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Terrestrial Plant Species Compliance Statement

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

Jessa cluster of wind energy facilities (Jessa M, Jessa S & Jessa Z)for ENERTRAG South Africa

Prepared by: Dr David Hoare
Pr.Sci.Nat. (Botany, Ecology) 400221/05

For: ENERTRAG (Pty) Ltd (South Africa)

08 March 2022

TABLE OF CONTENTS

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 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	Client	Signature
Dr David Hoare (Pr.Sci.Nat.)	PhD Botany	ENERTRAG	 Date: 08/03/2022

Details of Author:
Dr David Hoare

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

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 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).

_____ 08/03/2022

Dr David Hoare Date

TERMS OF REFERENCE

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

Prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration identified by the screening tool must be confirmed by the undertaking a site sensitivity verification. For the current site, the site web-based Online Screening Tool inidcated MEDIUM sensitivity for the Terrestrial Plant Species Theme. This was confirmed as part of the Site Sensitivity Verification process (suspected habitat for SCC).

According to the Protocols, the following process must be followed:

- The presence or likely presence of the SCC identified by the screening tool, must be confirmed through a site inspection by a specialist registered with the SACNASP in a field of practice relevant to the taxonomic group ("taxa") for which the assessment is being undertaken.
- The assessment must be undertaken within the study area.
- The site inspection to determine the presence or likely presence of SCC must be undertaken in accordance with the Species Environmental Assessment Guideline.
- The site inspection is to confirm the presence, likely presence or confirmed absence of a SCC within the site identified as "medium" sensitivity by the screening tool.
- Where SCC are found on site or have been confirmed to be likely present, a Terrestrial Plant Species Specialist Assessment must be submitted in accordance with the requirements specified for "very high" and "high" sensitivity in this protocol.
- Similarly, where no SCC are found on site during the investigation or if the presence is confirmed to be unlikely, a Terrestrial Plant Species Compliance Statement must be submitted.

On the basis of the outcome of the site inspection, where no SCC were found on site, a Compliance Statement process is followed here, although the presence of SCC on site is still possible.

TERRESTRIAL PLANT SPECIES COMPLIANCE STATEMENT

Where the sensitivity in the Screening Report from the web-based Online Screening Tool has been confirmed to be LOW, a Plant Species Compliance Statement is required, either (1) for areas where no natural habitat remains, or (2) in natural areas where there is no suspected occurrence of SCC.

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

The compliance stement must:

- be applicable within the study area
- confirm that the study area is of "low" sensitivity for terrestrial plant species; and
- indicate whether or not the proposed development will have anyimpact on SCC.

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

- contact details of the specialist, their SACNASP registration number, their field of expertise and a curriculum vitae;
- a signed statement of independence by the specialist;
- a statement on the duration, date and season of the site inspection and the relevance of the season to the outcome of the assessment;
- a baseline profile description of biodiversity and ecosystems of the site;

- the methodology used to verify the sensitivities of the terrestrial biodiversity and plant species features on the site including the equipment and modelling used where relevant;
- in the case of a linear activity, confirmation from the terrestrial biodiversity specialist that, in their opinion, based on the mitigation and remedial measures proposed, the land can be returned to the current state within two years of completion of the construction phase;
- where required, proposed impact management outcomes or any monitoring requirements for inclusion in the EMPr;
- a description of the assumptions made as well as any uncertainties or gaps in knowledge or data; and
- any conditions to which this statement is subjected.

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

INTRODUCTION

Project Background

ENERTRAG South Africa (Pty) Ltd ('ESA') has proposed construction of three (3) Wind Energy Facilities (WEFs) and associated grid connection infrastructure projects near Beaufort West in the Western Cape Province of South Africa. The above-mentioned WEF and associated grid connection infrastructure projects form part of a greater renewable energy project known as the 'Jessa Cluster', being proposed by ESA near the town of Beaufort West.

The Jessa Cluster consists of three (3) WEFs (including associated infrastructure) as well as three (3) associated grid connection infrastructure projects, as follows:

- Jessa M WEF – DFFE Reference Number: To be Allocated;
- Jessa M Grid Connection – DFFE Reference Number: To be Allocated;
- Jessa S WEF – DFFE Reference Number: To be Allocated;
- Jessa S M Grid Connection – DFFE Reference Number: To be Allocated;
- Jessa Z WEF – DFFE Reference Number: To be Allocated; and
- Jessa Z Grid Connection – DFFE Reference Number: To be Allocated.

Separate Basic Assessment (BA) processes are being undertaken for the above-mentioned WEF and grid connection projects which make up the Jessa Cluster. The location of the entire cluster of WEF and associated grid connection infrastructure projects is shown in Figure 1.

Figure 1: Location of the JESSA Cluster of projects south of Beauort West.

The grid connection infrastructure projects which form part of the Jessa Cluster require several key components to facilitate the distribution and transmission of electricity at a large scale, which includes the following:

- An onsite high voltage connecter substation (33kV/132kV) per Grid Connection project, to allow for the potential of multiple feeder bays of up to 132kV, as well as transformers, a control building, telecommunication infrastructure and access roads;
- 132kV powerlines (either single or double circuit), connecting each proposed Jessa WEF project to each other via the substations;
- 132kV transmission line from each WEF substation to the Eskom Droërivier Main Transmission Substation (MTS); and
- Upgrades to the existing Droërivier MTS (within the current footprint); or
- If required, an expansion / additional 132kV/400 kV MTS (approx. 20ha in extent).

ESA proposes to connect all three (3) WEF projects to the nearby Eskom Droërivier MTS through powerlines, transmitting up to 132kV (either single or double circuit). The proposed Jessa Grid Connection projects therefore aim to feed the electricity generated by the proposed Jessa WEF projects into the national grid.

To allow efficient transmission, the electricity generated by the wind turbines of the respective Jessa WEF projects undergoes a voltage 'step-up' process that occurs at each wind turbine, where power is stepped up to a maximum of 33kV (either in the turbine or in a small transformer container next to

the turbine) and again at each of the onsite WEF substations where power is stepped up to 132kV. The power is then transferred through a switching station (next to each WEF substation) along a 132kV line where it will connect into the Droërivier MTS and will form part of the national grid.

It is expected that the combined assessed project area (for all Jessa WEF and Grid Connection projects) will cover an area of approximately 13 000ha.

Project alternatives:

With regards to the Jessa Grid Connection projects, a site area of up to approximately 300 000m^2 (i.e., 550m x 550m or approximately 30ha) will also be assessed for the switching station portion of the substation[1] and connection of the associated powerlines which form part of each Grid Connection project.

In addition, three (3) 132kV powerline route alternatives will be assessed as part of the site area for each Grid Connection project, to link each proposed Jessa WEF project to the existing Eskom Droerivier MTS (see Figures 2-4 below). Powerline corridors with widths of 600m (i.e., 300m on either side of centre line) are being considered and assessed for the powerline route alternatives, to allow flexibility when routing the proposed powerlines within the authorised corridors.

It should be noted that only one (1) of the above-mentioned powerline corridor route alternatives will be required per Grid Connection project and thus the specialist is required to indicate whether one (1) of these alternatives has a preference over the others (including reasons for preferences).

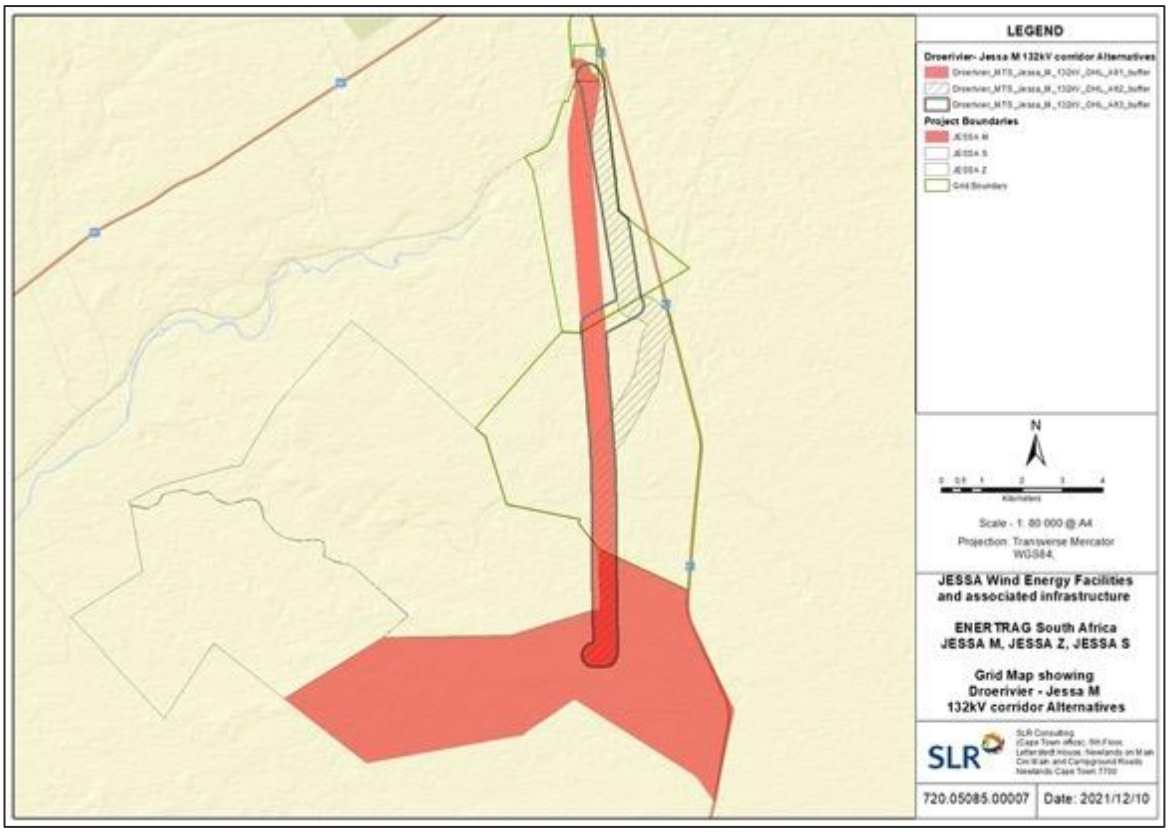

Figure 2: Powerline route alternatives to link proposed Jessa M WEF project to existing Eskom Dröerivier MTS

[1] Laydown, O&M buildings, ablutions and BESS will also be located within the 30ha footprint and is included in the respective Jessa WEF projects.

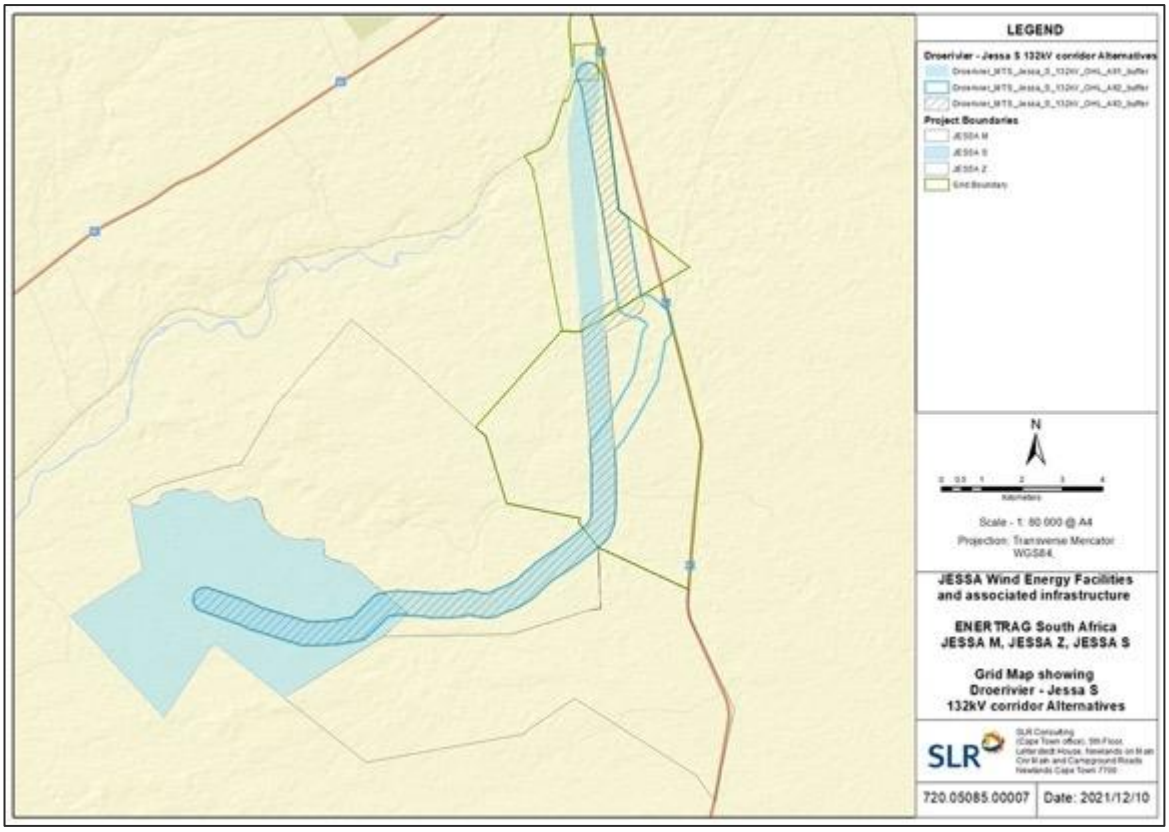

Figure 3: Powerline route alternatives to link proposed Jessa S WEF project to existing Eskom Dröerivier MTS

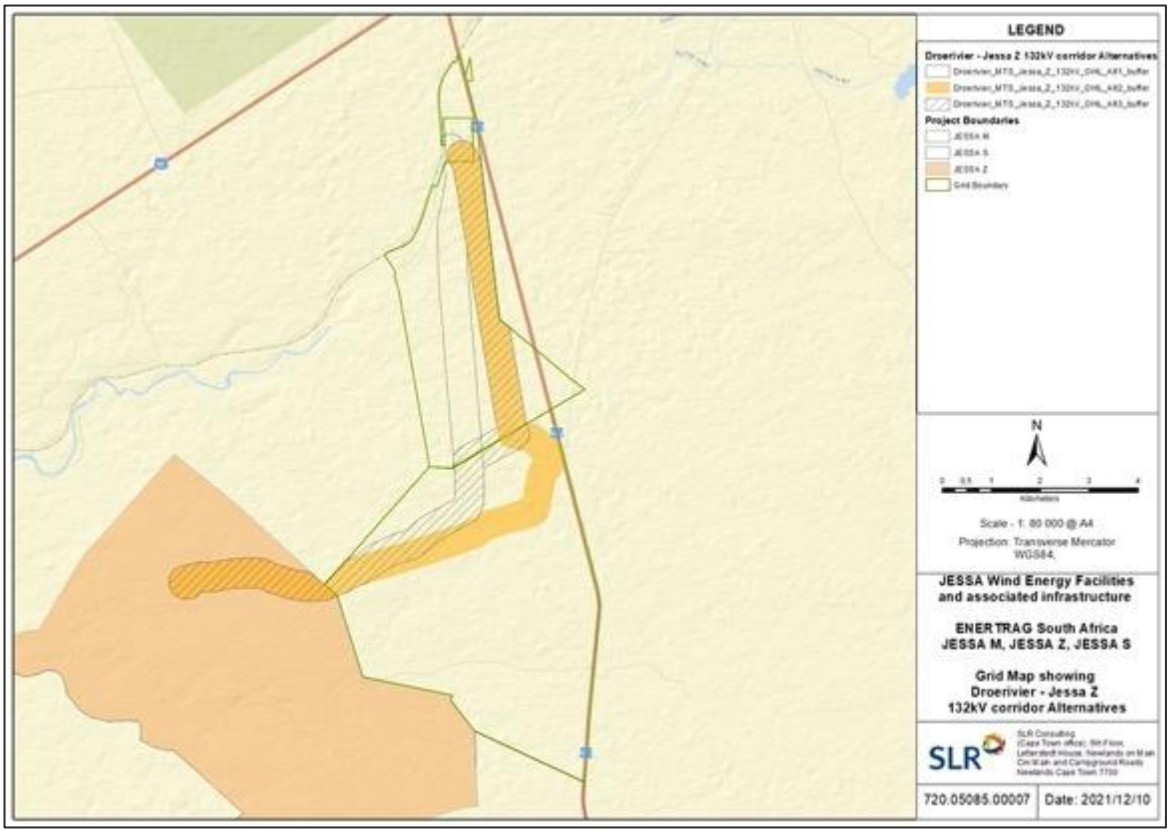

Figure 4: Powerline route alternatives to link proposed Jessa Z WEF project to existing Eskom Dröerivier MTS

In addition, to the powerline route alternatives to link the proposed Jessa WEF projects to the existing Eskom Droerivier MTS mentioned above, three (3) 132kV WEF connecting grid corridors to link the respective Jessa WEF projects (i.e., Jessa M – Jessa S; Jessa Z – Jessa M and Jessa Z to Jessa S) are also being assessed and proposed for authorisation (see Figure 5 below). Powerline corridors with widths of 600m (i.e., 300m on either side of centre line) have been considered and assessed for these WEF connecting grid corridors as well, to allow flexibility when routing the proposed powerline within the authorised corridors.

It should be noted that the Grid Connection projects are intrinsically linked to the WEF projects and three (3) WEF connecting grid corridors are required to ensure that the respective Jessa WEF projects connect to various connector substations, which will feed electricity generated by the WEF projects into the national grid via 132kV powerlines connecting to the Dröerivier MTS (Figure 5). As such, all three (3) WEF connecting grid corridors being assessed will need to be authorised by the DFFE, to allow the respective Jessa WEF projects to connect to the national grid, should one (1) of the proposed grid connection infrastructure projects not received EA.

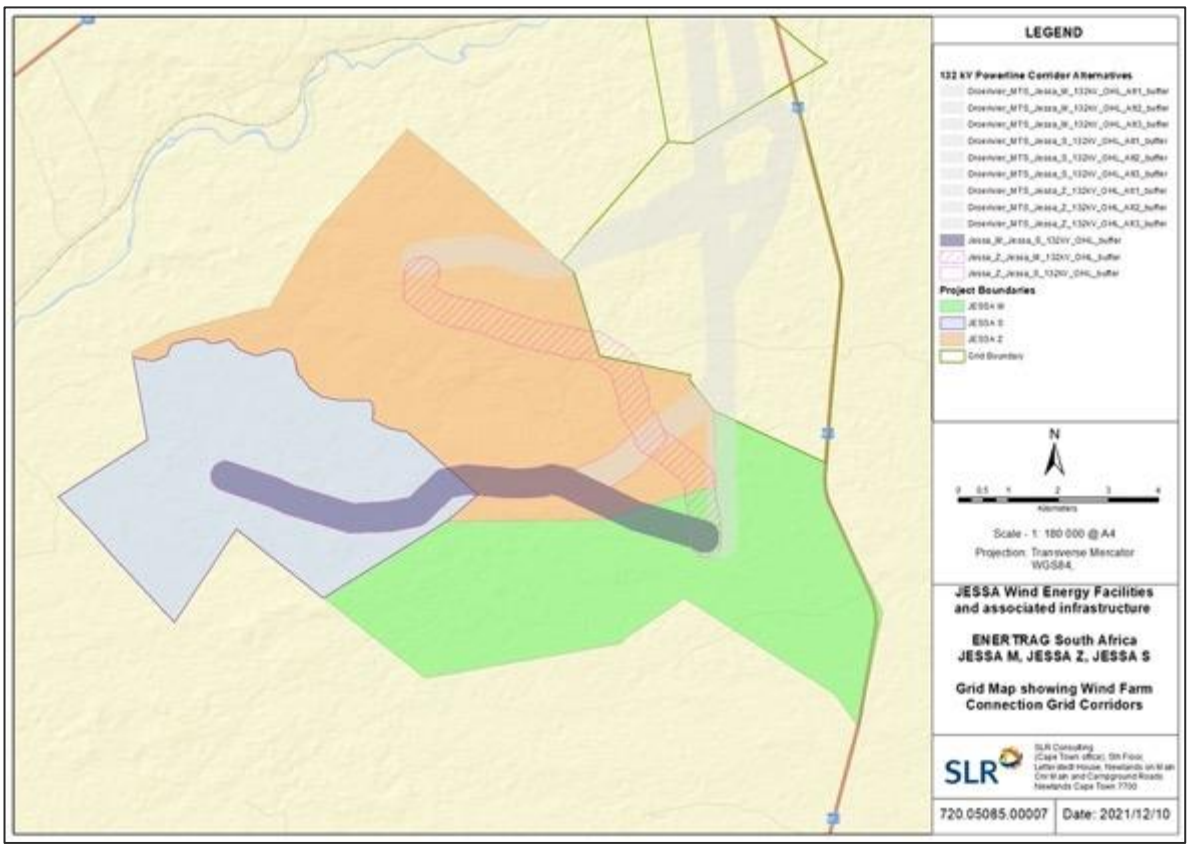

Figure 5: WEF connecting grid corridors to link proposed Jessa M, Jessa S and Jessa Z WEF projects

As an alternative to connecting directly to the existing Eskom Droerivier MTS, ESA will explore the possible expansion of the MTS. A 20-30 ha area will therefore be assessed for this purpose, over portion 10 of farm Weltevreden which is located near the existing Eskom MTS.

The 'no-go' alternative is the option of not constructing the three (3) Jessa Wind Farms and three (3) associated grid connection infrastructure projects, where the *status quo* of the current status and/or activities on the project sites would prevail. This alternative would result in no additional impact on the receiving environment.

Should the 'No-Go' alternative be considered, there would be no impact on the existing environmental baseline and no benefits to the local economy and affected communities. The alternative also bears the opportunity cost of missed socio-economic benefits to the local community that would otherwise realise from establishing the farms which form part of the project

sites. The option of not developing also entails that the bid to provide renewable/clean energy to the national grid and contribute to meeting the country's energy demands will be forfeited.

Identified Theme Sensitivities

A sensitivity screening report from the DFFE's Online Screening Tool (https://screening.environment.gov.za/screeningtool/#/pages/process) was requested in the application categories:

- WEFs - Utilities Infrastructure | Electricity | Generation | Renewable | Wind.
- Powerlines - Utilities Infrastructure | Electricity | Distribution and Transmission | Powerline
- Substations & MTS Expansion Area - Utilities Infrastructure | Electricity | Distribution and Transmission | Substation

The DFFE Screening Tool reports for the, Powerlines and MTS Expansion Area indicate the following ecological sensitivities:

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

The DFFE Screening Tool reports for the on-site substation areas indicate the following ecological sensitivities:

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

Animal Species theme

The animal species theme was highlighted as being of High sensitivity due the potential presence of the following species (Figure 6):

Sensitivity	Feature(s)
High	*Mammalia-Felis nigripes*
High	*Aves-Aquila verreauxii*
High	*Aves-Circus maurus*
High	*Aves-Neotis ludwigii*
Medium	*Aves-Circus maurus*
Medium	*Aves-Aquila verreauxii*
Medium	*Reptilia-Chersobius boulengeri*

As a result of the potential presence of these sensitive species (as well as the High sensitivity), a Terrestrial Ecology Impact Assessment Report has been compiled which addresses / assesses the animal species theme.

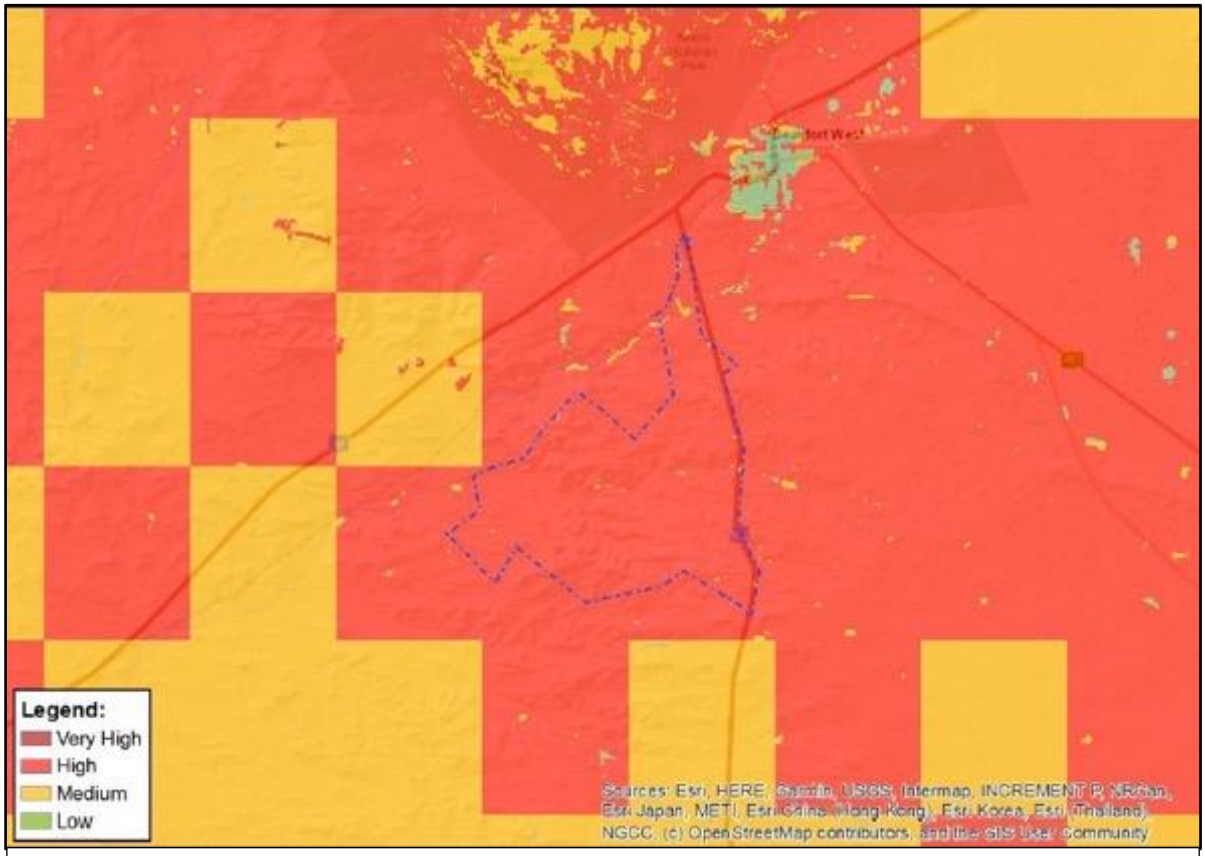

Figure 6: Screening tool map of relative animal species theme sensitivity – WEFs, Powerline Corridors, On-site Substation areas and MTS Expansion area.

Plant Species theme

The plant species theme was highlighted as being of Medium sensitivity due the potential presence of the following species (Figure 7):

Sensitivity	Feature(s)
Medium	*Ruschia beaufortensis*
Medium	Sensitive species 383
Medium	*Peersia frithii*
Medium	Sensitive species 1212
Medium	*Tritonia florentiae*

As a result of the potential presence of these sensitive species (as well as the Medium sensitivity), a separate plant species theme assessment (namely A Plant Species Compliance Statement) is being conducted which forms part of the Terrestrial Ecology Impact Assessment Report.

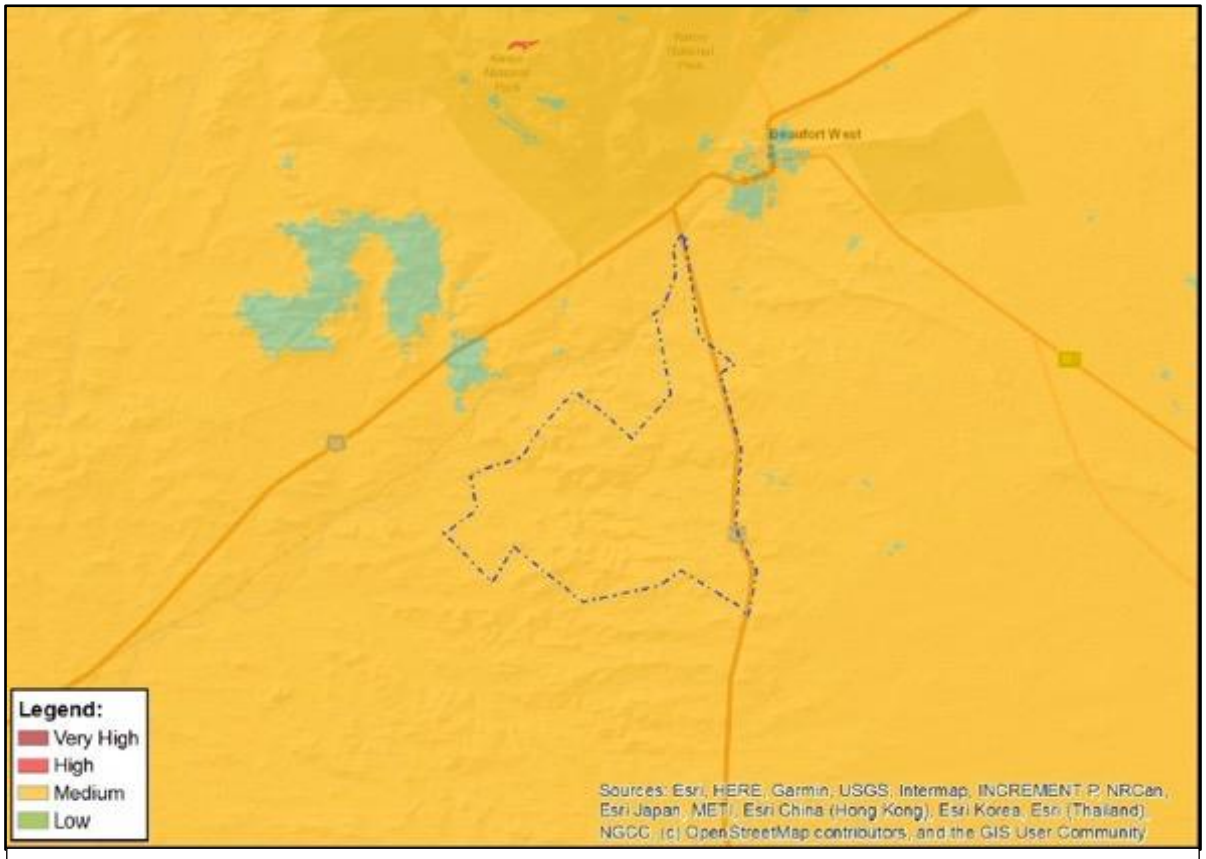

Figure 7: Screening tool map of relative plant species theme sensitivity – WEFs, Powerline Corridors, On-site Substation areas and MTS Expansion area.

Terrestrial Biodiversity theme

The current ecological sensitivities that triggered the Very High terrestrial biodiversity sensitivity include the following (Figure 8):

Sensitivity	Feature(s)
Very High	Critical biodiveristy area 1
Very High	Ecological support area 1
Very High	Ecological support area 2

As a result of the potential presence of these sensitive species (as well as the Very High sensitivity), a Terrestrial Ecology Impact Assessment Report has been compiled which addresses / assesses the Terrestrial Biodiversity theme.

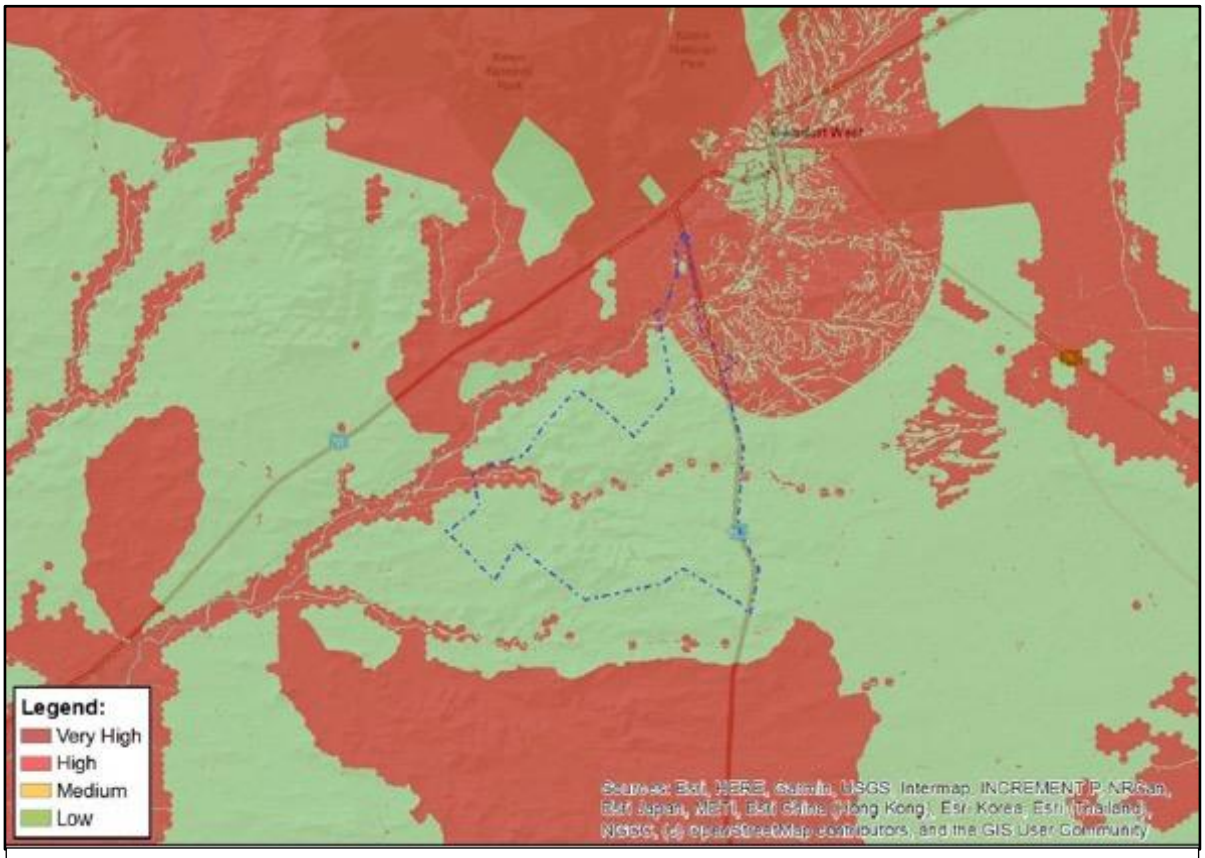

Figure 8: Screening tool map of relative animal species theme sensitivity – WEFs, Powerline Corridors, On-site Substation areas and MTS Expansion area.

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 15,16 and 17 September 2021. The site is within the biomes: Gamka Karoo and Southern Karoo Riviere with a peak rainfall season in summer and autumn, which occurs in March (major) and November (minor) (see Figure 8 for average rainfall per month for entire Biome). The timing of the survey is therefore good in terms of assessing the flora of the site, however, due to the survey having been undertaken at the end of an extended draught period (7+ years), the vegetation was in poor condition and extra caution was required in assessing observed patterns.

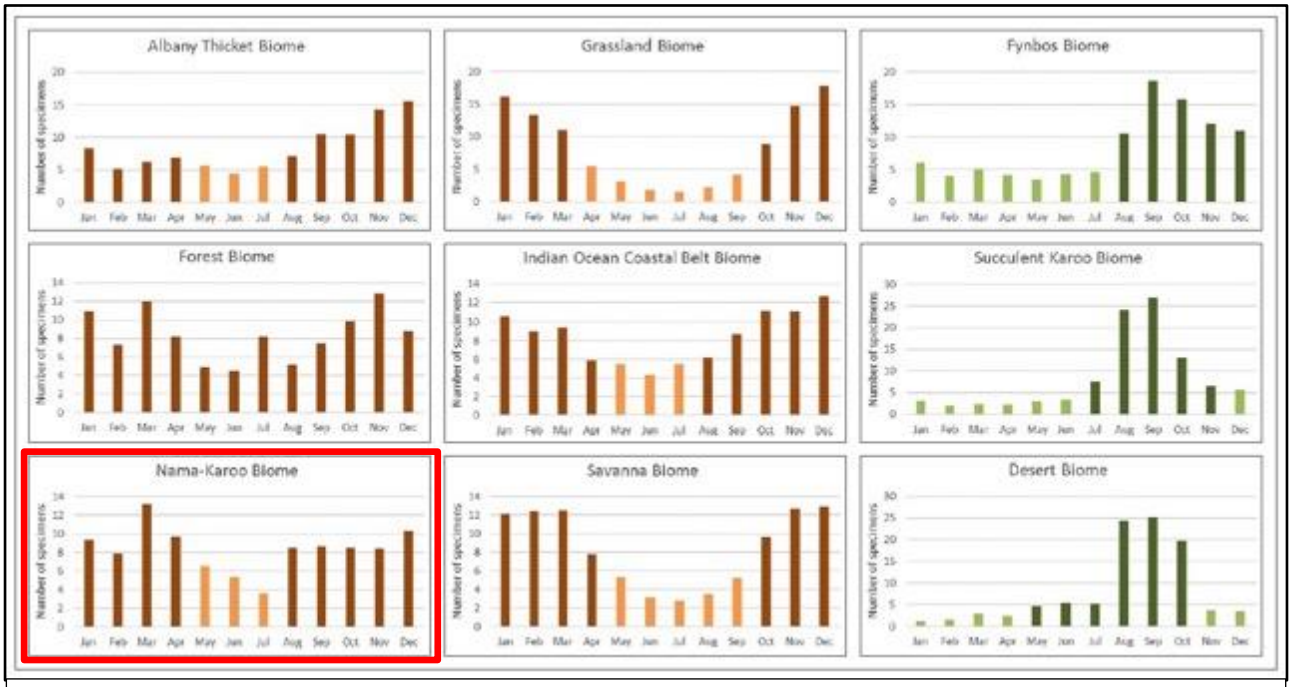

Figure 8: Recommended survey periods for different biomes (Species Environmental Assessment Guidelines). The site is within the Nama-Karoo Biome.

Field survey approach

During the field survey, all major natural variation on site was assessed and select locations were traversed on foot. A hand-held Garmin GPSMap 64s was used to record a track within which observations were made.

Aerial imagery from Google Earth was used to identify and assess habitats on site. Patterns identified from satellite imagery were verified on the ground. During the field survey, particular attention was paid to ensuring that all habitat variability was covered physically on the ground during the search

for plant species. From this ground survey, as well as ad hoc observations on site, a checklist of plant species occurring on site was compiled.

Digital photographs were taken of all plant species that were seen on site. All plant species recorded were uploaded to the iNaturalist website.

Sources of information

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.

RESULTS

Broad vegetation patterns

There are two regional vegetation type in the study area, namely Gamka Karoo and Southern Karoo Riviere (Figure 9), briefly described below, including expected species composition.

Gamka Karoo (NKI1)

Distribution

Western Cape and Eastern Cape Provinces and marginally into the Northern Cape Province: Large basin between the Great Escarpment (Nuweveld Mountains) in the north and northwest and Cape Fold Belt Mountains (mostly Swartberg Mountains) in the south. From approximately the edge of the Gamka basin catchment area (i.e. of the Dwyka River tributary) in the west to about the Kariega River in the east. Altitude varies mostly from 500 – 1 100 m.

Vegetation & Landscape Features

Extremely irregular to slightly undulating plains covered with dwarf spiny shrubland dominated by Karoo dwarf shrubs (e.g. *Chrysocoma ciliata, Eriocephalus ericoides*) with rare low trees (e.g. *Euclea undulata*). Dense stands of drought-resistant grasses (*Stipagrostis, Aristida*) cover (especially after

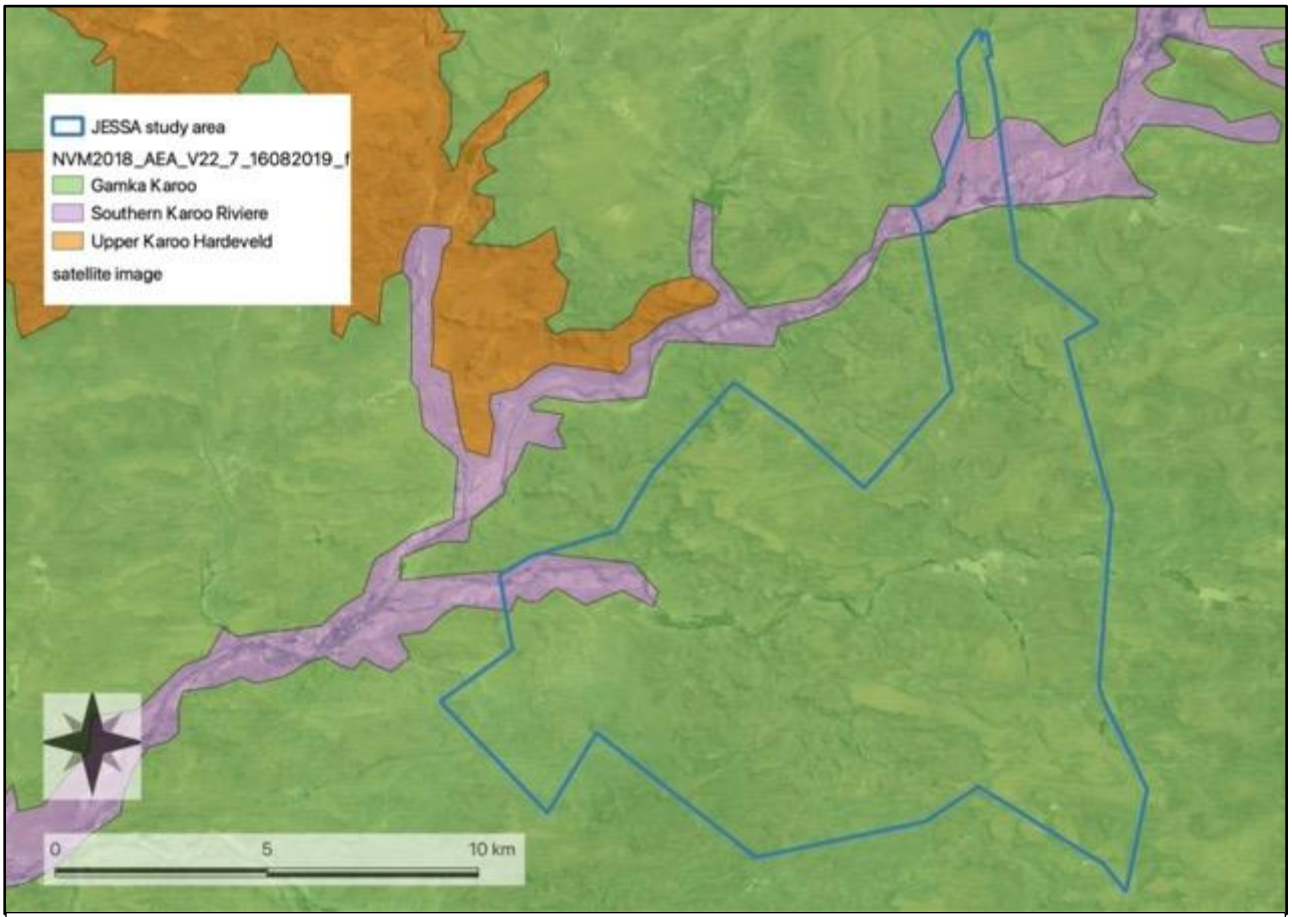

Figure 9: Regional vegetation types of the site and surrounding areas (WEFs, Powerline Corridors, On-site Substation areas and MTS Expansion area).

abundant rains) broad sandy bottomlands.

Geology and soils

Mudstones and sandstones of the Beaufort Group (Adelaide Subgroup) with some Ecca (Fort Brown Formation) shales supporting very shallow and stony soils of the Glenrosa and/or Mispah forms, typical of Fc land type.

Climate

One of the most arid units of the Nama-Karoo Biome. Rainfall mainly in autumn and summer, with a marked peak in March and low levels of cyclonic rain in winter. This region is in the rainshadow of Cape Fold Belt mountains in the south, MAP ranging from about 100 mm in some areas between the Dwyka and Gamka Rivers to about 240 mm against the Great Escarpment. Mean maximum and minimum monthly temperatures in Beaufort West are 38.7°C and –3.2°C for January and July, respectively. Strong northwesterly winds occur in winter.

Important Taxa

Tall Shrubs	*Lycium cinereum* (d), *L. oxycarpum* (d), *Rhigozum obovatum* (d), *Acacia karroo*, *Cadaba aphylla*, *Lycium schizocalyx*, *Rhus burchellii*, *Sisyndite spartea*.
Low Shrubs	: *Chrysocoma ciliata* (d), *Eriocephalus ericoides* subsp. *ericoides* (d), *E. spinescens* (d), *Felicia muricata* (d), *Galenia fruticosa* (d), *Limeum aethiopicum* (d), *Pentzia incana* (d), *Pteronia adenocarpa* (d), *Rosenia humilis* (d), *Aptosimum indivisum*, *Asparagus burchellii*, *Blepharis mitrata*, *Eriocephalus microphyllus* var. *pubescens*, *Felicia filifolia* subsp. *filifolia*, *F. muricata* subsp. *cinerascens*, *Galenia secunda*, *Garuleum bipinnatum*, *G. latifolium*, *Gomphocarpus filiformis*, *Helichrysum lucilioides*, *Hermannia desertorum*, *H. grandiflora*, *H. spinosa*, *Melolobium candicans*, *Microloma armatum*, *Monechma spartioides*, *Pentzia pinnatisecta*, *Plinthus karooicus*, *Polygala seminuda*, *Pteronia glauca*, *P. sordida*, *P. viscosa*, *Selago geniculata*, *Sericocoma avolans*, *Zygophyllum microcarpum*, *Z. microphyllum*.
Succulent Shrubs	*Ruschia intricata* (d), *Aridaria noctiflora* subsp. *straminea*, *Crassula muscosa*, *Drosanthemum lique*, *Galenia sarcophylla*, *Kleinia longiflora*, *Ruschia spinosa*, *Salsola tuberculata*, *Sarcocaulon patersonii*, *Trichodiadema barbatum*, *Tripteris sinuata* var. *linearis*.
Semiparasitic shrub	*Thesium lineatum*.
Herbs	*Gazania lichtensteinii* (d), *Chamaesyce inaequilatera*, *Dicoma capensis*, *Galenia glandulifera*, *Lepidium africanum* subsp. *africanum*, *L. desertorum*, *Lessertia pauciflora* var. *pauciflora*, *Leysera tenella*, *Osteospermum microphyllum*, *Sesamum capense*, *Tetragonia microptera*, *Tribulus terrestris*, *Ursinia nana*.
Geophytic herbs	*Drimia intricata*, *Moraea polystachya*.
Graminoids	*Aristida congesta* (d), *A. diffusa* (d), *Fingerhuthia africana* (d), *Stipagrostis ciliata* (d), *S. obtusa* (d), *Aristida adscensionis*, *Cenchrus ciliaris*, *Digitaria argyrograpta*, *Enneapogon desvauxii*, *Enneapogon scaber*, *Eragrostis homomalla*, *E. lehmanniana*, *E. obtusa*, *Tragus berteronianus*, *T. koelerioides*.

Geographically Important Taxa
(Endemic to Great Karoo Basin)

Succulent Shrubs	*Hereroa latipetala** (also found in Prince Albert Succulent Karoo), *H. odorata** (also found in Koedoesberge-Moordenaars Karoo), *Pleiospilos compactus* (southern and western limits of distribution), *Rhinephyllum luteum**, *Stapelia engleriana**.
Geophitic herb	*Tritonia tugwelliae**.
Low Shrub	*Felicia lasiocarpa**.
Succulent Herbs	*Piaranthus comptus**, *Tridentea parvipuncta* subsp. *parvipuncta**.
Graminoid	*Oropetium capense* (westernmost limit of distribution).

Endemic Taxa

Succulent Shrubs	*Chasmatophyllum stanleyi*, *Hereroa incurva*, *Hoodia dregei, Ruschia beaufortensis*.
Low shrub	*Jamesbrittenia tenuifolia*.
Herb	*Manulea karrooica*.
Succulent Herb	*Piaranthus comptus*.

Southern Karoo Riviere (Azi6)

Distribution

Western and Eastern Cape Provinces: Alluvia of the Buffels, Bloed, Dwyka, Gamka, Sout, Kariega, and Sundays Rivers and their tributaries), east of Laingsburg as far west as Graaff-Reinet and Jansenville. This vegetation unit is embedded within the Koedoesberge-Moordenaars Karoo, Prince Albert Succulent Karoo, Gamka Karoo, Eastern Lower Karoo, and southern parts of the Eastern Upper Karoo as well as some parts of the Albany Thicket Biome south of Cradock. Altitude ranging from 250 – 1 550 m.

Vegetation & Landscape Features

Narrow riverine flats supporting a complex of *Acacia karroo* or *Tamarix usneoides* thickets (up to 5 m tall), and fringed by tall *Salsola*-dominated shrubland (up to 1.5 m high), especially on heavier (and salt-laden) soils on very broad alluvia. In sandy drainage lines *Stipagrostis namaquensis* may occasionally also dominate. Mesic thicket forms in the far eastern part of this region (see Van der Walt 1980: Table 4) may also contain *Leucosidea sericea*, *Rhamnus prinoides* and *Ehrharta erecta.*

Geology, Soil & Hydrology

Recent sandy-clayey alluvial deposits rich in salt occurring on mudrocks and sandstones of the Adelaide Subgroup (Beaufort Group of the Karoo Supergroup) that support soils typical of Ia land type. Torrential convectional rains in summer cause sudden flood surges which remodel the riverbed and adjacent alluvium.

Climate

Transitional, bimodal (equinoctial) rainfall patterns with peaks in March (major) and November (minor). Climate is subarid on the whole, with overall MAP of 243 mm (range from 165 mm in the Gamka Karoo basin to 430 mm in the vicinity of Bedford). Overall warm-temperate regime, with MAT of 16.3°C, ranging from 14.6°C (Upper Karoo) to 18.3°C (upper reaches of Sundays River). Frost occurs frequently in winter. See also climate diagram for AZi 6 Southern Karoo Riviere (Figure 13.2).

Important Taxa

Riparian Thickets

Small Trees	*Acacia karroo* (d), *Rhus lancea* (d).
Tall shrubs	*Diospyros lycioides* (d), *Tamarix usneoides* (d), *Cadaba aphylla*, *Euclea undulata*, *Grewia robusta*, *Gymnosporia buxifolia*, *Melianthus comosus*.
Low Shrub	*Asparagus striatus*.
Succulent shrub	*Lycium cinereum* (d), *Amphiglossa callunoides*, *Lycium hirsutum*, *L. oxycarpum*.
Rocky slopes of river canals	
Graminoid	*Stipagrostis namaquensis* (d).
Alluvial shrublands & herblands	
Low Shrubs	*Ballota africana*, *Bassia salsoloides*, *Carissa haematocarpa*, *Pentzia incana*.
Succulent shrubs	*Malephora uitenhagensis* (d), *Salsola aphylla* (d), *S. arborea* (d), *Drosanthemum lique*, *Salsola geminiflora*, *S. gemmifera*.
Graminoids	*Cynodon incompletus* (d), *Cenchrus ciliaris*, *Cyperus marginatus*.

Reed beds	
Megagraminoid	*Phragmites australis* (d).

Endemic Taxon
Alluvial shrubland & herbland

Graminoid	*Isolepis expallescens*.

Plant species flagged for the study area

According to the National Web-Based Environmental screening tool, 5 plant species have been flagged as of concern for the area the current project is in, these are listed below. A description of each species is provided.

Ruschia beaufortensis (Aizoaceae)
Vulnerable
Poorly known species only recorded in the arid mountains near Beaufort West. Two to five locations exist, subpopulations occurring outside the Karoo National Park are potentially threatened by uranium mining. Endemic to South Africa. Provincial distribution in the Western Cape. Nama Karoo is the major habitat. Stable population trend. Known records include the plains south of Beaufort West, including the one grid in which the project is located. There is therefore a risk of it occurring on site, although it is likely to be very localised, if it occurs there.

Peersia frithii (Aizoaceae)
Vulnerable
This species was collected widely throughout the Southern Karoo in the past. Only recorded seven times since 1990. Occurs in the Nama Karoo on slopes or flats of finely weathered Ecca shales from Laingsburg to Aberdeen in the Eastern Cape, Northern Cape and Western Cape. Endemic to South Africa. Limited data on population trends, significant decline suspected. Population decline due to livestock overgrazing. Known observation records show that it definitely occurs in the type of habitat that includes the study area and that the site is within the distribution range. It was recorded to the south of the site in habitat that is virtually identical to that found on site. There is therefore a moderate to high probability that it occurs on site, although the exact locations where it could occur are difficult to determine on the basis of existing data. It is likely to have a localised distribution with specific habitat requirements.

Tritonia florentiae (Iridaceae)
Rare
This species occurs as small subpopulations and is known from nine sites where it is only found scarcely. Endemic to South Africa and distributed through the Northern and Western Cape from Roggeveld to Prince Albert and Beaufort West. The habitats this species occupies is the Nama Karoo and Succulent Karoo on dry stony clay flats in a variety of vegetation types. Known observations include a number of sites in the areas surrounding the project area. It includes one observation that is either on site or in close proximity. There is therefore a high probability that it occurs on site.

Additional listed plant species for the study area
A database search identifies a number of additional listed plant species that could possibly occur on site that are not flagged in the Screening Tool output. This includes the following:

- *Acanthopsis hoffmannseggiana* (DDT)
- *Anisodontea malvastroides* (Rare)
- *Colchicum karooparkense* (Rare)
- *Euryops zeyheri* (CR PE)
- *Hereroa concava* (VU)

- *Hoodia dregei* (VU)
- *Pleiospilos bolusii* (VU)
- *Stapelia engleriana* (DDT)
- *Astroloba herrei* (VU)

Plant species recorded in the study area

A total of only 46 plant species were recorded during the field survey (Appendix 1), after three days of searching a topographically diverse landscape (see Figures 10 and 11). This is a very poor checklist for an area this size and reflects the extremely dry conditions at the time of the field survey (see Figures 12 and 13). Some of these species are listed for the vegetation type, but they do not represent a typical example of the vegetation type.

Interesting observations were some succulent species, including *Aloe claviflora*, *Astroloba robusta*, *Euphorbia baunsii*, and the protected *Hoodia gordonii* (Figure 14). It suggests that there may possibly be other succulent species on site, including some of the listed species.

One of the only habitats that had any green vegetation was the drainage lines (Figure 15), but this was dominated overwhelmingly by *Vachellia karroo* and *Searsia lancea*. Small pockets of substrate with some moisture supported species such as *Afroscirpoides dioeca* and *Isolepis* sp., but few other species were seen in this habitat.

Figure 10: Typical landscape on site.

Figure 11: Topographical and substrate variability on site.

Figure 12: Very dry condition of vegetation at time of field survey.

Figure 13: View towards Beaufort West showing very dry vegetation condition.

Figure 14: Protected *Hoodia gordonii* seen on site.

Figure 15: Typical riparian vegetation in larger drainage lines.

ASSESSMENT OF IMPACTS

Possible impacts

For all infrastructure components for all constituent projects, there is the possibility that individuals or populations of plant species of concern may be lost due to construction impacts. It is, however, not possible to assess the significance of such impacts without information on the location of any such species, if they occur on site or not. Due to the extreme drought affecting the area at the time of the field survey, it was not possible to collect such data with any degree of confidence. There is therefore a small possibility that any individual piece of infrastructure could strike a population of SCC. In such a case, the probability becomes definite and the consequence high, but for all other locations, the significance is zero.

Based on known information, and data collected on site, the probability of encountering SCC at any particular location is considered to be low, but moderate to high across the entire site. Due to the arid nature of the area and the dispersed nature of plant populations, it is likely that any SCC on site will occur at low densities, if they occur there. Given the nature of the project (wind energy and powerlines), the dispersed nature of the infrastructure is unlikely to consistently strike any SCC. The exception is the road network, which, for wind energy projects, is usually extensive and a a significant cause of habitat loss.

The best mitigation to address uncertainty issues related to SCC is to do a walk-through survey of all final infrastructure positions to check for SCC, and to collect the necessary data for any flora permits that may be required. The only other option is to do multiple field surveys across the entire project area over time and progressively improve on current knowledge of the flora of the site - this is not feasible within the time-frames of an EIA, is limited by seasonal conditions, and may never provide a complete picture of species distributions on site.

Based on the limited amount of field data, there are no specific habitats or locations where the risk is considered to be higher than anywhere else.

CONCLUSIONS

- There are a number of plant species of concern that could possibly occur on the site of the Jessa Grid Connection projects, but none were seen.. Environmental conditions at the time of the field survey were not favourable for determining with any degree of confidence whether any occur on site or not - this is primarily due to the extreme drought that had affected the area for a number of years prior to the field survey. Nevertheless, the arid environment and dispersed nature of known populations of plant SCC suggests that there is a low risk that any SCC will be affected by the proposed projects.

- There are no specific locations or habitats on site where the risk of encountering plant species of concern is considered to be higher than any other part. It is therefore possible that any infrastructure component could affect plant species of concern, although the overall risk is considered to be low.

- The best mitigation to account for uncertainties related to distribution of plant species of concern on site is to undertake a walk-through survey of all final infrastructure footprints prior to construction. This will also provide the data required for any flora permits.

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APPENDICES:

Appendix 1: Plant species recorded on site.

Afroscirpoides dioeca
Aloe claviflora
Aptosimum indivisum
Asparagus striatus
Asparagus suaveolens
Astroloba robusta
Berkheya spinosa
Blepharis mitrata
Carissa haematocarpa
Cheilanthes parviloba
Chrysocoma ciliata
Crassothonna cacalioides
Crassula hemisphaerica
Crassula subaphylla
Curio radicans
Cyperus marginatus
Eragrostis lehmanniana
Euphorbia braunsii
Felicia muricata
Fingerhuthia africana
Geus Drosanthemum
Gazania
Gymnosporia
Hermannia
Isolepis sp.
Limosella aquatica
Lycium
Mesembryanthemum
Osteospermum
Pteronia
Selago
Gomphocarpus filiformis
Grewia robusta
Hoodia gordonii
Macledium spinosum
Monsonia salmoniflora
Rhigozum obovatum
Ruschia intricata
Schinus molle
Schmidtia kalahariensis
Searsia burchellii
Searsia lancea
Stipagrostis namaquensis
Tragus koelerioides
Vachellia karroo
*Veronica anagallis-aquatica**