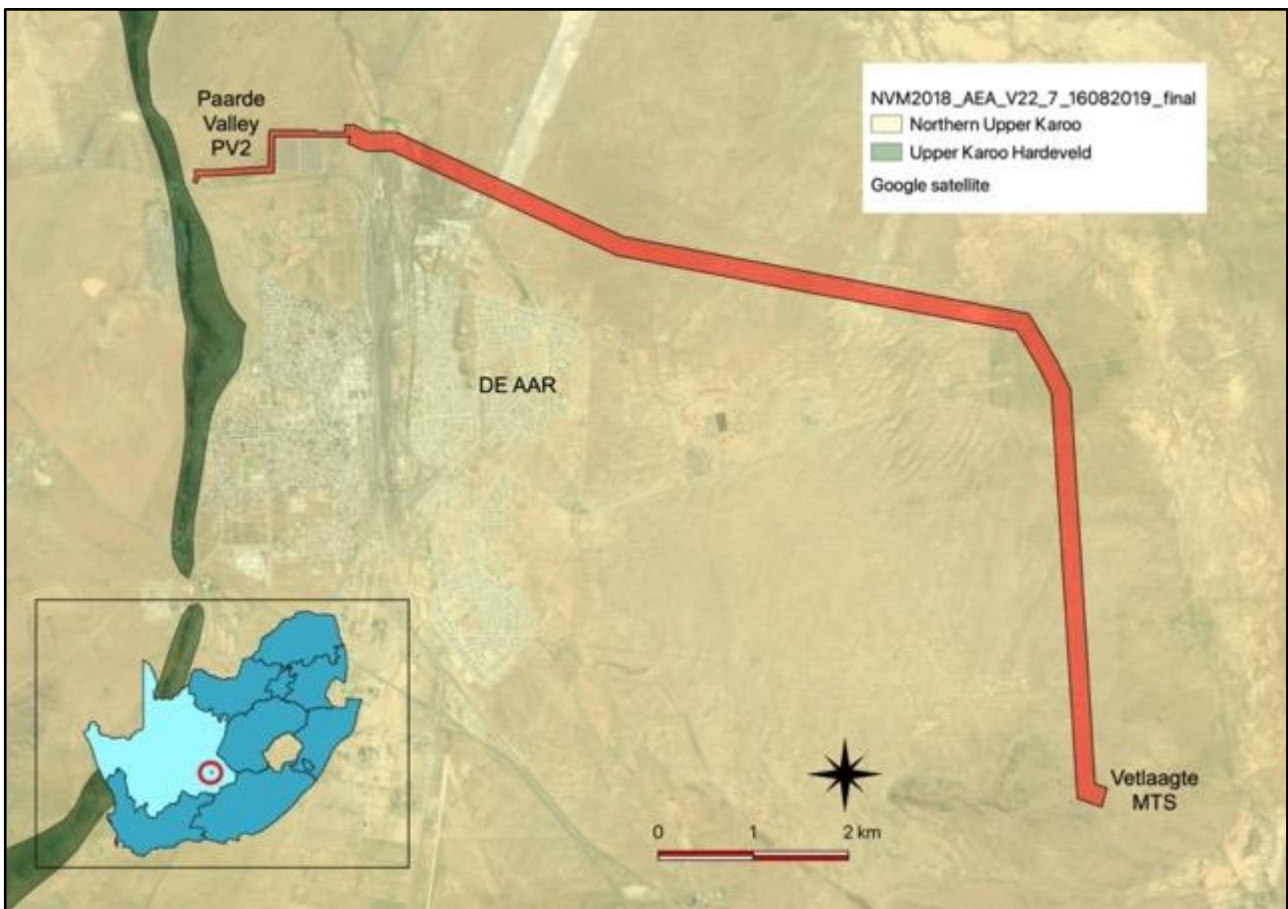


Figure 4: Regional vegetation types of the site and surrounding areas.

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. *detinens*, *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 karoocicus*, *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 szyszyłowiczii* 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 Upper 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 Upper Karoo	Least threatened	LC	LC

Habitats found on site

Plains

This is the widespread plains vegetation of the area around De Aar and occupies most of the area within the corridor (Figure 4). It is generally found on loamy soils with relatively low rock cover. The vegetation consists mostly of low dwarf shrubs, along with various grasses, especially after recent rainfall. It is relatively species poor, and is uniform across wide areas. There are some areas that are slightly raised relative to the general lowland plains, and have shallow rocky soils. They often occur on low rises, as well as forming a gradient to hills. The vegetation has many more dwarf shrubs and less grass than the lowland plains, and there is a higher species richness and more diverse local composition.

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*,

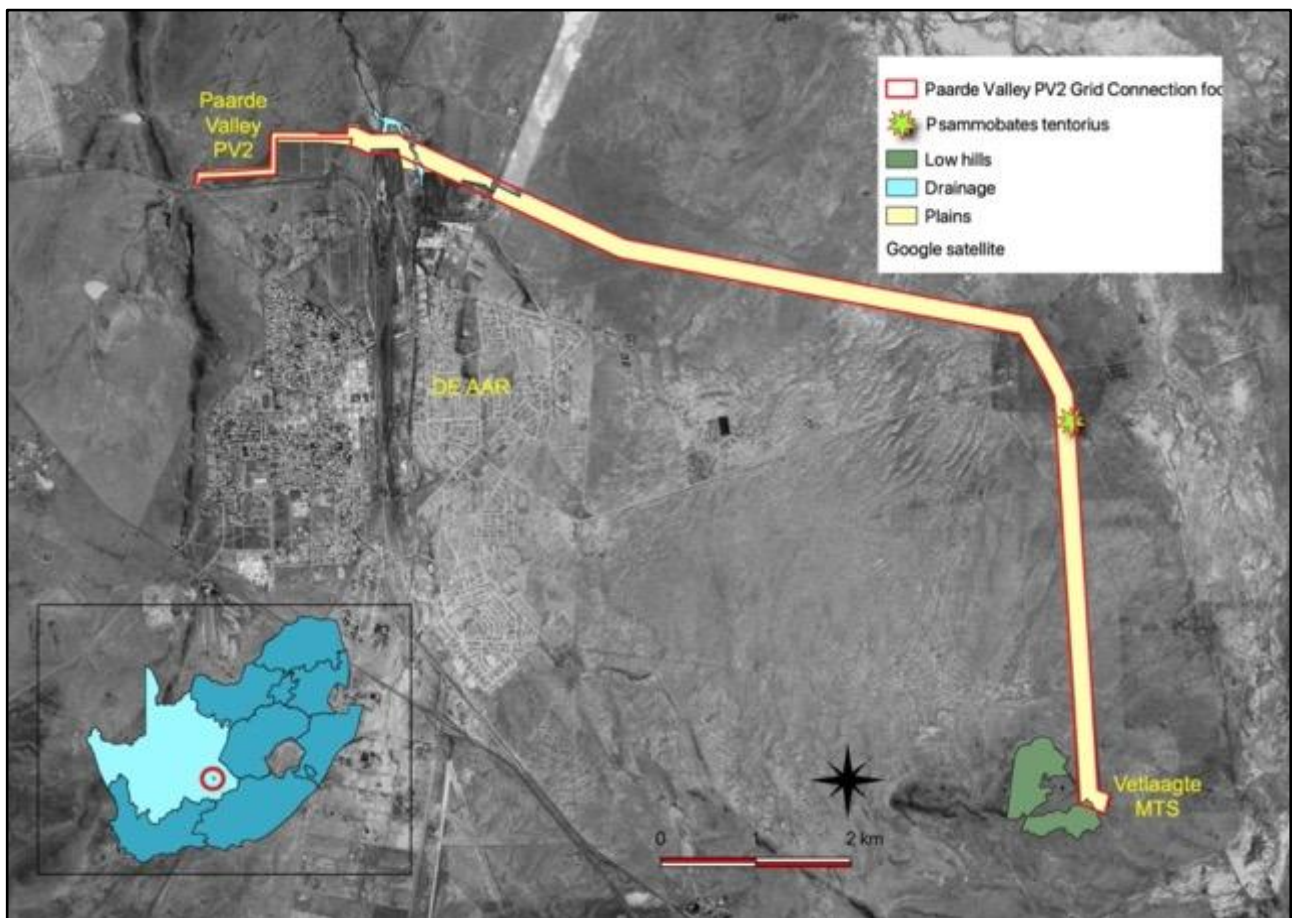


Figure 4: Habitats within the corridor.

Stipagrostis uniplumis, *Enneapogon cenchroides*, and *Cynodon dactylon*. It is relatively species poor, in terms of plant species, and is uniform across wide areas.

Low hills

There are a small number of low hills at the southern end of the study area (Figure 4) that have a steeper topography than the surrounding plains, are more rocky, and include various amounts of scattered rock and outcrops.

The vegetation is much more diverse than the surrounding plains and includes a higher diversity of woody shrubs, such as *Searsia burchellii*, *Diospyros austro-africanus*, *Boscia albitrunca* (PROTECTED TREE), *Asparagus glaucus*, and *Felicia filifolia*. The grass species composition is also different and includes *Heteropogon contortus*, *Themeda triandra*, and *Cenchrus ciliaris*.

Drainage

In the general De Aar area, the drainage areas include a variety of valley bottoms that are sometimes channelled and sometimes not, depending on the size. There is one of these that crosses the corridor near to the northern end (Figure 4). The margins generally grade into the surrounding karoo vegetation. The bottom is either bare soil or hollows that become waterlogged during rainfall. There are a number of built structures to hold back drainage, either for creating waterbodies or for erosion control. In places are well-defined channels in which recognisable wetland vegetation occurs. There are also local shallow depressions, as well as artificial waterholes, where wetland-like conditions exist.

Wetland vegetation is dominated by species such as *Afroscirpoides dioeca*, *Limosella major*, *Juncus rigidus*, *Eleocharis dregeana* and *Lobelia thermalis*. As is typical with wetland vegetation, there is often characteristic zonation driven by levels of water in the soils, sometimes resulting in localised areas dominated by a single species, and repetition of patterns in widely divergent areas.



Figure 5: View of plains vegetation in central part of corridor.



Figure 6: View of corridor along northern part of site.



Figure 7: North-western end of corridor.



Figure 8: Hill with rock outcrops.



Figure 9: Vegetation within hills showing scattered rock piles.



Figure 10: Typical view of plains at southern end of corridor.

Plant species that are flagged for the site

There are two plant species flagged for the site in the DEA Online Screening Tool output, namely *Tridentea virescens* (Figure 11), listed as Rare, and *Hereroa concava*, listed as Vulnerable.

Tridentea virescens

Tridentea virescens 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 (Figure 11). It occurs on stony ground, or on hard loam in floodplains. This habitat preference includes the entire section from the central bend to the Vetlaagte MTS. The species has been recorded twice previously near to De Aar and could possibly occur on site. However, it was not found, despite a careful search in suitable areas of habitat.

Hereroa concava

Due to taxonomic uncertainty, the distribution range of *Hereroa concava* is not well known. It appears to be endemic to a small area in the Great Karoo between Beaufort West, Richmond and De Aar. Plants occur sheltered among shrubs on flats and plateaus with shale outcrops. There are no known records from De Aar, although the site is within the overall geographical range known for the species. It was not found, despite a careful search in suitable areas of habitat.

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

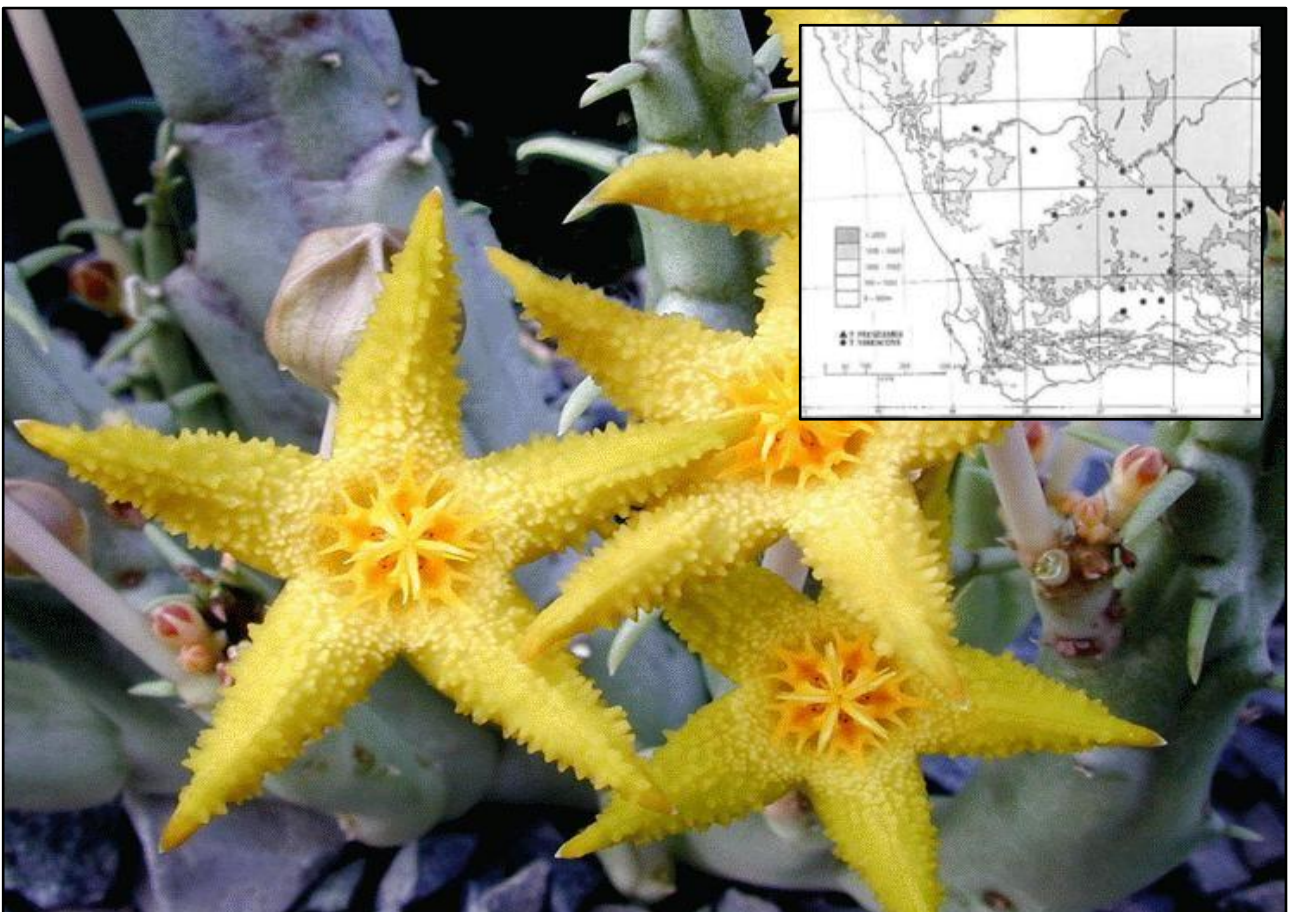


Figure 11: *Tridentea virescens* (picture from www.cactus-mall.com).

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. A number of individuals were found within the low hills at the southern end of the corridor, but outside of the assessed areas. This is close to the Vetlaagte MTS, but outside the footprint of the proposed infrastructure occurring in that area (proposed grid routes).

CONCLUSIONS

The following conclusions can be made regarding the outcomes of the Terrestrial Plant Species Specialist Assessment on site:

1. No SCC were found on site or are likely to occur there.
2. A small number of declared alien invasive species were found on site. These are listed in Appendix 1.
3. One protected tree species occurs near to the southern end of the corridor, namely *Boscia albitrunca*, but is unlikely to be affected by the proposed project.

RECOMMENDATIONS

The following is recommended:

1. An Alien Invasive Management Plan must be compiled for the project.
2. A permit must be obtained from Northern Cape Department of Environment and Nature Conservation (DENC) for any plant species that are protected under the Northern Cape Nature Conservation Act, 2009 (Act 9 of 2009).
3. If any individuals of the protected tree, *Boscia albitrunca*, are likely to be affected, a permit is required from the Department of Forestry, Fisheries and the Environment (DFFE) according to the requirements of the National Forests Act.

Required pre-construction survey

For permitting purposes, the following flora survey is required prior to construction activities taking place:

Detailed floristic walk-through survey of all footprint areas in order to document composition, especially of protected species. It is suggested this be undertaken after an appropriate time-period after rainfall, where possible, to allow emergence of any species of potential concern. The survey must also cover all footprint areas, including final road alignments. Renewable energy projects similar to the one assessed here tend to have high fluidity in terms of layout and technology, due to the current rapid evolution of the technology, which allows more efficient deployment of infrastructure. However, this means that "final" layouts regularly change. The walk-through survey:

1. MUST ASSESS THE FOOTPRINT THAT WILL BE CONSTRUCTED – if this changes then the new footprint areas must be subject to a walk-through survey in full.
2. MUST BE UNDERTAKEN IN THE CORRECT SEASON, if possible, taking administrative processes into account.
3. MUST BE ADEQUATELY RESOURCED TO ENSURE IT IS DONE PROPERLY.
4. MUST BE UNDERTAKEN BY A COMPETENT BOTANIST WITH KNOWLEDGE OF THE AREA.

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APPENDICES:

Appendix 1: Plant species recorded 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>	

Gomphocarpus fruticosus	
Helichrysum 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.	