

Biodiversity Assessment
for the
determination of the presence of
protected species

Remaining extent of Farm Onder
Rugzeer, Kenhardt, Northern Cape
Kenhardt PV2

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Biodiversity Assessment for the determination of the presence of protected species

Kenhardt PV 2

Photo voltaic Facility to be established on
Remaining extent of Farm Onder Rugzeer, Kenhardt, Northern Cape,

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Acronyms

NCDEAC – Northern Cape Department of Environmental Affairs and Conservation

NEMA – National Environmental Management Act

DWS – Department of Water and Sanitation

NWA – National Water Act

NFEPA – National Fresh Water Ecological Priority Areas

PES – Present Ecological Estate

EI – Ecological Importance

SANBI – South Africa National Biodiversity Institute.

EXECUTIVE SUMMARY

A biodiversity assessment of the approved Kenhardt Photo Voltaic 2 site was undertaken in November 2020 with additional site reconnaissance's undertaken 2021. The assessment was carried out through a grid-based reconnaissance of the site with occasional crepuscular and nocturnal assessment periods.

The object of the assessment was :

1. To identify any protected botanical specimens within the site.
2. To identify any faunal communities or individuals that may require relocation or may be considered to be directly affected by the establishment and operations of the PV facility.
3. Record the presence of such specimens to assist with final planning and design as well as conform with applications for licenses and/or permits to remove or disturb such specimens.

Review of Kenhardt PV 2 has indicated that this site presents isolated botanical specimens of *Aloidendron dichotomum* and *Boscia albitrunca*. Two management options are evidently available:

1. Removal of the specimen. Notably *A dichotomum* can be translocated to a different environment with some ease, dependent upon size.
2. Avoidance of the specimen. Following the mitigation hierarchy, good practise would be to incorporate these specimens into the overall layout of the facility and avoid disturbance. However, if avoidance is not possible, pruning and complete removal of the specimen should be carried out as a measure of last resort.

Where the specimens is to be removed, damaged or disturbed an applicable license would be required prior to such actions. The presence of listed and protected fauna on the site is unlikely and where encountered, species are generally transient across site or in the case of some invertebrates, may be using the site for the establishment of burrow refugia.

1. INTRODUCTION.

Scatec Solar SA 350 (Pty) Ltd is the authorisation holder (EA 14/12/16/3/3/2/838) in respect of the Kenhardt PV 2 facility that which permits the establishment and operation of a 100 MW solar photovoltaic facility. The PV2 facility is located east of Kenhardt (Figure 1) and has been subject to ecological evaluation during the environmental impact assessment process. Kenhardt PV 2 is one of 6 approved solar facilities (Figure 5).

The Environmental Authorisation and associated legislation require that prior to construction of the facility, an evaluation of the ecological or biodiversity components of the site be undertaken. The objective of this evaluation is to identify plant specimens, in particular that may be of ecological significance, or are listed within the applicable Provincial and National legislation. Such evaluation is, where applicable, to accompany an application to the appropriate Department for the issuance of a license to disturb or remove identified specimens.

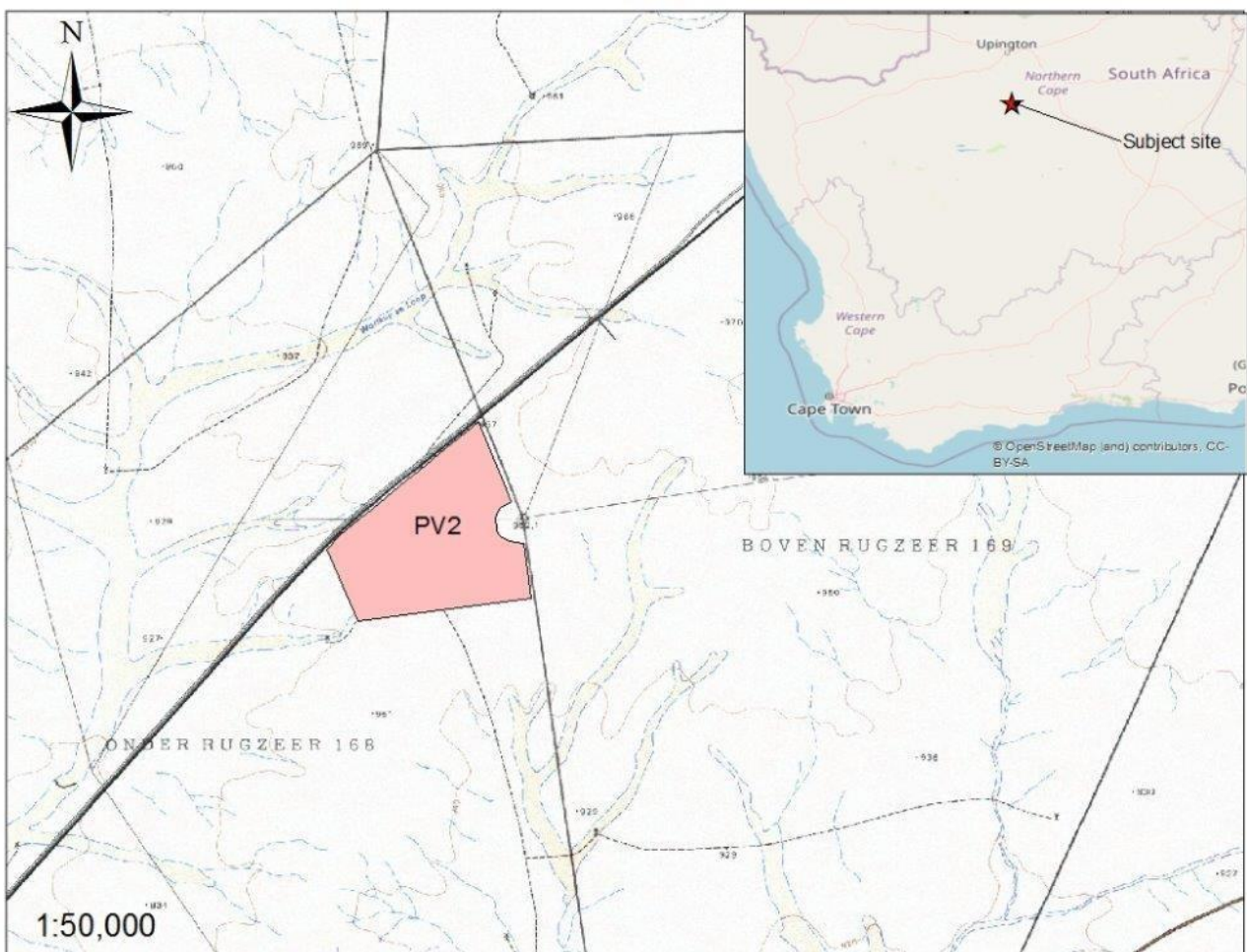


Figure 1. Regional map image of the subject site.

2. LEGISLATION.

(EA 14/12/16/3/3/2/838) was issued to Scatec Solar SA 350 (Pty) Ltd, following review by the mandated authority of both specific and requisite investigations relating to the development of Kenhardt PV 2. Compliance with other legislation is however, required in respect of both the EA and the overarching legislation. In respect of ecological aspects, the following legislation is to be adhered to with regards to the presence of selected floral and faunal species that may be encountered on Kenhardt PV 2:

1. The National Environmental Management: Biodiversity Act (Act 10 of 2004)

This Act serves to control the disturbance of land and its utilisation within certain habitats, as well as the planting and control of certain exotic species. The proposed development, taking place in the identified Bushmanland Arid Grassland environment, may not necessitate any particular application for a change in land use from an ecological perspective, however the effective disturbance and removal of species identified below, as well as possibly other species (i.e. TOPS species), will require specific permission from the applicable authorities.

In addition, the planting and management of exotic plant species on site, if and where required, will be governed by the Alien and Invasive Species (AIS) regulations, which were gazetted in 2014. These regulations compel landowners to manage exotic weeds on land under their jurisdiction and control.

2. The National Forests Act (Act 84 of 1998)

The National Forest Act (Act 84 of 1998) governs the removal, disturbance, cutting or damage and destruction of identified “protected trees”. The focus of this assessment has been to identify the position and nature of these specimens within the site. Where their removal is required, or where disturbance of the specimens will arise, a license must be obtained from the mandated authority, in this case the Department of Environment, Forestry and Fisheries, in terms of Section 15 of the Act. A specimen sample of the license application form is attached.

The same Act also considers the clearance of “forest” as requiring a license from the authority. In this regard the legal definition of a “forest”, is the presence of three or more trees with contiguous or interfacing canopy cover. While not a scientific definition, no forest form has been identified on the subject site and such habitat is generally not applicable to an arid grassland environment. It is

therefore unlikely that an application for the “clearing of a *natural forest*”, as defined within the Act, will be applicable to the site in question.

3. The Northern Cape Conservation Act (Act 9 of 2009)

The Northern Cape Conservation Act under its pertinent regulations and schedules governs the disturbance, transport and movement of faunal and floral species. A permit from the Northern Cape Department of Environment and Nature Conservation will be required in order to disturb or translocate both floral and faunal species, that are listed in terms of the Act, while the same Act presents controls and regulations on the planting of certain listed species which may be considered to be “exotic”.

It is clear that where listed species are encountered on site, an application for licenses may be required in terms of both Provincial and National legislation. Therefore, where for example species disturbed by activities on site may include license applications to the Northern Cape Department of Environment and Conservation (*Boscia albitrunca*, and *B foetida*), as well as to the Department of Environment Forestry and Fisheries (*B albitrunca* only) would be required.

3. METHODOLOGY & APPROACH.

Site reconnaissance at Kenhardt was undertaken between 23 November and 28 November 2020 whereby the following actions had been carried out:

- Evaluation of historical information and data was undertaken, with consideration of findings.
- Evaluation of mapping and spatial information in finer scale in order to identify anomalies and related features within the site.
- Traverse of the subject area using a grid pattern of evaluation was undertaken. Specific consideration was given to geomorphological features and the interface between such features.
- All vegetation associates were reviewed for the presence of cryptic and smaller succulent specimens.
- Larger listed botanical specimens, where identified were logged using a Garmin GPS. Where required, photographic evidence of the specimen was obtained.
- Larger woody specimens were inspected for the presence of any fauna that may be associated with the specimen, in particular nests, burrows and related faunal refugia. Where encountered, these were logged
- A camera trap was established for 24 hours on 26 November 2020.
- Night reconnaissance was undertaken on 27 November 2020 to consider the presence of nocturnal faunal species.
- All fauna identified within the site were identified to lowest taxa and recorded.
- All collated data was downloaded and placed into ARC GIS.
- Report compilation was undertaken.

3.1 Assumptions and Limitations

Reconnaissance of the site was undertaken during the mid-summer of November 2020. This period is notably extremely dry, with summer rains in the region being evident in and around March of each year, which is accompanied by resurgent growth in floral communities. Under excessively dry periods, vegetative growth and flowering may be delayed, often affecting the ability to detect smaller specimens, such as *Lithops spp* and other cryptic species or geophytes. It therefore follows that while care has been taken to evaluate all portions of the site, as well as particular niche environments, it is evident that not all specimens may have been located or logged. In acknowledgement of this limitation – it is recommended that a final inspection be carried out by the appointed ECO of this project.

3.2 Additional walk through(s)

Seasonal limitations during the initial site visit in 2020, with recent precipitation events experienced in Kenhardt over the months of February and March 2021 as well as comments received by DFFE and DAERDLR on the 26 of April 2021 had prompted the following additional walk throughs in order to log any individual species that had been previously unrecorded:

- Site walk over with accompaniment of DFFE and DENC on the 29th of March 2021.
- Site walk over by Scatec Solar and Cape EAP on the 30th of April 2021.

3.3 Statistical application

Sample standard deviation was calculated based on the number of species individuals *in toto* recorded throughout the remaining extent of Farm Onder Rugzeer, Kenhardt, Northern Cape to allow for statistical determination of dispersion within each PV site. The complete tally of individuals included the addition of standard deviation for the purposes of accurate permit application submissions, to the satisfaction of DFFE and DAERDLR in ensuring that ‘sufficient quantities are applied for removal’. These workings are attached as annexure B for view.

4. OVERVIEW OF SITE

The climate of Kenhardt and surrounds is classified “BWh”, using the Koppen-Geiger climate classification method (www.koeppen-geiger.vu-wien.ac.at) which is indicative of an arid hot environment. As such, the area can be considered to be arid, verging on hyper arid (www.wad.jrc.ec.europa.eu) with an annual rainfall of less than 200 mm per annum (SA Weather Services, 2015). As such, the area in question is undergoing protracted and extensive drought, with concomitant changes in the physical and biotic state of the land.

It follows that the regional vegetation type, namely Bushmanland Arid Grassland (NKB 4) has been subject to extreme water related stresses. As such the following, generally indicative of the veld type can be determined to have been affected by such conditions:

- Low graminoid or grass cover is evident across much of the area. The typical grass of the region, namely *Stipagrostis schmidtia*, has been subject to extensive grazing and senescence and is only evident in small associations or scattered specimens. (Figure 2)
- Senescence of a number of woody specimens is evident, in particular emergent *Boscia sp.* These species are generally tolerant of aridity, however extreme aridity has resulted in specimens becoming moribund or senescent – Figures 2 and 4.

An area check list of botanical species according to POSA is attached as annexure A. The topography can generally be described as “flat” with little topographic variation. Soils are primarily fine aeolian sands derived from the prevailing Kalahari Group geology. As indicated, limited topographic variation is evident, however calcrete exposures are present at points.

A number of *B albitrunca* and *Aloidendron dichotomoum* was identified on site, as presented in Table 1. As indicated in the images, much of the area is devoid of vegetation with *Rhigozum trichomotum* dominating at points. Notable is the collapsed *A dichotomoum* as well as the proliferation of graminoid vegetation as a result of recent precipitation events – Figure 3.

Table 1. Listed botanical species within Kenhardt PV 2 that require permit(s).

| PV 2 | | |
|---|--|--------------------------------|
| Species | Location | Co-ordinates |
| <i>Boscia albitrunca</i> | Northern Cape Conservation Act & National Forest Act | 29°11'19.80"S 21°18'25.30"E |
| <i>Boscia albitrunca</i> | Northern Cape Conservation Act & National Forest Act | 29°11'20.58"S 21°18'25.68"E |
| <i>Boscia albitrunca</i> | Northern Cape Conservation Act & National Forest Act | 29°11'19.82"S 21°18'34.10"E |
| <i>Boscia albitrunca</i> | Northern Cape Conservation Act & National Forest Act | 29°11'17.81"S 21°18'45.40"E |
| <i>Aloidendron dichotomum</i> + raptor nest | Northern Cape Conservation Act | 29°11'36.27"S 21°18'37.83"E |
| <i>Aloidendron dichotomum</i> | Northern Cape Conservation Act | 29°11'48.51"S 21°18'49.04"E |



Figure 2. *B albitrunca* recorded on site.



Figure 3. Image of the *A. dichotomum* as recorded during the 2020 site reconnaissance (Left). The most recent site visit in 2021 had noted that this specimen had collapsed.



Figure 4. Image of the *A dichotomum* with embedded raptor nest.

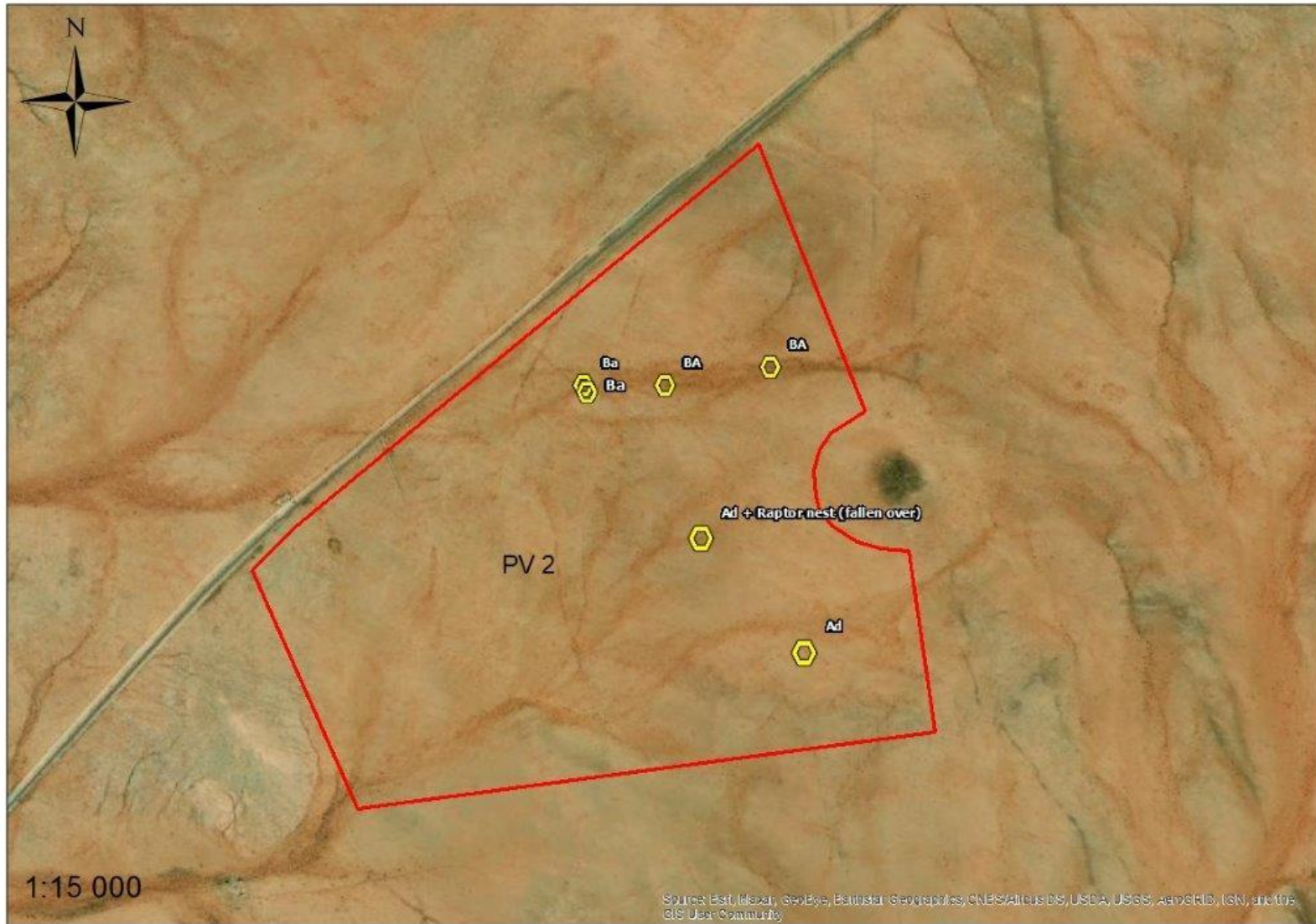


Figure 5 Aerial image indicating presence of listed botanical specimen within PV 2.

4.1. Fauna

An assessment of fauna within PV 2 was undertaken. Table 2, below presents the updated faunal species list for the subject area, as compiled by these authors and based on observation, spoor, spat and in some cases, anecdotal information.

From Table 2, six species that are listed as “Threatened or Protected Species”, in terms of the NEM Biodiversity Act have a high likelihood of occurrence in the locality. Of these, three are invertebrates (two Scorpiones). The scorpions are likely to be present on the subject site, given the sandy nature of the site and the suitable opportunity for the establishment of refugia.

Table 2. List of Terrestrial Species identified within and around the site.

| | | Observations | NC conservation Act | TOPS (2007) | Cons. Importance (IUCN) |
|----------------------------------|------------------------|---------------------|----------------------------|--------------------|--------------------------------|
| Mammals | | | | | |
| <i>Orycteropus afer</i> | Aardvark | Foraging evidence | | Protected | LC |
| <i>Felis nigripes</i> | Black-footed cat | Observed – roadkill | Protected | | VU |
| <i>Atelerix frontalis</i> | South African hedgehog | Per communication | | Protected | LC |
| <i>Canis mesomelas</i> | Black back jackal | | | | Not listed |
| <i>Xerus inauris</i> | Cape ground squirrel | Observed | Protected | | Not listed |
| <i>Lepus capensis</i> | Cape hare | Observed | | | Not listed |
| <i>Felis caracal</i> | Caracal | Remains of prey | Protected | | Not listed |
| <i>Procavia capensis</i> | Rock dassie | Observed | | | LC |
| <i>Suricata suricatta</i> | Meerkat | Observed | Protected | | LC |
| <i>Aethomys namaquensis</i> | Namaqua rock mouse | | Protected | | Not listed |
| <i>Hystrix africaeaustralis</i> | Porcupine | Observed | Protected | | LC |
| <i>Antidorcas marsupialis</i> | Springbok | Observed | Protected | | LC |
| <i>Raphicerus campestris</i> | Steenbok | Observed | Protected | | LC |
| <i>Cynictis penicillata</i> | Yellow mongoose | Observed | Protected | | LC |
| Reptiles | | | | | |
| <i>Ptenopus spp</i> | Barking gecko | | | | LC |
| <i>Naja nivea</i> | Cape cobra | | | | Not listed |
| <i>Chondrodactylus angulifer</i> | Giant ground gecko | | | | LC |
| <i>C bibronii</i> | Bibrons gecko | Observed | | | LC |
| <i>Cordylus spp</i> | Girdled lizard | | Protected | Protected | <i>C cataphractus</i> ; - EN |
| <i>Psammobates tentorius</i> | Karoo tent tortoise | | | | Not listed |

| | | Observations | NC conservation Act | TOPS (2007) | Cons. Importance (IUCN) |
|-----------------------------|----------------------|-----------------|---------------------|-------------|-------------------------|
| <i>Geochelone pardalis</i> | Leopard tortoise | Observed | | | Not listed |
| <i>Bitis arietans</i> | Puff adder | | | | Not listed |
| <i>Nucras ornata</i> | Ornate sand lizard | Observed | | | Not listed |
| <i>Agama makarikarica</i> | Spiny agama | Observed | | | Not listed |
| Amphibians | | | | | |
| <i>Tomopterna cryptotis</i> | Tremolo sand frog | | | | LC |
| Invertebrates | | | | | |
| <i>Locustana pardalina</i> | Brown locust | Observed | | | Not listed |
| <i>Pterinochilus spp</i> | Baboon spider | | | Protected | Not listed |
| <i>Seothyra spp</i> | Buckspoor spider | | | | Not listed |
| Family Vespidae | Various wasps | Observed | | | |
| Opisthophthalmus spp | Burrowing scorpions? | Burrow entrance | Protected | Protected | Not listed |
| <i>Parabuthus spp</i> | Parabuthid scorpion | | | Protected | Not listed |
| Hodotermitidae | Termite | | | | Not listed |

TOPS – Threatened or Protected Species GN R151 of the National Environmental Management: Biodiversity Act (Act 10 of 2004) ; IUCN – International Union of Conservation Networks :*. LC = Least concern; NT = Near threatened; VU = Vulnerable; EN = Endangered CR = Critically Endangered; EW = Extinct in the wild; NE = not evaluated; DD = data deficient

A frontalis, is possibly less likely to be present on site, given the low grass cover, although transient movement, usually nocturnal, into the site is possible. Sungazers (*Cordylus spp*) may however be encountered in the area, as they, like the parabuthids, excavate their burrows.

Those specimens most likely to be affected by the establishment of PV 5 on the subject site are:

- Nocturnal species, such as *A frontalis*, who may succumb to the passage of motor vehicles at night.
- Fossorial species, such as Parabuthids, that may be affected by excavation.

Management actions to reduce species mortality are embedded in the Environmental Management Programme compiled for the project, however, such measures should include:

- Fencing of the site for construction purposes
- Frequent inspection of transformer sumps and fuel bunds.

- Daily inspection of excavated areas.
- The flushing of wildlife from the fenced area, to ensure that no larger specimens are present within the site.
- Walkover to consider the presence of burrows and other signs of small vertebrates and invertebrates being present within the site.

In most cases, it is likely that animal specimens will leave the site as a consequence of disturbance at the commencement of construction. However, some species, such as *Orycteropus afer* are likely to move freely into and out of the construction site, despite fencing and other exclusionary measures. Where this becomes a problem or a risk to the animal, capture and relocation can be considered. Such measures are often not successful and require permitting by authorities. Trained personnel should be engaged where capture and relocation is required.

5. CONCLUSION

Review of Kenhardt PV 2 has indicated that this site presents a number of botanical specimens that are listed under both provincial and national legislation. Two management options are evidently available:

1. **Removal of the specimens.** Notably *A dichotomum* can be translocated to a different environment with some ease, dependent upon size.
2. **Avoidance of the specimens.** Good practise would be to incorporate these specimens into the overall layout of the facility. Following the mitigation hierarchy, good practise would be to incorporate these specimens into the overall layout of the facility and avoid disturbance. However, if avoidance is not possible, pruning and complete removal of the specimen should be carried out as a measure of last resort.

In practice, a combination of the above management options would be recommended. In this respect, where transfer, removal or disturbance is likely required, a license in terms of the applicable legislation would be required prior to the undertaking of any such actions. The following quantities, based on observations and statistical estimation should be applied for in order to increase the likelihood that all affected botanical specimens within the site are accounted for:

Table 3. Species and quantity of specimens that are to be included in the applicable permits.

| Species | Quantity of specimens |
|-------------------------------|-----------------------|
| <i>Boscia albitrunca</i> | 6 |
| <i>Aloidendron dichotomum</i> | 3 |

The presence of listed and protected fauna on the site is unlikely and where encountered, species are generally transient across site or in the case of some invertebrates, may be using the site for the establishment of burrow refugia. Lastly, it is recommended that a final walk through of the facility area be carried out by the appointed ECO prior to construction in order to log species of significance that may have been previously undetected.

Annexure A - Botanical species check list within the Kenhardt area according to POSA.

| Species | Observations | CONS importance |
|------------------------------------|--------------|-----------------|
| <i>Schwantesia triebneri</i> | POSA | LC |
| <i>Jamesbrittenia integerrima</i> | POSA | LC |
| <i>Mesembryanthemum sp.</i> | POSA | LC |
| <i>Drosanthemum sp.</i> | POSA | Threatened |
| <i>Galenia secunda</i> | POSA | LC |
| <i>Zaluzianskya diandra</i> | POSA | Not listed |
| <i>Hermbsaedia glauca</i> | POSA | Not listed |
| <i>Jamesbrittenia aurantiaca</i> | POSA | LC |
| <i>Jamesbrittenia canescens</i> | POSA | LC |
| <i>Indigofera alternans</i> | POSA | Not listed |
| <i>Helichrysum micropoides</i> | POSA | LC |
| <i>Heliophila deserticola</i> | POSA | LC |
| <i>Jamesbrittenia adpressa</i> | POSA | LC |
| <i>Jamesbrittenia atropurpurea</i> | POSA | LC |
| <i>Tetragonia arbuscula</i> | POSA | LC |
| <i>Justicia distichotricha</i> | POSA | Not listed |
| <i>Acacia sp.</i> | POSA | Not listed |
| <i>Kohautia caespitosa</i> | POSA | LC |
| <i>Senna italica</i> | POSA | NE |
| <i>Mesembryanthemum coriarium</i> | POSA | LC |
| <i>Vachellia karroo</i> | POSA | LC |
| <i>Jamesbrittenia maxii</i> | POSA | LC |
| <i>Pomaria lactea</i> | POSA | LC |
| <i>Lessertia frutescens</i> | POSA | LC |

| | | |
|-------------------------------------|--------------------|------------|
| <i>Mesembryanthemum noctiflorum</i> | POSA | Not listed |
| <i>Ruschia divaricata</i> | Onsite observation | LC |
| <i>Titanopsis hugo-schlechteri</i> | POSA | LC |
| <i>Dyerophytum africanum</i> | POSA | LC |
| <i>Lessertia incana</i> | POSA | LC |
| <i>Stipagrostis brevifolia</i> | POSA | LC |
| <i>Dinteranthus puberulus</i> | POSA | LC |
| <i>Sericocoma avolans</i> | POSA | LC |
| <i>Conophytum fulleri</i> | POSA | LC |
| <i>Phaeoptilum spinosum</i> | POSA | LC |
| <i>Anacampseros albissima</i> | POSA | LC |
| <i>Indigastrum niveum</i> | POSA | LC |
| <i>Mesembryanthemum lignescens</i> | POSA | |
| <i>Conophytum sp.</i> | POSA | |
| <i>Kewa salsoloides</i> | POSA | LC |
| <i>Kohautia cynanchica</i> | POSA | LC |
| <i>Mesembryanthemum latipetalum</i> | POSA | |
| <i>Mesembryanthemum excavatum</i> | POSA | |
| <i>Aptosimum spinescens</i> | POSA | LC |
| <i>Manulea schaeferi</i> | POSA | LC |

Annexure B - Raw data sheet presenting the calculations of St deviation.

| | B albitrunca | A dichotomum | D pole-evansii pop | A albissima pop | A clariflora | A hereroensis | R spp pop | E braunsii | H Gordonii | L cactiformis | Sarcocaulon spp pop |
|---|--------------|--------------|--------------------|-----------------|--------------|---------------|-----------|------------|------------|---------------|---------------------|
| PV 2 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PV 3 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PV 4 | 3 | 2 | 0 | 2 | 1 | 2 | 0 | 1 | 0 | 0 | 0 |
| PV 5 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| PV 6 | 3 | 3 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Access Road | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Total | 14 | 9 | 1 | 5 | 2 | 2 | 1 | 1 | 1 | 1 | 1 |
| Mean | 2,8 | 1,6 | 0,2 | 5 | 0,4 | 0,4 | 0,2 | 0,2 | 0,2 | 0,2 | 0,2 |
| St Dev | 1,64 | 1,14 | 0.4472 | 1 | 0,55 | 0,89 | 0.4472 | 0,45 | 0,45 | 0,45 | 0.4472 |
| Number of estimated individuals to be added to each site (St rounded off) | 2 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Total number of estimated individuals to be added | 10 | 5 | 0 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 |
| Total number of individuals applied for with regards to permit applications | 24 | 14 | 1 | 10 | 7 | 7 | 1 | 1 | 1 | 1 | 1 |