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**Date:** 06 July 2022  
**Ref:** Vaal River Solar 2 PV Facility, near Orkney, North West Province: Part 1 Amendment

**Attention: Ms Karen Jodas**

Dear Madam,

**ECOLOGICAL MOTIVATION REPORT: PROPOSED AMENDMENT TO THE AUTHORISED VAAL RIVER SOLAR 2 PV FACILITY (DEA REF 12/12/20/2513/1) - INCREASE OF TOTAL GENERATION CAPACITY OF THE FACILITY, INCLUSION OF A BATTERY ENERGY STORAGE SYSTEM (BESS) AND AN EXTENSION OF THE VALIDITY OF THE ENVIRONMENTAL AUTHORISATION.**

The original Ecological Assessment/Report was conducted by Dr. David Hoare (Specialist ecological study on the potential impacts of the proposed Vaal River Solar 2 Facility near Orkney, North-West Province – 1 April 2012). This specialist study included a combined assessment of all three Vaal River Solar PV Facilities/Phases (Vaal River Solar 1, 2 and 3). The final layout was accepted and authorised in August 2012 (DEA Ref: 12/12/20/2513/1).

The Vaal River Solar 2 PV Facility is authorised for maximum electricity export capacity of 100MW (as amended) and includes the following infrastructure.

- Arrays of photovoltaic panels.
- Foundations and mounting structure to support the PV panels.
- Cabling between the project components, to be lain underground where practical.
- Internal access roads (width less than 6m) and fencing.
- Workshop area for maintenance, storage, and offices.

Vaal River Solar 2 (Pty) Ltd is now proposing to:

- To increase the contracted capacity of the authorised PV solar facility within the authorised footprint from 100MW to 250MW; and
- To construct and operate a Battery Energy Storage System (BESS), within the authorised footprint.

The authorised footprint is located within:

- a portion of Portion 200 of the Farm Nooitgedacht 434 IP;
- a portion of Portion 3 of the Farm Vaalkop 439 IP; and
- a portion of the Farm Vaalkop 439 IP.

The authorised footprint is located east of Orkney (City of Motlasana Local Municipality and the Dr. Kenneth Kaunda District Municipality) in the North-West Province. The general purpose and utilisation of a Battery Energy Storage System (BESS) is to save and store excess electrical output as it is generated, allowing for a timed release when the capacity is required. BESS systems therefore provide flexibility in the efficient operation of the electric grid through decoupling of the energy supply and demand.

A development area for a battery energy storage area is proposed within the area assessed and approved for the solar PV facility.

In terms of the proposed increase of the contracted capacity of the authorised PV solar facility (to 250MW) within the authorised footprint, the proposed increase in the contracted will be due to improvements in technology of solar PV panels (since the original authorization of the project). The increase in the contracted capacity will not require an increase in the development footprint and the entire development will still be restricted to the authorised footprint.

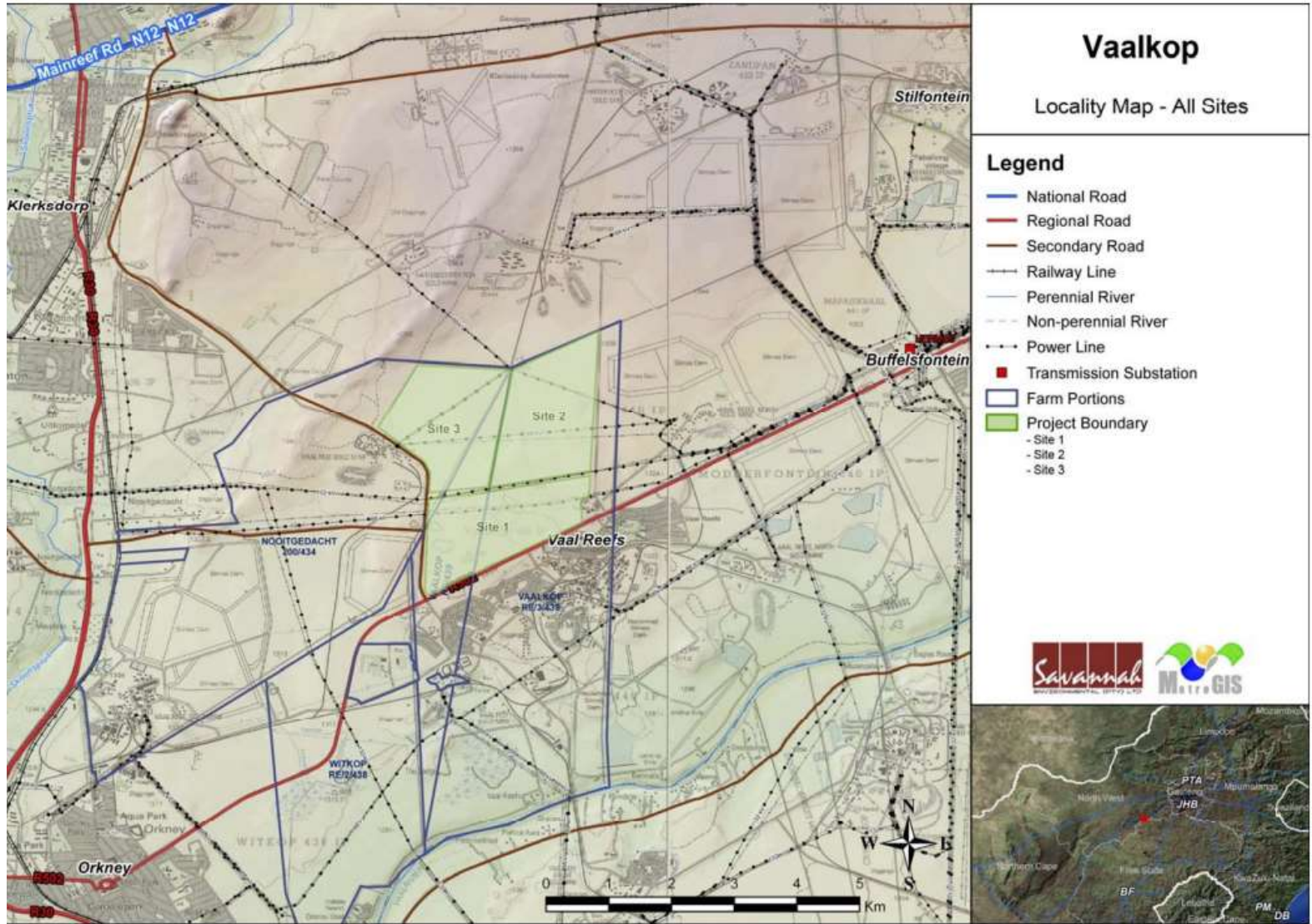
Furthermore, an Environmental Authorisation (EA) is granted/valid for a period of ten years, from the date of issue to the applicant (July 2012). Within this period the holder must commence with the authorised listed activities. However, no construction activities have occurred up to date and as such it is the developer's intention to apply for an extension of the validity of the EA beyond the initial 10 years.

Ultimately it is the Developer's intention to bid the solar PV facility and the battery energy storage under the Risk Mitigation Independent Power Producer (IPP) Procurement Programme of the Department of Mineral Resources and Energy. Ultimately, the development of the solar PV facility as well as the battery energy storage is intended to be part of the renewable energy projects portfolio for South Africa, as contemplated in the Integrated Resources Plan (IRP).

The following ecological comments (aim and terms of reference) were requested from Nkurenkuru Ecology and Biodiversity by Savannah Environmental regarding the proposed amendments to the **Vaal River Solar 2 PV Facility**.

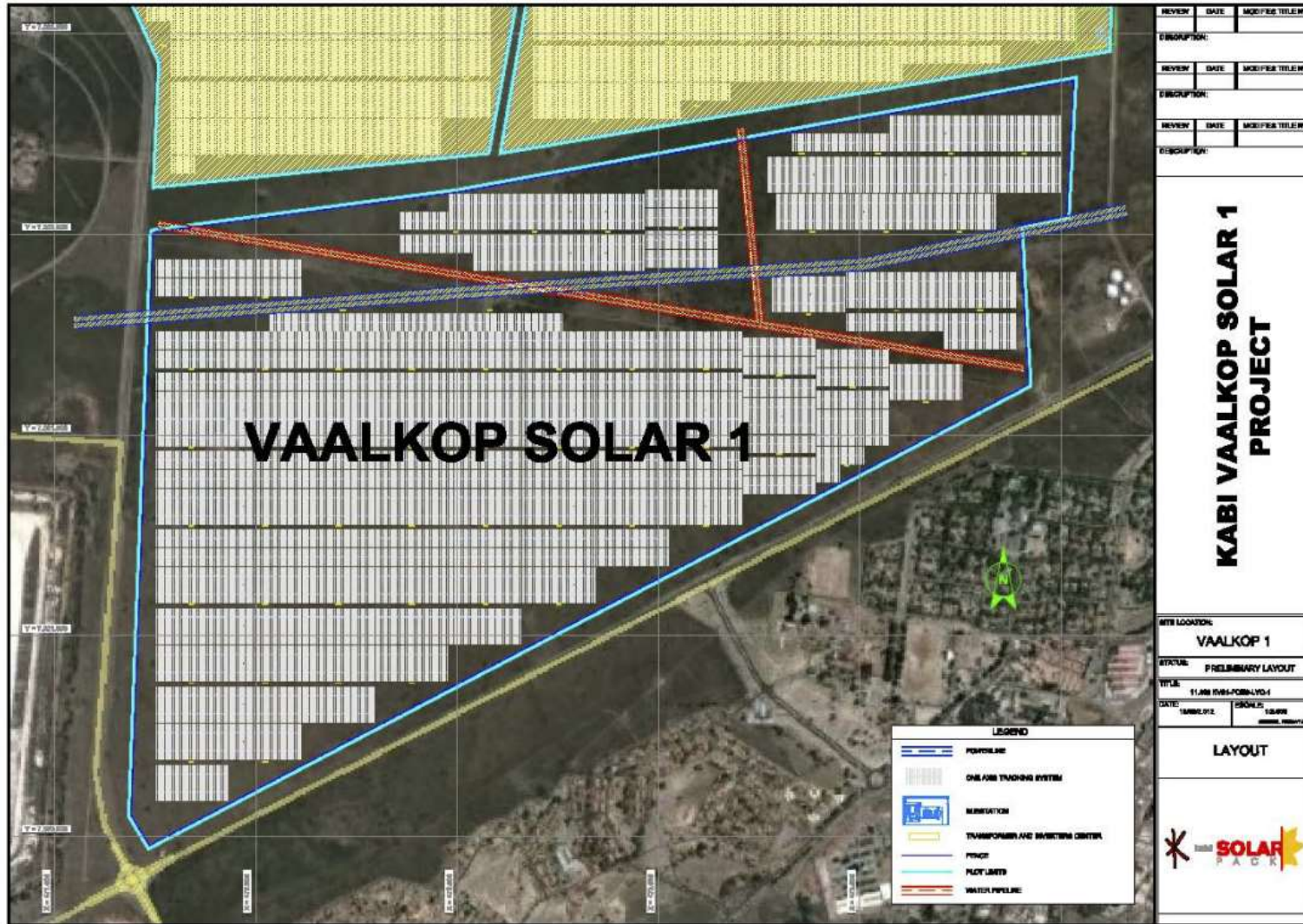
- The increase in the contracted capacity from 100MW to 250MW as well as the inclusion of a BESS into the project description (There will be no adjustment to the PV panel height and development footprint of the facility from that as authorised).
  - Determine whether the impacts assessed within the original Ecological Impact Assessment (2012) still ring true following the increase in contracted capacity to 250MW, as well as the inclusion of a BESS;
  - In the case where such impacts will change in any way due to the proposed amendments (in terms of duration, magnitude, significance etc.), a comparison should be provided of such impacts before the changes and after the proposed changes;

- Whether there will be any additional impacts;
  - In the case where there will be additional impacts, such impacts should be assessed following the methodology specified by Savannah Environmental.
  - Determine any potential advantages and/or disadvantages associated with the changes;
  - Provide measures to ensure avoidance, management and mitigation of impacts associated with such proposed changes, and any changes to the existing EMPr.
- Extension of the validity of the EA beyond the initial 10-year period.
- Determine status (baseline) of the environment (biophysical) that was assessed during the initial assessment (Hoare, 2012);
  - Determine and describe the current status of the assessed environment (biophysical) and whether there has been any change in vegetation cover, ecosystem condition (PES), ecosystem drivers, functionality, and ecological importance and sensitivity.
  - Determine the contribution of this development to ecological cumulative impacts, taking into account similar development within a 30km radius:
    - Identified cumulative impacts must be clearly defined, and where possible the size of the identified impact must be quantified and indicated, i.e., hectares of cumulatively transformed land.
    - Detailed process flow and proof must be provided, to indicate how the specialist's recommendations, mitigation measures and conclusions from the various similar developments in the area were taken into consideration in the assessment of cumulative impacts and when the conclusion and mitigation measures were drafted for this project.
    - The cumulative impacts significance rating must also inform the need and desirability of the proposed development.
    - A cumulative impact environmental statement on whether the proposed development must proceed.



**Figure 1:** Location of the three phases of the Vaal River Solar Project (Map provided by Savannah Environmental (Pty) Ltd). Site 1 represents the proposed location of the Vaal River Solar 2 Facility.





**Figure 2:** Zoomed in location map focussing on the area earmarked for the Vaal River Solar 2 Facility (Map provided by Savannah Environmental (Pty) Ltd).

## **1. GENERAL FINDINGS / NOTES ON THE AFFECTED ENVIRONMENT, COMPARISON WITH FINDING FROM THE ORIGINAL ECOLOGICAL REPORT**

The Vaal River Solar Facility development area was surveyed on the 10<sup>th</sup> of June 2021.

The following aspects of the site visit should be taken into account:

- » During the site visit a fairly moderate to high level survey of the affected area was conducted.
- » The site was conducted during the inactive, dry season and as such some of the plants and animals were in a dormant or inactive state. However, due the above average late autumn rainfall the area still contained enough identifiable plant material above ground (including geophytes) and animal activity, in order for this sit visit to serve its purpose.

### **1.1. SUMMARY OF THE ENVIRONMENTAL BASELINE RESULTS/FINDINGS MADE BY HOARE (2012).**

#### **1.1.1. *Land-use and Land-cover***

Hoare (2012) mentioned that this proposed development is located within a mining belt with numerous mines located nearby. The major land-use in the are is subsequently a mixture of mining activities and agricultural, predominantly cattle grazing and commercial crop cultivation, especially to the south, across the Vaal River.

Land cover maps and satellite imagery available at the time of the assessment indicated that that the entire development area consists of natural vegetation (unimproved grassland) with the exception of small areas of diggings.

The survey conducted by Hoare indicated/confirmed that the project area comprises predominantly natural vegetation in a moderate to poor condition, and which are potential habitat for various plant and animal species of conservation concern.

#### **1.1.2. *Broad Vegetation Types***

According to the vegetation data, that was used at the time of the initial study, the entire project site was located within a single vegetation type, namely Vaal Reefs Dolomite Sinkhole Woodland. This vegetation type is classified as Least Threatened (Mucina & Rutherford 2006) and is furthermore not listed within the list of threatened terrestrial ecosystems for South Africa as published on 9 December 2011 (G 34809, GoN 1002). According to Mucina & Rutherford (2006) approximately 23% of the vegetation type has been transformed.

### **1.1.3. Conservation Planning/Context**

At a national level the project area, at the time of the initial study, the project site was not located within any conservation planning/priority areas (e.g. NPAES Focus Areas, NPAES Formal Protected Areas, NPAES Informal Protected Areas, NEM:BA's Threatened Terrestrial Ecosystems for South Africa).

From a provincial level, no Critical Biodiversity Areas have been identified for the North-West Province, at the time of the initial study.

### **1.1.4. Plant Species of Conservation Concern (Red List, Threatened and Highly Range Restricted Species).**

Hoare (2012) listed five Plant SCC (Red List of South African Plants version 2011.1) and that have a distribution that include the project site namely;

- *Lithops lesliei* subsp. *lesliei* (Near Threatened)
- *Crinum bulbispermum* (Declining)
- *Pelargonium sidoides* (Declining)
- *Boophone disticha* (Declining)
- *Hypoxis hemerocallidea* (Declining)

No Plant SCC were recorded during the site survey (Hoare, 2012), however Hoare mentioned within the report that *H. hemerocallidea* was found on the site during previous surveys conducted within the area by De Castro (2007).

### **1.1.5. Protected Plants (National and Provincial).**

According to Hoare (2012), only one plant species, protected under the National Environmental Management: Biodiversity Act, 2004 (TOPS), could potentially occur within the project site, namely *Harpagophytum procumbens*. Due to the absence of suitable/preferred habitat, this species according Hoare (2012), has very low probability of occurring on the site and this was confirmed during the site survey.

According to Hoare (2012), two protected trees (protected under the National Forest Act) namely; *Boscia albitrunca* and *Acacia erioloba* have geographical distribution that includes the study site. These tree species however, not recorded within the project site during the site survey conducted by Hoare in 2012.

### **1.1.6. Animals Species of Conservation Concern (Red List, Threatened and Highly Range Restricted Species).**

Hoare (2012) listed four Mamma SCC (Red Data) that have a geographical distribution that includes the study area, and habitat preference that includes habitats available in the project site namely:

- White-tailed Rat (Endangered – Regional and Global)
- Brown Hyaena (Near Threatened – Regional and Global)
- Hedgehog (Near Threatened – Regional; Least Concern - Global)
- Honey Badger (Near Threatened – Regional; Least Concern - Global)

According to Hoare (2012), these species could potentially occur on site, however during the survey these species were not confirmed within the project site.

Hoare (2012) listed five Bird SCC (Red Data) that have a geographical distribution that includes the study area, and habitat preference that includes habitats available in the project site namely:

- Blue Crane (Vulnerable – Regional and Global)
- Lesser Kestrel (Vulnerable – Regional and Global)
- White-bellied Korhaan (Vulnerable – Regional and Global)
- Lanner Falcon (Near Threatened – Regional and Global)
- Melodious Lark (Near Threatened – Regional and Global)

According to Hoare (2012), these species have a moderate to high probability of utilising the available habitats within the project site however, during could potentially occur on site, however during the survey these species were not confirmed within the project site.

Hoare (2012) listed only one Amphibian SCC (Red Data) that has a geographical distribution that includes the study area, namely the Giant Bullfrog (Near Threatened – Regional and Least Concern – Global). This Amphibian SCC is however associated with seasonal, shallow grassy pans in flat open areas and tend to forage into the surrounding grasslands. Due to the absence of suitable habitat, this species according Hoare (2012), has low probability of occurring on the site.

Hoare (2012) listed only one Reptile SCC, that has a geographical distribution that includes the study area, namely the Striped Harlequin Snake (Near Threatened – Regional). This reptile species is also endemic to South Africa. According to Hoare (2012), this species could potentially occur on site, however during the initial survey this species was not confirmed within the project site.

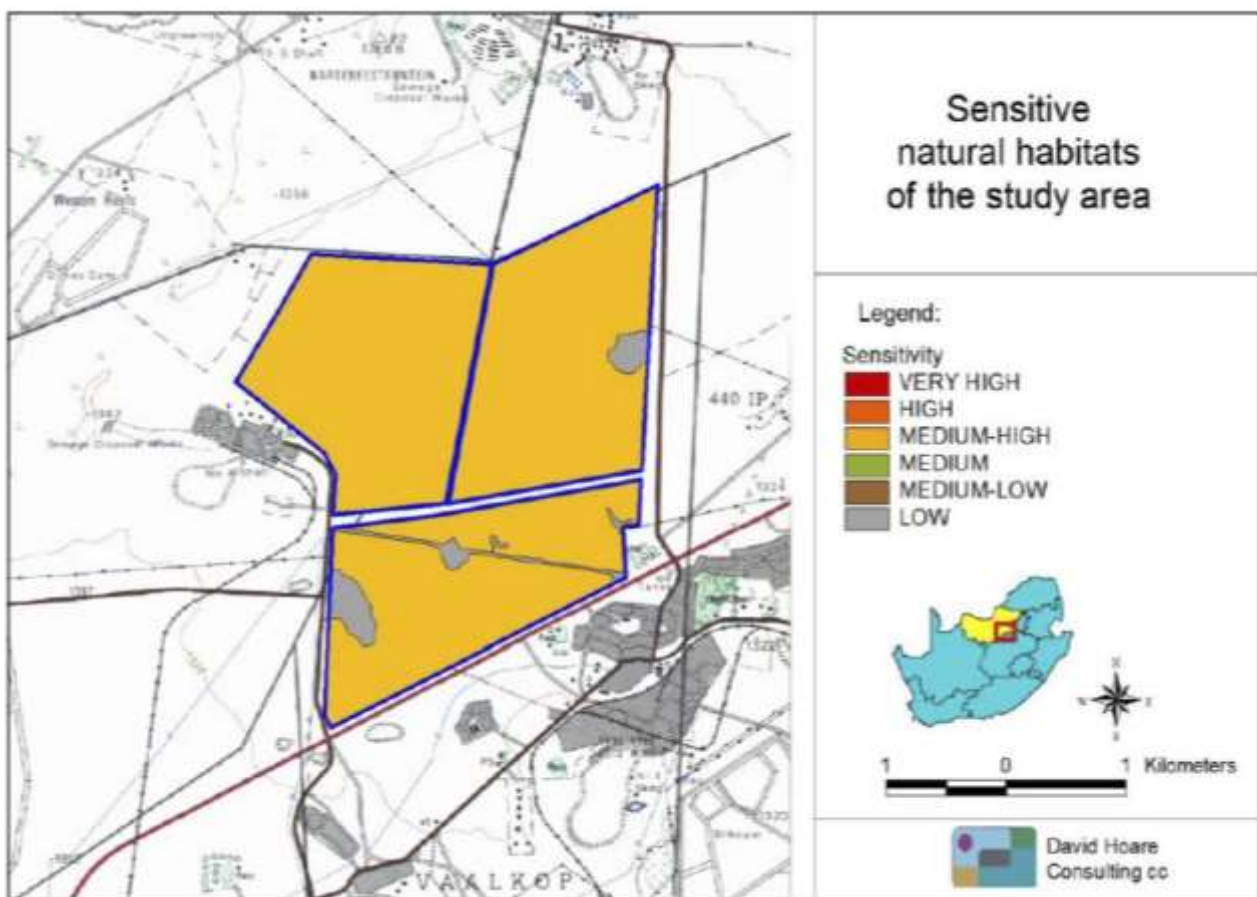


### 1.1.7. Protected Animals (National and Provincial).

According to Hoare (2012), three animal species, protected under the National Environmental Management: Biodiversity Act, 2004 (TOPS), could potentially occur within the project site, namely the Black-footed Cat, Cape Fox and the Giant Bullfrog, however during the survey these species were not confirmed within the project site.

### 1.1.8. Sensitivity Assessment.

According to Hoare (2012), no high/very high sensitive and “No-Go” areas were identified (Figure 3). The bulk of the project site can be classified as medium-high Sensitive (natural grasslands of a Vulnerable Vegetation Unit which is a moderate to poor condition). All disturbed and transformed areas have been classified as low sensitive.



**Figure 3:** Sensitive habitats as delineated by Hoare (2012).

## 1.2. THE FOLLOWING FINDINGS AND OBSERVATIONS WERE MADE FOLLOWING THE SITE VISIT.

### 1.2.1. *Land-use and Land-cover*

The land use and land cover, as described by Hoare (2012) was confirmed during the site visit. The project site comprises of a natural grassland in a moderate to poor condition due to long term overgrazing and frequent burning.

### 1.2.2. *Broad Vegetation Types*

The vegetation unit covering the project site has been confirmed as Vaal Reefs Dolomite Sinkhole Woodland (SANBI, 2018). According to the latest available vegetation type data (SANBI, 2018) this vegetation type is classified as Least Concern. This vegetation type is furthermore not listed within the list of threatened terrestrial ecosystems for South Africa as published on 9 December 2011 (G 34809, GoN 1002).

Due to the size and location of the project site within a moderate to poor condition grassland, it is not expected that this development will have an impact on Vaal Reefs Dolomite Sinkhole Woodland vegetation in good to pristine condition that is worthy of conservation and as such this development is unlikely to have an impact on the status of this vegetation type as well as the conservation target set out for this vegetation type.

At a fine scale the grassland within the project site can be described as follow:

The vegetation of the site can be described as a semi-natural grassland in moderate to poor condition, dominated by wiry, hardy climatic grasses indicative of long term grazing. Interspersed, throughout this grassy landscape are a few low growing trees and shrubs which may in some areas form an open shrub veld. A few groupings or clusters of larger tree species, are also present within the project site forming isolated open woodland patches. These woodland patches form a mosaic within the grasslands.

Throughout the site the graminoid layer (grass layer) is dominated by tufted- perennial- climatic increaser 3 grasses such as *Aristida diffusa*, *Eragrostis chloromelas* and *Triraphis andropogonoides*. The dominance of these grass species and the largely absence of *Themeda triandra* and *Digitaria eriantha* are indicative of the long-term overgrazing regime with which this area has been exposed to. These increaser 3 species thrive in overgrazed and selectively grazed veld and are largely unpalatable, hardy and relative dense. Accompanying the graminoid layer is a relative well represented forb layer of which some species resemble a karroid element (e.g. *Osteospermum muricatum*, *Chrysocoma ciliata*, *Pentzia* spp. and *Felicia muricata*). These karroid species are also usually associated with an advanced state of degradation due to long-term overgrazing. Throughout

most of the study area *Searsia lancea* is the dominant tall shrub or small tree. A total of 6 listed Alien Invasive Plants have been recorded namely; *Opuntia ficus-indica* (Category 1b), *Opuntia humifusa* (Category 1b) *Datura ferox* (Category 1b), *Eucalyptus camaldulensis* (Category 2), *Melia azedarach* (Category 1b), *Tipuana tipu* (Category 3). These AIPs are however, still sparsely distributed throughout the project site.

### **1.2.3. Conservation Planning/Context**

At a national level the project area, the project site, is still not located within any conservation planning/priority areas, according to the latest available data sets (NPAES Focus Areas, South African Conservation Areas 2020, South African Protected Areas 2020, NEM:BA's 2011 Threatened Terrestrial Ecosystems for South Africa and Important Bird Areas 2015).

From a provincial level, the project site is located outside of any Critical Biodiversity Areas (CBA) and Ecological Support Areas (ESA) as identified within the latest available spatial data sets (NWBS2015 Terrestrial CBA).

Subsequently, the statement made by Hoare in his report of 2012 still remain true, wherein he commented that the proposed project will not impact/affect any areas of conservation concern as identified at a national and provincial level.

### **1.2.4. Plant Species of Conservation Concern (Red List, Threatened and Highly Range Restricted Species).**

Based on the latest IUCN and South African Red Data Lists (IUCN 2021.3 and Red List of South African Plants 2020.1) no Plant SCC were recorded within the project site and it is highly unlikely that development will impact any individuals and/or populations of Plant SCC.

### **1.2.5. Protected Plants (National and Provincial).**

The only nationally protected species that will be impacted by the proposed development are a few small to medium tall specimens of *Vachellia erioloba*. This tree species is sparsely scattered throughout the project site with only a few specimens recorded within the project site. *Vachellia erioloba* is a fairly common tree within this area as well as within the vegetation type. As such the loss of these trees is not expected to have a significant impact on the larger area's population. However, future developments will have to consider the impacts, any further loss of trees, will have on the area's population health and status

At a provincial level (The Transvaal Nature Conservation Ordinance - No. 12 of 1983) four protected (Schedule 11) plant species have been recorded within the project site namely;

➤ *Schizocarpus nervosus*

During the survey of the PV solar footprint a few species have been recorded. It is however likely that more species may occupy the development footprint. However, due to the fact that this species is fairly common within the area, outside of the development footprint, the loss of these species within the development footprint is unlikely to impact the local population's status.

➤ *Boophone disticha*

During the survey of the PV solar footprint only a few specimens have been recorded. It is however likely that more species may occupy the development footprint. However, due to the fact that this species is fairly common within the area, outside of the development footprint, the loss of these species within the development footprint is unlikely to impact the local population's status.

➤ *Babiana bainesii*

During the site visit this species was found to be fairly common within the project site as well as within the surrounding areas and it is highly unlikely that the proposed development will have a significant impact on the species local population status.

➤ *Aloe grandidentata*

*A. grandidentata* is widespread and common, and has no significant threats in its habitat. During the site visit this species was found to be fairly common within the project site as well as within the surrounding areas and it is highly unlikely that the proposed development will have a significant impact on the species local population status.

It is recommended that a pre-construction fauna and flora walk-through is conducted by a registered botanical specialist, prior to the commencement of any construction activities. The purpose of the walk-through will be to locate and identify any conservation important plant species or fauna within the development footprint and assist with the permitting requirements.

**1.2.6. Animals Species of Conservation Concern (Red List, Threatened and Highly Range Restricted Species).**

Based on the latest IUCN and South African Red Data Lists (IUCN 2021.3 and 2016 Mammal Red List of South Africa Lesotho and Swaziland) no Mammal SCC were recorded within the project site and it is highly unlikely the that development will impact any individuals and/or populations of Mammal SCC.

Based on the latest IUCN and South African Red Data Lists (IUCN 2021.3 and 2015 Bird Red List of South Africa Lesotho and Swaziland) no Bird SCC were recorded within the project site and it is highly unlikely the that development will impact any individuals and/or populations of Bird SCC.

Based on the latest IUCN and South African Red Data Lists (IUCN 2021.3 and 2013 Amphibian Red List of South Africa) no Amphibian SCC were recorded within the project site and it is highly unlikely the that development will impact any individuals and/or populations of Amphibian SCC.

Based on the latest IUCN and South African Red Data Lists (IUCN 2021.3 and 2017 Reptile Red List of South Africa) no Reptile SCC were recorded within the project site and it is highly unlikely the that development will impact any individuals and/or populations of Reptile SCC.

#### **1.2.7. Protected Animals (National and Provincial).**

At a provincial level (The Transvaal Nature Conservation Ordinance - No. 12 of 1983) no protected (Schedule 2, 4, 5 and 7) animal species have been recorded within the project site namely.

#### **1.2.8. Sensitivity Assessment.**

Based on the site survey, the sensitivity classification done by Hoare (2012) was confirmed. The project site comprises of a natural grassland in a moderate to poor condition due to long term overgrazing and frequent burning. This grassland can be regarded as medium sensitive whilst all disturbed areas can be regarded as low sensitive. No high/very high sensitive and "No-Go" features were identified within the project site.



## 2. COMPARISON AND ASSESSMENT OF POTENTIAL IMPACTS LISTED WITHIN THE ORIGINAL ECOLOGICAL REPORT.

A summary of all applicable impacts listed within the original Ecology Report will be provided followed by a re-assessment of all impacts that that will either increase or decrease in significance following the amendment of the turbine design and location. All impacts that will have no change in significance will only be mentioned. Additional mitigation measures are provided where deemed necessary.

Within the original Ecology Report the following potential impacts were listed as applicable to this development.

- ***"Impacts on biodiversity:*** *this includes any impacts on populations of individual species of concern (flora and fauna), including protected species, and on overall species richness. This includes impacts on genetic variability, population dynamics, overall species existence or health and on habitats important for species of concern".*

Within the report the following biodiversity aspects were deemed to be potentially significant if not mitigated against:

- Loss of habitat and impact on animal species of conservation concern: Threatened animal species are affected primarily by the overall loss of habitat, since direct construction impacts can often be avoided due to movement of individuals from the path of construction.

In the case of threatened animal species, a loss of a population or individuals at a mass scale could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations or the habitat that they depend on.

Consequences may include

1. fragmentation of populations of affected species;
2. reduction in area of occupancy of affected species; and
3. loss of genetic variation within affected species.

It has been evaluated that there are four mammal species, three bird species and one reptile species of conservation concern, that could potentially be affected by the proposed development. It is unlikely that construction of the PV solar facility will have a significant impact on any of the mentioned listed species. The proposed significance of the impact of the PV Solar development was rated as **low**.

- Impacts on plants species of conservation concern: Plant species are especially vulnerable to infrastructure development due to the fact that they cannot move out of the path of the construction activities but are also affected by overall loss of habitat.

In the case of threatened plant species, a loss of a population or individuals at a mass scale could lead to a direct change in the conservation status of the species, possibly extinction. This may arise if the proposed infrastructure is located where it will impact on such individuals or populations or the habitat that they depend on. Consequences may include:

1. fragmentation of populations of affected species;
2. reduction in area of occupancy of affected species; and
3. loss of genetic variation within affected species.

Two Declining plant species are known to occur within the area whilst there is a potential for one Near Threatened and two more Declining plant species to occur on site. The overall significance of the impact has been rated as **medium**.

- Bird collisions with powerlines: Threatened bird species may be directly affected by collisions with overhead powerlines, Cranes, bustards, flamingos, waterfowl, shorebirds, gamebirds and falcons are among the most frequently affected (Jenkins et al. 2010). Ludwig's Bustard is especially affected by collisions with overhead power lines.

There are three threatened bird species and two near threatened bird species that have a medium probability of utilising available habitats in the study area, either for foraging or breeding.

The potential impact on these bird species are not considered to be of high frequency, but could potentially have some serious impact on some species. The proposed significance of this impact of the PV Solar development was rated as **low**.

- **Impacts on sensitive habitats:** *this includes impacts on any sensitive or protected habitats, including, for example, indigenous forest, thicket and wetland vegetation, that leads to direct or indirect loss of such habitat.*
- **Impacts on ecosystem function:** *this includes impacts on any processes or factors that maintain ecosystem health and character, including the following:*
  - *disruption to nutrient-flow dynamics;*
  - *impedance of movement of material or water;*
  - *habitat fragmentation;*
  - *changes to abiotic environmental conditions;*
  - *changes to disturbance regimes, e.g. increased or decreased incidence of fire;*
  - *changes to successional processes;*

- *effects on pollinators;*
- *increased invasion by alien plants.*

*Changes to factors such as these may lead to a reduction in the resilience of plant communities and ecosystems or loss or change in ecosystem function.*

Within the report the following aspects pertaining to impacts on sensitive habitats and ecosystem functions were deemed significant:

- Impacts on indigenous natural vegetation (terrestrial): Construction of infrastructure may lead to direct loss of vegetation. This will lead to localised or more extensive reduction in the overall extent of vegetation. Where this vegetation has already been stressed due to degradation and transformation at a regional level, the loss may lead to increased vulnerability (susceptibility to future damage) of the habitat. Consequences of the impact occurring may include:
  1. Negative change in conservation status of habitat (Driver et al. 2005);
  2. increased vulnerability of remaining portions to future disturbance;
  3. general loss of habitat for sensitive species;
  4. loss in variation within sensitive habitats due to loss of portions of it;
  5. general reduction in biodiversity;
  6. increased fragmentation (depending on location of impact);
  7. disturbance to processes maintaining biodiversity and ecosystem goods and services;  
and
  8. loss of ecosystem goods and services.

It has been established that the vegetation on site is classified as Least Threatened. The overall significance of the impact has been rated as **medium**.

- Establishment and spread of declared weeds and alien invader plant: Major factors contributing to invasion by alien invader plants includes high disturbance. Exotic species are often more prominent near infrastructural disturbances than further away (Gelbard & Belnap 2003, Watkins *et al.* 2003). Consequences of this may include:
  1. Loss of indigenous vegetation;
  2. change in vegetation structure leading to change in various habitat characteristics;
  3. change in plant species composition;
  4. change in soil chemical properties;
  5. loss of sensitive habitats;
  6. loss or disturbance to individuals of rare, endangered, endemic and/or protected species;
  7. fragmentation of sensitive habitats;

8. change in flammability of vegetation, depending on alien species;
9. hydrological impacts due to increased transpiration and runoff; and
10. impairment of wetland function.

The site is known to harbour alien trees in significant numbers in discrete areas. The main species of concern is *Acacia mearnsii*, which occurs adjacent to existing disturbances on site. There is therefore a strong potential for alien trees to spread following disturbance on site. The presence of a diffuse disturbance over a wide area could lead to the spread of a number of other species that are present in the area. This impact was rated as having a Significance rating of Medium in the absence of effective mitigation measures and a rating of **Low** with the implementation of effective mitigation measures.

## **2.1. AMENDMENTS TO EXISTING LISTED IMPACTS AND ADDITIONAL OF POTENTIAL IMPACTS FOLLOWING THE OBSERVATION MADE DURING THE SITE VISIT.**

Following the site visit, the following comments can be made regarding the above-mentioned impacts.

- The proposed amendments will not result in a change in the significance rating of the impacts listed and assessed within the report compiled by Hoare (2012).
- Due to the fact that land-cover and land-use have remained fairly unchanged, the significance rating of the impacts listed and assessed within the report compiled by Hoare (2012) will also not be affected these aspects
- Due to the above-mentioned aspects the significant ratings provided by Hoare (2012) will remain unchanged and are still applicable.
- However, cumulative impact of this development along with other surrounding developments (within a radius of 30km) were not considered/assessed during the original Ecological Impact Assessment, subsequently, an assessment of the potential cumulative impact of the development, including the addition of a BESS, is included within this Part 1 Motivation Report (below).

### **2.1.1. Local vs. cumulative Impacts: some explanatory notes**

Ecosystems consist of a mosaic of many different patches. The size of natural patches affects the number, type and abundance of species they contain. At the periphery of patches, influences of neighbouring patches become apparent, known as the 'edge effect'. Patch edges may be subjected to increased levels of heat, dust, desiccation, disturbance, invasion of exotic species and other factors. Edges seldom contain species that are rare, habitat specialists or species that require larger tracts of undisturbed core habitat. Fragmentation due to development reduces core habitat and

greatly extends edge habitat, which causes a shift in the species composition, which in turn puts great pressure on the dynamics and functionality of ecosystems (Perlman & Milder 2005).

Cumulative impacts of developments on population viability of species can be reduced significantly if new developments are kept as close as possible to existing developed and/or transformed areas or, where such is not possible, different sections of a development be kept as close together as possible. Thus, new power lines should follow routes of existing servitudes if such exist. Renewable energy facilities, like solar PVs should be constructed as close as possible to existing infrastructure or substations, and if several developments are planned within close proximity, these developments should be situated as close together as possible, not scattered throughout the landscape.

Existing solar energy projects that were considered in terms of their potential cumulative terrestrial ecological impacts that are in an approximate 30 km radius of the Vaal River Solar 2 Facility. Ten other PV Solar projects are located within the 30 km radius.

Conclusion on cumulative impacts due to this and the surrounding developments:

- Minimal transformation of intact, sensitive habitats. These impacts could potentially compromise the ecological functioning of these habitats and may contribute to the further fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. This contribution of the proposed project to this impact would be very limited due to the fact that the proposed development is situated within a predominantly moderate sensitivity area with some low sensitive areas. No high/very high sensitive areas will be impacted by the proposed development.
- Excessive clearing of vegetation can and will influence runoff and stormwater flow patterns and dynamics, which could cause excessive accelerated erosion of plains, and this could also have detrimental effects on the downslope freshwater resource systems.
  - Rehabilitation and revegetation of all surfaces disturbed or altered during construction is desirable.
  - Runoff from sealed surfaces or surfaces that need to be kept clear of vegetation to facilitate operation of a development needs to be monitored regularly to ensure that erosion control and stormwater management measures are adequate to prevent the degradation of the surrounding environment.
- Large-scale disturbance of indigenous vegetation creates a major opportunity for the establishment of invasive species and the uncontrolled spread of alien invasives into adjacent agricultural land and rangelands.
  - A regular monitoring and eradication protocol must be part of all developments long term management plans.
- The loss of and transformation of intact habitats could compromise the status and ecological functioning a fairly small vegetation type and may fracture and disrupt the connectivity this vegetation type. This in turn may impacting conservation targets set out for this vegetation type.



## 2.1.2. Identification of potential cumulative ecologic impacts

### **Cumulative Impact 1.** *Impacts on broad-scale ecological processes*

The proposed development will impact a portion of a very small vegetation unit as well as, at a local scale, impact on habitat loss, and the potential ability to meet future conservation targets. However, during this study it was determined that most of the development footprint is located within a semi-natural grassland in a moderate to poor condition, with sensitive habitats, providing important ecological services and functions, being avoided. Subsequently, the loss of and transformation of this portion of the affected vegetation type and associated habitats will not result in an impact on the ability to meet conservation targets, as set out for this vegetation type.

### **Cumulative Impact 1.** *Potential cumulative impacts due to nearby renewable energy developments (solar energy facilities).*

The affected properties are situated less than 9 km east of the town of Orkney and adjacent (west and north) to the Vaal Reefs Mine. The bulk of the surrounding land to the east, west and south is mostly in a transformed state and highly fractured. However, there are some landscape connectivity towards the north with the area to the north mostly utilised as grazing.

- Further solar developments in the immediate surroundings (30km radius from proposed development):
  - Proposed Buffels Solar pV 1 Solar Energy Project on a site near Orkney, North West Province
  - Proposed Buffels Solar pV 2 Solar Energy Project on a site near Orkney, North West Province
  - Proposed 50MW PV plant and associated infrastructure on Portion 2 of the Farm Town and Townlands of Potchefstroom 435 IQ, Gauteng
  - The 100mw Orkney PV SEF and 92M 132KV powerline South West of Orkney within The City of Matlosana LM in the North West Province.
  - Vaal River Photovoltaic Facility 2.
  - Vaal River Photovoltaic Facility 3.
  - The Proposed Construction of a 50MW Photovoltaic (Pv) Solar Energy Facility on the Farm Omega 342 In Viljoenskroon, Free State Province.
  - Proposed construction of the 75MW Kabi Witkop Solar 1 PV facility on a site near Orkney, North West Province
  - Proposed construction of the 61MW Witkop Solar PV II facility on a site near Orkney, North West Province.
  - Proposed Keren property holdings Rietvlei solar plant on Farm NR 539 in the Viljoenskroon district within Moqhaka Local Municipality, Free state

An estimated total area of 9325 ha will be impacted by the proposed PV solar facilities. However only seven PV solar facilities (including Vaal River Photovoltaic Facility 1) are planned within the Vaal Reefs Dolomite Sinkhole Woodland vegetation type and will cumulatively impact approximately 7098 ha of this vegetation type ( $\pm 20\%$  of the vegetation type).

Conclusion on cumulative impacts due to surrounding developments:

- It is highly unlikely that a cumulative effect of loss of high biodiversity areas could arise from the Vaal River Photovoltaic Facility 1 in combination with the other renewable energy projects in the surrounding environment for the following reasons:
  - The landscape between these developments are highly fractured and isolated from one another. Subsequently, potential faunal migration routes are absent between these developments and is not considered significant from a cumulative perspective due to existing degradation.

### 2.1.3. Assessment of cumulative impacts

**Cumulative Impact 1:** *Reduced ability to meet conservation obligations and targets.*

<b>Impact Nature:</b> The loss of unprotected vegetation types on a cumulative basis from the broader area impacts the countries' ability to meet its conservation targets		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects within the area</b>
<b>Extent</b>	Local (1)	Regional (3)
<b>Duration</b>	Long Term (4)	Long-Term (4)
<b>Magnitude</b>	Small (0)	Minor (2)
<b>Probability</b>	Very Improbable (1)	Improbable (2)
<b>Significance</b>	<b>Low (5)</b>	<b>Low (18)</b>
<b>Status</b>	Slightly Negative	Slightly Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources</b>	No	No
<b>Can impacts be mitigated?</b>	Yes, to a large extent	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.</li> <li>» An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland.</li> <li>» Reduce the footprint of the facility within sensitive habitat types as much as possible.</li> </ul>	

**Cumulative Impact 2: Impacts on Broad-Scale Ecological Processes.**

<b>Impact Nature:</b> Transformation of intact habitat could potentially compromise ecological processes as well as ecological functioning of important habitats and would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects within the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Long Term (4)	Long Term (4)
<b>Magnitude</b>	Small (1)	Low (4)
<b>Probability</b>	Improbable (2)	Improbable (2)
<b>Significance</b>	<b>Low (12)</b>	<b>Low (20)</b>
<b>Status</b>	Neutral – Slightly Negative	Slightly Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources</b>	No	Likely
<b>Can impacts be mitigated?</b>	Yes, to a large extent	
<b>Mitigation</b>	<ul style="list-style-type: none"> <li>» The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.</li> <li>» An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland.</li> <li>» Reduce the footprint of the facility within sensitive habitat types as much as possible.</li> <li>» Small to medium sized mammals can be allowed to move between the development area and surrounding areas by creating artificial passageways underneath boundary fences (this is optional and may be implemented by developer if deemed necessary).</li> </ul>	

**Cumulative Impact 2: Cumulative impacts due to nearby renewable energy developments.**

<p><b>Impact Nature:</b> Cumulative loss of habitats (including sensitive habitats) and further increase in the fractured nature of the landscape may lead to the loss of features responsible for maintaining biodiversity and providing ecosystem goods and services and may potentially lead to;</p> <ul style="list-style-type: none"> <li>» A change in the status of Vaal Reefs Dolomite Sinkhole Vegetation, subsequently also reducing the ability to meet national conservation obligations and targets;</li> <li>» A reduction in biodiversity and even the loss of some species from the area;</li> <li>» Fracturing and isolation of landscapes may cut off important migration routes and prevent genetic variability thus reducing “genetic health” which may in turn lead to weaker species incapable to adapt</li> </ul>
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<p>and react to potential environmental changes and consequently also to a reduction in biodiversity and the extinction of some species from certain areas.</p> <p>» The loss of important corridors essential for some species to allow for movement between important habitat types crucial for the survival of these species.</p>		
	<b>Overall impact of the proposed project considered in isolation</b>	<b>Cumulative impact of the project and other projects within the area</b>
<b>Extent</b>	Local (1)	Regional (2)
<b>Duration</b>	Long Term (4)	Long Term (4)
<b>Magnitude</b>	Small (0)	Minor (2)
<b>Probability</b>	Very Improbable (1)	Improbable (2)
<b>Significance</b>	<b>Low (5)</b>	<b>Low (16)</b>
<b>Status</b>	Neutral	Slightly Negative
<b>Reversibility</b>	Low	Low
<b>Irreplaceable loss of resources</b>	No	Likely
<b>Can impacts be mitigated?</b>	Yes, to a large extent	
<b>Mitigation</b>	<p>» The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.</p> <p>» An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland.</p> <p>» Reduce the footprint of the facility within sensitive habitat types as much as possible.</p> <p>» Small to medium sized mammals can be allowed to move between the development area and surrounding areas by creating artificial passageways underneath boundary fences (this is optional and may be implemented by developer if deemed necessary).</p>	

## 2.2. ADDITIONAL MITIGATION MEASURES DEEMED NECESSARY TO BE INCLUDED

Mitigation measures pertaining to the assessed cumulative impacts:

- The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.
- An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland.
- Reduce the footprint of the facility within sensitive habitat types as much as possible.
- Small to medium sized mammals can be allowed to move between the development area and surrounding areas by creating artificial passageways underneath boundary fences (this is optional and may be implemented by developer if deemed necessary).

Mitigation measures pertaining to the confirmation of protected plants within the project site:

- Preconstruction walk-through of the final development footprint for protected species that would be affected and that can be translocated.
- Before construction commences individuals of listed provincially protected plant species within the development footprint that would be affected, should be counted and marked and translocated where deemed necessary and possible by the ecologist conducting the pre-construction walk-through survey, and according to the recommended ratios. Permits from the relevant provincial authorities, will be required to relocate and/or disturb listed plant species.
- Any individuals of protected species affected by and observed within the development footprint during construction should be translocated under the supervision of the ECO and/or Contractor's Environmental Officer (EO).

### 3. CONCLUSION AND RECOMMENDATIONS

The following amendments to the project have been proposed by Vaal River Solar 2 (Pty) Ltd;

- To amend the authorised solar PV capacity (from 100MW to 250MW) with no adjustment to the PV panel height and development footprint of the facility from that as authorised.
- Inclusion of BESS into the project description.
- An extension of the validity of the Environmental Authorisation.

In order to obtain accurate results and to provide an applicable and relevant comparison and description of the potential impacts associated with the development a site visit was conducted on the 10<sup>th</sup> of June 2022.

Following this site visit as well as a revision of the "original" ecological report done by Dr. David Hoare (Specialist ecological study on the potential impacts of the proposed Vaal River Solar PV Facility near Orkney, North-West Province – 1 April 2012) the following conclusion were drawn:

- The proposed amendments will not result in a change in the significance rating of the impacts listed and assessed within the report compiled by Hoare (2012).
- Due to the fact that land-cover and land-use have remained fairly unchanged, the significance rating of the impacts listed and assessed within the report compiled by Hoare (2012) will also not be affected these aspects
- Due to the above-mentioned aspects the significant ratings provided by Hoare (2012) will remain unchanged and are still applicable.
- These proposed amendments hold no advantage or disadvantage to ecological functioning and services provided the affected habitats.
- However, cumulative impact of this development along with other surrounding developments (within a radius of 30km) were not considered/assessed during the original Ecological Impact



Assessment, subsequently, an assessment of the potential cumulative impact of the development, including the addition of a BESS, have been included within this Part 1 Amendment Motivation Report.

- It was found that all the potential cumulative impacts associated with the Solar PV projects planned within the area (30km radius) can be regarded as Low due to the fact that the landscape between these developments are highly fractured and natural areas are fairly isolated from one another.
- The only additional mitigation measures recommended to be included in the EMPr relates to the assessed cumulative impacts as well as the potential impact on the protected plant species that have been identified during the survey of the development site.
- Mitigation measures pertaining to the assessed cumulative impacts:
  - The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.
  - An open space management plan should be developed for the site, which should include management of biodiversity within the fenced area, as well as that in the adjacent rangeland.
  - Reduce the footprint of the facility within sensitive habitat types as much as possible.
  - Small to medium sized mammals can be allowed to move between the development area and surrounding areas by creating artificial passageways underneath boundary fences (this is optional and may be implemented by developer if deemed necessary).
- Mitigation measures pertaining to the confirmation of protected plants within the project site:
  - Preconstruction walk-through of the final development footprint for protected species that would be affected and that can be translocated.
  - Before construction commences individuals of listed provincially protected plant species within the development footprint that would be affected, should be counted and marked and translocated where deemed necessary and possible by the ecologist conducting the pre-construction walk-through survey, and according to the recommended ratios. Permits from the relevant provincial authorities, will be required to relocate and/or disturb listed plant species.
  - Any individuals of protected species affected by and observed within the development footprint during construction should be translocated under the supervision of the ECO and/or Contractor's Environmental Officer (EO).

**In conclusion the proposed amendments will not impact any additional areas of natural and/or sensitive vegetation, as well as sensitive faunal species or sensitive faunal/avifaunal habitats. The proposed amendments will result in similar impacts as was identified and assessed within the Ecological Impact Assessment conducted by Hoare 2012.**

**Subsequently, from an ecological (faunal, floral and avifaunal) perspective, no objective or motives (identification of impacts of high ecological significance etc.) were identified**

**which would hinder the proposed amendments. Therefore, it is the opinion that the proposed amendments are acceptable and may be authorised, subject to the implementation of the recommended mitigation measures within this Motivation Report as well as within the original Ecological Impact Assessment (Hoare, 2012).**



Gerhard Botha (SACNASP Reg. No 400502/14)  
Wednesday, 06 July 2022

## 4. APPENDICES

### 4.1. APPENDIX 1: DECLARATION OF CONSULTANTS INDEPENDENCE

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have any vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and 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 NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 13 of GN No. R. 326) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offense in terms of regulation 48 of GN No. R. 326.

### REPORT AUTHORS

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**Gerhard Botha** *Pr.Sci.Nat* 400502/14 (Botanical and Ecological Science)

**Field of expertise:** Fauna & flora, terrestrial biodiversity, wetland ecology, aquatic and wetland, aquatic biomonitoring, and wetland habitat evaluations. BSc (Hons) Zoology and Botany, MSc Botany (Phytosociology) from 2011 to present.



Wednesday, 06 July 2022

## 4.2. APPENDIX 2: SPECIALIST CV

# CURRICULUM VITAE:



Gerhard Botha

Name: : Gerhardus Alfred Botha  
Date of Birth : 11 April 1986  
Identity Number : 860411 5136 088  
Postal Address : PO Box 12500  
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Email Address : [gabotha11@gmail.com](mailto:gabotha11@gmail.com)  
Profession/Specialisation : Ecological and Biodiversity Consultant  
Nationality: : South African  
Years Experience: : 8  
Bilingualism : Very good – English and Afrikaans

### Professional Profile:

Gerhard is a Managing Director of Nkurenkuru Ecology and Biodiversity (Pty) Ltd. He has a BSc Honours degree in Botany from the University of the Free State Province and is currently completing a MSc Degree in Botany. He began working as an environmental specialist in 2010 and has since gained extensive experience in conducting ecological and biodiversity assessments in various development field, especially in the fields of conventional as well as renewable energy generation, mining and infrastructure development. Gerhard is a registered Professional Natural Scientist (Pr. Sci. Nat.)

### Key Responsibilities:

Specific responsibilities as an Ecological and Biodiversity Specialist include, inter alia, professional execution of specialist consulting services (including flora, wetland and fauna studies, where required), impact assessment reporting, walk through surveys/ground-truthing to inform final design, compilation of management plans, compliance monitoring and audit reporting, in-house ecological awareness training to on-site personnel, and the development of project proposals for procuring new work/projects.

## Skills Base and Core Competencies

- Research Project Management
- Botanical researcher in projects involving the description of terrestrial and coastal ecosystems.
- Broad expertise in the ecology and conservation of grasslands, savannahs, karroid wetland, and aquatic ecosystems.
- Ecological and Biodiversity assessments for developmental purposes (BAR, EIA), with extensive knowledge and experience in the renewable energy field (Refer to Work Experiences and References)
- Over 3 years of avifaunal monitoring and assessment experience.
- Mapping and Infield delineation of wetlands, riparian zones and aquatic habitats (according to methods stipulated by DWA, 2008) within various South African provinces of KwaZulu-Natal, Mpumalanga, Free State, Gauteng and Northern Cape Province for inventory and management purposes.
- Wetland and aquatic buffer allocations according to industry best practice guidelines.
- Working knowledge of environmental planning policies, regulatory frameworks, and legislation
- Identification and assessment of potential environmental impacts and benefits.
- Assessment of various wetland ecosystems to highlight potential impacts, within current and proposed landscape settings, and recommend appropriate mitigation and offsets based on assessing wetland ecosystem service delivery (functions) and ecological health/integrity.
- Development of practical and achievable mitigation measures and management plans and evaluation of risk to execution
- Qualitative and Quantitative Research
- Experienced in field research and monitoring
- Working knowledge of GIS applications and analysis of satellite imagery data
- Completed projects in several Provinces of South Africa and include a number of projects located in sensitive and ecological unique regions.

## Education and Professional Status

### **Degrees:**

- 2015: Currently completing a M.Sc. degree in Botany (Vegetation Ecology), University of the Free State, Bloemfontein, RSA.
- 2009: B.Sc. Hons in Botany (Vegetation Ecology), University of the Free State, Bloemfontein, RSA.
- 2008: B.Sc. in Zoology and Botany, University of the Free State, University of the Free State, Bloemfontein, RSA.

### **Courses:**

- 2013: Wetland Management (ecology, hydrology, biodiversity, and delineation) – University of the Free State accredited course.
- 2014: Introduction to GIS and GPS (Code: GISA 1500S) – University of the Free State accredited course.

### **Professional Society Affiliations:**

- The South African Council of Natural Scientific Professions: Pr. Sci. Nat. Reg. No. 400502/14 (Botany and Ecology).

## Employment History

- December 2017 – Current: Nkurenkuru Ecology and Biodiversity (Pty) Ltd
- 2016 – November 2017: ECO-CARE Consultancy
- 2015 - 2016: Ecologist, Savannah Environmental (Pty) Ltd
- 2013 – 2014: Working as ecologist on a freelance basis, involved in part-time and contractual positions for the following companies
  - Enviroworks (Pty) Ltd
  - GreenMined (Pty) Ltd
  - Eco-Care Consultancy (Pty) Ltd
  - Enviro-Niche Consulting (Pty) Ltd
  - Savannah Environmental (Pty) Ltd
  - Esicongweni Environmental Services (EES) cc
- 2010 - 2012: Enviroworks (Pty) Ltd

## Publications

### **Publications:**

- Botha, G.A. & Du Preez, P.J. 2015. A description of the wetland and riparian vegetation of the Nxamasere palaeo-river's backflooded section, Okavango Delta, Botswana. *S. Afr. J. Bot.*, **98**: 172-173.

### **Congress papers/posters/presentations:**

- Botha, G.A. 2015. A description of the wetland and riparian vegetation of the Nxamasere palaeo-river's backflooded section, Okavango Delta, Botswana. 41<sup>st</sup> Annual Congress of South African Association of Botanists (SAAB). Tshipise, 11-15 Jan. 2015.
- Botha, G.A. 2014. A description of the vegetation of the Nxamasere floodplain, Okavango Delta, Botswana. 10<sup>th</sup> Annual University of Johannesburg (UJ) Postgraduate Botany Symposium. Johannesburg, 28 Oct. 2014.

## Other

- Guest speaker at IAIAA Free State Branch Event (29 March 2017)
- Guest speaker at the University of the Free State Province: Department of Plant Sciences (3 March 2017):

## References:

- Christine Fouché  
Manager: GreenMined (Pty) LTD  
Cell: 084 663 2399
- Professor J du Preez  
Senior lecturer: Department of Plant Sciences  
University of the Free State  
Cell: 082 376 4404