Allepad PV Three

Northern Cape Province

Scoping Report

October 2018

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PROJECT DETAILS

DEA Reference No.	:	To be provided		
Title	:	Scoping Report for Allepad PV Three, a PV facility and associated infrastructure proposed on a site near Upington, in the Northern Cape Province		
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Report Status	:	Scoping Report for Public Review from **12 October 2018 – 12 November 2018**		
Date	:	October 2018		

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PUBLIC REVIEW PERIOD FOR SCOPING REPORT

This Scoping Report for Allepad PV Three has been made available for a 30-day public review period from **12 October 2018 – 12 November 2018**. This Scoping Report, which has been submitted to the national Department of Environmental Affairs (DEA) and the Northern Cape Department of Environment, and Nature Conservation (DENC) is also available for download on www.savannahsa.com or on request from Savannah Environmental (Pty) Ltd.

The report will be distributed to relevant Organs of State and will also be made available at the following locations:

- Dawid Kruiper Public Library, corner of Mark and Mutual Streets, Upington
- www.savannahsa.com

Please submit your comments to:
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The due date for comments on the Scoping Report is **Monday, 12 November 2018**.

Comments can be made as written submission via fax, post or e-mail.

ACRONYMS

AC	Alternating Current
B-BBEE	Broad-based Black Economic Empowerment
BARESG	Birds and Renewable Energy Specialist Group
BGIS	Biodiversity Geographic Information System
C&R	Comments and Response
CBA	Critical Biodiversity Area
CBIPPP	Coal Baseload Independent Power Producer Procurement
CR	Critically Endangered
CSIR	Council for Scientific and Industrial Research
CSP	Concentrated Solar Power
DAFF	Department of Agricultural, Forestry and Fisheries (National)
DEA	Department of Environmental Affairs (National)
DENC	Department of Environment and Nature Conservation (Northern Cape Provincial)
DC	Direct Current
DM	District Municipality
DMR	Department of Mineral Resources
DoE	Department of Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EGIS	Environmental Geographic Information System
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMPr	Environmental Management Programme
EN	Endangered
EP	Equator Principles
EPFI	Equator Principle Financial Institution
ERA	Electricity Regulation Act (No. 04 of 2006)
ESA	Ecological Support Area
ESMP	Environmental and Social Management Plan
GA	General Authorisation
GHG	Greenhouse Gas
GHI	Global Horizontal Irradiation
GIIP	Good International Industry Practice
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IAP2SA	International Association for Public Participation Southern Africa
IBA	Important Bird Area
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IEP	Integrated Energy Plan

IFC	International Finance Corporation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
km	Kilometre
kWh	Kilowatt hour
kV	Kilovolt
LC	Least Concern
LM	Local Municipality
LNG	Liquid Natural Gas
m	Metre
m²	Square meters
m³	Cubic meters
m amsl	Metres Above Mean Sea Level
MPRDA	Mineral and Petroleum Resources Development Act (No. 28 of 2002)
MTS	Main Transmission Substation
MW	Megawatts
NBKB	Ngwao Boswa Kapa Bokone
NCCRP	National Climate Change Response Policy
NDP	National Development Plan
NEMA	National Environmental Management Act (No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act (No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act (No. 10 of 2004)
NEM:WA	National Environmental Management: Waste Act (No. 59 of 2008)
NERSA	National Energy Regulator of South Africa
NFA	National Forests Act (No. 84 of 1998)
NFEPA	National Freshwater Ecosystem Priority Area
NGP	New Growth Path
NHRA	National Heritage Resources Act (No. 25 of 1999)
NT	Near Threatened
NWA	National Water Act (No. 36 of 1998)
O&M	Operation and Maintenance
OHS	Occupational Health and Safety
ONA	Other Natural Area
PA	Protected Area
PCS	Power Conversion Station
PICC	Presidential Infrastructure Coordinating Committee
PPA	Power Purchase Agreement
PV	Photovoltaic
RE	Renewable Energy
REDZ	Renewable Energy Development Zone
REIPPP	Renewable Energy Independent Power Producer Procurement
SABAP	South African Bird Atlas Project
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANBI	South African National Biodiversity Institute

SANParks	South African National Parks
SANRAL	South African National Roads Agency Limited
SDF	Spatial Development Framework
SIA	Social Impact Assessment
SIP	Strategic Integrated Project
SKA	Square Kilometre Array
TOPS	Threatened or Protected Species
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VIA	Visual Impact Assessment
VU	Vulnerable
WB	World Bank
WUL	Water Use License
WWF	World Wide Fund for Nature

EXECUTIVE SUMMARY

ILEnergy Development (Pty) Ltd, proposes the development of Allepad PV Three on a site near Upington, in the Northern Cape Province. Allepad PV Three comprises a commercial solar energy generation facility and associated infrastructure and is intended to form part of the Department of Energy's (DoE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. The REIPPP Programme aims to secure 14 725MW of new generation capacity from Renewable Energy (RE) sources (in accordance with South Africa's Integrated Resource Plan for Electricity (IRP) 2010 – 2030), while simultaneously diversifying South Africa's electricity mix, and positively contributing towards socio-economic, and environmentally sustainable growth.

Allepad PV Three is proposed on the Remaining Extent of Erf 5315 Upington (the project site), which is located approximately 11km north-west of Upington, in the Dawid Kruiper Local Municipality (LM), of the ZF Mgcawu District Municipality (DM), in the Northern Cape Province. The project will be designed to have a contracted capacity of up to 100MW, and will make use of either fixed-tilt, single-axis tracking, or dual-axis (double-axis) tracking photovoltaic (PV) solar technology for the generation of electricity.

The proposed project will comprise the following key infrastructure and components:

- Arrays of PV panels with a generation capacity of up to 100MW.
- Mounting structures to support the PV panels.
- Combiner boxes, on-site inverters (to convert the power from Direct Current (DC) to Alternating Current (AC)), and power transformers.
- A 132kV on-site substation up to 1ha in extent to facilitate the connection between the solar energy facility and the Eskom electricity grid.
- A new 132kV double-circuit power line (which will make use of a loop-in and loop-out configuration utilising a double-circuit monopole construction), up to 5km in length, between the on-site substation and Eskom grid connection point.
- Cabling between the project's components (to be laid underground where practical).
- Meteorological measurement station.
- An energy storage area up to 2ha in extent.
- Access road and internal access road network.
- On-site buildings and structures, including a control building and office, ablutions and guard house.
- Perimeter security fencing, access gates and lighting.
- Temporary construction equipment camp up to 1ha in extent, including temporary site offices, parking and chemical ablution facilities.
- Temporary laydown area up to 1ha in extent, for the storage of materials during the construction.

The development of Allepad PV Three requires Environmental Authorisation (EA) from the National Department of Environmental Affairs (DEA) in accordance with the requirements of the National Environmental Management Act (No. 107 of 1998) (NEMA), and the 2014 EIA Regulations (GNR 326). EA required for the project is subject to the completion of a full Scoping and Environmental Impact Assessment (EIA) process. Savannah Environmental (Pty) Ltd has been appointed as the independent environmental consultants responsible for managing the application for EA and supporting Scoping and EIA process, inclusive of comprehensive, independent specialist studies.

The Scoping Phase includes the identification and description of potential issues associated with the project through a desktop study and consultation with Interested and Affected Parties (I&APs) and key stakeholders through a Public Participation process. The entire project site is considered within

this process at a desktop level. Through this study, areas of sensitivity within the broader site are identified and delineated in order to identify any environmental fatal flaws, and environmentally sensitive, or no-go areas. The Scoping Phase aims to:

» Identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including design, construction, operation and decommissioning) within the broader study area through a desktop review of existing baseline data and specialist studies.
» Identify potentially sensitive environmental features and areas within the broader site in order to inform the preliminary design process of the facility.
» Define the scope of studies to be undertaken during the EIA Phase.
» Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA Phase, as well as regarding the scope and extent of specialist studies that will be required to be undertaken as part of the EIA Phase.

Potential impacts associated with the development of Allepad PV Three are expected to occur during both the construction and operation phases. Impacts associated with the construction of Allepad PV Three can also be expected to be associated with the decommissioning phase (however, to a lesser extent as the project site would have previously undergone transformation and disturbance during construction).

Flora and Fauna:

The vegetation of the site consists of Kalahari Karroid Shrubland in the eastern extent of the site and Gordonia Duneveld in the western extent of the site. The areas of Kalahari Karroid Shrubland in the eastern extent are associated with shallow calcrete soils and have numerous drainage lines as well as a few small pans present. This area is considered largely unsuitable for development. The western extent of the site comprises undulating sandy soils which are considered to be of low sensitivity and therefore suitable for development apart from the extensive area of mobile dunes which is considered to be medium high sensitivity and not suitable for development as the loose sands are very vulnerable to erosion. In addition, it is likely that significant soil disturbance would be required in this area for construction as the dunes would likely need to be at least partly levelled.

In terms of fauna, there are few species of conservation concern that are likely to be present or abundant at the site and the primary impact of the development on fauna would be habitat loss for the more common resident species. As such, no high long-term post-mitigation impacts on fauna are expected to occur as a result of the development.

Cumulative impacts in the area are a potential concern due to the proliferation of solar energy development in the wider Upington area. In terms of habitat loss, the Gordonia Duneveld vegetation type is still approximately 99% intact and is also a very extensive vegetation type, with the result that the loss of habitat associated with the development is not considered highly significant given that there are still very large contiguous intact areas available north of the site. The final cumulative impact of the development would depend on the final number of PV facilities developed at the site as well as their configuration, and the extent to which they impinge on the more sensitive habitats at the site.

Potential ecological impacts associated with the development provided in context of the features and characteristics of the site and the likelihood that each impact would occur given the characteristics of the site and the extent and nature of the development are provided below:

» Impacts on vegetation and protected plant species:
Several protected species occur at the site which may be impacted by the development, most notably Acacia haematoxylon. Vegetation clearing during construction will lead to the loss of currently intact habitat within the development footprint and is an inevitable consequence of the development. As this impact is certain to occur it will be assessed for the construction phase as this is when the impact will occur, although the consequences will persist for a long time after construction.

» Direct faunal impacts:
Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some impact on fauna is highly likely to occur during construction as well as operation and this impact will therefore be assessed for the construction phase and operational phase.

» Reduced ability to meet conservation obligations and targets:
The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the country's ability to meet its conservation targets. Although the receiving vegetation types in the study area are classified as Least Threatened and are still more than 99% intact, Kalahari Karroid Shrubland is a relatively restricted vegetation type for an arid area and is therefore vulnerable to cumulative impact. This impact is therefore assessed in light of the current development as well as any other developments in the surrounding area which would also contribute to cumulative impacts.

» Impact on broad-scale ecological processes:
Transformation of intact habitat on a cumulative basis 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. Due to the presence of a number of other renewable energy developments in the area, this is a potential cumulative impact of the development that is assessed.

At this stage of the Scoping process there are no impacts associated with the development that are considered to be of high significance and which cannot be mitigated to an acceptable level. Therefore, based on the results of this assessment, there are no reasons to indicate that the development should not move into the EIA phase for further assessment.

Avifauna:

An approximate total of 145 bird species have been recorded within the study area and surrounds, of which 54 species were observed on site. Only five of these are listed as near-endemic and a further ten species as biome-restricted. There are no known Important Bird Areas (IBAs) within the vicinity of the project site, while there are also no known large terrestrial bird populations or wetlands of significant avifaunal importance.

Nine species recorded in the broader area are red-listed, of which six species are listed as threatened, and three considered Near-Threatened. Two Near-Threatened species were recorded during the site visit, namely Karoo Korhaan (several pairs) and Kori Bustard (one pair). The six threatened species that may occur in the study area, albeit in low numbers or infrequently, include White-backed Vulture (Critically Endangered), Ludwig's Bustard (Endangered), Martial Eagle (Endangered), Tawny Eagle (Endangered), Secretarybird (Vulnerable), and Lanner Falcon (Vulnerable). No sensitive breeding or roosting sites of any red-listed

species were observed on site during the field survey. From an avifaunal perspective, the gravel plains are considered to be of High Sensitivity and should be avoided.

Assuming this area of high sensitivity is avoided, the expected impacts of the proposed solar development include:

» Habitat loss and fragmentation associated with sandy plains habitat of the Gordonia Duneveld vegetation type.
» Disturbance caused during the construction and maintenance phases
» Direct mortality of avifauna colliding with solar panels and associated power line structures, as well as electrocutions with power line infrastructure.

The species that will be the most negatively impacted by the proposed development include primarily small passerines, ground-dwelling non-passerines and large raptors and terrestrial birds that occasionally use the area for foraging. The impacts on the avifauna would normally be expected to be of medium importance, but due to the low frequency of occurrence of priority species, the impacts are likely to be low and no high post-mitigation impacts are expected.

The primary mitigation measures required to reduce the potential impacts on priority species include:

» Restrict habitat destruction and disturbance to within the footprint of the proposed development.
» Exclusion of the Kalahari Karroid Shrubland from any development as this area supports resident Karoo Korhaans.
» Exclusion of the linear dunes fields within the north-west portion of the study area.
» Fitment of bird diverters where necessary on all erected power lines associated with the development to reduce the possibility of collisions and electrocutions.
» Ensure that perimeter fencing along the boundaries of the development are bird (especially ground-dwelling species) and wildlife friendly.

Cumulative impacts associated with the development area may be of concern due to increasing numbers of solar facility developments proposed for the broader Upington area. Considering that the vegetation and avifauna that occur on the property are typical of the Kalahari bioregion, the overall cumulative avifaunal impact of the development is considered likely to be low, provided that the remaining areas of the property remain undeveloped and that suitable ecological corridors are identified and maintained. This is to ensure that ecological connectivity between areas of higher conservation value is maintained.

Considering that the project site supports a typical bioregional avifaunal assemblage, and that there are no known breeding or roosting sites of red-listed priority species, at this stage of the Scoping process there are no impacts associated with the development that are considered to be of high significance and which cannot be mitigated to an acceptable level. Therefore, based on the results of this assessment, there are no reasons to indicate that the development should not move into the EIA phase for further assessment.

Impacts on Soils, Land Use, and Agricultural Potential

Much of the western half of the project site comprises deep, red, sandy soils, with extensive areas of dunes. The eastern half is characterised by a mixture of deep, red, sands and shallow lithosols, often on calcrete. The very low rainfall in the area indicates that the only means of cultivation would be by irrigation. Remote sensing imagery of the area shows no signs of any agricultural infrastructure and none of irrigation, which is confined to a strip along the Orange River.

The climatic restrictions indicate that this region of the Northern Cape is suited at best for grazing, and the grazing capacity is very low, around 40 – 50 ha/large stock unit (ARC-ISCW, 2004). The dominant class of agricultural potential is low.

The major impact on the soil resources of the study area would be the loss of arable land due to the construction of the various types of infrastructure. However, this impact would in all probability be of very limited significance and would be local in extent. At the end of the project life, it is anticipated that removal of the structures would enable the land to be returned to more or less a natural state following rehabilitation, with little impact, especially given the low prevailing agricultural potential. The main mitigation would be to ensure that as little pollution or other non-physical disturbance occurs.

Given the prevailing dry climate and sandy soils, a real hazard would be increased wind erosion due to the construction of the solar panels and associated infrastructure. The area is mapped as "highly susceptible" (ARC-ISCW, 2004). The main mitigation would be to ensure that as little surface disturbance as possible occurs, and that soil conservation measures are put in place.

Specific measures would need to be put in place during both the construction and operational phases, which would include: absolute minimum removal of vegetation, geotextiles and other soil surface stabilizers, possible construction of windbreaks.

Regarding the grid connection corridor for the proposed power line, the impacts can be regarded as similar to the PV site as a whole. While the power line infrastructure will have a more limited footprint (e.g. transmission towers), it can be anticipated that an access road will need to be constructed along the corridor, where removal of surface vegetation can be expected to occur. The same mitigation measures outlined for the PV facility would be applicable.

Sensitive areas identified from a soils, land use, and agricultural potential perspective include:

- The dune fields in the west which comprise shifting sands with bare surface areas, where wind erosion could be especially severe.
- The stream channel network in the east, where any disturbance due to construction of infrastructure could lead to disruption of surface flow and possible water erosion. Although periods of heavy rainfall are rare in this dry environment, rainfall can occur sporadically and may very occasionally be heavy.

Due mainly to the prevailing unfavourable climatic conditions for arable agriculture, as well as the relatively homogeneous nature of the soils, it is not envisaged that any more detailed soil investigation will be required.

Impacts on Heritage Resources (Archaeological and Palaeontological)

According to Fourie's assessment of the impacts of similar infrastructure in the area (2014), due to the landscape's topography the solar park infrastructure will be prominent in the landscape and alter the rural appearance. Due to the remoteness of the area the impact on the experience of the cultural landscape is not foreseen to be significant.

Based on the available information, it is likely that the proposed development will impact on significant archaeological resources such as Stone Age artefact scatters, burial grounds and graves, historical artefacts, historical structures and rock art engravings through destruction during the development phase and disturbance during the operational phase. Based on the available information, including the scale and nature of the proposed development, it is likely that significant heritage resources will be impacted by the proposed development and as such it is recommended that an archaeological field

assessment be conducted to inform a full Heritage Impact Assessment.

According to the SAHRIS Palaeosensitivity Map, the area is underlain by the Gordonia Formation (Quarternary cover sands of moderate palaeontological sensitivity), the Bethesda Formation, the Jannelsepan Formation, the Keimoes Formation and the Straussburg Granite, all of which have zero palaeontological sensitivity. The primary risk associated with impacts to palaeontological heritage is related to impacting fossils preserved within the Quaternary cover sands of the Gordonia Formation (wind-blown alluvial sands). According to Almond's assessment for similar infrastructure development in this area (2011 SAHRIS NID 174335), "overall impact significance of the proposed solar park development is likely to be low because: Most of the study area is underlain by unfossiliferous igneous and metamorphic basement rocks (granites, gneisses etc.) or mantled by superficial sediments (wind-blown sands, alluvium etc.) of low palaeontological sensitivity, and extensive, deep excavations are unlikely to be involved in this sort of solar park project. Significant negative impacts on local fossil heritage are therefore unlikely to result from the proposed solar park development and in the specialist's opinion no further specialist palaeontological studies for this project are necessary."

Of the 29 Heritage Assessments conducted within 20km of the proposed development area, 8 are for Solar Energy / PV Facilities and 3 are for electrical infrastructure. The remaining assessments relate to mining infrastructure and residential township developments. At this stage, there is the potential for the cumulative impact of proposed solar energy facilities to negatively impact the cultural landscape due to a change in the landscape character from natural wilderness to semi-industrial, however, due to the remoteness of the area the impact on the experience of the cultural landscape is not foreseen to be significant.

Visual Impacts

Allepad PV Three is expected to have a fairly contained core area of visual exposure, generally restricted to a 2km radius of the project site. Receptors located within this zone include observers at Kalahari Monate Lodge, visitors to the lookout point on Spitskop Farm[1], and observers travelling along the N10 national and R360 regional roads. Visibility beyond 2km is more scattered and interrupted due to the undulating nature of the topography and the generally constrained height of the PV panel structures. The exposure of the facility is largely restricted to vacant land and natural open space.

The intensity of visual exposure is expected to subside beyond a 5km radius with the predominant visibility expected to the east. This zone includes limited potentially sensitive visual receptors and comprises mainly vacant land and natural open space. The facility may theoretically be visible from the north-western outskirts of Upington, but this exposure will be at distances exceeding 7.5km.

Visibility beyond 10km from the proposed development is expected to be negligible and highly unlikely due to the distance between the object (development) and the observer.

[1] Spitskop Farm is located east and adjacent to the proposed project site. Spitskop Farm is indicated on Google Earth as a private game farm, however it is not a designated protected area in the South African Protected Areas Database (SAPAD), and is not expected to be accessible to the public. Indications are that the farm is currently in the property market and not operating as a tourist lodge / destination, but rather as a private cattle and game ranch. The farm has a rocky outcrop that appears to be (or have been) a viewpoint from which to look out over the generally flat expanse surrounding it. The status and nature of operations of Spitskop Farm and its facilities need to be investigated during the EIA Phase of the project in order to determine its status as a potential sensitive visual receptor. It is expected that this viewpoint would be quite exposed to Allepad PV Three, and other larger solar energy facilities such as the operational Khi Solar One project, as well as structures at the Upington International Airport located within the region.

It is envisaged that the structures, where visible from shorter distances (e.g. less than 2km), may constitute a high visual prominence, potentially resulting in a high visual impact.

Anticipated issues related to the potential visual impact of the proposed PV Solar Energy Facility include the following:

- The visibility of the facility to, and potential visual impact on, observers travelling along the N10 national and R360 arterial roads traversing adjacent to the proposed facility.
- The visibility of the facility to, and potential visual impact on sensitive receptors (such as guests residing at the Kalahari Monate Lodge, and potentially residents of farm residences located within close proximity of the site).
- Potential cumulative visual impacts (or alternately, consolidation of visual impacts) with specific reference to the potential construction of up to four PV SEFs on the site and other existing or authorised SEFs within close proximity to the development site and within the Upington REDZ.
- The potential visual impact of the construction of ancillary infrastructure (i.e. the substation at the facility, associated power line and access roads) on observers in close proximity of the facility.
- The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in close proximity of the facility.
- The visual absorption capacity of natural or planted vegetation (if applicable).
- Potential visual impacts associated with the construction phase.
- The potential to mitigate visual impacts.

It is envisaged that the issues listed above may constitute a significant visual impact at a local and / or regional scale. A detailed Visual Impact Assessment is required to be undertaken to confirm the presence of sensitive receptors and assess the significance of the potential visual impact.

Social Impacts

A number of potential positive and negative social impacts have been identified for the project, which require further investigation as part of the EIA Phase. These include:

- Potential positive social impacts:
  - Creation of direct and indirect employment and skills development opportunities (during both construction and operation).
  - Economic multiplier effects.
  - Development of clean, renewable energy infrastructure.
  - Contribution to Local Economic Development and Social Upliftment.

- Potential negative social impacts:
  - In-migration of people (non-local workforce and jobseekers).
  - Safety and security impacts.
  - Impacts on daily living and movement patterns.
  - Nuisance impact (noise and dust).
  - Visual and sense of place impacts.
  - Impacts associated with the loss of agricultural land.

The potential social impacts identified for the project have been identified based on an assessment of available information and the current understanding of the proposed project, and are not exhaustive. The possibility therefore exists that additional impacts may be identified as part of the public review period, or during the collection of primary data as part of the EIA level SIA. All potential social impacts identified as part of the SIA process will be assessed in detail during the EIA Phase.

Environmental Sensitivity of the Project Site

An Environmental Sensitivity Map which illustrates potentially sensitive areas identified within the project site has been compiled for the project (refer to **Figure 1**). The Scoping Phase

environmental sensitivity map provides an informed illustration of sensitive features within the larger site. The detail is based on the desktop review of baseline information available for the study area, specialist inputs and limited field surveys. The environmental sensitivity map is intended to inform the location and layout of the PV facility and associated infrastructure, and must be used as a tool by the developer to, as far as possible, avoid those areas flagged to be of potential high sensitivity.

Ecology (Flora and Fauna)

An ecological sensitivity map of the site was produced by integrating the available ecological and biodiversity information available in the literature and various spatial databases with mapping based on the satellite imagery of the site as well as personal knowledge of the site. This includes delineating different habitat units identified on the satellite imagery and assigning likely sensitivity values to the units based on their ecological properties, conservation value and the potential presence of species of conservation concern. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

The eastern half of the site occurs on shallow calcrete soils and has numerous drainage lines as well as a few small pans present. This area is considered largely unsuitable for development. The western half of the site comprises undulating sandy soils and is considered to be low sensitivity and suitable for development apart from the extensive area of mobile dunes which is considered to be moderate high sensitivity and not suitable for development as the loose sands are very vulnerable to erosion. In addition, it is likely that significant soil disturbance would be required in this area as the dunes would likely need to be at least partly levelled before construction. The power line corridor route was inspected at a desktop level, and there are no visible features of high significance along the proposed route and minor features such as the occasional stands of trees present can likely be avoided though adjustment of the final route within the 300m corridor to be assessed.

Avifauna

An avifaunal sensitivity map of the site was produced by integrating available ecological and biodiversity information available in the literature and various spatial databases with mapping based on the satellite imagery of the site as well as the avifauna specialist's personal knowledge of the site. This includes delineating different habitat units identified on the satellite imagery and assigning likely sensitivity values to the units based on their ecological properties, conservation value and the potential presence of avifaunal species of conservation concern.

The study area supports three main avifaunal microhabitats, which are referred to as the gravel plains, sandy plains, and dunes habitat. These three habitats have different sensitivities, due to the subtle differences in the avifaunal assemblages that they support, especially with respect to red-listed species. The gravel plains are considered to be of High Sensitivity, as it supports several pairs of the Near-Threatened Karoo Korhaan, which are presumably resident in the area. The dune habitat is well represented within the bioregion, but due to the deeper soils, supports a number of protected tree species, such as the *Acacia erioloba, A.haematoxylon* and *Boscia albitrunca, B.foetida subsp. foetida*. These tree species provide important nesting and roosting sites for birds, including large raptors. This habitat is therefore considered to be of Medium Sensitivity due to its importance to a wide variety of avifaunal species. The sandy plains habitat represents the most widely distributed habitat in the region, and occurs primarily on shallower soils that do not support an extensive tree layer, besides scattered *Parkinsonia africana*. This habitat is therefore regarded to be of Low-Medium Sensitivity.

It is likely that development of the solar energy facility on the lower sensitivity parts of the project site, such as the sandy plains habitat, would generate the least impacts on avifauna, provided suitable mitigation measures are employed during construction and operation of the proposed facility. While the development would result in some habitat loss for avifauna of local significance, it will not necessarily impact negatively on red-listed avifaunal species, which appear to occur sparsely within the broader study area and primarily in adjacent habitats.

Soils, Land Use, and Agricultural Potential

Sensitive areas identified on site from a soils, land use and agricultural potential perspective include:

- The dune fields in the west, as these comprise shifting sands with bare surface areas, where wind erosion could be especially severe.
- The stream channel network in the east, where any disturbance due to construction of infrastructure could lead to disruption of surface flow and possible water erosion. Although periods of heavy rainfall are rare in this dry environment, rainfall can occur sporadically and may very occasionally be heavy.

These areas have been classified as soil sensitive areas as opposed to no-go areas. Development within these areas has the potential to result in soil impacts primarily in the form of soil erosion, which could require the implementation of appropriate mitigation measures.

Cumulative Environmental Sensitivity Map

Identified environmental features have been mapped on the project site as follows:

Table 1: Overview of Environmental Features and their Sensitivity Ratings

Environmental Feature	Sensitivity Rating	Area (ha)
Drainage Features	High Sensitivity (*Ecology and Avifauna*)	401ha
Gravel Plains	Moderate High Sensitivity (*Avifauna and Soils*) Medium Sensitivity (*Ecology*)	1 119ha
Dune Habitat	Moderate High Sensitivity (*Ecology, Avifauna and Soils*)	486ha
Dune Extension	Medium Sensitivity (*Avifauna and Soils*)	412ha
Sandy Plains	Low Sensitivity (*Ecology, Avifauna and Soils*)	1 471ha
TOTAL		**3 889ha**

A description of the sensitivity ratings assigned to the environmental features and their implications for development are provided below:

- **High Sensitivity –** These areas are essentially "no-go" areas from a development perspective, and should be avoided. Care should also be taken to avoid development within too close a proximity of these areas to limit the potential impact of the "edge effect" from neighbouring areas.
- **Moderate High Sensitivity –** While these areas are not classified as "no-go areas", development within these areas is less desirable and should only proceed with caution. Significant mitigation may be required to ensure that impacts occurring as a result of development within these areas are mitigated to an acceptable level, and sufficient reasoning / motivation provided as

to why development within these areas was considered preferable over development within areas with a lower sensitivity rating.

» **Medium Sensitivity –** Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are implemented.

» **Low Sensitivity –** There is likely to be negligible impact on ecological processes and terrestrial biodiversity within these areas. Therefore most types of development can proceed within these areas with little ecological impact.

The findings of the desktop Scoping Study indicate that no environmental fatal flaws associated with the proposed development of Allepad PV Three on the Remaining Extent of Erf 5315 Upington have been identified during the Scoping process to date. While some impacts of potential significance do exist it is anticipated that the implementation of appropriate mitigation measures would assist in reducing the significance of such impacts to acceptable levels.

The full extent of the project site (i.e. the Remaining Extent of Erf 5315 Upington) currently under investigation is approximately 3 889ha in extent, while the proposed development footprint is 250ha in extent, equivalent to approximately 6.4% of the total project site. It should however be noted that an additional three 100MW PV facilities and their associated infrastructure are also proposed for development by the applicant on the same property (i.e. the Remaining Extent of Erf 5315 Upington). While separate applications for EA have been prepared for each of the four 100MW Allepad PV projects, and the proposed projects are being managed separately and in parallel to one another, it is important to consider the impact that all four developments may have on the project site with regards to the area of developable land available for development while taking environmentally sensitive features which have been identified to date into consideration.

It is recommended that the focus areas for the development of the proposed facility (and those of the remaining three 100MW PV facilities proposed on the same site) be considered outside of the areas identified to date as being of High Sensitivity, and as far as possible outside of the areas identified as being of Moderate High Sensitivity in order to reduce the risk that the developments would have a detrimental impact on the environment. This forms part of the "funnel-down approach" for the identification of suitable development areas within the project site. While sufficient space is available for development outside of the identified sensitive areas, the possibility of developing four 100MW PV facilities within the greater site is therefore ultimately dependent on the configurations of the respective layouts, and the ground truthing of environmental sensitivities identified to date. This will be confirmed in the EIA phase of the project.

With an understanding of which areas within the site are considered sensitive to the development of the proposed facility, the project applicant can prepare the detailed infrastructure layout for consideration within the EIA Phase. During the EIA Phase more detailed environmental studies will be conducted in line with the Plan of Study for EIA. These studies will consider the detailed layouts produced by the developer and make recommendations for the implementation of avoidance strategies (if required), mitigation and management measures to ensure that the final assessed layout retains an acceptable environmental impact.

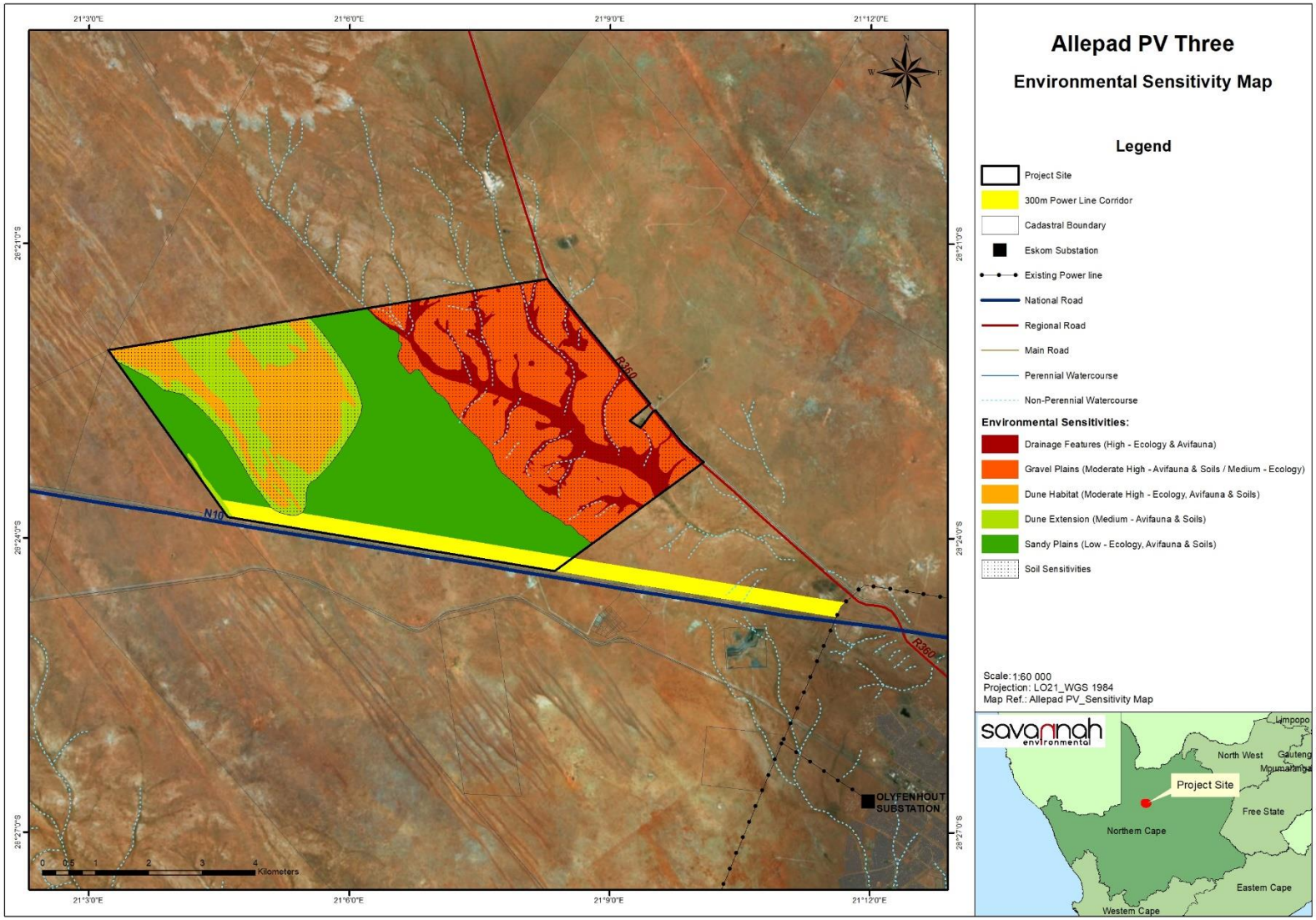

Figure 1: Environmental Sensitivity Map for Allepad PV Three.

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CHAPTER 1. INTRODUCTION

ILEnergy Development (Pty) Ltd, proposes the development of Allepad PV Three on a site near Upington, in the Northern Cape Province. Allepad PV Three comprises a commercial solar energy generation facility and associated infrastructure and is intended to form part of the Department of Energy's (DoE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. The REIPPP Programme aims to secure 14 725MW[2] of new generation capacity from Renewable Energy (RE) sources (in accordance with South Africa's Integrated Resource Plan for Electricity (IRP) 2010 – 2030)[3], while simultaneously diversifying South Africa's electricity mix, and positively contributing towards socio-economic, and environmentally sustainable growth.

1.1. Project Background

Allepad PV Three is proposed on the Remaining Extent of Erf 5315 Upington (the project site), which is located approximately 11km north-west of Upington, in the Dawid Kruiper Local Municipality (LM), of the ZF Mgcawu District Municipality (DM), in the Northern Cape Province. The project will be designed to have a contracted capacity of up to 100MW, and will make use of either fixed-tilt, single-axis tracking, or dual-axis (double-axis) tracking photovoltaic (PV) solar technology for the generation of electricity.

The proposed project will comprise the following key infrastructure and components:

- Arrays of PV panels with a generation capacity of up to 100MW.
- Mounting structures to support the PV panels.
- Combiner boxes, on-site inverters (to convert the power from Direct Current (DC) to Alternating Current (AC)), and power transformers.
- A 132kV on-site substation up to 1ha in extent to facilitate the connection between the solar energy facility and the Eskom electricity grid.
- A new 132kV double-circuit power line (which will make use of a loop-in and loop-out configuration utilising a double-circuit monopole construction), up to 5km in length, between the on-site substation and Eskom grid connection point.
- Cabling between the project's components (to be laid underground where practical).
- Meteorological measurement station.
- An energy storage area up to 2ha in extent.
- Access road and internal access road network.
- On-site buildings and structures, including a control building and office, ablutions and guard house.
- Perimeter security fencing, access gates and lighting.
- Temporary construction equipment camp up to 1ha in extent, including temporary site offices, parking and chemical ablution facilities.
- Temporary laydown area up to 1ha in extent, for the storage of materials during the construction.

[2] Source: https://www.ipp-renewables.co.za/

[3] Several updates have been made to the promulgated IRP for electricity 2010 – 2030 released in 2011, the most recent of which includes a Draft IRP 2018 which was released for public comment on 22 August 2018. None of these updates were promulgated to replace the IRP 2010 – 2030. The original IRP for electricity 2010 – 2030 released in 2011 therefore remains applicable until such time as an updated IRP is finalised and accepted by Cabinet.

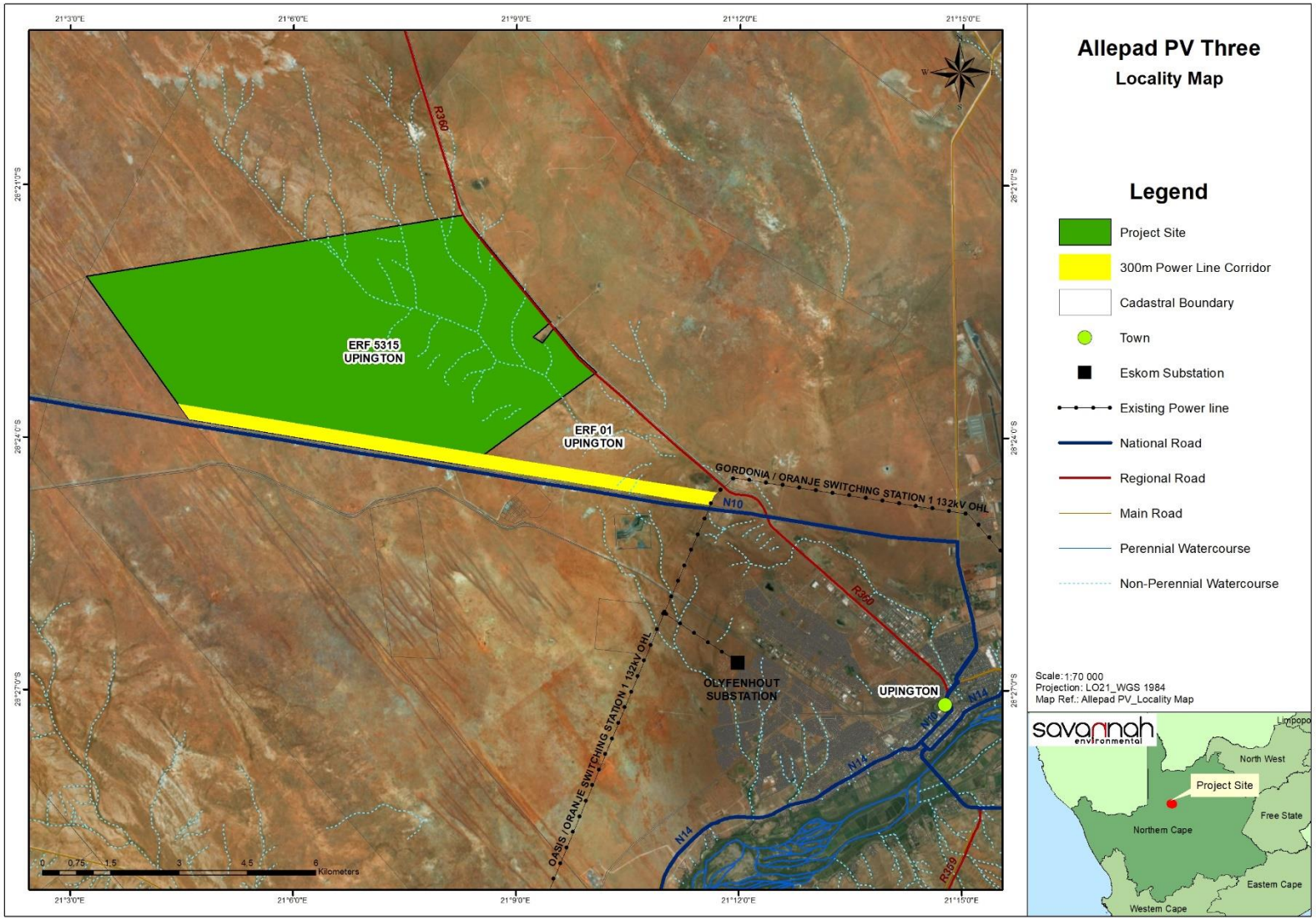

Figure 1.1: Locality map illustrating the location of the site proposed for Allepad PV Three.

Electricity generated by the project will feed into Eskom's national electricity grid via a new 132kV double-circuit power line which will connect the on-site substation to the upgraded 132kV double-circuit power line running between the new Upington Main Transmission Substation (MTS) (currently under construction approximately 15km south of the project site), and the Gordonia Distribution Substation (located in Upington town). The point of connection is located approximately 5km east of the project site and will make use of a loop-in and loop-out configuration, utilising a double-circuit monopole construction. The proposed power line required for the project will be constructed within a 36m wide servitude. A 300m wide power line corridor has been identified for investigation along the southern boundary of the site, running immediately north of, and parallel to, the N10 national road[4].

The key infrastructure components proposed as part of Allepad PV Three are described in greater detail in **Chapter 2** of this Scoping Report.

1.2. Requirements for Environmental Authorisation (EA)

Section 24 of South Africa's National Environmental Management Act (No. 107 of 1998) (NEMA) pertains to Environmental Authorisations (EA), and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed and reported on to the competent authority. The 2014 Environmental Impact Assessment (EIA) Regulations, as amended (GNR 326) published under NEMA prescribe the process to be followed when applying for EA, while the Listing Notices (Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324)) contain those activities which may not commence without EA from the Competent Authority.

In terms of NEMA, the 2014 EIA Regulations (GNR 326), and Listing Notices (Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324)), the development of Allepad PV Three requires EA from the National Department of Environmental Affairs (DEA) subject to the completion of a full Scoping and EIA process, as prescribed in Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326). The need for EA subject to the completion of a full Scoping and EIA process is triggered by the inclusion of, amongst others, Activity 1 of Listing Notice 2 (GNR 325)[5], namely:

"The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more."

In terms of GNR 779 of 01 July 2016, the National DEA has been determined as the CA for all projects which relate to the IRP for Electricity (IRP) 2010 – 2030, and any updates thereto. The Provincial Northern Cape Department of Environment and Nature Conservation (DENC) is therefore a Commenting Authority on the project.

[4] A total of four 100MW PV projects are proposed for development on the project site (i.e. Allepad PV One, Allepad PV Two, Allepad PV Three and Allepad PV Four). Should more than one PV project be constructed on the site, the additional plants will be interconnected to each other via the on-site power line corridor (in loop-in and loop-out configurations), and then ultimately be connected to existing Eskom infrastructure in the area, including the possibility of a direct connection to the Upington MTS by additional power lines (the route and details of which are not known at this stage). This transmission inter-connection will be assessed through a separate application for EA at a later stage once routing information and design requirements are given by Eskom.

[5] Refer to **Chapter 6** for a full list of applicable listed activities.

1.3. Overview of the EIA Process

The EIA process comprises two phases – i.e. a Scoping and EIA phase – and involves the identification and assessment of environmental impacts though specialist studies, as well as public participation. The process followed in these two phases can be described as follows:

- The **Scoping phase** includes the identification and description of potential impacts associated with the proposed project through a desktop study considering existing available information, and consultation with affected parties and key stakeholders. This phase considers the broader project site in order to identify and delineate any environmental fatal flaws, "no-go", or sensitive areas which should be avoided. Following a public review of the Scoping Report, the Scoping phase culminates in the preparation and submission of a Final Scoping Report and Plan of Study for EIA to the Competent Authority for acceptance, and approval to continue to the EIA phase.
- The **EIA phase** includes a detailed assessment of potentially significant positive and negative direct, indirect, and cumulative impacts identified during the Scoping phase. This phase considers a proposed development footprint within the identified project site and includes detailed specialist investigations, field work, and public consultation. Following a public review of the EIA Report, the EIA phase culminates in the preparation and submission of a Final EIA Report and Environmental Management Programme (EMPr), including recommendations of practical and achievable mitigation and management measures, to the Competent Authority for review and decision-making.

1.4. Appointment of an Independent Environmental Assessment Practitioner (EAP)

In accordance with Regulation 12 of the 2014 EIA Regulations, as amended (GNR 326) the applicant has appointed Savannah Environmental (Pty) Ltd as the independent environmental consultants responsible for managing the application for EA and supporting Scoping and EIA process, inclusive of comprehensive, independent specialist studies. The application for EA and Scoping and EIA process will be managed in accordance with the requirements of NEMA, the 2014 EIA Regulations, and all other relevant applicable legislation.

Neither Savannah Environmental nor any of its specialist consultants are subsidiaries of, or are affiliated to the applicant. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed solar facility. A signed Environmental Assessment Practitioner (EAP) declaration of interest confirming Savannah Environmental's independence is included in **Appendix A** of this Scoping Report.

1.4.1. Details and Expertise of the EAP

Savannah Environmental is a leading provider of integrated environmental and social consulting, advisory and management services with considerable experience in the fields of environmental assessment and management. The company is wholly woman-owned (51% black woman-owned), and is rated as a Level 2 Broad-based Black Economic Empowerment (B-BBEE) Contributor. Savannah Environmental's team have been actively involved in undertaking environmental studies over the past 12 years, for a wide variety of projects throughout South Africa, including those associated with electricity generation and infrastructure development.

This EIA process will be led by Karen Jodas. She will be supported by Shaun Taylor, and Nicolene Venter.

» ***Karen Jodas*** is a Director at Savannah Environmental (Pty) Ltd, and is the registered EAP for the EIA for this project. Karen holds a Master of Science Degree in Geography (M.Sc. Geomorphology) from Rhodes University, and is registered as a Professional Natural Scientist (Pr.Sci.Nat) with the South African Council for Natural Scientific Professions (SACNASP) in the field of Environmental Science (Registration No.: 400106/99). She has more than 20 years of consulting experience in the field of environmental management, impact assessment and compliance. Her key focus is on strategic environmental assessment and advice, management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines, compliance reporting, the identification of environmental management solutions and mitigation / risk minimising measures, and strategy and guideline development. Karen is currently responsible for the project management of EIAs for several renewable energy projects across the country.

» ***Shaun Taylor*** is an Environmental and Permitting Lead Consultant at Savannah Environmental, and is the Project Manager responsible for managing the application for EA and supporting EIA process for Allepad PV Three. Shaun has a M.Sc. in Aquatic Health (M.Sc.) from the University of Johannesburg (UJ), and his registration as a Professional Natural Scientist: Environmental Scientist with the SACNASP is pending. He has over 10 years of experience as an environmental consultant, and has successfully conducted and obtained environmental approvals for numerous renewable energy (wind and solar) developments as well as for infrastructure (roads, water pipeline and power line) related projects.

» ***Nicolene Venter*** is a Social and Public Participation Consultant at Savannah Environmental, and is responsible for managing the Public Participation process required as part of the EIA for Allepad PV Three. Nicolene has a Higher Secretarial Certificate from Pretoria Technicon, and a Certificate in Public Relations from the Public Relation Institute of South Africa at Damelin Management School. Nicolene has over 21 years of experience as a Public Participation Practitioner and Stakeholder Consultant, and is a Board Member of the International Association for Public Participation Southern Africa (IAP2SA). Nicolene's experience includes managing the stakeholder engagement components of large and complex EA processes across many sectors, with particular experience in the power sector, most notably on large linear power lines and distribution lines, as well as renewable energy projects. Nicolene is well versed with local regulatory requirements as well as international best practice principles for community consultation and stakeholder engagement, as well as international guidelines and performance standards.

Curricula Vitae (CVs) detailing Savannah Environmental's EIA team's expertise and relevant experience are provided in **Appendix A** to this Scoping Report.

1.4.2. Details of the Specialist Consultants

A number of independent specialist consultants have been appointed as part of the EIA project team in order to adequately identify and assess potential impacts associated with the project (refer to **Table 1.1**). The specialist consultants have provided input into this Scoping Report as well as the Plan of Study for EIA (refer to **Chapter 9**).

Table 1.1: Specialist Consultants which form part of the EIA project team

Specialist Study	Specialist Company	Specialist Name
Ecology (Flora and Fauna)	3Foxes Biodiversity Solutions	Simon Todd
Avifauna	3Foxes Biodiversity Solutions	Simon Todd and Eric Herrmann
Soils, Land Use and Agricultural Potential	Agricultural Research Council (ARC)	Garry Patterson
Visual	LOGIS	Lourens du Plessis
Heritage (Archaeology and Palaeontology)	CTS Heritage	Jenna Lavin
Social	Savannah Environmental and Dr. Neville Bews & Associates	Sarah Watson and Dr. Neville Bews

CVs detailing the specialist consultant's expertise and relevant experience are provided in **Appendix A** to this Scoping Report.

1.5. Structure of the Scoping Report

This Scoping Report has been prepared in accordance with the requirements of Appendix 2 of the 2014 EIA Regulations (GNR 326), and provides details of the nature and extent of the proposed project, as well as potential impacts associated with the construction, operation, and decommissioning of the project. It describes the scope of assessment, the consultation process to be undertaken throughout the EIA process, and includes a Plan of Study for undertaking the impact assessment component of the EIA.

An overview of the contents of the Scoping Report, as prescribed by Appendix 2 of the 2014 EIA Regulations (GNR 326), and where the corresponding information can be found within this Scoping Report is provided in **Table 1.2**.

Table 1.2: Summary of where the requirements of Appendix 2 of the 2014 EIA Regulations (GNR 326) are provided in this Scoping Report.

Requirement	Section reference in Report
(a) Details of – (i) The EAP who prepared the report. (ii) The expertise of the EAP, including a curriculum vitae.	» Chapter 1 » Appendix A
(b) The location of the activity, including – (i) The 21 digit Surveyor General code of each cadastral land parcel. (ii) Where available, the physical address and farm name. (iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties.	» Chapter 2
(c) A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is – (i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken. (ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken.	» Chapter 1 » Chapter 2
(d) A description of the scope of the proposed activity, including – (i) All listed and specified activities triggered.	» Chapter 2 » Chapter 4

	Requirement	Section reference in Report
	(ii) A description of the activities to be undertaken, including associated structures and infrastructure.	
(e)	A description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.	» Chapter 3
(f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location.	» Chapter 4
(g)	A full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including – (i) Details of all the alternatives considered. (ii) Details of the public participation process undertaken in terms of Regulation 41 of the Regulations, including copies of the supporting documents and inputs. (iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them. (iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects. (v) The impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts – (aa) Can be reversed. (bb) May cause irreplaceable loss of resources. (cc) Can be avoided, managed or mitigated. (vi) The methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives. (vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects. (viii) The possible mitigation measures that could be applied and level of residual risk. (ix) The outcome of the site selection matrix. (x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such. (xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.	» Chapter 2 » Chapter 5 » Chapter 6 » Chapter 7 » Chapter 8 » Chapter 9 » Appendix C » Appendix D – I
(h)	A plan of study for undertaking the environmental impact assessment process to be undertaken, including – (i) A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity. (ii) A description of the aspects to be assessed as part of the environmental impact assessment process. (iii) Aspects to be assessed by specialists. (iv) A description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists. (v) A description of the proposed method of assessing duration and significance. (vi) An indication of the stages at which the competent authority will be consulted.	» Chapter 9

	Requirement	Section reference in Report
	(vii) Particulars of the public participation process that will be conducted during the environmental impact assessment process. (viii) A description of the tasks that will be undertaken as part of the environmental impact assessment process. (ix) Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	
(i)	An undertaking under oath or affirmation by the EAP in relation to – (i) The correctness of the information provided in the report. (ii) The inclusion of comments and inputs from stakeholders and interested and affected parties. (iii) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.	» Appendix A
(j)	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment.	» Appendix A
(k)	Where applicable, any specific information required by the competent authority.	» N/A
(l)	Any other matter required in terms of Section 24(4)(a) and (b) of the Act.	» N/A
2.	Where a government notice gazetted by the Minister Provides for any protocol or minimum information requirement to be applied to a Scoping Report, the requirements as indicated in such notice will apply.	» N/A

CHAPTER 2. PROJECT DESCRIPTION

This Chapter provides a description of Allepad PV Three proposed for development. It must be noted that the project description presented in this Chapter is subject to change to some extent based on the outcomes and recommendations of detailed engineering and other technical studies, the findings and recommendations of the EIA and supporting specialist studies, and any licencing, permitting, and legislative requirements.

2.1. Project Site Overview

The applicant proposes the development of Allepad PV Three on a site near Upington, in the Northern Cape Province. The Remaining Extent of Erf 5315 Upington has been identified by the project applicant as the preferred project site suitable for the development of a commercial solar PV facility. From a technical perspective, the Upington area is considered favourable for the development of commercial solar energy generation facilities by virtue of the prevailing climatic conditions (primarily as the economic viability of a solar energy facility is directly dependent on the annual solar irradiation values for a particular area), relief and aspect, the extent of the site, the availability of a direct grid connection (i.e. point of connection to the national Eskom grid), and the availability of land on which development can take place.

The Remaining Extent of Erf 5315 Upington is located approximately 11km north-west of Upington, in the Dawid Kruiper LM, of the ZF Mgcawu DM, in the Northern Cape Province. The N10 national road forms the southern boundary of the project site, while the R360 regional road forms the north-eastern boundary of the project site. Access to the site is obtained via an existing farm entrance point, which is accessed directly from the N10 national road.

Electricity generated by the project will feed into Eskom's national electricity grid via a new 132kV double-circuit power line which will connect the on-site substation to the upgraded 132kV double-circuit power line running between the new Upington MTS (currently under construction approximately 15km south of the project site), and the Gordonia Distribution Substation (located in Upington town). The point of connection is located approximately 5km east of the project site and will make use of a loop-in and loop-out configuration utilising a double-circuit monopole construction. The proposed power line required for the project will be constructed within a 36m wide servitude. A 300m wide power line corridor has been identified for investigation immediately north of, and running parallel to, the N10 national road[6].

Table 2.1 provides information regarding the proposed project site identified for Allepad PV Three and includes information regarding the properties that may be impacted by the proposed grid connection.

[6] A total of four 100MW PV projects are proposed for development on the project site (i.e. Allepad PV One, Allepad PV Two, Allepad PV Three and Allepad PV Four). Should more than one PV project be constructed on the site, the additional plants will be interconnected to each other via the on-site power line corridor (in loop-in and loop-out configurations), and then ultimately be connected to existing Eskom infrastructure in the area, including the possibility of a direct connection to the Upington MTS by additional power lines (the route and details of which are not known at this stage). This transmission inter-connection will be assessed through a separate application for EA at a later stage once routing information and design requirements are given by Eskom.

Table 2.1: A description of the project site identified for Allepad PV Three and proposed grid connection.

Province	**Northern Cape Province**		
District Municipality	ZF Mgcawu District Municipality		
Local Municipality	Dawid Kruiper Local Municipality		
Ward Number(s)	Wards 11 and 13		
Nearest Town(s)	Upington (approximately 11km south-east of the project site)		
Farm Portion(s), Name(s) and Number(s)	**Allepad PV Three:** » Remaining Extent of Erf 5315 Upington **Proposed grid connection:** » Remaining Extent of Erf 5315 Upington » Erf 01 Upington		
SG 21 Digit Code (s)	**Allepad PV Three:** » C02800070000531500000 **Proposed grid connection:** » C02800070000531500000 » C02800070000000100000		
Current Zoning	Agriculture		
Current land use	Agriculture (i.e. Cattle grazing)		
Site Extent	**Allepad PV Three:** 3 889ha		
Project Site Co-ordinates		**Latitude**	**Longitude**
	Northern extent	28° 21' 21.62" S	21° 08' 16.64" E
	Western extent	28° 22' 05.50" S	21° 03' 13.23" E
	South-western extent	28° 23' 47.45" S	21° 04' 36.13" E
	Southern extent	28° 24' 20.20" S	21° 08' 21.81" E
	Eastern extent	28° 23' 13.52" S	21° 10' 04.64" E
Power Line Corridor Co-ordinates		**Latitude**	**Longitude**
	North-central extent	28° 24' 12.92" S	21° 08' 05.07" E
	North-western extent	28° 23' 45.30" S	21° 04' 53.96" E
	South-western extent	28° 23' 50.00" S	21° 04' 53.94" E
	South-central extent	28° 24' 17.97" S	21° 08' 01.51" E
	South-eastern extent	28° 24' 48.30" S	21° 11' 36.46" E
	North-eastern extent	28° 24' 44.12" S	21° 11' 34.81" E

2.2. Project Locality

The full extent of the project site (i.e. the Remaining Extent of Erf 5315 Upington)), as well as a 300m wide corridor for the power line are assessed within this Scoping study from a desktop level. The PV development site is approximately 3 889ha in extent, of which an area of approximately 250ha (equivalent to approximately 6.4% of the total project site) is required for the development of Allepad PV Three. The opportunity therefore exists for the 250ha development footprint to be suitably positioned within the larger 3 889ha site so as to avoid areas of major environmental sensitivities or constraints which may be identified during the EIA process. The exact location of Allepad PV Three within the greater project site has therefore not been defined at this stage of the EIA process (i.e. during Scoping), but will be identified and assessed during the EIA phase.

In terms of grid connection infrastructure required for the project, a 300m wide power line corridor has been identified (i.e. 150m on either side of the centre-line of the power line, to be located along the southern boundary of the project site, and to run north of and parallel to the N10 national road), within which a power line servitude of up to 36m in width (i.e. up to 18m on either side of the centre-line of the power line) will be established. The process of having identifies a power line corridor provides the opportunity for the power line servitude to be suitably positioned within the corridor so as to, as far as possible, avoid areas of environmental sensitivities or concern. No proposed power line routes have been identified within the power line corridor at this stage of the EIA process.

2.3. Technology considered for the Solar Facility and the Generation of Electricity

Allepad PV Three will have a contracted capacity of up to 100MW and will make use of photovoltaic (PV) technology. Solar energy facilities, such as those which utilise PV technology, use the energy from the sun to generate electricity through a process known as the Photovoltaic Effect (refer to **Figure 2.1**).

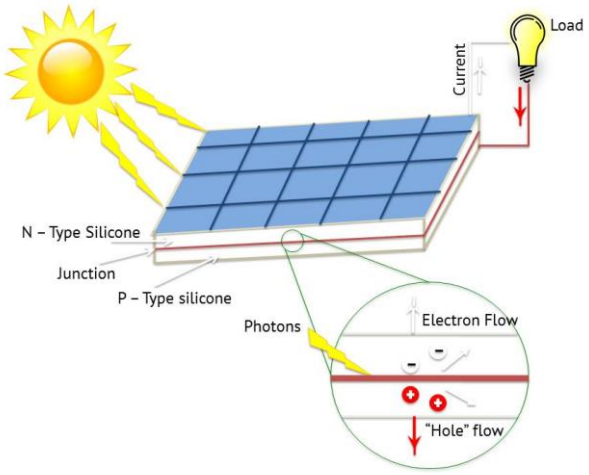

Figure 2.1: Diagram illustrating the Photovoltaic Effect (Source: Center for Sustainable Energy).

Generating electricity using the Photovoltaic Effect is achieved through the use of the following components:

PV Cells

A PV cell is made of silicone (Si) that is doped (i.e. another element is introduced to the Si-structure to enhance its electrical properties) to produce the Photovoltaic Effect. PV cells are arranged in multiples / arrays and placed behind a protective glass sheet to form a PV panel (refer to **Figure 2.2**). Each PV cell is positively charged on one side and negatively charged on the opposite side, with electrical conductors attached to either side to form a circuit. This circuit captures the released electrons in the form of an electric current (i.e. DC).

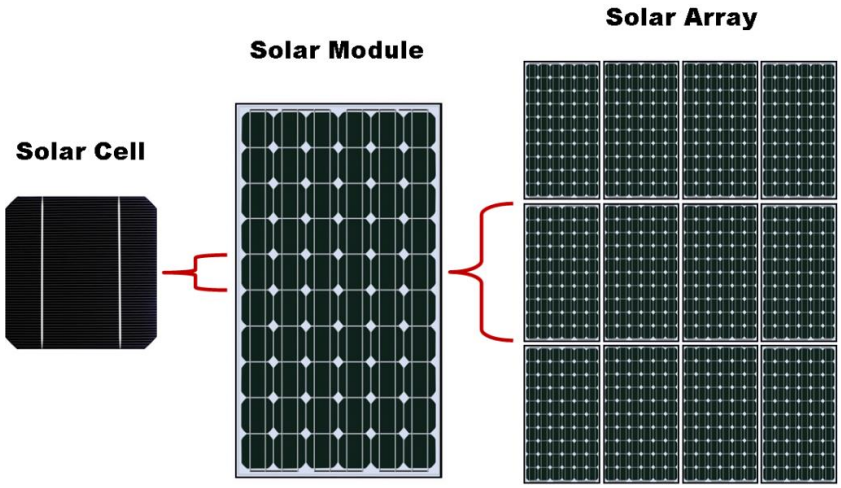

Figure 2.2: Overview of a PV cell, module and array / panel (Source: pveducation.com).

Inverters

Inverters are used to convert electricity produced by the PV cells from DC into AC, to enable the facility to be connected to the national electricity grid. In order to connect a large solar facility such as the one being proposed to the national electricity grid, numerous inverters will be arranged in several arrays to collect, and convert power produced by the facility.

Transformers

Transformers are required to transform (i.e. step-up) the power generation by the PV facility from a low voltage to a higher voltage to allow for it to be integrated into the national electricity grid.

Support Structures

PV panels will be fixed to support structures. PV panels can either utilise fixed / static support structures, or single-axis or dual-axis (double-axis) tracking support structures (refer to **Figure 2.3**). PV panels which utilise fixed / static support structures are set at an angle (fixed-tilt PV system) so as to optimise the amount of solar irradiation. With fixed / static support structures the angle of the PV panel is dependent on the latitude of the proposed development, and may be adjusted to optimise for summer and winter solar radiation characteristics. PV panels which utilise tracking support structures track the movement of the sun throughout the day so as to receive the maximum amount of solar irradiation.

PV panels are designed to operate continuously for more than 20 years, mostly unattended and with low maintenance.

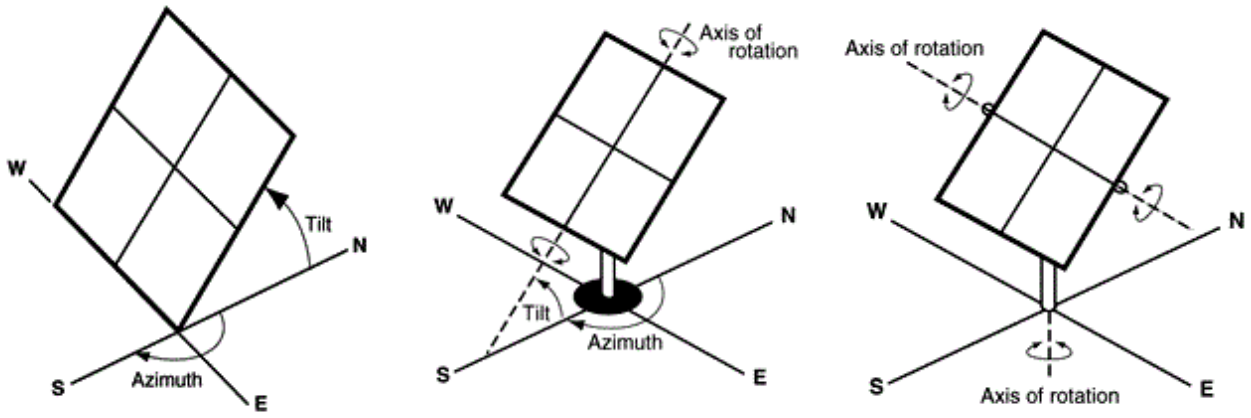

Figure 2.3: Overview of different PV tracking systems (from left to right: fixed-tilt, single-axis tracking, and dual-axis (double-axis) tracking (Source: pveducation.com)).

2.4. Description of the Associated Infrastructure

A summary of the planned infrastructure proposed as part of Allepad PV Three is provided in **Table 2.2**, and described in more detail under the sub-headings below.

Table 2.2: Planned infrastructure proposed as part of Allepad PV Three.

Infrastructure	Dimensions/ Details
Solar Facility	» PV technology. » Solar panels up to 3.5m in height. » Fixed-tilt, single-axis tracking, or dual-axis (double-axis) tracking systems. » Combiner boxes, on-site inverters (to convert the power from DC to AC), and power transformers. » PV structures / modules up to 150ha to 200ha in extent (depending on the type of support structure selected for implementation (i.e. static vs tracking)).
Supporting Infrastructure	» Meteorological measurement station. » Energy storage area of up to 2ha in extent. » On-site buildings and structures, including a control building and office, ablutions and guard house to occupy an area up to 1ha in extent. » Perimeter security fencing, access gates and lighting up to 2.8m in height. » Temporary construction equipment camp up to 1ha in extent, including temporary site offices, parking and chemical ablution facilities. » Temporary laydown area up to 1ha in extent, for the storage of materials during the construction.
On-site substation	» On-site substation with a 132kV capacity. » Will occupy an area up to 1ha in extent.
Grid Connection	» A 132kV double-circuit power line, which will make use of a loop-in and loop-out configuration utilising a double-circuit monopole construction. » A 300m wide power line corridor (i.e. 150m on either side of the centreline of the power line) has been identified along the southern boundary of the project site, immediately north of, and running parallel to, the N10 national road, within which a power line servitude will be established.

Infrastructure	Dimensions/ Details
	» The power line servitude will be up to 36m wide (i.e. up to 18m on either side of the centre-line).
Access road	» Access to the PV site will be via the existing farm entrance which is accessed from the N10 national road. » Internal access roads will be up to 6m wide and up to 15km in length.
Water Supply	» Up to 2 800m³ of water is required during construction (up to 18 months, but typically less than a year) as follows: * Up to 800m³ for the batching plant * Up to 2 000m³ for dust suppression » Up to 2 000m³ of water is required per year for operation (20 years) for washing of the solar panels. » The following water supply options are currently being considered: * Sourcing potable water from the Dawid Kruiper LM. * Sourcing raw water from the Dawid Kruiper LM (Upington water treatment works or nearest bulk water supply point).

2.4.1. Project Footprint

An area of approximately 250ha (equivalent to 6.5% of the total project site) is required for the development of Allepad PV Three. The PV structures / modules will occupy an area up to 150ha (in the case of static support structures) to 200ha (in the case of tracking support structures) in extent, while supporting infrastructure such as internal roads (up to 9ha), on-site buildings and structures (up to 1ha), and an on-site substation (up to 1ha) will occupy the remaining extent. During construction, a temporary construction equipment camp of up to 1ha in extent, including temporary site offices, parking and chemical ablution facilities will be required.

The type of technology selected for implementation, outcomes of the EIA process, and the completion of additional technical studies (e.g. geotechnical and other surveys) to be conducted as part of the detailed design phase will ultimately influence the final project layout and development footprint. The extent of the project site under investigation, and the fact that approximately 6.4% of the total project area would be required for development, allows for layout design and site-specific alternatives to be identified.

2.4.2. Details of the proposed project infrastructure

Allepad PV Three will be designed to have a contracted capacity of up to 100MW. The project will make use of fixed-tilt, single-axis tracking, or dual-axis (double-axis) tracking PV technology. The project will comprise solar panels which, once installed, will stand up to 3.5m above ground level. The solar panels will include combiner boxes, on-site inverters (to convert the power from DC to AC), and power transformers.

2.4.3. Grid Connection

A 132kV substation occupying an area up to 1ha in extent will be constructed on site. A new 132kV double-circuit power line which will make use of a loop-in and loop-out configuration utilising a double-circuit monopole construction, is required to evacuate electricity from the on-site substation for integration into the national electricity grid.

A power line corridor of 300m in width (i.e. up to 150m on either side of the centre-line of the power line) has been identified for investigation along the southern boundary of the project site, immediately north of, and running parallel to, the N10 national road, within which a power line servitude will be established. The power line servitude will be up to 36m wide (i.e. up to 18m on either side of the centre-line).

Once constructed, the grid connection infrastructure which connects Allepad PV Three to the Eskom national electricity grid will be handed over to Eskom and become one of the utility's assets. Possible power line routes within the power line corridor will be identified and assessed in detail as part of the EIA phase.

2.4.4. Water Supply

Allepad PV Three will utilise water during both construction and operation. Water is required during construction for use in the batching plant (up to 800m³), and for dust suppression (up to 2 000m³), while potable water will be required on site for the construction crew. During operation, water is required to clean the PV panels, for human consumption, and for use in the auxiliary buildings (i.e. for use in the office building, ablutions, etc.). Approximately 2 800m³ of water is required over a 12 month period during construction, and approximately 2 000m³ of water is required per year over the 20 year operational lifespan of the project.

The following water supply options are currently being considered for the project:

» Sourcing potable water from the Dawid Kruiper LM.
» Sourcing raw water from the Dawid Kruiper LM (Upington water treatment works or nearest bulk water supply point). As this water will have undergone basic treatment by the Dawid Kruiper LM and no further treatment is required.

Water will be transported to site utilising either an existing pipeline, or by means of a water bowser which will transport water to the site from the nearest municipal raw water supply point.

2.4.5. Panel Cleaning

It is anticipated that panels will be washed up to four times a year during operation, however the washing schedule will ultimately be determined based on the region's weather patterns. Only clean water (i.e. with no cleaning products), or non-hazardous biodegradable cleaning products will be utilised for the washing of panels. Wastewater generated by washing panels can be allowed to run-off under the panels.

2.4.6. Effluent and Wastewater

During construction, chemical toilets will be used. These will be serviced regularly and effluent will be disposed of at a registered wastewater treatment works. Any other effluent discharge during construction will be collected in sealed containers / tanks, and collected by a registered service provider (i.e. the LM / Contractor) to be disposed of at an approved facility off-site.

Apart from normal sewage from site and operation staff, no effluent will be produced during operation. Sewage will be collected and treated as per normal standards using a septic or conservancy tank. In cases where the LM does not permit the use of septic tanks, sewage will be stored in a conservancy tank and collected by a registered service provider (the LM / Contractor) to be treated at an approved facility off-site.

2.4.7. Energy Storage

Lithium-ion (Li-ion) type batteries will be utilised for energy storage. Energy generated by the project will be stored in the batteries for use after hours, when the PV facility is no longer generating electricity (i.e. at night or on cloudy days). The batteries will be housed in fully self-contained units comprising of up to 40 standard ("45 foot"), specially adapted shipping containers. The energy storage area will occupy an area up to 2ha in extent.

2.4.8. Waste

Solid waste generated during construction will mainly be in the form of construction material, excavated substrate and domestic solid waste. All waste will be disposed of in scavenger proof bins and temporarily placed in a central location for removal by an appropriate contractor. Where possible, waste will be recycled. Non-recyclable solid construction waste will be disposed of at an appropriately licensed landfill site. Any other waste and excess material will be removed once construction is complete and disposed of at a registered waste facility.

During construction use of the following hazardous substances are anticipated: petrol / diesel for trucks, cranes, bulldozers etc., and limited amounts of transformer oils. Dangerous goods required to be stored during construction (e.g. limited quantities of fuel, oil, lubricants etc.) will be done in compliance with relevant legislation (i.e. stored in covered area / bin and disposed of at a registered hazardous waste site). Hazardous waste will be appropriately stored and disposed of.

2.5. Alternatives Considered in the Scoping Phase

In accordance with the requirements of Appendix 2 of the 2014 EIA Regulations (GNR 326), reasonable and feasible alternatives including site and technology alternatives, as well as the "do-nothing" alternative should be considered. Alternatives are required to be assessed in terms of social, biophysical, economic and technical factors.

Most guidelines use terms such as "reasonable", "practicable", "feasible" or "viable" to define the range of alternatives that should be considered. Essentially there are two types of alternatives:

» Incrementally different (modifications) alternatives to the project.
» Fundamentally (totally) different alternatives to the project.

2.5.1. Consideration of Fundamentally Different Alternatives

Fundamentally different alternatives are usually assessed at a strategic level, and project-specific EIAs are therefore limited in scope and ability to address fundamentally different alternatives. Electricity generating alternatives have been addressed as part of the DoE's IRP 2010 – 2030. In this regard, the need for renewable energy power generation from solar has been identified as part of the technology mix for power generation in the country in the next 20 years[7].

[7] This scenario remains applicable under the Draft IRP 2018.

2.5.2. Consideration of Incrementally Different Alternatives

Incrementally different alternatives relate specifically to the project under investigation. "Alternatives", in relation to a proposed activity, means different ways of meeting the general purposes and requirements of the activity, which may include alternatives to:

- The property on which, or location where the activity is proposed to be undertaken.
- The type of activity to be undertaken.
- The design or layout of the activity.
- The technology to be used in the activity.
- The operational aspects of the activity.

In addition, the option of not implementing the activity (i.e. the "do-nothing" alternative) must also be considered.

These alternatives are discussed under the respective subheadings below.

2.5.2.1. Property or Location Alternatives

The placement of a solar PV facility is strongly dependent on several factors including climatic conditions (solar radiation levels), topography, the location of the site, and in particular the location in a planned node for renewable energy projects, availability of grid connection, the extent of the site and the need and desirability for the project.

The applicant considers the proposed project site (Remaining Extent of Erf 5315 Upington), to be highly favourable and the most suitable site for the development of a solar PV facility due to the following site characteristics

- **Solar resource**: The economic viability of a solar facility is directly dependent on the annual direct solar irradiation values. The Upington region and other parts of the Northern Cape Province are characterised as having the highest solar irradiation values in South Africa (and which are comparable on a global scale). The Global Horizontal Irradiation (GHI) for the proposed project site is in the region of approximately 2 264kWh/m^2/annum, which is ideally suited to the development of a commercial solar PV facility.
- **Topography**: A surface area with favourable topography facilitates the work involved in construction and maintenance of the PV facility. The proposed project site is characterised as having very flat topography with slopes of approximately 0.5% across the site (i.e. 900m to 870m across 7km).
- **Site extent:** The project site is approximately 3 889ha in extent, which is sufficient for the installation of the facility allowing for avoidance of site sensitivities. The development footprint of the facility would occupy an area equivalent to approximately 6.4% of the full project site.
- **Site access**: Access to the project site is obtained via the existing farm entrance which is accessed from the N10 national road.
- **Grid access:** A key factor in the siting of any project is that the project must have a viable grid connection. Grid connection is available by means of a new 132 kV double-circuit power line which will connect the on-site substation with Eskom's upgraded 132kV double-circuit power line running between the new Upington MTS (currently under construction approximately 15km south of the project site), and the Gordonia Distribution Substation (located in Upington town). The point of connection is located

approximately 5km east of the project site and will make use of a loop-in and loop-out configuration utilising a double-circuit monopole construction. The presence of existing power lines within such close proximity of the proposed project site provides opportunity for the project to connect to the national grid with minimal linear transmission impact (i.e. of less than 10km). The principle to minimise associated infrastructure and the resulting impacts is also supported.

» **Land suitability:** The current land use of the site is an important consideration in site selection in terms of limiting disruption to existing land use practices. Agricultural (i.e. grazing) land is preferred as the majority of farming practices can continue in tandem to the operation of the solar PV facility once construction and commissioning of the project is complete, without significantly impacting on the agricultural potential or productivity of the site. In addition, sites that facilitate easy construction conditions (i.e. relatively flat topography, lack of major rock outcrops, limited watercourse crossing etc.) are also favoured during site selection.

» **Geographic location**: The proposed site is located within an area which has become a node for renewable energy projects, and directly adjacent to the following solar energy facilities which is in close proximity to the project site: Upington Solar Park (bordering), Sirius Solar PV Projects 1 and 2, Rooiput, S-Kol PV Plant, Bloemsmond Solar 1 and 2, Solis I and II, Dyasonsklip, Khi Solar One and Kai Garib, and Upington Airport Solar PV (refer to **Figure 2.4**). The proposed project site is within very close proximity to an existing cluster or node for solar PV development and therefore compliments existing and future land use.

» **Landowner support**: The selection of a site where the landowner is supportive of the development of renewable energy is essential for ensuring the success of the project. The landowner does not view the development as a conflict with their current or proposed future land use practices

Based on these considerations, the applicant considers the proposed site as highly preferred in terms of the development of a solar PV facility and expects that this development will be able to draw on synergies with other projects proposed and / or currently under construction within the vicinity of the proposed project site. As a result, no site alternatives are proposed as part of this EIA process.

2.5.2.2. Design and Layout Alternatives

Allepad PV Three will have a development footprint of up to 250ha, to be located within a broader site of 3 889ha. The solar PV facility and its associated infrastructure can therefore be appropriately located within the broader project site. Potential environmentally sensitive areas have been identified as part of the Scoping phase (refer to **Chapter 8**) for further detailed consideration (through site-specific specialist studies) during the EIA phase. The environmental sensitivity identification process will inform the layout design for the solar PV facility, avoiding sensitive areas as far as possible, thereby ensuring that the layout plan taken forward for consideration during the EIA phase is the most optimal from an environmental perspective.

2.5.3. Technology Alternatives

Few technology options are available for solar PV facilities, and the use of those that are considered are usually differentiated by weather and temperature conditions that prevail on site, so that optimality is obtained by the final site selection. Solar energy is considered to be the most suitable renewable energy technology for this site, based on the site location, ambient conditions and energy resource availability. Solar PV was determined as the most suitable option for the proposed site as large volumes of water are not required for power generation purposes compared to Concentrated Solar Power (CSP) technology. PV is also preferred when compared to CSP technology because of the substantially lower visual profile.

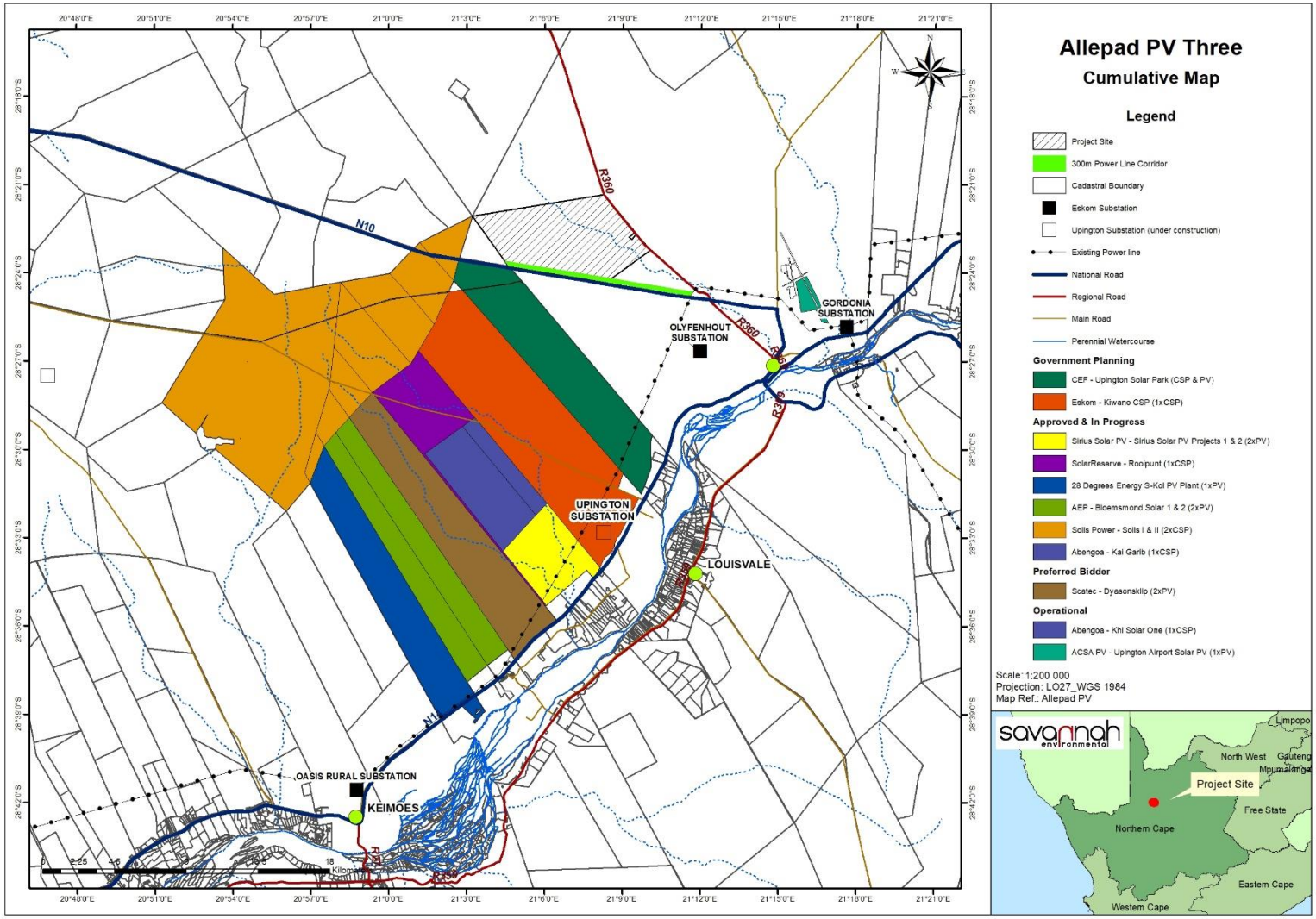

Figure 2.4: Map showing the location of solar energy facilities in relation to the proposed project site.

Two solar energy technology alternatives are being considered for the proposed project and include:

» Fixed mounted PV systems (static / fixed-tilt panels).
» Single-axis tracking or dual-axis (double-axis) tracking systems (with solar panels that rotate around a defined axis to follow the sun's movement).

The primary difference between technologies available, which affect the potential for environmental impacts, relate to the extent of the facility, or land-take (disturbance or loss of habitat), as well as the height of the facility (visual impacts). From an environmental perspective both technologies are considered to be environmentally acceptable for implementation. The technology preference will therefore be determined on the basis of technical and economic considerations. The PV panels are designed to operate continuously for more than 20 years, mostly unattended and with low maintenance. The impacts associated with the construction, operation, and decommissioning of the facility are anticipated to be the same irrespective of the PV technology selected for implementation.

2.5.4. The "Do-Nothing" Alternative

The "do-nothing" alternative is the option of not constructing Allepad PV Three. Should this alternative be selected, no environmental impacts will be incurred on site as a result of construction and operation activities associated with a solar PV facility. The "do-nothing" alternative will bring no socio-economic benefits at a local and regional scale, however, the extent of the loss in the area would be minimised by the number of projects under development in the Upington area. The "do-nothing" alternative will therefore likely result in minimising the cumulative impact on the land, although it is expected that pressure to develop the site for renewable energy purposes will be actively pursued due to the same factors which make the site a viable option for renewable energy development (refer to **Section 2.5.2.1**). Other developers will likely seek to develop the site for renewable energy purposes in order to realise South Africa's renewable energy targets, and the socio-economic and environmental benefits. This alternative will be assessed within the EIA phase of the process.

2.6. Proposed Activities during the Project Development Stages

A series of activities are proposed as part of the design, pre-construction, construction, operation, and decommissioning phases associated with the development of Allepad PV Three. These are discussed in more detail under the respective sub-headings below.

2.6.1. Design and Pre-Construction Phase

Pre-planning: Several post-authorisation factors are expected to influence the final design of the facility and could result in small-scale modifications of the PV array or associated infrastructure. While an objective of the Engineering, Procurement and Construction (EPC) Contractor, who will be responsible for the overall construction of the project, will be to comply with the approved facility design as far as possible, it should be understood that the construction process is dynamic and that unforeseen changes to the project specifications may take place. This Scoping Report therefore describes the project in terms of the best available knowledge at the time. The final facility design is required to be approved by DEA. Importantly, should there be any substantive changes or deviations from the original scope or layout of the project, DEA will need to be notified and where relevant, approval obtained.

Conduct Surveys: Prior to initiating construction, a number of surveys will be required including, but not limited to confirmation of the micro-siting footprint (i.e. the precise location of the PV panels, substation and the plant's associated infrastructure) and a geotechnical survey. Geotechnical surveys are executed by geotechnical engineers and geologists to acquire information regarding the physical characteristics of soil and rocks underlying a proposed project site. The purpose is to design earthworks and foundations for structures and to execute earthwork repairs necessitated due to changes in the subsurface environment.

2.6.2. Construction Phase

The construction phase will take up to 18 months to complete (but is typically less than a year), and will entail a series of activities including:

Procurement and employment

At the peak of construction the project is likely to create up to 300 direct employment opportunities. These employment opportunities will be temporary, and will last for a period of up to 18 months (i.e. the length of construction). Employment opportunities generated during the construction phase will include unskilled, semi-skilled, and highly-skilled opportunities. Solar PV projects make use of high levels of unskilled and semi-skilled labour so there will be good opportunity to use local labour. Employment opportunities for the proposed solar PV facility will peak during the construction phase and significantly decline during the operation phase. The injection of income into the area in the form of wages will represent an opportunity for the local economy and businesses in the area.

The majority of the labour force is expected to be sourced from the Upington area. No labour will be accommodated on-site during the construction period.

Establishment of an Access Road to the Site

Access to the project site will be established for the construction of the facility. Access to the project site is obtained via the existing farm entrance which is accessed from the N10 national road. Within the facility development footprint itself, access will be required from new / existing roads for construction purposes (and limited access for maintenance during operation). The final layout will be determined following the identification of site related sensitivities.

Undertake Site Preparation

Site preparation activities will include clearance of vegetation. These activities will require the stripping of topsoil which will need to be stockpiled, backfilled and / or spread on site.

Transport of Components and Equipment to Site

The national, regional, secondary and proposed internal access roads will be used to transport all components and equipment required during the construction phase of the solar facility. Some of the components (i.e. substation transformer) may be defined as abnormal loads in terms of the National Road Traffic Act (No. 93 of 1996) (NRTO)[8] by virtue of the dimensional limitations. Typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the mounting of the PV support structures, construction of the substation and site preparation.

[8] A permit will be required in accordance with Section 81 of the National Road Traffic Act (No. 93 of 1996) (NRTA) which pertains to vehicles and loads which may be exempted from provisions of Act.

Establishment of Laydown Areas on Site

Laydown and storage areas will be required for typical construction equipment. Once the required equipment has been transported to site, a dedicated equipment construction camp and laydown area will need to be established adjacent to the workshop area. The equipment construction camp serves to confine activities and storage of equipment to one designated area to limit the potential ecological impacts associated with this phase of the development. The laydown area will be used for the assembly of the PV panels and the general placement / storage of construction equipment. A temporary laydown area up to 1ha in extent is required during construction.

Erect PV Arrays and Construct Substation and Invertors

The construction phase involves installation of the solar PV panels and structural and electrical infrastructure required for the operation of the facility. In addition, preparation of the soil and improvement of the access roads is likely to continue for most of the construction phase. For array installations, vertical support posts are driven into the ground. Depending on the results of the geotechnical report, a different foundation method, such as screw pile, helical pile, micro pile or drilled post / pile could be used. The posts will hold the support structures (tables) on which the PV modules would be mounted. Brackets attach the PV modules to the tables. Trenches are dug for the underground AC and DC cabling and the foundations of the inverter enclosures and transformers are prepared. While cables are being laid and combiner boxes are being installed, the PV tables are erected. Wire harnesses connect the PV modules to the electrical collection systems. Underground cables and overhead circuits connect the Power Conversion Stations (PCS) to the on-site AC electrical infrastructure and ultimately the solar facility's on-site substation.

The construction of the on-site substation will require a survey of the site, site clearing and levelling and construction of access road(s) (where applicable), construction of a level terrace and foundations, assembly, erection, installation and connection of equipment, and rehabilitation of any disturbed areas, and protection of erosion sensitive areas.

Establishment of Ancillary Infrastructure

Ancillary infrastructure will include a power line for connection to the Eskom national grid, workshop, storage and laydown areas, gatehouse and security complex, as well as a temporary contractor's equipment camp.

The establishment of the ancillary infrastructure and support buildings will require the clearing of vegetation and levelling of the development site, and the excavation of foundations prior to construction. Laydown areas for building materials and equipment associated with these buildings will also be required.

Construction of the power line

A power line is constructed by surveying the power line route, constructing foundations for the towers, installing the towers, stringing the conductors, and finally rehabilitating disturbed areas and protecting erosion sensitive areas.

Undertake Site Rehabilitation

Once construction is completed and all construction equipment has been removed, the site will be rehabilitated where practical and reasonable. In addition, on full commissioning of the solar facility, any access points which are not required during operation must be closed and rehabilitated accordingly.

2.6.3. Operation Phase

The proposed solar facility is expected to operate for a minimum of 20 years. The facility will operate continuously, 7 days a week, during daylight hours. While the solar facility will be largely self-sufficient, monitoring and periodic maintenance activities will be required. Key elements of the Operation and Maintenance (O&M) plan include monitoring and reporting the performance of the solar facility, conducting preventative and corrective maintenance, receiving visitors, and maintaining security.

2.6.4. Decommissioning Phase

Depending on the continued economic viability of the solar PV facility following the initial 20-year operation lifespan, the facility will either be decommissioned or the operation phase will be extended. If it is deemed financially viable to extend the operation phase, existing components would either continue to operate or be dissembled and replaced with new, more efficient technology / infrastructure available at the time. If the decision is made to decommission the facility, the following decommissioning activities will take place.

Site Preparation
Site preparation activities include confirming the integrity of the access to the site to accommodate the required decommissioning equipment.

Disassembly and Removal of Existing Components
When the solar PV facility is ultimately decommissioned, the equipment to be removed will depend on the land use proposed for the site at the time. All above ground facilities that are not intended for future use at the site will be removed. Much of the above ground wire, steel, and solar PV panels of which the system is comprised are recyclable materials and would be recycled to the extent feasible. The components of the solar PV facility would be deconstructed and recycled, or disposed of in accordance with applicable regulatory requirements. The site will be rehabilitated and can be returned to agriculture or another beneficial land-use.

Future plans for the site and infrastructure after decommissioning
The generation capacity of the facility would have degraded by approximately 15% over the 20-year operations lifespan. The solar PV facility will potentially have the opportunity to generate power for a Merchant Market operation (i.e. the client would sell power on a bid basis to the market). Another option for the site after decommissioning is for agricultural activities to resume.

CHAPTER 3. POLICY AND LEGISLATIVE CONTEXT

This Chapter provides an overview of the policy and legislative context within which Allepad PV Three is being proposed. It identifies legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments which may be applicable, or may have relevance to the project, and which have been considered as part of the EIA process.

3.1. Strategic Electricity Planning in South Africa

The need to expand electricity generation capacity in South Africa is based on national policy, and is informed by ongoing strategic planning undertaken by the DoE. The hierarchy of policy and planning documentation that supports the development of Independent Power Producer (IPP) projects is illustrated in **Figure 3.1**.

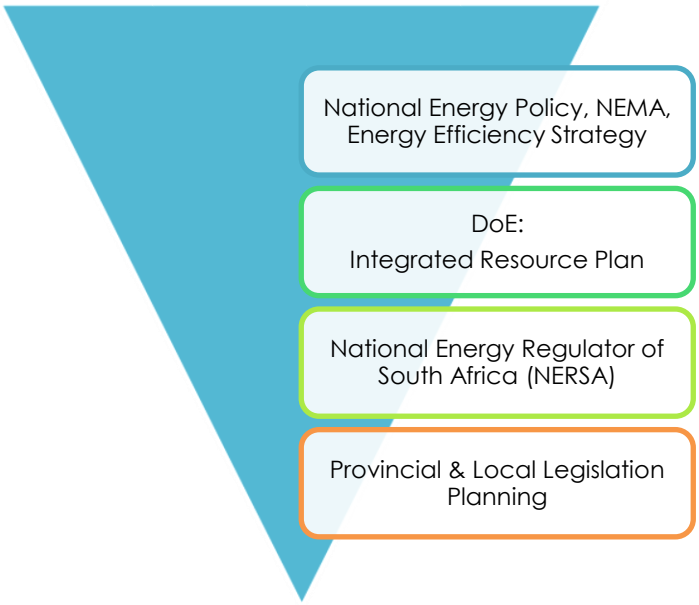

Figure 3.1: Hierarchy of Electricity Policy and Planning Documentation.

3.2. Regulatory Hierarchy

The regulatory hierarchy for energy generation projects consists of three tiers of authorities who exercise control through both statutory and non-statutory instruments, namely National, Provincial and Local levels.

At **National Level**, the main regulatory agencies are:

- **Department of Energy (DoE):** DoE is responsible for policy relating to all energy forms, and is responsible for compiling and approving the IRP for Electricity.
- **National Energy Regulator of South Africa (NERSA):** NERSA is responsible for regulating all aspects of the electricity sector, and will ultimately issue licenses in the form of Power Purchase Agreements (PPAs) for IPP projects to generate electricity.

- **Department of Environmental Affairs (DEA):** DEA is responsible for environmental policy and is the controlling authority in terms of NEMA and the 2014 EIA Regulations (GNR 326). As per GNR 779 of 01 July 2016, DEA is the Competent Authority, and is charged with granting the relevant EA for this project.
- **South African Heritage Resources Agency (SAHRA):** SAHRA is a statutory organisation established under the National Heritage Resources Act (No. 25 of 1999) (NHRA), as the national administrative body responsible for the protection of South Africa's cultural heritage.
- **South African National Roads Agency Limited (SANRAL):** SANRAL is responsible for the regulation and maintenance of all national roads and routes.
- **Department of Water and Sanitation (DWS):** DWS is responsible for effective and efficient water resources management to ensure sustainable economic and social development. DWS is also responsible for evaluating and issuing licenses pertaining to water use (i.e. Water Use Licenses (WULs) and / or registration of General Authorisations (GAs)).
- **Department of Agriculture, Forestry and Fisheries (DAFF):** DAFF is the custodian of South Africa's agricultural, forestry, and fishery resources and is primarily responsible for the formulation and implementation of policies governing the Agriculture, Forestry and Fisheries Sector. DAFF is also responsible for the issuing of permits for the disturbance or destruction of protected tree species.
- **Department of Mineral Resources (DMR):** Approval from DMR will be required to use land surface contrary to the objects of the Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) in terms of Section 53 of the Act. In terms of the MPRDA approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resource that may occur on site.
- **Department of Rural Development and Land Reform (DRDLR):** DRDLR is dedicated to the social and economic development of rural South Africa, and is responsible for providing a framework for rural development.

At **Provincial Level**, the main regulatory agencies are:

- **Northern Cape Department of Environment, and Nature Conservation (DENC):** DENC is the Commenting Authority for the project, and is also responsible for issuing any biodiversity and conservation-related permits. DENC's involvement relates specifically to sustainable resource management, conservation of protected species and land care.
- **Northern Cape Department of Roads and Public Works (NCDRPW):** NCDRPW is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads on public roads.
- **Ngwao Boswa Kapa Bokone (NBKB):** NBKB, the Northern Cape Provincial Heritage Resources Authority is responsible for the identification, conservation and management of heritage resources, as well as commenting on heritage related issues within the Province.

At **Local Level** the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. The project is proposed in the **Dawid Kruiper LM**, and **ZF Mgcawu DM**.

3.3. National Policy

3.3.1. The National Energy Act (No. 34 of 2008)

The purpose of the National Energy Act (No. 34 of 2008) is to ensure that diverse energy resources are available, in sustainable quantities and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, while taking into account environmental management

requirements and interactions amongst economic sectors, as well as matters relating to renewable energy. The National Energy Act also provides for energy planning, increased generation and consumption of renewable energies, contingency energy supply, holding of strategic energy feedstocks and carriers, adequate investment in, appropriate upkeep and access to energy infrastructure. The Act provides measures for the furnishing of certain data and information regarding energy demand, supply and generation, and for establishing an institution to be responsible for promotion of efficient generation and consumption of energy and energy research.

The Act provides the legal framework which supports the development of power generation facilities, such as Allepad PV Three.

3.3.2. White Paper on the Energy Policy of South Africa, 1998

The South African Energy Policy, published by the then Department of Minerals and Energy (DME) in December 1998 identifies five key objectives, namely:

- Increasing access to affordable energy services.
- Improving energy sector governance.
- Stimulating economic development.
- Managing energy-related environmental impacts.
- Securing supply through diversity.

In order to meet these objectives and the developmental and socio-economic objectives of South Africa, the country needs to optimally use available energy resources. The South African Government is required to address what can be done to meet these electricity needs both in the short and long-term. The White Paper identifies key objectives for energy supply, such as increasing access to affordable energy services, managing energy-related environmental impacts and securing energy supply through diversifying South Africa's electricity mix.

This policy recognises that renewable energy applications have specific characteristics which need to be considered. The Energy Policy is "*based on the understanding that renewables are energy sources in their own right, and are not limited to small-scale and remote applications, and have significant medium- and long-term commercial potential*." In addition, the National Energy Policy states that "*Renewable resources generally operate from an unlimited resource base and, as such, can increasingly contribute towards a long-term sustainable energy future*".

The support for the Renewable Energy Policy is guided by a rationale that South Africa has a very attractive range of renewable resources, particularly solar and wind, and that renewable applications are, in fact, the least cost energy service in many cases from a fuel resource perspective (i.e. the cost of fuel in generating electricity from such technology), more so when social and environmental costs are taken into account. In spite of this range of resources, the National Energy Policy acknowledges that the development and implementation of renewable energy applications has been neglected in South Africa.

Government policy on renewable energy is therefore concerned with addressing the following challenges:

- Ensuring that economically feasible technologies and applications are implemented.

» Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options.
» Addressing constraints on the development of the renewable industry.

3.3.3. White Paper on the Renewable Energy Policy, 2003

The White Paper on Renewable Energy Policy supplements the Government's overarching policy on energy as set out in its White Paper on the Energy Policy of the Republic of South Africa (DME, 1998). The White Paper on Renewable Energy Policy recognises the significance of the medium and long-term potential of renewable energy. The main aim of the policy is to create the conditions for the development and commercial implementation of renewable technologies. The position of the White Paper on Renewable Energy is based on the integrated resource planning criterion of:

"Ensuring that an equitable level of national resources is invested in renewable technologies, given their potential and compared to investments in other energy supply options."

The White Paper on Renewable Energy sets out the Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa. It also informs the public and the international community of the Government's vision, and how the Government intends to achieve these objectives, and informs Government agencies and organs of their roles in achieving the objectives.

South Africa relies heavily on coal to meet its energy needs because it is well-endowed with coal resources in particular. However, South Africa is endowed with renewable energy resources that can be sustainable alternatives to fossil fuels, but which have so far remained largely untapped. This White Paper fosters the uptake of renewable energy in the economy and has a number of objectives that include:

» Ensuring that equitable resources are invested in renewable technologies.
» Directing public resources for implementation of renewable energy technologies.
» Introducing suitable fiscal incentives for renewable energy.
» Creating an investment climate for the development of renewable energy sector.

The objectives of the White Paper are considered in six focal areas, namely:

i) Financial instruments.
ii) Legal instruments.
iii) Technology development.
iv) Awareness raising.
v) Capacity building and education.
vi) Market based instruments and regulatory instruments.

The policy supports the investment in renewable energy facilities as they contribute towards ensuring energy security through the diversification of energy supply, reducing Greenhouse Gas (GHG) emissions and the promotion of renewable energy sources.

3.3.4. The Electricity Regulation Act (No. 04 of 2006) (ERA)

The Electricity Regulation Act (No. 04 of 2006) as amended by the Electricity Regulation Act (No. 28 of 2007), replaced the Electricity Act (No. 41 of 1987), as amended, with the exception of Section 5B, which provides funds for the energy regulator for the purpose of regulating the electricity industry.

The ERA establishes a national regulatory framework for the electricity supply industry and made NERSA custodian and enforcer of the National Electricity Regulatory Framework. The ERA also provides for licences and registration as the manner in which the generation, transmission, distribution, reticulation, trading, and import and export of electricity is regulated.

3.3.5. Integrated Energy Plan (IEP), November 2016

The purpose and objectives of the Integrated Energy Plan (IEP) are derived from the National Energy Act (No. 34 of 2008). The IEP takes into consideration the crucial role that energy plays in the entire economy of the country and is informed by the output of analyses founded on a solid fact base. It is a multi-faceted, long-term energy framework which has multiple aims, some of which include:

- To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector.
- To guide the selection of appropriate technologies to meet energy demand (i.e. the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels).
- To guide investment in and the development of energy infrastructure in South Africa.
- To propose alternative energy strategies which are informed by testing the potential impacts of various factors such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors.

A draft version of the IEP was released for comment on 25 November 2016. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The development of the IEP is an ongoing continuous process. It is reviewed periodically to take into account changes in the macroeconomic environment, developments in new technologies and changes in national priorities and imperatives, amongst others.

The 8 key objectives of the integrated energy planning process are as follows:

- Objective 1: Ensure security of supply.
- Objective 2: Minimise the cost of energy.
- Objective 3: Promote the creation of jobs and localisation.
- Objective 4: Minimise negative environmental impacts from the energy sector.
- Objective 5: Promote the conservation of water.
- Objective 6: Diversify supply sources and primary sources of energy.
- Objective 7: Promote energy efficiency in the economy.
- Objective 8: Increase access to modern energy.

3.3.6. Integrated Resource Plan (IRP) for Electricity 2010 - 2030

The Integrated Resource Plan (IRP) for Electricity 2010 – 2030[9] constitutes a subset of the IEP and is South Africa's national electricity plan. The current iteration of the IRP for South Africa, initiated by the DoE after a first round of public participation in June 2010, led to the Revised Balanced Scenario (RBS) that was published in October 2010. A second round of public participation was conducted in November / December 2010, which led to several changes to the IRP model assumptions.

The document outlines the proposed generation new-build fleet for South Africa for the period 2010 – 2030. This scenario was derived based on a cost-optimal solution for new-build options (considering the direct costs of new build power plants), which was then "balanced" in accordance with qualitative measures such as local job creation.

The Policy-Adjusted IRP includes the same amount of coal and nuclear new builds as the RBS, while reflecting recent developments with respect to prices for renewables. In addition to all existing and committed power plants (including 10GW committed coal), the plan includes **17.8GW of renewables,** 9.6GW of nuclear, 6.25GW of coal, and approximately 8.9GW of other generation sources such as hydro, and gas.

	New build options							
	Coal (PF, FBC, imports, own build)	Nuclear	Import hydro	Gas – CCGT	Peak – OCGT	Wind	CSP	Solar PV
	MW	MW	MW	MW	MW	MW	MW	MW
2010	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	300
2013	0	0	0	0	0	0	0	300
2014	500[1]	0	0	0	0	400	0	300
2015	500[1]	0	0	0	0	400	0	300
2016	0	0	0	0	0	400	100	300
2017	0	0	0	0	0	400	100	300
2018	0	0	0	0	0	400[4]	100[4]	300[4]
2019	250	0	0	237[3]	0	400[4]	100[4]	300[4]
2020	250	0	0	237[3]	0	400	100	300
2021	250	0	0	237[3]	0	400	100	300
2022	250	0	1 143[2]	0	805	400	100	300
2023	250	1 600	1 183[2]	0	805	400	100	300
2024	250	1 600	283[2]	0	0	800	100	300
2025	250	1 600	0	0	805	1 600	100	1 000
2026	1 000	1 600	0	0	0	400	0	500
2027	250	0	0	0	0	1 600	0	500
2028	1 000	1 600	0	474	690	0	0	500
2029	250	1 600	0	237	805	0	0	1 000
2030	1 000	0	0	948	0	0	0	1 000
Total	6 250	9 600	2 609	2 370	3 910	8 400	1 000	8 400

Firm commitment necessary now

Final commitment in IRP 2012

1. Built, owned & operated by IPPs 2. Commitment necessary due to required high-voltage infrastructure, which has long lead time 3. Commitment necessary due to required gas infrastructure, which has long lead time 4. Possibly required grid upgrade has long lead time and thus makes commitment to power capacity necessary

Figure 3.2: National Energy Development Commitments detailed in the IRP 2010.

[9] It should be noted that the requirement for renewable energy generation (and specifically that from solar PV) has also been included in the latest IRP, published in August 2018 for comment. The updated IRP is yet to be finalised and promulgated.

Figure 3.2 indicates the new capacities of the IRP 2010 commitment. The dates shown indicate the latest that the capacity is required in order to avoid security of supply concerns. The IRP notes that projects could be concluded earlier than indicated if feasible.

When promulgated in March 2011, it was indicated that the IRP should be a "living plan" which would be revised by the DoE every two years. Since the promulgation of the IRP 2010 there have been a number of developments in the energy sector in South and Southern Africa. In addition the electricity demand outlook has changed markedly from that expected in 2010. An IRP 2010 – 2030 Update Report was prepared and released in November 2013. The IRP 2010 – 2030 Update Report of 2013 estimated the energy demand in 2030 to be in the range of 345TWh – 416TWh as opposed to 454TWh as was originally expected in the policy-adjusted IRP. This equates to a reduction from 67 800MW to 61 200MW of reliable generating capacity. In addition, to uncertainty regarding the future demand, additional variables in the energy sector including the global agenda to combat climate change and the resulting mitigation requirements on South Africa, were taken into consideration. This IRP Update report of 2013 was not adopted by Parliament and was therefore never implemented.

In November 2016 a draft IRP Update – Assumption, Base Case Results and Observations (Revision 1) document was released for comment. This revision was being undertaken to take into account the changed electricity landscape, in particular with regards to electricity demand and the underlying relationship with economic growth, new developments in technology and fuel options (both locally and globally), scenarios for carbon mitigation strategies and the impact on electricity supply up to 2050, and the affordability of electricity and its impact on demand and supply.

Unlike the IRP 2010 – 2030 which considered the CSIR as well as Eskom demand forecasts, the IRP Update Base Case only uses the forecast developed by the CSIR. The energy demand forecast developed by the CSIR is presented in **Figure 3.3**. Based on the fact that the IRP update uses the High (less energy intense) forecast, energy demand is still anticipated to increase and is expected to be in the region of approximately 52GWH by 2050.

Whereas the IRP 2010 – 2030 assumed Eskom's existing fleet to have an average plant performance of 86%, actual performance has declined to less than 70% in the recent past. Eskom has since adopted a new operation and maintenance strategy which has seen a significant improvement in this performance. The current plant life of the existing Eskom generation fleet includes requirements to comply with the requirements of the National Air Quality: Management Act (No. 39 of 2002) (NEM:AQA). Eskom, in agreement with DEA, has a plan in place to ensure all plants are compliant within a set period of time. An indication of the 50-year life decommissioning of units for the various Eskom plants is also provided in the IRP 2016.

The update process currently underway estimates that **18GW of PV** generation capacity would be required by the end of 2050, in addition to 15GW of coal-fired generation capacity, 37GW of wind, 20GW of nuclear, 34GW of gas, and 2.5GW of import hydro. The 2030 figures in the Base Case exclude the capacity already procured or under procurement (i.e. 6.2GW of renewable energy and 900MW of coal from IPP projects), and therefore differ from those in the IRP 2010 – 2030. The updated IRP is in the process of being finalised and is expected to be promulgated in mid-August 2018.

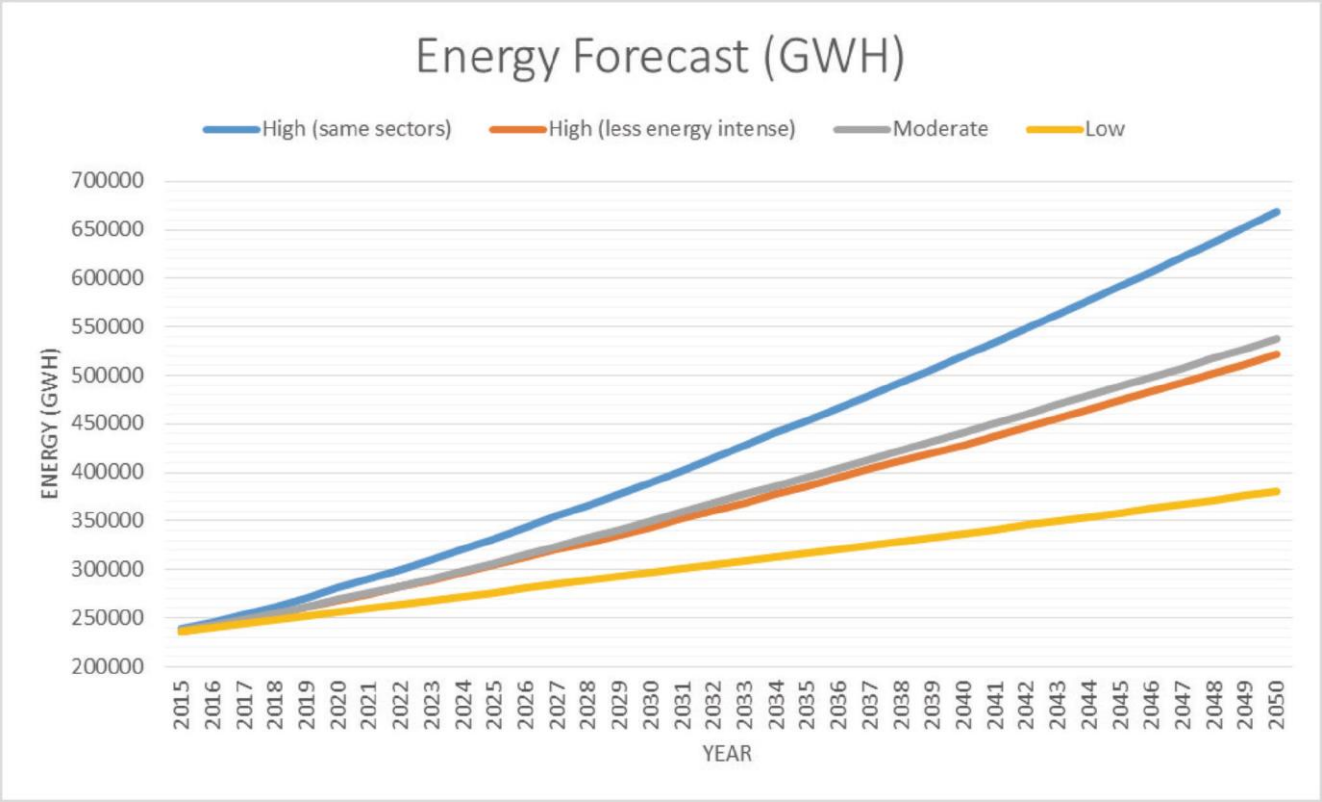

Figure 3.3: Energy Demand Forecast (Source: IRP Update, 2016).

The Draft IRP 2018 was released for comment on 27 August 2018. The Draft IRP 2018 is based on least-cost supply and demand balance and takes into account security of supply and the environment (i.e. with regards to minimising negative emissions and water usage). According to the Draft IRP 2018 key input assumptions that changed from the promulgated IRP 2010 – 2030 include, amongst others, technology costs, electricity demand projection, fuel costs and Eskom's existing fleet performance and additional commissioned capacity.

For the period ending 2030, the Draft IRP 2018 proposes a number of policy adjustments to ensure a practical plan that will be flexible to accommodate new, innovative technologies that are not currently cost competitive, the minimisation of the impact of decommissioning of coal power plants and the changing demand profile.

The following policy adjustments and considerations are proposed:

» A least-cost plan with the retention of annual build limits (1 000MW for PV and 1 600MW for wind) for the period up to 2030. This provides for smooth roll out of RE, which will help sustain the industry.
» Inclusion of 1 000MW of coal-to-power in 2023 – 2024, based on two already procured and announced projects. Jobs created from the projects will go a long way towards minimising the impact of job losses resulting from the decommissioning of Eskom coal power plants and will ensure continued utilisation of skills developed for the Medupi and Kusile projects.
» Inclusion of 2 500MW of hydro power in 2030 to facilitate the RSA-DRC treaty on the Inga Hydro Power Project in line with South Africa's commitments contained in the NDP to partner with regional neighbours. The Project has the potential to energise and unlock regional industrialisation.

» Renewable energy technologies identified and endorsed for localisation and promotion will be enabled through Ministerial Determinations utilising the existing PV, Wind and Gas allocations in the IRP Update. Technologies reflected are therefore a proxy for technologies that provide similar technical characteristics at similar or less cost to the system. The Electricity Regulations on New Generation Capacity enables the Minister of Energy to undertake or commission feasibility studies in respect of new generation capacity taking into account new generation capacity as provided for in the IRP Update. Such feasibility studies are, among others, is expected to consider the cost of new capacity, risks (technical, financial and operational) and value for money (economic benefits).
» Made annual allocations of 200MW for generation-for-own-use between 1MW to 10MW, starting in 2018. These allocations will not be discounted off the capacity allocations initially, but will be considered during the issuing of Ministerial Determinations taking into account generation for own use filed with NERSA.

With these adopted policy adjustments, the recommended updated Plan is as depicted in **Figure 3.4**.

	Coal	Nuclear	Hydro	Storage (Pumped Storage)	PV	Wind	CSP	Gas / Diesel	Other (CoGen, Biomass, Landfill)	Embedded Generation
2018	39 126	1 860	2 196	2 912	1 474	1 980	300	3 830	499	Unknown
2019	2 155					244	300			200
2020	1 433				114	300				200
2021	1 433				300	818				200
2022	711				400					200
2023	500									200
2024	500									200
2025					670	200				200
2026					1 000	1 500		2 250		200
2027					1 000	1 600		1 200		200
2028					1 000	1 600		1 800		200
2029					1 000	1 600		2 850		200
2030			2 500		1 000	1 600				200
TOTAL INSTALLED	**33 847**	**1 860**	**4 696**	**2 912**	**7 958**	**11 442**	**600**	**11 930**	**499**	**2600**
Installed Capacity Mix (%)	**44.6**	**2.5**	**6.2**	**3.8**	**10.5**	**15.1**	**0.9**	**15.7**	**0.7**	

Installed Capacity
Committed / Already Contracted Capacity
New Additional Capacity (IRP Update)
Embedded Generation Capacity (Generation for own use allocation)

Figure 3.4: Proposed Updated plan for the Period Ending 2030 (Source: Draft IRP 2018).

The following must be noted in terms of **Figure 3.4:**

» Coal Installed Capacity is less the 12 000MW capacity to be decommissioned between years 2020 and 2030.
» Existing and committed Coal, Nuclear, Hydro and Pumped Storage Capacity is less auxiliary power. Stated numbers are therefore based on sent out capacity not rated capacity.
» Two additional units at Medupi have since been commissioned earlier than previously assumed.

- Total installed generation for own use regardless of installed capacity is unknown as these installations were exempted from holding a generation license or were not required to be registered.
- The timing of new additional capacity as indicated in **Figure 3.4** can change (i.e. move back or forward) depending on what happens with the projected electricity demand and / or Eskom's existing plant performance.

Based on the Draft IRP 2018 there is currently 1 474MW of installed PV capacity, while an additional 814MW has been committed between 2020 and 2022, and an additional 5 670MW capacity has been allocated between 2025 and 2030.

3.3.7. New Growth Path (NGP) Framework, 23 November 2010

The purpose of the New Growth Path (NGP) Framework is to provide effective strategies towards accelerated job-creation through the development of an equitable economy and sustained growth. The target of the NGP is to create 5 million jobs by 2020. With economic growth and employment creation as the key indicators identified in the NGP. The framework seeks to identify key structural changes in the economy that can improve performance in term of labour absorption and the composition and rate of growth.

To achieve this, government will seek to, amongst other things, identify key areas for large-scale employment creation, as a result of changes in conditions in South Africa and globally, and to develop a policy package to facilitate employment creation in these areas.

3.3.8. The National Development Plan (NDP) 2030

The National Development Plan (NDP) 2030 is a plan prepared by the National Planning Commission in consultation with the South African public which is aimed at eliminating poverty and reducing inequality by 2030. The NDP aims to achieve this by drawing on the energies of its people, growing and inclusive economy, building capabilities, enhancing the capacity of the state and promoting leaderships and partnerships throughout society.

While the achievement of the objectives of the NDP requires progress on a broad front, three priorities stand out, namely:

- Raising employment through faster economic growth
- Improving the quality of education, skills development and innovation
- Building the capability of the state to play a developmental, transformative role

In terms of the Energy Sector's role in empowering South Africa, the NDP envisages that, by 2030, South Africa will have an energy sector that promotes:

- Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation.
- Social equity through expanded access to energy at affordable tariffs and through targeted, sustainable subsidies for needy households.

» Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change.

Although electricity generation from coal is still seen as part of the energy mix within the NDP, the plan sets out steps that aim to ensure that, by 2030, South Africa's energy system looks very different to the current situation: coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources – especially wind, solar, and imported hydroelectricity – will play a much larger role.

3.3.9. Climate Change Bill, 2018

On 08 June 2018 the Minister of Environmental Affairs published the Climate Change Bill ("the Bill") for public comment. The Bill provides a framework for climate change regulation in South Africa aimed at governing South Africa's sustainable transition to a climate resilient, low carbon economy and society. The Bill provides a procedural outline that will be developed through the creation of frameworks and plans. The following objectives are set within the Bill:

a) Provide for the coordinated and integrated response to climate change and its impacts by all spheres of government in accordance with the principles of cooperative governance,
b) Provide for the effective management of inevitable climate change impacts through enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to building social, economic, and environmental resilience and an adequate national adaptation response in the context of the global climate change response,
c) Make a fair contribution to the global effort to stabilise greenhouse gas concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe and in a manner that enables economic, employment, social and environmental development to proceed in a sustainable manner.

Allepad PV Three comprises a renewable energy generation facility and thus would not result in the generation or release of emissions during its operation.

3.3.10. National Climate Change Response Policy, 2011

South Africa's National Climate Change Response Policy (NCCRP) establishes South Africa's approach to addressing climate change, including adaptation and mitigation responses. The NCCRP formalises Government's vision for a transition to a low carbon economy, through the adoption of the 'Peak, Plateau and Decline' (PPD) GHG emissions trajectory whereby South Africa's emissions should peak between 2020 and 2025, plateau for approximately a decade, and then decline in absolute terms thereafter, and based on this the country has pledged to reduce emissions by 34% and 42% below Business As Usual (BAU) emissions in 2020 and 2025, respectively.

As an integral part of the policy, a set of near-term priority flagship programmes will be implemented to address the challenges of climate change, one of which includes the Renewable Energy Flagship Programme. This flagship programme includes a scaled-up renewable energy programme, based on the current programme specified in the IRP 2010, and using the evolving South African Renewables Initiative led by the Department of Public Enterprise and Department of Trade and Industry (DTI), as a driver for the deployment of renewable energy technologies. The programme will be informed by enhanced domestic

manufacturing potential and the implementation of energy efficiency and renewable energy plans by local government.

The development of Allepad PV Three is aligned with the Renewable Energy Flagship Programme identified under South Africa's NCCRP and could therefore be argued to be aligned with the country's approach to addressing climate change.

3.3.11. Strategic Integrated Projects (SIPs)

The Presidential Infrastructure Coordinating Committee (PICC) is integrating and phasing investment plans across 18 Strategic Infrastructure Projects (SIPs) which have five core functions: to unlock opportunity, transform the economic landscape, create new jobs, strengthen the delivery of basic services and support the integration of African economies. A balanced approach is being fostered through greening of the economy, boosting energy security, promoting integrated municipal infrastructure investment, facilitating integrated urban development, accelerating skills development, investing in rural development and enabling regional integration. SIP 8 and 9 of the energy SIPs supports the development of the solar energy facility:

- SIP 8: Green energy in support of the South African economy: Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP 2010 – 2030) and supports bio-fuel production facilities.
- SIP 9: Electricity generation to support socio-economic development: The proposed Orkney Solar Farm is a potential SIP 9 Project as electricity will be generated and social and economic upliftment, development and growth will take place within the surrounding communities. It would become a SIP 9 project if selected as a Preferred Bidder project by the Department of Energy. SIP 9 supports the acceleration of the construction of new electricity generation capacity in accordance with the IRP 2010 to meet the needs of the economy and address historical imbalances.

3.4. Provincial Policy and Planning Context

3.4.1. Northern Cape Provincial Spatial Development Framework (PSDF) 2012

The Northern Cape Provincial Spatial Development Framework (PSDF) 2012 states that the overarching goal for the Province is to enable sustainability through sustainable development. The Province considers social and economic development as imperative in order to address the most significant challenge facing the Northern Cape, which is poverty.

The PSDF considers the release of greenhouse gas (GHG) emissions created by human activity as the key cause of global warming, which in turn could result in major negative effects and disasters in the short- and medium-term. This effect would increasingly undermine human development gains. Innovative strategies would have to be implemented to reduce the impact of global deterioration.

The PSDF identifies key sectoral strategies and plans which are considered to be the key components of the PSDF. Sectoral Strategy 19 refers to a provincial renewable energy strategy. Within the PSDF a policy has been included which states that renewable energy sources (including the utilisation of solar energy) are to comprise 25% of the Province's energy generation capacity by 2020.

The overall energy objective for the Province also includes promoting the development of renewable energy supply schemes which are considered to be strategically important for increasing the diversity of domestic energy supply and avoiding energy imports, while also minimising the detrimental environmental impacts. The implementation of sustainable renewable energy is also to be promoted within the Province through appropriate financial and fiscal instruments.

Considering the need for the development of renewable energy facilities in order to achieve the objective of sustainability the development of the proposed solar energy facility within the Northern Cape and within the study area is considered to be aligned with the Northern Cape PSDF.

3.5. Local Policy and Planning Context

3.5.1. ZF Mgcawu District Municipality Draft Integrated Development Plan (IDP) 2017 – 2022 (2018 / 2019)

The vision of the ZF Mgcawu DM as contained within its IDP 2017 – 2022 (2018 / 2019) is as follows:

"*Quality support to deliver quality services.*"

The mission of the ZF Mgcawu DM is:

"*Centre of excellence in providing quality basic services through support to local municipalities.*"

The following strategic objectives and development objectives have been identified for the ZF Mgcawu DM:

Strategic Objective	Dev Objective Linkage codes	Development Objective
(i) To monitor and determine the housing backlogs in the district as well as to eradicate sanitation & infrastructure backlogs	BSD: 1	01. Maintain and report on the housing requirements
	BSD: 2	02. Provide project management support to B-Municipalities
(ii) To assess and provide targeted support improving institutional capacity and service delivery capabilities of category B-municipalities	MIT: 1	03. Assess and report on the institutional capacity of B-municipalities to fulfil their statutory mandates
	MIT: 2	04. Assess and report on the service delivery capabilities of B-municipalities to fulfil their statutory mandates
	GGP: 1	05. Provide targeted support to B-municipalities (e.g. including legal support to B-municipalities regarding land use matters)
(iii) To promote environmental health and safety of communities in the ZF Mgcawu District through the proactive prevention, mitigation, identification and management of environmental health services, fire and disaster risks	BSD: 3	06. Providing environmental health services to B-municipalities
	GGP: 2	07. Implement special programmes (e.g. HIV / Aids)

Strategic Objective	Dev Objective Linkage codes	Development Objective
(iv) To promote safety of communities in the ZF Mgcawu District through the proactive prevention, mitigation, identification and management of fire and disaster risks	BSD: 4	08. Establish disaster management mechanisms and programmes in the ZF Mgcawu District
(v) To Facilitate the Development of Sustainable regional land use, economic, spatial and environmental planning frameworks that will support and guide the development of a diversified, resilient and sustainable district economy	LED: 1	09. Establish a vehicle to ensure all businesses are co-operating (i.e. District LED Forum)
	LED: 2	10. Create investment opportunities in sectoral development (i.e. investment activities, Entrepreneurial business support programme)
	LED: 3	11. Enable an environment for business establishment and support initiatives (i.e. Increase the number of businesses, entrepreneurial support)
(v) To market, develop and co-ordinate tourism in the ZF Mgcawu District	LED: 4	12. Promote the Green Kalahari tourism brand in the ZF Mgcawu district
(vi) To assess and monitor the status of infrastructure needs and requirements of B Municipalities	BSD: 5	13. Establish and provide selected infrastructure needs to targeted B Municipalities
(vii) To ensure efficient business operations and to fulfils the assurance statutory requirements of the ZF Mgcawu District Municipality	MFV: 1	14. Enable and improve financial viability and management through well-structured budget processes, financial systems, and MFMA compliance (i.e. promote good budget and fiscal management, Unqualified audits)
	MIT: 3	15. Enable efficient and effective administrative support and Planning processes (i.e. Maintaining sound labour relations, practices and overall administrative support, IDP planning etc.

The implementation of Allepad PV Three would contribute positively towards the strategic objective of supporting and guiding the development of a diversified, resilient and sustainable district economy, and the development objectives of creating investment opportunities in sectoral development (i.e. investment activities, Entrepreneurial business support programme), and enabling an environment for business establishment and support initiatives (i.e. Increase the number of businesses, entrepreneurial support) through its local content and local economic development requirements as prescribed under the REIPPP Programme.

3.5.2. Dawid Kruiper LM IDP 2017 / 2022 (2018 / 2019)

The vision of the Dawid Kruiper LM as contained within the IDP 2017 / 2022 (2018 / 2019) is as follows:

"*To provide an affordable quality service to Dawid Kruiper and its visitors and to execute the policies and programmes of the Council.*"

The mission of the Dawid Kruiper LM is as follows:

"*As an authority that delivers Municipal Services to Dawid Kruiper, we attempt by means of a motivated staff, to develop Dawid Kruiper increasingly as a pleasant, safe and affordable living and workplace for its residents and a hospitable relaxed visiting place for its visitors*."

According to the IDP 2017 / 2022 (2018 / 2019) the focus of the IDP is still on the present (status quo) situation, but with strategic development objectives set the focus is set to shifts to the future. Development objectives were aligned with national imperatives and frameworks, and in line with the powers and functions of the municipality.

Guidelines governing these development objectives and strategies include the national key priority (focal) areas:

» Focal Area 1: Basic Service Delivery
» Focal Area 2: To promote Local Economic Development
» Focal Area 3: To promote municipal Transformation and Organisational Development
» Focal Area 4: Ensure Financial Viability and Management
» Focal Area 5: Ensure Good Governance and Public Participation
» Focal Area 6: Spatial Development Framework

Six Key Priority Areas (KPAs) with ten Development Priorities were identified based on the challenges faced by the LM, and prioritised by both ward committees and the community during public participation processes. These KPAs were linked to the six National Key Performance Areas and the SDF development objectives of the municipality, and include the following:

Development Priority	Spatial Development, Town Planning and Land Use Management
Key Priority Area	**Development Objectives**
Spatial Development Framework	» Develop, manage and maintain essential bulk water infrastructure and facilities to accommodate the aspirations, needs and pressures of present and future industries, businesses and dependent communities. » Develop, manage and maintain necessary infrastructure and facilities required to improve the provision of water services.

Development Priority	Sewerage
Key Priority Area	**Development Objectives**
Service Delivery and Infrastructure Development	» Develop, manage and maintain essential bulk sewerage infrastructure and facilities to accommodate the aspirations, needs and pressures of present and future industries, businesses and dependent communities. » Develop, manage and maintain necessary infrastructure and facilities required to improve the provision of sewerage services.

Development Priority	Human Settlements and Housing
Key Priority Area	**Development Objectives**
Service Delivery and Infrastructure Development	» Eradicate housing backlogs in municipal area. » Provide for sustainable human settlements (housing).

Development Priority	Energy and Electricity
Key Priority Area	**Development Objectives**
Service Delivery and Infrastructure Development	» Provide, manage and maintain essential infrastructure required to improve the provision of electrical services

Development Priority	Roads, Transport and Stormwater Drainage
Key Priority Area	**Development Objectives**
Service Delivery and Infrastructure Development	» Develop, manage and maintain necessary Road, Transport and Storm Water infrastructure and facilities required to improve transportation in, and Aesthetic qualities of urban areas.

Development Priority	Sanitation, Waste Management and Waste Removal
Key Priority Area	**Development Objectives**
Service Delivery and Infrastructure Development	» Regulate and manage waste disposal to prevent pollution of the natural environment and natural resources.

Development Priority	Economic Growth and Job Creation
Key Priority Area	**Development Objectives**
Local Economic Development	» Promote the development of tourist infrastructure that will enhance tourism » Create an environment that promotes the development of a diversified and sustainable economy.

Development Priority	Community Development and Facilities
Key Priority Area	**Development Objectives**
Service Delivery and Infrastructure Development	» Pro-active prevention, mitigation, identification and management of environmental health, fire and disaster risks. » Provide safety to communities through law enforcement services and through legislative requirements. » Provide equal access to sport, park, recreational facilities and other public amenities to all residents.

Development Priority	Administrative and Institutional Capacity
Key Priority Area	**Development Objectives**
Institutional Development and Organisational Transformation Good Governance	» Enable and improve financial viability and management through well-structured budget processes, financial systems, and MFMA compliance through legislative requirements

	» Align institutional arrangements to provide an effective and efficient support service to deliver on organisational objectives » Provide quality basic services to all communities within the municipality (i.e. electricity, water, sanitation, refuse) » Manage and maintain municipal property, plant, equipment and vehicle fleet » Facilitate the establishment of good governance practices » Promote and improve public relations through stakeholder participation and good customer service.

The implementation of Allepad PV Three would contribute positively towards several of the development priorities and development objectives identified by the Dawid Kruiper LM, specifically with regards to economic growth and job creation, and could also contribute towards the LM achieving some of the other development priorities and objectives through the provision of increased revenue which would enable municipal spending.

3.5.3. Dawid Kruiper LM SDF (2017)

In addition, the IDP identified the following 8 pillars as being important for development and the Dawid Kruiper Council's envisagement of a self-sustaining ecology with long-term benefit for all inhabitants of Dawid Kruiper:

1. **Agriculture** as an optimally efficient and economically viable market-directed sector representing a socio-economic 'pivot' of Dawid Kruiper.
2. **Manufacturing and industry** as a viable sector which builds on the comparative economic advantages of Dawid Kruiper, and operates in accordance with the highest standards for environmental management.
3. **Tourism** as a sustainable industry, supporting or enhancing marginal industries and contributing significantly to the improvement of the quality of life of all the communities of Dawid Kruiper.
4. **Urban development** in a safe, healthy and aesthetically pleasing urban environment, with the architectural and spatial character depicting the historic and cultural background of the habitant communities.
5. **Rural development** in an environmentally sustainable manner with the infrastructure and services that is essential for the development of the rural communities of Dawid Kruiper whilst enhancing its unique rural character.
6. **Social Development** establishing an optimally developed and empowered society in harmony with its environment.
7. **Conservation** of natural habitats worthy to be consolidated into continuous tracts of conservation land, protecting natural biodiversity and providing community-supporting ecosystem services.
8. **Natural resources** as fundamental requirements for sustainable development in Dawid Kruiper Municipality.

The project site is located in Ward 11 of the Dawid Kruiper LM, while the portion of the grid connection which occurs outside of the project site is located in Ward 13 of the Dawid Kruiper LM. According to the Dawid

Kruiper LM SDF the area under investigation is located within the C.a.2 Agriculture (Ward 11) and G.a.3 Vacant Land within Urban Edge (Ward 13) Spatial Planning Category (SPC) (refer to **Figure 3.5** and **Figure 3.6** respectively). These SPCs are described in more detail below:

C.a.2	**Agriculture:** The breeding of animals on natural veld, land and pasture, stock or auction pens, the processing of products produced on the farm, the cultivation of crops and at most one single residential house and other buildings that is reasonably relevant to the main agricultural activity on the farm, including bona-fide staff housing.
	Decision Making: This SPC covers the largest part of the DKLM area and contributes to the agricultural economy of the municipality. The protection of intensive agricultural areas, as is found on the banks of the Orange River, should enjoy critical protection from the pressures of urban development. Urban development on any area indicated as C.a.2 should immediately prompt the decision-making authority to request the inputs from the following departments or parastatals, namely: a) Department of Agriculture Forestry and Fisheries (DAFF), except where it may be proven that the involved land unit for development has been excluded from the provisions of Act No. 70 of 1970. b) Department of Environmental Affairs (DEA) to indicate if the development triggered a listed activity in accordance with NEMA. c) Department of Roads and Public Works (DRPW) stipulation 'No-Objection' regarding the development, access and prescribed building lines, if the property borders or makes use of a road in the jurisdiction of the said department. d) South African National Road Agency Limited (SANRAL) stipulation 'No-Objection' regarding the development, access and prescribed building lines, if the property borders or makes use of a road in the jurisdiction of the said parastatal. Urban development on any non-urban SPC should be excluded where such a development is outside of the urban edge, whereas the following SPCs are seen as complementary to Agriculture and the rezoning to being any of the following, can be considered under specific conditions and approvals: 1) D.f.1, Place of Worship, D.f.2, Place of Instruction and D.f.3 Institution. 2) D.g.1 Government Uses and D.g.2 Municipal Uses. 3) D.h.3 Accommodation Facilities 4) D.h.9 Small Holding 5) D.n.1 Cemeteries 6) D.o.1 Sports fields & Related Infrastructure 7) D.p.1 Airport and Related Infrastructure 8) D.q.1 Resort & Tourism Related Areas 9) E.a.1 Agricultural Industry 10) E.e.1 Extractive industry 11) SPC F. Surface Infrastructure 12) SPC G: Other, including Special Uses not clearly described in the LUMS and Vacant land within Urban Edge. C.a.2. May also be transformed to any land use within the A. to C's, subject to correct land use procedures being followed
G.a.3	**Vacant land within Urban Edge:** Vacant land inside the Urban Edge which may form part of the future expansion of Urban Related developments, but may include agriculture and other public amenities.

	Decision-Making: This SPC was indicated in and around the existing towns and settlements within the Urban Edge and in most cases include the commonage of the mentioned settlements and towns. This SPC may be rezoned to any of the SPCs included in this SDF document, specifically pertaining to the Policies included in this document.

The implementation of Allepad PV Three is not considered to be in contrast with the Dawid Kruiper LM SDF and the SPCs within which the project area is located. In addition, while application is being made to DEA for EA in terms of NEMA, DAFF, DRPW, and SANRAL are registered I&APs on the project.

The implementation of Allepad PV Three would contribute towards addressing the Dawid Kruiper LM's key issue regarding high levels of poverty and unemployment, skills shortage, and inequalities, through the creation of employment opportunities, the provision of skills training opportunities, and local economic growth, including growth in personal income levels of those community members who would be employed on the project. In addition, the REIPPP Programme requires preferred bidders to make contributions towards local economic development and social upliftment, to be focused on benefitting local communities within the vicinity of the project site.

3.6. International Policy and Planning Context

3.6.1. United Nations Framework Convention on Climate Change (UNFCCC) and Conference of the Party (COP)

Climate change is one of the major global challenges of the 21st century that require global response. The adverse impacts of climate change include persistent drought and extreme weather events, rising sea levels, coastal erosion and ocean acidification, further threatening food security, water, energy and health, and more broadly efforts to eradicate poverty and achieving sustainable development. Combating climate change would require substantial and sustained reductions in GHG emissions, which together with adaptation, can limit climate change risks. The convention responsible for dealing with climate change is the United Nations Framework Convention on Climate Change (UNFCCC).

The UNFCCC was adopted in 1992 and entered into force in 1994. It provides the overall global policy framework for addressing the climate change issue and marks the first international political response to climate change. The UNFCCC sets out a framework for action aimed at stabilizing atmospheric concentrations of GHGs to avoid dangerous anthropogenic interference with the climate system.

The UNFCCC has established a variety of arrangements to govern, coordinate and provide for oversight of the arrangements described in the documentation. The oversight bodies take decisions, provide regular guidance, and keep the arrangements under regular review in order to enhance and ensure their effectiveness and efficiency. The Conference of Parties (COP), established by Article 7 of the Convention, is the supreme body and highest decision-making organ of the Convention. It reviews the implementation of the Convention and any related legal instruments, and takes decisions to promote the effective implementation of the Convention.

COP 21 was held in Paris from 30 November to 12 December 2015. From this conference, an agreement to tackle global warming was reached between 195 countries. This Agreement was open for signature and subject to ratification, acceptance or approval by States and regional economic integration organizations that are Parties to the Convention from 22 April 2016 to 21 April 2017, and thereafter open for accession.

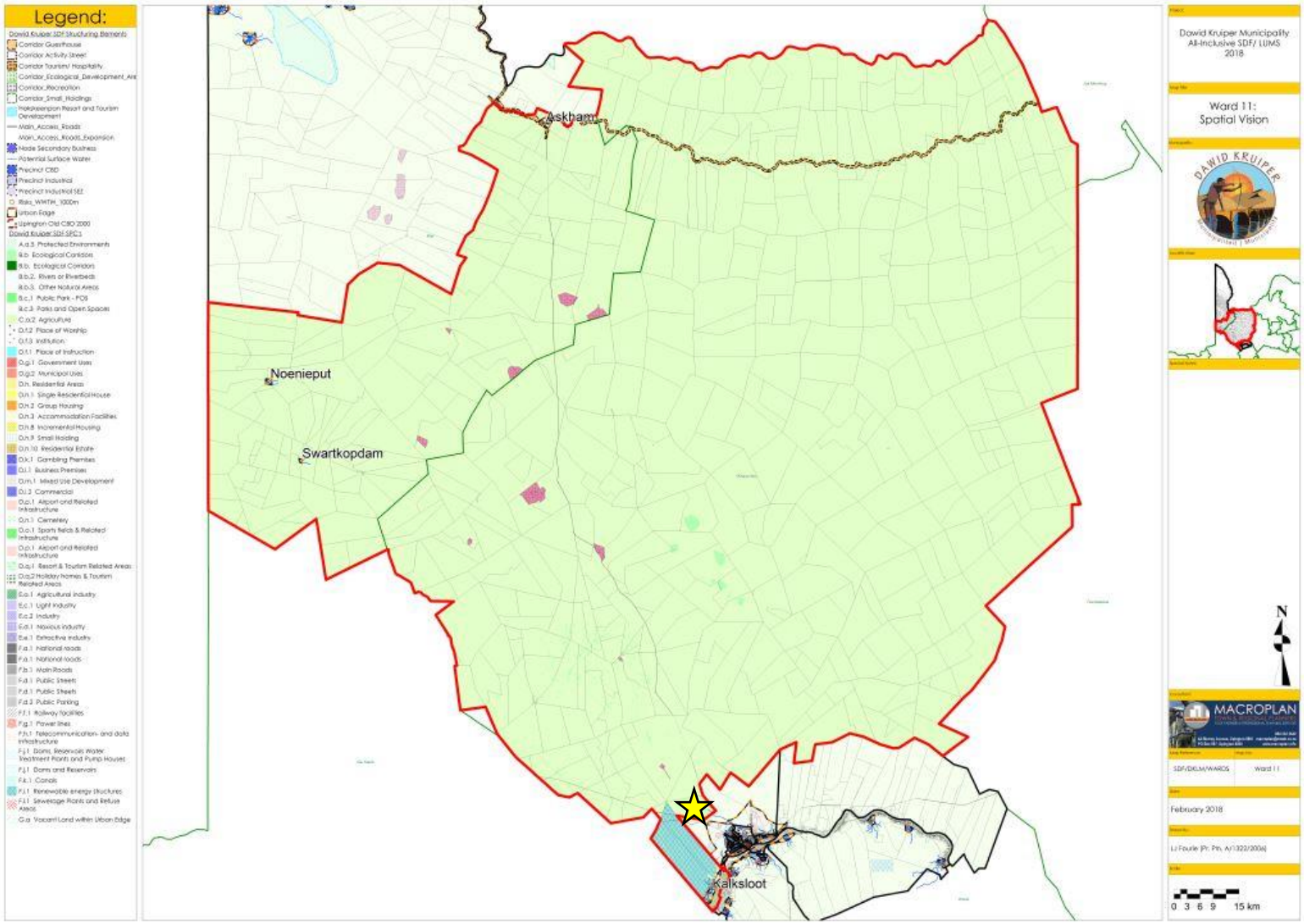

Figure 3.5: Dawid Kruiper LM SDF for Ward 11 (the location of the project site within the Ward 11 is indicated by the yellow star).

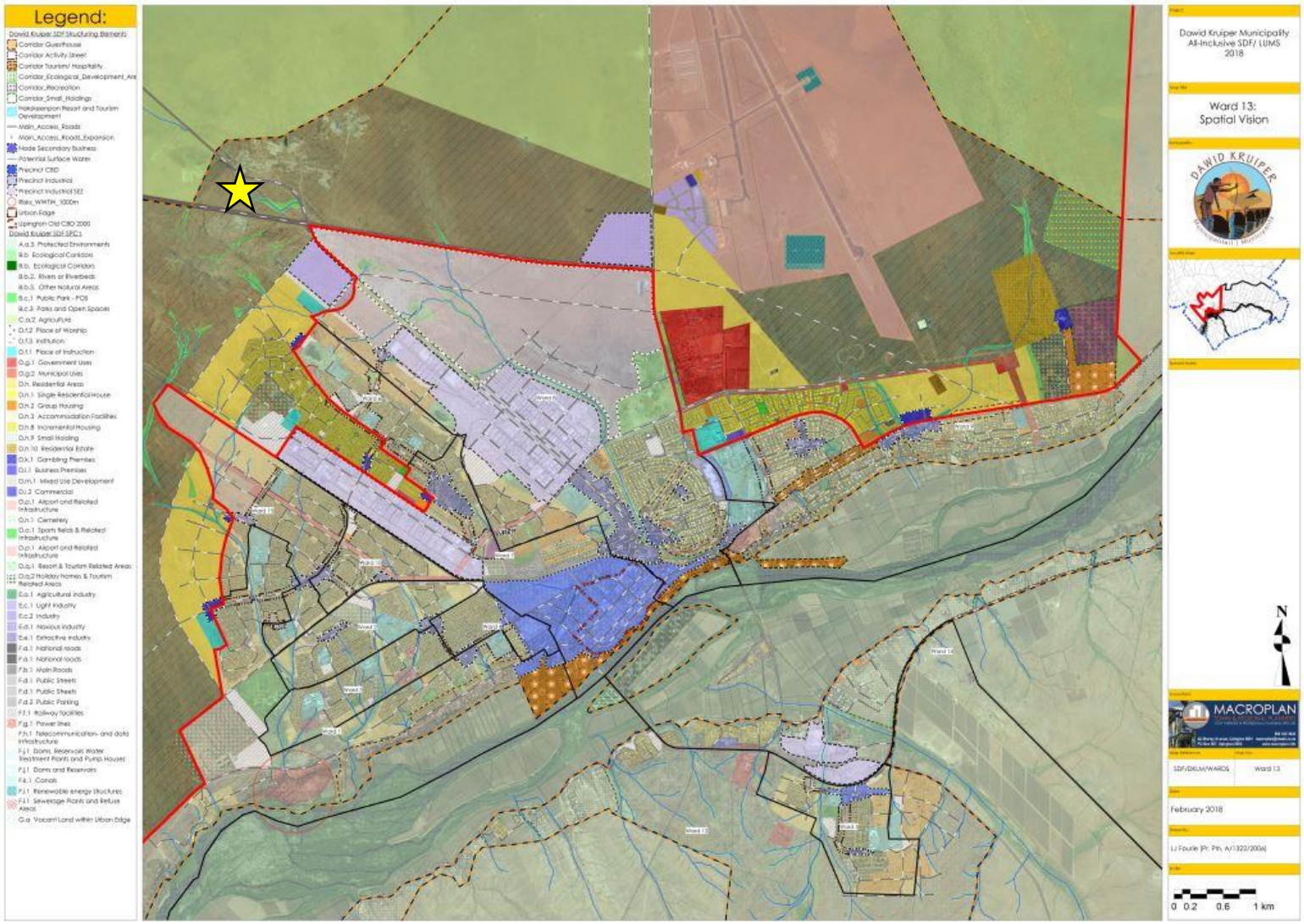

Figure 3.6: Dawid Kruiper LM SDF for Ward 13 (the location of the project site within the Ward 11 is indicated by a yellow star).

The Paris Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by:

(a) Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change.
(b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low GHG emissions development, in a manner that does not threaten food production.
(c) Making finance flows consistent with a pathway towards low GHG emissions and climate-resilient development.

In order to achieve the long-term temperature goal set out in Article 2 of the Agreement, Parties aim to reach global peaking of GHG emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of GHGs in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty.

The Paris Agreement requires all Parties to put forward their best efforts through "Nationally Determined Contributions" (NDCs) and to strengthen these efforts in the years ahead. This includes requirements that all Parties report regularly on their emissions and on their implementation efforts. In 2018, Parties will take stock of the collective efforts in relation to progress towards the goal set in the Paris Agreement and to inform the preparation of NDCs. There will also be a global stocktake every 5 years to assess the collective progress towards achieving the purpose of the Agreement and to inform further individual actions by Parties.

In working towards this goal, advanced economies have already included renewables in their energy mix and have planned to increase their use in order to meet their mitigation goals: Japan aims to derive 22 – 24% of its electricity production from renewable sources by 2030 and the European Union plans for them to reach 27% of its final energy consumption. Developing countries are also playing their part, including South Africa which has included a goal of 17.8GW of renewables by 2030 within the IRP.

South Africa signed the Agreement in April 2016, and ratified the agreement on 01 November 2016. The Agreement was assented to by the National Council of Provinces on 27 October 2016, and the National Assembly on 1 November 2016. The Agreement came into force on 04 November 2016, thirty days after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55% of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary.

COP 23 was held in Bonn, Germany from 06 to 17 November 2017, and is the second COP to be held since COP 21. One of the key outcomes of COP 23 was the launch of the "Powering Past Coal Alliance", led by the UK and Canada. More than 20 countries joined the alliance, including Denmark, Finland, Italy, New Zealand, Ethiopia, Mexico, and the Marshall Islands, as well as the United States (US) states of Washington and Oregon. The alliance notes that analysis shows that coal phase-out is needed by no later than 2030 in the OECD and EU28, and by no later than 2050 in the rest of the world to meet the Paris Agreement, however it does not commit signatories to any particular phase-out date. It also does not commit the signatories to ending the financing of unabated coal power stations, but rather just restricting it.

3.6.2. The Equator Principles III (June, 2013)

The Equator Principles (EPs) III constitute a financial industry benchmark used for determining, assessing, and managing projects environmental and social risks. The EPs are primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making. The EPs are applicable to large infrastructure projects and apply globally to all industry sectors.

The EPs comprise the following principles:

Principle 1: Review and Categorisation
Principle 2: Environmental and Social Assessment.
Principle 3: Applicable Environmental and Social Standards.
Principle 4: Environmental and Social Management System and Equator Principles Action Plan
Principle 5: Stakeholder Engagement
Principle 6: Grievance Mechanism
Principle 7: Independent Review
Principle 8: Covenants
Principle 9: Independent Monitoring and Reporting
Principle 10: Reporting and Transparency.

When a project is proposed for financing, the Equator Principle Financial Institution (EPFI) will categorise it based on the magnitude of its potential environmental and social risks and impacts.

Projects can be categorized as follows:

Category A: Projects with potential significant adverse environmental and social risks and / or impacts that are diverse, irreversible or unprecedented.
Category B: Projects with potential limited adverse environmental and social risks and / or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures.
Category C: Projects with minimal or no adverse environmental and social risks and / or impacts.

Based on the above-mentioned criteria, Allepad PV Three can be anticipated to be categorised as a Category B project.

Category A and Category B projects require that an assessment process be conducted to address the relevant environmental and social impacts and risks associated with the project. Such an assessment may include the following where applicable:

» An assessment of the baseline environmental and social conditions.
» Consideration of feasible environmentally and socially preferable alternatives.
» Requirements under host country laws and regulations, applicable international treaties and agreements.
» Protection and conservation of biodiversity (including endangered species and sensitive ecosystems in modified, natural and Critical Habitats) and identification of legally protected areas.
» Sustainable management and use of renewable natural resources (including sustainable resource management through appropriate independent certification systems).

- Use and management of dangerous substances.
- Major hazards assessment and management.
- Efficient production, delivery and use of energy.
- Pollution prevention and waste minimisation, pollution controls (liquid effluents and air emissions), and solid and chemical waste management.
- Viability of Project operations in view of reasonably foreseeable changing weather patterns / climatic conditions, together with adaptation opportunities.
- Cumulative impacts of existing Projects, the proposed Project, and anticipated future Projects.
- Respect of human rights by acting with due diligence to prevent, mitigate and manage adverse human rights impacts.
- Labour issues (including the four core labour standards), and occupational health and safety.
- Consultation and participation of affected parties in the design, review and implementation of the Project.
- Socio-economic impacts.
- Impacts on Affected Communities, and disadvantaged or vulnerable groups.
- Gender and disproportionate gender impacts.
- Land acquisition and involuntary resettlement.
- Impacts on indigenous peoples, and their unique cultural systems and values.
- Protection of cultural property and heritage.
- Protection of community health, safety and security (including risks, impacts and management of Project's use of security personnel).
- Fire prevention and life safety.

Such an assessment should propose measures to minimise, mitigate, and offset adverse impacts in a manner relevant and appropriate to the nature and scale of the proposed Project. In terms of the EPs South Africa is a non-designated country, and as such the assessment process for projects located in South Africa evaluates compliance with the applicable International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability, and Environmental Health and Safety (EHS) Guidelines (refer to **Section 6.6.2**).

Allepad PV Three is currently being assessed in accordance with the requirements of the 2014 EIA Regulations, as amended (GNR 326), published in terms of Section 24(5) of NEMA, which is South Africa's national legislation providing for the authorisation of certain controlled activities. Through this assessment, all potential social and environmental risks are identified and assessed, and appropriate mitigation measures proposed.

3.6.3. IFC's Performance Standards on Environmental and Social Sustainability (January 2012)

The IFC's Performance Standards on Environmental and Social Sustainability were developed by the IFC and were last updated on 1 January 2012. The overall objectives of the IFC Performance Standards are:

- To fight poverty.
- To do no harm to people or the environment.
- To fight climate change by promoting low carbon development.
- To respect human rights,
- To Promote gender equity,
- To provide information prior to project development, free of charge and free of external manipulation,

» To collaborate with the project developer to achieve the PS,
» To provide advisory services, and
» To notify countries of any Trans boundary impacts as a result of a Project.

The Performance Standards comprise the following:

Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts.
Performance Standard 2: Labour and Working Conditions.
Performance Standard 3: Resource Efficiency and Pollution Prevention.
Performance Standard 4: Community Health, Safety and Security.
Performance Standard 5: Land Acquisition and Involuntary Resettlement.
Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.
Performance Standard 7: Indigenous Peoples.
Performance Standard 8: Cultural Heritage.

Performance Standard 1 establishes the importance of:

i) Integrated assessment to identify the social and environmental impacts, risks, and opportunities of projects.
ii) Effective community engagement through disclosure of project-related information and consultation with local communities on matters that directly affect them.
iii) The management of social and environmental performance throughout the life of a project through an effective Environmental and Social Management System (ESMS).

Performance Standard 1 requires that a process of environmental and social assessment be conducted, and an ESMS appropriate to the nature and scale of the project and commensurate with the level of its environmental and social risks and impacts be established and maintained. Performance Standard 1 is the overarching standard to which all the other standards relate. Performance Standard 2 through 8 establish specific requirements to avoid, reduce, mitigate or compensate for impacts on people and the environment, and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment, Performance Standard 2 through 8 describe potential social and environmental impacts that require particular attention specifically within emerging markets. Where social or environmental impacts are anticipated, the developer is required to manage them through its ESMS consistent with Performance Standard 1.

Given the nature of Allepad PV Three it is anticipated at this stage of the EIA process that Performance Standards 1, 2, 3, 4, 6, and 8 may be applicable to the project.

CHAPTER 4. NEED AND DESIRABILITY

Appendix 2 of the 2014 EIA Regulations (GNR 326) requires that a Scoping Report include a motivation for the need and desirability of a proposed development including the need and desirability of the activity in the context of the preferred location. The need and desirability of a development needs to consider whether it is the right time and right place for locating the type of land-use / activity being proposed. Need and desirability is therefore equated to the wise use of land, and should be able to answer the question of what the most sustainable use of land is.

This Chapter provides an overview of the anticipated suitability of Allepad PV Three, being developed at the preferred project location, from an international, national, regional, and site specific perspective. It provides an overview of the need and desirability, and perceived benefits of the project specifically.

4.1. Need and Desirability from an International Perspective

The need and desirability of Allepad PV Three, from an international perspective, can be described through the project's alignment with internationally recognised and adopted agreements, protocols, and conventions. South Africa is signatory to a number of international treaties and initiatives, including the United Nation's Development Programme's (UNDP's) Sustainable Development Goals (SDGs). The SDGs address social and economic development issues such as poverty, hunger, health, education, climate change, gender equality, water, sanitation, energy, urbanization, environment and social justice. The SDGs comprise 17 global goals set by the United Nations. The 17 SDGs are characterised by 169 targets, and 304 indicators.

Goal 7 of the SGDs relates to "Affordable and Clean Energy", with the aim of the goal being to ensure access to affordable, reliable, sustainable and modern energy for all. The following targets and indicators have been set for Goal 7:

Targets		Indicators	
7.1	By 2030, ensure universal access to affordable, reliable and modern energy services.	7.1.1 7.1.2	Proportion of population with access to electricity. Proportion of population with primary reliance on clean fuels and technology.
7.2	By 2030, increase substantially the share of renewable energy in the global energy mix.	7.2.1	Renewable energy share in the total final energy consumption.
7.3	By 2030, double the global rate of improvement in energy efficiency.	7.3.1	Energy intensity measured in terms of primary energy and GDP.
7.A	By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.	7.A.1	Mobilized amount of United States dollars per year starting in 2020 accountable towards the $100 billion commitment.
7.B	By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island	7.B.1	Investments in energy efficiency as a percentage of GDP and the amount of foreign direct investment in financial transfer for infrastructure

Targets	Indicators
developing States, and land-locked developing countries, in accordance with their respective programmes of support.	and technology to sustainable development services.

The development of Allepad PV Three would contribute positively towards Goal 7 of the SGDs through the following means:

- By generating up to 100MW of affordable and clean energy.
  - A study published by the CSIR on 14 October 2016 ("Cost of new power generators in South Africa Comparative analysis based on recent IPP announcements", Dr Tobias Bischof-Niemz and Ruan Fourie) which took into consideration the results of the cost prices bid successfully under the DoE's REIPPP and Coal Baseload IPP Procurement (CBIPPP) Programmes found that solar PV and wind were 40% cheaper than new baseload coal (i.e. R0.62/kWh for PV and wind vs R1.03 for coal).
  - PV technology is one of the cleanest electricity generation technologies, as it is not a consumptive technology and does not result in the release of emissions during its operation.
- By contributing towards South Africa's total generation capacity, specifically through the utilisation of renewable energy resources.

4.2. Need and Desirability from a National Perspective

Allepad PV Three is proposed in specific response to a national government initiative, namely the DoE's REIPPP Programme. This programme was initiated in order to give effect to the requirements of the IRP with regards to renewable energy targets. As a result the need and desirability of the project from a national perspective can largely be assimilated from the project's alignment with national government policies, plans, and programmes which have relevance to energy planning and production (as discussed in detail in **Chapter 3**). The following key policies have been developed by government to take into account South Africa's current energy production, projected future demands, and provides the necessary framework within which energy generation projects can be developed:

- Integrated Energy Plan (IEP)
- Integrated Resource Plan (IRP)

The above-mentioned policies have been extensively researched and are updated on an ongoing basis to take into consideration changing scenarios, new information, developments in new technologies, and to reflect updated demands and requirements for energy production within the South African context. These plans form the basis of South Africa's energy generation sector and dictate national priorities for energy production.

The IEP is intended to provide a roadmap of South Africa's future energy landscape which guides future energy infrastructure investments and policy development. The latest iteration of the IEP (25 November 2016) contained the following statement regarding solar power in South Africa:

"*South Africa experiences some of the highest levels of solar radiation in the world and this renewable resource holds great potential for the country. The daily solar radiation in South Africa varies between 4.5 and 6.5 kilowatt hours per square meter (kWh/m²) (16 and 23 megajoules per square meter [MJ/m²]) (Stassen, 1996), compared to about 3.6 kWh/m² in parts of the United States and about 2.5 kWh/m² in Europe*

and the United Kingdom. The total area of high radiation in South Africa amounts to approximately 194 000km², including the Northern Cape, which is one of the best solar resource areas in the world. With electricity production per square kilometre of mirror surface in a solar thermal power station being 30.2 MW, and just 1% of the high radiation area in the country being made available for solar power generation, the generation potential is approximately 64 GW. Solar energy has the potential to contribute quite substantially to South Africa's future energy needs. This would, however, require large investments in transmission lines from the areas of high radiation to the main electricity consumer centres."

In terms of electricity generation, the IEP states that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources, and includes the following statement regarding solar energy's contribution to the diversified energy mix:

- *Solar should play a much more significant role in the electricity generation mix than it has done historically, and constitutes the greatest share of primary energy (in terms of total installed capacity) by 2050. The contribution of solar in the energy mix comprises both CSP and solar PV. Solar PV includes large scale installations for power generation which supply to the grid and individual, off-grid solar home systems and rooftop panels.*
- *Several interventions which could enhance the future solar energy landscape are recommended as follows: –Large scale CSP projects with proven thermal storage technologies and hybridisation / industrial steam application projects should be incentivised in the short to medium term. In the long term the existing incentives could be extended to promote locally developed CSP technology storage solutions and large scale solar fuel projects.*
- *A thorough solar resource assessment for South Africa should continue to be undertaken in the Northern Cape Province and extended to other provinces deemed to have high solar radiation levels.*
- *Investments should be made to upgrade the grid in order to accommodate increasing solar and other renewable energy contributions.*

The IRP for Electricity 2010 – 2030 is a subset of the IEP, and constitutes South Africa's current gazetted energy plan. The purpose of the plan is to ensure sustainable electricity development which takes into consideration technical, economic, and social constraints, and identifies investments in the electricity sector which are required to meet the country's forecasted electricity demands at minimum costs. The IRP 2010 - 2030 includes 9.6GW of nuclear, 6.25GW of coal, **17.8GW of renewables**, and approximately 8.9GW of other generation sources such as hydro, and gas in addition to all existing and committed power plants.

On 22 August 2018 the Draft IRP 2018 was released for comment. The latest update of the IRP includes estimates that **7.82GW of PV**, 9GW of wind, 10.94GW of gas (CCGT / CCGE / OCGT), and 0.025GW of landfill gas would be required by the end of 2030[10].

In line with government policy to reduce GHG emissions, the IRP update uses the moderate decline constraint for GHG emissions. Although this is subject to change following recent correspondence received from DEA indicating that carbon budget methodology must be used instead of emissions decline constraints, the consideration of GHG emissions in the determination of the energy generation mix indicates government's commitment to international obligations under the Paris Agreement.

[10] These figures reflect capacities for the Least Cost Plan (IRP1) by year 2030 without Annual Build Limits on RE (IRP3).

In response to the IRP, the DoE initiated a number of IPP Procurement Programmes to secure electricity generated by a range of resources from the private sector (i.e. from IPPs). Under these Programmes, IPPs are invited to submit proposals for the finance, construction, operation, and maintenance of electricity generation facilities for the purpose of entering into an Implementation Agreement with the DoE and a Power Purchase Agreement (PPA) with Eskom as the buyer. IPPP Programmes include the REIPPP, the Co-generation IPPP Programme, the Liquefied Natural Gas (LNG) to Power IPPP Programme, and the CBIPPPP (refer to **Table 4.1**).

Table 4.1: Overview of IPPP Programmes and their current allocation (MW).

IPP Procurement Programme	Technology	MW	Total
Renewables	Onshore Wind	6 360 MW	14 725MW
	Concentrated solar thermal	1 200 MW	
	Solar Photovoltaic	4 725 MW	
	Biomass	210 MW	
	Biogas	110 MW	
	Landfill Gas	25 MW	
	Small hydro	195 MW	
	Small Projects	400 MW	
	Solar Parks	1 500MW	
Coal Baseload	Coal	2 500MW	2 500MW
Cogeneration	Cogeneration	800MW	800MW
Gas	Gas	3 000MW	3 000MW

Renewable resources are valuable in contributing towards electricity generation and diversifying South Africa's electricity mix. Under the REIPPP Programme the DoE intends to secure 14 725MW of electricity from renewable energy generation facilities utilising either Onshore Wind, Concentrated Solar Thermal, Solar PV, Biomass, Biogas, Landfill Gas, or Hydro across a number of bidding windows, while simultaneously contributing towards socio-economic development. A total of 2 291.83MW of PV generated electricity has been awarded to preferred bidders across four (4) rounds of bidding to date, with 2 433.17 still remaining to be allocated in subsequent bidding rounds. Preferred bidders identified under any IPPP Programme, including the REIPPP Programme, are required to satisfy a number of economic development requirements, including amongst others, job creation, local content, skills development, enterprise and supplier development, and socio-economic development. In addition to electricity generation and supply, IPPP Programmes therefore also contribute positively towards socio-economic development of a region, over and above job creation.

The need for new power generation from PV has therefore been identified and assessed by government at a national scale considering the national energy requirements as well as international commitments to address climate change under the Paris Agreement, and provision has been made for the inclusion of new PV power generation capacity in South Africa's' energy mix. The implementation of the proposed project therefore has the potential to contribute positively towards the identified need, while simultaneously contributing to job creation and socio-economic development, identified as a need for the country within the NDP. The proposed project will make use of renewable energy technology, and would contribute positively towards reducing South Africa's GHG emissions and ensure compliance with all applicable legislation and permitting requirements. In addition, by making use of PV technology, the project would have reduced water requirements when compared with some other generation technologies in alignment with one of the vision 2030 themes of DWS's National Water Resource Strategy 2 (2013) (i.e. transitioning to a low carbon economy through stimulating renewable energy and retrofitting buildings).

4.3. Need and Desirability of the project from a Regional Perspective

South Africa's electricity generation mix has historically been dominated by coal. This can be attributed to the fact that South Africa has abundant coal deposits, which are relatively shallow with thick seams, and are therefore easy and comparatively cost effective to mine. In 2016 South Africa had a total generation capacity of 237 006GWh, approximately 85.7% (equivalent to 203 054GWh) of this figure was generated by coal, and only 0.9% (equivalent to 2 151GWh) was generated by solar (refer to **Figure 4.1**).

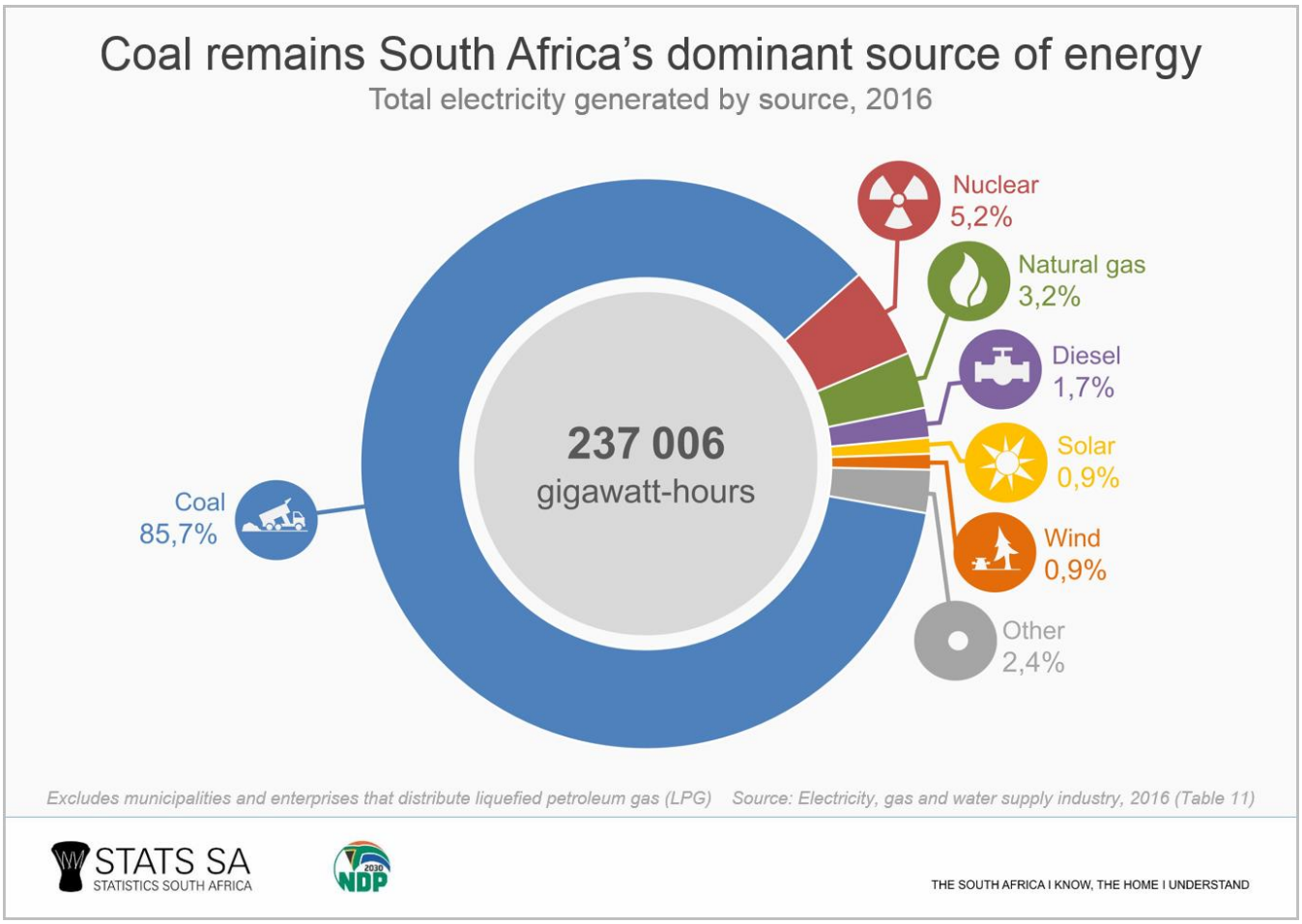

Figure 4.1: Overview of South Africa's electricity generation by source (Source: StatsSA 2016 Electricity, gas and water supply industry).

Whereas the majority of South Africa's electricity generation infrastructure is currently located within Mpumalanga Province due to the location of coal resources within this province, the Northern Cape Province has been identified as an area where the development of solar energy facilities is a feasible and suitable option for electricity generation.

The Upington area has been ear-marked as a hub for the development of solar energy projects due to the viability of the solar resource for the area, and this area is included in the solar corridor which has been identified by the Northern Cape Spatial Development Framework. The overarching objective for the solar energy facility is to maximise electricity production through exposure to the solar resource, while minimising infrastructure, operational and maintenance costs, as well as social and environmental impacts. From a regional site selection perspective, this region is considered to be preferred for solar energy development

by virtue of its annual solar irradiation values. The GHI for the area derived from the World Bank Group's Global Solar Atlas is approximately 2 264kWh/m²/annum, equivalent to the highest GHI values in the country (refer to **Figure 4.2**.

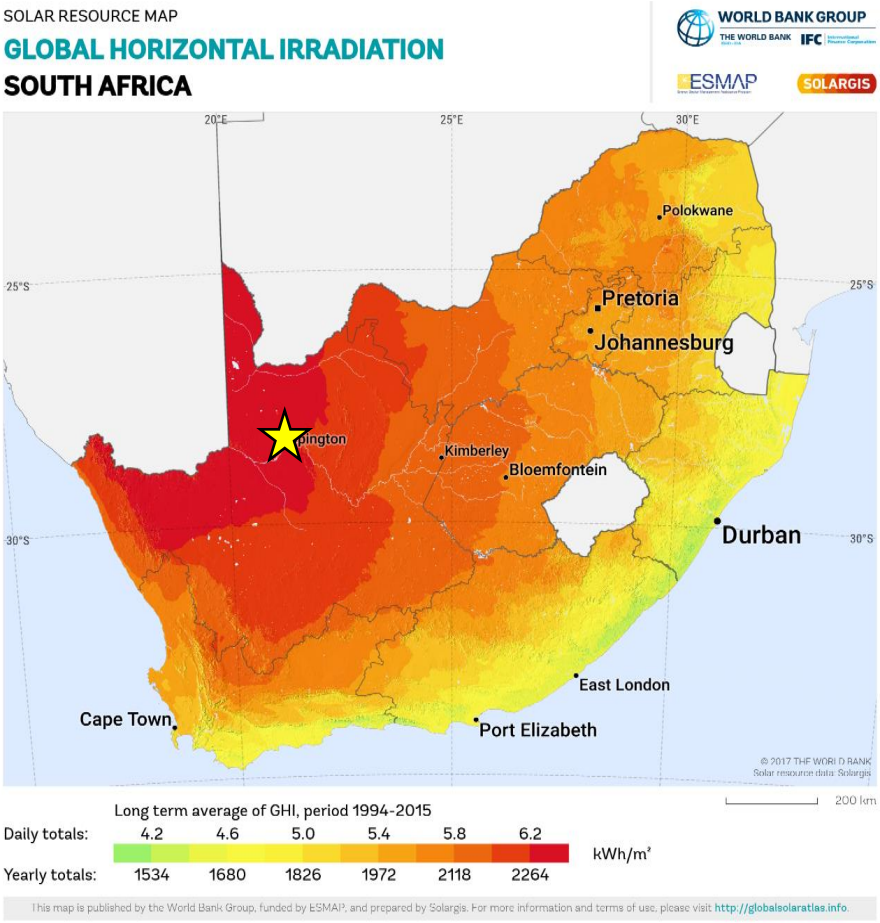

Figure 4.2: Solar irradiation map for South Africa, the proposed position of Allepad PV Three is shown by the yellow star on the map. (Source: World Bank Groups Global Solar Atlas).

4.4. Receptiveness of the proposed project site to development of Allepad PV Three

The placement of a solar PV facility is strongly dependent on several factors including climatic conditions (solar radiation levels), topography, the location of the site, and in particular the location in a planned node for renewable projects, availability of grid connection, the extent of the site and the need and desirability for the project. From a local level perspective, the project site has specifically been identified by the applicant as being highly desirable from a technical perspective for the development of a solar facility due to the following site characteristics:

» **Solar resource**: The economic viability of a solar facility is directly dependent on the annual direct solar irradiation values. The Upington region and other parts of the Northern Cape Province are characterised as having the highest solar irradiation values in South Africa (and which are comparable on a global scale). The Global Horizontal Irradiation (GHI) for the proposed project site is in the region of approximately 2 264kWh/m²/annum, which is ideally suited to the development of a commercial solar PV facility.

- **Topography**: A surface area with favourable topography facilitates the work involved in construction and maintenance of the PV facility. The proposed project site is characterised as having very flat topography with slopes of approximately 0.5% across the site (i.e. 900m to 870m across 7km).
- **Site extent:** The project site is approximately 3 889ha in extent, which is sufficient for the installation of the facility allowing for avoidance of site sensitivities. The development footprint of the facility would occupy an area equivalent to approximately 6.4% of the full project site.
- **Site access**: Access to the project site is obtained via the existing farm entrance which is accessed from the N10 national road.
- **Grid access:** A key factor in the siting of any project is that the project must have a viable grid connection. Grid connection is available by means of a new 132 kV double-circuit power line which will connect the on-site substation with Eskom's upgraded 132kV double-circuit power line running between the new Upington MTS (currently under construction approximately 15km south of the project site), and the Gordonia Distribution Substation (located in Upington town). The point of connection is located approximately 5km east of the project site and will make use of a loop-in and loop-out configuration utilising a double-circuit monopole construction. The presence of existing power lines within such close proximity of the proposed project site provides opportunity for the project to connect to the national grid with minimal linear transmission impact (i.e. of less than 10km). The principle to minimise associated infrastructure and the resulting impacts is also supported.
- **Land suitability:** The current land use of the site is an important consideration in site selection in terms of limiting disruption to existing land use practices. Agricultural (i.e. grazing) land is preferred as the majority of farming practices can continue in tandem to the operation of the solar PV facility once construction and commissioning of the project is complete, without significantly impacting on the agricultural potential or productivity of the site. In addition, sites that facilitate easy construction conditions (i.e. relatively flat topography, lack of major rock outcrops, limited watercourse crossing etc.) are also favoured during site selection.
- **Geographic location**: The proposed site is located within an area which has become a node for renewable energy projects, with the following solar energy facilities adjacent or in close proximity to the project site: Upington Solar Park (bordering), Sirius Solar PV Projects 1 and 2, Rooiput, S-Kol PV Plant, Bloemsmond Solar 1 and 2, Solis I and II, Dyasonsklip, Khi Solar One and Kai Garib, and Upington Airport Solar PV. The proposed project site is within very close proximity to an existing cluster or node for solar PV development and therefore compliments existing and future land use.
- **Landowner support**: The selection of a site where the landowner is supportive of the development of renewable energy is essential for ensuring the success of the project. The landowner does not view the development as a conflict with their current land use practices

4.5. Benefits of Renewable Energy and the Need and Desirability thereof

The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa, these include:

Socio-economic upliftment of local communities: The proposed project has the potential to create much needed employment for unskilled locals during the construction phase. Training opportunities will also be afforded to qualified local people who can be up-skilled to undertake certain roles during the construction and operation phases. In terms of the needs of the local community, the LM and DM IDPs identified the need to facilitate economic development by creating an environment which is conducive for business development, economic growth, sustainable employment opportunities and growth in personal income levels of communities, unlock opportunities to increase participation amongst all sectors of society in the

mainstream economy to create decent job opportunities, promote Local Economic Development, and enhance rural development and agriculture. The project has the potential to make a positive contribution towards the identified community needs. In terms of the economic development requirements of the REIPPP Programme, the project will commit benefits to the local community, in the form of job creation, localisation, and community ownership. In accordance with the DoE bidding requirements of the REIPPP Programme, a percentage of the revenue generated per annum during operation will be made available to local communities through a social beneficiation scheme. Therefore, the potential for creation of employment and business opportunities, and the opportunity for skills development for local communities is significant. Secondary social benefits can be expected in terms of additional spend in nearby towns due to the increased demand for goods and services. These socio-economic benefits would include an increase in the standard of living for local residents within the area as well as overall financial and economic upliftment.

Increased energy security: Given that renewables can often be deployed in a short timeframe and in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality in the short-term, while reducing expensive distribution losses. As a result of the power constraints in the first half of 2015, power generators meant to be the "barely-ever-used" safety net for the system (diesel-fired gas turbines) were running at >30% average load factor in the first half of 2015. Load shedding occurred during 82 days in the first half of 2015 (out of 181 days). Results of a CSIR Energy Centre study for the period January to June 2015 (CSIR, August 2015), concluded that the already implemented renewable projects (wind and solar) within the country avoided 203 hours of so-called 'unserved energy'. During these hours the supply situation was such that some customers' energy supply would have had to be curtailed ('unserved') had it not been for the renewables. The avoidance of unserved energy cumulated into the effect that during 15 days from January to June 2015 load shedding was avoided entirely, delayed, or a higher stage of load shedding prevented due to the contribution of renewable wind and PV projects[11].

Resource saving: It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres per annum. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability. Renewable energy also translates into revenue savings, as fuel for renewable energy facilities is free while compared to the continual purchase of fuel for conventional power stations. Results of a CSIR Energy Centre study for January – June 2015 (CSIR, August 2015) have quantified the contribution from renewable energy to the national power system and the economy over the first 6 months of 2015 compared to the 12 months of 2014:

2015 (6 months)	2014 (12 months)
R3.60 billion saving in diesel and coal fuel costs	R3.64 billion saving in diesel and coal fuel costs
200 hours of unserved energy avoided, saving at least an additional R1.20 billion – R4.60 billion for the economy	120 hours of unserved energy avoided, saving at least an additional R1.67 billion for the economy
Generated R4.0 billion more financial benefits than cost	Generated R0.8 billion more financial benefits than cost

Exploitation of significant renewable energy resource: At present, valuable renewable resources including biomass by-products, solar radiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio in South Africa.

[11] (http://ntww1.csir.co.za/plsql/ptl0002/PTL0002_PGE157_MEDIA_REL?MEDIA_RELEASE_NO=7526896)

Economics: As a result of the excellent renewable energy resources and competitive procurement processes, both wind power and solar PV power have now been proven as cheaper forms of energy generation in South Africa than coal power. They offer excellent value for money to the economy and citizens of South Africa while benefitting society as a whole through the development of clean energy. This is supported by the Draft IRP 2018 released for comment which follows the least cost option.

Pollution reduction: The release of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation. The use of solar radiation or wind for power generation is a non-consumptive use of a natural resource which produces zero emissions during its operation.

Climate friendly development: The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of GHG emissions. South Africa is estimated to currently be responsible for approximately 1% of global GHG emissions (and circa half of those for which Africa is responsible) and is currently ranked 9th worldwide in terms of per capita carbon dioxide emissions. Since its inception the REIPPP Programme has achieved carbon emission reductions[12] of 25.3 million tonnes of CO_2 (IPP Office, March 2018). The development of Allepad PV Three, and the associated electricity generated as a result of the facility, will result in considerable savings on tons of CO_2 emissions.

Support for international agreements: The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol, and for cementing its status as a leading player within the international community.

Employment creation: The development, procurement, installation, maintenance and management of renewable energy facilities have significant potential for job creation and skills development in South Africa. By the end of March 2018 the REIPPP Programme had created 35 702 job years (equivalent of a full time employment opportunity for one person for one year) for South African citizens including people from communities local to IPP operations (IPP Office, March 2018).

Acceptability to society: Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health and climate friendly development.

Support to a new industry sector: The development of renewable energy offers the opportunity to establish a new industry within the South African economy, which will create jobs and skill local communities which have potential for further renewable energy projects.

Protecting the natural foundations of life for future generations: Actions to reduce our disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change, thereby securing the natural foundations of life for generations to come. This is the basis of sustainable development.

[12] Carbon emission reduction is calculated based on a displacement of power, from largely coal-based to more environmentally friendly electrical energy generation, using a gross Eskom equivalent emissions factor of 1.015 tons CO_2/MWh.

CHAPTER 5. DESCRIPTION OF THE RECEIVING ENVIRONMENT

This Chapter provides a description of the environment that may be affected by Allepad PV Three. The information in this Chapter is provided in order to assist the reader in understanding the receiving environment within which the project is proposed, and features of the biophysical and social environment that could be directly or indirectly affected by, or alternatively could impact on, the proposed development. This information has been sourced from existing available information and the Scoping-level specialist investigations conducted to date, and aims to provide the context within which this EIA is being conducted. Copies of the full Scoping-level specialist investigations are attached as **Appendices D to I** of this Scoping Report.

5.1. Regional Setting: Description of the Broader Study Area

The Northern Cape Province is located in the north-western extent of South Africa and constitutes South Africa's largest province, occupying an area 372 889km² in extent, equivalent to nearly a third (30.5%) of the country's total land mass. It is also South Africa's most sparsely populated province with a population of 1 145 861, and a population density of 3.1/km². The capital city is Kimberley, and other important towns include Upington, Springbok, Kuruman, De Aar, and Sutherland. It is bordered by the Western Cape, and Eastern Cape Provinces to the south, and south-east, Free State, and North West Provinces to the east, Botswana and Namibia, to the north, and the Atlantic Ocean to the west. The Northern Cape is the only South African province which borders Namibia, and therefore plays an important role in terms of providing linkages between Namibia and the rest of South Africa. The Orange River, which is South Africa's largest river, is a significant feature and is also the main source of water in the Province, while also constituting the international border between the Northern Cape and Namibia.

The Northern Cape is rich in minerals including alluvial diamonds, iron ore, and copper. The province is also rich in asbestos, manganese, fluorspar, and semi-precious stones and marble. The mining sector is the largest contributor to the provincial GDP. The Northern Cape's mining industry is of national and international importance, as it produces approximately 37% of South Africa's diamond output, 44% of its zinc, 70% of its silver, 84% of its iron-ore, 93% of its lead and 99% of its manganese.

The province has fertile agricultural land in the Orange River Valley, especially at Upington, Kakamas and Keimoes, where grapes and fruit are cultivated intensively. The interior Karoo relies on sheep farming, while the karakul-pelt industry is one of the most important in the Gordonia district of Upington. Wheat, fruit, peanuts, maize and cotton are produced at the Vaalharts Irrigation Scheme near Warrenton. The agricultural sector employs approximately 19.5% of the total formally employed individuals (LED Strategy). The sector is experiencing significant growth in value-added activities, including game-farming, while food production and processing for the local and export market is also growing significantly (PGDS, July 2011). Approximately 96% of the land is used for stock farming, including beef cattle and sheep or goats, as well as game farming, while approximately 2% of the province is used for crop farming, mainly under irrigation in the Orange River Valley and Vaalharts Irrigation Scheme (LED Strategy).

The Northern Cape offers unique tourism opportunities including wildlife conservation destinations, natural features, historic sites, festivals, cultural sites, stars gazing, adventure tourism, agricultural tourism, ecotourism, game farms, and hunting areas, etc. The Province is home to the Richtersveld Botanical and Landscape

World Heritage Site, which comprises a United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Site under the World Heritage Convention. The Northern Cape is also home to 2 Transfrontier National Parks, namely the Kgalagadi Transfrontier Park, and the Richtersveld /Ai-Ais Transfrontier Park, as well as 5 national parks, and 6 provincial reserves. The Northern Cape also plays a significant role in South Africa's science and technology sector, as it is home to the Square Kilometre Array (SKA), the Southern African Large Telescope (SALT), and the Karoo Array Telescope (MeerKAT).

The Northern Cape comprises 5 Districts, namely Frances Baard, Johan Taolo Gaetsewe, Namakwa, Pixley Ka Seme, and ZF Mgcawu (refer to **Figure 5.1**).

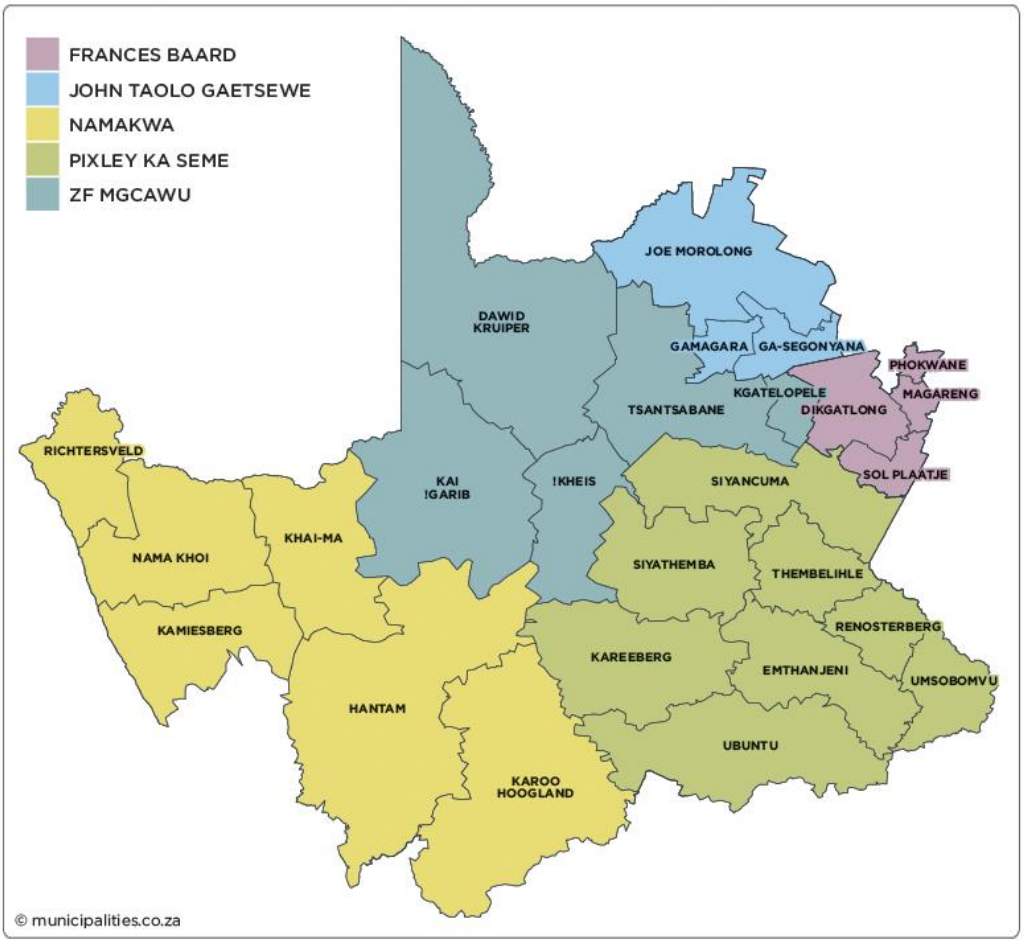

Figure 5.1: Districts of the Northern Cape Province (Source: Municipalities of South Africa).

The ZF Mgcawu DM (previously known as the Siyanda DM) is situated in the north-central extent of Northern Cape Province, and is bordered by the Namakwa DM to the south-west and south, the Pixley ka Seme DM to the south and south-east, the Frances Baard and John Taolo Gaetsewe DM to the east, Botswana to the north, and Namibia to the west. The ZF Mgcawu DM occupies an area of land approximately 102 484km² in extent which is equivalent to over one quarter (approximately 27%) of the Northern Cape Province. Approximately 65 000km² of the DM's land mass comprises the Kalahari Desert, Kgalagadi Transfrontier Park, and the former Bushman Land.

The ZF Mgcawu DM is home to Upington, which is the capital of the DM, and is also where the DM's government is located. Other prominent cities and towns located within the DM include Beeshoek, Brandboom, Danielskuil, Eksteenskuil, Groblershoop, Kakamas, Keimoes, Kenhardt, Lime Acres, Mier, Postmasburg, and Rietfontein. The main economic sectors within the DM include agriculture, mining, and tourism.

The ZF Mgcawu DM comprises 5 LMs, namely Dawid Kruiper, Kai! Garib, Tsantsabane, Kheis and Kgatelopele (refer to **Figure 5.2**).

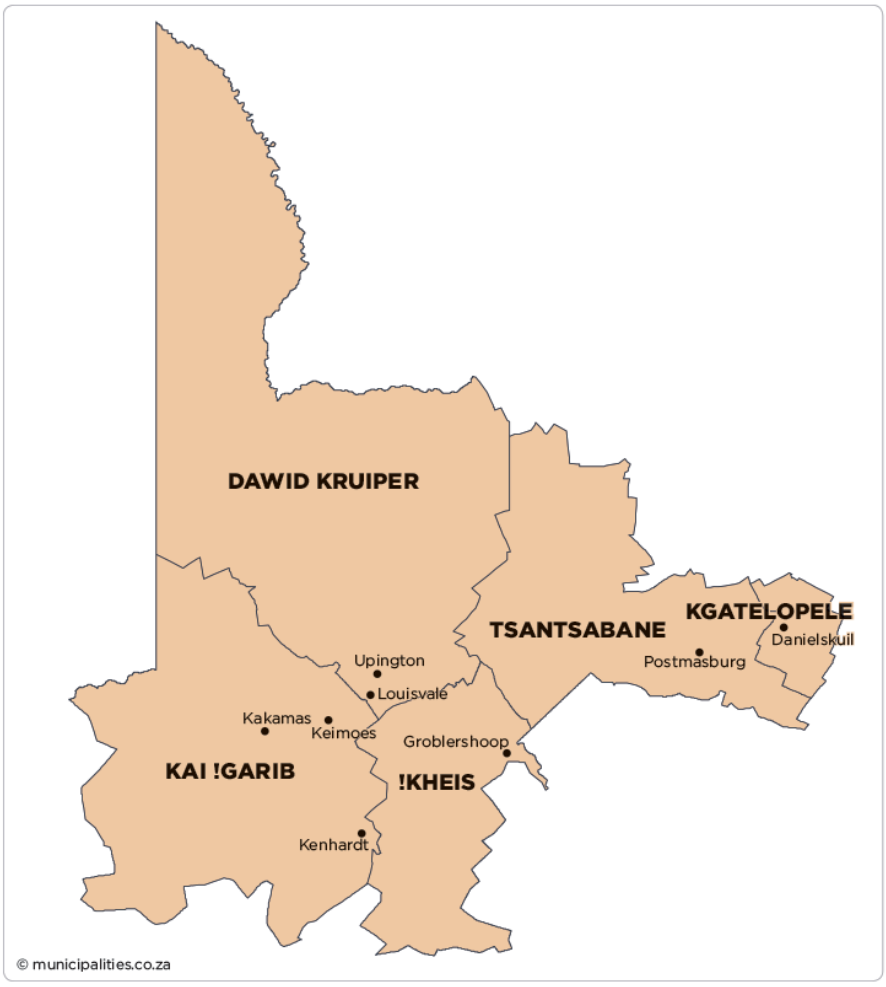

Figure 5.2: Local Municipalities of the ZF Mgcawu DM (Source: Municipalities of South Africa).

The Dawid Kruiper LM was established by the amalgamation of the Mier LM and //Khara Hais LM on 3 August 2016, and is located in the northern extent of the ZF Mgcawu DM. The Dawid Kruiper LM is bordered by the Kai !Garib and !Kheis LMs to the south, the Tsantsabane LM to the south-east, Botswana to the north-east and north, and Namibia to the west. The LM occupies an area of land approximately 44 231km² in extent and is the largest of the five LMs which make up the ZF Mgcawu DM, occupying an area equivalent to approximately 43% of the ZF Mgcawu DM. The Dawid Kruiper LM is also formally the largest LM in South Africa, and makes up approximately 12% of the Northern Cape Province, and approximately 4% of the total South African land mass. The LM is twice the size of Gauteng, one third the size of the Free State- and Limpopo Provinces, and almost half the size of KwaZulu-Natal Province.

The Kgalagadi Transfrontier Park is located in the northern extent of the LM. The LM is also home to the ǂKhomani San community, who are descended from several original San groups, and are indigenous people of Southern Africa.

The Dawid Kruiper LM is the commercial, educational, military, agricultural, medical, transport and tourism centre of the area. Upington comprises the administrative and economic centre of the LM, and is also the largest town within the LM. Other prominent cities and towns located within the LM include Mier and Rietfontein. The main economic sectors within the LM include agriculture, business services, game farming, tourism and hospitality, manufacturing, transport, community services, social and personal services.

5.2. Regional Setting: Location and description of the Project Site

The closest town to the proposed development is Upington, located approximately 11km south-east of the proposed project site. Upington is the administrative capital of the ZF Mgcawu DM and Dawid Kruiper LM, and is also the largest town within the LM and DM. The town of Upington is located on the banks of the Orange River, and is the centre of the karakul sheep and dried-fruit industries, and the most northerly winemaking region of South Africa.

Upington is characterised by some of the highest levels of solar irradiation within the country, and which are comparative on a global scale, making it the ideal location for solar energy production. In accordance with this the Upington area falls within the Northern Cape Solar Corridor and Renewable Energy Development Zone (REDZ) 7 (Upington) as identified by the DEA. REDZ 7 (Upington) has specifically been identified as an area where large scale solar PV energy facilities can be developed in terms of SIP 8 in a manner that limits significant negative impacts on the environment, while yielding the highest possible socio-economic benefits to the country. REDZ 7 stretches from south of the N10 national road and Upington in the north, to Kenhardt and Marydale in the south, and from Keimoes in the west, to Groblershoop in the east.

The project is proposed on the Remaining Extent of Erf 5315 Upington. The area under investigation is approximately 3 889ha in extent, and comprises a single agricultural property which is currently utilised for livestock (i.e. cattle) grazing. A farm house and associated infrastructure is located in the centre of the project site, and a dry riverbed or seasonal wetland (pan) is located in the eastern half of the project site.

The site is located between the N10 national and the R360 regional road which form the southern and eastern boundaries of the project site. Both of these roads are considered part of the primary access road network within the Northern Cape Province. The N10 serves as the national route from the Eastern Cape past De Aar, Prieska and Upington up to Namibia, while the R360 serves as the regional route to the Kgalagadi Transfrontier Park via Upington. Access to the site is provided directly from the N10 national road via the existing farm entrance.

The Kalahari Monate Lodge is located adjacent to the project site (in a small "cut-out" area in the north-eastern extent of the property). The Kalahari Monate Lodge comprises 6 self-catering chalets (which sleep 3 persons each), and 43 camping / caravan sites.

The majority of the surrounding area is sparsely populated and consists of a landscape of wide-open expanses. The local population is primarily concentrated in the town of Upington and smaller towns / settlements along the Orange River. There are a very limited number of farm residences or homesteads within the remaining portion of the area under investigation. The area is characterised as a semi-arid desert

region, and vegetation cover is predominantly restricted to low shrubland, described as Kalahari Karroid Shrubland and Gordonia Duneveld. Planted vegetation in the form of vineyards and cotton fields are found along the Orange River floodplain.

Major linear infrastructure, within the surrounding area includes the N10 national and R360 regional roads, a railway line which connects Karasburg in Namibia with Upington (which traverses the area south of the N10 national road in an east-to-west direction), and a number of 132kV overhead power lines. Some of these include:

» Gordonia to Upington 1 and 2
» Gordonia to Oranje
» Gordonia to Upington
» McTaggerts to Oranje
» Klipkraal to Upington

5.3. Climatic Conditions

The suitability of the site for the development of a solar facility is dependent on the prevailing climatic condition of the area. The viability of the solar farm is directly affected by the amount of solar irradiation received in the area. The GHI for the Northern Cape Province varies between 2 045 and 2 337kWh/m^2/annum, which relates to the higher end of the spectrum. The irradiation received in Upington and the location of the proposed site is approximately 2 337kWh/m^2/annum which is the highest in South Africa, and comparable on a global scale (refer to **Figure 5.3**).

The Upington area is typically characterised as having a desert climate (BWh). Very little rainfall occurs during the year, and the area is characterised by an average annual temperature of 19.3°C, and an average annual rainfall of 180mm.

Temperatures range from maximum highs of 34.6°C in January, to minimum lows of 2.5°C in July. January is the warmest month with average temperatures of 26.2°C, and July is the coldest month with average temperatures of 11.5°C. July is also typically the driest month, receiving an average of 2mm of rainfall, while March is the wettest month, receiving an average of 39mm of rainfall (refer to **Figure 5.4** and **Table 5.1**). Rainfall within the area is erratic, both locally and seasonally, and therefore cannot be relied on for agricultural practices. The average evaporation is 2 375mm per year, peaking at 11.2mm per day in December. Frost occurs most years on 6 days on average between mid-June and mid-August.

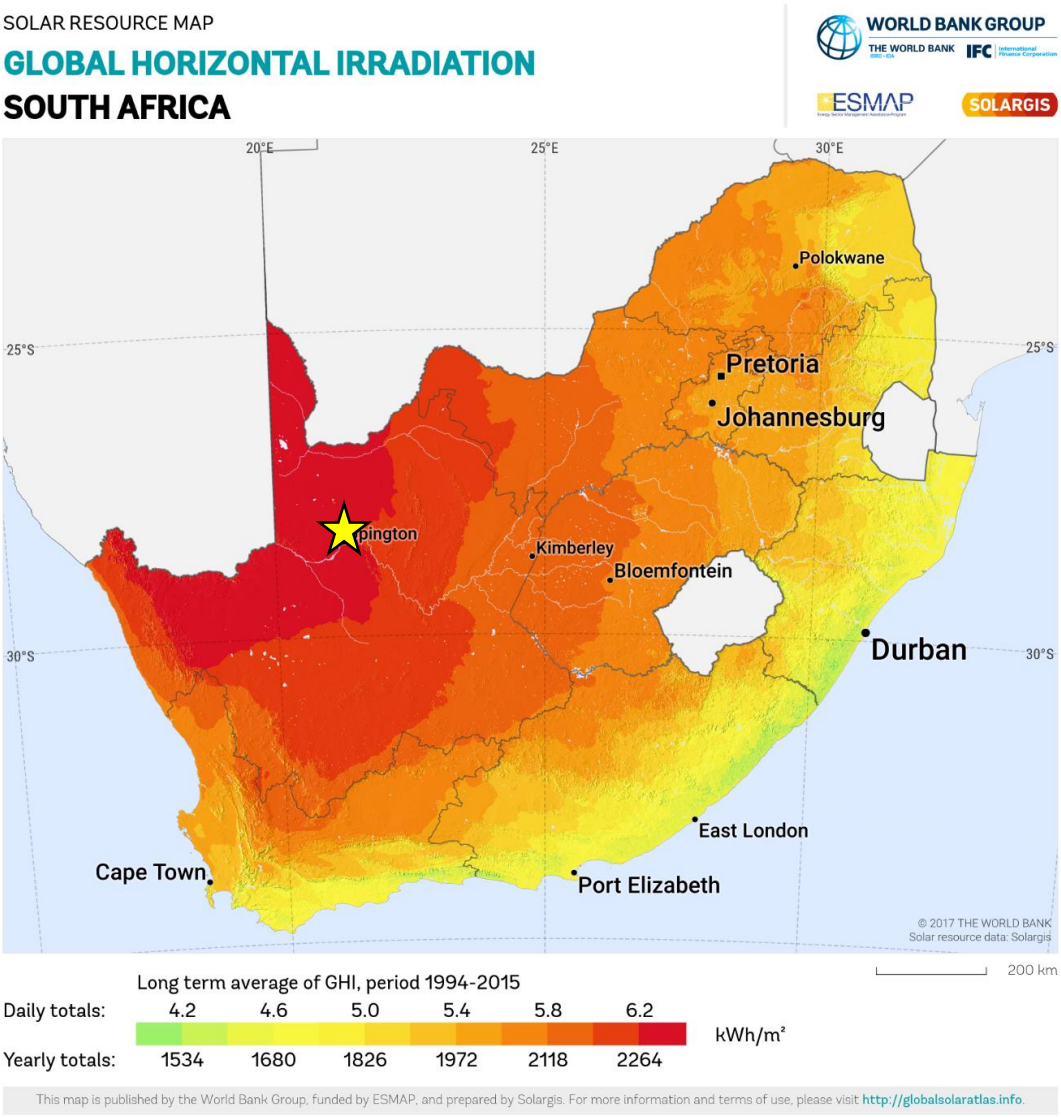

Figure 5.3: **GHI map for South Africa (Source: World Bank Group Solar Map). The proposed location of Allepad PV Three is shown by the yellow star on the map.**

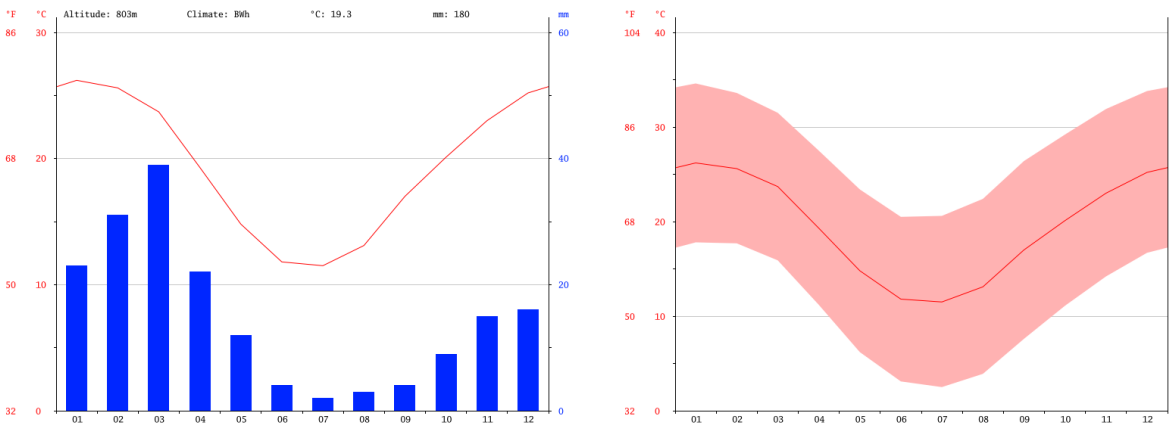

Figure 5.4: **Climate and Temperature graphs for Upington, Northern Cape Province (Source: en.climate-data.org).**

Table 5.1: Climate data for Upington, Northern Cape Province (Source: en.climate-data.org).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Temp. (˚C)	26.2	25.6	23.7	19.3	14.8	11.8	11.5	13.1	17	20.1	23	25.2
Minimum Temp. (˚C)	17.8	17.7	15.9	11.2	6.2	3.1	2.5	3.9	7.6	11.1	14.2	16.7
Maximum Temp. (˚C)	34.6	33.6	31.5	27.5	23.4	20.5	20.6	22.4	26.4	29.2	31.9	33.8
Precipitation (mm)	23	31	39	22	12	4	2	3	4	9	15	16

5.4. Biophysical Characteristics of the Project site

The following section provides an overview of the biophysical characteristics of the project site.

5.4.1. Landscape Features

The project site is generally flat to gently undulating and lies at a height of approximately 860m – 920m above mean sea level, sloping to the south. Dunes (trending in a north-west / south-east direction) occur in the western half of the project site, while there is a network of dry watercourses in the east. Although these stream beds will be dry in most years, they are a sign of possible water accumulation in the occasional years with above average rainfall.

5.4.2. Geology

The geology of the area comprises wind-blown sands with dunes of the Gordonia Formation, Kalahari Group (Geological Survey, 1988). The area is underlain by the Gordonia Formation, the Bethesda Formation, the Jannelsepan Formation, the Keimoes Formation and the Straussburg Granite (refer to **Figure 5.5**).

5.4.3. Soil and Land types

A land type is defined as an area with a uniform terrain type, macroclimate and broad soil pattern. The area under investigation is covered by the following land types (refer to **Table 5.2** and **Figure 5.6**):

» Ae10 (Deep, red, freely-drained soils, high base status)
» Af2, Af8 (Deep, red, freely-drained soils, high base status, with dunes)

Table 5.2: Land types occurring (with soils in order of dominance).

Land Type	Depth (mm)	Dominant soils	Percent of land type	Characteristics
Ae10	450 – 1 000	Hutton 33/34	42%	Red, sandy soils, occasionally on hardpan calcrete
	100 – 250	Mispah 22	40%	Red-brown, sandy topsoils on hard rock and calcrete
Af2	>1 200	Hutton 30/31	93%	Deep red, sandy dune soils on hard rock and calcrete
Af8	300 – 1 200	Hutton 30/31	64%	Deep red, sandy dune soils on hard rock and calcrete
	300 - 900	Hutton 33/34	35%	Red, sandy soils, occasionally on hardpan calcrete

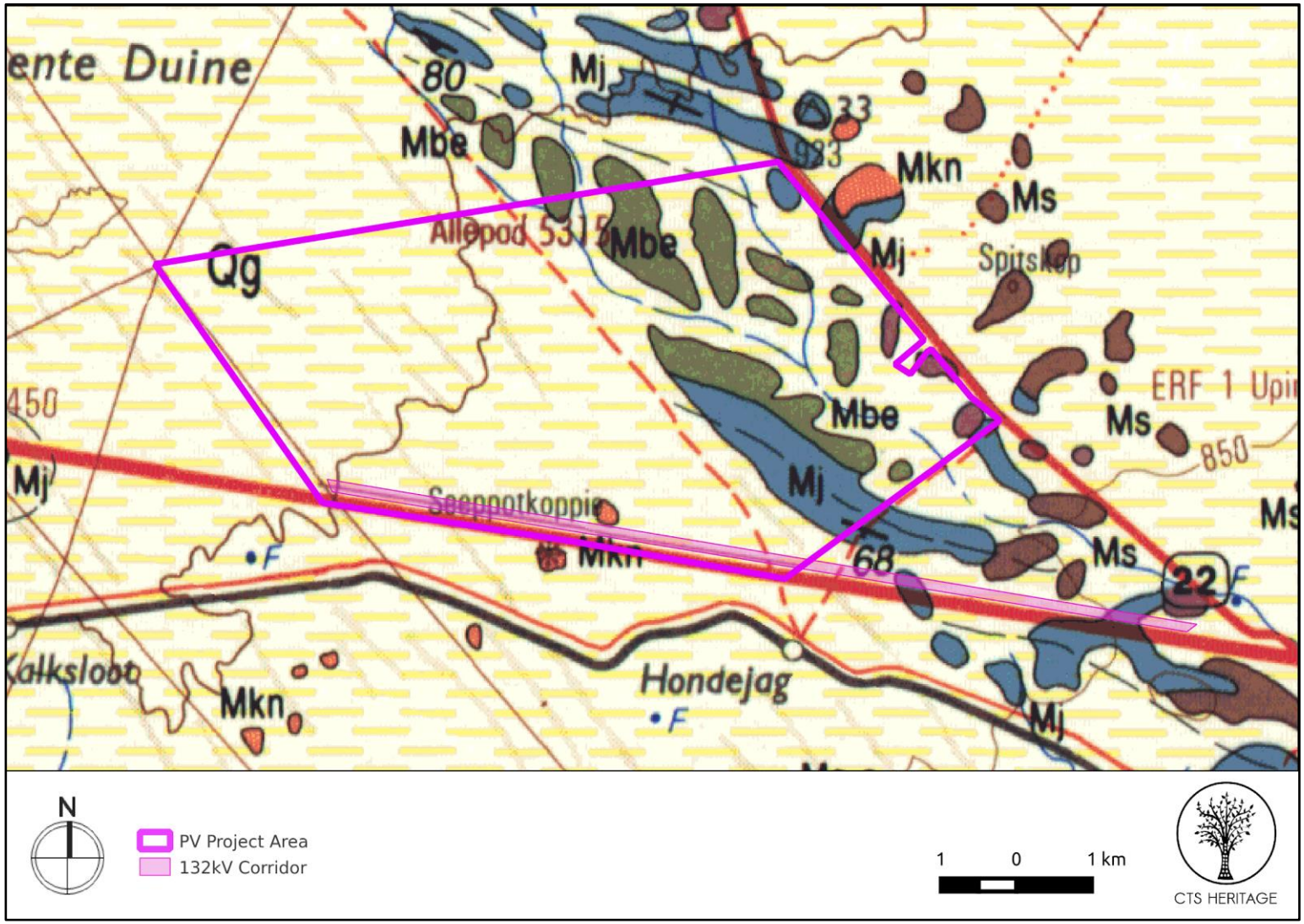

Figure 5.5: **Extract from the 1:50 000 Geological Map of South Africa: Council of GeoScience Map 2820 Zoomed in. [Qg: Gordonia Formation (Quaternary cover sands) Mbe: Bethesda Formation Mj: Jannelsepan Formation Mkn: Keimoes Formation Ms: Straussburg Granite].**

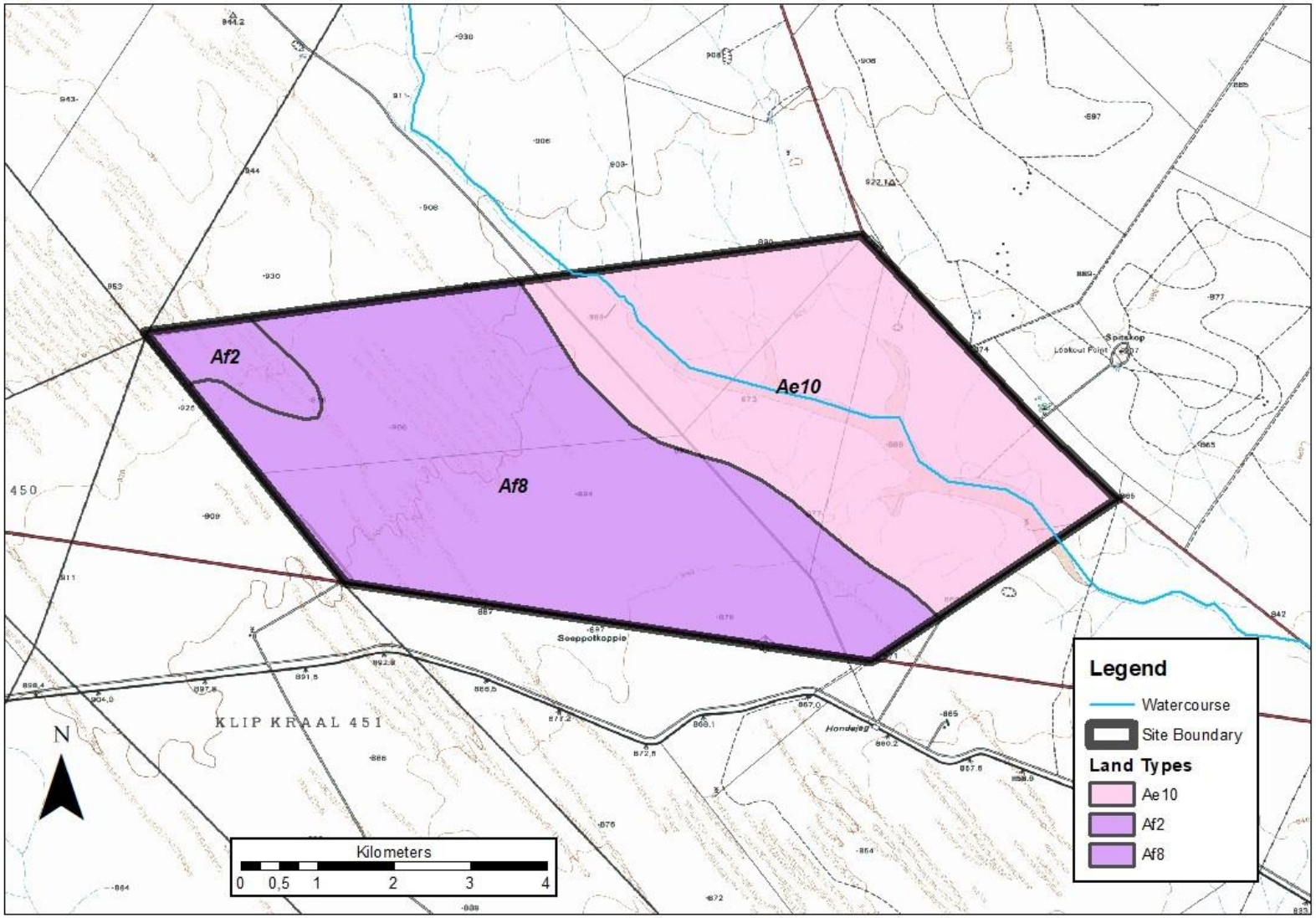

Figure 5.6: Land type map for Allepad PV Three.

Due to the fact that information contained in the land type survey is of a reconnaissance nature, only the general dominance of the soils in the landscape can be given, and not the actual areas of occurrence within a specific land type. Also, other soils that were not identified due to the scale of the survey may also occur.

5.4.4. Agricultural Potential

A significant portion of the western half of the project site comprises deep, red, sandy soils, with extensive areas of dunes. The eastern half has a mixture of deep, red, sands and shallow lithosols, often on calcrete (refer to **Table 5.2**). The very low rainfall in the area means that the only means of cultivation would be by irrigation, however remote sensing imagery of the area shows no signs of any agricultural infrastructure and none of irrigation, which is confined to a strip along the Orange River.

The climatic restrictions indicate that this part of the Northern Cape Province is suited at best for grazing, and the grazing capacity is very low, around 40 – 50 ha/large stock unit (ARC-ISCW, 2004). The dominant class of agricultural potential is considered low.

5.4.5. Hydrology

The project is located within the Lower Orange Water Management Area (WMA). Major rivers within the Lower Orange WMA include the Ongers, Hartebeest, and Orange. The Lower Orange WMA includes the stretch of Orange River between the Orange-Vaal confluence and Alexander Bay. Other tributaries include the Ongers and Hartebeest Rivers from the south, and the Molopo River and Fish River (Namibia) from the north. There are a number of highly intermittent water courses along the coast which drain directly to the ocean. The Lower Orange catchment is the largest, but also the driest and most sparsely populated catchment in South Africa.

The project site is located within the D73 tertiary drainage region where is straddles the border of the D73E and D73F quaternary catchments (refer to **Figure 5.7**).

A non-perennial tributary which ultimately drains into the Orange River approximately 11.5km south-east of the project site, as well as numerous drainage lines and a few small pans occur in the eastern extent of the project site.

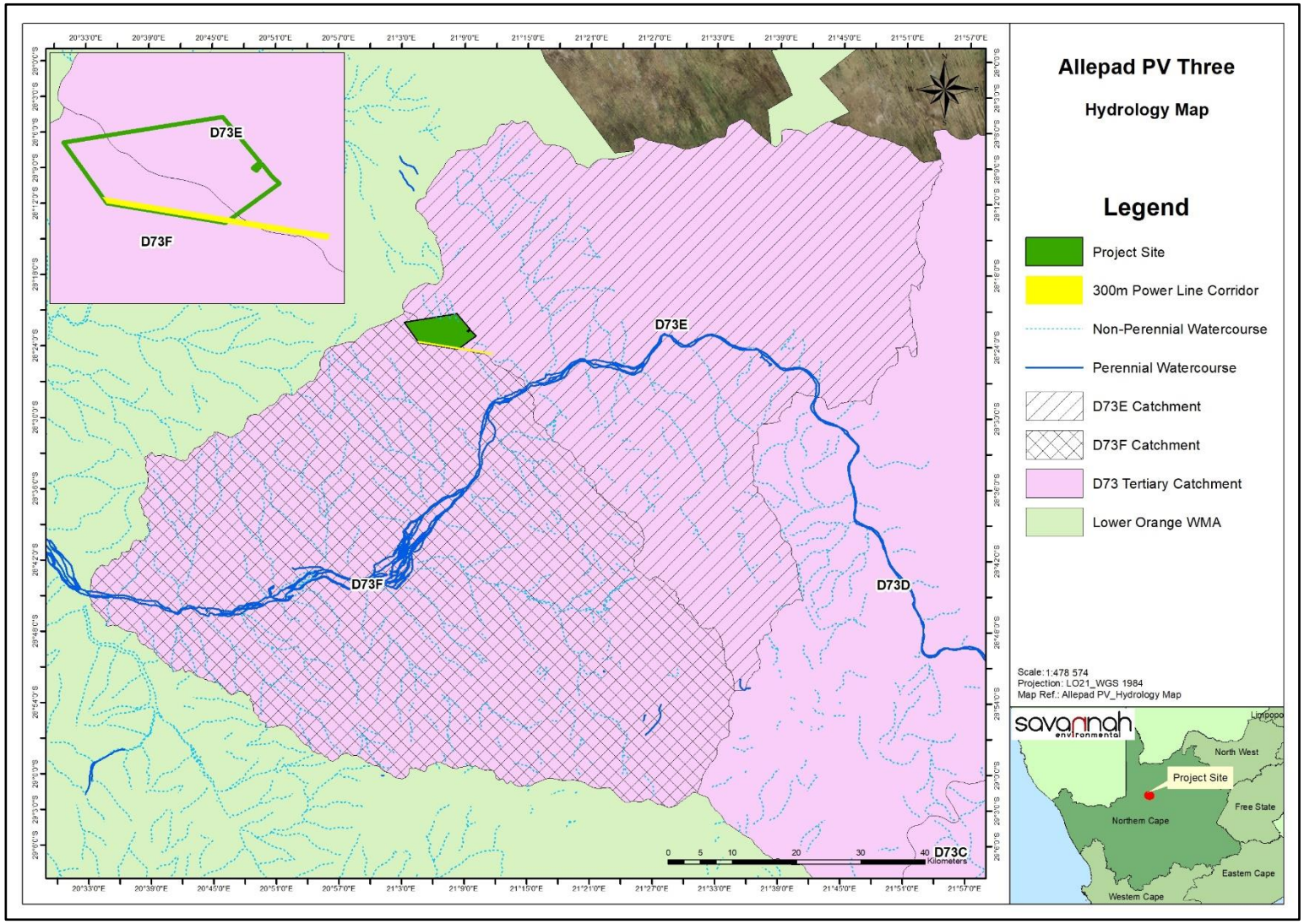

Figure 5.7: Hydrology Map showing the location of the project site in relation to the D73E and D73F Quaternary Catchments.

5.4.6. Ecological Profile

5.4.6.1. Broad-Scale Vegetation Patterns

According to the national vegetation map (Mucina & Rutherford 2006), there are two vegetation types within the study area, namely Kalahari Karroid Shrubland in the eastern extent of the project site, and Gordonia Duneveld in the western extent of the project site (refer to **Figure 5.8**).

Both Kalahari Karroid Shrubland and Gordonia Duneveld are classified as Least Threatened and have been impacted little by transformation, with more than 99% of their original extent is still intact. Kalahari Karroid Shrubland is considered Hardly Protected within formal conservation areas, while Gordonia Duneveld is Moderately Protected. No vegetation-type endemic species are listed for either Kalahari Karroid Shrubland or Gordonia Duneveld (Mucina & Rutherford 2006). The biogeographically important and endemic species known from these vegetation types tend to be widespread within the vegetation type itself and local-level impacts are not likely to be of significance for any of these vegetation types or species concerned. Gordonia Duneveld is widely distributed and is among the most extensive vegetation types in South Africa while Kalahari Karroid Shrubland is less extensive, but represents a transitional vegetation type between the northern Nama Karoo and Kalahari (Savannah) vegetation types.

Species commonly observed within the areas of Kalahari Karroid Shrubland on nearby sites include shrubs such as *Leucosphaera bainesii*, *Hermannia spinosa*, *Monoechma genistifoilium*, *Salsola rabieana*, *Aptosimum albomarginatum*, *A.spinecens*, *Kleinia longiflora*, *Limeum argute-carinatum*, *Phyllanthus maderaspatensis*, *Zygophyllum dregeanum* and grasses such as *Stipagrostis anomala*, *S.ciliata*, *S.uniplumis*, *S.hochstetteriana* and *Schmidtia kalariensis*. The proportion of shrubs in this vegetation type is usually related to soil depth and texture, with the proportion of grass increasing as the soils become deeper or more sandy. Species of conservation concern that are often present include *Adenium oleifolium*, *Aloe claviflora* and *Hoodia gordonii*.

The areas of Gordonia Duneveld consists of several different habitats. The most obvious of which are the dunes and the inter-dune areas. The dunes and areas of deep sand are usually dominated by species such as *Crotalaria orientalis*, *Stipagrostis amabilis*, *Centropodia glauca*, *Acacia haematoxylon* and various forbs. The interdune slacks are usually dominated by grasses or *Rhigozum trichotomum* depending on the substrate conditions as well as the history of land use. Other common species associated with the areas of Gordonia Duneveld include trees such as *Parkinsonia africana*, *Boscia foetida*, *Boscia albitrunca* and *Acacia erioloba*, shrubs such as *Phaeoptilum spinosum*, *Rhigozum trichotomum*, and *Lycium bosciifolium*, grasses such as *Stipagrostis ciliata*, *S.uniplumis*, *S.amabilis*, *Schmidtia kalahariensis*, and forbs such as *Senna italica*, *Tribulis pterophorus*, *Hermannia tomentosa* and *Requienia sphaerosperma*. Species of conservation concern associated with this habitat include the nationally protected trees *Acacia erioloba*, *Acacia haematoxylon* and *Boscia albitrunca*.

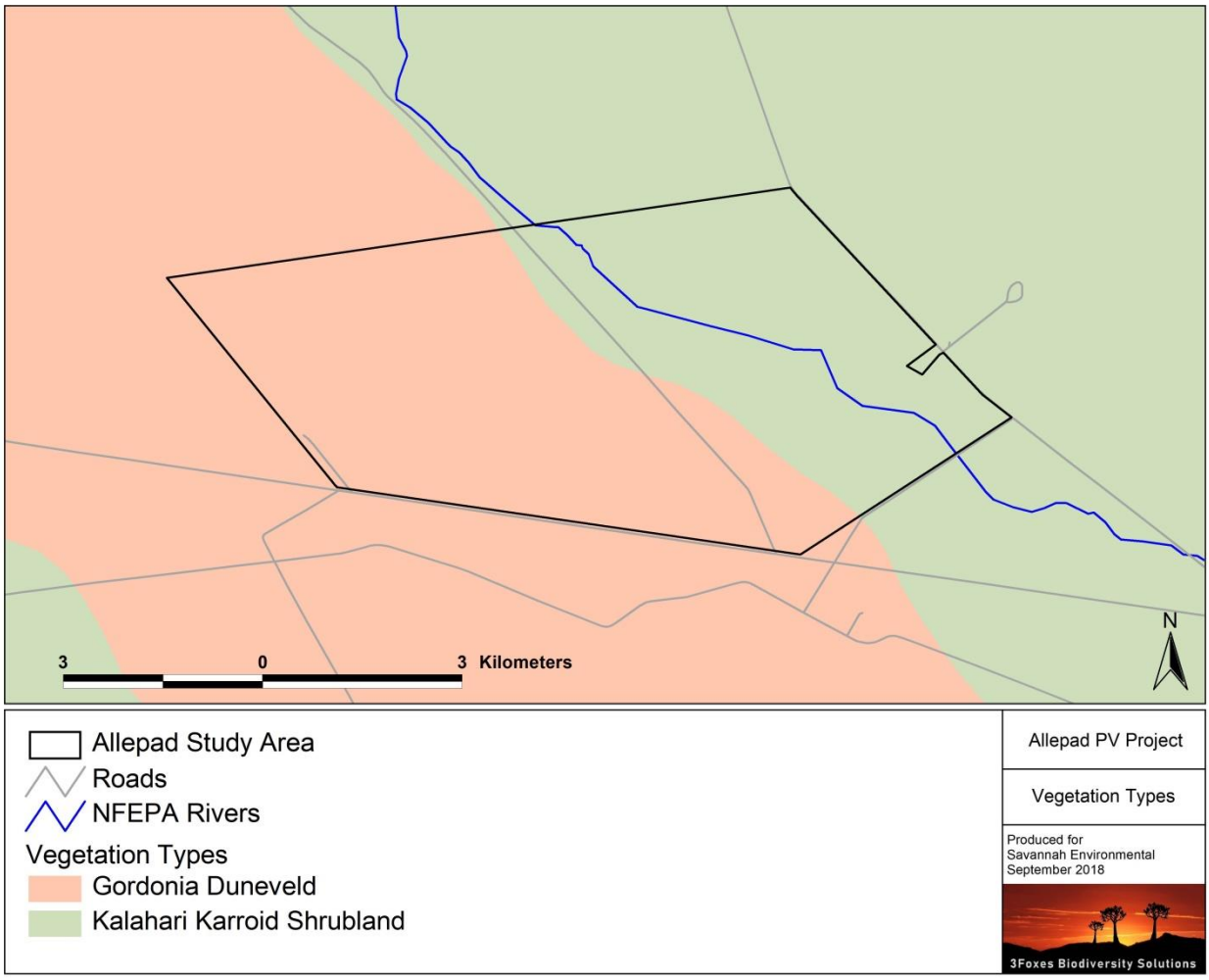

Figure 5.8: Broad-scale overview of the vegetation in and around the Allepad site. The vegetation map is an extract of the national vegetation map as produced by Mucina and Rutherford (2006/2012), and also includes drainage lines delineated by the NFEPA assessment (Nel et al. 2011).

5.4.6.2. Listed and Protected Plant Species

Two NFA-protected tree species occur at the site *Acacia haematoxylon* and *Boscia albitrunca*. Both of these species are associated with the more active dune areas which are considered to be medium or medium high sensitivity. The provincially protected *Boscia foetida* subsp. *foetida* is also confirmed present at the site. It is also likely that Devils' Claw *Harpagophytum procumbens* is present at the site, within the dune areas as this species is relatively common on Gordonia Duneveld in the Upington area.

5.4.6.3. Faunal Communities

5.4.6.3.1. Mammals

The site falls within the distribution range of 46 terrestrial mammals, indicating that the mammalian diversity at the site is of moderate potential. The variety of habitats present at the site is however fairly low and the overall mammalian diversity at the site is likely to be lower than the richness of the broader area. The lack

of rocky hills or outcrops at the site would preclude a variety of species from the site. Mammal species that can be confirmed present in the immediate area include Black-backed Jackal, African Wildcat, Cape Fox, South African Ground Squirrel, Steenbok, Cape Porcupine, Yellow Mongoose, Cape Hare and Aardvark.

Two listed terrestrial mammals may occur at the site, the Brown Hyaena *brunnea* (Near Threatened) and Black-footed cat *Felis nigripes* (Vulnerable). While it is possible that both species occur at the site, it is least likely that the Brown Hyaena *brunnea* is present as this species is often purposely or inadvertently persecuted within farming areas.

5.4.6.3.2. Reptiles

According to the SARCA database, 39 reptile species are known from the area suggesting that the reptile diversity within the site is likely to be moderate to low. As there are no significant rocky outcrops at the site, only species associated with sandy substrates or trees are likely to be present. Species observed in the vicinity include the Namaqua Mountain Gecko *Pachydactylus montanus*, Ground Agama *aculeata*, Spotted Sand Lizard *Pedioplanis lineoocellata* and Spotted Desert Lizard *Meroles suborbitalis*. No reptile species of conservation concern are known from the area and there do not appear to be any broad habitats at the site which would be of high significance for reptiles.

5.4.6.3.3. Amphibians

The site lies within the distribution range of 10 amphibian species. The only listed species which may occur at the site is the Giant Bullfrog *Pyxicephalus adspersus* which is listed as Near Threatened. Although there are several small pans at the site which are likely to be used by other frogs, they are rock pans or too shallow for the Giant Bullfrog and it is not likely that this species is present at the site. As there are no natural perennial water sources at the site, it is likely that amphibian abundance is generally low and restricted largely to those species which are relatively independent of water such as the Karoo Toad *Vandijkophrynus gariepensis*.

5.4.6.4. Critical Biodiversity Areas & Broad-Scale Processes

An extract of the Northern Cape Critical Biodiversity Areas (CBAs) map for the study area is depicted in **Figure 5.9**. The majority of the site lies within an area classified as Other Natural Areas (ONA) and is not classified as a CBA or Ecological Support Area (ESA). The drainage line which traverses the site is however classified as an ESA and would potentially be impacted by the development. There are no CBAs in close proximity to the site.

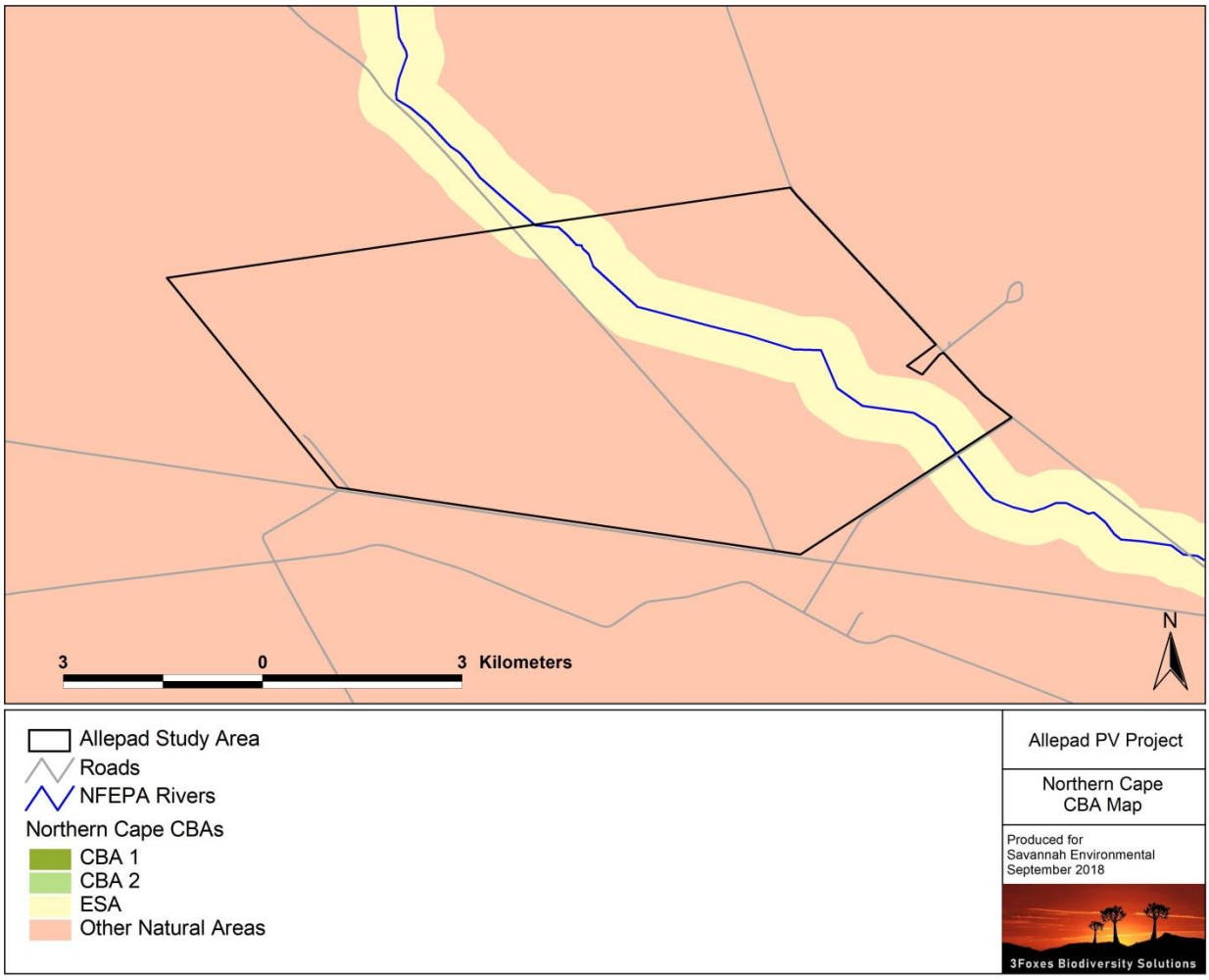

Figure 5.9. Extract of the Northern Cape CBA map for the study area, showing that there are no CBAs in close proximity to the site.

5.5. Visual Quality

The study area identified for the visual assessment encompasses a geographical area of 679km² and includes a 10km buffer zone (area of potential visual influence) from the boundary of the project site, and includes the western portion of the town of Upington, sections of the N10 and N14 national roads, and a section of the R360 regional road.

The topography of the region is relatively homogenous and is described pre-dominantly as lowlands with hills, dune hills, and irregular or slightly irregular plains. Relatively prominent hills occur towards the north-east of the study area. The terrain surrounding the project site is predominantly flat with an even south-eastern slope towards the Orange River valley.

The scarcity of water and other natural resources has dictated the settlement patterns of this region. The Orange River has, to a large degree, dictated the settlement pattern in the region by providing a source of perennial water for the cultivation of grapes and other irrigated crops. Cattle and game farming practises also occur, although less intensively. An example of this is the Spitskop Farm located east and adjacent to the proposed project site. Spitskop Farm is indicated on Google Earth as a private game farm, however it is

not a designated protected area in the South African Protected Areas Database (SAPAD), and is not accessible to the public. Spitskop Farm is currently in the property market and not operating as a tourist lodge / destination, but rather as a private cattle and game ranch. The farm has a rocky outcrop that appears to be (or have been) a viewpoint from which to look out over the generally flat expanse surrounding it. It is expected that this viewpoint would be quite exposed to Allepad PV Three, and other larger solar energy facilities such as the operational Khi Solar One project, as well as structures at the Upington International Airport located within the region.

Other land-use activities include conservation and nature oriented tourism in the form of the Kalahari Monate Lodge located virtually within the proposed development site, which provides self-catering and camping facilities.

The majority of the study area is sparsely populated (i.e. less than 10 people per km²) and consists of a landscape of wide-open expanses and vast desolation. The population distribution is primarily concentrated in Upington and the smaller towns / settlements along the Orange River. There are a very limited number of farm residences or homesteads within the remaining part of the study area.

Vegetation cover is predominantly restricted to low shrubland, described as Kalahari Karroid Shrubland and Gordonia Duneveld. Planted vegetation in the form of vineyards and cotton fields is found along the Orange River floodplain. A dry riverbed or seasonal wetland (pan) occurs on the eastern section of the proposed development site (refer to **Figure 5.10**).

Allepad PV Three is expected to have a fairly contained core area of visual exposure, generally restricted to a 2km radius of the site. Receptors located within this zone include observers at Kalahari Monate Lodge, visitors to the Spitskop Nature Reserve lookout point, and observers travelling along the N10 national and R360 regional roads. Visibility beyond 2km is more scattered and interrupted due to the undulating nature of the topography and the generally constrained height of the PV panel structures. The exposure of the facility is largely restricted to vacant land and natural open space.

5.6. Social Characteristics of the Broader Study Area and the Project Site

The following is a baseline summary of the social characteristics of the broader study area within which Allepad PV Three is proposed:

- The project is proposed within the Northern Cape Province, which is South Africa's largest, but least populated Province.
- The project is proposed within the Dawid Kruiper LM of the ZF Mgcawu DM.
- The Dawid Kruiper LM was established by the amalgamation of the Mier LM and //Khara Hais LM on 3 August 2016, and covers an area of land 44 231km² in extent, formally making it the largest LM in South Africa.
- Between 2001 and 2011 the Dawid Kruiper LM experienced a population growth rate of 1.8% per year.
- The Dawid Kruiper LM is female dominated, with females comprising approximately 50.6% of the LM population, while the ZF Mgcawu DM is male dominated, with males comprising approximately 50.8% of the DM population.
- Coloureds comprise the predominant population group within the Dawid Kruiper LM and ZF Mgcawu DM.

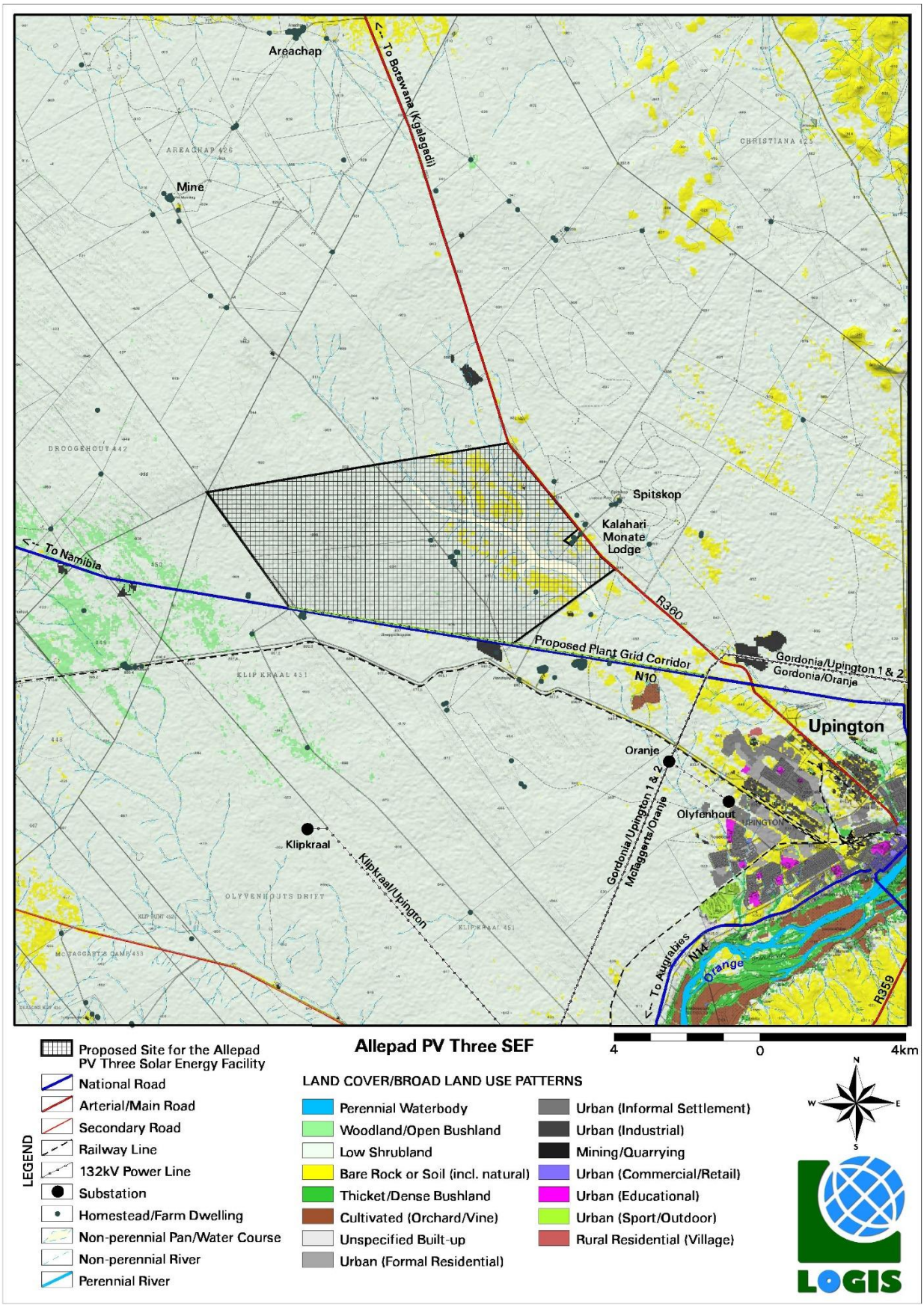

Figure 5.10: Land cover and broad land use patterns map of the study area.

- The Dawid Kruiper LM, ZF Mgcawu DM, and Northern Cape Provincial population age structures are youth dominated. A considerable proportion of the respective populations therefore comprise individuals of the economically active population between the ages of 15 – 64.
- The Dawid Kruiper LM has a dependency ratio of 35.6, which correlates closely with the ZF Mgcawu DM (34.4), Northern Cape Province (35.8), and South Africa (34.5).
- Education levels within the Dawid Kruiper LM are low with approximately 58.3% of the population over 20 years of age not having completed Grade 12 / Matric. This means that the majority of the population can be expected to have a relatively low-skill level and would either require employment in low-skill sectors, or skills development opportunities in order to improve the skills level of the area.
- The unemployment rate of the Dawid Kruiper LM is only fractionally lower than that of the ZF Mgcawu DM (i.e. 11.9% for the LM and 11.3% for the DM), and the percentage of economically inactive individuals within the Dawid Kruiper LM is higher than in the ZF Mgcawu DM (i.e. 43.3% in the LM and 38.3% in the DM). This could have a negative impact in terms of the local human capital available for employment.
- Household income levels are low within the area, with over half (54%) of falling within the poverty level (i.e. R0 – R38 400 per annum). The area can therefore be expected to have a high poverty level with associated social consequences such as not being able to pay for basic needs and services and poor living conditions.
- The primary economic activities within the Dawid Kruiper LM comprise trade and retail as a result of the strong tourism and agricultural sectors.
- The Dawid Kruiper LM is poorly serviced in terms of public sector health facilities with 2 hospitals (one public and one private hospital), 2 Community Healthcare Centres (CHC) and 6 Fixed Primary Healthcare Clinics (CHC), and 5 Satellite Healthcare Clinics.
- The majority of households within the Dawid Kruiper LM comprise formal brick dwellings, with only a very small proportion (0.8%) comprising traditional dwellings.
- The majority of households within the Dawid Kruiper LM are well serviced with regards to water, sanitation, electricity, and refuse removal, with the LM often exhibiting higher levels of service provision that the ZF Mgcawu, Northern Cape Province, and South Africa.

5.7. Heritage Resources

5.7.1. Cultural Landscape

According to Van Schalkwyk (2014 SAHRIS NID 170520), "The cultural landscape qualities of the region essentially consist of two components. The first is a rural area in which the human occupation is made up of a pre-colonial (Stone Age) component and a later colonial (farmer) component. This rural landscape has always been sparsely populated. The second component is an urban one, consisting of a number of smaller towns, most of which developed during the last 150 years or less." According to Von Vollenhoven (2012 SAHRIS NID 117902), "the environment of the area is mostly undisturbed although it is being used for sheep farming... The natural topography… is reasonably flat, but in the north-west a hill dominates the area resulting in an even slope up to the crest. This area also is very rocky. The stones here are dark in colour and may be of a basaltic origin. However in the flat areas adjacent to the hill the rocks are white coloured and most likely are soft calcrete, which would not have been suitable for the manufacture of stone tools. Different non-perennial streams run through the area…"

5.7.2. Archaeology and the Built Environment

The area surrounding Upington has a rich historical and archaeological past (Fourie, 2014 SAHRIS NID 174335). It is noted that most of the heritage resources identified are Stone Age artefact scatters of varying significance. In Fourie's assessment (2014), the field work identified numerous areas where low density scatters of Middle and Later Stone Age lithics were found. As no context and in situ preservation were identified these sites were graded as having low heritage significance. In addition, one possible herder site was identified during the survey. No other material or deposits were identified but does not exclude the possibility of subsurface material. The ruins of old mining infrastructure were also identified. In Von Vollenhoven's assessment (2012 SAHRIS NID 117902), a number of interesting and significant rock art engravings depicting various animals including giraffes and an aardvark were identified. In addition, a significant historical site known as the "Rebellion Tree" as well as graves associated with farmers in this area were identified.

Five sites of moderate local significance are located just beyond the border of the proposed project site. Namely Site 45523 (VRV01), Site 19977 (SPITZ1), Site 19978 (SPITZ2), Site 19979 (SPITZ3), and Site 24972 (Van Roois Vley) (refer to **Figure 5.11**). Site 24972 (Van Roois Vley) is linked to Von Vollenhoven's (2012) report and may well be the location of the rock art engravings described above. Site 45523 (VRV01) is described as consisting of ostrich egg shell fragments and stone flakes scattered around the base of a hill in low densities. Flakes are micro lithic supporting an ascription to the LSA utilising quartzite as raw material. A lead sealed bully beef can was also found here dated to the late 1800's or early 1900's. Site 19977 (SPITZ1), Site 19978 (SPITZ2), Site 19979 (SPITZ3) describe Middle Stone Age artefact scatter sites. In addition, there is a historical structure located within the development area of unknown heritage significance.

5.7.3. Palaeontology

According to the SAHRIS Palaeosensitivity Map, the area is underlain by the Gordonia Formation (Quarternary cover sands of moderate palaeontological sensitivity), the Bethesda Formation, the Jannelsepan Formation, the Keimoes Formation and the Straussburg Granite, all of which have zero palaeontological sensitivity (refer to **Figure 5.12**).

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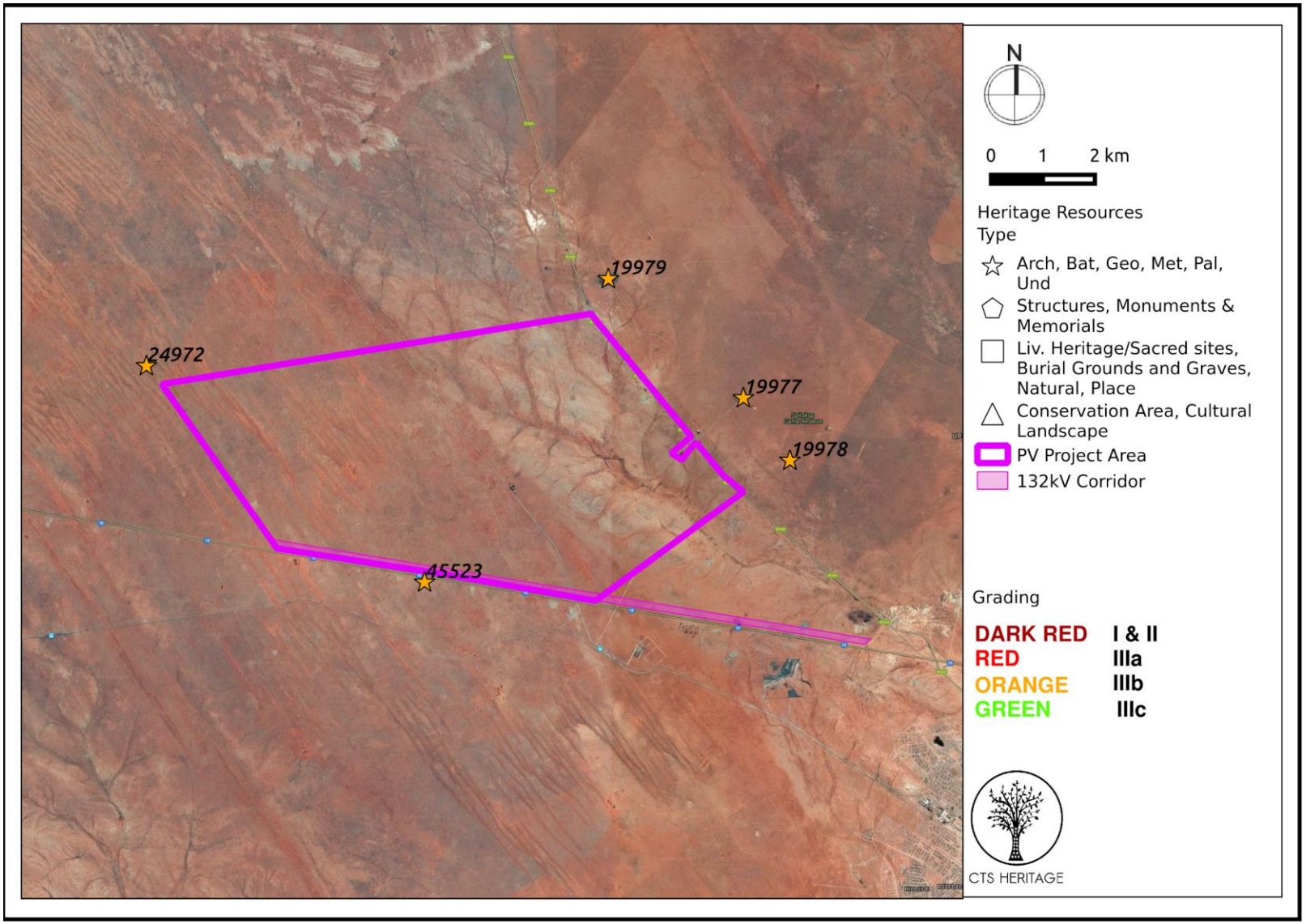


Figure 5.11: Heritage Resources Map showing heritage resources previously identified in and near the project site with SAHRIS Site IDs indicated.

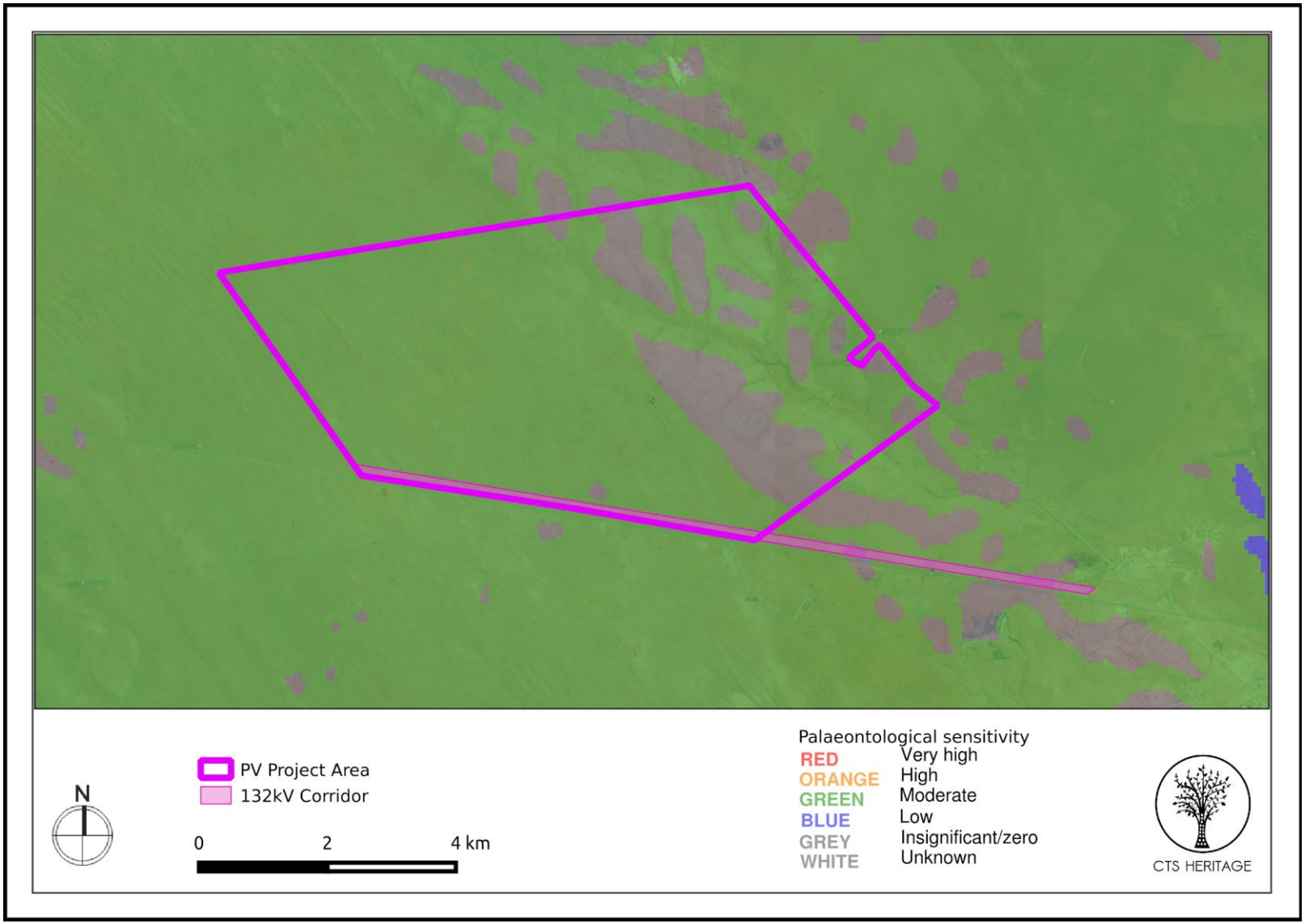


Figure 5.12: Palaeosensitivity Map indicating varied fossil sensitivity underlying the study area.

CHAPTER 6. APPROACH TO UNDERTAKING THE SCOPING PHASE

An EIA process refers to that process undertaken in accordance with the requirements of the relevant EIA Regulations (the 2014 EIA Regulations (GNR 326), as amended), which involves the identification and assessment of direct, indirect, and cumulative, environmental impacts associated with a proposed project or activity. The EIA process comprises two main phases: i.e. **Scoping** and **EIA Phase**.

The EIA process is illustrated in **Figure 6.1**.

Figure 6.1: The Phases of an EIA Process

6.1. Relevant legislative permitting requirements

The legislative permitting requirements applicable to Allepad PV Three as identified at this stage in the process are described in more detail under the respective subheadings.

6.1.1. National Environmental Management Act (No. 107 of 1998) (NEMA)

NEMA is South Africa's key piece of national environmental legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant EA. Due to the fact that Allepad PV Three is a power generation project and therefore relates to the IRP 2010 – 2030, the National DEA has been determined as the Competent Authority in terms of GNR 779 of 01 July 2016. The Provincial Northern Cape DENC is a Commenting Authority on the project.

The need to comply with the requirements of the EIA Regulations published under NEMA ensures that developers are provided the opportunity to consider the potential environmental impacts of their activities early in the project development process, and also allows for an assessment to be made as to whether environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project.

The EIA process being conducted for Allepad PV Three is being undertaken in accordance with Section 24 (5) of NEMA. Section 24 (5) of NEMA pertains to EAs, and requires that the potential consequences for, or impacts of, listed or specified activities on the environment be considered, investigated, assessed, and reported on to the competent authority. Listed Activities are activities identified in terms of Section 24 of NEMA which are likely to have a detrimental effect on the environment, and which may not commence without EA from the competent authority subject to the completion of an environmental assessment process (either a Basic Assessment (BA) of full Scoping and EIA).

Table 6.1 contains all the listed activities identified in terms of NEMA, the 2014 EIA Regulations (GNR 326), and Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324) which may be triggered by the proposed development of Allepad PV Three, and for which EA has been applied:

Table 6.1: Listed activities identified in terms of the Listing Notices (GNR 327, 325 and 324).

Notice Number	Activity Number	Description of listed activity
Listing Notice 1 (GNR 327) 08 December 2014	11 (i)	The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275kV or more. ***The project entails the construction of a new 132kV on-site substation up to 1ha in extent and a new 132kV double-circuit power line required to evacuate electricity generated by the project into the national electricity grid. The project site is located outside of the urban edge as identified in the Dawid Kruiper LM SDF (2017).***
Listing Notice 1 (GNR 327) 08 December 2014	28 (ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1ha. ***The project comprises an industrial development, and will result in the transformation of approximately 250ha of land (equivalent to the size of the development footprint) which is currently utilised for agricultural (i.e. grazing) purposes.***
Listing Notice 2 (GNR 325) 08 December 2014	1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20MW or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs – (a) within an urban area, or (b) on existing infrastructure. ***The project comprises a renewable energy generation facility, which will utilise ground-mounted PV technology and will have a generation capacity of up to 100MW. The project site is located outside of the urban edge as identified in the Dawid Kruiper LM SDF (2017).***

Notice Number	Activity Number	Description of listed activity
Listing Notice 2 (GNR 325) 08 December 2014	15	The clearance of an area of 20ha or more of indigenous vegetation[13], excluding where such clearance of indigenous vegetation is required for – (i) the undertaking of a linear activity, or (ii) maintenance purposes undertaken in accordance with a maintenance management plan. ***The project requires the clearance of an area up to 250ha (equivalent to the development footprint) of vegetation. The project is proposed on an agricultural property where the predominant land use is livestock grazing, and is therefore likely to comprise indigenous vegetation. The project would therefore result in the clearance of an area of land greater than 20ha of indigenous vegetation.***

6.1.2. National Heritage Resources Act (No. 25 of 1999) (NHRA)

The National Heritage Resources Act (No. 25 of 1999) (NHRA) provides an integrated system which allows for the management of national heritage resources and to empower civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities which potentially require the undertaking of a Heritage Impact Assessment.

Section 38: Heritage Resources Management

1). Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as –

a. the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length,

b. the construction of a bridge or similar structure exceeding 50m in length,

c. any development or other activity which will change the character of a site –

i). exceeding 5 000m² in extent, or

ii). involving three or more existing erven or subdivisions thereof, or

iii). involving three or more erven or divisions thereof which have been consolidated within the past five years, or

iv). the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority,

Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

In terms of Section 38(8), approval from the heritage authority is not required if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38(3) and any comments and recommendations of the relevant resources authority with regard to such development have been taken into account prior to

[13] "Indigenous vegetation" as defined by the 2014 EIA Regulations (GNR 326) refers to vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.

the granting of the consent. However, should heritage resources of significance be affected by the proposed development, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and the SAHRA Permit Regulations (GNR 668).

6.2. Overview of the Scoping and EIA Process being undertaken for the project.

In terms of NEMA, the 2014 EIA Regulations (GNR 326), and Listing Notices (Listing Notice 1 (GNR 327), Listing Notice 2 (GNR 325), and Listing Notice 3 (GNR 324)), the development of Allepad PV Three requires EA from DEA subject to the completion of a full Scoping and EIA process, as prescribed in Regulations 21 to 24 of the 2014 EIA Regulations (GNR 326). The need for a full Scoping and EIA process to be conducted in support of the application for EA is due to the fact that listed activities contained within Listing Notice 2 (GNR 325) are likely to be triggered.

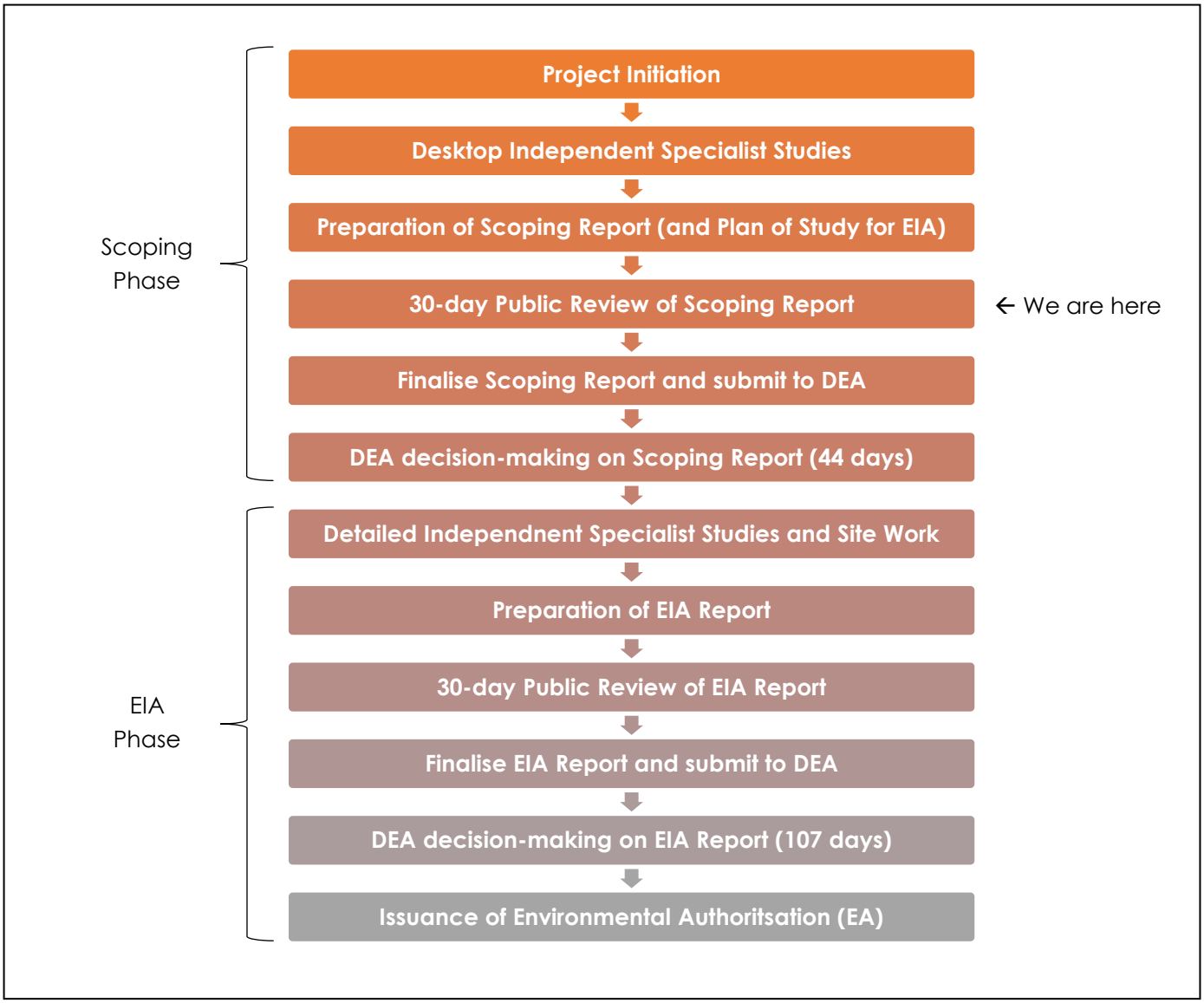
The Scoping and EIA process is to be undertaken in two phases as follows:

- The **Scoping Phase** includes the identification and description of potential issues associated with the project through a desktop study and consultation with I&APs and key stakeholders through a Public Participation process. The entire project site and 300m wide power line corridor are considered within this process at a desktop level. Through this study, areas of sensitivity within the broader site and power line corridor are identified and delineated in order to identify any environmental fatal flaws, and environmentally sensitive, or no-go areas. In accordance with Regulation 21(1) of the 2014 EIA Regulations (GNR 326) this Scoping Report prepared for the project will be subject to a 30-day review period during which members of the public, I&APs, and authorities are invited to review and provide comment on the Scoping Report. Following the conclusion of this review period a Final Scoping Report, which incorporates all comments received during the 30-day public review period, will be prepared and submitted to DEA for its consideration. Following its receipt of the Final Scoping Report DEA has 43 days within which to either accept the Scoping Report, and advise the applicant to proceed or continue with the tasks contemplated in the Plan of Study for EIA, or refuse EA in the event that the proposed activity is in conflict with a prohibition contained in legislation, or the Scoping Report does not substantially comply with Appendix 2 of the 2014 EIA Regulations (GNR 326).
- The **EIA Phase** involves a detailed assessment of potentially significant positive and negative direct, indirect, and cumulative impacts identified during the Scoping Phase. This phase includes detailed specialist investigations and a Public Participation process, and results in the compilation of an EIA Report and EMPr. In accordance with Regulation 23(1)(a) of the 2014 EIA Regulations (GNR 326) the EIA Report and EMPr prepared for the project will also be subject to a 30-day public review period during which members of the public, I&APs, and authorities will be invited to review and provide comment on the EIA Report and EMPr. Following the conclusion of this review period a Final EIA Report and EMPr which incorporates all comments received during the 30-day review period, will be prepared and submitted to DEA for its consideration. Following its receipt of the Final EIA Report and EMPr, DEA has 107 days within which to either grant or refuse EA.

6.3. Objectives of the Scoping Phase

This Scoping Report documents the evaluation of potential environmental impacts of Allepad PV Three and forms part of the EIA process being conducted in support of an Application for EA for the project. The Scoping Phase has been conducted in accordance with the requirements of the 2014 EIA Regulations (GNR 326), and therefore aims to:

» Identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including design, construction, operation and decommissioning) within the broader study area through a desktop review of existing baseline data and specialist studies.
» Identify potentially sensitive environmental features and areas within the broader site in order to inform the preliminary design process of the facility.
» Define the scope of studies to be undertaken during the EIA process.
» Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA process, as well as regarding the scope and extent of specialist studies that will be required to be undertaken as part of the EIA Phase.



The following objectives of the Scoping Phase (in accordance with Appendix 2 of the 2014 EIA Regulations (GNR 326)) have been met, through the undertaking of a consultative process and with the assistance of specialist input.

» The identification of relevant policies and legislation regarding the activities to be undertaken have been identified and considered within this Scoping Report.

- Activities to be undertaken for the development of Allepad PV Three have been identified and motivated in terms of the need and desirability for the activities to take place.
- Potential impacts associated with the undertaking of the identified activities and technology have been identified and described.
- Preferred areas for the development, which are areas associated with low to medium environmental sensitivity, have been identified within the site through a desktop level impact assessment process and on-going consultative process.
- Key issues associated with the project to be addressed during the EIA Phase for further detailed study and ground-truthing have been identified and listed within this Scoping Report.
- The level of assessment, expertise and the extent of further consultation to be undertaken in the EIA Phase of the process, with the aim of determining the extent of impacts associated with the activities through the life cycle of the project (i.e. construction, operation and decommissioning), have been identified and included within this Scoping Report.

6.4. Overview of the Scoping Phase

Key tasks undertaken within the Scoping Phase include:

- Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
- Submission of the completed Application for EA to the competent authority (i.e. DEA) in terms of Regulations 5 and 16 of the 2014 EIA Regulations (GNR 326).
- Undertaking a public participation process throughout the Scoping Phase in accordance with Chapter 6 of the 2014 EIA Regulations (GNR 326) in order to identify issues and concerns associated with the proposed project.
- Undertaking of independent specialist studies in accordance with Appendix 6 of the 2014 EIA Regulations (GNR 326).
- Preparation of a Scoping Report and Plan of Study for EIA in accordance with the requirements of Appendix 2 of the 2014 EIA Regulations (GNR 326).
- 30-day public and authority review period.
- Preparation of a Comments and Response (C&R) Report detailing key issues raised by I&APs as part of the Scoping Phase, and finalisation of the Scoping Report.
- Submission of a final Scoping Report to DEA for review and acceptance.

6.4.1. Authority Consultation and Application for Authorisation in terms of the 2014 EIA Regulations (GNR 982)

In terms of GNR 779 of 1 July 2016, the National DEA has been determined as the competent authority for all projects which relate to the IRP 2010 and any updates thereto. As the project is proposed within Northern Cape Province, the Northern Cape DENC is the provincial commenting authority for the project. Consultation with these authorities is being undertaken throughout the Scoping Phase. Authority consultation includes the following:

- Submission of project notification letters to DEA and DENC.
- Submission of the Application Form for EA to DEA.
- Submission of the Scoping Report for review and comment by:
  - The competent and commenting authorities.

- State departments that administer laws relating to a matter affecting the environment relevant to an application for EA.
- Organs of state which have jurisdiction in respect of the activity to which the application relates.

A record of authority consultation undertaken with organs of state during the Scoping Phase is included in **Appendix C**.

6.4.2. Public Participation Process

Public participation is an essential and regulatory requirement for any EA process and is guided by Regulations 41 to 44 of the 2014 EIA Regulations (GNR 326).

The sharing of information forms the basis of the public participation process and offers the opportunity for I&APs to become actively involved in the EIA Process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner. The public participation process affords I&APs opportunities to provide input into and receive information regarding the EIA process in the following ways:

» During the **Scoping Phase**:
- Identify issues of concern and suggestions for enhanced benefits.
- Verify that issues have been accurately recorded.
- Assist in identifying reasonable alternatives, where required.
- Contribute relevant local information and knowledge to the environmental assessment.

» During the **EIA Phase**:
- Contribute relevant local information and knowledge to the environmental assessment.
- Verify that issues have been considered in the environmental investigations as far as possible.
- Comment on the findings of the environmental assessments.
- Attend a Public Open House to be conducted for the project.

» During the **decision-making phase**:
- Be advised of the outcome of the competent authority's decision, and how and by when the decision can be appealed.

The public participation process therefore aims to ensure that:

» Information containing all relevant facts in respect of the application is made available to stakeholders and I&APs.
» Participation is facilitated in such a manner that I&APs are provided with a reasonable opportunity to comment on the proposed development.
» Adequate review periods are provided to I&APs to comment on the findings of the Scoping and EIA Reports.

Chapter 6 of the 2014 EIA Regulations (GNR 326), details the key public participation tasks required to be undertaken. In compliance with the requirements of Chapter 6 of the 2014 EIA Regulations (GNR 326), the following summarises the key public participation activities conducted to date:

i. Placement of Site Notices

40.(2)(a)	Fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of – (i) The site where the activity to which the application or proposed application relates is or is to be undertaken, and (ii) Any alternative site.

Site notices (in English and Afrikaans) were placed at visible points along the boundary of the project site (i.e. on the boundary of the Remaining Extent of Erf 5315 Upington) on **18 September 2018**. The site notice text, and photographs of the site notices are included in **Appendix C2**.

ii. Providing Written Notice

40.(2)(b)	Giving written notice, in any of the manners provided for in section 47D[14] of the Act, to – (i) The occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken, (ii) Owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken, (iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area, (iv) The municipality which has jurisdiction in the area, (v) Any organ of state having jurisdiction in respect of any aspect of the activity, and (vi) Any other party as required by the competent authority.

A Background Information Document (BID) was compiled in English in order to provide information on Allepad PV Three and the EIA process being undertaken in support of the Application for EA for the project (refer to **Appendix C3**). Copies of the BID and written notice notifying I&APs of the initiation of the EIA process and copies of the BID were distributed to identified stakeholders and I&APs on **01 October 2018**. Copies of the BID were distributed to key stakeholders via email and registered mail. The BID was also made available electronically on Savannah Environmental's website (www.savannahSA.com).

iii. Newspaper Advertisements

40.(2)(c)	Placing an advertisement in – (i) One local newspaper, or

[14] Section 47D of NEMA pertains to the delivery of documents, and states that:

(1) A notice or other document in terms of this Act or a specific environmental management Act may be issued to a person –
(a) By delivering it by hand,
(b) By sending it by registered mail –
(i) To that person's business or residential address, or
(ii In the case of a juristic person, to its registered address or principal place of business,
(bA) By faxing a copy of the notice or other document to the person, if the person has a fax number,
(bB) By e-mailing a copy of the notice or other document to the person, if the person has an e-mail address, or
(bC) By posting a copy of the notice or other document to the person by ordinary mail, if the person has a postal address,
(c) Where an address is unknown despite reasonable enquiry, by publishing it once in the Gazette and once in a local newspaper circulating in the area of that person's last known residential or business address.
(2) A notice or other document issued in terms of subsection (1)(b), (bA), (bB), (bC) or (c) must be regarded as having come to the notice of the person, unless the contrary is proved."

(ii) Any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations,

40.(2)(d) Placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii), and

40.(2)(e) Using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desirous of but unable to participate in the process due to –

(i) Illiteracy,
(ii) Disability, or
(iii) Any other disadvantage.

A newspaper advertisement notifying the public of the EIA process being undertaken, and announcing the availability of the Scoping Report for a 30-day public review period and inviting the public to review and provide comment on the report were placed in English and Afrikaans in Die Gemsbok newspaper on **17 October 2018**.

The advertisement text is included in **Appendix C2** of this Scoping Report, and a copy of the advertisement tear sheet will be included in **Appendix C2** of the Final Scoping Report for submission to DEA.

iv. Register of I&APs

42. A proponent or applicant must ensure the opening and maintenance of a register of I&APs and submit such a register to the competent authority, which register must contain the names, contact details and addresses of –
    (a) All persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP,
    (b) All persons who have requested the proponent or applicant, in writing, for their names to be placed on the register, and
    (c) All organs of state which have jurisdiction in respect of the activity to which the application relates.

I&APs have been identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder databases, undertaking of a deeds search, liaison with potentially affected parties in the study area, and a registration process involving completion of a registration and comment sheet. The key stakeholder groups identified to date include authorities, local and district municipalities, ward councillors, national, provincial and local organs of state, government bodies and state owned companies, directly affected and adjacent landowners, environmental groups, and non-governmental organisations.

An initial list of stakeholders identified and registered is listed in **Table 6.2**.

Table 6.2: List of Stakeholder Identified during the Scoping Phase

Organs of State
National Government Departments
Department of Agriculture, Forestry and Fisheries (DAFF)
Department of Energy (DoE)
Department of Environmental Affairs (including the Conservation & Biodiversity Directorate)
Department of Mineral Resources (DMR)
Department of Rural Development and Land Reform (DRDLR)

Department of Water and Sanitation (DWS)
Government Bodies and State Owned Companies
Eskom Holdings SOC Limited
National Energy Regulator of South Africa (NERSA)
South African Civil Aviation Authority (CAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
Provincial Government Departments
Northern Cape Department of Agriculture
Northern Cape Department of Environment and Nature Conservation (DENC)
Northern Cape Department of Roads and Public Works
Ngwao Boswa Kapa Bokone (NBKB)
Local Government Departments
ZF Mgcawu DM
Dawid Kruiper LM
Key Stakeholders
BirdLife South Africa
Endangered Wildlife Trust (EWT)
Wildlife and Environment Society of South Africa (WESSA)
Landowners
Affected landowners and tenants
Neighbouring landowners and tenants

As per Regulation 42 of the 2014 EIA Regulations (GNR 326), all relevant stakeholder and I&AP information has been recorded within a register of I&APs (refer to **Appendix C1** for a list of recorded parties). The register of I&APs contains the names, contact details and addresses of:

- All persons who requested to be registered on the database in writing.
- All organs of state which hold jurisdiction in respect of the activity to which the application relates.
- All persons who submitted written comments or attended meetings during the public participation process.

While I&APs have been encouraged to register their interest in the EIA process from the onset, the identification and registration of I&APs will be on-going for the duration of the EIA process. The register of I&APs will be updated throughout the EIA process, and will act as a record of the parties involved in the public participation process.

v. Registered I&APs entitled to Comment on Reports and Plans

43.(1) A registered I&AP is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.

(2) In order to give effect to section 24O of the Act, any State department that administers a law relating to a matter affecting the environment must be requested, subject to regulation 7(2), to comment within 30 days.

44.(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.

(2) Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to –

(a) A lack of skills to read or write,

(b) Disability, or

(c) Any other disadvantage,

Reasonable alternative methods of recording comments must be provided for.

I&APs registered on the database have been notified by means of notification letter of the release of the Scoping Report for a 30-day public review period, invited to provide comment on the Scoping Report, and informed of the manner in which, and timeframe within which such comment must be made. Registered I&APs will also be provided with an opportunity to comment on the EIA Report and EMPr to be prepared for the project as part of the EIA Phase.

vi. Comments of I&APs to be Recorded in Reports and Plans

Comments received during the 30-day public review period will be incorporated into a C&R Report, and attached as **Appendix C8** to the Final Scoping Report to be submitted to DEA for its review and consideration. The C&R Report will include detailed responses from members of the EIA project team and / or project proponent.

The C&R Report will be treated as a living document for the duration of the EIA process and will be updated as necessary throughout the process. Where applicable comments will be used to inform the preparation of reporting required as part of the EIA process being undertaken.

vii. Consultation

In order to accommodate the varying needs of stakeholders and I&APs within the communities surrounding the project site, as well as capture their views, issues, and concerns regarding the project, various opportunities have been and will continue to be provided in order for I&APs to have their issues noted. I&APs are being consulted through the following means:

- Focus group meetings (pre-arranged and stakeholders invited to attend).
- One-on-one consultation meetings (for example with directly affected or surrounding landowners).
- Telephonic consultation sessions with organs of state and key stakeholders.
- Written, faxed or email correspondence.

The Scoping Report has been released for a 30-day review period from **12 October 2018 – 12 November 2018**. Comments received from I&APs during the 30-day review period will be collated and responded to in a C&R Report, to be included in the Final Scoping Report to be submitted to DEA for acceptance.

Within the 30-day review period of the Scoping Report focus group meetings will be held with key stakeholders, including the relevant authorities, the affected and adjacent landowners and key representatives of the surrounding communities (refer to **Table 6.3**).

Table 6.3: Focus group meetings to be held as part of the Scoping Phase.

Group	Relevance to the project
ZF Mgcawu DM – Municipal Manager	Affected DM
Dawid Kruiper LM – Municipal Manager	Affected LM
Dawid Kruiper LM – Ward 11 & 13 Councillors	Affected Wards
Adjacent Landowners	Landowners of the properties located adjacent to the project site
Impacted Landowner	Landowner affected by the project

viii. Identification and Recording of Issues and Concerns

A Comments and Response Report has been compiled to include all comments received to date through the public participation process. All comments received during the 30-day review period from Organs of State, landowners and other stakeholders, as well as issues raised during the focus group meetings, will be included in C&R Report (refer to **Appendix C8**).

6.5. Review of the Scoping Report

The Scoping Report has been made available for a 30-day public review period from **12 October 2018 – 12 November 2018** at the following locations:

» Hard copy at the Dawid Kruiper Public Library, corner of Mark and Mutual Streets, Upington.
» Available for download at www.savannahSA.com.

All registered I&APs have been notified of the availability of the Scoping Report for review via email and registered post (refer to **Appendix C5**), while a newspaper advertisement informing the general public of the availability of the Scoping Report for review has been placed in English and Afrikaans in Die Gemsbok newspaper (refer to **Appendix C2** for advertisement text).

6.5.1. Evaluation of Issues Identified through the Scoping Process

Direct, indirect, and cumulative environmental impacts associated with the project identified during the Scoping Phase have been evaluated through desktop studies. In identifying and evaluating potential impacts, the following specialists have provided input into this Scoping Report.

Table 6.4: List of specialists providing an evaluation of potential impacts associated with Allepad PV Three

Specialist Study	Specialist Company	Specialist Name	Appendix
Ecology (Flora and Fauna)	3Foxes Biodiversity Solutions	Simon Todd	**Appendix D**
Avifauna	3Foxes Biodiversity Solutions	Simon Todd and Eric Herrmann	**Appendix E**
Soils, Land Use and Agricultural Potential	Agricultural Research Council (ARC)	Garry Patterson	**Appendix F**
Visual	LOGIS	Lourens du Plessis	**Appendix G**
Heritage (Archaeology and Palaeontology)	CTS Heritage	Jenna Lavin	**Appendix H**
Social	Savannah Environmental	Sarah Watson	**Appendix I**

In order to evaluate issues and assign an order of priority, the following methodology was used to identify the characteristics of each potential issue / impact:

- The ***nature***, which includes a description of what causes the impact, what will be affected and how it will be affected.
- The ***extent***, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional or national.
- Identify ***sensitive receptors*** that may be impacted on by the proposed development and the types of impacts that are most likely to occur.
- The ***significance*** of potential impacts in terms of the requirements of the 2014 EIA Regulations (including (nature, significance, consequence, extent, duration and probability of the impacts, the degree to which these impacts:
  (a) Can be reversed,
  (b) May cause irreplaceable loss of resources, and
  (c) Can be avoided, managed or mitigated.
- Identify the potential impacts that will be considered further in the EIA Phase through detailed investigations.

The evaluation of the issues resulted in a description of the nature, significance, consequence, extent, duration and probability of the identified issues, as well as recommendations regarding further studies required within the EIA Phase. Specialist Scoping Reports are contained within **Appendices D – I**.

6.5.2. Finalisation of the Scoping Report

The final stage of the Scoping Phase entails the capturing of comments received from stakeholders and I&APs on the Scoping Report in order to finalise the Scoping Report for submission to DEA for decision-making.

6.6. Legislation and Guidelines that have informed the preparation of this Scoping Report

The following legislation and guidelines have informed the scope and content of this Scoping Report:

- NEMA
- The 2014 EIA Regulations (GNR 326), and Listing Notices published under Chapter 5 of NEMA (GNR 327, GNR 325, and GNR 324).
- International guidelines – the Equator Principles and the IFC Performance Standards and EHS Guidelines.

Several other Acts, standards or guidelines have also informed the project process and the scope of issues addressed and assessed in this Scoping Report. A review of legislative requirements applicable to the proposed project is provided in **Table 6.5**.

Table 6.5: Relevant legislative permitting requirements applicable to Allepad PV Three

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "*Everyone has the right –* » *To an environment that is not harmful to their health or well-being, and* » *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:* * *Prevent pollution and ecological degradation,* * *Promote conservation, and* * *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development*."	Applicable to all authorities	There are no permitting requirements associated with this Act. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through the use of natural resources and ecologically sustainable development.
National Environmental Management Act (No 107 of 1998) (NEMA)	The 2014 EIA Regulations have been promulgated in terms of Chapter 5 of NEMA. Listed activities which may not commence without EA are identified within the Listing Notices (GNR 327, GNR 325 and GNR 324) which form part of these Regulations (GNR 326). In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. In terms of the Listing Notices (GNR 327, GNR 325 and GNR 324), a full Scoping and EIA Process is required to be undertaken for the proposed project.	DEA – Competent Authority Northern Cape DENC – Commenting Authority	The listed activities triggered by the proposed project have been identified and are being assessed as part of the EIA process currently underway for the project. The Scoping and EIA process will culminate in the submission of a Final EIA Report to the competent and commenting authority in support of the application for EA.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Environmental Management Act (No 107 of 1998) (NEMA)	In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	DEA Northern Cape DENC	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section finds application during the EIA Phase through the consideration of potential cumulative, direct, and indirect impacts. It will continue to apply throughout the life cycle of the project.
Environment Conservation Act (No. 73 of 1989) (ECA)	The Noise Control Regulations in terms of Section 25 of the ECA contain regulations applicable for the control of noise in the Provinces of Limpopo, North West, Mpumalanga, Northern Cape, Eastern Cape, and KwaZulu-Natal Provinces. The Noise Control Regulations cover the powers of a local authority, general prohibitions, prohibitions of disturbing noise, prohibitions of noise nuisance, use of measuring instruments, exemptions, attachments, and penalties. In terms of the Noise Control Regulations, no person shall make, produce or cause a disturbing noise, or allow it to be made, produced or caused by any person, machine, device or apparatus or any combination thereof (Regulation 04).	DEA Northern Cape DENC Dawid Kruiper LM	Noise impacts are expected to be associated with the construction phase of the project. Provided that appropriate mitigation measures are implemented, construction noise is likely to present a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of the legislation.
National Water Act (No. 36 of 1998) (NWA)	A water use listed under Section 21 of the NWA must be licensed with the Regional DWS, unless it is listed in	Regional DWS	In the event that development activities impede or divert the flow of water in a

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Schedule 1 of the NWA (i.e. is an existing lawful use), is permissible under a GA, or if a responsible authority waives the need for a licence. Water use is defined broadly, and includes consumptive and non-consumptive water uses, taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation. Consumptive water uses may include taking water from a water resource (Section 21(a)), and storing water (Section 21(b)). Non-consumptive water uses may include impeding or diverting of flow in a water course (Section 21(c)), and altering of bed, banks or characteristics of a watercourse (Section 21(i)).		watercourse, or alter the bed, banks, course or characteristics of watercourse, Section 21(c) and 21 (i) of the NWA would be triggered, and the project proponent would need to apply for a WUL or register a GA with the DWS.
Minerals and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)	In accordance with the provisions of the MPRDA a mining permit is required in accordance with Section 27(6) of the Act where a mineral in question is to be mined, including the mining of materials from a borrow pit.	DMR	Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the project, and as a result a mining permit or EA is not required to be obtained.
	Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely		In terms of Section 53 of the MPRDA approval is required from the Minister of Mineral Resources to ensure that the proposed

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	to impede any such object must apply to the Minister for approval in the prescribed manner.		development does not sterilise a mineral resource that might occur on site.
National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)	The National Dust Control Regulations (GNR 827) published under Section 32 of NEM:AQA prescribe the general measures for the control of dust in all areas, and provide a standard for acceptable dustfall rates for residential and non-residential areas. In accordance with the Regulations (GNR 827) any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dustfall standard set out in Regulation 03 must, upon receipt of a notice from the air quality officer, implement a dustfall monitoring programme. Any person who has exceeded the dustfall standard set out in Regulation 03 must, within three months after submission of the dustfall monitoring report, develop and submit a dust management plan to the air quality officer for approval.	Northern Cape DENC / ZF Mgcawu DM	In the event that the project results in the generation of excessive levels of dust the possibility could exist that a dustfall monitoring programme would be required for the project, in which case dustfall monitoring results from the dustfall monitoring programme would need to be included in a dust monitoring report, and a dust management plan would need to be developed. However granted that appropriate mitigation measures are implemented, the proposed project is not anticipated to result in significant dust generation.
National Heritage Resources Act (No. 25 of 1999) (NHRA)	Section 07 of the NHRA stipulates assessment criteria and categories of heritage resources according to their significance. Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites. Section 36 of the NHRA provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority.	SAHRA Ngwao Boswa Kapa Bokone (NBKB)	A Scoping level Heritage Impact Assessment (HIA) has been undertaken as part of the Scoping process conducted to date, and the recommendation that a full HIA (with field work) be undertaken as part of the EIA Phase has been made. The HIA proposed as part of the EIA process will allow for the identification of heritage resources present within the proposed project site, and which may be impacted on as a result of the proposed development. It will also recommend appropriate mitigation measures for

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	Section 38 of the NHRA lists activities which require developers or any person who intends to undertake a listed activity to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development. Section 44 of the NHRA requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction.		implementation to avoid, minimise, or mitigate impacts to heritage resources. Should a heritage resource be impacted upon, a permit may be required from SAHRA or Ngwao Boswa Kapa Bokone (NBKB) in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GNR 668). This will be determined once the final location of the project and its associated infrastructure within the project site has been determined.
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process. Three government notices have been published in terms of Section 56(1) of NEM:BA as follows: » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems	DEA Northern Cape DENC	Under NEM:BA, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species. TOPS potentially occurring within the study area, and in terms of which a permit may be required will be identified as part of the independent ecological specialist study proposed to be undertaken as part of the EIA process.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	(NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014).		
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an alien species without a permit issued in terms of Chapter 7 of NEM:BA, and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out. Applicable, and exempted alien and invasive species are contained within the Alien and Invasive Species List (GNR 864).	DEA Northern Cape DENC	Restricted Activities and the respective requirements applicable to persons in control of different categories of listed invasive species are contained within the Alien and Invasive Species Regulations (GNR 598) published under NEM:BA, together with the requirements of the Risk Assessment to be undertaken.
Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)	Section 05 of CARA provides for the prohibition of the spreading of weeds. Regulation 15 of GNR 1048 published under CARA provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E of GNR 1048 published under CARA provides requirement and methods to implement control measures for different categories of alien and invasive plant species.	DAFF	CARA will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented. The permission of DAFF will be required if the Project requires the draining of vleis, marshes or water sponges on land outside urban areas. However this is not anticipated to be required for the project. In terms of Regulation 15E (GNR 1048) where Category 1, 2 or 3 plants occur a land user is required to control such plants by means of one or more of the following methods: » Uprooting, felling, cutting or burning.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			» Treatment with a weed killer that is registered for use in connection with such plants in accordance with the directions for the use of such a weed killer. » Biological control carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that has as its object the control of plants concerned, subject to the provisions of sub-regulation (4). » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods to the extent that the agents are destroyed or become ineffective.
National Forests Act (No. 84 of 1998) (NFA)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 734. The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister".	DAFF	A licence is required for the removal of protected trees. It is therefore necessary to conduct a survey that will determine the number and relevant details pertaining to protected tree species present on the project site for the submission of relevant permits to authorities prior to the disturbance of these individuals. The independent ecological specialist study proposed to be undertaken as part of the EIA process will include a site visit which will allow

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			for the identification of any protected tree species which may require a license in terms of the NFA within the project site.
National Veld and Forest Fire Act (No. 101 of 1998) (NVFFA)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it. Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires, and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.	DAFF	While no permitting or licensing requirements arise from this legislation, this Act will be applicable during the construction and operation of the project, in terms of the preparation and maintenance of firebreaks, and the need to provide appropriate equipment and personnel for firefighting purposes.
Hazardous Substances Act (No. 15 of 1973) (HAS)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger, to provide for the	Department of Health (DoH)	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on site and in what operational context they are used, stored or handled. If applicable, a license would be required to be obtained from DoH.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product, and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.		
National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of NEM:WA (GNR 912), a BA or EIA is required to be undertaken for identified listed activities. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:	DEA – hazardous waste Northern Cape DENC – general waste	General waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926) published under Section 7(1)(c) of NEM:WA will need to be considered in this regard.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	» The containers in which any waste is stored, are intact and not corroded or in » Any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise, and » Pollution of the environment and harm to health are prevented.		
National Road Traffic Act (No. 93 of 1996) (NRTA)	The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits	SANRAL – national roads Northern Cape DoT	An abnormal load / vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. Transport vehicles exceeding the dimensional limitations (length) of 22m. Depending on the trailer configuration and height when loaded, some of the substation components may not meet specified dimensional limitations (height and width).

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.		

6.6.1. Best Practice Guidelines Birds & Solar Energy (2017)

The Best Practice Guidelines Birds & Solar Energy (2017) proposed by the Birds and Renewable Energy Specialist Group (BARESG) (convened by BirdLife South Africa and the Endangered Wildlife Trust) contain guidelines for assessing and monitoring the impact of solar generation facilities on birds in Southern Africa. The guidelines recognise the impact that solar energy may have on birds, through for example the alteration of habitat, the displacement of populations from preferred habitat, and collision and burn mortality associated with elements of solar hardware and ancillary infrastructure, and the fact that the nature and implications of these effects are poorly understood.

The guidelines are aimed at EAPs, avifaunal specialists, developers and regulators and propose a tiered assessment process, including:

(i) Preliminary avifaunal assessment – an initial assessment of the likely avifauna in the area and possible impacts, preferably informed by a brief site visit and by collation of available data, also including the design of a site-specific survey and monitoring project should this be deemed necessary.
(ii) Data collection – further accumulation and consolidation of the relevant avian data, possibly including the execution of baseline data collection work (as specified by the preliminary assessment), intended to inform the avian impact study.
(iii) Impact assessment – a full assessment of the likely impacts and available mitigation options, based on the results of systematic and quantified monitoring if this was deemed a requisite at preliminary assessment.
(iv) Monitoring – repetition of baseline data collection, plus the collection of mortality data. This helps to develop a complete before and after picture of impacts, and to determine if proposed mitigation measures are implemented and are effective, or require further refinement. Monitoring may only be necessary for projects with the potential for significant negative impacts on birds (i.e. large area affected and / or vulnerable species present).

In terms of the guidelines the quantity and quality of baseline data required to inform the assessment process at each site should be set in terms of the size of the site and the predicted impacts of the solar technology in question, the anticipated sensitivity of the local avifauna (for example, the diversity and relative abundance of priority species present, proximity to important flyways, wetlands or other focal sites) and the amount of existing data available for the area.

Data collection could vary from a single, short field visit (Regime 1, for e.g. at a small or medium sized site with low avifaunal sensitivity), to a series of multi-day survey periods, including the collection of various forms of data describing avian abundance, distribution and movement and spread over 12 months (Regime 3, for e.g. at a large developments located in a sensitive habitat, or which otherwise may have significant impacts on avifauna). **Table 6.6** is taken from the best practise guidelines and provides a summary of the recommended assessment regimes in relation to proposed solar energy technology, project size, and likely risk).

Table 6.6: Recommended avian assessment regimes in relation to proposed solar energy technology, project size, and known impact risks.

Type of technology*	**Size****	**Avifaunal Sensitivity*****		
		Low	Medium	High
All except CSP power tower	Small (< 30ha)	Regime 1	Regime 1	Regime 2

Type of technology*	Size**	Avifaunal Sensitivity***		
		Low	Medium	High
	Medium (30 – 150ha)	Regime 1	Regime 2	Regime 2
	Large (> 150ha)	Regime 2****	Regime 2	Regime 3
CSP power tower	All	Regime 3		

Regime 1: One site visit (peak season), minimum 1 – 5 days.
Regime 2: Pre- and post-construction, minimum 2 – 3 x 3 – 5 days over 6 months (including peak season), carcass searches.
Regime 3: Pre- and post-construction, minimum 4 – 5 x 4 – 8 days over 12 months, carcass searches.

* Different technologies may carry different intrinsic levels of risk, which should be taken into account in impact significance ratings

** For multi-phased projects, the aggregate footprint of all the phases should be used. At 3ha per MW, Small = < 10MW, Medium = 10 – 50MW, Large = > 50MW.

*** The avifaunal sensitivity is based on the number of priority species present, or potentially present, the regional, national or global importance of the affected area for these species (both individually and collectively), and the perceived susceptibility of these species (both individually and collectively) to the anticipated impacts of development. For example, an area would be considered to be of high avifaunal sensitivity if one or more of the following is found (or suspected to occur) within the broader impact zone:

1) Avifaunal habitat (e.g. a wetlands, nesting or roost sites) of regional or national significance.
2) A population of a priority species that is of regional or national significance.
3) A bird movement corridor that is of regional or national significance.
4) A protected area and / or Important Bird and Biodiversity Area.

An area would be considered to be of medium avifaunal sensitivity if it does not qualify as high avifaunal sensitivity, but one or more of the following is found (or suspected to occur) within the broader impact zone

1) Avifaunal habitat (e.g. a wetland, nesting or roost sites) of local significance.
2) A locally significant population of a priority species.
3) A locally significant bird movement corridor.

An area would be considered to be of low avifaunal sensitivity if it is does not meet any of the above criteria.

**** Regime 1 may be applied to some large sites, but only in instances where there is abundant existing data to support the assessment of low sensitivity.

For the purposes of Allepad PV Three the project has been classified as Regime 2 site. Two sets of monitoring (i.e. a winter and a summer monitoring season) of 4 days each (i.e. 2 x 4 days over 6 months) will be undertaken and the results thereof included in the independent Ecological Impact Assessment being conducted as part of the EIA process. The results from the monitoring will be used to inform both the development footprint and Ecological Impact Assessment report, to be attached as an Appendix to the EIA Report.

6.6.2. The IFC EHS Guidelines

The IFC EHS Guidelines are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). The following IFC EHS Guidelines have relevance to the proposed project:

» IFC EHS General Guidelines
» IFC EHS Guidelines for Electric Power Transmission and Distribution

The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines, however no Industry Sector EHS Guidelines have been developed for PV solar power to date.

The application of the General EHS Guidelines should be tailored to the hazards and risks associated with a project, and should take into consideration site-specific variables which may be applicable, such as host country context, assimilative capacity of the environment, and other project factors. In instances where host country regulations differ from the standards presented in the EHS Guidelines, whichever is the more stringent of the two in this regard should be applied.

The General EHS Guidelines include consideration of the following:

- Environmental:
  - Air Emissions and Ambient Air Quality
  - Energy Conservation
  - Wastewater and Ambient Water Quality
  - Water Conservation
  - Hazardous Materials Management
  - Waste Management
  - Noise
  - Contaminated Land
- Occupational Health and Safety:
  - General Facility Design and Operation
  - Communication and Training
  - Physical Hazards
  - Chemical Hazards
  - Biological Hazards
  - Radiological Hazards
  - Personal Protective Equipment (PPE)
  - Special Hazard Environments
  - Monitoring
- Community Health and Safety:
  - Water Quality and Availability
  - Structural Safety of Project Infrastructure
  - Life and Fire Safety (L&FS)
  - Traffic Safety
  - Transport of Hazardous Materials
  - Disease Prevention
  - Emergency Preparedness and Response
- Construction and Decommissioning:
  - Environment
  - Occupational Health & Safety
  - Community Health & Safety

6.6.3. IFC's Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (2015)

While no Industry Sector EHS Guidelines have been developed for PV Solar Power, the IFC has published a Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (IFC, 2015). Chapter 8 of the Project Developer's Guide pertains to Permits, Licensing and Environmental Considerations, and states that in order to deliver a project which will be acceptable to international lending institutions, environmental

and social assessments should be carried out in accordance with the requirements of the key international standards and principles, namely the Equator Principles and IFC's Performance Standards.

Some of the key environmental considerations for solar PV power plants contained within the Project Developer's Guide include:

- Construction phase impacts (i.e. Occupational Health and Safety (OHS), temporary air emissions from dust and vehicle emissions, noise related to excavation, construction and vehicle transit, solid waste generation and wastewater generation from temporary building sites and worker accommodation).
- Water usage (i.e. the cumulative water use requirements).
- Land matters (i.e. land acquisition procedures and the avoidance or proper mitigation of involuntary land acquisition / resettlement).
- Landscape and visual impacts (i.e. the visibility of the solar panels within the wider landscape and associated impacts on landscape designations, character types and surrounding communities).
- Ecology and natural resources (i.e. habitat loss / fragmentation, impacts on designated areas and disturbance or displacement of protected or vulnerable species).
- Cultural heritage (i.e. impacts on the setting of designated sites or direct impacts on below-ground archaeological deposits as a result of ground disturbance during construction).
- Transport and access (i.e. impacts of transportation of materials and personnel).
- Drainage / flooding (i.e. flood risk associated with the site).
- Consultation and disclosure (i.e. consulting with key authorities, statutory bodies, affected communities and other relevant stakeholders as early as possible).
- Environmental and Social Management Plan (ESMP) (i.e. compile an ESMP to ensure that mitigation measures for relevant impacts are identified and incorporated into project construction procedures and contracts).

CHAPTER 7. SCOPING OF POTENTIAL IMPACTS

This Chapter provides an overview of the potential impacts and risks associated with the development of Allepad PV Three, identified at this stage of the process through a desktop review of available existing information and specialist studies.

Potential environmental impacts and risks associated with the development of PV solar energy generation facilities, as described in the IFC's Project Developer's Guide to Utility-Scale Solar Photovoltaic Power Plants (2015), include:

- Construction phase impacts, such as temporary air emissions (dust and vehicle emissions), noise, solid waste and wastewater generation, and OHS issues such as the risk of preventable accidents leading to injuries and / or fatalities.
- Water usage, such as the cumulative water use requirement in arid areas where local communities rely upon scarce groundwater resources.
- Land matters, such as land acquisition procedures and in particular involuntary land acquisition / resettlement.
- Landscape and visual impacts, such as the visibility of the project within the wider landscape and associated impacts on landscape designations, character types and surrounding communities.
- Ecology and natural resources, such as habitat loss / fragmentation, impacts on designated areas, and disturbance or displacement of protected or vulnerable species.
- Cultural heritage, such as impacts on the setting of designated sites or direct impacts on below-ground archaeological deposits as a result of ground disturbance during construction.
- Transport and access, such as impacts associated with the transportation of materials and personnel on project-affected communities.
- Drainage / flooding, such as the potential for high flood risk associated with the project site.

In order to appropriately identify, assess, and as far as possible avoid or mitigate potential impacts and risks that may be associated with the development, construction, operation and decommissioning of Allepad PV Three, Savannah Environmental commissioned a team of independent specialist consultants with relevant scientific knowledge and expertise in the biophysical (i.e. biotic and abiotic) and social environments.

The specialist consultants that provided input into this Scoping Report and whose in-depth studies will form part of the EIA process are provided in **Table 7.1**. Copies of the specialist Scoping level assessments are included in **Appendices D – I** of this Scoping Report.

Table 7.1: Specialist Studies to be conducted as part of the EIA process.

Specialist Study	Specialist Company	Specialist Name
Ecology (Flora and Fauna)	3Foxes Biodiversity Solutions	Simon Todd
Avifauna	3Foxes Biodiversity Solutions	Simon Todd and Eric Herrmann
Soils, Land Use and Agricultural Potential	Agricultural Research Council (ARC)	Garry Patterson
Visual	LOGIS	Lourens du Plessis

Specialist Study	Specialist Company	Specialist Name
Heritage (Archaeology and Palaeontology)	CTS Heritage	Jenna Lavin
Social	Savannah Environmental and Dr. Neville Bews & Associates	Sarah Watson and Dr. Neville Bews

Section 7.1 and **Section 7.2** provide a summary of the findings of the scoping study undertaken for the construction and operation phases of Allepad PV Three respectively. Those impacts associated with construction can also be expected to be associated with the decommissioning phase (however, to a lesser extent as the project site would have previously undergone transformation and disturbance during construction). These summaries must be read in conjunction with the specialist reports attached as **Appendices D – I** of this Scoping Report. Potential impacts associated with the project are evaluated, and recommendations are made regarding further studies required within the EIA Phase. It must be noted that the evaluations provided in **Section 7.1** and **Section 7.2** are preliminary in nature, and will only be finalised once more in-depth investigations and site surveys have been conducted (i.e. during the EIA Phase).

A summary of the potential cumulative impacts that may be associated with the project is provided in **Section 7.3**. These impacts are associated with the scale of the project when considered together with other similar developments within the region, and will be confirmed and assessed within the EIA Phase of the project.

7.1. Evaluation of Potential Impacts Associated with the Construction Phase

7.1.1. Potential Impacts on Ecology (Flora and Fauna)

Impact Impacts on vegetation and listed or protected plant species resulting from construction activities. Impacts on vegetation will occur due to disturbance and vegetation clearing associated with the construction of the facility. In addition, it is highly likely that some loss of individuals of plant SCC will occur.
Desktop Sensitivity Analysis of the Site The sensitivity map for the Allepad study area is illustrated in **Figure 7.1**. The eastern half of the site occurs on shallow calcrete soils and has numerous drainage lines as well as a few small pans present. This area is considered largely unsuitable for development. The western half of the site on undulating sandy soils is considered to be low sensitivity and suitable for development apart from the extensive area of mobile dunes which is considered to be medium high sensitivity and not suitable for development as the loose sands are very vulnerable to erosion. In addition, it is likely that significant soil disturbance would be required in this area as the dunes would likely need to be at least partly levelled before construction. Based on these results, it is likely that the Allepad PV Three site can be located within area of low sensitivity where ecological impacts can be restricted to a low level. The power line corridor runs along the southern boundary of the site towards Upington and then runs adjacent to the N10 national road until it reaches upgraded 132kV between the Upington Main Transmission Substation (MTS) and the Gordonia Distribution Substation. The route was inspected and there are no visible features of high significance along the proposed route and minor features such as the occasional stands of trees present can likely be avoided though adjustment of the final route within the 300m corridor to be assessed.

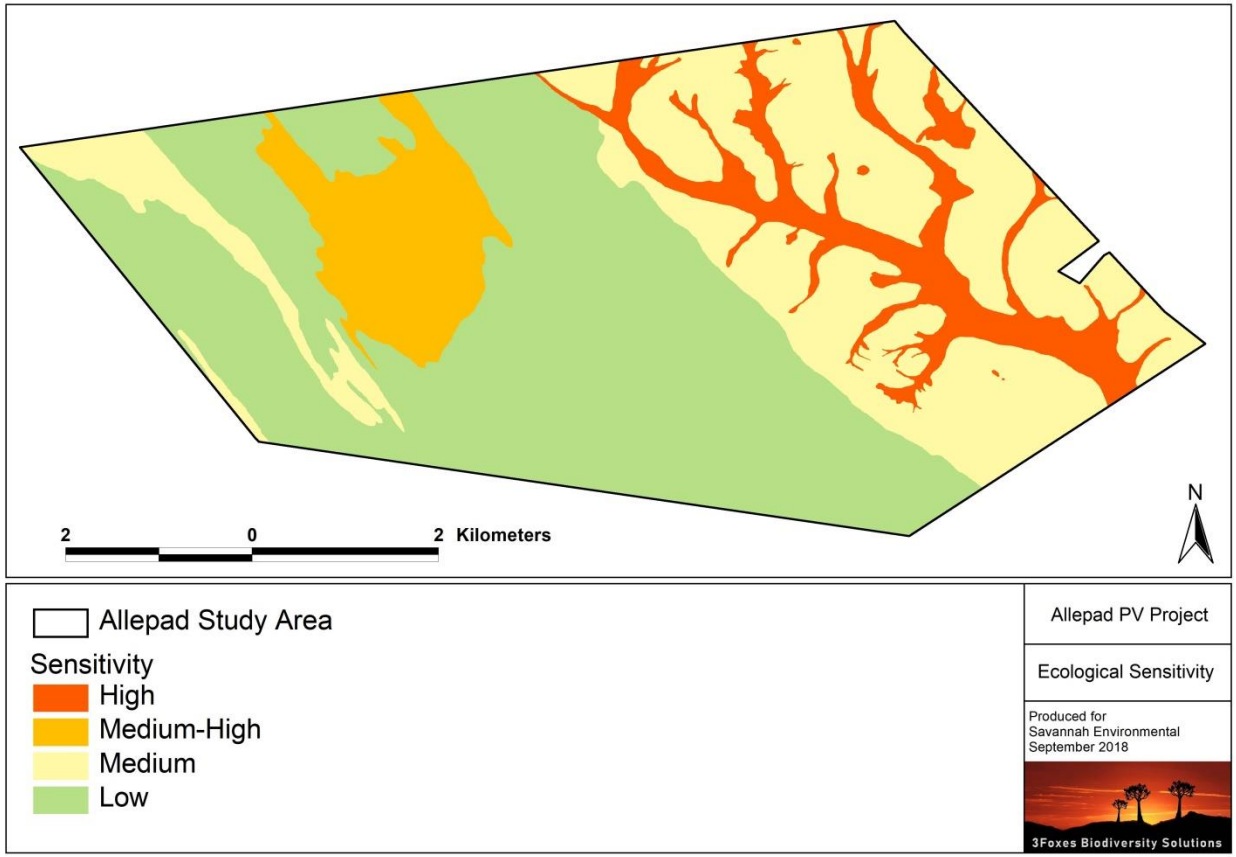


Figure 7.1: Sensitivity map for the Allepad PV Three project area.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Vegetation clearing will result in loss of currently intact vegetation	Habitat loss and impact on plant SCC will occur	Local	The Gravel Plains habitat in the east of the site should be avoided, due to the likely presence of plant SCC. In addition the larger contiguous dune area in the west should be avoided as far as possible.

Description of expected significance of impact:

Impacts on vegetation and SCC are likely to be moderate to low, depending on the exact location of the development footprint and the presence of species of concern within the development footprint.

Gaps in knowledge & recommendations for further study

» The different habitats mapped in this study are based on satellite imagery and will need to be verified and characterised in the field.
» The density and distribution of plant SCC across the site will need to be characterised to better inform the EIA phase.
» The sensitivity map derived for the site will need to be updated based on the results of the above studies.

Impact

Direct faunal impacts due to construction activities.

Disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction. Due to noise and operation of heavy machinery, faunal disturbance will extend well beyond the footprint and extend into adjacent areas. This will however be transient and restricted to the construction phase.

Desktop Sensitivity Analysis of the Site

Refer to **Figure 7.1** for the desktop sensitivity analysis of the site.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Construction phase disturbance of fauna	Fauna will be disturbed or killed by construction phase disturbance	Local	The Gravel Plains habitat in the east of the site should be avoided, due to the likely significance of this area for fauna. In addition the larger contiguous dune area in the west should be avoided as far as possible.

Description of expected significance of impact:

Faunal impacts due to construction activities will be of relatively high intensity given the clearing and site establishment impacts, but this would be of short duration and of moderate overall significance.

Gaps in knowledge & recommendations for further study

» The fauna associated with the different habitats at the site will need to be verified and characterised in the field.
» Important faunal habitats which have not been captured in the sensitivity map will need to be identified and mapped in the field.
» The overall impact of the development on fauna and faunal habitats will need to be evaluated in the field based on the proposed layout of the development.

7.1.2. Avifauna

Impact
Habitat loss and disturbance as a result of the construction of the PV facility.
Desktop Sensitivity Analysis of the Site
An avian sensitivity map was generated by integrating avian microhabitats present on the site and avifaunal information collected during the site visit (refer to **Figure 7.2**). The study area supports three main avifaunal microhabitats, which are referred to as the gravel plains, sandy plains, and dunes habitat. These three habitats have different sensitivities, due to the subtle differences in the avifaunal assemblages that they support, especially with respect to red-listed species. The gravel plains are considered to be of High Sensitivity, due firstly to the habitat diversity of the area and the fact that it supports several pairs of the Near-Threatened Karoo Korhaan, which are presumably resident in the area. The dune habitat is well represented within the bioregion, but due to the deeper soils, supports a number of protected tree species, such as the *Acacia erioloba*, *A.haematoxylon* and *Boscia albitrunca*, *B.foetida subsp. foetida*. These tree species, in turn, provide important nesting and roosting sites for birds, including large raptors. This habitat is therefore considered to be of Medium Sensitivity due to its importance to a wide variety of avifaunal species. The sandy plains habitat represents the most widely distributed habitat in the region, and occurs primarily on shallower soils that do not support an extensive tree layer, besides scattered *Parkinsonia africana*. This habitat is therefore regarded to be of Low-Medium sensitivity. It is likely that development of the solar energy facility on the lower sensitivity parts of the site, such as the sandy plains habitat, would generate the least impacts on the avifauna, provided suitable mitigation measures are employed during construction and operation of the proposed facility. While the development would result in some habitat loss for avifauna of local significance, it will not necessarily impact negatively on red-listed avifaunal species, which appear to occur sparsely within the broader study area and primarily in adjacent habitats.

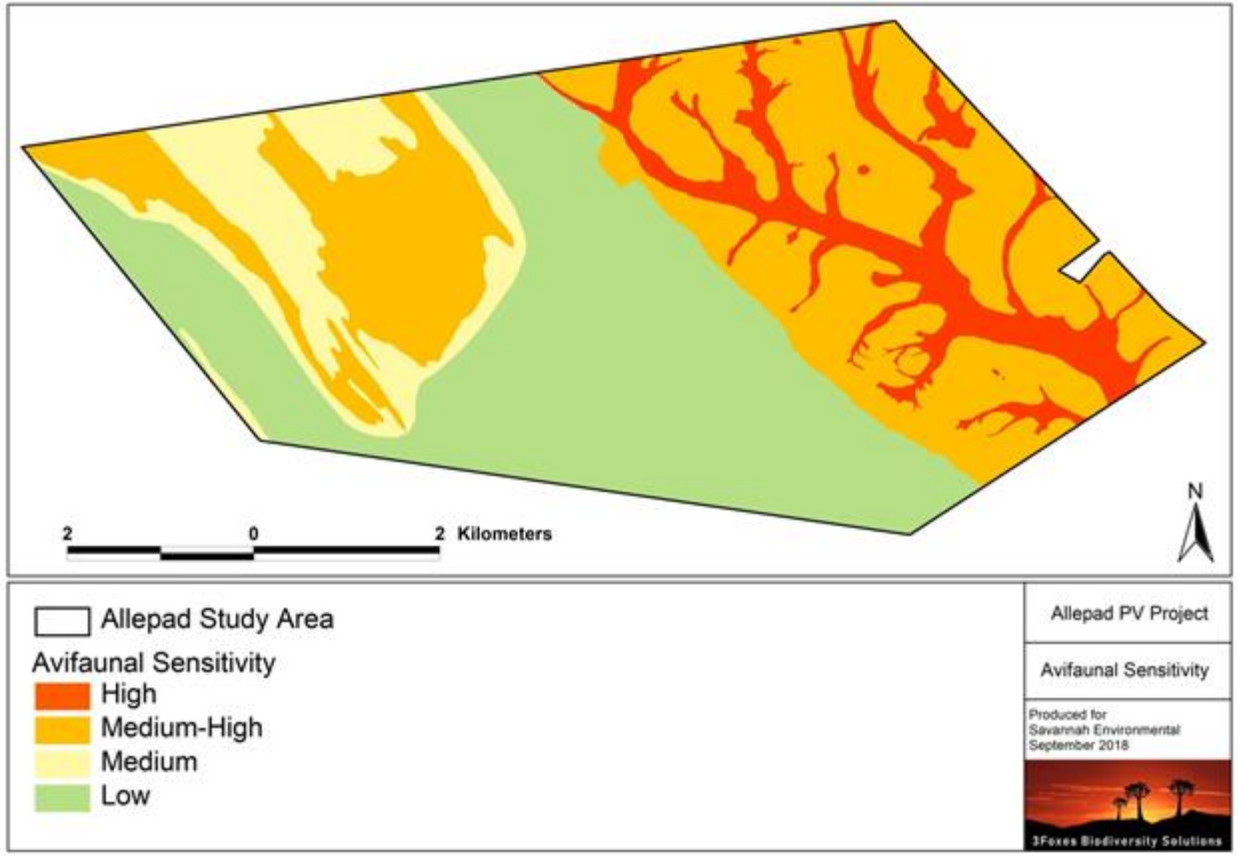


Figure 7.2: Sensitivity map for Allepad PV Three, showing the High Sensitivity gravel plains in the east of the study area, and the Medium and Medium High Sensitivity dunes habitat in the west. The remaining central and southern areas constitute the sandy plains habitat with a Low Sensitivity.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Loss of intact habitat due to transformation for the PV plant as well as disturbance of local avifauna due to construction activities.	Vegetation clearing will potentially lead to the loss of avifaunal species, habitats and ecosystems as birds are displaced from their habitat	Local	The Gravel Plains habitat in the east of the site should be avoided, due to the presence and significance of this area for avifauna species of concern.

Description of expected significance of impact:
Since habitat loss and disturbance are an unavoidable outcome of the development, this impact cannot be fully mitigated and the impacts on the local avifauna after mitigation are likely to be Medium Low Negative, but could also potentially be Medium Negative depending on the final position of the development footprint and the extent of habitat loss within the Medium and Medium High sensitivity areas.

Gaps in knowledge & recommendations for further study

» The use and presence of larger raptors and other similar species of conservation concern at the site should be better quantified with a summer-season survey. This information should be used to inform the sensitivity mapping at the site as well as the final layout of the development footprint.
» The fence around the facility should be designed with potential impacts on avifauna in mind. This includes the location and positioning of the electrified strands in relation to the fence as it has been shown that avifauna may become trapped in the gap between these two components of the fence.

Impact
Habitat loss and disturbance as a result of the construction of grid connection infrastructure.

Desktop Sensitivity Analysis of the Site
Refer to **Figure 7.2** for the desktop sensitivity analysis of the site.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
The construction of the power line will result in some habitat loss and disturbance of local avifauna.	Disturbance and construction phase activities will result in habitat loss and displacement of avifauna from the vicinity of the development footprint.	Local.	Impact near to important habitats such as stands of large trees that may be breeding sites for large raptors should be minimised.

Description of expected significance of impact:
The footprint of the power line would be relatively low and the construction phase disturbance would be transient. As a result, the impact of the power line construction on avifauna can be mitigated to a low significance.

Gaps in knowledge & recommendations for further study

» The features along the proposed route have not been characterised and important avifaunal features such as drainage lines and stands of large trees that may be breeding sites for large raptors should be investigated and mapped in the field.
» Areas where the power line should be fitted with bird flight diverters to reduce collision risk should be identified.

7.1.3. Potential Impacts on Soil, Land Use, and Agricultural Potential

Impact

Loss of arable agricultural land.

The major impact on the soil resources of the study area would be the loss of arable land due to the construction of the various types of infrastructure. This impact would in all probability be of very limited significance and would be local in extent. At the end of the project life, it is anticipated that removal of the structures would enable the land to be returned to more or less a natural state following rehabilitation, with little impact, especially given the low prevailing agricultural potential.

Desktop Sensitivity Analysis of the Site

Much of the western half of the area comprises deep, red, sandy soils, with extensive areas of dunes. The eastern half has a mixture of deep, red, sands and shallow lithosols, often on calcrete. The very low rainfall in the area means that the only means of cultivation would be by irrigation and remote sensing imagery of the area shows no signs of any agricultural infrastructure and none of irrigation, which is confined to a strip along the Gariep River. The climatic restrictions mean that this part of the Northern Cape is suited at best for grazing and here the grazing capacity is very low, around 40 – 50 ha/large stock unit (ARC-ISCW, 2004). The dominant class of agricultural potential is low.

Sensitive areas identified on the project site from a soils, land use, and agricultural perspective include:

- The dune fields in the west which comprise shifting sands with bare surface areas, where wind erosion could be especially severe.
- The stream channel network in the east, where any disturbance due to construction of infrastructure could lead to disruption of surface flow and possible water erosion. (Although periods of heavy rainfall are rare in this dry environment, rainfall can occur sporadically and may very occasionally be heavy.

These areas are shown in orange in the sensitivity map (refer to **Figure 7.3**). The boundary lines have been drawn from desktop information (including the land type data and remote sensing imagery). It can therefore be expected that field ground-truthing might enable these areas to be refined somewhat.

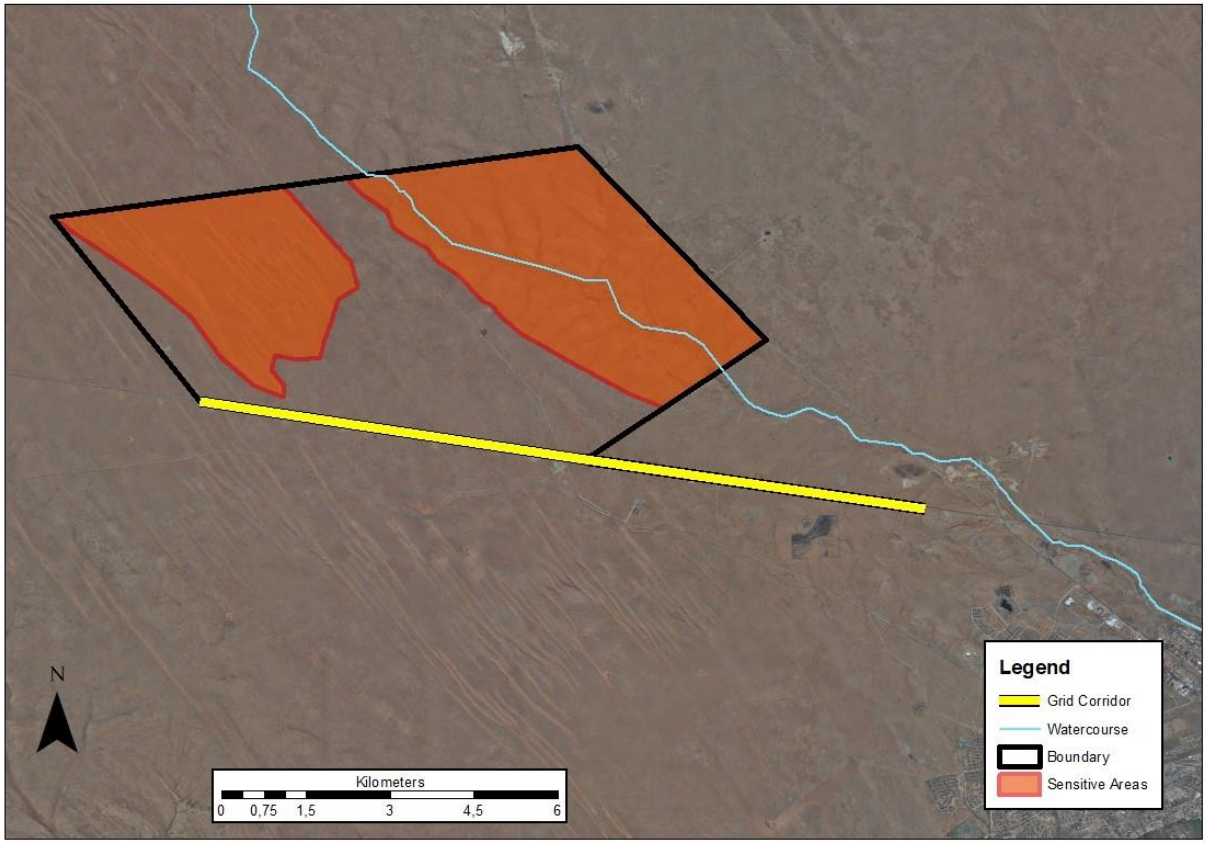


Figure 7.3: Map indicating sensitive areas (dune area to the west, stream bed area to the east).

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Loss of agricultural land.	Land that is no longer able to be utilised due to construction of infrastructure.	Site – Confined to areas within the site where infrastructure will be located.	No no-go areas have been identified for the project, however the dune fields in the west (which comprise shifting sands with bare surface areas, where wind erosion could be especially severe), and the stream channel network in the east,

			(where any disturbance due to construction of infrastructure could lead to disruption of surface flow and possible water erosion) have been identified as sensitive areas.

Description of expected significance of impact:
Duration of impact: Long-term, the impact will cease if the operation of the activity ceases.
Probability of impact: Highly probable.
Severity of impact: Low
Significance of impact: Low, mainly due to the low potential of the area, as well as nature of the infrastructure proposed.

Gaps in knowledge & recommendations for further study
» None identified.

Impact
Wind erosion.

Given the prevailing dry climate and sandy soils, a real hazard would be increased wind erosion due to the construction of the solar panels and associated infrastructure. The area is mapped as "highly susceptible" (ARC-ISCW, 2004).

Desktop Sensitivity Analysis of the Site
Refer to **Figure 7.3** for the desktop sensitivity analysis of the site.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Increased wind erosion.	Topsoil lost due to the action of the prevailing wind.	Local (i.e. areas surrounding the site) – Wind action can cause soil particles to be transported for considerable distances.	No no-go areas have been identified for the project, however the dune fields in the west (which comprise shifting sands with bare surface areas, where wind erosion could be especially severe), and the stream channel network in the east, (where any disturbance due to construction of infrastructure could lead to disruption of surface flow and possible water erosion) have been identified as sensitive areas.

Description of expected significance of impact: Duration of impact: Long-term, as long as the soil surface is not stabilised erosion will continue. Probability of impact: Highly probable. Severity of impact: Low Significance of impact: High, mainly due to dry climate and sandy soils.
Gaps in knowledge & recommendations for further study » None identified.

7.1.4. Potential Impacts on Heritage (Archaeology and Palaeontology)

Impact » Impact to archaeological and built environment resources » Impact to palaeontological resources » Impact to Cultural Landscape » Cumulative Impact			
Desktop Sensitivity Analysis of the Site None identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Impact to significant archaeological resources such as Stone Age artefact scatters, burial grounds and graves, historical artefacts, historical structures and rock art engravings through destruction during the construction phase.	Destruction of significant archaeological and other heritage resources.	Local scale with broader impacts to scientific knowledge.	To be identified through the field assessment.
Description of expected significance of impact: » Based on the available information, it is likely that the proposed development will impact on significant archaeological resources such as Stone Age artefact scatters, burial grounds and graves, historical artefacts, historical structures and rock art engravings through destruction during the construction phase. Impacts are likely to be negative, local to regional, and of medium significance. » Impacts to palaeontological resources are unlikely.			
Gaps in knowledge & recommendations for further study » The heritage resources in the area proposed for development are not sufficiently recorded.			

» Based on the available information, including the scale and nature of the proposed development, it is likely that significant heritage resources will be impacted by the proposed development and as such it is recommended that an archaeological field assessment be conducted to inform a full Heritage Impact Assessment. This field assessment will identify all heritage resources of significance within the development footprint, map them and grade them in terms of their significance. This will inform the Heritage Impact Assessment which will clarify the impacts anticipated and provide mitigation measures, recommendations and possible no-go zones, as well as an assessment of the proposed alternatives.

7.1.5. Potential Visual Impacts

Apart from the potential visual impact of the construction of ancillary infrastructure (i.e. the substation at the facility, associated power line and access roads) on observers in close proximity of the facility (i.e. observers travelling along the N10 national and R360 regional roads, visitors to the Kalahari Monate Lodge, and residents of homesteads and farm dwellings (if present in close proximity to the facility)), the majority of potential visual impacts associated with the project are anticipated to occur during the operation phase (refer to **Section 7.2.5**).

7.1.6. Potential Socio-Economic Impacts

Impact			
Creation of direct and indirect employment opportunities and skills development.			
Desktop Sensitivity Analysis of the Site:			
No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Construction of the project will result in the creation of a number of direct and indirect employment opportunities, which will assist in addressing unemployment levels within the area and aid in skills development of communities in the area.	Positive – The creation of employment opportunities will assist to an extent in alleviating unemployment levels within the area.	The impact will occur at a local, regional, and national level.	No no-go areas have been identified to date.
Description of expected significance of impact			
At its peak, the construction is likely to result in the creation of approximately 300 direct employment opportunities. Of those direct employment opportunities likely to be generated, approximately 60% will comprise opportunities for low skilled or non-skilled workers, 25% for semi-skilled workers, and 15% for skilled workers. Skills developed through experience in the construction of the facility will be retained by the community members involved. The impact is likely to be positive, local to national in extent, short-term, and of medium significance.			

Gaps in knowledge and recommendations for further study

» Information on the exact direct and indirect employment opportunities and skills development opportunities likely to be created during construction.

Impact

Economic multiplier effects.

Desktop Sensitivity Analysis of the Site:

No sensitivity identified.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Economic multiplier effects from the use of local goods and services during the construction phase.	Positive – There are likely to be opportunities for local businesses to provide goods and services during the construction phase of development.	The impact will occur at a local, and regional level.	No no-go areas have been identified to date.

Description of expected significance of impact

Economic multiplier effects from the use of local goods and services opportunities include, but are not limited to, the provision of construction materials and equipment, provision of workforce essentials such as services, safety equipment, ablution, accommodation, transportation and other goods. The increase in demand for goods and services may stimulate local business and local economic development (however locally sourced materials and services may be limited due to availability). There is likely to be a direct increase in industry and indirect increase in secondary businesses. The impact is likely to be positive, local to regional in extent, short-term, and of medium significance.

Gaps in knowledge and recommendations for further study

» Information on capital expenditure to be spent on local goods and services.

Impact

In-migration of people (non-local workforce and jobseekers).

Desktop Sensitivity Analysis of the Site:

No sensitivity identified.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Increased pressure on infrastructure and basic services, and social conflicts during construction as a result of in-migration of people.	Negative – The in-migration of job seekers to the area could result in increased pressure being placed on infrastructure and basic services, and a rise in social conflicts.	The impact will occur at a local level.	No no-go areas have been identified to date.

Description of expected significance of impact
The in-migration of people to the area as either non-local workforce and / or jobseekers could result in increased pressure being placed on infrastructure and basic services on the local population (rise in social conflicts). An influx of people into the area, could lead to a temporary increase in crime levels, cause social disruption, and put pressure on basic services. An influx of people looking for economic opportunities could result in pressure on the local population such as rise in social conflicts and change in social dynamics, increase in HIV, pregnancies and drug abuse. Adverse impacts could occur if a large in-migrant workforce, which is culturally different from the local population, is brought in during construction. The impact is likely to be negative, local in extent, short-term[15], and of medium significance due to the number of jobs expected to be created, and the proportion of which would accrue to the non-local workforce.
Gaps in knowledge and recommendations for further study
» Information on the exact number of employment opportunities likely to accrue to the local labour force, versus the number of employment opportunities likely to accrue to the non-local workforce and jobseekers. » Mechanisms for employment of local labour and minimisation of in-migration.

Impact			
Safety and security impacts.			
Desktop Sensitivity Analysis of the Site:			
No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Temporary increase in safety and security concerns associated with the influx of people during the construction phase.	Negative – The in-migration of job seekers to the area could be perceived to result in increased criminal activity.	The impact will occur at a local level.	No no-go areas have been identified to date. No workers should be allowed to reside on-site during construction.
Description of expected significance of impact			
The perception exists that an influx of jobseekers, and / or construction workers to an area is a contributor to increased criminal activities in an area, such as increased safety and security risk for neighbouring properties and damage to property, increased risk of veld fire, stock theft, and crime etc. The impact is likely to be negative, local in extent, short-term, and of medium significance due to the number of jobs expected to accrue to the non-local workforce.			
Gaps in knowledge and recommendations for further study			
» Information on existing crime levels within the area. » Mechanisms for employment of local labour and minimisation of in-migration.			

[15] While the extent of the impact may be short-term (i.e. people are only likely to move into the area in search of employment prior to and possibly during the construction period), the implications thereof may be long-term, as people are likely to have settled in the area, and are unlikely to leave immediately following the completion of construction.

Impact			
Impacts on daily living and movement patterns.			
Desktop Sensitivity Analysis of the Site:			
No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Temporary increase in traffic disruptions and movement patterns during construction.	Negative – An increase in traffic due to construction vehicles and heavy vehicles could create short-term disruptions and safety hazards for current road users.	The impact will occur at a local level.	No no-go areas have been identified to date.
Description of expected significance of impact			
Increased traffic due to construction vehicles and heavy vehicles could cause disruptions to road users and increase safety hazards. The use of local roads and transport systems may cause road deterioration and congestion. The impact is likely to be negative, local in extent, short-term, and of medium significance given the proximity of the site to the N10 national road.			
Gaps in knowledge and recommendations for further study			
» Number of vehicle trips anticipated during construction.			

Impact			
Nuisance impacts (noise and dust).			
Desktop Sensitivity Analysis of the Site:			
No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Nuisance impacts in terms of temporary increase in noise and dust, and wear and tear on access roads to the site.	Negative – The impact will negatively impact sensitive receptors, and could cause disruptions for neighbouring properties.	The impact will occur at a local level.	No no-go areas have been identified to date.
Description of expected significance of impact			
Impacts associated with construction related activities include noise, dust and disruption or damage to adjacent properties. Site clearing activities increase the risk of dust and noise being generated, which can in turn negatively impact on adjacent properties. The impact is likely to be negative, local in extent, short-term, and of low significance.			
Gaps in knowledge and recommendations for further study			
» Impact of noise and dust on surrounding landowners.			

Impact Visual and sense of place impacts.			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Intrusion impacts from construction activities will have an impact on the area's "sense of place".	Negative – The project could alter the area's sense of place which could negatively impact on sensitive receptors.	The impact will occur at a local level.	No no-go areas have been identified to date.
Description of expected significance of impact Intrusion impacts such as aesthetic pollution (i.e. building materials, construction vehicles, etc.), noise and light pollution, and other impacts could impact the "sense of place" for the local community. The impact is likely to be negative, local in extent, short-term, and of low significance.			
Gaps in knowledge and recommendations for further study » Potential sensitive visual receptors need to be identified. » Visual Impact Assessment to inform the impact on the sense of place.			

7.2. Evaluation of Potential Impacts Associated with the Operation Phase

7.2.1. Potential Impacts on Ecology (Flora and Fauna)

Impact Faunal Impacts due to Operation. The operation and presence of the facility may lead to disturbance or persecution of fauna within or adjacent to the facility.			
Desktop Sensitivity Analysis of the Site Refer to **Figure 7.1** for the desktop sensitivity analysis of the site.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Operational phase disturbance of fauna	Fauna will be disturbed or killed by operational phase disturbances such as electrocution along the perimeter fence or run over by maintenance vehicles	Local	The development should be restricted to the lower sensitivity parts of the site.
Description of expected significance of impact: Faunal impacts during operation are likely to be of low intensity and of low significance with the implementation of appropriate mitigation.			

Gaps in knowledge & recommendations for further study

» The fauna associated with the different habitats at the site will need to be verified and characterised in the field.
» Recommendations regarding the most appropriate avoidance and mitigation measures to the implemented at the site will need to be informed by the fauna present at the site and their distribution and potential movement pathways.

Impact

Negative impact on ESAs, CBAs and broad-scale ecological processes.

Development of the PV plant may impact ESAs and broad-scale ecological processes such as the ability of fauna to disperse.

Desktop Sensitivity Analysis of the Site

Refer to **Figure 7.1** for the desktop sensitivity analysis of the site.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Presence of the PV Plant may impact broad-scale ecological processes	The presence of the facility may disrupt landscape connectivity for fauna and cause habitat fragmentation	Local	The development should be restricted to the lower sensitivity parts of the site.

Description of expected significance of impact:

The impact of the development on CBAs and broad-scale processes is likely to be relatively low and of low overall significance.

Gaps in knowledge & recommendations for further study

» The most important areas for faunal movement at the site will need to be investigated and identified in the field at the site and used to inform the final layout of the facility to ensure that important movement corridors are not disrupted by the development.

7.2.2. Avifauna

Impact

Disturbance and collisions with PV panels, security fences and other site infrastructure.

Desktop Sensitivity Analysis of the Site

Refer to **Figure 7.2** for the desktop sensitivity analysis of the site.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Disturbance due to general operational activities and mortality of avifauna from collisions with plant infrastructure.	Mortality among the local avifauna may result due to direct collisions with solar panels or entrapment along the fenced	Local	The Gravel Plains habitat in the east of the site should be avoided, due to the

	boundaries of the facility. The operation of the facility will also generate noise and disturbance which may deter some avifauna from the area, especially red-listed avifaunal species which are less tolerant of disturbances.		presence and significance of this area for avifauna species of concern.
Description of expected significance of impact: Specific areas that will require mitigation include design of night-lighting and ensuring that the fence around the facility is constructed according to a bird-friendly design as well as management of bird interactions will the infrastructure of the facility. With mitigation, the operational phase impact on avifauna can be reduced to a low significance.			
Gaps in knowledge & recommendations for further study » The presence and distribution of species with are considered potentially more vulnerable to impact at PV facilities, such as Northern Black Korhaan and Red-crested Korhaan should be better quantified with a follow-up summer season survey			

Impact			
Operational phase power line electrocution and collision risk of large terrestrial birds and raptors.			
Desktop Sensitivity Analysis of the Site Refer to **Figure 7.2** for the desktop sensitivity analysis of the site.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Many larger bird species are vulnerable to collision with or electrocution from power line infrastructure.	Many red-listed know to occur in the area such as White-backed Vulture, Martial eagle, Secretarybird and Tawny Eagle, are susceptible to collisions with power lines owing to reduced ability to see the power lines and reduced manoeuvrability in flight to avoid collisions. All large terrestrial birds, including the red-listed species, are killed in substantial numbers by existing and newly erected power lines in the country. An additional threat faced by the large raptors is electrocution when perched or	Local.	Impact near to important habitats such as stands of large trees that may be breeding sites for large raptors should be minimised.

	attempting to perch on power line structures.		
Description of expected significance of impact: With mitigation such as fitting bird flappers to the line along identified stretches of the line, it is likely that the impact of the power line on avifauna during operation can be reduced to a low significance.			
Gaps in knowledge & recommendations for further study » The power line should be monitored for collisions post-construction to evaluate the impact of the power line on species of conservation concern and also to identify if there are any additional areas where further mitigation actions may be required.			

7.2.3. Potential Impacts on Soil, Land Use, and Agricultural Potential

Impact Loss of arable agricultural land. The major impact on the soil resources of the study area would be the loss of arable land due to the construction of the various types of infrastructure. This impact would in all probability be of very limited significance and would be local in extent. At the end of the project life, it is anticipated that removal of the structures would enable the land to be returned to more or less a natural state following rehabilitation, with little impact, especially given the low prevailing agricultural potential.			
Desktop Sensitivity Analysis of the Site Refer to **Figure 7.3** for the desktop sensitivity analysis of the site.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Loss of agricultural land.	Land that is no longer able to be utilised due to construction of infrastructure.	Site – Confined to areas within the site where infrastructure will be located.	No no-go areas have been identified for the project, however the dune fields in the west (which comprise shifting sands with bare surface areas, where wind erosion could be especially severe), and the stream channel network in the east, (where any disturbance due to construction of infrastructure could lead to disruption of surface flow and possible water erosion) have been identified as sensitive areas.
Description of expected significance of impact: Duration of impact: Long-term, the impact will cease if the operation of the activity ceases.			

Probability of impact: Highly probable.
Severity of impact: Low
Significance of impact: Low, mainly due to the low potential of the area, as well as nature of the infrastructure proposed.

Gaps in knowledge & recommendations for further study

» None identified.

Impact

Wind erosion.

Given the prevailing dry climate and sandy soils, a real hazard would be increased wind erosion due to the operation of the solar panels and associated infrastructure. The area is mapped as "highly susceptible" (ARC-ISCW, 2004).

Desktop Sensitivity Analysis of the Site

Refer to **Figure 7.3** for the desktop sensitivity analysis of the site.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Increased wind erosion.	Topsoil lost due to the action of the prevailing wind.	Local (i.e. areas surrounding the site) – Wind action can cause soil particles to be transported for considerable distances.	No no-go areas have been identified for the project, however the dune fields in the west (which comprise shifting sands with bare surface areas, where wind erosion could be especially severe), and the stream channel network in the east, (where any disturbance due to construction of infrastructure could lead to disruption of surface flow and possible water erosion) have been identified as sensitive areas.

Description of expected significance of impact:

Duration of impact: Long-term, as long as the soil surface is not stabilised erosion will continue.
Probability of impact: Highly probable.
Severity of impact: Low
Significance of impact: High, mainly due to dry climate and sandy soils.

Gaps in knowledge & recommendations for further study

» None identified.

7.2.4. Potential Impacts on Heritage (Archaeology and Palaeontology)

Impact

- Impact to archaeological and built environment resources
- Impact to palaeontological resources
- Impact to Cultural Landscape
- Cumulative Impact

Desktop Sensitivity Analysis of the Site

None identified.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Impact to significant archaeological resources such as Stone Age artefact scatters, burial grounds and graves, historical artefacts, historical structures and rock art engravings through disturbance during the operation phase.	Destruction of significant archaeological and other heritage resources.	Local scale with broader impacts to scientific knowledge.	To be identified through the field assessment.

Description of expected significance of impact:

- Based on the available information, it is likely that the proposed development will impact on significant archaeological resources such as Stone Age artefact scatters, burial grounds and graves, historical artefacts, historical structures and rock art engravings through disturbance during the operation phase. Impacts are likely to be negative, local to regional, and of medium significance.
- Impacts to palaeontological resources are unlikely.

Gaps in knowledge & recommendations for further study

- The heritage resources in the area proposed for development are not sufficiently recorded.
- Based on the available information, including the scale and nature of the proposed development, it is likely that significant heritage resources will be impacted by the proposed development and as such it is recommended that an archaeological field assessment be conducted to inform a full Heritage Impact Assessment. This field assessment will identify all heritage resources of significance within the development footprint, map them and grade them in terms of their significance. This will inform the Heritage Impact Assessment which will clarify the impacts anticipated and provide mitigation measures, recommendations and possible no-go zones, as well as an assessment of the proposed alternatives.

7.2.5. Potential Visual Impacts

Impact

Visual impact of the solar energy facility on observers in close proximity to the proposed structures. Potential sensitive visual receptors include:

- Observers travelling along the N10 national and R360 regional roads,
- Visitors to the Kalahari Monate Lodge, and
- Residents of homesteads and farm dwellings (if present in close proximity to the facility).

Anticipated issues related to the potential visual impact of the proposed PV solar energy facility include the following:

- The visibility of the facility to, and potential visual impact on, observers travelling along the N10 national and R360 regional roads traversing adjacent to the proposed facility.
- The visibility of the facility to, and potential visual impact on sensitive receptors (such as guests residing at the Kalahari Monate Lodge, and potentially residents of farm residences located within close proximity of the site).
- The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in close proximity of the facility.
- The visual absorption capacity of natural or planted vegetation (if applicable).
- The potential to mitigate visual impacts.

Desktop Sensitivity Analysis of the Site

The result of the preliminary viewshed analysis for the proposed facility is shown in Error! Reference source not found.. The initial viewshed analysis was undertaken from 976 vantage points within the proposed development area at an offset of 4m above ground level. This was done in order to determine the general visual exposure (visibility) of the area under investigation, simulating the maximum height of the proposed structures (PV panels) associated with the facility. The viewshed analysis will be further refined during the EIA Phase once a preliminary and / or final layout is completed and will be regenerated for the actual position of the infrastructure on the site and actual proposed technology. Error! Reference source not found. also indicates proximity radii from the proposed site boundaries of the proposed facility in order to show the viewing distance (scale of observation) of the facility in relation to its surrounds. The viewshed analysis does not include the effect of vegetation cover or existing structures on the exposure of the proposed facility, therefore signifying a worst-case scenario.

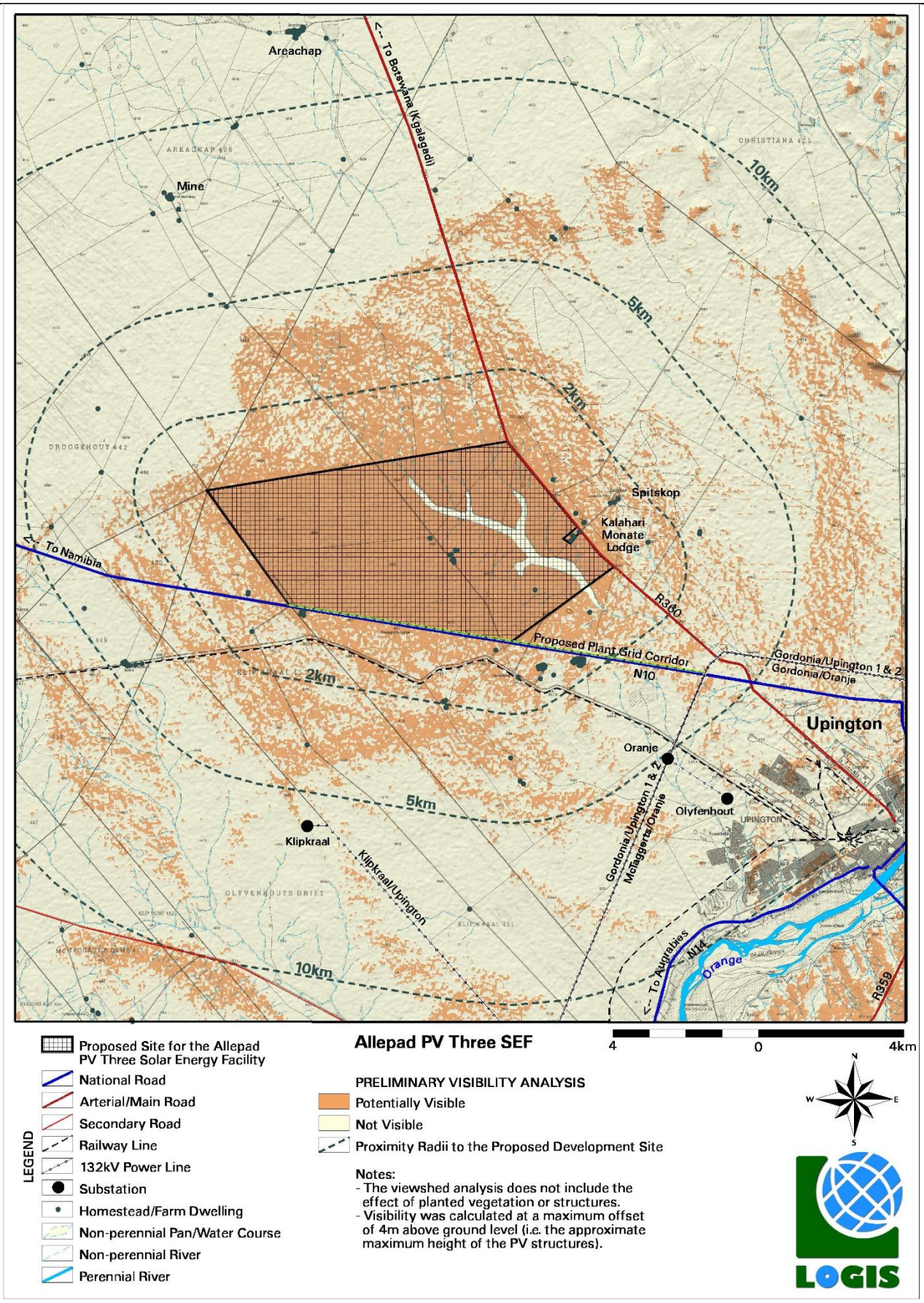


Figure 7.4: Map indicating the potential (preliminary) visual exposure of the proposed facility.

Allepad PV Three is expected to have a fairly contained core area of visual exposure, generally restricted to a 2km radius of the site. Receptors located within this zone include observers at Kalahari Monate Lodge, visitors to the lookout point on Spitskop Farm[16], and observers travelling along the N10 national and R360 regional roads. Visibility beyond 2km is more scattered and interrupted due to the undulating nature of the topography and the generally constrained height of the PV panel structures. The exposure of the facility is largely restricted to vacant land and natural open space. The intensity of visual exposure is expected to subside beyond a 5km radius with the predominant visibility expected to the east. This zone includes limited potentially sensitive visual receptors and comprises mainly vacant land and natural open space. The facility may theoretically be visible from the north-western outskirts of Upington, but this exposure will be at distances exceeding 7.5km. Visibility beyond 10km from the proposed development is expected to be negligible and highly unlikely due to the distance between the object (development) and the observer.

It is envisaged that the structures, where visible from shorter distances (e.g. less than 2km), may constitute a high visual prominence, potentially resulting in a high visual impact.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
The viewing of the PV arrays and associated infrastructure.	The potential negative experience of viewing the structures within a relatively natural setting.	Predominantly observers situated within a 2km radius of the structures.	The dry water course / seasonal wetland on site should be avoided (this water feature may, for a part of rainy season, attract birds that may by be a visual attraction to visitors to the Kalahari Monate Lodge).

Description of expected significance of impact:
It is envisaged that the issues identified may constitute a significant visual impact at a local and / or regional scale.

Extent: Local
Duration: Long term
Magnitude: Moderate to High
Probability: Probable
Significance: Moderate to High
Status (positive, neutral or negative): Negative
Reversibility: Recoverable
Irreplaceable loss of resources: No

[16] Spitskop Farm is located east and adjacent to the proposed project site. Spitskop Farm is indicated on Google Earth as a private game farm, however it is not a designated protected area in the South African Protected Areas Database (SAPAD), and is not expected to be accessible to the public. Indications are that the farm is currently in the property market and not operating as a tourist lodge / destination, but rather as a private cattle and game ranch. The farm has a rocky outcrop that appears to be (or have been) a viewpoint from which to look out over the generally flat expanse surrounding it. The status and nature of operations of Spitskop Farm and its facilities need to be investigated during the EIA Phase of the project in order to determine its status as a potential sensitive visual receptor. It is expected that this viewpoint would be quite exposed to Allepad PV Three, and other larger solar energy facilities such as the operational Khi Solar One project, as well as structures at the Upington International Airport located within the region.

Can impacts be mitigated: Yes

Gaps in knowledge & recommendations for further study

- A detailed Visual Impact Assessment is required to be undertaken to confirm the presence of sensitive receptors and assess the significance of the potential visual impact.
- A layout of the facility and proposed solar technology are required for further analysis.
- Additional spatial analyses are required in order to create a visual impact index that will include the following criteria:
  - Visual exposure
  - Visual distance / observer proximity to the structures
  - Viewer incidence / viewer perception (sensitive visual receptors)
  - Visual absorption capacity of the environment surrounding the structures
- Additional activities:
  - Identify potential cumulative visual impacts
  - Undertake a site visit
  - Recommend mitigation measures and / or infrastructure placement alternatives

7.2.6. Potential Socio-Economic Impacts

Impact

Direct and indirect employment opportunities and skills development.

Desktop Sensitivity Analysis of the Site:

No sensitivity identified.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Creation of direct and indirect employment and skills development opportunities and skills development as a result of the operation of the project.	Positive – The creation of employment opportunities and skills development will assist to an extent in alleviating unemployment levels within the area.	The impact will occur at local, regional, and national levels.	No no-go areas have been identified to date.

Description of expected significance of impact

During operation a maximum of approximately 25 direct employment opportunities will be created. Of those direct employment opportunities likely to be generated by the project approximately 40% will comprise opportunities for low-skilled / unskilled workers, and 60% will comprise opportunities for skilled workers. Employment opportunities include safety and security staff, operation and monitoring, and maintenance crew. Maintenance activities will be carried out throughout the lifespan of the project, and include washing of solar panels, vegetation control, and general maintenance around the solar energy facility. The impact is likely to be positive, local-to-national in extent, long-term, and of medium significance.

Gaps in knowledge and recommendations for further study

- Information on exact direct and indirect employment opportunities and skills development programmes likely to be created during operation.

Impact			
Development of non-polluting, renewable energy infrastructure.			
Desktop Sensitivity Analysis of the Site:			
No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Development of non-polluting, renewable energy infrastructure.	Positive – Increasing the contribution of the RE sector to the local economy would contribute to the diversification of the local economy and provide greater economic stability.	The impact will occur at local, regional, and national levels.	No no-go areas have been identified to date.
Description of expected significance of impact			
The generation of renewable energy will contribute to South Africa's electricity mix, and may contribute to the diversification of the local economy. The growth in the RE sector as a whole could introduce new skills and development into the area. The impact is likely to be positive, local to national in extent, long-term, and of medium significance.			
Gaps in knowledge and recommendations for further study			
» Information on the proposed project's contribution towards diversifying the local economy.			

Impact			
Contribution to local economic development and social upliftment.			
Desktop Sensitivity Analysis of the Site:			
No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Benefits to the local area from Socio-Economic Development (SED) / Enterprise Development (ED) programmes and community trust from REIPPP Programme social responsibilities.	Positive – The creation of employment opportunities, skills development, and the proposed project's contributions to local economic development will assist to an extent in both alleviating unemployment levels within the area, and improving the quality of life.	The impact will occur at local, regional, and national levels.	No no-go areas have been identified to date.

Description of expected significance of impact Under the REIPPP Programme, renewable energy projects are required to contribute to local economic development in the area. Awarded projects are required to spend a certain amount of their generated revenue (as defined in the agreement with DoE) on Socio-Economic Development (SED) and Enterprise Development (ED) and share ownership in the project company with local communities. The impact is likely to be positive, local to national in extent, long-term, and of high significance.
Gaps in knowledge and recommendations for further study » Information on the project's proposed contributions.

Impact			
Visual and sense of place impacts.			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Sense of place impacts from a social perspective associated with the operation phase of the solar energy facility and associated infrastructure.	Negative – The project could alter the areas sense of place which could negatively impact on sensitive receptors.	The impact will occur at a local level.	No no-go areas have been identified to date.
Description of expected significance of impact The presence of the solar energy facility could impact the "sense of place" for the local community. The impact is likely to be negative, local in extent, long-term, and of low significance.			
Gaps in knowledge and recommendations for further study » Potential sensitive visual receptors need to be identified. » Visual Impact Assessment to inform impact on sense of place.			

Impact			
Impacts associated with the loss of agricultural land.			
Desktop Sensitivity Analysis of the Site: No sensitivity identified.			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
The development footprint on which the solar energy facility will be developed will be removed from agricultural production.	Negative – Impacts associated with loss of agricultural land due to occupation of land by the solar energy facility.	The impact will occur at a local level.	No no-go areas have been identified to date.

Description of expected significance of impact

The development of the proposed project on an agricultural property would result in an area of land required to support the development footprint being removed from potential agricultural production. In the event that the land on which the project is proposed is being productively utilised for agricultural purposes this could have negative implications in terms of food production and security, and could also threaten jobs of workers employed in agricultural activities. The Soils and Agricultural Potential impact assessment undertaken as part of the Scoping Phase determined that the major impact on the natural resources of the study area would be the loss of arable land due to the construction of the various types of infrastructure, however this impact would in all probability be of very limited significance and would be local in extent. The impact is likely to be negative, local in extent, medium-term, and of low significance.

Gaps in knowledge and recommendations for further study

» The current land use and agricultural potential of the area likely to be removed from agricultural production needs to be determined.

7.3. Evaluation of Potential Cumulative Impacts Associated with the project

Impacts of a cumulative nature place the direct and indirect impacts of the proposed project into a regional and national context, particularly in view of similar or resultant developments and activities in the region. Potential cumulative impacts associated with Allepad PV Three are described below, these will be assessed in detail as part of the subsequent EIA Phase to be conducted for the project.

Impact

Cumulative impacts, in relation to an activity, refer to the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area. For cumulative effects analysis to help the decision-maker and inform interested parties, it must be limited to effects that can be evaluated meaningfully (DEAT, 2004). Boundaries must be set so analysts are not attempted to measure effects on everything. Therefore, the cumulative impacts associated with Allepad PV Three have been viewed from two perspectives within this Scoping Report:

» Cumulative impacts associated with the scale of the projects (i.e. one 100MW PV facility proposed on the Remaining Extent of Erf 5315 Upington, and
» Cumulative impacts associated with other relevant planned, approved or existing solar developments within proximity of the project site.

Cumulative effects are commonly understood as the impacts which combine from different projects and which result in significant change, which is larger than the sum of all the impacts (DEAT, 2004). The complicating factor is that the projects that need to be considered are from past, present and reasonably foreseeable future development. Cumulative effects can be characterised according to the pathway they follow. One pathway could be the persistent additions from one process. Another pathway could be the compounding effect from one or more processes. Cumulative effects can therefore occur when impacts are:

» Additive (incremental),
» Interactive,

» Sequential, or
» Synergistic.

Canter and Sadler (1997) describe the following process for addressing cumulative effects in an EIA:

» Delineating potential sources of cumulative change (i.e. GIS to map the relevant renewable energy facilities in close proximity to one another),
» Identifying the pathways of possible change (direct impacts),
» Indirect, non-linear or synergistic processes, and
» Classification of resultant cumulative changes.

Allepad PV Three is proposed on the Remaining Extent of Erf 5315 Upington, located approximately 11km north-west of Upington, in the Northern Cape Province. The site is located directly adjacent, and north of REDZ 7 (Upington). REDZ 7 (Upington) has specifically been identified as an area where large scale solar PV energy facilities can be developed in terms of SIP 8 in a manner that limits significant negative impacts on the environment, while yielding the highest possible socio-economic benefits to the country. REDZ 7 stretches from south of the N10 national road and Upington in the north, to Kenhardt and Marydale in the south, and from Keimoes in the west, to Groblershoop in the east. As a result, there are a number of solar energy projects / developments located within the vicinity. **Table 7.2** provides details of other known approved solar energy projects / developments located within a 20km radius of the project site. This information was obtained from DEA's latest release of the South African Renewable Energy EIA Application Database (REEA_OR_2018_Q2, 05 July 2018)[17].

Table 7.2: Other solar energy projects / developments approved within proximity of Allepad PV Three.

Project Name	DEA Reference Number(s)	Location	Approximate distance from Allepad PV Three	Project Status
Upington Solar Park (1 x 1 000MW CSP and PV)	12/12/20/2146	Farm Klip Kraal No. 451	Immediately adjacent (south-west)	Approved
Sirius One Solar PV Project (1 x 75MW PV)	14/12/16/3/3/2/469	Remaining Extent of the Farm Tungsten Lodge No. 638	~14km south	Preferred Bidder project under construction
Sirius Two Solar PV Project (1 x 75MW PV)	14/12/16/3/3/2/470	Remaining Extent of the Farm Tungsten Lodge No. 638	~14km south	Approved
Rooipunt (1 x 150MW CSP)	14/12/16/3/3/1/427	Farm McTaggarts Camp No. 435	~8.5km south-west	Approved

[17] Source: The DEA's Environment Geographic Information Systems (EGIS) website (https://egis.environment.gov.za/).

Project Name	DEA Reference Number(s)	Location	Approximate distance from Allepad PV Three	Project Status
S-Kol PV Plant (1 x 100MW PV)	12/12/20/2230	Farm Geelkop No. 456	~18km south-south-west	Approved
Bloemsmond Solar 1 and 2 (1 x 75MW PV)	14/12/16/3/3/2/815	Portions 5 and 14 of the Farm Bloems Mond No. 455.	~17km south-south-west	Approved
Bloemsmond Solar 2 (1 x 75MW)	14/12/16/3/3/2/816	Portions 5 and 14 of the Farm Bloems Mond No. 455.	~17km south-south-west	Approved
Solis Power I Project (1 x 150MW CSP)	14/12/20/16/3/3/3/82	Portion 443 to 450 of the Farm Van Rooys Vlei	Immediately adjacent (west)	Approved
Solis Power II Project (1 x 125MW CSP)	14/12/16/3/3/2/621	Portion 443 to 450 of the Farm Van Rooys Vlei	Immediately adjacent (west)	Approved
Dyason's Klip 1 and 2 (2 x 75MW)	14/12/16/3/3/2/538/1 14/12/16/3/3/2/538/2	Portion 12 of the Farm Dyasonklip No. 454	~12.5km south-south-west	Preferred Bidder projects under construction
Kai Garib (1 x 125MW CSP)	14/12/16/3/3/2/656	Portion 03 of the Farm McTaggarts Camp No. 435	~11.5km south-south-west	Approved
Khi Solar One (1 x 50MW CSP)	12/12/20/1831	Portion 03 of the Farm McTaggarts Camp No. 435	~11.5km south-south-west	Operational
Upington Airport Solar PV (1 x 8.9MW PV)	12/12/20/2146	Erf 6013 Upington	~8.5km east	Operational

In addition to the solar energy developments listed in **Table 7.2**, three new 100MW PV solar energy facilities are proposed for development on the same project site, namely:

» Allepad PV Three, a 100MW PV solar energy facility and associated infrastructure, proposed for development on the Remaining Extent of Erf 5315 Upington,
» Allepad PV Three, a 100MW PV solar energy facility and associated infrastructure, proposed for development on the Remaining Extent of Erf 5315 Upington, and
» Allepad PV Three, a 100MW PV solar energy facility and associated infrastructure, proposed for development on the Remaining Extent of Erf 5315 Upington.

The impact of solar energy facilities on landscape connectivity is considered likely to be a key issue in certain parts of South Africa where there is a growing number of solar energy facility applications. Cumulative impacts are expected to be associated with the following:

» Loss of vegetation and species of conservation concern,

- Impacts on faunal habitats and sensitive faunal species,
- Impacts on soil resources, land use, and agricultural potential,
- Impacts on CBAs as defined by the Northern Cape provincial authorities and broad-scale Ecological processes,
- Loss of heritage resources (including archaeological and palaeontological resources),
- Visual impacts, and
- Impacts on the social environment (both positive and negative).

Allepad PV Three is proposed in an area which has historically been used for agricultural (livestock grazing) activities. The Upington area and its surrounds (within which Allepad PV Three is proposed) receive a significant amount of annual solar radiation which is considered appropriate for the development of solar energy facilities. It can thus be expected that the area will be developed for solar energy facilities, adding to the cumulative impact of the overall area.

Summary of the nature, significance, consequence, extent, duration and probability of the impacts

- The above-mentioned impacts are considered to be probable, although it is anticipated that the extent, duration, and magnitude of these impacts can be minimised to levels where this impact can be regarded as having low significance through the implementation of appropriate mitigation measures.
- The operational lifespan of the project and other solar energy facilities within the surrounding areas is expected to be long-term (i.e. a minimum of 20 years with the possibility of extension) and subsequently the impact is also expected to be long-term.
- The impact associated with the proposed development is expected to be local, affecting mainly the immediate environment and surrounding areas, as well as other renewable energy facilities within the vicinity.

Gaps in knowledge & recommendations for further study:

- Each specialist study will consider and assess the cumulative impacts of proposed, approved and authorised renewable projects in the area.
- Cumulative impacts will be fully assessed and considered in the EIA Phase.

CHAPTER 8. CONCLUSIONS

This Scoping Report is aimed at detailing the nature and extent of the proposed project, identifying and describing potential issues associated with developing the project on the proposed project site, identifying potential environmental fatal flaws and / or areas of sensitivity, and defining the extent of studies required to be undertaken as part of the detailed EIA Phase. This has been achieved through an evaluation of the proposed project, considering available information, input from I&APs, and input from the project team with experience on similar projects. This Scoping Report has been compiled in terms of the 2014 EIA Regulations (GNR 326) published in terms of Section 24(5) of NEMA.

A summary of the conclusions of the evaluation of the potential impacts identified to be associated with the project is provided in **Section 8.1**. Recommendations regarding investigations required to be undertaken within the detailed EIA Phase are provided within the Plan of Study for EIA, contained in **Chapter 9** of this Scoping Report.

8.1. Conclusions drawn from the Evaluation of the Proposed Project

Allepad PV Three is proposed on a portion of the Remaining Extent of Erf 5315 Upington (the project site), which is located approximately 11km north-west of Upington, in the Dawid Kruiper Local Municipality (LM), of the ZF Mgcawu District Municipality (DM), in the Northern Cape Province. The project will be designed to have a contracted capacity of up to 100MW, and will make use of either fixed-tilt, single-axis tracking, or dual-axis (double-axis) tracking photovoltaic (PV) solar technology for the generation of electricity.

The proposed project will comprise the following key infrastructure and components:

- Arrays of PV panels with a generation capacity of up to 100MW.
- Mounting structures to support the PV panels.
- Combiner boxes, on-site inverters (to convert the power from Direct Current (DC) to Alternating Current (AC)), and power transformers.
- A 132kV on-site substation up to 1ha in extent to facilitate the connection between the solar energy facility and the Eskom electricity grid.
- A new 132kV double-circuit power line (which will make use of a loop-in and loop-out configuration utilising a double-circuit monopole construction), up to 5km in length, between the on-site substation and Eskom grid connection point.
- Cabling between the project's components (to be laid underground where practical).
- Meteorological measurement station.
- An energy storage area up to 2ha in extent.
- Access road and internal access road network.
- On-site buildings and structures, including a control building and office, ablutions and guard house.
- Perimeter security fencing, access gates and lighting.
- Temporary construction equipment camp up to 1ha in extent, including temporary site offices, parking and chemical ablution facilities.
- Temporary laydown area up to 1ha in extent, for the storage of materials during the construction.

Table 8.1 and **Table 8.2** provide a summary of the extent and significance of potential impacts identified as being associated with the development of Allepad PV Three from a desktop level investigation by the specialists as part of the Scoping Phase. These evaluations are preliminary in nature, and will only be finalised once more in-depth investigations and site surveys have been conducted (i.e. during the EIA Phase).

Table 8.1: Potential Impacts associated with the Construction Phase

Construction / Decommissioning Phase Impacts	Extent[18]	Significance[19]
Impacts on vegetation and listed or protected plant species resulting from construction activities.	L	L / M
Direct faunal impacts due to construction activities.	L	M
Habitat loss and disturbance as a result of the construction of the PV facility.	L	L / M
Habitat loss and disturbance as a result of the construction of grid connection infrastructure.	L	L
Loss of agricultural land	L	L
Increased wind erosion	L / R	H
Impacts on significant heritage resources.	L / R	M
Creation of employment opportunities and skills development (Positive).	L / R / N	M
Economic multiplier effect (Positive).	L / R	M
In-migration of people (non-local workforce and jobseekers).	L	M
Safety and security impacts.	L	M
Impacts on daily living and movement patterns.	L	M
Nuisance impacts (noise and dust).	L	L
Visual and sense of place impacts.	L	M

Table 8.2: Potential Impacts Associated with the Operation Phase

Operation Phase Impacts	Extent	Significance
Faunal Impacts due to operation.	L	L
Negative impact on ESAs, CBAs and broad-scale ecological processes.	L	L
Disturbance and collisions with PV panels, security fences and other site infrastructure	L	L
Operational phase power line electrocution and collision risk of large terrestrial birds and raptors.	L	L
Loss of agricultural land	L	L
Increased wind erosion	L / R	H
Impacts on significant heritage resources.	L / R	M
Visual impact of the solar energy facility on observers in close proximity to the proposed structures.	L	M / H
Direct and indirect employment opportunities and skills development (Positive).	L / R / N	M
Development of non-polluting, renewable energy infrastructure (Positive).	L / R / N	M
Contribution to local economic development and social upliftment (Positive).	L / R / N	H

[18] **Extent**

L **Local** R **Regional** N **National** I **International**

[19] **Significance**

L **Low** M **Medium** H **High**

Operation Phase Impacts	Extent	Significance
Visual and sense of place impacts.	L	L
Impacts associated with the loss of agricultural land.	L	L

8.1.1. Impacts identified to date

The following section provides a summary of the findings of the desktop specialist studies undertaken for the project during the Scoping Phase.

8.1.1.1. Ecology Impacts (Flora and Fauna)

The vegetation of the site consists of Kalahari Karroid Shrubland in the eastern extent of the site and Gordonia Duneveld in the western extent of the site. The areas of Kalahari Karroid Shrubland in the eastern extent are associated with shallow calcrete soils and have numerous drainage lines as well as a few small pans present. This area is considered largely unsuitable for development. The western extent of the site comprises undulating sandy soils which are considered to be of low sensitivity and therefore suitable for development apart from the extensive area of mobile dunes which is considered to be medium high sensitivity and not suitable for development as the loose sands are very vulnerable to erosion. In addition, it is likely that significant soil disturbance would be required in this area for construction as the dunes would likely need to be at least partly levelled.

In terms of fauna, there are few species of conservation concern that are likely to be present or abundant at the site and the primary impact of the development on fauna would be habitat loss for the more common resident species. As such, no high long-term post-mitigation impacts on fauna are expected to occur as a result of the development.

Cumulative impacts in the area are a potential concern due to the proliferation of solar energy development in the wider Upington area. In terms of habitat loss, the Gordonia Duneveld vegetation type is still approximately 99% intact and is also a very extensive vegetation type, with the result that the loss of habitat associated with the development is not considered highly significant given that there are still very large contiguous intact areas available north of the site. The final cumulative impact of the development would depend on the final number of PV facilities developed at the site as well as their configuration, and the extent to which they impinge on the more sensitive habitats at the site.

Potential ecological impacts associated with the development provided in context of the features and characteristics of the site and the likelihood that each impact would occur given the characteristics of the site and the extent and nature of the development are provided below:

» Impacts on vegetation and protected plant species:
Several protected species occur at the site which may be impacted by the development, most notably Acacia haematoxylon. Vegetation clearing during construction will lead to the loss of currently intact habitat within the development footprint and is an inevitable consequence of the development. As this impact is certain to occur it will be assessed for the construction phase as this is when the impact will occur, although the consequences will persist for a long time after construction.

» Direct faunal impacts:
Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some impact on fauna is highly likely to occur during construction as well as operation and this impact will therefore be assessed for the construction phase and operational phase.

» Reduced ability to meet conservation obligations and targets:
The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the country's ability to meet its conservation targets. Although the receiving vegetation types in the study area are classified as Least Threatened and are still more than 99% intact, Kalahari Karroid Shrubland is a relatively restricted vegetation type for an arid area and is therefore vulnerable to cumulative impact. This impact is therefore assessed in light of the current development as well as any other developments in the surrounding area which would also contribute to cumulative impacts.

» Impact on broad-scale ecological processes:
Transformation of intact habitat on a cumulative basis 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. Due to the presence of a number of other renewable energy developments in the area, this is a potential cumulative impact of the development that is assessed.

At this stage of the Scoping process there are no impacts associated with the development that are considered to be of high significance and which cannot be mitigated to an acceptable level. Therefore, based on the results of this assessment, there are no reasons to indicate that the development should not move into the EIA phase for further assessment.

8.1.1.2. Avifauna Impacts

An approximate total of 145 bird species have been recorded within the study area and surrounds, of which 54 species were observed on site. Only five of these are listed as near-endemic and a further ten species as biome-restricted. There are no known Important Bird Areas (IBAs) within the vicinity of the project site, while there are also no known large terrestrial bird populations or wetlands of significant avifaunal importance.

Nine species recorded in the broader area are red-listed, of which six species are listed as threatened, and three considered Near-Threatened. Two Near-Threatened species were recorded during the site visit, namely Karoo Korhaan (several pairs) and Kori Bustard (one pair). The six threatened species that may occur in the study area, albeit in low numbers or infrequently, include White-backed Vulture (Critically Endangered), Ludwig's Bustard (Endangered), Martial Eagle (Endangered), Tawny Eagle (Endangered), Secretarybird (Vulnerable), and Lanner Falcon (Vulnerable). No sensitive breeding or roosting sites of any red-listed species were observed on site during the field survey. From an avifaunal perspective, the gravel plains are considered to be of High Sensitivity and should be avoided.

Assuming this area of high sensitivity is avoided, the expected impacts of the proposed solar development include:

» Habitat loss and fragmentation associated with sandy plains habitat of the Gordonia Duneveld vegetation type.
» Disturbance caused during the construction and maintenance phases
» Direct mortality of avifauna colliding with solar panels and associated power line structures, as well as electrocutions with power line infrastructure.

The species that will be the most negatively impacted by the proposed development include primarily small passerines, ground-dwelling non-passerines and large raptors and terrestrial birds that occasionally use the area for foraging. The impacts on the avifauna would normally be expected to be of medium importance, but due to the low frequency of occurrence of priority species, the impacts are likely to be low and no high post-mitigation impacts are expected.

The primary mitigation measures required to reduce the potential impacts on priority species include:

» Restrict habitat destruction and disturbance to within the footprint of the proposed development.
» Exclusion of the Kalahari Karroid Shrubland from any development as this area supports resident Karoo Korhaans.
» Exclusion of the linear dunes fields within the north-west portion of the study area.
» Fitment of bird diverters where necessary on all erected power lines associated with the development to reduce the possibility of collisions and electrocutions.
» Ensure that perimeter fencing along the boundaries of the development are bird (especially ground-dwelling species) and wildlife friendly.

Cumulative impacts associated with the development area may be of concern due to increasing numbers of solar facility developments proposed for the broader Upington area. Considering that the vegetation and avifauna that occur on the property are typical of the Kalahari bioregion, the overall cumulative avifaunal impact of the development is considered likely to be low, provided that the remaining areas of the property remain undeveloped and that suitable ecological corridors are identified and maintained. This is to ensure that ecological connectivity between areas of higher conservation value is maintained.

Considering that the project site supports a typical bioregional avifaunal assemblage, and that there are no known breeding or roosting sites of red-listed priority species, at this stage of the Scoping process there are no impacts associated with the development that are considered to be of high significance and which cannot be mitigated to an acceptable level. Therefore, based on the results of this assessment, there are no reasons to indicate that the development should not move into the EIA phase for further assessment.

8.1.1.3. Impacts on Soils, Land Use, and Agricultural Potential

Much of the western half of the project site comprises deep, red, sandy soils, with extensive areas of dunes. The eastern half is characterised by a mixture of deep, red, sands and shallow lithosols, often on calcrete. The very low rainfall in the area indicates that the only means of cultivation would be by irrigation. Remote sensing imagery of the area shows no signs of any agricultural infrastructure and none of irrigation, which is confined to a strip along the Orange River.

The climatic restrictions indicate that this region of the Northern Cape is suited at best for grazing, and the grazing capacity is very low, around 40 – 50 ha/large stock unit (ARC-ISCW, 2004). The dominant class of agricultural potential is low.

The major impact on the soil resources of the study area would be the loss of arable land due to the construction of the various types of infrastructure. However, this impact would in all probability be of very limited significance and would be local in extent. At the end of the project life, it is anticipated that removal of the structures would enable the land to be returned to more or less a natural state following rehabilitation, with little impact, especially given the low prevailing agricultural potential. The main mitigation would be to ensure that as little pollution or other non-physical disturbance occurs.

Given the prevailing dry climate and sandy soils, a real hazard would be increased wind erosion due to the construction of the solar panels and associated infrastructure. The area is mapped as "highly susceptible" (ARC-ISCW, 2004). The main mitigation would be to ensure that as little surface disturbance as possible occurs, and that soil conservation measures are put in place.

Specific measures would need to be put in place during both the construction and operational phases, which would include: absolute minimum removal of vegetation, geotextiles and other soil surface stabilizers, possible construction of windbreaks.

Regarding the grid connection corridor for the proposed power line, the impacts can be regarded as similar to the PV site as a whole. While the power line infrastructure will have a more limited footprint (e.g. transmission towers), it can be anticipated that an access road will need to be constructed along the corridor, where removal of surface vegetation can be expected to occur. The same mitigation measures outlined for the PV facility would be applicable.

Sensitive areas identified from a soils, land use, and agricultural potential perspective include:

» The dune fields in the west which comprise shifting sands with bare surface areas, where wind erosion could be especially severe.
» The stream channel network in the east, where any disturbance due to construction of infrastructure could lead to disruption of surface flow and possible water erosion. Although periods of heavy rainfall are rare in this dry environment, rainfall can occur sporadically and may very occasionally be heavy.

Due mainly to the prevailing unfavourable climatic conditions for arable agriculture, as well as the relatively homogeneous nature of the soils, it is not envisaged that any more detailed soil investigation will be required.

8.1.1.4. Impacts on Heritage Resources (Archaeological and Palaeontological)

According to Fourie's assessment of the impacts of similar infrastructure in the area (2014), due to the landscape's topography the solar park infrastructure will be prominent in the landscape and alter the rural appearance. Due to the remoteness of the area the impact on the experience of the cultural landscape is not foreseen to be significant.

Based on the available information, it is likely that the proposed development will impact on significant archaeological resources such as Stone Age artefact scatters, burial grounds and graves, historical artefacts, historical structures and rock art engravings through destruction during the development phase and disturbance during the operational phase. Based on the available information, including the scale and nature of the proposed development, it is likely that significant heritage resources will be impacted by the proposed development and as such it is recommended that an archaeological field assessment be conducted to inform a full Heritage Impact Assessment.

According to the SAHRIS Palaeosensitivity Map, the area is underlain by the Gordonia Formation (Quarternary cover sands of moderate palaeontological sensitivity), the Bethesda Formation, the Jannelsepan Formation, the Keimoes Formation and the Straussburg Granite, all of which have zero palaeontological sensitivity. The primary risk associated with impacts to palaeontological heritage is related to impacting fossils preserved within the Quarternary cover sands of the Gordonia Formation (wind-blown alluvial sands). According to Almond's assessment for similar infrastructure development in this area (2011 SAHRIS NID 174335), "overall impact significance of the proposed solar park development is likely to be low because: Most of the study area is underlain by unfossiliferous igneous and metamorphic basement rocks (granites, gneisses etc.) or mantled by superficial sediments (wind-blown sands, alluvium etc.) of low palaeontological sensitivity, and extensive, deep excavations are unlikely to be involved in this sort of solar park project. Significant negative impacts on local fossil heritage are therefore unlikely to result from the proposed solar park development and in the specialist's opinion no further specialist palaeontological studies for this project are necessary."

Of the 29 Heritage Assessments conducted within 20km of the proposed development area, 8 are for Solar Energy / PV Facilities and 3 are for electrical infrastructure. The remaining assessments relate to mining infrastructure and residential township developments. At this stage, there is the potential for the cumulative impact of proposed solar energy facilities to negatively impact the cultural landscape due to a change in the landscape character from natural wilderness to semi-industrial, however, due to the remoteness of the area the impact on the experience of the cultural landscape is not foreseen to be significant.

8.1.1.5. Visual Impacts

Allepad PV Three is expected to have a fairly contained core area of visual exposure, generally restricted to a 2km radius of the project site. Receptors located within this zone include observers at Kalahari Monate Lodge, visitors to the lookout point on Spitskop Farm[20], and observers travelling along the N10 national and R360 regional roads. Visibility beyond 2km is more scattered and interrupted due to the undulating nature of the topography and the generally constrained height of the PV panel structures. The exposure of the facility is largely restricted to vacant land and natural open space.

The intensity of visual exposure is expected to subside beyond a 5km radius with the predominant visibility expected to the east. This zone includes limited potentially sensitive visual receptors and comprises mainly vacant land and natural open space. The facility may theoretically be visible from the north-western outskirts of Upington, but this exposure will be at distances exceeding 7.5km.

Visibility beyond 10km from the proposed development is expected to be negligible and highly unlikely due to the distance between the object (development) and the observer.

[20] Spitskop Farm is located east and adjacent to the proposed project site. Spitskop Farm is indicated on Google Earth as a private game farm, however it is not a designated protected area in the South African Protected Areas Database (SAPAD), and is not expected to be accessible to the public. Indications are that the farm is currently in the property market and not operating as a tourist lodge / destination, but rather as a private cattle and game ranch. The farm has a rocky outcrop that appears to be (or have been) a viewpoint from which to look out over the generally flat expanse surrounding it. The status and nature of operations of Spitskop Farm and its facilities need to be investigated during the EIA Phase of the project in order to determine its status as a potential sensitive visual receptor. It is expected that this viewpoint would be quite exposed to Allepad PV Three, and other larger solar energy facilities such as the operational Khi Solar One project, as well as structures at the Upington International Airport located within the region.

It is envisaged that the structures, where visible from shorter distances (e.g. less than 2km), may constitute a high visual prominence, potentially resulting in a high visual impact.

Anticipated issues related to the potential visual impact of the proposed PV Solar Energy Facility include the following:

- The visibility of the facility to, and potential visual impact on, observers travelling along the N10 national and R360 arterial roads traversing adjacent to the proposed facility.
- The visibility of the facility to, and potential visual impact on sensitive receptors (such as guests residing at the Kalahari Monate Lodge, and potentially residents of farm residences located within close proximity of the site).
- Potential cumulative visual impacts (or alternately, consolidation of visual impacts) with specific reference to the potential construction of up to four PV SEFs on the site and other existing or authorised SEFs within close proximity to the development site and within the Upington REDZ.
- The potential visual impact of the construction of ancillary infrastructure (i.e. the substation at the facility, associated power line and access roads) on observers in close proximity of the facility.
- The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in close proximity of the facility.
- The visual absorption capacity of natural or planted vegetation (if applicable).
- Potential visual impacts associated with the construction phase.
- The potential to mitigate visual impacts.

It is envisaged that the issues listed above may constitute a significant visual impact at a local and / or regional scale. A detailed Visual Impact Assessment is required to be undertaken to confirm the presence of sensitive receptors and assess the significance of the potential visual impact.

8.1.1.6. Social Impacts

A number of potential positive and negative social impacts have been identified for the project, which require further investigation as part of the EIA Phase. These include:

- Potential positive social impacts:
  - Creation of direct and indirect employment and skills development opportunities (during both construction and operation).
  - Economic multiplier effects.
  - Development of clean, renewable energy infrastructure.
  - Contribution to Local Economic Development and Social Upliftment.

- Potential negative social impacts:
  - In-migration of people (non-local workforce and jobseekers).
  - Safety and security impacts.
  - Impacts on daily living and movement patterns.
  - Nuisance impact (noise and dust).
  - Visual and sense of place impacts.
  - Impacts associated with the loss of agricultural land.

The potential social impacts identified for the project have been identified based on an assessment of available information and the current understanding of the proposed project, and are not exhaustive. The possibility therefore exists that additional impacts may be identified as part of the public review period, or during the collection of primary data as part of the EIA level SIA. All potential social impacts identified as part of the SIA process will be assessed in detail during the EIA Phase.

8.2. Sensitivity Analysis for the Study Site

An Environmental Sensitivity Map which illustrates potentially sensitive areas identified within the project site has been compiled for the project (refer to **Figure 8.1**). The Scoping Phase environmental sensitivity map provides an informed illustration of sensitive features within the larger site. The detail is based on the desktop review of baseline information available for the study area, specialist inputs and limited field surveys. The environmental sensitivity map is intended to inform the location and layout of the PV facility and associated infrastructure, and must be used as a tool by the developer to, as far as possible, avoid those areas flagged to be of potential high sensitivity. Specific sensitivities identified within the scoping study are summarised below.

8.2.1. Ecology

An ecological sensitivity map of the site was produced by integrating the available ecological and biodiversity information available in the literature and various spatial databases with mapping based on the satellite imagery of the site as well as personal knowledge of the site. This includes delineating different habitat units identified on the satellite imagery and assigning likely sensitivity values to the units based on their ecological properties, conservation value and the potential presence of species of conservation concern. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

The eastern half of the site occurs on shallow calcrete soils and has numerous drainage lines as well as a few small pans present. This area is considered largely unsuitable for development. The western half of the site comprises undulating sandy soils and is considered to be low sensitivity and suitable for development apart from the extensive area of mobile dunes which is considered to be moderate high sensitivity and not suitable for development as the loose sands are very vulnerable to erosion. In addition, it is likely that significant soil disturbance would be required in this area as the dunes would likely need to be at least partly levelled before construction. The power line corridor route was inspected at a desktop level, and there are no visible features of high significance along the proposed route and minor features such as the occasional stands of trees present can likely be avoided though adjustment of the final route within the 300m corridor to be assessed.

8.2.2. Avifauna

An avifaunal sensitivity map of the site was produced by integrating available ecological and biodiversity information available in the literature and various spatial databases with mapping based on the satellite imagery of the site as well as the avifauna specialist's personal knowledge of the site. This includes delineating different habitat units identified on the satellite imagery and assigning likely sensitivity values to the units based on their ecological properties, conservation value and the potential presence of avifaunal species of conservation concern.

The study area supports three main avifaunal microhabitats, which are referred to as the gravel plains, sandy plains, and dunes habitat. These three habitats have different sensitivities, due to the subtle differences in the avifaunal assemblages that they support, especially with respect to red-listed species. The gravel plains are considered to be of High Sensitivity, as it supports several pairs of the Near-Threatened Karoo Korhaan, which are presumably resident in the area. The dune habitat is well represented within the bioregion, but due to the deeper soils, supports a number of protected tree species, such as the *Acacia erioloba, A.haematoxylon* and *Boscia albitrunca, B.foetida subsp. foetida*. These tree species provide important nesting and roosting sites for birds, including large raptors. This habitat is therefore considered to be of Medium Sensitivity due to its importance to a wide variety of avifaunal species. The sandy plains habitat represents the most widely distributed habitat in the region, and occurs primarily on shallower soils that do not support an extensive tree layer, besides scattered *Parkinsonia africana*. This habitat is therefore regarded to be of Low-Medium Sensitivity.

It is likely that development of the solar energy facility on the lower sensitivity parts of the project site, such as the sandy plains habitat, would generate the least impacts on avifauna, provided suitable mitigation measures are employed during construction and operation of the proposed facility. While the development would result in some habitat loss for avifauna of local significance, it will not necessarily impact negatively on red-listed avifaunal species, which appear to occur sparsely within the broader study area and primarily in adjacent habitats.

8.2.3. Soils, Land Use, and Agricultural Potential

Sensitive areas identified on site from a soils, land use and agricultural potential perspective include:

» The dune fields in the west, as these comprise shifting sands with bare surface areas, where wind erosion could be especially severe.
» The stream channel network in the east, where any disturbance due to construction of infrastructure could lead to disruption of surface flow and possible water erosion. Although periods of heavy rainfall are rare in this dry environment, rainfall can occur sporadically and may very occasionally be heavy.

These areas have been classified as soil sensitive areas as opposed to no-go areas. Development within these areas has the potential to result in soil impacts primarily in the form of soil erosion, which could require the implementation of appropriate mitigation measures.

8.3. Cumulative Environmental Sensitivity Map

Identified environmental features have been mapped on the project site as follows:

Table 8.3: Overview of Environmental Features and their Sensitivity Ratings

Environmental Feature	Sensitivity Rating	Area (ha)
Drainage Features	High Sensitivity (*Ecology and Avifauna*)	401ha
Gravel Plains	Moderate High Sensitivity (*Avifauna and Soils*) Medium Sensitivity (*Ecology*)	1 119ha
Dune Habitat	Moderate High Sensitivity	486ha

Environmental Feature	Sensitivity Rating	Area (ha)
	(*Ecology, Avifauna and Soils*)	
Dune Extension	Medium Sensitivity (*Avifauna and Soils*)	412ha
Sandy Plains	Low Sensitivity (*Ecology, Avifauna and Soils*)	1 471ha
TOTAL		**3 889ha**

A description of the sensitivity ratings assigned to the environmental features and their implications for development are provided below:

- **High Sensitivity –** These areas are essentially "no-go" areas from a development perspective, and should be avoided. Care should also be taken to avoid development within too close a proximity of these areas to limit the potential impact of the "edge effect" from neighbouring areas.
- **Moderate High Sensitivity –** While these areas are not classified as "no-go areas", development within these areas is less desirable and should only proceed with caution. Significant mitigation may be required to ensure that impacts occurring as a result of development within these areas are mitigated to an acceptable level, and sufficient reasoning / motivation provided as to why development within these areas was considered preferable over development within areas with a lower sensitivity rating.
- **Medium Sensitivity –** Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are implemented.
- **Low Sensitivity –** There is likely to be negligible impact on ecological processes and terrestrial biodiversity within these areas. Therefore most types of development can proceed within these areas with little ecological impact.

8.4. Overall Conclusion and Fatal Flaw Analysis

The findings of the desktop Scoping Study indicate that no environmental fatal flaws associated with the proposed development of Allepad PV Three on the Remaining Extent of Erf 5315 Upington have been identified during the Scoping process to date. While some impacts of potential significance do exist it is anticipated that the implementation of appropriate mitigation measures would assist in reducing the significance of such impacts to acceptable levels.

The full extent of the project site (i.e. the Remaining Extent of Erf 5315 Upington) currently under investigation is approximately 3 889ha in extent, while the proposed development footprint is 250ha in extent, equivalent to approximately 6.4% of the total project site. It should however be noted that an additional three 100MW PV facilities and their associated infrastructure are also proposed for development by the applicant on the same property (i.e. the Remaining Extent of Erf 5315 Upington). While separate applications for EA have been prepared for each of the four 100MW Allepad PV projects, and the proposed projects are being managed separately and in parallel to one another, it is important to consider the impact that all four developments may have on the project site with regards to the area of developable land available for development while taking environmentally sensitive features which have been identified to date into consideration.

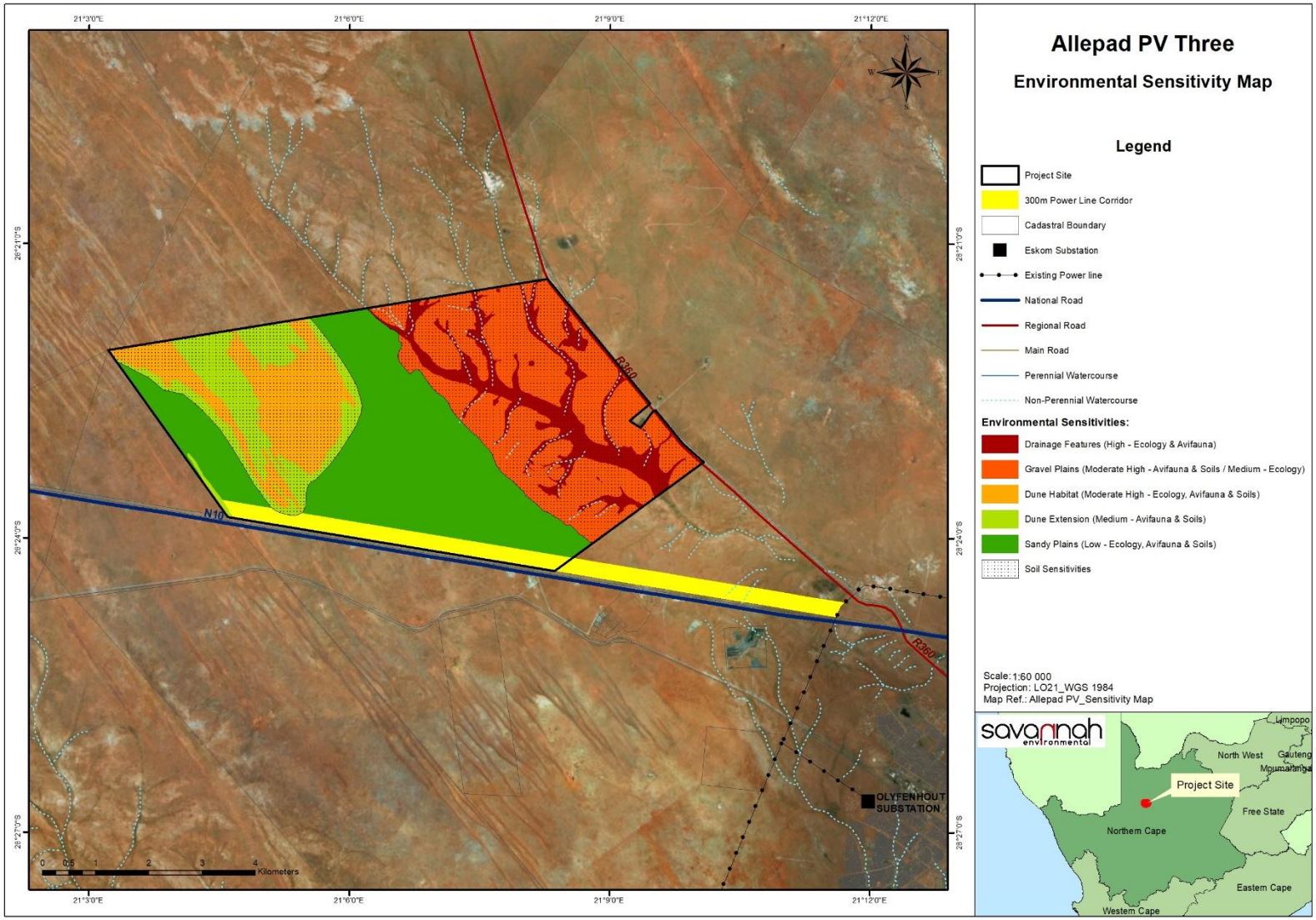


Figure 8.1: Environmental Sensitivity Map for Allepad PV Three.

While sufficient developable land is available for the development of a 100MW PV facility and its associated infrastructure with a development footprint of approximately 250ha, the impact of the project needs to be considered in light of the additional three 100MW PV facilities which are also being proposed on the same project site. In the event that all four 100MW PV facilities are developed, a development area of approximately 1 000ha would be required (i.e. 4 x 250ha). Based on the environmentally sensitive features identified to date (refer to **Section 8.2** and **Figure 8.1**) and the information provided in **Table 8.3** the applicant is confident that sufficient developable area is available to support the development of four 100MW PV facilities and their associated infrastructure.

It is recommended that the focus areas for the development of the proposed facility (and those of the remaining three 100MW PV facilities proposed on the same site) be considered outside of the areas identified to date as being of High Sensitivity, and as far as possible outside of the areas identified as being of Moderate High Sensitivity in order to reduce the risk that the developments would have a detrimental impact on the environment. This forms part of the "funnel-down approach" for the identification of suitable development areas within the project site. While sufficient space is available for development outside of the identified sensitive areas, the possibility of developing four 100MW PV facilities within the greater site is therefore ultimately dependent on the configurations of the respective layouts, and the ground truthing of environmental sensitivities identified to date. This will be confirmed in the EIA phase of the project.

With an understanding of which areas within the site are considered sensitive to the development of the proposed facility, the project applicant can prepare the detailed infrastructure layout for consideration within the EIA Phase. During the EIA Phase more detailed environmental studies will be conducted in line with the Plan of Study for EIA contained in **Chapter 9** of this Scoping Report. These studies will consider the detailed layouts produced by the developer and make recommendations for the implementation of avoidance strategies (if required), mitigation and management measures to ensure that the final assessed layout retains an acceptable environmental impact.

CHAPTER 9. PLAN OF STUDY FOR EIA

One of the key objectives of the Scoping Phase is to determine the level of assessment to be undertaken within the EIA Phase of the process, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks a particular activity will impose on a preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site.

This Chapter contains the Plan of Study for EIA for Allepad PV Three. The findings of the Scoping Phase include inputs from the project proponent and the EIA specialist team, and are used to inform the Plan of Study for EIA together with the requirements of the 2014 EIA Regulations (GNR 326) and applicable guidelines. The Plan of Study for EIA describes how the EIA Phase will proceed and includes details of the independent specialist studies required to be undertaken to assess the significance of those impacts identified within the Scoping Study to be of potential significance.

9.1. Objectives of the EIA Phase

The EIA will assess potential direct, indirect, and cumulative environmental impacts and benefits associated with each phase of development including design, construction, operation, and decommissioning, and will aim to provide the Competent Authority with sufficient information to make an informed decision regarding the proposed project. A site layout will be assessed by a range of independent specialist studies. Furthermore, as required in terms of the 2014 EIA Regulations (GNR 326) the assessment will also include an assessment of the "do nothing" (i.e. no-go) alternative.

9.2. Authority Consultation

Consultation with the regulating authorities (i.e. DEA and Northern Cape DENC) will be undertaken and will continue throughout the EIA process. On-going consultation will include the following:

- Submission of a Final Scoping Report following the 30-day public review period (and consideration of comments received).
- Submission of an EIA Report for review and comment.
- Submission of a Final EIA Report following a 30-day public review period (and consideration of comments received).
- Consultation and a site visit with DEA and Northern Cape DENC (if required) in order to discuss the findings and conclusions of the EIA Report.

9.3. Consideration of Alternatives

The following project alternatives will be investigated in the EIA Phase:

- **Design and Layout Alternatives:** Allepad PV Three will have a development footprint of up to 250ha, to be located within a broader site of 3 889ha. The solar facility and its associated infrastructure can therefore be appropriately located within the broader project site. Potential environmentally sensitive

areas have been identified as part of the Scoping Phase for further detailed consideration (through site-specific specialist studies) during the EIA Phase. The environmental sensitivity identification process undertaken to date will inform the layout design for the solar facility, avoiding sensitive areas as far as possible, thereby ensuring that the layout plan taken forward for consideration during the EIA Phase is the most optimal from an environmental perspective. An optimal location within the broader site will be identified based on constraints identified as part of the independent specialist studies undertaken during the Scoping Phase, and an area for development of the solar facility will be recommended within the preferred project site.

» **Technology Alternatives:** Few technology options are available for solar PV facilities, and the use of those that are considered are usually differentiated by weather and temperature conditions that prevail on site, so that optimality is obtained by the final site selection. Solar energy is considered to be the most suitable renewable energy technology for this site, based on the site location, ambient conditions and energy resource availability. Solar PV was determined as the most suitable option for the proposed site as large volumes of water are not required for power generation purposes compared to Concentrated Solar Power (CSP) technology. PV is also preferred when compared to CSP technology because of the substantially lower visual profile. Two solar energy technology alternatives are being considered for the proposed project and include:
  * Fixed mounted PV systems (static / fixed-tilt panels).
  * Single-axis tracking or dual-axis (double-axis) tracking systems (with solar panels that rotate around a defined axis to follow the sun's movement).

  The primary difference between technologies available, which affect the potential for environmental impacts, relate to the extent of the facility, or land-take (disturbance or loss of habitat), as well as the height of the facility (visual impacts). From an environmental perspective both technologies are considered to be environmentally acceptable for implementation. The technology preference will therefore be determined on the basis of technical and economic considerations. The PV panels are designed to operate continuously for more than 20 years, mostly unattended and with low maintenance. The impacts associated with the construction, operation, and decommissioning of the facility are anticipated to be the same irrespective of the PV technology selected for implementation, with the primary difference being that tracking systems would require more space.

» **The 'Do-Nothing' Alternative:** The "do-nothing" alternative is the option of not constructing Allepad PV Three. Should this alternative be selected, no environmental impacts will be incurred on site as a result of construction and operation activities associated with a solar PV facility. The "do-nothing" alternative will bring no socio-economic benefits at a local and regional scale, however, the extent of the loss in the area would be minimised by the number of projects under development in the Upington area. The "do-nothing" alternative will therefore likely result in minimising the cumulative impact on the land, although it is expected that pressure to develop the site for renewable energy purposes will be actively pursued due to the same factors which make the site a viable option for renewable energy development. Other developers will likely seek to develop the site for renewable energy purposes in order to realise South Africa's renewable energy targets, and the socio-economic and environmental benefits. This alternative will be assessed within the EIA phase of the process.

9.4. Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

A summary of those issues identified during Scoping, which require further investigation during the EIA Phase, as well as the proposed activities to be undertaken in order to assess and ground-truth the significance of these potential impacts, is provided in **Table 9.1**. Based on the conclusions of the scoping study, no further

detailed soil investigation will be required due mainly to the prevailing unfavourable climatic conditions for arable agriculture, as well as relatively homogeneous nature of the soils.

The specialists that will undertake independent specialist studies, field surveys, and provide specialist assessments as part of the EIA Phase are also reflected in **Table 9.1**. As part of the EIA Phase these specialist studies will consider the development footprint proposed for Allepad PV Three and all associated infrastructure, as well as feasible and reasonable alternatives identified for the project.

Table 9.1: Issues requiring further investigation during the EIA Phase and activities to be undertaken in order to assess the significance of these potential impacts relevant to Allepad PV Three.

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Ecology (Flora and Fauna)	***Sensitivity Analysis and EIA assessment*** A significant task remaining for the EIA phase is the field assessment to verify and characterise the habitats, vegetation and faunal communities of the site. The following activities and outputs are planned to inform the EIA phase of the development: » Characterise the vegetation and plant communities present across the site. Including the presence and distribution of plant SCC at the site. This information would be used to further inform the sensitivity map of the site and the site layout if required. » Map the distribution and estimate the density of protected trees at the site in order to better evaluate the impact of the development on protected tree species. » Characterise the faunal habitats at the site and identify areas of high faunal value such as drainage lines, pans and other habitats of significance. This information will be used to inform the sensitivity map of the site as well as the layout of the development. » Provide a more detailed assessment of cumulative impact associated with the development of the site. Including an assessment of the extent of habitat lost to solar energy development in the area to date and the likely future potential loss from the current as well as other proposed developments in the area. The potential for there to be disruption of broad-scale ecological processes in the area will be examined by evaluating the extent of habitat loss to date and the distribution of this impact in relation to the gradients, corridors and associated processes operating in the area. » Evaluate, based on the site attributes and final layout of the development, what the most applicable mitigation measures to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented. » Assess the impacts identified above in light of the site-specific findings and the final layout for assessment in the EIA Phase to be provided by the developer. » Address any comments received on the scoping study from I&APs and commenting authorities and ensure that that study complies with best practice and the requirements of the 2014 EIA regulations as amended. ***Assessment of Impacts for the EIA*** The methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts associated	Simon Todd of 3Foxes Biodiversity Solutions

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	with an activity. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refer to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. ***Environmental Management Programme*** For each overarching anticipated impact, management recommendations for the design, construction, and operation phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Avifauna	***Sensitivity Analysis and EIA assessment*** The following activities and outputs are planned to inform the EIA Phase of study: » Conduct a summer-season avifaunal survey within the development footprint to confirm the preliminary findings from the winter-season survey. Include the results of the summer-season survey into the EIA Phase report and assess the implications of these results for the impact assessment and the recommended mitigation and avoidance measures. » Provide a more detailed assessment of cumulative impacts associated with the development of the site. Including an assessment of the extent of habitat lost to solar energy development in the area to date and the likely future potential loss from the current as well as other proposed developments in the area. The potential for there to be disruption of broad-scale ecological processes in the area will be examined by evaluating the extent of habitat loss to date and the distribution of this impact in relation to the gradients, corridors and associated processes operating in the area. » Evaluate, based on the site attributes and final layout of the development, what the most applicable mitigation measures to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented. Particular attention will be paid to potential impacts on seemingly unimportant landscape features such as the dense stands of *Parkinsonia africana*, which may serve unknown benefits to avifauna. » Assess the impacts identified above in light of the site-specific findings and the final layout for assessment in the EIA Phase to be provided by the developer.	Simon Todd and Eric Herrmann of 3Foxes Biodiversity Solutions

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Address any comments received on the scoping study from I&APs and commenting authorities and ensure that the study complies with best practice and the requirements of the 2014 EIA Regulations (GNR 326) as amended. ***Assessment of Impacts for the EIA*** This methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refer to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. ***Environmental Management Programme*** For each overarching anticipated impact, management recommendations for the design, construction, and operation phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Visual impact	***Sensitivity Analysis and EIA assessment*** It is recommended that additional spatial analyses be undertaken in order to create a visual impact index that will further aid in determining potential areas of visual impact. This exercise should be undertaken for the core facility as well as for the ancillary infrastructure, as these structures (e.g. the substation and power line) are envisaged to have varying levels of visual impact at a more localised scale. The site-specific issues (as mentioned earlier in the report) and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact. This recommended work must be undertaken during the EIA Phase of reporting for this proposed project. In this respect, the Plan of Study for the EIA is as follows:	Lourens du Plessis of LOGIS

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	Determine potential visual exposure: The visibility or visual exposure of any structure or activity is the point of departure for the visual impact assessment. It stands to reason that if (or where) the proposed facility and associated infrastructure were not visible, no impact would occur. The viewshed analyses of the proposed facility and the related infrastructure are based on a 5m contour interval digital terrain model of the study area. The first step in determining the significance of the visual impact of the proposed facility is to identify the areas from which the structures would be visible. The type of structures, the dimensions, the extent of operations and their support infrastructure must be taken into account. *Determine visual distance / observer proximity to the facility:* In order to refine the visual exposure of the facility on surrounding areas/receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for this type of structure. Proximity radii for the proposed infrastructure are created in order to indicate the scale and viewing distance of the facility and to determine the prominence of the structures in relation to their environment. The visual distance theory and the observer's proximity to the facility are closely related, and especially relevant, when considered from areas with a high viewer incidence and a predominantly negative visual perception of the proposed facility. *Determine viewer incidence / viewer perception (sensitive visual receptors):* The next layer of information is the identification of areas of high viewer incidence (i.e. main roads, residential areas, settlements, etc.) that would be exposed to the project infrastructure. This is done in order to focus attention on areas were the perceived visual impact of the facility will be the highest and where the perception of affected observers will be negative. Related to this data set, is a land use character map, that further aids in identifying sensitive areas and possible critical features (i.e. tourist facilities, national parks, etc.), that should be addressed. *Determine the visual absorption capacity (VAC) of the landscape:* This is the capacity of the receiving environment to absorb the potential visual impact of the proposed facility. The VAC is primarily a function of the vegetation, and will be high if the vegetation is tall, dense and continuous. Conversely, low growing sparse and patchy vegetation will have a low VAC. The VAC would also be high where the environment can readily absorb the structure in terms of texture, colour, form and light / shade characteristics of the structure. On the other hand, the VAC for a structure contrasting markedly with one or	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	more of the characteristics of the environment would be low. The VAC also generally increases with distance, where discernible detail in visual characteristics of both environment and structure decreases. *Calculate the visual impact index:* The results of the above analyses are merged in order to determine the areas of likely visual impact and where the viewer perception would be negative. An area with short distance visual exposure to the proposed infrastructure, a high viewer incidence and a predominantly negative perception would therefore have a higher value (greater impact) on the index. This focusses the attention to the critical areas of potential impact and determines the potential magnitude of the visual impact. GIS software will be used to perform the analyses and to overlay relevant geographical data sets in order to generate a visual impact index. *Site visit:* Undertake a site visit in order to verify the results of the spatial analyses, verify the presence of sensitive receptors and to identify any additional site specific issues that may need to be addressed in the VIA report. *Determine impact significance:* The potential visual impacts are quantified in their respective geographical locations in order to determine the significance of the anticipated impact on identified receptors. Significance is determined as a function of extent, duration, magnitude (derived from the visual impact index) and probability. Potential cumulative and residual visual impacts are also addressed. The results of this section are displayed in impact tables and summarised in an impact statement. *Propose mitigation measures:* The preferred layout alternative (or a possible permutation of the alternatives) will be based on its potential to reduce the visual impact. Additional general mitigation measures will be proposed in terms of the planning, construction, operation and decommissioning phases of the project. *Reporting and map display:* All the data categories, used to calculate the visual impact index, and the results of the analyses will be displayed as maps in the accompanying report. The methodology of the analyses, the results of the visual impact assessment (VIA) and the conclusion of the assessment will be addressed in the VIA report.	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	Assessment of Impacts for the EIA This methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refer to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. ***Environmental Management Programme*** For each overarching anticipated impact, management recommendations for the design, construction, and operation phase (where appropriate) will be drafted for inclusion in the project EMPr.	
Heritage (Archaeology and Palaeontology)	***Sensitivity Analysis and EIA assessment*** Based on the available information, including the scale and nature of the proposed development, it is likely that significant heritage resources in the form of archaeology and palaeontology will be impacted by the proposed development. As such, it is recommended that an archaeological field assessment be conducted to inform a full Heritage Impact Assessment (HIA). This field assessment will identify all heritage resources of significance within the development footprint, map them and grade them in terms of their significance. This will inform the HIA which will clarify the impacts anticipated and provide mitigation measures, recommendations and possible no-go zones, as well as an assessment of the proposed alternatives. ***Assessment of Impacts for the EIA*** This methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refer to the causes of the effect, what will be affected and how it will be affected.	Jenna Lavin of Cedar Tower Services (CTS) Heritage

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	For each anticipated impact, recommendations will be made for desirable mitigation measures. ***Environmental Management Programme*** For each overarching anticipated impact, management recommendations for the design, construction, and operation phase (where appropriate) will be drafted for inclusion in the project EMPr, as well as a chance finds procedure.	
Social	***Sensitivity Analysis and EIA assessment*** It is recommended that a full EIA level Social Impact Assessment (SIA) be conducted as part of the EIA Phase. The following activities should be undertaken as part of this process: » Review comments pertaining to social impacts received from members of the public, key stakeholders, and any organ of state during the public review of the Scoping Report. Where applicable, comments received from the DEA on the Final Scoping Report, which may pertain to social impacts or have relevance to the SIA, will also be reviewed. » Collect primary data during a site visit. Interview directly affected and adjacent landowners, and key stakeholders to obtain primary information related to the project site, social environment, and to gain their inputs on the proposed project and its perceived social impact (positive and /or negative). » Update the baseline information with information received during the site visit, as well as any additional information received from the client, or updates to the project description. » Assess impacts identified for the project in terms of their nature, extent, duration, magnitude, probability, status, and significance, as well as the degree to which the impact can be reversed, may cause irreplaceable loss of resources, and can be mitigated. » Identify mitigation measures with which to reduce negative impacts, and enhance positive impacts for inclusion in the EMPr. As far as possible the mitigation hierarchy of "avoid, minimise, and reduce" will be followed in the mitigation of potential negative impacts. » Identify any conditions for inclusion in the EA. » Identify any monitoring requirements for inclusion in the EMPr or EA. » Provide a reasoned opinion regarding the acceptability of the project, and whether the proposed project should be authorised. » Prepare a SIA Report for inclusion in the EIA Report to be prepared for the project. » Subject the SIA Report prepared for the project for inclusion in the EIA Report to external peer review.	Sarah Watson of Savannah Environmental External review by Dr. Neville Bews of Dr. Neville Bews and Associates

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	Assessment of Impacts for the EIA This methodology described above assists in the evaluation of the overall effect of a proposed activity on the environment. It includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive). The nature of the impact will be defined and described, and refer to the causes of the effect, what will be affected and how it will be affected. For each anticipated impact, recommendations will be made for desirable mitigation measures. ***Environmental Management Programme*** For each overarching anticipated impact, management recommendations for the design, construction, and operation phase (where appropriate) will be drafted for inclusion in the project EMPr.	

9.5. Assessment of Potential Impacts Associated with the Project

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified, will be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
  - Local extending only as far as the development site area – assigned a score of 1.
  - Limited to the site and its immediate surroundings (up to 10km) – assigned a score of 2.
  - Will have an impact on the region – assigned a score of 3.
  - Will have an impact on a national scale – assigned a score of 4.
  - Will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
  - The lifetime of the impact will be of a very short duration (0 – 1 years) – assigned a score of 1.
  - The lifetime of the impact will be of a short duration (2 – 5 years) – assigned a score of 2.
  - Medium-term (5 – 15 years) – assigned a score of 3.
  - Long term (> 15 years) – assigned a score of 4.
  - Permanent – assigned a score of 5.
- The **magnitude**, quantified on a scale from 0 – 10, where a score is assigned:
  - 0 is small and will have no effect on the environment.
  - 2 is minor and will not result in an impact on processes.
  - 4 is low and will cause a slight impact on processes.
  - 6 is moderate and will result in processes continuing but in a modified way.
  - 8 is high (processes are altered to the extent that they temporarily cease).
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
  - Assigned a score of 1 – 5, where 1 is very improbable (probably will not happen).
  - Assigned a score of 2 is improbable (some possibility, but low likelihood).
  - Assigned a score of 3 is probable (distinct possibility).
  - Assigned a score of 4 is highly probable (most likely).
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
- The **status**, which will be described as either positive, negative or neutral.
- The degree to which the impact can be **reversed**.
- The degree to which the impact may cause **irreplaceable loss of resources**.
- The degree to which the impact can be **mitigated**.

The **significance** is determined by combining the criteria in the following formula:

S= (E+D+M) P, where

S = Significance weighting
E = Extent

D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area).
- 30 – 60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated).
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

The project applicant has the responsibility to avoid and / or minimise impacts as well as plan for their management (in terms of the 2014 EIA Regulations (GNR 326)), the mitigation of significant impacts will be discussed. Assessment of mitigated impacts will demonstrate the effectiveness of the proposed mitigation measures.

The results of the impact assessment studies and other available information will be integrated by the Savannah Environmental project team. The EIA Report will be compiled in terms of the requirements of the 2014 EIA Regulations (GNR 326) and will include:

- The details and expertise of the **EAP** who prepared the report.
- The **location** of the activity and a locality map illustrating the location of the proposed activity.
- A **description** of the scope of the proposed activity including all listed activities triggered and a description of associated structures and infrastructure.
- The **policy and legislative** context within which the development is located and an explanation of how the development complies and responds to the legislation and policy context.
- The **need and desirability** of the proposed development of the activity in the context of the preferred location.
- A motivation for the **preferred development footprint** within the approved site.
- A description of the **process** followed to reach the proposed development footprint within the approved site, including:
  - Details of the development footprint considered.
  - Details of the public participation process undertaken in terms of Regulation 41 of the 2014 EIA Regulations, including copies of supporting documents.
  - A summary of issues raised by interested and affected parties and the manner in which the issues were incorporated.
  - The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.
  - The impacts and risks identified including the nature, significance, consequence extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated.
  - The methodology used for determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks.
  - Positive and negative impacts that the activity and alternatives will have on the environment and the community.

- Possible mitigation measures to be applied and the level of residual risk.
- A motivation for not considering alternative development locations.
- A concluding statement indicating the preferred alternative development location.
- A full description of the process followed to identify, assess and rank impacts of the activity and associated infrastructure on the preferred location including all environmental issues and risks that have been identified and an assessment of the significance of each issue and risk and the extent to which the issue/risk can be avoided or mitigated.

» An **assessment** of the identified potentially significant impacts and risks.
» A summary of the **findings and recommendations** of any specialist report and an indication as to how these findings and recommendations have been included.
» An **environmental impact assessment** containing a summary of key findings, an environmental sensitivity map and a summary of the positive and negative impacts and risks of the proposed activity.
» **Recommendations** from specialist, the recording of proposed impact management **objectives** and the impact management **outcomes** for inclusion in the **EMPr** as well as inclusion as conditions of authorisation.
» The final **alternatives** which respond to the impact management measures, avoidance and mitigation measures identified.
» Any aspects which were **conditional** to the findings of the assessment.
» A description of the assumptions, uncertainties and gaps in knowledge relating to the assessment and mitigation measures proposed.
» An **opinion** as to whether the proposed activity should or should not be authorised and the conditions thereof.
» An undertaking or **affirmation** by the EAP in relation to the correctness of the information, the inclusion of comments and inputs from stakeholders and Interested and affected parties, the inclusion of inputs and recommendations from the specialists and any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties.

The EIA Report will be released to the public and relevant stakeholders, Organs of State and Authorities for a 30-day review period. Comments received from I&APs will be captured within a Comments and Response Report, which will be included within the Final EIA Report, for submission to DEA for decision-making.

9.6. Public Participation Process

A public participation process will be undertaken by Savannah Environmental during the EIA Phase. Consultation with key stakeholders and I&APs will be on-going throughout the EIA Phase. Through this consultation process, stakeholders and I&APs will be encouraged to verify that their issues were recorded in the Scoping Phase and to identify additional issues of concern or highlight positive aspects of the proposed project, and to comment on the findings of the EIA Phase. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their inputs, various opportunities will be provided for stakeholders and I&APs to be involved in the EIA Phase of the process, as follows:

» Focus group meetings and Public Meetings (pre-arranged and I&APs are invited to attend).
» One-on-one consultation meetings (for example with directly affected and surrounding landowners).
» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the public participation consultant, lead EIA consultant as well as specialist consultants).
» Written, faxed or e-mail correspondence.

The EIA Report will be made available for a 30-day review period prior to finalisation and submission to the DEA for decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, a public meeting will be held during this public review period, depending on the specific needs of the stakeholders in the area. All comments received during the public review period will be included within the final report to be submitted to the DEA for review and decision-making.

9.7. Key Milestones of the Programme for the EIA

The envisaged key milestones of the programme for the EIA Phase are outlined in the following table (and include indicative dates):

Key Milestone Activities	**Proposed timeframe[21]**
Make Scoping Report available to the public, stakeholders and authorities	12 October 2018 – 12 November 2018
Finalisation of Scoping Report, and submission of the Final Scoping Report to DEA	November / December 2018
Authority acceptance of the Final Scoping Report and Plan of Study to undertake the EIA	Within 44 days of receipt of the Final Scoping Report (i.e. December 2018 / January 2019)
Make EIA Report and EMPr available to the public, stakeholders and authorities	Within 60 days of receipt of acceptance of the Final Scoping Report (i.e. March 2019).
Finalisation of EIA Report, and submission of the Final EIA Report to DEA	Within 40 days of the release of the EIA Report to the public, stakeholders and authorities (i.e. April 2019).
Authority review period and decision-making (107 calendar days)	Within 107 days of receipt of the Final EIA Report (i.e. April 2019 – August 2019).

[21] Indicative dates

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